



WERKSTATTHANDBUCH
WORKSHOPMANUAL
MANUEL D'ATELIER
MANUAL DE TALLER
MANUALE PER L'OFFICINA

FAVORIT 900

916 chassis no. 23/3001 and up

920 chassis no. 23/3001 and up

924 chassis no. 23/3001 and up

926 chassis no. 23/3001 and up

Note:

If not noted otherwise, is the document valid for the North-America version also (chassis no. 9xx/24/xxxx)

Ausgabe 12/2001 Edition

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Assembly overview | A |
|---|---|----------|

| | |
|-------------|---------------------------------|
| 0000 | Tractor / General system |
|-------------|---------------------------------|

| | |
|-------------|----------------------------------|
| 1000 | Transmission |
| 1005 | Transmission control unit |
| 1010 | Differential |
| 1015 | Axle drive |
| 1030 | Handbrake |
| 1050 | Housing |
| 1070 | Brake system |
| 1080 | Vario transmission unit |
| 1090 | Emergency control |
| 1100 | Clutch actuation system |
| 1150 | Cardan brake |
| 1170 | ML range control |
| 1200 | Front PTO |
| 1220 | Live PTO |
| 1320 | Front-wheel drive |
| 1430 | Hydrodamp |
| 1432 | Hydraulic pump |
| 1470 | Transmission lubrication system |
| 1490 | Pump drive |
| 1530 | ML variable-displacement system |
| 1600 | Enhanced actuation system valves |
| 1620 | Enhanced actuation system pipes |

| | |
|-------------|-------------------|
| 2000 | Engine |
| 2010 | Cylinder head |
| 2020 | Speed adjustment |
| 2050 | Cooling system |
| 2060 | Fuel system |
| 2170 | Exhaust brake |
| 2180 | Cold-start system |
| 2190 | Intercooler |
| 2210 | Crankcase |
| 2250 | Engine preheater |
| 2312 | Lubrication |
| 2710 | Injection pump |
| 2712 | Injectors |
| 2714 | Governor |

| | | | | | | |
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| Farmer 400 Fav 700 Fav 900 | Tractor / General system Assembly overview | A |
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| | |
|-------------|-----------------------------|
| 3000 | Front axle |
| 3010 | Front axle support |
| 3020 | Axle housing |
| 3050 | Suspension |
| 3060 | Suspension valve fitting |
| 3070 | Suspension pipe |
| 3100 | Track rod |
| 3120 | Steering cylinder |
| 3170 | Frame |
| 3180 | Cardan shaft |
| 3190 | Diff. lock actuation system |

| | |
|-------------|-------------------------|
| 4000 | Steering |
| 4070 | Steering wheel |
| 4090 | Hydr. steering assembly |

| | |
|-------------|------------------------|
| 5000 | Vehicle body |
| 5010 | Body |
| 5030 | Driver's seat |
| 5050 | Hitch |
| 5161 | Hitch trailer coupling |
| 5200 | Cab mount, suspension |

| | |
|-------------|-------------------------|
| 5500 | Air conditioning |
| 5520 | Compressor drive |
| 5530 | Coolant lines |
| 5550 | Evaporator |
| 5560 | Condenser |
| 5570 | Electric cables |

| | |
|-------------|------------------|
| 8100 | Cab |
| 8113 | Heater |
| 8114 | Ventilation |
| 8117 | Windscreen wiper |
| 8121 | Cable loom |

| | |
|-------------|---------------------------------|
| 8600 | Power lift |
| 8610 | Electrohydraulic control EPC |
| 8618 | Electrohydraulic remote control |
| 8631 | Power lift |

| | |
|-------------|--------------------------|
| 8700 | Three-point hitch |
| 8730 | Lift arms |
| 8740 | Support |

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Assembly overview | A |
|---|---|----------|

| | |
|-------------|-----------------------------|
| 8800 | Air compressor |
| 8810 | Compressor |
| 8820 | Brake fittings |
| 8830 | Lines |
| 8850 | Electrical actuation system |
| 8890 | Air tank |

| | |
|-------------|----------------------------------|
| 8900 | Front loader |
| 8910 | Mounting frame |
| 8915 | Hydr. implement actuation system |
| 8955 | 3rd hydr. circuit |
| 8958 | Multi-coupling |
| 8970 | Pipes |
| 8990 | Lift cylinder |

| | |
|-------------|----------------------|
| 9000 | Electrics |
| 9010 | Generator |
| 9015 | Starter inhibitor |
| 9040 | Fuses |
| 9050 | Battery system |
| 9060 | Starter motor system |

| | |
|-------------|---------------------------------|
| 9200 | Front power lift |
| 9210 | Power lift |
| 9211 | Electrohydraulic remote control |
| 9220 | Cylinder |
| 9230 | Pipes |
| 9260 | Enhanced-control power lift |
| 9280 | Frame |

| | |
|-------------|----------------------------|
| 9400 | Hydr. pump assembly |
| 9410 | LS pump |
| 9420 | Transmission pump |
| 9430 | Steering pump |

| | |
|-------------|------------------------|
| 9500 | Hydraulic pipes |
| 9510 | Basic circuit |
| 9516 | Power lift |
| 9525 | with oil cooler |
| 9530 | Hydr. trailer brake |
| 9531 | Steering |
| 9534 | Reversing system |

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Assembly overview | A |
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| | |
|-------------|-----------------------------|
| 9600 | Hydr. equipment |
| 9605 | Hydr. connections |
| 9610 | Central control block (ZSB) |
| 9620 | Valve fitting |
| 9666 | External hydraulic supply |
| 9690 | Valve supplement |

| | |
|-------------|-------------------------------|
| 9700 | Electronics |
| 9710 | Instrument panel |
| 9715 | Vario terminal |
| 9717 | LBS - agricultural bus system |
| 9720 | Transducer |
| 9730 | Radar sensor |
| 9740 | E-box |
| 9750 | Transmission actuator unit |
| 9760 | Joystick |
| 9770 | Control unit |
| 9780 | Engine EDC |
| 9790 | ECU, power lift |

| | |
|-------------|----------------|
| 9900 | Service |
| 9920 | Special tools |
| 9970 | FENDIAS |

| | | | | | | |
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|---|--------------------------------|----------|
| Farmer 400 Fav 700 Fav 900 | Documentation structure | A |
|---|--------------------------------|----------|

The fundamental feature of this documentation is that the different tractor types are divided into main assemblies which correspond, with a few exceptions for technical reasons, to the FENDOS structure. These main assemblies are, for example, "0000 - Tractor/General system" ; "1000 - Transmission"; "2000 - Engine" etc.

The main assemblies are sub-divided into subassemblies, e.g. "1005 - Transmission control unit"; "1220 - Live PTO" etc.

Please see document 0000 A 000009 for an overview of the assemblies.

Each assembly is subdivided into various registers which are labelled with a register letter.

These are as follows.

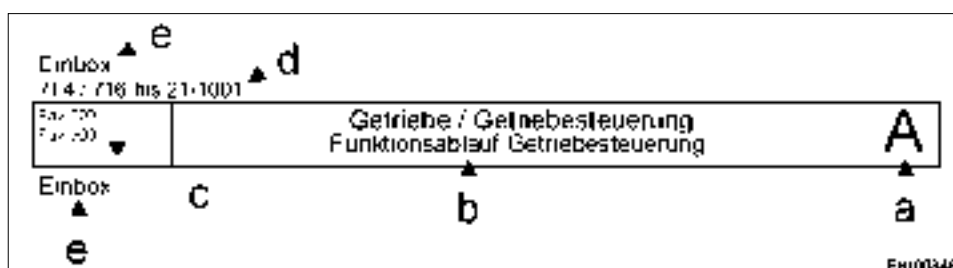
| | |
|----------------------------|-----------------------------|
| A - General | E - Testing |
| B - Faults | F - Setting and Calibration |
| C - Documents and Diagrams | G - Repair |
| D - Component Location | H - Service - Info |

This documentation comprises a large number of self-contained individual documents (=worksheets). These documents can be used for various applications and are available in different languages.

Each document is given a unique document code (8), which is made up of the chapter no. (1) (=assembly / subassembly), the register letter (2) and the docu-no. (3) and is printed at the right of the footer.

A document can, therefore, be clearly assigned to a main assembly/subassembly and the register.

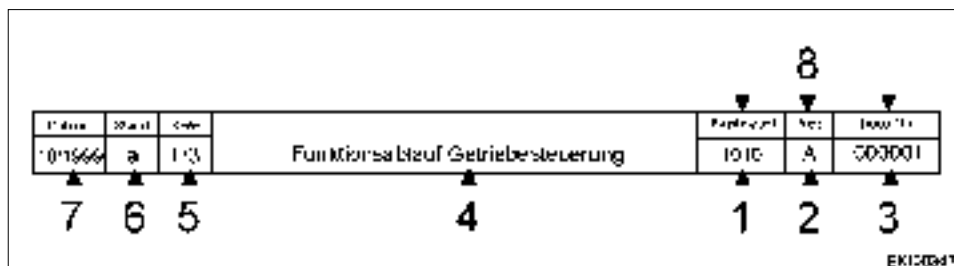
Explanation of the header and footer:



| | | | |
|---|-------------------|---|-----------------------|
| a | Register letter | d | Validity: chassis no. |
| b | Chapter / section | e | Other validity notes |
| c | Type validity | | |

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| | | |
|---|--------------------------------|----------|
| Farmer 400 Fav 700 Fav 900 | Documentation structure | A |
|---|--------------------------------|----------|



- | | | | |
|---|-----------------------------|---|--------------------------|
| 1 | Main assembly / subassembly | 5 | No. of pages in document |
| 2 | Register | 6 | Revision status |
| 3 | Docu-no. | 7 | Date created |
| 4 | Section | 8 | Document code |

All assemblies are paginated sequentially, starting at page 1.

The document code does not have to be sequential, i.e. gaps may occur.

The docu-no. is not the page number in the documentation. The page number is listed on the right in the contents.

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| | | |
|--|---|----------|
| | Tractor / General system Notes on documentation | A |
|--|---|----------|

Please note

This Workshop Manual gives the trained expert type-related information for the repair of our tractors. It is assumed that standard tools and general instruments which are part of the usual equipment in a workshop will be available. Special tools are kept to the absolute minimum and are shown both at the point where they are used and in a summary at the end of the manual.

If parts have to be replaced, **only** genuine spare parts may be used! When placing orders for parts please always quote the chassis number in accordance with the relevant valid spares documentation. The division of the assemblies in the Workshop Manual mirrors that of FENDOS.

Maintenance documentation and technical specifications must also be taken into account by workshops. On completion of a repair, the person responsible must carry out a test drive to ensure that the tractor is in perfect condition and its roadworthiness can be guaranteed.

We reserve the right to make design changes in the interests of technical progress.

Notes on register G - Repairs

The disassembly and reassembly instructions shown represent the design status at the time that the Workshop Manual was written.

Technical refinement of the product and expansions in terms of different models may require different work procedures which can be carried out without major difficulty by qualified experts.

These disassembly and reassembly instructions are superseded on publication of the next edition.

Important notes on safety at work

It is a fundamental principle that those carrying out repairs are responsible for ensuring their own safety while working.

Compliance with all applicable safety regulations and statutory provisions is a prerequisite for avoiding personal injury and product damage during maintenance and repair work. Repair staff must familiarise themselves with such regulations and provisions before starting work.

The proper repair of Fendt products presupposes that the work will be carried out by appropriately trained expert staff.

The obligation to provide such training lies with the repair workshop.

The following are used in this manual to draw attention to safety issues



This pictogram warns of situations where a lack of care can lead to personal injury or product damage.

Read the relevant instructions thoroughly before starting any tests or repair work.

Photos, drawings and components do not always represent the original. They are an illustration of the work procedure required.

Photos, drawings components are not to scale. No conclusions may be drawn regarding size and weight (even within a single illustration).

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| 26.03.2001 | a | 1/1 | 0000 | A | 000021 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Working and steering hydraulics / General system Safety instructions and measures | A |
|---|--|----------|

Reason:

- The pressure pipes of the front suspension between the central control block ZSB and the suspension cylinders,
- the accumulators ASP1 and ASP2 on the central control block and
- the piped accumulator ZSP

are subject to a pressure of 200 bar even with the engine switched off and the suspension lowered (=locked)!

Action:

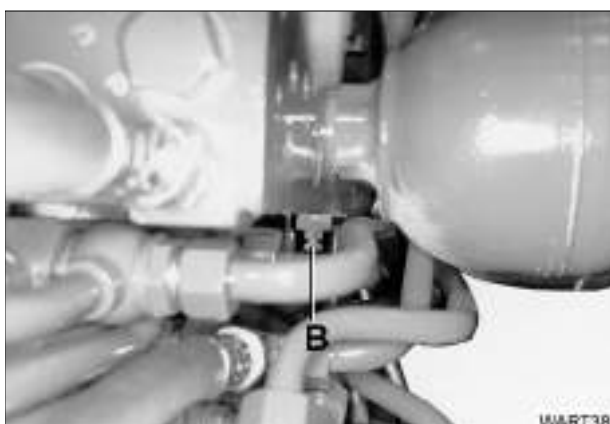
The pressure has to be relieved manually before any repair is carried out or anything is released or opened in this area.

Note:

The "Lock suspension / lower suspension" command has no effect!

Steps:

1. Loosen stopcock item A (stopcock is labelled AV2 in further documents and circuit diagrams) on top of central control block by approx. 1 turn anti-clockwise.



2. Loosen stopcock item B (stopcock is labelled AV1 in further documents and circuit diagrams) on bottom of central control block by approx. 1 turn anti-clockwise.

Check:

Emptying of accumulator sounds like flowing liquid as oil temperature increases (scarcely audible in winter).

Note and comparison:

For tractors without a central control block (e.g. Fav 500) it is still necessary to relieve pressure using the "External power supply" method.

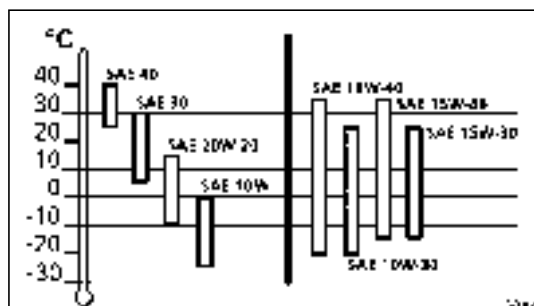
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| 12/1999 | a | 1/1 | 0000 | A | 000012 |

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Fuels and lubricants | A |
|----------------|--|----------|

| Filling points | Filling quantity approx. litres | Type 4) | Frequency of change 2) |
|---|---------------------------------|--|--|
| Engine "Max" with filter change | 24 | All-year SHPD engine oil 3) to ACEA E3-96 | After 50, 500, 1000 op. hrs. then every 500 op. hrs. though at least once a year if sulphur content is up to 0.5% 5) |
| Transmission and differential (refill) | 65 | STOU SAE 10 W-40 or 15 W-40 | then every 2 years or every 2000 operating hours. |
| Power lift shaft lubrication | 0.2 | | Power lift shaft lubrication (top-up- only) after 50 operating hours and in event of leaks |
| Axle drives per side | 13 | Special hypoid transmission oil SAE 85 W-90 or SAE 80 W-90 or SAE 90 as per API GL-5 | Every 500 operating hours then every 2 years or every 2000 op. hrs. |
| Front axle differential | 9.5 | No STOU or other universal oil | Front axle differential and hub drives After 50 then 1000 op. hrs. then every 2 years or 2000 op. hrs. |
| Hub drives per side | 2.7 | | |
| Front PTO | 4.2 | | After 500 op. hrs. then every 2 years or 2000 op. hrs. |
| Rear axle stub shaft (optional) axle drivers per side | 13 | Special hypoid transmission oil 85 W-140 to API GL-5 | After 500 op. hrs. then every 2 years or 2000 op. hrs. |
| Hydraulics | | STOU SAE 10W-30, 10W-40, 15W-30 | After 1000 op. hrs. |
| Quantity for max. filling | 70 | Also permissible: HD-SAE 20 W-20 to API-CD | then every 2 years or every 1000 op. hrs. |
| Fuel tank | 530 | Diesel 5) | Fill up after use |
| Cooling system | 26 | Water with 35 - 50% vol/vol anti-freeze and anti-corrosion agent | Change antifreeze every 2 years |
| Brake and clutch system | 0.8 | Pentosin CHF 11S (X 902.011.622) | Every 2 years |
| Air compressor | 0.5 | Ethyl alcohol antifreeze (X 902.015.003) | Fill up only below + 5°C |
| Lubrication points | | Lithium-saponified grease, NLGI class 2 | See Lubrication Chart |
| see Lubrication Chart | | (worked penetration coefficient 265-295) | -regularly oil all other joints and bearing surfaces |

3) VISCOSITY OF OILS IN ENGINE

Monograde oils Multigrade oils



1) As indicated on dipstick, by overflow from filling point etc.

2) Whichever is the sooner.

4) For permitted tradenames, if specified, see current fuels and lubricants list which all Fendt dealers receive as a service circular.

5) If diesel fuel contains more than 0.5 - 1% sulphur, oil-change intervals must be halved. A sulphur content of less than 0.05% is recommended, though the fuel supplier must confirm that an adequate lubricant effect is guaranteed (e.g. by means of additives). Only use alternative fuels, e.g. RME, once discussed with the Service Workshop.

| Date | Version | Page | Fuels and lubricants | Capitel | Index | Docu-No. |
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| 12.11.2001 | a | 1/2 | | 0000 | A | 000029 |

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Fuels and lubricants | A |
|----------------|--|----------|

Lubricants, sealants and bonding agents

| | |
|--|--|
| High-pressure grease for long-term lubrication, e.g. for splined shaft profiles | X 902.002.472 long-life grease |
| Grease for lubricating sealing lips of shaft seals | Multi-purpose grease 1) and 2) |
| Sealant (fully curing) for shaft seals with steel cage | Serdon X 903.051.711 |
| Shaft seals with rubberised outer ring Coat outer rings with | Spirit/water mixture 1:1 |
| Sealant (not fully curing) for surfaces of gearbox housing | Loctite X 903.050.074 |
| Sealant e.g. for Hall-effect sensors with rotational direction sensor (non-curing) | F 119.200.210.930 |
| Synthetic bonding agent | Normal Loctite bolt-sealant X 903.050.084 3) |
| Synthetic bonding agent | Loctite high-strength X 903.050.091 3) |
| High-speed cleaner for use against grease and oil, 520 ml spray can | X 907.505.000 |

- 1) = Lithium-saponified, dripping point approx. 185°C, worked penetration coefficient 265 to 295 (soft)
- 2) = Alvania 2 or Renolit MP
- 3) = Components which are to be bonded must be free of paint, oil and grease. Apply synthetic bonding agent to the dry joint surfaces of both components; after mating them, leave them for the specified curing time without exposing them to the air.

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| 12.11.2001 | a | 2/2 | Fuels and lubricants | 0000 | A |
| | | | | | 000029 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Tightening torques for screws/bolts in Nm (kpm) | A |
|---|--|----------|

Coefficient of friction: μ tot. 0.14 for nuts and bolts without aftertreatment and for phosphated nuts.
Tighten by hand.

Tightening torques, unless otherwise specified, can be taken from the following table.

| Metrisches Gewinde | | | | | | | | |
|--------------------|--------|---------|--------|---------|--------|---------|--------|---------|
| | 6,9 | | 8,8 | | 10,9 | | 12,9 | |
| Abmessung | Nm | (kpm) | Nm | (kpm) | Nm | (kpm) | Nm | (kpm) |
| M 6 | 8,4 | (0,85) | 9,8 | (1,0) | 13,7 | (1,4) | 16,7 | (1,7) |
| M 8 | 20,6 | (2,1) | 24,5 | (2,5) | 34,3 | (3,5) | 40,2 | (4,1) |
| M 10 | 40,2 | (4,1) | 48,1 | (4,9) | 67,7 | (6,9) | 81,4 | (8,3) |
| M 12 | 70,6 | (7,2) | 84,4 | (8,6) | 117,7 | (12,0) | 142,2 | (14,5) |
| M 14 | 112,8 | (11,5) | 132,4 | (13,5) | 186,4 | (19,0) | 225,6 | (23,0) |
| M 16 | 176,6 | (18,0) | 206,0 | (21,0) | 289,4 | (29,5) | 348,2 | (35,5) |
| M 18 | 240,3 | (24,5) | 284,5 | (29,0) | 392,4 | (40,0) | 475,8 | (48,5) |
| M 20 | 338,4 | (34,5) | 402,2 | (41,0) | 569,0 | (58,0) | 676,9 | (69,0) |
| M 22 | 456,2 | (46,5) | 539,5 | (55,0) | 765,2 | (78,0) | 912,3 | (93,0) |
| M 24 | 588,6 | (60,0) | 696,5 | (71,0) | 981,0 | (100,0) | 1177,2 | (120,0) |
| M 27 | 873,1 | (89,0) | 1030,0 | (105,0) | 1471,5 | (150,0) | 1765,8 | (180,0) |
| M 30 | 1177,2 | (120,0) | 1422,4 | (145,0) | 1962,0 | (200,0) | 2354,4 | (240,0) |

| Metrisches Feingewinde | | | | | | | | |
|------------------------|--------|---------|--------|---------|--------|---------|--------|---------|
| | 6,9 | | 8,8 | | 10,9 | | 12,9 | |
| Abmessung | Nm | (kpm) | Nm | (kpm) | Nm | (kpm) | Nm | (kpm) |
| M 8 x 1 | 22,6 | (2,3) | 26,5 | (2,7) | 37,3 | (3,8) | 44,1 | (4,5) |
| M 10 x 1,25 | 42,2 | (4,4) | 51,0 | (5,2) | 71,6 | (7,3) | 86,3 | (8,8) |
| M 12 x 1,25 | 78,5 | (8,0) | 93,2 | (9,5) | 132,4 | (13,5) | 157,0 | (16,0) |
| M 12 x 1,5 | 74,5 | (7,6) | 88,3 | (9,0) | 122,6 | (12,5) | 147,1 | (15,0) |
| M 14 x 1,5 | 122,6 | (12,5) | 147,1 | (15,0) | 206,0 | (21,0) | 245,2 | (25,0) |
| M 16 x 1,5 | 186,4 | (19,0) | 220,7 | (22,5) | 309,0 | (31,5) | 372,8 | (38,0) |
| M 18 x 1,5 | 296,8 | (27,5) | 318,8 | (32,5) | 451,3 | (46,0) | 539,5 | (55,0) |
| M 20 x 1,5 | 377,7 | (38,5) | 451,3 | (46,0) | 627,8 | (64,0) | 755,4 | (77,0) |
| M 22 x 1,5 | 510,1 | (52,0) | 598,4 | (61,0) | 843,7 | (86,0) | 1030,0 | (105,0) |
| M 24 x 2 | 637,6 | (65,0) | 765,2 | (78,0) | 1079,1 | (110,0) | 1275,3 | (130,0) |
| M 27 x 2 | 951,6 | (97,0) | 1128,1 | (115,0) | 1569,6 | (160,0) | 1912,9 | (195,0) |
| M 30 x 2 | 1324,4 | (135,0) | 1569,6 | (160,0) | 2207,2 | (225,0) | 2648,7 | (270,0) |

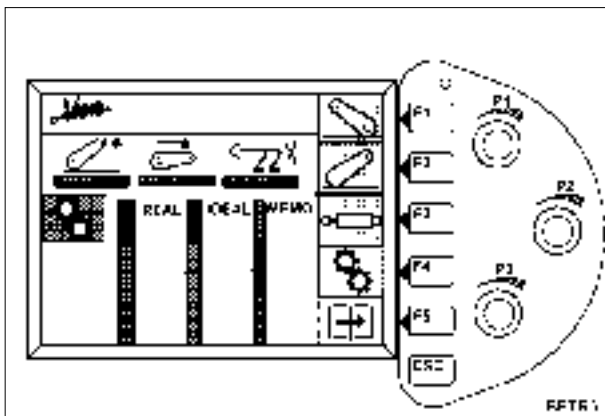
A3D519

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Farmer 400
Fav 700
Fav 900

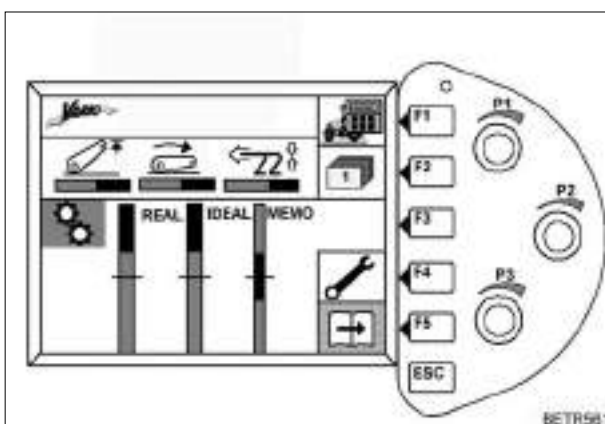
Tractor / General system
Tractor diagnostics with terminal A008

A



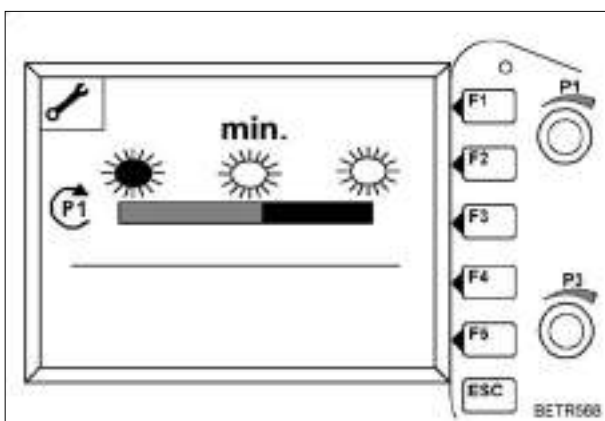
Ignition ON

Press **F5** to switch to second main menu level.



Second main menu level is displayed.

Press **F4** to open Screen Brightness menu.



Screen Brightness menu is displayed.

Press **F1** to open Diagnostics menu.

Farmer 400
Fav 700
Fav 900

Tractor / General system

Tractor diagnostics with terminal A008

A



Diagnostics menu is displayed.

- High pressure - Transm ission - Sens or **B008** indicates oil pressure in transmission high-pressure circuit. (bar)
- Setpoint speed accelerator potentiometer **B018** indicates setpoint engine speed. (rpm)
- Temp erature sensor discharge **B009** indicates discharge temperature of transmission high-pressure circuit. (digit = digital units)
- Trans mission - Act ion - Prio rity - E un ct ion indicates transmission's control status. (actuated, automatic maximum output control, cruise control, control via joystick, no control action)
- Press **ESC** to return to Screen Brightness menu.



Press **F5** to open Diagnostics Help menu.

This menu displays the conversion factors for the digital units (digit).

Press **ESC** to return to Diagnostics menu.

Note:

The Diagnostics terminal is not a replacement for measuring pressure in the transmission circuit or electrical readings.

The Diagnostics terminal provides a reference value for the Vario transmission functions.

Possible applications:

- Loss of power in tractor (question: transmission or engine?)
- Transmission is overheating (question: how high is the transmission discharge temperature for various tasks?)
- Checking setpoint engine speed

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| 12.2.2001 | a | 2/2 | | 0000 | A | 000015 |

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Technical specifications | A |
|----------------|--|----------|

| Model | | 916 | 920 |
|---|--------|-----------------|-----------------|
| Engine | | | |
| Type of engine | | DO836LE504 | DO836LE503 |
| Turbocharger / intercooler | | with / with | with / with |
| No. of cylinders / cooling | | 6 / water | 6 / water |
| Bore / stroke | mm | 108 / 125 | 108 / 125 |
| Effective displacement | l | 6870 | 6870 |
| Idling speed | rpm | 780 +/-30 | 780 +/-30 |
| Rated speed | rpm | 2150 | 2150 |
| No-load engine speed | rpm | 2260-2320 | 2280-2340 |
| Fuel | l | 530 | 530 |
| Engine stop | | electrical | electrical |
| Noise level at driver's ear | dB(A) | 72 | 72 |
| Angle of engine | | | |
| Tractor stability must be guaranteed | | | |
| Lengthways in travel direction front / rear | degree | 25 | 25 |
| Across travel direction left / right | degree | 25 | 25 |
| Weights and dimensions | | | |
| with following tyres and track width | | | |
| Tyres front | | 480/70R34 | 480/70R34 |
| Tyres rear | | 580/70R42 | 580/70R42 |
| Track width front | mm | 2000 | 2000 |
| Track width rear | mm | 1970 | 1970 |
| Overall length | mm | 4940 | 4940 |
| Overall width | mm | 2550 | 2550 |
| Overall height incl. cab | mm | 3095 | 3095 |
| Ground clearance | mm | 605 | 605 |
| Wheelbase | mm | 2840 | 2840 |
| Flange centre distance front | mm | 1892 | 1892 |
| Flange centre distance rear | mm | 1890 | 1890 |
| Min. turning circle radius without / with steering brake | mm | 5.9/54 | 5.9/5.4 |
| Kerb weight | kg | 8750 | 8750 |
| Max. permissible gross vehicle weight at 50km/h | kg | 12000 | 12000 |
| Max. permissible gross vehicle weight with mounted implements, depending on tyres | kg | 14000 | 14000 |
| Max. permissible axle load | kg | 6500 | 6500 |
| Max. permissible axle load rear | kg | 7730 | 7730 |
| Maximal vertical load on trailer coupling | kg | 2000 | 2000 |
| Maximal vertical load on trailer hitch | kg | 3000 | 3000 |
| PTO 540/750/1000 | | | |
| PTO profile | | 1 3/4" 6-spline | 1 3/4" 6-spline |
| PTO speed at rated engine speed and 540 setting | rpm | 569 | 569 |
| PTO speed at rated engine speed and 750 setting | rpm | 726 | 726 |
| PTO speed at rated engine speed and 1000 setting | rpm | 1058 | 1058 |
| Max. permissible torque at 540 setting | Nm | 3500 | 3500 |
| Max. permissible torque at 750 setting | Nm | 2100 | 2100 |
| Max. permissible torque at 1000 setting | Nm | 1600 | 1600 |
| Front PTO 1000 | | | |
| PTO speed at rated engine speed and 1000 setting | rpm | 1111 | 1111 |
| Max. permissible torque for 1000 | Nm | 830 | 830 |

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| Fav 900 | Tractor / General system Technical specifications | A |
|----------------|--|----------|

| Model | | 916 | 920 |
|---|-------|--------------|--------------|
| Hydraulics | | | |
| Working pressure | bar | 200 | 200 |
| Hydraulic pump | l | 112 | 112 |
| Available hydr. oil at max. capacity | l | 50 | 50 |
| Rear power lift | | | |
| Three-point | | Cat. 2/3 | Cat. 2/3 |
| Control | | EPC | EPC |
| Max. lift capacity | kN | 90 | 90 |
| Front power lift (optional) | | | |
| Three-point | | Cat. 2 | Cat. 2 |
| Max. lift capacity | kN | 50 | 50 |
| Implement weight up to approx. | kg | 3600 | 3600 |
| Transmission | | | |
| Vario continuously variable transmission | km/h | 50 | 50 |
| Range I forwards | km/h | 0.02 - 32 | 0.02 - 32 |
| Range I reverse | km/h | 0.02 - 20 | 0.02 - 20 |
| Range II forwards | km/h | 0.02 - 50 | 0.02 - 50 |
| Range II reverse | km/h | 0.02 - 38 | 0.02 - 38 |
| Electrics | | | |
| Operating voltage | V | 12 | 12 |
| Battery | V/Ah | 12/2 x 90 | 12/2 x 90 |
| Alternator | W/V/A | 2520/14/2x90 | 2520/14/2x90 |
| Starter | kW | 4.0 | 4.0 |
| Wheel tightening torques (threads and locating faces lightly oiled) | | | |
| Front wheels | Nm | 450 | 450 |
| Rear wheels | Nm | 620 | 620 |

Note:

The warranty becomes null and void if changes are made to the power output governor and max. speed setting or if the permissible loads and weights are exceeded.

Note:

With PTO operation:

If the maximum permissible torque can be exceeded because of the particular application, use cardan shafts with a safety coupling and freewheel, if appropriate.

Maximum protection against seizing at peak torques 4000 Nm.

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| Fav 900 | Tractor / General system Technical specifications | A |
|----------------|--|----------|

| Model | | 924 | 926 |
|---|--------|-----------------|-----------------|
| Engine | | | |
| Type of engine | | DO836LE502 | DO836LE501 |
| Turbocharger / intercooler | | with / with | with / with |
| No. of cylinders / cooling | | 6 / water | 6 / water |
| Bore / stroke | mm | 108 / 125 | 108 / 125 |
| Effective displacement | l | 6870 | 6870 |
| Idling speed | rpm | 780 +/-30 | 780 +/-30 |
| Rated speed | rpm | 2250 | 2250 |
| No-load engine speed | rpm | 2400-2460 | 2420-2480 |
| Fuel | l | 530 | 530 |
| Engine stop | | electrical | electrical |
| Noise level at driver's ear | dB(A) | 72 | 72 |
| Angle of engine | | | |
| Tractor stability must be guaranteed | | | |
| Lengthways in travel direction front / rear | degree | 25 | 25 |
| Across travel direction left / right | degree | 25 | 25 |
| Weights and dimensions | | | |
| with following tyres and track width | | | |
| Tyres front | | 540/65R34 | 600/65R34 |
| Tyres rear | | 650/65R42 | 650/85R38 |
| Track width front | mm | 2000 | 2000 |
| Track width rear | mm | 1970 | 1970 |
| Overall length | mm | 4940 | 4940 |
| Overall width | mm | 2580 | 2640 |
| Overall height incl. cab | mm | 3110 | 3110 |
| Ground clearance | mm | 605 | 605 |
| Wheelbase | mm | 2840 | 2840 |
| Flange centre distance front | mm | 1892 | 1892 |
| Flange centre distance rear | mm | 1890 | 1890 |
| Min. turning circle radius without / with steering brake | mm | 5.9/5.4 | 5.9/5.4 |
| Kerb weight | kg | 8800 | 8800 |
| Max. permissible gross vehicle weight at 50km/h | kg | 12000 | 12000 |
| Max. permissible gross vehicle weight with mounted implements, depending on tyres | kg | 14000 | 14000 |
| Max. permissible axle load front | kg | 6500 | 6500 |
| Max. permissible axle load rear | kg | 7730 | 7730 |
| Maximal vertical load on trailer coupling | kg | 2000 | 2000 |
| Maximal vertical load on trailer hitch | kg | 3000 | 3000 |
| PTO 540/750/1000 | | | |
| PTO profile | | 1 3/4" 6-spline | 1 3/4" 6-spline |
| PTO speed at rated engine speed and 540 setting | rpm | 596 | 596 |
| PTO speed at rated engine speed and 750 setting | rpm | 760 | 760 |
| PTO speed at rated engine speed and 1000 setting | rpm | 1108 | 1108 |
| Max. permissible torque at 540 setting | Nm | 3500 | 3500 |
| Max. permissible torque at 750 setting | Nm | 2100 | 2100 |
| Max. permissible torque at 1000 setting | Nm | 1600 | 1600 |
| Front PTO 1000 | | | |
| PTO speed at nominal speed, 1000 version | rpm | 1062 | 1062 |
| Max. permissible torque at 1000 setting | Nm | 830 | 830 |

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| Fav 900 | Tractor / General system Technical specifications | A |
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| Model | | 924 | 926 |
|---|-------|--------------|--------------|
| Hydraulics | | | |
| Working pressure | bar | 200 | 200 |
| Hydraulic pump | l | 117 | 117 |
| Available hydr. oil at max. capacity | l | 50 | 50 |
| Rear power lift | | | |
| Three-point | | Cat. 2/3 | Cat. 2/3 |
| Control | | EPC | EPC |
| Max. lift capacity | kN | 99.8 | 99.8 |
| Front power lift (optional) | | | |
| Three-point | | Cat. 2 | Cat. 2 |
| Max. lift capacity | kN | 50 | 50 |
| Implement weight up to approx. | kg | 3600 | 3600 |
| Transmission | | | |
| Vario continuously variable transmission | km/h | 50 | 50 |
| Range I forwards | km/h | 0.02 - 32 | 0.02 - 32 |
| Range I reverse | km/h | 0.02 - 20 | 0.02 - 20 |
| Range II forwards | km/h | 0.02 - 50 | 0.02 - 50 |
| Range II reverse | km/h | 0.02 - 38 | 0.02 - 38 |
| Electrics | | | |
| Operating voltage | V | 12 | 12 |
| Battery | V/Ah | 12/2 x 90 | 12/2 x 90 |
| Alternator | W/V/A | 2520/14/2x90 | 2520/14/2x90 |
| Starter | kW | 4.0 | 4.0 |
| Wheel tightening torques (threads and locating faces lightly oiled) | | | |
| Front wheels | Nm | 450 | 450 |
| Rear wheels | Nm | 620 | 620 |

Note:

The warranty becomes null and void if changes are made to the power output governor and max. speed setting or if the permissible loads and weights are exceeded.

Note:

With PTO operation:

If the maximum permissible torque can be exceeded because of the particular application, use cardan shafts with a safety coupling and freewheel, if appropriate.

Maximum protection against seizing at peak torques 4000 Nm.

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Farmer 400
Fav 700
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Tractor / General system
Vario Tractors - Failure Codes

B

| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------------|--|--------------------------------------|---|---|---------------------------------|
| 0.0.11 | A021; A022 | ECU, EDC; ECU, EMR | EDC / EMR bus fault. Fault in ECU | Tractor can be driven using accelerator. | | |
| | | | Programming errors in ECU. | Fault message, no restrictions. | | EOL reprogramming necessary. |
| 0.0.12 | A008 | Terminal | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F039, F046 | |
| 0.0.13 | A004 | Control console | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F040, F041 | |
| 0.0.14 | A001; A002 | Transmission control module | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F040, F041 | |
| 0.0.15 | A001, A002 | AWD; Differential - Lock activation | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F040, F041 | |
| 0.0.16 | A001, A002 | Rear PTO | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F040, F041 | |
| 0.0.17 | A001, A002 | Front PTO | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F040, F041 | |
| 0.0.18 | A005 | EPC Rear | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F040, F041 | |
| 0.0.19 | A005 | Front - Powerlift | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F040, F041 | |
| 0.0.1A | A005 | Spool valves | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F040, F041 | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|----------------------|-------------|--|--|---|---|-----------------------------|
| 0.0.20 | A005 | CAN-Bus-wiring | Bus Failure | no functions available, no display | Voltage supply CAN-Bus on fuse board A013; fuses F040, F041 | |
| 0.1.50 | A007 | Instrument panel | VDO instrument panel EEPROM not programmed | Malfunctions in instrument panel | | EOL reprogramming necessary |
| 0.1.51 | B012 | Engine oil pressure sensor | Sensor failure, wiring failure | no monitoring ! | Electrical diagram "Dashpanel" | |
| 0.1.54 | B019 | Pressure sensor compressed air tank | Sensor failure, wiring failure | no display | Electrical diagram "Dashpanel" | |
| 0.1.55 | S036 | Level Sensor hydraulic oil | Sensor failure, wiring failure | no monitoring ! | Electric diagram "Spool valves 1" | |
| 0.1.56 | B005 | Engine temperature sensor | Sensor failure, wiring failure | no monitoring ! | Electrical diagram "Dashpanel" | |
| 0.1.57 | B006 | Sensor, intercooler temperature | Sensor fault, wiring fault | No monitoring ! | Circuit diagram: "Instrument panel" (F400, F700); "EDC control module" (F900) | |
| 0.1.59 | B007 | Fuel level sensor | Sensor failure, wiring failure | no monitoring ! | Electrical diagram "Dashpanel" | |
| 1.1.01, evtl. 4.2.81 | B038 | Position sensor accelerator pedal EDC (yellow marker) | Signal out of range | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.1.03 | B029/- B038 | Position sensor accelerator pedal EST (Elektron box comfort, red marker) / Position sensor accelerator pedal EDC (yellow marker) | values not corresponding B029 / B038 | Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.1.7E | B035 | Position sensor manual accelerator | Signal out of range. | Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failures) | Electric diagram "EDC Control " | |

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Faults

Farmer 400
Fav 700
Fav 900

Tractor / General system
Vario Tractors - Failure Codes

B

| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|------------------------|---|---|---|--|------------------------------|
| 1.1.7F | A004 | Control console | Electrical fault in hand throttle memory keys (EDC/EMR). No communication with control console. | Last speed setting is retained. Engine speed can be changed using hand throttle or accelerator. | | |
| 1.1.9E | A003 | Memorization keys Engine speed | Signal out of range. | Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.1.9F | A002, A004 | EST Comfort Control Module, Side Console | CAN communication failure EST Control Module (A002) - Side Console (A004) | Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control ", "Transmission BUS", "Comfort-BUS" | |
| 1.1.A0 | A021 | EDC control module | EDC control module (A021) cannot be identified, EOL Programming error | According to failure importance, Engine torque will be reduced to Fav.916 torque . Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.1.A1 | A002, A021 | EST control module, EDC control module | CAN Communication failure EST control module (A002) - EDC control module (A021) | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram Transmission -BUS (G-BUS) | |
| 1.1.B0 | | | CAN-bus communication restricted | | | EOL reprogramming necessary. |
| 1.1.E0 | B035 | Position sensor manual accelerator | Checksum EEPROM is wrong | Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.13 | G001, G003, G001, A021 | Battery 1, Battery 2, Generator, EDC control module | Voltage supply failure EDC control module | No engine power Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "Voltage supply +Ub" | |

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Fav 700
Fav 900

Tractor / General system
Vario Tractors - Failure Codes

B

| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|------------|--|--|--|--|----------------|
| 1.2.17 | | Excessive Engine speed | Inadequate driving (e.g. Downhill ride) | Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.18 | A020 | Electronic injection pump VP44 | Start of injection - deviation of control | Restricted Power, Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.1A | B026 | Needle motion sensor NBF | Signal failure | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.1F | A021 | EDC control module | CAN Message: EDC control module connection failure | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control ", Transmission - BUS | |
| 1.2.21 | A002 | EST control module, Transmission - BUS | Fendt-EST not connected or CAN-Connection to Transmission Bus discontinued. | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram Transmission - BUS , EDC Motorsteuerung | |
| 1.2.23 | A002 | EST control module | CAN-Message failure from EST control module (A002) EDC control module | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram Transmission - BUS , EDC Control Module | |
| 1.2.25 | K020 | Relay Ub30 EDC | Contact does not open, Earth contact | Battery will run empty, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.2A | A002, A021 | EST Control Module; EDC Control Module - BUS, Comfort-BUS | CAN Message failure from EST Module (A002) to EDC Control Module (A021) "Function Exhaust brake" | No function of Exhaust brake, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram Transmission - BUS , EDC Control Module; Transmission - BUS, Exhaust brake / Engine stop | |
| 1.2.2B | A002, A021 | EST Control Module; EDC Control Module - BUS, Transmission BUS ; Comfort-BUS | CAN Message failure from EST Module (A002) to EDC Control Module (A021) "Function Exhaust brake" | No function of Exhaust brake, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram Transmission BUS , "EDC Control Module ", Transmission - BUS, Exhaust brake / Engine stop | |

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Tractor / General system
Vario Tractors - Failure Codes

B

| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|-------------|---|--|--|---|----------------|
| 1.2.2C | A002, A021 | EST Control Module, EDC Control Module, Transmission - BUS, Komfort-BUS | CAN Message failure from EST Control Module (A002) to EDC Control Module (A021) "Function Exhaust brake" | No Function of exhaust brake, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control ", Transmission - BUS, Motorbremse/Motorabs-tellung | |
| 1.2.2D | A002, A021 | EST Control Module, EDC Control Module, Transmission - BUS | CAN Signal failure from EST Control Module (A002) to EDC Control Module (A021) | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control ", Transmission - BUS, | |
| 1.2.2E | A002, A021 | Enhanced control module, EDC control module, transmission bus | CAN signal fault from enhanced control module (A002) to EDC control module (A021) | | EDC control module, Transmission bus circuit diagrams | |
| 1.2.38 | A021 | EDC Control Module | Function failure EDC Control Module "Engine - Stop" | restricted power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " Voltage supply +UB | |
| 1.2.42 | A020 | Pump Control (Injection pump) | Injection Pump, Fuel temperature to high | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.46 | BUSS-system | Comfort-BUS, Transmission - BUS, EDC-BUS | CAN-BUS Message failure | Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control ", Transmission - BUS, Comfort-BUS | |
| 1.2.81 | B038 | Position sensor accelerator pedal EDC (yellow marker) | Signal failure Supply time | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.82 | A020 | Pump Control (Injection pump) | Supply time High pressure solenoid valve not adequate | Engine stops, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.84 | B025 | Speed sensor EDC | Signal Failure | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |

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Tractor / General system
Vario Tractors - Failure Codes

B

| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|-------------------|----------------|--|---|--|---------------------------------|-----------------------|
| 1.2.85 | B028 | Sensor Intake pressure LDF | Signal Failure | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.87 | B027 | Water temperature sensor (EDC control) | Signal Failure | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.89 | A020 | Pump Control (Injection pump) | electronic volume controller failure | Engine won't start, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.91 | B025 | Speed sensor EDC | Signal Failure | restricted power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.92 | A020 A021 | EDC Control Module , Pump Control (Injection pump) | Failure Engine Stop via "Injected volume = 0" fehlerhaft, se Chapter 2710 Reg.A "Engine Stop" | Restricted power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.96 | A021 | EDC Control Module Monitoring unit | Failure EDC Control Module Monitoring unit (A021) | Engine stops, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.99 | A020 A021 | EDC Control Module and Pump Control (Injection pump) | Engine Stop via Voltage monitoring within EDC Control Module, Chapter 2710 Reg.A "Engine Stop". | Reduced power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.9B | A020/- A021 | EDC Control Module, Pump Control (Injection pump) | Engine stop via engine stop solenoid valve, Chapter 2710 Index A Engine Stop | Reduced power, Chapter 2000 Index B (EDC-fault) | Electric diagram "EDC Control " | |
| 1.2.A2 | K021 | Relay solenoid valve engine stop | Engine stop via relay K021, Chapter 2710 Index A Engine Stop | Reduced power, Chapter 2000 Index B (EDC-fault) | Electric diagram "EDC Control " | |

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Tractor / General system
Vario Tractors - Failure Codes

B

| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|------------|---|---|---|---------------------------------|----------------|
| 1.2.A6 | A021, A020 | EDC Control Module, Pump Control (Injection pump) | Engine stop, fault in signal processing in EDC control module | Reduced power, Chapter 2000 Index B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.A8 | A021 | EDC Control Module | Fault in barometric pressure sensor | Chapter 2000 Index B (EDC-Failure) | | |
| 1.2.A9 | A020 | Pump Control (Injection pump) | Failure identified during auto diagnostic | restricted Power, Engine does not start, Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.B1 | A021, A020 | EDC Control Module, Pump Control (Injection pump) | EDC-CAN Message failure: from EDC Control Module to Pump Control (Injection pump) | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.B2 | A020 | Pump Control (Injection pump) | Failure identified during auto diagnostic | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.B3 | A020 | Pump Control (Injection pump) | Supply failure Pompe Control . Chapter 2710 Reg.A "Engine Stop". | Engine stops, Engine does not start, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.B4 | A020 A021 | EDC Control Module, Pump Control (Injection pump) | CAN Message failure: from Pump Control to EDC Control Module | Engine runs idle, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.B5 | A020 | Pump Control (Injection pump) | Failure during auto diagnostic Pump Control (EEPROM-Checksum) | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.B6 | A020 | Pump Control (Injection pump) | Failure during auto diagnostic Pump Control (EEPROM-Status) | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.B7 | A020, B025 | Pump Control (Injection pump), Speed sensor EDC | Speed sensor Failure, --- Signal processing failure within injection pump | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |

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Tractor / General system
Vario Tractors - Failure Codes

B

| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|-------------------|------------------|---|---|--|---------------------------------|-----------------------|
| 1.2.B9 | A020 | Pump Control (Injection pump) | Failure during auto diagnostic of injection pump (RAM-Failure) | Motor stops. Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.C1 | A020 | Pump Control (Injection pump) | Failure during auto diagnostic of injection pump (Solenoid valve final stage) | Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.C3 | A021, A020 | EDC Control Module, Pump Control (Injection pump) | CAN Message Failure : EDC Control Module to injection pump during engine start. | Motor runs idle (720 Rpm), Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.C4 | A020 | Pump Control (Injectin pump) | CAN Message failure to Injection Pump | Engine runs idle (720 Rpm), Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.C5 | A021, A020 | EDC Control Module, Pump Control (Injection pump) | Failure durin Engine Stop via Solenoid valve, Chapter 2710 Reg.A Engine Stop | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.C7 | A020 | Pump Control (Injection pump) | Pump Speed sensor failure (IWZ-Signal) | Engine stops. Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.C8 | A021, B026, B028 | EDC-CAN-BUS, EDC Control Module, Needle Motion Sensor, Intake Air pressure sensor | EDC Control Module: Injection volume is not precise | Engine stops, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.C9 | A020 | Pump Control (Injection pump) | Failure during Autodiagnostic of Injection pump (Solenoid Valve final stage) | Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.CA | A020 | Pump Control (Injection pump) | Injection controller out of range | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|------------|---|--|---|---|----------------|
| 1.2.CB | A021, A020 | EDC Control Module, Pump Control (Injection pump) | CAN Message failure to Injection pump | Engine runs idle, Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control " | |
| 1.2.CD | A021, A020 | EDC Control Module, Pump Control (Injection pump) | Speed failure of CAN Message Between Injection Pump and EDC Control Module | restricted Power, Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.DE | A002, A021 | EDC Control Module , EST Comfort Module | Speed of CAN Message missing | restricted operation, Chapter 2000 Reg.B (EDC-Failure) | | |
| 1.2.E0 | A021, A002 | EDC Control Module , EST Comfort Module | Communication failure during CAN - Message between EDC Control Module and EST Contol Module | Chapter 2000 Reg.B (EDC-Failure) | Electric diagram "EDC Control ", Transmission - BUS | |
| 1.2.E1 | | | Fault in speed signal (B014 - sensor, accumulator shaft, B015 - sensor - bevel pinion) or PTO is driving engine (running on) | Fault display, Chapter 2000 Index B (EDC fault) | | |
| 2.1.EE | | LBS mounted implement | Fault in LBS ECU | Mounted implement can no longer be operated via joystick controls or terminal. | | |
| 2.1.EF | | LBS mounted implement | | Depending on implement manufacturer / restricted operation of mounted implement | For fault description, please see implement manufacturer's literature | |
| 3.1.01 | A004 | Side Console | RAM, EEPROM - Failure | Functions switched off: - keypad, - digital / analogue input, - LED actuation | Fit new control console | |

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|------------|---------|-----------------------------------|---|--|---|-----------------------------------|
| 3.1.02 | A004 | Side Console | RAM, EEPROM - Failure | Functions switched off: - keypad, - digital / analogue input, - LED actuation | Fit new control console | |
| 3.1.03 | A004 | Side Console | RAM, EEPROM - Failure | Functions switched off: - keypad, - digital / analogue input, - LED actuation | Fit new control console | |
| 3.1.04 | A004 | Side Console | RAM, EEPROM - Failure | Functions switched off: - keypad, - digital / analogue input, - LED actuation | Fit new control console | |
| 3.1.05 | A004 | Side Console | Internal 8,5 Volt Failure, Keypad failure | Functions switched off: - keypad, - digital / analogue input, - LED actuation | Fit new control console | |
| 3.1.06 | A004 | Side Console | 8,5 Volt Failure | Functions switched off: - keypad, - digital / analogue input, - LED actuation | Fit new control console | |
| 4.1.01 | A003 | Acceleration Ramp I...IV | Signal failure | Only Auxilliary Operation | | TRANSMISSION |
| | | | Supply Failure 8,5 Volt | | A013 Fuse 5 | |
| 4.1.04 | B017 | Position sensor clutch pedal | Signal failure | Comfort-/ Function - Restrictions in final speed control; Cruise Control not available | Electric diagram "Transmission Control" | TRANSMISSION |
| | | | Supply Failure 8,5 Volt | | A013 Fuse 8 | |
| 4.1.06 | B018 | Position sensor accelerator pedal | Signal failure | Only Auxilliary operation | Electric diagram "Transmission Control" | Engine without EDC , TRANSMISSION |
| | | | Supply failure 8,5 Volt | | A013 Fuse 4 | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|---|-------------------------|--|--|--------------------------|
| 4.1.06 | B029 | Accelerator ECU position sensor (red marker) | Signal fault | Restricted operation (no hand throttle, no memory keys) | 'EDC control` circuit diagram | Engine Fav 900/23/24 EDC |
| | | | 8.5 V supply fault | | A013 fuse 17 | |
| 4.1.07 | B008 | High pressure sensor transmission | Signal failure | Operating Range switching from 1 to 2 not possible | Electric diagram "Transmisson Control" | TRANSMISSION |
| | | | Supply Failure 8,5 Volt | | A013 Fuse 3 | |
| 4.1.08 | B016 | Position sensor operating range | Signal failure | Switching Operating ranges not available; Actual Range remains engaged | Electric diagram "Transmisson Control" | TRANSMISSION |
| | | | Supply Failure 8,5 Volt | | A013 fuse 13 | |
| 4.1.21 | S045 | Position sensor "Reversed Operating Controls" | Signal failure | | | |
| 4.1.23 | A003 | Joystick "Cruise Control Activate" | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.24 | S015 | Position sensor parking brake | Signal failure | Parking Brake automatism not available | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.25 | A003 | Joystick "Quick Reverse" | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.28 | A009 | Transmission Control unit, Incremental sensor | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.29 | A003 | Joystick "Central Position" | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.2A | B015 | Speed.sensor motor 1 bevel pinion | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|--|----------------|---|--|--|
| 4.1.2B | A003 | Button Switching Operating Range | Signal failure | Actual Operating Range remains engaged; no further switching possible | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.2C | A003 | Button "Neutral / Active Standstill | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.2D | S014 | Button "Quick Reverse " left of steerin wheel | Signal failure | Quick Reverse still possible via Joystick | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.2E | A003 | Joystick Ahead "v+ transmission control" | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.2F | A003 | Joystick Backward "v+ transmission control" | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.30 | | Contact "Auxilliary Operation Hatch" Open / Closed | Signal failure | Only Auxilliary Operation | | valid only for FAV900 with telescopic handle |
| 4.1.31 | B014 | Speed. sensor collector shaft | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.32 | A003 | Key within Joystick "Activating" | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.33 | | Key "Load limit control" | Signal failure | Function not available | | only for Twin EST Modules -FAV900 |
| 4.1.34 | | Key "Cruise Control" | Signal failure | Function not available | | only for Twin EST Modules -FAV900 |
| 4.1.35 | | Key "Memorizing Reverse Transmission ratio" | Signal failure | Function not available | | only for Twin EST Modules -FAV900 |
| 4.1.36 | | Key "Rear PTO Control Transfer" | Signal failure | Function not available | | only for Twin EST Modules -FAV900 |
| 4.1.37 | | Key "Front - PTO Control Transfer" | Signal failure | Function not available | | only for Twin EST Modules -FAV900 |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|--|--|---|---|--|
| 4.1.38 | | Key "Memorizing Transmission Ratio Ahead" | Signal failure | Function not available | | only for Twin EST Modules -FAV900 |
| 4.1.41 | B011 | Speed. sensor motor 2 | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.42 | B014 | Speed. sensor collector shaft | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.44 | B010 | Speed.sensor motor 1 | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.45 | B015 | Speed.sensor bevel pinion | Signal failure | Only Auxilliary Operation | Electric diagram "Transmisson Control" | TRANSMISSION |
| 4.1.50 | S017 | Contact "Transmission Oil Filter contaminated" | Filter contaminated | no further indication of contamination | Electrical diagram "Transmission Control" | Only Twin EST Module version. TRANSMISSION - TRANSMISSION OIL FILTER Contact only effective > 50°C. |
| 4.1.53 | B009 | Temperature switch | "Transmission Oil temperature > 110°C" | Stop immediately , serious risk of transmission damage! | Electrical diagram "Transmission Control" | TRANSMISSION |
| 4.1.56 | S017 | Contact "Transmission Oil Filter contaminated" | Signal failure | no further display ! | Electrical diagram "Transmission Control" | TRANSMISSION - TRANSMISSION OIL FILTER on for Twin EST Module Version |
| 4.1.58 | | Transmission -Slip - Monitoring | Transmission output speed deviates fore more than 30% from ideal value | Can occur under extremely cold ambient temperatures; Repeated occurence under normal circumstances leads to Oil overheating and serious transmisson damage. | | TRANSMISSION - TRANSMISSION CONTROL (Comparison "ideal Ratio / actual Ratio) |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|--|--|---|---|--|
| 4.1.59 | | "Auxilliary Operation" | Auxilliary Operation activated without apparent reason | | | Failure Code will not be memorized |
| | | | Auxilliary Operation failure | | | |
| 4.1.61 | Y002 | Solenoid valve operating range 1 | Supply failure | Only Auxilliary Operation Mode | Electrical diagram "Transmission Control" | TRANSMISSION |
| 4.1.62 | Y003 | Solenoid valve operating range 2 | Supply failure | Only Auxilliary Operation Mode | | TRANSMISSION |
| 4.1.63 | Y005 | Solenoid valve speed limiter | Supply failure | Maximal speed 30 km/h | Electrical diagram "Transmission Control" | TRANSMISSION |
| 4.1.64 | Y004 | Solenoid valve neutral/turboclutch | PWM-Supply failure | | Electrical diagram "Transmission Control" | TRANSMISSION |
| 4.1.65 | Y006 | Solenoid valve exhaust brake | Supply failure | | | TRANSMISSION only for FARMER 400 |
| | | | | | | |
| 4.1.70 | A004 | Key "Cruise Control 1" | Key failure | Cruise Control cannot be activated | Electrical diagram "Transmission Control" | TRANSMISSION |
| | | | Bus failure from A004 to Transmission Control Module | | | |
| 4.1.71 | A004 | Key "Cruise Control 2" | Key failure | Cruise Control cannot be activated | Electrical diagram "Transmission Control" | TRANSMISSION |
| | | | Bus failure from A004 to Transmission Control Module | | | |
| 4.1.72 | S017 | Contact "Transmission Oil Filter contaminated" | Signal failure | no further display or monitoring, possibly Transmisssion damage | Electrical diagram "Transmission Control" | only for Single EST Module Version: TRANSMISSION TRANSMISSION OIL FILTER |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|--------------|--|--|---|---|--|
| 4.1.73 | B033 | Temperatur-Sensor "Temperature Feed oil" | Signal failure | no further display or monitoring, possibly Transmisssion damage | Electrical diagram "Transmission Control" | only for Single EST Module Version. TRANSMISSION |
| 4.1.74 | S015 | Position sensor parking brake | Signal failure | | Electrical diagram "Transmission Control" | only for Single EST Module Version. TRANSMISSION |
| 4.1.75 | S045 | Position switch reverse operation | Signal failure | | Electrical diagram "Transmission Control" | only for Single EST Module Version. TRANSMISSION |
| 4.1.76 | S047 | Contamination switch | Signal failure | | Electrical diagram "Transmission Control" | only for Single EST Module Version. TRANSMISSION |
| 4.1.7E | B035 | Position sensor manual accelerator | Signal failure | | Electric diagram "EDC Control Module" | FAV900 , EDC Calibration Code "4011" |
| 4.1.7F | A003 | Memorizing key Selected engine speed | Signal failure | | Electric diagram "EDC Control Module" | FAV900 with EDC |
| 4.1.81 | B010 B011 | Speed.sensor motor 1 Speed. sensor motor 2 | Plausibility failure (=Speed indications are not corresponding) | Only Auxilliary Operation Mode | Electrical diagram "Transmission Control" | TRANSMISSION |
| 4.1.82 | B014 B015 | Speed. sensor collector shaft, Speed.sensor bevel pinion | Plausibility failure (=Speed indications are not in logical corresponding) | Only Auxilliary Operation Mode | Electrical diagram "Transmission Control" | TRANSMISSION |
| 4.1.83 | B014 B015 | Speed. sensor collector shaft, Speed.sensor bevel pinion | Plausibility failure (=Speed indications are not in corresponding direction) | Only Auxilliary Operation Mode | Electrical diagram "Transmission Control" | TRANSMISSION |
| 4.1.84 | | Joystick contacts (Quick Reverse, Cruise Control) | Plausibility failure (=Speed indications are not corresponding logically) | Only Auxilliary Operation Mode | Electrical diagram "Transmission Control" | TRANSMISSION |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|----------------------------|---|--|---|--|---|
| 4.1.85 | | | Engine speed sensor does not supply plausible speed curves. Output speed increase or decrease is outside limits. | Continuation in emergency mode possible | `Transmission control` circuit diagram | |
| 4.1.90 | A001 A004 | Cruise Control 1 - data communication | Data Communication fault | Key not available | | Only for FAV700/900 twin e-box version |
| 4.1.91 | A001 A004 | Cruise Control 2 - data communication | Data communication fault | Key not available | | Only for FAV700/900 twin e-box version |
| 4.1.92 | A001 A002 | Brake pedal left / right , data communication | Data communication fault | Automatic cruise control not available | | Only for FAV700/900 twin e-box version |
| 4.1.93 | A001 A002 | Brake pedal left , data communication | Data communication fault | Automatic cruise control not available | | Only for FAV700/900 twin e-box version |
| 4.1.A0 | A009 | Transmission control unit | Actuation fault in transmission control module | Continuation in emergency mode possible | | |
| 4.1.A1 | A009 | Transmission control unit | Turn angle is not reached within 2 seconds. | Continuation in emergency mode possible | | Mechanical verification: check ease of movement of adjustment device using emergency control system. TRANSMISSION, TRANSMISSION CONTROL |
| 4.1.A2 | A009 A001 or A002 | Transmission control unit | CAN-bus actuation fault | Continuation in emergency mode possible | | |
| 4.1.A3 | A009 | Transmission control unit | Fault or logical error in incremental sensor signal (actual position signal) | Continuation in emergency mode possible | | TRANSMISSION, TRANSMISSION CONTROL |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
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| 4.1.A4 | A009 | Transmission control unit | Fault or logical error in ECU signal. | Continuation in emergency mode possible | | TRANSMISSION, TRANSMISSION CONTROL |
| 4.1.A5 | A009 | Transmission control unit | Initial -Reference (=Zero position) could not be reached during ignition "ON" | Continuation in emergency mode possible | | TRANSMISSION, TRANSMISSION CONTROL |
| 4.1.A6 | A009 | Transmission control unit | Reference point signal fault during operation | Continuation in emergency mode possible | | TRANSMISSION, TRANSMISSION CONTROL |
| 4.1.B0 | all bus consumers | | Initialisation error | Restricted CAN-bus data communication | | |
| 4.1.B1 | Y001 Y002 | Speed range control | Illogical speed range operation (=fatal error) | Continuation in emergency mode possible | | |
| 4.1.B2 | A002 | ECU, enhanced control | Fault in EPROM programming (range control I / II) | Range cannot be changed while driving. | | EOL reprogramming necessary |
| 4.1.B3 | A002 | ECU, enhanced control | Fault in EPROM programming (rapid reversing ramp parameters) | Rapid reversing possible with standard values. | | EOL reprogramming necessary |
| 4.1.B4 | B010 | Sensor, engine 1 | Input parameter values for plausibility monitoring are incorrect. | Standard parameters are stored, plausibility monitoring system remains functional. | | EOL reprogramming necessary |
| 4.1.E0 | Y004 | Turboclutch characteristic | Wrong characteristic stored | Continuation in emergency mode possible | | EOL reprogramming necessary |
| 4.1.E9 | | | Values for shift from range II to I outside tolerances | Shifting only possible when stationary | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|--------------|---|----------------------------------|--|--------------------------------------|---|
| 4.1.EA | | | Internal fault (RAM / EEPROM) | Continuation in emergency mode possible | | |
| 4.1.EB | B016 | Speed range operation | No calibration or drifted values | Continuation in emergency mode possible | | TRANSMISSION, calibration code "4003" |
| 4.1.EC | B029 B038 | Target engine speed position sensor ('accelerator') | No calibration or drifted values | Continuation in emergency mode possible | | Fav 900 with EDC - TRANSMISSION calibration code "4005" |
| 4.1.ED | B017 | Clutch pedal angular resolver | No calibration or drifted values | Continuation in emergency mode possible | | TRANSMISSION, Calibration Code "4001" |
| 4.1.EE | | Transmission characteristic | No calibration or drifted values | Continuation in emergency mode possible | | TRANSMISSION, calibration code "4007" |
| 4.1.EF | | Turboclutch characteristic | No calibration or drifted values | Continuation in emergency mode possible | | TRANSMISSION, TURBOCLUTCH FUNCTION, calibration code "4009" |
| 4.1.FF | A001 A002 | Transmission e-box | Internal fault (RAM / EEPROM) | Continuation in emergency mode possible | | |
| 5.1.31 | A004 | 4WD 100% key | key / A004 signal fault | Other functions remain active | " 4 WD / Diff. Lock" circuit diagram | 4WD ENHANCED CONTROL |
| | | | Bus fault A004 / A002 | | | |
| 5.1.32 | A004 | 4WD automatic key | Key / A004 signal fault | Other functions remain active | " 4 WD / Diff. Lock" circuit diagram | 4WD ENHANCED CONTROL |
| | | | Bus fault A004 / A002 | | | |
| 5.1.33 | Y009 | 4WD clutch solenoid valve | Actuation fault | 4WD engages | "4WD / Diff. Lock" circuit diagram | 4WD ENHANCED CONTROL |
| 5.1.34 | B047 | Proximity sensor - Steering angle sensor 1 | Signal / switch fault | 4WD diff. lock automatic system out of order | "4WD / Diff. Lock" circuit diagram | 4WD ENHANCED CONTROL |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|--|-------------------------|---|------------------------------------|---------------------------------------|
| 5.1.35 | B047 | Proximity sensor - Steering angle sensor 2 | Signal / switch fault | 4WD diff. lock automatic system out of order | "4WD / Diff. Lock" circuit diagram | 4WD ENHANCED CONTROL |
| 5.1.51 | A004 | Diff. lock 100% key | Key / A004 signal fault | Other functions remain active | "4WD / Diff. Lock" circuit diagram | DIFFERENTIAL LOCK ENHANCED CONTROL |
| | | | Bus fault A004 / A002 | | | |
| 5.1.52 | A004 | Diff. lock automatic system key | Key / A004 signal fault | Other functions remain active | "4WD / Diff. Lock" circuit diagram | DIFFERENTIAL LOCK ENHANCED CONTROL |
| | | | Bus fault A004/A002 | | | |
| 5.1.53 | Y010 | Diff. lock solenoid valve | Actuation fault | Diff. lock disengages | "4WD / Diff. Lock" circuit diagram | DIFFERENTIAL LOCK ENHANCED CONTROL |
| 5.1.54 | S006 | Left brake pedal solenoid switch | Signal fault | Automatic differential lock not available | "4WD / Diff. Lock" circuit diagram | DIFFERENTIAL LOCK ENHANCED CONTROL |
| 5.1.55 | S005 | Right brake pedal solenoid switch | Signal fault | Automatic differential lock not available | "4WD / Diff. Lock" circuit diagram | DIFFERENTIAL LOCK ENHANCED CONTROL |
| 5.1.61 | B003 | Suspension position sensor | Signal fault | No further functions available, suspension remains in last position. Continuation without suspension possible | " Suspension" circuit diagram | SUSPENSION ENHANCED DIAGNOSTIC SYSTEM |
| | | | 8,5 supply fault | | A013 Fuse | |
| 5.1.62 | Y014 | "Raise" suspension solenoid valve | 12V supply fault | No further functions available, suspension remains in last position. Continuation without suspension possible | " Suspension" circuit diagram | SUSPENSION ENHANCED DIAGNOSTIC SYSTEM |
| 5.1.63 | Y013 | "Lower" suspension solenoid valve | 12V supply fault | No further functions available, suspension remains in last position. Continuation without suspension possible | " Suspension" circuit diagram | SUSPENSION ENHANCED DIAGNOSTIC SYSTEM |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
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| 5.1.64 | A004 | "Suspension "ON" key | Fault in signal from key to A004 | Suspension not operational. Continuation without suspension possible | | SUSPENSION ENHANCED DIAGNOSTIC SYSTEM only with single e-box version |
| | | | Fault in bus signal from A004 to A002 | | "CAN/enhanced controls bus" circuit diagram | |
| 5.1.65 | A004 | "Suspension OFF / Lock" key | Fault in signal from key to A004 | Suspension not operational. Continuation without suspension possible | | SUSPENSION ENHANCED DIAGNOSTIC SYSTEM only with single e-box version |
| | | | Fault in bus signal from A004 to A002 | | "CAN/enhanced controls bus" circuit diagram | |
| 5.1.66 | Y012 | Valve, charge suspension | Actuatuion fault | Suspension moves to "Lock" status. | | Only in Farmer 400 |
| 5.1.6E | B003 | Suspension position sensor | Incorrect calibration | Suspension not operational | | SUSPENSION ENHANCED DIAGNOSTIC SYSTEM calibration code "7666" |
| 5.1.00 | A002 | ECU, enhanced control | EPROM checksum error | | | |
| 5.1.91 | A003 | "Rear automatic ON / OFF" key in joystick | Signal fault | | | |
| 5.1.93 | A003 | "Front automatic ON / OFF" key in joystick | Signal fault | | | |
| 5.1.95 | A003 | "Automatic functions STOP" key in joystick | Signal fault | | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|----------------------------------|--|---|----------------------------------|---|
| 5.1.98 | S025 | LS pump pressure-operated switch | Minimum pressure cannot be reached, test Sequence : 0 / 2,4 V | Case A) Valves locked : immediate fault code ; case B) Valves in operation : 1. No fault code initially 2. Valve flow is automatically reduced. 3. If pressure-operated switch remains open for 2 more seconds, then fault code and locking of valves (= no supply to control pressure valve Y032), 4. If pressure-operated switch opens during flow restriction (see above) then flow will be restored after 3 more seconds and no fault code will be generated | "Spool valves 1" circuit diagram | Fault code only after at least 1second > 1000 rpm |
| | | | Pressure-operated switch does not open. Test sequence : 0 / 2.4V | see above | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|-------------|--|--|---|----------------------------------|---|
| 5.1.99 | S026 | Auxilliary pump flow monitor | Minimum flow cannot be reached, test sequence: 0 / 0 V | 1. Control valve flow ist automatically reduced to 20 l/min. 2. Hydraulic oil preheater switched off (if active). 3. Fault code cannot be cleared (i.e. Key reset / restart necessary). | "Spool valves 1" circuit diagram | Fault code only after at least 1 second >1000 rpm |
| | | | Flow monitor does not open. Test sequence: 0 / 0 V | No monitoring | | |
| 5.1.99 | S025 , S026 | LS Pump pressure-operated switch, auxilliary pump flow monitor | Short-circuit to earth in signal line, test sequence: 0/0 V | No monitoring for either pump. | | |
| 5.1.9A | S026 | Auxilliary pump flow monitor | Switch fault (does not close / is still open without oil flow), test sequence 2.4 / 5.1V | No monitoring (from 09/2000 or from A002 Vario V090 software the fault will only be stored if the temperature sensor of control valve 1 for oil heater was over 5°C) | "Spool valves 1" circuit diagram | Fault code appears 8 second after "Ignition ON". Fault code can be cancelled, but appears again after 10 minutes. |
| | | | Signal line to flow monitor is interrupted, test sequence 2.4 / 5.1V | No monitoring (from 09/2000 or from A002 Vario V090 software the fault will only be stored if the temperature sensor of control valve 1 for oil heater was over 5°C) | | |
| 5.1.9B | S025 , S026 | LS Pump pressure-operated switch, auxilliary pump flow monitor | Interruption, while engine is running, between connector and e-box or connector and flow monitor, test sequence: 0 / 8 V | No monitoring | "Spool valves 1" circuit diagram | Fault code with engine running |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|-------------|--|---|--|----------------------------------|--|
| 5.1.9B | S025 , S026 | LS Pump pressure-operated switch, auxilliary pump flow monitor | Interruption even before ignition is switched on between e-box and connector (same as when both components are disconnected), test sequence: constant 8 V | No monitoring | "Spool valves 1" circuit diagram | Fault code already present at "Ignition ON". |
| 5.1.9E | S034 | Engine coolant level switch | Coolant level too low | Major engine damage! | Circuit diagram "Dashpanel" | Only for FAV 700: Fault code can only be cleared temporarily; it is repeated every 2 minutes |
| 5.1.9F | S034 | Engine coolant level switch | Signal fault | No further monitoring | Circuit diagram "Dashpanel" | Only for FAV 700 |
| 5.1.B0 | A002 | ECU, enhanced control | CAN-bus communication restricted | | | EOL reprogramming necessary |
| 5.1.FF | A002 | ECU, enhanced control | Internal fault (RAM / EEPROM) | | | |
| 6.1.01 | A004 | Rear PTO ON / OFF key in cab | Key A004 signal fault Bus fault A004 / A002 | PTO disengages | Circuit diagram "PTO's" | COMFORT REAR PTO |
| 6.1.02 | S020 | Left external Rear "PTO ON / OFF" pushbutton | Signal fault | PTO can be engaged by pressing emergency key in cab for 5 seconds. | Circuit diagram "PTO's" | COMFORT REAR PTO |
| 6.1.03 | S019 | Right external "Rear PTO ON / OFF" pushbutton | Signal fault | PTO can be engaged by pressing emergency key in cab for 5 seconds. | Circuit diagram "PTO's" | COMFORT REAR PTO |
| 6.1.04 | Y008 | Rear PTO clutch solenoid valve | Actuation fault | PTO disengages | Circuit diagram "PTO's" | COMFORT REAR PTO |
| 6.1.05 | B021 | Hall-effect speed sensor at rear PTO clutch | Signal fault | PTO can be engaged by pressing emergency key in cab for 5 seconds. | Circuit diagram "PTO's" | COMFORT REAR PTO |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|---|-------------------------|--|-------------------------|--|
| 6.1.06 | A004 | Rear PTO speed selector key 1 | Key / A004 signal fault | | | Fav900 twin e-box version. COMFORT REAR PTO |
| | | | Bus fault A004 / A002 | | | |
| 6.1.07 | A004 | Rear PTO speed selector key 2 | Signal fault | | | Fav900 twin e-box version. COMFORT REAR PTO |
| | | | Bus fault A004 / A002 | | | |
| 6.1.08 | Y026 | Rear PTO speed 1 solenoid valve | Actuation fault | | | Fav900 twin e-box version. COMFORT REAR PTO |
| 6.1.09 | Y027 | Rear PTO speed 2 solenoid valve | Actuation fault | | | Fav900 twin e-box version. COMFORT REAR PTO |
| 6.1.10 | B020 | Hall-effect speed sensor on rear PTO stub shaft | Signal fault | PTO can be engaged by pressing emergency key in cab for 5 seconds. | | COMFORT REAR PTO |
| 6.1.11 | A004 | Rear PTO automatic mode key | Signal fault | PTO disengages, automatic mode OFF | Circuit diagram "PTO's" | Fav700 COMFORT REAR PTO |
| 6.1.0A | A004 | "Aktiv" key (NA-Version) | Key / A004 signal fault | PTO cannot be engaged | | Only for NA single e-box version. COMFORT REAR PTO |
| 6.1.15 | A004 | NEUTRAL speed selection key | Key / A004 signal fault | PTO speed cannot be modified or selected | Circuit diagram "PTO's" | Only for single e-box version. COMFORT REAR PTO |
| 6.1.16 | A004 | 540 rpm speed selector key | Key / A004 signal fault | PTO speed cannot be modified or selected | Circuit diagram "PTO's" | Only for single e-box version. COMFORT REAR PTO |
| 6.1.17 | A004 | 750 rpm speed selector key | Key / A004 signal fault | PTO speed cannot be modified or selected | Circuit diagram "PTO's" | Only for single e-box version. COMFORT REAR PTO |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|---|--|---|-------------------------|--|
| 6.1.18 | A004 | 1000 rpm speed selector key | Key / A004 signal fault | PTO speed cannot be modified or selected | Circuit diagram "PTO's" | Only for single e-box version. COMFORT REAR PTO |
| 6.1.1A | Y026 | Rear PTO speed 540 solenoid valve | Actuation fault | PTO cannot be engaged | Circuit diagram "PTO's" | Only for single e-box version. COMFORT REAR PTO |
| 6.1.1B | Y027 | Rear PTO speed 750 solenoid valve | Actuation fault | PTO cannot be engaged | Circuit diagram "PTO's" | Only for single e-box version. Not for Fav 900 . COMFORT REAR PTO |
| 6.1.1B | Y026 | Rear PTO speed 750 solenoid valve | Actuation fault | PTO cannot be engaged | Circuit diagram "PTO's" | Only for Fav 900 . ENHANCED CONTROL REAR PTO |
| 6.1.1C | Y028 | Rear PTO speed 1000 solenoid valve | Actuation fault | PTO cannot be engaged | Circuit diagram "PTO's" | Only for single e-box version. Not for Fav 900 COMFORT REAR PTO |
| 6.1.1C | Y027 | Rear PTO speed 1000 solenoid valve | Actuation fault | PTO cannot be engaged | Circuit diagram "PTO's" | Only for Fav 900 . ENHANCED CONTROL REAR PTO |
| 6.1.41 | A004 | Rear PTO ON / OFF key (in cab) | has been pressed for more than 30 seconds, mechanical or electric fault in key | Speed selection moves to neutral , no preselection possible | Circuit diagram "PTO's" | Only for single e-box version COMFORT REAR PTO |
| 6.1.42 | S020 | Right external "Rear PTO ON / OFF" pushbutton | has been pressed for more than 30 seconds, mechanical or electric fault in key | No speed selection, PTO cannot be engaged | Circuit diagram "PTO's" | Only for single e-box version COMFORT REAR PTO |
| 6.1.43 | S019 | Left external "Rear PTO ON / OFF" pushbutton | has been pressed for more than 30 seconds, mechanical or electric fault in key | No speed selection, PTO cannot be engaged | Circuit diagram "PTO's" | Only for single e-box version. COMFORT REAR PTO |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|---|--|--|-------------------------|--|
| 6.1.45 | B021 | Hall-effect speed sensor at rear PTO clutch | Speed selection in neutral, clutch not engaged, B021 shows speed, clutch disc package does not separate, PTO brake non operational | Activating speeds remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode). | Circuit diagram "PTO's" | Only for single e-box version COMFORT REAR PTO |
| | | | Speed is selected, clutch 100% engaged, clutch speed deviates by more than 20 % from engine speed. Clutch is slipping. | Activating speeds remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode). | Circuit diagram "PTO's" | Only for single e-box version. COMFORT REAR PTO |
| | | | PTO clutch speed is lower than that of PTO stub shaft, fault in power supply to Hall-effect sensor B021 | Activating speeds remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode). | Circuit diagram "PTO's" | Only for single e-box version. COMFORT REAR PTO |
| 6.1.4A | A004 | "Active" key (only NA Version) | has been pressed for more than 30 seconds, mechanical or electrical fault in key | No PTO operation possible | | Only for single e-box NA version. COMFORT REAR PTO |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|--|--|--|------------------------|---|
| 6.1.50 | B020 | Rear PTO stub shaft Hall-effect speed sensor | Speed at PTO stub shaft > 1300 rpm, signal fault in Hall-effect sensor (B020 or B021) | Activating speeds remains possible , press "Engage PTO" key for more than 5 seconds (emergency mode) | Circuit diagram "PTO's | Only for Fav700 single e-box version. COMFORT REAR PTO |
| | | | Selected speed is active, speed at stub is lower than clutch speed , power supply fault to Hall-effect sensor B020, speed selection solenoid valve (Y026, Y027, Y028) stuck in "OFF" position. | Electric speed selection remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode). In case of a faulty solenoid valve, corresponding speed cannot be engaged. | Circuit diagram "PTO's | Only for Fav 700 single e-box version. COMFORT REAR PTO |
| 6.1.55 | A004 | NEUTRAL speed selection key | has been pressed for more than 30 seconds, mechanical or electrical fault in key. | All speeds can be selected and engaged. Neutral cannot be selected. | Circuit diagram "PTO's | Only for single e-box version . COMFORT REAR PTO |
| 6.1.56 | A004 | 540 rpm speed selector key | has been pressed for more than 30 seconds, mechanical or electrical fault in key. | As long as "540" is selected, engagement can occur. "1000" and "750" can be selected, press "Engage PTO" key longer than 5 seconds. "540" cannot be selected. | Circuit diagram "PTO's | Only for single e-box version. COMFORT REAR PTO |
| 6.1.57 | A004 | 750 rpm speed selector key | has been pressed for more than 30 seconds, mechanical or electrical fault in key. | As long as "750" is selected, engagement can occur. "1000" and "540" can be selected, press "Engage PTO" key longer than 5 seconds. "750" cannot be selected. | Circuit diagram "PTO's | Only for single e-box version. COMFORT REAR PTO |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|--------------|---|--|---|------------------------|--|
| 6.1.58 | A004 | 1000 rpm speed selector key | has been pressed for more than 30 seconds, mechanical or electrical fault in key. | As long as "1000" is selected, engagement can occur. "750" and "540" can be selected, press "Engage PTO" key longer than 5 seconds. "1000" cannot be selected. | Circuit diagram "PTO's | Only for single e-box version. COMFORT REAR PTO |
| 6.1.60 | B020 B021 | PTO stub shaft Hall-effect speed sensor B020, Hall-effect speed sensor on PTO clutch B021 | Actual speed of stub shaft differs by more than plus / minus 12% from setpoint speed of PTO clutch. Solenoid valve (Y026, Y027, Y028) wrongly wired or seized. Mechanical fault in speed selector. Signal fault at Hall-effect sensor (B020, B021) | Electric speed selection remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode). In case of a faulty solenoid valve, corresponding speed cannot be engaged | Circuit diagram "PTO's | Only for single e-box version . COMFORT REAR PTO |
| 6.1.A1 | A004 | Rear PTO "ON" key | Communication fault | | Circuit diagram "PTO's | Only for single e-box version. COMFORT REAR PTO |
| 6.1.AA | A004 | "Active" key | Communication fault | | | Only for single e-box NA version. COMFORT REAR PTO |
| 6.1.B0 | | | CAN-bus communication restricted | Rear PTO non-operational | | EOL reprogramming necessary |
| 6.1.B5 | A004 | NEUTRAL speed selection key | Communication fault | | | Only for single e-box version. COMFORT REAR PTO |
| 6.1.B6 | A004 | 540 rpm speed selector key | Communication fault | | | Only for single e-box version. COMFORT REAR PTO |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|---|--|--------------------------------|-------------------------|---|
| 6.1.B7 | A004 | 750 rpm speed selector key | Communication fault | | | Only for single e-box version. COMFORT REAR PTO |
| 6.1.B8 | A004 | 1000 rpm speed selector key | Communication fault | | | Only for single e-box version. COMFORT REAR PTO |
| 6.1.C1 | | | Activating speed for automatic operation of PTO/power lift not achieved. | Increase travel speed > 1 km/h | | |
| 7.1.01 | A004 | Front PTO ON / OFF key | Key / A004 signal fault | | Circuit diagram "PTO's" | COMFORT FRONT PTO |
| | | | Bus fault A004 / A002 | | | |
| 7.1.02 | S041 | "Release front PTO brake" external pushbutton | Signal fault | | Circuit diagram "PTO's" | Fav900: COMFORT FRONT PTO |
| 7.1.03 | Y034 | "Release brake" front PTO solenoid valve | Actuation fault | | Circuit diagram "PTO's" | |
| 7.1.04 | Y011 | "PTO clutch" front PTO solenoid valve | Actuation fault | | | COMFORT FRONT PTO |
| 7.1.05 | B002 | Front PTO Hall-effect speed sensor | Signal fault | | Circuit diagram "PTO's" | COMFORT FRONT PTO |
| 7.1.06 | S042 | Front PTO speed sensor 1 solenoid switch | Signal fault | | Circuit diagram "PTO's" | Fav 900 twin e-box version. COMFORT FRONT PTO |
| 7.1.07 | S042 | Front PTO speed sensor 2 solenoid switch | Signal fault | | Circuit diagram "PTO's" | Fav 900 twin e-box version. COMFORT FRONT PTO |
| 7.1.08 | S042 | Front PTO speed sensor 3 solenoid switch | Signal fault | | Circuit diagram "PTO's" | Fav 900 twin e-box version. COMFORT FRONT PTO |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|------------------------------|--|--------------------------------|-------------------------|--|
| 7.1.09 | A004 | Front PTO automatic mode key | Key / A004 signal fault | | Circuit diagram "PTO's" | Fav 700: COMFORT FRONT PTO |
| | | | Bus fault A004 / A002 | | | |
| 7.1.0A | A004 | "Active" key | Key / A004 signal fault | | | Only for NA single e-box version. COMFORT FRONT PTO |
| | | | Bus fault A004 / A002 | | | |
| 7.1.41 | A004 | Front PTO "ON" key | Plausibility error, key has been pressed for more than 30 seconds | | | Only for single e-box version. COMFORT FRONT PTO |
| 7.1.42 | S041 | "Release brake" key | Plausibility error, key has been pressed for more than 30 seconds | | | Only for Fav 900 Single e-box version. COMFORT FRONT PTO |
| 7.1.4A | A004 | "Active" key | Plausibility error, key has been pressed for more than 30 seconds | | | Only for single e-box NA version. COMFORT FRONT PTO |
| 7.1.A1 | A004 | Front PTO "ON" key | Communication fault | | | Only for single e-box version. COMFORT FRONT PTO |
| 7.1.A2 | | | Communication fault | | | Only for single e-box version. COMFORT FRONT PTO |
| 7.1.AA | A004 | "Active" key | Communication fault | | | Only for single e-box NA version. COMFORT FRONT PTO |
| 7.1.C1 | | | Activating speed for automatic operation of PTO/power lift not achieved. | Increase travel speed > 1 km/h | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|-------------------|----------------|--|-------------------------------|---------------------|---|--|
| 8.3.11 | A005; Y021 | Rear EPC , "Raise" function | Fault in signal line to valve | Control locked | "Electrohydraulic power lift control" circuit diagram | REAR EPC SPOOL VALVES - OPERATING STATUS |
| | | | Solenoid valve fault | | | |
| | | | E-box fault | | | |
| 8.3.12 | Y021 | Rear EPC , "Lower" function | Fault in signal line to valve | Control locked | "Electrohydraulic power lift control" circuit diagram | REAR EPC SPOOL VALVES - OPERATING STATUS |
| | | | Solenoid valve fault | | | |
| | | | E-box fault | | | |
| 8.3.14 | S029 | "Raise" rear power lift external pushbotton, cab, left rear | Signal line fault, key fault | Control locked | "Electrohydraulic power lift control" circuit diagram | REAR EPC EXTERNAL PUSHBUTTONS |
| 8.3.15 | S030 | "Lower" rear power lift external pushbotton, cab, left rear | Signal line fault | Control locked | "Electrohydraulic power lift control" circuit diagram | REAR EPC EXTERNAL PUSHBUTTONS |
| 8.3.16 | A005 | Rear EPC control module | Stable voltage < 1 volt | Control locked | "Electrohydraulic power lift control" circuit diagram | REAR EPC EXTERNAL PUSHBUTTONS |
| 8.3.17 | A005 | Rear EPC control module | Supply voltage >18 volt | Control locked | "Electrohydraulic power lift control" circuit diagram | Ub 30 |
| 8.3.18 | S027 | "Raise" rear power lift external pushbotton, cab, right rear | Signal line fault | Control locked | "Electrohydraulic power lift control" circuit diagram | REAR EPC EXTERNAL PUSHBUTTONS |
| | | | Key fault | | | |
| 8.3.19 | S028 | "Lower" rear power lift external pushbotton, cab, right rear | Signal line fault | Control locked | "Electrohydraulic power lift control" circuit diagram | REAR EPC EXTERNAL PUSHBUTTONS |
| | | | Key fault | | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
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| 8.3.21 | | Rotary control for "Position/traction hybrid control" for rear EPC | Signal fault | | | Only for FAV900 with twin control modules |
| 8.3.22 | B030 | Rear EPC position sensor | Signal line fault | Control locked | "Electrohydraulic power lift control" circuit diagram | REAR EPC SETPOINT / POSITION SENSOR |
| | | | Fault in 9.5 V supply to A005 | | | |
| | | | Sensor out of position | | | |
| | | | Sensor fault | | | |
| 8.3.23 | (A004) | Rear EPC "Depth control" setpoint setting | Signal line fault | Control locked | | REAR EPC SETPOINT / POSITION SENSOR |
| 8.3.24 | | Rear power lift "lift height limit" rotary control | Signal fault | Control locked | | Only for FAV900 with twin control modules |
| 8.3.26 | | External position sensor for rear power lift | Signal line fault | Control locked | "Electrohydraulic power lift control" circuit diagram | |
| | | | Sensor out of position | | | |
| | | | Sensor fault | | | |
| 8.3.28 | (A004) | Control console ECU | Fault in rear EPC rapid lift control | "Lift" and "Lower" only possible via external buttons. | "Electrohydraulic power lift control" circuit diagram | REAR EPC ACKNOWLEDGEMENTS / STATUS |
| 8.3.31 | B031 | Rear EPC right draft-sensing pin | Signal line fault | Restricted control quality with traction control | "Electrohydraulic power lift control" circuit diagram | REAR EPC DRAFT-SENSING PIN |
| | | | 9,5 V supply fault | | | |
| | | | Sensor fault | | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
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| 8.3.32 | B032 | Rear EPC left draft-sensing pin | Signal line fault | Restricted control quality with traction control | "Electrohydraulic power lift control" circuit diagram | REAR EPC DRAFT-SENSING PIN |
| | | | Fault in 9,5 V supply to A005 | | | |
| | | | Sensor fault | | | |
| 8.3.33 | G001; G002 | Battery 1; battery 2 | Battery voltage < 11 volts | | "Power supply +Ub" circuit diagram | |
| 8.3.34 | | Rear power lift "Lowering speed" rotary control | Signal fault | Cannot be changed | "Electrohydraulic power lift control" circuit diagram | Only for FAV900 with twin control modules |
| 8.3.35 | | Rear power lift "Operating mode" rotary control | Signal fault | Cannot be changed | "Electrohydraulic power lift control" circuit diagram | Only for FAV900 with twin control modules |
| 8.3.38 | | Rear power lift pressure sensor | Signal fault, pressure sensor fault | Control is continued | "Electrohydraulic power lift control" circuit diagram | Only for FAV900 with twin control modules |
| 8.3.39 | | Rear power lift "Rapid lowering / Hitchlift" switch | Signal fault | Control is continued | "Electrohydraulic power lift control" circuit diagram | Only for FAV900 with twin control modules |
| 8.3.40 | (A004) | Rear power lift rapid lift control | Fault in switch / A004 contact | Lifting and lowering only via external controls | "Electrohydraulic power lift control" circuit diagram | REAR EPC ACKNOWLEDGEMENTS / STATUS |
| | | | CAN (K-Bus) fault A004 / A005 | | | |
| 8.3.41 | (A004) | Rear power lift rapid lift control | Fault in switch / A004 contact | Rapid lowering system not functioning | "Electrohydraulic power lift control" circuit diagram | REAR EPC ACKNOWLEDGEMENTS / STATUS |
| | | | CAN (K-Bus) fault A004 / A005 | | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|------------------------|---|--|--------------------------------|---|------------------------------------|
| 8.3.42 | (A004) | Rear EPC, hitch function | Fault in switch / A004 contact | Hitch function not operational | "Electrohydraulic power lift control" circuit diagram | REAR EPC ACKNOWLEDGEMENTS / STATUS |
| | | | CAN (K-Bus) fault A004 / A005 | | | |
| 8.3.43 | (A004) | Automatic function (switching from control console to joystick) | Fault in switch / A004 | Switching not possible | "Electrohydraulic power lift control" circuit diagram | REAR EPC ACKNOWLEDGEMENTS / STATUS |
| | | | CAN (K-Bus) fault A004 / A005 | | | |
| 8.3.50 | B031 draft-sensing pin | Rear EPC right draft-sensing pin | Draft-sensing pin is overloaded as a result of twisting lift in upper range (90-100% lift height) due to too tight setting | Fault code will not be stored | "Electrohydraulic power lift control" circuit diagram | Display is not shown for FAV900 |
| 8.3.51 | B032 draft-sensing pin | Rear EPC left draft-sensing pin | Draft-sensing pin is overloaded as a result of twisting lift in upper range (90-100% lift height) due to too tight setting | Fault code will not be stored | "Electrohydraulic power lift control" circuit diagram | Display is not shown for FAV900 |
| 9.1.50 | | Spool valve fault | Valve cannot be identified by bus line | No valve operation available | Signal flow diagram A002 CAN II Pin 4 and 5 | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|-------------------|---|-----------------------------------|------|------------------|
| 9.1.5F | | Spool valve fault | Setpoint message missing | Valve moves into neutral position | | FRONT POWER LIFT |
| | | | Configuration message missing | | | |
| | | | Setpoint message is not plausible | | | |
| | | | Configuration message is not plausible | | | |
| | | | Potentiometer or PWM fault | | | |
| 9.1.51 | | Spool valve fault | EEPROM inconsistent | Valve moves into neutral position | | FRONT POWER LIFT |
| 9.1.52 | | Spool valve fault | Supply voltage < 8 volts | Valve moves into neutral position | | FRONT POWER LIFT |
| 9.1.53 | | Spool valve fault | Supply voltage > 18 volts | Valve moves into neutral position | | FRONT POWER LIFT |
| 9.1.54 | | Spool valve fault | Main Piston travel too short due to drop of control pressure below 22 bar | Valve moves into neutral position | | FRONT POWER LIFT |
| | | | Hydraulic oil temperature too low | | | |
| 9.1.5A | | Spool valve fault | Main piston deflected too far | Valve moves into neutral position | | FRONT POWER LIFT |
| 9.1.5B | | Spool valve fault | Floating position is not reached | Valve moves into neutral position | | FRONT POWER LIFT |
| 9.1.5C | | Spool valve fault | Floating position has been set manually | No consequences | | FRONT POWER LIFT |
| 9.1.55 | | Spool valve fault | Overvoltage (> 45 volts) | Valve moves into neutral position | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|--------------------------------------|---|---|----------------------------------|--|
| 9.1.56 | | Spool valve fault | Magnet output stage fault within spool valve | Valve moves into neutral position | | FRONT POWER LIFT |
| 9.1.57 | | Spool valve fault | Internal position sensor fault | Valve moves into neutral position | | FRONT POWER LIFT |
| 9.1.58 | | Spool valve fault | Main piston cannot return into neutral position because of oil contamination | | | FRONT POWER LIFT |
| 9.1.59 | | Spool valve fault | Main piston cannot return into neutral position when switched on because of oil contamination | | | FRONT POWER LIFT |
| 9.1.A0 | A002 | ECU, enhanced control | EEPROM fault while storing | Set values (enhanced controls) are not stored | | |
| 9.1.A1 | A002 | ECU, enhanced control | EEPROM fault while loading | Set values (enhanced controls) cannot be read | | |
| 9.1.B0 | B040 | Position sensor | Not calibrated | No position control available | "Spool valves 2" circuit diagram | FRONT POWER LIFT calibration code "9002" |
| 9.1.B1 | B040 | Position sensor | Signal line fault | No position control available | Circuit diagram "Spool Valves 2" | FRONT POWER LIFT |
| | | | 8.5 V supply Fault | | | |
| | | | Sensor out of position | | | |
| | | | Sensor fault | | | |
| 9.1.B2 | A004 | Depth control setpoint potentiometer | Not calibrated | Setpoint cannot be set | | FRONT POWER LIFT calibration code "9001" |
| 9.1.B3 | A004 | Depth control setpoint potentiometer | Switch / A004 signal fault | Setpoint cannot be set | | FRONT POWER LIFT |
| 9.1.C0 | A004 | Control console | Not available or bus not connected | | | |

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|--|---------|--|---|--|---|--------------------|
| 9.1.C1 | A004 | Automatic (switching from control console to joystick) | Key fault | | | FRONT POWER LIFT |
| 9.1.C2 | A004 | Valve locked | Key fault | | | FRONT POWER LIFT |
| 9.1.C3 | A004 | Floating position | Key fault | | | FRONT POWER LIFT |
| 9.1.C4 | A004 | "Lift" rapid lift control | Key fault | | | FRONT POWER LIFT |
| 9.1.C5 | A004 | "Lower" rapid lift control | Key fault | | | FRONT POWER LIFT |
| 9.1.C6 9.1.C7 9.1.C8 9.1.C9 9.1.CA | A004 | Control Console | CAN-bus fault | Malfunctions which cannot be further specified | | |
| 9.1.D0 | S021 | "Lift" front power lift external pushbutton | Key fault | No function | Circuit diagram "Spool valves 2" | FRONT POWER LIFT |
| 9.1.D1 | S022 | "Lower" front power lift external pushbutton | Key fault | No function | Circuit diagram "Spool valves 2" | FRONT POWER LIFT |
| A.1.10 | | Spool valve fault, valve 1 | Valve cannot be recognised by valve bus | No valve operation available | Signal flow diagram A002 CAN II pin 4 and 5 | |
| A.1.11 | | Spool valve fault, valve 1 | EEPROM inconsistent | Valve moves into neutral position | | |
| A.1.12 | | Spool valve fault, valve 1 | Supply voltage < 8 volts | Valve moves into neutral position | | |
| A.1.13 | | Spool valve fault, valve 1 | Supply voltage > 18 volts | Valve moves into neutral position | | |
| A.1.14 | | Spool valve fault, valve 1 | Main piston travel too short due to drop of control pressure below 22 bar | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| | | | Hydraulic oil temperature too low | | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|----------------------------|---|--|------|--|
| A.1.15 | | Spool valve fault, valve 1 | Overvoltage (<45 volts) | Valve moves into neutral position | | |
| A.1.16 | | Spool valve fault, valve 1 | Magnet output stage fault within spool valve | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.17 | | Spool valve fault, valve 1 | Internal position sensor fault | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.18 | | Spool valve fault, valve 1 | Main piston cannot return to neutral position because of oil contamination. | Undefined and uncontrolled functions can occur , DANGER! | | SPOOL VALVES 1 - 4 |
| A.1.19 | | Spool valve fault, valve 1 | Main piston cannot return to neutral position when switched on because of oil contamination | | | SPOOL VALVES 1 - 4 |
| A.1.1A | | Spool valve fault | Main piston deflected too far | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.1B | | Spool valve fault, valve 1 | Floating position is not reached | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.1C | | Spool valve fault, valve 1 | Floating position has been set manually | No consequences | | SPOOL VALVES 1 - 4 |
| A.1.1F | | Spool valve fault, valve 1 | Setpoint message is missing or not plausible | Valve moves into neutral position | | SPOOL VALVES 1 - 4 setpoint / actual value display |
| | | | Configuration message is missing or not plausible | | | |
| | | | Potentiometer or PWM fault | | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|----------------------------|---|--|---|--------------------|
| A.1.20 | | Spool valve fault, valve 2 | Valve cannot be recognised by valve bus | No valve operation available | Signal flow diagram A002 CAN II pin 4 and 5 | |
| A.1.21 | | Spool valve fault, valve 2 | EEPROM inconsistent | Valve moves into neutral position | | |
| A.1.22 | | Spool valve fault, valve 2 | Supply voltage < 8 volts | Valve moves into neutral position | | |
| A.1.23 | | Spool valve fault, valve 2 | Supply voltage > 18 volts | Valve moves into neutral position | | |
| A.1.24 | | Spool valve fault, valve 2 | Main piston travel too short due to drop of control pressure below 22 bar | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| | | | Hydraulic oil temperature to low | | | |
| A.1.25 | | Spool valve fault, valve 2 | Overvoltage (> 45 volts) | Valve moves into neutral position | | |
| A.1.26 | | Spool valve fault, valve 2 | Magnet output stage fault within spool valve | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.27 | | Spool valve fault, valve 2 | Internal position sensor fault | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.28 | | Spool valve fault, valve 2 | Main piston cannot return into neutral position because of oil contamination. | Undefined and uncontrolled functions can occur , DANGER! | | SPOOL VALVES 1 - 4 |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|----------------------------|--|-----------------------------------|---|--|
| A.1.29 | | Spool valve fault, valve 2 | Main piston cannot return to neutral position when switched on because of oil contamination. | | | SPOOL VALVES 1 - 4 |
| A.1.2A | | Spool valve fault, valve 2 | Main piston deflected too far | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.2B | | Spool valve fault, valve 2 | Floating position is not reached | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.2C | | Spool valve fault, valve 2 | Floating position has been set manually | No consequences | | SPOOL VALVES 1 - 4 |
| A.1.2F | | Spool valve fault, valve 2 | Setpoint message is missing or not plausible | Valve moves into neutral position | | SPOOL VALVES 1 - 4 setpoint / actual value display |
| | | | Configuration message is missing or not plausible | | | |
| | | | Potentiometer or PWM fault | | | |
| A.1.30 | | Spool valve fault, valve 3 | Valve cannot be recognised by valve bus | No valve operation available | Signal flow diagram A002 CAN II pin 4 and 5 | |
| A.1.31 | | Spool valve fault, valve 3 | EEPROM inconsistent | Valve moves into neutral position | | |
| A.1.12 | | Spool valve fault, valve 3 | Supply voltage < 8 volts | Valve moves into neutral position | | |
| A.1.33 | | Spool valve fault, valve 3 | Supply voltage > 18 volts | Valve moves into neutral position | | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|----------------------------|--|---|------|--------------------|
| A.1.34 | | Spool valve fault, valve 3 | Main piston travel too short due to drop of control pPressure below 22 bar | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| | | | Hydraulic oil temperature too low | | | |
| A.1.35 | | Spool valve fault, valve 3 | Overvoltage (> 45 volts) | Valve moves into neutral position | | |
| A.1.36 | | Spool valve fault, valve 3 | Magnet output stage fault within spool valve | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.37 | | Spool valve fault, valve 3 | Internal position sensor fault | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.38 | | Spool valve fault, valve 3 | Main piston cannot return into neutral position because of oil contamination. | Undefined and uncontrolled functions can occur, DANGER! | | SPOOL VALVES 1 - 4 |
| A.1.39 | | Spool valve fault, valve 3 | Main piston cannot return to neutral position when switched on because of oil contamination. | | | SPOOL VALVES 1 - 4 |
| A.1.3A | | Spool valve fault, valve 3 | Main piston deflected too far | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.3B | | Spool valve fault, valve 3 | Floating position is not reached | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.3C | | Spool valve fault, valve 3 | Floating position has been set manually | No consequences | | SPOOL VALVES 1 - 4 |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|----------------------------|---|---|---|--|
| A.1.3F | | Spool valve fault, valve 3 | Setpoint message is missing or not plausible | Valve moves into neutral position | | SPOOL VALVES 1 - 4 setpoint / actual value display |
| | | | Configuration message is missing or not plausible | | | |
| | | | Potentiometer or PWM fault | | | |
| A.1.40 | | Spool valve fault, valve 4 | Valve cannot be recognised by valve bus | No valve operation available | Signal flow diagram A002 CAN II pin 4 and 5 | |
| A.1.41 | | Spool valve fault, valve 4 | EEPROM inconsistent | Valve moves into neutral position | | |
| A.1.42 | | Spool valve fault, valve 4 | Supply voltage < 8 volts | Valve moves into neutral position | | |
| A.1.43 | | Spool valve fault, valve 4 | Supply voltage > 18 volts | Valve moves into neutral position | | |
| A.1.44 | | Spool valve fault, valve 4 | Main piston travel too short due to drop of control pressure below 22 bar | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| | | | Hydraulic oil temperature too low | | | |
| A.1.45 | | Spool valve fault, valve 4 | Overvoltage (> 45 Volt) | Valve moves into neutral position | | |
| A.1.46 | | Spool valve fault, valve 4 | Magnet output stage fault within spool valve | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.47 | | Spool valve fault, valve 4 | Internal position sensor fault | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.48 | | Spool valve fault, valve 4 | Main piston cannot return to neutral position because of oil contamination. | Undefined and uncontrolled functions can occur, DANGER! | | SPOOL VALVES 1 - 4 |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|----------------------------|--|-----------------------------------|------|--|
| A.1.49 | | Spool valve fault, valve 4 | Main piston cannot return to neutral position when switched on because of oil contamination. | | | SPOOL VALVES 1 - 4 |
| A.1.4A | | Spool valve fault, valve 4 | Main piston deflected too far | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.4B | | Spool valve fault, valve 4 | Floating position is not reached | Valve moves into neutral position | | SPOOL VALVES 1 - 4 |
| A.1.4C | | Spool valve fault, valve 4 | Floating position has been set manually | No consequences | | SPOOL VALVES 1 - 4 |
| A.1.4F | | Spool valve fault, valve 4 | Setpoint message is missing or not plausible | Valve moves into neutral position | | SPOOL VALVES 1 - 4 setpoint / actual value display |
| | | | Configuration message is missing or not plausible | | | |
| | | | Potentiometer or PWM fault | | | |
| A.1.A0 | A002 | E-box | EEPROM fault while storing | | | - |
| A.1.A1 | A002 | E-box | EEPROM fault while loading | | | - |
| A.1.A2 | | | More valves connected than registered via end-of-line programming. Program | Not all valves can be operated | | - |
| A.1.B0 | A003 | Crossgate lever | Not calibrated | Valves cannot be operated | | Calibration code "1001" |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|--|--|---------------------------|----------------------------------|------------------------|
| A.1.B1 | A003 | Crossgate lever | X- axis signal fault | Valves cannot be operated | Circuit diagram "Spool valves 1" | SPOOL VALVES OPERATION |
| A.1.B2 | A003 | Crossgate lever | Y- axis signal fault | Valves cannot be operated | Circuit diagram "Spool valves 1" | SPOOL VALVES OPERATION |
| A.1.B3 | A003 | Crossgate lever | Interference with X- and Y-axis signals; crossgate lever missing | Valves cannot be operated | Circuit diagram "Spool valves 1" | SPOOL VALVES OPERATION |
| A.1.B4 | A003 | Crossgate lever | Zero position signals of X- and Y-axes are not identical to the "Rest position" signal (=plausibility check) | Valves cannot be operated | Circuit diagram "Spool valves 1" | SPOOL VALVES OPERATION |
| A.1.B5 | A003 | Crossgate lever | "Rest position" signal fault | Valves cannot be operated | Circuit diagram "Spool valves 1" | SPOOL VALVES OPERATION |
| A.1.C0 | A004 | Side console | Not available or bus not connected | | | - |
| A.1.C1 | A004 | Automatic (switching from control console to joystick) | Key fault | | | SPOOL VALVES OPERATION |
| A.1.C2 | A004 | Valve locked | Key fault | | | SPOOL VALVES OPERATION |
| A.1.C5 | A004 | Switching function | Key fault | | | SPOOL VALVES OPERATION |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|--|---------|---|---|---|----------------------------------|---|
| A.1.C6 A.1.C7 A.1.C8 A.1.C9 A.1.CA | A004 | Control console | CAN-bus fault | Malfunctions which cannot be further specified | | - |
| A.1.D1 | A003 | Joystick button for spool valve 3 Lifting / Lowering | Key fault | No valve operation available | | SPOOL VALVES OPERATION |
| A.1.D3 | A003 | Joystick button for spool valve 4 Lifting / Lowering | Key fault | No valve operation available | | SPOOL VALVES OPERATION |
| A.1.D4 | S023 | Release for external operation / position of front power lift | Solenoid switch or signal fault | Impossible to switch mode from hydraulic connection to front power lift | Circuit diagram "Spool valves 1" | |
| A.1.D6 | S021 | External "Lift" pushbutton | | No valve operation available | Circuit diagram "Spool valves 1" | STANDARD FRONT POWER LIFT or COMFORT FRONT POWER LIFT EPC |
| A.1.D7 | S036 | Hydraulic oil level sensor | Break in cable or sensor disconnected | No further monitoring | Circuit diagram "Spool valves 1" | Single e-box versions (cf. 0.1.55) ENHANCED CONTROL STEERING FLUID LEVELS |
| A.1.D9 | S036 | Hydraulic oil level sensor | Tank is empty | All valves are locked | Circuit diagram "Spool valves 1" | ENHANCED CONTROL STEERING FLUID LEVELS |
| A.1.DA | B022 | Pressure-operated switch for kickout (NA) | Switch fault | "Kickout" function not available | Circuit diagram "Spool valves 1" | |
| A.1.DB | | | Hydraulic oil tank characteristic implausible | Incorrect tank display | | EOL reprogramming necessary |

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**Tractor / General system
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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|---------|---------------------------------|---|--|----------------------------------|----------------|
| A.1.DC | | | Hydraulic oil priority volume greater than pump volume. Reduce hydraulic oil priority volume. | | | |
| A.1.E0 | | | Not all conditions which are required for switching are met | Switching from EPC to DA and vice versa impossible | | |
| A.1.E1 | | | Switch fault | Switching from EPC to DA and vice versa impossible | | |
| A.1.E2 | | | Pilot valve fault | Switching from EPC to DA and vice versa impossible | | |
| A.1.E3 | | | Shutoff valve fault | Switching from EPC to DA and vice versa impossible | | |
| A.1.E4 | | | EPC is not available, not detected | Switching from EPC to DA and vice versa impossible | | |
| A.1.E5 | | | Mecanical problem within spool valve | Switching from EPC to DA and vice versa impossible | | |
| A.1.F0 | Y032 | Control pressure solenoid valve | Fault in electric actuation system or solenoid valve. | Valves in neutral position | Circuit diagram "Spool valves 1" | |

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| Fault code | Id code | Brief description | Description | Consequences | Link | FENDIAS / Note |
|------------|-------------|------------------------|---|---|--|--|
| A.1.F1 | Y033 MVV | "Flush valve" solenoid | 12V supply fault | No oil heating during start-up process for LS pump at low ambient temperature | Circuit diagram "Suspension" | SPOOL VALVES OVERVIEW OF OPERATION VALVES 1 - 4 |
| A.1.F1 | A013 | Fuseboard | Overall 8.5 V power supply failure (multiple fault codes) | Fault in suspension and other faults | Circuit diagram "Electronics power supply" | No FENDIAS diagnosis possible. |

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| Message - symptom - fault | | | | | | | | | | | | |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|--|--|
| A | | | | | | | | | | | | |
| | B | | | | | | | | | | | |
| | | C | | | | | | | | | | |
| | | | D | | | | | | | | | |
| | | | | E | | | | | | | | |
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| X O | likely possible | | | | | | | | | | | | Fault | Cause | Action, if necessary see ... |
|--------|-----------------|---|---|---|---|---|---|---|---|---|--|--|---------------------------------------|--|--|
| A | B | C | D | E | F | G | H | J | K | L | | | | | |
| X | | | | | | | | | | | | | Front axle load too high | | |
| X | | | | | | | | | | | | | Raise valve Y014 | Fault in coil / cartridge | |
| | X | | | | | | | | | | | | Lower valve Y013 | Fault in coil / cartridge | |
| X | | | | | | | | | | | | | Raise nozzle BI 3 | Blocked | Visual inspection, blow through, if nec. |
| | X | | | | | | | | | | | | Lower nozzle BI 4 | Blocked | Visual inspection, blow through, if nec. |
| X | | | | | | | | | | | | | Pressure duct open | Bleed point AV 1/2 open | Check Ma = 20 Nm |
| | | X | | | | | | | | | | | Leak from B duct | Non-return valve RV2 | Blow through / replace |
| | | X | | | | | | | | | | | to P or A | Raise valve SV2 | Blow through / replace |
| | | X | | | | | | | | | | | | Bleed point AV2 | Closed? Ma = 20 Nm |
| | | | X | O | | | | | | | | | Leak | Lower valve SV1 | Blow through / replace |
| | | | X | O | | | | | | | | | from A duct to T | Bleed point AV1 | Closed? Ma = 20 Nm |
| | | | X | O | | | | | | | | | | Non-return valve DBV-HPS 250 bar | Blow through / replace |
| | | | | X | | | | | | | | | Leak in cylinder | Oil flowing between piston and rod sides | |
| | | | | | | | X | | | | | | 200 bar charge pressure not available | Fault in charge valve MVL/Y012 | Generate 200 bar elsewhere, if nec. replace |
| | | | | | | | O | | | | | | | Shuttle valve WLS1 leaking / not available | This fault would affect entire hydraulic system! |
| | | | | | X | | | | | | | | Accumulator capacity not available | Fault in diaphragm accumulator ASP1/2, ZSP | Replace |

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|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Troubleshooting chart for front suspension | B |
|---|--|----------|

| X O | likely possible | | | | | | | | | | | Fault | Cause | Action, if necessary see ... |
|--------|-----------------|---|---|---|---|---|---|---|---|---|---|---|--|---|
| | A | B | C | D | E | F | G | H | J | K | L | | | |
| | | | | | | | X | X | | | | Raise/lower valve correctly wired, though valve cartridges mixed up | Valves do not have identical function | Check: Raise=white-chromated Lo- wer=yellow-chroma- ted |
| X | | | | | | | | | X | | | Position sensor B003 | Fault in mech. connection | |
| | | | | | | | | | | X | | Suspension (characteristic) incorrect | Faulty diaphragm in accumulator, i.e. reduction in nitrogen pre-tension pressure | Pre-tension pressure can only be measured with special instrument! If nec., compare by replacing accumulator. Caution! Pressure in suspension must be relieved! |
| | | | | | | | | | | | X | | Wrong accumulator fitted | Check / replace Caution! Pressure in suspension must be relieved! |

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| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Troubleshooting chart for the steering | B |
|---|--|----------|

| Message - symptom - fault | | | | | | | | | | | | |
|----------------------------------|---|---|---|---|---|---|--|--|--|--|--|-------------------------------------|
| A | | | | | | | | | | | | Steering heavy / "lack of pressure" |
| | B | | | | | | | | | | | Vibrations |
| | | C | | | | | | | | | | Steering only initially heavy |
| | | | D | | | | | | | | | |
| | | | | E | | | | | | | | |
| | | | | | F | | | | | | | |
| | | | | | | G | | | | | | |
| | | | | | | | | | | | | |

| X O | likely possible | | | | | | | | | | | | Fault | Cause | Action, if necessary see ... |
|--------|-----------------|---|---|---|---|---|---|---|---|---|---|--|--|--|------------------------------|
| | A | B | C | D | E | F | G | H | J | K | L | | | | |
| X | | | | | | | | | | | | | Front axle load too high | | |
| X | | | | | | | | | | | | | Lack of working pressure in all other consumers too | | Refer to general faults |
| X | | | | | | | | | | | | | Lack of working pressure only when steering | Steering-side leak in shuttle valve WLS1 | Blow through / replace |
| O | | | | | | | | | | | | | | Steering pressure-relief valve DBV-L too low | |
| X | | | | | | | | | | | | | Priority valve PVL not operating | Piston not functioning | Blow through / replace |
| X | | | | | | | | | | | | | | Non-return valve RV5 d=0.5 blocked | Blow through / replace |
| X | | | | | | | | | | | | | | Non-return valve RV6 d=1.2 blocked | Blow through / replace |
| | X | | | | | | | | | | | | Priority valve PVL regulating poorly | Piston not functioning smoothly | Blow through / replace |
| | X | | | | | | | | | | | | | Non-return valve RV5 blocked | Blow through / replace |
| | X | | | | | | | | | | | | | Non-return valve RV6 blocked | Blow through / replace |
| X | | X | | | | | | | | | | | LS command is delayed or attenuated when forwarded | Dirt on diaphragm in LS duct of servostat | Blow through |
| | X | | | | | | | | | | | | Air in circuit (in P to steering unit and steering cylinder) | | Bleed |

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| 24.10.2000 | a | 1/1 | | 0000 | B | 000003 |

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|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system General troubleshooting chart for the hydraulics | B |
|----------------------------------|---|----------|

| Message - symptom - fault | | | | | | | | | | | | |
|---------------------------|---|---|---|---|---|--|--|--|--|--|--|--|
| A | | | | | | | | | | | | |
| | B | | | | | | | | | | | |
| | | C | | | | | | | | | | |
| | | | D | | | | | | | | | |
| | | | | E | | | | | | | | |
| | | | | | F | | | | | | | |
| | | | | | | | | | | | | |

| X O | likely possible | | | | | | | | | | | Fault | Cause | Action, if necessary see ... |
|--------|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|--|
| | A | B | C | D | E | F | G | H | J | K | L | | | |
| | | | | | | X | | | | | | System-related; i.e. not a fault! | With dynamic constant load at high pressure level | |
| | | | | | | O | | | | | | | When bio-oils are used, hydraulic systems may be louder in operation | |
| X | | | | | | | | | | | | Lack of cooling | Contaminated radiator | Check |
| O | | | | | | | | | | | | | Insufficient residual oil volume in tank | Check |
| O | | | | | | | | | | | | | Visco fan does not kick in | Check |
| X | | | | | | | | | | | | | Engine speed too low | |
| X | | | | | X | O | | | | | | Pressure overlap / overpressure effect at | Working pressure of 200 bar increased without authority | Symptom: engine speed depressed and |
| O | | | | | X | O | | | | | | | Pressure relief too low | |
| X | | | | | O | | | | | | | LS pump constantly working at excessive pressure | Implement cannot reach setpoint | |
| X | | | | | X | | | | | | | | Consumer running against stop too long, e.g. seized valve or time function of electrohydraulic control valve (EHS) too long | |
| X | | | | | X | | | | | | | | Fault in charge valve; oil leaking from P line to LS; (=constant charge effect) | |
| X | | | | | X | O | | | | | | Hydr. oil preheater (in tractors with EHS valves) | Does not switch off (required time at -20°C normally approx. 15 to 20 mins) | Note: noise during intended preheating of oil (=flushing) is not a fault |
| X | | | | | | O | | | | | | | Priority valve does not switch / seizes | |
| O | | | | | | O | | | | | | Auxiliary pump working against pressure | Other throttle valves have free flow | |
| | O | | | | | | | | | | | | 200 bar pressure relief adjusted | |

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| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system General troubleshooting chart for the hydraulics | B |
|---|--|----------|

| X | likely possible | | | | | | | | | | | Fault | Cause | Action, if necessary see ... |
|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--|---|--|
| O | A | B | C | D | E | F | G | H | J | K | L | | | |
| X | X | | | | | | | | | | | | LS pump leaking too much inside | |
| | | | | X | | | | | | | | Required oil volume is greater than possible pump output | Engine speed too low | |
| | | X | | | | | | | | | | Fault in LS command | Leak / pressure drop in shuttle valve WLS1 | |
| | | X | | | | | | | | | | | Air in LS duct | See also "Operating with ext. control blocks" |
| | | X | | | | | | | | | | | Blockage e.g. dirt before a shuttle valve | |
| | | | | | | X | | | | | | LS pump entraining air | Tank empty | Check operation of level sensor FSG/S036 (not fitted to 400) |
| | | | | | | X | | | | | | | Oil foaming (=air bubbles) because auxiliary pump is entraining air | |
| | | | | | | X | | | | | | Transmission of structure-borne noise | Another component touching hydraulic pipe or similar | |
| O | | | | | | X | | | | | | LS pump is worn | | To measure oil leak volume (not possible in FAV 900) see |
| O | | | | | | O | | | | | | Auxiliary pump PL is worn | | |

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Troubleshooting chart: instrument control block at Pext and LSext | B |
|---|---|----------|

| Message - symptom - fault | | | | | | | | | | | | |
|----------------------------------|---|---|---|---|---|---|--|--|--|--|--|--|
| A | | | | | | | | | | | | Rise in oil temperature |
| | B | | | | | | | | | | | Commands not being carried out, i.e. "implement not working" |
| | | C | | | | | | | | | | Commands are carried out only with a delay |
| | | | D | | | | | | | | | Performance (pressure / volume) at implement too weak |
| | | | | E | | | | | | | | |
| | | | | | F | | | | | | | |
| | | | | | | G | | | | | | |

| X O | likely possible | | | | | | | | | | | | Fault | Cause | Action, if neces- sary see ... |
|--------|-----------------|---|---|---|---|---|---|---|---|---|--|--|---|---|---|
| A | B | C | D | E | F | G | H | J | K | L | | | | | |
| X | | | | | | | | | | | | | Lack of cooling | Contaminated radiator | Check |
| O | | | | | | | | | | | | | | Insufficient residual oil volume in tank | Check |
| O | | | | | | | | | | | | | | Visco fan does not kick in | Check |
| X | | | | | | | | | | | | | | Engine speed too low | |
| X | | | | | | | | | | | | | LS pump working constantly against pressure | Implement cannot reach setpoint | Check |
| X | | | | | | | | | | | | | | Consumer working against stop too long e.g. seized valve or time function of EHS valve too long | Check |
| | | | X | | | | | | | | | | Transmission of command in LS line corrupted | Air in LS line (especially at commissioning) | Bring valve to max. pressure capacity and then bleed LS line as close as poss. to LS pump |
| | | | X | X | | | | | | | | | Excessive pressure drop in P connecting line | In Fav 900: LS pressure increase ("Control pressure increase") not actuated | Check |
| | | | O | | | | | | | | | | | Connection cross-sections too small | |
| X | X | | | | | | | | | | | | Control block not matched to LS, i.e. pressure supply system working as open system | "LS screw" not corrected | See relevant Operating Manual for implement |
| | | | | | | | | | | | | | | | |

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|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Troubleshooting chart: implement control block at tractor valve | B |
|---|---|----------|

| Message - symptom - fault | | | | | | | | | | | | |
|---------------------------|---|---|---|---|---|---|--|--|--|--|--|--|
| A | | | | | | | | | | | | Rise in oil temperature |
| | B | | | | | | | | | | | Commands not being carried out, i.e. "implement not working" |
| | | C | | | | | | | | | | |
| | | | D | | | | | | | | | |
| | | | | E | | | | | | | | |
| | | | | | F | | | | | | | |
| | | | | | | G | | | | | | |

| X O | likely possible | | | | | | | | | | | | Fault | Cause | Action, if neces- sary see ... |
|--------|--------------------|---|---|---|---|---|---|---|---|---|--|--|--|---|---|
| A | B | C | D | E | F | G | H | J | K | L | | | | | |
| X | | | | | | | | | | | | | Lack of cooling | Contaminated radiator | Check |
| O | | | | | | | | | | | | | | Insufficient residual oil volume in tank | Check |
| O | | | | | | | | | | | | | | Visco fan does not kick in | Check |
| X | | | | | | | | | | | | | | Engine speed too low | |
| X | | | | | | | | | | | | | LS pump working constantly against pressure | Implement cannot reach setpoint | |
| X | | | | | | | | | | | | | | Consumer working against stop too long e.g. seized valve or time function of EHS valve too long | |
| X | | | | | | | | | | | | | LS pump constantly working at excessive pressure | Set quantity at tractor valve is higher than consumers' setpoint quantity | |
| X | X | | | | | | | | | | | | Control block not matched to open system | "LS screw" not corrected | See relevant Operating Manual for implement |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

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| Farmer 400 Fav 700 Fav 900 | Tractor / General system Component overview | D |
|---|--|----------|

Note:

The entries in the tractor range columns refer to the relevant circuit diagrams (sheet no.).

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------|---|---------------------------------|--|--|---|---|
| A001 | Transmission control unit e-box | | | 3, 6, 19, 20, 25, 26 | | |
| A002 | E-box (enhanced-control twin box version) | X031 | 3, 6, 19, 20, 25, 26, 27, 28, 29, 30 | 3, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29 | 3, 6, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30 | 3, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33 |
| A003 | Joystick | X032 | | 19, 24, 25 | 3, 19, 22, 24, 26 | 3, 20, 23, 25, 27, 33 |
| A004 | Control console | X033 | 3, 6, 19, 20, 21, 22, 23, 26, 28, 30 | 3, 19, 20, 22, 24 | 3, 6, 19, 20, 21, 22, 23, 24, 26, 28, 30 | 3, 6, 20, 21, 22, 23, 24, 25, 27, 29, 30, 31, 33 |
| A005 | EPC e-box | X034 | 3, 18, 19, 20, 22 | 18, 20, 22 | 3, 18, 19, 20, 22 | 3, 19, 20, 21, 23 |
| A006 | Keypad on front dashboard | X035 | 21 | 21 | 21 | 22 |
| A007 | Instrument panel | X100, X101, X102 | 3, 5, 7, 8, 18, 19, 20, 21, 22 | 5, 7, 8, 18, 20, 21, 22, 25 | 3, 5, 7, 8, 18, 19, 20, 21, 22, 24, 26 | 3, 5, 7, 9, 19, 20, 21, 22, 23, 27, 33 |
| A008 | Vario terminal | X036, X461 | 3, 19, 20, 31 | 19, 20, 24, 30 | 3, 19, 20, 31 | 3, 20, 21, 32 |
| A009 | Actuator unit | X037 | 25, 26 | 25 | 25, 26 | 26, 27 |
| A010 | Thermostat, electronic | X281 | 14 | 14 | 14 | 15 |
| A011 | Radar sensor | X039 | 22 | 22 | 22 | 5, 23 |
| A012 | Cold-start aid | X081 | 5 | 5 | 5 | |
| A013 | Fuse board ABC | X200, X201, X202 | 19, 20, 21, 25, 26, 28, 29, 30, 31 | 19, 20, 21, 23, 24, 25, 27, 28, 29, 30 | 19, 20, 21, 24, 25, 26, 28, 29, 30, 31 | 20, 21, 22, 25, 26, 27, 29, 30, 31, 32, 33 |
| A015 | Radio | X261, X262, X383, X384 | 13 | 13 | 13 | 14 |
| A016 | Heated mirror board | X263, X264 | 16 | 16 | 16 | 17 |
| A017 | LBS bus terminal board | X205 | 31 | 30 | 31 | 32 |
| A018 | Tank | | | | | |
| A020 | VP44 (electronic fuel injection pump) | X046 | | | | 33 |
| A021 | EDC e-box | X047, X048 | | | | 5, 26, 33 |
| A023 | Front LBS bus terminal | | | | | 23 |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------|------------------------------------|---------------------|---------------|-----------------------|----------------------------|---------|
| B001 | Steering angle sensor 1 | X403 | | 29 | | 31 |
| B002 | Front PTO Hall-effect speed sensor | X151 | 29 | 28 | 29 | 30 |

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| Farmer 400 Fav 700 Fav 900 | Tractor / General system Component overview | D |
|---|--|----------|

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------|--|---------------------|---------------|-----------------------|----------------------------|---------|
| B003 | Suspension position sensor | X152 | 28 | 27 | 28 | 29 |
| B004 | Underpressure switch | X153 | 21 | 21 | 21 | 22 |
| B005 | Engine temperature sensor | X154 | 21 | 21 | 21 | 33 |
| B006 | Intercooler temperature sensor | X155 | 21 | 21 | 21 | 33 |
| B007 | Fuel level sensor | X156 | 21 | 21 | | |
| B008 | High-pressure sensor | X157 | 26 | 25 | 26 | 27 |
| B009 | Discharge temperature sensor | X158 | 26 | 25 | 26 | 27 |
| B010 | Engine Hall-effect speed sensor 1 | X159 | 26 | 25 | 26 | 27 |
| B011 | Engine Hall-effect speed sensor 2 | X160 | 26 | 25 | 26 | 27 |
| B012 | Engine oil pressure sensor | X161 | 21 | 21 | 21 | 22 |
| B013 | Hydraulic oil temperature thermostat | X162 | 21 | 21 | 21 | 22 |
| B014 | Hydrostat accumulator shaft speed sensor | X163 | 26 | 25 | 26 | 27 |
| B015 | Bevel pinion speed sensor | X164 | 26 | 25 | 26 | 27 |
| B016 | Range sensor position sensor | X165 | 26 | 25 | 26 | 27 |
| B017 | Clutch pedal position sensor | X166 | 26 | 25 | 26 | 27 |
| B018 | Setpoint engine speed sensor | X167 | 26 | 25 | 26 | |
| B019 | Compressed-air volume pressure transducer | X168 | 21 | 21 | 21 | 22 |
| B020 | Rear PTO Hall-effect speed sensor | X169 | 29 | 28 | 29 | 30 |
| B021 | Rear PTO Hall-effect speed sensor after clutch | X170 | 29 | 28 | 29 | 30 |
| B022 | Kickout pressure-operated switch | X171 | | 23 | 23 NA | 24 |
| B023 | Cold-start aid temperature sensor | | | | | |
| B024 | Steering angle sensor 2 | X404 | | 29 | | 31 |
| B025 | EDC speed sensor | X172 | | | | 33 |
| B026 | EDC needle motion sensor | X173 | | | | 33 |
| B027 | Water temperature sensor | X174 | | | | 33 |
| B028 | Intercooler pressure sensor | X175 | | | | 33 |
| B029 | Accelerator position sensor | X176 | | | | 33 |
| B030 | Signal position sensor | X178 | 22 | 22 | 22 | 23 |
| B031 | Right draft-sensing pin | X179 | 22 | 22 | 22 | 23 |
| B032 | Left draft-sensing pin | X180 | 22 | 22 | 22 | 23 |
| B033 | Discharge temperature sensor (AB sensor) | | | | | |
| B034 | Fuel level sensor | X182 | | | 21 | 22 |
| B035 | Hand throttle position sensor | X183 | | | | 33 |
| B036 | Tank sensor 1 | | | | | |
| B037 | Tank sensor 2 | | | | | |
| B038 | EDC accelerator position sensor | X189 | | | | 33 |
| B040 | Front power lift position sensor | X188 | | 24 | 24 | 25 |
| B045 | Temperature sensor (air-conditioning NTC2) | X195 | 14 | 14 | 14 | 15 |
| B046 | Temperature sensor (air-conditioning NTC1) | X196 | 14 | 14 | 14 | 15 |
| B047 | Steering angle switch (4WD diff. lock) | X401 | 30 | | 30 | |
| B050 | Left loudspeaker | X311, X312 | 13 | 13 | 13 | 14 |
| B051 | Right loudspeaker | X289, X290 | 13 | 13 | 13 | 14 |

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|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Component overview | D |
|---|--|----------|

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------|---|------------------------|---------------|-----------------------|----------------------------|----------|
| E001 | H4 headlamp right | X350 | 7 | 7 | 7 | 8 |
| E002 | H4 headlamp left | X351 | 7 | 7 | 7 | 8 |
| E003 | H4 auxiliary headlamp right | X352 | 7 | 7 | 7 | 7 |
| E004 | H4 auxiliary headlamp left | X353 | 7 | 7 | 7 | 7 |
| E005 | Sidelight front right | X372, X378, X380 | 7, 8 | 7, 8 | 7, 8 | 7, 9 |
| E006 | Sidelight front left | X373, X379, X381 | 7, 8 | 7, 8 | 7, 8 | 7, 9 |
| E007 | Tail light rear right | X121 | 7, 8, 9 | | | 8, 10 |
| E008 | Tail light rear left | X120 | 7, 8, 9 | 7, 8, 9 | 7, 8, 9 | 8, 9, 10 |
| E009 | Licence plate lighting right | X374, X375 | 7 | 7 | 7 | 7 |
| E010 | Licence plate lighting left | X376, X377 | 7 | 7 | 7 | 7 |
| E011 | Work light in roof rear left | X385, X386, X387 | 12 | 12 | 12 | 13 |
| E012 | Work light in roof rear left | X388, X389, X390 | 12 | 12 | 12 | 13 |
| E013 | Work light in roof front right | X291 | 11 | 11 | 11 | 12 |
| E014 | Work light in roof front left | X294 | 11 | 11 | 11 | 12 |
| E015 | Work light front on right direction indicator | X292, X293 | 11 | 11 | 11 | 12 |
| E016 | Work light front on left direction indicator | X295, X296 | 11 | 11 | 11 | 12 |
| E017 | Work light on tail light bracket right | X366 | 12 | 12 | 12 | 13 |
| E018 | Work light on tail light bracket left | X367 | 12 | 12 | 12 | 13 |
| E019 | UB cab lighting | X308, X309, X310 | 13 | 13 | 13 | 14 |
| E020 | EPC lighting | X282, X283 | 11 | 11 | 11 | 12 |
| E021 | Rotating beacon right | X346 | 10 | | | 11 |
| E022 | Rotating beacon left | X345 | 10 | | | 11 |
| E023 | Heated rear window | X259, X260 | 16 | 16 | 16 | 17 |
| E024 | Heated mirror connection right | X337, X338 | 16 | 10, 16 | 16 | 17 |
| E025 | Heated mirror connection left | X339, X340 | 16 | 10, 16 | 16 | 17 |
| E026 | Indicator right rear roof-mounted | X122 | 7 | 7 | | |
| E027 | Indicator left rear roof-mounted | | | | | |
| E028 | Indicator right USA front | | | | | |
| E029 | Indicator left USA front | | | | | |
| E030 | Corner light right | X358 | | | | 12 |
| E031 | Corner light left | X359 | | | | 12 |
| E032 | EDC diagnostic lamp | | | | | |

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| Farmer 400 Fav 700 Fav 900 | Tractor / General system Component overview | D |
|---|--|----------|

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------|---|---------------------|---------------|-----------------------|----------------------------|---------|
| E033 | Fuel heater | X141 | | | | 5 |
| E034 | Licence plate lighting in tail light left | | | | | |
| E035 | Extra-wide light (Italy) | X458 X459 | | | | 8 |
| E036 | Extra-wide light (Italy) | X463 X464 | | | | 8 |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------|---------------|------------------------|---------------|-----------------------|----------------------------|---------|
| G001 | Battery | X060, X066, X067 | 2, 3 | 2, 3 | 2, 3 | 2, 3 |
| G002 | Alternator | X062, X064 | 2, 5 | 2, 5 | 2, 5 | 2, 5 |
| G003 | Battery 2 | X058, X059 | | | | 2 |
| G004 | 2. Alternator | X449, X450 | | | | 2 |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------|-------------------------|---------------------|---------------|-----------------------|----------------------------|---------|
| H005 | Horn | X998, X999 | 7 | 7 | 7 | 8 |
| H006 | Beeper | | 21 | 21 | 21 | 22 |
| H010 | Telltale 2nd alternator | X210 | | | | 5 |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------|--|---------------------|---------------|-----------------------|----------------------------|---------|
| K001 | +Ub 15 relay | X070 | 2 | 2 | 2 | 2 |
| K002 | +Ub 58 relay | X073 | 2, 7 | 2, 7 | 2, 7 | 2, 7 |
| K003 | +Ub 15E relay | | | 2 | | |
| K004 | 56A relay | X077 | 7 | 7 | 7 | 7 |
| K005 | 56B relay | X078 | 7 | 7 | 7 | 7 |
| K006 | Cold-start aid telltale relay | | | | | |
| K007 | Brake relay | X079 | 9 | 7, 9 | 9 | 10 |
| K008 | Starter inhibitor relay | X075 | 4 | 4 | 4 | 4 |
| K009 | Windscreen wiper pulse generator | X093 | 10 | 10 | 10 | 11 |
| K010 | Direction indicator controller relay | X094 | 8 | 8 | 8 | 9 |
| K011 | EPC relay Ub | | | 22, 23 | | |
| K013 | Relay for 3rd hydraulic circuit | X097 | 24 | 24 | 24 | 25 |
| K014 | Exhaust brake relay | X084 | | 6 | | 6 |
| K015 | Emergency control relay | X098 | 27 | 26 | 27 | 28 |
| K016 | Suspension valves relay (charge/flush) | X074 | | 27 | 28 | 29 |
| K017 | EPC/DA switchover remote-control relay | | | | | |

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| | | |
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| Farmer 400 Fav 700 Fav 900 | Tractor / General system Component overview | D |
|---|--|----------|

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------------|------------------------------------|---|-----------------------|-------------------------------|-------------------------------------|----------------|
| K018 | Battery changeover relay | X054, X055, X056, X065, X068, X069 | | | | 2, 4 |
| K020 | EDC UB 30 relay | X096 | | | | 33 |
| K021 | Shutoff solenoid valve relay | X099 | | | | 33 |
| K022 | +Ub 15 relay | X142 | | | | 2, 33 |
| K023 | +Ub 58 relay | X143 | | | | 2 |
| K025 | Left indicator relay USA | | | | | |
| K026 | Right indicator relay USA | | | | | |
| K027 | Indicator relay USA | | | | | |
| K028 | Direction indicator controller USA | | | | | |
| K029 | EPC-DA switchover solenoid switch | | | | | |
| K030 | Direction indicator controller USA | | | | | |
| K031 | Left indicator switch relay USA | | | | | |
| K032 | Right indicator switch relay USA | | | | | |
| K033 | Fuel preheater relay | | | | | 5 |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 - twin e-box | Fav 700 - single e-box | Fav 900 |
|------------|-----------------------------|---------------------------------|-----------------------|---------------------------------|---------------------------------------|----------------|
| M001 | Starter | X061, X063 | 2, 4 | 2, 4 | 2, 4 | 4 |
| M002 | Front wiper motor | X347 | 4, 10 | 10 | 10 | 11 |
| M003 | Screen washer pump front | X301 | 10 | 10 | 10 | 11 |
| M004 | Windscreen wiper motor rear | X258 | 10 | 10 | 10 | 11 |
| M005 | Screen washer pump rear | X303 | 10 | 10 | 10 | 11 |
| M007 | Seat adjustment motor | X305 | 17 | 17 | 17 | 18 |
| M008 | Heater fan | X027 | 15 | 15 | 15 | 16 |
| M009 | Fan | X285, X286, X287, X288 | 14 | 14 | 14 | 15 |
| M010 | Fuel pump | | | | | |
| M011 | 24V starter | X061, X063 | | | | 2 |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 - twin e-box | Fav 700 - single e-box | Fav 900 |
|------------|--------------------|------------------------------|-----------------------|---------------------------------|---------------------------------------|----------------|
| R001 | Heater plug | X090 | 5 | 5 | 5 | 5 |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 - twin e-box | Fav 700 - single e-box | Fav 900 |
|------------|--------------------|------------------------------|-----------------------|---------------------------------|---------------------------------------|----------------|
| S001 | Control stalk | X215, X245 | 7, 8, 10 | 7, 8, 10 | 7, 8, 10 | 9, 11 |

| | | | | | | |
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| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Component overview | D |
|---|--|----------|

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 - twin e-box | Fav 700 - single e-box | Fav 900 |
|------------|---|------------------------------|-----------------------|---------------------------------|---------------------------------------|----------------|
| S002 | Ignition-starter switch | X072, X246 | 2, 4 | 2, 4 | 2, 4 | 2, 4 |
| S003 | Headlight pushbutton | X080 | 7 | 7 | 7 | |
| S004 | Hazard warning light pushbutton | X216 | 8 | 8 | 8 | 9 |
| S005 | Right brake solenoid switch | X217 | 9, 30 | 9, 29 | 9, 30 | 10, 31 |
| S006 | Left brake solenoid switch | X218 | 9, 30 | 9, 29 | 9, 30 | 10, 31 |
| S007 | Auxiliary lighting pushbutton | X219 | 7 | | 7 | |
| S008 | Front work light switch | X275 | 11 | 11 | 11 | 12 |
| S009 | Rear work light switch | X274 | 12 | 12 | 12 | 13 |
| S010 | Rear wiper motor switch | X273 | 10 | 10 | 10 | 11 |
| S011 | Rotating beacon switch telltale connec- tion | X270, X271, X272 | 10 | 10 | 10 | 11 |
| S012 | Starter inhibitor switch | X082 | 4, 27 | 4, 26 | 4, 27 | 28 |
| S013 | Emergency mode pushbutton | X224 | 27 | 26 | 27 | 28 |
| S014 | Rapid reversing/steering wheel adjust- ment control | X225 | 26 | 25 | 26 | 27 |
| S015 | Handbrake switch | X226 | 26 | 25 | 26 | 27 |
| S016 | EPC/DA switchover switch | | | 22 | | |
| S017 | Clogged filter pressure-operated switch | X228 | 26 | 25 | 26 | 27 |
| S018 | Exhaust brake pushbutton | | | 6 | | X |
| S019 | PTO ON key, rear left | X229 | 29 | 28 | 29 | 30 |
| S020 | PTO ON key, rear right | X230 | 29 | 28 | 29 | 30 |
| S021 | Raise front power lift ext. pushbutton | X231 | | 24 | 24 | 25 |
| S022 | Lower front power lift ext. pushbutton | X232 | | 24 | 24 | 25 |
| S023 | Lock ext. pushbutton front power lift so- lensoid switch | X233 | | 24 | 24 | 25 |
| S024 | Brake-fluid sensor | | | 21 | 21 | 22 |
| S025 | Steering pressure-operated switch | X235 | 23 | 23 | 23 | 24 |
| S026 | Flow monitor | X236 | 23 | 23 | 23 | 24 |
| S027 | Raise ext. pushbutton right | X237 | 22 | 22 | 22 | 23 |
| S028 | Lower ext. pushbutton right | X238 | 22 | 22 | 22 | 23 |
| S029 | Raise ext. pushbutton left | X239 | 22 | 22 | 22 | 23 |
| S030 | Lower ext. pushbutton left | X240 | 22 | 22 | 22 | 23 |
| S031 | Door contact switch right | X279 | 13 | 13 | 13 | 14 |
| S032 | Door contact switch left | X299 | 13 | 13 | 13 | 14 |
| S033 | Heater control | X247 | 15 | 15 | 15 | 16 |
| S034 | Coolant level switch | X244 | 21 | 21 | 21 | 22 |
| S035 | Air-conditioning high/low pressure switch | X341 | 14 | 14 | 14 | 15 |
| S036 | Hydraulic oil level switch | X214 | | 23 | 23 | 24 |
| S037 | Fan switch | X280 | 14 | 14 | 14 | 15 |
| S038 | Heated rear window telltale connection | X267, X268, X269 | 16 | 16 | 16 | 17 |
| S039 | Mirror heater toggle switch | X265, X266 | 16 | 16 | 16 | 17 |
| S040 | Flush valves thermostat | | | 27 | | |
| S041 | Release PTO brake pushbutton | X223 | | | | |
| S042 | Front PTO speed sensor microswitch | | | | | |

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|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Component overview | D |
|---|--|----------|

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 - twin e-box | Fav 700 - single e-box | Fav 900 |
|------------|---|------------------------------|-----------------------|---------------------------------|---------------------------------------|----------------|
| S043 | UB 15 pressure-operated switch | | | | | |
| S044 | Air-conditioning switch | X220 | 14 | 14 | 14 | 15 |
| S045 | Reversing system solenoid switch | X213 | | | | 27 |
| S046 | Crossgate lever neutral position switch | | | | | |
| S047 | Exhaust brake plunger-operated switch | X140 | 6 | | 6 | 6 |
| S048 | EPC/DA switchover solenoid switch | | | | 22 | 23 |
| S051 | Fuel preheater thermostat | | | | | 5 |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 - twin e-box | Fav 700 - single e-box | Fav 900 |
|------------|--------------------|------------------------------|-----------------------|---------------------------------|---------------------------------------|----------------|
| V003 | Diode group | X089 | 27 | 6,26 | 27 | 28 |
| V004 | Diode group | | | | | |
| V005 | Diode group | X136 | | | 28 | 29 |
| V006 | EPC/DA 3A diode | | | | | |
| V007 | Diode group | | | | | |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 - twin e-box | Fav 700 - single e-box | Fav 900 |
|--------------------|-------------------------------|------------------------------|-----------------------|---------------------------------|---------------------------------------|----------------|
| X001 to X999 | Cable couplers and connectors | | | | | |

| DIN | Designation | Con- nec- tor | Farmer 400 | Fav 700 twin e-box | Fav 700 single e-box | Fav 900 |
|------------|---|------------------------------|-----------------------|-------------------------------|-------------------------------------|----------------|
| Y001 | Increased quantity solenoid valve | | | 4 | | |
| Y002 | Speed range 1 solenoid valve | X315 | 26 | 25 | 26 | 27 |
| Y003 | Speed range 2 solenoid valve | X316 | 26 | 25 | 26 | 27 |
| Y004 | Transmission neutral / turboclutch valve solenoid valve | X317 | 27 | 26 | 27 | 28 |
| Y005 | Speed governor solenoid valve | X318 | 26 | 25 | 26 | 27 |
| Y006 | Exhaust brake solenoid valve | X086 | 6 | 6 | 6 | 6 |
| Y007 | Engine OFF solenoid valve | X087 | 6 | 6 | 6 | |
| Y008 | Rear PTO solenoid valve | X319 | 29 | 28 | 29 | 30 |
| Y009 | 4WD solenoid valve | X320 | 30 | 29 | 30 | 31 |
| Y010 | Diff. lock solenoid valve | X321 | 30 | 29 | 30 | 31 |
| Y011 | Front PTO solenoid valve | X322 | 29 | 28 | 28 | 30 |
| Y012 | Charge suspension solenoid valve | X323 | 28 | 27 | 27 | 29 |
| Y013 | Lower suspension solenoid valve | X324 | 28 | 27 | 27 | 29 |
| Y014 | Raise suspension solenoid valve | X325 | 28 | 27 | 27 | 29 |
| Y015 | Valve 1 | X326 | | 23 | 23 | 24, 26 |
| Y016 | Valve 2 | X327 | | 23 | 23 | 24, 26 |
| Y017 | Valve 3 | X328 | | 23 | 23 | 24, 26 |
| Y018 | Valve 4 | X329 | | 23 | 23 | 24, 26 |
| Y019 | Valve 5 | X330 | | 23 | 23 | 24, 26 |
| Y021 | Lift solenoid valve | X332 | 22 | 22 | 22 | |

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| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Reserve cables (R) | D |
|----------------|--|----------|

The cab cable loom incorporates several reserve cables (R).

Possible uses for reserve cables (R)

- In event of breaks in cables in cab cable loom
- Connecting auxiliary implements (note cross-sections of cables!)

Note:

Cable nos. are printed on cable sheaths



Cable no.: WF 3000 ; WF 3001 ; WF 3002 ;
WF 3003 ; WF 3004 ; WF 3005 ; WF 3006 ;
WF 3007 ; WF 3008 ; 3009

In cab on right mudguard



Remove panel

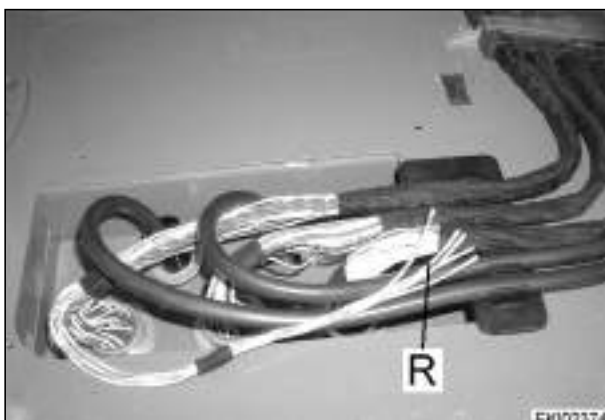


Cable no.: WF 3005 ; WF 3006 ; WF 3007 ;
WF 3008 ; WF 3009

On right of steering column



Remove panel



Cable no.: WF 3000 ; WF 3001 ; WF 3002 ;
WF 3003 ; WF 3004

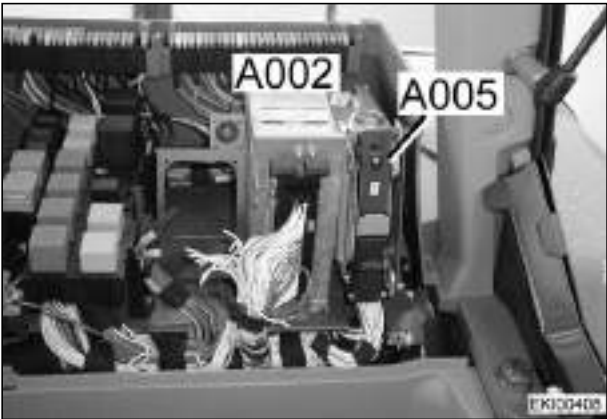
In cab, at bottom left of footwell



Raise floor mat, remove panel

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| 09.11.2001 | a | 1/1 | Reserve cables (R) | 0000 | D |
| | | | | | 000042 |

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - A | D |
|----------------|--|----------|



A002 = ECU, enhanced control
A005 = ECU, lift assembly
In cab on right mudguard



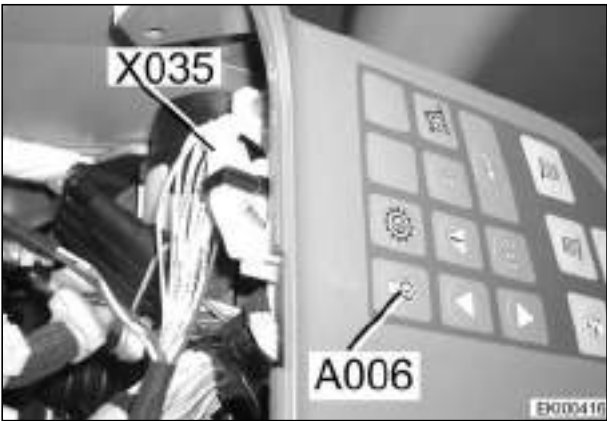
Remove panel



A003 = Joystick
In cab on right armrest



A004 = ECU, control console
On right in cab



A006 = Keypad, dashboard
To right of steering wheel



| | | | | | | |
|---------|----------|------|---|-------------|----------|---------------|
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| 08/2000 | a | 1/4 | | 0000 | D | 000028 |

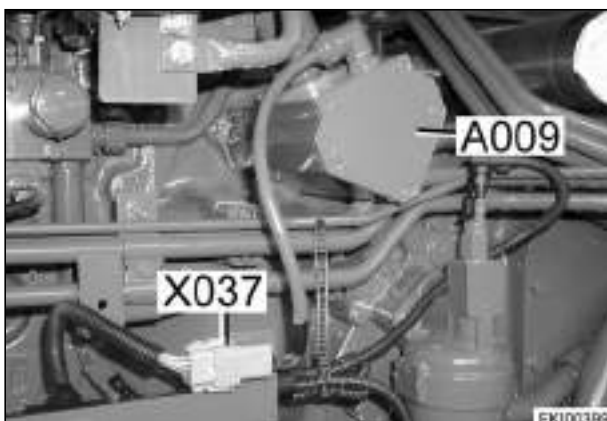
| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - A | D |
|----------------|--|----------|



A007 = Display unit
At top of steering column



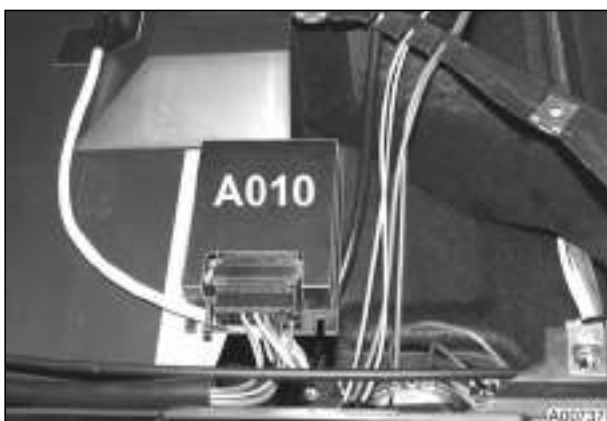
A008 = Vario terminal
On right in cab on control console



A009 = Actuator unit
On right below cab



Unscrew right rear wheel and panel



A010 = ECU, air-conditioning
In front of right B-pillar





Remove cab roof



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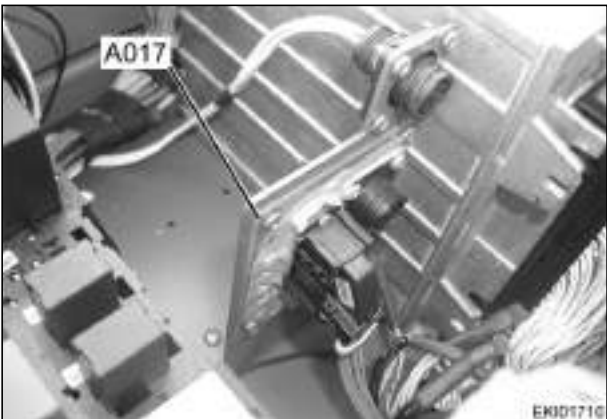
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| Fav 900 | Tractor / General system Electrical / electronic components - A | D |
|----------------|--|----------|





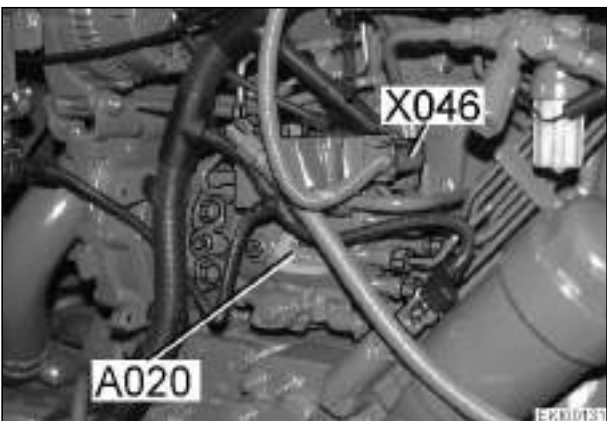
- A011** = Sensor, radar
On right below cab
-  Remove rear wheel
Remove panels on right
- 





- A013** = Board, fuse
In cab in right B-pillar
-  Remove hatch cover.
- 

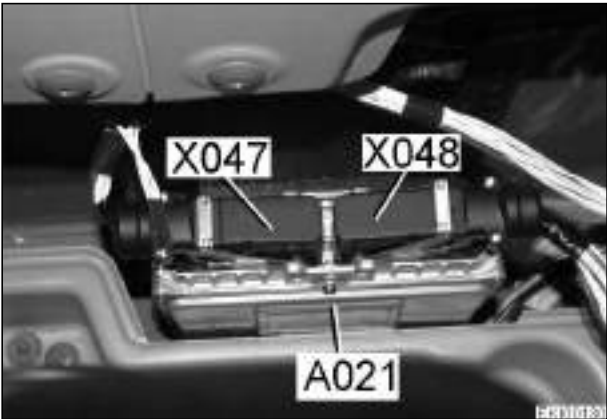


- A017** = Board, LBS
In cab on right mudguard
-  Remove panel
- 



- A020** = ECU, VP44
Left side of engine
-  Open left side of bonnet
- 

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - A | D |
|----------------|--|----------|



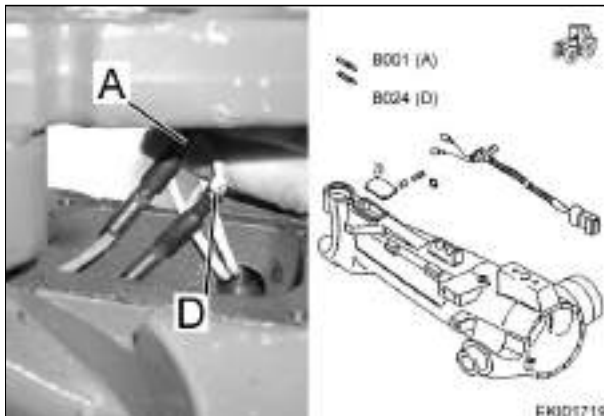
A021 = ECU, EDC
In cab under side panel of right mudguard



Remove side panel

Fav 900

Tractor / General system
Electrical / electronic components - B

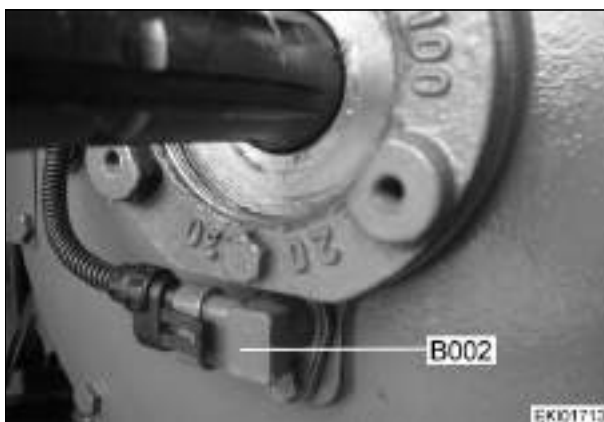
D**B001** = Sensor, steering angle 1**B024** = Sensor, steering angle 2

On steering knuckle of right front axle.



Remove cover (20).

B001 (top) and B024 (bottom) are labelled A and D.

**B002** = Sensor, front PTO

At front on PTO gearbox.



Remove protective cup.

**B003** = Sensor, suspension

On frame, left side next to cross-member joint



Remove panel from frame

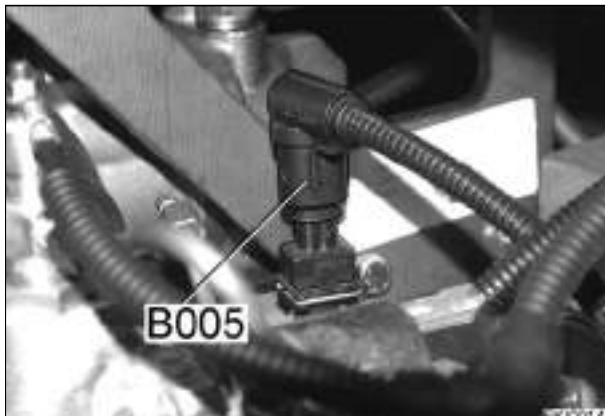
**B004** = Sensor, underpressure switch

On engine air filter



Open right side of bonnet

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - B | D |
|----------------|--|----------|



B005 = Sensor, engine temperature
Engine compartment on water pipe
(fan side)



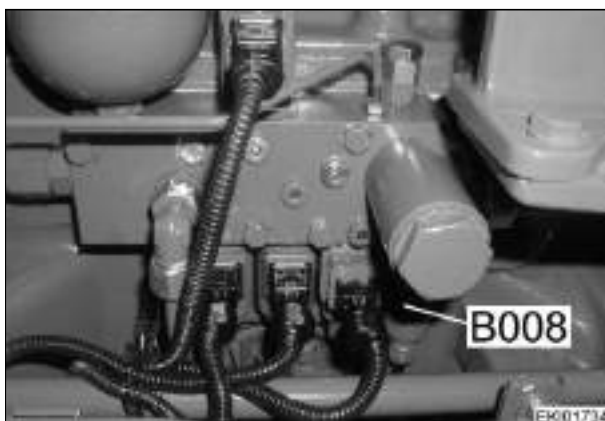
Open left side of bonnet



B006 = Sensor, intercooler temperature
Engine compartment on intake pipe



Open left side of bonnet



B008 = Sensor, high pressure
Behind right rear wheel at bottom on valve
unit



Unscrew right rear wheel and panel



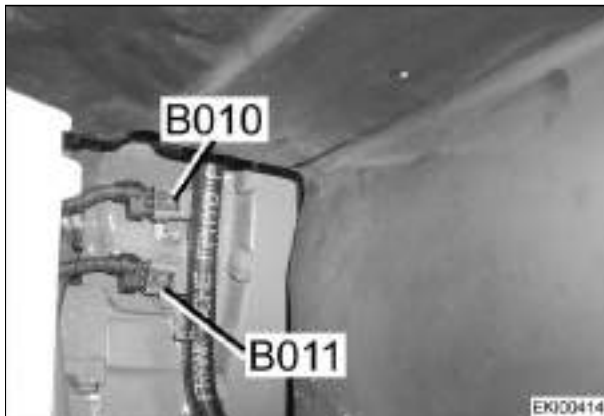
B009 = Sensor, output temperature
Behind right rear wheel, behind pressure
filter



Unscrew right rear wheel and panel

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| | | |
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| Fav 900 | Tractor / General system Electrical / electronic components - B | D |
|----------------|--|----------|



B010 = Sensor, engine 1

B011 = Sensor, engine 2

Top left rear on engine



B012 = Sensor, engine oil pressure

On left of engine, on oil filter housing



Remove left side of bonnet



B013 = Sensor, hydraulic oil temperature

On right of engine near steering pump



Remove right side of bonnet



B014 = Sensor, accumulator shaft

Centre right on transmission

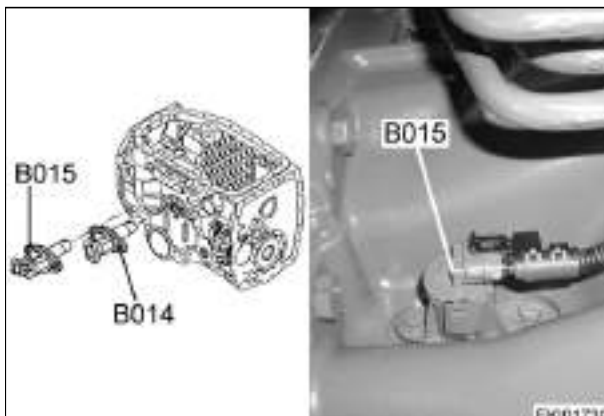


Unscrew right rear wheel and panel

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Fav 900

Tractor / General system
Electrical / electronic components - B

D**B015** = Sensor, bevel pinion

At bottom right of transmission



Unscrew right rear wheel and panel

**B016** = Sensor, range sensor

On right, behind fuel tank



Remove fuel tank on left

**B017** = Sensor, clutch pedal

At top of steering column



Remove hatch cover at top of steering column, then remove instrument panel

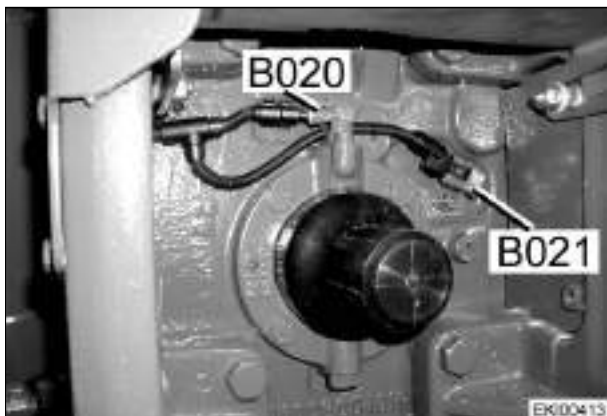
**B019** = Sensor, compressed-air volumeOn right of transmission on
compressed-air reservoir at rear

Unscrew right rear wheel and panel



Fav 900

Tractor / General system
Electrical / electronic components - B

D**B020** = Sensor, PTO 1**B021** = Sensor, PTO 2

At rear above PTO stub shaft



Remove cover panel

**B022** = Sensor, kickout

At right entrance step on left connection surface by SAE pump connection



Remove panels

**B025** = Sensor, EDC speed

On left side of tractor on flywheel housing



Open left side of bonnet.

**B026** = Sensor, EDC needle motion sensor

Injector nozzle for cylinder 1 (fan side)



Open left side of bonnet.

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - B | D |
|----------------|--|----------|



B027 = Sensor, water temperature
Engine compartment on water pipe
(flywheel side)



Open left side of bonnet



B028 = Sensor, boost pressure
Engine compartment on intake pipe



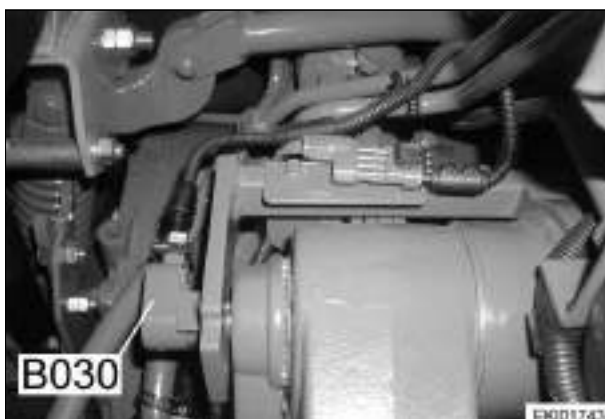
Open left side of bonnet



B029 = Sensor, accelerator
Cab, under steering column



Remove steering column cover at bottom
right



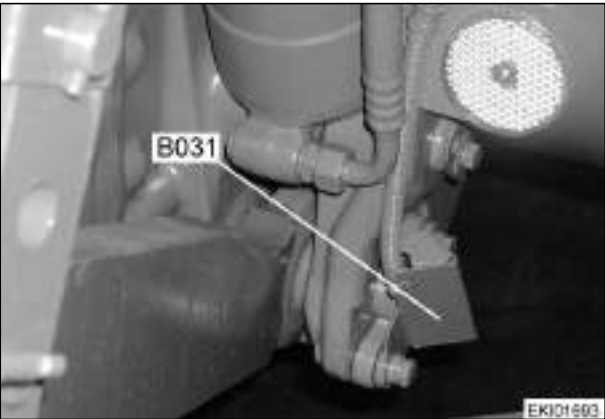
B030 = Sensor, rear power lift position
On left lift arm



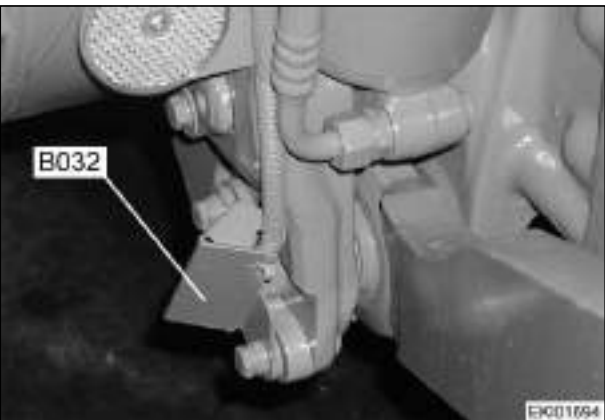
Unscrew cover panel

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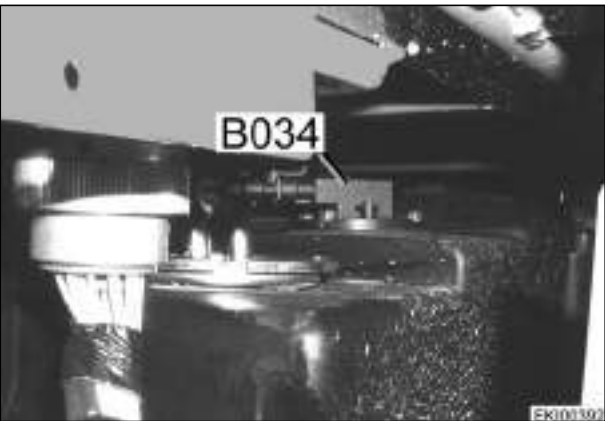
| | | |
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| Fav 900 | Tractor / General system Electrical / electronic components - B | D |
|----------------|--|----------|



B031 = Sensor, draft-sensing pin right
Cross-beam bearing



B032 = Sensor, draft-sensing pin left
Cross-beam bearing



B034 = Sensor, fuel
On left tank



Remove panel



B035 = Sensor, hand throttle
In control console



Remove control console

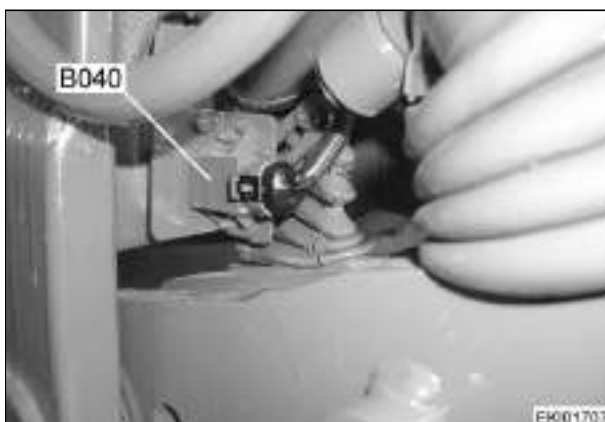
| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - B | D |
|----------------|--|----------|



B038 = Sensor, accelerator
Cab, under steering column



Remove steering column cover at bottom left



B040 = Sensor, front power lift position
On right bottom link in direction of travel



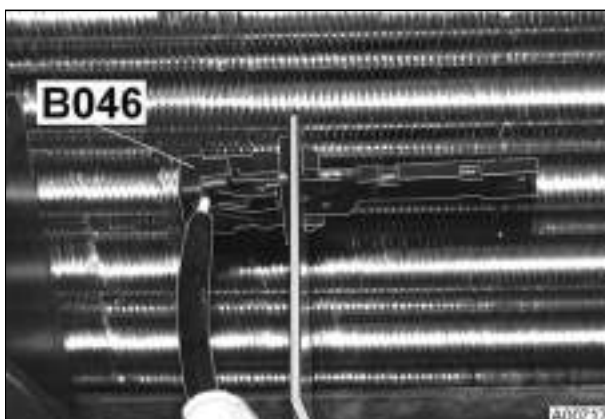
Remove guard



B045 = Sensor, air-conditioning 2
Top right between A- and B-pillars at
air-conditioning expansion valve



Remove cab roof



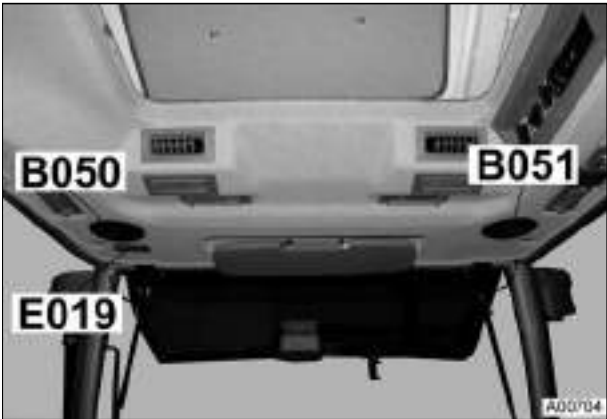
B046 = Sensor, air-conditioning 1
At top in roof



Remove roof from cab, then unscrew
plastic cover

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| 01.08.2000 | a | 8/9 | | 0000 | D | 000029 |

| | | |
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| Fav 900 | Tractor / General system Electrical / electronic components - B | D |
|----------------|--|----------|



B050 = Loudspeaker, left
B051 = Loudspeaker, right
At top in cab (roofliner)



| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - E | D |
|----------------|--|----------|



- E001** = H4 headlight right
E002 = H4 headlight left
E003 = H4 auxiliary headlight right
E004 = H4 auxiliary headlight left
E005 = Indicator / sidelight front right
E006 = Indicator / sidelight front left
 Tractor seen from front



- E007** = Tail light rear right
E008 = Tail light rear left
E009 = Licence plate light right
E010 = Licence plate light left
E011 = Work lamp in roof rear right
E012 = Work lamp in roof rear left
 Tractor seen from rear



- E013** = Work lamp in roof front right
E014 = Work lamp in roof front left
E015 = Work lamp front on right direction indicator
E016 = Work lamp front on left direction indicator
 Tractor seen from front

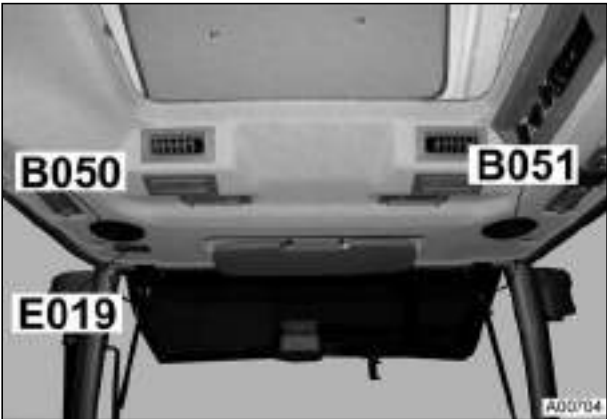


- E017** = Work light on tail light bracket right
E018 = Work light on tail light bracket left
 Tractor seen from rear



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| | | |
|---------|--|---|
| Fav 900 | Tractor / General system Electrical / electronic components - E | D |
|---------|--|---|



E019 = UB cab lighting
At top in cab (roofliner)



E020 = EPC lighting
At top right in cab



E021 = Rotating beacon right
E022 = Rotating beacon left
Tractor seen from rear



E026 = Indicator high-mounted right rear
E027 = Indicator high-mounted left rear
Tractor seen from rear



| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - E | D |
|----------------|--|----------|



E028 = Indicator right USA front
E029 = Indicator left USA front
Tractor seen from front



E030 = Corner light right
E031 = Corner light left
Tractor seen from front



E033 = Fuel heater
Left rear on engine



Open left side of bonnet

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - G | D |
|----------------|--|----------|

**G001 = Battery**

In central part of tractor on left below fuel tank



Open battery cover

**G002 = Alternator**

On right of engine



Open right side of bonnet

**G003 = Battery**

In central part of tractor on left below fuel tank



Open battery cover

**G004 = Alternator**

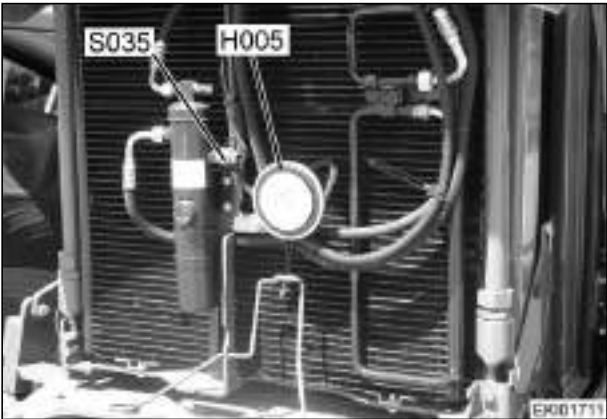
On left of engine



Open left side of bonnet

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| 18.07.2001 | a | 1/1 | Electrical / electronic components - G 0000 | D | 000037 |

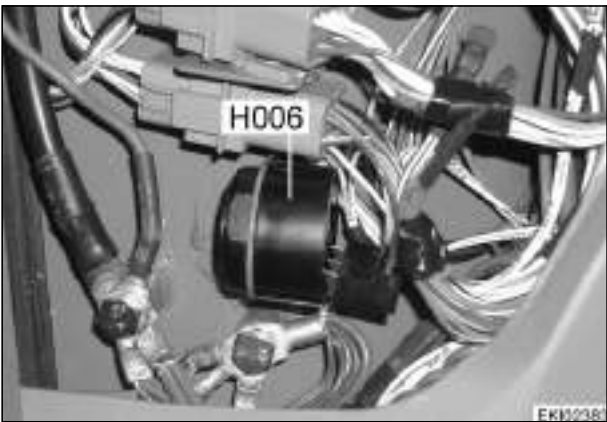
| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - H | D |
|----------------|--|----------|



H005 = Horn
Bottom right in centre of tractor



Opening the front section



H006 = Buzzer
On right mudguard



Remove control console from right mudguard in cab

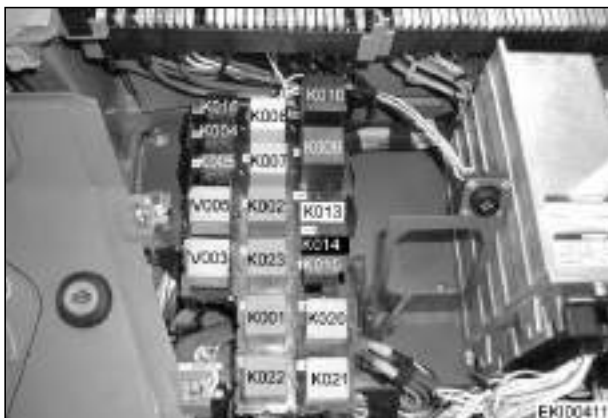


H010 = Display, generator 2
Middle of steering column



Fav 900

Tractor / General system
Electrical / electronic components - K

D

- K001** = Relay, +Ub 15
 - K002** = Relay, +Ub 58
 - K004** = Relay, 56A
 - K005** = Relay, 56B
 - K007** = Relay, brake
 - K008** = Relay, starter inhibitor
 - K009** = Relay, windscreen wiper
 - K010** = Relay, direction indicator controller
 - K013** = Relay, 3rd hydraulic circuit
 - K014** = Relay, exhaust brake
 - K015** = Relay, emergency control
 - K016** = Relay, valves, charge / flush suspension
- At right rear in cab



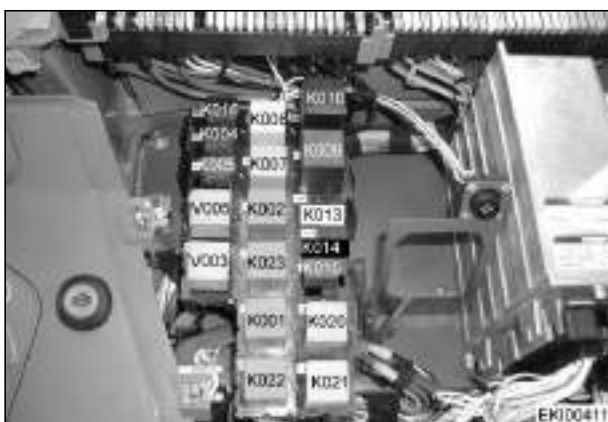
Remove cover



- K018** = Relay, battery switchover
- On left of battery frame



Pivot battery frame upwards



- K020** = Relay, EDC, UB 30
 - K021** = Relay, engine stop solenoid valve
 - K022** = Relay, +Ub 15
 - K023** = Relay, +Ub 58
- At right rear in cab



Remove cover

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - K | D |
|----------------|--|----------|



K033 = Relay, fuel preheater
Front left in engine compartment



Open left side of bonnet

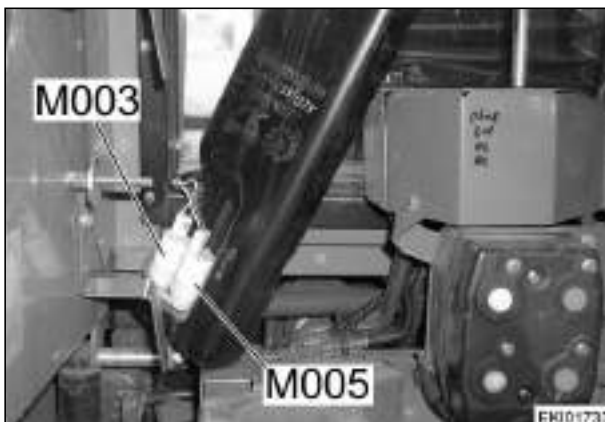
| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - M | D |
|----------------|--|----------|



M002 = Wiper motor, front
In windscreen



Unscrew cover



M003 = Wiper pump, front

M005 = Wiper pump, rear
In windscreen washer bottle



Remove windscreen washer bottle from
left rear mudguard



M004 = Wiper motor, rear
In rear window



Unscrew cover



M007 = Motor, seat adjustment
Under seat bracket



Remove rubber bellows from spring unit
of driver's seat

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| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - M | D |
|----------------|--|----------|



M008 = Motor, heater fan
In front of cab



Remove cover from bonnet, filter and heater



M009 = Motor, fan
Top front in roof



Remove roof cover from cab, then unscrew plastic cover



M011 = Starter motor, 24V
Left rear on engine



Remove left side of bonnet

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - R | D |
|----------------|--|----------|



R001 = Glow plug
At front on intake pipe



Open bonnet

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - S | D |
|----------------|--|----------|



S001 = Switch, control stalk
On left of steering wheel



S002 = Switch, ignition
On right of steering column



S003 = Switch, headlights
S004 = Switch, hazard warning lights
On left of instrument panel by steering wheel



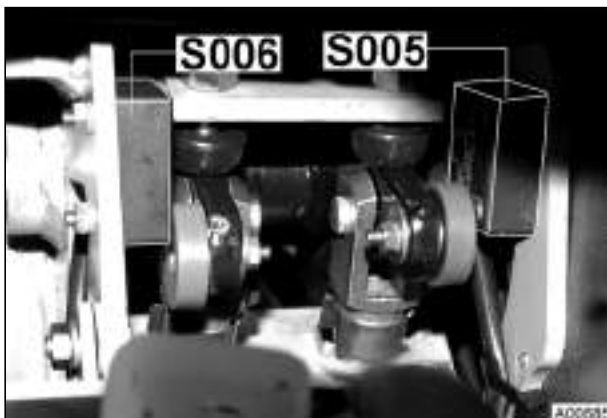
S005 = Solenoid switch, right brake
At top on brake pedals



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Fav 900

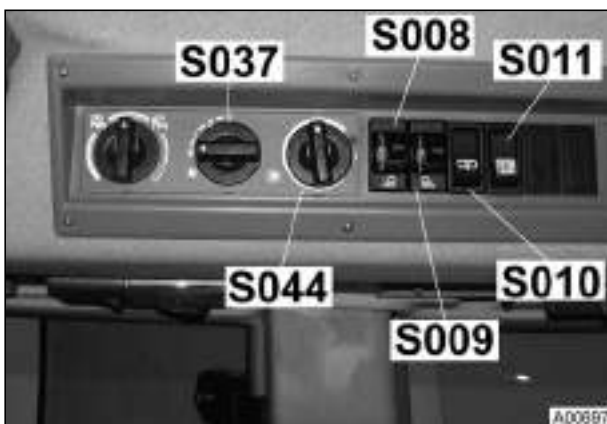
Tractor / General system
Electrical / electronic components - S

D

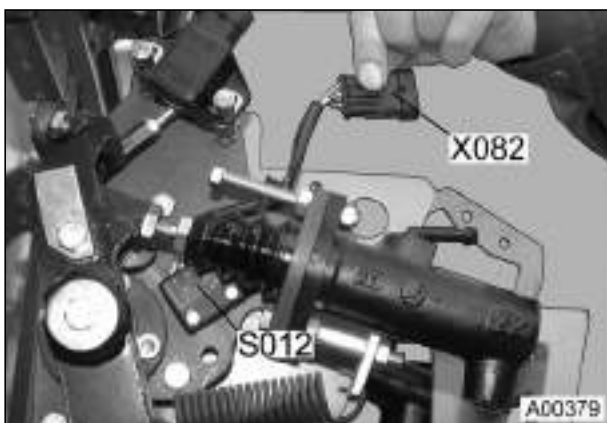
S006 = Switch, left brake
 At top on brake pedals



Remove panel



S008 = Switch, front working lights
S009 = Switch, rear working lights
S010 = Switch, rear wiper motor
S011 = Switch, rotating beacon
S037 = Switch, fan
S044 = Switch, air-conditioning
 Top right in roofliner of cab



S012 = Switch, starter inhibitor
 At top by clutch pedal



Remove instrument panel



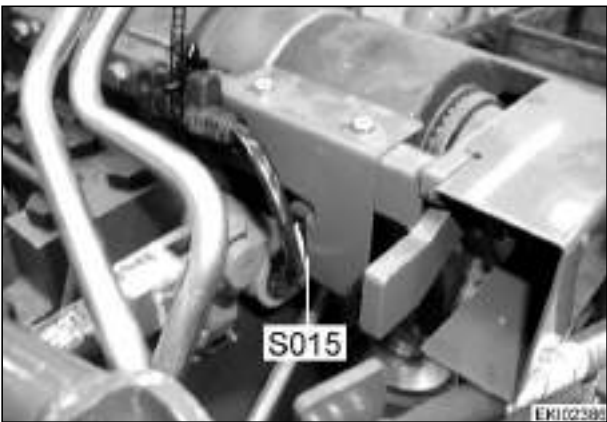
S013 = Switch, Emergency mode
 To left of steering wheel



| | | |
|---------|--|---|
| Fav 900 | Tractor / General system Electrical / electronic components - S | D |
|---------|--|---|



S014 = Switch, rapid reversing
To left of steering wheel



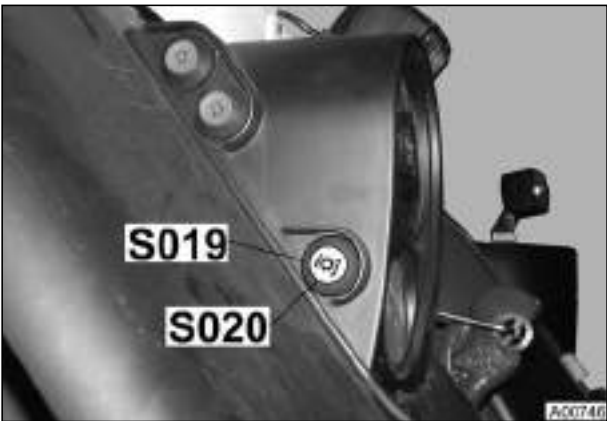
S015 = Switch, handbrake
At rear on left brake cylinder



S017 = Switch, filter clogging
Behind right rear wheel on pressure filter



Unscrew right rear wheel and panel



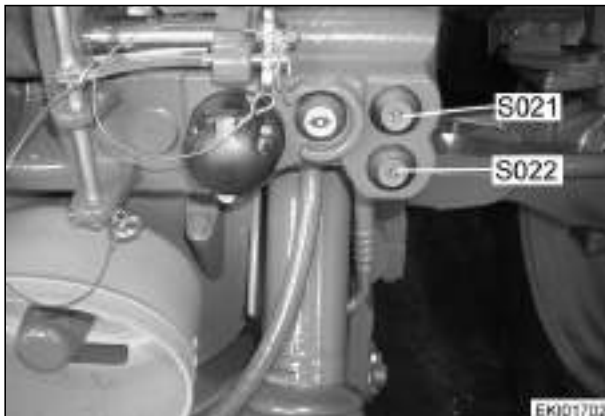
S019 = Switch, rear PTO, left
S020 = Switch, rear PTO, right
On left and right mudguards at rear



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Fav 900

Tractor / General system
Electrical / electronic components - S

D**S021** = Switch, raise front power lift**S022** = Switch, lower front power lift
Front left**S023** = Switch, lock front power lift

On right entrance step by stopcock AVF



Remove cover panel

**S024** = Switch, brake fluid

At front in steering column

**Note:**

Brake fluid must not be used! Only Pentosin CHF11S, order no. X 902.011.622, is permissible.



Remove hatch cover at top front of steering column.

**S025** = Switch, steering

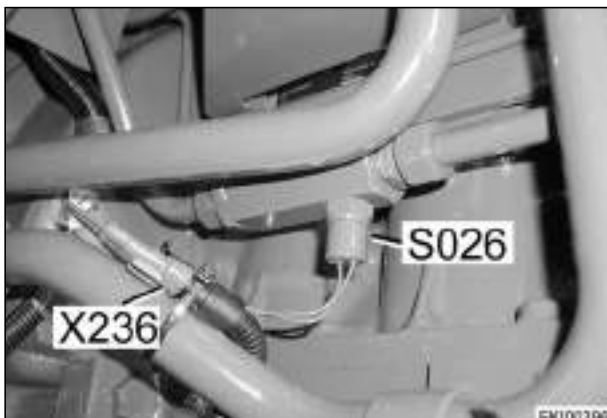
On right entrance step, top of central control block ZSB, bore no. 2007



Panel

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| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - S | D |
|----------------|--|----------|



S026 = Switch, flow monitor



By auxiliary pump in space between transmission and engine, in frame

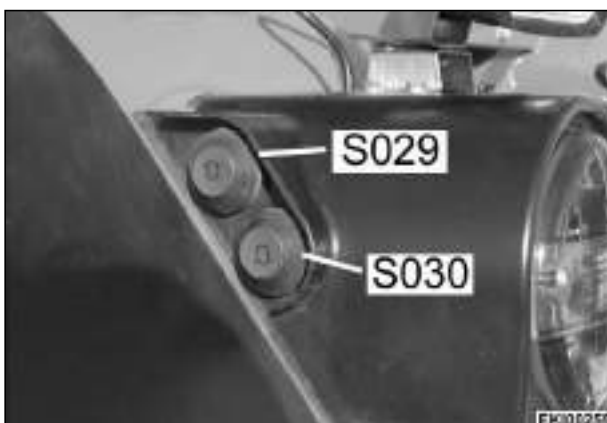


Remove right side of bonnet



S027 = Switch, raise rear power lift, right

S028 = Switch, lower rear power lift, right



S029 = Switch, raise rear power lift, left

S030 = Switch, lower rear power lift, left



S031 = Switch, door contact switch, right

S032 = Switch, door contact switch, left

Note:

Photo shows left door contact switch; right switch analogous.

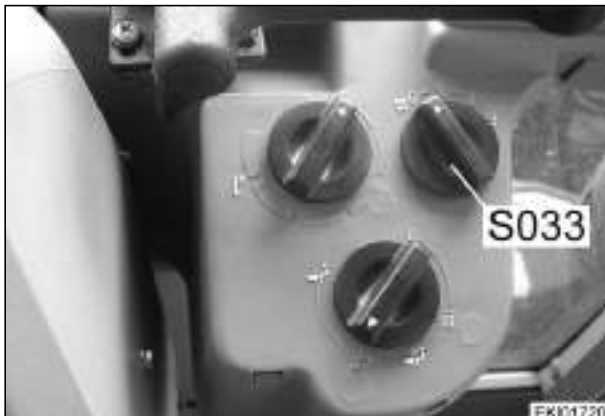


At top on door hinge on cab doors

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Fav 900

Tractor / General system
Electrical / electronic components - S

D

S033 = Switch, heater control
 On left of steering column



S034 = Switch, coolant level
 Expansion tank at rear of engine compartment



Remove bonnet cover



S035 = Switch, air-conditioning high/low pressure
 In front of radiators on fluid tank (drier)



Raise head section



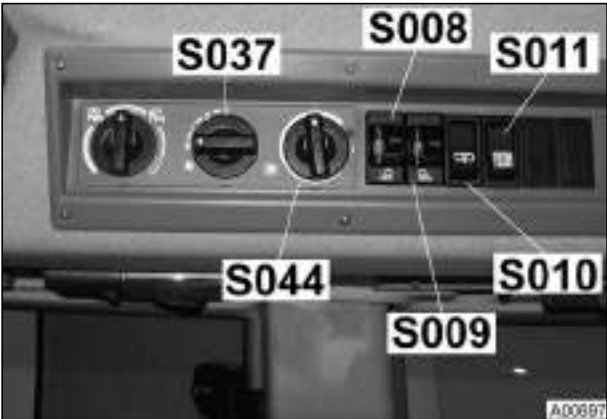
S036 = Switch, hydraulic oil level
 On top of clutch housing



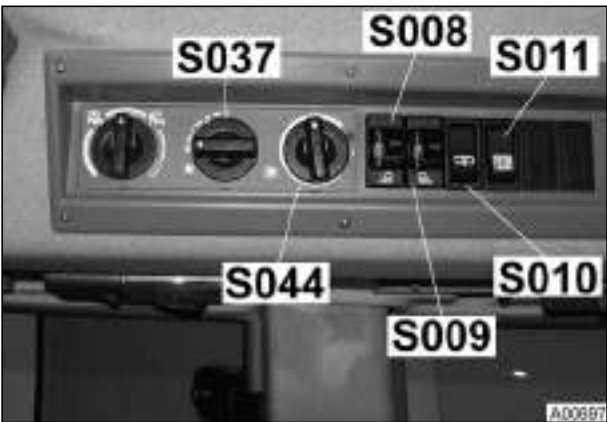
Raise cab at front

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| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - S | D |
|----------------|--|----------|



S037 = Switch, fan
Top right in cab



S044 = Switch, air-conditioning
In cab at top right on roofliner



S045 = Switch, reversing system
Under seat bracket



Remove driver's seat



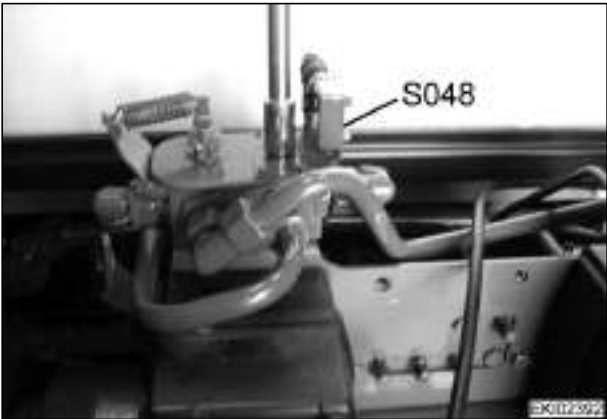
S047 = Switch, exhaust brake
Cab floor



Remove floor mat

| | | | | | | |
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| Fav 900 | Tractor / General system Electrical / electronic components - S | D |
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S048 = Switch, EPC / DA switchover
Rear of tractor above rear connections



Remove cover panel

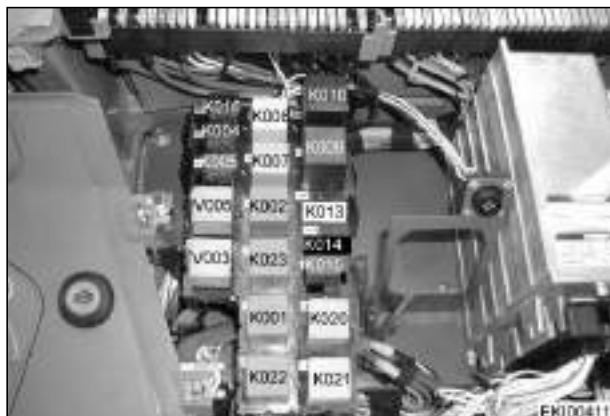


S051 = Switch, fuel preheater
Left rear on engine



Open left side of bonnet

| | | |
|----------------|---|----------|
| <i>Fav 900</i> | Tractor / General system Electrical / electronic components - V | D |
|----------------|---|----------|



V003 = Diode, group

V005 = Diode, group

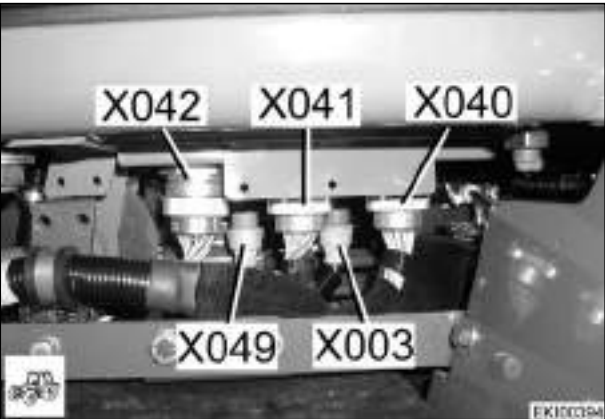
At right rear in cab



Remove cover

| | | | | | | |
|---------|---------|------|--|---------|-------|----------|
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| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - X | D |
|----------------|--|----------|



X003 = Load contact, chassis/cab base
Left side of tractor



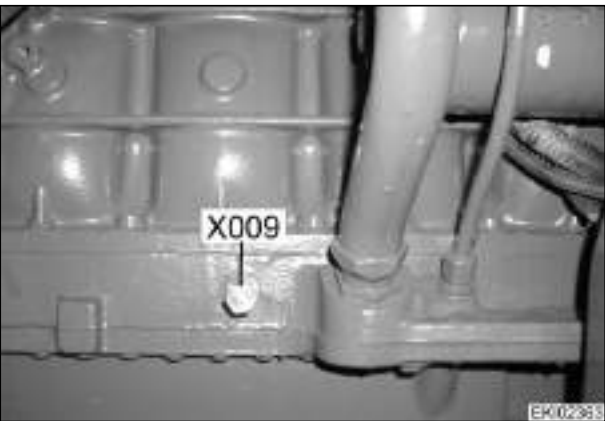
Remove panel



X007 = Cable coupler, implement socket
At top right rear in cab



X008 = Cable coupler, on-board computer counter input
At top right rear in cab



X009 = External start terminal earth
On left of engine block



Open left side of bonnet

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Fav 900

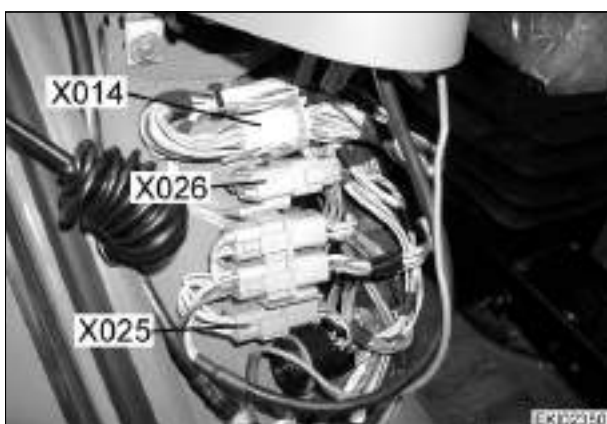
Tractor / General system
Electrical / electronic components - X

D

X010 = External start terminal plus
 On left of battery frame



Remove cover panel and protective cap
 from K018 - relay, battery switch



X014 = Cable coupler, cab/cab base
 In cab on right mudguard at front



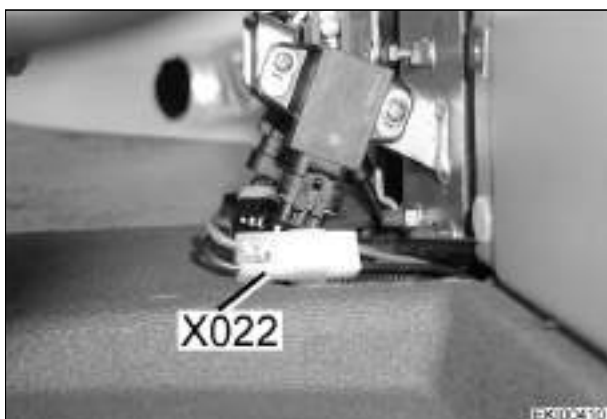
Remove hatch cover from control console
 at front



X016 = Cable coupler, licence plate lighting/work
 light (round cable coupler)
 Right rear



Remove cab roof



X022 = Cable coupler, M008 - heater fan motor
 In steering column

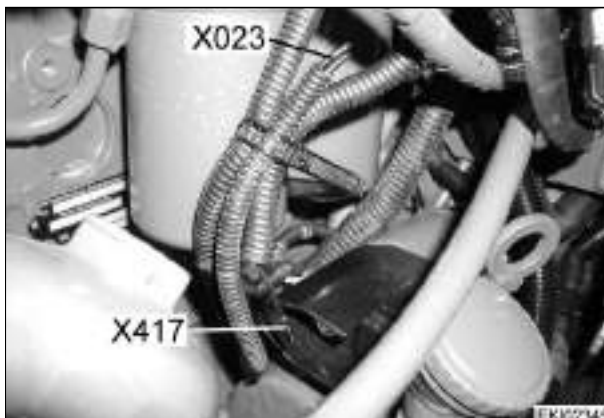


Remove steering column cover at bottom
 left

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Fav 900

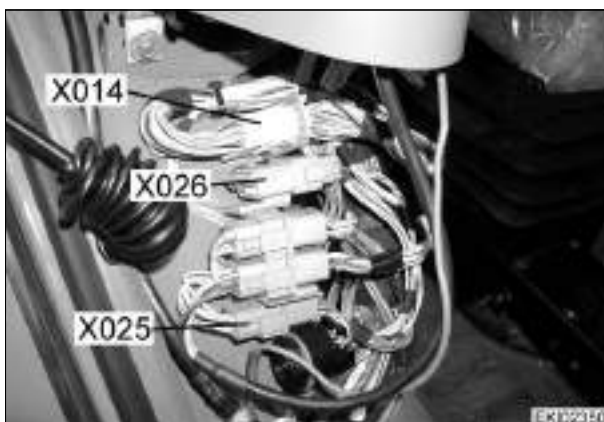
Tractor / General system
Electrical / electronic components - X

D

X023 = Cable coupler, 3rd hydraulic circuit socket
 Left side of tractor, in region of starter motor



Open left side of bonnet



X025 = LBS prewiring

X026 = Cable coupler, communication box
 In cab on right mudguard at front



Remove hatch cover from control console at front



X027 = Cable coupler, heater switch / M008 - motor, heater fan



At front of cab
 Remove bonnet cover



Withdraw filter element, remove heater cooler, pull cable through rubber grommet



X028 = Cable coupler, communication box
 At top right rear in cab



Fav 900

Tractor / General system
Electrical / electronic components - X

D

X029 = Cable coupler, cab/cab base
 In cab on right mudguard at front



Remove hatch cover from control console
 at front



X032 = Connector, A003 - joystick
 At bottom right on driver's seat bracket



Remove panel



X036 = Cable coupler, A008 - terminal
 In cab on right mudguard at front



Remove hatch cover from control console
 at front



X037 = Cable coupler, for A009 - actuator unit
 On right below cab

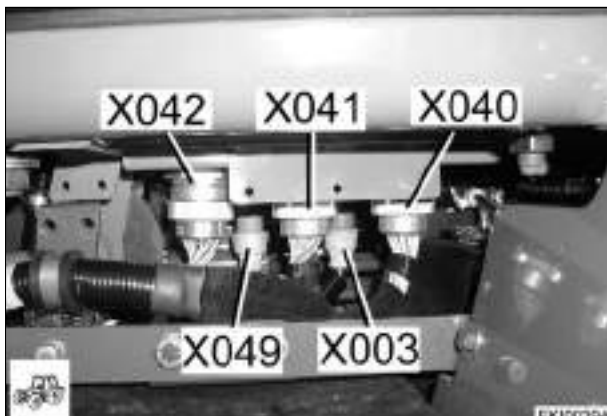


Unscrew right rear wheel and panel

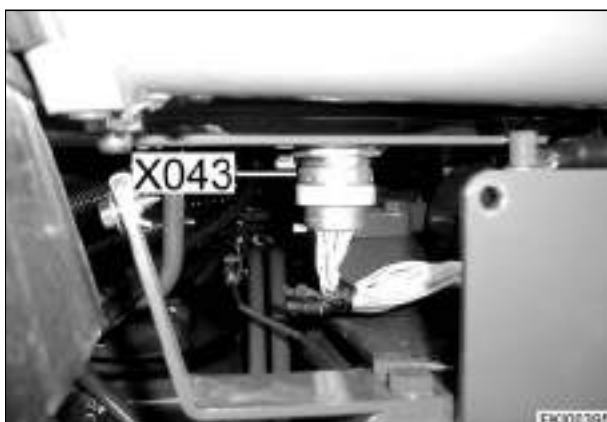
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Fav 900

Tractor / General system
Electrical / electronic components - X

D**X040** = Cable coupler, cab base / engine**X041** = Cable coupler, cab base / engine**X042** = Cable coupler, cab base / engine
Left side of tractor

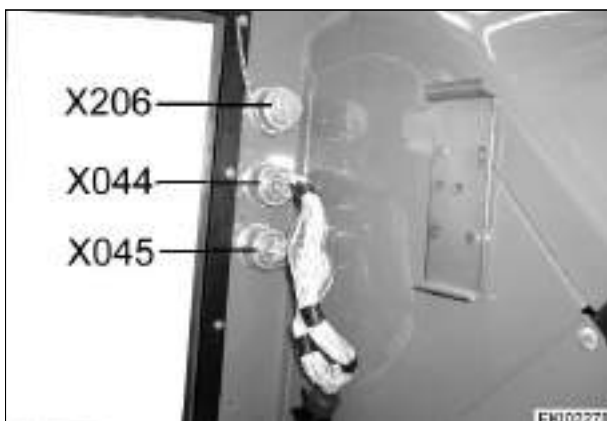
Remove panels

**X043** = Cable coupler cab base/engine
(spool valves)

Cab, right entrance step



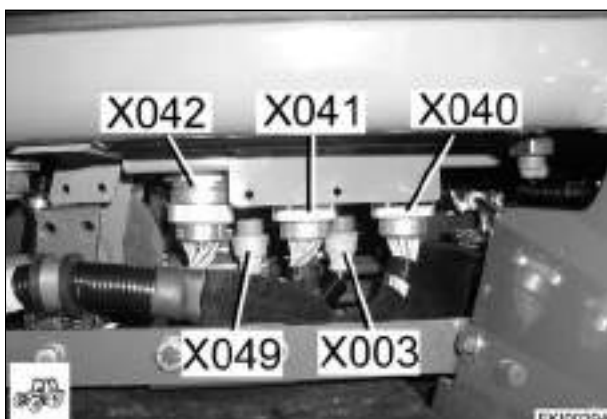
Remove footplate

**X044** = Connector, cab base / transmission**X045** = Connector, cab base / transmission

Rear of tractor, right side



Remove panel

**X049** = Load contact, chassis/cab base

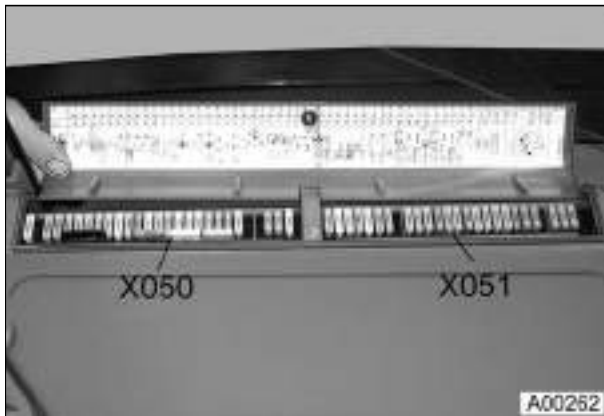
Left side of tractor



Remove panel

Fav 900

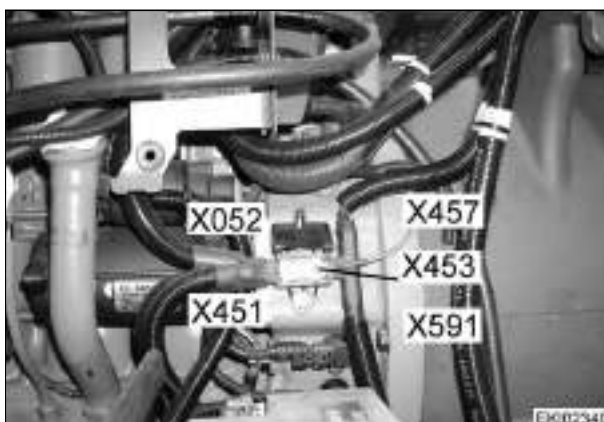
Tractor / General system
Electrical / electronic components - X

D**X050** = Fuse holder 1 compl.**X051** = Fuse holder 2 compl.

At right rear in cab



Remove cover

**X052** = Chassis plus terminal

On left side of tractor in flywheel housing

**Note:**

Shown with fuel tank removed for greater clarity.

**X053** = Connector, + UB 30

Right mudguard



Remove panels

**X064** = Generator D+, G002 - generator

Right side of engine

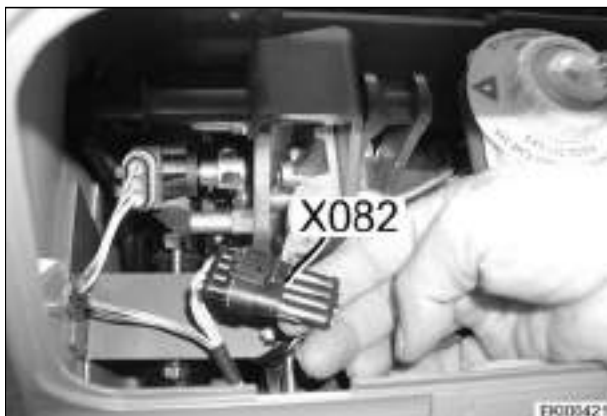


Open right side of bonnet

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| 08/2000 | a | 6/34 | | 0000 | D | 000033 |

Fav 900

Tractor / General system
Electrical / electronic components - X

D

X082 = Cable coupler, S012 - switch, starter inhibitor

At top of steering column



Remove instrument panel

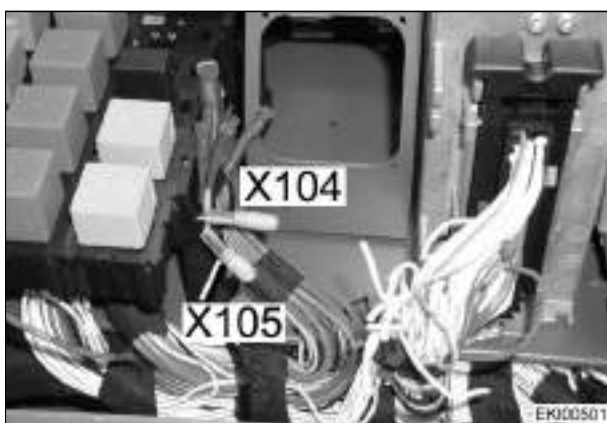


X103 = Earthing point, A002 - ECU, enhanced control

In cab on right mudguard



Remove panel



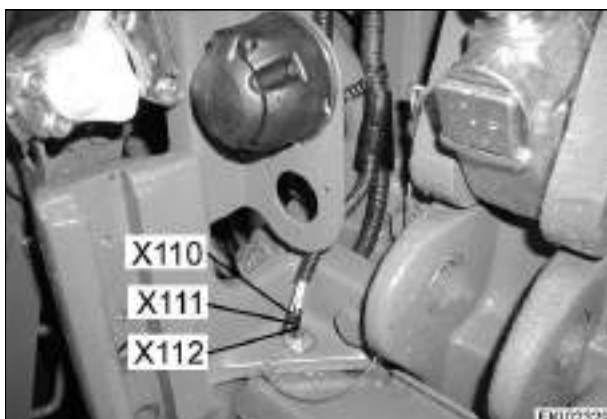
X104 = Test socket, electronics, electric circuit 15E

X105 = Test socket, electronics, earth

At right rear in cab



Remove panel



X110 = To X015 - socket, electrohydraulic remote control

X111 = To X015 - socket, electrohydraulic remote control

X112 = To X015 - socket, electrohydraulic remote control

At rear of tractor



Open cable loom

| Date | Version | Page | Electrical / electronic components - X | Capitel | Index | Docu-No. |
|---------|---------|------|--|---------|-------|----------|
| 08/2000 | a | 7/34 | | 0000 | D | 000033 |

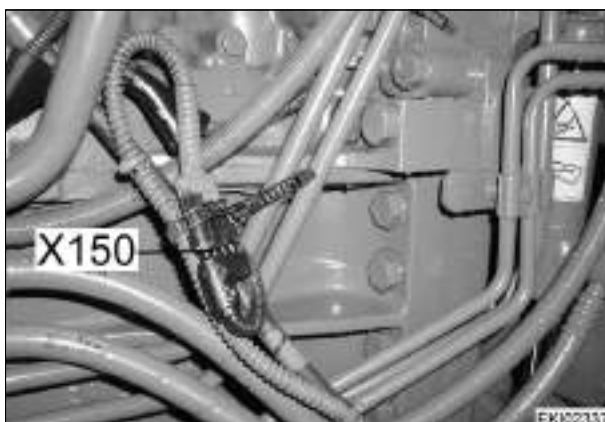
| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - X | D |
|----------------|--|----------|



X118 = Earthing point, A004 - ECU, control console
In cab on right mudguard



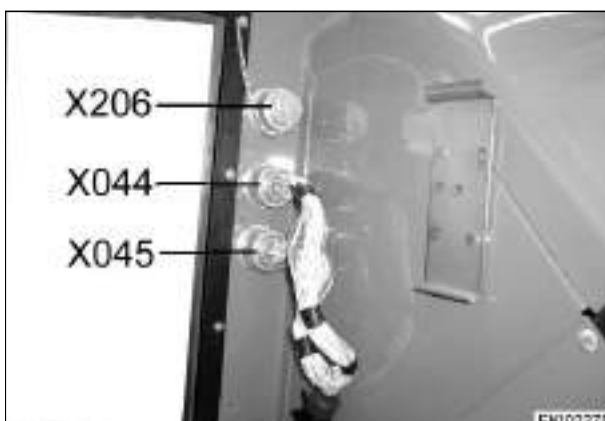
Remove panel



X150 = Connector, B001/B024 - sensor, steering angle
Right side of engine



Open right side of bonnet



X206 = LBS socket (implements)
Rear of tractor, right side



Remove panel



X207 = Connector, supply TLE (LBS)
In cab in right B-pillar

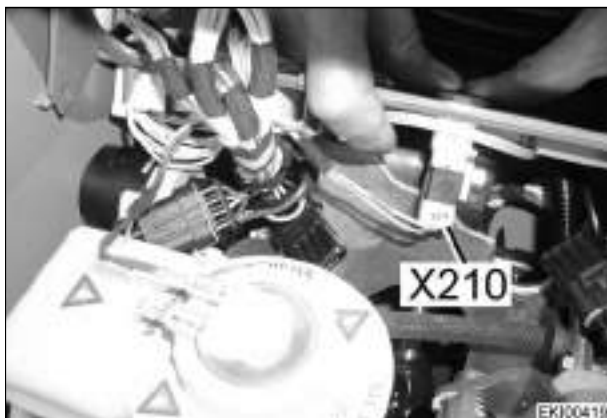


Remove hatch cover

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| 08/2000 | a | 8/34 | | 0000 | D | 000033 |

Fav 900

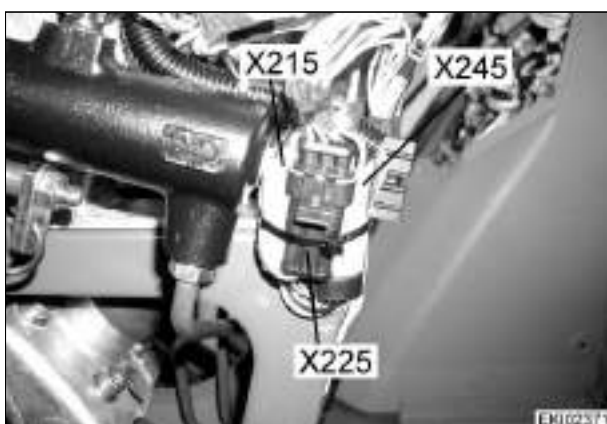
Tractor / General system
Electrical / electronic components - X

D

X210 = Indicator lamp 2/generator
 At top of steering column



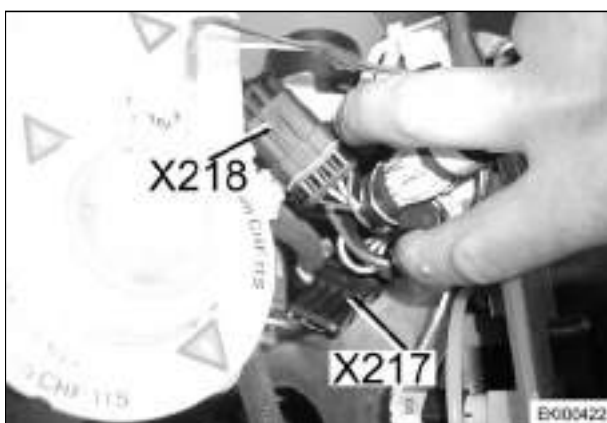
Remove hatch cover at top of steering column, then remove instrument panel



X215 = Cable coupler, S001 - switch, control stalk
 At rear of steering column on left



Remove panel



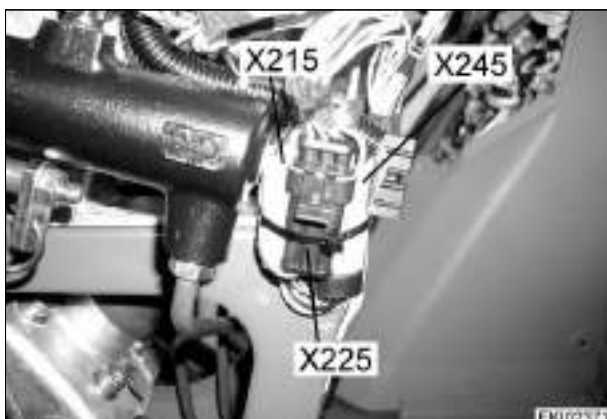
X217 = Solenoid switch, S005 - switch, right brake

X218 = Solenoid switch, S006 - switch, left brake

At top of steering column



Remove hatch cover at top of steering column, then remove instrument panel



X225 = Cable coupler, S014 - switch, rapid reversing

At rear of steering column



Remove panel

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| 08/2000 | a | 9/34 | | 0000 | D | 000033 |

Fav 900

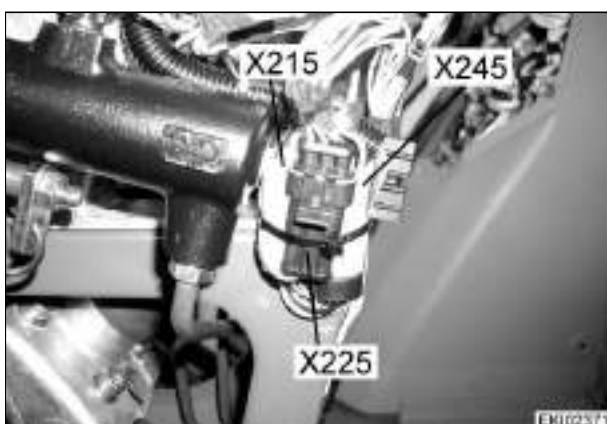
Tractor / General system
Electrical / electronic components - X

D

X236 = Cable coupler, S026 - switch, flow monitor
 By auxiliary pump in space between transmission and engine, in frame



Open right side of bonnet



X245 = Cable coupler, S001 - switch, control stalk
 At rear of steering column on left



Remove panel



X254 = 10 A socket, connected to electric circuit 15, 10 amp fuse

X255 = 25 A socket, connected to electric circuit 30, 25 amp fuse

At top right rear in cab



X258 = Cable coupler, M004 - rear wiper motor
 At rear wiper motor

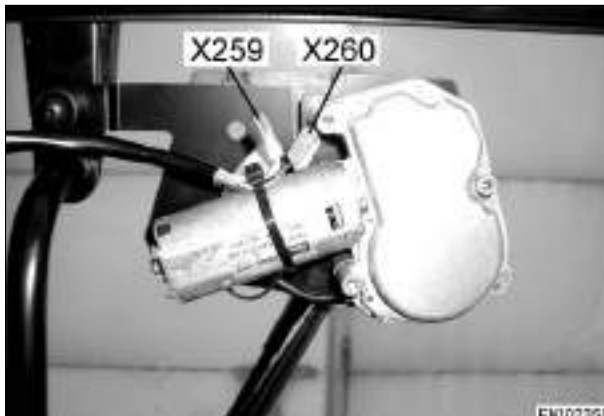


Remove panel

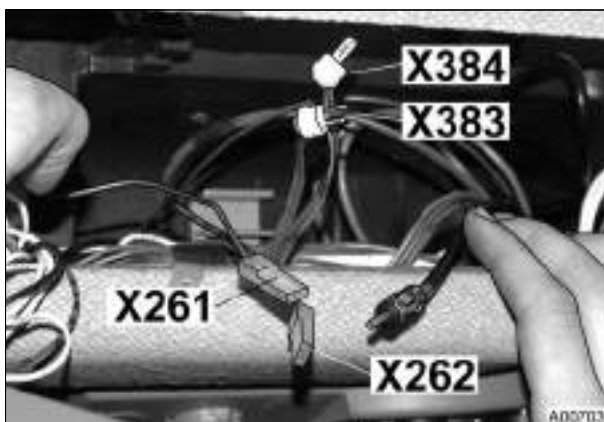
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Fav 900

Tractor / General system
Electrical / electronic components - X

D**X259** = Terminal, E023 - heated rear window**X260** = Terminal, E029 - heated rear window
At rear wiper motor

Remove panel

**X261** = Radio earth**X262** = +UB radio

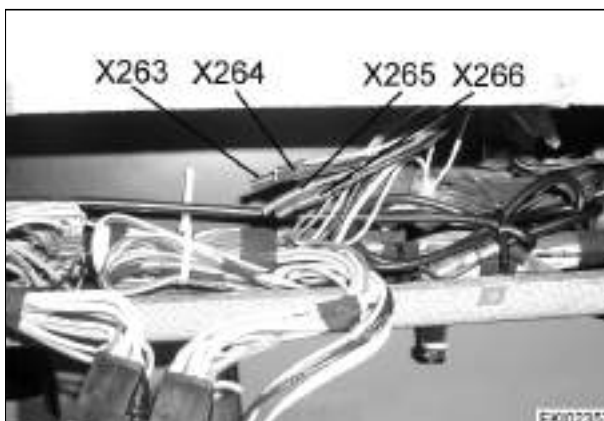
Not assigned = Radio aerial

A015 = Radio not shown

At top right in cab



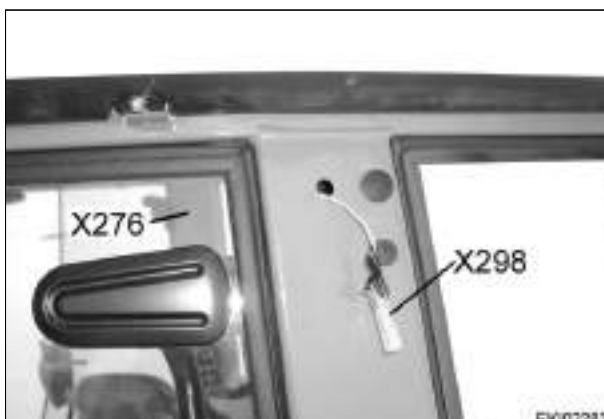
Remove radio housing blanking plate

**X263** = Terminal, UB, board for heated mirror**X264** = Terminal, earth, board for heated mirror**X265** = Terminal, mirror heater toggle switch**X266** = Terminal, mirror heater toggle switch

At top right in cab



Remove radio housing blanking plate

**X276** = Connector, E021 - right rotating beacon

Right side of tractor, in B-pillar

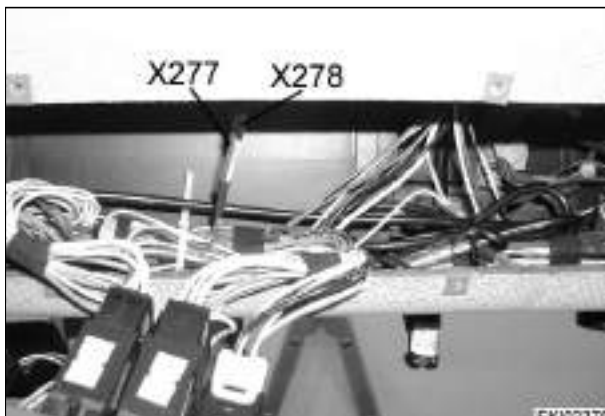


Remove blanking plug

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Fav 900

Tractor / General system
Electrical / electronic components - X

D**X277** = Lighting, wide load, left (earth)**X278** = Lighting, wide load, left (+UB)
At top right in cab

Remove radio housing blanking plate

**X281** = Connector, air-conditioning**Note:****Shown with cab roof removed for greater clarity.**

At top right below roof



Remove panel

**X284** = Connector, M002 - front right wiper motor

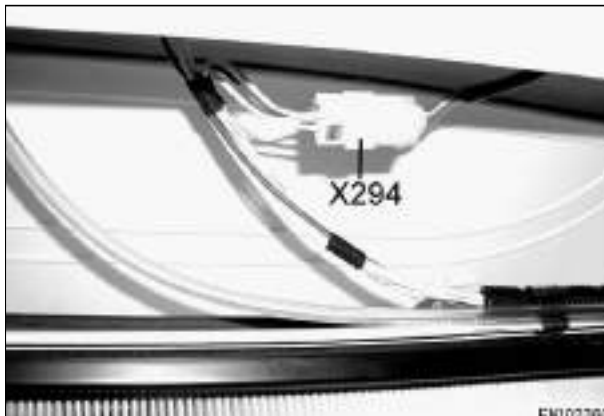
Pull out of roofliner at front right

**X291** = E013 - work lights in roof, front right

Top front in roof

Pivot bracket for work lights in roof
upwards

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - X | D |
|----------------|--|----------|



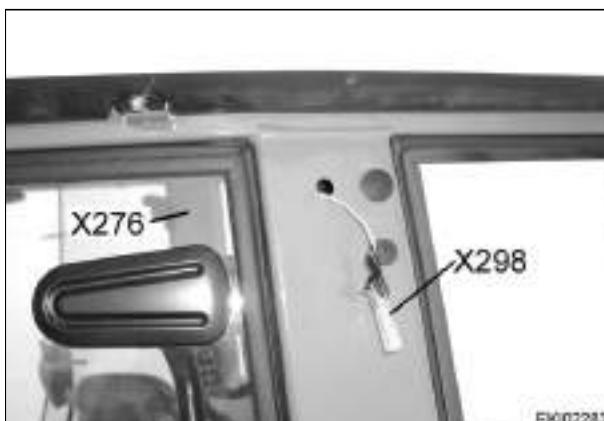
X294 = E014 - work lights in roof, front left
Top front in roof



Pivot bracket for work lights in roof
upwards



X297 = Connector, M002 - front left wiper motor
Pull out of roofliner at front left



X298 = Connector, E022 - left rotating beacon
Left side of tractor, in B-pillar



Remove blanking plug



X305 = +UB, M007 - seat adjustment motor
Rear of driver's seat



Pull cable out of seat

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| Fav 900 | Tractor / General system Electrical / electronic components - X | D |
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X313 = Lighting, wide load, right, +UB
X314 = Lighting, wide load, right, earth
 Front left in roof



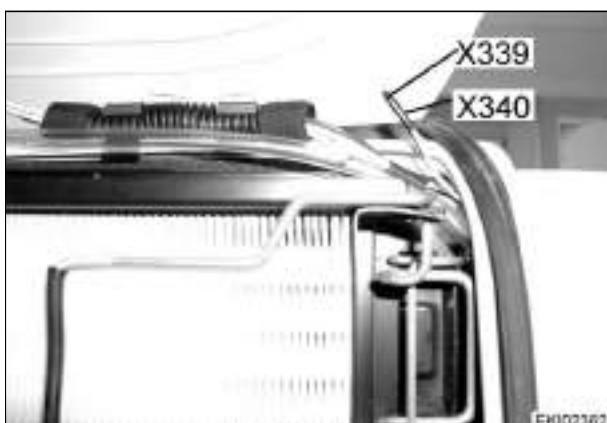
Remove cab roof



X337 = Terminal, E024 - right heated mirror
X338 = Terminal, E024 - right heated mirror
 Top front in roof



Pivot bracket for work lights in roof
 upwards



X339 = Terminal, E025 - left heated mirror
X340 = Terminal, E025 - left heated mirror
 Top front in roof



Pivot bracket for work lights in roof
 upwards



X342 = Connector, Y024 - air-conditioning
 magnetic clutch
 Front right on engine



Open right side of bonnet

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| Fav 900 | Tractor / General system Electrical / electronic components - X | D |
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X347 = Cable coupler, M002 - front wiper motor
On front wiper motor



Remove panel



X367 = Cable coupler, E018 - left work lights

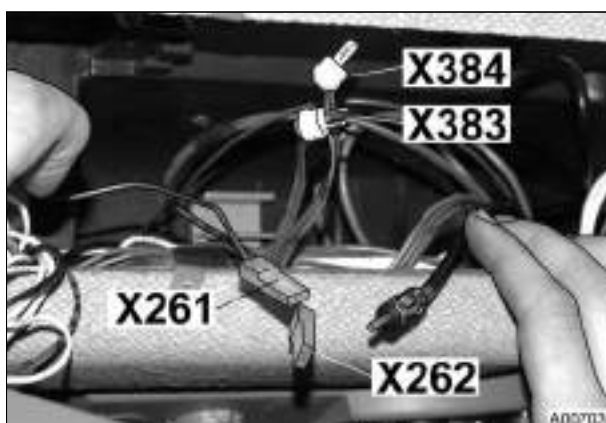
Note:

Photo shows left connector

X366 = cable coupler E017 - right work lights is analogous



Remove indicator/brake/tail light cluster



X383 = Terminal, left loudspeaker

X384 = Terminal, right loudspeaker

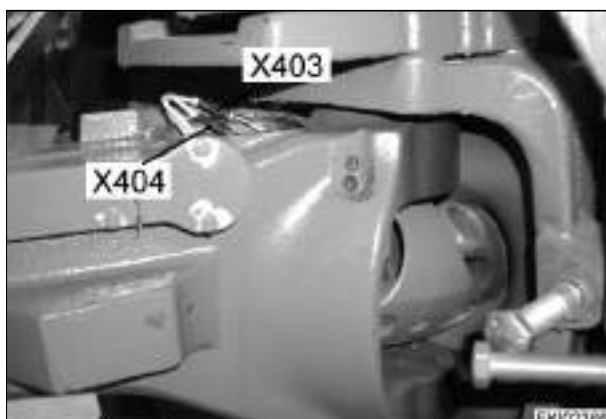
Not assigned = Radio aerial

A015 = Radio (not shown)

At top right in cab



Remove radio housing blanking plate



X403 = Connector, B001 - sensor, steering angle 1

X404 = Connector, B024 - sensor, steering angle 2

Right front axle

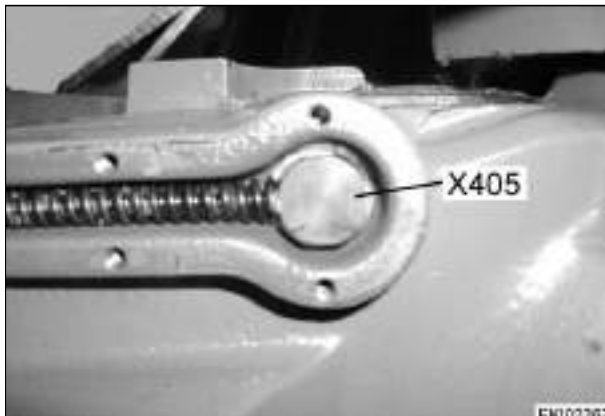


Unscrew cover from axle housing

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Fav 900

Tractor / General system
Electrical / electronic components - X

D

X405 = Connector, steering angle sensors
 Right front axle



Unscrew cover from axle housing



X406 = +UB, not currently assigned

Right side of tractor, B009 - sensor, output temperature



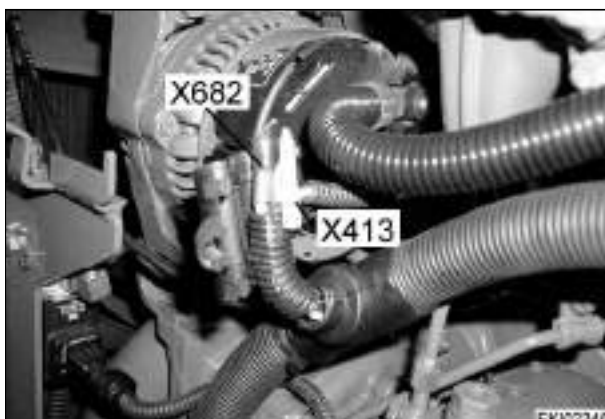
Unscrew right rear wheel and panel



X412 = EDC - diagnostics plug
 In cab on right mudguard



Remove panel



X413 = Cold start diagnostics
 Front left on engine



Open left side of bonnet, remove T-piece from cable loom

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - X | D |
|----------------|--|----------|



X415 = Connector, A-pillar
Front right in roof



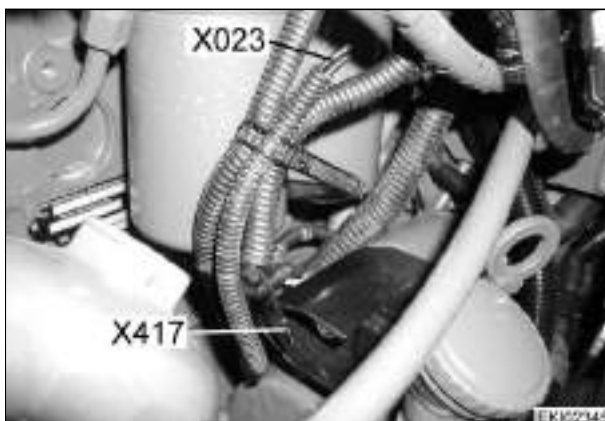
Remove cab roof



X416 = Connector, A-pillar
Front left in roof



Remove cab roof



X417 = Power supply, E033 - fuel preheater
Left side of tractor, in region of starter motor



Open left side of bonnet



X418 = Cable coupler, external start terminal, earth

X419 = Cable coupler, external start terminal, plus
On left of battery frame



Raise cover

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Fav 900

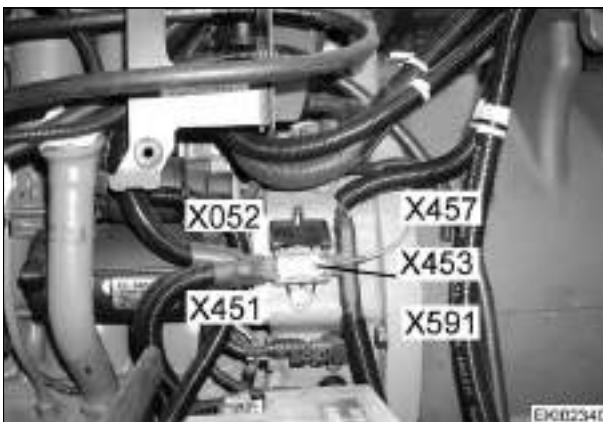
Tractor / General system
Electrical / electronic components - X

D

X442 = Connector, bonnet front
 At top above radiator



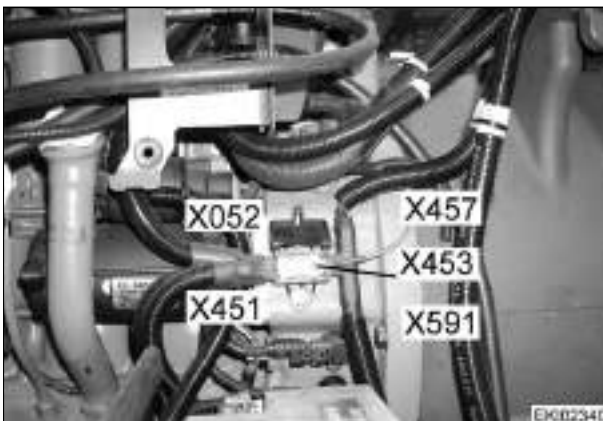
Opening the front section



X451 = Cable lug, plus terminal, chassis
 On left side of tractor in flywheel housing



Note:
 Shown with fuel tank removed for greater clarity.



X453 = Cable lug, plus terminal, chassis
 On left side of tractor on flywheel housing



Note:
 Shown with fuel tank removed for greater clarity.



X454 = Cable lug, plus terminal, cab base
X455 = Cable lug, plus terminal, cab base
 Right mudguard

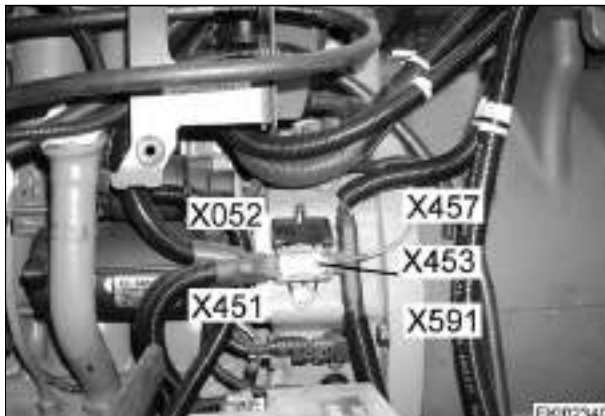


Remove panels

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Fav 900

Tractor / General system
Electrical / electronic components - X

D

X457 = Cable lug, plus terminal, cab base
 On left side of tractor in flywheel housing



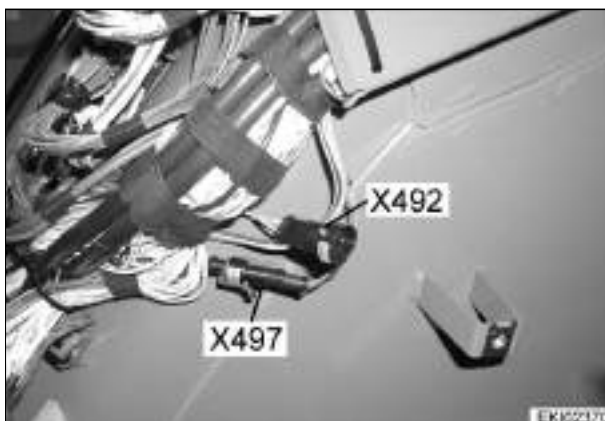
Note:
 Shown with fuel tank removed for greater clarity.



X462 = Earthing point, cab base
 In cab at front right in front of control console



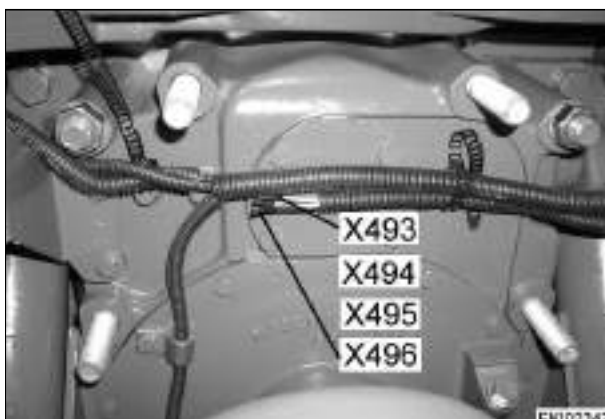
Unscrew hatch cover



X492 = Connector, LBS prewiring (front)
 In cab on right mudguard at front



Remove hatch cover on control console and mudguard panel at front



X493 = LBS prewiring, front
X494 = LBS prewiring, front
X495 = LBS prewiring, front
X496 = LBS prewiring, front
 Between front plate and front PTO

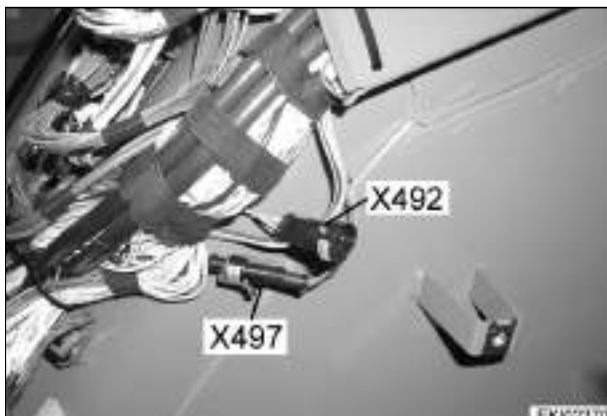


Remove front plate

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Fav 900

Tractor / General system
Electrical / electronic components - X

D

X497 = Connector, LBS prewiring (front)
 In cab on right mudguard at front



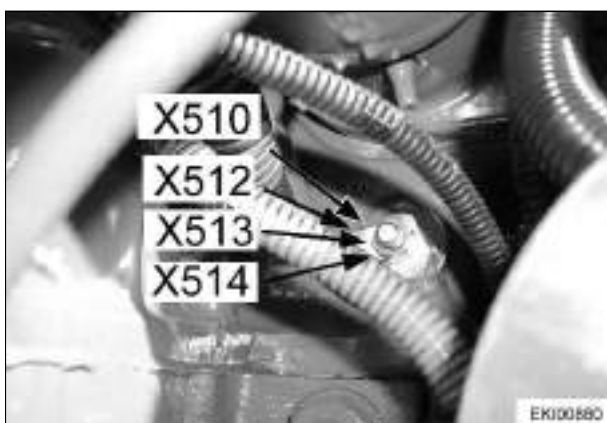
Remove hatch cover on control console
 and mudguard panel at front



X499 = +UB30 LBS 40 amps
 Right mudguard



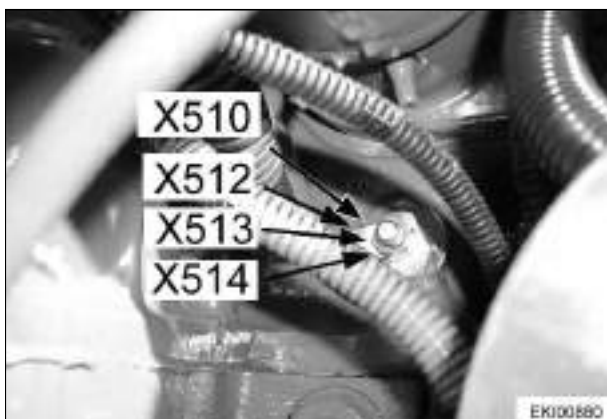
Remove panels



X510 = Earthing point, engine, left
 On left side of tractor on flywheel housing



Open left side of bonnet



X512 = Earthing point, engine, left

X513 = Earthing point, engine, left

On left side of tractor on flywheel housing

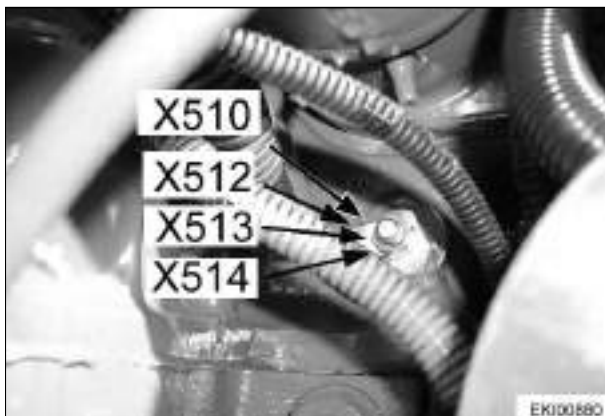


Open left side of bonnet

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Fav 900

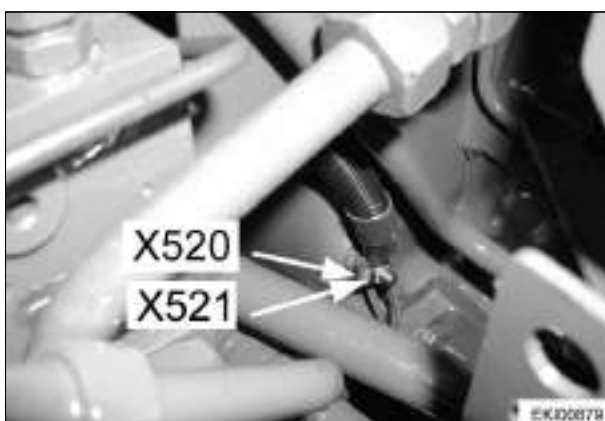
Tractor / General system
Electrical / electronic components - X

D**X514** = Earthing point, engine, left

On left side of tractor on flywheel housing



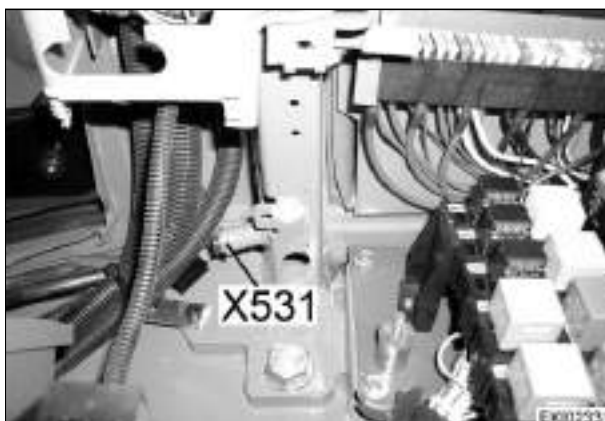
Open left side of bonnet

**X520** = Earthing point, engine, right**X521** = Earthing point, engine, right

On right side of tractor on flywheel housing



Open right side of bonnet

**X531** = Earthing point, B-pillar

In cab on right mudguard



Remove A004 - ECU, control console

**X532** = Earthing point, body/cab, right**X533** = Earthing point, body/cab, right**X534** = Earthing point, body/cab, right**X536** = Earthing point, body/cab, right

At top right in cab



Remove radio housing blanking plate



Fav 900

Tractor / General system
Electrical / electronic components - X

D**X550** = Earthing point, cab base

In cab at front right in front of control console



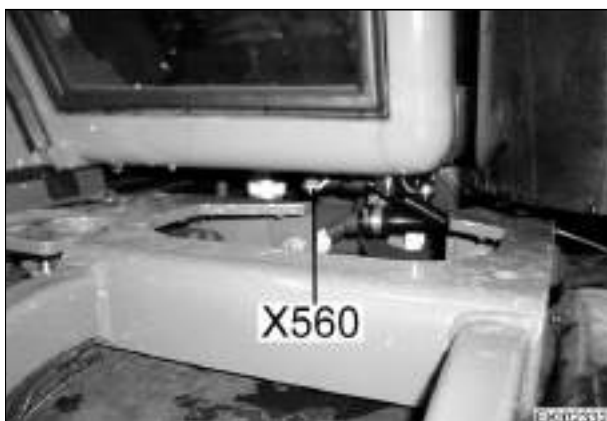
Unscrew hatch cover

**X551** = Earthing point, cab base**X552** = Earthing point, cab base**X553** = Earthing point, cab base**X554** = Earthing point, cab base**X556** = Earthing point, cab base

At front right in cab



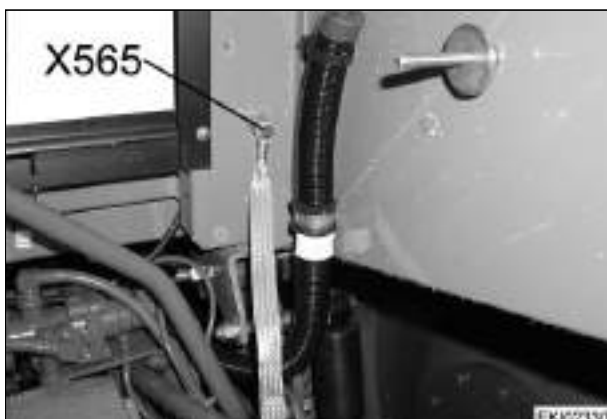
Remove hatch cover in front of control console

**X560** = Earthing point, cab base

Cab, right entrance step



Remove footplate

**X565** = Earthing point, cab base

Rear of tractor, right side



Remove panel

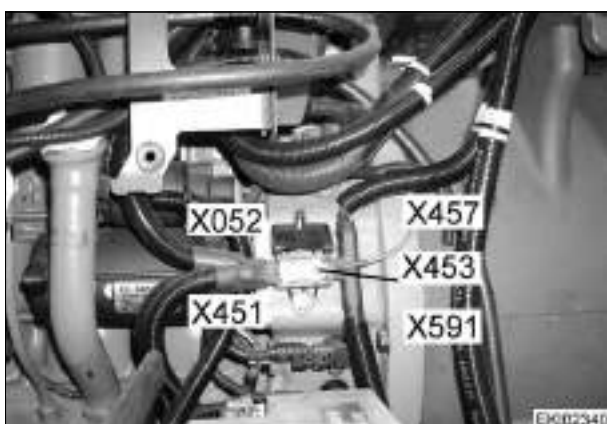


Fav 900

Tractor / General system
Electrical / electronic components - X

D

- X570** = Earthing point, transmission
X571 = Earthing point, transmission
X572 = Earthing point, transmission
 Rear of tractor, right axle tube



- X591** = Connector, +UB 30 LBS implement socket
 On left side of tractor in flywheel housing



Note:
 Shown with fuel tank removed for greater clarity.



- X600** = Connector, CAN high upstream of A013 - board, fuse
X601 = Connector, CAN low upstream of A013 - board, fuse
 In cab at front right in front of control console



Unscrew hatch cover



- X602** = Connector, CAN high upstream of A004 - ECU, control console
X603 = Connector, CAN low upstream of A004 - ECU, control console
 In cab at front right in front of control console

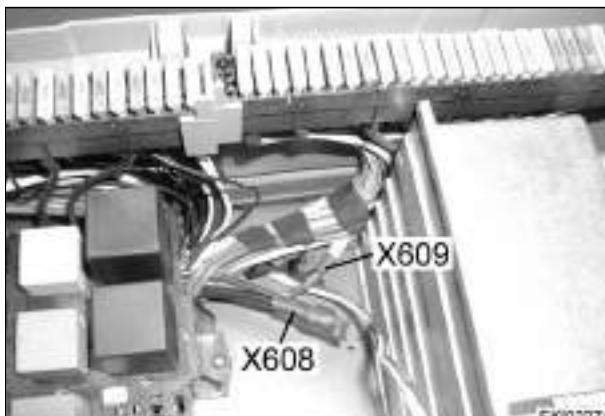


Unscrew hatch cover

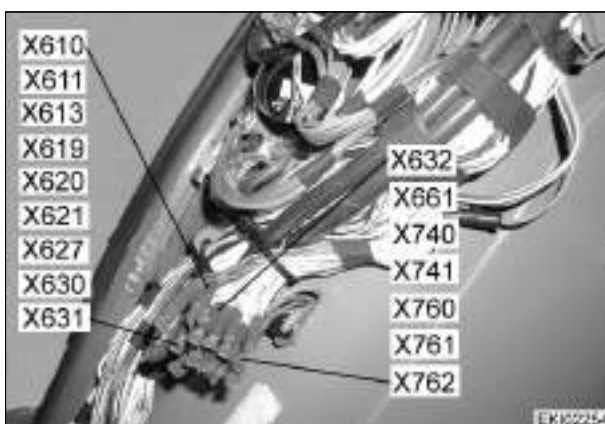
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Fav 900

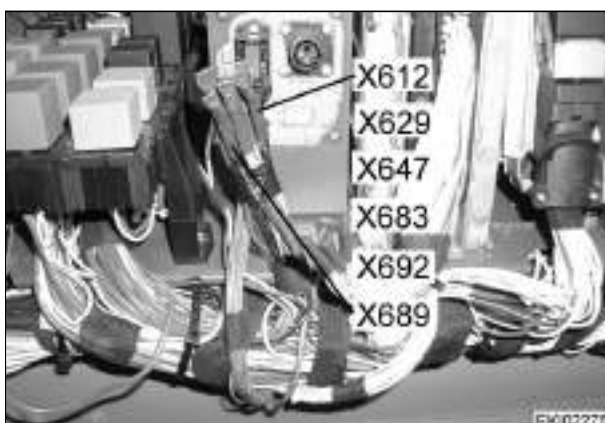
Tractor / General system
Electrical / electronic components - X

D**X608** = Connector, +UB15**X609** = Connector, +UB58 lighting
In cab on right mudguard

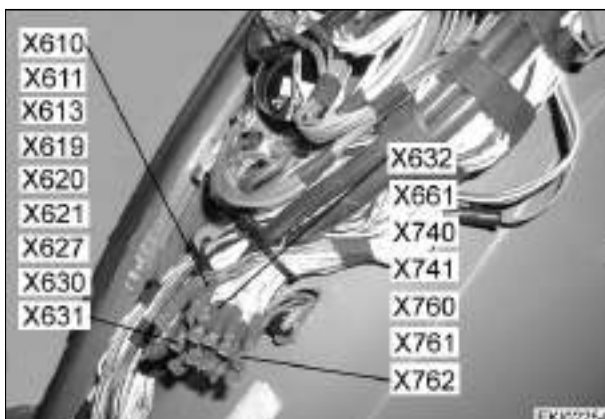
Remove panel

**X610** = Connector, E007 - right indicator**X611** = Connector, E008 - left indicator
In cab at front right in front of control console

Unscrew hatch cover

**X612** = Connector, +UB15, M002/M004 - wiper motor, E021/E022 - rotating beacon
In cab on right mudguard

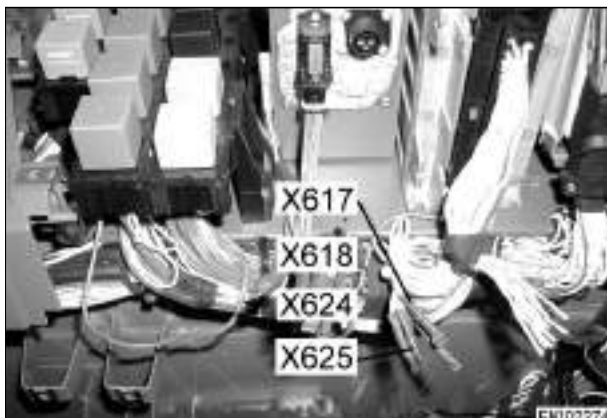
Remove panel

**X613** = Connector, earth, sensor system, A002 - ECU, enhanced control
In cab at front right in front of control console

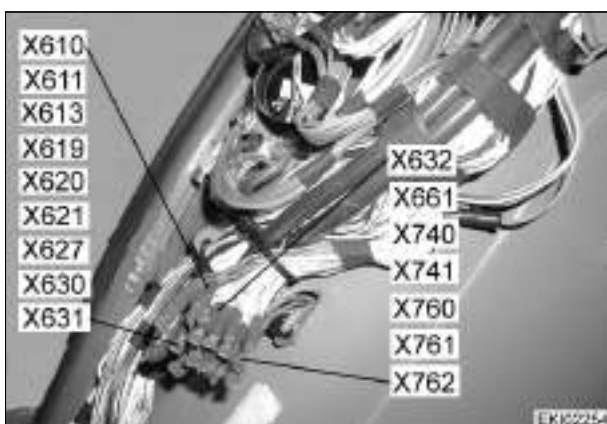
Unscrew hatch cover

Fav 900

Tractor / General system
Electrical / electronic components - X

D**X617** = Connector, G-bus, CAN low**X618** = Connector, G-bus, CAN high
In cab on right mudguard

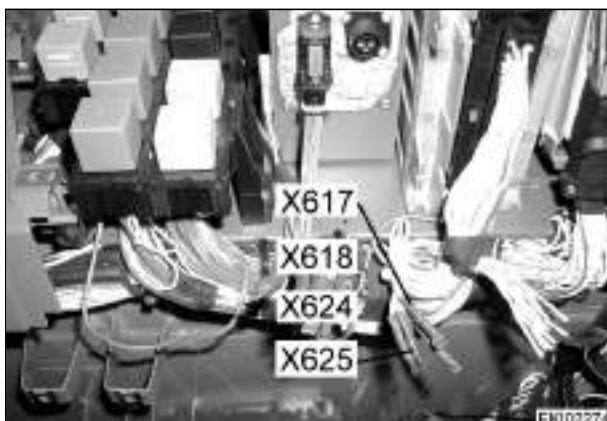
Remove panel

**X619** = Connector, earth/electronics / 3**X620** = Connector, earth/electronics / 2**X621** = Connector, earth/electronics / 1

In cab at front right in front of control console



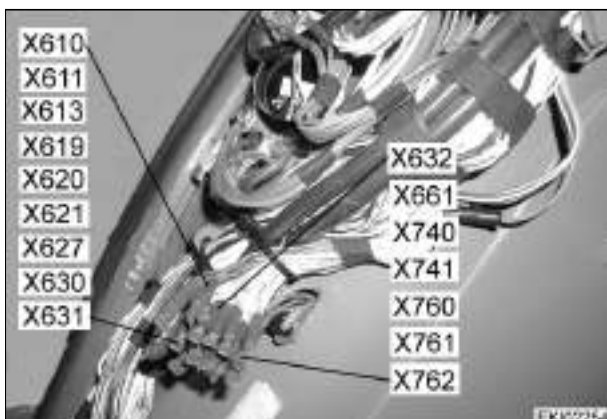
Unscrew hatch cover

**X624** = Connector, K-bus, CAN high**X625** = Connector, K-bus, CAN low

In cab on right mudguard



Remove panel

**X627** = Connector, earth

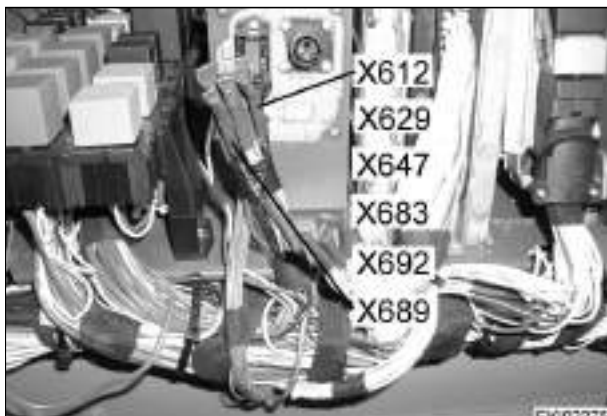
At front right in cab



Remove hatch cover in front of control console

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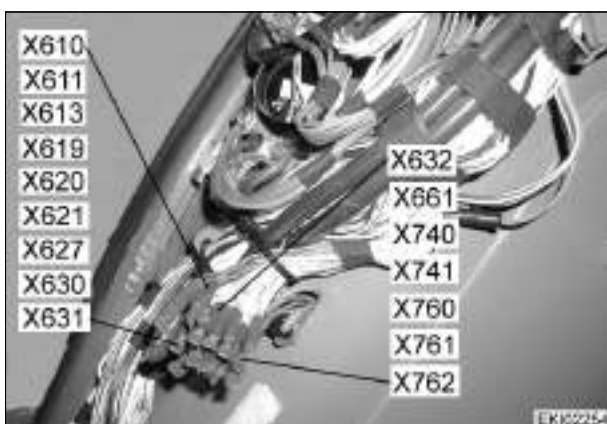
| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Electrical / electronic components - X | D |
|----------------|--|----------|



X629 = Connector, +UB30, A002 - ECU,
enhanced control
In cab on right mudguard



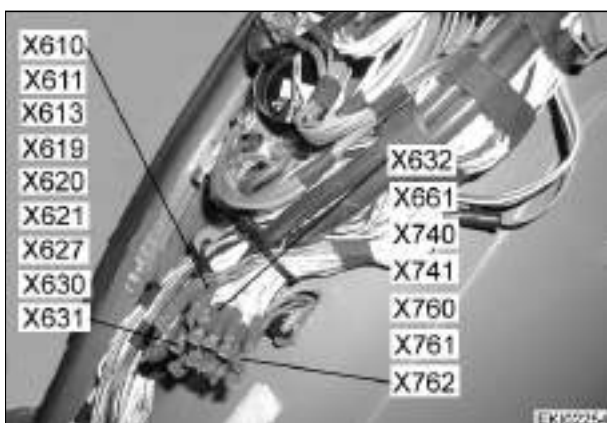
Remove panel



X630 = Connector, brake light
In cab at front right in front of control
console



Unscrew hatch cover



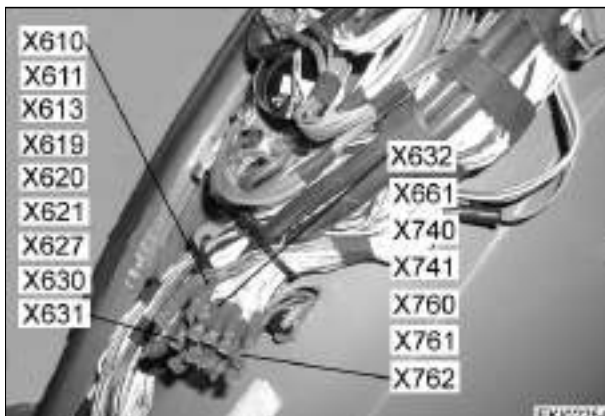
X631 = Connector, "Rear PTO on" LED
In cab at front right in front of control
console



Unscrew hatch cover

Fav 900

Tractor / General system
Electrical / electronic components - X

D

X632 = Connector, S027 - switch, raise rear power lift, right
 Connector, S028 - switch, lower rear power lift, right
 Connector, S029 - switch, raise rear power lift, left
 Connector, S030 - switch, lower rear power lift, left
 In cab at front right in front of control console



Unscrew hatch cover



X633 = Connector, K-bus, CAN high
X634 = Connector, K-bus, CAN low
 In cab on right mudguard



Remove panel



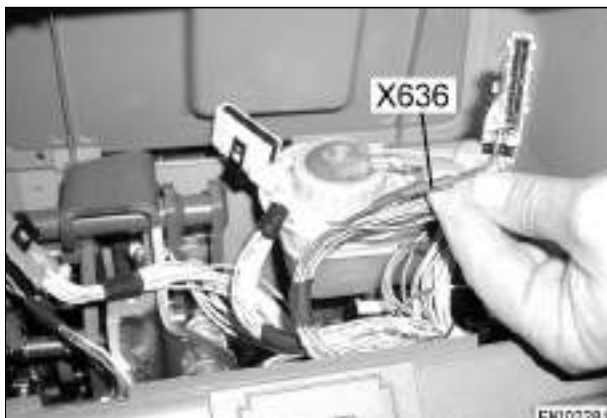
X635 = Connector, analog earth, A007 - display unit
 At top of steering column



Remove instrument panel

Fav 900

Tractor / General system
Electrical / electronic components - X

D

X636 = Connector, +UB30, A007 - display unit
 Top front of steering column



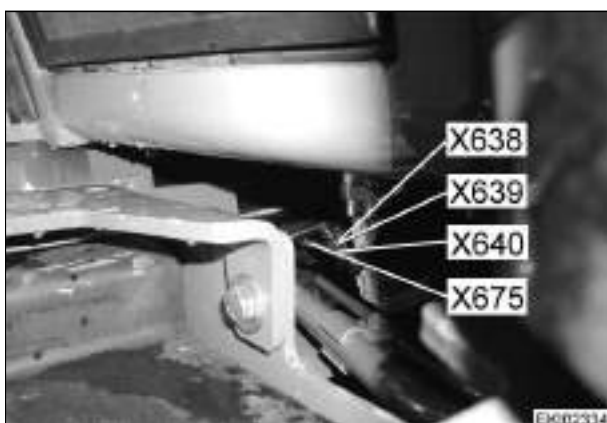
Remove A007 - display unit



X637 = Connector, +UB 15, A007 - display unit
 At top of steering column



Remove instrument panel



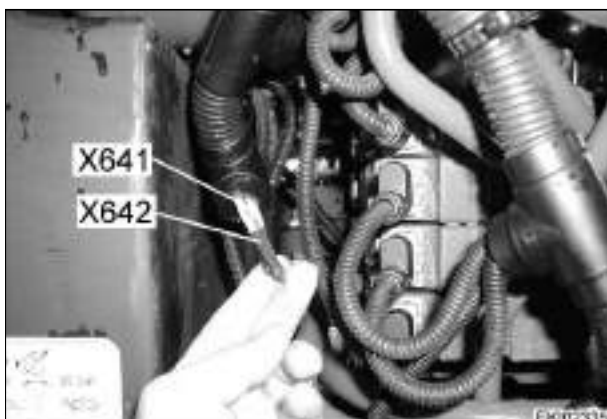
X638 = Connector, earth, S025/S026 - switch
 (steering oil pressure)

X639 = Connector, +UB, S025/S026 - switch
 (steering oil pressure)

X640 = Connector, +UB, Y015-Y019 - valves
 Cab, right entrance step



Remove footplate



X641 = Connector, G-bus, CAN high
 (Y015-Y019 - valves)

X642 = Connector, G-bus, CAN low
 (Y015-Y019 - valves)



Right side of tractor, in region of
 ZSB - central control block

Remove flap

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| | | | | | 000033 |

Fav 900

Tractor / General system
Electrical / electronic components - X

D

X643 = Connector, earth, A007 - display unit
 At top of steering column



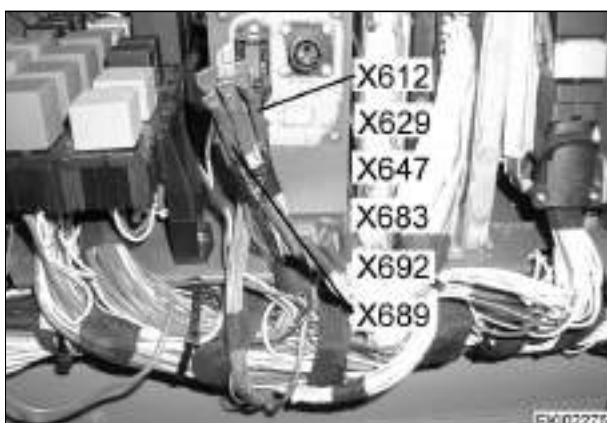
Remove instrument panel



X644 = Connector, +UB 58 at front, S002 - switch, ignition
 Bottom left in footwell



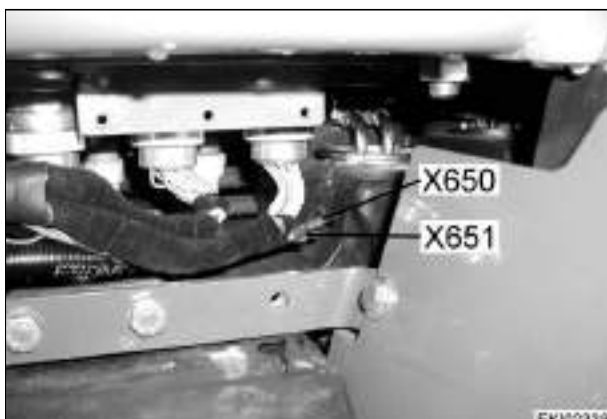
Raise floor mat and unscrew cover



X647 = Connector, +UB15, EPC-DA switchover
 In cab on right mudguard



Remove panel



X650 = Connector, E001/E002 - headlights
 (56b dipped headlights)

X651 = Connector, E001/E002 - headlights
 (56a main beam)

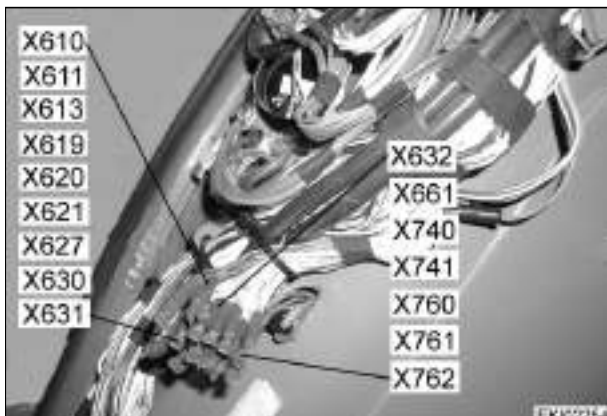
Cab, left step



Remove cover panel

Fav 900

Tractor / General system
Electrical / electronic components - X

D**X661** = Connector, earth/electronics / 4

In cab at front right in front of control console



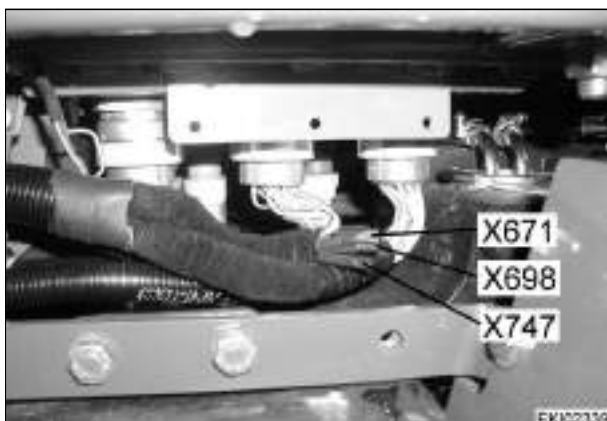
Unscrew hatch cover

**X662** = Connector, G-bus, CAN low (A021 - ECU, EDC; Y015-Y016 - valves; A009 - actuator unit)**X663** = Connector, G-bus, CAN high (A021 - ECU, EDC; Y015-Y016 - valves; A009 - actuator unit)

Right mudguard



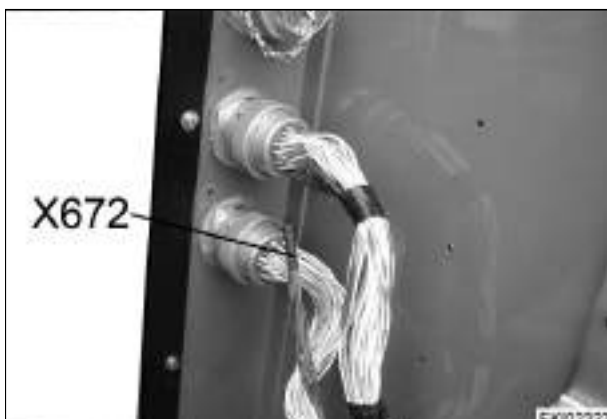
Remove panel

**X671** = Connector, earth, A002 - ECU, enhanced control

Cab, left step



Remove cover panel

**X672** = Connector, earth, sensor system, A002 - ECU, enhanced control

Rear of tractor, right side

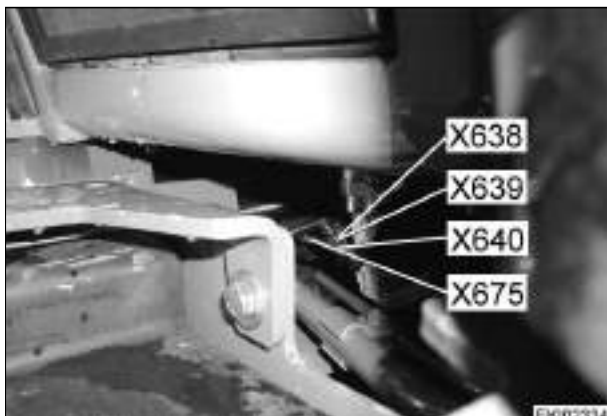


Remove panel

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Fav 900

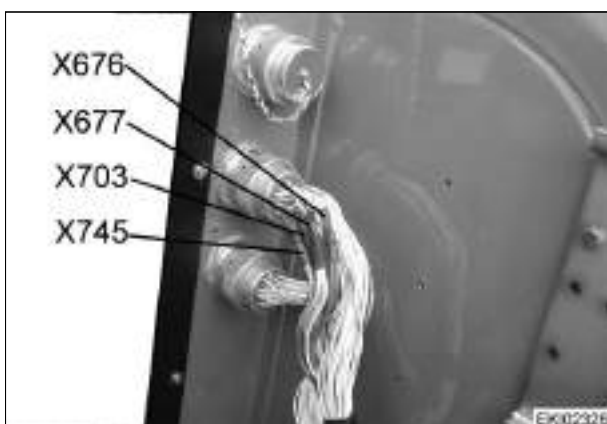
Tractor / General system
Electrical / electronic components - X

D

X675 = Connector, earth, Y021/Y022 - valve
 (raise/lower suspension)
 Cab, right entrance step



Remove footplate

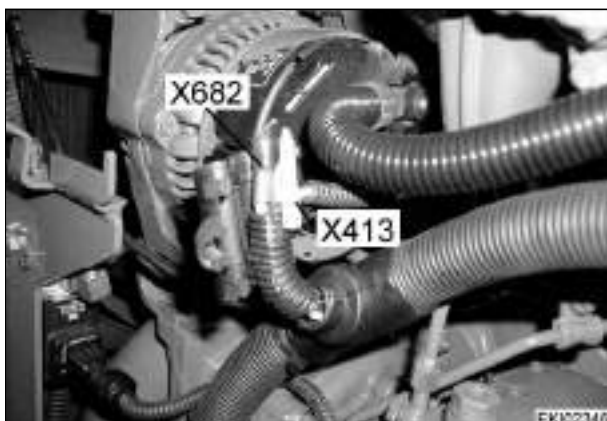


X676 = Connector, earth, B031/B032 - sensor,
 draft-sensing pin

X677 = Connector, +UB, B031/B032 - sensor,
 draft-sensing pin
 Rear of tractor, right side



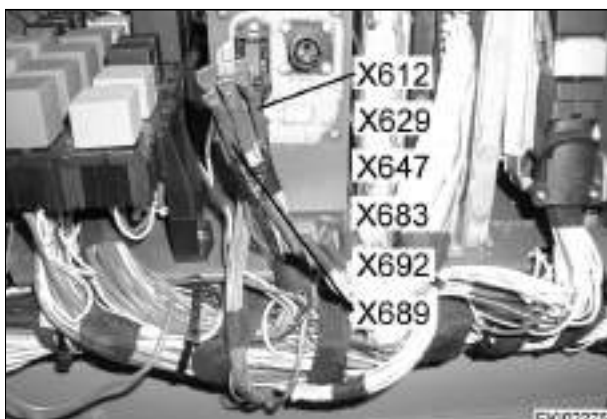
Remove panel



X682 = Connector, R001 - heater plug
 Front left on engine



Open side of bonnet, remove T-piece from
 cable loom



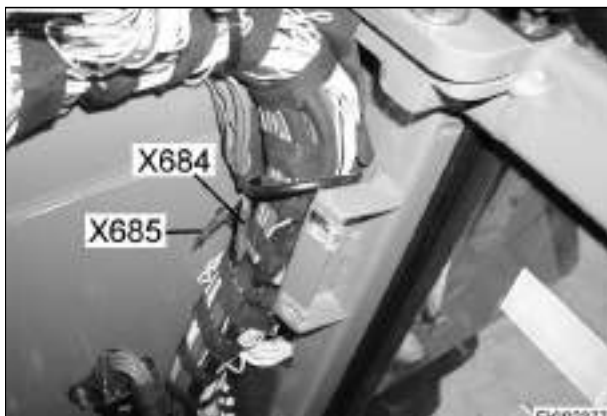
X683 = UB 8.5 V for B012 - sensor, engine oil
 pressure and B019 - sensor,
 compressed-air volume
 In cab on right mudguard



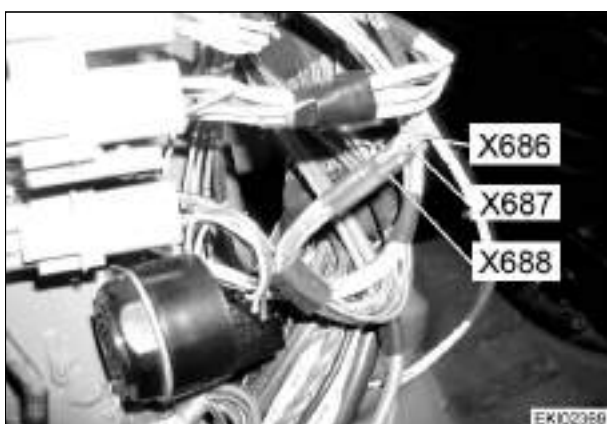
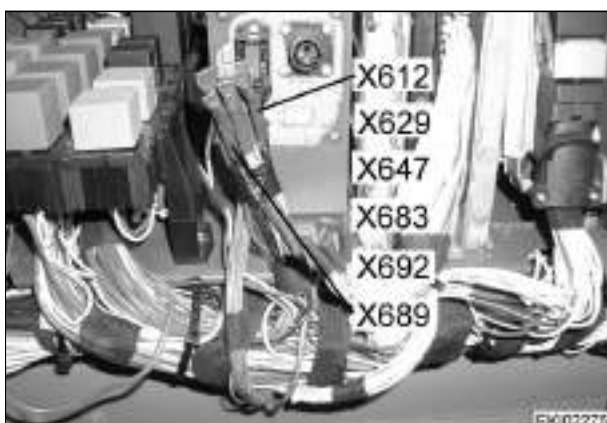
Remove panel

Fav 900

Tractor / General system
Electrical / electronic components - X

D**X684** = Connector, LBS (earth)**X685** = Connector, UB 30/251
Right rear mudguard

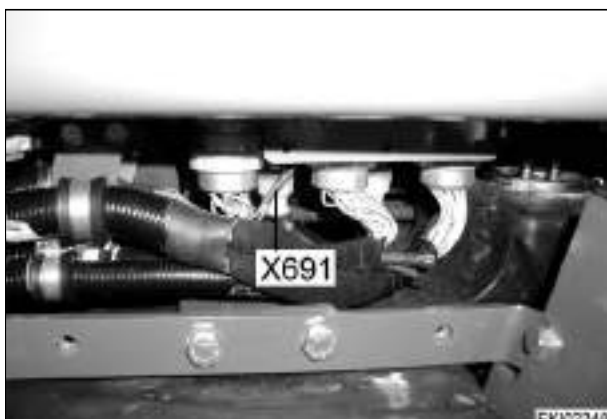
Remove panels

**X686** = Connector, LBS, Can low**X687** = Connector, LBS, Can high**X688** = Connector, LBS, digital earth
In cab on right mudguard at frontRemove hatch cover from control console
at front**X689** = Connector, +UB15, LBS - front

In cab on right mudguard



Remove panel

**X691** = Connector, analog earth, A007 - display
unit

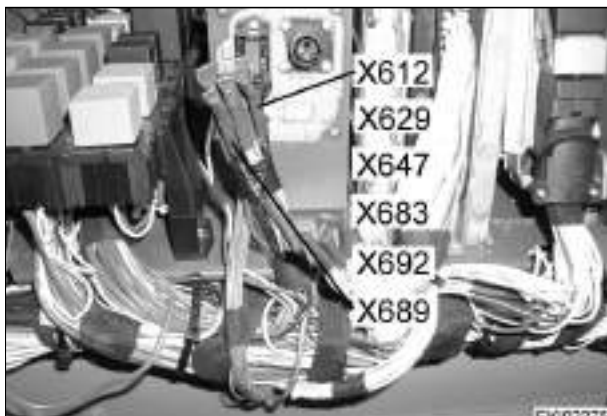
Left side of tractor



Remove panel

Fav 900

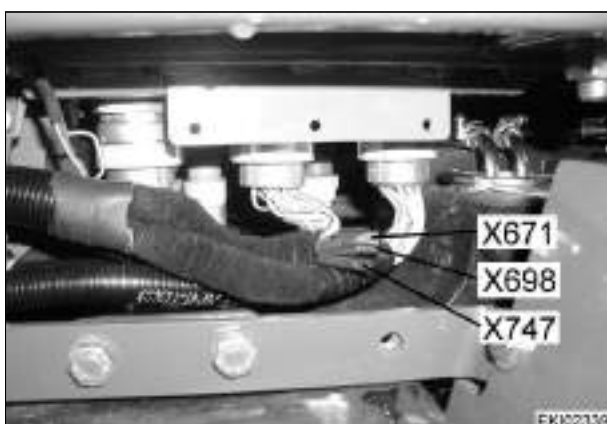
Tractor / General system
Electrical / electronic components - X

D

X692 = Connector, UB 30, EDC control unit
 In cab on right mudguard



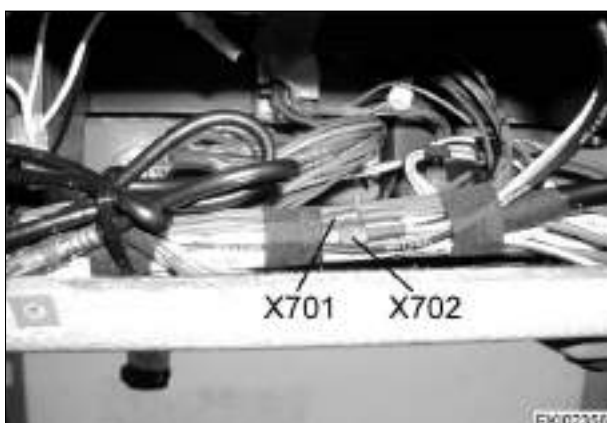
Remove panels



X698 = Connector, earth, A007 - display unit
 Cab, left step



Remove cover panel



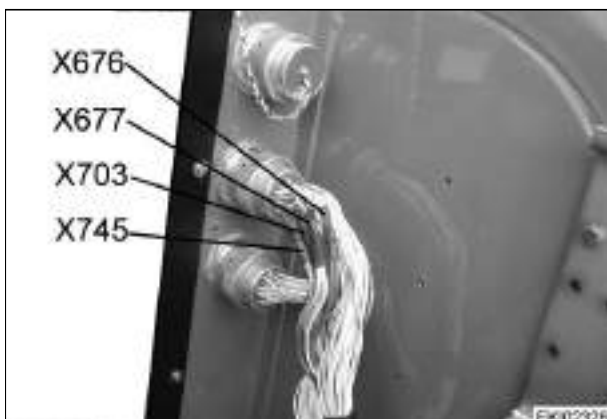
X701 = Connector, +UB, heated mirror

X702 = Connector, earth, heated mirror

At top right in cab



Remove radio housing blanking plate



X703 = Connector; earth; B034 - sensor, fuel
 Rear of tractor, right side

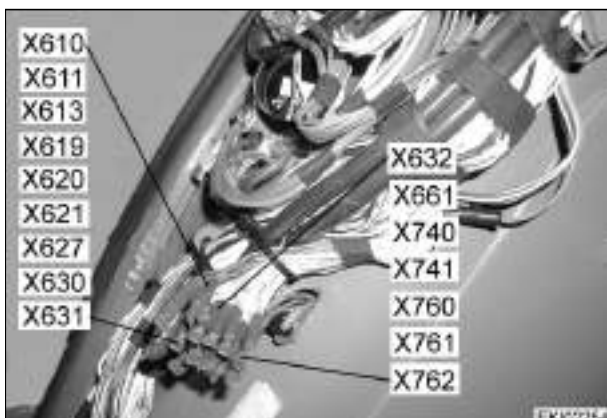


Remove panel

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Fav 900

Tractor / General system
Electrical / electronic components - X

D

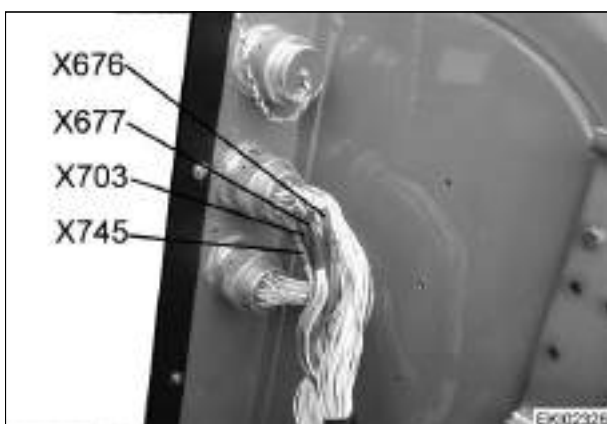
X740 = Connector, earth, sensor system 1,
 A004 - ECU, control console

X741 = Connector, earth, sensor system 2,
 A004 - ECU, control console

In cab at front right in front of control
 console



Unscrew hatch cover

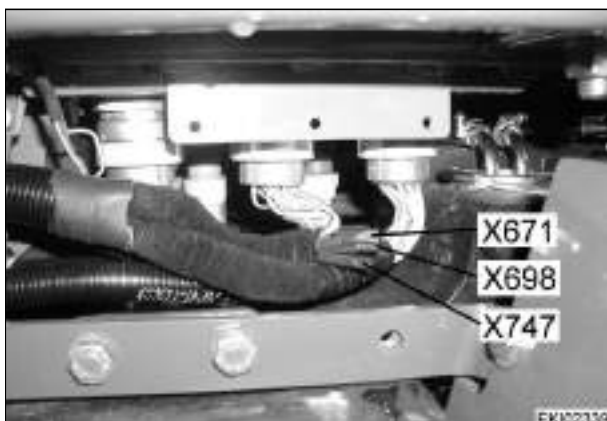


X745 = Connector, transmission, sensor system
 to A004 - ECU, control console (contact 1)

Rear of tractor, right side



Remove panel

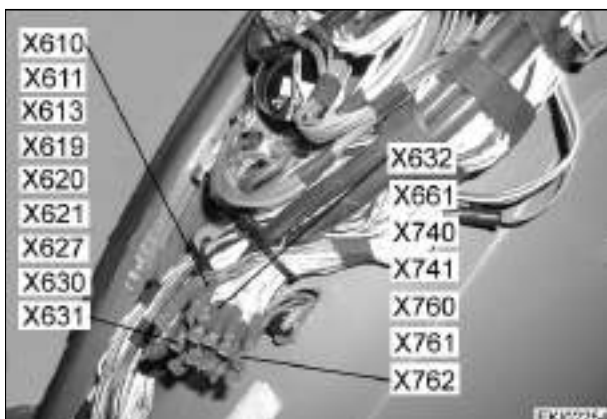


X747 = Connector, engine, sensor system to
 A004 - ECU, control console

Cab, left step



Remove cover panel



X760 = Connector, Y014 - valve, raise suspension

X761 = Connector, Y013 - valve, lower
 suspension

X762 = Connector, Y012 - valve, charge
 suspension

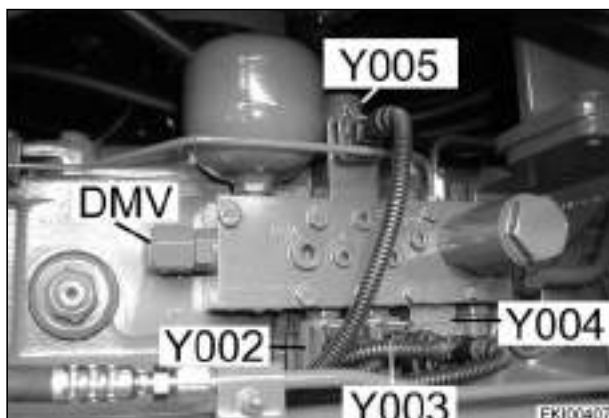
In cab at front right in front of control
 console



Unscrew hatch cover

Fav 900

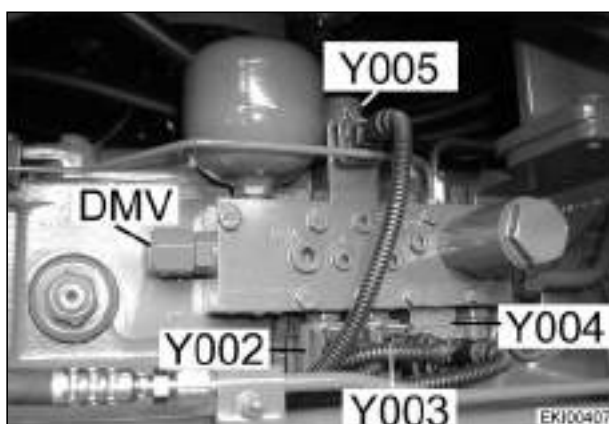
Tractor / General system
Electrical / electronic components - Y

D**Y002** = Valve, speed range 1**Y003** = Valve, speed range 2

Behind rear right wheel on valve unit



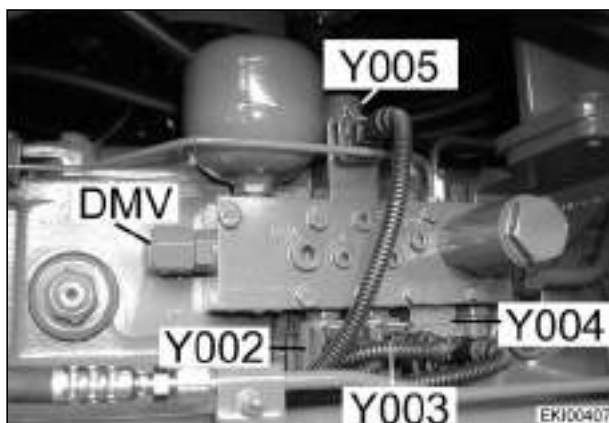
Unscrew rear right wheel and panel

**Y004** = Valve, transmission neutral / turboclutch valve

At right of transmission at bottom of valve unit



Unscrew rear right wheel and panel

**Y005** = Valve, speed governor

Behind rear right wheel on valve unit



Unscrew rear right wheel and panel

**Y006** = Valve, exhaust brake

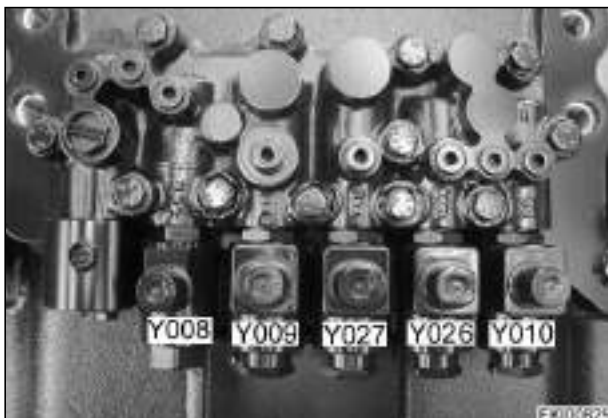
At front left on radiator



Remove left side of bonnet

Fav 900

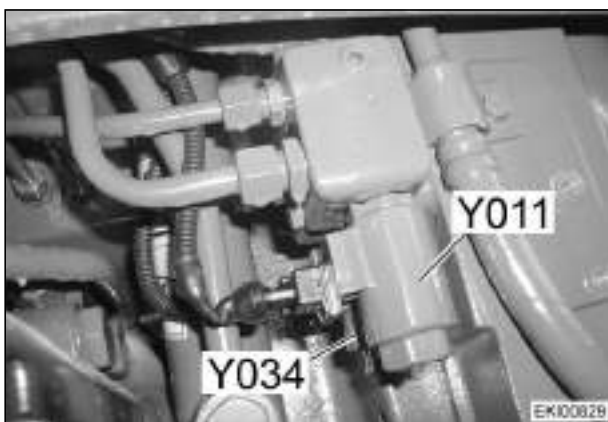
Tractor / General system
Electrical / electronic components - Y

D**Y008** = Valve, rear PTO**Y009** = Valve, 4WD**Y010** = Valve, diff. lock

On rear-axle housing



Raise cab at rear

**Y011** = Valve, front PTO

On front PTO gearbox at left



Unscrew cover panel

**Y012 / MVL** = Valve, charge suspension

= "Charge valve" for suspension and oil preheater

At right entrance step, on top of central control block in bore 2011



Remove footplate and cover

**Y013 / SV1** = Valve, lower suspension

= Identifying feature of Y013: valve body yellow-chromated and without counterbore

At right entrance step, on top of central control block in bore 2002



Remove footplate and cover

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Fav 900

Tractor / General system
Electrical / electronic components - Y

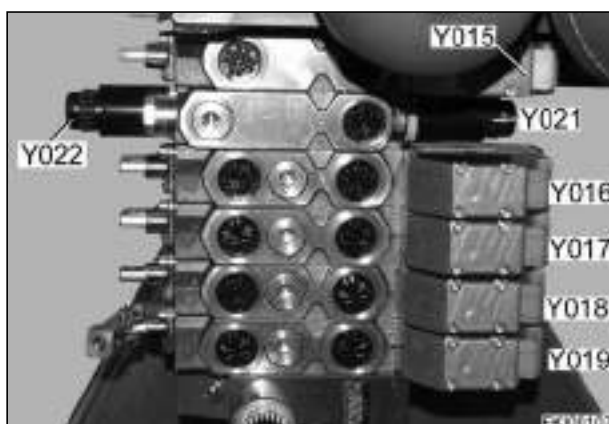
D

Y014 / SV2 = Valve, "Raise suspension" solenoid valve

- = Identifying feature of Y014: valve body white-chromated and with counterbore
- At right entrance step, on top of central control block in bore 2001



Remove footplate and cover

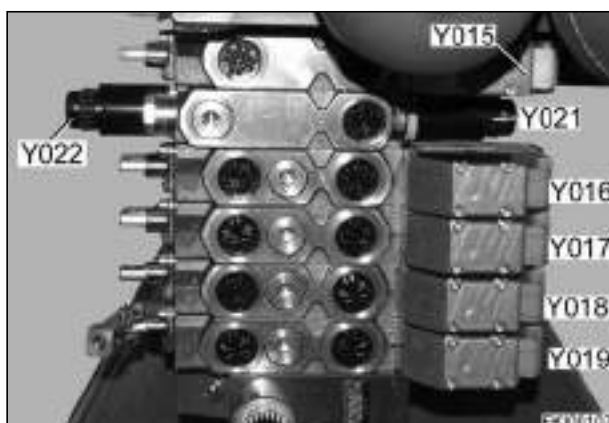


Y015 = Valve 1

- = Control valve SB 23 LS EHS
- 1st control valve on underside of central control block
- Note: EPC control valve is located between Y015 and Y016.



Unscrew right step
Pull right auxiliary tank outwards

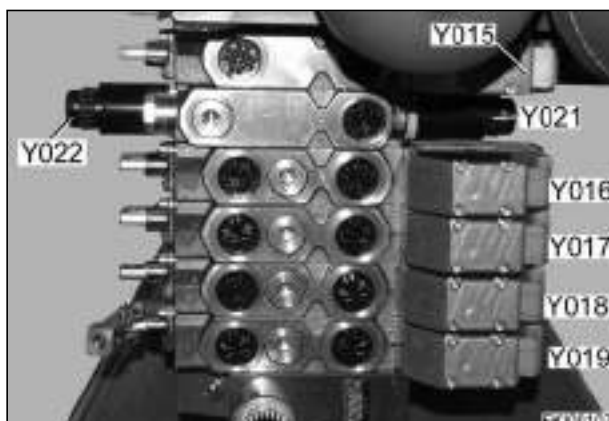


Y016 = Valve 2

- = Control valve SB 23 LS EHS
- 2nd control valve on underside of central control block
- Note: EPC control valve is located between Y015 and Y016.



Unscrew right step
Pull right auxiliary tank outwards



Y017 or Y018 or Y019 = Valve 3, valve 4, valve 5

- = Relevant control valve SB 23 LS EHR for front power lift or for connections, depending on tractor's equipment level
- 1st control valve on underside of central control block



Unscrew right step
Pull right auxiliary tank outwards

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Fav 900

Tractor / General system
Electrical / electronic components - Y

D

Y023 = Valve, compressed-air advance control system

At rear right above axle drive

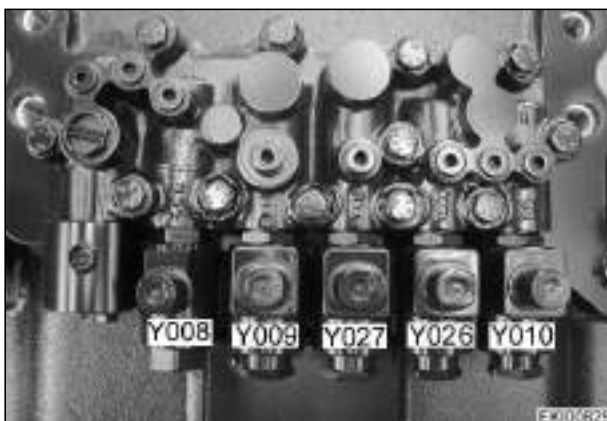


Y025 = Valve, cold-start aid

At front on intake pipe



Open left side of bonnet



Y026 = Valve, rear PTO speed 1

Y027 = Valve, rear PTO speed 2

On rear-axle housing



Raise cab at rear



Y032 / MVSt = Valve, neutral (valves)

= Electrically activated pressure-relief valve for 22 bar control pressure; non-energised = no control pressure, EHS valves non-operational.

At right entrance step, in end plate EP of valve array under central control block ZSB.



Unscrew right step. Pull right auxiliary tank outwards

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| | | |
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| Fav 900 | Tractor / General system Electrical / electronic components - Y | D |
|----------------|--|----------|



Y033 MVV = Valve, flush

= Opens flow from P via aperture 5 to tank.
In end plate EP



Unscrew right step. Pull right auxiliary
tank outwards



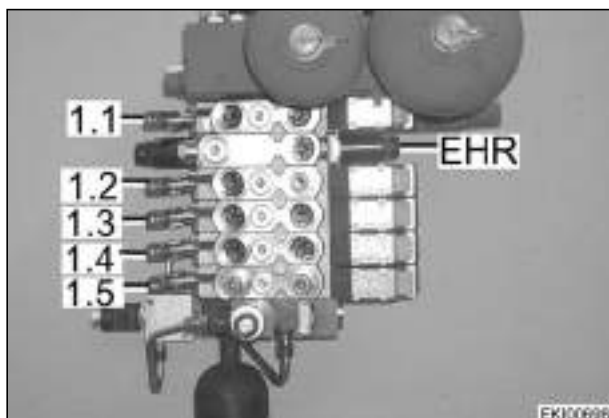
Y034 = Valve, release brake

On front PTO gearbox at left



Unscrew cover panel

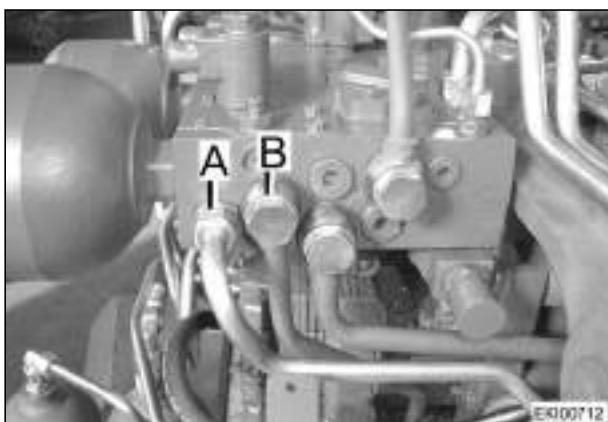
| Date | Version | Page | Electrical / electronic components - Y | Capitel | Index | Docu-No. |
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| 21.9.2001 | a | 5/5 | | 0000 | D | 000038 |

Fav 900
Tractor / General system
Hydraulic components
D

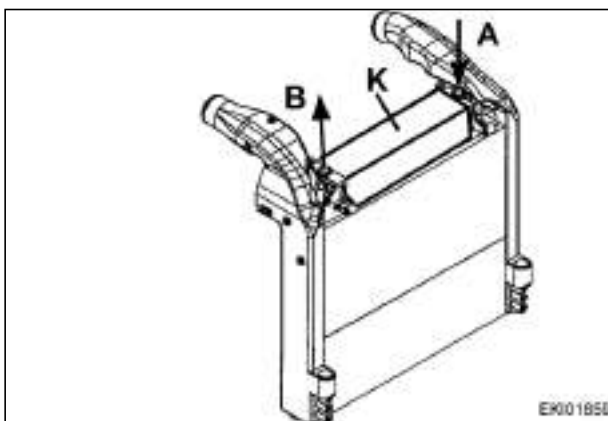
1.1, 1.2, 1.3, 1.4, 1.5, = Control valves SB 23 EHS
 = Relevant control valve for front power lift or for connections, depending on tractor's equipment level

1.1 = 1. Valve
 1.2 = 2. Valve
 1.3 = 3. Valve
 1.4 = 4. Control valve
 1.5 = 5. Control valve

Note:
EPC control valve is between 1.1 and 1.2



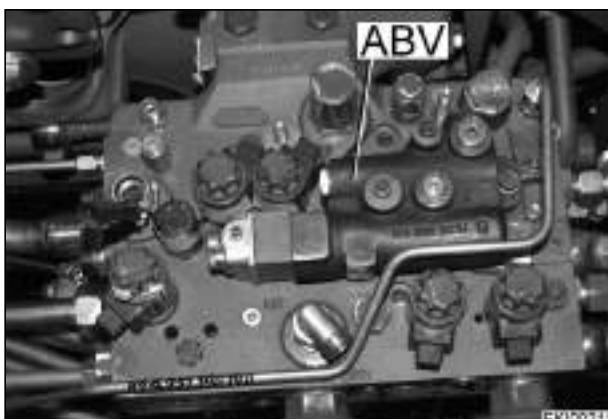
Connection A = Raise suspension
 Right side of ZSB



A on K = Hydraulic oil cooler inlet
 At front under bonnet



Raise bonnet front

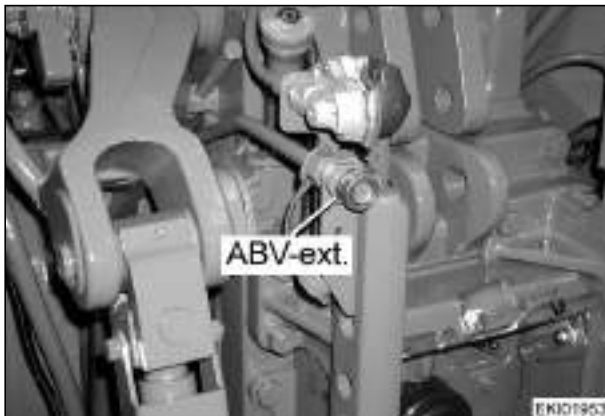


ABV = Hydraulic trailer brake valve
 = Optional
 If appropriate, on top of central control block



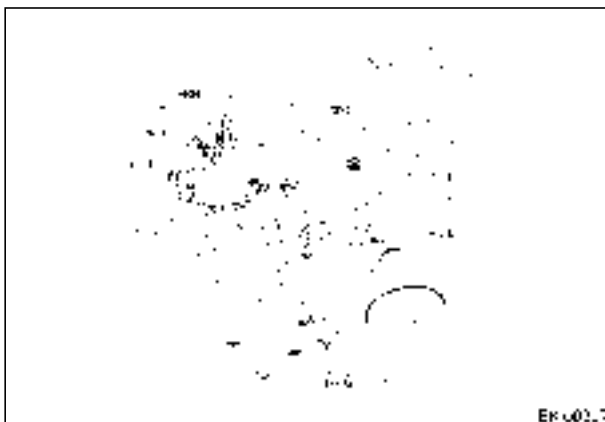
Fav 900

Tractor / General system
Hydraulic components

D

ABV-ext. = Connection for hydraulic trailer brake valve

Rear of tractor



ASP1 = Accumulator no. 1 with 1.4 l capacity / 50 bar

ASP2 = Accumulator no. 2 with 0.75 l capacity / 50 bar

= Nitrogen diaphragm accumulator for front suspension, piston side

Fav 700, 900: ASP1 and ASP2 fitted

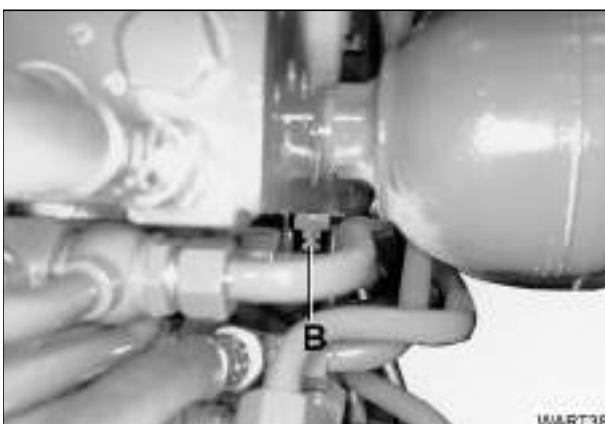
Farmer 400: only ASP1 fitted



AV1 = Shutoff

= Safety system for relieving pressure in front suspension

On top of ZSB



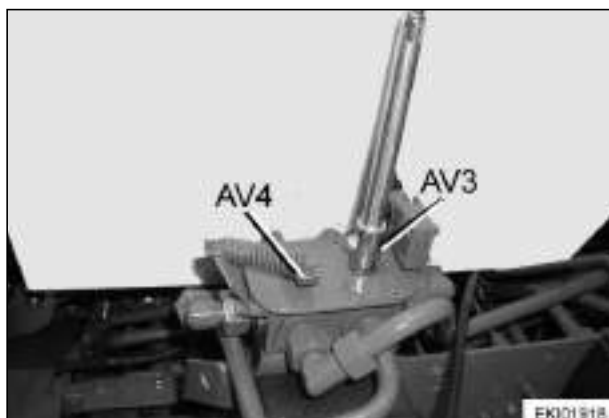
AV2 = Shutoff

= Safety system for relieving pressure in front suspension

On bottom of ZSB



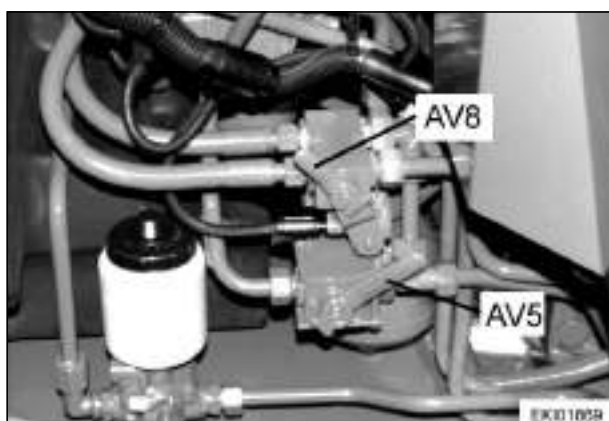
| Date | Version | Page | Hydraulic components | | | Capitel | Index | Docu-No. |
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| 8.12.2000 | a | 2/23 | | | | 0000 | D | 000035 |

Fav 900
Tractor / General system
Hydraulic components
D**AV3** = EPC-DA multiway valve**AV4** = EPC-DA multiway valve

Rear of tractor above rear connections



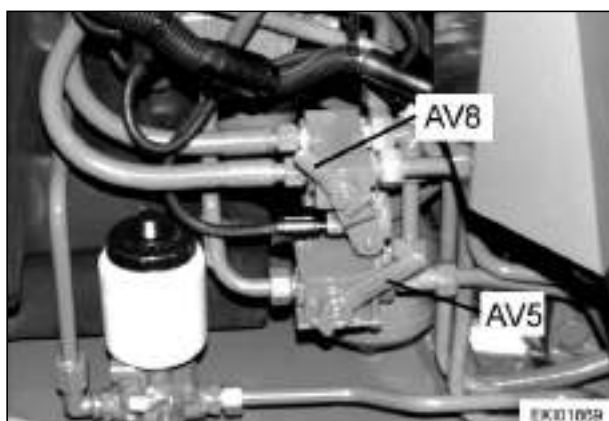
Remove cover panel.

**AV5** = Front power lift EPC-DA multiway valve

On right side of tractor - underneath central control block



Open cover panel at right entrance step.

**AV8** = Front power lift stopcock valve

On right side of tractor - underneath central control block



Open cover panel at right entrance step.

**AVLSt.** = Stopcock to increase control pressure

On central control block, right side.



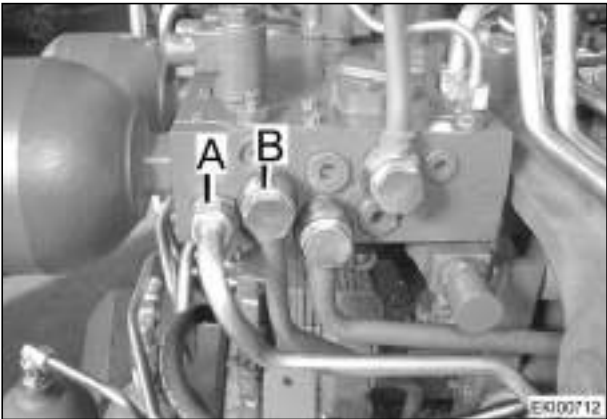
Open cover panel at right entrance step.

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|-----------|----------|------|-------------|----------|---------------|
| 8.12.2000 | a | 3/23 | 0000 | D | 000035 |

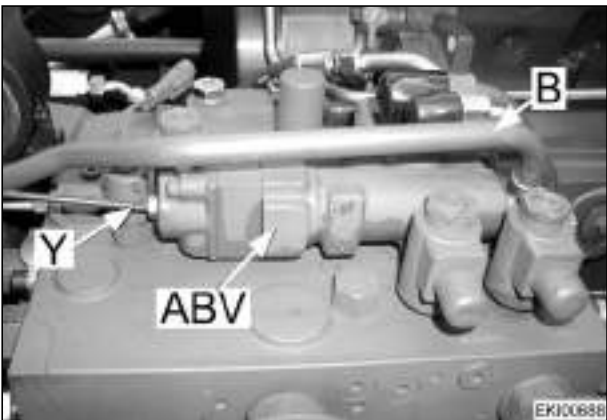
Hydraulic components

<https://www.truck-manuals.net/>

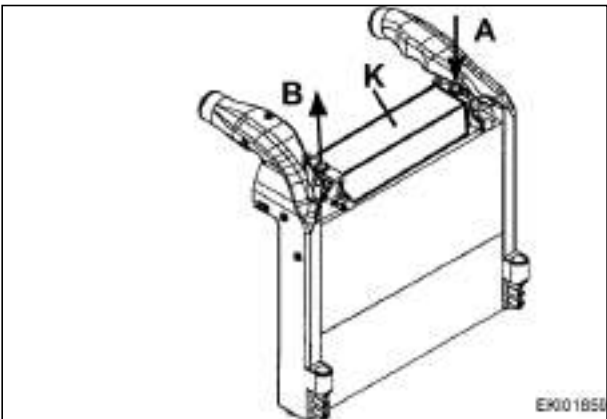
| | | |
|----------------|---|----------|
| Fav 900 | Tractor / General system Hydraulic components | D |
|----------------|---|----------|



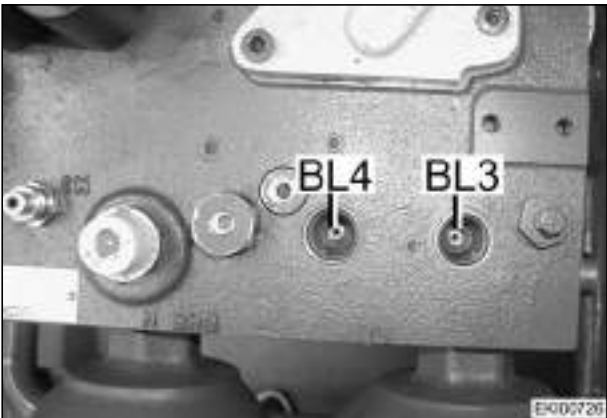
Connection B = Lower suspension
Right side of ZSB



B on ABV = Hydr. pipe for hydraulic trailer brake
rear connection
On top of ZSB



B on K = Hydraulic oil cooler outlet
Raise bonnet front

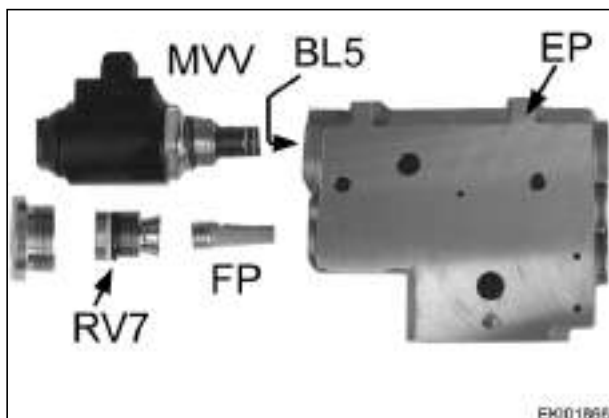


BL3 = Aperture no. 3, d=1.6
BL4 = Aperture no. 4, d=1.6
On top of ZSB

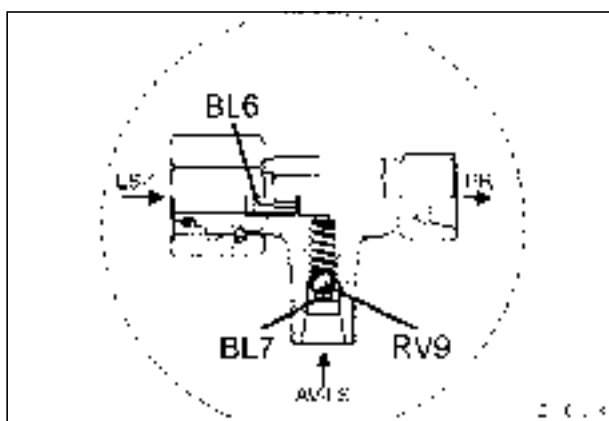


In bore of SV2, SV1

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| 8.12.2000 | a | 4/23 | 0000 | D | 000035 |

Fav 900
Tractor / General system
Hydraulic components
D

BL5 = Aperture no. 5, d=1.5mm - oil preheater
In end plate

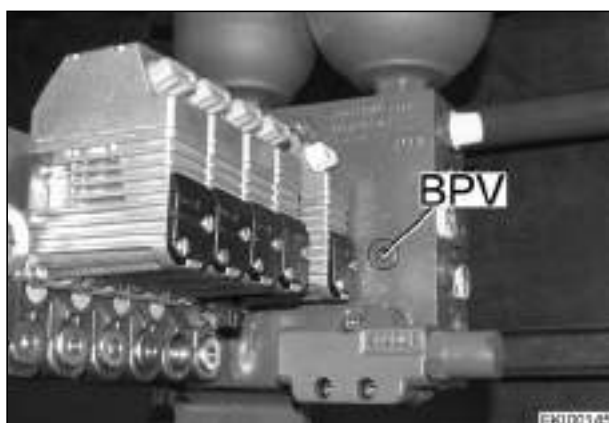


BL6 = Aperture no. 6, d=0.9mm in LS system
BL7 = Aperture no. 7, d=0.8mm to increase control pressure

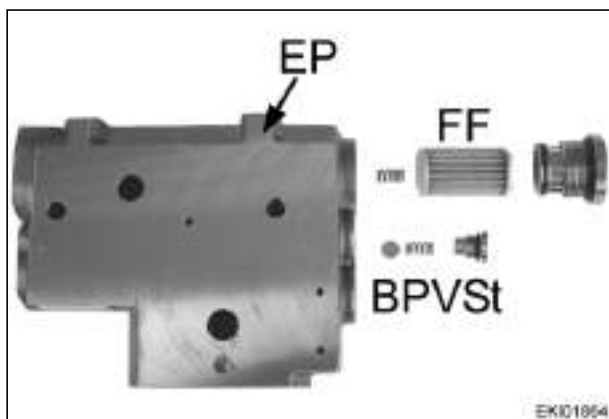
LS-1 connection on central control block (ZSB) - left side.



Pivot cover at right entrance step out of way.



BPV = Radiator bypass valve
On bottom of ZSB



BPVSt = Bypass valve on microfilter
In end plate



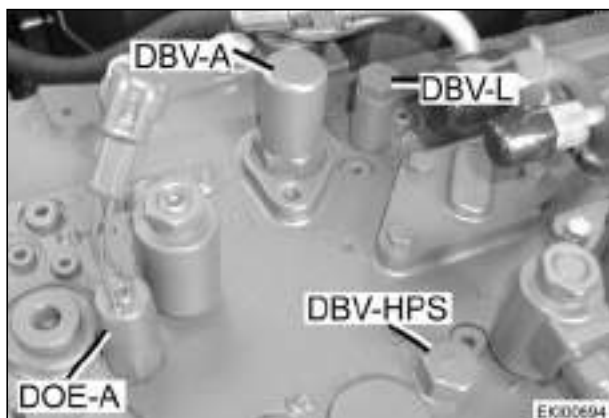
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Hydraulic components

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Fav 900

Tractor / General system
Hydraulic components

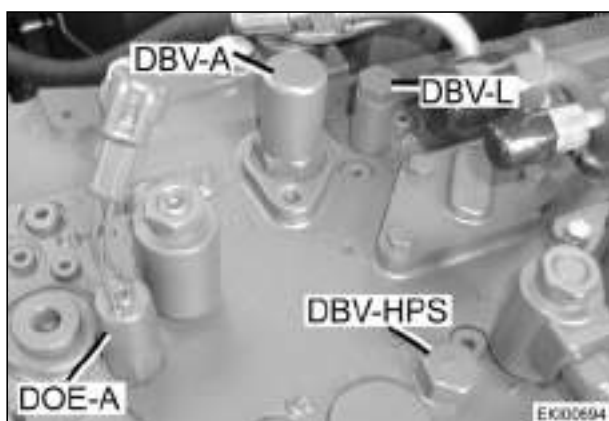
D

DBV-A = 230 bar pressure-relief valve
 = Safety valve for LS pump

Note:

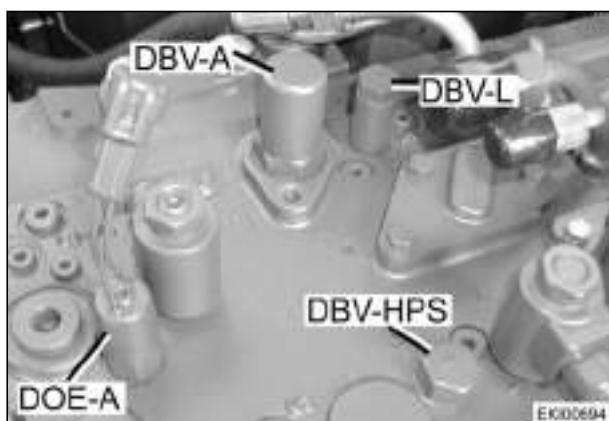
Not used for setting working pressure

On top of ZSB



DBV-HPS = 250 bar pressure-relief valve
 = Safety and pressure-relief valve for suspension

DBV-L = 180 bar pressure-relief valve
 = To relieve pressure on auxiliary pump
 On top of ZSB



DOE-A = Pressure-operated switch 8 bar
 = LS pump monitor (earlier version was 25 bar)

At right entrance step, on top of central control block ZSB

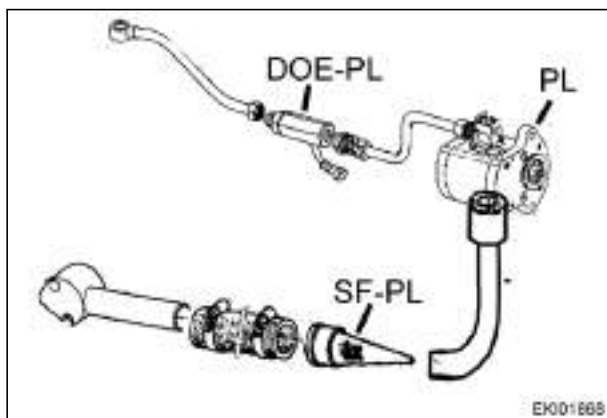


DOE-B = Connection bore for "Kickout" pressure-operated switch B022 (only in NA version)

On ZSB



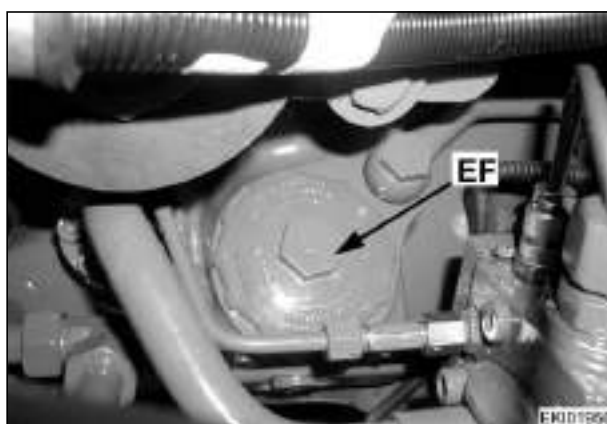
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DOE-PL = Flow monitor (auxiliary pump monitor)
 Right side of engine on auxiliary pump



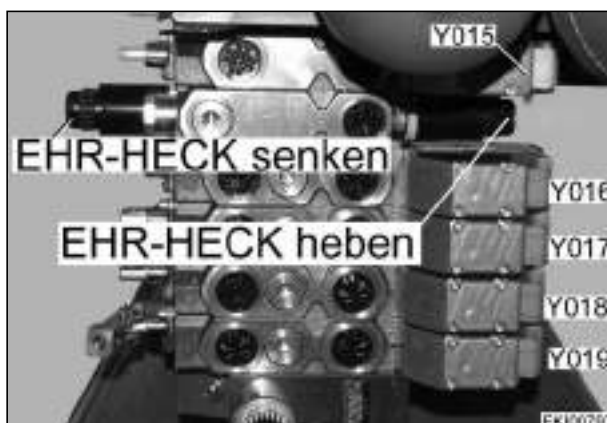
Raise side of bonnet



EF = Hyd. tank filler neck cover
 On right side of tractor - in front of cab.



Raise side of bonnet.

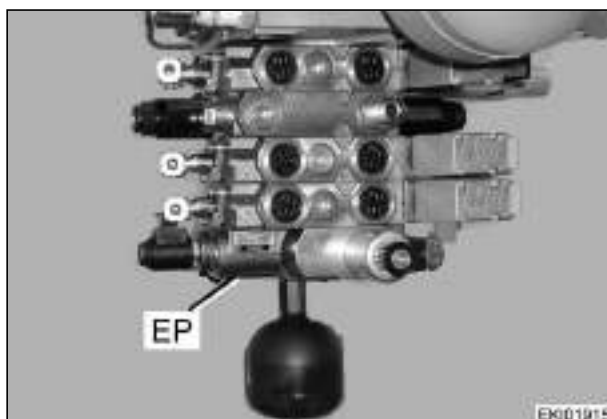


Lift rear EPC = "Lift" solenoid valve
 = Rear power lift
Lower rear EPC = "Lower" solenoid valve
 = Rear power lift



At right entrance step, second valve in control valve unit from top after central control block, right or left

Panels



EP = End plate with pressure-reducing valve (MVSt.) for 22 bar control pressure.

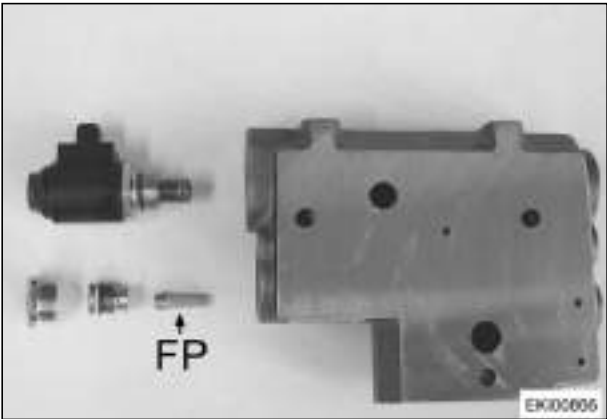



Lowest plate of control valve array

Open cover panel on right entrance step.


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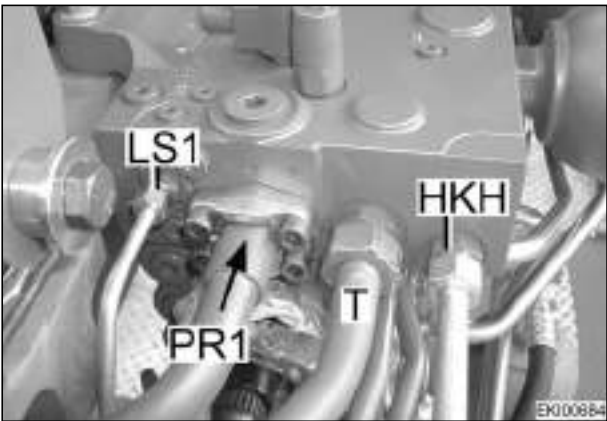
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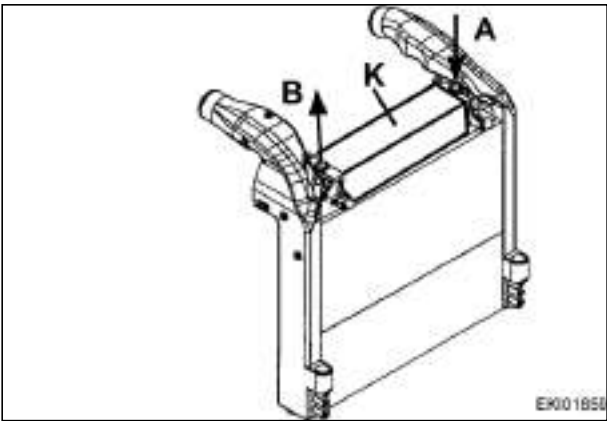
- FP** = Prefilter
= Sintered-metal filter in P duct upstream of control pressure valve Y032 (MVSt) in end plate EP
-  On right at entrance step, lowest end plate with integral valves and filters




- FSP** = Front power lift accumulator
-  On right side of tractor on engine oil pan.



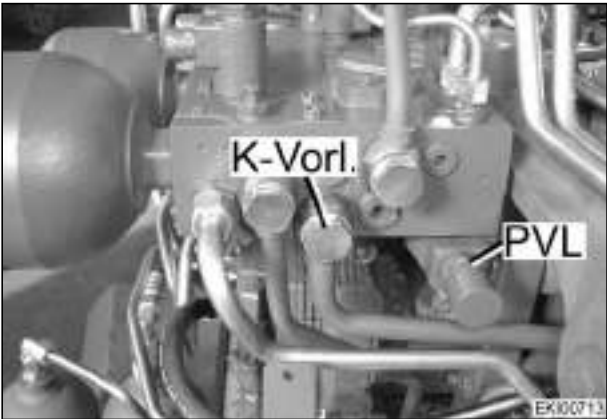
- HKH** = Rear power lift tank connection
-  Left side of ZSB



- K** = Hydraulic oil cooler
-  At front under bonnet

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K-Vorl. = Auxiliary pump (PL) cooler (K) tank
Right side of ZSB



L on LE = Steering unit for steering cylinder
(steering to right).
In steering column.



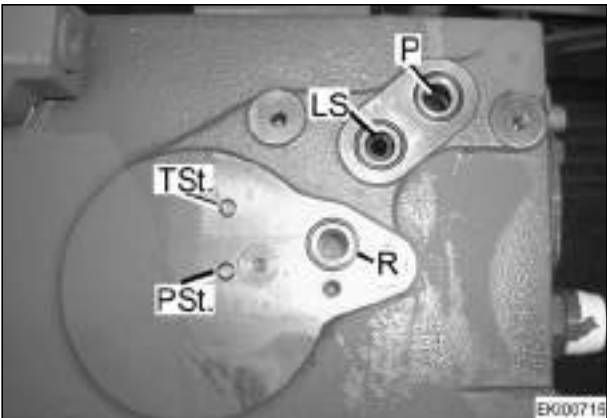
Remove steering column panel.



LE = Steering unit.
In steering column.



Remove steering column panel.



LS = Load sensor output to control valves
On bottom of ZSB



In bore of SV2, SV1

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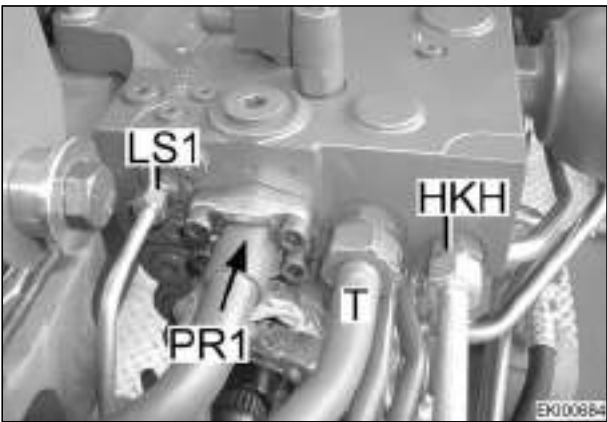
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LS on LE = Control line (LS) from steering unit to central control block (ZSB).
In steering column.



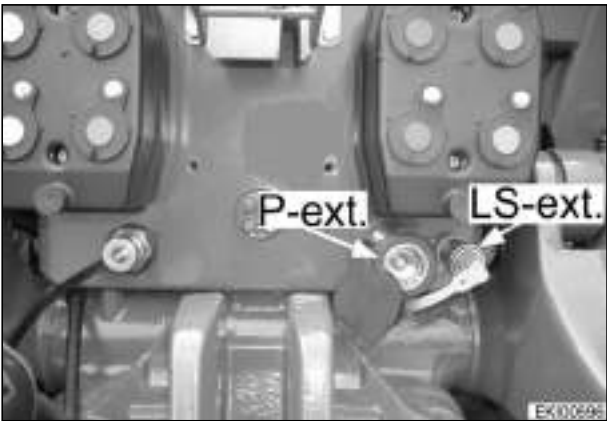
Remove steering column panel.



LS1 = Load sensor to PR (LS pump)
Left side of ZSB



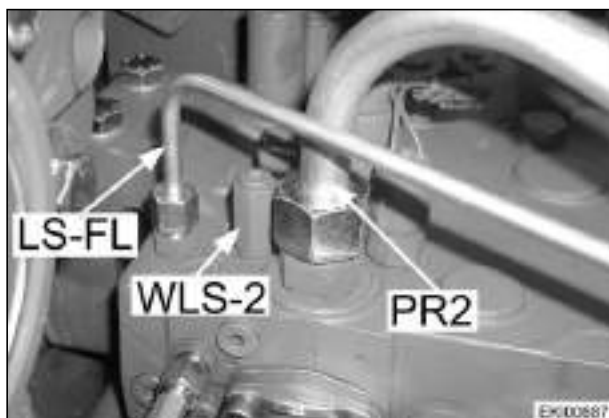
LS2 = LS to steering unit (LE)
On top of ZSB



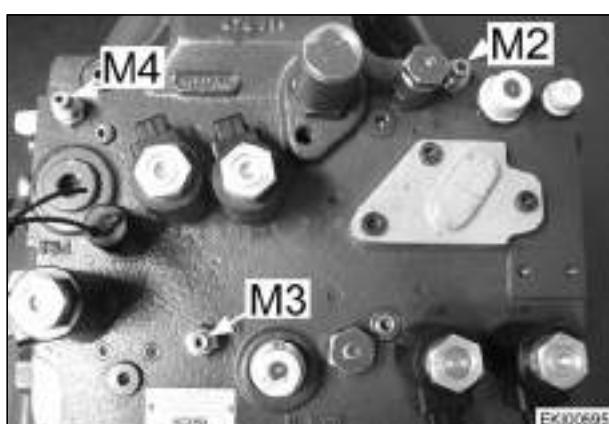
LS-ext. = Connection for external pressure supply to LS (load sensor)
Rear panel



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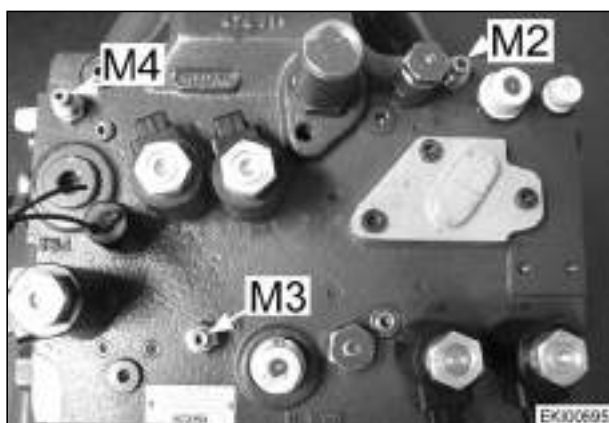
LS-FL = LS to external connection (LS-ext.)
 On top of ZSB



M2 = Pressure measuring point no. 2
 = Auxiliary pump readings: circulating pressure (=normal scenario), pressure for steering in need scenario or for hydraulic trailer brake.



At right entrance step, on top of central control block

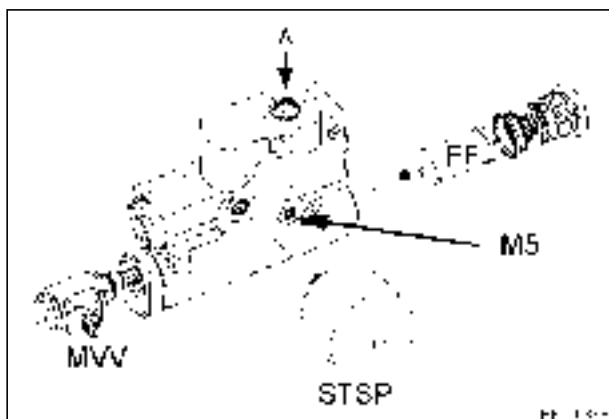


M3 = Pressure measuring point no. 3
 = LS pump readings: min. standby pressure, current working pressure and max. standby pressure

M4 = Pressure measuring point no. 4
 = LS (=load sensor) pressure upstream of LS pump

Note:**View with measurement adapter fitted**

At right entrance step, on top of central control block



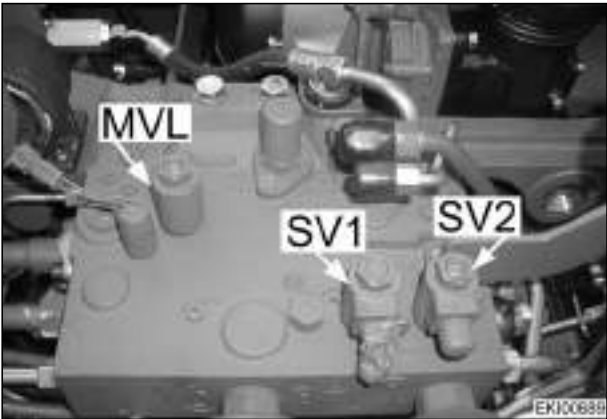
M5 = Pressure measuring point no. 5
 = Control pressure for electrohydraulic control valves



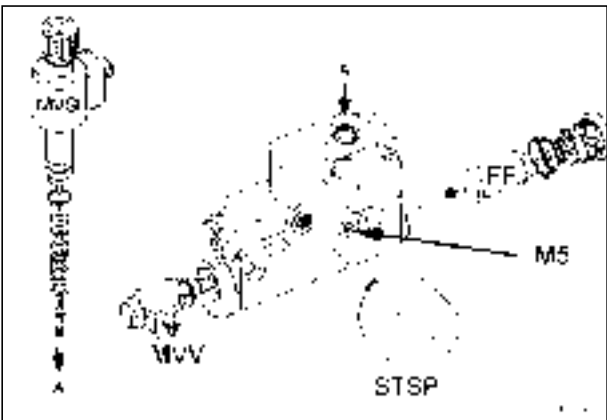
Only for Fav 700 and Fav 900
 At right entrance step, on underside of end plate EP (=connection plate of valve array)

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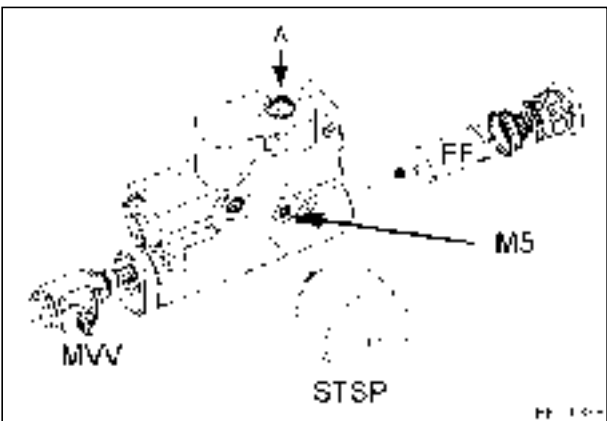
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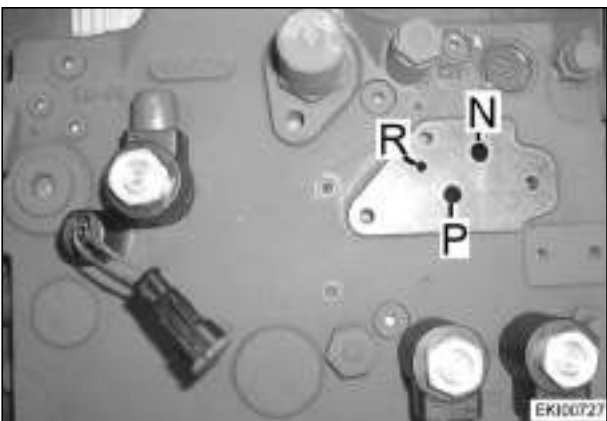
MVL = Solenoid valve
= "Charge valve" for suspension and oil preheater (Fav 700 and Fav 900)
At right entrance step, top of central control block (ZSB) in bore 2011 of ZSB



MVSt = Solenoid valve, neutral (valves), control pressure 22 bar
In end plate (EP) - valve array end plate, right side of tractor.

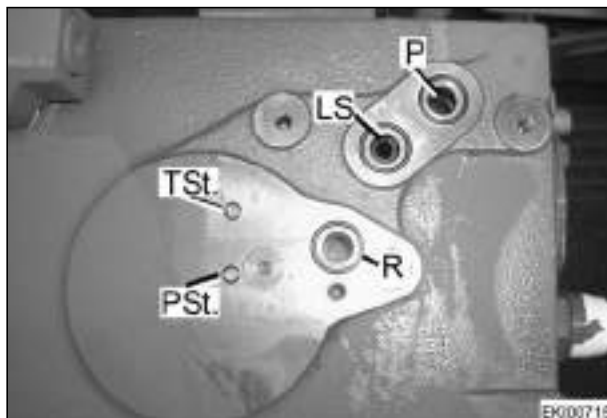


MVV = "Oil preheater" solenoid valve
= Opens flow from P via aperture 5 to tank
In end plate EP



N on ABV = Return flow connection for hydraulic trailer brake (ABV)
On top of ZSB

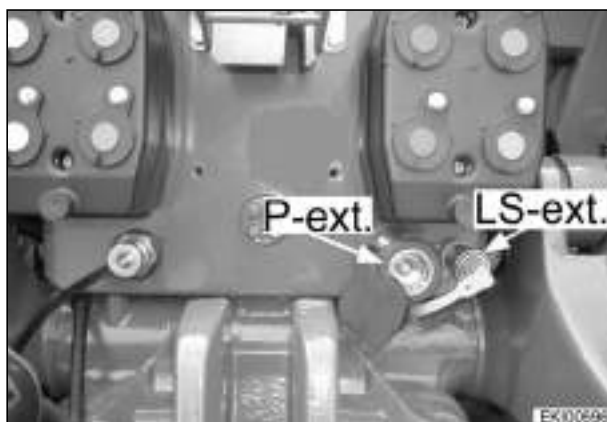


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P = LS pump output to control valves
On bottom of ZSB



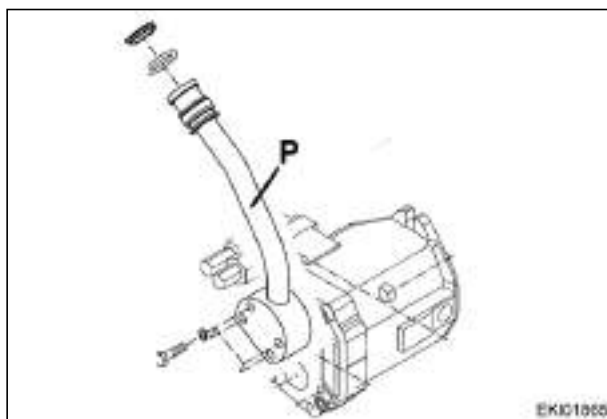
Control valves SB23 LS - EHS have been removed



P-ext. = External pressure supply connection
directly from PR (LS pump)



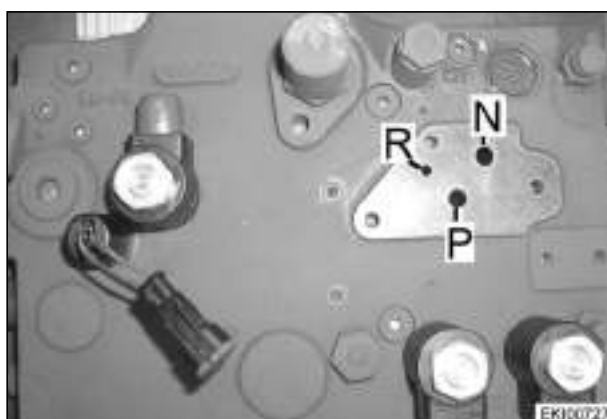
Rear panel



P on PR = Outlet from LS pump



Top of clutch housing, on right side of tractor.



P on ABV = Connection between auxiliary pump
(PL) and trailer brake valve (ABV)



On top of ZSB

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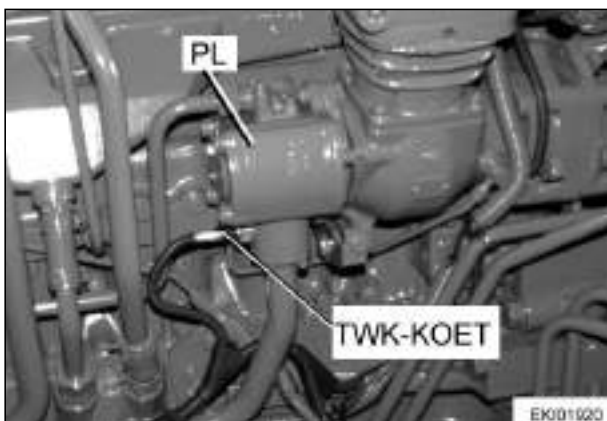
P on LE = Steering unit pressure pipe
In steering column.



Remove steering column panel.



P1 = LS pump (PR) to steering unit (LE)
On top of ZSB



PL = Auxiliary pump (gear pump)
Flange-mounted on right side of engine



Raise side of bonnet.



PL 1 = Input from auxiliary pump PL 1
On ZSB





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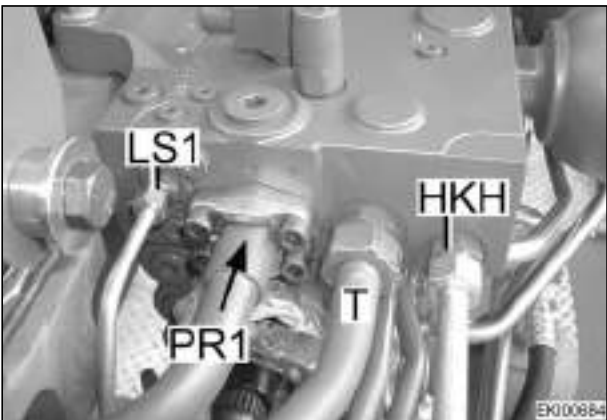
Hydraulic components


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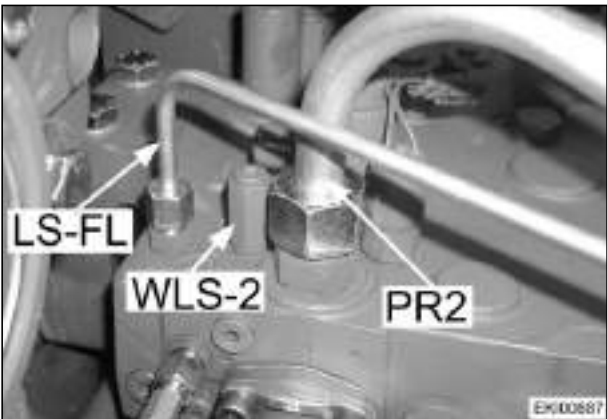
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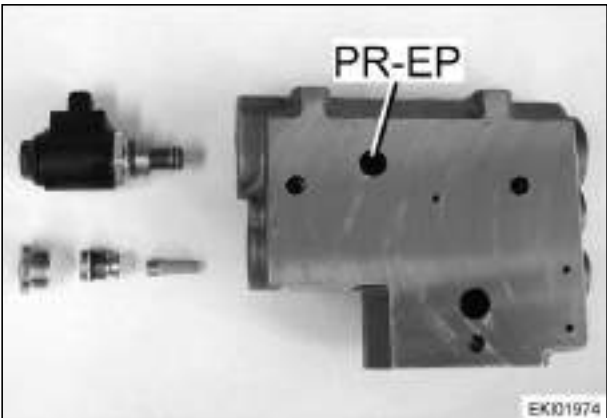
- PR** = LS pump (inclined-disc axial-flow piston pump) service hydraulics.
In clutch housing.
-  Remove rear right wheel, right auxiliary tank and clutch housing hatch cover.
- 





- PR1** = Input from LS pump
Left side of central control block (ZSB)
- 

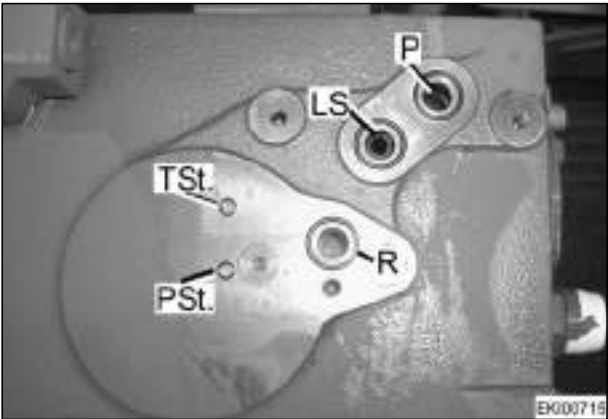


- PR2** = PR (LS pump) to external connection (P-ext.)
On top of ZSB
- 

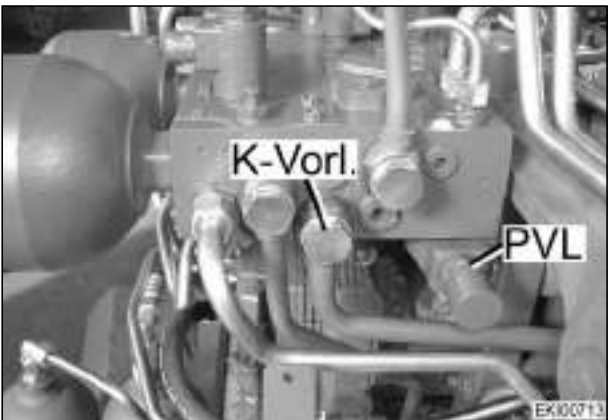


- PR-EP** = PR inlet (LS pump) in end plate
Lower end plate on control valve array.
-  Pivot cover on right step out of way.
- 

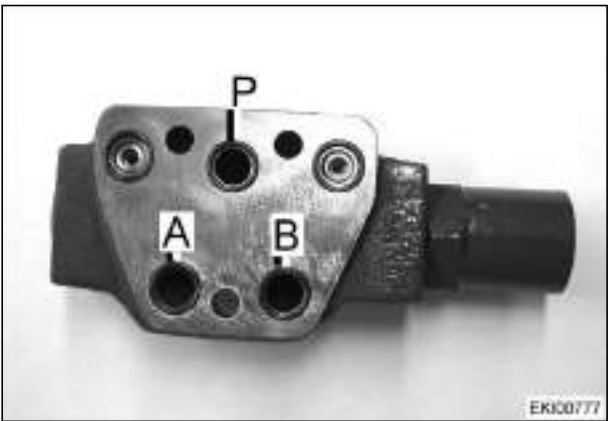
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| Fav 900 | Tractor / General system Hydraulic components | D |
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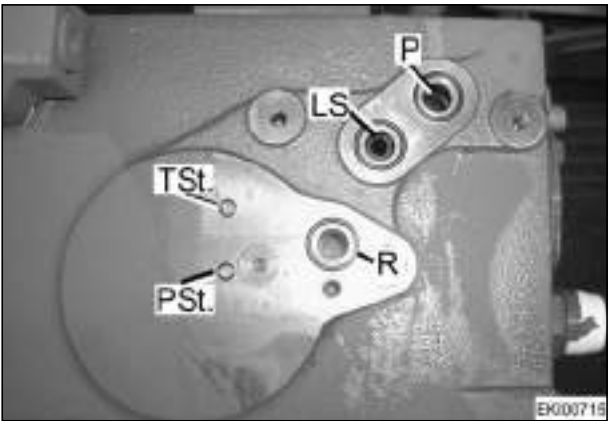
PSt. on ZSB = Control pressure 22 bar
On bottom of ZSB



PVL = Priority valve
= Automatic switching of auxiliary pump when required (need scenario); steering always has priority
On underside of central control block ZSB

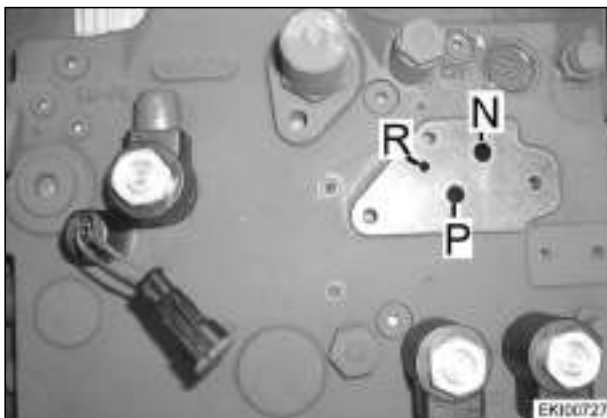


P on PVL = Auxiliary pump connection (PL)
A on PVL = Output to steering unit
B on PVL = Return flow via trailer brake



R = Return flow from control valves
On bottom of ZSB

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R on ABV = Return flow connection for hydraulic trailer brake (ABV)
 On top of ZSB



R on LE = Steering unit for steering cylinder (steering to right).
 In steering column



Remove steering column panel.



RF = Filter for tank return flow
 On right side of tractor, above ZSB (central control block) in clutch housing.



Remove cover at right entrance step.



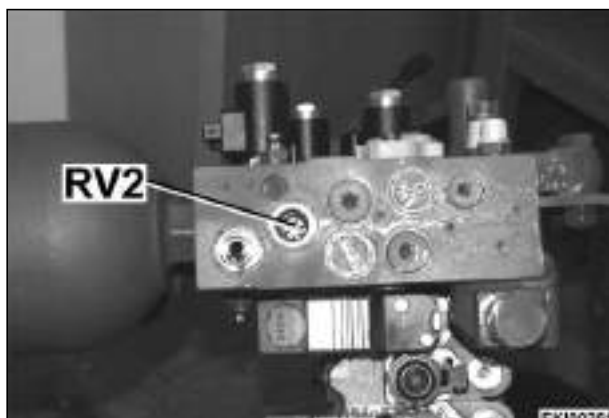
RV1 = Non-return valve no. 1
 = In suspension system
 Interior of ZSB (viewed from frame)



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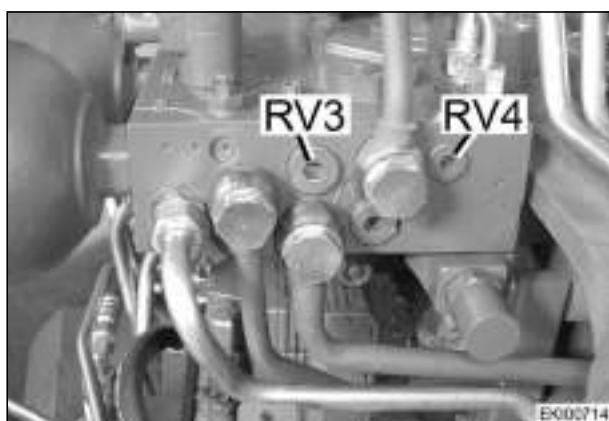
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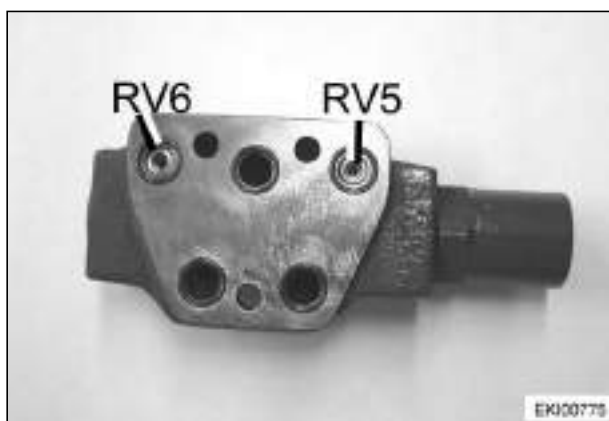
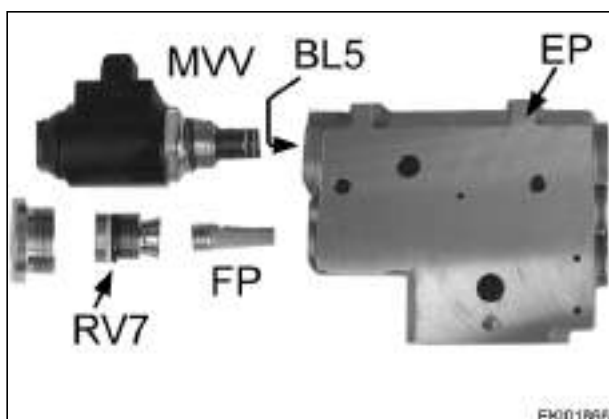
RV2 = Non-return valve no. 2
 = Lower suspension in connection bore "B"

On right side of ZSB



RV3 = Non-return valve no. 3
RV4 = Non-return valve no. 4
 = RV3 and RV4 separate auxiliary pump and LS pump from each other.

On left side of ZSB

**RV5/RV6** = Shutoff valve in priority valve (PVL)

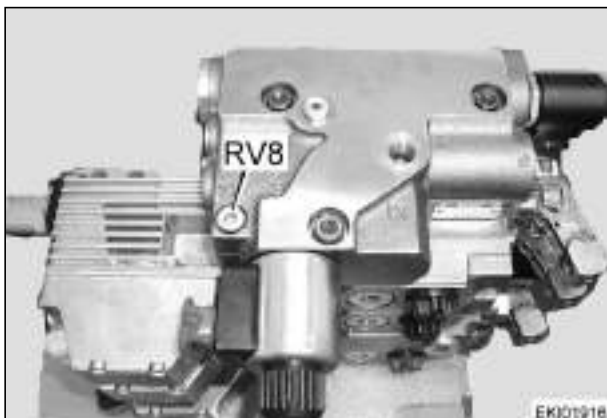
RV7 = End plate shutoff valve
 Lowest plate of control valve array



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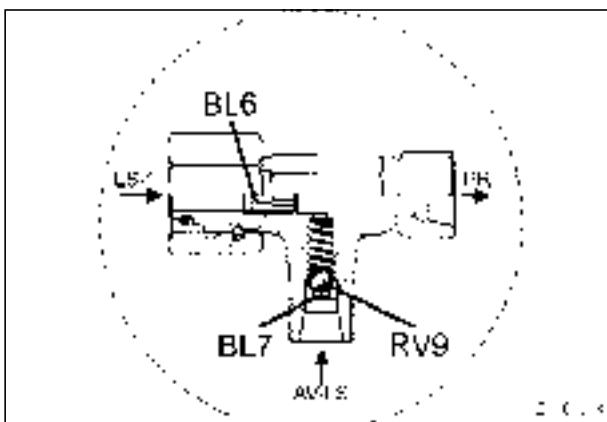
<https://www.truck-manuals.net/>

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D**RV8**

= End plate shutoff valve
 Lowest plate of control valve array



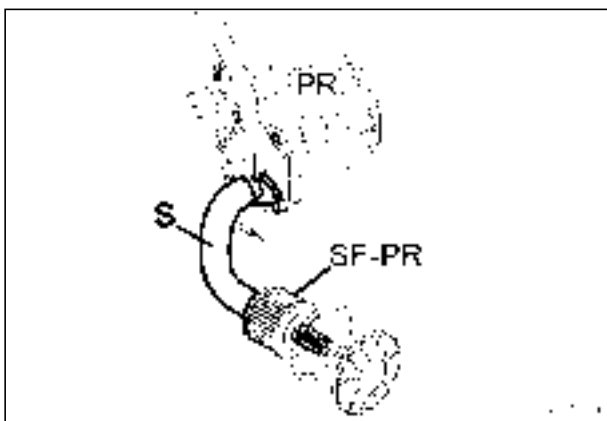
Open cover panel on right entrance step.

**RV9**

= Control pressure increase shutoff valve.
 LS-1 connection on central control block (ZSB) right side.



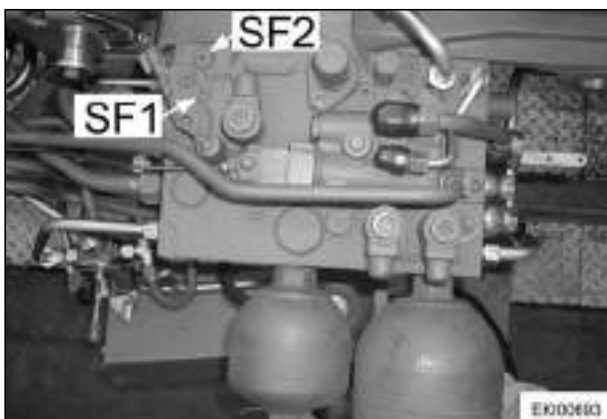
Pivot cover on right step out of way.

**S**

= LS pump (PR) intake pipe
 In clutch housing



Remove screw cap on right side of clutch housing.

**SF1**

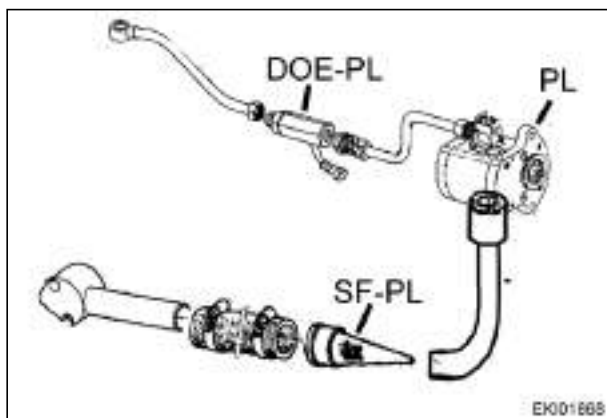
= Strainer no. 1
 = Safety prefilter for suspension system

SF2

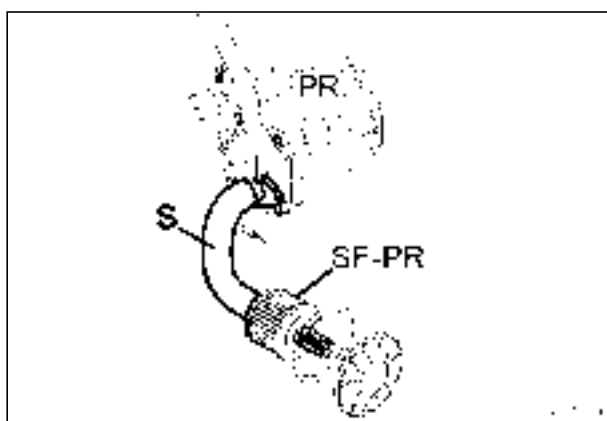
= Strainer no. 2
 = Only fitted if "External pressure supply" is available.
 = Safety filter in LS line



On top of ZSB

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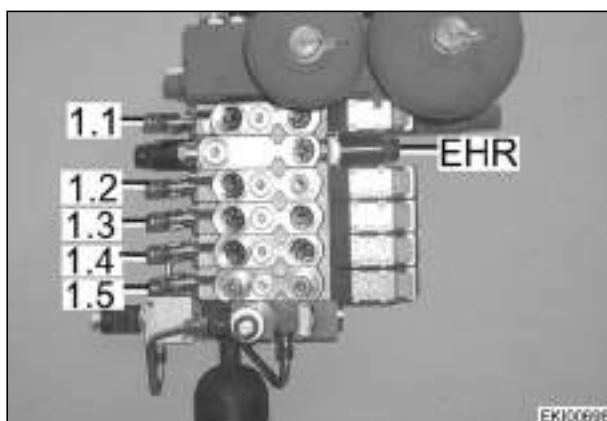
SF-PL = Filter upstream of auxiliary pump
 On right side of tractor - on bottom of clutch housing.



SF-PR = LS pump suction filter
 In clutch housing.



Remove hatch cover from clutch housing
 on left side of tractor

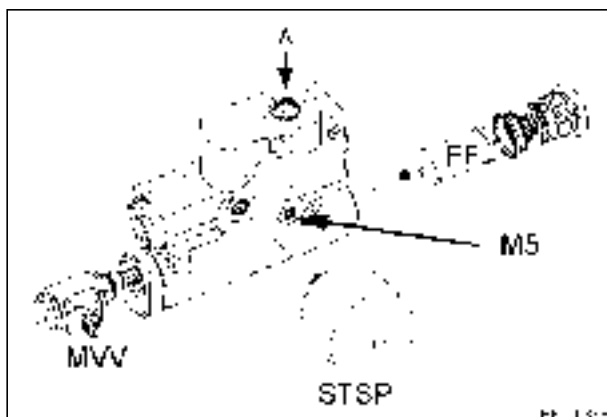


SB 23 LS EHS = Control valve
 = Relevant control valve for front power lift or for connections, depending on tractor's equipment level

- 1.1 = 1. Valve
- 1.2 = 2. Valve
- 1.3 = 3. Valve
- 1.4 = 4. Control valve
- 1.5 = 5. Control valve

Note:

EPC control valve is between 1.1 and 1.2

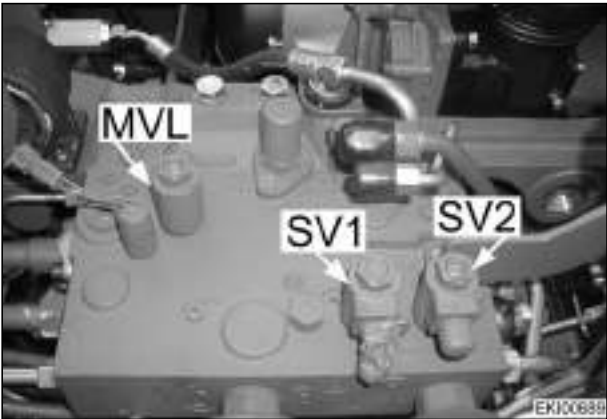


STSP = Nitrogen diaphragm accumulator control pressure
 = Capacity: 0.32 litres

On right at entrance step, on underside of end plate EP

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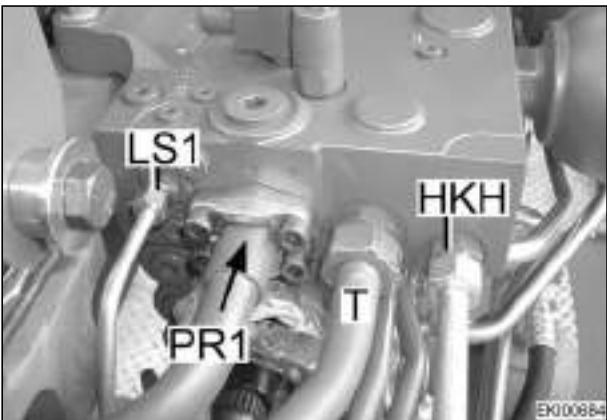
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- SV1** = "Lower" suspension solenoid valve
= Identifying feature of SV1: valve body yellow-chromated and without counterbore
- SV2** = "Raise" suspension solenoid valve
= Identifying feature of SV2: valve body white-chromated and with counterbore



At right entrance step, on top of central control block



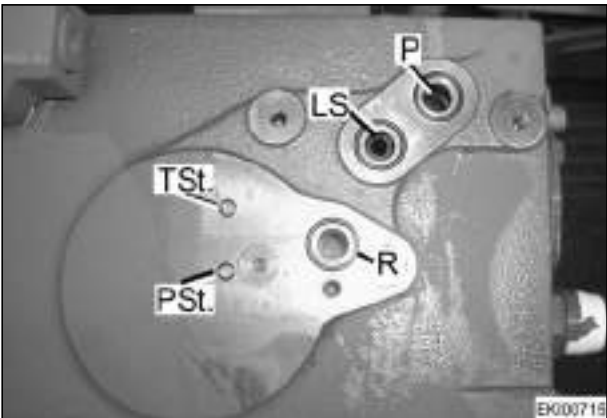
- T** = Return flow to tank
Left side of ZSB



- T on LE** = Steering unit return flow
In steering column.



Remove steering column panel.

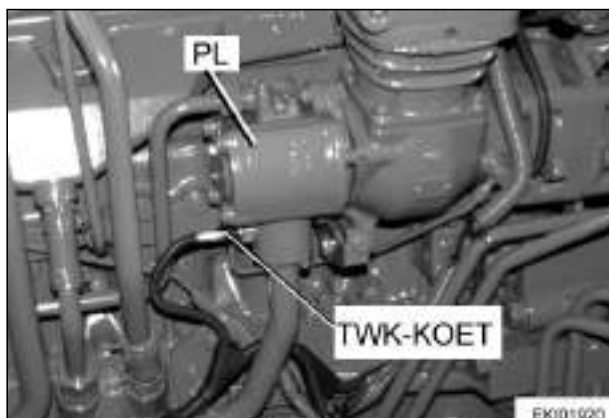


- TSt.** = Return flow control pressure (PSt.)
On bottom of ZSB



Fav 900

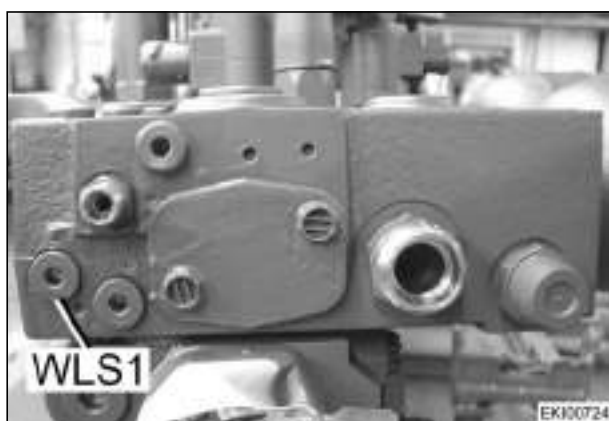
Tractor / General system
Hydraulic components

D**TWK-KOET** = Hydraulic oil thermostat

Right side of engine - intake pipe on
 auxiliary pump



Open right side of bonnet.

**WLS-1** = Shuttle valve no. 1

= Compares LS pressure between
 steering and result from other
 consumers.



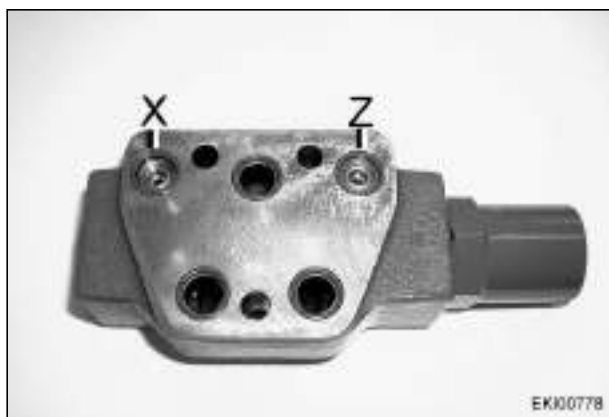
Left side of ZSB

**WLS-2** = Shuttle valve no. 2

= Only fitted if "External pressure
 supply" is available, gravity-controlled
 shuttle valve



On top of ZSB

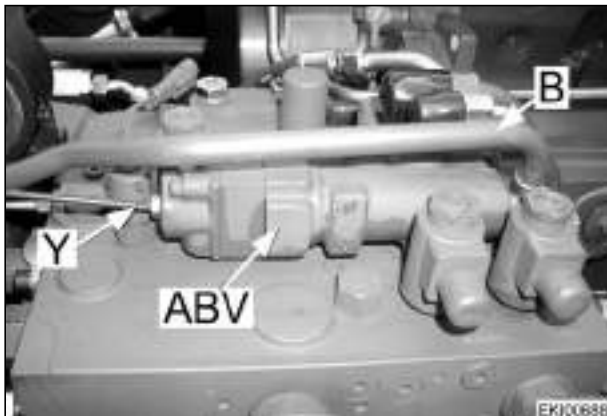
**X on PVL** = Input to LS pump (PR)**Z on PVL** = Input of LS pressure of steering unit

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| 8.12.2000 | a | 22/23 | 0000 | D | 000035 |

Hydraulic components

<https://www.truck-manuals.net/>

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General system Hydraulic components | D |
|----------------|--|----------|



Y on ABV = Brake line connection
On top of ZSB



ZSB = Central control block
= Hydraulic oil block with internal and external components for many different functions.



ZSP = Front-axle suspension auxiliary accumulator

On righty side of tractor, below control valves.



Open cover panel on right entrance step.

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system General points on calibration | F |
|---|---|----------|

In order to equalise the mechanical and electrical tolerances of the sensors, it is necessary to calibrate the relevant sensor. If a sensor is replaced, the replacement must be calibrated. A complete calibration must generally be carried out after replacement of the e-boxes (A001, A002), EPC (A005), control console (A004) or actuator unit (A009).

The following sensors and functions have to be calibrated.

1. Calibration - rear EPC, code 8001 and 8002
2. Calibration - enhanced-control front power lift (where fitted), code 9001 and 9002
3. Calibration - hydraulic auxiliary control valves (**not** Farmer 400), code 1001
4. Calibration - suspension sensor, code 7666
5. Calibration - engagement point of rear PTO, code 6034
6. Calibration - engagement point of front PTO, code 7034
7. Calibration - clutch pedal sensor, code 4001
8. Calibration - range control sensor, code 4003
9. Calibration - accelerator sensor, code 4005
10. Calibration - transmission ratio characteristic curve, code 4007
11. Calibration - turboclutch operation, code 4009
12. Calibration - hand throttle (only Fav 900/23/... EDC), code 4002
13. Calibration - accelerator (only Fav 900/23/... EDC), code 4005

Note:

Keep to the calibration sequence.

Calibrations 1. - 6. can be carried out as required.

Calibrations 7. - 11 (13 - Fav 900 from 23/3001 onwards) must be carried out in ascending order and in a block (transmission calibration).

Calibrations 12. - 13. can be carried out as required (engine EDC)

The emergency control must not be engaged during calibration.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.

If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Data are only accepted when ignition key is turned to position "0".

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|----------|------|-------------|----------|---------------|
| 10/2000 | a | 1/1 | 0000 | F | 000012 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 8001, 8002

F

1. Calibration of rear EPC

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Press key.



Pictogram at left displayed.



Press key



Input code **8001**



Press one of keys until desired number is displayed.



Store with key.



Pictogram at left displayed.



Turn setpoint potentiometer to pos. 1 and store with key.

| Date | Version | Page | Calibration code 8001, 8002 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------------|---------|-------|----------|
| 05/2000 | a | 1/3 | | 0000 | F | 000001 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 8001, 8002

F



Pictogram at left displayed.



Turn setpoint potentiometer to pos. 10 and store with key.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Press key



Pictogram at left displayed.



Press key



Input code **8002**



Press one of keys until desired number is displayed.



Store with key

| Date | Version | Page | Calibration code 8001, 8002 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------------|---------|-------|----------|
| 05/2000 | a | 2/3 | | 0000 | F | 000001 |

| | | |
|----------------------------------|---|---|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 8001, 8002 | F |
|----------------------------------|---|---|



Pictogram at left displayed.

Switch rapid lift control to "Lift", power lift rises and halts at top.



Store with key



Pictogram at left displayed.

Switch rapid lift control to "Lower", power lift lowers and halts at bottom.



Store with key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

| Date | Version | Page | Calibration code 8001, 8002 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------------|---------|-------|----------|
| 05/2000 | a | 3/3 | | 0000 | F | 000001 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 9001, 9002

F

2. Calibrating the enhanced-control front power lift (where fitted)

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Press key.



Pictogram at left displayed.



Press key



Pictogram at left displayed.
 Key flashes



Press key



Input code **9001**



Press one of keys until desired number is displayed.



Store with key.

| Date | Version | Page | Calibration code 9001, 9002 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------------|---------|-------|----------|
| 05/2000 | a | 1/3 | | 0000 | F | 000010 |

| | | |
|----------------------------------|---|---|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 9001, 9002 | F |
|----------------------------------|---|---|



Pictogram at left displayed.



Turn setpoint potentiometer to pos. 1 and store with key.



Pictogram at left displayed.



Turn setpoint potentiometer to pos. 10 and store with key.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Press key



Pictogram at left displayed.



Press key



Pictogram at left displayed.
Key flashes

| Date | Version | Page | Calibration code 9001, 9002 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------------|---------|-------|----------|
| 05/2000 | a | 2/3 | | 0000 | F | 000010 |

| | | |
|----------------------------------|---|---|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 9001, 9002 | F |
|----------------------------------|---|---|



Press key



Input code **9002**



Press one of keys until desired number is displayed.



Store with key



Pictogram at left displayed.

Switch rapid lift control to "Lift", power lift rises and halts at top.



Store with key



Pictogram at left displayed.

Switch rapid lift control to "Lower", power lift lowers and halts at bottom.



Store with key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

| Date | Version | Page | Calibration code 9001, 9002 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------------|---------|-------|----------|
| 05/2000 | a | 3/3 | | 0000 | F | 000010 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 1001

F

3. Calibrating hydraulic auxiliary valves

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Press key



Pictogram at left displayed.



Press key twice



Pictogram at left displayed.
Key flashes



Press key, next pictogram displayed



Input code **1001**



Press one of keys until desired number is displayed.



Store with key

| Date | Version | Page | Calibration code 1001 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------|---------|-------|----------|
| 12/1999 | a | 1/2 | | 0000 | F | 000002 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 1001

F



Push joystick forwards and hold against stop (do not exert excessive pressure)



Store with key in this position,
 and next pictogram is displayed



Push joystick to right and hold against stop (do not exert excessive pressure)



Store with key in this position,
 and next pictogram is displayed



Pull joystick to rear and hold against stop (do not exert excessive pressure)



Store with key in this position,
 and next pictogram is displayed



Pull joystick to left and hold against stop (do not exert excessive pressure)



Store with key in this position,
 and next pictogram is displayed



Release joystick (centres automatically).



Store this position with key.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

| Date | Version | Page | Calibration code 1001 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------|---------|-------|----------|
| 12/1999 | a | 2/2 | | 0000 | F | 000002 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 7666

F

4. Calibrating the suspension

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way



Press key



Key flashes



Press key, next pictogram displayed



Key flashes



Press key, next pictogram displayed



Input code **7666**



Press one of keys until desired number is displayed.



Store with key, following pictogram displayed

| Date | Version | Page | Calibration code 7666 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------|---------|-------|----------|
| 05/2000 | a | 1/2 | | 0000 | F | 000003 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 7666 | F |
|---|---|----------|



Flashing arrow indicates desired end position, tractor is raised



Store with key, following pictogram displayed



Lower arrow flashes, and tractor is lowered



Store with key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

| Date | Version | Page | Calibration code 7666 | Capitel | Index | Docu-No. |
|---------|----------|------|-----------------------|-------------|----------|---------------|
| 05/2000 | a | 2/2 | | 0000 | F | 000003 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 6034

F

5. Calibrating the engagement point of the rear PTO

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Press key



Key flashes



Press key **twice** , next pictogram displayed



Key flashes



Press key, next pictogram displayed



Input code **6034**



Press one of keys until desired number is displayed.



Store with key, following pictogram displayed

| Date | Version | Page | Calibration code 6034 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------|---------|-------|----------|
| 05/2000 | a | 1/2 | | 0000 | F | 000004 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 6034 | F |
|---|---|----------|



Set any PTO speed and engage rear PTO.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

We recommend calibrating PTO with implement mounted. This ensures PTO accelerates to correct speed after calibration with mounted implement.

| Date | Version | Page | Calibration code 6034 | Capitel | Index | Docu-No. |
|---------|----------|------|-----------------------|-------------|----------|---------------|
| 05/2000 | a | 2/2 | | 0000 | F | 000004 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 7034

F

6. Calibrating the engagement point of the front PTO

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Press key, next pictogram displayed.



Key flashes



Press key **three times** , next pictogram displayed



Key flashes



Press key, next pictogram displayed



Input code **7034**



Press one of keys until desired number is displayed.



Store with key, following pictogram displayed

| Date | Version | Page | Calibration code 7034 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------|---------|-------|----------|
| 05/2000 | a | 1/2 | | 0000 | F | 000011 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 7034 | F |
|---|---|----------|



Engage front PTO.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

We recommend calibrating PTO with implement mounted. This ensures PTO accelerates to correct speed after calibration with mounted implement.

| Date | Version | Page | Calibration code 7034 | Capitel | Index | Docu-No. |
|---------|----------|------|-----------------------|-------------|----------|---------------|
| 05/2000 | a | 2/2 | | 0000 | F | 000011 |

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 4001 | F |
|----------------------------------|--|----------|

7. Calibrating the clutch pedal

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Press key, next pictogram displayed



Key flashes



Press key, next pictogram displayed



Input code **4001**



Press one of keys until desired number is displayed.



Store with key, following pictogram displayed



Clutch pedal **not** actuated



Store with key, following pictogram displayed

| Date | Version | Page | Calibration code 4001 | Capitel | Index | Docu-No. |
|---------|----------|------|-----------------------|-------------|----------|---------------|
| 12/1999 | a | 1/2 | | 0000 | F | 000005 |

| | | |
|---|--|----------|
| <i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i> | Tractor / General system Calibration code 4001 | F |
|---|--|----------|



Clutch pedal **actuated**



Store with key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

| Date | Version | Page | Calibration code 4001 | Capitel | Index | Docu-No. |
|---------|----------|------|-----------------------|-------------|----------|---------------|
| 12/1999 | a | 2/2 | | 0000 | F | 000005 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 4003

F

8. Calibrating the range control

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- Clutch pedal remains depressed
- Engine speed less than 800 rpm
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Press key, next pictogram displayed



Key flashes



Press key, next pictogram displayed



Input code **4003**



Press one of keys until desired number is displayed.



Store with key, following pictogram displayed



Range I is shown to be engaged, see pictogram

| Date | Version | Page | Calibration code 4003 | Capitel | Index | Docu-No. |
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| 12/1999 | a | 1/2 | | 0000 | F | 000006 |

| | | |
|----------------------------------|---|---|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 4003 | F |
|----------------------------------|---|---|



Range II is automatically displayed and engaged, see pictogram



Mid-position is automatically displayed and engaged, see pictogram

If incorrect values are found or conditions are not met, **ERROR** message is displayed.



If calibration proceeds without errors, OK is displayed, and new sensor settings are stored.



Check:
Press key and hold,



then press key, pictogram shown above is cleared.
OK is displayed

If incorrect values are found or conditions are not met, **ERROR** message is displayed.

If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

| Date | Version | Page | Calibration code 4003 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------|---------|-------|----------|
| 12/1999 | a | 2/2 | | 0000 | F | 000006 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 4005

F

9. Calibrating the accelerator

Caution: following preparatory steps must be carried out.

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Pictogram at left displayed.



First press key and hold,



then press key, pictogram shown above is cleared



Press key



Pictogram at left displayed.
 Key flashes



Press key, next pictogram displayed



Input code **4005**



Press one of keys until desired number is displayed.



Store with key, following pictogram displayed

| Date | Version | Page | Calibration code 4005 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------|---------|-------|----------|
| 12/1999 | a | 1/2 | | 0000 | F | 000007 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 4005

F



Set engine speed at 800 ± 20 rpm using hand throttle



and store with key.
 Max. 30 sec for this setting.



Pictogram at left displayed.
 Set engine speed at 1300 ± 20 rpm using hand throttle



and store with key.
 Max. 30 sec for this setting.



Pictogram at left displayed.
 Set engine speed at 1700 ± 20 rpm using hand throttle



and store with key.
 Max. 30 sec for this setting.

Proceed in same way for engine speeds of 1900 and 2200.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.

If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

| Date | Version | Page | Calibration code 4005 | Capitel | Index | Docu-No. |
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| 12/1999 | a | 2/2 | | 0000 | F | 000007 |

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 4007 | F |
|----------------------------------|--|----------|

10. Calibrating the transmission ratio characteristics

Caution: following preparatory steps must be carried out.

- Handbrake released
- Start engine
- Tractor stationary (less than 0.01 km/h)
- Engine speed 1600 rpm \pm 30
- Engine speed must not fall below 1400 rpm during calibration
- No error message from speed sensors
- Neutral switch not set to neutral - transmission is in non-positive lock (both F/R lamps light up, though this does not apply to new transmission e-box at initial calibration)
- Range control set to neutral (range control is normally neutral after calibration). If necessary, shift to neutral manually via emergency control system.
- Clutch pedal not actuated
- If necessary, actuate footbrake.
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way.



Pictogram at left displayed.



Press key and hold,



then press key, and fault symbol is cleared



Pictogram at left displayed.



Press key and hold,



then press key, and fault symbol is cleared



Press key, next pictogram displayed

| Date | Version | Page | Calibration code 4007 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------|---------|-------|----------|
| 12/1999 | a | 1/5 | | 0000 | F | 000008 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 4007

F



Key flashes



Press key, next pictogram displayed



Input code **4007**



Press one of keys until desired number is displayed.



Store with key, following pictograms displayed



Step 1 to



step 7 proceed automatically.



If incorrect values are found or conditions are not met, ERROR message is displayed.
Explanation of error messages F1 to F15.



If calibration proceeds without errors, this pictogram is displayed, and new sensor settings are stored.

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 4007 | F |
|----------------------------------|--|----------|

Check:

Press key and hold,



then press key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

Possible error messages when calibrating the transmission ratio, code 4007

| Error message | Cause / remedy |
|---------------|--|
| F 1 | Preconditions not met |
| F 2 | 1. After ignition OFF relay in transmission e-box has not released. Once ignition has been switched off, release of relay in transmission e-box must be audible. 2. Test plug connections to actuator unit. |
| F 3 | Actuator unit does not go to exact setpoint. Test ease of movement of transmission control, e.g. engage emergency control and test. |
| F 4 | Transmission ratio has not been adjusted within 8 sec. Test ease of movement of transmission control, e.g. engage emergency control and test. |
| F 5 | Step 1 = actuator unit does not find zero point from 0 in forward direction. Step 2 = actuator unit does not find zero point from 0 in reverse direction. Test connection between actuator unit and actuator shaft. |
| F 6 | See error message F 5 |
| F 7 | Step 2: zero points of transmission control unit for forward and reverse travel are too far apart, greater than 8°. Test connection between actuator unit and actuator shaft. Actuator unit. |
| F 8 | Step 3: maximum point of transmission ratio forwards not found. Target value min. 155°, max. 187°. Step 4: maximum point of transmission ratio in reverse not found. Target value min. 136°, max. 165°. Test connection between actuator unit and actuator shaft. |
| F 9 | Step 3: actuator shaft is displaced by more than 155° forwards. However, transmission displacement reacts by less than 155°. Step 4: actuator shaft is displaced by more than 135° forwards. However, transmission displacement reacts by less than 135°. Test connection between actuator unit and actuator shaft. Actuator unit. |
| F 10 | Transmission ratio characteristic curve not logical. For example, forward set, reverse detected. Repeat calibration. See also error message F 2 Test rotational direction signal from accumulator shaft sensor. |
| F 11 / F 12 | Step 7 = verify figures of steps 1 to 6. ML transmission ratio not OK. Repeat calibration. See also error message F 2 Then, if necessary, test hydrostatic power branch, e.g. by means of Emergency mode. |
| F 13 | 1. Incorrect EOL programming (before step 1) 2. Stored values in transmission e-box not logical Remedy: 1. Run EOL programming again 2. See 1, if necessary fit new transmission e-box. |
| F 14 | See F 11 / F 12 |

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| 12/1999 | a | 3/5 | | 0000 | F | 000008 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Tractor / General system Calibration code 4007 | F |
|---|---|----------|

Possible error messages when calibrating the transmission ratio, code 4007 (Forts.)

| Error message | Cause / remedy |
|----------------------|--|
| F 15 | 1. Maximum forward and/or reverse transmission ratio is not reached 2. Speed-governor valve (30 km/h) defective. Remedy: 1. Repeat calibration (see also F 2). Then, if necessary, test hydraulic power branch, e.g. by means of Emergency mode. 2. Test speed-governor valve (30 km/h). |

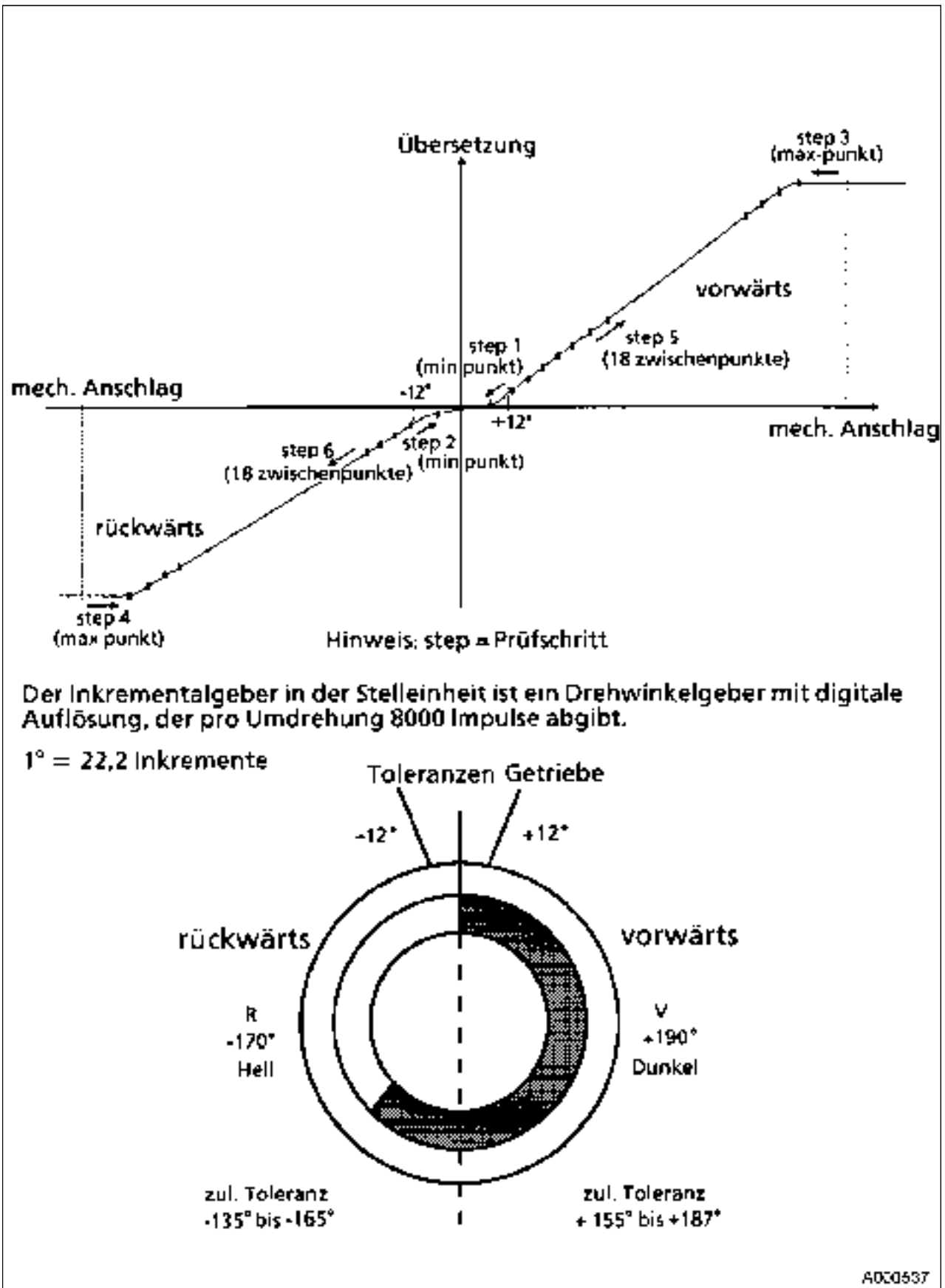
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| 12/1999 | a | 4/5 | | 0000 | F | 000008 |

Farmer 400
Fav 700
Fav 900

Tractor / General system
Calibration code 4007

F

Graphic representation of transmission ratio calibration procedure



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|---------|---------|------|-----------------------|---------|-------|----------|
| 12/1999 | a | 5/5 | | 0000 | F | 000008 |

Farmer 400
Fav 700

Tractor / General system
Calibration code 4009

F

11. Calibrating turboclutch operation

Caution: following preparatory steps must be carried out.

- Handbrake pulled on **tight**
- Start engine
- Tractor stationary (less than 0.01 km/h)
- Engine speed 1100 rpm \pm 40
- During calibration engine speed falls to approx. 700 rpm
- Engage range II via switch in armrest
- Transmission oil temperature approx. 40°C
- If error messages are displayed, faults must be individually cleared



First press key and hold,



then press key, and fault symbol is cleared. Clear other faults in same way



Press key, next pictogram displayed.



Key flashes



Press key, next pictogram displayed



Input code **4009**



Press one of keys until desired number is displayed.



Store with key, following pictogram displayed



System runs through following five pictograms automatically

| Date | Version | Page | Calibration code 4009 | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------|---------|-------|----------|
| 12/1999 | a | 1/2 | | 0000 | F | 000009 |

Farmer 400
Fav 700

Tractor / General system
Calibration code 4009

F



دیتا کیلکولیشن



دیتا کیلکولیشن



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If incorrect values are found or conditions are not met, **ERROR** message is displayed.
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Note:

Data are only accepted when ignition key is turned to position "0".

| Date | Version | Page | Calibration code 4009 | Capitel | Index | Docu-No. |
|---------|----------|------|-----------------------|-------------|----------|---------------|
| 12/1999 | a | 2/2 | | 0000 | F | 000009 |

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General System Calibration 4002 | F |
|----------------|--|----------|

12. Calibrating Hand Throttle

Caution: Following preliminaries must be fulfilled.

- Parking Brake applied
- Ignition "ON"
- In Presence of Failure Codes, they must be cancelled individually



Press Key and hold,



then press key and the failure code will be cancelled. Proceed the same way for eventual further Failure Codes.



Press Key



Wrench is flashing



Press Key, next symbol is displayed



Enter Code **4002**



Press any key, until desired value appears



Memorize with key.



Following symbol will appear



Hand Throttltle in min. Position and memorize with key

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|------------|---------|------|------------------|---------|-------|----------|
| 30.11.2000 | a | 1/2 | | 0000 | F | 000013 |

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General System Calibration 4002 | F |
|----------------|--|----------|



Following symbol will appear



Hand Throttlettle in maximal Position and memorize with key

If values are out of range or any condition is not fulfilled, Failure **ERROR** will be displayed.

If Calibration runs OK without problem, **OK** will be displayed and the new values are memorized.

Remark:

Definite Memorization occurs only after having set Ignition to "OFF".

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| 30.11.2000 | a | 2/2 | Calibration 4002 0000 | F | 000013 |

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General System Calibration 4005 | F |
|----------------|--|----------|

13. Calibrating Accelerator Pedal Sensors (B029, B038)

Caution: Following preliminaries must be fulfilled..

- Parking Brake applied
- Start Engine
- In Presence of Failure Codes, they must be cancelled individually



Press Key and hold,



then press key and the failure code will be cancelled. Proceed the same way for eventual further Failure Codes.



Press Key



Wrench is flashing



Press Key, next symbol is displayed



Enter Code **4005**



Press any key, until desired value appears



Memorize with key. Following symbol will appear



Set 850 Rpm Engine Speed with accelerator Pedal.



memorize with key

| Date | Version | Page | Calibration 4005 | Capitel | Index | Docu-No. |
|------------|---------|------|------------------|---------|-------|----------|
| 30.11.2000 | a | 1/2 | | 0000 | F | 000014 |

| | | |
|----------------|--|----------|
| Fav 900 | Tractor / General System Calibration 4005 | F |
|----------------|--|----------|



Following symbol will appear
Set 1300 Rpm Engine Speed with accelerator Pedal.



memorize with key



Following symbol will appear
Set 1700 Rpm Engine Speed with accelerator Pedal.



memorize with key



Following symbol will appear
Set 1900 Rpm Engine Speed with accelerator Pedal.



Following symbol will appear



Following symbol will appear
Set Maximum Engine Speed with accelerator Pedal.



memorize with key

If values are out of range or any condition is not fulfilled, Failure **ERROR** will be displayed.
If Calibration runs OK without problem, OK will be displayed and the new values are memorized.

Remark:

Definite Memorization occurs only after having set Ignition to "OFF".

| Date | Version | Page | Calibration 4005 | Capitel | Index | Docu-No. |
|------------|----------|------|------------------|-------------|----------|---------------|
| 30.11.2000 | a | 2/2 | | 0000 | F | 000014 |

| | | |
|----------------|---|----------|
| Fav 900 | Transmission / Transmission control unit Transmission control unit functional sequence | A |
|----------------|---|----------|

Transmission type ML 200

- M = Marschall, designer of this development
 L = Stands for the German term Leistungsverzweigung (= power splitting), mechanical and hydrostatic power transmission
 200 = Average power 200 bhp, 100 - 300 bhp is economically transmitted to the wheels.

ML 200 transmission

The ML 200 transmission is a continuously variable transmission for forward and reverse travel.

Synchronised range shifting is integrated in the transmission.

Range I is for forward speeds from 0 to approx. 32 km/h.

Range II is for forward speeds from 0 to approx. 50 km/h.

Range I is intended for heavy traction work at low travel speeds, i.e. less than 12 km/h.

Range II is intended for use on roads (transporting applications). At 50 km/h the transmission ratio is electronically matched to the engine speed. Should the electronic governor not engage, the tractor runs at a max. travel speed of approx. 70 km/h.

Power transmission can be hydrostatic or mechanical or hydrostatic and mechanical.

Basically this means:

Slow forward travel = hydrostatic power transmission high / mechanical low

Fast forward travel = hydrostatic power transmission low / mechanical high

Detailed explanation: Chapter 1005 Reg. A - Transmission function schematic

Hydrostatic power branch

The ML transmission unit is flexibly mounted in the transmission housing. The transmission housing is also the oil reservoir for the hydrostatic drive.

Oil: STOU oil

Initial fill: approx. 85 l

Refill: approx. 65 l, e.g. at an oil change

Functional sequence: Chapter 1005 Reg. C - Hydraulic circuit diagram

The lubricating pump (1P2) draws in oil via the intake filter (1Z1).

The temperature sensor (1S1 / B009) monitors the transmission oil temperature.

Oil flow through the oil cooler (1Z3) depends on the temperature.

This means that if the transmission oil is cold, little oil flows through the oil cooler, while most flows via the bypass valve which opens when the pressure differential exceeds approx. 3.5 bar. The transmission oil temperature is monitored by the temperature sensor.

The servopump (1P1) generates the system pressure for the ML control valves and the enhanced control valves. The system pressure of approx. 25 bar is restricted by the pressure-relief valve with its throttling port.

The system uses different pressures.

1. System pressure for ML transmission control unit approx. 25 bar and enhanced pressure approx. 18 bar for rear PTO clutch, differential locks and cardan brake.
2. High pressure in ML transmission. Max. pressure-measuring point approx. 500 + 20 bar.

Contamination of the pressure filter is monitored by a pressure-operated switch (1S2 / So17) as a function of the transmission oil temperature. If the transmission oil temperature is below 50°C, filter contamination is not monitored.

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| Fav 900 | Transmission / Transmission control unit Transmission control unit functional sequence | A |
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Cooled transmission oil is supplied to the high-pressure circuit via two non-return valves alternately. Hot transmission oil is discharged from the high-pressure circuit via the flush valve (2V5).

The high-pressure circuit incorporates: a variable-displacement pump (2P1) and two variable-displacement motors (2A1 / 2A2), two non-return valves, two servo-assisted high-pressure-relief valves (2V3 / 2V4), a flush valve 2V5), a turboclutch pressure-relief valve (4V4 / Y004), a clutch pressure-relief valve (4V5) and a test connection.

The regulator cylinders of the variable-displacement pump and variable-displacement motors are actuated by two 4/3-way valves.

The 4/3-way valves are activated mechanically by the actuator shaft.

The actuator shaft is rotated as required by the actuator unit, thereby setting the correct quantity of oil to be supplied or consumed.

The variable-displacement pump and variable-displacement motors swivel accordingly.

In Emergency mode the actuator shaft is operated manually from the cab.

For further details on the actuator unit (A009), please see the section dealing with electronics.

In Emergency mode the transmission is automatically locked at approx. 30 km/h after the engine has been started.

If the clutch pedal, handbrake or neutral switch is operated, the high-pressure circuit is depressurised by means of the two high-pressure-relief valves.

Operation of the turboclutch is controlled via the pressure-relief valve.

Important note on filling the ML 200 transmission with oil:

During normal maintenance work, e.g. for a transmission oil change, the transmission oil should be added as in a normal change-gear transmission.

If there is no oil in the high-pressure circuit, the transmission must be filtered via an external hydraulic oil-filling unit.

See Chapter 1080 Reg. G

The transmission oil is also filtered through the connection as it is being added.

If the oil is not topped up, it may result in damage to the variable-displacement pump and variable-displacement motors if they run dry after starting up.

Electrical / electronic control

The CAN-bus is a data line which connects various components (also called users) to each other. If a large amount of data is transmitted, the voltage in the CAN-bus (+ and - wires) rises.

In the Favorit 900 chassis number 23/3001 and up data are transmitted via three CAN-bus systems

K-bus = enhanced control bus

G-bus = transmission bus

EDC-bus = Electronic Diesel Control

The voltage can be checked at the CAN-bus sockets

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|----------------|---|----------|
| Fav 900 | Transmission / Transmission control unit Transmission control unit functional sequence | A |
|----------------|---|----------|

The **A009 - actuator unit** controls the actuator shaft, thereby changing the transmission ratio in the ML transmission.

The actuator unit comprises:

1. Drive for Emergency mode (required in case of failure of the electronic control system)
2. Clutch for the drive
3. Incremental encoder which is a position sensor with digital resolution emitting 8000 pulses per revolution.
4. Planetary gear $i = 192 : 1$ (electric motor to actuator shaft)
5. 12 V_{DC} electric motor, 0.4 to 7 amps, actuator unit no-load speed of 4500 rpm
6. Slip clutch 2.5 to 3.5 Nm, 4 to 5 Nm at key-operated actuator of emergency control

Once the ignition is on, the actuator unit locates the reference point (approximate neutral point between forward and reverse travel).

When the engine has started, the actuator unit locates the reference point (exact neutral point between forward and reverse travel).

Automatic maximum output control (restricting the reduction in engine speed or adaptation to the engine output)

Example: the engine speed is reduced when a load is applied. The electronics change the transmission ratio towards slow so that the engine speed is not reduced too far.

Automatic maximum output control is always engaged once the engine is started. However, the reduction in engine speed can be changed from 0 to 30% (see Operating Manual).

The default setting is 14%.

Automatic maximum output control functions:

The electronics detect the setpoint engine speed from the position of the accelerator pedal by means of the analogue position sensor (potentiometer) on the accelerator.

Control - setpoint transmission ratio has been reached.

The tractor is put under load, and the engine speed drops.

The automatic maximum output control only ever changes the transmission ratio towards slow.

The automatic maximum output control is engaged at:

reduction in engine speed of over 180 rpm + set value.

Example:

| | |
|--|----------|
| Engine speed according to accelerator pedal position | 2000 rpm |
| Setting for automatic maximum output control 10% = | 200 rpm |
| Calculation: | |
| 2000 rpm - 180 rpm - 200 rpm = | 1620 rpm |

This means that the automatic maximum output control changes the transmission ratio towards "Slow" from 1620 rpm. Theoretically the automatic maximum output control changes the transmission ratio when under load until the travel speed reaches 0.

Note:

Since the automatic maximum output control only changes the transmission ratio towards slow, it is beneficial to switch on cruise control.

If the engine speed rises again with cruise control switched on, the transmission ratio is changed towards fast again, up to the stored speed at a maximum.

Control by means of the automatic maximum output control + cruise control can be damped or accelerated using the crossgate lever (accelerator ramp switch) on the joystick.

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|----------------|---|----------|
| Fav 900 | Transmission / Transmission control unit Transmission control unit functional sequence | A |
|----------------|---|----------|

Sensors

B010 - engine sensor 1 and B011 - engine sensor 2 measure the engine speed. Both sensors must provide an identical signal. If one sensor fails, it is only possible to proceed in Emergency mode.

B014 - sensor, accumulator shaft and B015 - sensor, bevel pinion measure the rotational and forward speeds and detect the rotational direction.

B008 - sensor, high-pressure transmits the instantaneous hydraulic pressure in the high-pressure circuit to the electronics.

B029 - sensor, accelerator transmits the accelerator pedal position to the electronics and compares it with the engine speed. This position sensor is required for automatic maximum output control.

B017 - sensor, clutch pedal electronically monitors the clutch pedal travel. Before the clutch is engaged, the transmission ratio is reduced. Pulling away in speed range I approx. 5 km/h, pulling away in speed range II approx. 10 km/h.

B016 - range sensor I / II electronically monitors the range control travel.

B009 - sensor, output temperature monitors the transmission oil temperature. Temperatures above 110°C are stored under fault code 4.1.53.

Actuators

The range control I and II solenoids charge the selector cylinders of range control I / II with hydraulic oil.

Range control I / II can be actuated under the following conditions:

a) The tractor is stationary.

1. The engine is running.
2. The neutral switch has been operated, **LED N** in the armrest **is illuminated** or the clutch pedal has been actuated (which opens the high-pressure valves).
3. The tractor can drive at a maximum speed of 2.5 km/h.
4. The range control can be shifted from I to II or from II to I.

b) The tractor is moving.

1. Speed above 5 km/h
2. The neutral switch has been operated, **LED N** in the armrest is **off** (which closes the high-pressure valves). It is also possible to shift range with the clutch pedal depressed.
3. The transmission must not be under an excessive load (max. 150 bar in the high-pressure circuit).
4. It is only possible to shift from range I up to II.

The transmission neutral / turboclutch valve solenoid controls the turboclutch operation. The high-pressure valves open as a function of the engine speed.

The speed governor solenoid cancels the approx. 30 km/h speed restriction when the electronics are operational. The speed restriction is cancelled when 800 ± 50 mA is applied to the solenoid.

The pressure-operated switch monitors clogging of the pressure filter on the ML transmission.

Handbrake switch, with the handbrake on, the two high-pressure valves are opened - both F/R lamps flash. The transmission is switched to neutral.

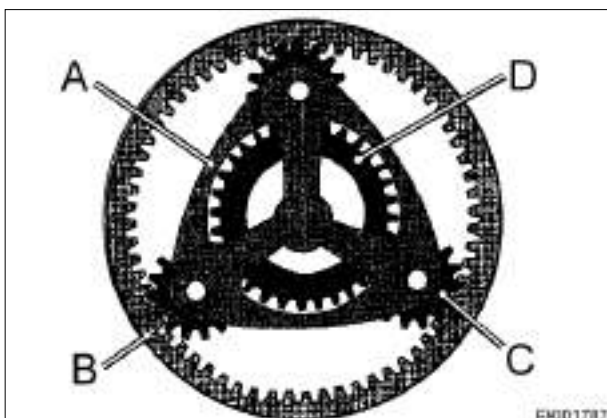
Joystick in the right **armrest**.

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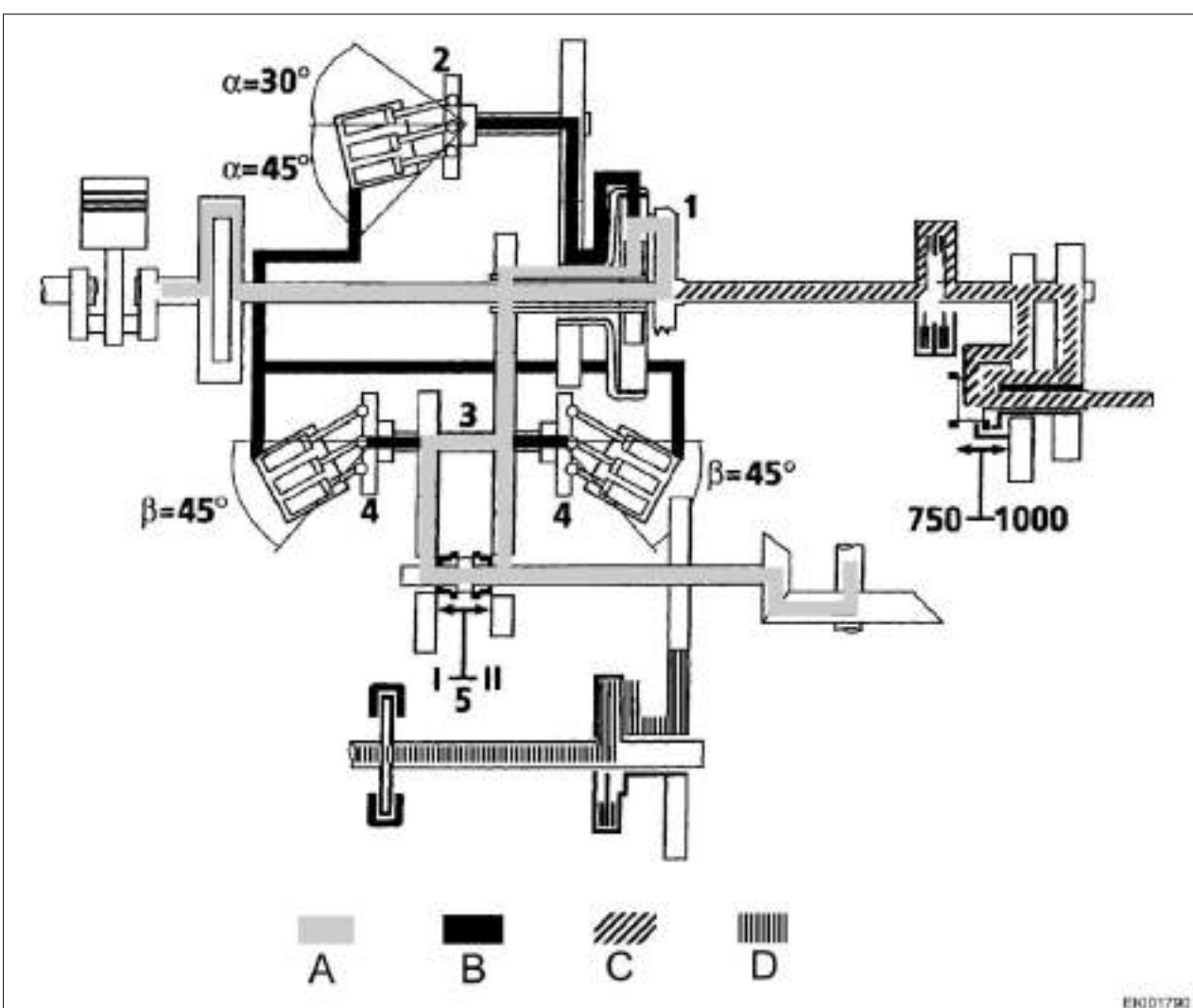
Fav 900

Transmission / Transmission Control Unit

Transmission function schematic

A**Planetary gear / power splitting**

- A** = Planet carrier
Drive from engine
- B** = Annulus
Drive to pump
- C** = Planet wheel
- D** = Sun wheel
Drive to accumulator shaft



| | | | |
|---|------------------------|---|-------------------|
| A | Mechanical power flux | 1 | Planetary gear |
| B | Hydrostatic power flux | 2 | Hydraulic pump |
| C | PTO drive | 3 | Accumulator shaft |
| D | 4WD | 4 | Hydraulic motor |
| | | 5 | Range control |

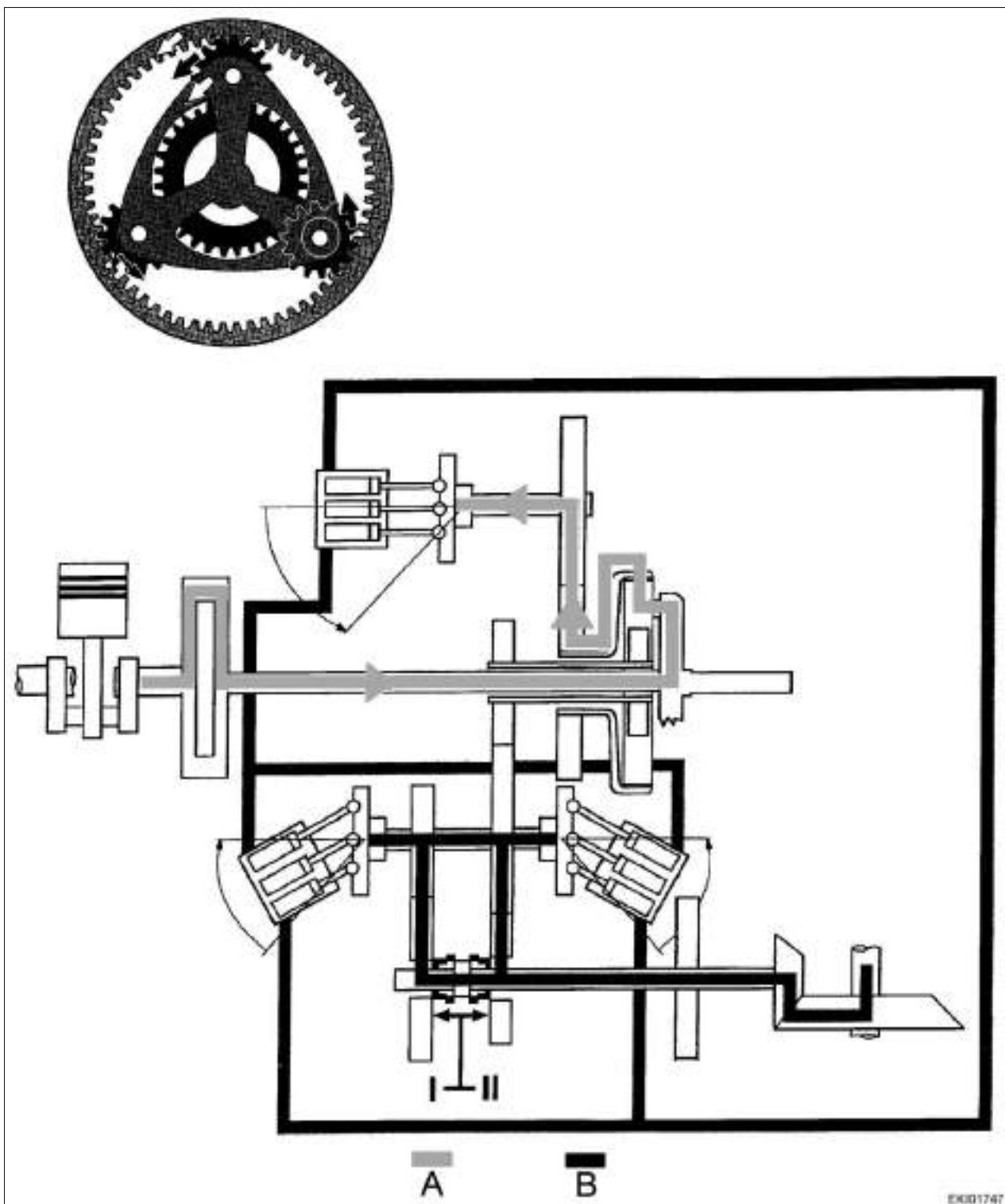
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Fav 900

Transmission / Transmission Control Unit
Transmission function schematic

A**Active stationary mode**

Engine running, tractor stationary



A Mechanical power flux

B Hydrostatic power flux

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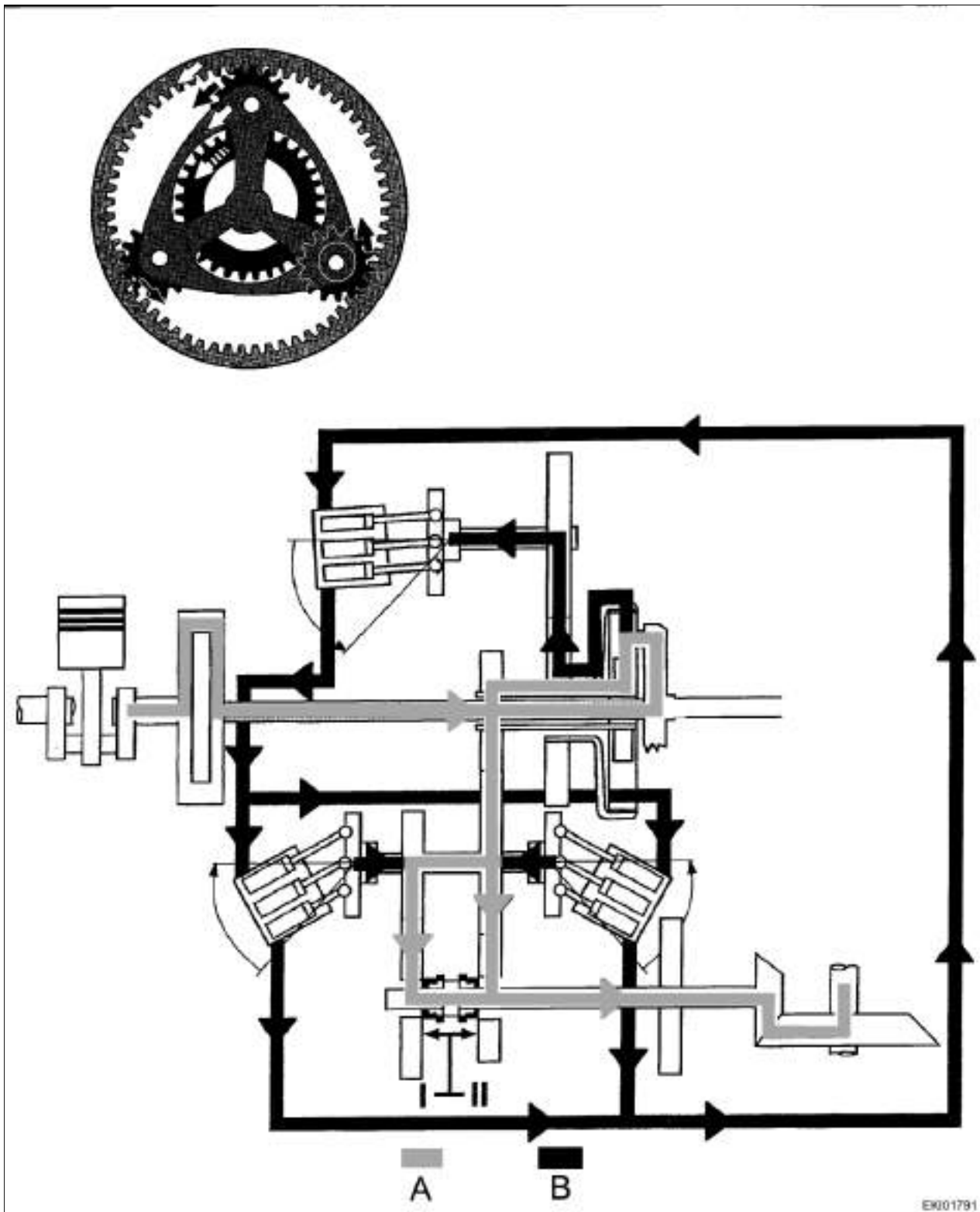
Fav 900

Transmission / Transmission Control Unit
Transmission function schematic

A**Pulling away**

99% hydrostatic power transmission

1% mechanical power transmission



A Mechanical power flux

B Hydrostatic power flux

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Transmission function schematic

<https://www.truck-manuals.net/>

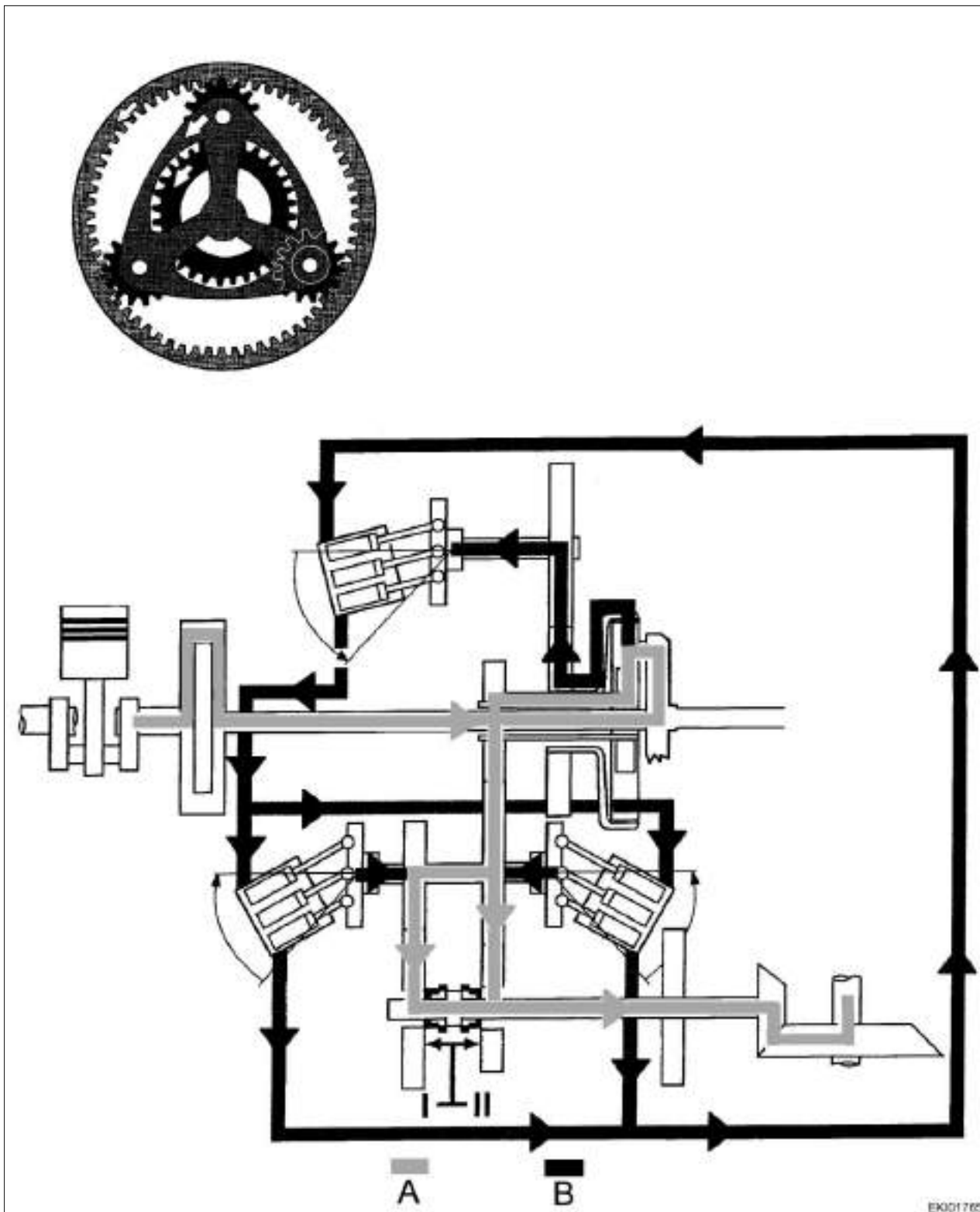
Fav 900

Transmission / Transmission Control Unit
Transmission function schematic

A**Driving, medium speed**

50% hydrostatic power transmission

50% mechanical power transmission



A Mechanical power flux

B Hydrostatic power flux

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Transmission function schematic

<https://www.truck-manuals.net/>

Fav 900

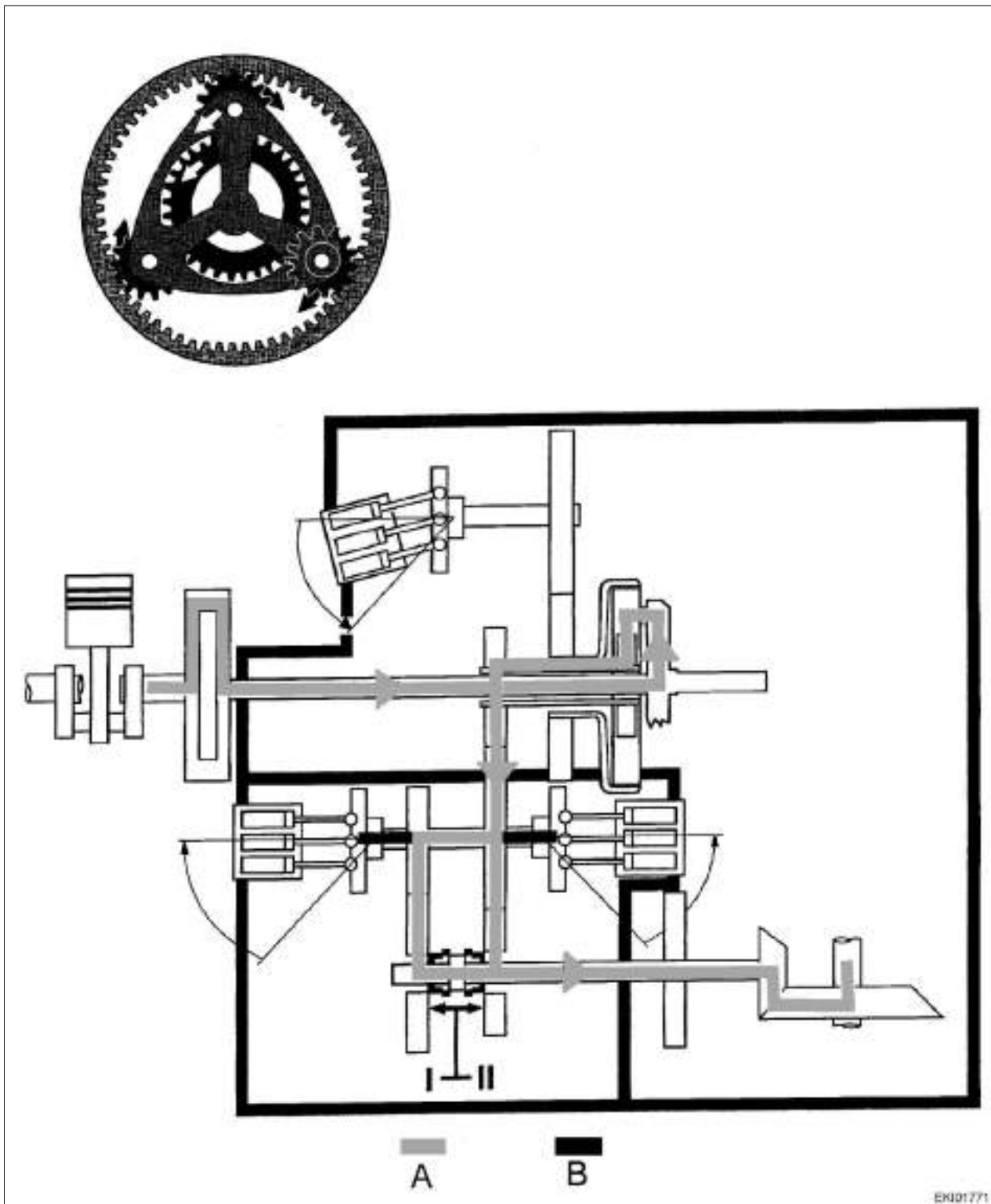
Transmission / Transmission Control Unit
Transmission function schematic

A

Transporting 50 km/h

Engine 1500 rpm

100% mechanical power transmission



A Mechanical power flux

B Hydrostatic power flux

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| 07/2001 | a | 5/6 | 1005 | A | 000004 |

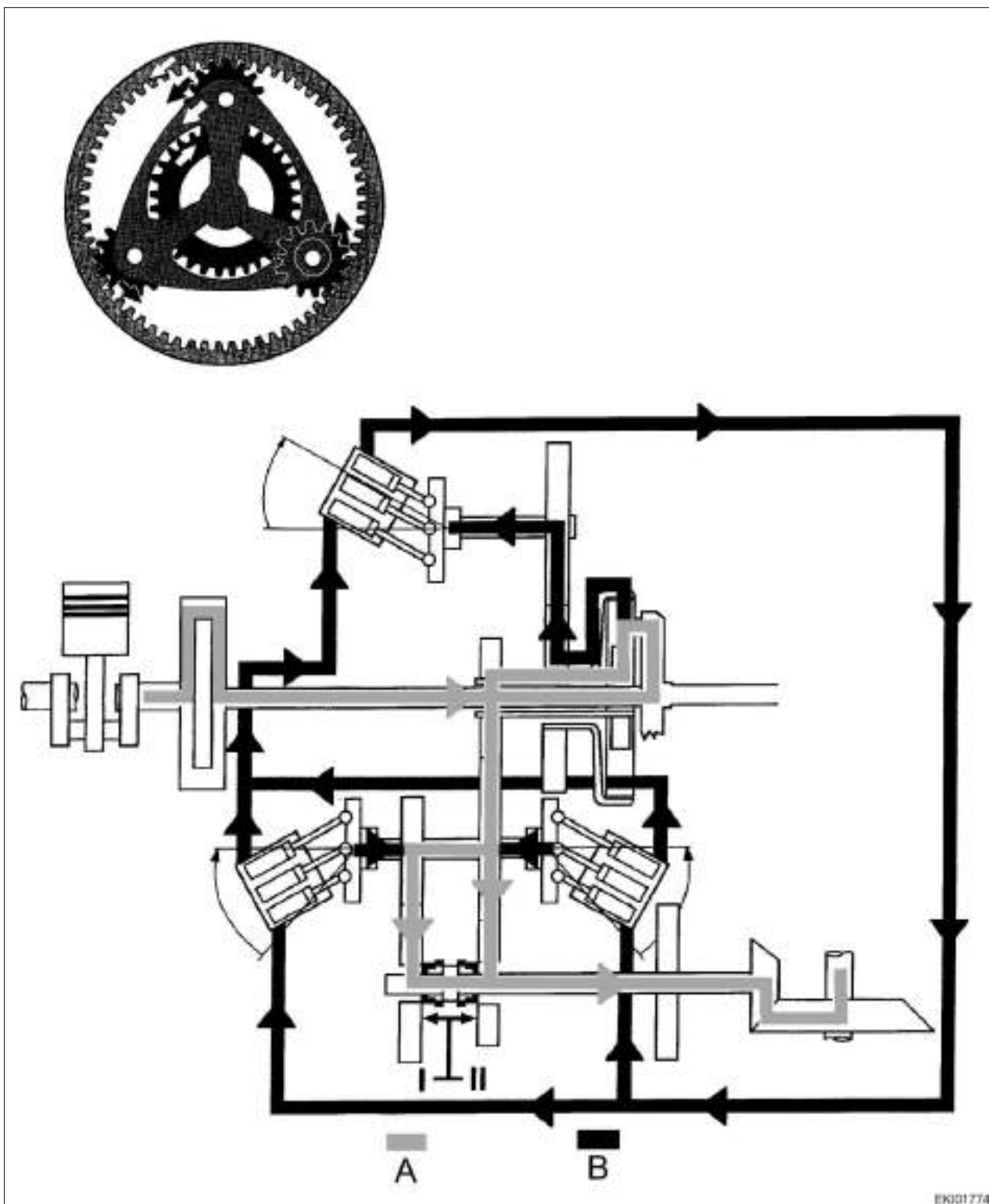
Transmission function schematic

<https://www.truck-manuals.net/>

Fav 900

Transmission / Transmission Control Unit

Transmission function schematic

A**Reversing****Medium speed****100% hydrostatic power transmission****Ring gear turning faster than engine**

EK01774

A Mechanical power flux

B Hydrostatic power flux

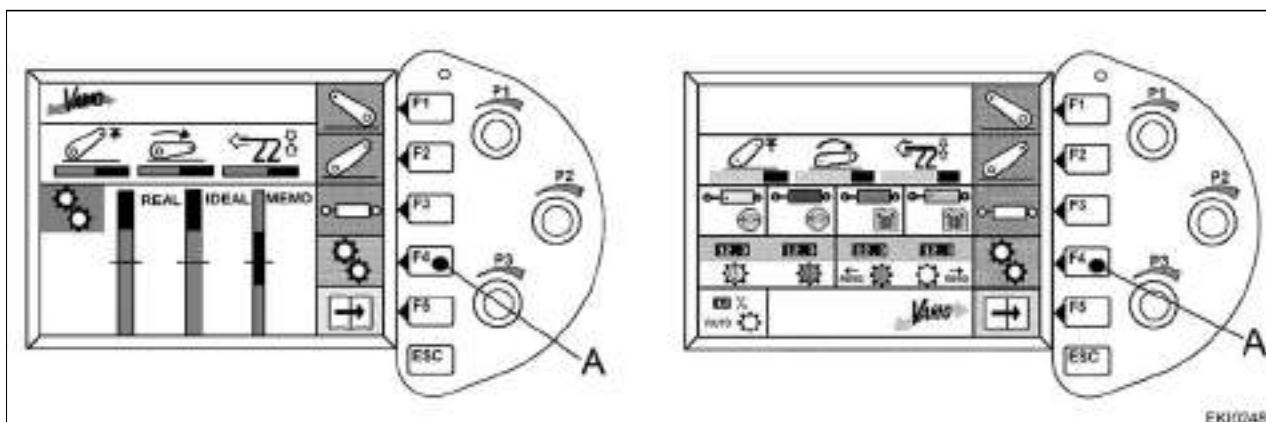
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Transmission function schematic

<https://www.truck-manuals.net/>

Fav 900
Transmission / Transmission control unit
Transmission programming
A

The transmission is programmed via the Vario terminal. Press **F4** to move to the transmission settings menu level.

**Vario terminal main menu level**

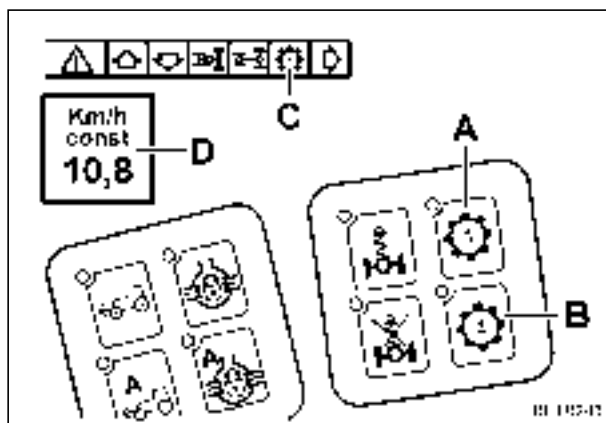
Variotronic 1.0

Variotronic 2.0

1. Setting cruise control.**The speed is kept constant.**

The cruise control function enables the driver to reach and maintain a predefined speed whenever required, simply and accurately.

With the Vario transmission there are two independent cruise control memories so two speeds (e.g. for agricultural operations and on-road driving) can be stored.

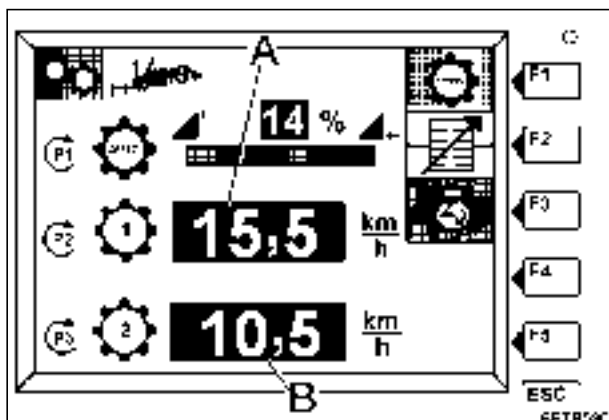


The setpoint speed is displayed in the centre of the **instrument panel (D)**.

When cruise control is ON, the **cruise control pictogram (C)** lights up.

Cruise control memory 1 (**A**)

Cruise control memory 2 (**B**)

Fav 900Transmission / Transmission control unit
Transmission programming**A****Presetting speeds using the rotary controls on the control console**

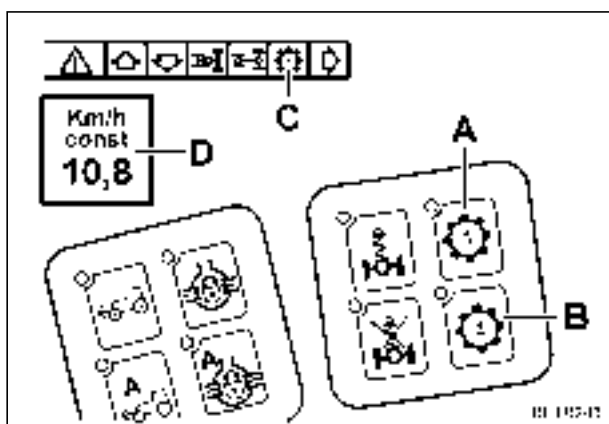
Once the transmission menu has been called up, the desired speed can be set using the rotary controls.

P2 = cruise control 1 (**A**)

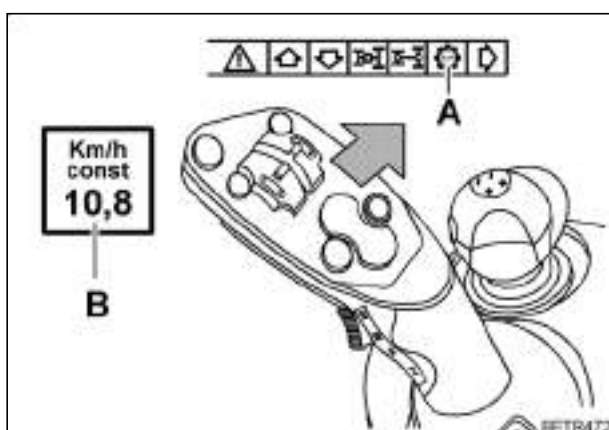
P3 = cruise control 2 (**B**)

The set values are automatically stored and remain stored even when the ignition is switched off.

When driving with cruise control engaged, the stored speed can be adapted to the current operating conditions by adjusting the relevant **rotary control P2 or P3** .

2. Activating cruise control.

Press the key (**A or B**) briefly to toggle between the two cruise control memories.



If you wish to drive at the stored speed again, press the joystick to the right ("**Cruise control on**").

The transmission accelerates or decelerates until the stored speed is reached.

The cruise control pictogram (**A**) lights up on the instrument panel, and the stored speed is displayed on the multi-display (**B**).

The cruise control can only be activated if the following conditions are met:

- Clutch pedal is not operated
- Vehicle is in motion
- Engine speed is greater than 1400 rpm

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| 20.11.2001 | a | 2/7 | Transmission programming | 1005 | A |
| | | | | | 000006 |

| | | |
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| Fav 900 | Transmission / Transmission control unit Transmission programming | A |
|----------------|--|----------|

Otherwise, the cruise control function is cancelled, and the current transmission ratio is maintained. It is not possible to pull away from stationary with cruise control engaged.

The stored speeds can be used in both directions.

Cruise control is terminated by:

- moving the joystick from its neutral position
- operating the footbrake or the exhaust brake
- reducing the engine speed to below 1400 rpm
- changing to neutral
- shifting the range control from range I to range II

3. Automatic maximum output control

(Limiting the reduction in engine speed or adapting to the engine output)

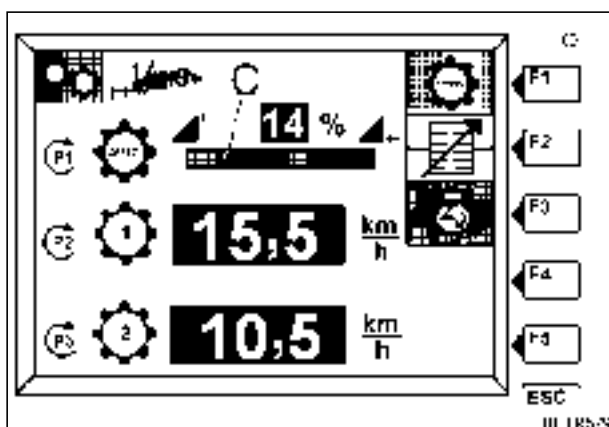
The aim is to free the driver from having to adapt the driving speed to the available engine output when operating at the engine's power limit.

The **setpoint engine speed** (accelerator pedal position) is therefore compared constantly with the **actual engine speed**.

The automatic maximum output control is engaged automatically when the engine speed falls under load.

Example:

The engine speed is reduced when a load is applied. The electronics change the transmission ratio towards slow so that the engine speed is not reduced too far. The permissible reduction in engine speed can be set from 0 to 30% via the control console.



Setting the automatic maximum output control:

The set reduction in engine speed, e.g. 14%, is displayed by the bar display (**C**).

Turn the rotary control (**P1**) to set the reduction in engine speed level from 0 to 30%.

The engine speed can be reduced by 180 rpm without any control action being initiated. This ensures that the control unit is not constantly actuated.

When is the automatic maximum output control activated?

With a reduction in engine speed of over 180 rpm + set value

Example:

Engine speed according to accelerator pedal position = 2000 rpm

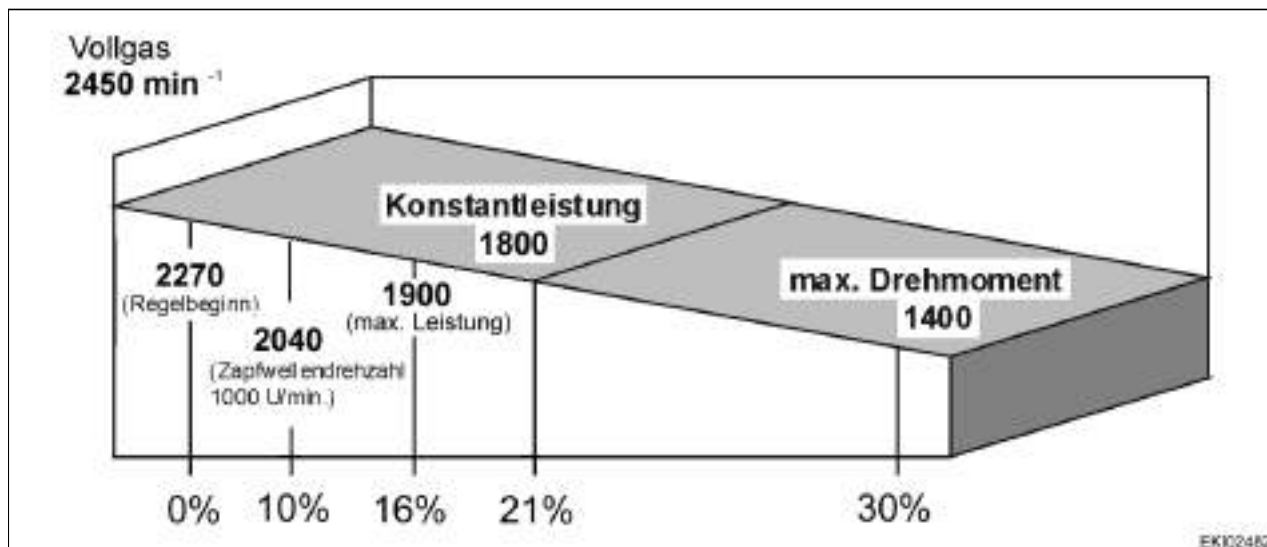
Automatic maximum output control setting 10% = 200 rpm

2000 rpm - 180 rpm - 200 rpm = 1620 rpm = automatic maximum output control activated

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| | | |
|----------------|---|----------|
| Fav 900 | Transmission / Transmission control unit Transmission programming | A |
|----------------|---|----------|

Favorit 900 automatic maximum output control



Application examples:

Heavy traction work (ploughing)

Utilising constant output range, maximum output per unit area, best possible utilisation of total available engine output

| | |
|---|---------------------------|
| Engine speed (accelerator) | Full throttle 2450 rpm |
| Automatic maximum output control setting: | 16% |
| Reduction in engine speed to | 1900 rpm |

PTO work (rotary harrow)

Maximum PTO output. PTO speed must be maintained to achieve optimum work quality.

| | |
|---|---------------------------|
| Engine speed (accelerator) | Full throttle 2450 rpm |
| Automatic maximum output control setting: | 10% |
| Reduction in engine speed to | 2040 rpm |

Transport (maximum transport speed)

Maximum transport speed, utilising constant output range, best possible utilisation of total available engine output

| | |
|---|---------------------------|
| Engine speed (accelerator) | Full throttle 2450 rpm |
| Automatic maximum output control setting: | 16% |
| Reduction in engine speed to | 1900 rpm |

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| | | |
|----------------|---|----------|
| Fav 900 | Transmission / Transmission control unit Transmission programming | A |
|----------------|---|----------|

Transport (minimum fuel consumption)

Lowest possible fuel consumption, utilising engine torque

| | |
|---|----------|
| Engine speed (accelerator) | 1850 rpm |
| Automatic maximum output control setting: | 16% |
| Reduction in engine speed to | 1400 rpm |

Note:

Since the automatic maximum output control only changes the transmission ratio towards slow, it is beneficial to switch on cruise control. If the engine speed rises again with cruise control switched on, the transmission ratio is changed towards fast again, up to the stored speed at a maximum.

4. Reversing and storing the transmission ratio.**Gentle direction change**

Pull the joystick backwards (when driving forwards) until the tractor comes to a halt, then press the activating control and pull the joystick backwards again.

Rapid direction change

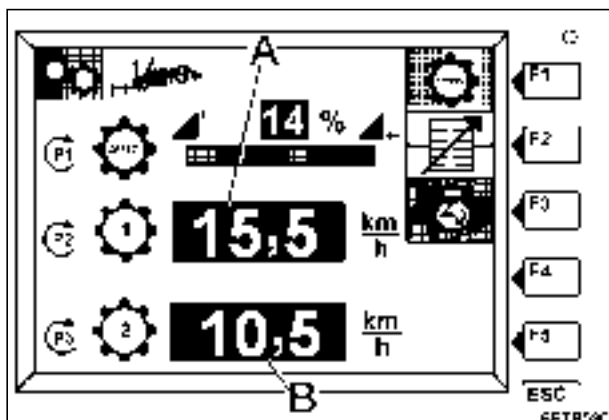
The Vario 900 has two means of quickly changing the direction of travel:

- Press activating control and move joystick to left
- Operate switch (B) in steering wheel adjustment lever.

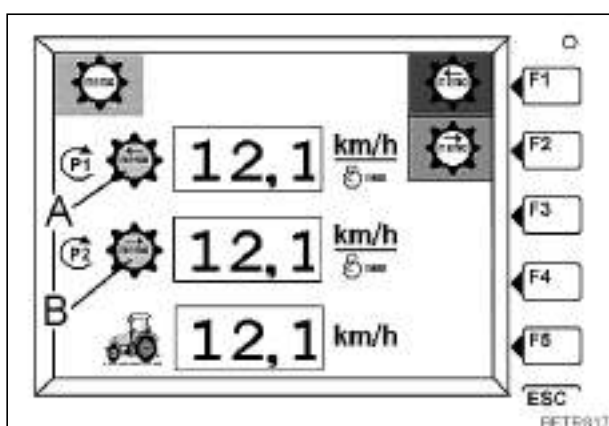


If the driver moves the joystick to the left while driving and then presses the activating control or the switch in the steering wheel adjustment lever (**B**), a programmed direction-change procedure is initiated. The tractor decelerates to a standstill, then accelerates away in the opposite direction.

During deceleration, the preset direction of travel is indicated by the relevant display flashing, while the actual direction of travel is shown by a steady light.

Fav 900Transmission / Transmission control unit
Transmission programming**A**

Press **F1** in the transmission settings menu level to go to the transmission ratio menu level.



The speed setting is carried out using rotary control P1 (forwards) and rotary control P2 (reverse). Activate the speed settings using keys **F1** = forwards and **F2** = reverse.

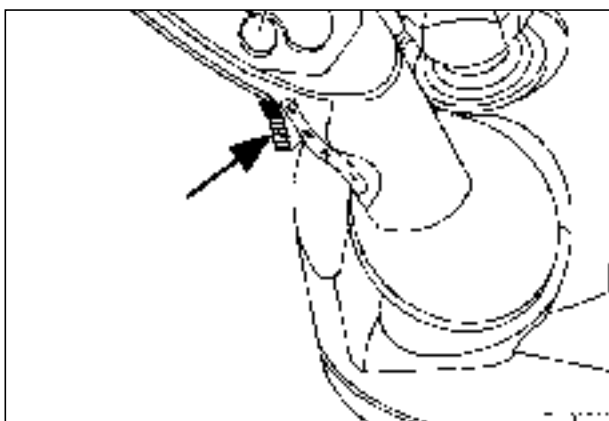
This enables the shuttle process to be optimally adapted to the prevailing conditions. These are not cruise control functions; in other words, no ongoing corrections are carried out.

Without any preset the tractor drives forwards and backwards equally fast ("shuttle control").

5. Adjusting acceleration

During the direction-change procedure the driver can release the joystick. The direction-change procedure can be cancelled at any time by moving the joystick (forwards or backwards).

Acceleration and deceleration during rapid direction change depend on the position of the accelerator control (**B**) on the joystick (I = gentle, IV = aggressive).



| | 1x touch | 0 to 50 km/h |
|------------|-----------------|---------------------|
| Level I: | 0.03 - 0.5 km/h | 250-45.5 sec |
| Level II: | 0.5 km/h | 45.5 secs |
| Level III: | 1 km/h | 23.8 secs |
| Level IV: | 2 km/h | 10 secs |

Rapid direction change can be initiated at any travel speed.

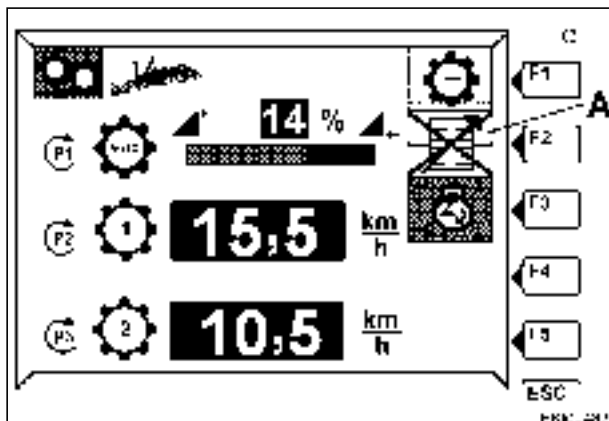
| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|--------------------------|-------|----------|
| 20.11.2001 | a | 6/7 | Transmission programming | 1005 | A |
| | | | | | 000006 |

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Transmission control unit Transmission programming | A |
|----------------|--|----------|

6. Turboclutch operation

The turboclutch function is simulated by modulating the working pressure in the hydrostatic circuit as a function of the engine speed. By reducing the pressure in the hydrostatic circuit, the tractive power is reduced at low engine speeds. The effect of the turboclutch function, therefore, is comparable to measured actuation of the clutch pedal.

If the engine speed falls below 1400 rpm, the working pressure in the hydrostatic circuit is steadily reduced with decreasing engine speed. In this way the engine load is reduced, as in a real turboclutch, and the engine is prevented from stalling.



Disabling turboclutch operation.

The driver can disable the turboclutch for certain operations by pressing F2 on the terminal. With the turboclutch disabled the pictogram (A) is displayed as shown.

Shut-off conditions

- Engine running
- Transmission in neutral
- System not in Emergency mode
- No fault message generated

Note:

Turboclutch operation is automatically reactivated after every restart.

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| 20.11.2001 | a | 7/7 | 1005 | A | 000006 |

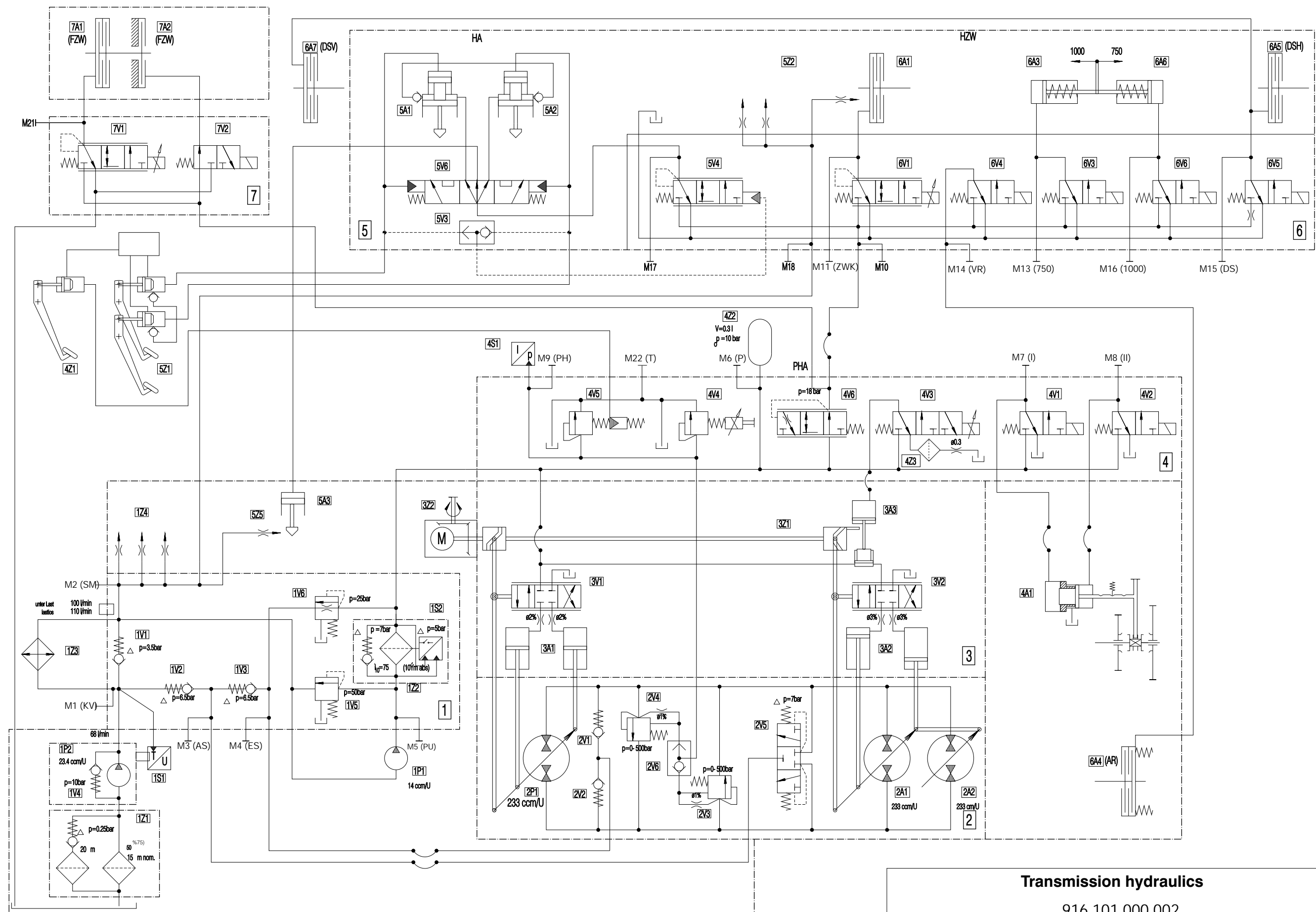
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|----------------|---|----------|
| Fav 900 | Transmission / transmission Control Transmission hydraulic diagram and legend | C |
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| | | |
|----------------|--|----------|
| Fav 900 | Transmission / transmission Control Transmission hydraulic diagram and legend | C |
|----------------|--|----------|

| Circuits: | | | Valves: | | |
|------------------|------|--|--------------------------|------|--|
| 1 | | Valves bloc "Supply / Lubrication" | 1V1 | | Radiator Bypass Valve |
| 2 | | Main Circuit | 1V2 | | Pressure Limiting Valve Feed line |
| 3 | | Control | 1V3 | | Pressure Limiting Valve Supply line |
| 4 | | Valves bloc Comfort hydraulics | 1V4 | | Pressure Limiting Valve Lubrication |
| 5 | | Brakes and Rear Axle | 1V5 | | Pressure Limiting Valve Servo pump |
| 6 | | Valves bloc on Rear Axle | 1V6 | | Pressure Limiting Valve Servo- Circuit |
| 7 | | Front PTO | 2V1 | | Supply Valve "Ahead" |
| Pumps: | | | 2V2 | | Supply Valve "Reverse" |
| 1P1 | | Pump Control Pressure | 2V3 | | High Pressure Limiting valve "Ahead" |
| 1P2 | | Lubrication pump | 2V4 | | High Pressure Limiting valve "Reverse" |
| 2P1 | | Hydrostatic Pump | 2V5 | | Flushing valve |
| | | Drives: | 2V6 | | Switching valve |
| 2A1 | | Hydrostatic Pump | 3V1 | | Controller valve Hydrostatic Pump |
| 2A2 | | Hydrostatic Motor | 3V2 | | Controller valve Hydrostatic Motor |
| 3A1 | | Control Cylinder Hydrostatic Pump | 4V1 | Y002 | Solenoid Valve Operating range 1 |
| 3A2 | | Control Cylinder Hydrostatic Motor | 4V2 | Y003 | Solenoid Valve Operating range 2 |
| 3A3 | | Speed limiter in auxilliary operation | 4V3 | Y005 | Solenoid valve speed limiter |
| 4A1 | | Shifting Operating Ranges | 4V4 | Y004 | Pressure Limiter valve Turboclutch |
| 5A1 | | Brake actuator right | 4V5 | | Pressure limiting valve clutch |
| 5A2 | | Brake actuator left | 4V6 | | Pressure reducer Rear axle |
| 5A3 | | Front axle brake | 5V1 | | Cooling oil valve Right brake |
| 6A1 | | Clutch Rear PTO | 5V2 | | Cooling oil valve Left brake |
| 6A2 | | Control Cylinder PTO 540 | 5V3 | | Swithing Valve |
| 6A3 | | Control Cylinder PTO 750 | 5V4 | | Relay Valve Brakes |
| 6A4 | | 4WD Clutch | 5V5 | | Cooling oil valve front axle brake |
| 6A5 | | Differential Lock Rear Axle | 5V6 | | Direction Brake Valve |
| 6A6 | | Control Cylinder PTO 1000 | 6V1 | Y008 | Pressure Reducing Valve PTO |
| 6A7 | | Differential Lock front Axle | | | |
| 7A1 | | Clutch Front PTO | 6V3 | Y027 | Solenoid Valve PTO 750 |
| 7A2 | | Brake Front PTO | 6V4 | Y009 | Solenoid valve 4WD clutch |
| Sensors: | | | 6V5 | Y010 | Solenoid Valve Differential Lock |
| 1S1 | B009 | Temperature switch Transmission Oil | 6V6 | Y026 | Solenoid valve PTO 1000 |
| 1S2 | S017 | Pressure switch "Filter Contamination" | 7V1 | Y011 | Pressure Reducing valve Front PTO |
| 4S1 | B008 | High presure Sensor | 7V2 | Y034 | Solenoid Valve "Brake Front PTO" |
| | | Further Components: | Measuring Points: | | |
| 1Z1 | | Aspiration Filter with Bypass | M1 | KV | Radiator Inlet |
| 1Z2 | | Pressure Filter with Bypass | M2 | SM | Lubrication Pressure |
| 1Z3 | | Transmission Oil Radiator | M3 | AS | Feed |
| 1Z4 | | Lubrication of transmission | M4 | ES | Supply Pressure |
| 3Z1 | | Control shaft | M5 | PU | Pressure Pump Control Circuit |
| 3Z2 | A009 | Transmission Control Unit | M6 | P | Transmission system Pressure |
| 4Z1 | | Clutch Pedal with emitter cylinder | M7 | I | Switching presure Operating range 1 |
| 4Z2 | | Hydraulic accumulator | M8 | II | Switching presure Operating range 2 |
| 4Z3 | | Strainer insert | M9 | PH | High Pressure |
| 5Z1 | | Brake Pedals with main Cylinder | M10 | | System Pressure Rear AQxle and Brakes |
| 5Z2 | | Lubrication Rear PTO | M11 | ZWK | Pressure PTO Clutch |
| 5Z3 | | Lubrication Differential Lock and Right hand Brake | M13 | 750 | Switching Pressure PTO 750 |
| 5Z4 | | Lubrication Differential Lock and Left hand Brake | M14 | VR | Pressure 4 WD Clutch |
| 5Z5 | | Lubrication Front axle Brake | M15 | DS | Pressure Differential lock |
| | | | M16 | 1000 | Switching Pressure PTO 1000 |
| | | | M17 | | Control Pressure for Brakes |
| | | | M18 | | Lubrication Pressure Rear axle |
| | | | M21 | | Prssure Front PTO Clutch |
| | | | M22 | T | Leak flow Clutch Valve / Turboclutch Valve |

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Transmission hydraulics
 916.101.000.002
 Fav 900 chassis number 23/... and up

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Transmission Control Unit Valve unit - feed/lubrication | C |
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| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Transmission Control Unit Valve unit - feed/lubrication | C |
|----------------|--|----------|

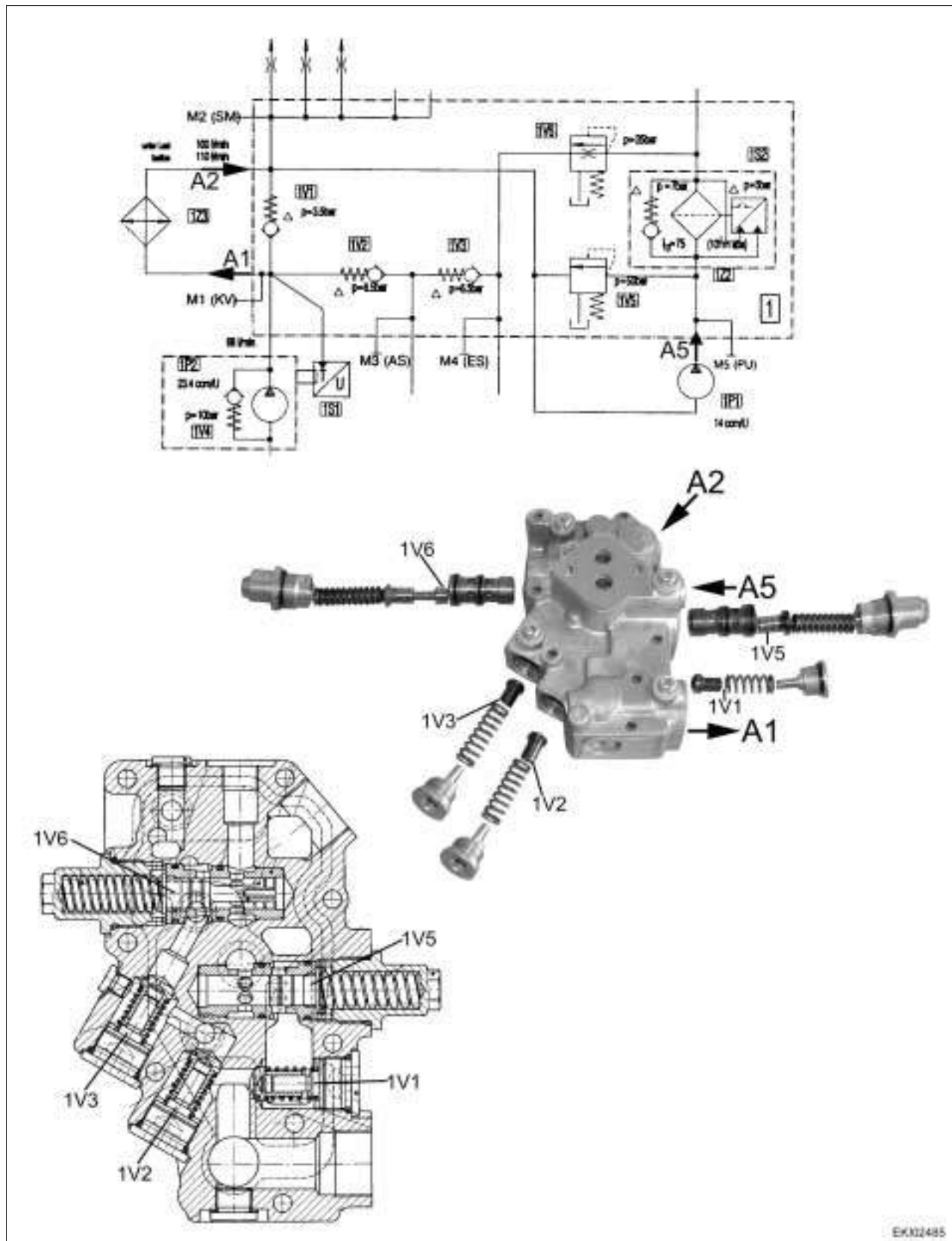
- 1V1 = Radiator bypass valve (3.5 bar)
- 1V2 = Discharge pressure-relief valve (6.5 bar)
- 1V3 = Supply pressure-relief valve (6.5 bar)
- 1V5 = Servopump pressure-relief valve (50 bar)
- 1V6 = Servocircuit pressure-relief valve (25 bar)

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| 30.11.2001 | a | 2/3 | 1005 | C | 000005 |

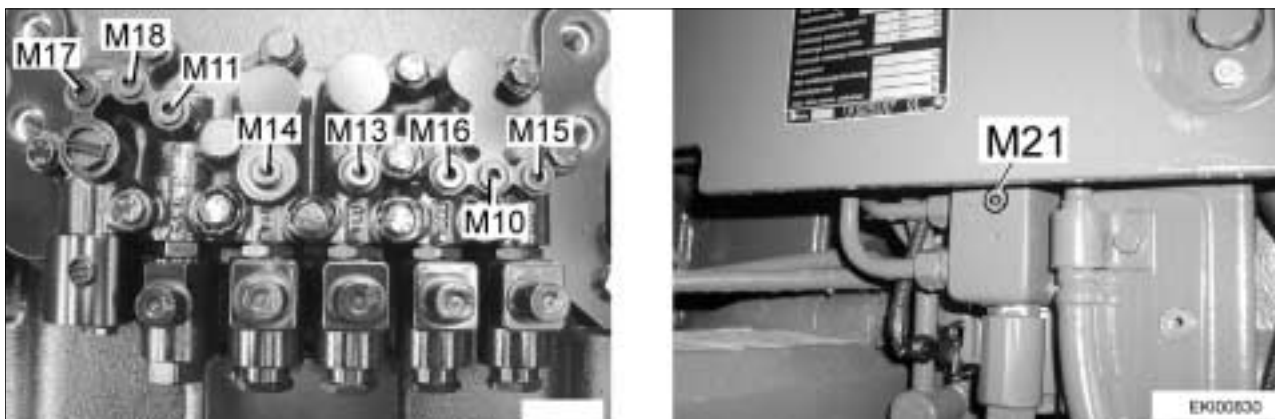
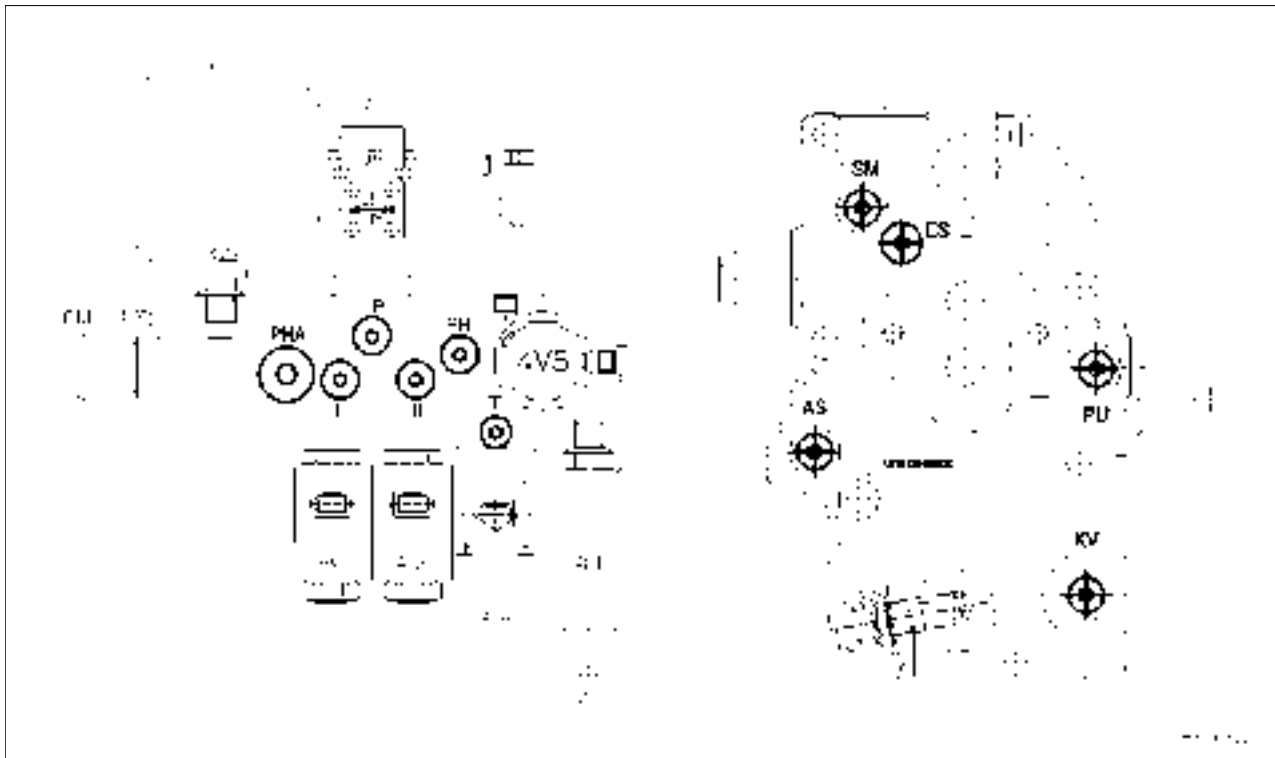
Fav 900

Transmission / Transmission Control Unit
Valve unit - feed/lubrication

C



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| 30.11.2001 | a | 3/3 | Valve unit - feed/lubrication | 1005 | C |
| | | | | | 000005 |

Fav 900
Transmission / Transmission Control
Measuring Points Transmission - and Comfort Controls
D

| Measuring point | Marking on the component | Component | Measuring point | Marking on the component | Component |
|-----------------|--------------------------|--|-----------------|--------------------------|---|
| M1 | KV | Radiator supply flow | M11 | ZWK | Operating Pressure PTO Clutch |
| M2 | SM | Lubrication Pressure | M13 | 750 | Switching Pressure PTO 750 |
| M3 | AS | Feed | M14 | VR | Operating Pressure 4WD Cluth |
| M4 | ES | Supply Pressure | M15 | DS | Control Pressure Differential Lock |
| M5 | PU | Operating Pressure Control Pump | M16 | 1000 | Swithing Pressure PTO 1000 |
| M6 | P | Operating Pressure Transmission | M17 | - | Operating Pressure Brake Control |
| M7 | I | Switching Pressure Operating Range 1 | M18 | - | Lubricating Pressure rear Axle |
| M8 | II | Switching Pressure Operating Range 2 | M21 | - | Operating pressure Front PTO Clutch |
| M9 | PH | High pressure | M22 | T | Leak flow Clutch valve /Turboclutch valve |
| M10 | PHA | Operating Pressure Rear axle, brakes and Front PTO | | | |

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| 04.12.2000 | a | 1/1 | Measuring Points Transmission - and Comfort Controls | 1005 | D | 000001 |

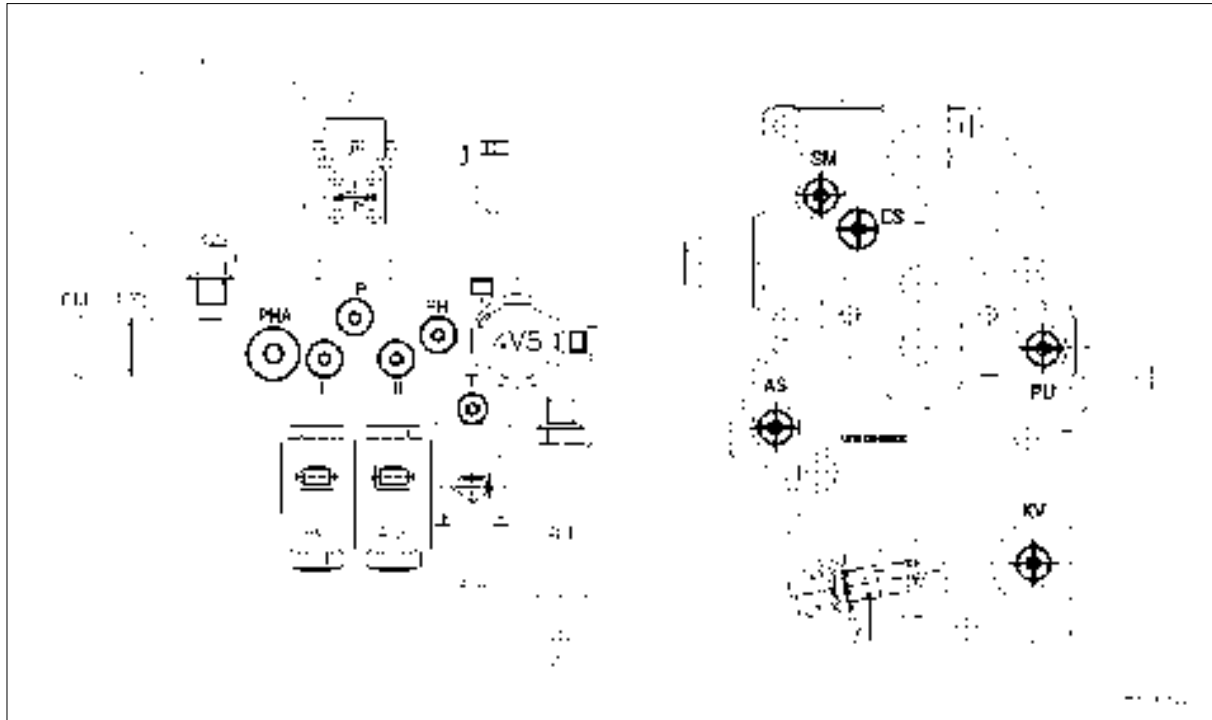
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| <i>Fav 900</i> | Transmission / Transmission Control Transmission Pressures Recordings | E |
|----------------|---|----------|



DANGER:

To avoid accident hazard, always jack up all 4 wheels of the tractor for hydraulic pressure measurements!

1. Checking supply pressures



NOTE:

Measurements are to be performed at transmission Oil temperature of 35 - 45°C

| Measuring Point | Engine speed | Requested value in Bar | Actual value in Bar |
|-----------------------------------|--------------|------------------------|---------------------|
| PU | 800 | 25 ± 2 | |
| M5 | 1200 | 26 ± 2 | |
| Pump Control circuit | 1600 | 27 ± 2 | |
| | 2000 | 28 ± 2 | |
| P | 800 | 25 ± 2 | |
| M6 | 1200 | 25,5 ± 2 | |
| Transmission System Pres- sure | 1600 | 26 ± 2 | |
| | 2000 | 27 ± 2 | |
| ES | 800 | 16 ± 2 | |
| M4 | 1200 | 19 ± 2 | |
| Supply pressure | 1600 | 20 ± 2 | |
| | 2000 | 23,0 ± 2 | |
| AS | 800 | 9 ± 2 | |
| M3 | 1200 | 11,5 ± 2 | |
| Feed pressure | 1600 | 13 ± 2 | |
| | 2000 | 15 ± 2 | |
| SM | 800 | 1,4 ± 0,2 | |
| M2 | 1200 | 2,2 ± 0,3 | |
| Lubrication pressure | 1600 | 3,6 ± 0,5 | |
| | 2000 | 5,0 ± 0,5 | |

| | | | | | | |
|------------|---------|------|-----------------------------------|---------|-------|----------|
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| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Transmission Control Transmission Pressures Recordings | E |
|----------------|--|----------|

II. High Pressure measurement


DANGER:

High Pressure measurement must not exceed 5 Seconds for Reverse and Forward, risk of Oil overheating!

Preliminaries: Operating range II, Acceleration ramp 4 or

Auxilliary operation (By turning the handle do not exceed an angle of 15° risk of Oil overheating!

| Meßstelle | Motordrehzahl | Sollwert in bar | Istwert in bar |
|-----------|---------------|---|----------------|
| PH | 1600 | Neu 500 + 20 Längere Zeit im Einsatz 500 - 40 | |

NOTE:

Hochdruckkreis PH maximal 5 Sekunden belasten und dabei nachfolgende Messungen durchführen.

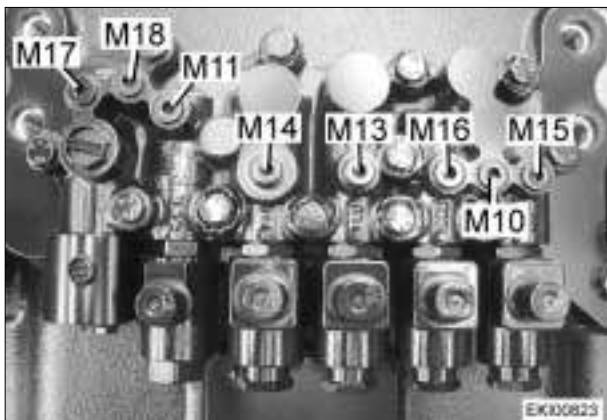
| Measuring Point | Engine speed | Requested value in bar | Actual value in bar |
|-----------------|--------------|------------------------|---------------------|
| P | 1600 | 26 ± 2 | |
| ES | 1600 | 13 ± 2 | |
| AS | 1600 | 12 ± 2 | |
| SM | 1600 | 1,6 ± 0,4 | |

III. Checking control pressures

| Measuring Point | Engine speed | Requested value in bar | Actual value in bar |
|---|--------------|------------------------|---------------------|
| I and II Operating range switching 1 + 2 | 1600 | 26 ± 2 | |

Supply alternately 12 V_{DC} to Solenoid valve 1 (4V1) and 2 (4V2)

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Fav 900
Transmission / Transmission Control
Transmission Pressures Recordings
E**Rear PTO , Differential lock and 4WD clutch**

Mounted on top of rear axle housing (Cabin must be lifted):

M10 = System Pressure rear axle, Brakes and Front PTO

M11 = PTO Clutch

M13 = Engaging Pressure PTO 750

M14 = 4WD Clutch

M15 = Differential lock

M16 = Engaging Pressure PTO 1000

M17 = Control Pressure Brakes

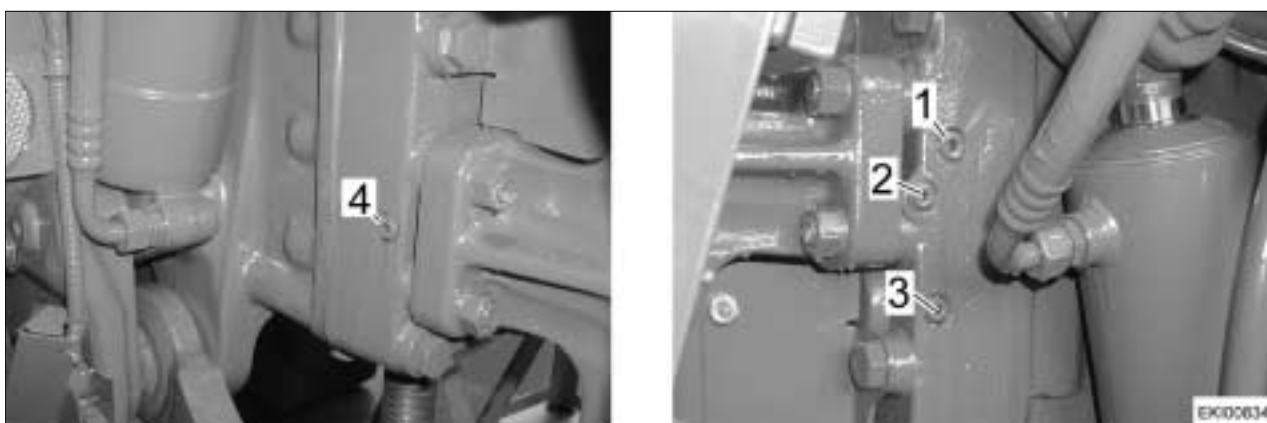
M18 = Lubrication pressure rear axle

NOTE:

Run engine at 1200 Rpm. Check pressure simultaneously at measuring points M10 and M18 (SM).

| Verbraucherschaltstellung | Measuring point | System Pressure M10 | System Pressure M10 | Lubrication Pressure M18 (SM) | Lubrication Pressure M18 (SM) |
|------------------------------------|-----------------|------------------------|---------------------|-------------------------------|-------------------------------|
| | | Requested value in bar | Actual value in bar | Requested value in bar | Actual value in bar |
| PTO - ON / OFF | M11 | 18 ± 2,0 | | 2 ± 0,3 | |
| Differential lock - ON / OFF | M15 | 18 ± 2,0 | | 2,0 ± 0,3 | |
| 4WD - ON / OFF | M14 | 18 ± 2,0 | | 2,1 ± 0,3 | |
| Apply single wheel brake | M17 | 18 ± 2,0 | | 1,6 ± 0,3 | |
| Apply both brakes (Linked Pedals) | M17 | 18 ± 2,0 | | 1,2 ± 0,3 | |

Measuring connections on the rear right side of the cover of the rear axle casing can also be used to check Rear PTO



1 = PTO Clutch (Measuring point M12 - 1,5)

2 = Lubrication Pressure rear axle (Measuring point M 10 - 1)

3 + 4 = PTO Engagement 750 rel. 540 (Measuring point M 10 - 1)

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| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Transmission Control Transmission Pressures Recordings | E |
|----------------|--|----------|

Checking Front PTO



NOTE:

Run engine at 1200 Rpm. Engage and disengage alternately Front PTO

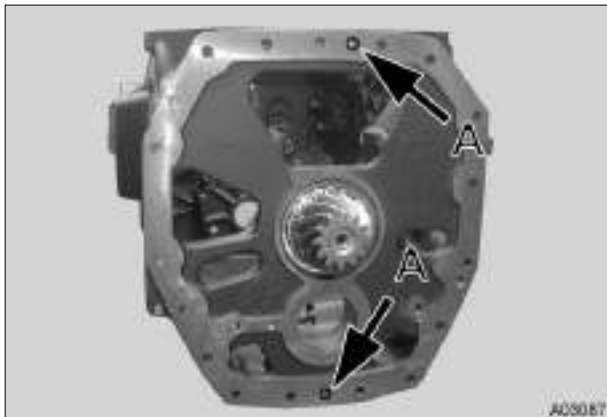


| Measuring Point | Requested value in bar | Actual Value in bar |
|-----------------|------------------------|---------------------|
| M 21 | 18 +2 | |

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| | | |
|---|--|--------------------|
|   | <h1>Repair instructions</h1> | |
| Fav 900 | Transmission / Differential Reference dimension for bevel drive correction | Repair G |

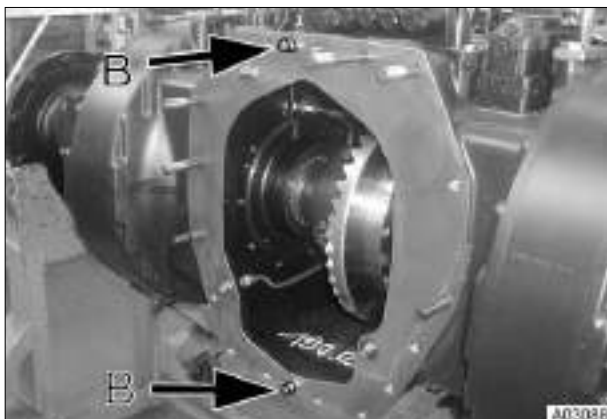
The following points must be borne in mind when replacing the ring gear or a ring gear plus pinion shaft:



If eccentric bushes are inserted in the pin bores (A), these must be removed.

Removing the eccentric bushes

- Tap M14 thread in bore and withdraw bush using M14 screw.



- If stepped bolts are inserted in the housing (see B), these must be removed and the bolts supplied must be fitted.

Note:

If only the pinion shaft is replaced, the bushes and stepped bolts remain in place.

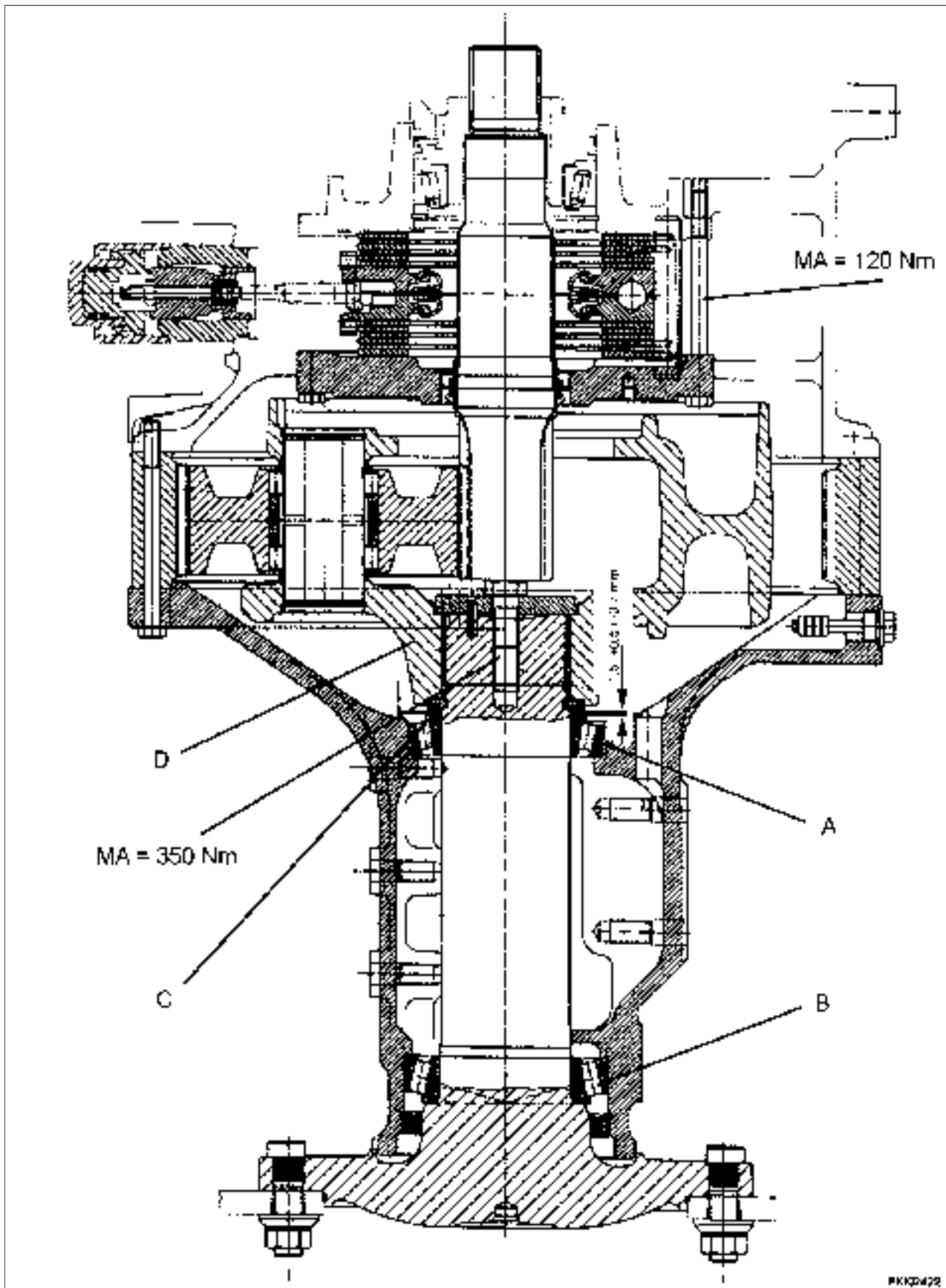
Please refer to the workshop manual for details of testing and adjusting the backlash and gear-tooth contact pattern.

| | | |
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| Fav 900 | Transmission / Axle drives Axle drives (flange) | C |
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Fav 900

Transmission / Axle drives
Axle drives (flange)

C

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Axle drives (flange)

<https://www.truck-manuals.net/>

| | | |
|----------------|---|----------|
| Fav 900 | Transmission / Axle drives Axle drives (flange) | C |
|----------------|---|----------|

Bearing settings (A, B)

Pretension the taper roller bearings (A, B) using the adjusting washers (C) such that the **rotational resistance (without shaft seal) is 4-6 Nm.**

Axial play in planet carrier (D)

Setpoint : 0.2- 0.5 mm (note: axial play must be present!)

Note:

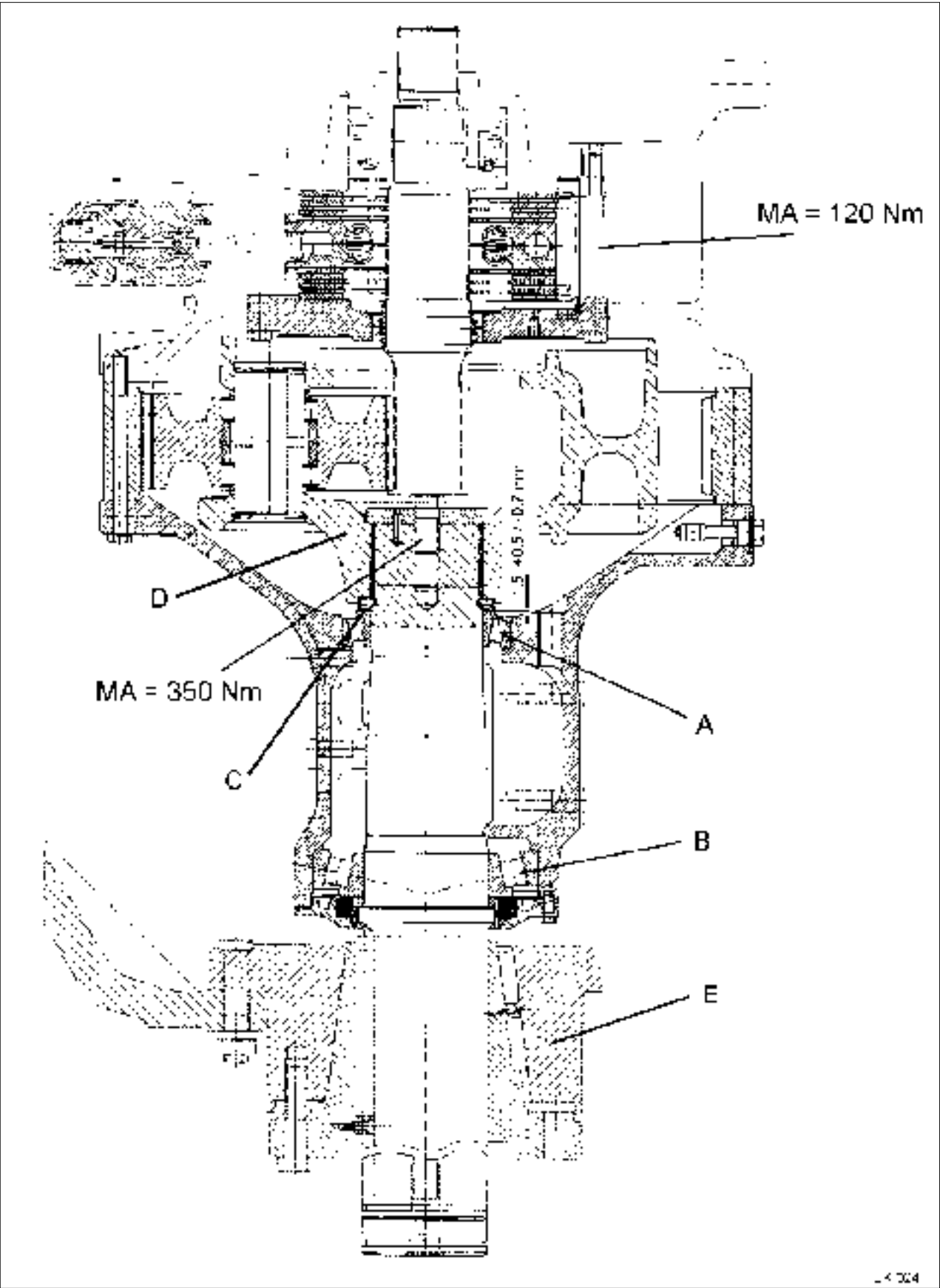
Chapter 1015 Reg. G - Disassembly and reassembly of axle drives

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| Fav 900 | Transmission / Axle drives Axle drives (stub axle) | C |
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| Fav 900 | Transmission / Axle drives Axle drives (stub axle) | C |
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| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Axle drives Axle drives (stub axle) | C |
|----------------|--|----------|

Bearing settings (A, B)

Pretension the taper roller bearings (A, B) using the adjusting washers (C) such that the **rotational resistance (without shaft seal) is 4-6 Nm.**

Axial play in planet carrier (D)

Setpoint : 0.2- 0.5 mm (note: axial play must be present!)

Note:

Chapter 1015 Reg. G - Disassembly and reassembly of axle drives

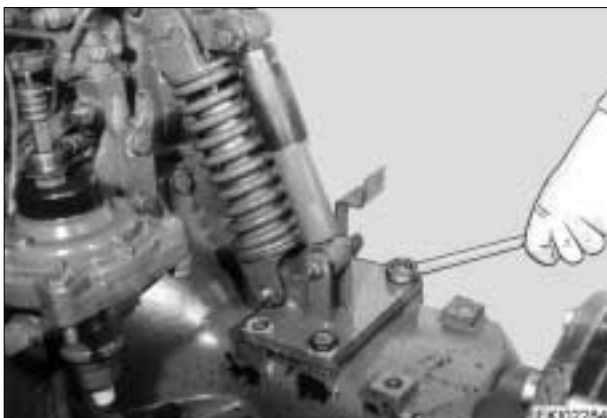
Note:

Attachment cone (E)

To change track see:

Operating Manual - 22. Track distribution

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**Axle drives (rear axle)****Removal**

Remove relevant rear wheel.

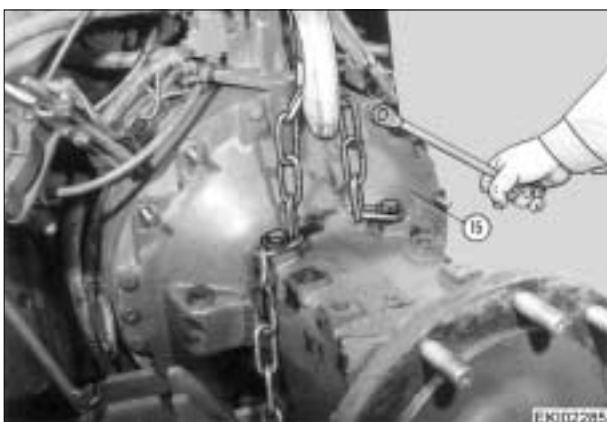
Drain oil from axle drive.

Remove any obstructing panels.

Remove lateral stabilisation rod from three-point linkage or complete lateral stabilisation unit.

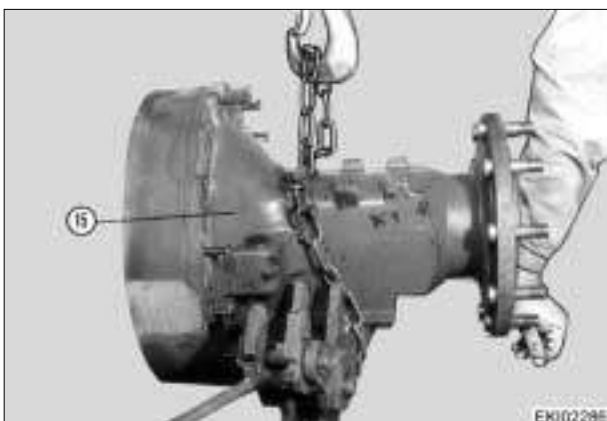
Prop cab, taking appropriate safety precautions

Remove axle housing/cab support.



Remove any other obstructing components.

Prop rear-axle housing, taking appropriate safety precautions. Attach axle housing (15) to hoist (e.g. small jib crane), taking appropriate safety precautions and raise.

**Fitting**

Clean flange surface and coat with surface sealant X 903.050.074.

Attach axle housing (15) in hoist, taking appropriate safety precautions, and flange-mount on rear-axle housing.

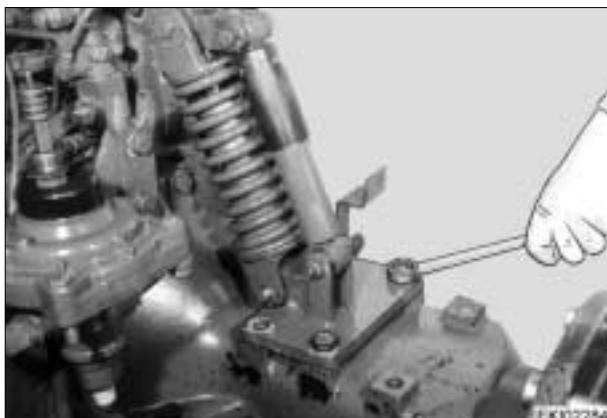


Tighten hexagon nuts (21) and bolts (18) crosswise in stages to **120 Nm** .

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Fav 900

Transmission / Axle drives
Installation and remove of axle drives

G

Fit axle housing/cab support and other components.

Fill axle drive with oil.

Observe instructions for oil types and quantities.
 Approx. 13 l per side.

Fit rear wheel, tighten wheel nuts to **620 Nm** .

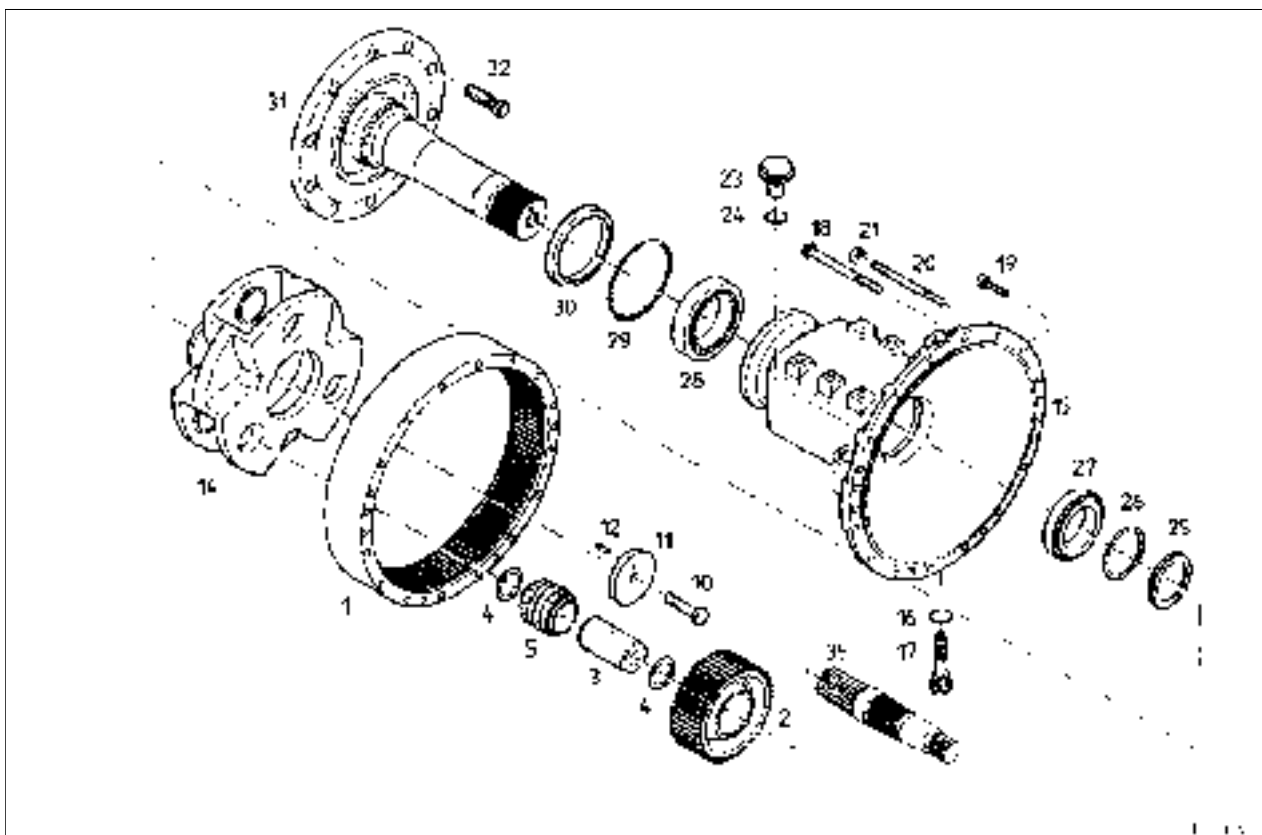
Remove prop.

Note:

See also Chapter 0000 Reg. A - Fuels and lubricants

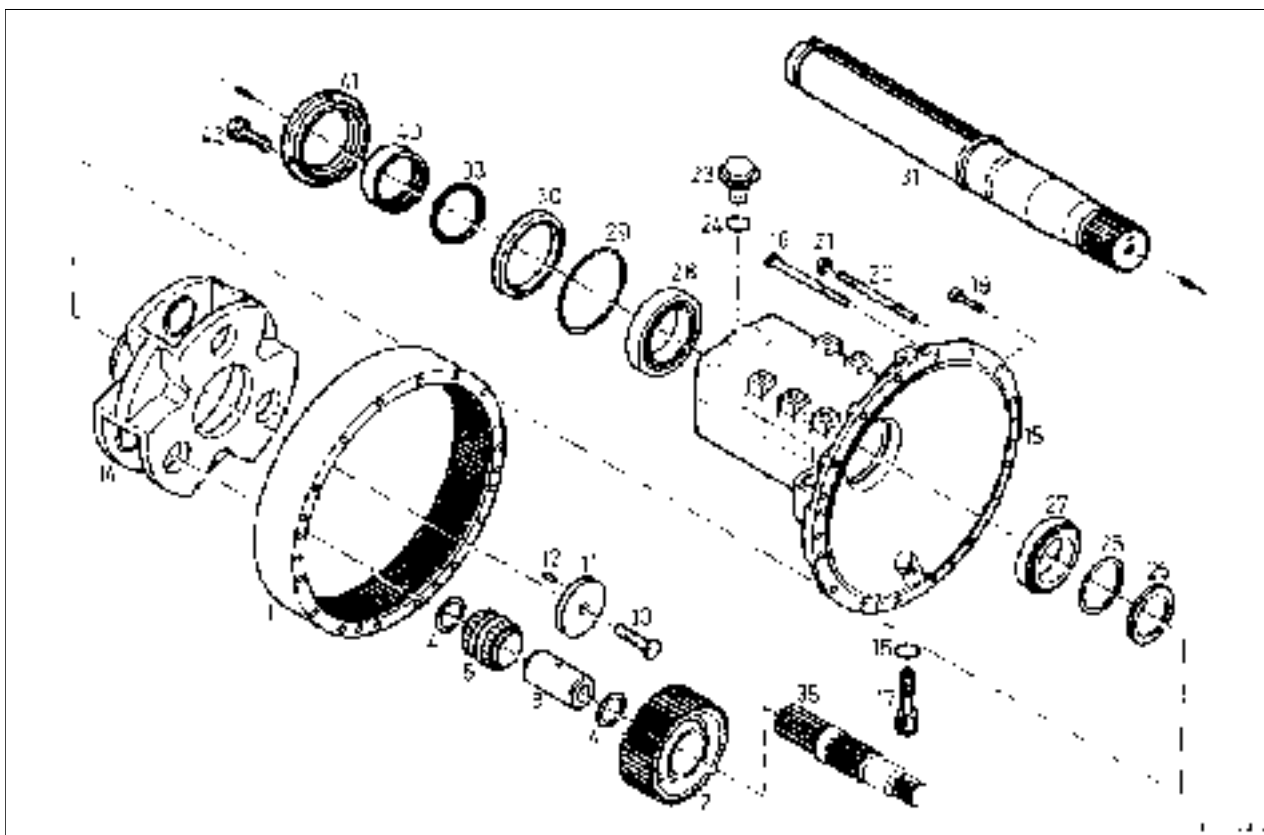
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Axle drives (flange)



| Item | Designation | Item | Designation |
|------|----------------------------|------|------------------------|
| 1 | Annulus | 20 | M12x165-10.9 stud bolt |
| 2 | Spur gear | 21 | M12-10 hexagon nut |
| 3 | Axle | 23 | M30x1.5 drain plug |
| 4 | Circlip | 24 | Sealing ring |
| 5 | Cylinder roller ring | 25 | Ring |
| 10 | Hexagon screw | 26 | Adjusting washer |
| 11 | Plate | 27 | Taper roller bearing |
| 12 | Dowel pin | 28 | Taper roller bearing |
| 14 | Planet carrier | 29 | Snap ring |
| 15 | Axle housing | 30 | Shaft seal |
| 16 | Sealing ring | 31 | Rear-axle shaft |
| 17 | Magnetic plug | 32 | Wheel bolt |
| 18 | M12x160-10.9 hexagon screw | 35 | Shaft |
| 19 | Socket head cap screw | | |

Axle drives (stub shaft)



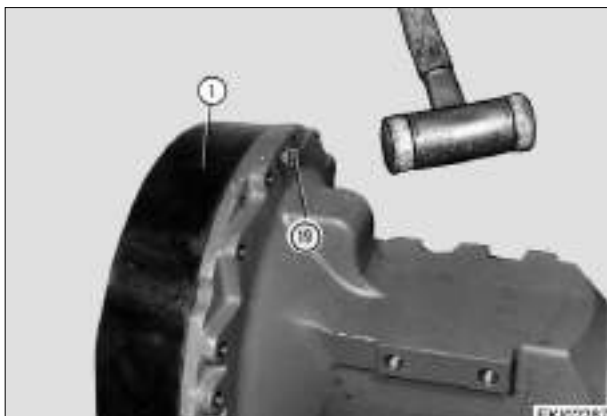
| Item | Designation | Item | Designation |
|------|----------------------------|------|----------------------|
| 1 | Annulus | 21 | M12-10 hexagon screw |
| 2 | Spur gear | 23 | M30x1.5 drain plug |
| 3 | Axle | 24 | Sealing ring |
| 4 | Circlip | 25 | Ring |
| 5 | Cylinder roller ring | 26 | Adjusting washer |
| 10 | Hexagon screw | 27 | Taper roller bearing |
| 11 | Plate | 28 | Taper roller bearing |
| 12 | Dowel pin | 29 | O-ring |
| 14 | Planet carrier | 30 | Shaft seal |
| 15 | Axle housing | 31 | Rear-axle shaft |
| 16 | Sealing ring | 33 | O-ring |
| 17 | Magnetic plug | 35 | Shaft |
| 18 | M12x160-10.9 hexagon screw | 40 | Spacer |
| 19 | Socket head cap screw | 41 | Cover |
| 20 | M12x165-10.9 stud bolt | 42 | Hexagon screw |

Fav 900

Transmission / Axle drives

Disassembly and reassembly of axle drives

G

**Note:**

The work shown was carried out on the axle drive (flange).

Repair and adjust the axle drive (stub shaft) in the same manner.

Preliminary work: remove relevant axle drive.

Chapter 1015 Reg. G - Installation and removal of axle drives

Disassembly

If necessary, remove annulus (1).

Note:

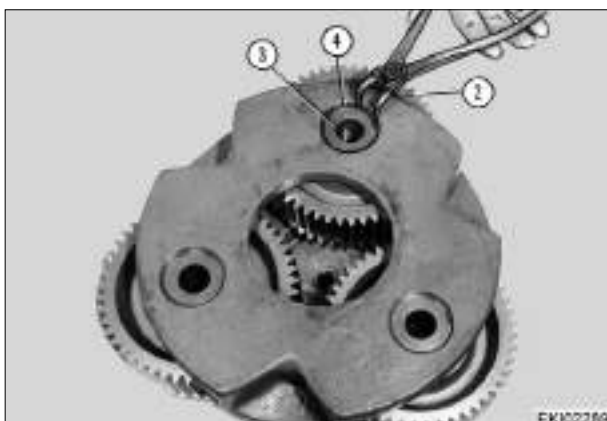
Unscrew socket head cap screws (19) by approx. 10 mm and force annulus (1) off by striking gently.



Unscrew hexagon screw (10) and remove planet carrier.

Note:

Hexagon screw (10) is secured with synthetic bonding agent!



If necessary:

Unclip circlip (4).

Disconnect axle (3).

Remove spur gear (2).

Fit spur gears (2) (planet wheels).



Locate one or two adjusting washers, order no. X 534.739.501 (each 1.0 mm thick) on rear-axle shaft (31). Then refit planet carrier.

Note:

If no adjusting washer is available, rear-axle shaft bearing can also be pretensioned using clamping bush (DIY).



Pretension rear-axle shaft bearing using hexagon screw (10).

Remove planet carrier (14) again.

Do not turn rear-axle shaft (31)!



Press split ring (25) out of groove in rear-axle shaft (31).

Remove adjusting washers.

Withdraw dowel pin (12).



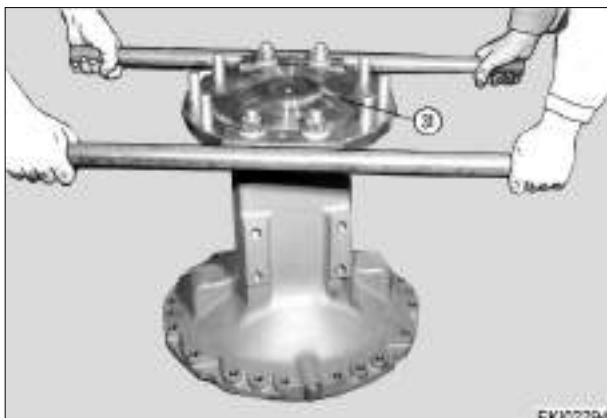
Fit protective cap X 899.980.157 on rear-axle shaft.

Fav 900

Transmission / Axle drives

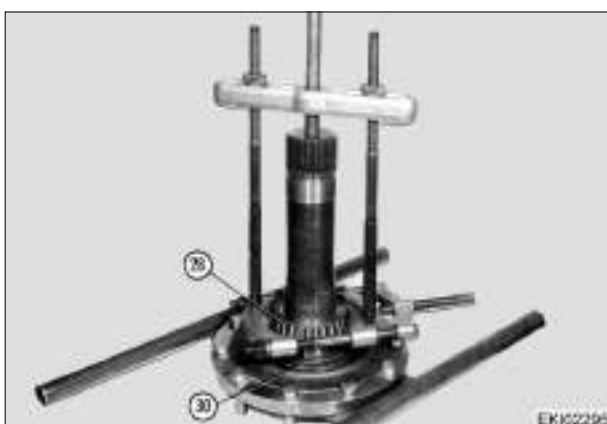
Disassembly and reassembly of axle drives

G



Attach mounting handles (DIY, see photo) to rear-axle shaft (31).

Knock rear-axle shaft (31) onto metal block.



Withdraw inner race of taper roller bearing (28) using bearing separator X 899.980.159.

Then force shaft seal (30) off.



Assembly

Where removed:

Press outer race of taper roller bearing (28) in as far as stop.

Clip snap ring (29) into groove.

On other side press in outer race of taper roller bearing as far as stop.



Heat inner race of taper roller bearing (28) to approx. 80°C and insert into axle housing (15).

Coat new shaft seal (30) on outside with sealant X 903.051.711 and on inside with alcohol/water mixture (1:1) and then insert until stop is reached.

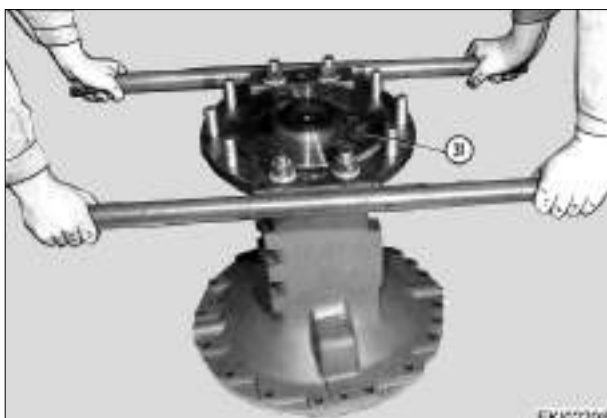
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Fav 900

Transmission / Axle drives

Disassembly and reassembly of axle drives

G



Before bearing inner race cools down, insert rear-axle shaft (31) using fitted mounting handles (DIY, see photo) as far as stop.



Turn axle housing (15) round.

Heat inner race of taper roller bearing (27) to approx. 80°C and press on as far as stop.

Lubricate rear-axle shaft bearing with transmission oil.



Prop axle housing (15). Rear-axle shaft bearing must have small amount of play.

Fit torque gauge X 899.980.150 and measure and record rotational resistance of shaft seal, e.g. 5.0 Nm.



Select thickness of adjusting washers (26) such that split ring (25) can be inserted play-free.

Note:

If possible, fit adjusting washers (26) such that 1.0 mm thick adjusting washer (26) faces split ring (25).

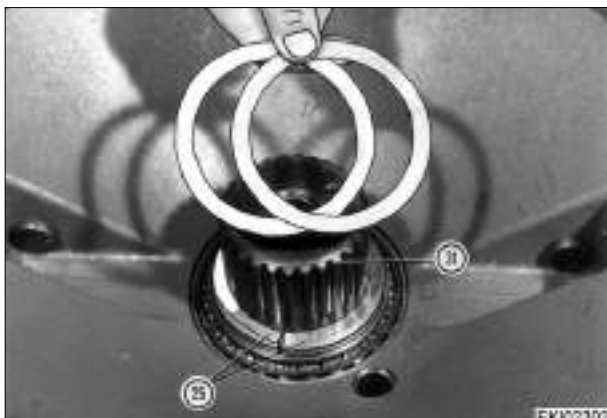
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Transmission / Axle drives

Disassembly and reassembly of axle drives

G



Locate two adjusting washers, order no. X 534.739.501 (each 1.0 mm thick), on rear-axle shaft (31). Then fit planet carrier and tighten. Rotational resistance of rear-axle shaft bearing must rise.

Note:

If rotational resistance does not rise, remove planet carrier again and fit further adjusting washers (26) under split ring (25) - see photo EKI02301, then pretension rear-axle shaft bearing again.



Strike bearing in both directions to relieve stress on it.

Remove planet carrier again.

Select thickness of adjusting washers (26) such that split ring (25) can be inserted with gentle hammer blows.

Fit dowel pin (12) into rear-axle shaft (31).



Coat thread of hexagon screw (10) with synthetic bonding agent X 903.050.084 and tighten to 350 Nm.

Strike bearing in both directions to relieve stress on it.



Measure rotational resistance of shaft seal plus bearing using torque gauge X 899.980.150 and record result.

Target value: 4.0-6.0 Nm (bearing) plus rotational resistance (shaft seal in photo EKI02300 e.g. 5.0 Nm).

In event of discrepancies correct by means of adjusting washers (26) - see photos EKI02301 and EKI02303.

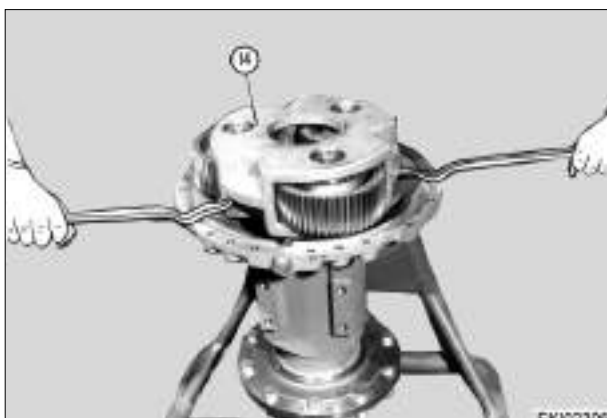
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Transmission / Axle drives

Disassembly and reassembly of axle drives

G



Check axial play of planet carrier (14) using two tyre levers.

Target value: 0.2-0.5 mm axial play

Note:

Important - axial play must be present.



Where removed - see photo EKI02289 -

Fit planet wheels:

Clip snap ring into groove in bush and press bush (arrowed) into spur gear (2) (planet wheel) until snap ring engages.

Note:

Bush (arrowed) cannot be removed.



Use grease to hold 19 rollers of roller set (5) in spur gear (2).

Then use grease to hold ring of roller set (5) in spur gear (2).

Preassemble other side of spur gear (2) in same manner.



Clip circlip (4) into groove in planet carrier (14).

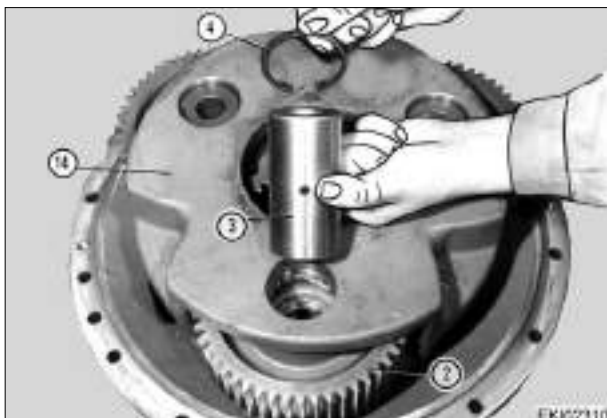
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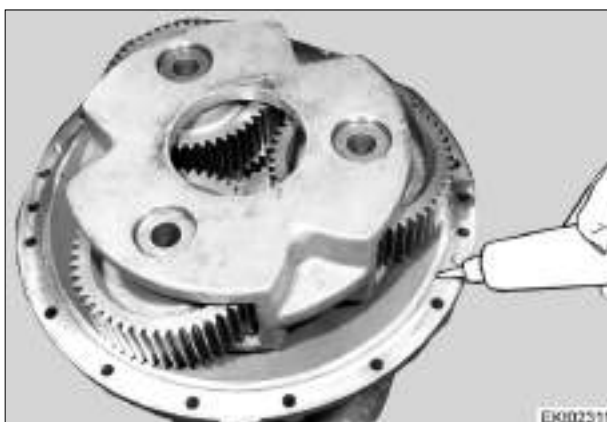
Transmission / Axle drives

Disassembly and reassembly of axle drives

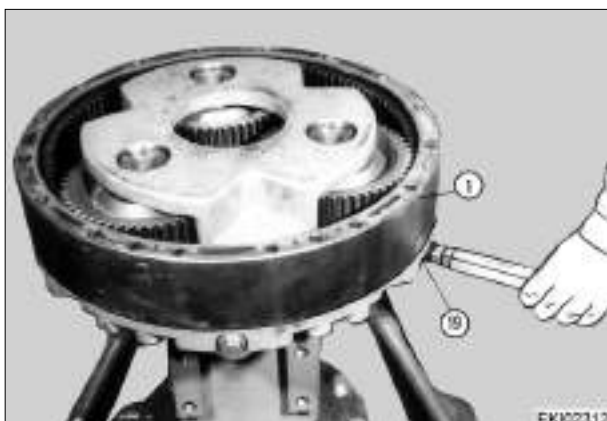
G



Insert pre-assembled spur gear (2).
Insert axle (3) and clip circlip (4) into groove in planet carrier (14).



Clean flange surface and then coat with surface sealant X 903.050.074.



Fit annulus (1).
Tighten socket head cap screws (19) to 86 Nm.
Fitting axle drive
Chapter 1015 Reg. G - Installation and removal of axle drives

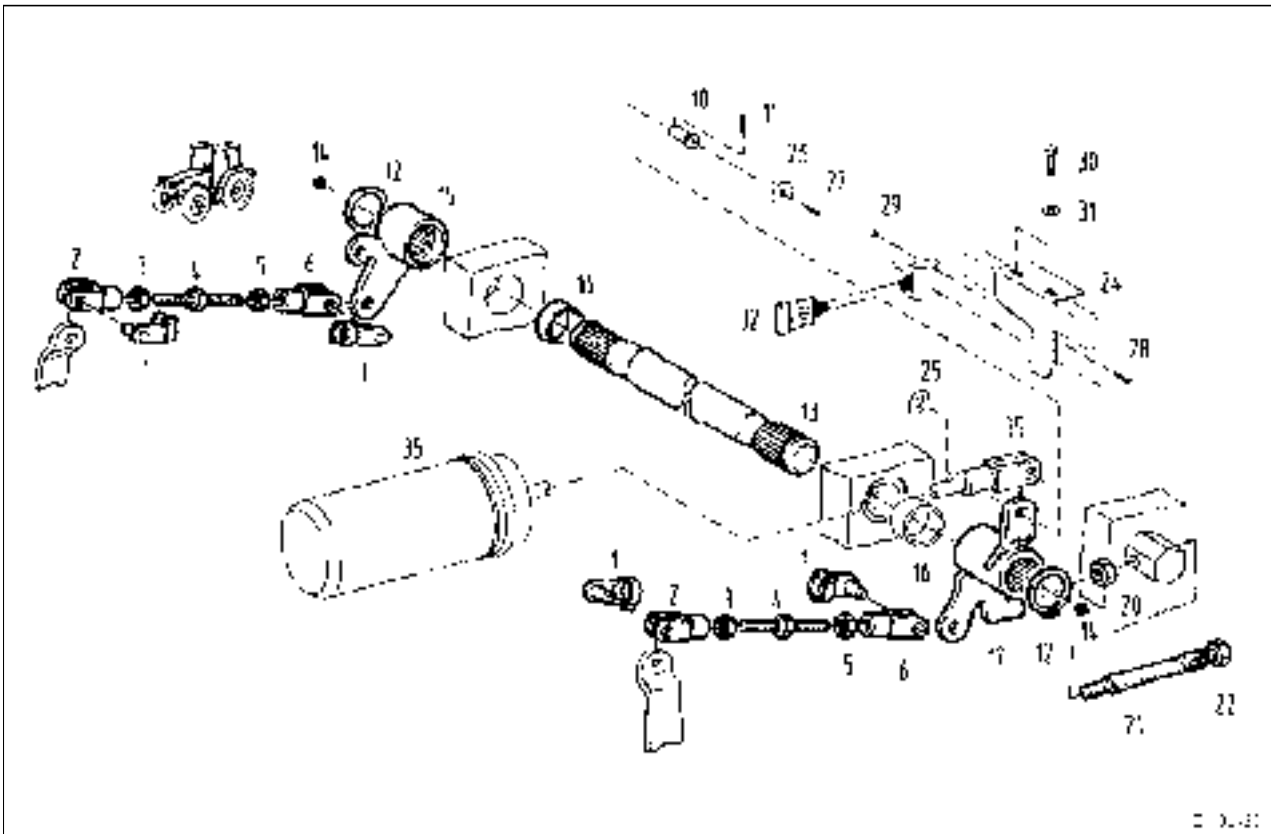
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Fav 900

Transmission / Handbrake

Adjusting handbrake

F



| Item | Designation | Item | Designation |
|------|-----------------|------|----------------------------------|
| 1 | Pin | 20 | Hexagon nut |
| 2 | Fork connection | 21 | Hose |
| 3 | Hexagon nut | 22 | Hexagon screw |
| 4 | Threaded rod | 24 | Bracket |
| 5 | Hexagon nut | 25 | Washer |
| 6 | Fork connection | 26 | Solenoid |
| 10 | Pin | 27 | Socket head cap screw |
| 11 | Split pin | 28 | Socket head cap screw |
| 12 | Circlip | 29 | Hexagon nut |
| 13 | Shaft | 30 | Self-tapping screw |
| 14 | Lubricator | 31 | Washer |
| 15 | Lever | 32 | S015 - switch, handbrake |
| 16 | Bush | 35 | Accumulator (diaphragm cylinder) |
| 17 | Lever | | |

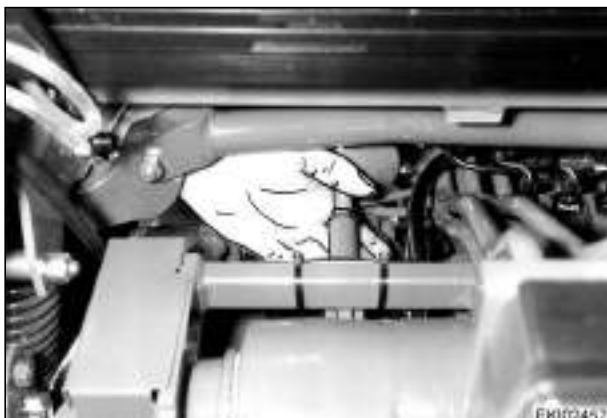
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Fav 900

Transmission / Handbrake

Adjusting handbrake

F



Adjusting handbrake

Note:

The work was carried out on a Fav 900/21/....
Carry out work on a Fav 900 chassis number
23/3001 and up in same manner.

Handbrake released.

Detach actuating linkage of handbrake
accumulator on left.

Detach actuating linkage from right brake cylinder.



Turn threaded rod (4) (turnbuckle) such that gap
of **4.0 to 5.0 mm** is created between lever (17)
and left lift arm.

Fasten threaded rod (4) in this position with lock
nut.



Hold actuating linkage of right brake cylinder to
rear such that it is pressed gently against stop.

Turn threaded rod (4) (turnbuckle) such that pin
can be inserted play-free.

Fasten threaded rod (4) in this position with lock
nut.



Hold actuating linkage of left brake cylinder to
rear such that it is pressed gently against stop.

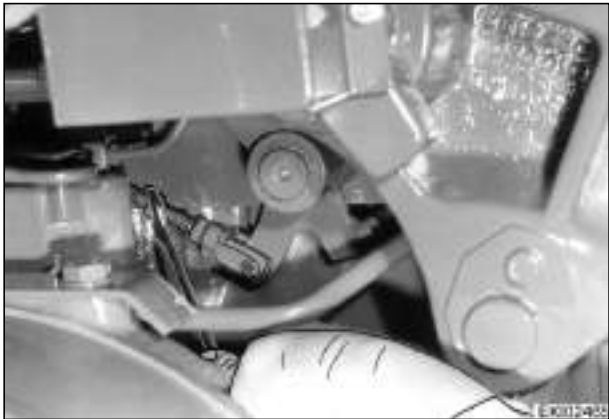
Turn fork connection on actuating rod
(accumulator) such that pin can be disconnected
play-free.

Fasten fork connection with lock nut.

Secure pin with washer and split pin.

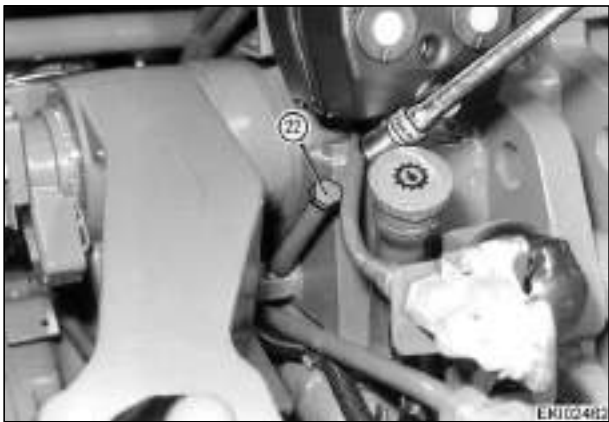
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| | | |
|---------|---|---|
| Fav 900 | Transmission / Handbrake Adjusting handbrake | F |
|---------|---|---|



Carry out test drive and operate handbrake.

Note:
If rear-wheel braking effect is greater on one side: lengthen actuating linkage on side where greater braking effect occurs.



Mechanically releasing (unlocking) handbrake

If air compressor is unpressurised, handbrake can be mechanically released.

Tighten screw (22) at left rear on rear power lift as far as stop, then tighten a further **3 to 5 turns** .

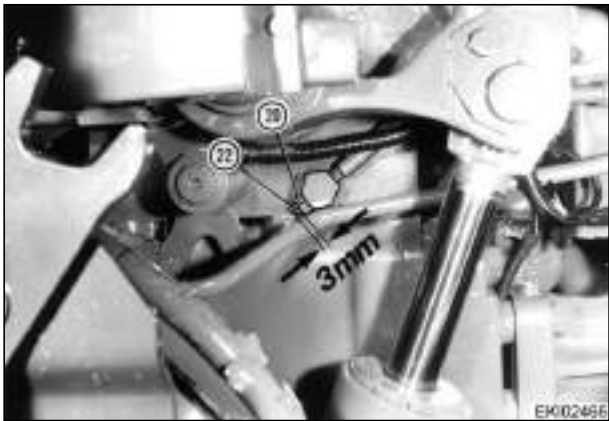
Accumulator effect is cancelled out, handbrake is free.



Following must be borne in mind if screw (22) is replaced:

Slide hose (21) onto screw (22).

Grease thread of screw (22) and screw into welded hexagon.



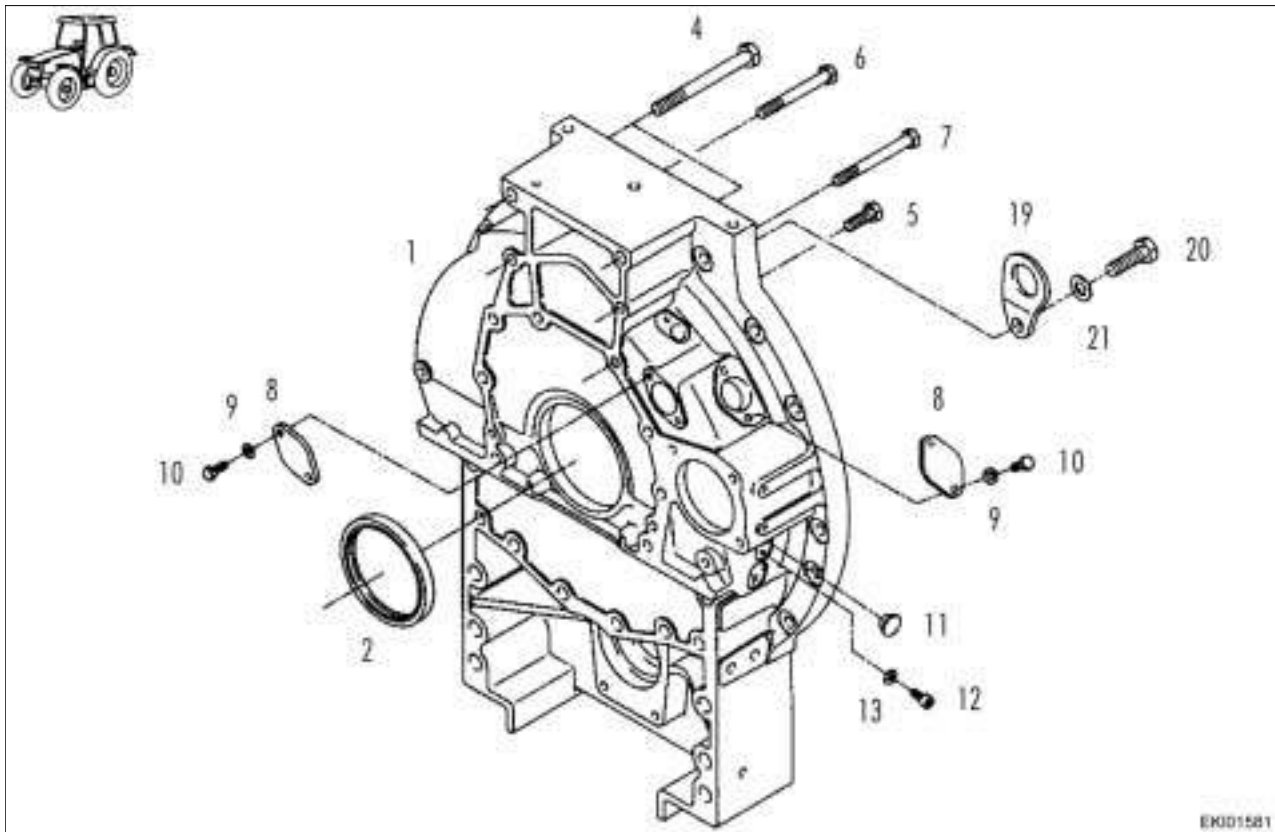
On opposite side, screw hexagon nut (20) on with crowned face pointing downwards until screw (22) protrudes **3.0 mm** .

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Fav 900

Transmission / Housing

Disconnecting tractor, flywheel and clutch housing

G

| Item | Designation | Item | Designation |
|------|----------------------------|------|--------------------------|
| 1 | Flywheel housing | 10 | M8x25-8.8 hexagon screw |
| 2 | Shaft seal | 11 | Sealing plug |
| 4 | M14x14-10.9 hexagon screw | 12 | Socket head cap screw |
| 5 | M12x35-10.9 hexagon screw | 13 | Sealing ring |
| 6 | M12x100-10.9 hexagon screw | 19 | Eye |
| 7 | M12x110-10.9 hexagon screw | 20 | M14x25-8.8 hexagon screw |
| 8 | Blind flange | 21 | Washer |
| 9 | Washer | | |



Remove panel at front. Remove right engine cover.

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Fav 900

Transmission / Housing

Disconnecting tractor, flywheel and clutch housing

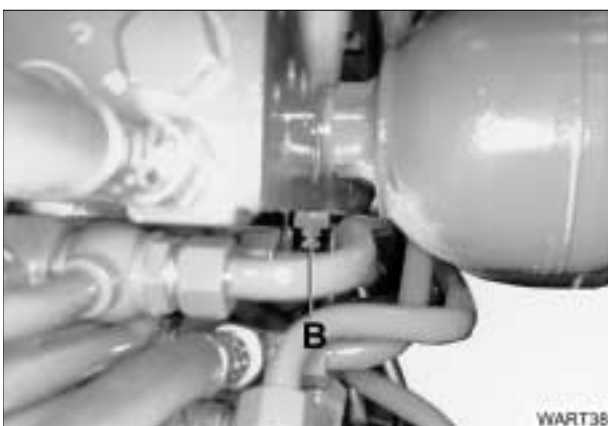
G

Open front-axle suspension stopcocks on central control block (ZSB).

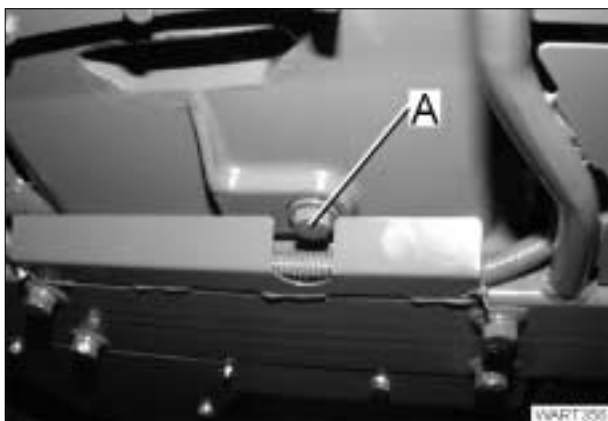


Warning:
Front axle lowers against block.

Open stopcock A.



Open stopcock B.



Disconnecting tractor

Preliminary work:

- Prop tractor, taking appropriate safety precautions, and remove both rear wheels.
- Remove left and right front mudguards.
- Remove panels.
- Drain hydraulic oil (approx. 70 l).



Raise cab at front.

Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G

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Disconnecting tractor, flywheel and clutch housing

<https://www.truck-manuals.net/>

Fav 900

Transmission / Housing
Disconnecting tractor, flywheel and clutch housing

G

Remove fuel tank and auxiliary tank.

Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G

**Left side**

Remove engine cover and disconnect air-conditioning cooling hoses.

Note:

Disconnect coolant hoses only at these screw couplings. Internal valves prevent the coolant from escaping.



Remove both batteries.



Remove clips for cable loom.

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Disconnecting tractor, flywheel and clutch housing

<https://www.truck-manuals.net/>

Fav 900**Transmission / Housing**
Disconnecting tractor, flywheel and clutch housing**G**

Disconnect cable B+ (to generator on right) at connector.

Release cable tie and pull cable B+ to right side of tractor.



Disconnect compressed-air line from spill valve.
Release cable tie and pull compressed-air line forwards.



Release cable tie at battery - terminal cable (arrowed).

Remove retaining strap for tank frame.



Disconnect tank venting tube at T-junction.

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Fav 900**Transmission / Housing**
Disconnecting tractor, flywheel and clutch housing**G**

Disconnect hydraulic line and remove retaining strap.

**Right side**

Remove exhaust bend.

Release clip (arrowed) for tank venting tube.



Remove return flow to hydraulic tank.



Remove hydraulic lines (to transmission oil cooler) from valve unit.

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Fav 900**Transmission / Housing**
Disconnecting tractor, flywheel and clutch housing**G**

Disconnect hydraulic lines (to transmission oil cooler) at connector.
Remove lines



Remove hydraulic line (to hydraulic oil cooler).
Remove hydraulic line (to steering pump).



Disconnect hydraulic lines to steering cylinder.



Disconnect hydraulic lines to front PTO.

Fav 900**Transmission / Housing**
Disconnecting tractor, flywheel and clutch housing**G**

Disconnect hydraulic lines to front-axle suspension and release clip.



Warning:
Open front-axle suspension stopcocks on central control block (ZSB) (pressure relief)!



Disconnect hydraulic lines to front power lift.



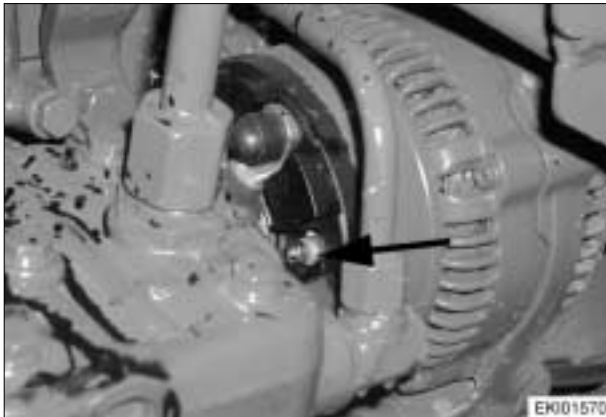
Remove bracket (arrowed) for accumulator.



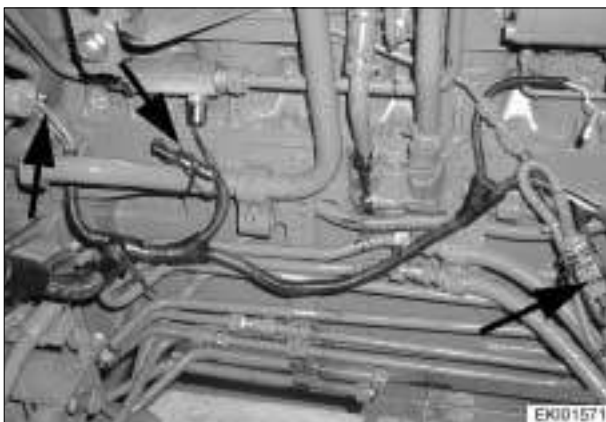
Disconnect compressed-air line at antifreeze pump.

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| | | |
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| Fav 900 | Transmission / Housing | G |
| Disconnecting tractor, flywheel and clutch housing | | |



Disconnect D+ cable (arrowed) from generator.



Disconnect cable from B047 sensor
(front axle: 4WD, diff. lock),
disconnect cable from S026 sensor
(flow monitor).

Disconnect X520 earth.



Remove cover panel under oil pan.

Detach cardan shaft for front-wheel drive
(because of separation of 4WD).



Prop oil pan with movable and adjustable trestle,
taking appropriate safety precautions.

Prop clutch housing with adjustable trestle, taking
appropriate safety precautions.

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Fav 900**Transmission / Housing**
Disconnecting tractor, flywheel and clutch housing**G**

Place wedge between engine and front axle, taking appropriate safety precautions.



Remove three screws each (on left and right sides of tractor) connecting flywheel housing to oil pan.



Remove screws for flanged joint between flywheel and clutch housings.



Separate flywheel housing from clutch housing and move it away.

Ensure clearance of all components.

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Fav 900
Transmission / Housing
Disconnecting tractor, flywheel and clutch housing
G**Connecting tractor**

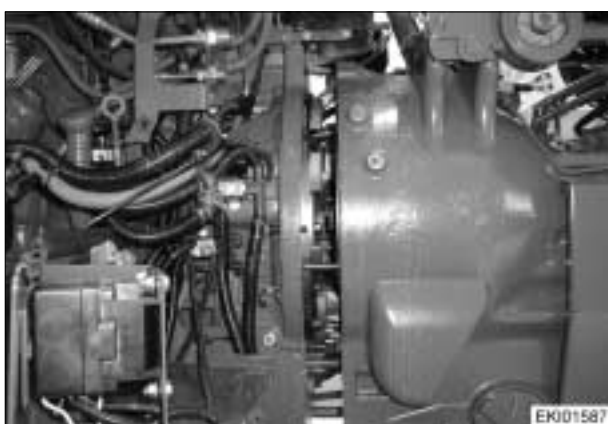
Check venting duct (arrowed) for soiling.

Clean flange surfaces.

Screw in two M12 stud bolts (fitting aid).

Locate new O-ring (A) on transmission drive shaft and grease.

Coat drive shafts (transmission drive shaft, cardan shaft) with long-life grease X 902.002.472.



Mate flywheel and clutch housings.

If necessary, turn engine over with engine cranking device X 899.980.220.

Tighten screws for flywheel and clutch housing flanged joint to **120 Nm**.



Tighten three screws each (on left and right sides of tractor) connecting flywheel housing to oil pan to **405 Nm**.



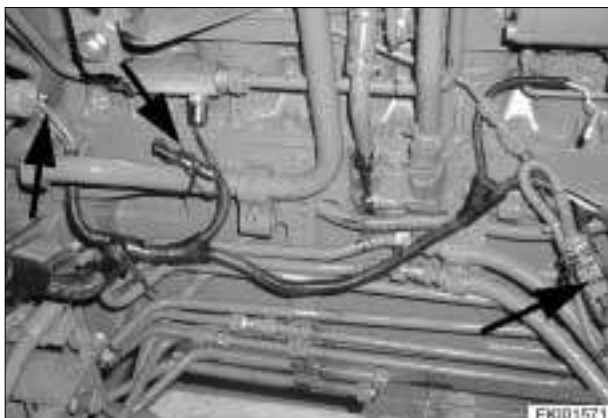
Fit front-wheel drive cardan shaft.

Tighten M12-10.9 socket head cap screws to **150 Nm**.

Fit cover panel under oil pan.

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Disconnecting tractor, flywheel and clutch housing
<https://www.truck-manuals.net/>

Fav 900
Transmission / Housing
Disconnecting tractor, flywheel and clutch housing
G**Right side**

Fit cable to B047 sensor
(front axle: 4WD, diff. lock).
Fit cable to sensor (flow monitor).
Fit X520 earth.



Fit D+ cable (arrowed) to generator.



Fit compressed-air line to antifreeze pump.



Fit bracket (arrowed) for accumulator.

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Disconnecting tractor, flywheel and clutch housing
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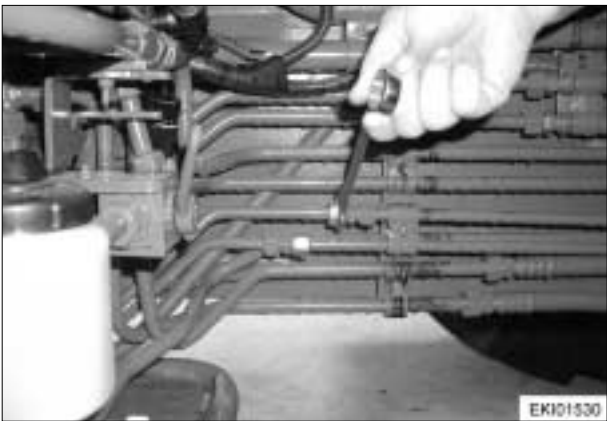
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| Fav 900 | Transmission / Housing Disconnecting tractor, flywheel and clutch housing | G |
|----------------|--|----------|



Fit hydraulic lines to front power lift.



Fit hydraulic lines to front-axle suspension and fit clip.



Fit hydraulic lines to front PTO.



Fit hydraulic lines to steering cylinder.

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Fav 900

Transmission / Housing
Disconnecting tractor, flywheel and clutch housing

G

Fit hydraulic line (to hydraulic oil cooler).
 Fit hydraulic line (to steering pump).



Fit hydraulic lines (transmission oil cooler) to
 connector.



Fit hydraulic lines (transmission oil cooler) to
 valve unit.



Fit exhaust bend.
 Fit clip (arrowed) for tank venting tube.

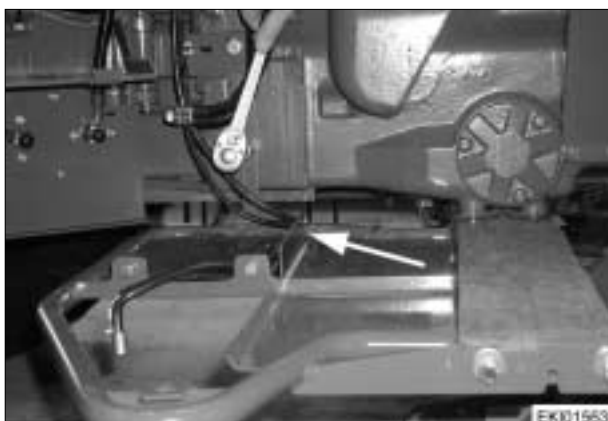
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Fav 900**Transmission / Housing**
Disconnecting tractor, flywheel and clutch housing**G****Left side**

Fit hydraulic line and retaining strap.



Fit tank venting tube at T-junction.



Fit retaining strap for tank frame.

Fasten battery - terminal cable (arrowed) with cable tie.



Fit compressed-air line to spill valve.

Fasten compressed-air line with cable ties.

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Fav 900**Transmission / Housing**
Disconnecting tractor, flywheel and clutch housing**G**

Fit cable B+ (to generator on right) to connector.
Fasten cable B+ with cable ties.



Fit clips for cable loom.



Fit both batteries.



Fit coolant hoses to connector.

Fav 900

Transmission / Housing

Disconnecting tractor, flywheel and clutch housing

G

Fit fuel tank and auxiliary tank.

Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G



Lower cab.

Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G



Fill with oil preferably via return flow connection with pump. (Oil is filtered in return flow.)

If this is not possible, unscrew venting filter (A) and add oil.

Observe instructions for oil type and quantity.

Initial fill approx. 70 l

Note:

See also :

Chapter 0000 Reg. A - Fuels and lubricants



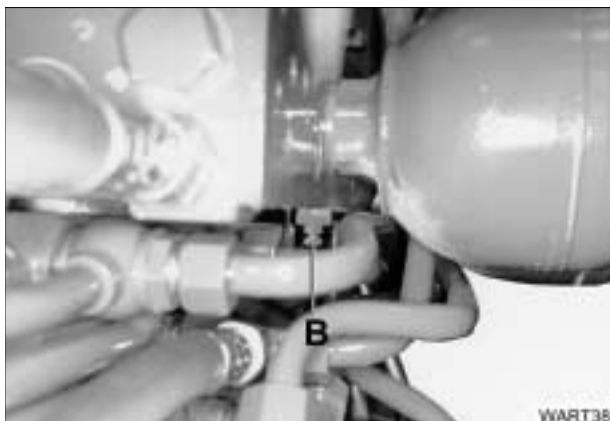
Close stopcock of front-axle suspension (A).

| Date | Version | Page | Capitel | Index | Docu-No. |
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| 06.06.2001 | a | 16/17 | 1050 | G | 000003 |

Disconnecting tractor, flywheel and clutch housing

<https://www.truck-manuals.net/>

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, flywheel and clutch housing | G |
|----------------|--|----------|

**Concluding work:**

Close stopcock of front-axle suspension (B).

Fit other panels.

Fit wheels.

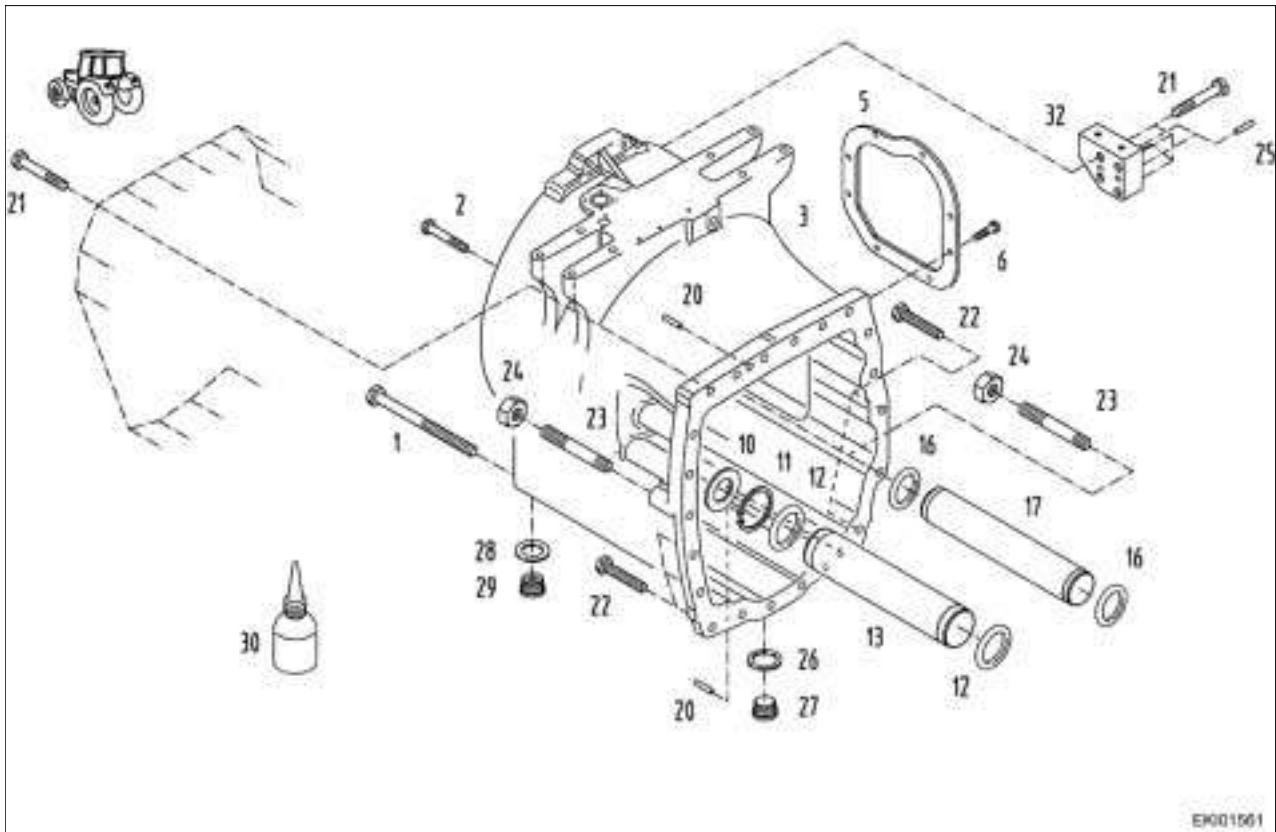
Close front-axle suspension stopcocks.

Check tractor for operation and leaks.

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| 06.06.2001 | a | 17/17 | 1050 | G | 000003 |

Fav 900

Transmission / Housing
Disconnecting tractor, clutch and transmission housing

G

| Item | Designation | Item | Designation |
|------|----------------|------|---------------|
| 1 | Hexagon screw | 21 | Hexagon screw |
| 2 | Hexagon screw | 22 | Hexagon screw |
| 3 | Clutch housing | 23 | Stud bolt |
| 5 | Cover | 24 | Hexagon nut |
| 6 | Hexagon screw | 25 | Dowel pin |
| 10 | Washer | 26 | Sealing ring |
| 11 | Circlip | 27 | Drain plug |
| 12 | O-ring | 28 | Sealing ring |
| 13 | Pipe | 29 | Drain plug |
| 16 | O-ring | 30 | Surface seal |
| 17 | Pipe | 32 | Block |
| 20 | Dowel pin | | |



Remove panel at front. Remove right engine cover.

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| 30.05.01 | a | 1/27 | Disconnecting tractor, clutch and transmission housing 1050 | G | 000002 |

Fav 900

Transmission / Housing

Disconnecting tractor, clutch and transmission housing

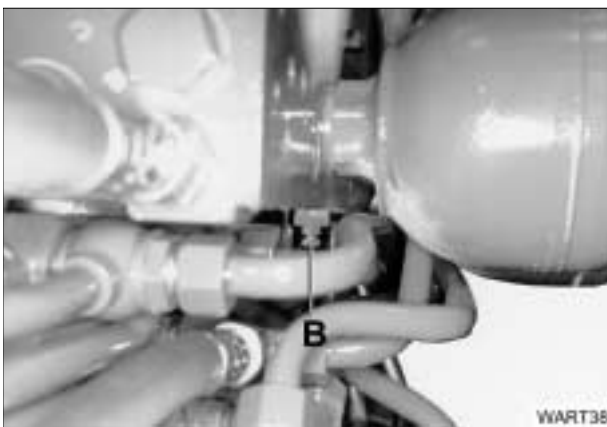
G

Open front-axle suspension stopcocks on central control block (ZSB).

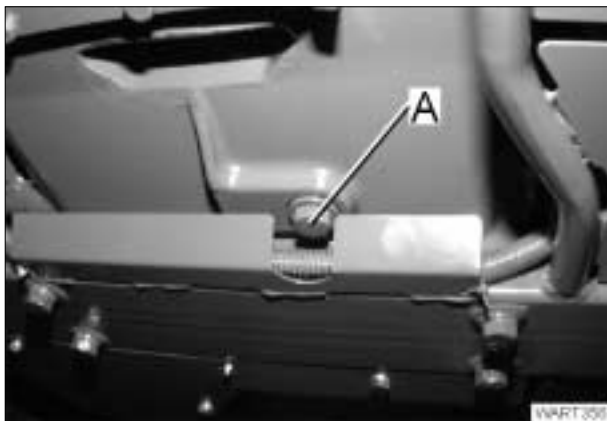


Warning:
Front axle lowers against block.

Open stopcock A.



Open stopcock B.



Disconnecting tractor

Preliminary work:

- Prop tractor, taking appropriate safety precautions, and remove both rear wheels.
- Remove mudguard of front right wheel.
- Remove panels.
- Drain hydraulic oil (approx. 70 l).



Raise cab or, depending on repair required, completely remove cab.

Raising the cab is sufficient for repairs to the cardan-shaft brake and leaks in the drive shaft. Completely removing the cab is necessary for repairs to the pump drive, the cardan-shaft coupling or the differential.

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| 30.05.01 | a | 2/27 | Disconnecting tractor, clutch and transmission housing | 1050 | G | 000002 |

Fav 900**Transmission / Housing**
Disconnecting tractor, clutch and transmission housing**G****Raising cab at front:**

Open side sections and remove cover panel.



Remove left and right support plates .



Open coolant water drain plug with caution.

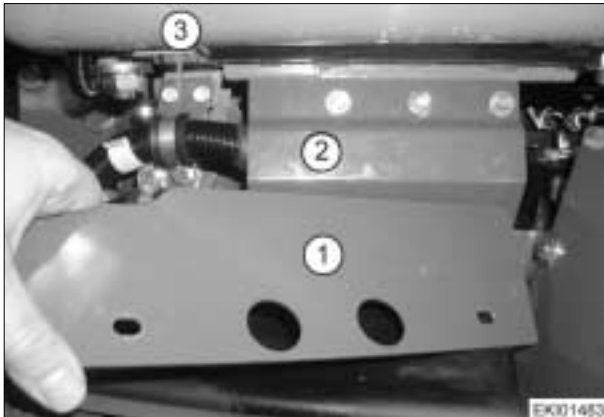
**Caution:**
If engine is warm
- danger of scalding injury!

Disconnect heating system water pipes.

Fav 900

Transmission / Housing

Disconnecting tractor, clutch and transmission housing

G

On left in direction of travel

Remove cover panel (1), cover of cable coupler (2) and bracket of cable loom (3).



Label and disconnect cable couplers.



Remove engine cover and disconnect air-conditioning cooling hoses.

Note:**Disconnect coolant hoses only at these screw couplings. Internal valves prevent the coolant from escaping.**

On right in direction of travel:

Remove footplate.

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| 30.05.01 | a | 4/27 | Disconnecting tractor, clutch and transmission housing | 1050 | G | 000002 |

Fav 900

Transmission / Housing

Disconnecting tractor, clutch and transmission housing

G

Disconnect cable coupler.

Remove cable loom bracket (arrowed) and earth cable (arrowed).



Remove cover of EPC-DA switchover.



Remove support at rear left and right and fit in tilted position (arrowed).



Attach cab to hoist at front on mirror bracket, taking appropriate safety precautions.

| Date | Version | Page | | Capitel | Index | Docu-No. |
|----------|---------|------|--|---------|-------|----------|
| 30.05.01 | a | 5/27 | Disconnecting tractor, clutch and transmission housing | 1050 | G | 000002 |

Fav 900

Transmission / Housing

Disconnecting tractor, clutch and transmission housing

G

Remove hexagon screw in front cab mount.
Remove opposite side in same manner.



Raise cab at front until rear window is against EPC-DA multiway valve.

Check on clearance of all components when raising cab.

Note:

Prop cab using timber prop (risk of accident!)



Remove fuel tank and auxiliary tank.

Remove step at left.



Remove clamp, braces and bracket (arrowed) of fuel tank.

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, clutch and transmission housing | G |
|----------------|--|----------|



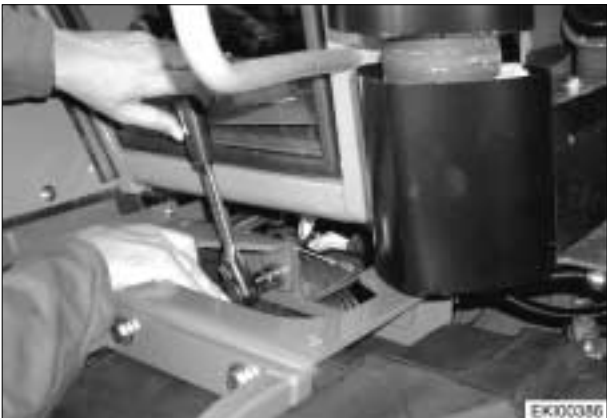
Open battery case and remove toolbox storage compartment.



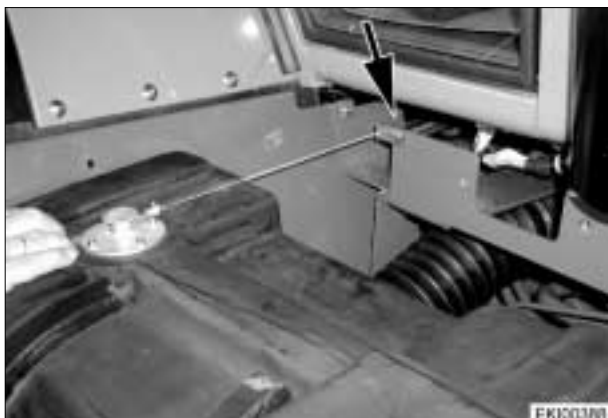
Remove cover panel from spill valve and air tank.



Remove guard from fuel hose. Release clip (arrowed).



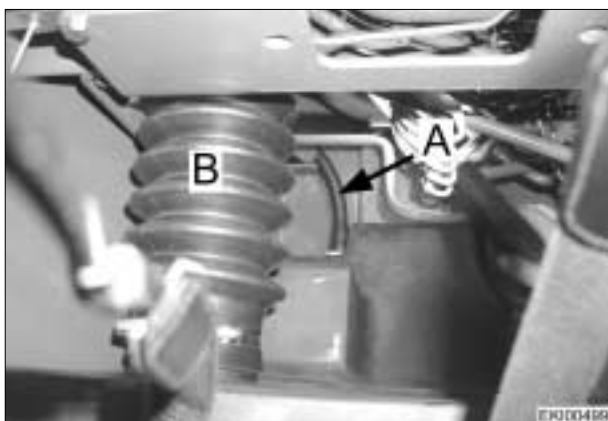
Remove step on right.

Fav 900**Transmission / Housing**
Disconnecting tractor, clutch and transmission housing**G**

Withdraw auxiliary tank on right as far as retaining cable.



Seal tank hose at bottom with hose clamp.
Pump fuel out of auxiliary tank.



Release hose clips.

Withdraw connecting hoses A and B, remove retaining cable.

Note:

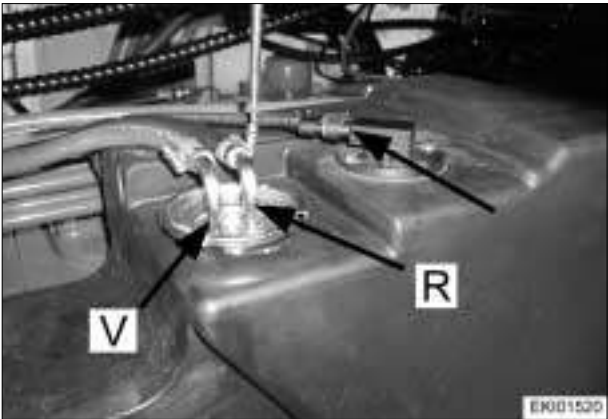
Pump fuel off to level of upper connecting pipe B.



Withdraw venting tube from fuel tank.
Remove auxiliary tank.

| Date | Version | Page | | Capitel | Index | Docu-No. |
|----------|---------|------|--|---------|-------|----------|
| 30.05.01 | a | 8/27 | Disconnecting tractor, clutch and transmission housing | 1050 | G | 000002 |

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, clutch and transmission housing | G |
|----------------|--|----------|



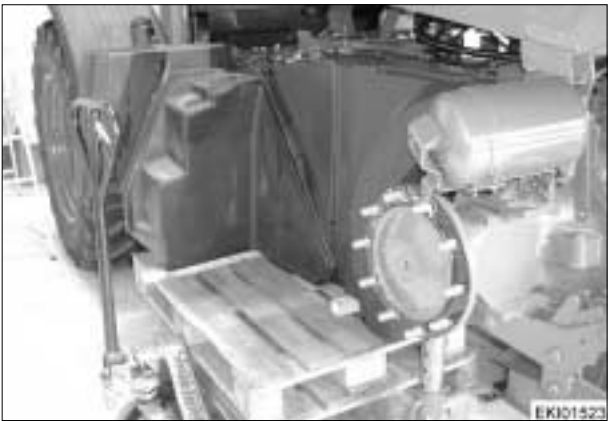
Disconnect feed (V) and return flow (R) intake pipe.
Disconnect fuel level sensor connector (arrowed).



Withdraw tank venting device.



Remove connecting pipe (clearance when removing fuel tank).



Remove fuel tank.

| Date | Version | Page | Disconnecting tractor, clutch and transmission housing | Capitel | Index | Docu-No. |
|----------|---------|------|--|---------|-------|----------|
| 30.05.01 | a | 9/27 | | 1050 | G | 000002 |

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, clutch and transmission housing | G |
|----------------|--|----------|



Left side of tractor
Disconnect hydraulic line.



Remove clip.



Disconnect compressed-air line from spill valve,
cut cable tie and pull compressed-air line
forwards.



Right side of tractor
Disconnect hydraulic lines to steering cylinder.

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| 30.05.01 | a | 10/27 | | 1050 | G | 000002 |

Fav 900
Transmission / Housing
Disconnecting tractor, clutch and transmission housing
G

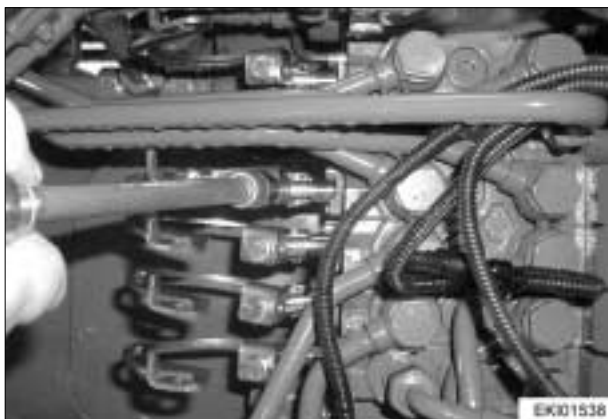
Disconnect hydraulic lines to front PTO.



Release pipe clip.
Remove steering system return flow.



Remove hydraulic line (arrowed) from central control block (ZSB).
Remove load-sensing line to steering system (LS-LE).

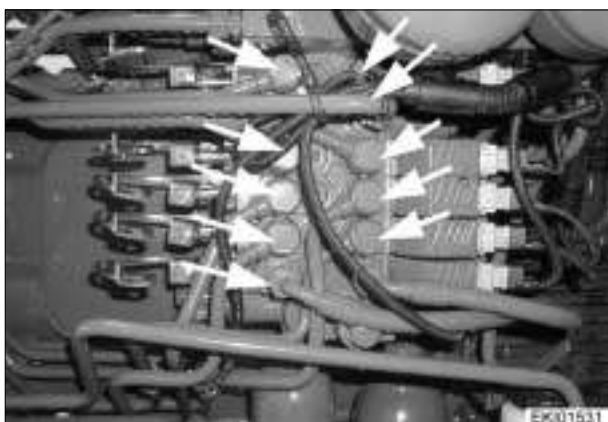
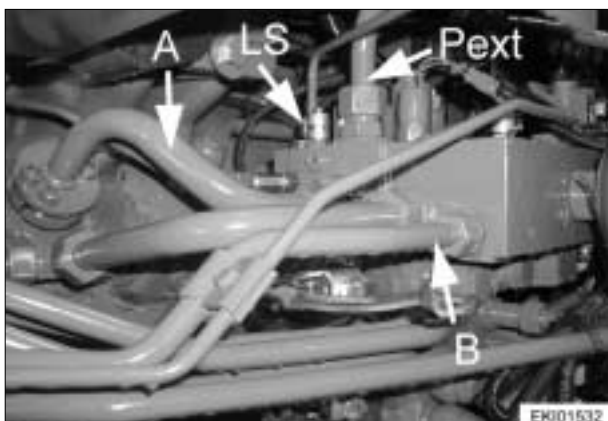


Remove emergency control valve (clearance for hydraulic lines).

| Date | Version | Page | Capitel | Index | Docu-No. |
|----------|---------|-------|---|----------|---------------|
| 30.05.01 | a | 11/27 | Disconnecting tractor, clutch and transmission housing 1050 | G | 000002 |

Fav 900**Transmission / Housing**
Disconnecting tractor, clutch and transmission housing**G**

Remove bracket (clearance for hydraulic lines).

Remove hydraulic lines (arrowed) to spool valves.
Remove screw socket (clearance for hydraulic lines).Remove pressure pipe (A) of LS pump.
Remove hydraulic line (B) for EPC-DA switchover.
Remove load-sensing line (LS).
Remove external pressure supply (P ext. - optional extra).

Remove bracket.

| Date | Version | Page | Capitel | Index | Docu-No. |
|----------|---------|-------|--|-------|----------|
| 30.05.01 | a | 12/27 | Disconnecting tractor, clutch and transmission housing 1050 | G | 000002 |

Fav 900**Transmission / Housing**
Disconnecting tractor, clutch and transmission housing**G**

Remove entire intake pipe for steering pump (clearance for hydraulic lines).



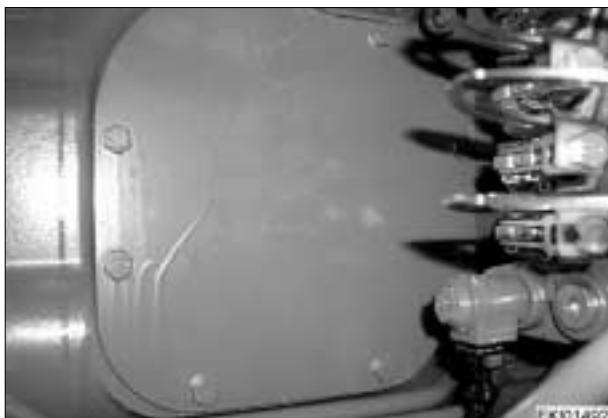
Remove return flow to hydraulic tank at T-junction.



Remove hydraulic lines (to transmission oil cooler) from valve unit.



Disconnect hydraulic lines (to transmission oil cooler) at connector.
Remove lines (clearance for hatch).

Fav 900**Transmission / Housing**
Disconnecting tractor, clutch and transmission housing**G**

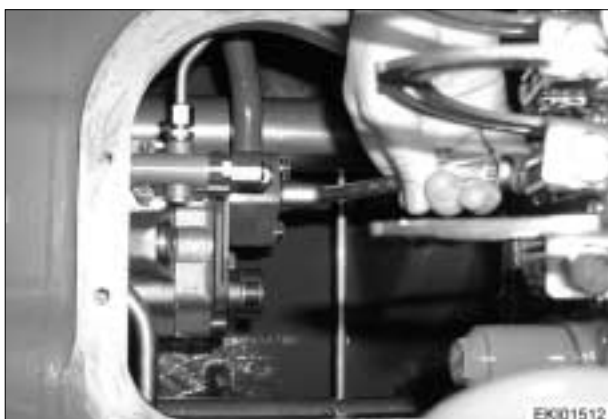
Remove hatch.

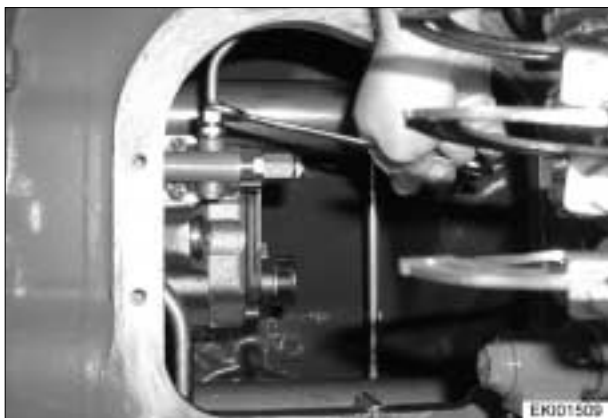


Remove screw cap (arrowed) from return-flow filter and remove entire filter.



Remove V-section sealing ring (arrowed) from pressure pipe.

Remove 4 M10 hexagon screws from pressure pipe.
Pull pressure pipe out of housing towards inside.

Fav 900**Transmission / Housing**
Disconnecting tractor, clutch and transmission housing**G**

Remove control line (load-sensing system) from LS pump.



Remove intake pipe from LS pump.



Remove compressed-air line from antifreeze pump.



Remove cover panel under oil pan.
Detach cardan shaft for front-wheel drive (necessary because of distortions in drivetrain when separating clutch and transmission housing).

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| 30.05.01 | a | 15/27 | Disconnecting tractor, clutch and transmission housing 1050 | G | 000002 |

Fav 900

Transmission / Housing
Disconnecting tractor, clutch and transmission housing

G

Prop clutch housing (3) with movable and adjustable trestle, taking appropriate safety precautions.

Prop transmission housing with movable and adjustable trestle, taking appropriate safety precautions.



Place wedge between engine and front axle, taking appropriate safety precautions.



Remove tank support plate.

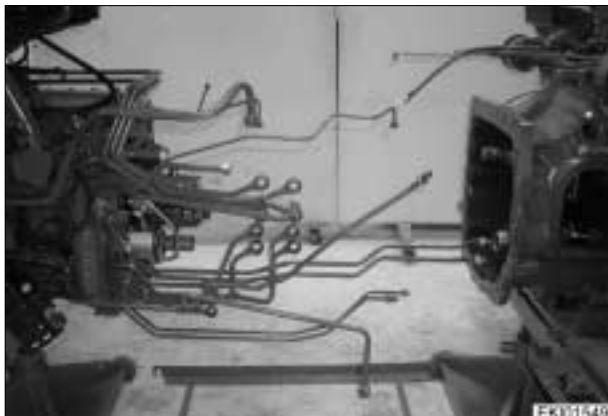


Remove nuts and bolts of clutch and transmission housing flange connection.

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|----------|---------|-------|---|----------|---------------|
| 30.05.01 | a | 16/27 | Disconnecting tractor, clutch and transmission housing 1050 | G | 000002 |

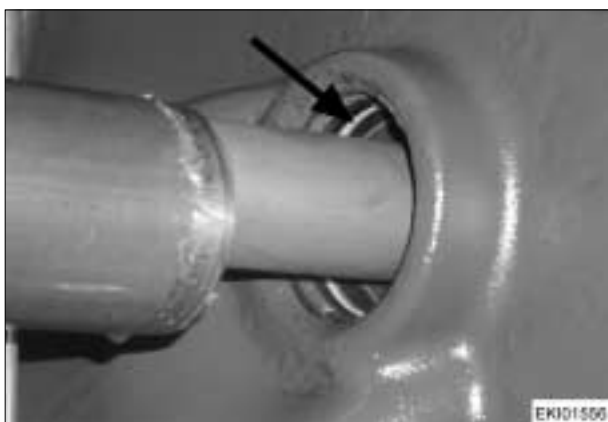
Fav 900

Transmission / Housing
Disconnecting tractor, clutch and transmission housing

G

Separate clutch housing (3) from transmission housing and move it away.

Ensure that all components move freely.



Reassembling clutch and transmission housings

Where removed:

Seal pipe (17) (transmission drive shaft).

Insert O-ring (16) into housing groove and grease.



Where removed:

Seal pipe (13) (cardan shaft).

Insert washer (10). Clip circlip (11) into housing groove.

Insert O-ring (12) into housing groove and grease.

Press pipe (13) into clutch housing (3) until stop is reached.

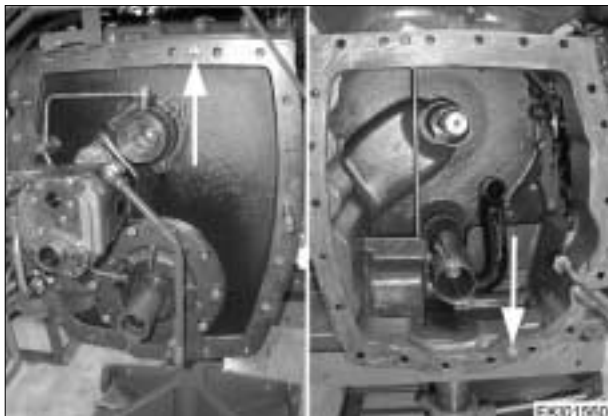


Coat splines on cardan shaft with long-life grease and fit cardan shaft.

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|----------|---------|-------|--|---------|-------|----------|
| 30.05.01 | a | 17/27 | Disconnecting tractor, clutch and transmission housing | 1050 | G | 000002 |

Fav 900

Transmission / Housing
Disconnecting tractor, clutch and transmission housing

G

Clean flange surfaces.

Check that two dowel pins (20) (arrowed) are present.

Grease all O-rings.

Coat flange surface with sealant X 903.050.074 and bring tractor together again.



Mate clutch and transmission housings.

If necessary, turn engine over with engine cranking device X 899.980.220.

Note:

When bringing clutch and transmission housings together, raise pipes (transmission drive shaft (17) and cardan shaft (13)) and guide them into seats (above hatch cover).

Tighten hexagon screws and nuts in stages to 295 Nm.

Remove clutch and transmission housing props and front axle wedge.



Fit front-wheel drive cardan shaft.

Tighten M12-12.9 socket head cap screws to **150 Nm**.

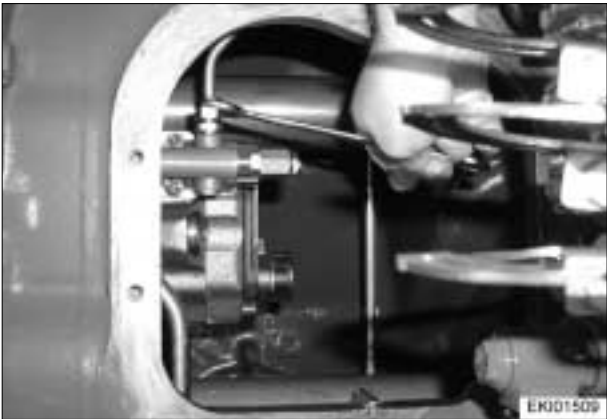
Fit cover panel under oil pan.

**Right side**

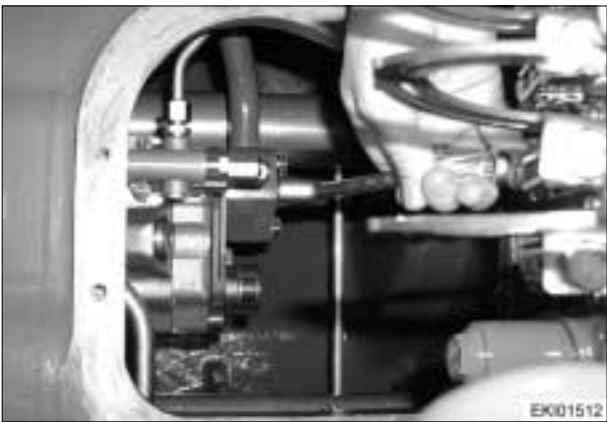
Fit LS pump intake pipe.

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|----------|---------|-------|--|---------|-------|----------|
| 30.05.01 | a | 18/27 | Disconnecting tractor, clutch and transmission housing | 1050 | G | 000002 |

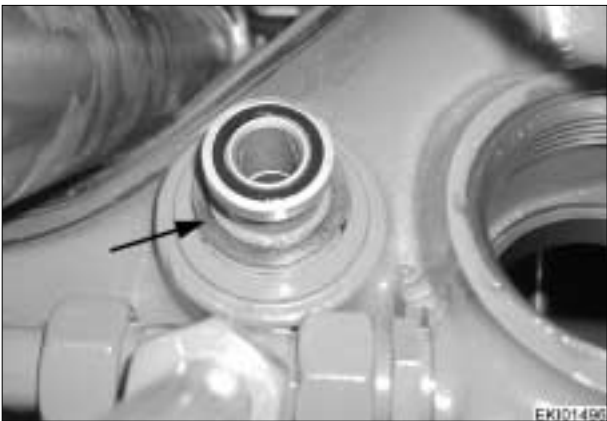
| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, clutch and transmission housing | G |
|----------------|--|----------|



Fit control line (load-sensing system) to LS pump.



Fit LS pump pressure pipe.

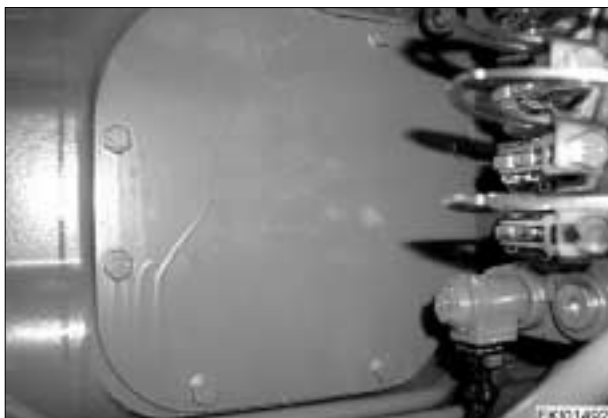


Fit V-section sealing ring (arrowed) to pressure pipe.



Fit new filter element and hand-tighten filter cover.

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| 30.05.01 | a | 19/27 | Disconnecting tractor, clutch and transmission housing 1050 | G | 000002 |

Fav 900**Transmission / Housing**
Disconnecting tractor, clutch and transmission housing**G**

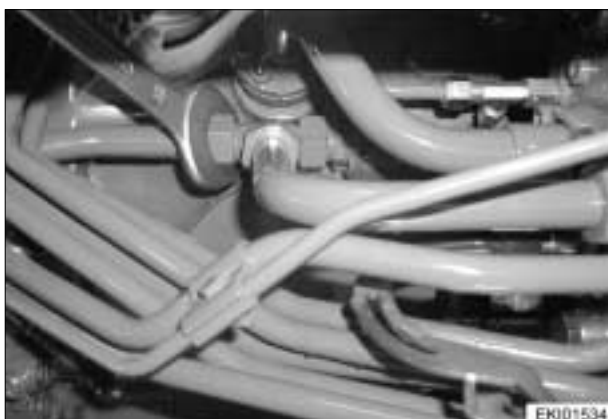
Clean flange surface, coat with sealant X 903.050.074 and fit hatch cover.



Fit pressure pipe to antifreeze pump with new sealing ring.



Fit hydraulic lines (to transmission oil cooler).



Fit return flow to hydraulic tank at T-junction.

Fav 900

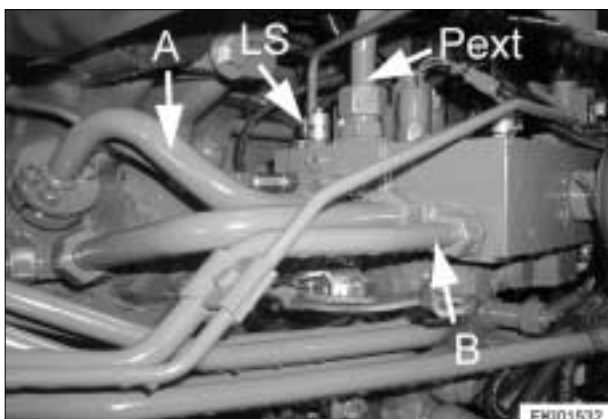
Transmission / Housing
Disconnecting tractor, clutch and transmission housing

G

Fit steering pump intake pipe.

**Note:****Check suction filter in intake pipe for soiling.**

Fit bracket.



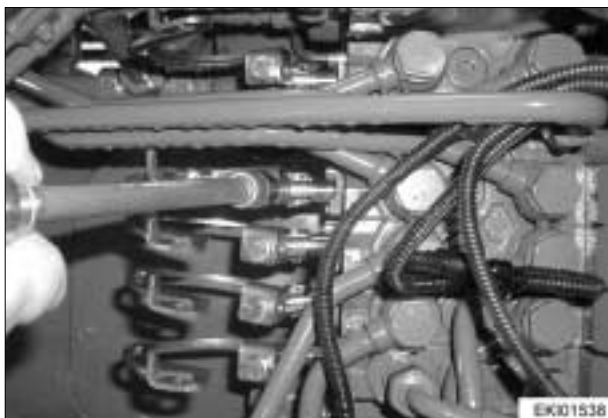
Fit LS pump pressure pipe (A).

Fit hydraulic line (B) for EPC-DA switchover.

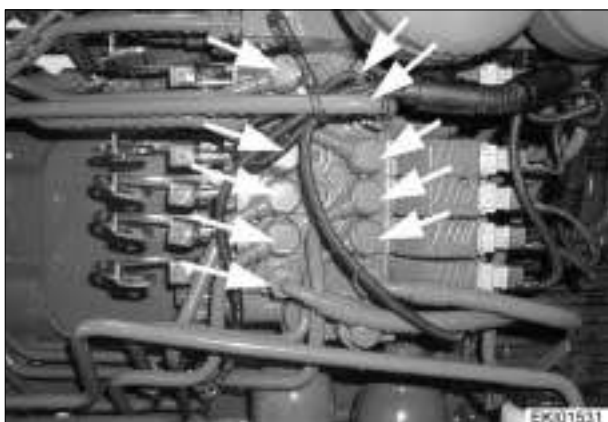
Fit load-sensing line (LS).

Fit external pressure supply
(P ext. - optional extra).

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|----------|---------|-------|---|----------|---------------|
| 30.05.01 | a | 21/27 | Disconnecting tractor, clutch and transmission housing 1050 | G | 000002 |

Fav 900
Transmission / Housing
Disconnecting tractor, clutch and transmission housing
G

Fit emergency control valve.



Fit screw socket.

Fit hydraulic lines (arrowed) with new U-sit rings.



Fit hydraulic line (arrowed) to central control block (ZSB).

Fit load-sensing line to steering system (LS-LE).

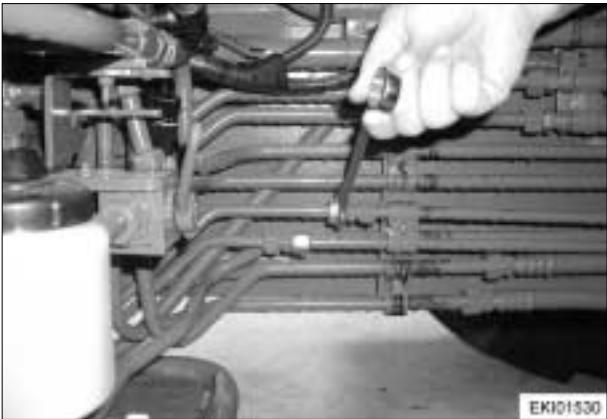


Fit pipe clip.

Fit return flow of steering system.

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| 30.05.01 | a | 22/27 | Disconnecting tractor, clutch and transmission housing 1050 | G | 000002 |

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, clutch and transmission housing | G |
|----------------|--|----------|



Fit hydraulic lines to front PTO.



Fit hydraulic lines to steering cylinder.



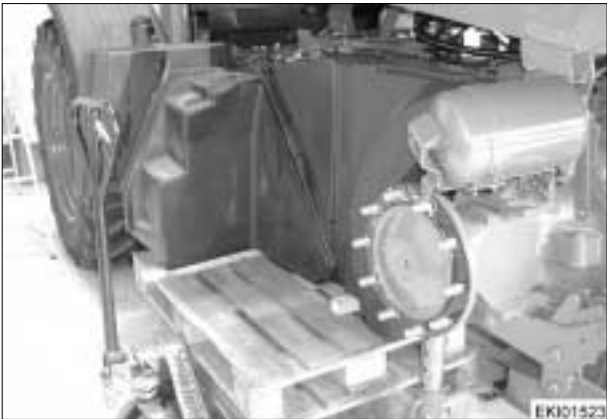
Left side

Fit hydraulic line.
Lay compressed-air line to spill valve and fasten with cable tie.



Fit clip.

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, clutch and transmission housing | G |
|----------------|--|----------|



Fitting fuel tank and auxiliary tank



Fit clamp, brace and bracket (arrowed).

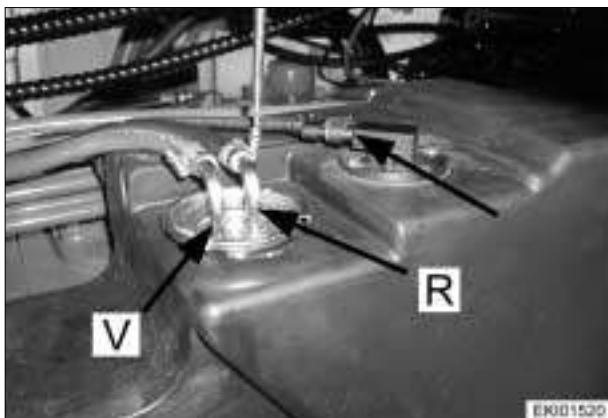


Fit connecting pipe.



Fit tank venting tube.

| Date | Version | Page | Disconnecting tractor, clutch and transmission housing | Capitel | Index | Docu-No. |
|----------|---------|-------|--|---------|-------|----------|
| 30.05.01 | a | 24/27 | | 1050 | G | 000002 |

Fav 900**Transmission / Housing**
Disconnecting tractor, clutch and transmission housing**G**

Fit fuel lines to feed and (V) and return flow (R) intake pipes.

Fit cable coupler X 182 to fuel level sensor.



Fit air tank, then fit compressed-air line to spill valve and cover panel.

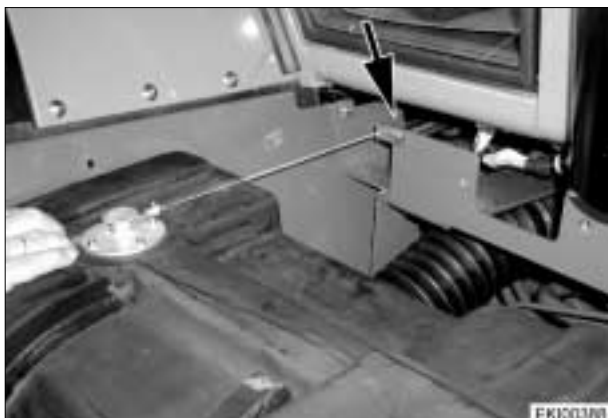


Fit toolbox storage compartment, close battery case.



Fit left step.

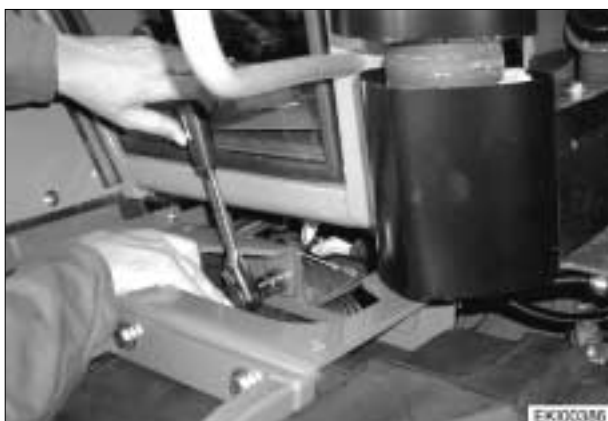
| Date | Version | Page | | Capitel | Index | Docu-No. |
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| 30.05.01 | a | 25/27 | Disconnecting tractor, clutch and transmission housing | 1050 | G | 000002 |

Fav 900**Transmission / Housing**
Disconnecting tractor, clutch and transmission housing**G**

Locate auxiliary tank on right and connect connecting hoses.



Release hose clamp.



Fit right step.

**Lowering cab**

Fitting sequence: in reverse order to raising cab.

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| 30.05.01 | a | 26/27 | Disconnecting tractor, clutch and transmission housing 1050 | G | 000002 |

Fav 900

Transmission / Housing

Disconnecting tractor, clutch and transmission housing

G

Fill with oil preferably via return flow connection with pump. (Oil is filtered in return flow.)

If this is not possible, unscrew venting filter (A) and add oil.

Observe instructions for oil type and quantity.

Initial fill approx. 70 l

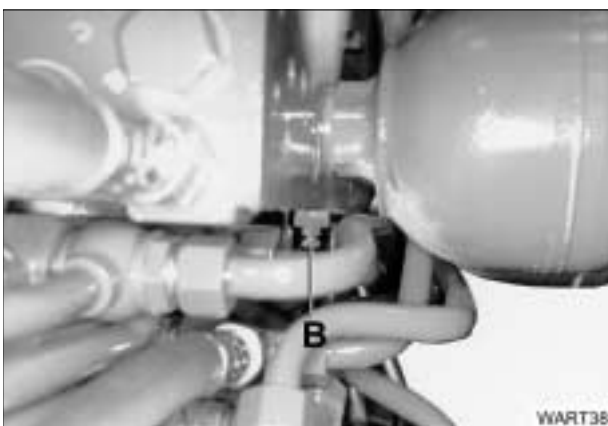
Note:

See also:

Chapter 0000 Reg. A - Fuels and lubricants



Close stopcock of front-axe suspension (A).



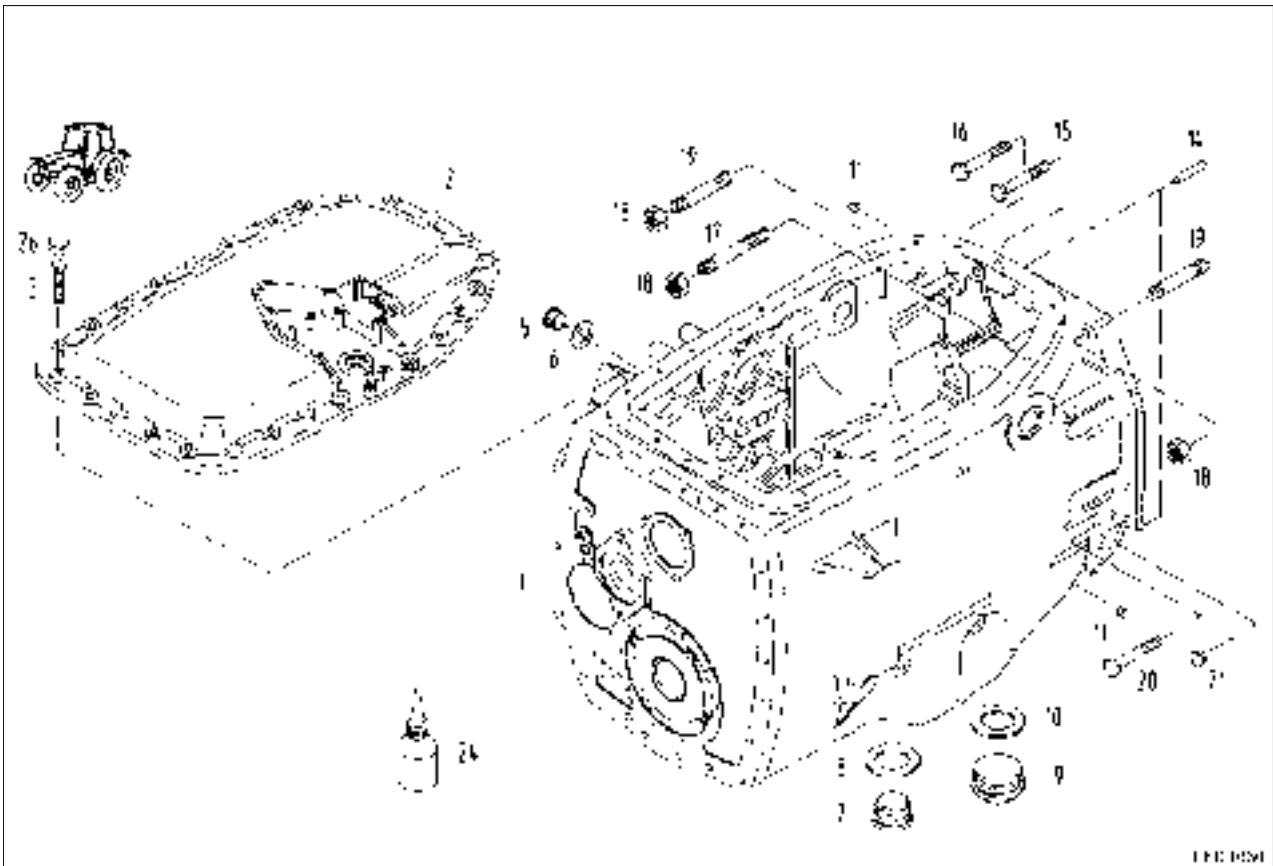
Concluding work:

Close stopcock of front-axe suspension (B).

Fit other panels.

Fit wheels.

Check tractor for operation and leaks.

Fav 900
Transmission / Housing
Disconnecting tractor, transmission and rear-axle housings
G

| Item | Designation | Item | Designation |
|------|--------------------------|------|---------------------------|
| 1 | Transmission housing | 14 | Parallel pin |
| 2 | Housing cover | 15 | M16x80-10.9 hexagon screw |
| 3 | M12x50-8.8 hexagon screw | 16 | M16x90-10.9 hexagon screw |
| 5 | Drain plug | 17 | M16x110-10.9 stud bolt |
| 6 | Sealing ring | 18 | Hexagon nut |
| 7 | Drain plug | 19 | M16x75-10.9 stud bolt |
| 8 | Sealing ring | 20 | M16x60-10.9 hexagon screw |
| 9 | Drain plug | 21 | Sealing plug |
| 10 | Sealing ring | 24 | Sealant |
| 11 | Drain plug | 26 | Hexagonal protective cap |



Remove front panels. Remove right engine cover.

| Date | Version | Page | Capitel | Index | Docu-No. |
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| 11.06.2001 | a | 1/18 | Disconnecting tractor, transmission and rear-axle housings 1050 | G | 000004 |

Fav 900

Transmission / Housing

Disconnecting tractor, transmission and rear-axle housings

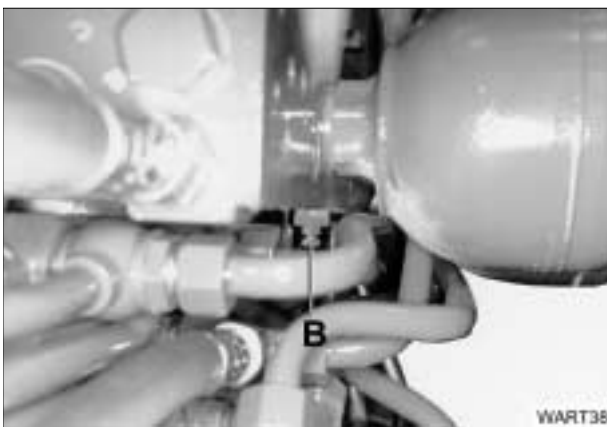
G

Open front-axle suspension stopcocks on central control block (ZSB).



Warning:
Front axle lowers against block.

Open stopcock A.



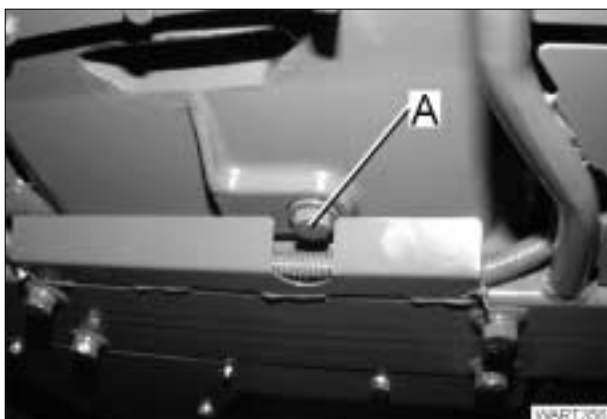
Open stopcock B.



Disconnecting tractor

Preliminary work:

- Lower rear power lift.
- Prop tractor, taking appropriate safety precautions, and remove rear wheels.
- Remove panels.
- Drain hydraulic oil (approx. 65 l).

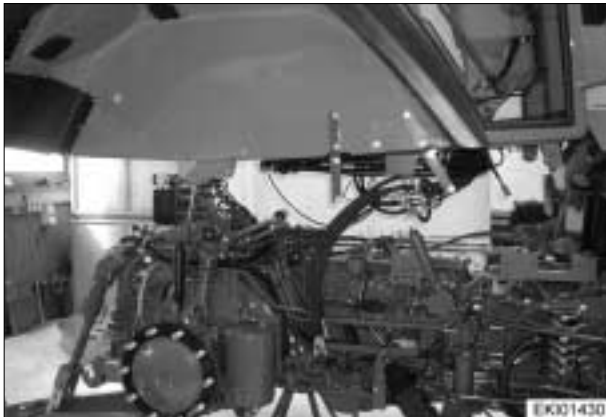


Drain hydraulic oil (approx. 70 l).

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| 11.06.2001 | a | 2/18 | Disconnecting tractor, transmission and rear-axle housings | 1050 | G | 000004 |

Fav 900

Transmission / Housing
Disconnecting tractor, transmission and rear-axle housings

G

Removing cab - see Chapter 8100 Reg.G



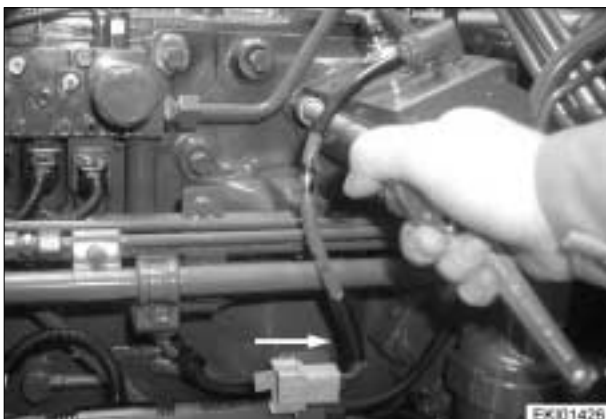
Remove fuel tank and auxiliary tank.

Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G

**Note:**

Shift range control to neutral position (to separate 4WD).

Unscrew console with auxiliary lever (to provide access to return line (hydraulic oil)).



Disconnect cable coupler X307. Unlock plug housing and slide out of bracket in direction of arrow.

Remove A009 - actuator unit (to provide access to return line (hydraulic oil)).

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| 11.06.2001 | a | 3/18 | Disconnecting tractor, transmission and rear-axle housings 1050 | G | 000004 |

Fav 900

Transmission / Housing

Disconnecting tractor, transmission and rear-axle housings

G**Left side**

Remove bracket for B030 sensor.



Handbrake is released with compressed air.
Create external connector (DIY) to accumulator.
Detach handbrake linkage.



External connector (DIY) to accumulator



Detach Bowden cable for range control I - II on console.
Remove accumulator (handbrake) with console.

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, transmission and rear-axle housings | G |
|----------------|--|----------|



Disconnect compressed-air line from spill valve.



Remove hydraulic line to diff. lock.



Remove stabiliser strut.

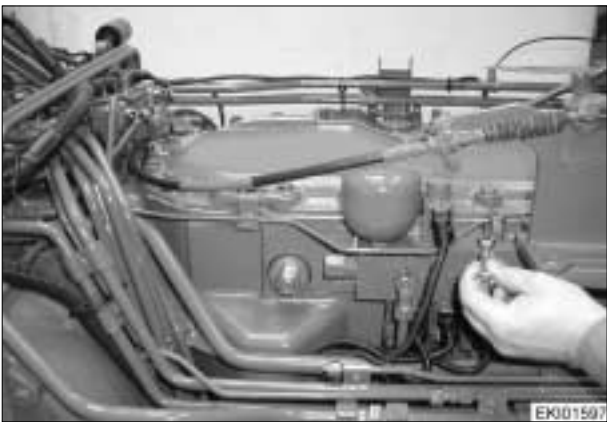


Right side
Remove bracket for steering lines.

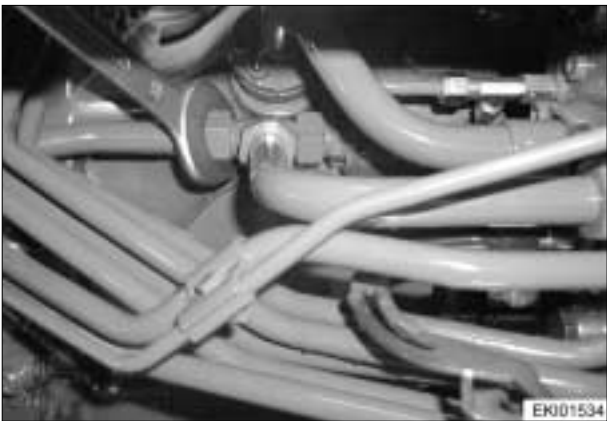
| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, transmission and rear-axle housings | G |
|----------------|--|----------|



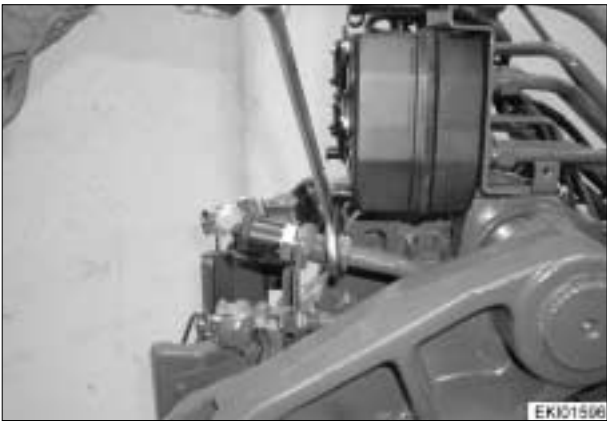
Remove entire hydraulic line for external pressure supply.



Remove entire clutch venting system.



Remove return flow to hydraulic tank at T-junction.



Remove return flow to hydraulic tank hydraulic couplings.
Release clips.

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| 11.06.2001 | a | 6/18 | Disconnecting tractor, transmission and rear-axle housings 1050 | G | 000004 |

Fav 900**Transmission / Housing**
Disconnecting tractor, transmission and rear-axle housings**G**

Remove both connecting lines of lift cylinders in their entirety.



Withdraw drain pan.



Disconnect hydraulic lines for EPC-DA switchover.



Remove lift cylinder pressure pipe.

Fav 900**Transmission / Housing**
Disconnecting tractor, transmission and rear-axle housings**G**

Remove hydraulic line to cardan brake from 5V6 selector valve.



Remove entire vent unit with bleed lines.



Remove bracket for hydraulic couplings.



Label and disconnect electrical connectors in region of rear axle.
Disconnect trailer socket.
Release cable tie and pull cable loom forwards.

Fav 900
Transmission / Housing
Disconnecting tractor, transmission and rear-axle housings
G

Remove bracket for pipes and clamp.
 Unscrew screws from cover. Screw in
 M10 eye bolt and raise cover.



Place wedge between engine and front axle,
 taking appropriate safety precautions.



Prop transmission housing with movable and
 adjustable trestle, taking appropriate safety
 precautions.

Prop rear-axle housing using trestle, taking
 appropriate safety precautions.



Remove nuts and bolts from
 transmission/rear-axle housing flanged joint.

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| 11.06.2001 | a | 9/18 | Disconnecting tractor, transmission and rear-axle housings 1050 | G | 000004 |

Fav 900

Transmission / Housing

Disconnecting tractor, transmission and rear-axle housings

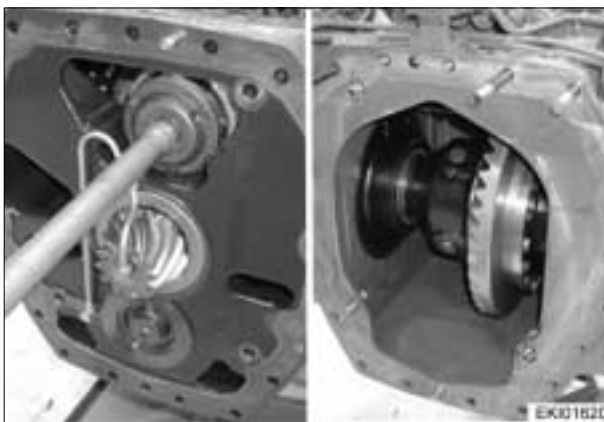
G

Separate transmission housing from rear-axle housing and move it away.

Ensure clearance of all components.

Note:

Range control I - II is set to neutral (to separate 4WD).

**Connecting tractor**

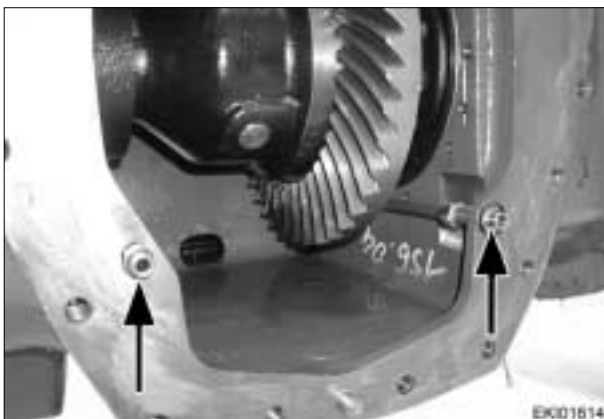
Clean flange surfaces.

Check that dowel pins are present.

Coat flange surface with sealant X 903.050.074.



Locate O-ring on oil transfer point and grease.



Locate O-ring on oil transfer point and grease.

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| 11.06.2001 | a | 10/18 | Disconnecting tractor, transmission and rear-axle housings | 1050 | G | 000004 |

Fav 900
Transmission / Housing
Disconnecting tractor, transmission and rear-axle housings
G

Mate transmission and rear-axle housings.
If necessary, turn engine over with engine cranking device X 899.980.220.

Note:

Range control I - II is set to neutral (to separate 4WD).

Engage live PTO in gearing.



Tighten hexagon screws and nuts in stages to **295 Nm**.

Remove transmission and rear-axle housing props and front axle wedge.



Coat transmission housing cover with sealant X 903.050.074 and fit cover.

Tighten M12 hexagon screws to **86 Nm**.

Fit bracket for pipes and clamp.



Connect electrical connectors in region of rear axle.

Connect trailer socket.

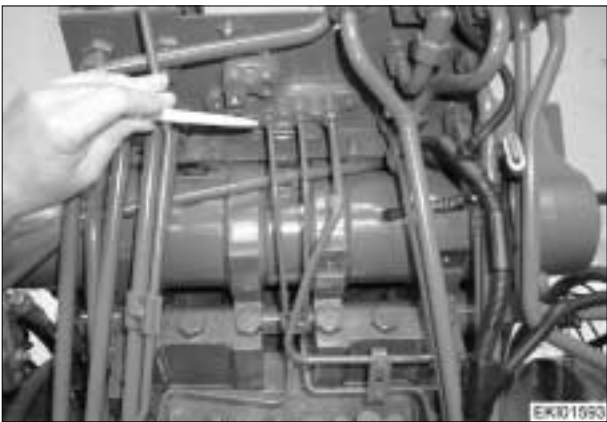
Attach cable ties.

| Date | Version | Page | Disconnecting tractor, transmission and rear-axle housings | Capitel | Index | Docu-No. |
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| 11.06.2001 | a | 11/18 | | 1050 | G | 000004 |

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, transmission and rear-axle housings | G |
|----------------|--|----------|



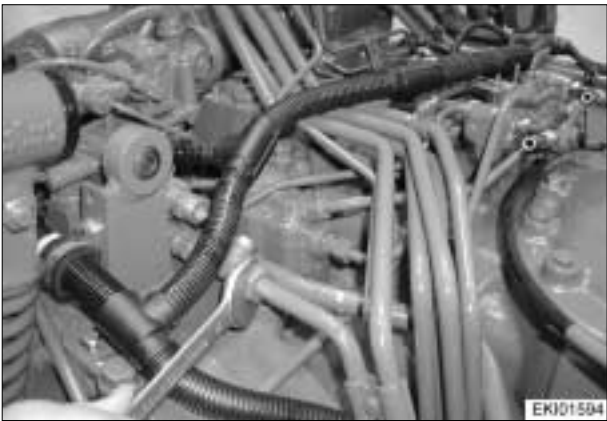
Fit bracket for hydraulic couplings.



Right side
Fit vent unit with bleed lines.



Fit hydraulic line to cardan brake at 5V6 selector valve.



Fit lift cylinder pressure pipe.

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| 11.06.2001 | a | 12/18 | Disconnecting tractor, transmission and rear-axle housings 1050 | G | 000004 |

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, transmission and rear-axle housings | G |
|----------------|--|----------|



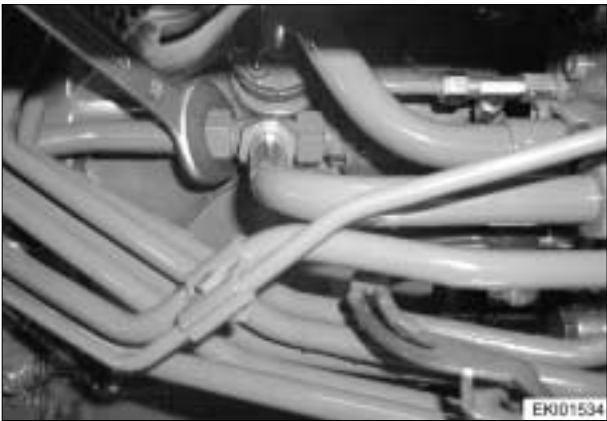
Fit both connecting lines of lift cylinders.



Fit hydraulic lines for EPC-DA switchover.



Fit drain pan.



Fit return flow to hydraulic tank at T-junction.

Fav 900

Transmission / Housing
Disconnecting tractor, transmission and rear-axle housings

G

Fit return flow to hydraulic tank at hydraulic coupling.
 Fit clips.



Fit A009 - actuator unit and console with auxiliary lever.



Fit clutch venting system.



Fit hydraulic line for external pressure supply.

Fav 900**Transmission / Housing**
Disconnecting tractor, transmission and rear-axle housings**G**

Fit bracket for steering lines.

**Left side**

Fit hydraulic line to diff. lock.



Fit stabiliser strut.

Fit compressed-air line to spill valve.
Fasten compressed-air line with cable ties.

| | | |
|---|-------------------------------|----------|
| Fav 900 | Transmission / Housing | G |
| Disconnecting tractor, transmission and rear-axle housings | | |



Attach Bowden cable for range control I - II.
Fit accumulator (handbrake) with console.

Note:

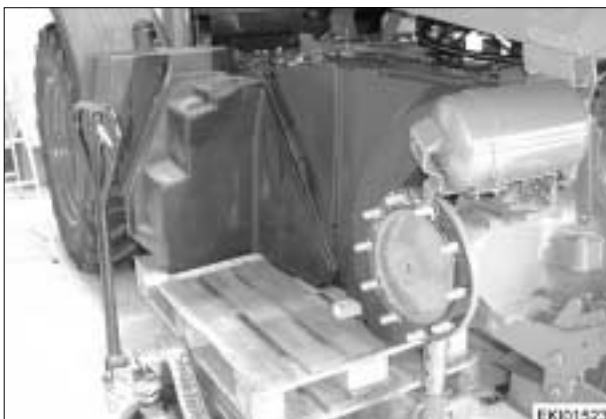
Engage speed range I or II with auxiliary lever.



Handbrake is released with compressed air.
Create external connector (DIY) to accumulator.
Attach handbrake linkage.



Fit bracket for B030 sensor.



Fit fuel tank and auxiliary tank.

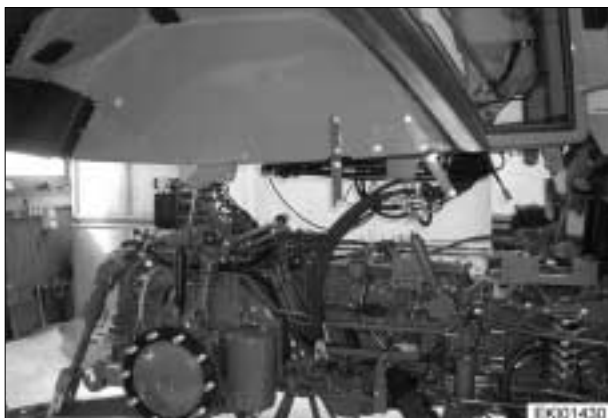
Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G

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|------------|---------|-------|---------|-------|----------|
| 11.06.2001 | a | 16/18 | 1050 | G | 000004 |

Fav 900

Transmission / Housing

Disconnecting tractor, transmission and rear-axle housings

G

Fitting cab - see Chapter 8100 Reg.G



During normal maintenance work, e.g. transmission oil change and / or filter change

Fill with transmission oil at rear left.

Fill with oil preferably using external oil-filling unit with superfine filter.

Observe instructions for oil type and quantity.

Initial fill approx. 65 l

Note:

See also:

Chapter 0000 Reg. A - Fuels and lubricants



Fill with oil preferably via return flow connection with pump. (Oil is filtered in return flow.)

If this is not possible, unscrew venting filter (A) and add oil.

Observe instructions for oil type and quantity.

Initial fill approx. 70 l

Note:

See also :

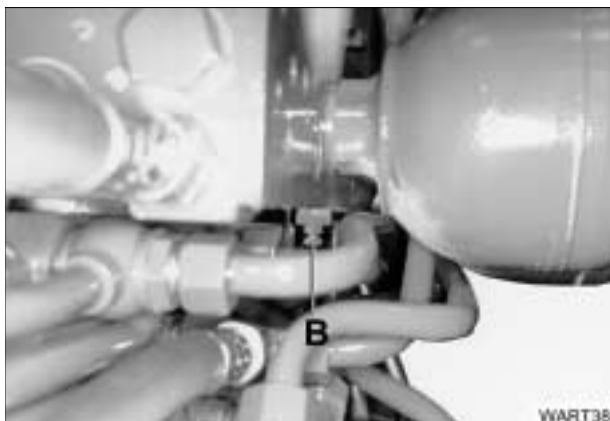
Chapter 0000 Reg. A - Fuels and lubricants



Close stopcock of front-axle suspension (A).

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| 11.06.2001 | a | 17/18 | Disconnecting tractor, transmission and rear-axle housings | 1050 | G | 000004 |

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Housing Disconnecting tractor, transmission and rear-axle housings | G |
|----------------|--|----------|

**Concluding work:**

Close stopcock of front-axle suspension (B).

Fit other panels.

Fit wheels.

Check tractor for operation and leaks.

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| 11.06.2001 | a | 18/18 | 1050 | G | 000004 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Transmission / brake system General description of brake system | A |
|---|---|----------|

Comparison of Farmer 400, Fav 700 and Fav 900 brake systems

| | Farmer 400 | Fav 700 | Fav 900 |
|---|-------------------|----------------|----------------|
| Cardan-shaft brake | No | Yes | Yes |
| Brake pad | - | Sintered metal | Sintered metal |
| Cardan-shaft brake actuation | - | Piston | Wedge |
| Hydraulically-assisted cardan-shaft brake | - | Yes | Yes |
| 4WD engagement | Yes | No | Yes |
| Wet rear brake | Yes | Yes | Yes |
| Brake pad | Sintered metal | Sintered metal | Sintered metal |
| Hydraulically-assisted rear brake | No | No | Yes |
| Medium | Pentosin | Pentosin | Pentosin |

Note:**Hydr. circuit diagram for transmission hydraulics - Chapter 1005 Index C****Rear brake - Chapter 1070 Index G****Cardan-shaft brake - Chapter 1150 Index G**

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| 8.2.2001 | a | 1/1 | 1070 | A | 000001 |

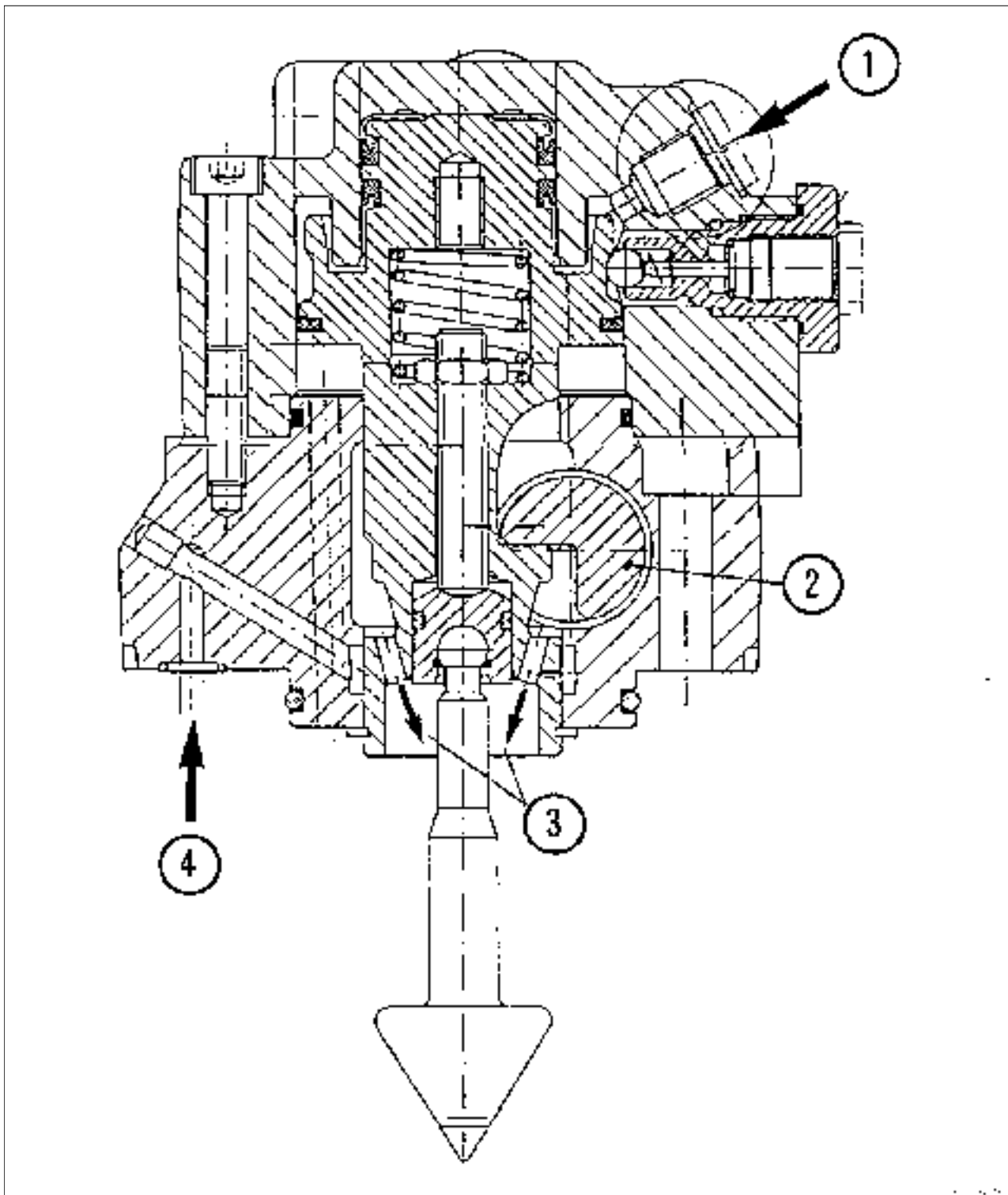
| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Brake system Technical drawing of brake cylinder | C |
|----------------|--|----------|

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| 15.10.2001 | a | 1/3 | 1070 | C | 000003 |

Fav 900

Transmission / Brake system
Technical drawing of brake cylinder

C



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|------------|---------|------|---------|-------|----------|
| 15.10.2001 | a | 2/3 | 1070 | C | 000003 |

Fav 900

Transmission / Brake system

Technical drawing of brake cylinder

C

Adjusting brake cylinder



- Remove upper part of brake cylinder.
- Unscrew lock nut on M10 setscrew.
- Tighten setscrew using torque gauge X899.980.151 until tightening torque of **4.0 to 5.0 Nm (rear wheel locks)** is reached.

If new brake package has been fitted

- Tighten setscrew to **15 Nm (brake package moves into contact)**.
- Loosen setscrew.
- Tighten setscrew to **4.0 to 5.0 Nm (rear wheel locks)**.

Fav 900 /21/ ...

Unscrew setscrew by 1 2/3 turns (rear wheel can be turned) and then lock.

Fav 900 chassis number 23/3001 and up

Unscrew setscrew by 2/turns (rear wheel can be turned) and then lock.

- Tighten hexagon nut to **40 +5 Nm**.

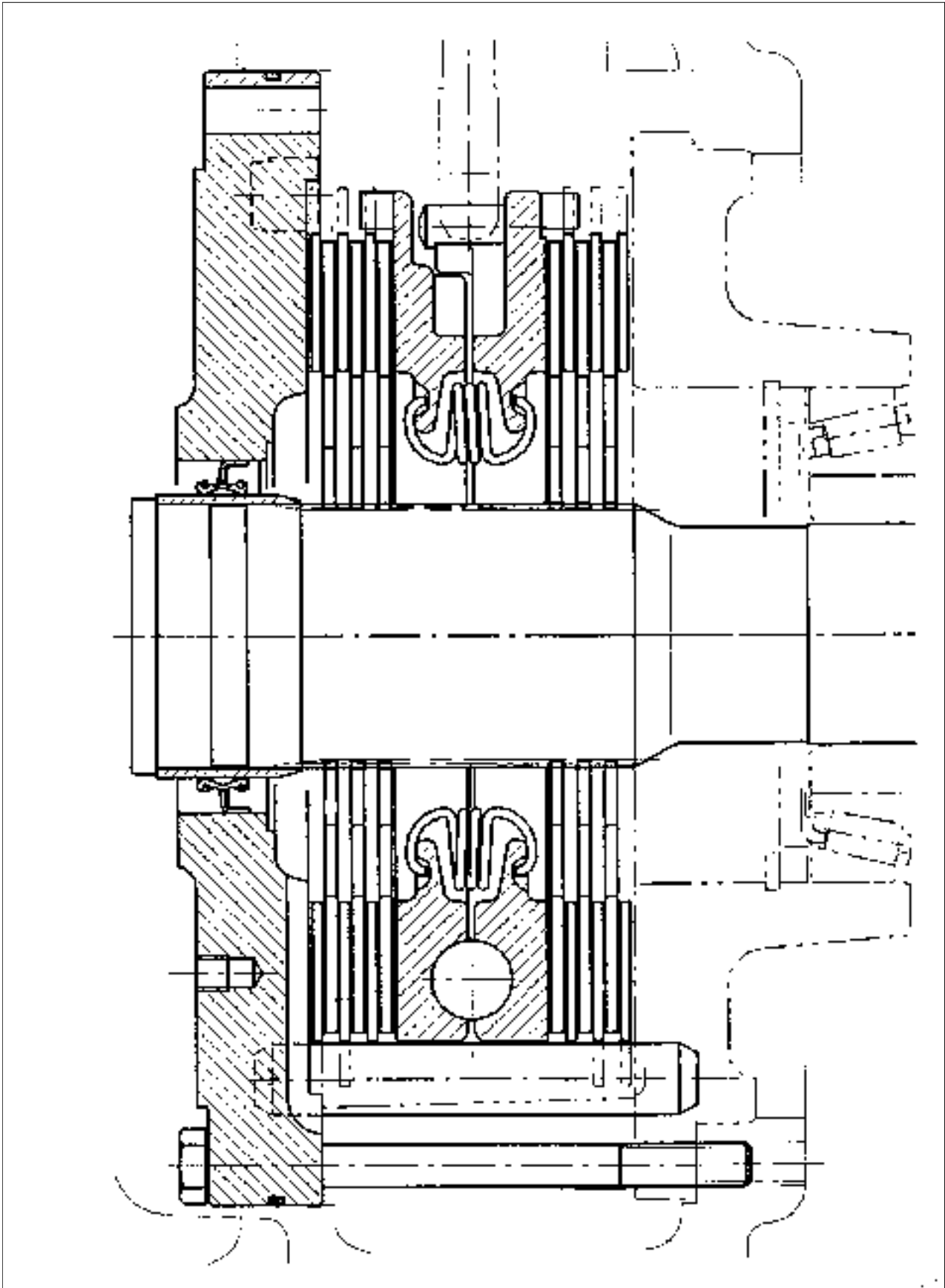
Note:

When locking, only tighten hexagon nut. Outer hexagon socket (or inner hexagon socket) is only for holding, not for locking.

Chapter 1070 Reg. C - Technical drawing of brake cylinder

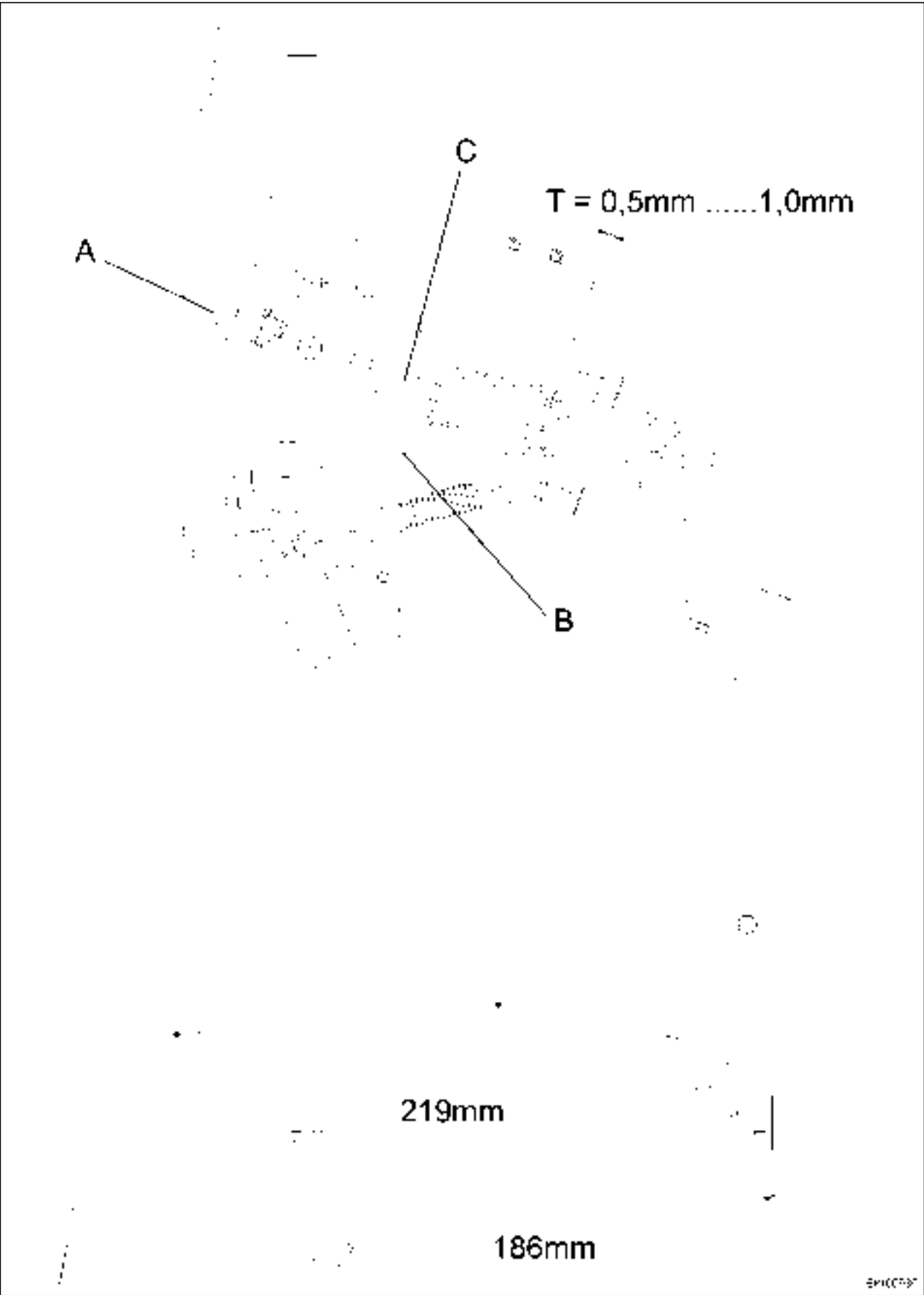
- Fit upper part of brake cylinder.

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 15.10.2001 | a | 3/3 | 1070 | C | 000003 |

Fav 900**Transmission / Brake system**
Technical drawing of rear brake**C**

| Date | Version | Page | Technical drawing of rear brake | Capitel | Index | Docu-No. |
|------------|---------|------|---------------------------------|---------|-------|----------|
| 16.10.2001 | a | 1/1 | | 1070 | C | 000004 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Transmission / brake system Setting master brake cylinder | E |
|---|--|----------|



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|-----------|----------|------|---|----------|---------------|
| 17.1.2001 | b | 1/2 | Setting master brake cylinder 1070 | E | 000001 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Transmission / brake system Setting master brake cylinder | E |
|---|---|----------|

Fault: Brake system does not release (becomes hot without brake being actuated).

Possible causes:

- **Check settings on master brake cylinder.**
- **Check brake cylinder setting.**

Checking settings on master brake cylinder

Release steering column cover.

Remove combi-instrument.

Setting brake pedal travel.

Brake pedals locked and in rest position.

Distance from brake pedal pivot point to brake pedal foot plate **approx. 219 mm** (corresponding to pedal travel of approx. 186 mm).

In event of deviations coat thread of stop screws **A** with synthetic bonding agent X 903.050.084.

Set measurement of 219 mm and lock with lock nut. Set second stop screw in same manner. Ensure that snubbers are fitted to stop screws.

Note:

This dimension only has to be measured in exceptional cases, e.g. after replacing the brake pedals.

Setting piston rod play (T)

Set **piston rod play T=0.5 to 1.0 mm** with brake pedals locked, corresponding to **pedal travel of approx. 3 mm**.

In event of deviations, turn piston rod as appropriate and lock with lock nut **C**.

Set second piston rod in same manner.

Setting piston travel

Release brake pedals. Open relevant bleed valve with full brake system. Depress brake pedal as far as stop. Tighten stop screw **B** until piston in master brake cylinder has reached limit position. Then unscrew stop screw **B by one revolution** (corresponding to approx. 1 mm clearance at base of piston) and lock.

Set second master brake cylinder in same manner.

Note:

To set brake cylinder see: - Installation and removal of brake cylinder - Chapter 1070 Index G
To bleed brake hydraulics - Chapter 1070 Index G

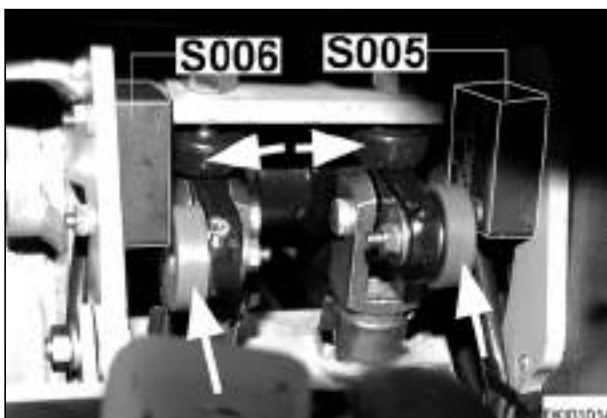
| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|----------|------|-------------|----------|---------------|
| 17.1.2001 | b | 2/2 | 1070 | E | 000001 |

Farmer 400
Fav 700
Fav 900

Transmission / brake system

Setting magnet for solenoid switch (S005 / S006)

E



Setting magnet for solenoid switch S005 S006

At top of steering column.

Remove combi-instrument A007.

Loosen feed reservoir for brake and clutch hydraulic system and swivel to one side.

1. Release brake pedals. Setting is carried out individually.
2. Place 3 mm thick spacer (DIY) between snubber of stop screw **A** and brake pedal **E** (corresponding to pedal travel of approx. 16 mm).
3. Connect test lamp to pin 1 (brown) and pin 2 (white), (brake light / trailer advance-braking control system) of solenoid switch **S005**.

Note:

Elec. circuit diagram for brake light, compressed-air advance control system - Chapter 9000 Index C page 9

4. Slide magnet **D** towards switch **S005** until test lamp lights up.
5. Tighten magnet **D**.
6. Remove 3 mm spacer from between snubber of stop screw **A** and brake pedal **E**.

Checking setting

- Set ohmmeter to 2 KOhm range and connect to pin 3 (white) and pin 4 (brown/yellow) (diff. lock / control console A004) of switch **S005**.

Note:

Elec. circuit diagram for 4WD and diff. locks - Chapter 9000 Index C page 30

Brake pedal **E** released and not operated

- Pilot bulb of test lamp must light up.
- Ohmmeter must indicate **approx. 120 ohms**.



Release and operate brake pedal **E**.

- Pilot bulb of test lamp must go out after brake pedal travel of 25 mm.
- Ohmmeter must indicate **approx. 500 ohms** after **25 mm** at latest.

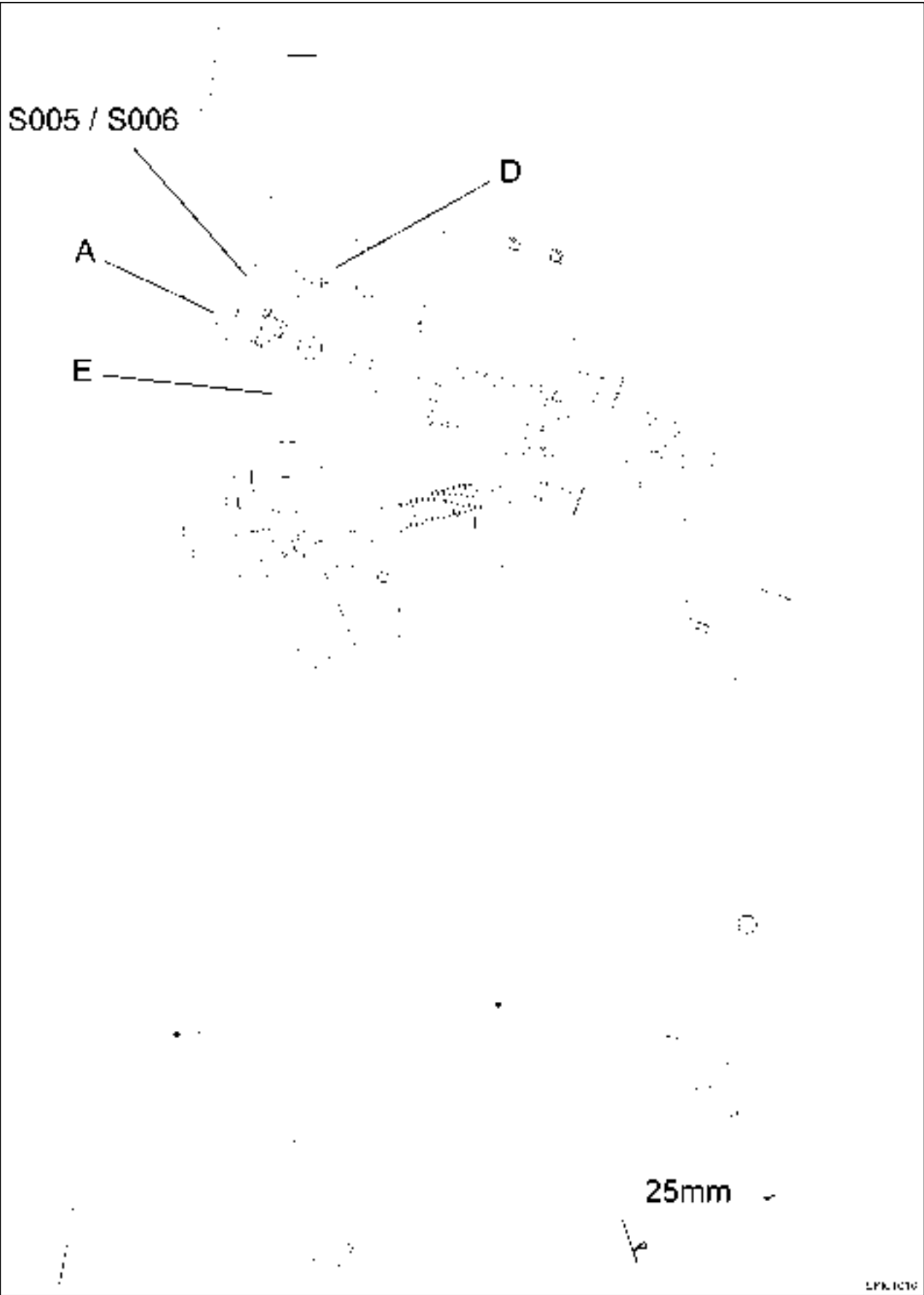
Magnet for solenoid switch S006 is set in same fashion

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|----------|---------|------|---------|-------|----------|
| 8.2.2001 | a | 1/2 | 1070 | E | 000002 |

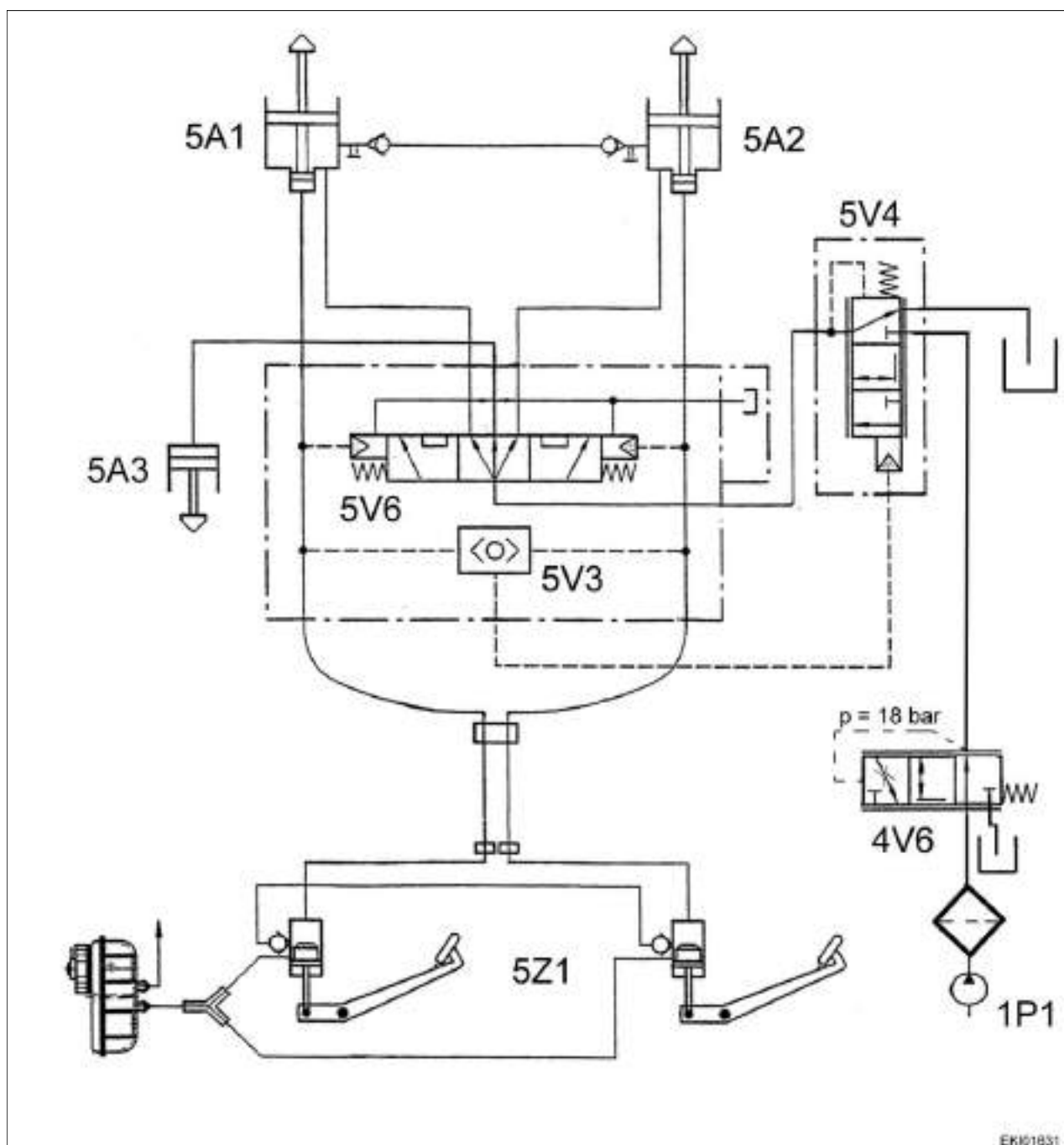
Setting magnet for solenoid switch (S005 / S006)

<https://www.truck-manuals.net/>

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Transmission / brake system Setting magnet for solenoid switch (S005 / S006) | E |
|---|---|----------|



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|----------|---------|------|---------|-------|----------|
| 8.2.2001 | a | 2/2 | 1070 | E | 000002 |



| Item | Designation | Item | Designation |
|------|---|------|----------------------------------|
| 1P1 | Servopump | 4V6 | Pressure-relief valve, rear axle |
| 5A1 | Brake cylinder, right | 5V3 | Shuttle valve |
| 5A2 | Brake cylinder, left | 5V4 | Relay valve, brake |
| 5A3 | Cardan brake | 5V6 | Selector valve |
| 5Z1 | Brake pedals with master brake cylinder | | |

Fav 900

Transmission / Brake system

Bleeding brake hydraulic system

G



Bleeding clutch actuation system and brakes

Important:

Do not use brake fluid for brake and clutch actuation system.

Only Pentosin order no. X902.011.622 is permissible (1l container).

Feed reservoir at top front of steering column.



Bleeding brakes

Lock brake pedals. Depress brake pedals and slowly release.

Wait for at least 15 seconds before depressing again so that Pentosin is discharged from relevant bleed valve without bubbles, then close bleed valve.

Top up feed reservoir to max. level with Pentosin.



Bleeding sequence: at rear of tractor

1 = 5A1 right brake cylinder and trailer brake valve air compressor



2 = 5A2 left brake cylinder

3 = 5V6 selector valve

4 = 5V4 brake relay valve

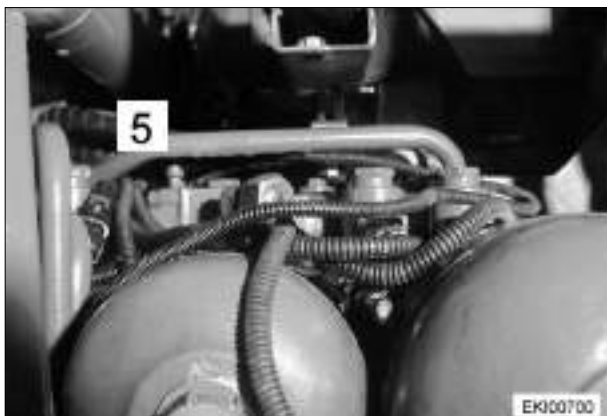
K = 4V5 clutch pressure-relief valve

(Clutch actuation system can be bled independently of brake, see Chapter 1100 Reg. G).

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|------------|---------|------|---------------------------------|-------|----------|
| 13.06.2001 | a | 2/3 | Bleeding brake hydraulic system | 1070 | G |
| | | | | | 000005 |

Fav 900

Transmission / Brake system
Bleeding brake hydraulic system

G

When hydraulic trailer brake is fitted
 right-hand side of tractor, on central control block
5 = hydraulic trailer brake valve (ABV)

**Test :**

Handbrake released.

Depress brake pedals with force of 500 N.

Max. free travel with pedals locked 120 mm.

Max. free travel with pedals released on right
 150 mm.

Max. free travel with pedals released on left and
 without hydraulic trailer brake 140 mm.

Max. free travel with pedals released on left and
 with hydraulic trailer brake 150 mm.

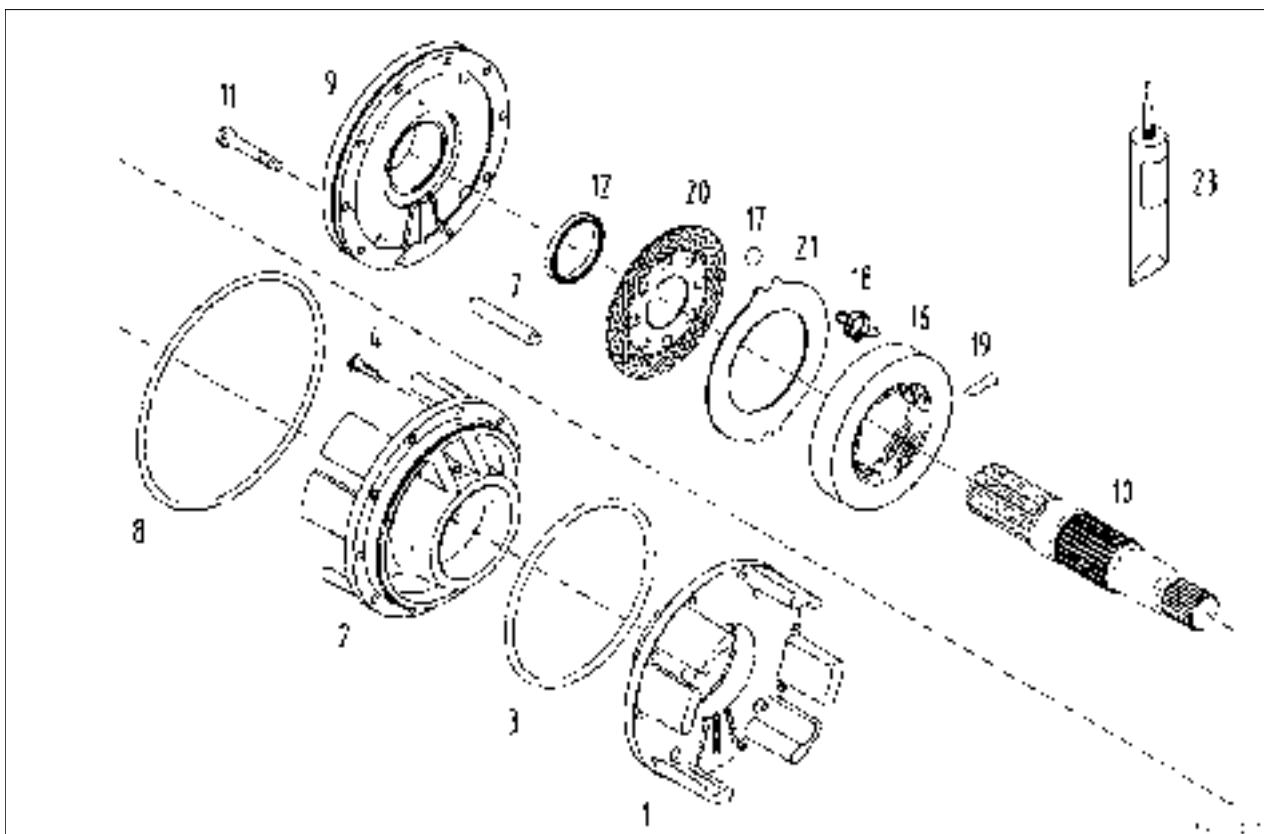
If these figures are exceeded, there is still air in
 system.

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|------------|---------|------|---------|-------|----------|
| 13.06.2001 | a | 3/3 | 1070 | G | 000005 |

Fav 900

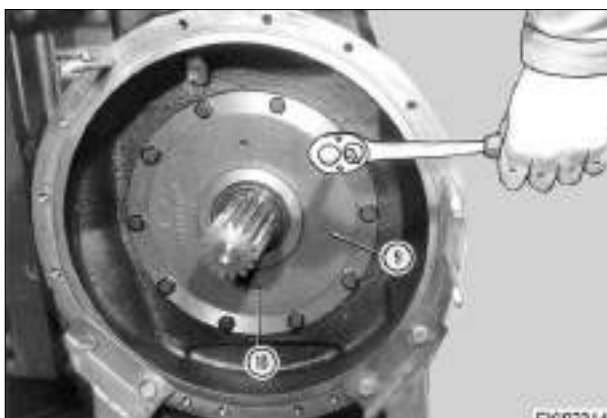
Transmission / Brake system

Installation and removal of rear-wheel brake

G

| Item | Designation | Item | Designation |
|------|----------------------------|------|---------------------------|
| 1 | Bearing flange | 12 | Shaft seal |
| 2 | Bearing flange | 16 | Actuating disc |
| 3 | O-ring | 17 | Ball |
| 4 | M12x40-10.9 hexagon screw | 18 | Extension spring |
| 7 | Pin | 19 | Parallel pin |
| 8 | O-ring | 20 | Brake pad |
| 9 | Brake plate | 21 | Externally toothed disc |
| 10 | Shaft | 23 | Surface seal X903.050.074 |
| 11 | M12x160-10.9 hexagon screw | | |

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| 09.10.2001 | a | 1/4 | 1070 | G | 000006 |

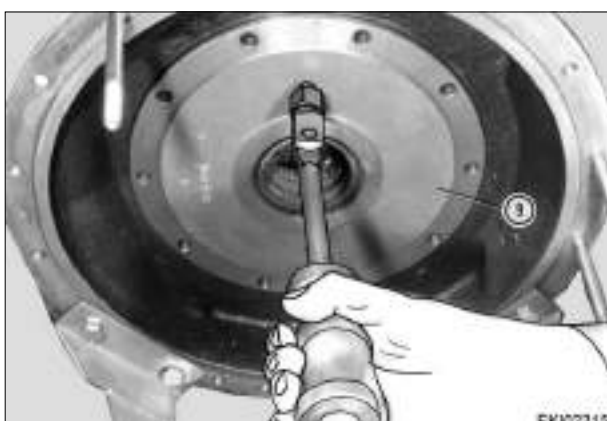


**Preliminary work: Chapter 1015 Reg. G -
 Installation and removal of axle drives**

Removal

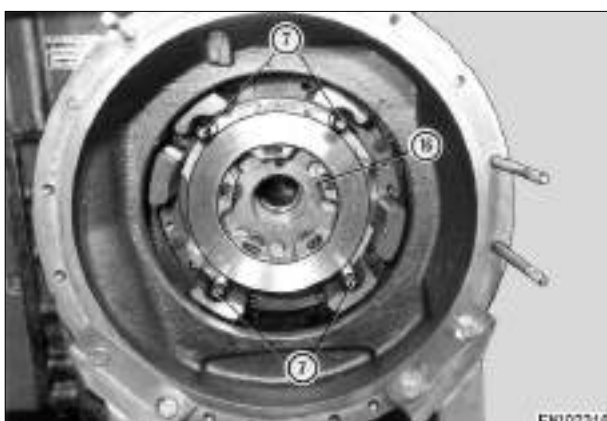
Remove relevant actuating cylinder
 (brake cylinder).

Remove shaft (10). Unscrew hexagon screws
 from brake plate (9).



Withdraw brake plate (9) using slide hammer
 puller X 899.980.053.

Remove internally and externally toothed discs.



Remove actuating disc (16) and other internal and
 external discs.

Withdraw pins (7).

Disassemble other side in same manner.



Installation

Note:

**Check brake discs for scoring and corrosion.
 Oil brake discs before fitting.**

Insert discs (washers).

Start with intermediate disc (21), then brake pad
 (20), with large bore (arrowed) pointing
 downwards (simplifies insertion of shaft (10) at
 end, see photo EKI02325).

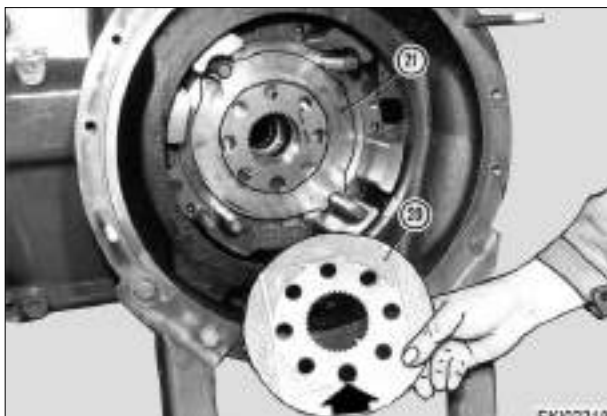
| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 09.10.2001 | a | 2/4 | 1070 | G | 000006 |

Fav 900

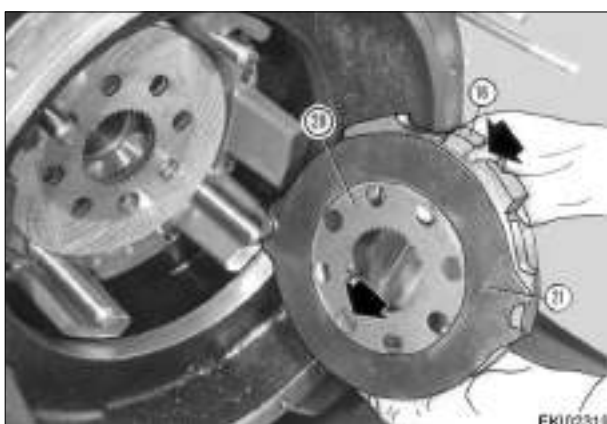
Transmission / Brake system

Installation and removal of rear-wheel brake

G



Insert intermediate disc (21) offset, then brake pad (20), with large bore (arrowed) pointing downwards.



Lay brake pad (20) with large bore (arrowed) pointing downwards onto actuating disc (16). Actuating cams (arrowed) point upwards towards brake cylinder.

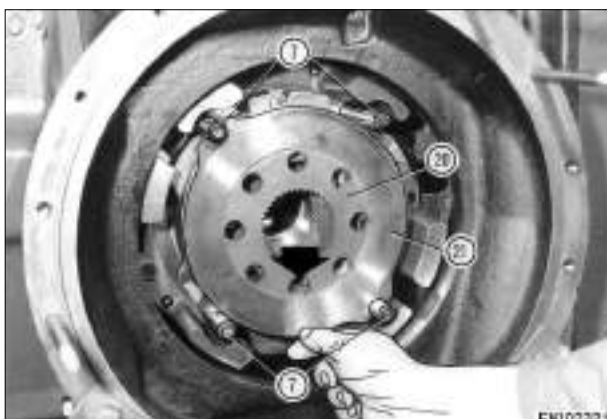
Lay intermediate disc (21) on cams of actuating disc (16) (see photo).

Insert pre-assembled brake package.



Lay brake pad (20) with large bore (arrowed) pointing downwards onto actuating disc (16).

Then lay intermediate disc (21) on cams (arrowed) of actuating disc (16).



Insert brake pad (20) with large bore (arrowed) pointing downwards.

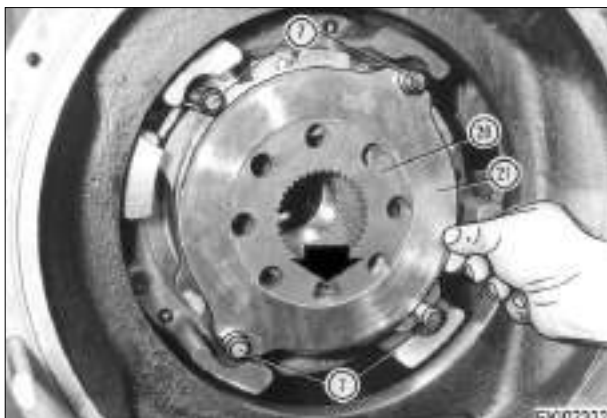
Then slide intermediate disc (21) onto pins (7).

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Fav 900

Transmission / Brake system

Installation and removal of rear-wheel brake

G

Insert brake pad (20) with large bore (arrowed) pointing downwards.

Then slide intermediate disc (21) offset - see photos EKI02321 and EKI02322 - onto pins (7).



Coat new shaft seals (12) on outside with spirit/water mixture (ratio 1:1) and press centrally into brake plate (9). Sealing lips point to respective oil chamber.

Insert new O-ring (8) into groove in brake plate (9) and grease. Oil ducts (arrowed) in brake plate (9) point downwards when fitted.



Fit pre-assembled brake plate (9). Check position of oil ducts - see photo EKI02323.

Tighten hexagon screws crosswise in stages to 120 Nm.



Fill sealing lips of shaft seals (12) 2/3 with grease. Fully insert shaft (10).

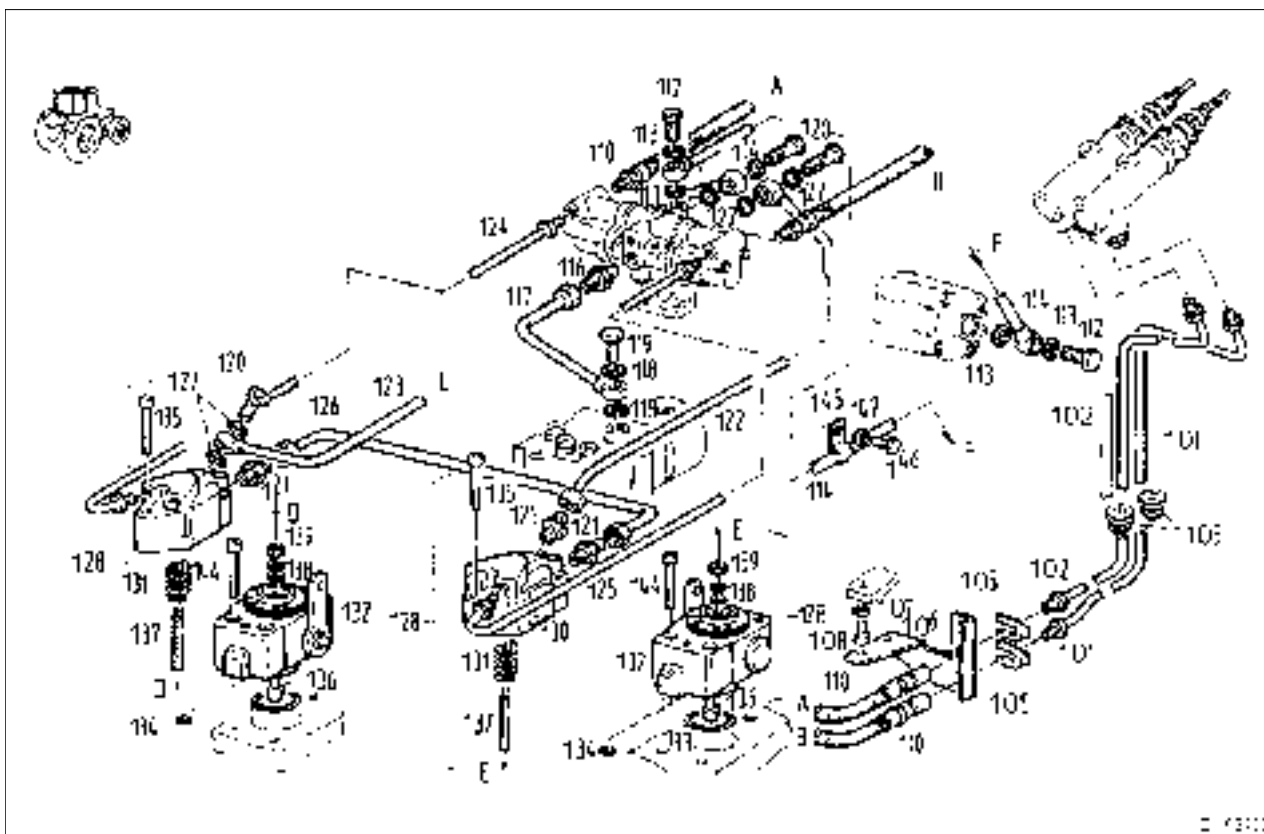
Metallic stop must be audible when shaft is inserted.

If metallic stop is not audible, it is possible that last brake pad was not fitted.

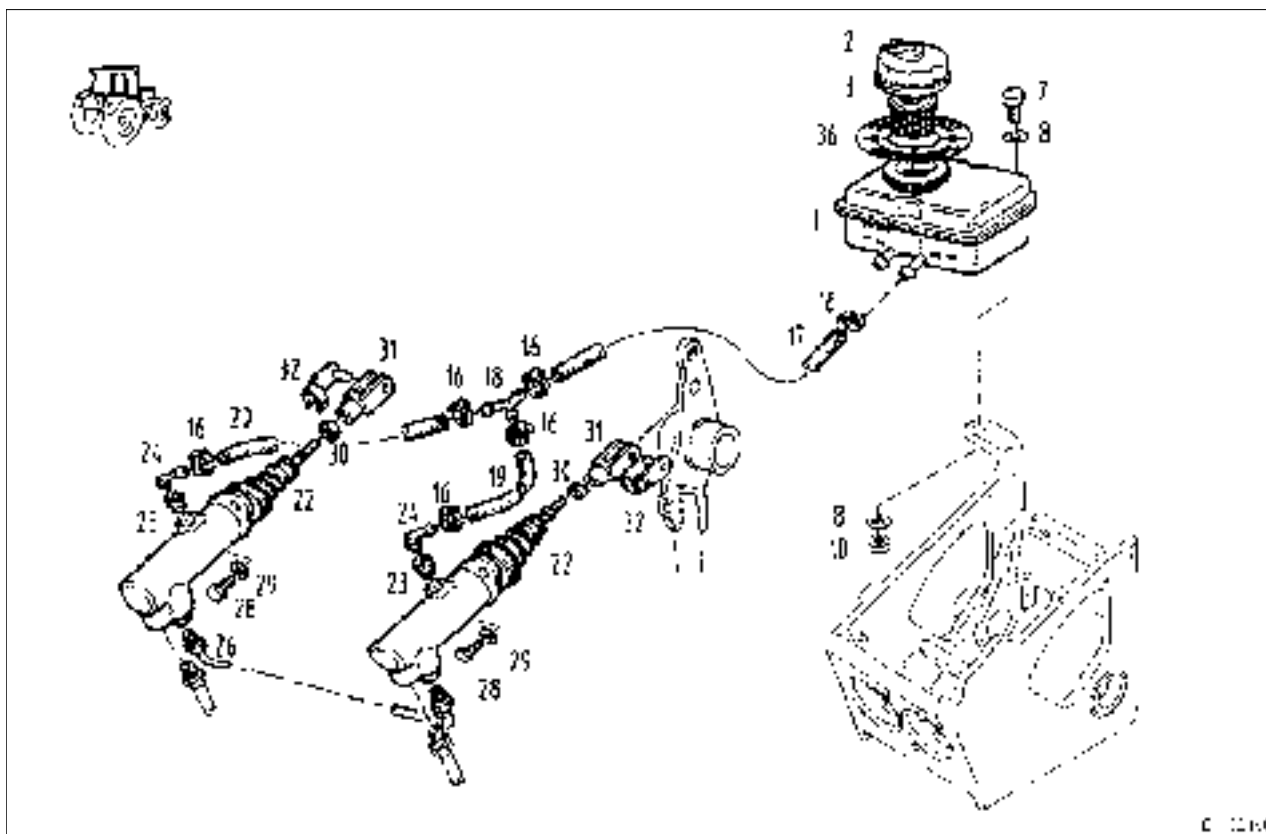
Chapter 1015 Reg. G - Installation and removal of axle drives

Chapter 1070 Reg. G - Installation and removal of brake cylinders

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| Item | Designation | Item | Designation |
|------|--------------------|------|-----------------------------------|
| 101 | Brake line | 126 | Pressure pipe |
| 102 | Brake line | 127 | Sealing ring |
| 103 | Grommet | 128 | Brake cylinder (left) |
| 105 | Hose bracket | 128 | Brake cylinder (right) |
| 106 | Bracket | 128 | Seal set |
| 107 | Spring washer | 130 | Brake cylinder (upper part) |
| 108 | Self-tapping screw | 131 | Compression spring |
| 110 | Brake hose | 132 | Brake cylinder (lower part) |
| 112 | Hollow-core screw | 132 | Brake cylinder (lower part) |
| 113 | Sealing ring | 133 | Sealing ring |
| 114 | Pressure pipe | 134 | O-ring |
| 116 | Screw socket | 135 | Socket head cap screw |
| 117 | Pressure pipe | 136 | Wedge |
| 118 | Sealing ring | 137 | Setscrew |
| 119 | Hollow-core screw | 138 | Washer |
| 120 | Hollow-core screw | 139 | Hexagon nut |
| 121 | Screw socket | 144 | M10x50-10.9 socket head cap screw |
| 122 | Pressure pipe | 145 | Clip |
| 123 | Pressure pipe | 146 | Hexagon screw |
| 124 | Brake line | 147 | Washer |
| 125 | Brake line | | |



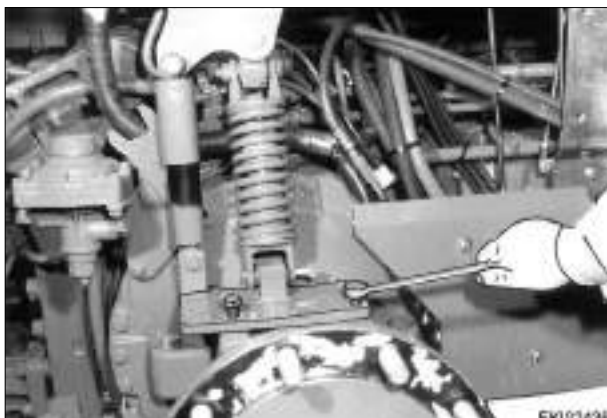
| Item | Designation | Item | Designation |
|------|-------------------|------|-----------------------|
| 1 | Double reservoir | 22 | Master brake cylinder |
| 2 | Cover with switch | 22 | Repair kit |
| 3 | Strainer sleeve | 23 | Rubber plug |
| 7 | Hexagon screw | 24 | Elbow joint |
| 8 | Washer | 26 | Compensating line |
| 10 | Hexagon nut | 28 | Hexagon screw |
| 16 | Hose clip | 29 | Spring washer |
| 17 | Pressure hose | 30 | Hexagon nut |
| 18 | Socket | 31 | Fork connection |
| 19 | Pressure hose | 32 | Pin |
| 20 | Pressure hose | 36 | Marking plate |

Fav 900

Transmission / Brake system

Installation and removal of brake cylinders

G



Removing brake cylinder

Note:

The work was carried out on a Fav 900/21/....
Carry out work on a Fav 900 chassis number
23/3001 and up in same manner.

Remove rear wheels.

Prop tractor, taking appropriate safety
precautions.

Remove panel from right mudguard.

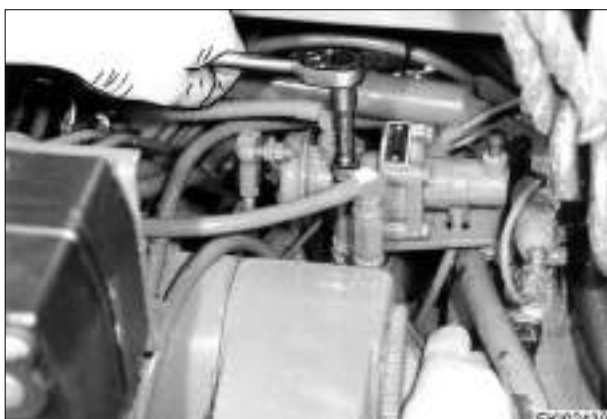
Unscrew support on left and right from axle
housing.



Attach cab at rear left and right to hoist, taking
appropriate safety precautions, and raise until cab
is in contact with bonnet.



Only raise cab until it is in contact with bonnet
(arrowed)



Remove trailer valve of air compressor at rear
right.

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| 29.10.2001 | a | 3/7 | 1070 | G | 000007 |

Fav 900

Transmission / Brake system

Installation and removal of brake cylinders

G



Remove stabiliser strut.

Unscrew lines at right brake cylinder (130).



Do not actuate handbrake.

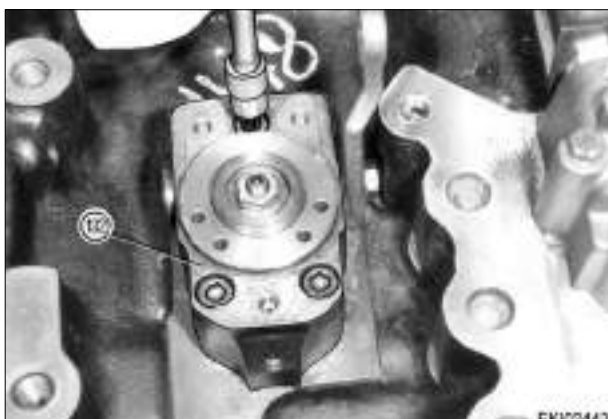
At rear left remove split pin from actuating rod of diaphragm cylinder (handbrake) and detach.

Then actuate handbrake.

Unscrew lines at left brake cylinder (130).



Remove brake cylinder (130).



Remove left and right brake cylinders (132).

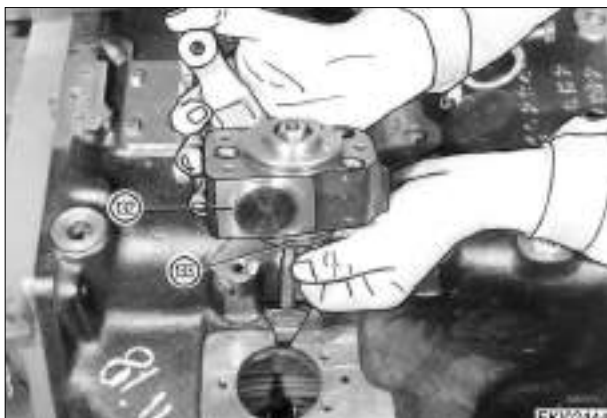
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Fav 900

Transmission / Brake system

Installation and removal of brake cylinders

G



Installing brake cylinders

Fit new sealing ring (133) to brake cylinder (132).

Grease sealing ring (133) before fitting.

When fitting, press actuating rod upwards and actuating lever forwards.

Tighten M10 fastening screws to **49 Nm**.

Note:

Installation and setting are carried out in same manner on left and right.



Setting brake cylinder (132)

- Tighten setscrew (137) using torque gauge X899.980.151 until tightening torque of **4.0 to 5.0 Nm (rear wheel locks)** is reached.

If new brake package has been fitted

- Tighten setscrew (137) to **15 Nm (brake package moves into contact)**.
- Loosen setscrew (137).
- Tighten setscrew (137) to **4.0 to 5.0 Nm (rear wheel locks)**.

Fav 900 /21/ ...

Unscrew setscrew (137) by 1 2/3 turns (rear wheel can be turned) and then lock.

Fav 900 chassis number 23/3001 and up

Unscrew setscrew (137) by 2 turns (rear wheel can be turned) and then lock.

- Tighten hexagon nut (139) to **40 +5 Nm**.

Note:

When locking, only tighten hexagon nut (139). Outer hexagon socket (or inner hexagon socket) is only for holding, not for locking.

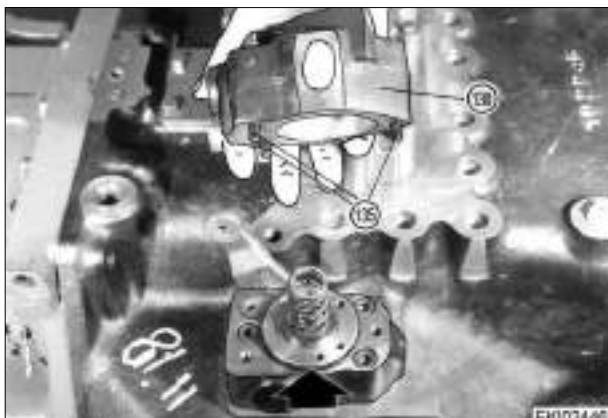
Chapter 1070 Reg. C - Technical drawing of brake cylinder

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Fav 900

Transmission / Brake system

Installation and removal of brake cylinders

G

Insert new O-ring (arrowed) and grease
 Locate compression spring and fit brake cylinder (130) (upper part).
 Tighten socket head cap screws (135) to **25 Nm** .



Connect lines on left and right brake cylinders.
 Use new sealing rings.



Pin actuating rod of diaphragm cylinder (handbrake) and secure with split pin.



Fit stabiliser strut.

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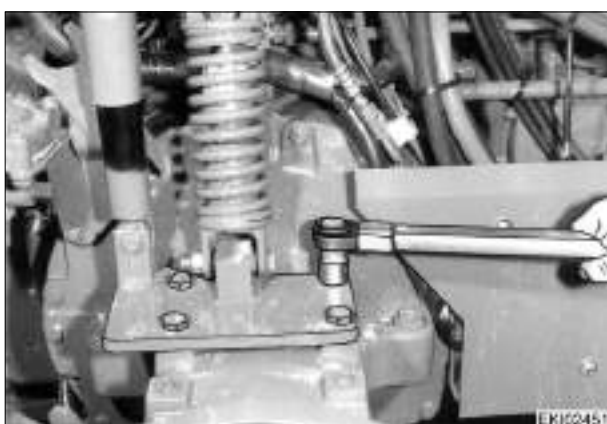
Fav 900

Transmission / Brake system

Installation and removal of brake cylinders

G

Fit trailer valve at rear right.
Connect lines which were removed.



Lower cab.
Tighten support for cab mount left and right to **210 Nm** .
Fit panel to right mudguard.

Note:

Chapter 1070 Reg. G - Bleeding brake hydraulic system

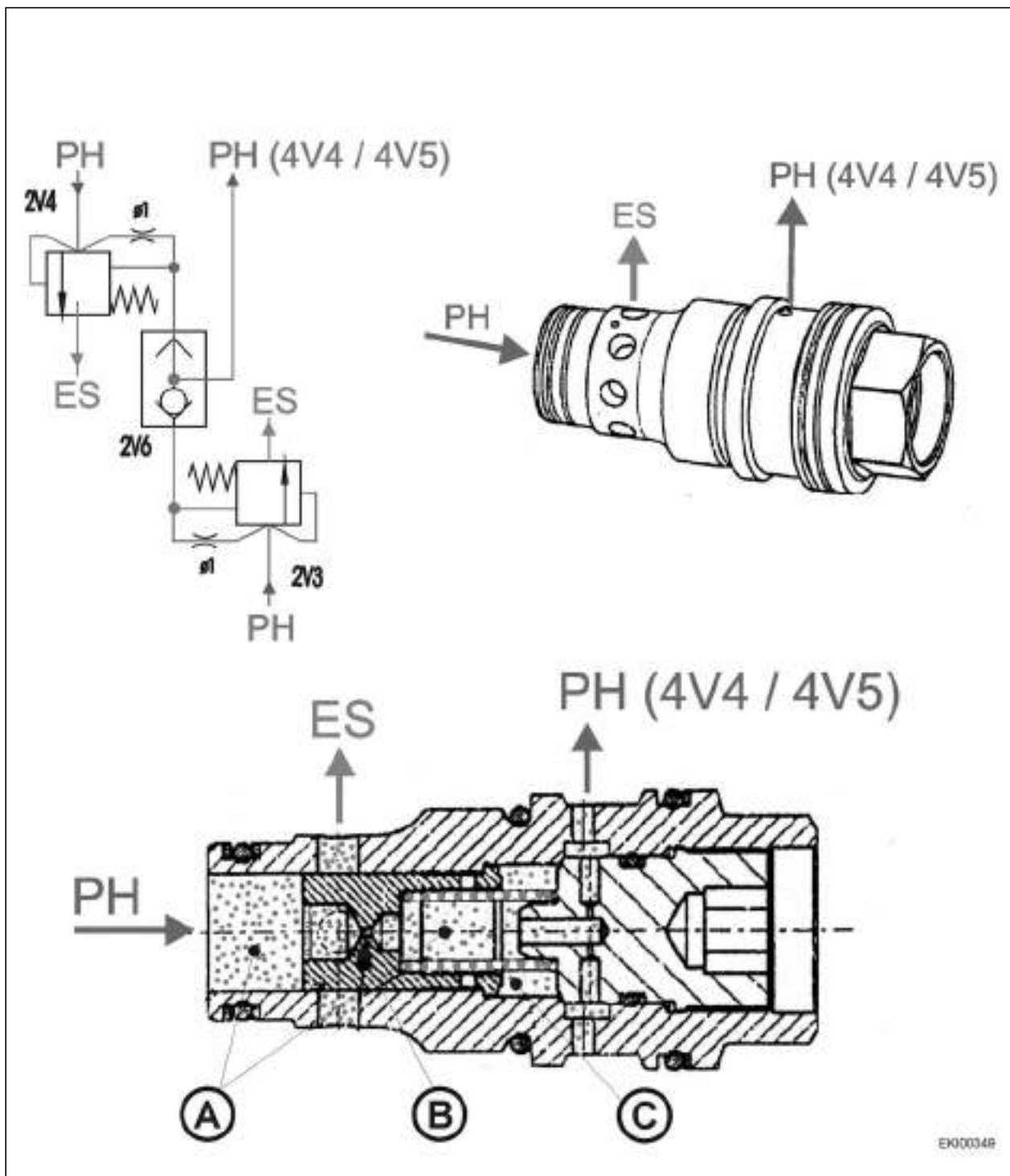
Fit rear wheels, tighten wheel nuts to **620 Nm** .
Unjack tractor.

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| 29.10.2001 | a | 7/7 | 1070 | G | 000007 |

Farmer 400
Fav 700
Fav 900

Transmission / Vario transmission unit
2V3 / 2V4 high-pressure-relief valve forwards / reverse

A



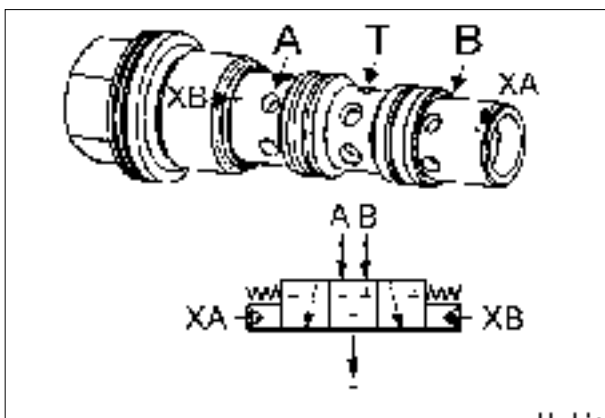
- A = The pressure is equal in both chambers if the clutch/turboclutch valve is closed. The spring holds the piston closed.
- B = If the clutch or turboclutch valve is open, the pressure drop via the diaphragm (x piston surface area) is greater than the spring load. The piston moves to the right and connects PH with ES.
- C = The pressure is relieved by the clutch and turboclutch valves.

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| 05/2000 | a | 1/1 | 2V3 / 2V4 high-pressure-relief valve forwards / reverse 1080 | A | 000001 |

Farmer 400
Fav 700
Fav 900

Transmission / Vario transmission unit 2V5 - flush valve (operation)

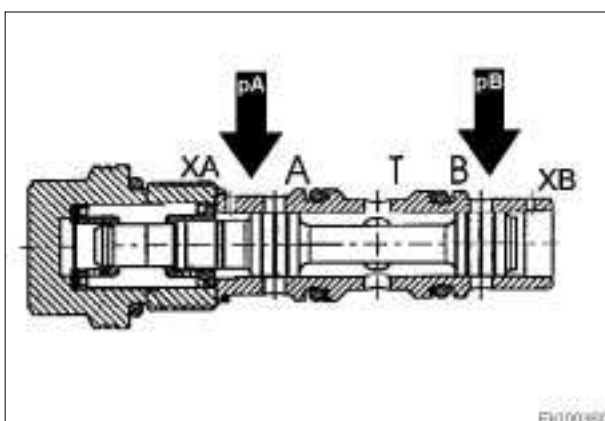
A



Pressure at **A, B** max. 500 bar

Pressure at **T** max. 50 bar

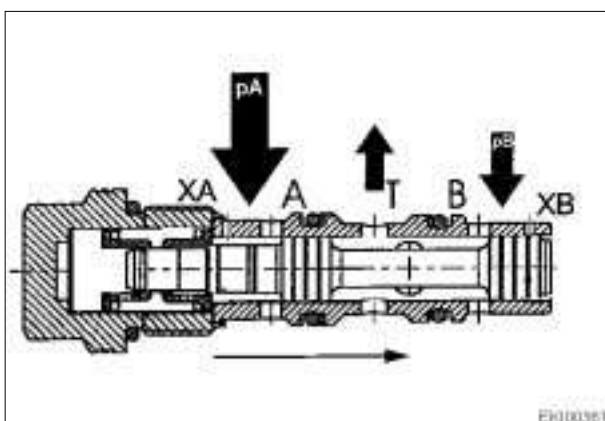
Opening pressure: $\Delta p = 7$ bar between **A** and **B**



Transmission in "neutral"

$p_A = p_B$, $\Delta p < 7$ bar

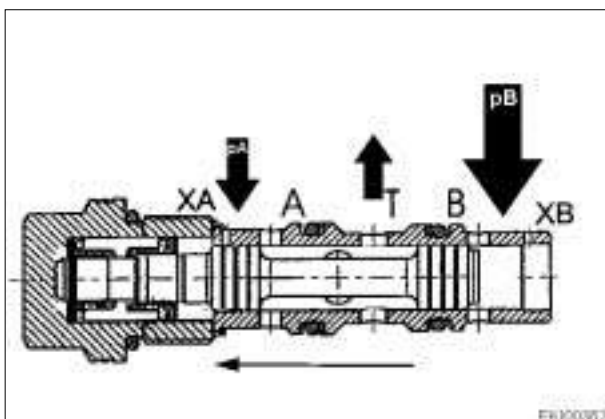
Piston is held in mid-position by spring force.
Both channels (**A, B**) are closed.



"Tractive mode"

$p_A > p_B$, $\Delta p > 7$ bar

Piston is pushed upwards via control bore **XA**.
Channel **B** is linked to **T**. Hot oil can flow from low-pressure side **B** via **T** to discharge connection and to oil cooler.



"Pushing mode"

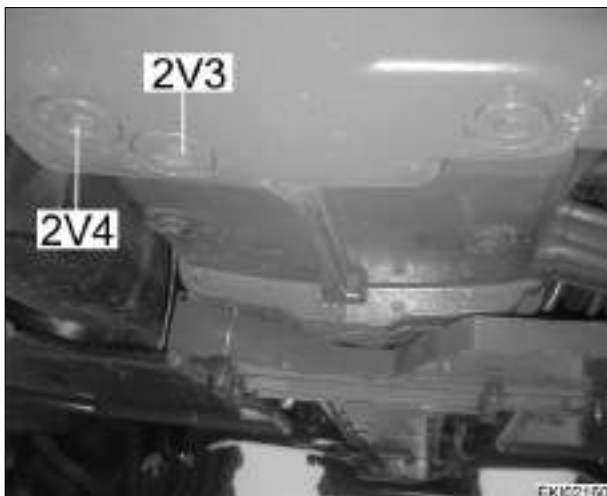
$p_A < p_B$, $\Delta p > 7$ bar

Piston is pushed downwards via control bore **XB**.
Channel **A** is linked to **T**. Hot oil can flow from low-pressure side **A** via **T** to discharge connection and to oil cooler.

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| 06/2000 | a | 1/1 | 2V5 - flush valve (operation) | 1080 | A |

Fav 900

Transmission / Vario transmission unit
Replacing high-pressure-relief valves forwards/reverse

G

Preliminary work: drain transmission oil (approx. 65 l). Unscrew two drain plugs at bottom of transmission.

Remove 2V3 and 2V4 = high-pressure-relief valves using socket head (27 mm).

Note:

2V3 = high-pressure-relief valve forwards

2V4 = high-pressure-relief valve reverse



Photo shows **2V3 = high-pressure-relief valve** removed from transmission.

This high-pressure-relief valve is a servo-assisted pressure-relief valve.

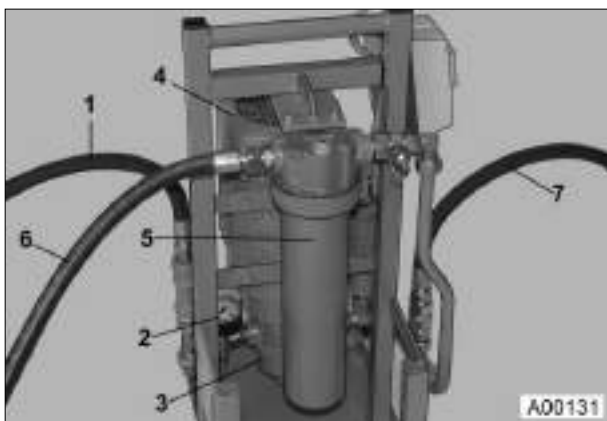
Pressure setting new 500 + 20 bar.

Pressure setting used 480 +/- 20 bar.

Only fit new O-rings is old ones are damaged.

Take care to fit locating rings correctly.

Tighten 2V3 and 2V4 = high-pressure-relief valves to 250 + 20 Nm.

**Note:**

Filling with transmission oil using external oil-filling unit: Chapter 1080 Reg. G

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| 29.8.2001 | a | 1/1 | Replacing high-pressure-relief valves forwards/reverse | 1080 | G | 000012 |

Fav 900**Transmission / Vario transmission unit
Removing flush valve****G**

Preliminary work: drain transmission oil (approx. 65 l). Unscrew drain plug at bottom of transmission.

Unscrew **2V5=flush valve** using socket head (22 mm).

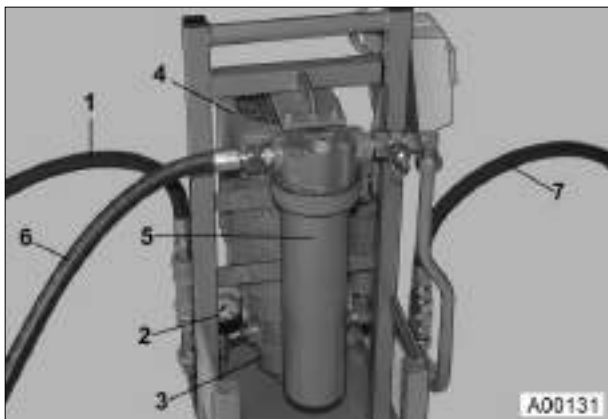


Photo shows **2V5=flush valve** removed from transmission.

Only fit new O-ring if old one is damaged. Take care to fit locating rings correctly, i.e. facing each other. Tighten flush valve to 200 + 10 Nm.

Note:

New 2V5=flush valve with annular groove (arrowed) is also supplied as spare part. Tighten to 250 + 20 Nm.



Note:

Filling with transmission oil using external oil-filling unit: Chapter 1080 Reg. G

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| 29.8.2001 | a | 1/1 | 1080 | G | 000011 |

Fav 900**Transmission / Vario transmission unit
Removing continuously variable transmission****G****Equipment required:**

- hoist (Vario transmission unit 265 kg)
- hoisting yoke (DIY, see Chapter 9920 Reg. A)

Preliminary work

- Raise cab - see Chapter 8100 Reg.G



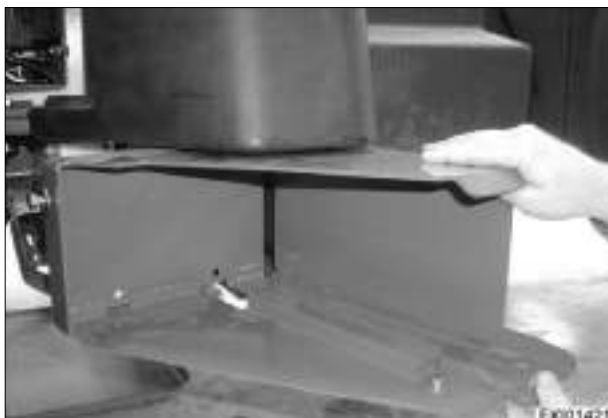
Drain hydraulic oil (approx. 65 l).



Remove step at left.



Remove clamp, braces and bracket (arrowed) from tank.

Fav 900**Transmission / Vario transmission unit
Removing continuously variable transmission****G**

Open battery case and remove toolbox storage compartment.



Remove cover panel from spill valve and air tank.



Remove guard from fuel hose.
Release clip (arrowed).

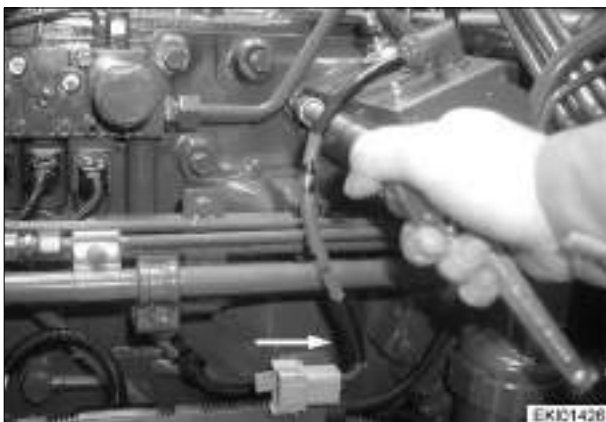


Withdraw tank carefully.

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| 14.5.2001 | a | 2/7 | 1080 | G | 000006 |

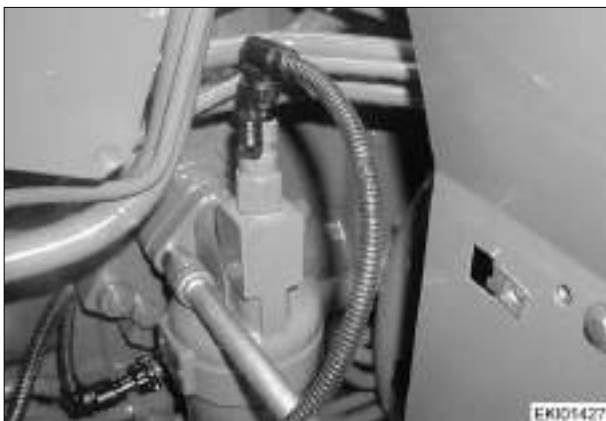
Fav 900**Transmission / Vario transmission unit
Removing continuously variable transmission****G****Note:****Shift range control to neutral position**

Remove auxiliary lever support.



Disconnect cable coupler X037. Unlock plug housing and slide out of bracket in direction of arrow.

Remove A009 - actuator unit.



Disconnect cable coupler X228.

Remove pressure filter housing. Collect any draining oil.



Disconnect cable coupler X158 and hydraulic lines.

Remove valve unit.

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| 14.5.2001 | a | 3/7 | Removing continuously variable transmission 1080 | G | 000006 |

Fav 900

Transmission / Vario transmission unit
Removing continuously variable transmission

G

Disconnect cable couplers, clutch-bleed line and hydraulic lines.

Remove valve unit.



Disconnect cable coupler X163 and remove B014 = sensor, accumulator shaft.



Remove bracket for pipes and clamp.

Unscrew screws from cover.

Screw in M10 eye bolt and raise cover.



Unscrew stud bolt and withdraw actuator shaft.

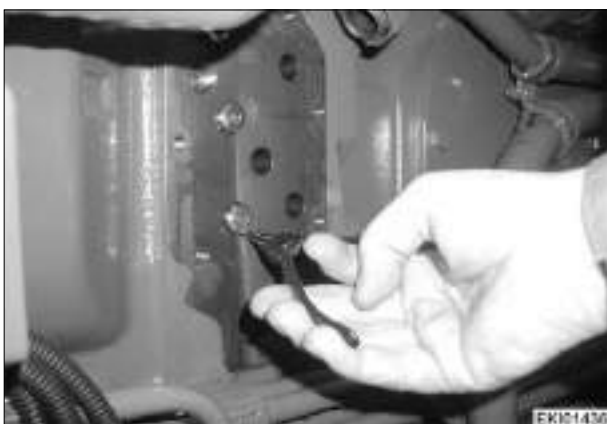
Fav 900

Transmission / Vario transmission unit
Removing continuously variable transmission

G

Unclip circlips and press hose assemblies inwards.

Disconnect high-pressure line (steel line).



Unclip three circlips and press hose assemblies inwards.



Remove hydraulic hose (pressure supply to enhanced shift system).

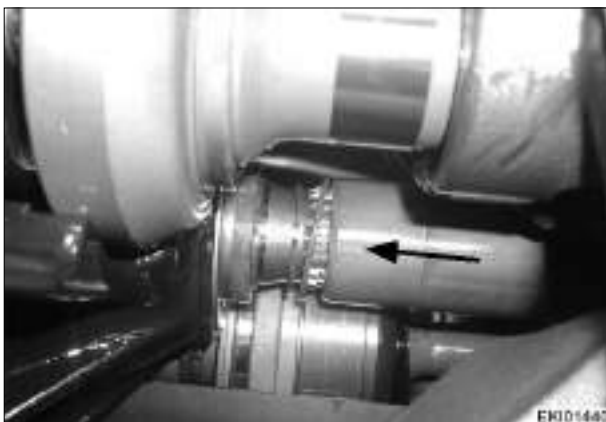


Unclip drive shaft circlip.

Push drive shaft to rear.

Fav 900**Transmission / Vario transmission unit
Removing continuously variable transmission****G**

Unscrew three M8 hexagon screws from planetary gear.
Push drive shaft to rear.



Unclip circlip from pinion shaft.
Slide circlip, washer and coupling sleeve onto pinion shaft in direction of arrow.



Pivot hydraulic motors inwards using tyre lever.



Unscrew two hexagon nuts (arrowed) on both left and right sides.

Fav 900
Transmission / Vario transmission unit
Removing continuously variable transmission
G

Release upper M12 clamping screws.

Unscrew two drain plugs on underside of transmission housing.

Collect any draining oil.

Release two clamping screws in same manner as above.



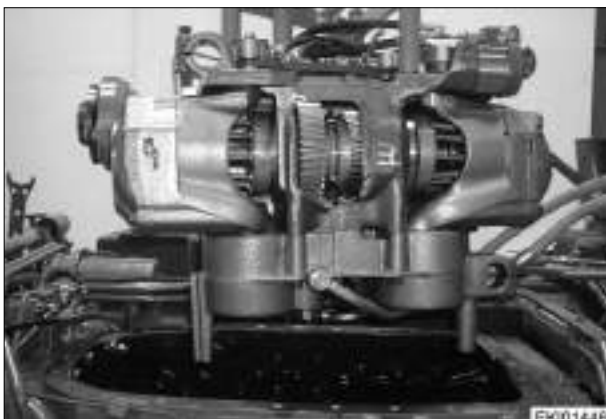
Attach hoisting yoke.

Attach load hook and take up tension.



Screw on slide hammer puller with modified M20 nut (DIY).

Withdraw shafts for flexible mounting.



Raise transmission unit carefully out of transmission housing using hoist.

Ensure clearance of all components.

Do not walk or stand under suspended loads!

Fav 900

Transmission / Vario transmission unit

Fitting continuously variable transmission

G

Attach transmission unit to hoist, taking appropriate safety precautions.

Shift range control I - II (arrowed) to "Neutral" (in mid-position).



Clean seal surfaces on transmission housing to remove oil and seal residues.

Move selector finger (arrowed) of range control I - II in transmission housing to "Neutral" (in mid-position).



Where removed:

Clamp circlip and washer to collar of pinion shaft. Slide coupling sleeve onto pinion shaft in direction of arrow until stop is reached.

Locate flange on connection shaft (PTO drive) and insert connection shaft.



Insert ML transmission into transmission housing. Ensure clearance of all components. Insert two shafts into bores of transmission housing and transmission unit.

Note:

Insert short shaft, see photo.

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Transmission / Vario transmission unit
Fitting continuously variable transmission
G

Check bushes (flexible) for wear. If necessary, fit new bushes.

Insert four bushes into bores as far as stop.



Locate ring - with groove pointing to bush (flexible). Then screw on M20 lock nut.

Fit three other nuts and rings in same manner.



Tighten all four M20 nuts to 250 Nm.

Note:

Brace while tightening nuts.

Remove hoist.



Turn one planet wheel of planetary gear of power splitting system upwards.

Align (centre) transmission unit (ML transmission) using feeler gauge.

For example, it must just be possible to fit 0.6 mm between annulus and transmission housing on left and right.

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Fav 900

Transmission / Vario transmission unit

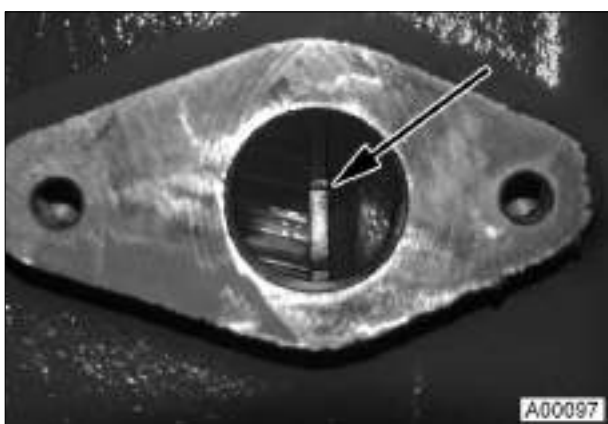
Fitting continuously variable transmission

G

Tighten all four clamping screws to 86 Nm.

Screw in two drain plugs with new seals at bottom of transmission housing and tighten.

Then operate range control I - II (check at selector finger).



Turn ML transmission until tooth of one tooth of toothed washer is in centre of bore (arrowed) for Hall-effect sensor.



Coat seal surface of Hall-effect sensor with sealant X 903.050.553 (non-curing) and insert into bore of transmission housing. Tighten fastening screws to 25 Nm.

Connect electric cable.

Note:

If already installed Hall-effect sensors are re-used, stick two cardboard strips, each 0.9 mm thick, into slit in Hall-effect sensor on left and right (for centring when fitting).



Pivot hydraulic motors outwards as far as stop (45°).

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| 16.05.2001 | a | 3/9 | | 1080 | G | 000007 |

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Transmission / Vario transmission unit
Fitting continuously variable transmission
G

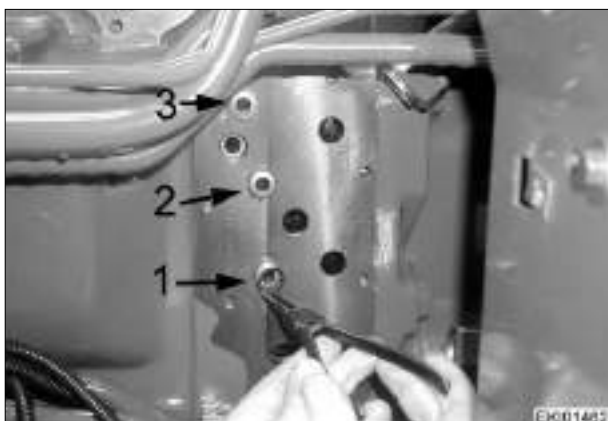
Slide coupling sleeve on pinion shaft forwards until circlip groove is revealed. Clip circlip into groove.

Note:

If coupling sleeve does not engage, jack up one front wheel and turn until coupling sleeve engages.



Mount flange on planetary gear of power splitting system. Tighten three M8 hexagon screws to 25 Nm.



Insert hydraulic hoses into bores of transmission housing at front right.

Hold inserted hoses in place with circlips (opening downwards).

1 = short blue hose (discharge)

2 = long blue hose (feed)

3 = black hose (lubrication)

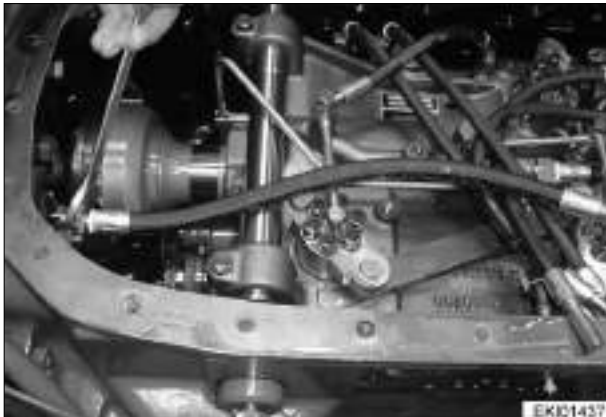


Top front of transmission housing:

Clip snap ring into shaft groove. Slide shaft forwards. Insert washer.

Engage circlip in spur gear groove.

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| 16.05.2001 | a | 4/9 | Fitting continuously variable transmission 1080 | G | 000007 |

Fav 900
Transmission / Vario transmission unit
Fitting continuously variable transmission
G

Fit hydraulic hose (pressure supply to enhanced shift system).



Insert pressure hoses into bores on right in transmission housing.

1 = pressure supply hydraulic hose (enhanced pressure)

2 = range control I

3 = mechanical speed governor

4 = range control II

5 = control valves (adjustment)

6 = high pressure to clutch and turboclutch operation (steel line)



Secure pressure hoses using circlips.

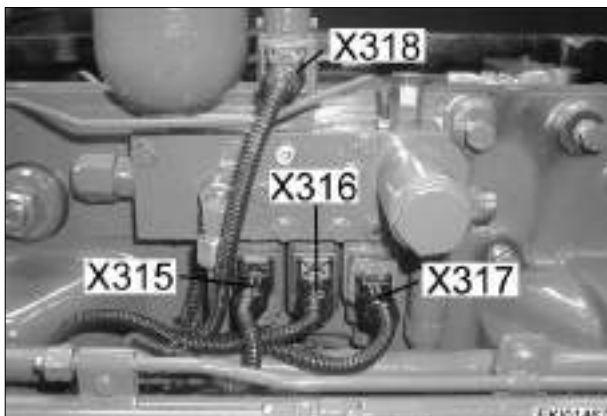


Screw two M8 stud bolts into transmission housing.

Fit new gasket, stick new O-rings into valve unit using a little grease.

Insert valve unit and tighten fastening screws to 25 Nm (from inner to outer)

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Fav 900
Transmission / Vario transmission unit
Fitting continuously variable transmission
G

Connect cable couplers, clutch-bleed line and hydraulic line.

X315 = Y002 speed range I solenoid valve
X316 = Y003 speed range II solenoid valve
X317 = Y004 turboclutch valve solenoid valve
X318 = Y005 speed governor solenoid valve
X157 = B008 high pressure sensor



Screw two M8 stud bolts into transmission housing. Fit new gasket.

Fit new O-rings in valve unit with a little grease. Insert valve unit, tighten fastening screws to 25 Nm from inside to outside.

Connect cable coupler and hydraulic lines.



Fit new O-rings with a little grease and tighten pressure filter to 25 Nm.

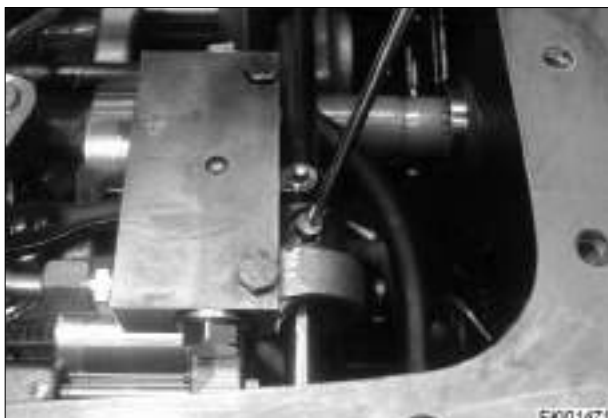
Connect cable coupler.



If required, coat new shaft seal on outside with 1:1 spirit/water mixture and press in as far as stop. Fill sealing lips 2/3 with grease.

Insert actuator shaft.

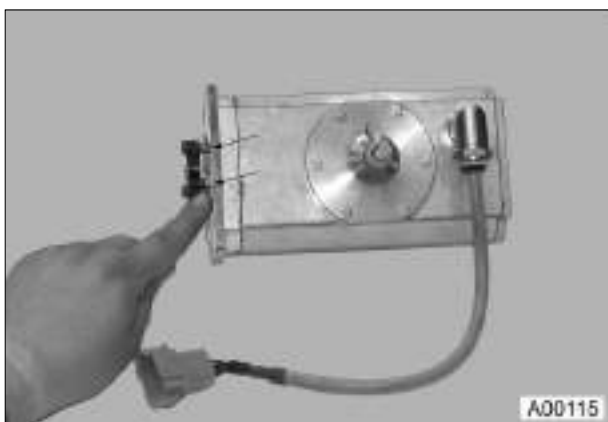
| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|--|----------|---------------|
| 16.05.2001 | a | 6/9 | Fitting continuously variable transmission 1080 | G | 000007 |

Fav 900
Transmission / Vario transmission unit
Fitting continuously variable transmission
G

<Mate depression in actuator shaft with threaded bore.

Note:

Coat thread of hexagon screw with synthetic bonding agent X 903.050.084 and tighten to 25 Nm.

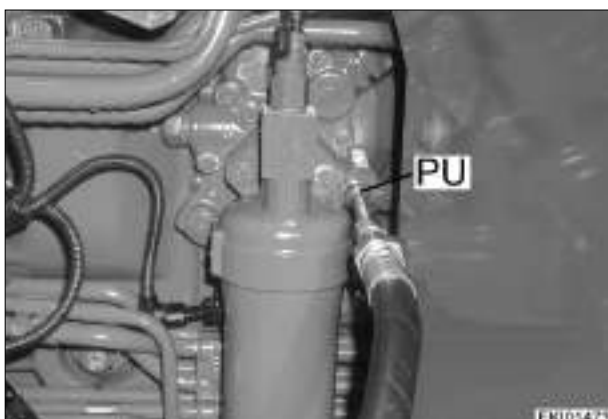


Locate driver plate with two raised sections (arrowed) facing actuator unit.



Mount pre-assembled actuator unit on transmission housing.

Tighten M8 socket head cap screws to 25 Nm.
Connect electric cable.



Unscrew drain plug - labelled PU.

Connect external oil-filling unit.

Comply with specified oil type and volume.

Note:

During filling pivot hydraulic motors and pump by turning actuator shaft.

Check that there are no leaks from visible hydraulic connections.

Filling with transmission oil using external oil-filling unit: Chapter 1080 Reg. G

| Date | Version | Page | Fitting continuously variable transmission | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 16.05.2001 | a | 7/9 | | 1080 | G | 000007 |

Fav 900**Transmission / Vario transmission unit
Fitting continuously variable transmission****G**

Coat transmission housing surface cover with sealant X903.050.074. Fit cover.

Tighten M12 hexagon screws to 86 Nm.

Fit bracket for pipes and clamp.



Fit auxiliary lever support.



Slide tank carefully forwards as far as stop.

Note:

When doing so, ensure that bleed pipe (see photo) is also inserted.



Fit clip for fuel hose.

Insert guard into fuel hose and fit guard.

Fav 900

Transmission / Vario transmission unit
Fitting continuously variable transmission

G

Fit air tank with cover panel.



Fit brace with bracket and clamp.



Fit toolbox storage compartment.
 Close battery case.



Fit left step.

Concluding work:**Fitting cab, see Chapter 8100 Reg.G**

**Transmission calibration, see
 Chapter 0000 Reg. F**

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---|-------------|---------------|
| 16.05.2001 | a | 9/9 | Fitting continuously variable transmission | 1080 | G |
| | | | | | 000007 |

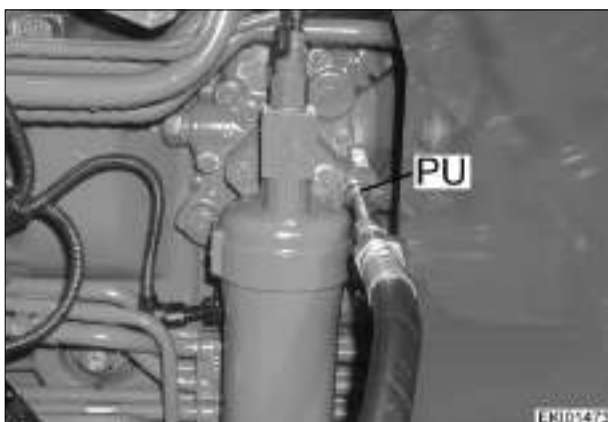
Fav 900
Transmission / Vario transmission unit
Filling with transmission oil
G

During normal maintenance work, e.g. transmission oil change and / or filter change, fill with transmission oil at rear left.

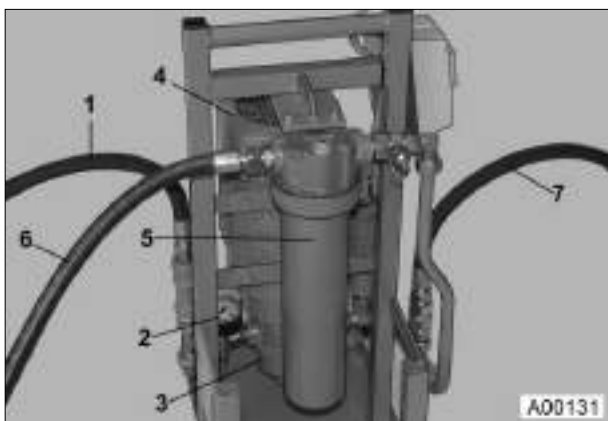
Comply with specified oil type and volume.

Initial fill approx. 85 l

Refill approx. 65 l


External oil-filling unit always necessary:

1. When replacing transmission unit (ML transmission)
2. When high-pressure unit is empty, e.g. after removal of high-pressure valves or discharge valve (flush valve)


External oil-filling unit with superfine filter

- 1 = suction line from oil reservoir
- 2 = vacuum meter
- 3 = pump
- 4 = 230 VAC electric motor
- 5 = superfine pressure filter with filter monitor
- 6 = pressure hose to tractor
- 7 = pressure hose to oil cleaner in service hydraulics (does not operate when external oil-filling unit is used)

Note:

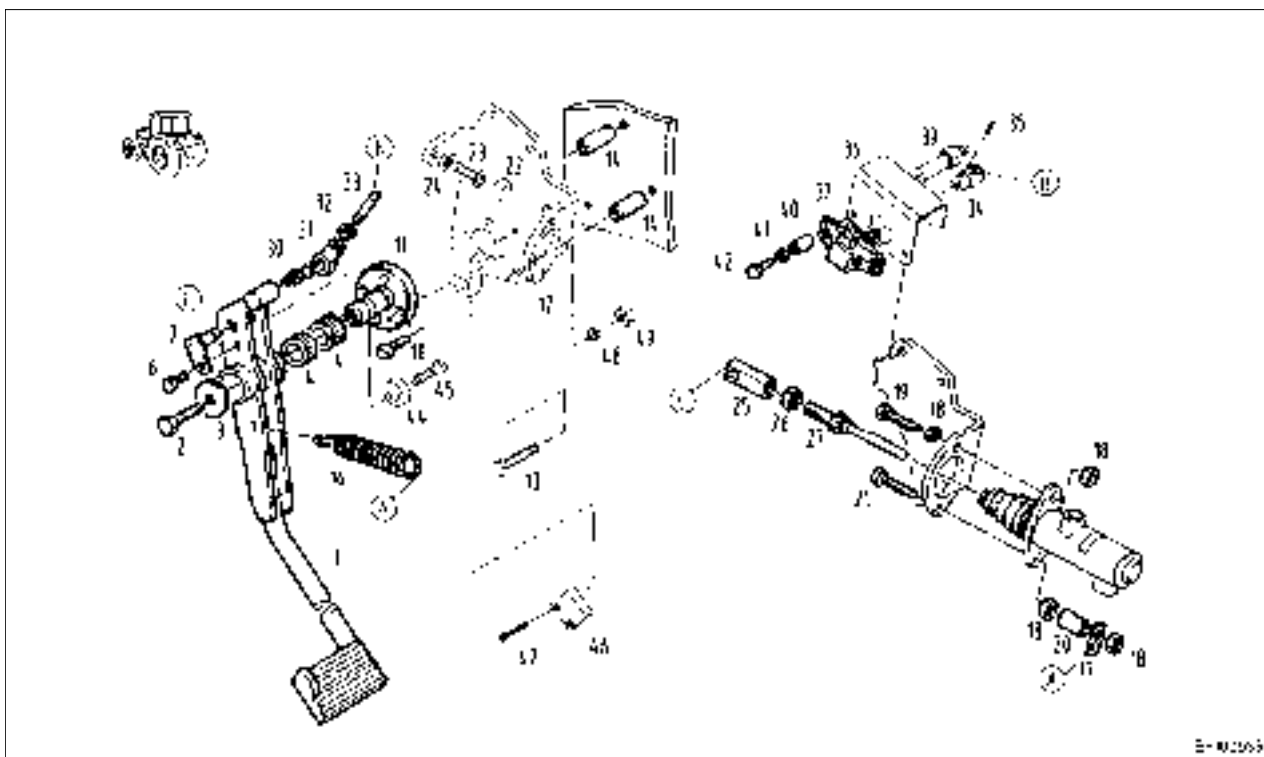
Use of external oil-filling unit prevents hydraulic pump and hydraulic motor from running dry.

| Date | Version | Page | Filling with transmission oil | Capitel | Index | Docu-No. |
|-----------|---------|------|-------------------------------|---------|-------|----------|
| 18.5.2001 | a | 1/1 | | 1080 | G | 000008 |

Farmer 400
Fav 700
Fav 900

Transmission / clutch actuation system
Setting clutch master cylinder

E



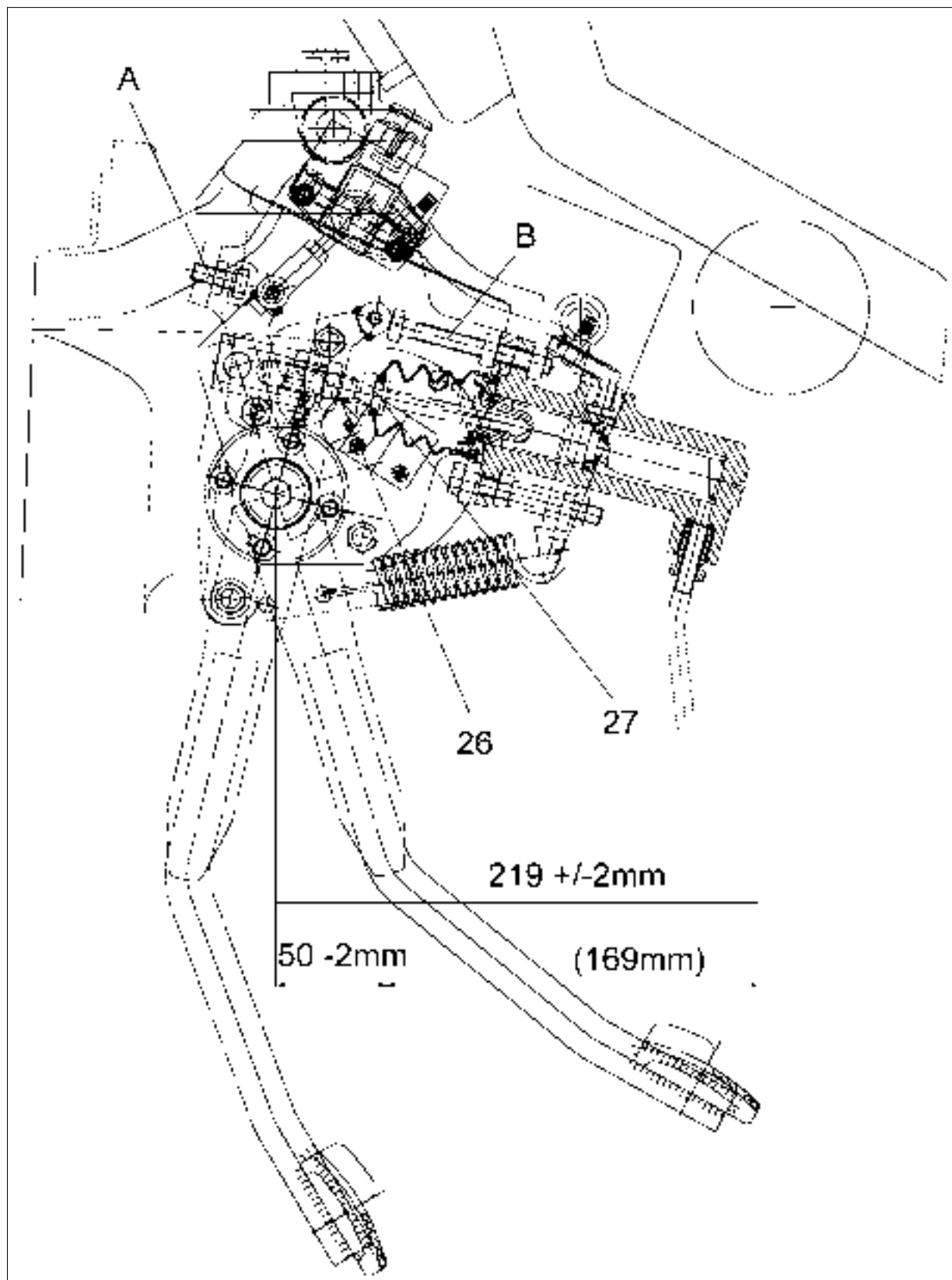
| Item | Description | Item | Description |
|------|-----------------------|------|-----------------------|
| 1 | Clutch pedal | 25 | Thrust piece |
| 2 | Hexagon screw | 26 | Hexagon nut |
| 3 | Washer | 27 | Piston rod |
| 4 | Needle bush | 30 | Ball-headed spindle |
| 6 | Hexagon screw | 31 | Ball socket |
| 7 | Pin | 32 | Hexagon nut |
| 10 | Socket head cap screw | 33 | Rod |
| 11 | Axle | 34 | Bush |
| 12 | Plate | 35 | Dowel pin |
| 13 | Hexagon screw | 36 | Cable guard |
| 14 | Bush | 37 | Sensor |
| 16 | Extension spring | 39 | Pin |
| 17 | Strap | 40 | Bush |
| 18 | Hexagon nut | 41 | Washer |
| 19 | Hexagon screw | 42 | Hexagon screw |
| 20 | Spacer | 44 | Magnet |
| 21 | Hexagon screw | 45 | Socket head cap screw |
| 22 | Snubber | 47 | Socket head cap screw |
| 23 | Hexagon screw | 48 | Spring washer |
| 24 | Hexagon nut | 49 | Hexagon nut |

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|--------------------------------|-------|----------|
| 24.1.2001 | a | 1/3 | Setting clutch master cylinder | 1100 | E |
| | | | | | 000001 |

Farmer 400
Fav 700
Fav 900

Transmission / clutch actuation system
Setting clutch master cylinder

E



| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|---------|-------|----------|
| 24.1.2001 | a | 2/3 | 1100 | E | 000001 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Transmission / clutch actuation system Setting clutch master cylinder | E |
|---|---|----------|

Fault: Tractor clutch will not disengage.

Possible cause:

- Check settings on master clutch cylinder .

Preliminary work:

Release steering column cover.

Setting clutch pedal travel

Clutch pedal engaged

Distance from pivot point of clutch pedal to foot plate of clutch pedal **219 +/-2mm**

In event of deviations coat thread of stop screw **A** with synthetic bonding agent X 903.050.084.

Set distance of 219 +/-2mm and lock with lock nut. Check that snubber is on stop screw A.

Clutch pedal disengaged

Distance from pivot point of clutch pedal to foot plate of clutch pedal **50 -2 mm**

In event of deviations, set distance of 50 -2 mm with **stop screw B** and lock.

Note:

Clutch pedal travel approx. 169 mm

Note:

Clutch pedal travel only has to be measured in exceptional cases, e.g. after replacing clutch pedal.

Setting clutch master cylinder

Clutch pedal engaged

Set piston rod play of clutch master cylinder. Lightly oil bellows on piston rod collar.

Loosen hexagon nut (26) and screw piston rod (27) in.

Piston rod (27) now has ample play.

Unscrew piston rod (27) until there is no play.

Then screw piston rod (27) in by one-sixth of a turn and lock in this position with hexagon nut (26).

Piston rod (27) now has slight **play (approx. 0.1 mm)** .

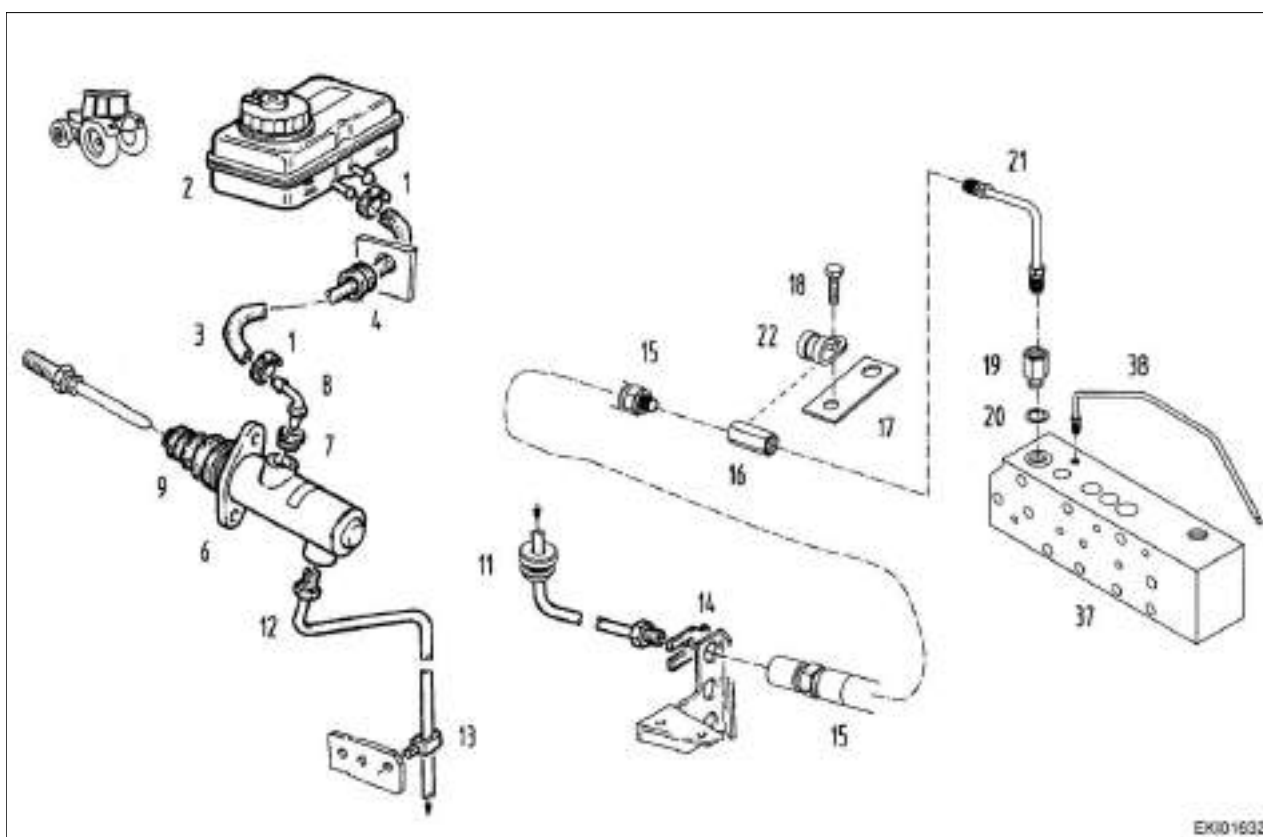
| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|----------|------|-------------|----------|---------------|
| 24.1.2001 | a | 3/3 | 1100 | E | 000001 |

Fav 900

Transmission / Clutch actuation system

Bleeding clutch hydraulics

G



| Item | Designation | Item | Designation |
|------|------------------------|------|--------------------|
| 1 | Hose clip | 14 | Hose bracket |
| 2 | Expansion tank | 15 | Brake hose |
| 3 | Pressure hose | 16 | Spacer |
| 4 | Grommet | 17 | Bracket |
| 6 | Clutch master cylinder | 18 | Self-tapping screw |
| 6 | Repair kit | 19 | Screw connector |
| 7 | Rubber plug | 20 | Sealing ring |
| 8 | Elbow joint | 21 | Brake line |
| 9 | Protective cap | 22 | Pipe clip |
| 11 | Grommet | 37 | Valve unit |
| 12 | Connecting pipe | 38 | Bleed line |

Note:

Hydraulic circuit diagram of clutch hydraulics - see Chapter 1005 Reg.C - Transmission hydraulic circuit diagram

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 13.06.2001 | a | 1/2 | 1100 | G | 000003 |

Fav 900

Transmission / Clutch actuation system

Bleeding clutch hydraulics

G



Bleeding clutch actuation system and brakes

Important:

Do not use brake fluid for brake and clutch actuation system.

Only Pentosin order no. X902.011.622 is permissible.

Feed reservoir at top front of steering column.



Bleeding clutch actuation system

Fit transparent plastic hose to oil can and connect to bleed valve at rear of tractor.

Open bleed valve (K).

Force Pentosin into feed reservoir via bleed valve using oil can.

Close bleed valve.

Fill feed reservoir to max. mark with Pentosin.



Note:

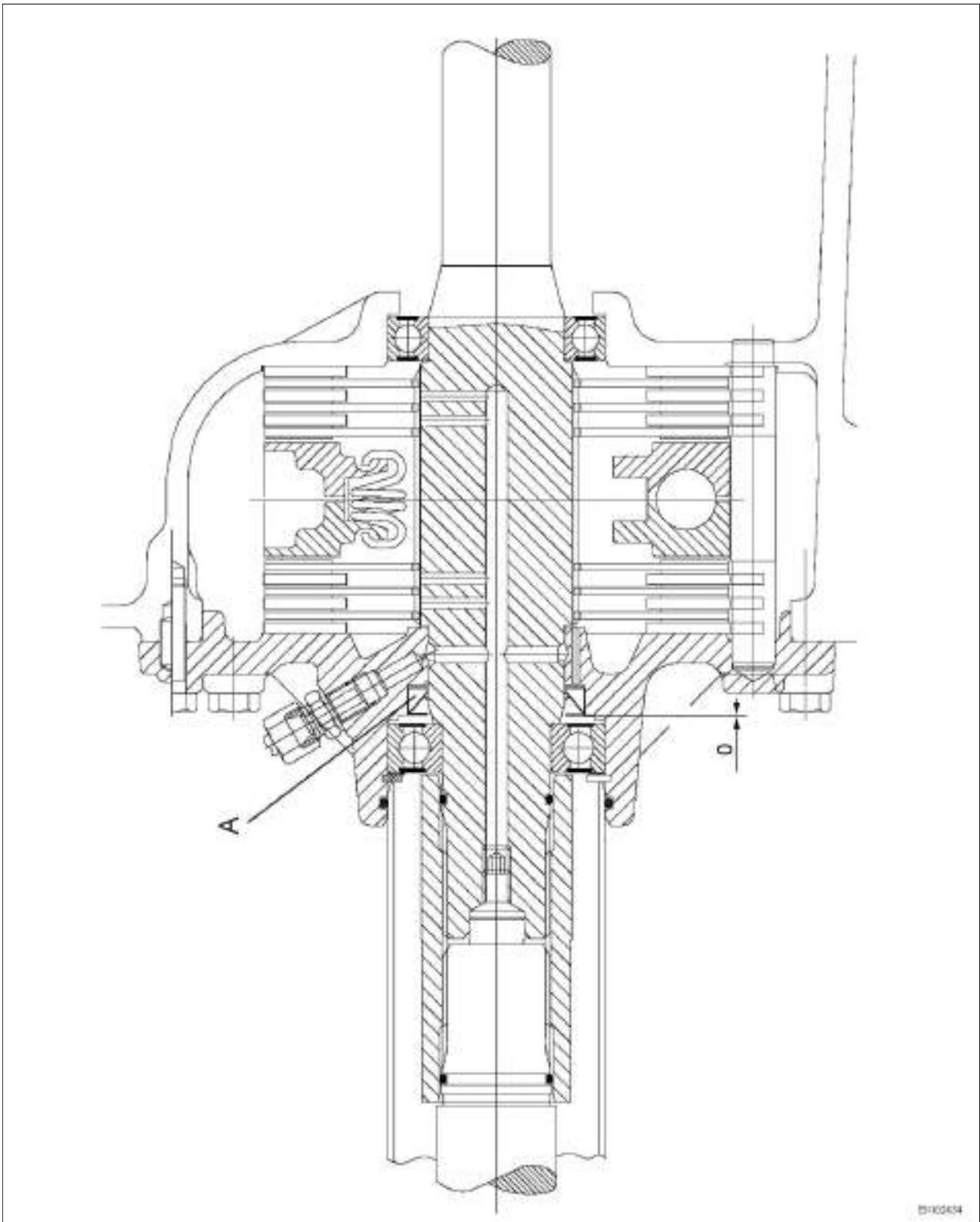
Spongy clutch pedal means that there is still air in system.

If necessary, bleed system further by pumping clutch pedal.

Then top up feed reservoir to max. level with Pentosin.

Fav 900

Transmission / Cardan brake
Technical drawing of cardan-shaft brake

C

Installation depth, shaft seal A = 0 mm

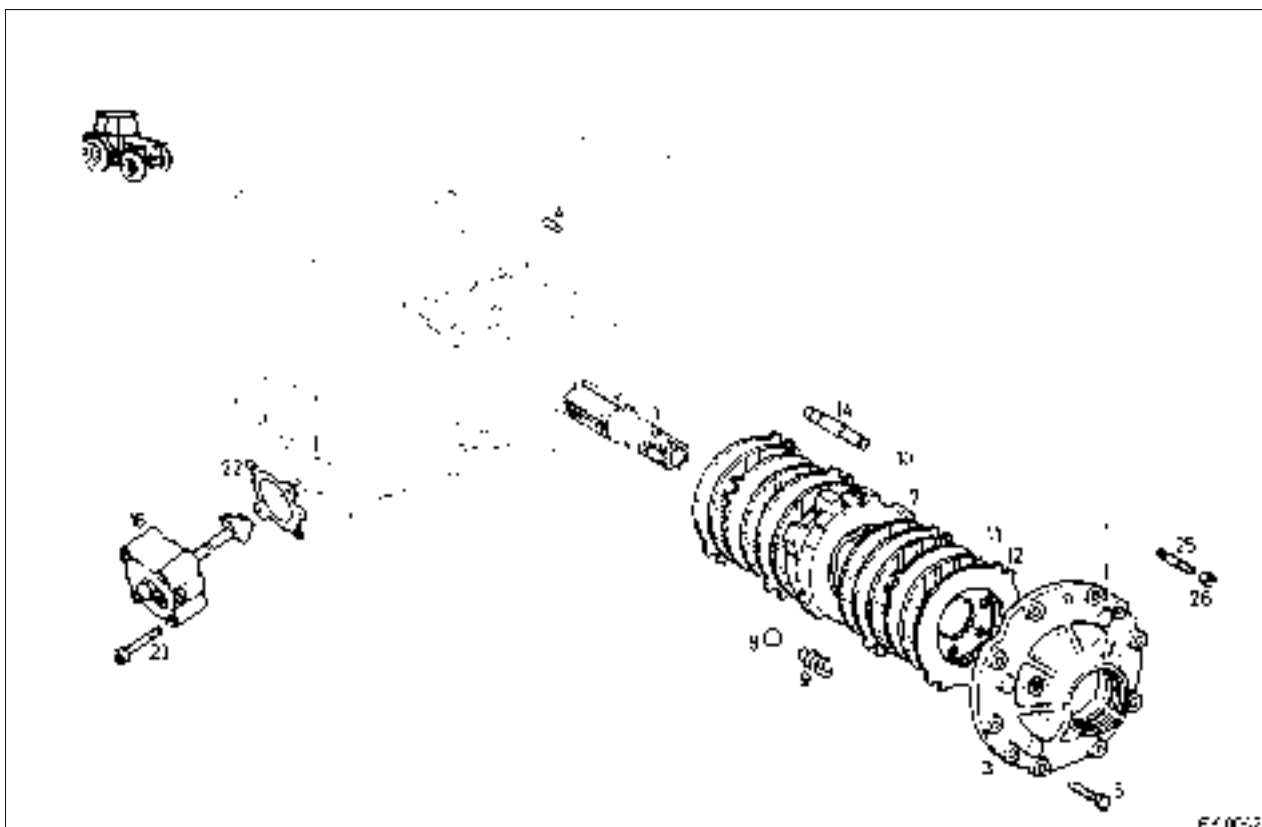
| Date | Version | Page | Technical drawing of cardan-shaft brake | Capitel | Index | Docu-No. |
|------------|---------|------|---|---------|-------|----------|
| 18.10.2001 | a | 1/1 | | 1150 | C | 000002 |

Fav 900

Transmission / Cardan-shaft brake

Repairing cardan-shaft brake

G



| Item | Designation | Item | Designation |
|------|------------------|------|-----------------------|
| 1 | Shaft | 11 | Brake pad |
| 3 | Flange | 12 | Intermediate disc |
| 4 | Parallel pin | 14 | Pin |
| 5 | Hexagon screw | 16 | Cardan-brake cylinder |
| 7 | Disc brake | 22 | Gasket |
| 8 | Ball | 23 | Socket head cap screw |
| 9 | Extension spring | 25 | Stud bolt |
| 10 | Parallel pin | 26 | Hexagon nut |

The following must first be carried out:

- Drain transmission oil (approx. 65 litres).
- Disconnect tractor between clutch housing and transmission housing: Chapter 1050 Reg. G - Disconnecting tractor, clutch and transmission housing

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|---------|------|---------|-------|----------|
| 08/2000 | a | 1/8 | 1150 | G | 000001 |

Fav 900

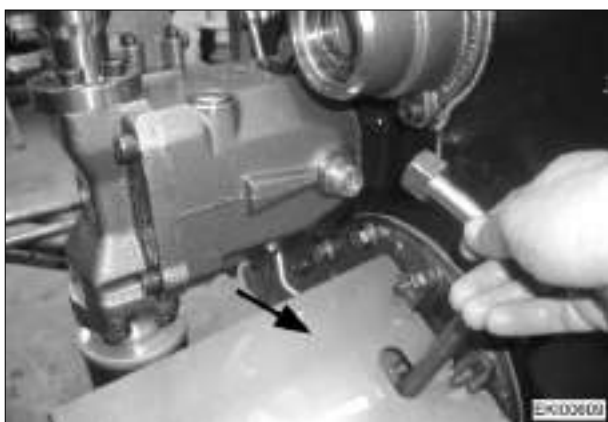
Transmission / Cardan-shaft brake

Repairing cardan-shaft brake

G

**Removing cardan-shaft brake:****Fav 900 up to 23/3000/...**

Remove LS pump intake filter.



Remove oil leakage line and baffle plate (arrowed).

**Fav 900 chassis number 23/3001 and up**

Remove oil leakage line.



Remove lube oil line.

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|---------|---------|------|---------|-------|----------|
| 08/2000 | a | 2/8 | 1150 | G | 000001 |

Fav 900

Transmission / Cardan-shaft brake

Repairing cardan-shaft brake

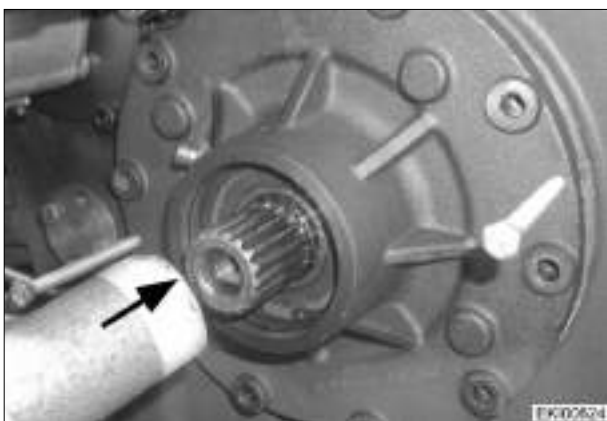
G



Remove cardan-brake cylinder (16)



Withdraw coupling sleeve.



Remove flange screws (5).

Force flange (3) off with two M8 screws.

Note:

When forcing flange off, drive shaft must not be pulled out of its bearing seat.



Remove flange (3), brake pads (11), intermediate discs (12) and disc brake (7).

| Date | Version | Page | Repairing cardan-shaft brake | Capitel | Index | Docu-No. |
|---------|---------|------|------------------------------|---------|-------|----------|
| 08/2000 | a | 3/8 | | 1150 | G | 000001 |

Fav 900

Transmission / Cardan-shaft brake

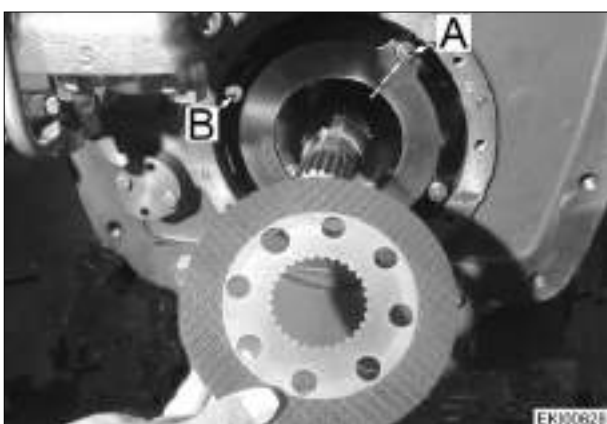
Repairing cardan-shaft brake

G



Fitting cardan-shaft brake:

Insert pins (4).



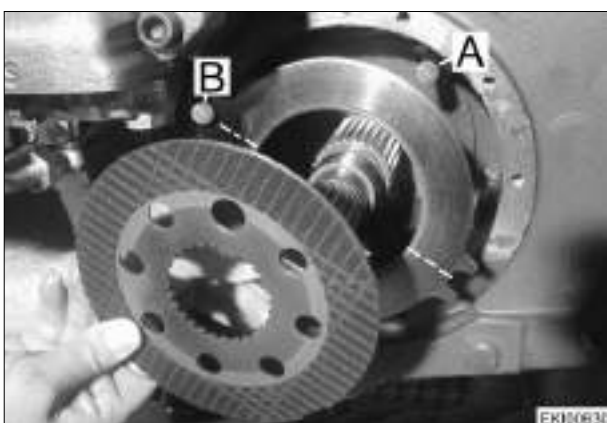
Starting with intermediate disc (12), fit three intermediate discs (12) and three brake pads (11) alternately.

1st intermediate disc (12) - installation position A.

Note:

Use new intermediate discs (12) and brake pads (11).

Immerse brake pads in oil before fitting.



2nd intermediate disc (12) - installation position B etc.



Insert disc brake (7).

Actuating cams (arrowed) point towards bore (arrowed).

| Date | Version | Page | Repairing cardan-shaft brake | Capitel | Index | Docu-No. |
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| 08/2000 | a | 4/8 | | 1150 | G | 000001 |

Fav 900

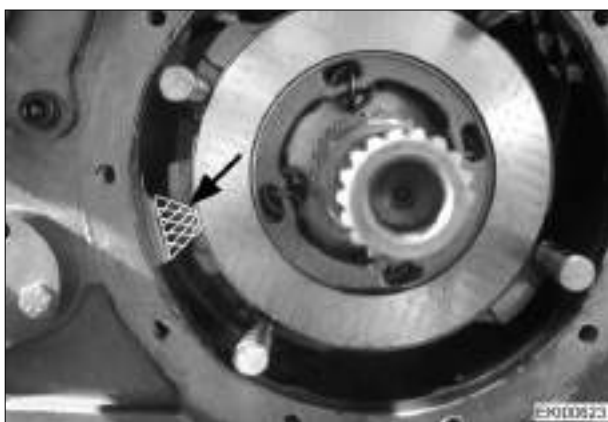
Transmission / Cardan-shaft brake

Repairing cardan-shaft brake

G



Fit cardan-brake cylinder (16) with new gasket (22).



Note installation position of trigger key (arrowed) relative to disc brake (7).



Fit remaining brake pads (11) and intermediate discs (12).



Clean flange seal surfaces and coat with sealant X 903.050.074.

Mount flange (3) and tighten screws (5) to **50 Nm**.

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|---------|---------|------|---------|-------|----------|
| 08/2000 | a | 5/8 | 1150 | G | 000001 |

Fav 900

Transmission / Cardan-shaft brake

Repairing cardan-shaft brake

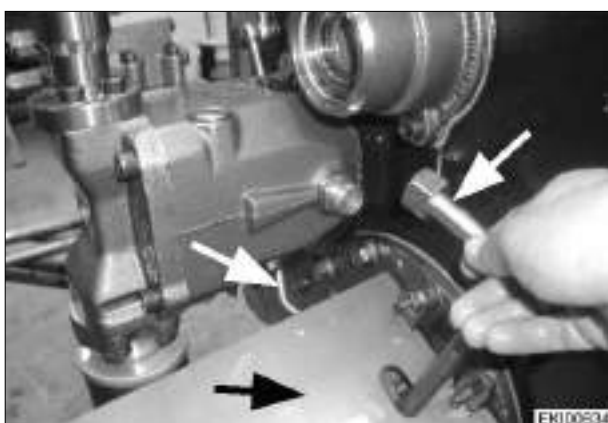
G



Check axial play of cardan shaft with gauge.
Target value: 0.3 +0.1 mm



In event of discrepancies, correct axial play
using spacers.



Fav 900 up to 23/3000

Fit lube oil line, oil leakage line and baffle plate.



Fav 900 up to 23/3000

Fit new intake filter.

| Date | Version | Page | Repairing cardan-shaft brake | Capitel | Index | Docu-No. |
|---------|---------|------|------------------------------|---------|-------|----------|
| 08/2000 | a | 6/8 | | 1150 | G | 000001 |

Fav 900

Transmission / Cardan-shaft brake

Repairing cardan-shaft brake

G



Fav 900 chassis number 23/3001 and up
Fit oil leakage line.



Locate new O-ring on shaft (1) and grease.
Slide coupling sleeve onto shaft (1).



Setting cardan-brake cylinder:

1. Release lock nut.

Tighten setscrew using torque gauge
X 899.980.151 (**4.0 to 5.0 Nm**).

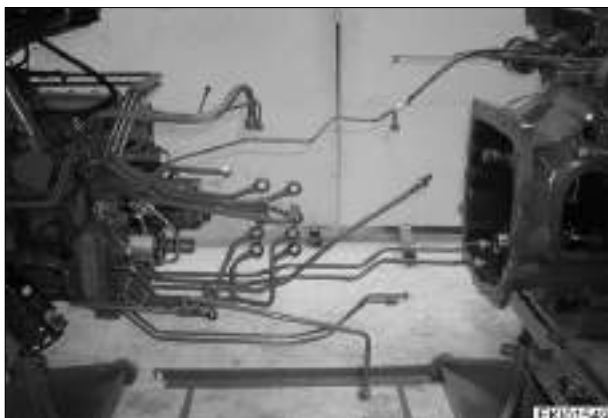


2. Then unscrew setscrew by **3 full turns and a further 4/6 of a turn** and lock in this position.

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| 08/2000 | a | 7/8 | 1150 | G | 000001 |

Fav 900

Transmission / Cardan-shaft brake
Repairing cardan-shaft brake

G

Assembling clutch and transmission housing
 - see Chapter 1050 Reg.G - Disconnecting tractor, clutch and transmission housing.

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| 08/2000 | a | 8/8 | 1150 | G | 000001 |

| | | |
|----------------|---|----------|
| Fav 900 | Transmission / Front PTO Technical specifications of front PTO | A |
|----------------|---|----------|

EU (European version) = 1000 rpm

The front PTO's direction of rotation is clockwise viewed in the direction of travel.

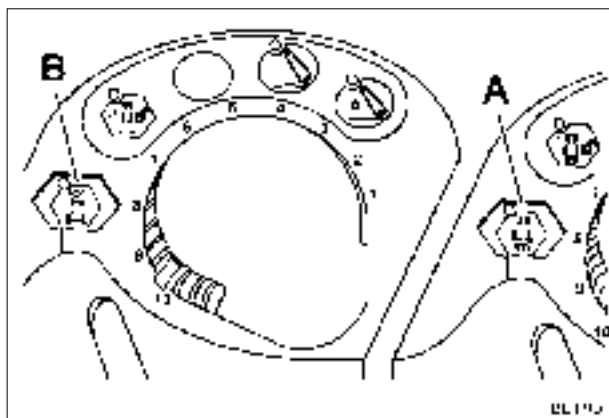
Technical specifications of front PTO (European version)

| Model | | 916 | 920 |
|--------------------------|-----|------|------|
| Front PTO 1000 | | | |
| PTO speed at rated speed | rpm | 1062 | 1062 |
| Max. permissible torque | Nm | 830 | 830 |

Technical specifications of front PTO (European version)

| Model | | 924 | 926 |
|--------------------------|-----|------|------|
| Front PTO 1000 | | | |
| PTO speed at rated speed | rpm | 1111 | 1111 |
| Max. permissible torque | Nm | 830 | 830 |

Switching front PTO on and off



Danger:

Before switching PTO on, ensure that no one is near implement!

Switch B is used to switch front PTO on and off. When front PTO is switched on, lamp next to pushbutton switch lights up.

Engagement depends on actuating time of switch B.

Less than 5 sec

Gentle start-up, PTO clutch adapts automatically to implement's requirements.

More than 5 sec

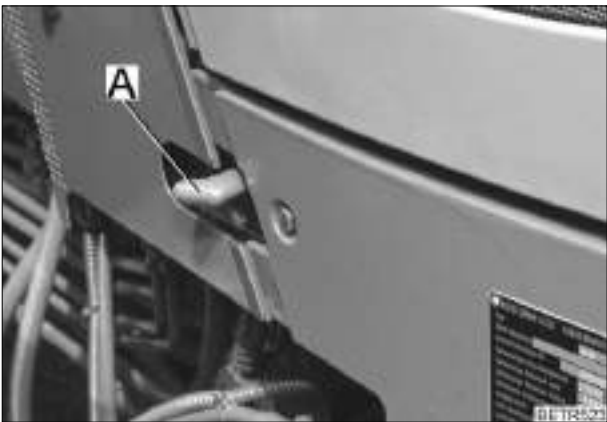
Speed and fault monitor are skipped.

| Date | Version | Page | Technical specifications of front PTO | Capitel | Index | Docu-No. |
|------------|---------|------|---------------------------------------|---------|-------|----------|
| 31.10.2001 | a | 1/4 | | 1200 | A | 000002 |

| | | |
|---------|---|---|
| Fav 900 | Transmission / Front PTO Technical specifications of front PTO | A |
|---------|---|---|



! Danger:
After working with PTO, fit protective cover over PTO stub shaft!



Switch engine off
Switch season control on using lever (A).

Note:
For operation of front PTO see section 8 of Operating Manual

| | | | | | | |
|------------|---------|------|---------------------------------------|---------|-------|----------|
| Date | Version | Page | Technical specifications of front PTO | Capitel | Index | Docu-No. |
| 31.10.2001 | a | 2/4 | | 1200 | A | 000002 |

| | | |
|----------------|---|----------|
| Fav 900 | Transmission / Front PTO Technical specifications of front PTO | A |
|----------------|---|----------|

Calibrating front PTO clutch



Danger:

During calibration process PTO starts to rotate briefly.
Observe all necessary safety measures.

Note:

Calibration of front PTO clutch adjusts starting operation to particular implement, e.g. in case of implements which are slow to get up to speed.
The data determined in this way are used for future starting operations.
Only calibrate with implement mounted.

- Start engine.

If faults are displayed, these must be cleared individually.



Press key and hold,



then press key and fault message is cleared.

Once there are no more fault warnings:



Press key, following pictogram is displayed



Key pictogram flashes



Press key **three times** , and following pictogram is displayed



Key pictogram flashes



Press key, next pictogram is displayed



Input code **7034** for front PTO

| Date | Version | Page | Technical specifications of front PTO | Capitel | Index | Docu-No. |
|------------|---------|------|---------------------------------------|---------|-------|----------|
| 31.10.2001 | a | 3/4 | | 1200 | A | 000002 |

| | | |
|----------------|--|----------|
| Fav 900 | Transmission / Front PTO Technical specifications of front PTO | A |
|----------------|--|----------|



Press one of keys until desired number is displayed.



Store with key.

After last number has been stored, following pictogram is displayed.



Engage front PTO.

If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.

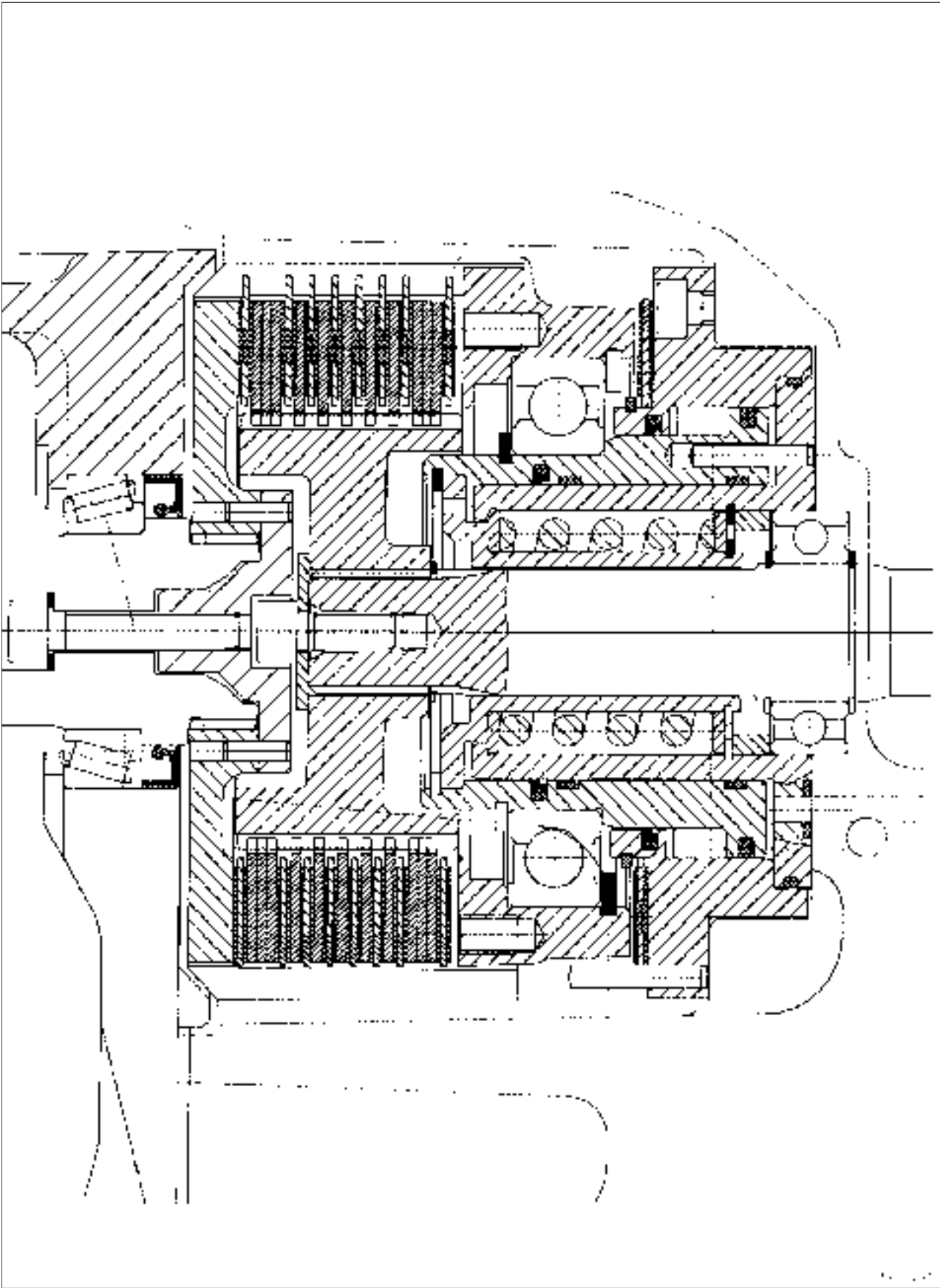


Press key

- New data are accepted by switching ignition OFF - ON.

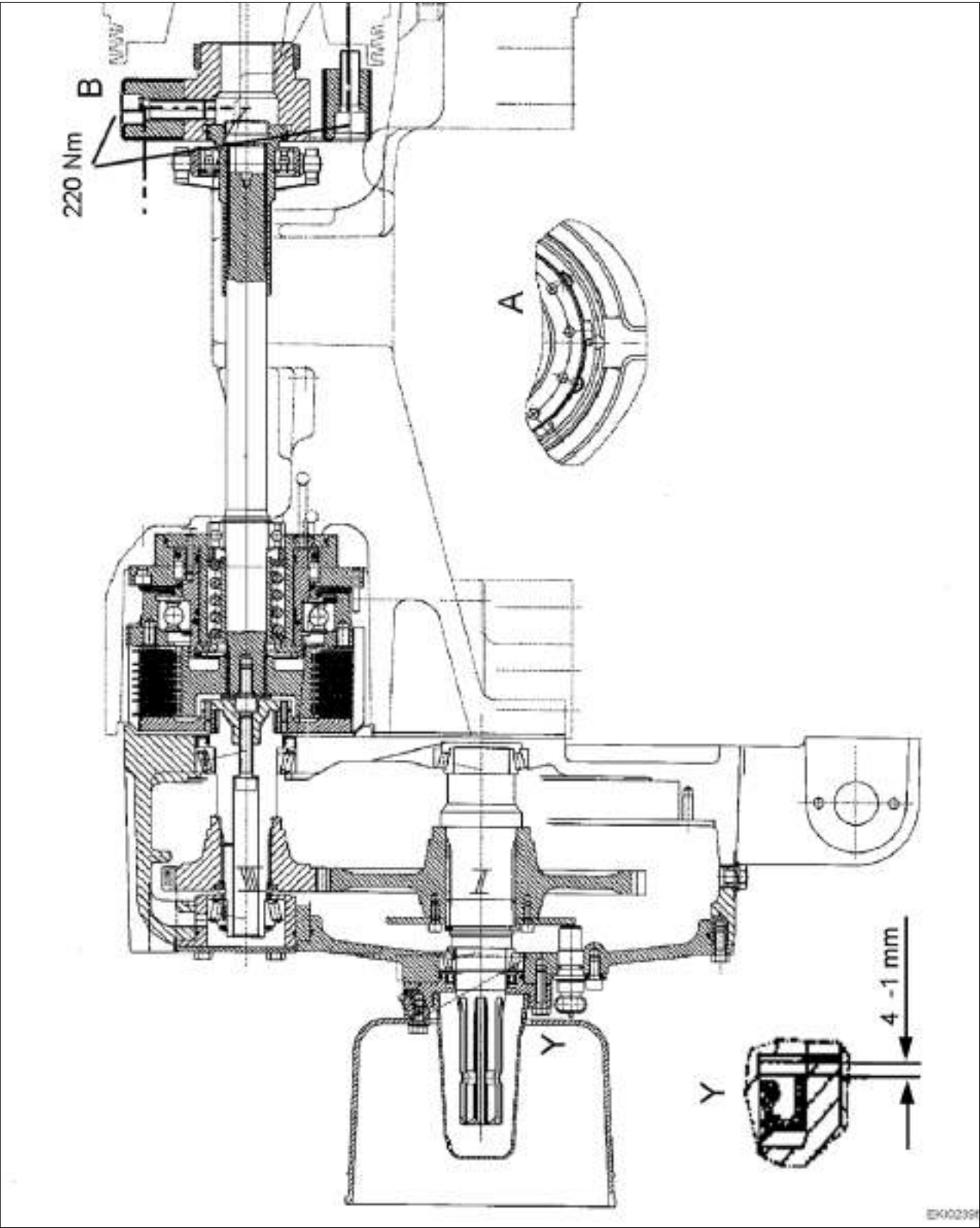
| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 31.10.2001 | a | 4/4 | 1200 | A | 000002 |

| | | |
|----------------------------------|--|----------|
| Fav 800 Fav 900 | Transmission / Front PTO Front PTO clutch | C |
|----------------------------------|--|----------|



| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 04.10.2001 | a | 1/1 | 1200 | C | 000006 |

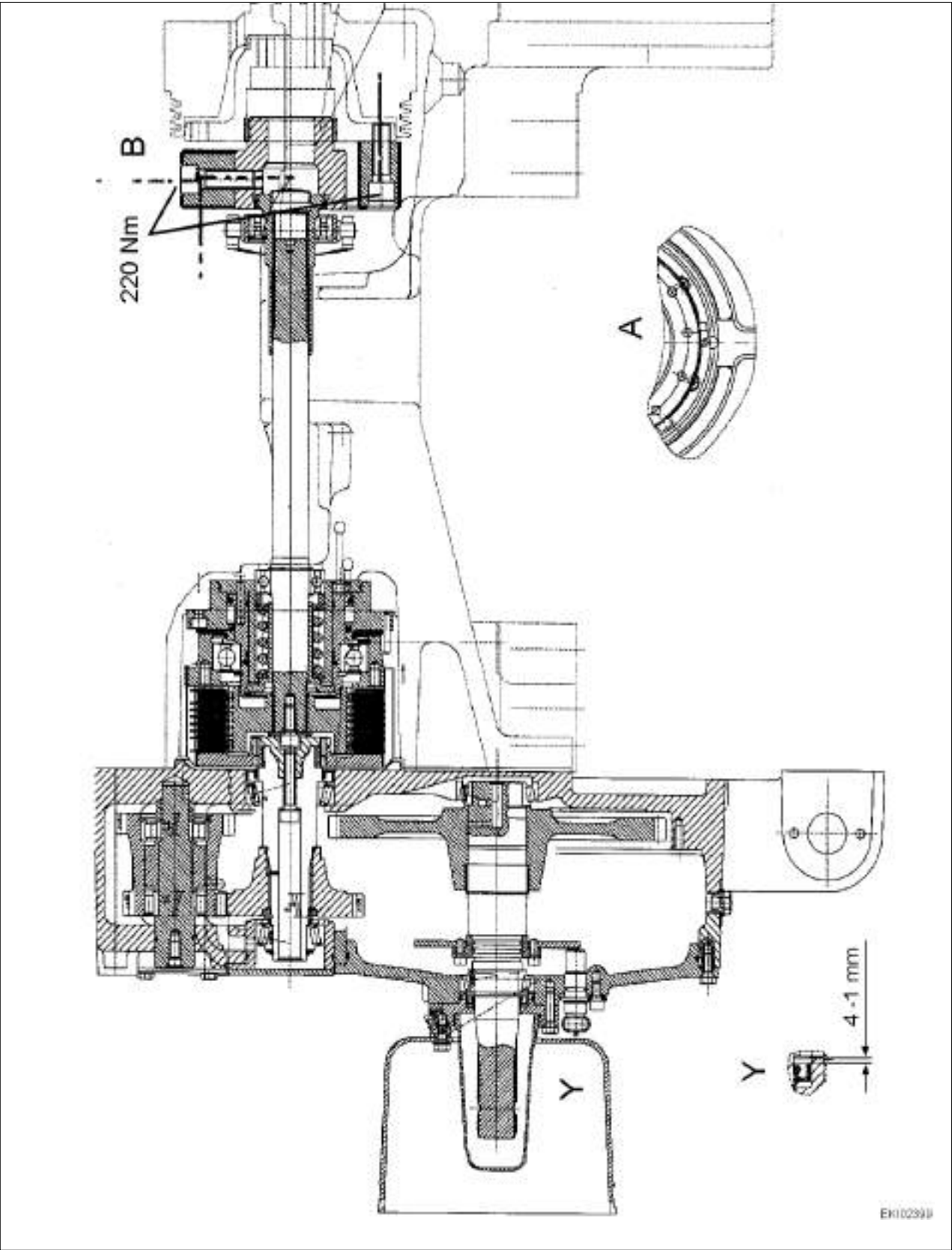
| | | |
|----------------------------------|---|----------|
| Fav 800 Fav 900 | Transmission / Front PTO Front PTO 1000 (European version) | C |
|----------------------------------|---|----------|



| | | | |
|---|------------------------|---|------------|
| A | Position of brake disc | Y | Shaft seal |
| B | Front PTO drive | | |

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|--|----------|---------------|
| 04.10.2001 | | 1/1 | Front PTO 1000 (European version) 1200 | C | 000005 |

| | | |
|----------------------------------|---|----------|
| Fav 800 Fav 900 | Transmission / Front PTO Front PTO 1000 right (NA version) | C |
|----------------------------------|---|----------|



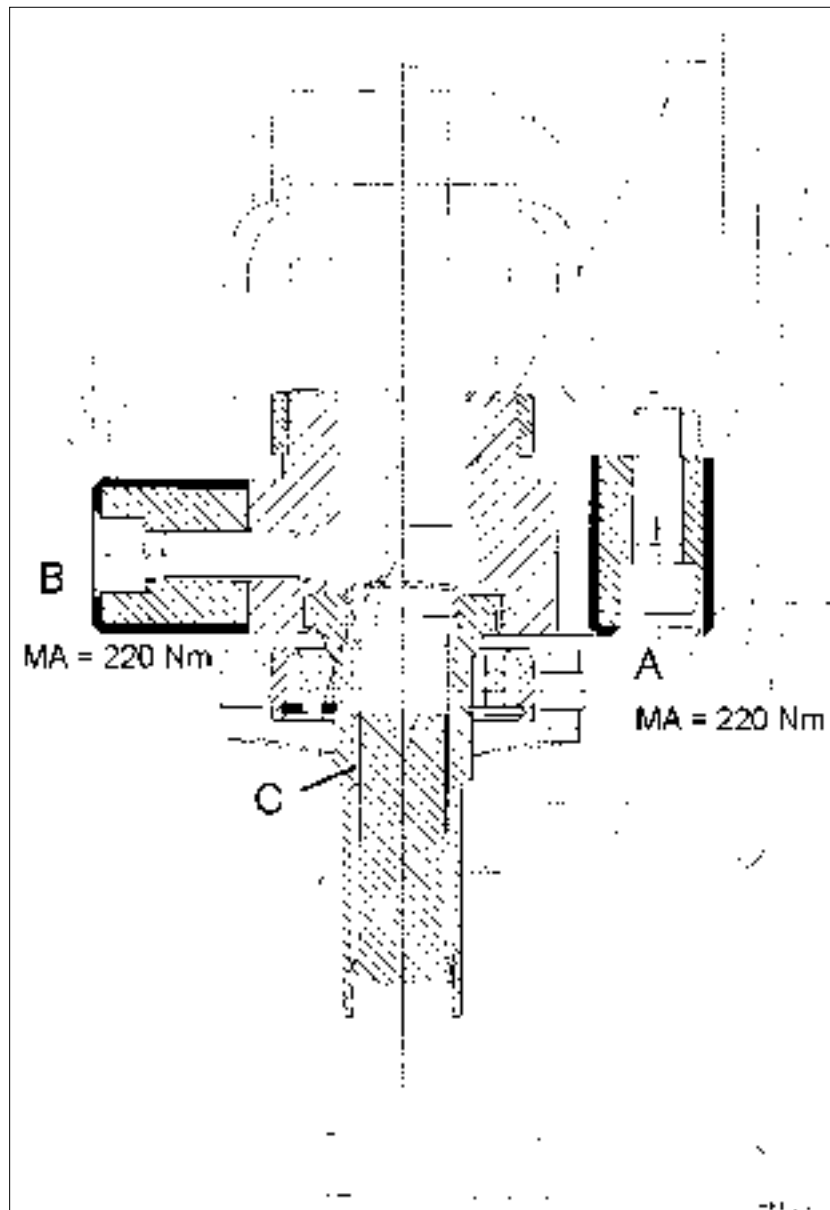
| | | | |
|---|------------------------|---|------------|
| A | Position of brake disc | Y | Shaft seal |
| B | Front PTO drive | | |

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 05.10.2001 | | 1/1 | 1200 | C | 000008 |

Fav 800
Fav 900

Transmission / Front PTO
Front PTO drive (season control)

C



Fitting tip for socket head cap screws (A and B) (Centaflex clutch)

Fitting sequence:

1. Tighten axial screws to 220 Nm.
2. Tighten radial screws to 220 Nm.

Note:

Centaflex clutch must not deform when tightening, therefore grease screw head bed. When tightening, avoid displacing (skewing) rubber component.

Lightly grease toothing (C) with long-life grease X 902.002.472.

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|---|----------|---------------|
| 5.10.2001 | | 1/1 | Front PTO drive (season control) 1200 | C | 000007 |

| | | |
|----------------|---|----------|
| Fav 900 | Transmission / Front PTO Front PTO system pressure | E |
|----------------|---|----------|

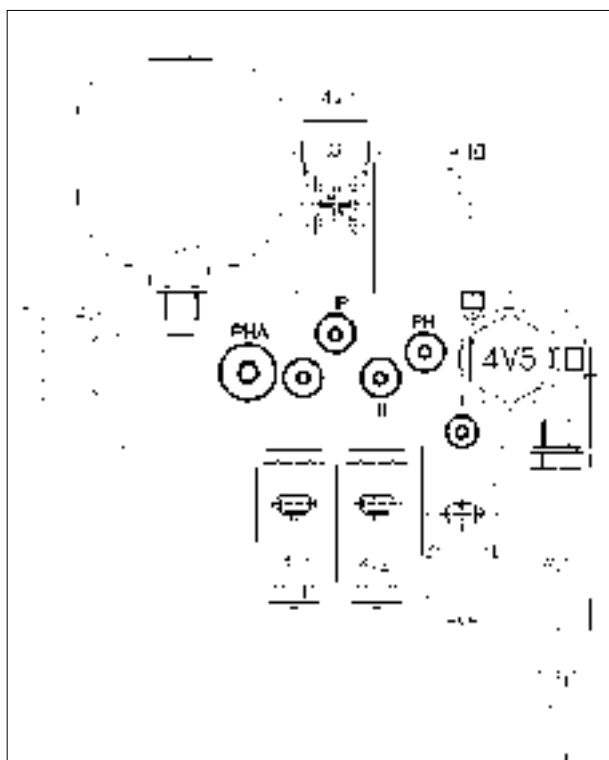
**Checking clutch pressure**

Unscrew cover panel at front right on valve unit.
Connect M10 x1 test connection (X598.303.000) to **M21**.

| Condition | Target value |
|--|--------------|
| Run engine at 1200 rpm. Engage front PTO. | 18 + 2 bar |
| Switch off front PTO. | 0 bar |

Note:

Chapter 1005 Reg. C - Transmission hydraulics circuit diagram



If there is no clutch pressure:

Measure system pressure at **connection P** of enhanced hydraulics valve unit.

Target value 25 + 2 bar at 1200 rpm.

Note:

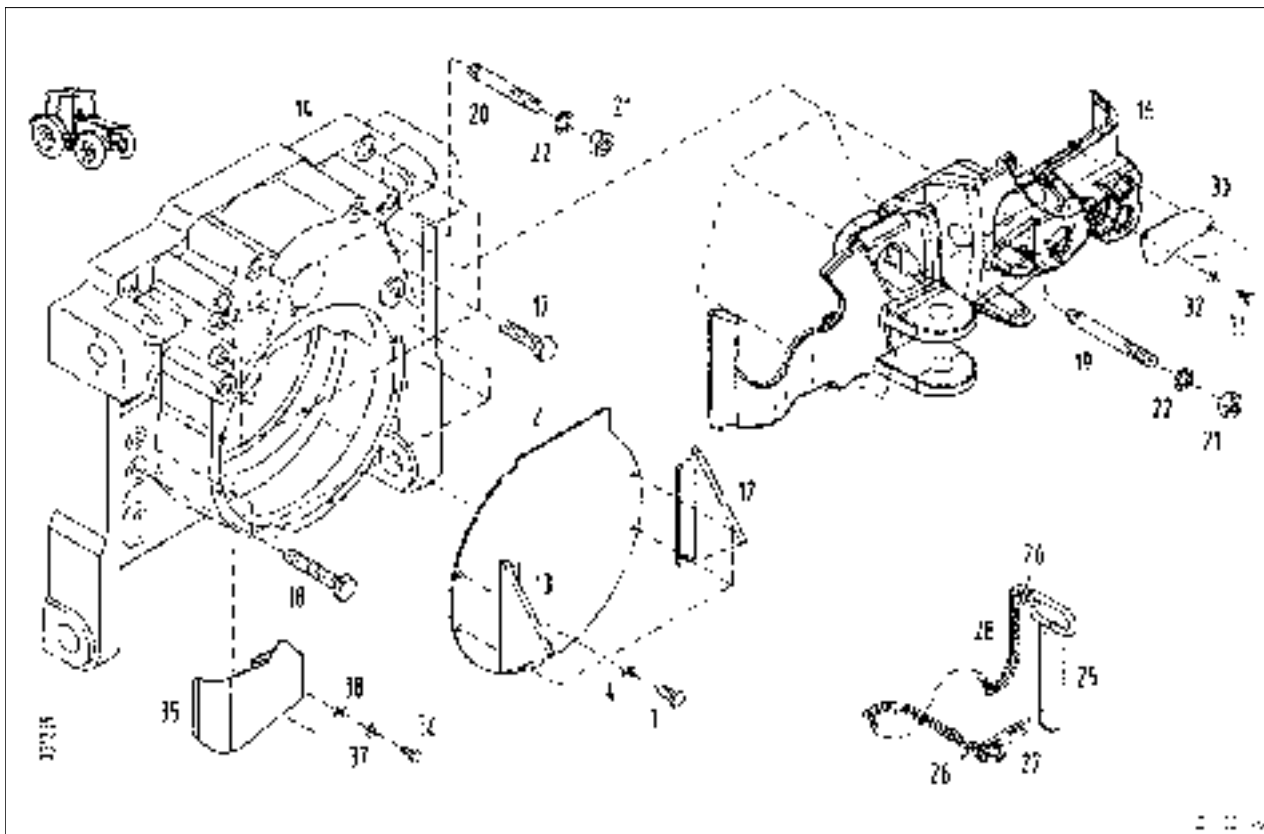
Chapter 1005 Reg. C - Transmission hydraulics circuit diagram

| Date | Version | Page | Front PTO system pressure | Capitel | Index | Docu-No. |
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Transmission / Front PTO

Installation and removal of front PTO gearbox

G

| Item | Designation | Item | Designation |
|------|---------------------------|------|-------------------------|
| 2 | Cover | 21 | M18-8 hexagon nut |
| 3 | M8x16-8.8 hexagon screw | 22 | Spring washer |
| 4 | Spring washer | 25 | Coupling pin |
| 12 | Cover | 26 | Hook |
| 13 | Cover | 27 | Clip pin |
| 14 | Housing | 28 | Chain |
| 16 | Front plate | 30 | Panel |
| 17 | M18x90-10.9 hexagon screw | 31 | M5x12-8.8 hexagon screw |
| 18 | M18x100-8.8 hexagon screw | 32 | Spring washer |
| 19 | M18x230-10.9 stud | 35 | Cover |
| 20 | M18x200-10.9 stud | | |

Fav 900

Transmission / Front PTO Installation and removal of front PTO gearbox

G**Removing front PTO gearbox**

- Lower front power lift.
- Remove bottom link.
- Open bonnet front.

When carrying out repairs on gearbox (PTO, layshaft) drain transmission oil (approx. 4.2 l).

When carrying out repairs on PTO clutch do not drain transmission oil.



Remove left and right front cover panels.



Release front plate.



X231 = connector, S021 - switch, raise front power lift

X232 = connector, S022 - switch, lower front power lift

X223 = connector, S041 - switch, release PTO brake

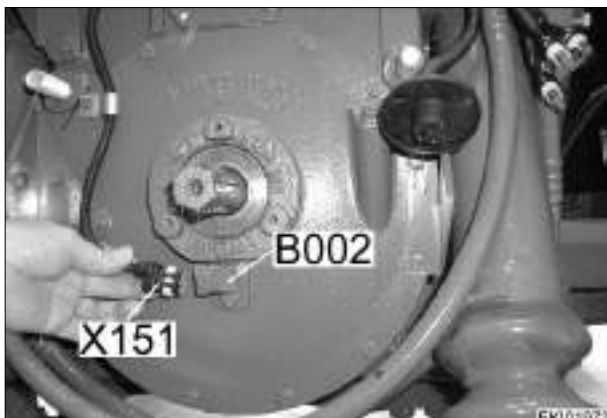
X017 = front socket, for front power lift

Label and disconnect above.

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Transmission / Front PTO Installation and removal of front PTO gearbox

G

X151 = connector, B002 - sensor, front PTO
Label and disconnect above.



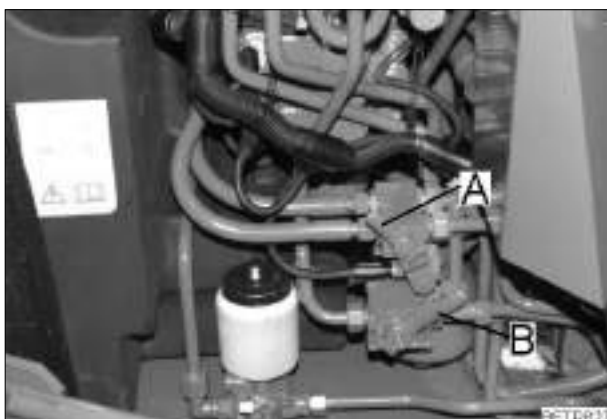
Only with enhanced front power lift (optional extra)

X188 = connector, B040 - sensor, front power lift position
Label and disconnect above.



X322 = connector, Y011 - valve, front PTO
X369 = connector, Y034 - valve, release PTO brake

Label and disconnect above.
Unclip front PTO cable loom and place to one side.



A = AV8 - stopcock, front power lift (**only in standard power lift**), to CLOSED position (turn to right)
B = AV5 - multiway valve, switch SA-DA front power lift to DA position (turn to right)
This prevents hydraulic oil from continuing to run.

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Transmission / Front PTO
Installation and removal of front PTO gearbox

G

Remove hydraulic lines from lift cylinders.



Cap hydraulic lines and place to one side.



Detach PTO valve.



Only with enhanced front power lift (optional extra)

Detach linkage for B040 - sensor, front power lift position.

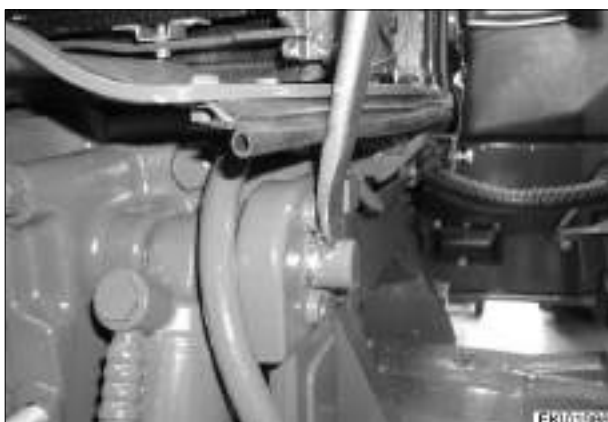
Fav 900

Transmission / Front PTO

Installation and removal of front PTO gearbox

G

Remove pin lock.



Withdraw pin using tyre lever and swing lift cylinder forwards.



Remove cover.



- Brace PTO stub shaft.
- Loosen socket head cap screw.

Note:

Socket head cap screw is secured with Loctite.

Note:

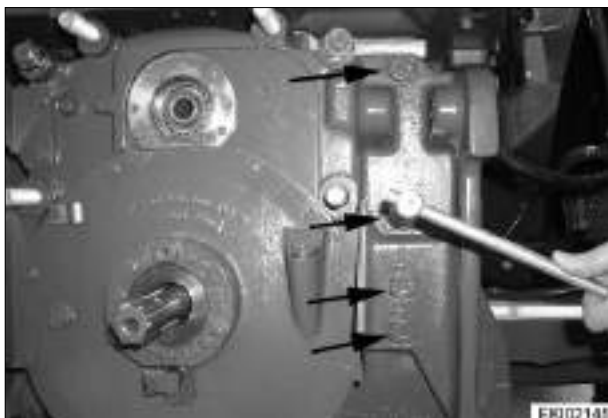
Chapter 1200 Reg. C - Technical drawing of front PTO

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Transmission / Front PTO

Installation and removal of front PTO gearbox

G

Attach front PTO to hoist, taking appropriate safety precautions.

Unscrew four hexagon screws (arrowed) on left and right.



Unscrew two hexagon nuts.

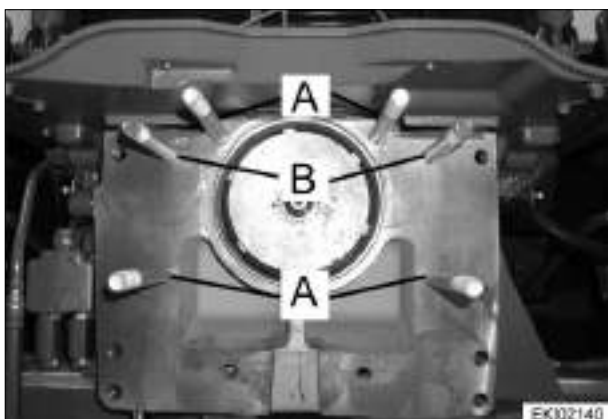


Remove front PTO.

Note:

Hold clutch bell housing (30).

Chapter 1200 Reg. C - Technical drawing of front PTO



Mounting front PTO gearbox

Screw in studs as far as stop and tighten to **290 Nm**.

A = long studs

B = short studs

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Transmission / Front PTO

Installation and removal of front PTO gearbox

G

Lightly coat gearing for clutch bell housing with long-life grease.



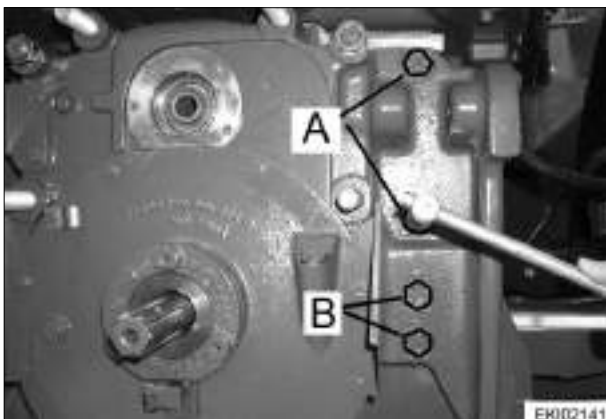
Attach front PTO to hoist, taking appropriate safety precautions, and mount on tractor.

Note:

Align externally toothed discs and locate clutch bell housing.



Initially tighten two hexagon nuts as far as stop.



Initially tighten four hexagon screws on left and right as far as stop.

A = M18 x 90-10.9

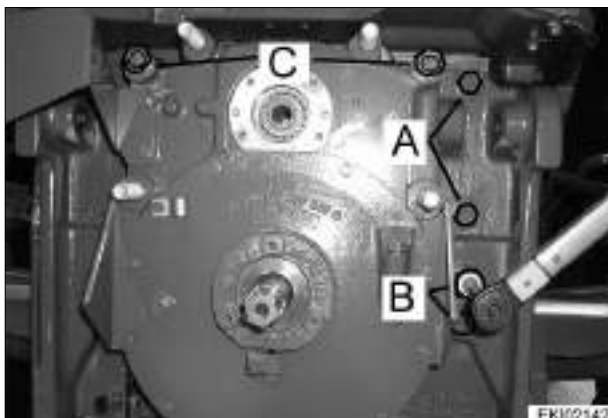
B = M18 x 100-8.8

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Transmission / Front PTO

Installation and removal of front PTO gearbox

G

Tighten all hexagon screws and nuts to relevant torque.

- A = M18-10.9 = **400 Nm**
- B = M18-8.8 = **290 Nm**
- C = M18-8 nut = **290 Nm**



Screw on PTO with clutch bell housing.

- Fit socket head cap screw with new Usit ring.
- Coat socket head cap screw with Loctite X 903.050.084.
- Brace PTO stub shaft and tighten socket head cap screw to **69 Nm**.



Coat cover with surface sealant X 903.050.074.

Tighten cover crosswise and in stages to **25 Nm**.



Fit pin lock.

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Transmission / Front PTO

Installation and removal of front PTO gearbox

G

Only with enhanced front power lift (optional extra)

Attach linkage for B040 - sensor, front power lift position.

Note:

If B040 - sensor was moved, sensor must be recalibrated.

Calibration 9001 and 9002

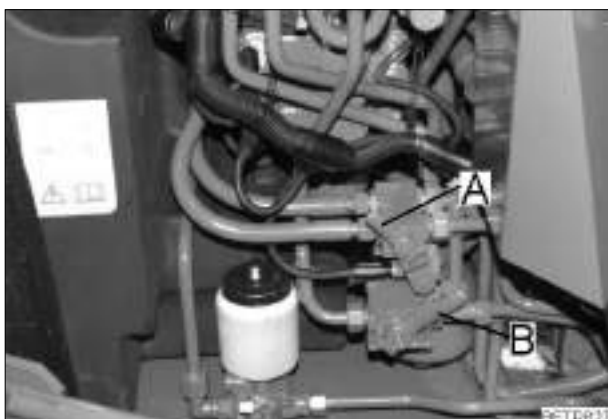
Chapter 0000 Reg. F - Calibration code



Mount PTO valve.



Connect hydraulic lines to lift cylinders.



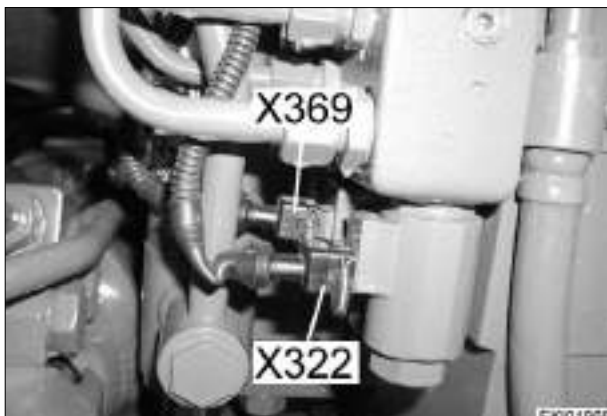
If necessary:

- A = AV8 - stopcock, front power lift (**only in standard power lift**), to CLOSED position (turn to right)
- B = AV5 - multiway valve, switch EW-DA front power lift to DA position (turn to right)

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Transmission / Front PTO Installation and removal of front PTO gearbox

G**Connecting connectors**

X322 = connector, Y011 - valve, front PTO

X369 = connector, Y034 - valve, release PTO brake

**Only with enhanced front power lift (optional extra)**

X188 = connector, B040 - sensor, front power lift position



X151 = connector, B002 - sensor, front PTO



X231 = connector, S021 - switch, raise front power lift

X232 = connector, S022 - switch, lower front power lift

X223 = connector, S041 - switch, release PTO brake

X017 = front socket, for front power lift

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Transmission / Front PTO

Installation and removal of front PTO gearbox

G

Fit front plate.

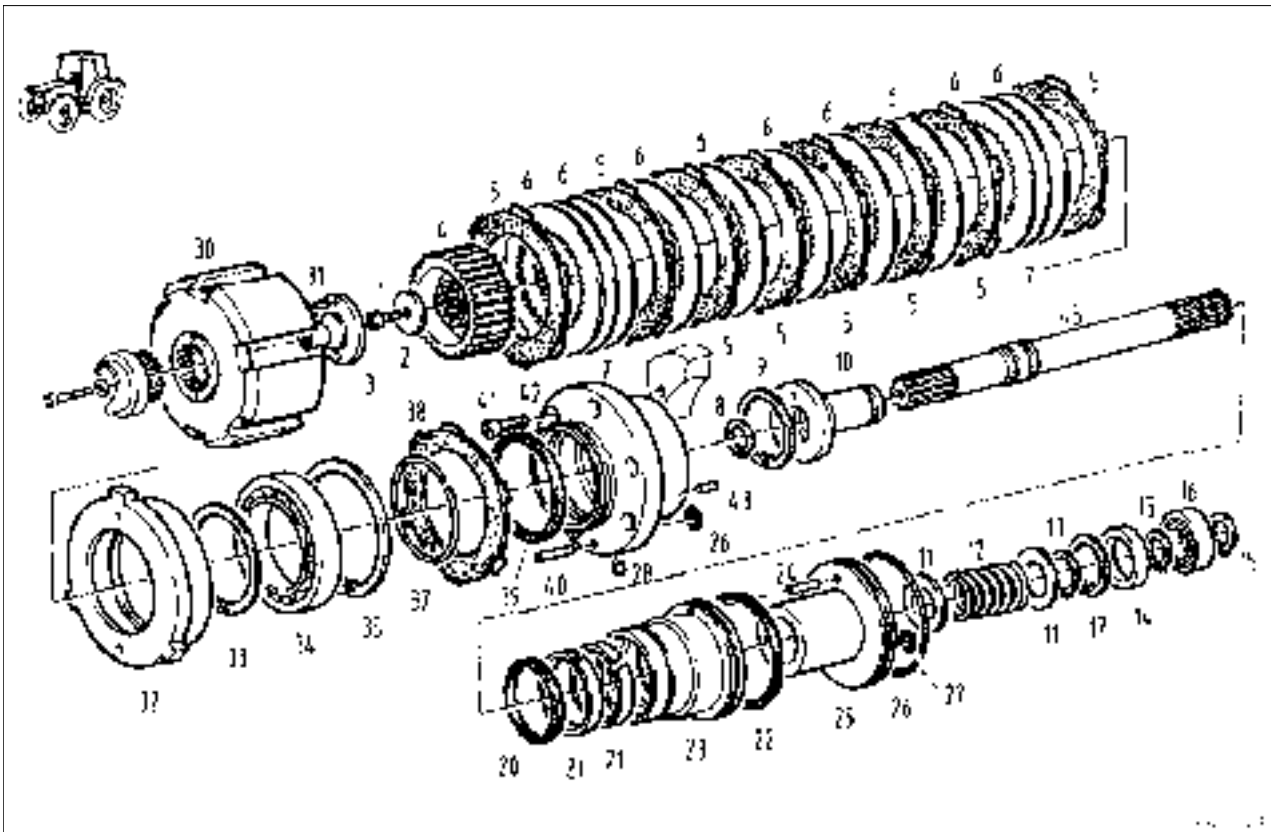
Tighten M18-8 hexagon nuts to **290 Nm**.**Note:****Check clearance of cable loom.**

Fit left and right front cover panels.

**If necessary:**

Fill front PTO with transmission oil - for details of quantity please see Chapter 0000 Reg. A - Fuels and lubricants

Carry out performance test on front PTO.

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Transmission / Front PTO
Installation and removal of front PTO clutch
G

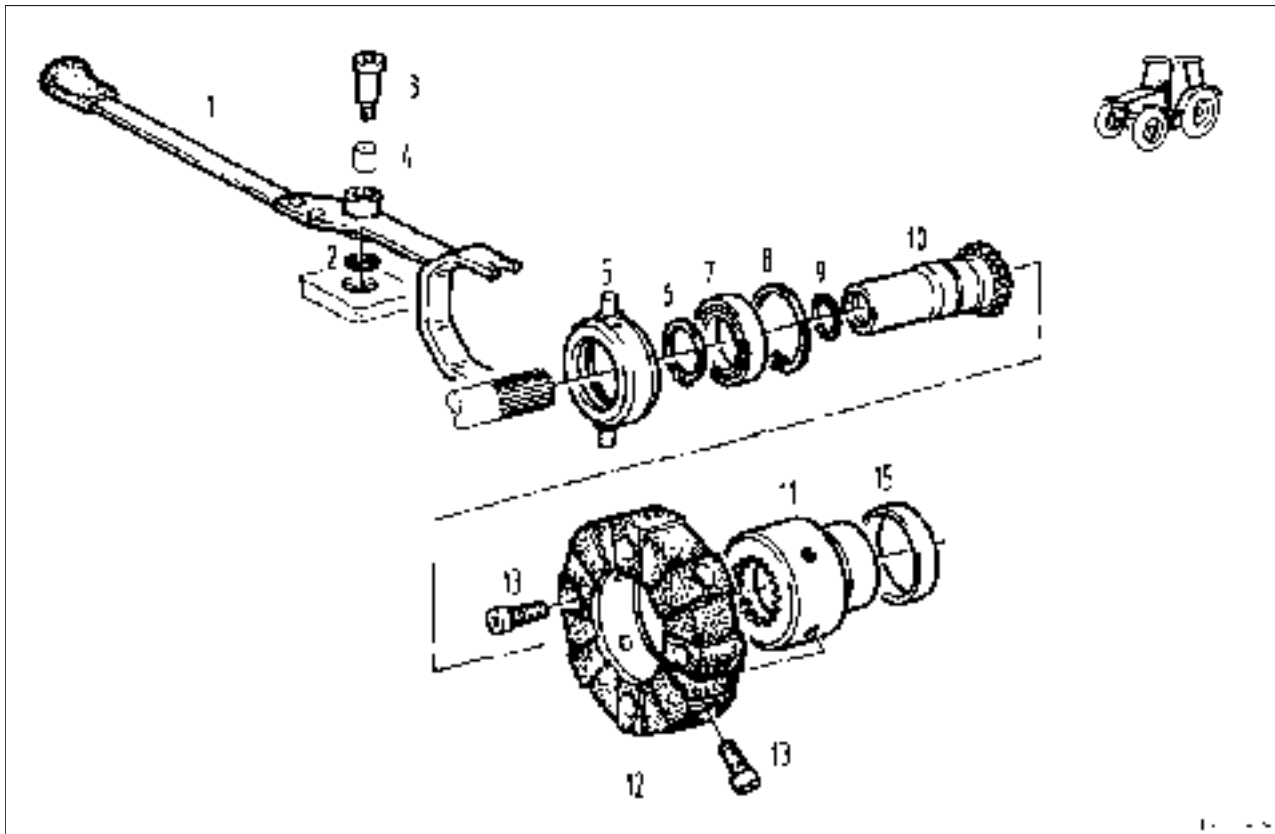
| Front PTO clutch | | | |
|-------------------------|---------------------------------|-------------|--------------------------------------|
| Item | Designation | Item | Designation |
| 1 | Socket head cap screw | 23 | Piston |
| 2 | Washer | 24 | Parallel pin |
| 3 | Retaining ring | 25 | Cylinder liner |
| 4 | Internally toothed disc carrier | 26 | O-ring |
| 5 | Externally toothed disc | 27 | O-ring |
| 6 | Internally toothed disc | 28 | Setscrew |
| 7 | Sine disc | 30 | Clutch bell housing |
| 8 | Circlip | 31 | Dowel pin |
| 9 | Circlip | 32 | Thrust collar |
| 10 | Flanged bush | 33 | Circlip |
| 11 | Locating ring | 34 | Deep-groove ball bearing |
| 12 | Compression spring | 35 | Circlip |
| 13 | Circlip | 37 | Snap ring |
| 14 | Ring | 38 | Brake disc (externally toothed disc) |
| 15 | Circlip | 39 | Form seal |
| 16 | Deep-groove ball bearing | 40 | Parallel pin |
| 17 | Circlip | 41 | Socket head cap screw |
| 20 | Form seal | 42 | Cylinder liner |
| 21 | Guide ring | 43 | Dowel pin |
| 22 | Form seal | 45 | Shaft |

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Transmission / Front PTO

Installation and removal of front PTO clutch

G

| Front PTO season control | | | |
|--------------------------|--------------------------|------|-----------------------|
| Item | Designation | Item | Designation |
| 1 | Control lever | 8 | Circlip |
| 2 | Washer | 9 | O-ring |
| 3 | Adjusting washer | 11 | Selector sleeve |
| 4 | Bearing bush | 12 | Clutch |
| 5 | Release ring | 13 | Socket head cap screw |
| 7 | Deep-groove ball bearing | 15 | Bush |

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Transmission / Front PTO

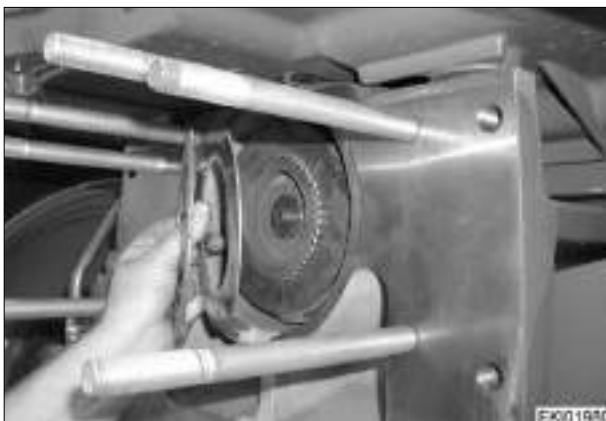
Installation and removal of front PTO clutch

G**Preliminary work:**

Remove front PTO gearbox.

Note:**Hold clutch bell housing (30).****Chapter 1200 Reg. G - Installation and removal of front PTO gearbox**

Remove clutch bell housing (30).



Remove externally toothed discs (5), internally toothed discs (6) and sine discs (7) from internally toothed disc carrier (4) one by one.



Loosen socket head cap screw (1).

Note:**Switch on front PTO season control (see Operating Manual).****Socket head cap screw (1) is secured with Loctite.**

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| Fav 900 | Transmission / Front PTO Installation and removal of front PTO clutch | G |
|---------|--|---|



Remove internally toothed disc carrier (4).



Unclip circlip (9).



Withdraw thrust collar (32) and deep-groove ball bearing (34) with slide hammer puller.

Note:
Do not tilt deep-groove ball bearing (34).



Remove thrust collar (32) and deep-groove ball bearing (34).

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Transmission / Front PTO

Installation and removal of front PTO clutch

G

Unclip snap ring (37).

Remove brake disc (externally toothed disc).



Unclip circlip (8).



Loosen socket head cap screws (41).



Screw slide hammer puller into shaft (45).

Withdraw piston package complete with shaft (45).

Note:**Switch on front PTO season control. This prevents bush from falling out.****Chapter 1200 Reg. C - Technical drawing of front PTO**

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Fav 900**Transmission / Front PTO
Installation and removal of front PTO clutch****G**

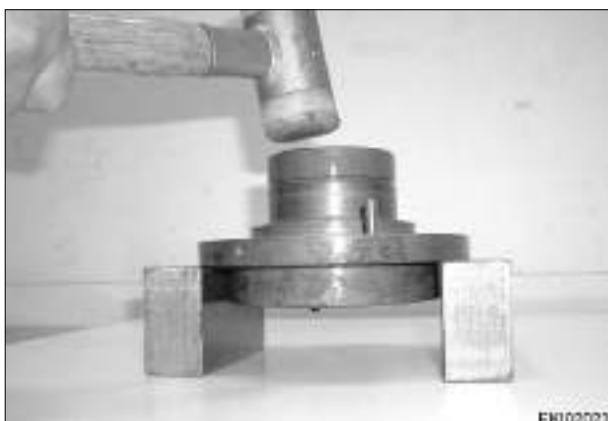
Withdraw piston package complete with shaft (45).



Knock shaft (45) carefully out of piston package.



Remove shaft (45) with deep-groove ball bearing (16) and ring (14).



Remove cylinder liner (42).

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Fav 900**Transmission / Front PTO
Installation and removal of front PTO clutch****G**

Tension compression spring (12) using press and third hand and unclip circlip (13).



Tension compression spring (12) using press and third hand and unclip circlip (9).



Remove flanged bush (10).



Tension compression spring (12) using press and third hand and unclip circlip (17).

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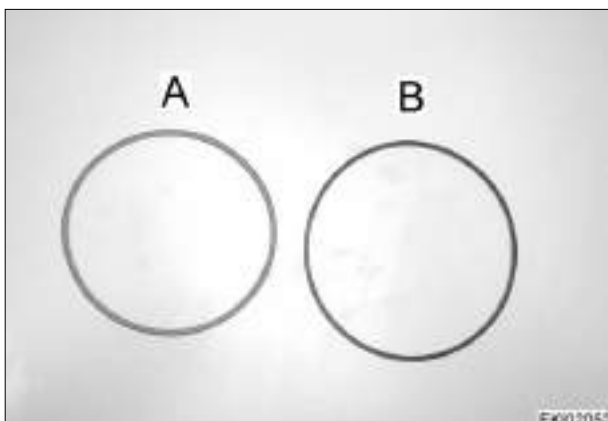
Transmission / Front PTO
Installation and removal of front PTO clutch

G

Remove compression spring (12) and locating rings (11).



Force off piston (23) from cylinder liner (25).



Installing front PTO clutch

Pre-assembling piston (23)

Form seal (22) consists of:

- O-ring (A)
- Sealing ring (B)



Insert O-ring into groove in piston (23) and grease.

Fav 900**Transmission / Front PTO
Installation and removal of front PTO clutch****G**

Carefully warm sealing ring up with hot-air blower.

Note:

Do not burn sealing ring.

**Warning:**

Beware of hot surfaces!



Insert sealing ring into groove in piston (23) over O-ring.

Note:

Chapter 1200 Reg. C - Technical drawing of front PTO clutch



Compress sealing ring using clamp.

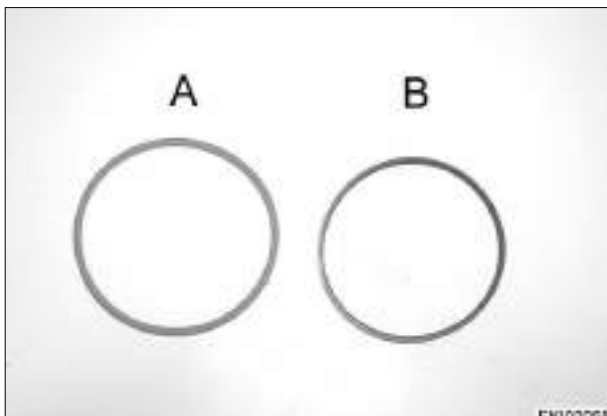


Place two guide rings (21) into grooves of piston (23) and grease.

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Transmission / Front PTO
Installation and removal of front PTO clutch

G

Form seal (20) consists of:

- O-ring (A)
- Sealing ring (B)



Insert O-ring into groove in piston (23) and grease.



Pinch sealing ring and ..

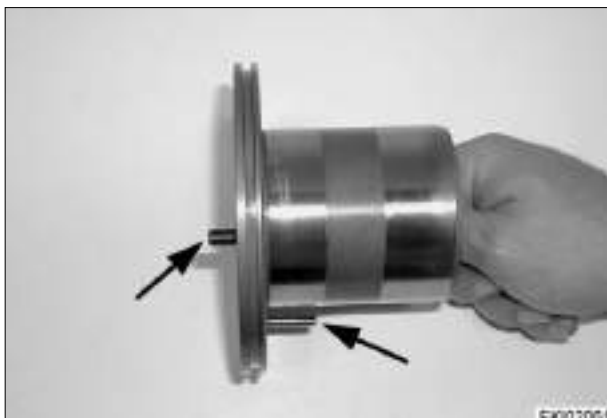


... insert sealing ring into groove in piston (23) with sealing edge facing oil pressure chamber and grease.

Note:

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Fav 900**Transmission / Front PTO
Installation and removal of front PTO clutch****G****Pre-assembling cylinder liner (25)**

Coat parallel pin (24) with Loctite X 903.050.084 and insert into cylinder liner (25).

Wipe off excess Loctite.

Insert dowel pin (43).



Insert O-ring (27) into groove in cylinder liner (25) and grease.

**Fitting cylinder liner (25) and piston (23)**

Slide cylinder liner (25) onto piston (23).



Insert washer (11), compression spring (12), washer (11).

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Transmission / Front PTO

Installation and removal of front PTO clutch

G

Tension compression spring (12) using press and third hand and clip circlip (17) into place.



Lightly grease flanged bush (10) and insert into cylinder liner (25).

Note:

Align compression spring (12).



Tension compression spring (12) using press and third hand and clip circlip (9) into place.



Tension compression spring (12) using press and third hand and clip circlip (13) into place.

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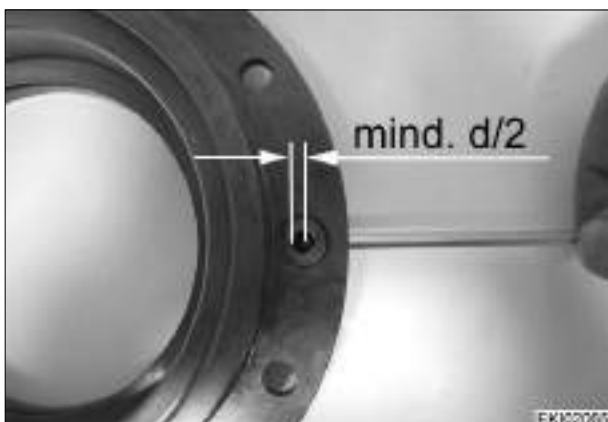
Transmission / Front PTO

Installation and removal of front PTO clutch

G**Pre-assembling cylinder liner (42)**

Coat parallel pin (40) (stop for brake disc) with Loctite X 903.050.084 and insert into cylinder liner (42).

Wipe off excess Loctite.

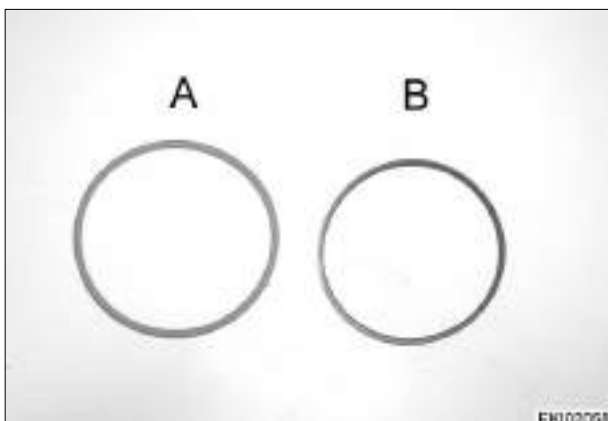


Coat setscrew with Loctite X 903.050.091.

Screw in setscrew.

Important:

Cross hole must remain at least half open.



Form seal (20) consists of:

- O-ring (A)
- Sealing ring (B)



Insert O-ring into groove in cylinder liner (42) and grease.

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Installation and removal of front PTO clutch

G

Pinch sealing ring and ..



... insert sealing ring into groove in cylinder liner (42) with sealing edge facing oil pressure chamber and grease.

Note:

Chapter 1200 Reg. C - Technical drawing of front PTO clutch



Locate cylinder liner (42).

Note:

Note position of parallel pin (40) and dowel pin (43).

**Pre-assembling shaft (45)**

Check deep-groove ball bearing (16) and, if necessary, replace with new bearing.

Clip in circlip (15), slide deep-groove ball bearing (16) on as far as stop and secure with circlip (15).

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Fav 900**Transmission / Front PTO
Installation and removal of front PTO clutch****G**

Slide pre-assembled shaft (45) into gearing of season control.

Press deep-groove ball bearing (16) into bearing seat.



Insert O-rings (26 and 27) and grease.



Insert ring (14).



Insert pre-assembled piston package.

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Transmission / Front PTO

Installation and removal of front PTO clutch

G

Tighten socket head cap screws (41) crosswise to **25 Nm**.

Note:

Check operation of season control.



Locate brake disc (38).

Note:

Parallel pin (40) must be in contact with brake disc lug on left (seen in opposite direction to direction of travel).



Locate snap ring (37).



Check deep-groove ball bearing (34) and, if necessary, replace with new bearing.

Press deep-groove ball bearing (34) into thrust collar (32) and clip circlip (35) in place.

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Press pre-assembled thrust collar into bearing seat.



Clip circlip (33) in place.



Clip circlip (8) into groove in shaft (45).



Locate internally toothed disc carrier (4).

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Transmission / Front PTO

Installation and removal of front PTO clutch

G

Coat socket head cap screw (1) with Loctite X 903.050.091.

Screw in socket head cap screw (1) with washer (2).

Tighten socket head cap screw (1) to **49 Nm**.

Note:

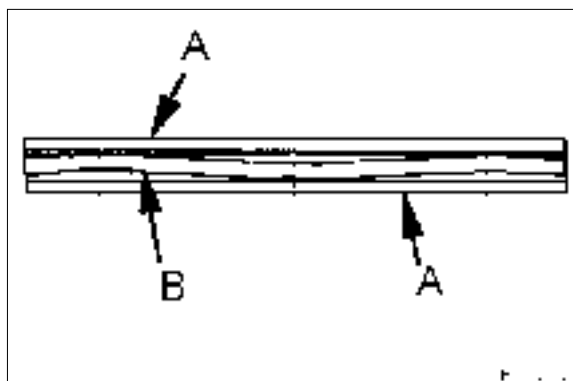
Switch on front PTO season control (see Operating Manual).



Locate disc package.

Clean internally toothed discs (6) and externally toothed discs (5) such that they are grease-free before fitting.

Start with externally toothed disc (5)



continue with:

A = internally toothed disc (6)

B = sine disc (7)

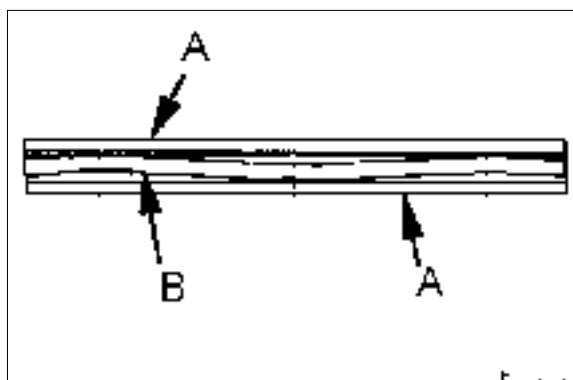
A = internally toothed disc (6)

continue with:

6 externally toothed discs (5) and 5 internally toothed discs (6) alternately.

Note:

Chapter 1200 Reg. C - Technical drawing of front PTO



continue with:

A = internally toothed disc (6)

B = sine disc (7)

A = internally toothed disc (6)

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Transmission / Front PTO

Installation and removal of front PTO clutch

G

Finish with externally toothed disc (5).



Pre-assembling clutch bell housing (30)

Insert retaining ring (3) into clutch bell housing (30).



Align externally toothed discs (5) and locate clutch bell housing (30).



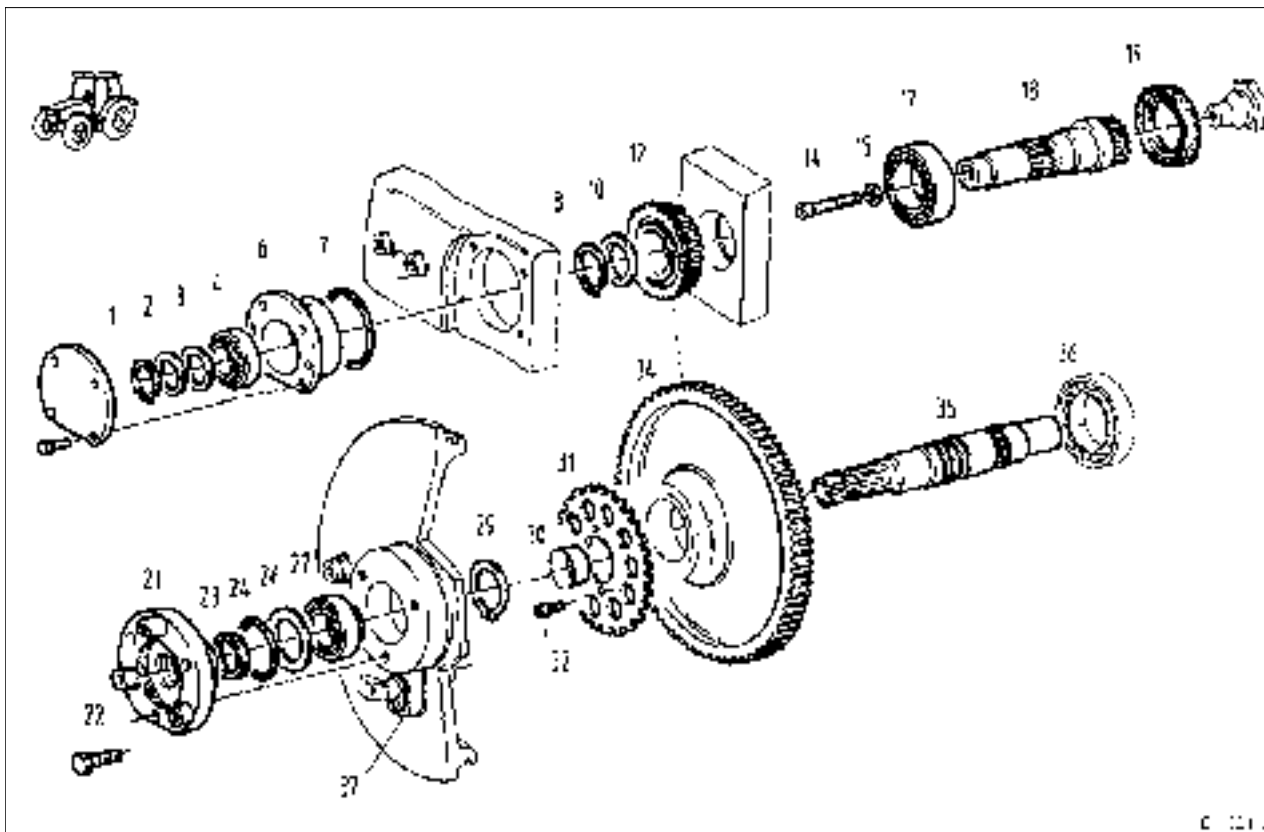
Concluding work

Mount front PTO gearbox.

Note:

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Installation and removal of front PTO gearbox
G

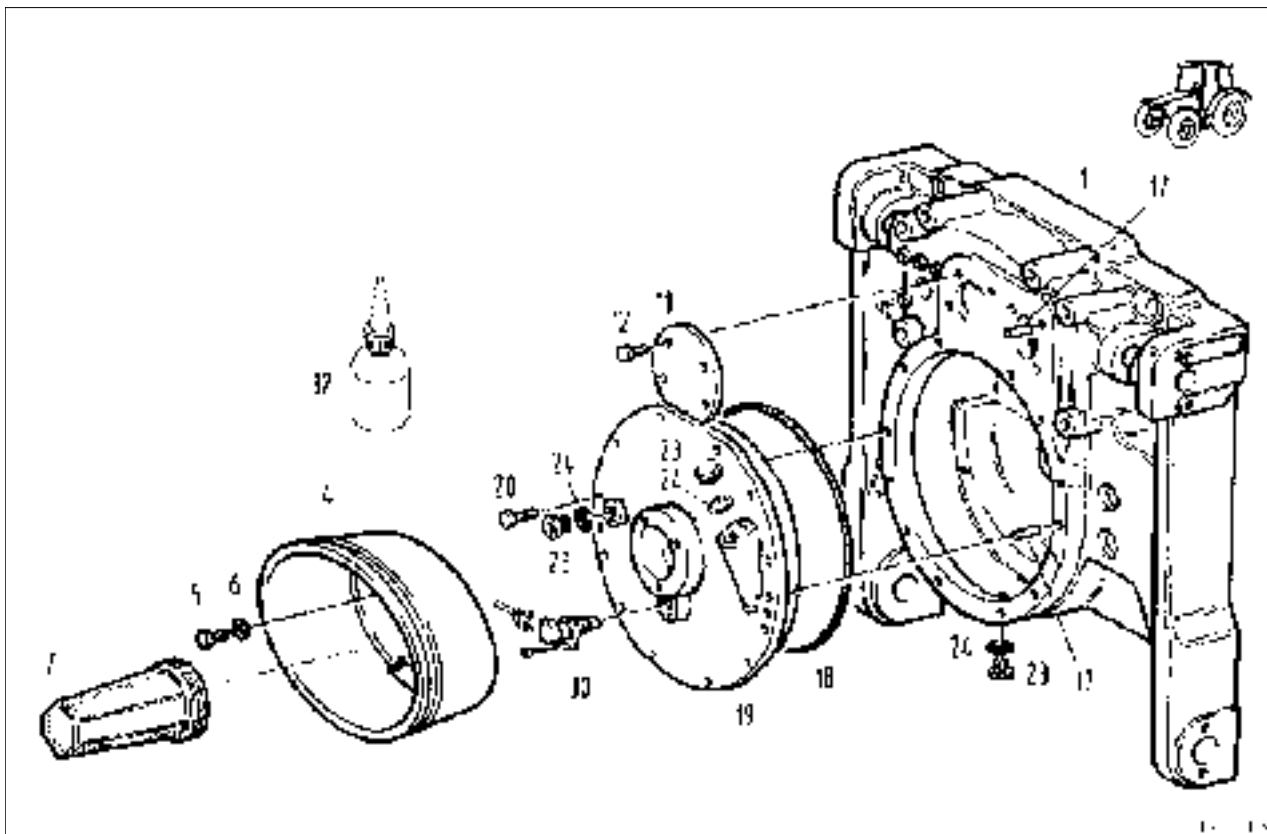
| Item | Designation | Item | Designation |
|------|---------------------------------|------|-----------------------|
| 1 | Circlip | 21 | Centering cover |
| 2 | Locating ring | 22 | Hexagon screw |
| 3 | Adjusting washers (as required) | 23 | Shaft seal |
| 4 | Taper roller bearing | 24 | O-ring |
| 6 | Bearing bush | 26 | Adjusting washer |
| 7 | O-ring | 27 | Taper roller bearing |
| 8 | Circlip | 29 | Circlip |
| 10 | Ring | 30 | Inner race |
| 12 | Spur gear | 31 | Ratchet wheel |
| 14 | Socket head cap screw | 32 | Socket head cap screw |
| 15 | Usit ring | 34 | Spur gear |
| 17 | Taper roller bearing | 35 | PTO |
| 18 | Shaft | 36 | Taper roller bearing |
| 19 | Shaft seal | 37 | B002 - sensor |

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Transmission /Front PTO

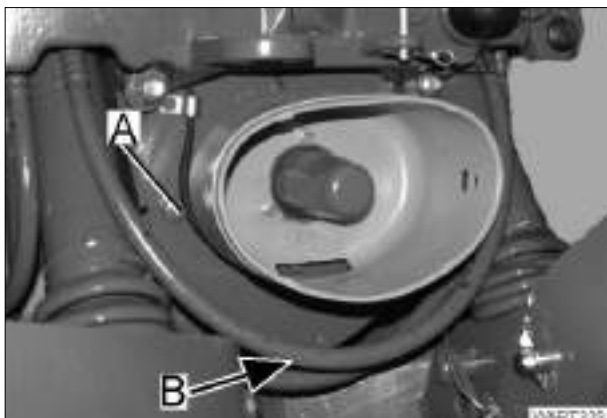
Installation and removal of front PTO gearbox

G

| Item | Designation | Item | Designation |
|------|-----------------|------|---------------------------|
| 1 | Housing | 18 | O-ring |
| 4 | Protective cup | 19 | Cover |
| 5 | Hexagon screw | 20 | Hexagon screw |
| 6 | Washer | 23 | Drain plug |
| 7 | PTO shaft guard | 24 | Sealing ring |
| 11 | Cover | 30 | B002 - sensor |
| 12 | Hexagon screw | 32 | Loctite X 903.050.074.000 |
| 17 | Parallel pin | | |

Fav 900

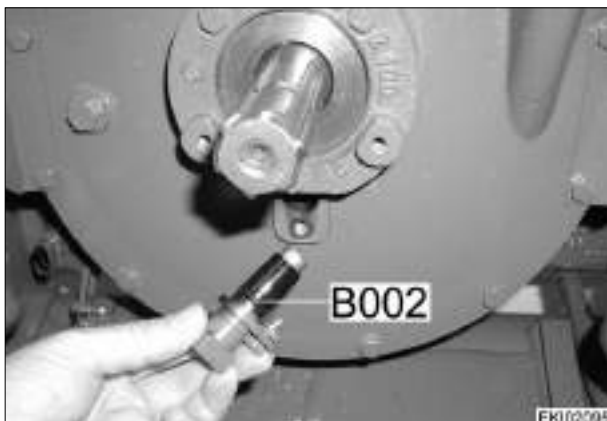
Transmission /Front PTO Installation and removal of front PTO gearbox

G**For repairs to front PTO gearbox:**

Drain oil, approx. 4.2 l

A = fill with oil via filler opening

B = oil drain plug

Note:**Chapter 0000 Reg. A - Fuels and lubricants****If only PTO (35) is removed: front PTO gearbox remains mounted on tractor.****If shaft (18) is removed: remove front PTO gearbox from tractor.****Note:****Chapter 1200 Reg. G - Installation and removal of front PTO gearbox****Disassembling front PTO gearbox****Removing PTO (35)**

Remove B002 - sensor, front PTO.

Note:**Note number of washers (used for setting B002 - sensor)**

Unscrew hexagon screws from centering cover (21).

| | | |
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| Fav 900 | Transmission /Front PTO Installation and removal of front PTO gearbox | G |
|---------|--|---|



Remove centering cover (21) and adjusting washers (26).



Unscrew twelve hexagon screws.



Force cover off using two M8 setscrews.

Note:
Hold PTO.



Remove cover and PTO (35) with fitted components.

| | | | | | | |
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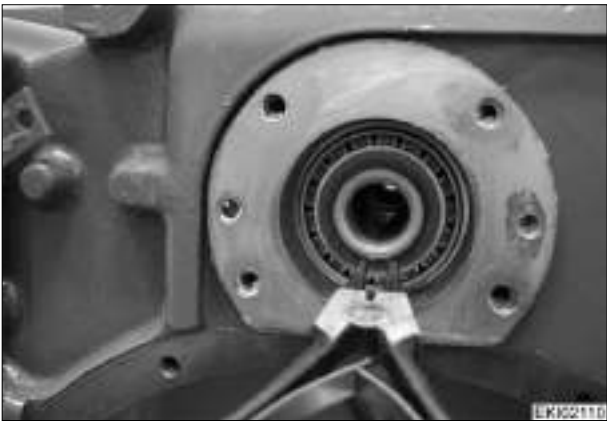
Withdraw taper roller bearing (27) from PTO (35) with extractor.



Unclip circlip (29).



Remove fitted components from PTO (35).



Removing shaft (18)

Preliminary work: remove front PTO gearbox.

Note:
Chapter 1200 Reg. G - Installation and removal of front PTO gearbox

Unclip circlip (1).

Fav 900**Transmission /Front PTO
Installation and removal of front PTO gearbox****G**

Remove circlip (1), locating ring (2) and, if appropriate, adjusting washers (3).



Force bearing bush (6) off with two M8 setscrews.



Remove taper roller bearing (4) and bearing bush (6).



Unclip circlip (8).

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Transmission /Front PTO

Installation and removal of front PTO gearbox

G

Press shaft (18) out of bearing seat.

Note:

Hold spur gear (12).



Fitted components on shaft (18)

**Assembling front PTO gearbox****Installing and setting shaft (18)**

Heat inner race of taper roller bearing (17) to approx. 80°C.



Press inner race of taper roller bearing (17) onto shaft (18) as far as stop.

Fav 900**Transmission /Front PTO
Installation and removal of front PTO gearbox****G**

Press outer race of taper roller bearing (17) into gearbox housing as far as stop.



Install shaft (18) with fitted components.



Fit locating ring (2).

Note:
Chamfer faces gearwheel.



Clip circlip (1) in place.

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Transmission /Front PTO Installation and removal of front PTO gearbox

G

Press outer race of taper roller bearing (4) into bearing bush (6) as far as stop.



Insert O-ring (7) into groove in bearing bush (6) and grease.



Fit bearing bush (6) and tighten with two hexagon screws to **25 Nm** (for setting bearing).



Heat inner race of taper roller bearing (4) to approx. 80°C.

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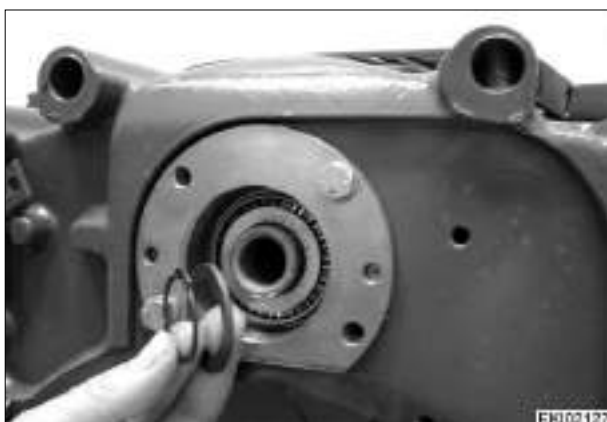
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Transmission /Front PTO

Installation and removal of front PTO gearbox

G

Slide inner race of taper roller bearing (4) onto shaft (18).



Fit locating ring (2) and clip circlip (1) in place.
Oil bearing, knock bearing in both directions and turn bearing.



Fit torque gauge X 899.980.151 and check rotational resistance of shaft bearing.

Target value = 40-60 Ncm (0.4-0.6 Nm)

In event of discrepancies, correct using adjusting washers (3) and check rotational resistance again.

Note:

To measure rotational resistance, fit socket head cap screw to shaft (18) and lock with washer and nut.



Coat shaft seal (19) on outside with spirit/water mixture (1:1 ratio).

Fill sealing lips 2/3 with grease.

Press uniformly deeply into gearbox housing with sealing lip facing oil chamber.

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Fav 900**Transmission /Front PTO
Installation and removal of front PTO gearbox****G****Installing and setting PTO shaft (35)**

Heat inner race of taper roller bearing (36) to approx. 80°C.



Press inner race of taper roller bearing (36) onto PTO (35) as far as stop.



Slide spur gear (34) (1000 rpm) onto splines of PTO (35) and press spur gear (34) as far as stop.

Note:

Take care not to damage taper roller bearing (36).



Press bush (30) in using fitting tool.

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Transmission /Front PTO Installation and removal of front PTO gearbox

G

Locate ratchet wheel.

Coat two M6 screws using Loctite X 903.050.084.

Tighten screws to **10 Nm**.



Clip circlip (29) in place.



Heat inner race of taper roller bearing (27) to approx. 80°C.



Press inner race of taper roller bearing (27) onto PTO (35) as far as stop.

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Fav 900**Transmission /Front PTO
Installation and removal of front PTO gearbox****G**

Press outer race of taper roller bearing (36) into gearbox housing as far as stop.



Insert PTO (35) with fitted components into transmission housing.

Note:
Oil bearing.



Insert O-ring into groove in cover and grease.



Mount cover and tighten hexagon screws to 25 Nm .

Note:
Note position of dowel pin.

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Transmission /Front PTO

Installation and removal of front PTO gearbox

G

Press outer race of taper roller bearing (27) into cover.

Fit centering cover (21) with **thinnest adjusting washer (26)**.

Tighten hexagon screws to 25 Nm.

Note:

To set bearing: fit centering cover (21) without shaft seal (23) and without O-ring (24).



Tap bearing lightly and rotate bearing approx. 10 turns.

Fit gauge and pull **once** on PTO (35).

Note play.

Note:

Measurement is more accurate and also simpler if gearbox is vertical.



Set axial play of PTO (35) using adjusting washers (26).

Target value: 0.0-0.03 mm axial play

Rotate PTO (35) again at least 10 turns and repeat measurement procedure as described above.



Insert O-ring (24) into groove in centering cover (21) and grease.

Coat shaft seal (23) on outside with spirit/water mixture (1:1 ratio).

Fill sealing lips 2/3 with grease.

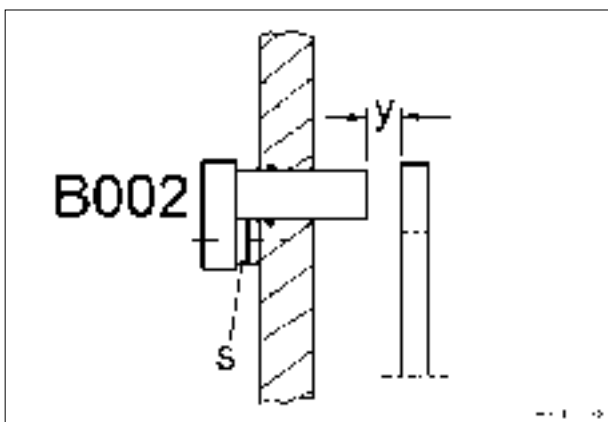
Press into centering cover (21) as far as stop with sealing lip facing oil chamber.

Mount centering cover (21) and tighten hexagon screws to **25 Nm**.

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Fav 900**Transmission /Front PTO
Installation and removal of front PTO gearbox****G****Fitting and setting B002 - sensor**

Measure gap between cover and ratchet wheel (31) using depth gauge.



Set B002 - sensor using washers (S).

Target value: $0.5 \text{ mm} < y < 1.5 \text{ mm}$

Measure length of sensor = approx. 40 mm

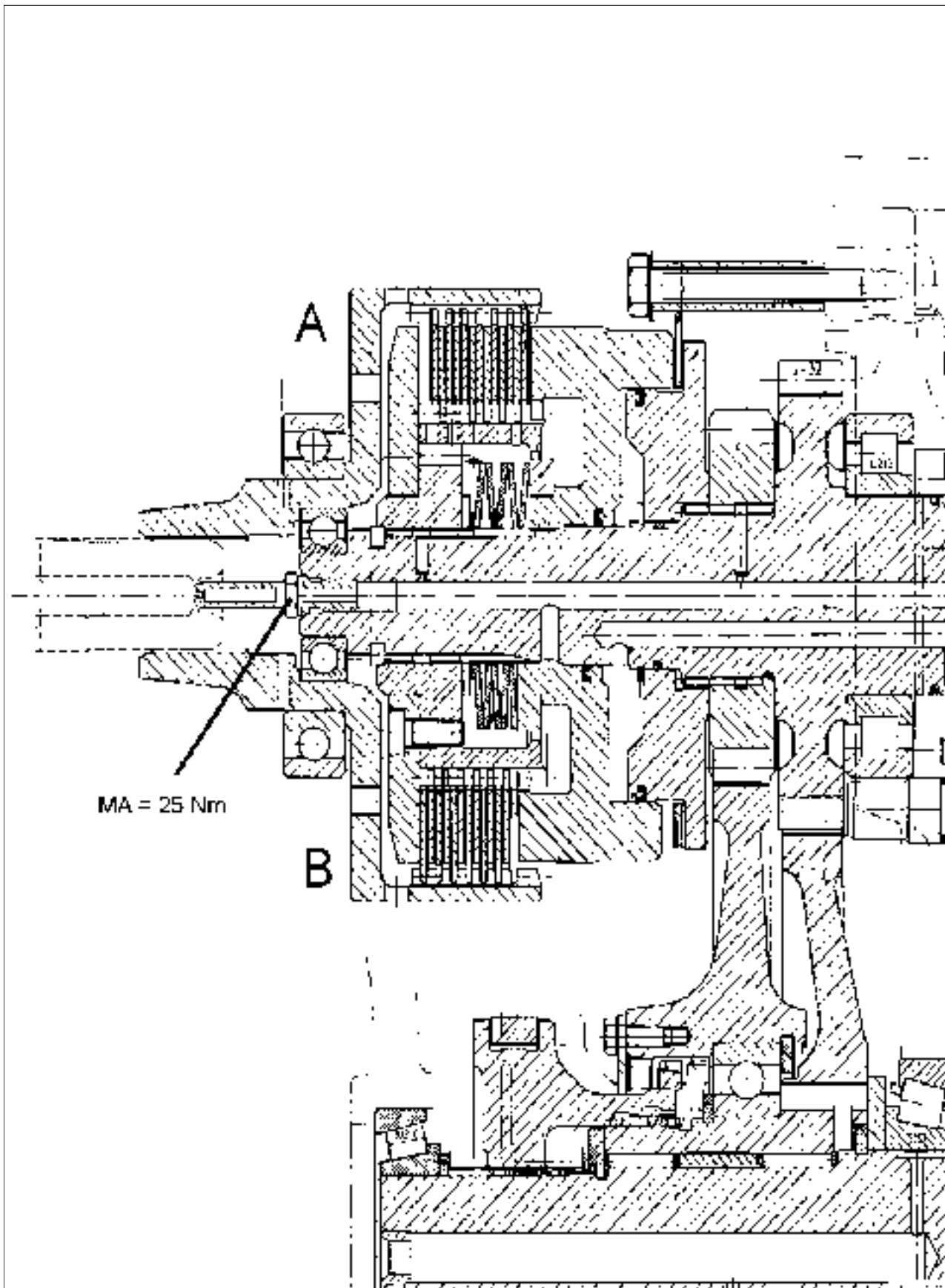
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Live PTO clutch

| | | |
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| Fav 900 | Transmission / Live PTO Live PTO clutch | C |
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A = Clutch OFF / brake ON

B = Clutch ON / brake OFF

Note:

Chapter 1005 Reg. C - Transmission hydraulic circuit diagram with key

Chapter 1005 Reg. D - Pressure-measuring points in transmission and enhanced controls

Chapter 1005 Reg. E - Pressure measurement in transmission

Chapter 1220 Reg. G - Installation and removal of live PTO clutch

Chapter 1220 Reg. G - Installation and removal of live PTO gearbox

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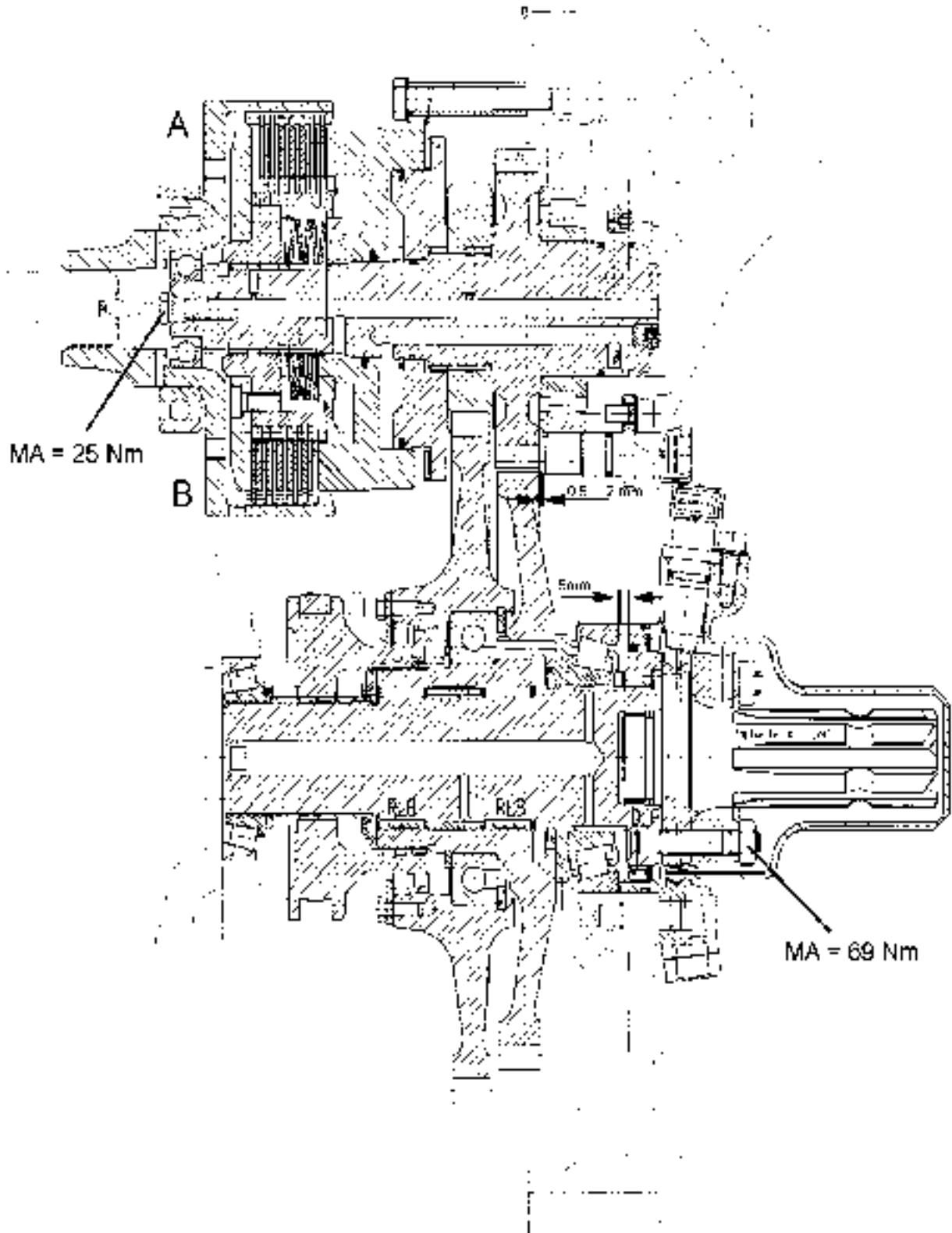
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Live PTO 750 / 1000

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Live PTO 750 / 1000

<https://www.truck-manuals.net/>

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| Fav 900 | Transmission / Live PTO Live PTO 750 / 1000 | C |
|----------------|--|----------|

A = Clutch OFF / brake ON

B = Clutch ON / brake OFF

Note:

Live PTO 750 / 1000 (standard)

Live PTO 540 / 1000 (option)

Note:

Chapter 1005 Reg. C - Transmission hydraulic circuit diagram with key

Chapter 1005 Reg. D - Pressure-measuring points in transmission and enhanced controls

Chapter 1005 Reg. E - Pressure measurement in transmission

Chapter 1220 Reg. G - Installation and removal of live PTO clutch

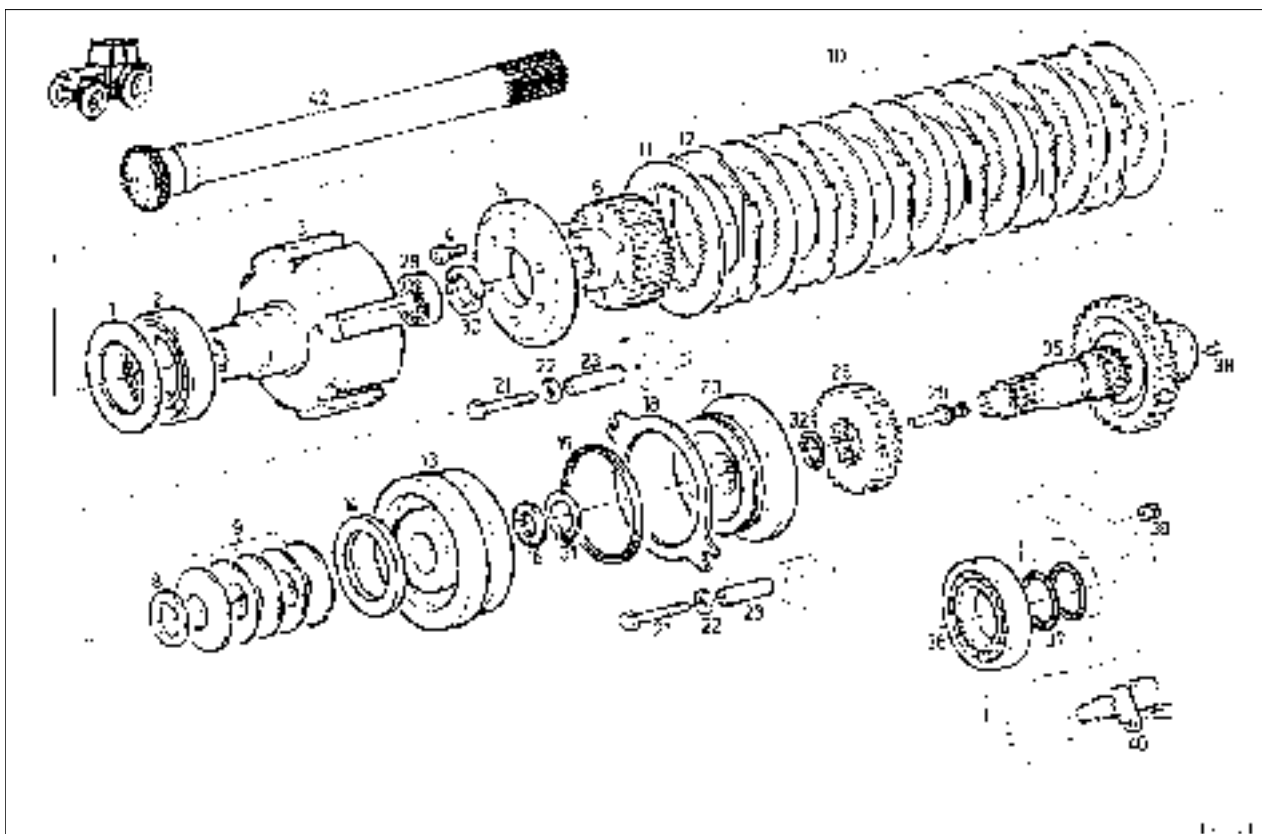
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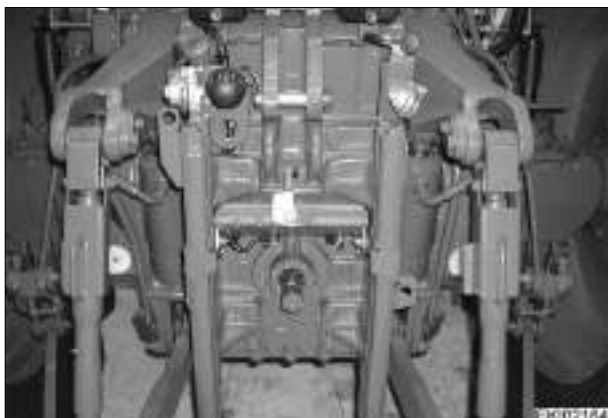
Transmission / Live PTO

Installation and removal of live PTO clutch

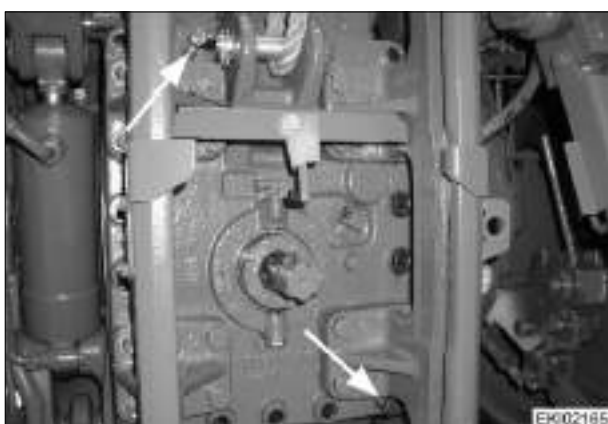
G

| Item | Designation | Item | Designation |
|------|---------------------------------|------|----------------------------|
| 1 | Adjusting washer | 21 | Hexagon screw |
| 2 | Deep-groove ball bearing | 22 | Spring washer |
| 3 | Clutch bell housing | 23 | Bush |
| 4 | Socket head cap screw | 25 | Spur gear |
| 5 | Locating ring | 28 | Deep-groove ball bearing |
| 6 | Internally toothed disc carrier | 29 | Nozzle |
| 8 | Adjusting washer | 30 | Half-ring |
| 9 | Belleville spring | 31 | Circlip |
| 10 | Disc package (11, 12) | 32 | O-ring |
| 11 | Internally toothed disc | 35 | Shaft |
| 12 | Externally toothed disc | 36 | Cylindrical roller bearing |
| 13 | Piston | 37 | Rectangular-section ring |
| 14 | Ring | 38 | Setscrew |
| 16 | Lip seal | 39 | Nozzle |
| 18 | Disc | 40 | B021 - sensor |
| 19 | Lip seal | 42 | Shaft |
| 20 | Brake disc | | |

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**Preliminary work:**

- Lower rear power lift.
- Drain transmission oil (approx. 65 l).
- Remove trailer hitch.
- Label and disconnect connector X169 from B020 - sensor, PTO 1.
- Label and disconnect connector X170 from B021 - sensor, PTO 2.
- Unscrew compressed-air connections from connecting frame.



Unscrew all fastening nuts and bolts. Connecting frame remains on housing cover.

Remove silicone plastic from threaded bores and screw in two M12 forcing screws (arrowed).

Attach housing cover to hoist, taking appropriate safety precautions, and force housing cover off.



Remove housing cover (with rear PTO).

Note:

Note adjusting washer (1). This is used in setting bearing play.



Force clutch bell housing (3) off using two hexagon screws.

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Transmission / Live PTO Installation and removal of live PTO clutch

G

Unscrew nozzle (29).



Attach tensioning device X 899.980.145 and tension clutch.

Remove half-rings (30).

Release tension on clutch.

Remove internally toothed disc carrier (6) and disc package (10).



Remove adjusting washers (8), belleville spring package (9) and ring (14).



Remove piston (13).

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Unscrew one hexagon screw (21) and remove disc (18).



Unclip circlip (31) and remove brake disc (20).



Assembling clutch

Insert new O-ring (32) into groove in shaft (35) and grease.

Check brake disc (20) for damage.

If required, fit new brake disc (20).



Clip circlip (31) in place.

Insert new lip seal (19) into groove in brake disc (20) with sealing lip facing oil chamber and grease.

Note:

Chapter 1220 Reg. C - Technical drawing of live PTO clutch

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Transmission / Live PTO Installation and removal of live PTO clutch

G



Locate disc (18).

Coat thread of hexagon screw (21) with synthetic bonding agent X 903.054.084, then locate spring washer (22) and bush (23).

Tighten hexagon screw.



Insert new lip seal (16) into inner groove in piston (13) with sealing lip facing oil chamber and grease.

Note:

Chapter 1220 Reg. C - Technical drawing of live PTO clutch



Locate pre-assembled piston (13).

Locate ring (14).



Locate five belleville springs (9) with outer diameters facing each other and also locate adjusting washers (8).

Note:

Outer diameter of first belleville spring (9) faces ring (14) in piston (13).

Chapter 1220 Reg. C - Technical drawing of live PTO clutch

If necessary, e.g. adjusting washer (8) has been lost:

determine pretension of belleville springs (9).

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G



Determining pretension of belleville springs

If removed: mount locating ring (5) on internally toothed disc carrier (6).

Coat thread of socket head cap screws (4) with synthetic bonding agent X 903.050.084 and tighten.



Locate pre-assembled internally toothed disc carrier (6).

Measure distance between face end of shaft (35) and internally toothed disc carrier (6) and record distance, e.g. 23.2 mm.



Attach tensioning device X 899.980.145 and tension belleville springs (9).

Insert half-rings (30).

With chamfered half-rings (30) chamfer faces internally toothed disc carrier (6).

Remove tensioning device X 899.980.145.

Note:

Chapter 1220 Reg. C - Technical drawing of live PTO clutch

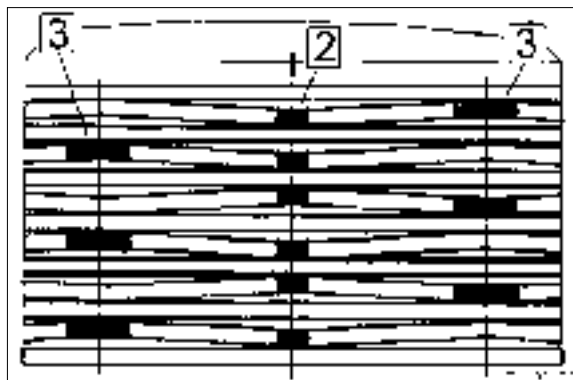


Measure distance between face end of shaft (35) and internally toothed disc carrier (6) and record distance, e.g. 25.8 mm.

If belleville spring package is compressed by approx. 2.5 mm, pre-tension is correct.

In event of discrepancies, correct using adjusting washers (8).

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Slide disc package (10) onto internally toothed disc carrier (6).

Start with externally toothed disc (12)

then continue, fitting internally (11) and externally (12) toothed discs alternately. Narrow groove (item 2) in **each** internally toothed disc (11) and broad groove in **every second** internally toothed disc (11) must be aligned.

Note:

Total number of discs: seven externally toothed discs (12) and six internally toothed discs (11)



Locate internally toothed disc carrier (6) with disc package (9).



Fit tensioning device X 899.980.145.

Tension clutch.

Insert half-rings (30).

With chamfered half-rings (30) chamfer faces internally toothed disc carrier (6).

Note:

Chapter 1220 Reg. C - Technical drawing of live PTO clutch

Note:

If internally toothed disc carrier (6) does not engage, locate internally toothed disc carrier (6) without disc package (10) and mark gearing with coloured pen.



Press down on disc package centrally.

Measure gap (ventilating path) with feeler gauge.

Target value: 1.75-3.50 mm

If minimum gap of 1.75 mm is not reached, discs are bowed.

Fit new disc package (10).

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Transmission / Live PTO

Installation and removal of live PTO clutch

G

Coat thread of nozzle (29) with synthetic bonding agent X903.903.050.084.

Tighten nozzle (29) to 25 Nm.



Where removed: press deep-groove ball bearing (28) into clutch bell housing (3) as far as stop with closed side facing upwards.



Where removed: press deep-groove ball bearing (2) onto clutch bell housing (3) as far as stop.

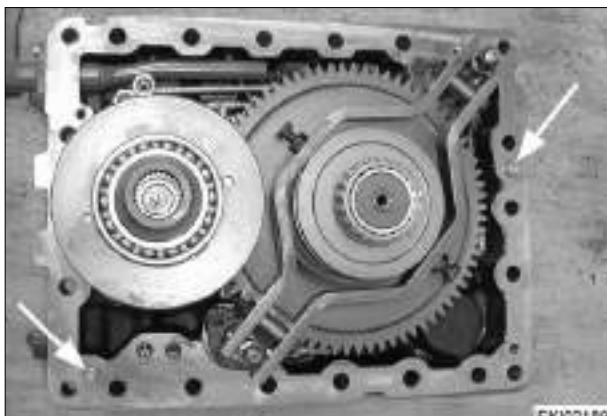


Align externally toothed discs (12) and press clutch bell housing (3) in place as far as stop.

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G

Clean flange surfaces.

Check that two dowel pins (20) (arrowed) are present.

Coat flange surface with surface sealant X 903.050.074.

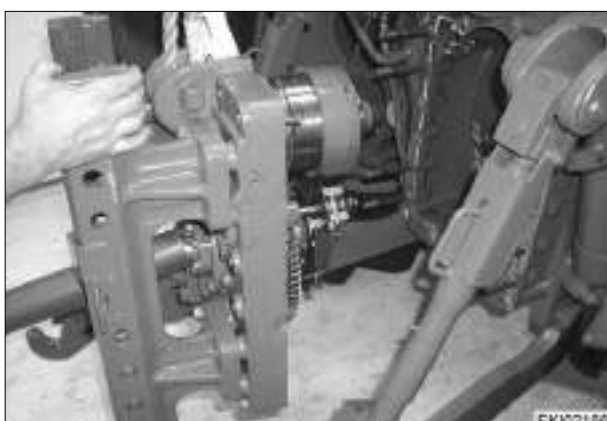


Insert existing adjusting washers (1) into upper bore.

Note:

Determining required adjusting washer (1)
Chapter 1220 Reg. G - Installation and removal of live PTO gearbox

Fit and grease four new O-rings for pressure connections.



Attach housing cover to hoist, taking appropriate safety precautions, and mount on rear-axle housing.



Tighten M18 fastening nuts and bolts to **400 Nm**.

Fit B020 - sensor, PTO 1 (connector X 169)

Fit B021 - sensor, PTO 2 (connector X170)

Clip electric cables in place.

Screw compressed-air connections to connecting frame.

Mount trailer hitch.

Fill with transmission oil.

Note:

Chapter 0000 Reg. A - Fuels and lubricants

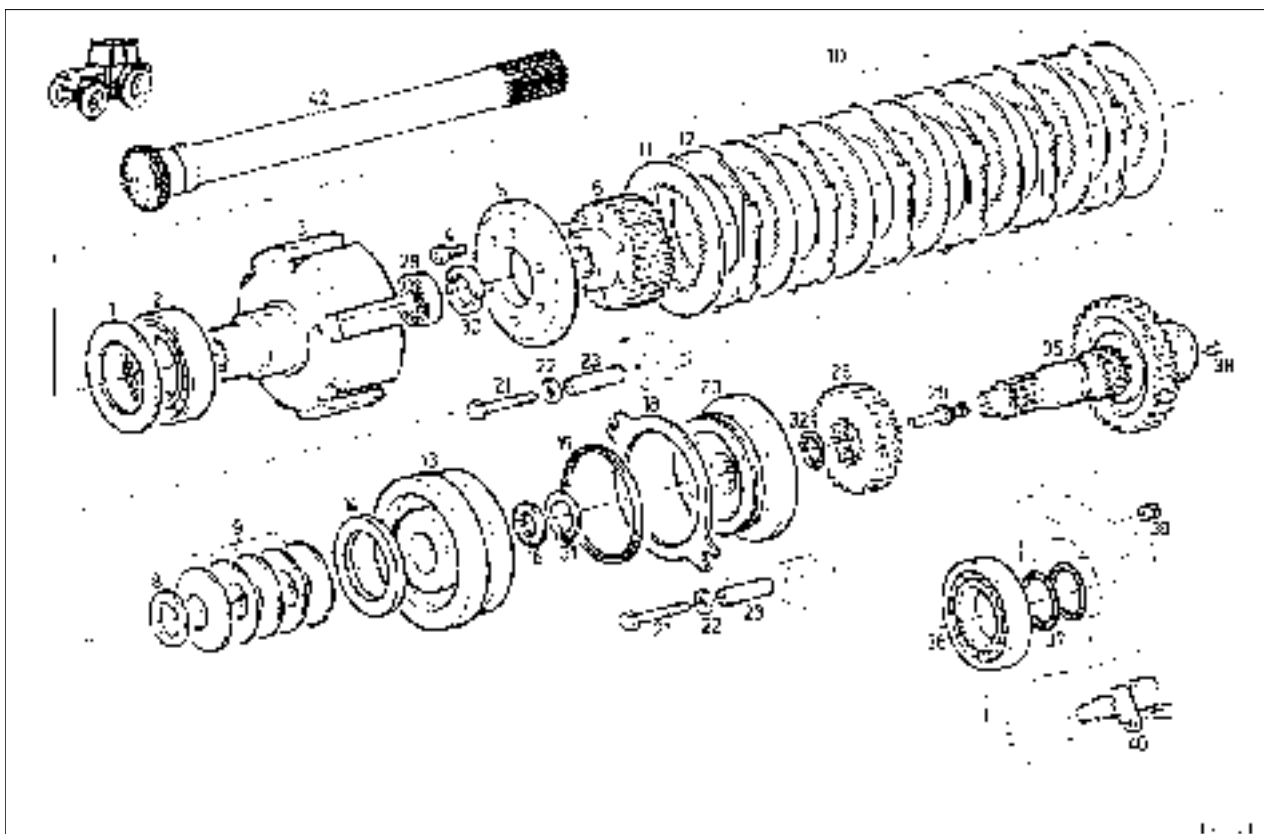
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Installation and removal of live PTO gearbox

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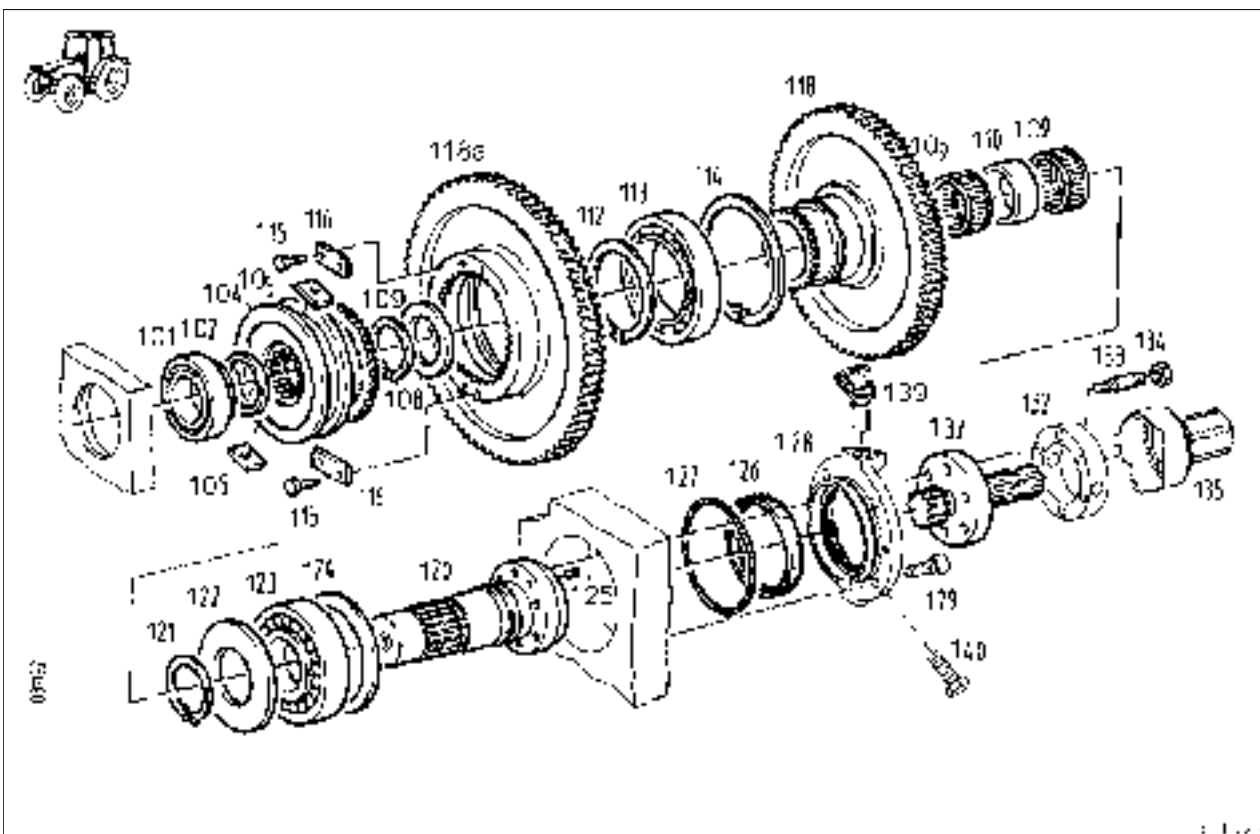
| Item | Designation | Item | Designation |
|------|---------------------------------|------|----------------------------|
| 1 | Adjusting washer | 21 | Hexagon screw |
| 2 | Deep-groove ball bearing | 22 | Spring washer |
| 3 | Clutch bell housing | 23 | Bush |
| 4 | Socket head cap screw | 25 | Spur gear |
| 5 | Locating ring | 28 | Deep-groove ball bearing |
| 6 | Internally toothed disc carrier | 29 | Nozzle |
| 8 | Adjusting washer | 30 | Half-ring |
| 9 | Belleville spring | 31 | Circlip |
| 10 | Disc package (11, 12) | 32 | O-ring |
| 11 | Internally toothed disc | 35 | Shaft |
| 12 | Externally toothed disc | 36 | Cylindrical roller bearing |
| 13 | Piston | 37 | Rectangular-section ring |
| 14 | Ring | 38 | Setscrew |
| 16 | Lip seal | 39 | Nozzle |
| 18 | Disc | 40 | B021 - sensor |
| 19 | Lip seal | 42 | Shaft |
| 20 | Brake disc | | |

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Transmission / Live PTO Installation and removal of live PTO gearbox

G



| Item | Designation | Item | Designation |
|------|----------------------------|------|-----------------------|
| 101 | Taper roller bearing | 121 | Circlip |
| 102 | Locating ring | 122 | Washer |
| 104 | Clutch hub | 123 | Taper roller bearing |
| 105 | Slider | 124 | Adjusting washer |
| 107 | Circlip | 125 | Setscrew |
| 108 | Washer | 126 | Shaft seal |
| 109 | Needle-roller assembly | 127 | O-ring |
| 110 | Spacer | 128 | Bearing cap |
| 112 | Circlip | 129 | Socket head cap screw |
| 113 | Deep-groove ball bearing | 132 | Spacer |
| 114 | Circlip | 133 | M10x50-10.9 stud bolt |
| 115 | Hexagon screw | 134 | M10-10 hexagon nut |
| 116 | Stop | 135 | PTO shaft guard |
| 118 | Spur gear (1000 rpm) | 137 | Flanged pin |
| 118A | Spur gear (540 or 750 rpm) | 139 | B020 - sensor |
| 120 | Shaft | 140 | Hexagon screw |

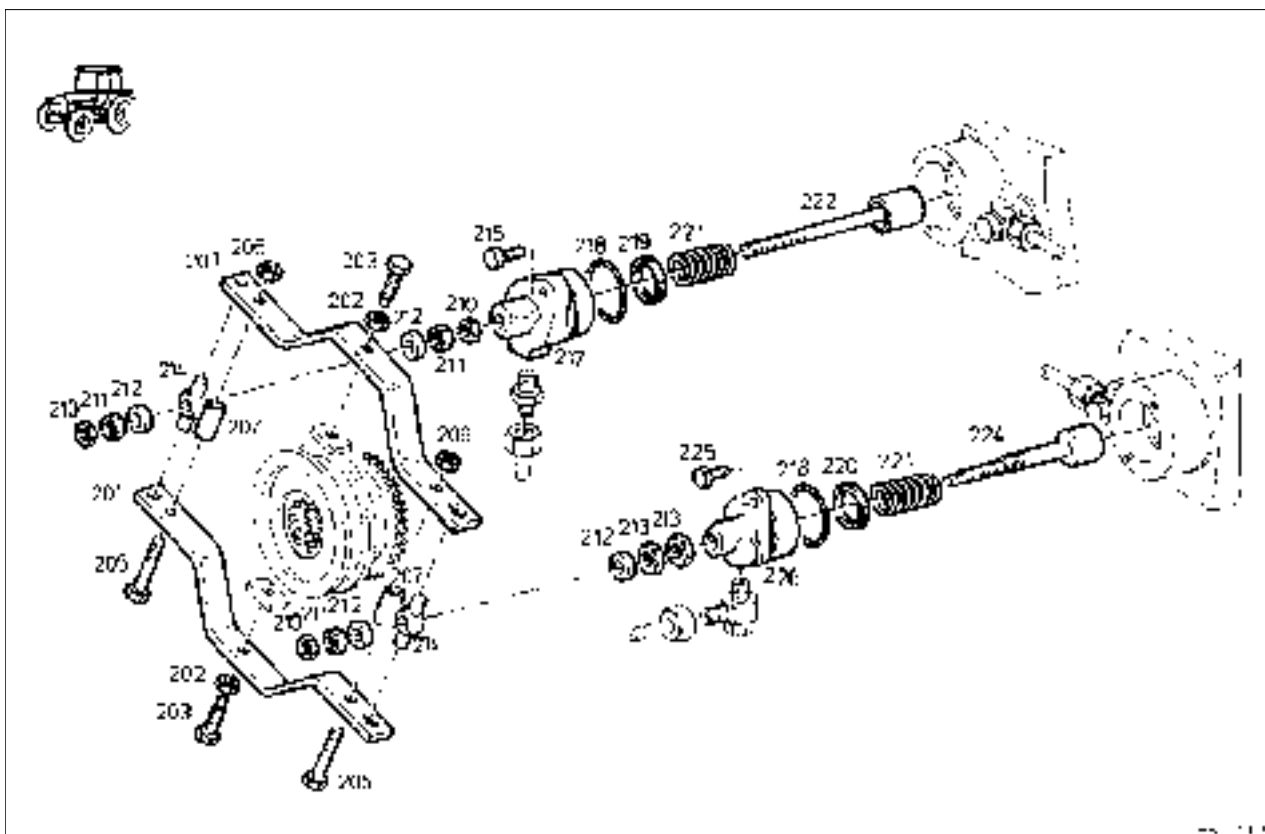
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Installation and removal of live PTO gearbox

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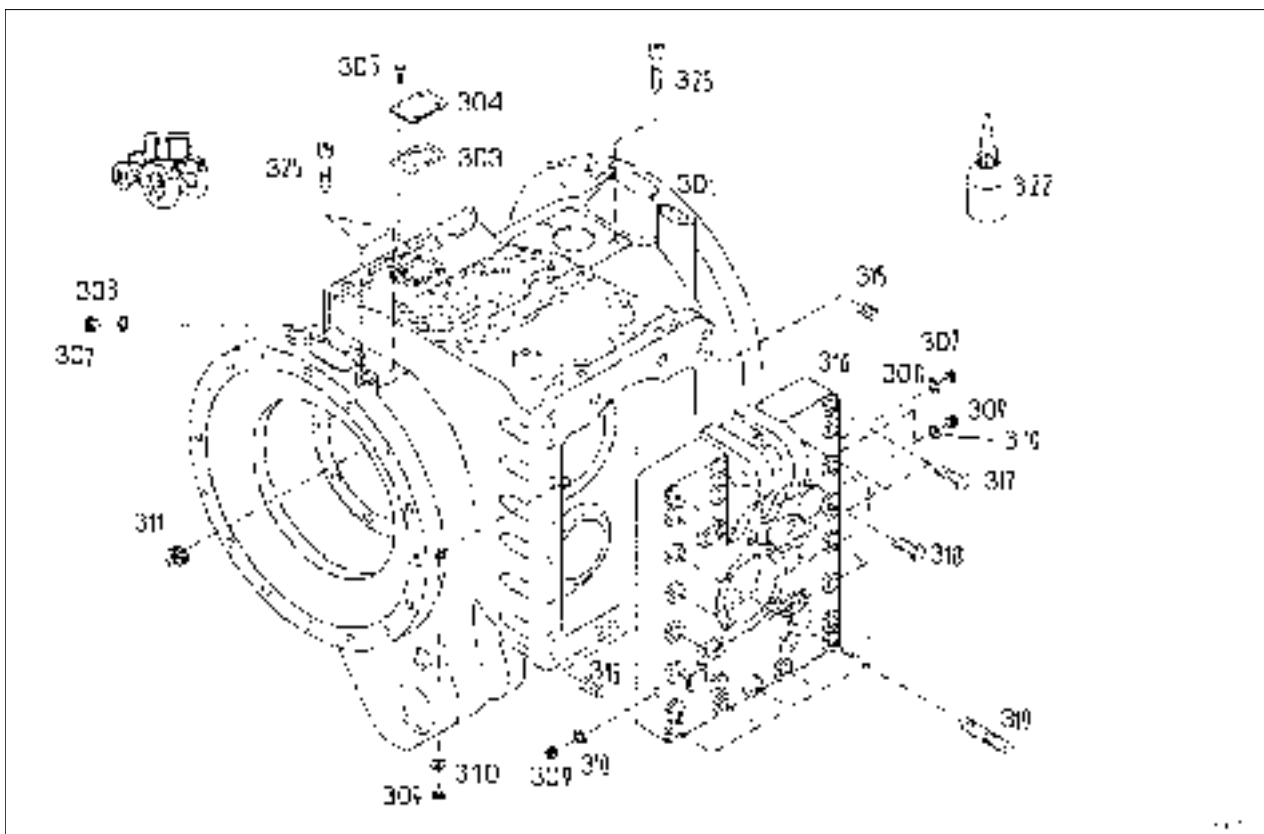
| Item | Designation | Item | Designation |
|------|---------------|------|----------------------|
| 201 | Strap | 216 | Hexagon screw |
| 202 | Hexagon nut | 217 | Cylinder |
| 203 | Stud bolt | 218 | O-ring |
| 205 | Hexagon screw | 219 | Compact sealing ring |
| 206 | Hexagon nut | 220 | Compact sealing ring |
| 207 | Spacer sleeve | 221 | Compression spring |
| 210 | Hexagon nut | 222 | Piston |
| 211 | Hexagon nut | 224 | Piston |
| 212 | Washer | 225 | Hexagon screw |
| 213 | Hexagon nut | 226 | Cylinder |
| 214 | Support | | |

Fav 900

Transmission / Live PTO

Installation and removal of live PTO gearbox

G



| Item | Designation | Item | Designation |
|------|-------------------|------|----------------------------|
| 301 | Rear-axle housing | 311 | Drain plug |
| 303 | Gasket | 315 | Parallel pin |
| 304 | Cover | 316 | Housing cover |
| 305 | Hexagon screw | 317 | M18x90-10.9 hexagon screw |
| 307 | Drain plug | 318 | M18x110-10.9 hexagon screw |
| 308 | Sealing ring | 319 | M18x130-10.9 stud bolt |
| 309 | Drain plug | 322 | Surface seal X 903.050.074 |
| 310 | Sealing ring | 325 | Socket head cap screw |

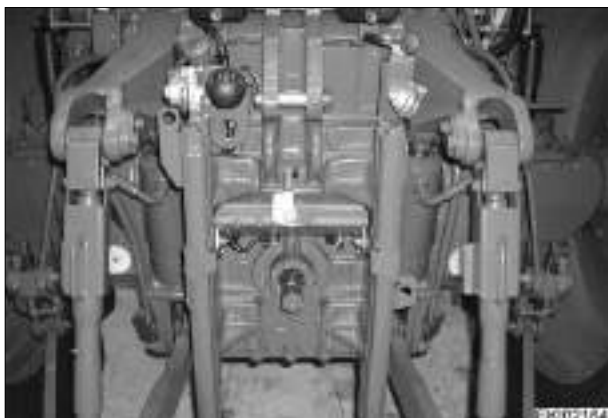
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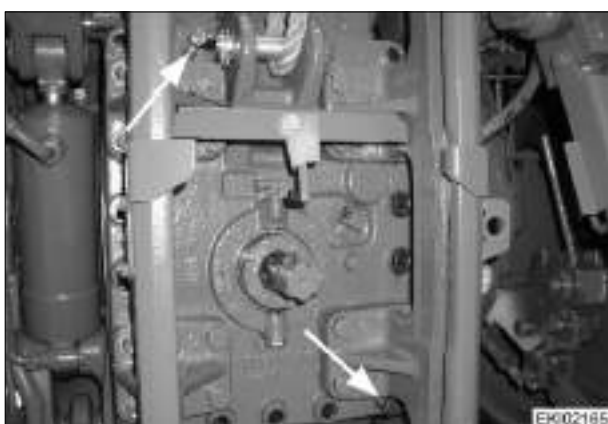
Transmission / Live PTO

Installation and removal of live PTO gearbox

G

**Preliminary work:**

- Lower rear power lift.
- Drain transmission oil (approx. 65 l).
- Remove trailer hitch.
- Label and disconnect connector X169 from B020 - sensor, PTO 1.
- Label and disconnect connector X170 from B021 - sensor, PTO 2.
- Unscrew compressed-air connections from connecting frame.



Unscrew all fastening nuts and bolts. Connecting frame remains on housing cover.

Remove silicone plastic from threaded bores and screw in two M12 forcing screws (arrowed).

Attach housing cover to hoist, taking appropriate safety precautions, and force housing cover off.



Remove housing cover (with rear PTO).

Note:

Note adjusting washer (1). This is used in setting bearing play.



Remove clutch.

Chapter 1220 Reg. G - Installation and removal of live PTO clutch

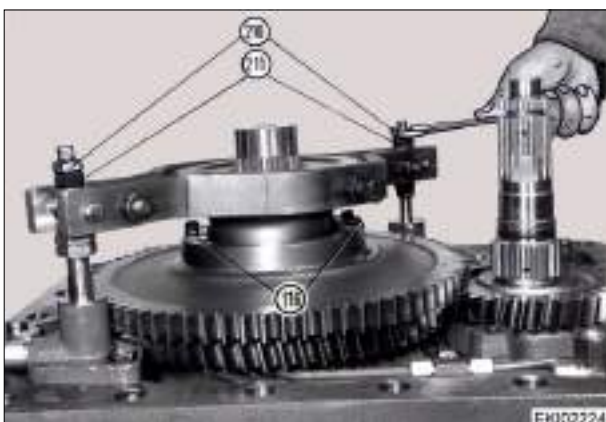
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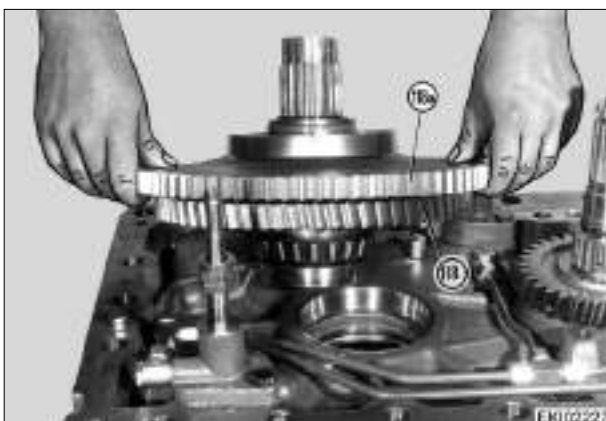
Transmission / Live PTO Installation and removal of live PTO gearbox

G

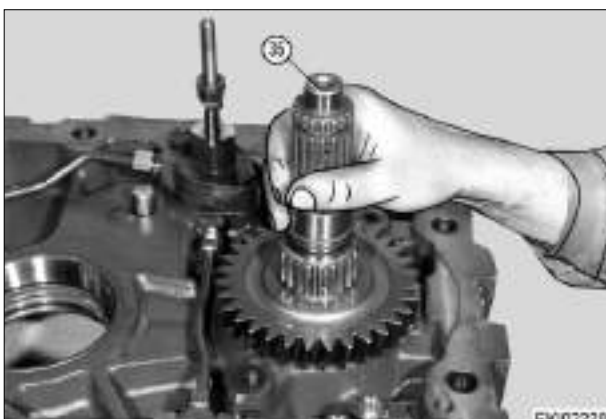
Withdraw taper roller bearing (101) using commercially available extractor.
Remove locating ring.



Unscrew hexagon nuts (210 and 211).
If necessary, record spacing of hexagon nuts (210 and 211).
Remove stops (116).
Remove switching mechanism.



Remove spur gears (118) and (118a).

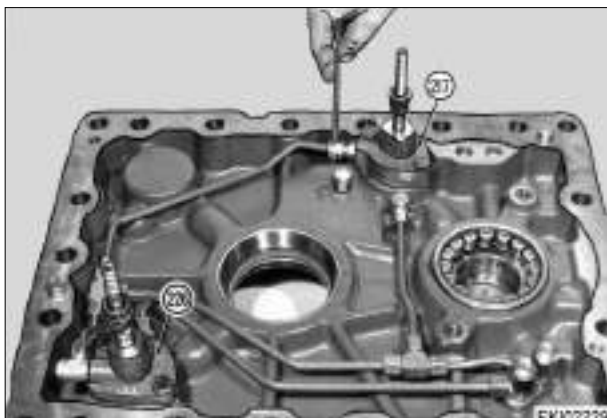


Withdraw shaft (35).
If necessary, press bearing outer race out.

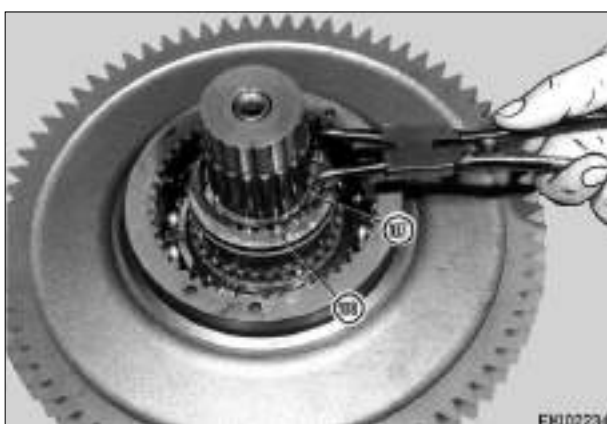
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Transmission / Live PTO Installation and removal of live PTO gearbox

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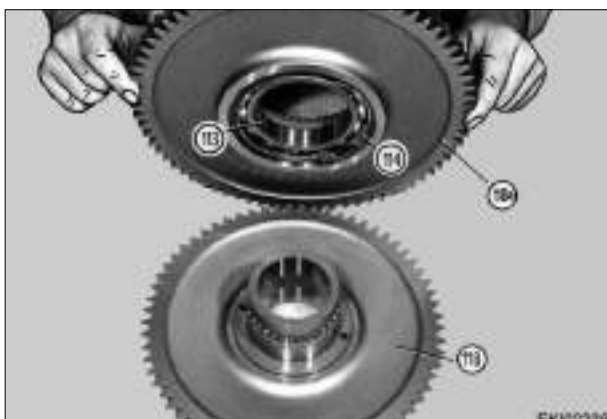
If necessary, remove cylinder (217) and / or cylinder (226).



Unclip circlip (107) and remove washer (108) and spur gears.



Unclip circlip (112).
Press spur gear (118) out.



Assembly

Press deep-groove ball bearing (113) into spur gear (118a) as far as stop and secure with circlip (114).

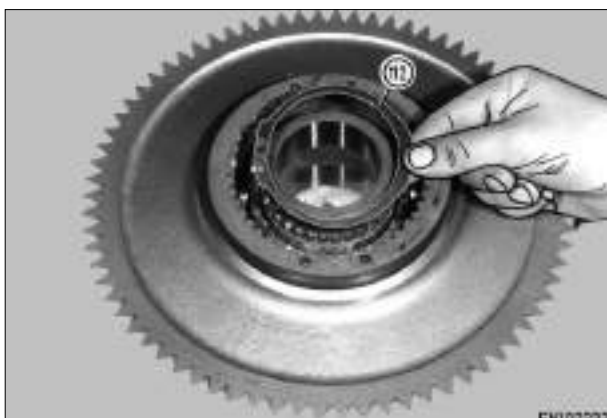
Then press spur gear (118) in as far as stop.

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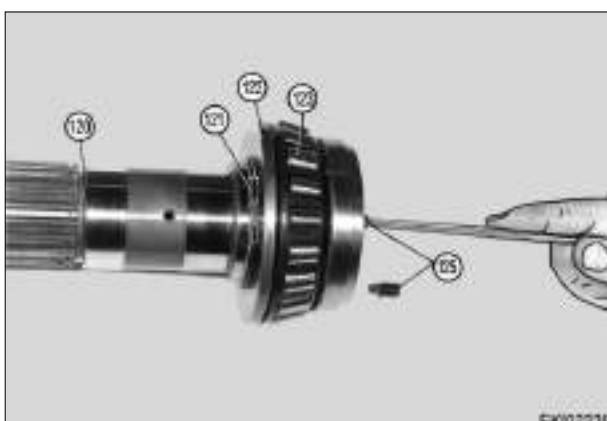
Fav 900

Transmission / Live PTO Installation and removal of live PTO gearbox

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Clip circlip (112) in place on opposite side.



Slide inner race of taper roller bearing (123) onto shaft (120).

Fit washer (122).

Clip circlip (121) in place.

Coat two setscrews (125) with synthetic bonding agent X903.050.084 and screw in until inner race of taper roller bearing (123) is in contact.

Washer (122) must be firmly held.

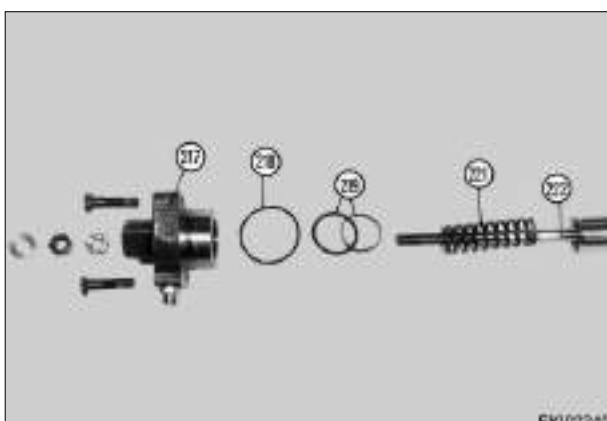


Slide needle-roller assembly (109), spacer (110) and needle-roller assembly (109) onto shaft (120).

Insert shaft (120).

Fit washer (108).

Clip circlip (107) in place.



Insert new compact sealing rings (219) into cylinder (217).

Insert new O-ring (218) into groove in cylinder (217) and grease. Grease seal elements.

Insert piston (222) with compression spring (221) into cylinder (217) in configuration shown.

Note:

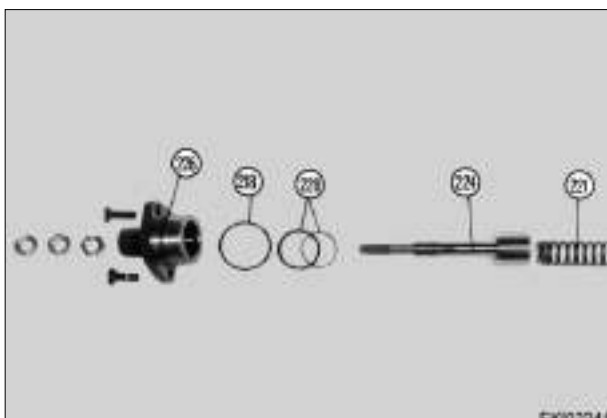
Compact sealing ring (219) consists of two parts, O-ring on outside and piston guide ring on inside.

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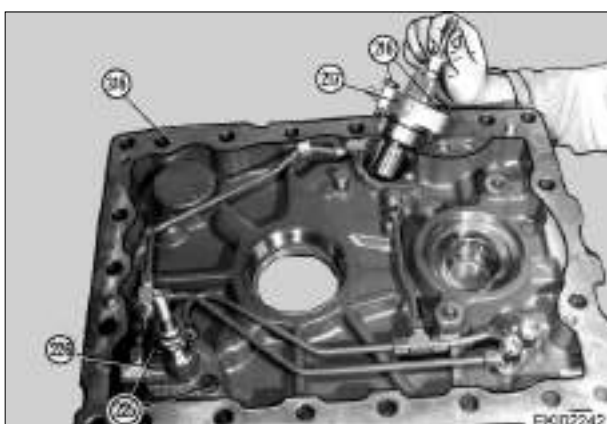
Insert new compact sealing rings (220) into cylinder (226).

Insert new O-ring (218) into groove in cylinder (226) and grease. Grease seal elements.

Insert piston (224) with compression spring (221) into cylinder (226) in configuration shown.

Note:

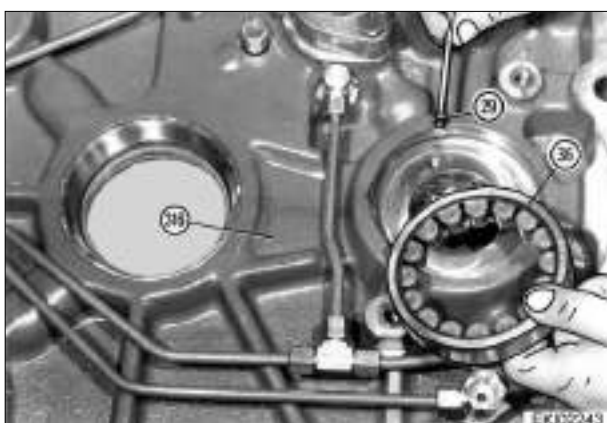
Compact sealing ring (220) consists of two parts, O-ring on outside and piston guide ring on inside.



Fit cylinder (217) and cylinder (226).

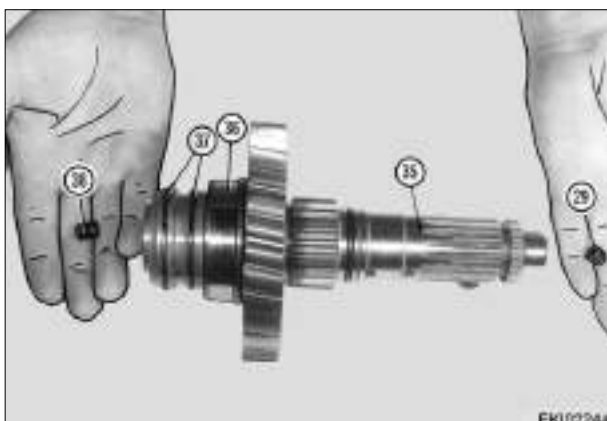
Coat thread of hexagon screws (216) and (225) with synthetic bonding agent X 903.050.084 and tighten to **49 Nm**.

Connect hydraulic lines - where removed - to housing cover (316).



If new housing cover (316) is fitted, screw nozzle (29) into threaded bore as far as stop.

Press outer race of cylindrical roller bearing (36) in as far as stop.



Insert two new rectangular-section rings (37) into grooves in shaft (35), lock and grease.

Press inner race of cylindrical roller bearing (36) in as far as stop.

When fitting new shaft (35), coat setscrew (38) with synthetic bonding agent X 903.050.084 and screw in as far as stop.

Screw nozzle (29) in as far as stop.

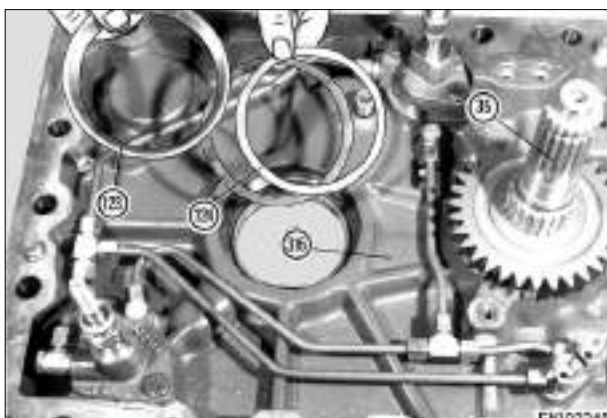
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Transmission / Live PTO

Installation and removal of live PTO gearbox

G

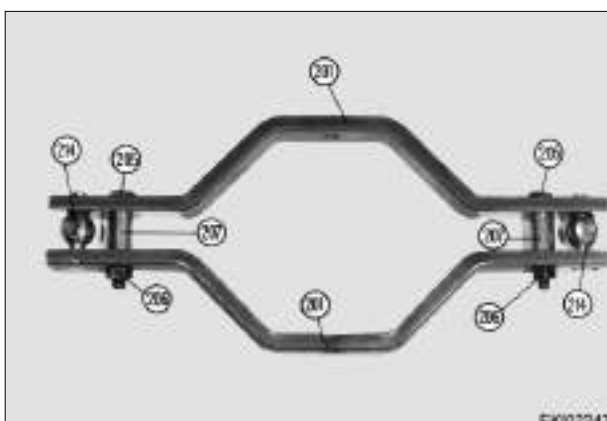


Hold pre-assembled shaft (35) in place in housing cover (316).

Where removed: insert existing adjusting washers (124) and press bearing outer race of taper roller bearing (123) in as far as stop.



Insert pre-assembled pair of gears and spur gear (25).

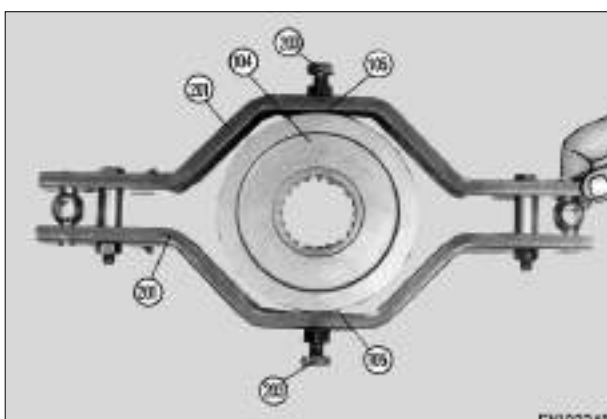


Pre-assembling strap (201):

Coat thread of hexagon screws (205) with synthetic bonding agent X903.050.084.

Fit spacer sleeves (207) and supports (214).

Tighten hexagon nuts (206).



Fit sliders (105) into clutch hub (104).

Coat thread of stud bolts (203) with synthetic bonding agent X903.903.050.084.

Set straps (201) equidistantly such that they are play-free.

Then loosen each stud bolt (203) by 1/6 turn and lock in this position.

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Installation and removal of live PTO gearbox

G



Screw hexagon nuts (210), (211) and (213) onto piston rods (222) and (224).

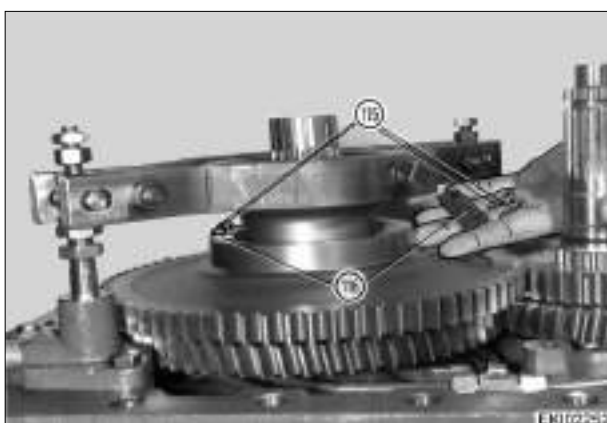
Locate washers (212) with depression facing upwards.



Fit pre-assembled strap (201).

Locate washers (212) with depression facing downwards.

Screw on hexagon nuts (211) and (210).



Coat thread of hexagon screws (115) with synthetic bonding agent X903.903.050.084.

Insert stops (116) and tighten hexagon screws (115).



Note following before setting switching travel :

Slot in strap (201) faces cylinder (226).

Screw hexagon nuts (213) fully onto piston rod of cylinder (226).

Screw hexagon nuts (211) and (210) as far as stop and lock.

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Transmission / Live PTO Installation and removal of live PTO gearbox

G



Screw M12 ring nut (DIY) onto piston rod of cylinder (217).

Use hoist to withdraw piston rod as far as stop (750 or 540 rpm position).

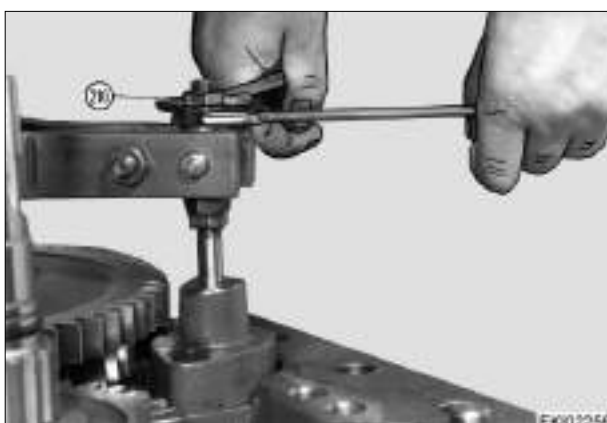
Check play in clutch hub (104).

Target value: 0.1-0.2 mm play



In event of discrepancies

Adjust M12 setting nut at top and bottom correspondingly until play of 0.1-0.2 mm is reached.



Remove hoist, then unscrew and lock M12 ring nuts (DIY).



Press piston rod of cylinder (226) in using G clamp until hexagon nuts (213) are in contact (stroke limit, 1000 rpm position).

Check play in clutch hub (104).

Target value: 0.1-0.2 mm play

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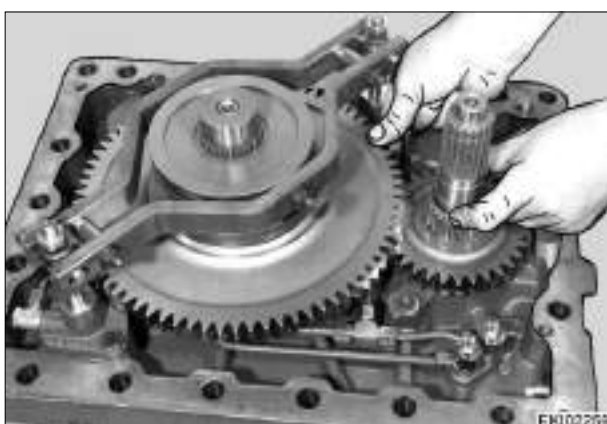
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Transmission / Live PTO Installation and removal of live PTO gearbox

G

**In event of discrepancies**

Adjust hexagon nut (213) correspondingly until play of 0.1-0.2 mm is reached and then lock.



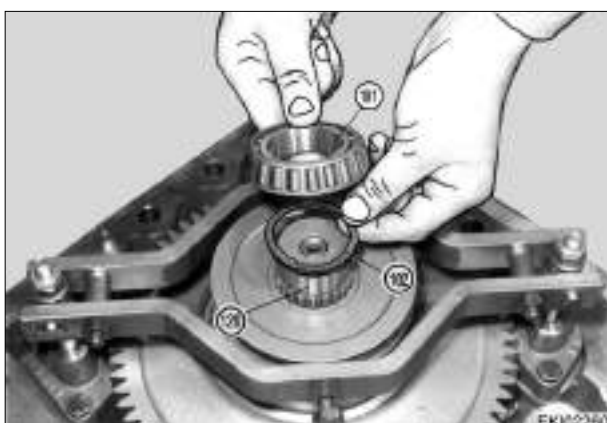
Remove G clamp.

Switching mechanism engages in "Neutral".

It must be possible to rotate spur gears for 750 or 540 and 1000 positions freely.

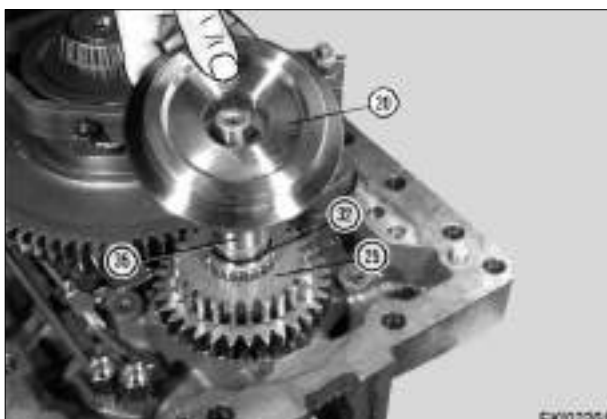
Free travel in switching mechanism must be equally large upwards and downwards.

In event of discrepancies repeat setting procedure for switching mechanism.



Fit locating ring (102).

Slide inner race of taper roller bearing (101) onto shaft (120) as far as stop.



Locate spur gear (25).

Insert new O-ring into groove in shaft (35) and grease.

Check brake disc (20) for damage.

If required, fit new brake disc (20).

For further details on fitting clutch please refer to:

Chapter 1220 Reg. G - Installation and removal of live PTO clutch

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Align externally toothed discs (12) and press clutch bell housing (3) in place as far as stop.



Locate existing adjusting washer (1) or adjusting washers (1) on deep-groove ball bearing (2).

Measure and record distance to flange surface.

E.g. 178.6 mm



Distance from bearing face surface to flange surface is marked in white at top in rear-axle housing.

E.g. 178.71 mm

Distance from adjusting washer of deep-groove ball bearing (2) to flange surface of housing cover must be 0.1-0.2 mm less than marked distance.

In other words, bearing system must have play of 0.1-0.2 mm.

In event of discrepancies, correct using adjusting washer (1).



Distance of lower shaft from bearing face surface to flange surface is marked in white at bottom in rear-axle housing.

E.g. 148.75

Note:

This dimension is not required for repairs since a measurement device is needed to measure bearing play.

To check bearing play in lower shaft (120): see description below.

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Transmission / Live PTO

Installation and removal of live PTO gearbox

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Insert appropriate adjusting washers (1) into upper bore.

Fit and grease four new O-rings for pressure connections.



Attach housing cover to hoist, taking appropriate safety precautions, and mount on rear-axle housing.



Tighten M18 fastening nuts and bolts to **400 Nm**.



Where removed:

Coat new shaft seal (126) thinly on outside with sealant X 903.051.711 - with sealing lip facing oil chamber - and press into bearing cap (128) until stop is just reached

(to depth of approx. 5mm).

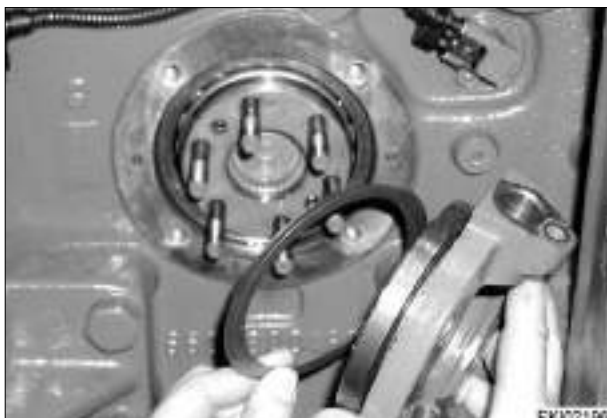
Fill sealing lips 2/3 with grease.

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Transmission / Live PTO Installation and removal of live PTO gearbox

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Insert existing adjusting washers (124).
Insert new O-ring (127) into groove in bearing cap (128) and grease.
Coat thread of hexagon screws (129) with synthetic bonding agent X903.903.050.084 and tighten.



Rotate shaft (120) approx. 10 times.
Attach gauge.
Press shaft (120) in once and record play.



Rotate shaft (120) approx. 10 times.
Attach gauge.
Withdraw shaft (120) once and record play.
Total play = play, pressing shaft (120) in + play, withdrawing shaft (120)
Target value: 0.02-0.07 mm play
In event of discrepancies, correct using adjusting washers (124).



Flanged pin splined shaft 6-part 1 3/8"
Optionally:
Flanged pin involute 21-part 1 3/8"
Flanged pin splined shaft 6-part 1 3/4"
Flanged pin involute 20-part 1 3/4"
Note:
Flanged pin has four pulse bores (arrowed) for B020 - sensor.

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Installation and removal of live PTO gearbox

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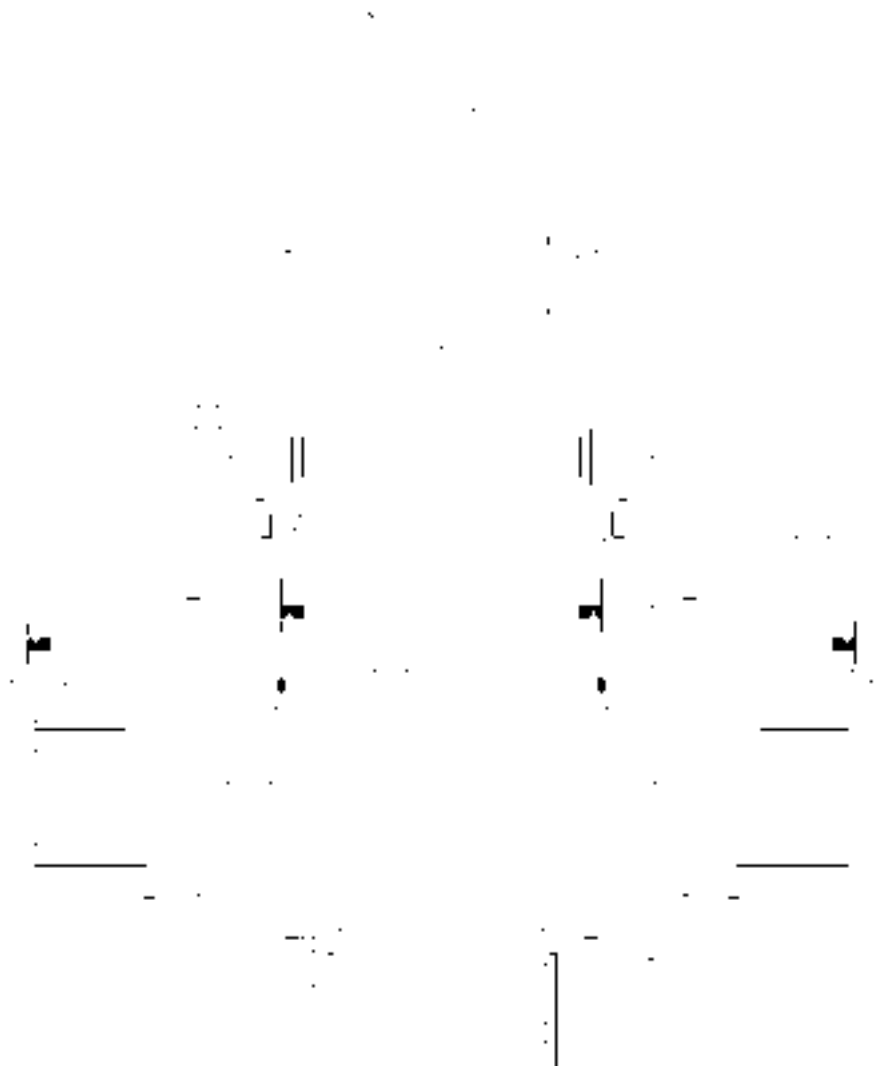
Fit flanged pin (137).
Fit spacer (132).



Lock flanged pin (137) in place using M16 screw
(arrowed) (as fitting aid).
Tighten M10-10 hexagon nuts (134) to **69 Nm** .
Fill with transmission oil.

Note:
Chapter 0000 Reg. A - Fuels and lubricants

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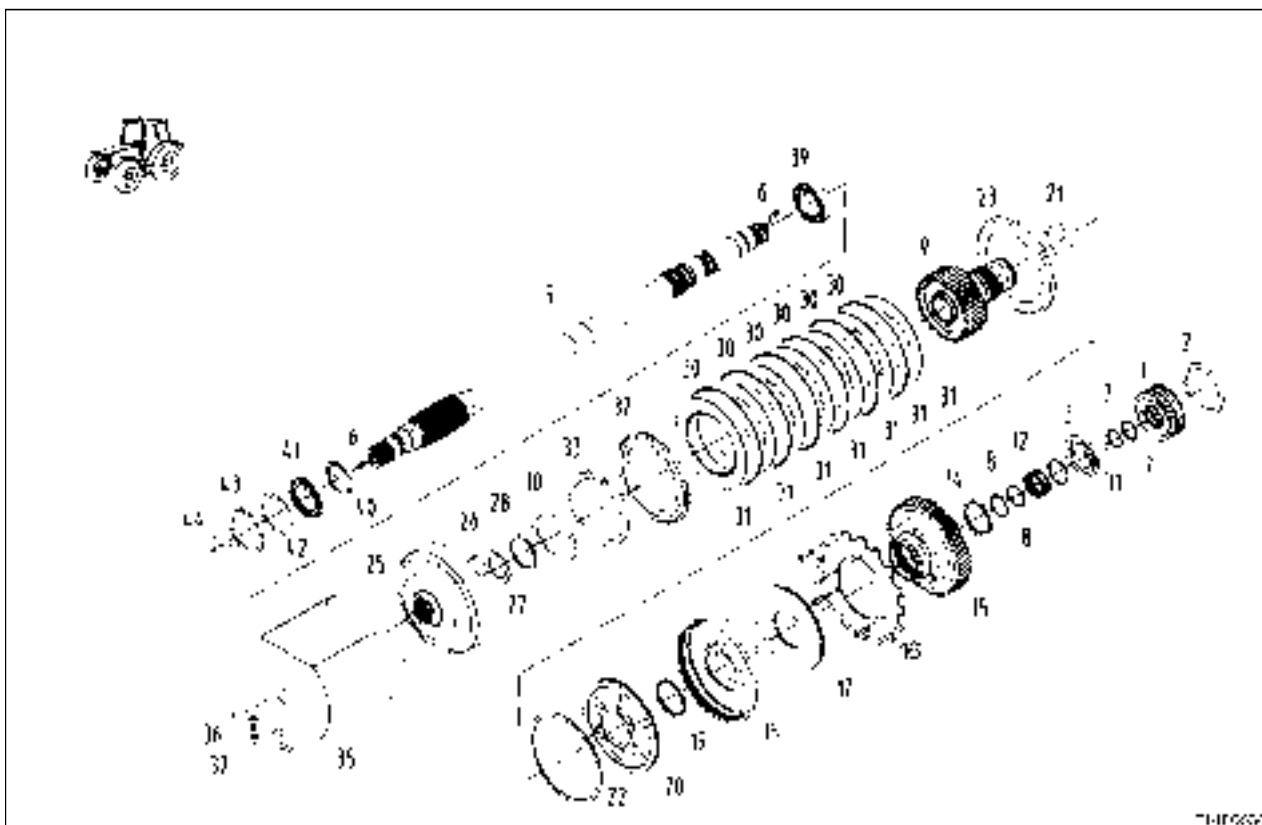
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Fav 700
Fav 900

Transmission / front-wheel drive
Repairing front-wheel drive clutch

G



| Item | Description | Item | Description |
|------|---------------------------|------|-------------------------|
| 1 | Cover | 22 | Lip seal |
| 2 | Circlip | 23 | Supporting plate |
| 3 | Ball bearing | 25 | Clutch bell housing |
| 5 | Shaft | 26 | Dowel pin |
| 6 | Setscrew | 27 | Washer |
| 7 | Rectangular-section ring | 28 | Circlip |
| 8 | Rectangular-section ring | 30 | Externally toothed disc |
| 9 | Disc carrier | 31 | Internally toothed disc |
| 10 | Oil tray | 32 | Supporting plate |
| 11 | Snap ring | 33 | Circlip |
| 12 | Needle roller bearing | 35 | Shroud |
| 14 | Circlip | 36 | Hexagon screw |
| 15 | Spur gear | 37 | Washer |
| 16 | Ratchet wheel | 39 | Ball bearing |
| 17 | Belleville spring package | 40 | Shaft seal |
| 18 | Piston | 41 | Ball bearing |
| 19 | Lip seal | 42 | Shim |
| 20 | Piston disc | 43 | Circlip |
| 21 | O-ring | 44 | O-ring |

Note:

The procedure was performed on a model for greater clarity.

The following must first be carried out:

- Removing continuously variable drive - Chapter 1080 Index G
- Repairing cardan-shaft brake - Chapter 1320 Index G

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Fav 700
Fav 900**Transmission / front-wheel drive**
Repairing front-wheel drive clutch**G****Removing front-wheel drive clutch:**
Removing Fav 900 suction pipe

Remove M8 screw and withdraw locating washer.



Slide suction pipe out of filter housing.

**Removing Fav 700 suction pipe**

Detach suction pipe bend.



Slide suction pipe out of filter housing.

| | | |
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| Fav 700 Fav 900 | Transmission / front-wheel drive Repairing front-wheel drive clutch | G |
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Further disassembly work shown on Fav 900:
Detach screw cap. Remove suction filter.



Remove suction filter housing (using DIY special tool).



DIY special tool



Remove speed sensor bevel pinion.

Fav 700
Fav 900**Transmission / front-wheel drive**
Repairing front-wheel drive clutch**G**

Withdraw shaft (5).

**Caution:**
Once shaft has been removed, there is no further control over front-wheel drive clutch. Beware of injury risk!

Remove front-wheel drive clutch together with shroud (35).



Locate third hand (DIY).

Press belleville spring package (17) together with press until circlip (2) can move freely.



Unclip circlip (2) and carefully release press.

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Fav 700
Fav 900**Transmission / front-wheel drive**
Repairing front-wheel drive clutch**G**

Remove spur gear (15).



Remove belleville spring package (17).



Remove piston (18), piston disc (20) and supporting plate (23).



Remove disc package (30/31), supporting plate (32) and disc carrier (9).

Fav 700
Fav 900**Transmission / front-wheel drive**
Repairing front-wheel drive clutch**G****Installing front-wheel drive clutch:**

Fit disc carrier (9) with new O-ring (21) and new lip seal (19).

Note:

Grease O-ring (9) and lip seal (21).
Groove (arrowed) in lip seal faces oil chamber.



Insert disc carrier (9) into clutch bell housing (25).
Fit supporting plate (32). Groove (arrowed) faces clutch bell housing (25)



Fit disc package, starting with internally toothed disc (31).

Oil internally toothed discs. Fit internally toothed disc (31) and externally toothed disc (30) alternately.



Fit supporting plate (23). Groove (arrowed) faces internally toothed disc (31).

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Fit new lip seal (22) to piston disc (20).

Note:
Grease lip seal (22).
Groove (arrowed) in lip seal faces oil chamber.



Insert piston disc (20) into piston (18).
Note installation position (arrowed).



Fit piston (18), piston disc (20).



Fit belleville spring package (17).

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Fav 700
Fav 900**Transmission / front-wheel drive**
Repairing front-wheel drive clutch**G**

Fit spur gear (15).



Insert shaft (5) to centre front-wheel drive clutch.



Place front-wheel drive clutch with mounted shaft (5) in press.



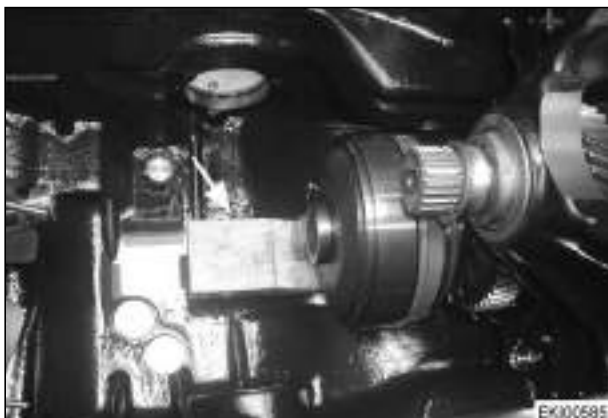
Locate third hand (DIY).

Press belleville spring package (17) together in press.

Clip circlip (2) in place.

Fav 700
Fav 900

Transmission / front-wheel drive
Repairing front-wheel drive clutch

G

Fit front-wheel drive clutch, placing wedge underneath.



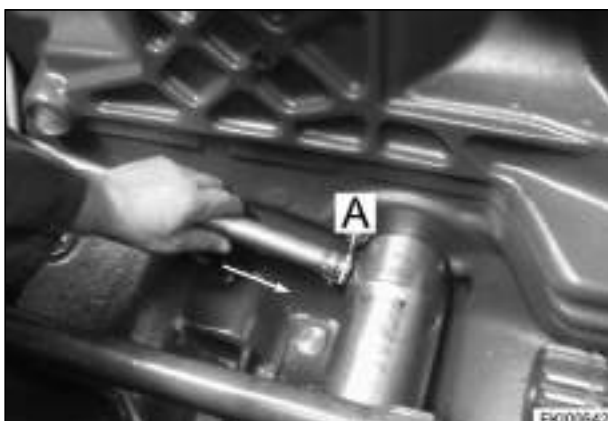
Insert four rectangular-section rings (arrowed) into grooves of shaft (5) such that they are offset relative to each other, then secure and grease them.



Insert shaft (5), remove wedge and fit shroud (35).

Note:

Ball bearing (32) must not be damaged.
Move shaft (5) carefully to stop.



Fit suction filter housing.

Slide suction pipe with new seal (item A) into suction filter housing.

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Fav 700
Fav 900**Transmission / front-wheel drive**
Repairing front-wheel drive clutch**G****Fitting Fav 700 suction pipe bend**

Fit new seals.
Grease seals.



Fit suction pipe bend.

**Fitting Fav 900 suction pipe**

Insert locating washer in groove. Fasten with M8 screw.



Fit screw cap with new gasket.

| | | |
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| Fav 700 Fav 900 | Transmission / front-wheel drive Repairing front-wheel drive clutch | G |
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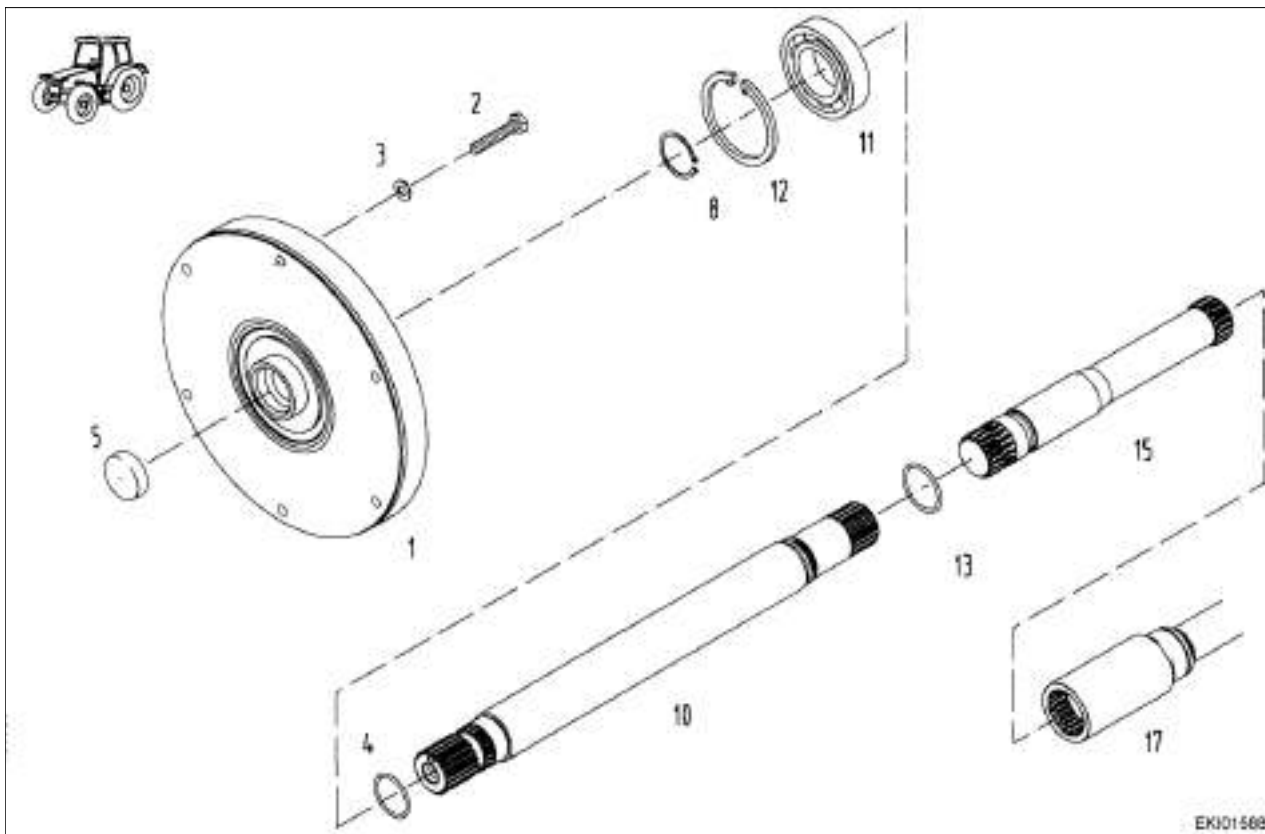


Fit speed sensor bevel pinion with sealant X 903.050.553.

Repairing speed sensor - Chapter 9720 Index G

Note:
Drive shaft axial play setting: Repairing car-
dan-shaft brake - Chapter 1150 Index G

| | | | | | | |
|---------|----------|-------|---|-------------|----------|---------------|
| Date | Version | Page | Repairing front-wheel drive clutch | Capitel | Index | Docu-No. |
| 09/2000 | a | 11/11 | | 1320 | G | 000001 |

Fav 900
**Transmission / Hydrodamp
Installation and removal of hydrodamp**
G

| Item | Designation | Item | Designation |
|------|---------------|------|--------------------------|
| 1 | Hydrodamp | 10 | Drive shaft |
| 2 | Hexagon screw | 11 | Deep-groove ball bearing |
| 3 | Washer | 12 | Circlip |
| 4 | O-ring | 13 | O-ring |
| 5 | Screw cap | 15 | Shaft |
| 8 | Circlip | 17 | Shaft |

Fav 900

Transmission / Hydrodamp Installation and removal of hydrodamp

G**Preliminary work:**

Disconnecting tractor, flywheel and clutch housing - see Chapter 1050 Reg.G

**Removing hydrodamp**

Unscrew hexagon screws.



Remove hydrodamp.

**Fitting hydrodamp**

If screw cap (5) is not fitted with new hydrodamp, fit screw cap (5).

Note:

Ensure that rivets (arrowed) are firmly seated.

| Date | Version | Page | Installation and removal of hydrodamp | Capitel | Index | Docu-No. |
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| 06.06.2001 | a | 2/4 | | 1430 | G | 000002 |

Fav 900

Transmission / Hydrodamp

Installation and removal of hydrodamp

G

Locate hydrodamp on flywheel, taking care that it is grease-free and dry.



Coat M10-10.9 hexagon screws with synthetic bonding agent X 903.050.084.



Tighten hydrodamp crosswise and in stages to **71 Nm**.



Coat inner splines of hydrodamp with long-life grease X 902.002.472.

| Date | Version | Page | Capitel | Index | Docu-No. |
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| 06.06.2001 | a | 3/4 | 1430 | G | 000002 |

| | | |
|----------------|---|----------|
| Fav 900 | Transmission / Hydrodamp Installation and removal of hydrodamp | G |
|----------------|---|----------|



Connect tractor.
Disconnecting tractor, flywheel and clutch housing - see Chapter 1050 Reg.G

Farmer 400
Fav 700
Fav 900

Transmission / enhanced actuation system valves
Operation of turboclutch pressure-relief valve (4V4)

A

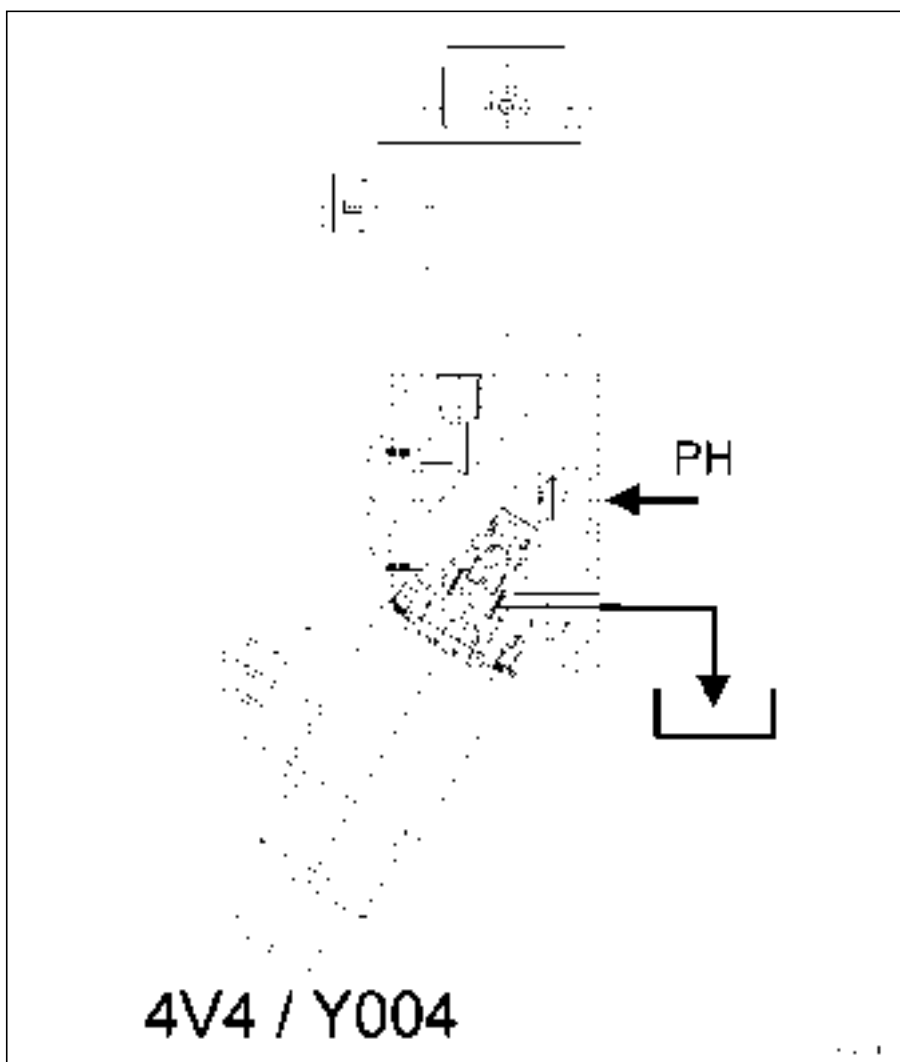
Turboclutch pressure-relief valve 4V4 / Y004

Turboclutch valve (4V4) regulates build-up of high pressure **PH** such that it is proportional to engine speed.

This enables turboclutch operation.

Turboclutch valve is mounted in valve unit which also contains connection between high-pressure circuit **PH** and tank. If this connection is not closed, high pressure cannot be generated, and tractor does not reach maximum tractive power.

High-pressure circuit **PH** to tank is closed by turboclutch valve (4V4).



Turboclutch valve is actuated from electronic box. Electrical power consumption depends on engine speed and is as follows:

| Engine speed | Power consumption | Max. PH | Note |
|------------------|-------------------|---------|-----------------------|
| 800 rpm | 0 A | 0 bar | Transmission neutral |
| 800 rpm | approx. 0.46 A | 78 bar | Transmission actuated |
| 1200 rpm | 1.23 A | 105 bar | |
| 1400 rpm onwards | 1.71 A | 500 bar | |

High-pressure build-up therefore depends on electrical supply and tightness of turboclutch valve against leaks.

| Date | Version | Page | Operation of turboclutch pressure-relief valve (4V4) | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 29.11.2000 | a | 1/2 | | 1600 | A | 000001 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Transmission / enhanced actuation system valves Operation of turboclutch pressure-relief valve (4V4) | A |
|---|---|----------|

Turboclutch valve can be **mechanically locked** to check tightness against leaks.



- Move actuating lever (see arrow)



- or tighten hexagon socket screw

Farmer 400
Fav 700
Fav 900

Transmission / enhanced actuation system valves
Operation of clutch pressure-relief valve (4V5)

A

Clutch pressure-relief valve 4V5

Clutch pressure-relief valve is mounted in valve unit which also contains connection between high-pressure circuit **PH** and tank.

Clutch valve also limits max. high pressure **PH** to 500 bar (+/- 20 bar).

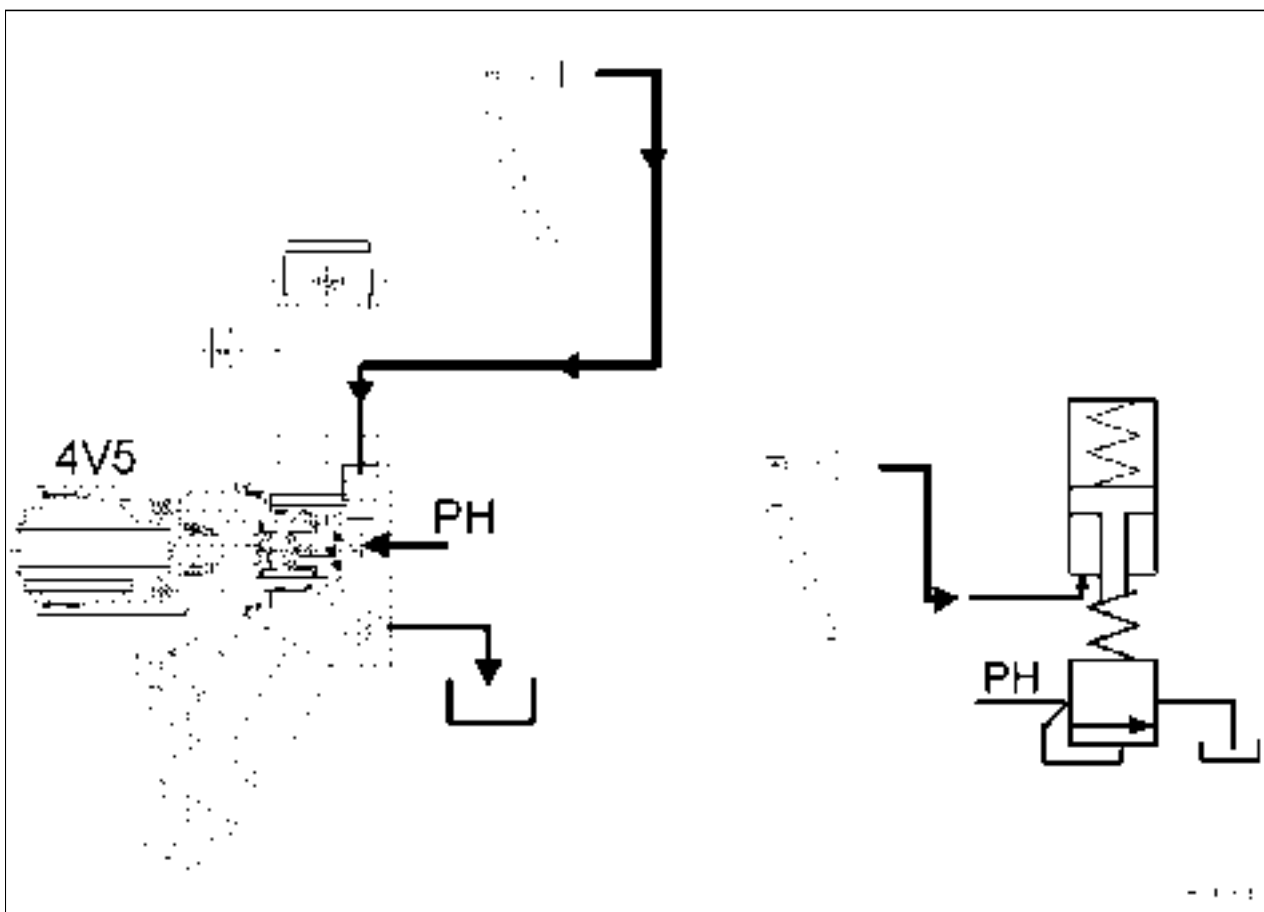
Clutch valve closes high-pressure circuit to tank when clutch pedal is not actuated.

When clutch pedal is actuated, clutch valve opens, and high pressure PH is discharged via tank connection.

Discharge of high pressure (interruption in tractive power) is therefore proportional to clutch pedal travel (comparable to mechanical clutch).

Clutch pedal fully depressed, **high pressure PH = 0 bar**.

Max. high pressure and high-pressure build-up depend on operation and tightness against leaks of clutch pressure-relief valve (4V5).



Farmer 400
Fav 700
Fav 900

Transmission / enhanced actuation system valves

Checking valve unit

E

If max. high pressure is not reached during high-pressure measurement, cause may lie in Vario transmission unit or outside this in valve unit. In order to decide whether Vario transmission unit has to be removed, valve unit (transmission control unit) should first be checked for tightness against leaks. Generation of high pressure in valve unit depends on tightness against leaks of

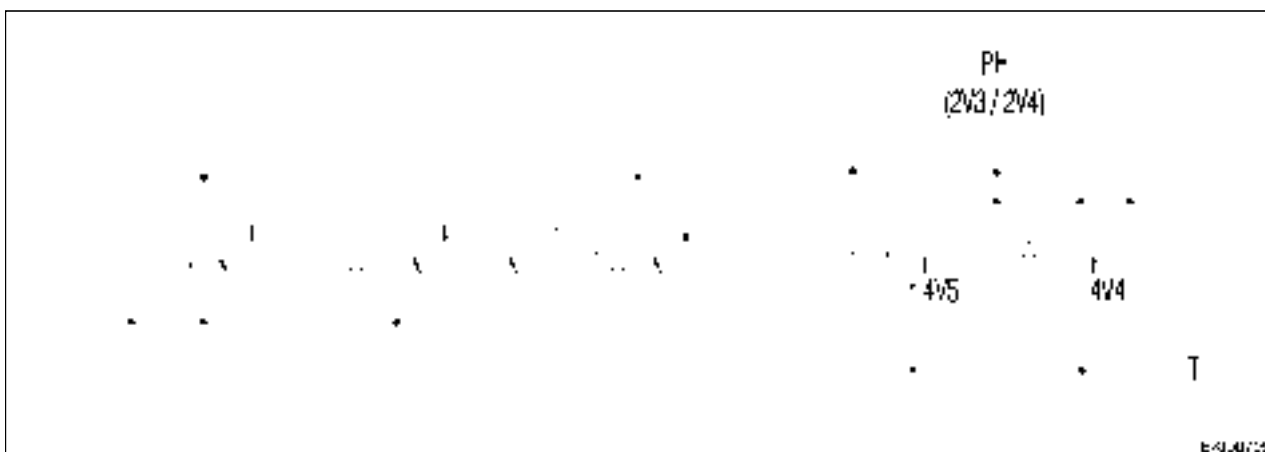
- turboclutch [4V4 / Y 004]
- clutch [4V5]

pressure-relief valves.

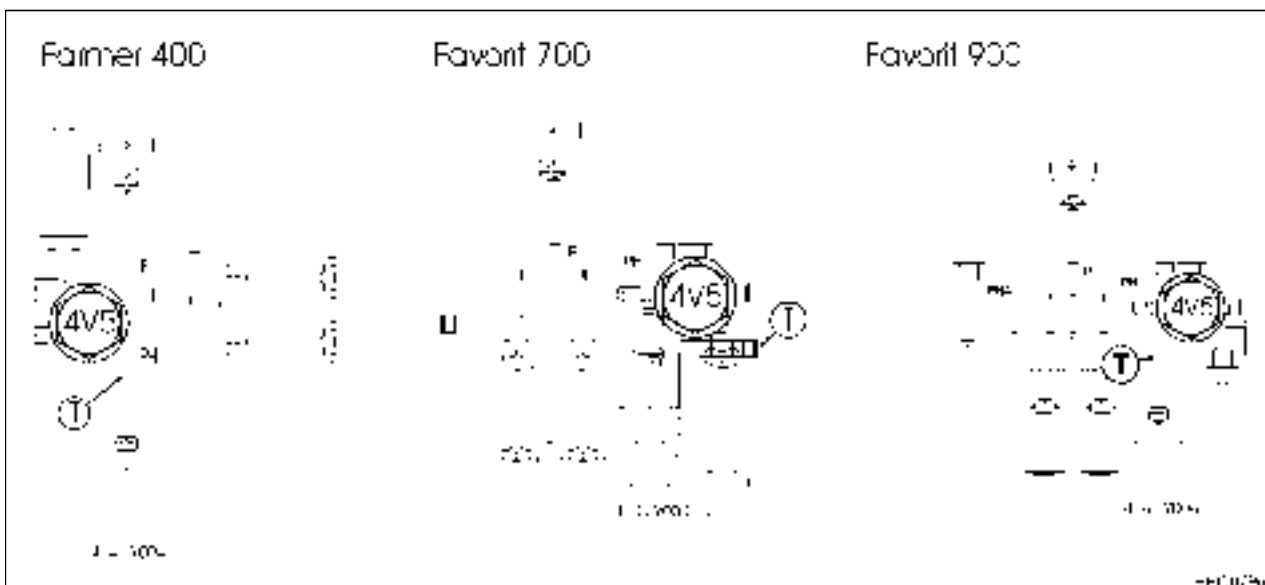
Turboclutch valve is closed under following circumstances, and therefore high pressure cannot be generated:

- Engine speed greater than 1400 rpm (energised to maximum)
- Emergency mode actuated.
- Valve mechanically locked (tighten hexagon socket screw or operate actuating lever)

Clutch valve is closed (high pressure can be generated) when clutch pedal is **not actuated** .



Tightness of both pressure-relief valves (4V4 / 4V5) against leaks can be checked at connection **T** .



Farmer 400
Fav 700
Fav 900

Transmission / enhanced actuation system valves
Checking valve unit

E

Checking high-pressure circuit in valve unit

Following preliminary work must be carried out:



Danger:

Jack tractor up on 4 trestles taking appropriate safety precautions (high-pressure measurement).

- Remove right rear wheel and panels.
- Remove drain plug at **connection T**.
- Connect pressure gauge with range of greater than 500 bar to **test connection PH**.



Test sequence:

1. Start engine.
2. Actuate Emergency mode.



Actuate clutch pedal.

Actuate push-button to left of steering wheel.



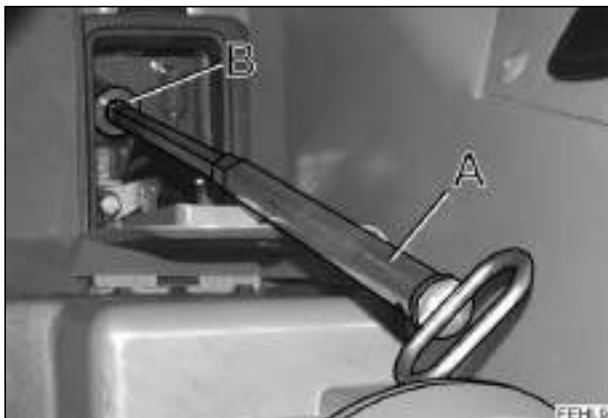
Following is displayed on combi-instrument:

3. Pull on handbrake.

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| 24.11.2000 | a | 2/3 | 1600 | E | 000001 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Transmission / enhanced actuation system valves Checking valve unit | E |
|---|---|----------|

4. Attach auxiliary actuation device (A) and operate transmission against high pressure.



Measurement (example):

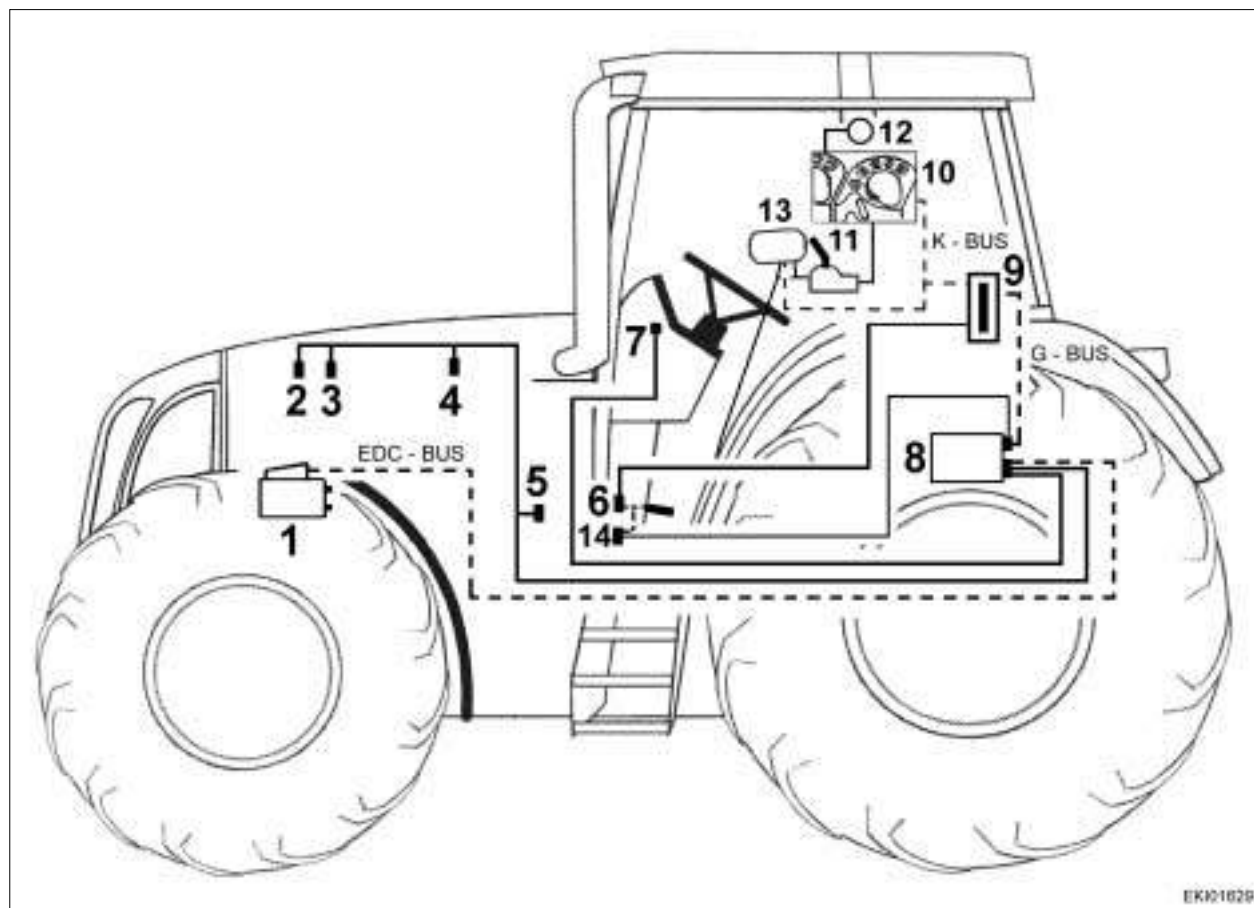
| PH | Connection T | Possible cause of fault |
|---------|---------------------|--|
| 250 bar | No oil flows from T | Fault in Vario transmission unit (shuttle valve, screw coupling in pressure pipe); remove Vario transmission unit. |
| 250 bar | Oil flows from T | Leaky turboclutch valve (4V4) or clutch valve (4V5). |

Checking turboclutch valve (4V4):

Turboclutch valve mechanically locked (tighten hexagon socket screw or operate actuating lever)

| PH | Connection T | Possible cause of fault |
|---------|--------------------------------------|--|
| 250 bar | Oil flows from T | Leak in clutch valve (4V5) (replace) |
| 500 bar | Oil flows from T (limit pressure) | Electrical check of turboclutch valve Y004 Chapter 9000 Index E |

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| 24.11.2000 | a | 3/3 | 1600 | E | 000001 |



| | | | |
|---|--|----|--|
| 1 | Injection Pump VP44 (A020) | 8 | EDC Control Module (A021) |
| 2 | Intercooler Pressure Sensor (B028) | 9 | EST Control Module (A022) |
| 3 | Nozzle lift Sensor (B026) | 10 | Side console (A004) |
| 4 | Temperature Sensor (water) (B027) | 11 | Vario joystick (A003) |
| 5 | Speed Sensor EDC (B025) | 12 | Hand throttle position sensor (B035) |
| 6 | Position Sensor Accelerator Pedal (B029) | 13 | Terminal (A008) |
| 7 | Ignition lock (S022) | 14 | Pedal position sensor (oversees B029) (B038) |

| | | |
|----------------|---|----------|
| Fav 900 | Engine / System in general Engine Data Fav 900 | A |
|----------------|---|----------|

| | | |
|----------------------------|-------------------------------------|-----------------------|
| Typ | 916 | 920 |
| Description | MAN | MAN |
| | D 0836 | D 0836 |
| | LE 504 | LE 503 |
| Power (KW/PS) | 132/180 | 154/210 |
| at nominal Speed ECE | | |
| max power (KW/PS) | 146/198 | 162/220 |
| at 1800-2100 Rpm | | |
| Displacement (l) | 6,9 | 6,9 |
| Diameter/Course (mm) | 108/125 | 108/125 |
| Number of cylinders | 6 | 6 |
| Nominal Speed | 2150 | 2150 |
| Rpm | | |
| Unloaded Speed (Rpm) | 2350 +/-30 | 2350 +/-30 |
| Start of delivery | O.T. +/-0,5° | O.T. +/-0,5° |
| (Setting Value) | | |
| Pre displacement VP44 (mm) | Specific to each pump | Specific to each pump |
| Operation | Turbocharger, Intercooler, Viscofan | |

| | | |
|----------------------------|-------------------------------------|-------------------------|
| Typ | 924 | 926 |
| Description | MAN | MAN |
| | D 0836 | D 0836 |
| | LE 502 | LE 501 |
| Power (KW/PS) | 176/240 | 199/270 |
| at nominal speed ECE | | |
| max Power (KW/PS) | 186/253 | 210/286 |
| ati 1800-2100 Rpm | | |
| Displacement (l) | 6,9 | 6,9 |
| Course (mm) | 108/125 | 108/125 |
| Number of cylinders | 6 | 6 |
| Nomial Speed | 2250 | 2250 |
| Rpm | | |
| No Load Speed Rpm | 2450 +/-30 | 2450 +/-30 |
| Start of delivery | Top dead Point. +/-0,5° | Top dead Point. +/-0,5° |
| (SettingValue) | | |
| Pre displacement VP44 (mm) | Specific to each pump | Specific to each pump |
| Operation | Turbocharger, Intercooler, Viscofan | |

| | | | | | | |
|------------|---------|------|---------------------|---------|-------|----------|
| Date | Version | Page | Engine Data Fav 900 | Capitel | Index | Docu-No. |
| 21.11.2000 | a | 1/1 | | 2000 | A | 000003 |

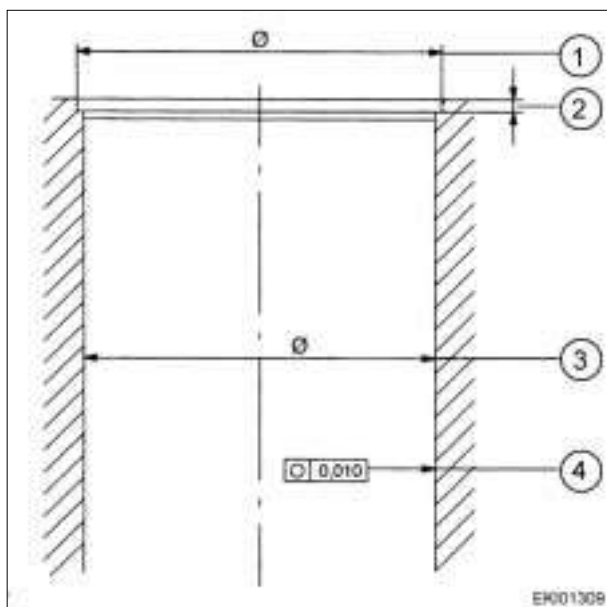
| | | |
|----------------|---|----------|
| Fav 900 | Engine / Generalities Specifications | A |
|----------------|---|----------|

Engine

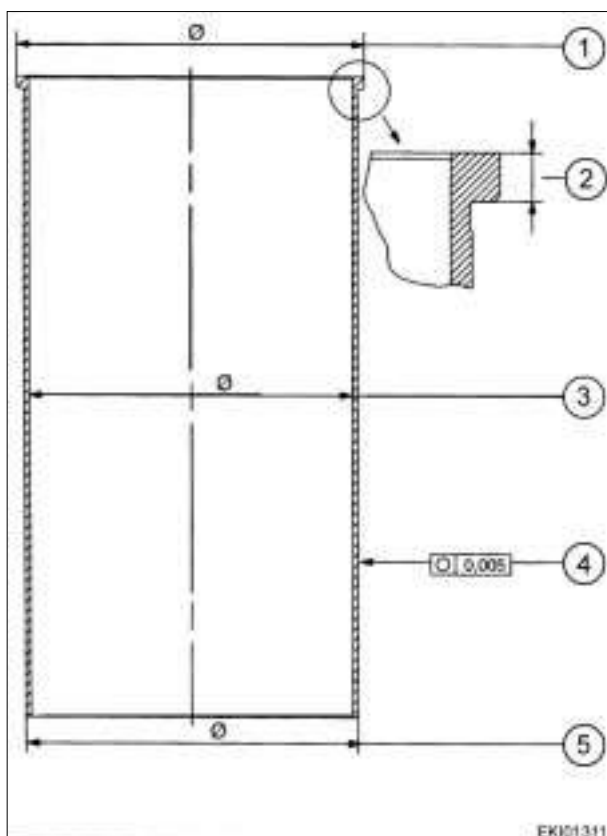
| | |
|---|---|
| Design | In-line vertical |
| Principle of operation | 4- Stroke Diesel with turbocharger and inter-cooler |
| Method | Direct injection |
| Number of cylinders | 6 |
| Compression ratio | 18 : 1 |
| Bore | 108 mm (4.25") |
| Stroke | 125 mm (4.92") |
| Swept volume | 6871 cm ³ (419.29 in ³) |
| Firing sequence | 1-5-3-6-2-4 |
| Emission category | MVEG 1 |
| Max. output to ISO 1585 88/195 EWG | |
| D 0836 LE 501 | 210 kW (285 PS) at 2250 rpm (281HP) |
| D 0836 LE 502 | 186 kW (255 PS) at 2250 rpm (249HP) |
| D 0836 LE 503 | 162 kW (220 PS) at 2150 rpm (217 HP) |
| D 0836 LE 504 | 146 kW (200 PS) at 2150 rpm (196 HP) |
| Max. torque to ISO 1585 88/195 EWG | |
| D 0836 LE 501 | 1175 Nm at 1400 rpm |
| D 0836 LE 502 | 1070 Nm at 1400 rpm |
| D 0836 LE 503 | 970 Nm at 1400 rpm |
| D 0836 LE 504 | 880 Nm at 1400 rpm |
| Rotation in rpm | Idling speed - Final speed |
| D 0836 LE 501 / 502 | 800±30 ; 2250; 2420-2480 |
| D 0836 LE 503 / 504 | 800±30 ; 2150; 2320-2380 |
| Start of delivery | Crankshaft angle before TDP |
| D 0836 LE 501 / 502 / 503 / 504 | 0°±0,5° |
| Engine number D 0836 LE 50. 164 9790 ... and up | 5°±0,5° |
| Lubrication method | Forced feed lubrication gear oil pump |
| Quantities | |
| Quantities in oil pan | min. 18 ltr. (19 qt.) max. 23 ltr. (24.3 qt.) |
| Oil change with filter | 25,5 ltr. (27 qt.) |
| Cooling Method | Liquid cooling Impeller pump |
| Coolant temperature | |
| D 0836 LE 501 / 502 | |
| normal | 102°C (215°F) |
| momentary | max. 108°C (226°F) |
| D 0836 LE 503 / 504 | |
| normal | 105°C (221°F) |
| momentary | max. 113°C (235°F) |

| Date | Édition | Page | Chapitre | Reg. | Docu-No. |
|------------|----------|------|-------------|----------|---------------|
| 12/03/2001 | a | 1/1 | 2000 | A | 000005 |

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| Fav 900 | Engine / Generalities Service Data | A |
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Crankcase

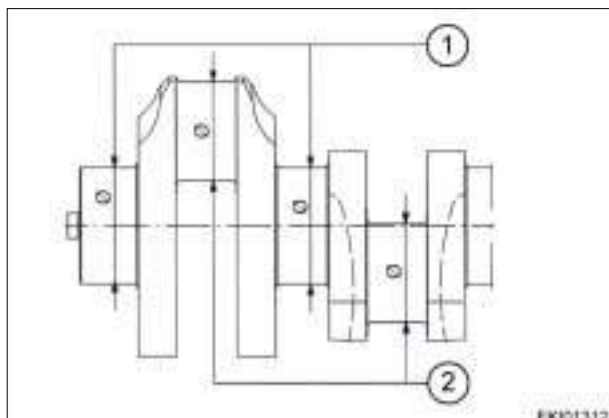
1. 116,0-116,1 mm (4.4567 - 4.4570 ")
2. Standard size: 4,00-4,03 mm (.157 - .159")
Oversize: 4,20-4,23 mm (.165 - .167")
3. Standard size: 111,50-111,52 mm (4.389 - 4.390")
Oversize 0,5 mm: 112,00-112,02 mm (4.409 - 4.410")
4. Max. permissible taper over length of cylinder

Cylinder liner

1. 115,74-115,88 mm (4.556 - 4.562")
2. Standard size 4,04-4,06 mm (.159 - .160")
Oversize: 4,24-4,26 mm (.167 - .168")
3. 108,00-108,22 mm (4.252 - 4.260")
max. wear limit: 0,1 (.039") above basic size
4. Max. permissible taper over length of cylinder
5. Standard size: 111,475-111,490 mm (4.388 - 4.389")
Oversize: 0,5 mm (.020"): 111,975-111,990 mm (4.408 - 4.409")

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| 13/03/2001 | b | 1/14 | | 2000 | A | 000006 |

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|----------------|---|----------|
| Fav 900 | Engine / Generalities Service Data | A |
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Crankshaft

1. Dimensions:

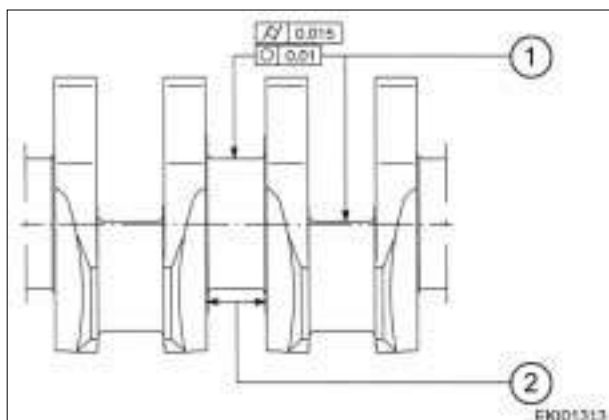
Standard: 76,981-77,000 mm (3.031 - 3.032")

Under size: 0,10 mm (.004"): 76,881-76,900 mm (3.027 - 3.028")

2. Con-rod bearing journal diameter:

Standard : 69,981-70,000 mm (2.755 - 2.756")

Under size: 0,10 mm (.004"): 69,881-69,900 mm (2.751 - 2.752")



1. For all crankshaft journals:

maximal permissible runout

maximal deviation from conical form

2. Thrust bearing journal width:

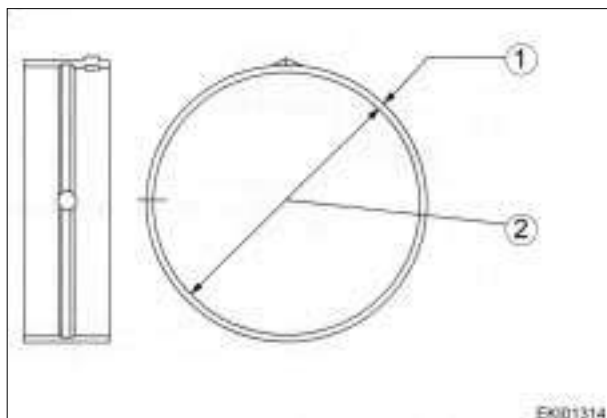
Standard size: 34,000-34,062 mm

(1.339 - 1.341")

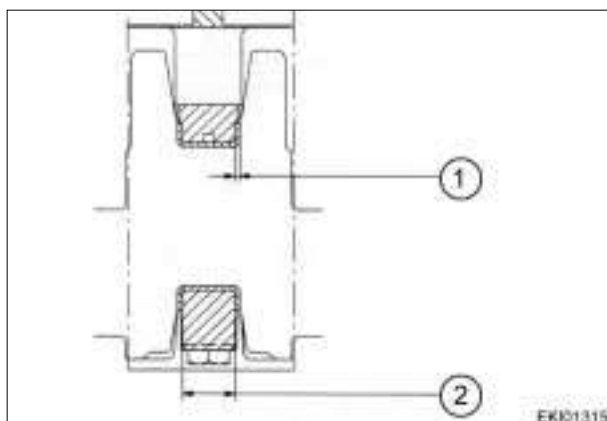
Repair sizes: 34,500-34,562 mm (1.358 - 1.361")

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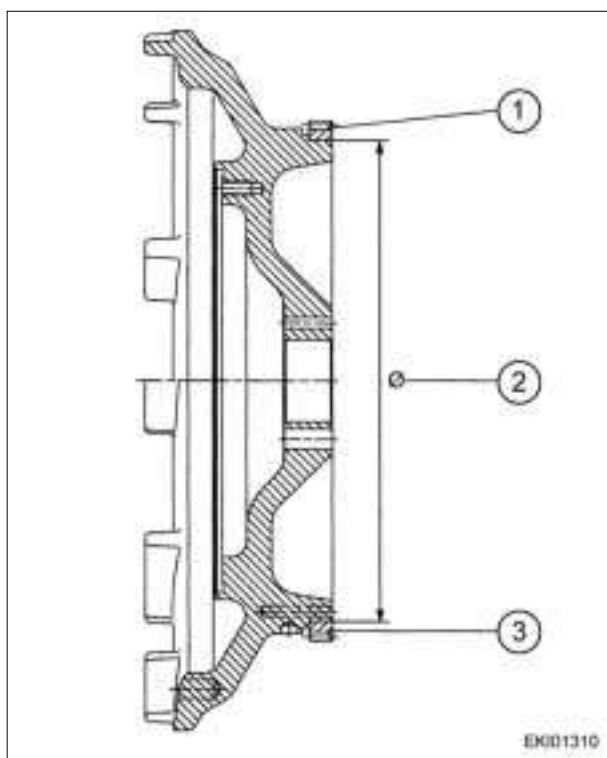
| | | |
|----------------|---|----------|
| Fav 900 | Engine / Generalities Service Data | A |
|----------------|---|----------|

Main bearing

1. Standard size: 2,468-2,480 mm (.097 - .098")
Oversize 0,10 mm (.004"): 2,518-2,530 mm (.099 - .100")
2. Fitted bearing inner Ø for main bearing :
Standard size : 77,040-77,086 mm (3.033 - 3.035")
Undersize 0,10mm (.004"): 76,940-76,986 mm (3.029 - 3.031")
Housing bore for main bearing: 82,000-82,022 mm (3.228 - 3.229")
Axial play: 0,040-0,105 mm (.002 - .004")
Spread of main bearing shells: 0,5-1,5 mm (.020 - .059")



- max permissible crankshaft axial play:
0,200-0,395 mm (.008 - .016")
1. Thrust bearing journal width thrust washer:
Standard size: 2,850-2,900 mm (.112 - .114")
Repair size: 3,100-3,150 mm (.122 - .124")
 2. 27,967-28,000 mm (1.101 - 1.102")

Flywheel

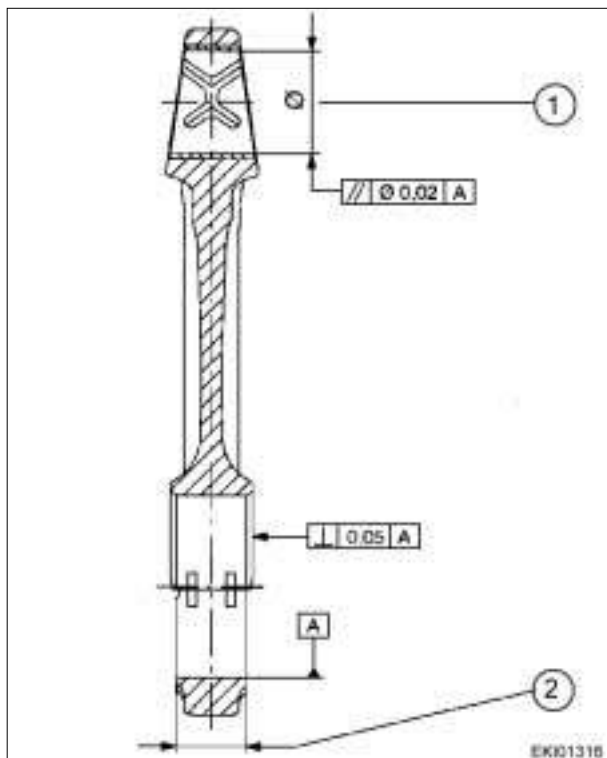
1. Watch position of chamfer!
Fitting temperature (Shrink-on temperature):
220-240°C (428-464°F)
2. Flywheel: 352,390-352,447 mm (13.874 - 13.876")
Ring gear (Internal): 351,671-351,760 mm (13.845 - 13.849")
m total. = 50,3 kg (110.89 lbs.)
J total = 1,65 kgm²
3. Number of teeth : Z=125, Module 3
Mating gear (Z=11)
Backlash : 0,4-0,7 mm (.016 - .020")

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Fav 900

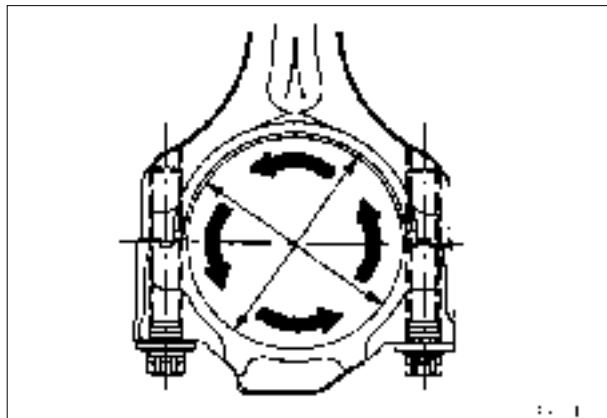
Engine / Generalities

Service Data

A**Connecting rod**

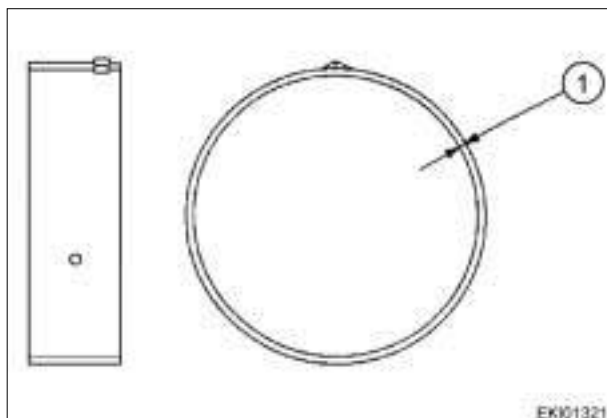
1. 42,050-42,066 mm (1.655 - 1.656")

2. 32,78-32,88 mm (1.290 - 1.294")

Con-rod journal width: 33,0-33,1mm
(1.299 - 1.303")

Fit con-rod bearing caps (without shells). Measure basic bore with an internal micrometer.

74,000-74,019 mm (2.913 - 2.914")

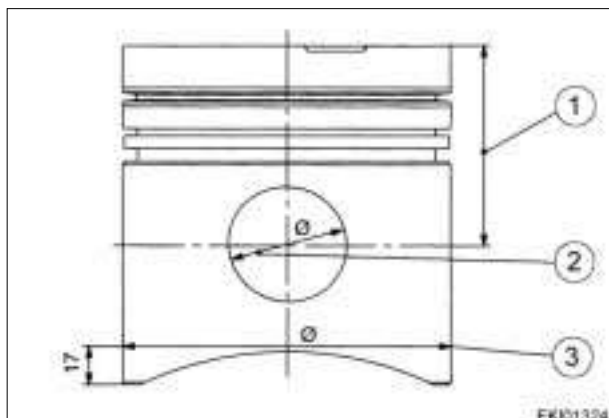
Con-rod bearing

1. Standard size: 1,975-1,987 mm (.077 - .078")

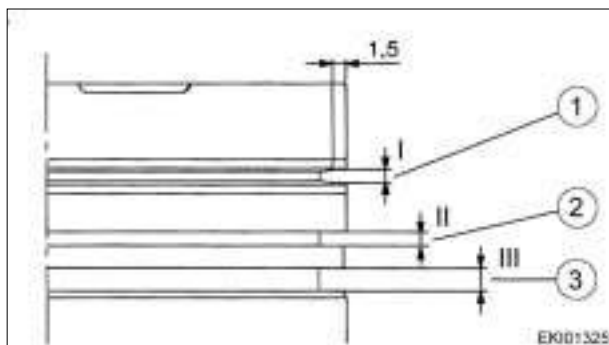
Oversize 0,10 mm (.004"): 2,025-2,037 mm
(.079 - .080")Spread of new bearing shells : 0,5-2,0 mm
(.020 - .079")

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|------------|----------|------|--------------|-------------|----------|---------------|
| 13/03/2001 | b | 4/14 | | 2000 | A | 000006 |

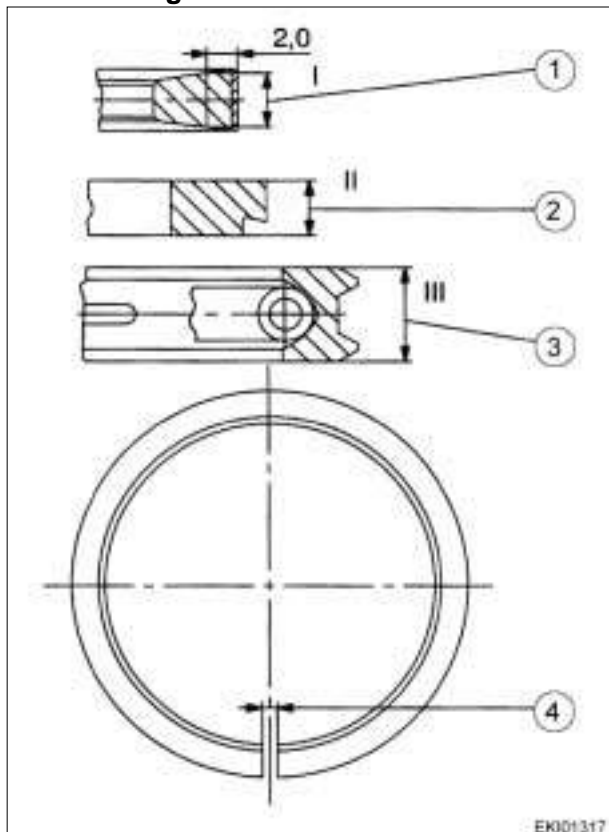
| | | |
|----------------|---|----------|
| Fav 900 | Engine / Generalities Service Data | A |
|----------------|---|----------|

Piston

1. Compression height: 63,90-64,00 mm (2.516 - 2.519")
with undersizes 0,2 mm (.008"): 63,70-63,80 mm (2.508 - 2.511")
with undersizes 0,4 mm (.016"): 63,50-63,60 mm (2.500 - 2.503")
Piston projection above crankcase: 0,0093-0,391 mm (.004 - .015")
2. 42,003-42,009 mm (1.6537 - 1.6539")
Piston pin diameter: 41,994-42,000 mm (1.6533 - 1.6535")
3. 107,891-107,900 mm (4.2477 - 4.2480")

Piston ring grooves

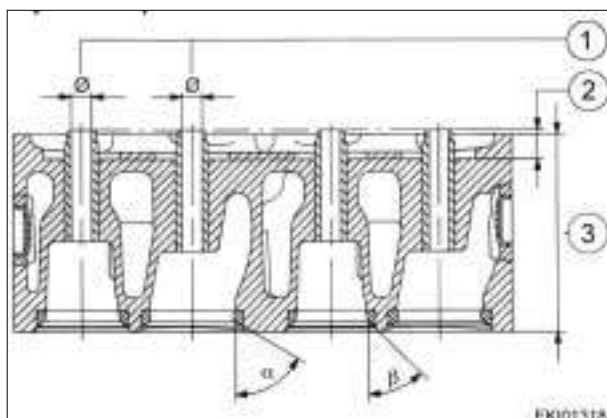
1. 2,685 mm (.106")
2. 2,54-2,56 mm (.100 - .101")
3. 4,02-4,04 mm (.158 - .159")

Piston rings

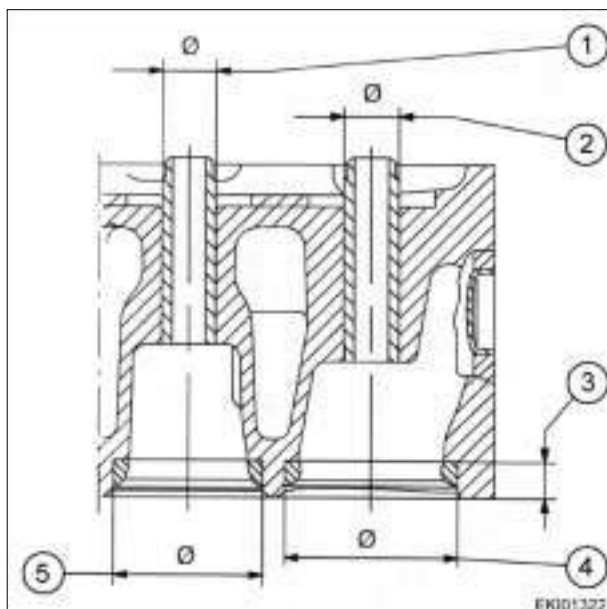
1. Ring - keystone ring:
Height: 2,429-2,463 mm (.096 - .097")
2. Ring - chamfered ring:
Height: 2,478-2,490 mm (.097 - .098")
Axial play: 0,050-0,082 mm (.002 - .003")
3. Ring - D-ring with spring:
Height: 3,975-3,990 mm (.156 - .157")
Axial play: 0,030-0,065 mm (.001 - .002")
4. End gap clearance:
 1. Ring: 0,35-0,55 mm (.001 - .002")
 2. Ring: 0,3-0,5 mm (.001 - .002")
 3. Ring: 0,3-0,6 mm (.001 - .002")

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| | | |
|----------------|---|----------|
| Fav 900 | Engine / Generalities Service Data | A |
|----------------|---|----------|

Cylinder head

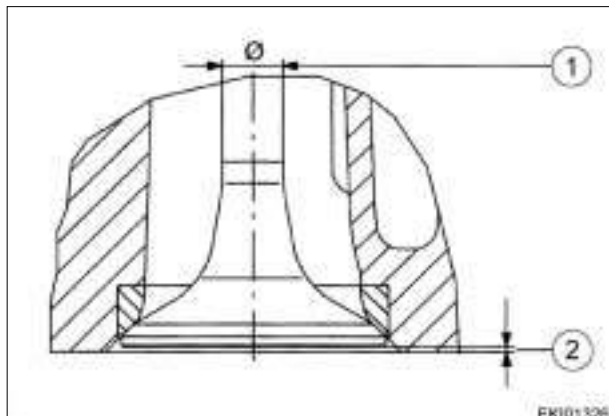
1. 10,000-10,015 mm (.3937 - .3942") at intake and exhaust valves
 2. 14,1-14,15 mm (.555 - .557")
 3. 97,8-98,0 mm (3.850 - 3.860")
Minimum: 96,8 mm (3.811")
- alpha = 60° Intake valve
beta = 45° Exhaust valve



1. Valve guide bore in cylinder head:
Standard size: 16,000-16,018 mm (.630 - .631")
Oversize: 16,250-16,268 mm (.640 - .641")
2. Valve guide outer diameter:
Standard size: 16,028-16,046 mm (.631 - .632")
Oversize: 16,278-16,296 mm (.641 - .642")
3. Standard size:
Intake valve: 10,8-10,9 mm (.425 - .429")
Exhaust valve: 11,0-11,1 mm (.433 - .437")
Oversize:
Intake valve: 11,0-11,1 mm (.433 - .437")
Exhaust valve: 11,2-11,3 mm (.441 - .445")
4. Cylinder head basic bore:
Standard size: 51,00-51,03 mm (2.008 - 2.009")
Oversize: 51,20-51,23 mm (2.016 - 2.017")
Valve seat insert outer diameter:
Standard size: 51,10-51,11 mm (2.011 - 2.012")
Oversize: 51,30-51,31 mm (2.019 - 2.020")
5. Cylinder head basic bore:
Standard size: 44,000-44,025 mm (1.732 - 1.733")
Oversize: 44,200-44,225 mm (1.740 - 1.741")
Valve seat insert outer diameter:
Standard size: 44,10-44,11 mm (1.736 - 1.737")
Oversize: 44,30-44,31 mm (1.744 - 1.745")

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| | | |
|----------------|---|----------|
| Fav 900 | Engine / Generalities Service Data | A |
|----------------|---|----------|

Valves

1. Intake valve: 9,965-9,980 mm (.3923 - .3929")

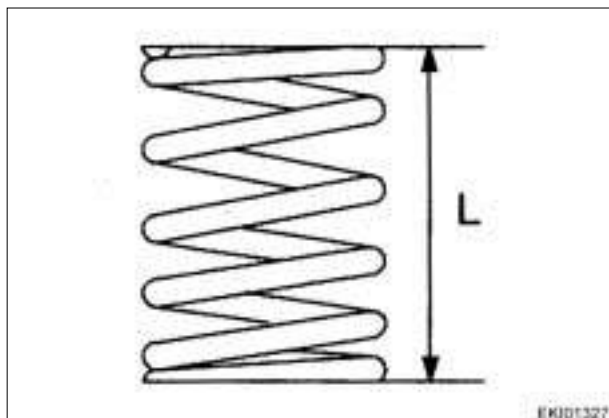
Exhaust valve: 9,950-9,965 mm (.3917 - .3923")

Wear limit: max. 0,1 mm (.0039")

2. Valve recess:

Intake valve : 0,25-0,71 mm (.010 - .028")

Exhaust valve: 0,45-1,05 mm (.018 - .041")



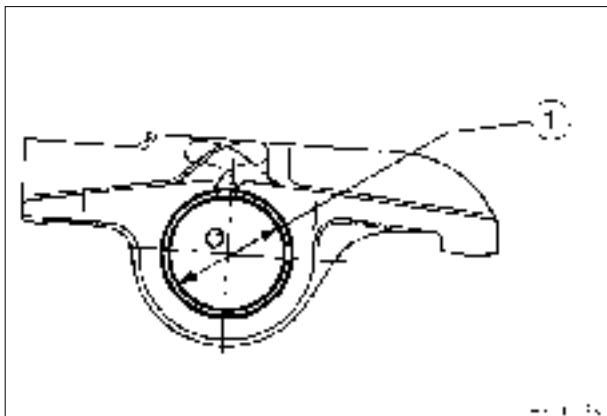
Valve springs:

Untensioned approx.: 59,5-61,0 mm
(2.343 - 2.401")

Spring resistance L = 45 mm: 410-471 N
(92 - 106 lbs.)

Spring resistance L = 33,5 mm: 744-825 N
(167 - 185 lbs.)

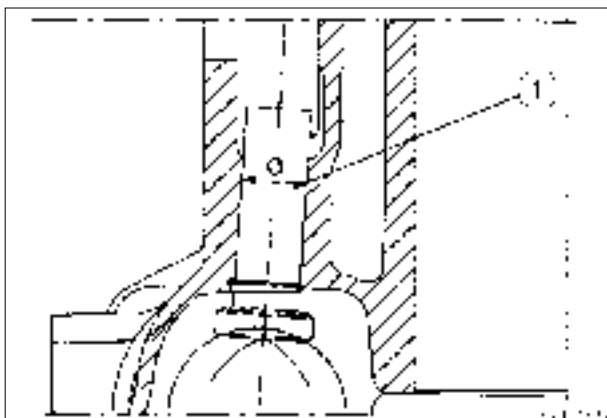
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Fav 900**Engine / Generalities
Service Data****A****Valve operation****Rocker arm**

1. 20,000-20,001 mm (.78740 - .78744")

Diameter of rocker arm bearing: 19,957-19,970 mm (.7857 - .7862")

Wear limit: 0,08 mm (.003")

**Valve tappets**

1. Tappet housing bore:

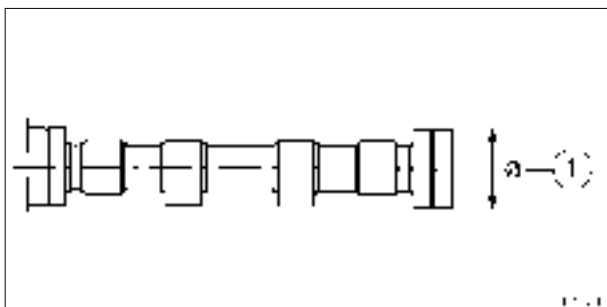
Standard size: 20,000-20,021 mm (.787 - .788")

Oversize: 20,250-20,271 mm (.797 - .798")

Tappet outer diameter:

Standard size: 19,944-19,965 mm (.785 - .786")

Oversize: 20,194-20,215 mm (.795 - .796")

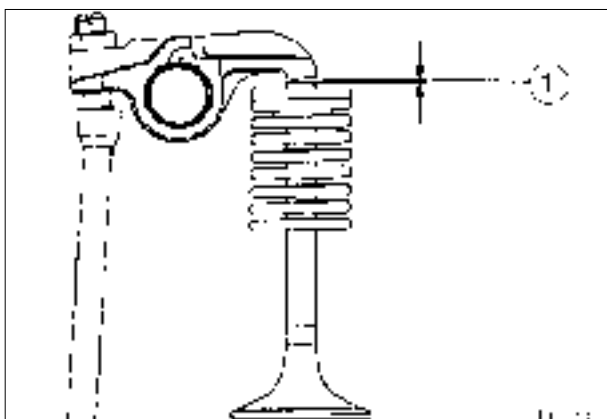
**Camshaft**

Camshaft bush inner diameter: 55,07-55,14 mm (2.168 - 2.170")

1. 1. 54,91-54,94 mm (2.162 - 2.163")

Camshaft axial diameter: 0,14-0,27 mm (.0055 - .0106")

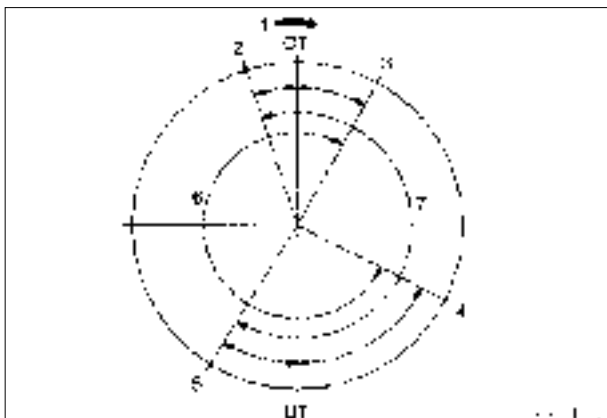
Wear limit: 1,5 mm (.059")

**Valve clearance**

1. Adjust when engine is cold.

Intake valve: 0,5 mm (.020")

Exhaust valve: 0,5 mm (.020")

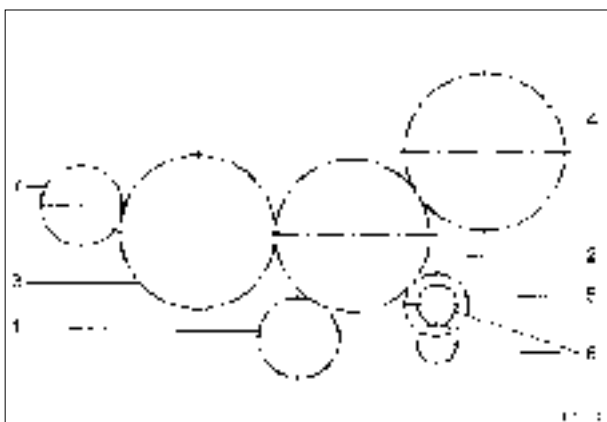
Fav 900**Engine / Generalities
Service Data****A****Valve timing**

1. Engine direction of rotation
2. Intake valve opens 18° before TDC.
3. Exhaust valve closes 29° after TDC.
4. Exhaust valve opens 63° before TDC.
5. Intake valve closes 32° after bottom dead point.

6. Exhaust valve opening point 272°.

7. Intake valve opening point 230°.

Figures in degrees relate to the crankshaft angle.

**Layout of engine timing**

1. Crankshaft gear
2. Intermediate timing gear
3. Camshaft gear
4. Injection pump drive gear
5. Oil pump drive gear
6. Oil pump delivery gear
7. Power take off / air compression take off

Backlash between

| | |
|--|-------------------------------|
| Crankshaft gear and intermediate gear | 0,000-0,465 mm (0 - .018") |
| Intermediate gear and crankshaft gear | 0,062-0,324 mm (.002 - .013") |
| Intermediate gear and injection pump drive | 0,10-0,27 mm (.004 - .010") |
| Intermediate gear and oil pump drive | 0,100-0,266 mm (.004 - .010") |
| Oil pump delivery gears | 0,10-0,22 mm (.004 - .009") |
| Camshaft gear and hydraulic pump gear | 0,10-0,15 mm (.004 - .006") |

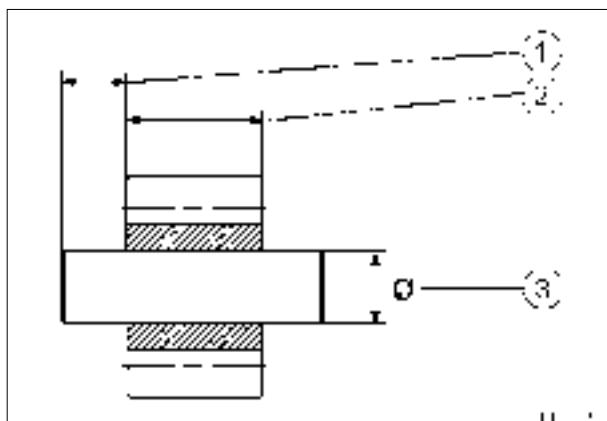
Compression pressures

| | |
|---------------------|-----------------------------|
| good | above 30 bar (435 PSI) |
| permissible | 27 - 30 bar (391 - 435 PSI) |
| needs repairing | under 26 bar (377 PSI) |
| pressure difference | max. 4 bar (58 PSI) |

| | | |
|----------------|---|----------|
| Fav 900 | Engine / Generalities Service Data | A |
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Engine lubrication

| | |
|---------------------------------------|-------------------------------|
| Valve opening pressures | |
| Bypass valve for full flow oil filter | 2-3 bar (29 - 44 PSI) |
| Oil pump pressure relief valve | 5-6 bar (73 - 87 PSI) |
| Pressure valve of oil nozzles | |
| Opening pressure | 1,9-2,1 bar (27.5 - 30.5 PSI) |
| Closing pressure | 1,4-1,6 bar (20.3 - 23.2 PSI) |
| Oil splash nozzle orifice | 1,75-1,85 mm (.069 - .073") |

Oil pump**Oil pump drive gear**

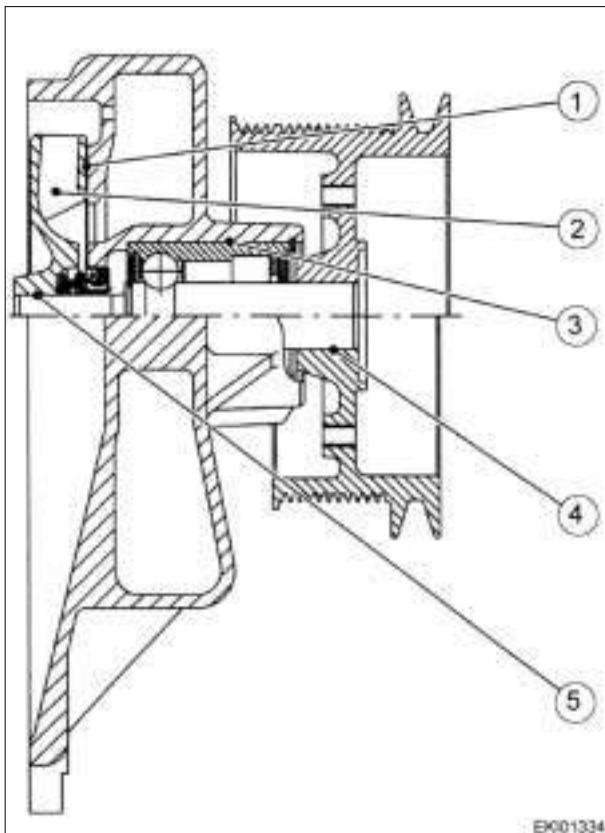
- 1. 16 mm (.630")
- 2. D 0836 LE 501/502: 31,925-31,950 mm (1.257 - 1.258")
D 0836 LE 503/504: 31,920-31,950 mm (1.257 - 1.258")
Housing depth: 32,000-32,039 mm (1.260 - 1.261")
Housing bore: 10000 N
- 3. Shaft: 15,94-15,95 mm (.627 - .628")
Housing bore: 16,000-16,018 mm (.630 - .631")

Oil pump delivery at pump speed (with SAE 20W/20 Oil, at 90°C (194°F) and p=6bar (87 PSI))

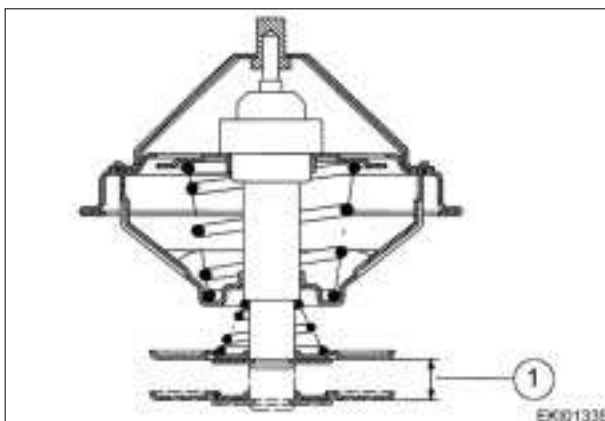
Gear spread 32 mm (1.260")

| | |
|------------------------------------|--------------------------|
| at n = 1008 1/min (rpm 800 1/min) | 17 ltr./min (4.5 GPM) |
| at n = 2709 1/min (rpm 2150 1/min) | 53,5 ltr./min (14 GPM) |
| at n = 2835 1/min (rpm 2250 1/min) | 56,5 ltr./min (15 GPM) |
| at n = 2961 1/min (rpm 2350 1/min) | 59 ltr./min (15.5 GPM) |
| at n = 3087 1/min (rpm 2450 1/min) | 62,5 ltr./min (16.5 GPM) |

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Fav 900**Engine / Generalities
Service Data****A****Cooling system****Water pump (engine)**

1. Gap between impeller and housing:
0,5-0,9 mm (.020 - .035")
2. Impeller diameter: 136 mm (5.354")
3. Bearing location in housing:
54,940-54,970 mm (2.163 - 2.164").
Bearing diameter:
54,981-54,994 mm (2.1646 - 2.1651")
4. Bore in hub: 25,000-25,013 mm (.984 - .985").
Bearing shaft diameter: 25,048-25,061 mm
(.986 - .987").
5. Impeller bearing shaft bore: 16,000-16,018
mm (.630 - .631"). Bearing shaft diameter :
16,045-16,056 mm (.6316 - .6321).

**Thermostat**

Opening at 83°C (±2°) (181°F ±3.6°F).

Fully open: 95°C (203°F).

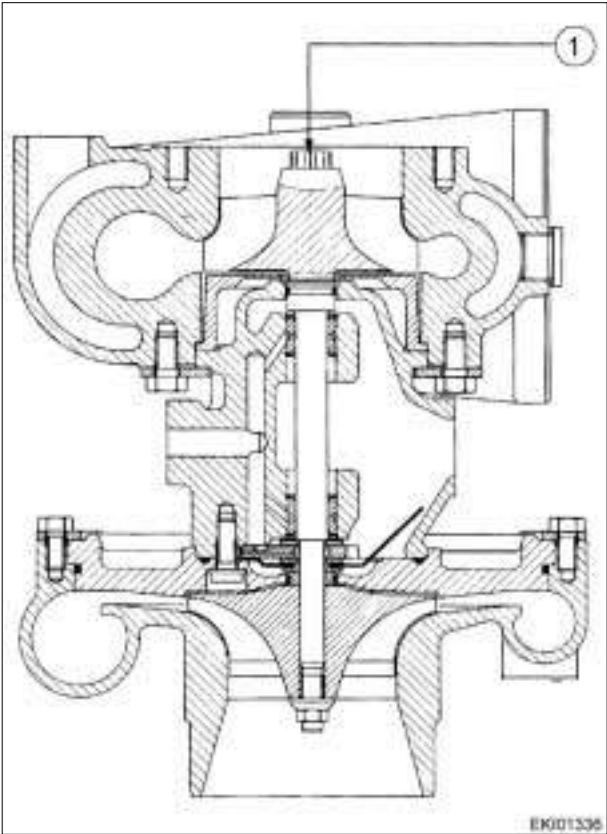
1. Stroke: min 8 mm at 95°C (.315" at 203°F).

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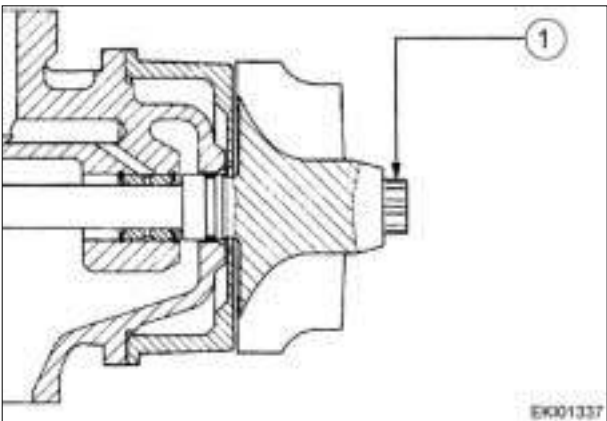
Turbocharger

| | |
|---|---------------------------|
| Manufacturer D 0836 LE 501/502/503/504 | KKK HX40-8274AW/H18WA8 |
|---|---------------------------|



Axial play

1. 0,038-0,093 mm (.0015 - .0037")



Radial play

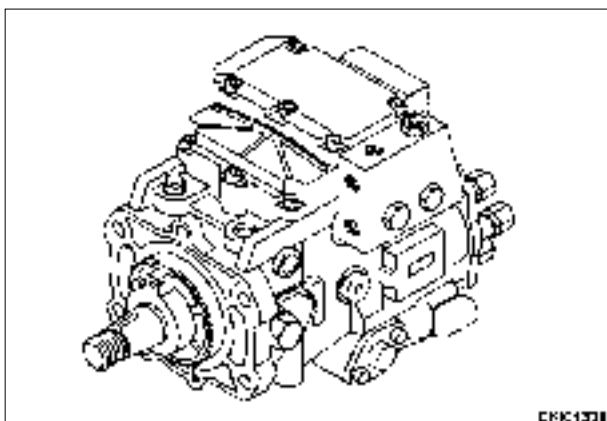
1. 0,329-0,501 mm (.0130 - .0197")

| | | | | | | |
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| Fav 900 | Engine / Generalities Service Data | A |
|----------------|---|----------|

Fuel system**Injection nozzles**

| | |
|--|------------------------------|
| Manufacturer | Bosch |
| Type : | DSL A 154 P 625 |
| N° of orifices | 6 |
| Nozzle opening pressure : | |
| Nozzle holder new : | 320 + 8 bar (4641 + 116 PSI) |
| Nozzle holder used : | 300 + 8 bar (4351 + 116 PSI) |
| Nozzle injection pump with vane-cell feed pump and automatic pressure controlled injection timer | 2,68-3,47 mm (.106 - .137") |
| Nozzle holder | KDEL 82 P 55 |

**Injection pump**

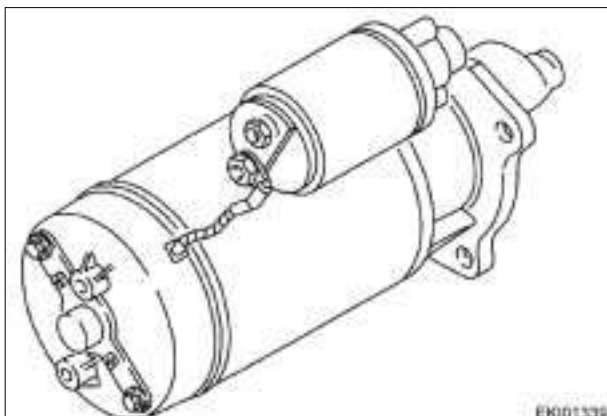
Nozzle injection pump with vane pump and automatic pressure controlled injection timer

Manufacturer : Bosch.

Type: VP 44.

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| Fav 900 | Engine / Generalities Service Data | A |
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**Starter**

Manufacturer : Bosch

Type : EV

operating method : pre-engaged drive

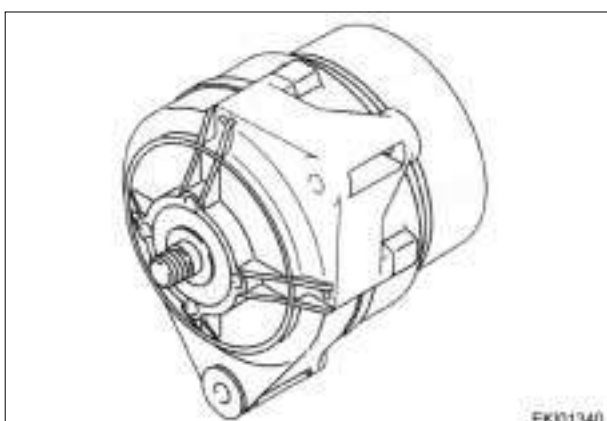
Starter pinion gear

Number of teeth: 11

Module: 3

Nominal voltage: 24 Volt

Nominal output : 4 kW (5.36 HP)

**Generator**

Manufactured : Bosch

Type : KC

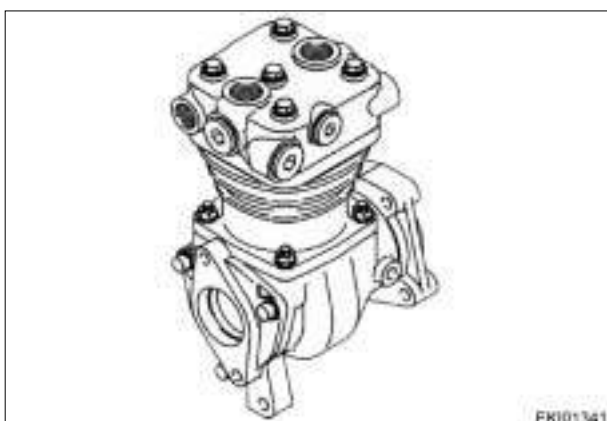
Operating method : 3_PHASE

Nominal voltage : 14 Volt

Max. current : 45-90 Ampere

Power take-off for hydraulic pump / Air compressor

| | |
|-------|---------------------|
| Speed | 0,97 * engine speed |
|-------|---------------------|

**Air compressor**

Single cylinder air compressor

Manufacturer: Knorr

Lubrication: Circulatory system with pressure compression

Cooling: air-cooled

Displacement: 213 cm³ (129 in³)

Op speed: max. 3000 1/min

Op pressure: max 12,5 bar (181 PSI)

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| Fav 900 | Engine / Generalities Tightening Torque values | A |
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Note:

All threaded unions not specified in this table must be tightened according to our works standard M 3059. Bolts and screws must be lightly oiled before tightening !

Plugs

| | |
|-------------------|------------------------|
| DIN 908 | |
| M 14*1,5; M16*1,5 | 80 Nm (59,00 lbf-ft) |
| M 18*1,5; M22*1,5 | 100 Nm (73,76 lbf-ft) |
| M 24*1,5; M26*1,5 | 120 Nm (88,51 lbf-ft) |
| M 30*1,5 | 150 Nm (110,63 lbf-ft) |
| DIN 7604 | |
| AM 10*1; M12*1,5 | 50 Nm (36,88 lbf-ft) |
| AM 14*1,5 | 80 Nm (59,00 lbf-ft) |

Crankcase, crank gear

| | |
|---|-------------------------------|
| Crankshaft bearing cap on and crankcase | |
| Initial torque | 115 Nm (84,82 lbf-ft) |
| Angular torque | 90-100° |
| Damper on crankshaft M14*1,5 10,9 | |
| Initial torque | 150 Nm (110,63 lbf-ft) |
| Angular torque | 90-100° |
| Damper on crankshaft M14*1,5 12,9 | |
| Initial torque | 150 Nm (110,63 lbf-ft) |
| Angular torque | 90-100° |
| Angular torque | 90-100° |
| Flywheel on crankshaft | |
| Initial torque | 100 Nm (73,76 lbf-ft) |
| Angular torque | 90-100° |
| Con-rod bearing caps | |
| Initial torque | 50-60 Nm (36,88-44,25 lbf-ft) |
| Angular torque | 90-100° |

Cylinder head

| | |
|---|-----------------------|
| For tightening and retightening of cylinder head bolts see following page | |
| Lock nut for valve adjusting screw | 40 Nm (29,50 lbf-ft) |
| Cheese-head screws with hexagonal socket for bolts of intermediate gear | 115 Nm (84,82 lbf-ft) |
| Collar screw for crankshaft | 65 Nm (47,94 lbf-ft) |
| Rocker socket (Torx E12) | 65 Nm (47,94 lbf-ft) |

Lubrication

| | |
|---|-------------------------------|
| Oil pressure valve for piston spray nozzle | 38-42 Nm (28,03-30,98 lbf-ft) |
| Oil pump drive gear on shaft | 30 Nm (22,13 lbf-ft) |
| Screw plug for pressure relief valve in crankcase | 60 Nm (44,25 lbf-ft) |
| Oil pan drain plug | 60 Nm (44,25 lbf-ft) |
| Screw plug for oil filter head (M 10*1) | 20 Nm (14,75 lbf-ft) |
| Threaded coupling for oil filter | 40 Nm (29,50 lbf-ft) |
| Screw plug in oil filter (M 18*1,5) | 30 Nm (22,13 lbf-ft) |
| Screw plug in oil filter (M 24*1,5) | 30 Nm (22,13 lbf-ft) |
| Screw plug in oil filter (M 30*1,5) | 40 Nm (29,50 lbf-ft) |
| Oil change filter | 25 Nm (18,44 lbf-ft) |

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Cooling system

| | |
|---------------------------------------|----------------------|
| Screw plug in coolant pipe (M14*1,5) | 20 Nm (14,75 lbf-ft) |
| Hose clips : | |
| Clamping range 12 to 31 mm, 9 mm wide | 3,6 Nm (2,66 lbf-ft) |
| over 32 mm, 13 mm wide | 5 Nm (3,69 lbf-ft) |

Exhaust / Intake manifolds

| | |
|-----------------------------------|-------------------------------|
| Exhaust manifold on cylinder head | |
| Initial torque | 50-55 Nm (36,88-40,75 lbf-ft) |
| Angular torque | 90-100° |
| Banjo bolt of solenoid valve | 10-15 Nm (7,38-11,06 lbf-ft) |
| Knuckle pin clap of turbocharger | 12 Nm (8,85 lbf-ft) |

Fuel system

| | |
|--------------------------------|-------------------------------|
| Nozzle holder in cylinder head | 70 Nm (51,63 lbf-ft) |
| Nozzle adjusting nut | 45 Nm (33,19 lbf-ft) |
| Banjo bolt for leak oil | 10-12 Nm (7,38-8,86 lbf-ft) |
| Pressure line at nozzle | |
| Initial torque | 10 Nm (7,38 lbf-ft) |
| Angular torque | 60° |
| Banjo bolt on oil filter | 20-30 Nm (14,75-22,13 lbf-ft) |
| Fuel filter | 10-15 Nm (7,38-11,06 lbf-ft) |
| Purge plug on fuel filter | 8-10 Nm (5,90-7,38 lbf-ft) |

Starter / Alternator / Compressor

| | |
|-----------------------|-----------------------------------|
| Alternator pulley | 75-85 Nm (55,32-62,69 lbf-ft) |
| Compressor drive gear | 200-250 Nm (147,51-184,39 lbf-ft) |

Sensors

| | |
|----------------------------------|----------------------|
| Oil pressure sensor | 80 Nm (59,00 lbf-ft) |
| Temperature sensor switch | 15 Nm (11,06 lbf-ft) |
| Coolant Temperature sensor (EDC) | 35 Nm (25,82 lbf-ft) |

| | | |
|----------------|---|----------|
| Fav 900 | Engine / Generalities Tightening Torque values | A |
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Assembly tightening torques to works standard M 3059

External or internal hexagon nuts and bolts, heads without collar or flange.

| Tread size * Pitch | Property class / Tightening torque in Nm (lbf-ft) | | |
|--------------------|---|-----------------|-----------------|
| | at 8,8/8 | at 10,9/10 | at 12,9/12 |
| M4 | 2,5 (1,84) | 4,0 (2,95) | 4,5 (3,32) |
| M5 | 5,0 (3,69) | 7,5 (5,53) | 9,0 (6,64) |
| M6 | 9,0 (6,64) | 13,0 (9,59) | 15,0 (11,06) |
| M7 | 14,0 (10,33) | 20,0 (14,75) | 25,0 (18,44) |
| M8 | 22,0 (16,23) | 30,0 (22,13) | 35,0 (25,81) |
| M8*1 | 23,0 (16,96) | 35,0 (25,81) | 40,0 (29,50) |
| M10 | 45,0 (33,19) | 65,0 (47,94) | 75,0 (55,32) |
| M10*1,25 | 45,0 (33,19) | 65,0 (47,94) | 75,0 (55,32) |
| M10*1 | 50,0 (36,88) | 70,0 (51,63) | 85,0 (62,62) |
| M12 | 75,0 (55,32) | 105,0 (77,44) | 125,0 (92,20) |
| M12*1,5 | 75,0 (55,32) | 110,0 (81,13) | 130,0 (95,88) |
| M12*1,25 | 80,0 (59,00) | 115,0 (84,20) | 135,0 (99,57) |
| M14 | 115,0 (84,20) | 170,0 (125,39) | 200,0 (147,51) |
| M14*1,5 | 125,0 (92,20) | 185,0 (136,45) | 215,0 (158,58) |
| M16 | 180,0 (132,76) | 260,0 (191,77) | 310,0 (228,64) |
| M16*1,5 | 190,0 (140,14) | 280,0 (206,52) | 330,0 (243,40) |
| M18 | 260,0 (191,77) | 370,0 (272,90) | 430,0 (317,15) |
| M18*2 | 270,0 (199,14) | 290,0 (213,89) | 450,0 (331,90) |
| M18*1,5 | 290,0 (213,89) | 410,0 (302,40) | 480,0 (354,03) |
| M20 | 360,0 (265,52) | 520,0 (383,53) | 600,0 (442,54) |
| M20*2 | 380,0 (280,27) | 540,0 (398,28) | 630,0 (464,66) |
| M20*1,5 | 400,0 (295,02) | 570,0 (420,41) | 670,0 (494,17) |
| M22 | 490,0 (361,40) | 700,0 (516,29) | 820,0 (604,80) |
| M22*2 | 510,0 (376,16) | 730,0 (538,42) | 860,0 (634,30) |
| M22*1,5 | 540,0 (398,28) | 770,0 (567,92) | 900,0 (663,80) |
| M24 | 620,0 (457,29) | 890,0 (656,43) | 1040,0 (767,06) |
| M24*2 | 680,0 (501,54) | 960,0 (708,06) | 1130,0 (833,44) |
| M24*1,5 | 740,0 (545,8) | 1030,0 (759,69) | 1220,0 (899,82) |

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Cylinder head bolts**Tightening cylinder head bolts following repair work (new engine)**

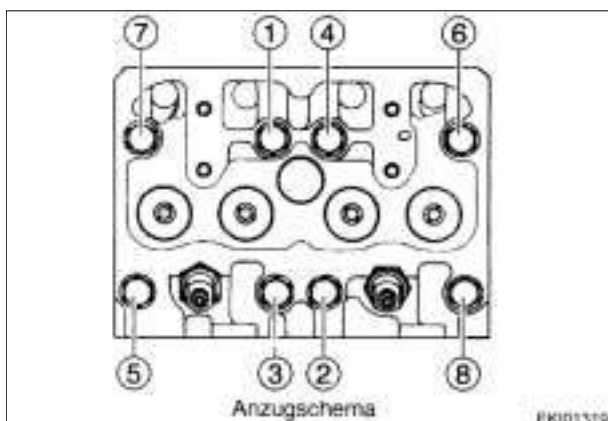
Only for Torx-head screws.

No tightening for Torx-head screws.

Tightening cylinder head bolts following repair work

(cold engine)

Only for Torx-head screws.

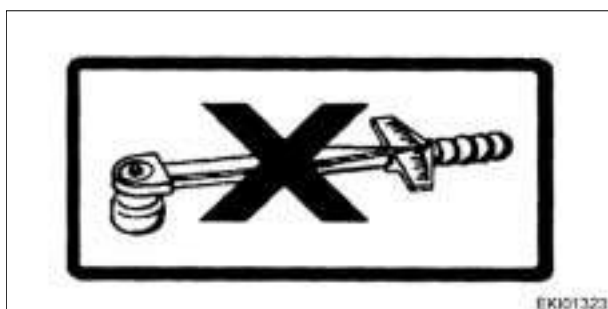
**Note:****Only use new cylinder head bolts. do not re-use.**

before inserting bolts, lubricate threads (not the tapped bores) and the bolt heads with "Optimoly White T" paste. Do not use oils or additives containing MoS₂ -h. Tighten bolts by the torque angle method following the diagram :

- 1.st initial stage = 10 Nm (7,38 lbf-ft).
- 2.nd initial stage = 80 Nm (59,00 lbf-ft).
- 3.rd initial stage = 150 Nm (110,63 lbf-ft).
- 4.th initial stage = 90°.
- 5.th initial stage = 90°.
- Final stage = 90°.

Adjust valve play

Put on sticker number 51.97801-0150.

**Tightening cylinder head bolts following repair work**

Only for Torx-heads.

No tightening for Torx-head screws.

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| | | |
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| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
|----------------|--|----------|

Content of EDC-Failures

| | | |
|----------------------|----------------------|----|
| Fendt Failure Codes: | 4.1.06 | 3 |
| | 1.1.03 | 4 |
| | 1.1.01, EVTL. 4.2.81 | 5 |
| | 1.1.7E | 7 |
| | 1.1.9E | 8 |
| | 1.1.7E | 9 |
| | 1.1.9F | 10 |
| | 1.1.A1 | 11 |
| | 1.1.A0 | 12 |
| | 1.2.81 (Test 1) | 13 |
| | 1.2.82 (Test 2) | 15 |
| | 1.2.84 (Test 3) | 16 |
| | 1.2.85 (Test 4) | 18 |
| | 1.2.87 (Test 5) | 20 |
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Pedal Position Sensor B029 to ESTControl module A002 Direct Diagnostic

Failure Code (Fendt):

4.1.06

Failure location (MAN):

not available

Failure path:

Accelerator pedal position sensor

- Signal to high
- Signal to low

Consequences:

Requested engine speed will be compared to the position of pedal sensor EDC (B038). In case of correspondance, control via CAN-Bus will be deactivated. Control via hand throttle, memorization keys and vario terminal will not be possible. Only accelerator pedal operation (Sensor B038).

Possible origin:

Wiring interruption , Shot circuit, Power supply failure, Pedal position sensor failure, EST Control Module failure.

Test Conditons:

Adaptor box connected

Ignition "On"

Use wiring diagrams wich are corresponding to the tractor

Fendt Component identification:

B029 Pedal position sensor

Fendt Connector identification:

X176 Connector, 1:Earth, 2: 5V supply, 3:Signal

| Test | Measurements | Trouble shooting |
|---------------|--|--|
| Power supply | <p>Check Voltage on Adaptor box between fuse board A013 Pin A6 (+), Connector X200 against earth.</p> <p>Check wiring WF1492, WF 1744</p> <p>Requested value: 8 - 8,5 V</p> | <p>- Check wiring</p> <p>- Check connectors</p> <p>- If no failure can be identified, check Fuses</p> |
| Potentiometer | <p>Current with adaptor box at EST Control Module A002 Pin 7, Connector X031 .</p> <p>Check wiringWF 1728</p> <p>Check Signal with FENDIAS</p> <p>Requested value:</p> <p>Idle Position: 16mA - 22mA</p> <p>Full throttle position: 2mA - 8mA</p> <p>Tolerances: I < 2mA oder I > 22mA</p> | <p>- Check wiring</p> <p>- Check Connectors</p> <p>- Adjust mecanical link between pedal and sensor</p> <p>- If adjustment becomes unfeasable, replace position sensor</p> |

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Pedal position sensor B029 with PWG B038 Plausibility (Correspondance)

Failure Code (Fendt):

1.1.03

Failure location (MAN):

not Available

Failure display :

Failure display within dashpanel

Failure path

Pedal position sensor

No correspondance Pedal position sensor B038 with B029.

During calibration separate characteristics are memorized for both position sensors. Both values are permanently compared during operation. In case of a too important deviation, a failure code will appear. No further consequences on vehicle operation.

Possible origin:

Mechanical attribution error of both sensors. Alteration of adjustment during operation

Testing condition:

FENDIAS Diagnostic program

2 Adaptor boxes, 1 * Adaptor connector and harness

Ignition "On"

Use wiring diagrams which are corresponding to the tractor

Fendt Component Identification:

B029, B038

Fendt Connector Identification:

X176, X189, 1: Earth, 2: 5V Supply, 3: Signal

| Test | Measurement | Trouble shooting |
|-----------------------|---|--|
| Potentiometer Signals | <p>Check both speed sensor signals with Diagnostic Program</p> <p>Check Current with Adaptor box at EST Control Module A002 Pin 7, Connector X031 simultaneously</p> <p>check Voltage at EDC Control Module A021 Pin B23 Connector X048</p> <p>Requested values (B029) Idle Position: 16mA - 22mA Full Power Position: 2mA - 8mA</p> <p>Requested values (B038) Idle Position: 0,3 - 0,6 V Full Power Position: 4,0 - 4,5 V</p> <p>Tolerances: A Deviation > 400 Rpm generates the Failure Code</p> | <p>- Check wiring</p> <p>- Check Connectors</p> <p>- Adjust mechanical linkage between Pedal and Sensor</p> <p>- if Adjustment is not feasible, Replace Position Sensor.</p> |

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CAN -Message Pedal Position Sensor B038 to EDC Control Module A021

Failure Code (Fendt):

1.1.01, evtl. 4.2.81

Failure location (MAN):

not available, eventually Failure location 81

Failure display:

Message on Dashpanel

Failure path:

Pedal Position Sensor B038

- Signal to high
- Signal to low

Consequences:

During normal Operation with CAN-Bus: Only Failure Display. If Additionally Pedal Position Sensor B029 fails, last identified value will be kept. Engine Stop only via terminal 15. During Operation without CAN - Bus: Engine Speed will be brought to idle according to ramp.

Possible Origin:

Wiring discontinuity, Short Circuit, Voltage supply failure, Pedal Position Sensor Failure, EDC - Control Module Failure, Control Module A021 not Connected or Fuse for Control Module A021 is burned.

Test Conditions:

Adaptor box and adaptor Connectors connected, FENDIAS, Ignition "ON"

Use wiring diagrams which are corresponding to the tractor

Fendt Component Identification:

B038 (PWG)

Fendt Connector Identification:

X189 (PWG), 1: Earth, 2: 5V Supply, 3: Signal

| Test | Measurement | Trouble shooting |
|----------------|---|--|
| Voltage supply | Check Voltage with Adaptor box and adaptor Connectors between Pin B16 (+) and Pin B35 (-) on Control Module A021, Connector X048. Check wirings WF 1732, WF 1731 Requested Value: 4,5 - 5,2 V | - Check wiring - Check connectors - In no failure can be identified, Replace EDC Control Module A021 - Check fuse for A021 Check CAN-Bus Connection A002 to A021 |
| Sensor Signal | Check Voltage with Adaptor box and adaptor Connectors between Pin B23 (+) and Pin B35 (-) on Control Module A021, Connector X048. Check Wires WF 1733, WF 1731 Check Signal with Diagnostic Program Requested Values: Idle Position: 0,3 - 0,6 V Full Power Position: 4,0 - 4,5 V Threshold values: U < 0.3V or U > 4,8V | - Check Wiring - Check Connectors - Adjust mechanical link between Pedal and Position Sensor - If Adjustment is not Possible, replace Pedal Position Sensor - Check fuse (XXX) for A021 Check CAN - Bus Connection A002 to A021 |

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Hand throttle Position Sensor B035 on Side Console A004 Direct diagnostic**Fehlercode (Fendt):****1.1.7E****Failure location (MAN):****none****Failure display:**

Message on Dashpanel

Failure path:**Hand throttle Position Sensor**

- Signal to high
- Signal to low

Consequences:

In Case of Identification, actual Requested Speed will be compared to EST - Pedal Position Sensor (B029). After Correspondance being established, requested value of Hand Throttle Position Sensor B035 will be deactivated, Operation will only be possible via Accelerator pedal Positon Sensor B029 . The Functions Hand Throttle and Terminal Settings are Deactivated.

Possible origin:

Wiring Discontinuity , Short circuit, Voltage supply Failure, Pedal Position Sensor failure, EST Control Module failure

Test Conditons:

Adaptor box connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

Fendt Component Identification:

B035

Fendt Connector Identification:

X183, 1: Earth, 2: 5V, Supply 3: Signal

| Test | Measurement | Trouble shooting |
|----------------------|---|--|
| Voltage supply | On Adaptor box, Voltage between fuse board A013 Pin B15 (+), Connector X201 and earth Check wires WF1491, WF 1743 Requested value: 8 - 8,5 V | - Check wiring - Check connectors - if no failure can be identified, check fuse |
| Potentiometer Signal | On Adaptor box , Current on side console A004 Pin 30 Connector X033 Check wire WF 1722 Check signal with FENDIAS . Requested values: Idle position: 16mA - 22 mA Full power position: 2mA - 8mA Tolerances: I < 2mA or I > 22mA | - Check wires - Check connectors - Check mecanical link from accelera- tor Pedal to position sensor - If adjustment cannort be performed, replace position sensor |

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Hand Throttle potentiometer B035 on Side console A004 CAN - Connection

Failure Code (Fendt):

1.1.9E

Failure location (MAN):

none

Failure display :

Message on Dashpanel

Failure path:

Hand Throttle position Sensor

CAN Communication failure between EST Control Module A002 and Side Console A004

Consequences:

In case of Failure, actual Requested Speed will be compared to EST - Pedal Position Sensor (B029). After Correspondance being established, requested value of hand throttle position Sensor B035 will be deactivated, Operation will only be possible via Accelerator pedal Positon Sensor B029 . The Functions Hand Throttle and Terminal Settings are Deactivated.

Possible Origin:

CAN Connection A002 to A004 interrupted, Side Console Failure, Fuse (XXX) For Side Console burned out, Fuse Board Failure A013, CAN-Bus Wiring Short Circuit to Earth etc.

Test Conditons:

Adaptor box connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--|--|--|
| CAN Bus Connection EST A002 to Side Con- sole A004 | Check Connection EST Control module A002, Pin 26 Connector X031 to Side Console A004 , Pin 26 , Connector X033 . | - Replace fuses |
| | Check Connection EST Control module A002, Pin 27, Connector X031 to Side console A004, Pin 27, Connector X033 | - Replace Fuse board for side Con- sole |
| | Check fuse board A004 | |
| | Check fuse board A013 | |

| | | |
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Memory Keys A003 on Side Console A004 Direct Diagnostic**Failure Code (Fendt):****1.1.7E****Failure location (MAN):****nonet****Failure display :**

Message on Dashpanel

Failure path:**Memory Keys**

- Signal to high
- Signal to low

Consequences:

In case of Failure Identification, actual Requested Speed will be compared to EST - Pedal Position Sensor (B029). After Correspondance being established, value of Memory Keys A003 will be deactivated, Operation will only be possible via Accelerator pedal Positon Sensor B029 . The Functions Hand Throttle and Terminal Settings are Deactivated.

Possible origin:

Wiring Disruption, Short circuit, Voltage supply Failure, Memory key Failure, EST Control Module Failure.

Test Conditons:

Adaptor box connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

Fendt Component Identification:

A003, Joystick

Fendt Connector Identification:

X032_P

| Test | Measurement | Trouble shooting |
|----------------------|--|--|
| Voltage Supply | Check Voltage with adaptor Box between Joystick A003, Pin 30, Connector X032_P and earth . Check Wire WF1741. Requested value: 8 - 8,5 V | - Check wiring - Check Connectors - If no failure can be identified, Check fuse |
| Signal of Memory key | Check Current with Adaptor Box Between Joystick A003, Pin 31, Connector X032_P against eath. Check Wire WF1742. Check Signal with FENDIAS. Requested Values: 2 mA - 22 mA Threshold Values: I < 2mA or I > 22mA | - Check Wiring - Check Connectors - Adjust mecanical link between Pedal and Position Sensor - If adjustment becomes impossible, Replace position sensor |

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Memory Key A003 on side Console A004 CAN-Communication**Failure Code (Fendt):****1.1.9F****Failure location (MAN):****not Available****Failure Display:**

Message on Dashpanel

Failure path:

- Hand Throttle Potentiometer
- CAN- Communication failure between EST Control Module A002 and Side Console A004

Consequences:

Only pedal B029 Operation will be possible after Failure identification (actual requested Speed will be compared to requested Value of EST- Pedal position sensor (B029). After Correspondance beeing established, requested value of Hand Throttle position sensor B035 will be deactivated. Terminal settings and memorizing Key function are deactivated .

Possible Origin:

CAN Connection A002 to A004 disrupted, Side console Failure, Fuse (XXXXX) for Side Console burned out, Fuse Board A013 failure, CAN-Bus wiring Short Circuit to Earth etc.

Test Conditons:

Adaptor Box connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--|---|---|
| Connection CAN Bus EST Control Module A002 to Side Console A004 | Check Connection EST Control Module A002, Pin 26, Connector X031 to Side Console A004, Pin 26, Connector X033 . Connection EST Control Module A002, Pin 27, Connector X031 to side console A004, Pin 27 Check Connector X033 Check Fuses for A004 Check Fuse board A013 | - Replace fuses - Replace Fuse board, Side Console |

| | | |
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CAN-Connection: EST Control Module to EDC Control Module A021**Failure Code (Fendt):****1.1.A1****Failure location (MAN):****Not Available****Failure Display:**

Message on Dashpanel

Failure path:

CAN-Bus, EST Control module, EDC Control module

CAN Communication Failure between EST Control Module A002 and EDC Control Module A021.

Consequences:

Failure display only

Possible Origin:

CAN Communication from A002 to A021 interrupted, EDC Control module Failure, Fuse for EDC Control module burned out, EDC Control module not connected, Fuse Board A013 failure, CAN-Bus Wiring, Short circuit etc.

Test Conditions:

Adaptor Box connected

Ignition "ON"

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|---|---|---|
| CAN Bus, Communication EST Control Module A002 to EDC Control Module A021 | Check Connection EST, A002, Pin 4, Connector X031 to EDC Control Module A021, Pin 11, Connector X048. Check Connection EST, A002, Pin 5, Connector X031 to EDC Control Module A021, Pin 12 Check Connector X048 Check fuse (XXXX) for A048 Check fuse board A013 | Restaure CAN-Bus Connection - Replace Fuse Board (XXXX) Repace EDC Control Module |

| | | |
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Wrong EDC Control Module**Failure Code (Fendt):****1.1.A0**

Failure location (MAN):

not available

Failure display:

Message on Dashpanel

Failure path:

EST Control Module, EDC Control Module

- End of Line Programming (EOL)

Consequences:

Failure Identification limits Engine Torque to values of Favorit 916.

Possible Origin:

Wrong EDC Control Module, EOL Programming not OK

Test Conditons:

FENDIAS

Ignition "ON"

| Test | Measurement | Trouble shooting |
|--|------------------------------------|--|
| ??????G-Number. EST Control Module, Type of Tractor EOL Programming. Identifi- cation Number EDC Control Module | read out Tractor type with FENDIAS | - Fit appropriate EDC Control Module - Enter Correct Tractor Type |

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Pedal Position Sernsor B038 to EDC Control Module A021 (Test 1)**Failure Code (Fendt):****1.2.81**

Failure location (MAN):

81

Failure display :

Message on Dashpanel

Failure path:

Pedal Position Sensor

- Signal to High

- Signal to low

Consequences:

During normal CAB - BUS Operation: Only Failure Code Display

During Operation without CAN - BUS : Engine runs Idle speed

Possible Origin:

Dicontinued wire, Short Circuit, Voltage Supply Failure, Pedal Position Sensor Failure, EDC Control Module failure

Test Conditons:

Adaptor box with adapting connectors connected

Ignition "ON"

FENDIAS

Use wiring diagrams wich are corresponding to the tractor

Fendt Component Identification:

B038 (Pedal Position Sernsor)

Fendt Connector Identification:

X189 (Pedal Position Sernsor) 1: Earth, 2: 5V Supply, 3: Signal

| Test | Measurement | Trouble shooting |
|----------------------|--|---|
| Voltage supply | Check Voltage with adaptor box with adaptor Connectors between Pin B16 (+) and Pin B35 (-) on EDC Control Module A021, Connector X048 .Check Wires WM1732, WM 1731 . Requested value: 4,5 - 5.2 V | - Record Failure and ambient Parameters. - Delete Failure Memory - Test again - Check Wires - Check Connectors Check Voltage supply/Earth A021 . If no failure can be identified, replace EDC Control Module |
| Potentiometer Signal | Check Voltage with adaptor box with adaptor Connectors between Pin B23 (+) and Pin B35 (-) on EDC Control Module A021, Connector X048. Check Wires WM WM1733, WM 1731 Check Signal using FENDIAS. Requested values: Idle Position: 0,3 - 0,7 V Full Power Position: 4,0 - 4,5 V | - Record Failure and ambient Parameters. Delete Failure memory - Check again Check Wires Check Connectors - Mecanical Link from Pedal to Position sensor - Pedal Positon Sensor Adjustment - If Adjustment is not feasable, Re-place Pedal Position Sensor |

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| Test | Measurement | Trouble shooting |
|-------------------------|--|---|
| EDC Control Module A021 | Threshold values: U < 0.3V or U > 4,8V Check Voltage with adaptor box with adaptor Connectors between Pin B23 (+) and Pin B35 (-) on EDC Control Module A021, Connector X048. Check Wires WM WM1733, WM 1731 | Check Voltage supply /Earth EDC Control module A021 |

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High Pressure Solenoid Valve (Q-MV) in Injection Pump (Plausibility Supply time)

(Test 2)

Failure Code (Fendt):

1.2.82

Failure location (MAN):

82

Failure display:

Message on Dashpanel

Failure path:

Duration of supply of Solenoid Valve , Flow signal wich is communicated via CAN-Bus to Pump

Consequences:

Engine will be stopped

Engine does not start

Possible Origin:

Injection Pump Failure, Supply / Earth VP44 not OK

| Test | Measurement | Trouble shooting |
|----------------|--|--|
| Injection Pump | Check Voltage supply/ Earth VP44, Pin 6,7, A020 ,Connector X046 by putting load on Supply wires WM1041, WM1352 | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete failure Memory using FENDIAS - Check again with FENDIAS - Check Connectors - If Failures are still persisting , replace Injection Pump |

| | | |
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Speed sensor EDC B025 (Test 3)**Failure Code (Fendt):****1.2.84****Failure location (MAN):****84****Failure display :**

Message on Dashpanel

Failure path:

Speed Sensor

- Statically not plausible
- Dynamically not plausible

Consequences:

Full power flow reduced by 25-40%

Reduced maximal speed 1800 Rpm.

System switches from injection start Control to predefined injection start characteristic.

In case of error of correspondance of pump speed sensors, engine will stop

Possible Origin:

Wire disruption, short circuit, Speed sensor failure. Wrong signal through metallic chips , e.g. next to the installation Place; Distance to fly wheel not OK? EDC Control module is not OK,

Test Conditions:

Adaptor Box with Adaptor Connectors , connected

Diagnostic Program

Use wiring diagrams which are corresponding to the tractor

Fendt Component Identification:

B025 (Speed Sensor)

Fendt Connector Identification:

X172 (Speed Sensor), 1: Earth, 2: Signal

Remark:

Occurs simultaneously with FC 1.2.B7

| Test | Measurement | Trouble shooting |
|--------------|---|--|
| Resistance | Check Resistance with Adaptor Box and adaptor Cable between Pin A1 (+) and Pin A13 (-) to EDC Control Module A021, Connector X047 Requested Value: 770 - 1000 Ohm | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check Wiring - Check Connectors - if no Failure can be identified, replace Speed Sensor |
| Speed Signal | Check Signal with Adaptor Box and adaptor Connectors between Pin A1 (+) and Pin A13 (-) to EDC Control Module A021, Connector X047 with Oscilloscope . Number of holes in the Flywheel: 6 Requested Value: Speed 1200 Rpm; Frequency = 120Hz | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check Wires - Check Connectors |

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| Test | Measurement | Trouble shooting |
|-------------------------|--|---|
| | See Test 3 Distance to Flywheel: 0.5 mm - 1.5 mm Tolerances: Triggering Threshold: | - if no Failure can be identified, replace Control Module - Check Distance between Speed Sensor to Flywheel, Resistance of sensor must be OK. |
| EDC Control Module A021 | Check Voltage with adaptor box with adaptor Connectors between Pin B23 (+) and Pin B35 (-) on Control Module A021, Connector X048 . Check Wiring WM WM1733, WM 1731. | -Check Voltage supply / Earth A021 |

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Intake Pressure sensor B028 (Test 4)**Failure Code (Fendt):**

1.2.85

Failure location (MAN):

85

Failure display :

Message on Dashpanel

Failure path:

Intake pressure sensor (XXXX)

- Signal to high
- Signal to low

Signal not compatible with Atmospheric pressure sensor (within Control Module (XXXX))

Consequences:

Full Power Fuel Flow Reduced by 20-40%, Set Value: approx. 200 mbar Intake pressure dark smoke emission during accelerations

Possible Origin:

Discontinued wire, Short circuit, Intake Pressure Sensor, Leak in Intake Tubing, Control Module failure Atmospheric Pressure sensor failure within EDC Control Module A021

Test Conditions:

Adaptor Box with adaptor connectors connected

Ignition "ON"

Apply pressure onto Pressure sensor with ALDA- TesterP or Mitywac Duo - Manual Pump (Absolute Pressure) from MAN

Remark:

Only few Millibar (mBar) are to be measured with FENDIAS, the engine running idle

Use wiring diagrams which are corresponding to the tractor

Fendt Component identification:

B028 (Intake Pressure Sensor)

Fendt Connector Identification.:

X175 (Intake Pressure Sensor) 1: Signal, 2: 5V Supply, 3: Earth

| Test | Measurement | Trouble shooting |
|------------------|--|---|
| Voltage Supply | Check Voltage with adaptor box with adaptor Connectors between Pin A23 (+) and Pin A17 (-) on Control Module A021, Connector X047 Requested Value: 4,75 - 5,25 V | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS - Check Wiring - Check Connectors - If no failure can be identified, Replace Control Module |
| Signal Amplitude | Check Voltage with adaptor box with adaptor Connectors between Pin A12 (+) and Pin A17 (-) on Control Module A021 Connector X047. Check Intake Pressure with FENDIAS Requested Values: 1,50 - 1,70 V at 1500 mbar | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS - Check Wiring - Check Connectors |

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| Test | Measurement | Trouble shooting |
|------|--|---|
| | 2,70 - 3,00 V at 2000 mbar Threshold values: U < 0.4V or U > 4,5V Requested values: 2,65 - 2,75 V at 1500 mbar relative pressure 3,20 - 3,40 V at 2000 mbar relative pressure Threshold values: U < 0,455V or U > 4,783V Check Atmospheric Pressure Sensor with FENDIAS See Test 18 | - If no failure can be identified, replace Intake Pressure sensor |

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Coolant Temperature Sensor (B027) (Test 5)**Failure Code (Fendt):**

1.2.87

Failure location (MAN):

87

Failure display :

Message on Dashpanel

Failure path:

Coolant Temperature Sensor (B027)

Consequences:

Full Power Fuel Flow reduced by 50%, Preset Value will be activated (approx. 110 °C)

Difficult Start in cold Conditions

Possible Origin:

Wire discontinued, Short Circuit, Temperature Sensor Failure, Control Module (XXXX) Failure

Test Conditions:

Adaptor box with adapting connectors connected

Diagnostic Program

Use wiring diagrams which are corresponding to the tractor

Fendt Component Identification:

B027 (Coolant temperature sensor)

Fendt Connector Identification:

X174 (Coolant temperature sensor), 1: not attributed, 2: Earth, 3: Signal

| Test | Measurement | Trouble shooting |
|-------------------|---|--|
| Sensor Resistance | Check Resistance with adaptor box with adaptor Connectors between Pin A22 and Pin A5 on Control Module A021, Connector X047 Separate Sensor from Control Module (XXXX) ! Requested Values: 3,6 - 1,3 KOhm at 15 - 30°C 460 - 230 Ohm bei 75 - 80°C | - Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS - Check Wiring - Check Connectors - Replace temperature Sensor (XXXXX) |
| Sensor Voltage | Check Voltage with adaptor box and adaptor Connectors between Pin A22 and Pin A5 on Control Module A021, Connector X047 Requested Value: 3,0 - 1,15 V at 30 - 90°C Tolerances: U < 0.53V oder U > 4,3V | - Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS - Check Wiring - Check Connectors - Replace temperature Sensor - If no failure can be identified, replace Control Module (XXXX) |

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Pump Control Module A020 Auto Diagnostic - Pump characteristic not found (Test 6)

Failure Code (Fendt):

1.2.89

Failure location (MAN):

89

Failure display :

Message on Dashpanel

Failure path:

Pump Control Module (Injection Pump)

Consequences:

Engine does not Start

Possible Origin:

Pump Control Module (Injection Pump) failure

Remark:

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures which are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|----------------|--------------------|---|
| Injection Pump | | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS - If Failure persists, Replace Injection Pump |

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Test: Engine Stop via CAN Setting "Fuel Flow 0" (Test 7)**Failure Code (Fendt):**

1.2.92

Failure location (MAN):

92

Failure display :

Message on Dashpanel

Failure path:

EDC Control Module, Injection pump

Consequences :

Full Power Fuel Flow reduced by 25-40%

Reduced max. Speed to 1900 Rpm

Function:

During Relay Delay time Fuel Flow 0 is set. If the expected Speed drop does not occur, Failure Code will be emitted.

Possible Origin:

EDC Control Module failure, Injection Pump Failure, Bewel Pinion Speed Sensor failure, Engine Stop Path Failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures which are not requesting a replacement of the Control Module or of the pump.

Remark 2:

In Case of Relay Delay Time failures, Bewel Pinion Speed Sensor must be checked.

Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Engine Stop Paths may be identified as failed, since speed does not drop fast enough (still moving tractor).

| Test | Measurement | Trouble shooting |
|--------------------|---|---|
| EDC Control Module | Tractor at standstill (0 km/h) Engine speed 800 Rpm, start seven times Engine in order to delete Failure codes. Engine must stand still for at least 5 seconds between 2 Starting trials. | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS - If Failure persists, replace EDC Control Module |
| Engine Stop Paths | Tractor at standstill (0 km/h) Engine speed 800 Rpm, start seven times Engine in order to delete Failure codes. Engine must stand still for at least 5 seconds between 2 Starting trials. Check Speed Sensor Signal with FENDIAS. | |
| Injection pump | | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS - If Failure persists, replace Injection Pump |

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Low Voltage EDC-System (Test 8)**Failure Code (Fendt):**

1.2.13

Failure location (MAN):

13

Failure display :

Message on Dashpanel

Failure path:

Voltage supply EDC Control Module (Low Battery)

Consequences:

According to the importance of Voltage drop, different behaviours of the EDC-Systems or Engine may occur:

- Lack of power
- unsteady engine operation
- Engine stops
- heavy smoke emission
- **incompatible Failure Codes !**

Possible Origin:

Low Battery or Generator failure, Cable discontinuity, Short circuit,
Main Relay failure

Test Conditions:

Adaptor box with adapting connectors connected

Ignition "ON"

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|----------------|---|---|
| Voltage Supply | <p>Check Voltage with adaptor box with adaptor Connectors between Pin B15 (+) and Pin B1 (-), Pin B15 (+) and Pin B27 (-), Pin B3 (+) and Pin B2 (-), Pin B4 (+) and Pin B1 (-) on Control Module A021, Connector X048</p> <p>Sollwert: 7,5 - 15 V</p> <p>Threshold Value: Umin=7,5V</p> <p>Failure Condition: Voltage has been lower than Threshold for more than 10 second</p> | <p>- Record Failure and ambient Parameters with FENDIAS</p> <p>- Delete Failure memory with FENDIAS</p> <p>- Check again with FENDIAS</p> <p>Check Wiring</p> <p>- Check Connectors</p> <p>Replace Main Relay</p> <p>- If no failure can be identified, replace Control Module (XXXX)</p> |

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Overspeed (Test 9)**Failure Code (Fendt):**

1.2.17

Failure location (MAN):

17

Failure display :

Message on Dashpanel

Failure path:

Engine overspeed

Consequences:

Fuel Flow will be interrupted.

If no further Failure can be identified , Fuel Flow will resume when speed comes into permitted range.

Possible Origin:

Operating Error (e.g. Downhill run).

| Test | Measurement | Trouble shooting |
|------|--|--|
| | If no further Failure can be identified , no further action is necessary Threshold value: N > 3100 Rpm | - Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check Again with FENDIAS |

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Start of Delivery Deviation (Test 10)**Failure Code (Fendt):**

1.2.18

Failure location (MAN):

18

Failure display :

Message on Dashpanel

Failure path:

Start of Delivery system deviates

Consequences:

Full Power Fuel Flow reduced to 50-60%

Reduced max Speed to 1700 Rpm

Heavy Smoke Emission

System switches from Normal operation into Control mode with fixed Delivery Start with fixed characteristic.

Possible Origin:

Failures in the fuel system (leaks, clogged, air in the System)

Overflow Valve Failure, leaks or Air in the Fuel System

Fuelling Pump Failure

Contaminated Filter

Clogged fuel lines, squeezed Fuel lines

Empty fuel tank

Contaminated fuel system including Fuel Tank

Problem in Fuel Tank Venting (Vacuum)

Wiring disruption, Short Circuit

Connectors on Injection Pump / Cabin / Control Module

oxydation, loose , pushed back or damaged

Signal Speed sensor not OK

Wrong Signals from Needle motion Sensor

Pump is not correctly fitted (Check Adjustments)

Injection Pump Failure

Remark:

Even without Failure Code , Check always Function Paths , Needle Motion Sensor, Speed Sensor Engine (Flywheel) as well as Wire KW Speed, VP 44 to Control Module A012 .

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|------|--|--|
| | Check with Diagnostic program requested / actual value start of injection Failure Condition: +/- 3 degrees | - Record Failure and ambient Parameters with FENDIAS - Delete failure memory content with FENDIAS |
| | Deviation 2,5 second of duration Monitoring only with Speed > 1000 Rpm | - Check again with FENDIAS - check Wiring - Check Connectors - Check fuel system - Fill up fuel tank - Check pump |

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| Test | Measurement | Trouble shooting | |
| | | - replace injection pump | |
| Needle Motion Sensor | see test 11 | see test 11 | |
| Speed sensor | see test 3 | see test 3 | |

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Needle Motion Sensor r B026 (Test 11)**Failure Code (Fendt):****1.2.1A****Failure location (MAN):****1A****Failure display :**

Message on Dashpanel

Failure Path:

Needle Motion Sensor (B026)

- Signal Amplitude to low
- Insufficient pulses
- To many Impulses
- Internal Resistance not OK

Consequences:

System switches from Control Mode to Start of Injection Control.

If failure disappears, System will switch automatically back to Control Mode.

Possible Origin:

Wiring Disruption, Short Circuit, Needle Motion sensor Failure

Failures in pulses from Primary speed Sensor (XXXX) (even without Failure Code)

Disturbance Pulses between (XXXX) Control Module and Needle Motion Sensor (e.g. by switching a Relay)

Disturbance pulses on Needle motion Sensor due to Mecanical Failures (e. g. Valve control, Pistons)

Stuck Injector Needle

Leaks or Air within System

Fuel Lifting Pump failure

Contaminated Fuel Filter

Clogged fuel lines

Empty fuel Tank

Injection Pump Failure

Test Conditions:

Adaptor box with adapting connectors connected

Use wiring diagrams wich are corresponding to the tractor

Fendt Component identification:

B026 (Needle Motion Sensor)

Fendt Connector Identification:

X173 (Needle Motion Sensor), 1: Signal, 2: Earth

| Test | Measurement | Trouble shooting |
|---------------------|---|---|
| Internal resistance | Check Resistance with adaptor box with adaptor Connectors between Pin A29 and Pin A15 on Control Module A021, Connector X047 Requested value: 65 - 160 Ohm Failure Conditions: No indications | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check wiring - Check Connectors - Replace Needle Motion Sensor |

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| Test | Measurement | Trouble shooting |
|--------|--|---|
| Signal | Check Voltage by Oscillograph, with adaptor box and adaptor Connectors between Pin A29 and Pin A15 on Control Module A021 Connector X047 Requested Value : (Amplitude) (Bosch Service) Frequency : Half Engine Speed | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check Wiring |

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Plausibility Engine Stop via Solenoid valve (MAB-Signal) (Test 12)**Failure Code (Fendt):****1.2.9B****Failure location (MAN):****9B****Failure display :**

Message on Dashpanel

Failure path:

Status "Engine Stop via Solenoid valve"

Consequence:

Full Power Fuel Flow reduced by 25-40%

Reduced max. engine speed to 1900 Rpm

Funktion:

Check whether MAB-Status in Pump Control Module and EDC Control module are identical

Possible Origin:

Wiring disruption between Pump Control Module and EDC Control Module

Signal failure "Solenoid Valve Engine Stop" on EDC Control Module.

Injection Pump (Control Module) failure

Remark1:

Before replacing the Injection Pump or Pump Control Module , delete Failure Code memory and analyse the failures.

Perform first all tests corresponding to failure Codes which do not make Injection Pump or Pump Control Module replacement necessary.

Remark 2:

By Failures in Delay Time, check equally Signal of Bewel Pinion Speed Sensor (B015)

Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs.

The various Solution paths can be identified as Failures , since Engine speed does not decrease sufficiently fast (while tractor is moving).

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------------|--|---|
| EDC Control Module | Check connection Pin A20 on Control module A021, Connector X047 with Pin 5 , A020 Connector X046, VP 44, Wire WM1709 | - Record Failure and ambient Parameters with FENDIAS Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If Failure persists, replace EDC Control Module |
| Injection Pump | Connection Pin A20 on EDC Control Module A021, Connector X047 Check VP 44 with Pin 5, A020, Connector X046, VP 44 Failure Conditions: none indicated | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check Wires - Check connectors - if Failure persists, replace Injection Pump |

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CAN - System (Test 13)**Failure Code (Fendt):****1.2.1F****Failure location (MAN):****1F****Failure display :**

Message on Dashpanel

Failure path:

EDC Control module

Consequences:

Interrupted Data Transmission between EDC System and other electronic Systems

Possible Origin:

Interface failure

EOL- Programming not OK

EDC Control Module Failure

Test Conditions:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------------|---|--|
| EDC Control Module | <p>Check Resistance with adaptor box and adaptor Connectors between Pin B11 and Pin B12, on EDC Control Module, A021, Connector X048</p> <p>Requested Value : 160 Ohm, all CAN -Correspondants being connected.</p> <p>Failure Condition: No message received after 5 seconds</p> | <p>- Record Failure and ambient Parameters with FENDIAS</p> <p>With FENDIAS, Delete Content of Failure Code Memory</p> <p>- Check again with FENDIAS</p> <p>- If approx.. 0 Ohm, short circuit from CAN-H to CAN-L</p> <p>- In case of High resistance, check connection to Fuse Board (XXXX).</p> <p>- Check Connection to Transmission Control Module.</p> <p>- Replace Control Module</p> |

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"Timeout" CAN Connection to Transmission - BUS (Test 14)**Failure Code (Fendt):**

1.2.21

Failure location (MAN):

21

Failure display :

Message on Dashpanel

Failure path:

EST Control Module not connected or CAN - Connection Failure to Transmission Bus

Consequences:

No more fuel flow limitation

Possible Origin:

Disrupted wire, Short Circuit

Test Conditions:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|------------------|---|--|
| EDC Control Unit | Check resistance with Adaptor Box an adaptor connectors between Pin B11 and Pin B12 on EDC Control Module A021, Connector X048 . Requested Value: 160 Ohm Failure Conditions: Timeout - Period: 5 seconds | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - see Test 13 |

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"Timeout" CAN - Message EST Control Module to EDC Control Module (Test 15)**Failure Code (Fendt):****1.2.23****Failure location (MAN):****23****Failure display :**

Message on Dashpanel

Failure path:

CAN-Signal from Fendt-EST to EDC

Consequences:

After 5sec system will switch to Pedal Position Sensor EDC . Operation only via Pedal Accelerator, no more Hand throttle, no Memory keys function, no Terminal Settings).

| Test | Measurement | Trouble shooting |
|---------------------------|--|--|
| EDC Control Module (A021) | Check resistance with Adaptor Box an adaptor connectors between Pin B11 and Pin B12 on EDC Control Module A021, Connector X048 Requested Value: 160 Ohm Test Conditions: Timeout- period : 5 seconds Or to many messages received | - Record Failure and ambient Parameters with FENDIAS - Delete Failure code memory within FENDIAS - Check again with FENDIAS - see Test 13 |

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Relay UB30 EDC (K020) (Test 16)**Failure Code (Fendt):**

1.2.25

Failure location (MAN):

25

Failure display :

Message on Dashpanel

Failure path:

Main relay

Contact is sticking (does not open)

Consequences:

Battery may run empty

Function:

Minus is supplied to solenoid by EDC Control module, output Pin B27. Main Relay Switching off occurs with certain delay after switching "OFF" the ignition (Delay Time).

Delay time allows internal functions and tests as well as the memorizing of eventual failure Codes.

Possible Origin:

Short Circuit with earth, Main Relay failure

Test Conditions:

Adaptor box with adapting connectors connected

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|-------------------|--|--|
| Main Realy (XXXX) | <p>Check Voltage with adaptor box with adaptor Connectors between Pin B3/4 and Pin B1/2 B12 on Control module A021, Connector X048</p> <p>Requested Values: U Bat by Ignition "ON"</p> <p>0 V by Ignition "OFF"</p> <p>Failure Conditions: After interruption of supply, Check opening of Relay Max. Time: 5seconds.</p> | <p>- Record Failure and ambient Parameters with FENDIAS</p> <p>- Delete Failure Code Memory with FENDIAS</p> <p>- Check again with FENDIAS</p> <p>- Check Wiring</p> <p>- Check Connectors</p> <p>- if Wiring is OK , Replace main Relay</p> |

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Check Relay Time Delay: Engine Stopf via Gate-Array (Control Module) within EDC Control Module A021 (Test 17)

Failure Code (Fendt):

1.2.A6

Failure location (MAN):

A6

Failure display :

Message on Dashpanel

Failure path:

EDC Control Module , Driving Speed Signal, Injection Pump

Consequences:

Full Power Fuel Flow reduced by 25-40%

Reduce max Speed to 1900 Rpm

Engine Stop is not possible via Monitoring Module

Function:

Mikroprocessor runs an Autotest. For Rely Delay Time, failures are simulated on purpose . If the expected Speed Loss does not occur, a Failure Code will be emitted.

Possible origin:

EDC Control Module Failure, Bewel pinion Sensor (XXXX) Signal not plausible, Injection Pump Failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Remark 2:

Bewel pinion Speed Sensor (XXXX) Signal need to be checked in Case of Relay delay Time Failures.

Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Solution Paths ???? in Delay time will then be considered as Failed, since speed does not decrease fast enough (vehicle is still moving).

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|------------------|--|--|
| EDC Control Unit | Failure Conditions: If Speed does not drop within 10 seconds below 300 Rpm, Failure Code will be emitted. | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with Diagnostic program. - Delete Failure Code Memory with EDC Diagnostic Program - Check again with diagnostic program - If Failure persists, Replace EDC Control Module |
| Injection Pump | | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If Failure persists, Replace Injection Pump |

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Relay time Delay: Engine Stop via Relay "Soplenoid valve " K021 (Test 18)**Failure Code (Fendt):****1.2.A2****Failure location (MAN):****A2****Failure display :**

Message on Dashpanel

Failure path:

EDC Control Module , Driving Speed , Injection Pump, Relay

Consequences:

Full Power Fuel Flow reduced by 25-40%

Reduced max. Speed down to 1900 Rpm

Engine Stop via Pump Relay is not possible

Function:

Pump Relay will be disconnected , Engine will stop.

Possible Origin:

EDC Control Module Failure, Bewel Pinion Speed Sensor not plausible, Injection Pump Failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Remark 2:

In Case of Delay Time failures, Bewel Pinion Sensor must be checked.

Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Solution Paths in Delay time will then be considered as Failed, since speed does not decrease fast enough (vehicle is still moving).

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------|--|---|
| Pumpenrelais | Fehlerbedingungen: Sinkt die Drehzahl innerhalb von 10 sec nicht unter 300 1/min, erfolgt die Defekteinstufung. | - Record Failure and ambient Parameters with FENDIAS - Start Engine several Times (7 times), innorder to delete Failures. - Engine must be at a Standstill for at least 5seconds between 2 Start trials - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If failure persists , Replace Pump Relay |

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Atmospheric Pressure Sensor (EDC Control Module A021) (Test 19)**Failure Code (Fendt):****1.2.A8****Failure location (MAN):****A8****Failure Display:**

Message on Dashpanel

Failure Path:

EDC Control Module

Failure Atmospheric Pressure Sensor within EDC Control Module

Consequences:

No noticeable consequences

In specific cases, Failure Code "Intake Pressure Sensor" may appear simultaneously

Possible Origin:

EDC Control Module Failure

| Test | Measurement | Trouble shooting |
|--------------------|--|--|
| EDC Control Module | <p>Check Atmospheric pressure using MAN-Diagnostic Program. If this is the only failure, no test will be possible, since the sensor is located within the EDC Control Module.</p> <p>If the Intake Pressure Sensor is simultaneously identified as failed , then check it according to Test 4 .</p> <p>Failure conditions: Umin=2,35V Umax=4,25V Default value: 1000hPa</p> | <p>- Record Failure and ambient Parameters with FENDIAS</p> <p>- Delete Failure Code Memory with FENDIAS</p> <p>- Check again with FENDIAS</p> <p>Replace EDC Control Module</p> |

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Solenoid valve in Pump Control Module A020 (Test 20)**Failure Code (Fendt):****1.2.A9****Failure location (MAN):****A9****Failure display:**

Message on Dashpanel

Failure path:

EDC Control Module , Injection Pump

Failure path:

Injection Pump

Consequences:

Reduced maximal speed 2000 min-1

Full Power flow reduced by 25-40%

Engine stops

Engine does not start

Function:

Final Stage Connection ????? or short circuit can be identified by testing Voltage on Pump Control Module

Possible origin:

Unsteady contact on engine Flywheel speed sensor

Injection pump failure

Remark:

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|----------------|---------------------------------|---|
| Injection Pump | Failure Conditions: None | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check wiring to speed Sensor (XXXX) on Flywheel - If failure persists, Replace Injection Pump |

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"Timeout" CAN-Signal on Exhaust brake (Test 21)**Failure Code (Fendt):****1.2.2A****Failure location (MAN):****2A****Failure display:**

Message on Dashpanel

Failure path:

EDC Control Unit , Bewel Pinion speed Sensor (XXXX) , Injection pump

Failure path:

CAN-Signal from EST Control Unit, Exhaust brake (EDC Control Module)

Consequences:

ABS/ASR does not control Exhaust brake

Possible Origin:

Discontinued wire, Short circuit, EDC Control Unit failure

Test Conditions:

Adaptor box with adapting coonectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------------|---|--|
| EDC Control Module | see Test 13 Failure Conditions: CAN Connection to EST Control Module discontinued for more than 5 seconds | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - see Test 13 |

| | | |
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| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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"Timeout" CAN-Signal EST Control Module A002 to exhaust brake A021 (Test 22)

Failure Code (Fendt):

1.2.2B

Failure location (MAN):

2B

Failure Display:

Message on Dashpanel

Failure path:

CAN-Signal from EST Control Module to Exhaust Brake (EDC Control Module)

Consequences:

No control of Exhaust brake

Possible Origin:

Discontinued wire, Short circuit, EDC Control Unit failure

Test Conditions:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------------|---|--|
| EDC Control Module | see Test 13 Failure Conditions: CAN Connection to EST Control Module discontinued for more than 5 seconds | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - see Test 13 |

| | | |
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| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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"Timeout" CAN-Signal EST Control Module A002 to Exhaust brake A021 (Test 23)

Failure Code (Fendt):

1.2.2C

Failure location (MAN):

2C

Failure display :

Message on Dashpanel

Failure path:

CAN-Signal EST Control module to Exhaust brake

Consequences:

No Control of Exhaust brake

Possible origin:

Discontinued wire, Short circuit, EDC Control Unit failure

test Conditions:

Adaptor box with Adaptor Connectors connected

Ignition "OFF"

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|------------------|---|--|
| EDC Control Unit | see Test 13 Failure Conditions: CAN Connection to EST Control Module discontinued for more than 5 seconds | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with MAN FENDIAS - see test 13 |

| | | |
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| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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"Timeout" CAN-Signal EST Control Module - EDC Control Module (Test 24)**Failure Code (Fendt):****1.2.2D****Failure location (MAN):****2D****Failure display:**

Message on Dashpanel

Failure path:

CAN-Signal from EST Control Module to EDC Control Module

Consequences:

After 5 seconds, system switches to EDC Pedal position Sensor. Then only Pedal operation possible , Hand Throttle, Memory keys and terminal settings will be deactivated.

| Test | Measurement | Trouble shooting |
|------------------|--|--|
| EDC Control Unit | Check Resistance with adaptor box with adaptor Connectors between Pin B11 and Pin B12 on Control module A021, Connector X048 Requested Value: 160 Ohm Failure Conditions: CAN Connection to EST Control Module discontinued for more than 5 seconds | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - see Test 13 |

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Relay Delay Time Control (Engine Stop) (Test 25)**Failure Code (Fendt):**

1.2.38

Failure location (MAN):

38

Failure display:

Message on Dashpanel

Failure path:

Control Module Output failure

Relay delay Time not operating

Consequences:

Max. speed reduced down to 1900 Rpm

Full Power Fuel Flow reduced by 25-40%

Function:

After each Engine Stop Relay Time delay will occur.

Possible Origin:

EDC Control Module Voltage supply Failure , Delay Time not ensured.

EOL not accomplished

Test conditions:

Adaptor box with adapting connectors connected

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|------------------------------------|---|---|
| Voltage supply EDC Control Unit | Check Voltage with adaptor box with adaptor Connectors between Pin B3/B4 and Pin B1/B2 on Control Module A021, Connector X048 Requested values: U Bat , Ignition "OFF". Time delay will occur Battery - Main Switch will be held by EDC-Control Unit Failure Conditions: Relay must open within 5second | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check wiring - Check Connectors - Check Relay Time delay - Check Main Relay |

| | | |
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Final Stage Solenoid Valve A020 (Autotest Pump Control Module) (Test 26)**Failure Code (Fendt):****1.2.C1****Failure location (MAN):****C1****Failure display:**

Message on Dashpanel

Failure path:

Pump Control Module (Injection Pump)

Consequences:

non known

Function:

Autotest of oltage, if Solenoid Valve is not supplied

Possible Origin:

Pump Control Module (Injection Pump) Failure

Remark:

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|----------------|-------------|--|
| Injection Pump | | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If failure persists, Replace Injection Pump |

| | | |
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Pump Control Module (Fuel temperature.) A020 (Test 27)**Failure Code (Fendt):****1.2.42****Failure location (MAN):****42****Failure display:**

Message on Dashpanel

Failure path:

Injection Pump (Control Module) Fuel Temperature to high or Temperature sensor failure.

Consequences:

If values are not plausible, system will switch to substitution Value (75°C) . Fuel Flow will be reduced according to Speed.

Possible Origin:

Fuel Temperature to high , Injection Pump Failure

Remark:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.
In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Remark 2:

Fuel Temperature Sensor is an integrated part of the injection Pump and cannot be replaced separately.

| Test | Measurement | Trouble shooting |
|----------------|--|--|
| Injection Pump | Failure thresholds : $t > 130^{\circ}\text{C}$ or $< -45^{\circ}\text{C}$ will be substituted by 20°C . Check with FENDIAS wether Values are out of thresholds but realistic (e.g. Temperatur by cold Engine). | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS, let fuel cool down - If Failure Persists, Replace Injection Pump |

| | | |
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| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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CAN to Pump Control module A020 (Test 28)**Failure Code (Fendt):****1.2.C3****Failure location (MAN):****C3****Failure Display:**

Message on Dashpanel

Failure path:

CAN-Signal of EDC Control Module (Busoff) during Engine Start.

Consequences:

Engine runs idle (approx. 730 Rpm), Accelerator pedal, Hand throttle and memory keys are ineffective.

Possible Origin:

Wiring Discontinuity, Short Circuit, Control Module Failure, Injection Pump failure

Remark:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Test Conditions:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------------|---|--|
| EDC Control Module | Check Resistance with adaptor box with adaptor Connectors between Pin A27 and A24 on Control Module A021, Connector X047 Connector Shut: Sollwert: 60 Ohm Connector open:Sollwert: 120 Ohm Failure Conditions : Time Since last Busoff, in wich no more Busoff must appear: 10 sec | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS Check - CAN-Bus Connection to EDC Control Module to VP 44 - approx. 0 Ohm Short Circuit from von CAN-H to CAN-L - approx. 120 Ohm: Connection to external resistance (VP44) is discontinued - If failure persists , Replace Control Module |
| Injection Pump | Check Resistance with adaptor box with adaptor Connectors between Pin 1 and Pin 2 on Control Module A020, Connector X046 VP 44 Connector connected: requested Value: 60 W ??? Connector disconnected: requested Value: 120 W | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with CAN - Bus connection to EDC Control Module to VP 44 - approx. 0 Ohm Short Circuit from von CAN-H to CAN-L - approx. 120 Ohm: Connection to Control Module is discontinued - If failure persists, Replace injection Pump |

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CAN Interface To Pump Control Modulet A020 (Test 29)**Failure Code (Fendt):****1.2.C4****Failure location (MAN):****C4****Failure display :**

Message on Dashpanel

Failure path:

CAN-Signal Pump control Module

Consequences:

Engine runs idle (approx. 730 Rpm), no Operation via accelerator Pedal, Hand Throttle, Memory Keys, or Terminal possible eventually Speed reduction down to 2100 Rpm in connection with power reduction

Possible Origin:

Injection Pump Failure

Remark:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Test Conditions:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|----------------|-------------|--|
| Injection Pump | | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If failure persists, Replace injection Pump |

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Relay Delay Time: Engine Stop with MAB-Signal (Test 30)**Failure Code (Fendt):****1.2.C5****Failure location (MAN):****C5****Failure path:**

Status Engine Stop Via Solenoid Valve during Delay Time

Consequences:

Max. Speed Reduced to 1900 Rpm

Full Power Fuel low reduced by 25-40%,
since MAB- Engine stop is not possible**Possible Origin:**

Bewel Pinion Speed Sensor Signal Failure (Display on Dashpanel "99,99 km/h")

PTO Drives Engine due to Implement inertia.

Injection Pump Failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Remark 2:

In Case of Delay Time failures, Bewel Pinion Sensor must be checked.

Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Solution Paths in Delay time will then be considered as Failed, since speed does not decrease fast enough (vehicle is still moving).

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--|--|--|
| Signal Bewel Pinion Speed Sensor (XXX) | Speed must be 0 kPh to be checked by FENDIAS when Engine is Stopped | - Check speed Bevel pinion / Collector shaft |
| Injection pump | Failure Conditions: Failure Code will be emitted if Speed does not drop below 300 Rpm within 10 seconds | - Record Failure and ambient Parameters with Diagnostic program. - Start Engine 7 times in order to delete Failure Codes. - Engine needs to be at standstill for at least 5seconds between 2 Start trials - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS Delete Failure memory - read out failure Memory - If failure persists, Replace injection Pump |

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Vehicle CAN (Test 31)**Failure Code (Fendt):**

1.2.46

Failure location (MAN):

46

Failure display :

Message on Dashpanel

Failure path:

Fahrzeug-CAN Busoff

Fehlerauswirkung:

System Switches after 5 seconds to EDC Pedal Position sensor. Only Pedal acceleration will be possible, no more Hand Throttle function, Memory Keys or Terminal settings available.

Possible Origin:

Wiring Discontinuity, Short Circuit, Control module Failure

Hinweis 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.
In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Test Conditions:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------------|--|--|
| EDC Control Module | Check Resistance with adaptor box with adaptor Connectors between Pin B11 and B12 on Control Module A021, Connector X048 Sollwert: 160 Ohm Failure Conditions: No more Busoff must appear within 10 seconds | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - 0 Ohm Short circuit from CAN-H to CAN-L - In case of High resistance , Check Connection to Fuse board (XXXX) - Check Connection to Transmission control module - Replace EDC Control Module - Consult Document "Checking Vehicle CAN" |

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CAN-BUS Message: ESTControl Module A002 on EDC Control Module A021 (Test 32)

Failure Code (Fendt):

1.2.DE

Failure location (MAN):

DE

Failure display :

Message on Dashpanel

Failure path:

No Message Driving Speed

Consequences:

System Switches after 5 seconds to EDC Pedal Position sensor. Only Pedal acceleration will be possible, no more Hand Throttle function, Memory Keys or Terminal settings available.

Possible Origin:

Wiring discontinuity , Short Circuit, EDC Control Module Failure

Remark:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.
In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Test Conditions:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------------|---|---|
| EDC Control Module | <p>Check Resistance with adaptor box with adaptor Connectors between Pin B11 and B12 on Control Module A021, Connector X048 (</p> <p>Requested Value: 160 Ohm</p> <p>Failure Conditions: After 5 seconds Timeout or to many messages, Failure Code will appear</p> | <p>- Record Failure and ambient Parameters with FENDIAS</p> <p>- Delete Failure Code Memory with FENDIAS</p> <p>- Check again with FENDIAS</p> <p>- 0 Ohm Short circuit from CAN-H to CAN-L</p> <p>- In case of High resistance , Check Connection to Fuse board (XXXX)</p> <p>- Check Connection to Transmission control module</p> <p>- Replace EDC Control Module</p> <p>- Consult Document "Checking Vehicle CAN"</p> |

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Pump Speed Sensor (IWZ-Signal) A020 (Test 33)**Failure Code (Fendt):****1.2.C7****Failure location (MAN):****C7****Failure display :**

Message on Dashpanel

Failure path:

Injection Pump

Consequences :

Engine Stops

Possible Origin:

Failure within Fuel lifting System (leaks, clogged, Air in System)

Injection Pump failure (Dynamically : not plausible, statically : Increments / Segment not complete)

Remark:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|----------------|------------------------------------|--|
| Injection Pump | Failure Conditions: no indications | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check fuel supply system - Purge air from fuel lines (Filter, than Injection lines on at least 3 injectors) - After successfull engine start, keep engine running idle during at least 30 seconds - Fill up fuel tank - Check pump - if failure persists, Replace injection pump |

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Checking Residual Flow 0 Setting (Test 34)**Failure Code (Fendt):****1.2.C8****Failure location (MAN):****C8****Failure display :**

Message on Dashpanel

Failure Path:

CAN-Signal (Fuel Flow, value transmitted via CAN-Bus to Pump)

LDF

NBF

Consequences:

Engine stops, since calculation of Fuel Flow is not accurate

Possible Origin:

Wiring discontinuity, Short Circuit, Control Module failure (XXXX), Needle Motion sensor (XXXX)

Failure, Intake pressure Sensor (XXXX) failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|-------------------------------|--|---|
| Injection Pump | Failure conditions: If in spite of Setting "Fuel Flow =0", Speed is higher than 700 Rpm, Intake pressure > approx. 300 mbar and Needle motion Sensor Signal are identified, failure Code will be emitted. | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS -- If failure persists, Replace injection Pump |
| Needle Motion Sensor (XXXX) | | see equally Test 4 |
| Intake pressure sensor (XXXX) | | see equally Test 4 |

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Solenoid Valve Final Stage (Pump Control Module Autodiagnostic) A020 (Test 35)

Failure Code (Fendt):

1.2.C9

Failure location (MAN):

C9

Failure display :

Message on Dashpanel

Failure path:

Hardware Failure within Final Stage Solenoid Valve (Pump Control Module)

Consequences:

none known

Function:

Check final stage in PSG - Autodiagnostic

Possible Origin:

Pump Control Module Failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures which are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|----------------|--|--|
| Injection Pump | Failure Conditions: no Indications available | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If failure persists, Replace Injection Pump |

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Start of Delivery Controller (Pump Control module) A020 (Test 36)**Failure Code (Fendt):****1.2.CA****Failure location (MAN):****CA****Failure display :**

Message on Dashpanel

Failure path:

Start of Delivery Controller out of range

Consequences:

Maximal Speed reduced to 1700 Rpm

Reduzierte Full Power Fuel Flow by 50-60%

Possible Origin:

Wire Discontinuity, Short Circuit

Fuel Low Pressure system Failure

inadequate Overflow Valve or Failure

Leaks or Air within Fuel System

Fuel Lifting Pump Failure

Contaminate fuel Filter

Clogged fuel lines

empty fuel tank

Injection pump failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|----------------|---|--|
| Injection pump | Failure Conditions: In Case of deviations Rquested / actual value of more than +/- 3 Grad for more than 8seconds aund Speed >1200 Rpm | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS Check Fuel Supply system - Fill up fuel tank - Check pump adjustment (Wich pump) - If failure persists, Replace Injection pump |

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"Timeout" CAN - Message Pump Control Module A020 to EDC Control Module A021 (Test 37)

Failure Code (Fendt):

1.2.B4

Failure location (MAN):

B4

Failure display :

Message on Dashpanel

Failure path:

CAN-Signal from Pump Control Module to EDC Control Module (Timeout)

Consequences:

Engine runs Idle (approx. 730 Rpm). After 5 seconds system switches to EDC Pedal Position Sensor, Only Pedal acceleration will be possible. Hand Throttle, memory keys and terminalö settings are no more available. Max. Speed Reduction to 2100 Rpm as well as Power Reduction may occur.

Possible Origin:

Wiring discontinuity , Short Circuit, Control Module failure, Injection pump Failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures which are not requesting a replacement of the Control Module or of the pump.

Test Conditions:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------------|--|---|
| EDC Control Module | <p>Check Resistance with adaptor box with adaptor Connectors between Pin A27 and A24 on Control Module A021, Connector X047</p> <p>Connector connected: Requested value: 60 Ohm</p> <p>Connector disconnected: Requested value: 120 Ohm</p> <p>Failure conditions: No Indications available</p> | <p>- Record Failure and ambient Parameters with FENDIAS</p> <p>- Delete Failure Code Memory with FENDIAS</p> <p>- Check again with FENDIAS</p> <p>- approx. 0 Ohm Short Circuit from CAN-H to CAN-L</p> <p>- approx. 120 Ohm; Connection to End Resistor (VP44) is discontinued</p> <p>- if Failure persists, Replace Control Module (XXXX)</p> |
| Injection pump | <p>Check Resistance with adaptor box with adaptor Connectors between Pin 1 and Pin 2 on Control Module A020, Connector X046, VP 4</p> <p>Failure Conditions:4</p> <p>Connector closed circuit: Requested value: 60 Ohm</p> <p>Connector open circuit. Requested value: 120 Ohm</p> | <p>- Document failure (including atmospheric parameters) using FENDIAS</p> <p>- Delete EDC failure codes using FENDIAS</p> <p>- Test again using FENDIAS</p> <p>- If failure persists, replace injection pump</p> |

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Relay Delay Time check: Engine Stop via Voltage monitoring (Test 38)**Failure Code (Fendt):**

1.2.99

Failure location (MAN):

99

Failure display :

Message on Dashpanel

Failure path:

Status Engine stop via Voltage monitoring

Consequences:

Max Speed reduced to 1900 Rpm

Torque reduced down to 25-40%,

Function:

A Failure will be simulated intentionally During Time delay (Threshold Values). If the expected Speed Loss does not occur, then Failure Code will be emitted

Possible Origin:

Wiring discontinuity between EDC Control Module and Injection Pump, EDC Control Module Failure, Injection Pump Failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures which are not requesting a replacement of the Control Module or of the pump.

Remark 2:

In Case of Delay Time failures, Bewel Pinion Sensor must be checked.

Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Solution Paths in Delay time will then be considered as Failed, since speed does not decrease fast enough (vehicle is still moving).

| Test | Measurement | Trouble shooting |
|--------------------|---|--|
| EDC Control Module | Failure Conditions: If speed does not drop below 300 Rpm within 10 seconds, Failure Code will be emitted | <ul style="list-style-type: none"> - Document failure (including atmospheric parameters) using FENDIAS - Start Engine several times (7 times), in order to delete Failure Codes. - Keep Engine at least 5 seconds at Standstill between 2 start trials - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check MAB Signal (Connection Control Module to Pump) if additionally Failure Codes 1.2.9B or 1.2.A6 are occurring - If Failure persists, Replace EDC Control Module |
| Injection Pump | | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Start Engine several times (7 times), in order to delete Failure Codes. |

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| Test | Measurement | Trouble shooting |
|------|-------------|---|
| | | - Keep Engine at least 5 seconds at Standstill between 2 start trials - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check again with FENDIAS - If Failure persists, Replace Injection Pump |

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"Timeout" CAN Message from Engine Control Module A021 to Pump Control Module A020

(Test 39)

Failure Code (Fendt):

1.2.B1

Failure location (MAN):

B1

Failure display:

Message on Dashpanel

Failure path:

CAN-Signal from EDC Control Module to Pump Control Module (Timeout)

Consequence:

Maximal Speed reduced to 2000 Rpm

Torque reduced by 25-40%

Possible Origin:

Wiring discontinuity, Short Circuit, Control Module failure, Injection pump failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Remark 2:

In Case of CAN Failure, engine speed will be set at 730 Rpm

Test Condition+-s:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------------------|--|--|
| EDC Control Module | 1. Check Voltage with adaptor box with adaptor Connectors between Pin A27 and A24 Requested Value: 60 Ohm 2. Check continuity CAN-Bus between VP44 and Contol Module Wires WM1707 and WM1706 Failure Conditions: No Indications available | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - approx. 0 Ohm Short Circuit from CAN-H to CAN-L - Approx. 120 Ohm: Connection to final Resistor is discontinued - If Failure persists, Replace Control module |
| Injection pump | | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If Failure persists, Replace Injection Pump |

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Pump Control module A020 - System Voltage (Test 40)**Failure Code (Fendt):****1.2.B3****Failure location (MAN):****B3****Failure display:**

Message on Dashpanel

Failure path:

Voltage Supply Pump Control Module, Safety relay

Consequences:

Engine stops

Engine does not start

Possible Origin:

Wire disruption, Short Circuit

Test Conditions:

see further

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|---|--|--|
| Voltage Supply | Voltage Test on Harness connector to (XXX) PSG between Pin 7 (+) and Pin 5 (-) Requested value: U Bat Failure Thresholds U < 7V or U > 32V Failure Conditions: | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check Wires - Check Connectors - Check Safety relay |
| Solenoid resistances of safety relay K324 (MAR) | Ignition "ON" Check Voltage with adaptor box with adaptor Connectors between Pin B18 and Pin B2 Requested Value : U Bat. Ignition "OFF", disconnect EDC Control Module. Check Resistance with Adaptor Box and Adaptor Connectors between Pin B18 and Pin B1 Requested Value: 58 - 72 Ohm | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check wires - Check connectors - Replace safety Relay |

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CAN - Interface Pump Control Module A020 (Test 41)**Failure Code (Fendt):****1.2.CB****Failure location (MAN):****CB****Failure display:**

Message on Dashpanel

Failure path:

CAN-Signal to e Pump Control Module A020 (Timeout)

Consequences:

Engine runs Idle. After 5seconds Pedal Position sensor Will be activated. Memory Keys , Hand throttle and terminal settings will be inactive.

Possible Origin:

Wiring Discontinuity, Short Circuit, Control module Failure, Injectionpump Failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.
In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Test conditions:

Adaptor Box with Adaptor Connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|---------------------------|--|---|
| EDC Control Module (A021) | Check resistance with adaptor box with adaptor Connectors between Pin A27 and A24 Requested Value: 60 Ohm Failure Conditions: No Indications available | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - approx. 0 Ohm Short Circuit from CAN-H to CAN-L - approx. 120 Ohm contact to End resistor is discontinued - if Failure persists, Replace Control Module (XXXX) |
| Injection Pump | | - Document failure (including atmospheric parameters) using FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If Failure persists, Replace Injection Pump |

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Speed Sensor Signal Processing, Pump Control Module A020 (Test 42)**Failure Code (Fendt):****1.2.B7****Failure location (MAN):****B7****Failure display:**

Message on Dashpanel

Failure path:

Speed Signal to Pum Control Module (XXXX) , Speed Sensor (XXXX) on Flywheel

onsequences:

Max Speed reduced to 1800 Rpm

Torque reduced down to 25-40%

Function:

Monitoring of negative ramp within Monitoring Window

Possible Origin:

Speed Sensor (XXXX) failure on Fly wheel or distance to flywheel to important, Injection pump not correctly mounted (Start of delivery to Top Dead point not OK), Control module failure , Injection Pump Failure.

Remark 1:

In Case of intermittent Contact , FC 4.2.18, "Start of Injection Control Deviation " may occur simultaneously

Remark 2:

Occurs simultaneously with FC 4.2.84

Fendt Component Identification:

B025 (Speed Sensor)

Fendt Connector Identification:

X172 (Speed Sensor), 1: Earth, 2: Signal

| Test | Measurement | Trouble shooting |
|--|--|---|
| Speed sensor B025 | See Test 3 Distance to Flywheel : 0,5mm - 1,5 mm | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - siehe Test 3 - Check Distance between Sensor and Flywheel |
| Connection from Control module A021 to Pump A020 | Check Signal with adaptor box with adaptor Connectors at Start Speed between Pin A35 Control module A021, Connector X047; and Pin 8 Injection Pump A020, Connector X046 Requested Values: If system is OK , Voltage will be 0,7V lower than U Bat. UB is available during Failure. | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check Connectors |

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| Test | Measurement | Trouble shooting |
|----------------|---------------------|--|
| | Failure conditions: | <ul style="list-style-type: none"> - Check Wire Continuity from Pump Control Module (???) VP44 Signal KW (???) Speed , Wire WM1710 - If no failure can be identified, Replace control unit |
| Injection Pump | | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If Failure persists, Replace injection Pump |

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Auto diagnostic Pump Control Modulet A020 (EEPROM-Checksum) (Test 43)**Failure Code (Fendt):****1.2.B5****Failure location (MAN):****B5****Failure display :**

Message on Dashpanel

Failure path:

Checksum Test E2PROM

Consequences:

Reduced Max. Engine speed to 1700 Rpm.

Engine Torque reduced by 50-60%,

Injection Start Controller may run on "Max. Early".

Function:

Checksummenprüfung im Selbsttest

Possible Origin:

Pump Control Module Failure , Injection Pump Failure

Hinweis 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|----------------|--------------------------|--|
| Injection Pump | Failure Conditions: None | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - if failure Persists, Replace Injection Pump |

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Auto diagnostic Pump Control Module A020 (EEPROM-Status) (Test 44)**Failure Code (Fendt):****1.2.B6****Failure location (MAN):****B6****Failure display:**

Message on Dashpanel

Failure path:

Status E2PROM

Consequences:

Reduced Max. Engine Speed to 1700 Rpm

Engine Torque reduced by 50-60%,

Injection Start Controller may run on "Max. Early".

Function:

Hardware Auto diagnostic

Possible Origin:

Pump Control Module Failure , Injection Pump Failure

Hinweis 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|----------------|--------------------------|--|
| Injection Pump | Failure Conditions: None | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If Failure persists, replace Injection Pump |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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Auto Diagnostic Pump Control Module A020 (A/D C - Status) (Test 45)**Failure Code (Fendt):****1.2.B2****Failure location (MAN):****B2****Failure display:**

Failure display in daspanel

Failure path:

Status Analog-Digital-Converter

Consequences:

Reduced max. Engine Speed to 2000 Rpm.

Engine Torque reduced by 25-40%

Function:

During Autodiagnostic of a channel of the A / D - Converter there will be no Flow correction, Voltage on Solenoid valve will not be monitored

Possible Origin:

Pump Control module Failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures which are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|----------------|--------------------------|--|
| Injection Pump | Failure Conditions: None | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - if Failure persists, Replace Injection Pump |

| | | |
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| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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Autodiagnostic Pump Control Module A020 (RAM) (Test 46)**Failure Code (Fendt):****1.2.B9****Failure location (MAN):****B9****Failure display:**

Message on Dashpanel

Failure path:

RAM within Pum Control Module

Consequences:

Engine Stops

Function:

RAM Autodiagnostic

Possible Origin:

Pum Control Module Failure

Hinweis 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.
In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|----------------|--|---|
| Einspritzpumpe | Failure Conditions: No Indications available | <ul style="list-style-type: none"> - Record Failure and ambient Parameters FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If failure persists, replace Injection Pump |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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Interchanged Poles of Speed Sensor B025 (Test 47)**Failure Code (Fendt):**

1.2.91

Failure location (MAN):

91

Failure display:

Message on Dashpanel

Failure path:

Speed Sensor on Flywheel (XXX)

Consequences:

Maximal Speed reduced to 1800 Rpm

Torque reduced by 25-40%

Possible Origin:

Cable on wrong Connector (XXXX) , Speed Sensor (XXX) failure

Use wiring diagrams which are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--------|--|--|
| Wiring | Connector X337, Pin e: Wiring Colour white / blue X337 Pin F: Colour blue EDC Control Unit, Pin A1: Wiring Colour white / blue, Pin A13: Colour blue Failure Conditions: Lower Speed Threshold: 500 Rpm. Up- per Speed Threshold: 1500 Rpm | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Connect Correctly cables - falls Fehler immer noch vorhanden, Drehzahlgeber erneuern |

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EDC Control Module, Monitoring Module (m-Controller) A021 (Test 48)**Failure Code (Fendt):**

1.2.96

Failure location (MAN):

96

Failure display:

Message on Dashpanel

Failure path:

m-Controller on EDC Control Unit

Consequences:

Engine stops

Possible Origin:

EDC Control Module failure

Remark 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.
In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

| Test | Measurement | Trouble shooting |
|--------------|--|--|
| Control Unit | Failure conditions: No Indications available | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If failure Persists, Replace EDC Control Unit |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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Pump Control Module - Initialisation A020 (Test 49)**Failure Code (Fendt):****1.2.CD****Failure location (MAN):****CD****Failure display:**

Message on Dashpanel

Failure path:

Exchange of messages between Pump Control Module and EDC Control Module

Consequences:

Max. Speed reduced to 2000 Rpm

Torque reduction by 25-40%

Function:

During Autodiagnostic, Messages between Pump Control Module and EDC Control Module are monitored. If Time Delay becomes too long then Failure Code emission.

Possible Origin:

Pumpensteuergerät (Einspritzpumpe) defekt oder nicht vorhanden

Remark 1:

Grundsätzlich sollte vor jedem Pumpen-bzw. Steuergerätaustausch der Fehlerspeicher gelöscht und der Fehler beobachtet werden.

In case of several Failure Codes, check first the Test procedures which are not requesting a replacement of the Control Module or of the pump.

Remark 2:

If CAN fails completely, Engine speed will be 730 Rpm

| Test | Measurement | Trouble shooting |
|----------------|---|---|
| Injection Pump | Check CAN Bus between EDC Control Module and Pump | - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS |
| | Failure Conditions: no indications | - Check again with FENDIAS - If Failure persists, Replace Injection Pump. |

| | | |
|----------------|---|----------|
| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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Failure during CAN - Message Transmissiont (Test 50)**Failure Code (Fendt):****1.2.E0****Failure location (MAN):****E0****Failure display:**

Message on Dashpanel

Failure path:

EDC Control Module (A021)

Consequences:

None

Possible Origin:

CAN from EDC Control UModule are not connected

Test condition:

Adaptor box with adapting connectors connected

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--|--|--|
| CAN-Bus EDC Control Module to EST Control Module | <p>Check Voltage with adaptor box with adaptor Connectors between Pin B3/B4 and Pin B1/B2 on Control Module A021, Connector X048 (</p> <p>Requested value : U Bat while Ignition is "OFF", As long Relay Time Delay occurs within EST Control Module. Battery main switch will be held from EDC Control Module (Hold Circuit)</p> <p>Failure Condition: Relay must come into Rest Position within 5 Seconds.</p> | <p>- Record Failure and ambient Parameters with FENDIAS</p> <p>- Delete Failure Code Memory with FENDIAS</p> <p>- Check again with diagnostic program</p> <p>- Check Wires</p> <p>- Check Connectors</p> |

| | | |
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| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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Relay Delay Time control could not be carried out (Test 51)

Failure Code (Fendt):

No display

Failure location (MAN):**E1****Failure display:**

None

Failure path:

Driving Speed , PTO

Consequences:

none

Function:

After each Engine Stop a Relay Time delay occurs. If this does not happen , this failure will automatically be memorized

Possible Origin:

Speed Signal Failure (Collector Shaft (XXX)) or PTO drives the engine.

Test condition:

Adaptor box with adapting connectors connected

Remark:

This Failure is only a Warning (Except in case of a Speed Signal failure). If will be stopped whilst tractor is still moving or if still running PTO is driving Engine , (no Free Wheeling), a Failure will be m,emorized. For this reason there is only a Failure memorized in EDC Control Module but not in the Daspanel Display

| Test | Measurement | Trouble shooting |
|----------------------------------|-------------|--|
| Speed Sensor Bewel Pinion (B014) | | <ul style="list-style-type: none"> - Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with diagnostic program |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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Exhaust brake (Test 52)**Failure Code (Fendt):**

none

Failure location (MAN):

None

Failure display:

none

Failure path:

Exhaust Brake , Exhaust Brake Control Pushbutton

Consequences:

No Exhaust brake Function

Function:

Control of Exhaust Brake occurs depending on Engine speed via Pin A18 (Output) of EDC Control Module.

Activation occurs by putting Power on Pin B?? (Input) of Side console A004 by pressing Pushbutton (XXXX) of Exhaust brake

Possible Origin:

Wiring discontinuity, Short Circuit, Exhaust brake failure

Test condition:

Adaptor box with adapting coconnectors connected

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|--|---|---|
| Voltage supply of Exhaust brake Pushbutton (XXX) | Ignition "ON" Check Voltage with adaptor box with adaptor Connectors between Pin B14 (+) and Pin B1/2 (-) Requested Values: Pusbutton (XXXX) Exhaust brake pressed: UBat Failure Conditions: | - Check Wires - Check Connectors - Connecting bridge on ZE (???), Spot 61 inserted? - Replace Pusbutton (XXXX) Exhaust brake |
| Solenoid Valve Exhaust Brake | Check Voltage with adaptor box with adaptor Connectors between Pin A18 (+) and Pin B1/2 (-) Start engine and run it at approx. 1100 Rpm. Requested Values: Pusbutton (XXX) Exhaust Brake pushed, : U Bat. Exhaust brake must be activated | - Check Wiring - Check connectors - replace Solenoid Valve Exhaust brake - If no failure can be identified, Replace Control Module |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
|----------------|--|----------|

Relay "Solenoid Valve Engine Stop" K021 (Safety relay) (Test 53)**Failure Code (Fendt):**

none

Failure location (MAN):

none

Failure display:

none

Failure path:

Safety Relay

Consequences:

Engine Stops

Engine does not start

Function:

Safety Relay fullfills an important Safety function as an independand and redundant Engine Stop System.

In Certain Emmergency Cases, the Safety relay will take over the Engine Stop if it becomes impossible via " 0 Fuel Flow".

Safety relay interrupts Plus from Voltage supply (Pin B18) to Pump Control Module

Possible Origin:

Wiring Discontinuity, Short circuit, Safety relay, Supply of EDC Control Unit Failure

Test Conditions:

Adaptor box with adapting connectors connected

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|-------------------------------------|--|--|
| Function Safety Relay | Start Engine and run it in "High Idle". (Abregeldrehzahl @PWG max) Interrupt Pin B18 Failure Conditions: Engine must Stop within 10 seconds | - Check Wires - Check Connectors - Replace Safety Relay |
| Voltage Supply | Ignition "ON" Check Voltage with adaptor box with adaptor Connectors between Pin B18 (+) and Pin B2 (-) Requested Value: UBat | - Check Wires - Check Connectors - Replace Safety relay. If no failure can be identified, replace (XXX) Control Module |
| Resistance of Safety Relay Solenoid | Ignition "OFF" Disconnect (XXX) Control Module Check Resistance with adaptor box with adaptor Connectors between Pin B18 and Pin B2 Requested Value: 58- 72 Ohm | - Check Wires - Check Connectors - Replace Safety Relay |

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| Fav 900 | Engine / Systems Trouble shooting program EDC | B |
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Eventual Failure Codes within EDC Control Module Memory but without consequences (Test 54)

Failure Code (Fendt):

none

Failure location (MAN):

15, 1d, 94, 88, e9, 1c, 24, ce, cf, d1, d2, d3, d4, d5, d7, d8, d9, da, 83, db, dc, dd u. df

Failure display:

none

Failure path:

none

Consequence:

none

Function:

Not attributed inputs can generate described failures when Input voltages become to high

Possible Origin:

high voltages on non attributed inputs

Test condition:

Adaptor box with adapting connectors connected

Use wiring diagrams wich are corresponding to the tractor

| Test | Measurement | Trouble shooting |
|------------------------------------|-------------|---------------------------------|
| All non attributed In-puts/Outputs | | - Remove wrongly connected wire |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / General system Diagnostic Method EDC | B |
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Diagnostic Method: Engine wont start

| | | |
|--|-----------|--|
| Engine wont start Read Failure Code Memory Delet Failure Codes | | |
| Starter Engine runs ? | NO | Check Starter Engine Connections and electric control Chapter 9000 Reg.C - Battery Voltage - Starter Engine |
| Yes | | |
| Supply externally Injection Pump | | |
| Chapter 2710 Reg. A - VP44 Auxilliary Operation | | |
| Engine Starts ? (runs constantly 720 Rpm) | NO | Check Fuel supply system: Chapter 2060 Reg. G - Purge Air from Fuel Supply System Chapter 2710 Reg. E - Pump pre -pressure - Pump internal Pressure Chapter 2710 Reg. E - Checking Start of Delivery Chapter 2712 Reg. G Chapter 2000 Reg. A - Checking Injection Valves |
| Yes | | |
| To be Checked: Voltage supply on Injection Pump Chapter 2710 Reg. A - Pump supply - Engine Stop System Chapter 9780 Reg. C - Bloc Diagram A021 | | |
| Engine Starts ? | NO | Check Function of Injection pump: Chapter 2710 Reg.A - General Description VP44 Chapter 2710 Reg.A - EDC Control Module A021 - Pump Control Module A020 (eventually . Q-MV Failure) |
| Yes | | |
| | | |
| EDC OK | | |

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| Fav 900 | Engine / General system Turbocharger, troubleshooting | B |
|----------------|--|----------|

Before replacing the turbocharger, check the following:

Excessive engine oil consumption, lack of power and abnormal intake or exhaust noises are a frequent cause of unnecessary turbocharger replacement.

Examination of the allegedly defective parts by the manufacturer often shows the turbocharger to be in perfectly good working order.

To avoid this situation, the following checks must be performed :

Excessive oil consumption

- Check air filter contamination
- Check intake pipe for restricted cross section (e.g. damage, dirt)

Either are possible causes for increased oil consumption due to the higher pressure.

- Check turbocharger for external traces of oil

Excessive oil consumption of the turbocharger is due to bearing wear, quickly resulting in mechanical damage.

Lack of power

For satisfactory power, observe correct settings for:

- start of fuel delivery
- valves clearance
- engine control (at full load)
- exhaust brake (must open fully).

Also check:

- Cylinder compression
- air filter contamination
- intake system for restricted cross sections and leaks
- exhaust system for damage and leaks.

If none of these checks reveal the cause of poor performance, the turbocharger has to be also checked for:

- Coking of turbine impedes easy rotation. (Axial movement may release coking.)
- Dirt within compressor
- Damage by foreign objects
- Turbine wheel in contact with housing

Remove visible contamination of compressor side and check bearing clearance.

Note:

Do not damage the compressor fan wheel.

Abnormal intake and exhaust noises

- Check intake and exhaust system adjacent to the turbocharger assembly. Damaged gaskets must be replaced (can mislead to failure diagnostic of turbocharger).
- If this does not eliminate the abnormal noises, the turbocharger is to be replaced. (A turbocharger in good condition does not generate noise!)

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| Fav 900 | Engine / General system Turbocharger, troubleshooting | B |
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Oil in intake pipes and intercooler

Oil spray within the intake system is necessary. It lubricates inlet valve seats.

If too much oil is encountered to such an extent that puddles can be found within the air box of the intercooler, there is a serious risk of engine "runaway", an uncontrolled increase of engine speed. Leaks must immediately be removed.

Possible origins:

- Engine oil level too high - Check whether proper dipstick is used -
- Inadequate engine oil, check "Lubricants " schedule.
- Operation on not allowed high slanting angles
- High pressure within crankcase, e. g. Oil release valve failure (Crank case venting) or worn piston rings

Turbocharger compressor coking

Can occur by excessive intake air temperature, e.g. during constant full load operation.

Coking may result in reduced intake air pressure, there will not be a noticeable power reduction or a diminished acceleration behavior. Coking may result in exhaust turbidity.

If Turbocharger compressor coking occurs:

- Disassemble compressor housing. Avoid compressor fan wheel damage which could result in balancing problems and strong vibrations until complete destruction of the turbocharger.
- Use a solvent to remove coking from the compressor housing



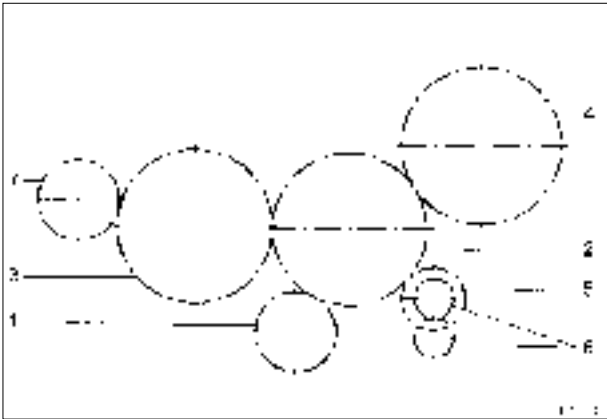
Warning:

Never inject solvent spray while the engine is running - Accident Hazard !!! -

- In severe cases, use special oil with low coking risk.

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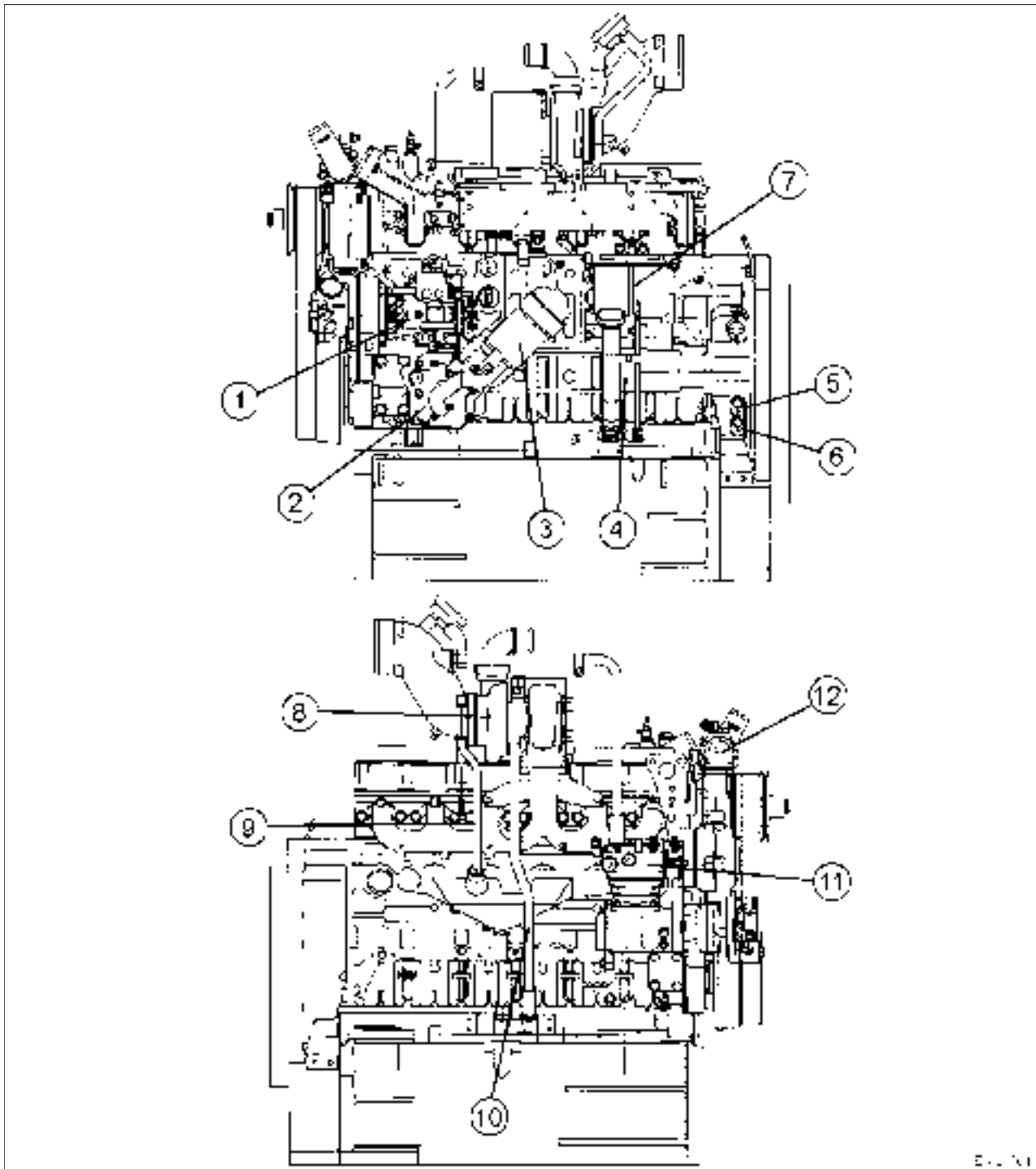
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| Fav 900 | Engine Engine control | C |
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- 1. Crankshaft gear
- 2. Idler gear
- 3. Camshaft
- 4. Injector pump gear
- 5. Oil pump driving gear
- 6. Oil pump gears
- 7. Gear for auxilary drive

Fav 900

Engine / Generalities
View of engine D 0836 LE 501



D

| | | | |
|---|---|----|--|
| 1 | Fuel injection pump (VP44) | 7 | Fuel filters |
| 2 | Lubricant cooler | 8 | Turbocharger |
| 3 | Lubricant filter | 9 | Lubrication oil turbocharger (pressure) |
| 4 | Oil filling socket, Oil level indicator | 10 | Lubrication oil return from turbocharger |
| 5 | B10 - Sensor, Engine 1 | 11 | Air compressor |
| 6 | B11 - Sensor, Engine 2 | 12 | Thermostat |

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View of engine D 0836 LE 501

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|   | <h1>Fitting instructions</h1> <div>Repair</div> | |
| Fav 900 | Engine / total system Fitting instructions for air filter ejector nozzle | G |

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1. Version from pilot production to manufacturing date of 31.12.2000

up to serial nos. 916.23.3056, 920.23.3078, 924.23.3094, 926.24.3222

2. Version from manufacturing date 01.01.2001 to 05.2001

from serial nos. 916.230.3057, 920.230.3079, 924.230.3095, 926.240.3223

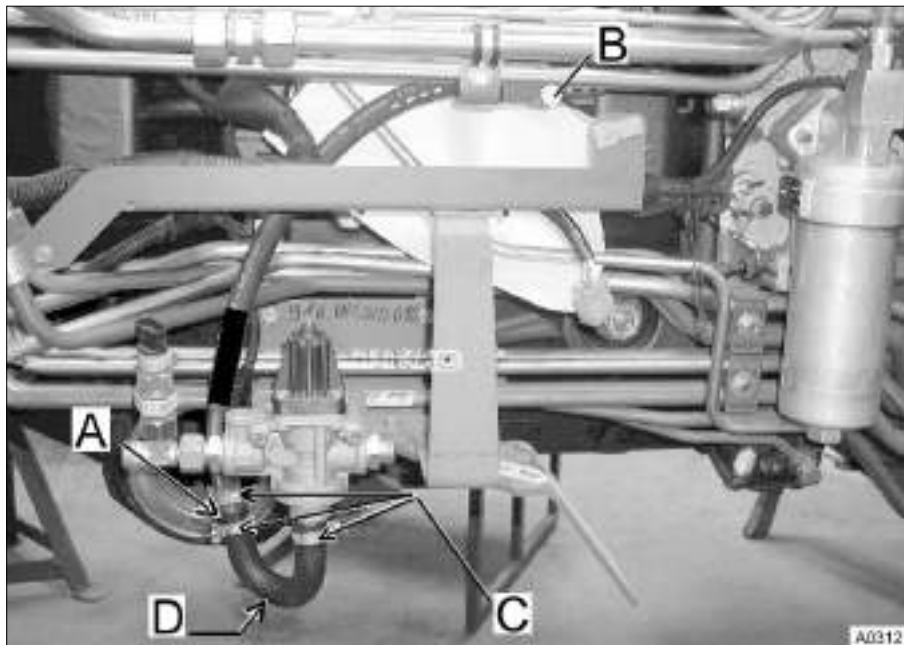
3. Version from 05.2001 to mid-09.2001

from serial nos. 916.23.3118, 920.23.3136, 924.23.3167, 926.23.3437

In all three versions the installed air filter remains in place; only the ejector is retrofitted.

1. Version from pilot production to manufacturing date of 31.12.2000

Refurbishment of dust discharge, straight socket on left




- A = Reducer 916.201.091.040
- B = Cable tie (see photo below)
- C = 3x hose clip X458.650.600
- D = Hose bow 192.204.900.010

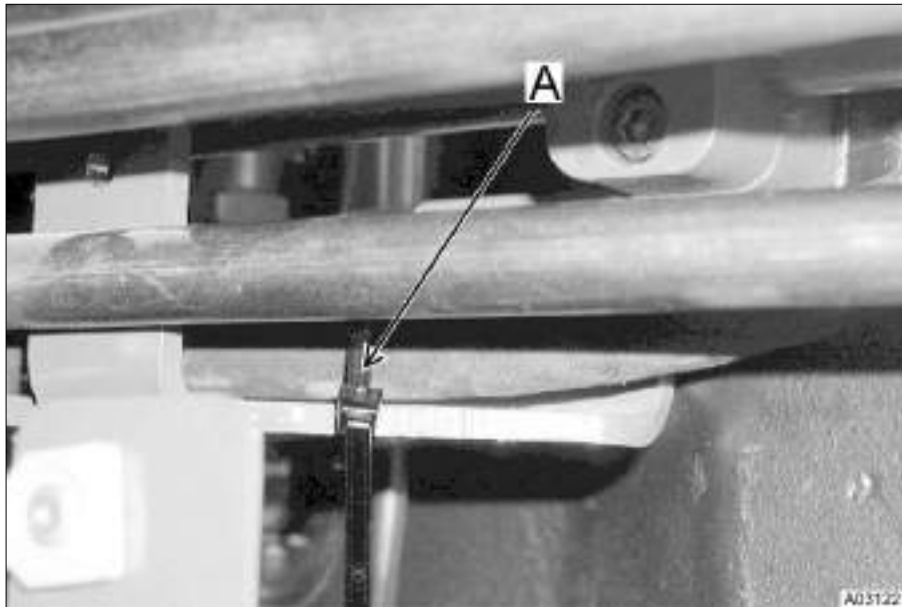
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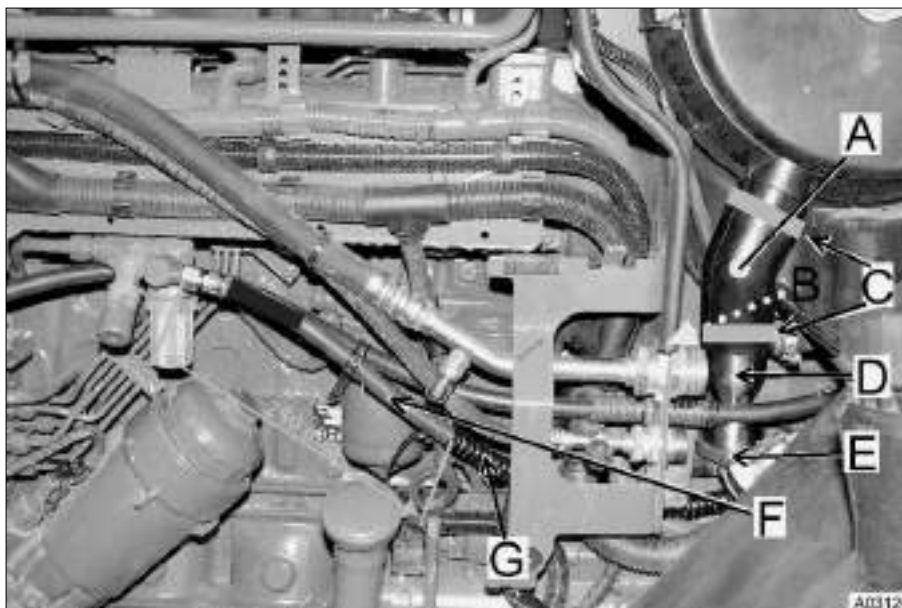
Johann-Georg-Fendt-Str. 4 D-87616 Marktoberdorf

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|  | Fitting instructions Repair | |
| Fav 900 | Engine / total system Fitting instructions for air filter ejector nozzle | G |



A = Cable tie X668.980.522



- A = Rubber bend 916.201.091.070
- B = Seal bore with plug X499.504.295.
- C = Hose clip X458.648.000
- D = Nozzle G916.201.092.010
- E = V-seal 50x58x8 X548.388.500
- F = New hose length 1540 mm, shorten 1630-mm-long series H916.201.061.161 fuel line.
- G = Wrap hose protection X591.494.000 round for 600 mm.

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Fitting instructions

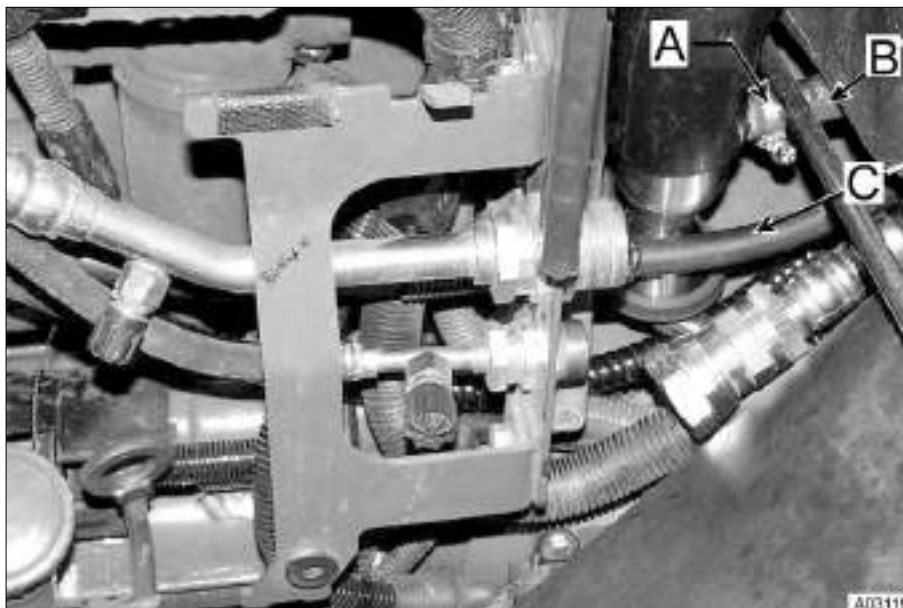
Repair

Fav 900

Engine / total system

Fitting instructions for air filter ejector nozzle

G





- A = Hose clip X458.650.600
- B = Compressed-air hose
- C = Return flow series



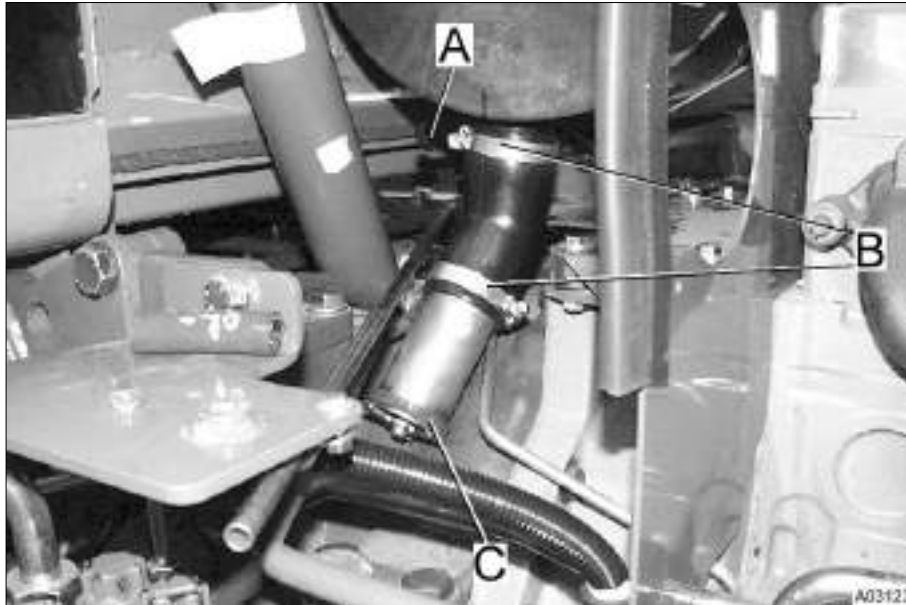
- A = Pressure hose X604.178.000, length 1880 mm

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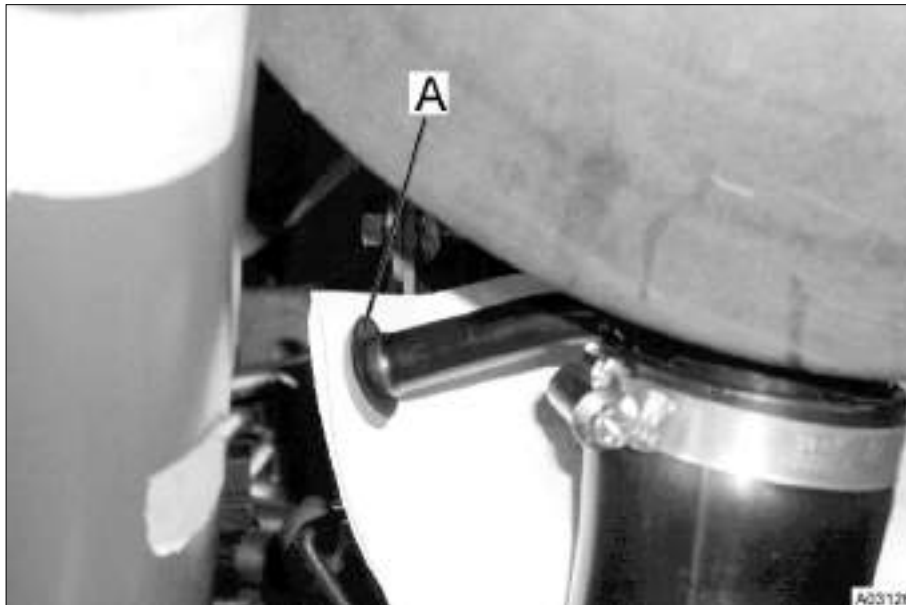
| | | |
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|   | Fitting instructions Repair | |
| Fav 900 | Engine / total system Fitting instructions for air filter ejector nozzle | G |

2. Version from manufacturing date 01.01.2001 to 05.2001

Compressed-air-driven ejector, refurbishment of dust discharge on right, straight socket



- A = Seal socket (see next photo)
- B = 2x hose clip X458.648.000
- C = V-seal 50x58x8 X548.388.500



Note: Seal Ø12 air pipe with plastic plug (A).

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Fitting instructions

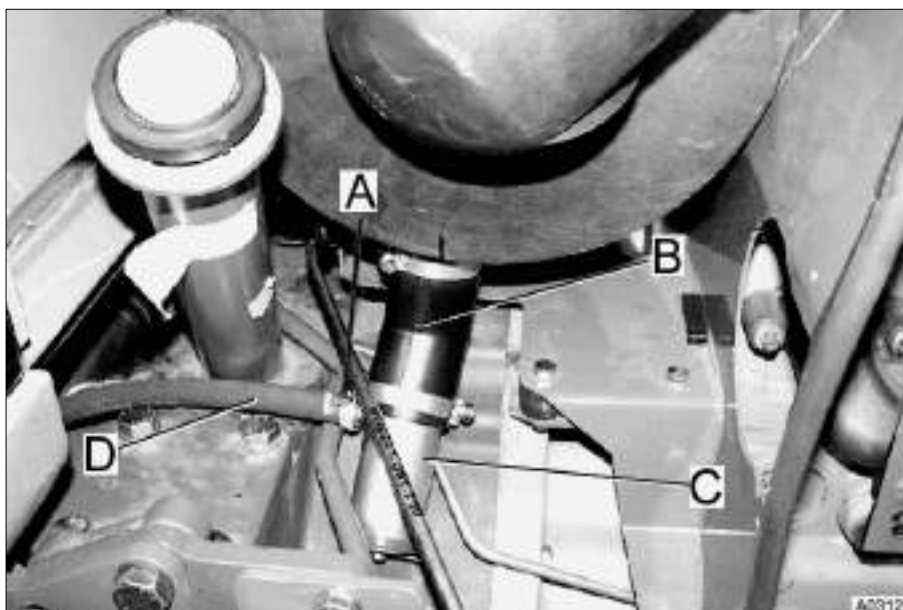
Repair

Fav 900

Engine / total system

Fitting instructions for air filter ejector nozzle

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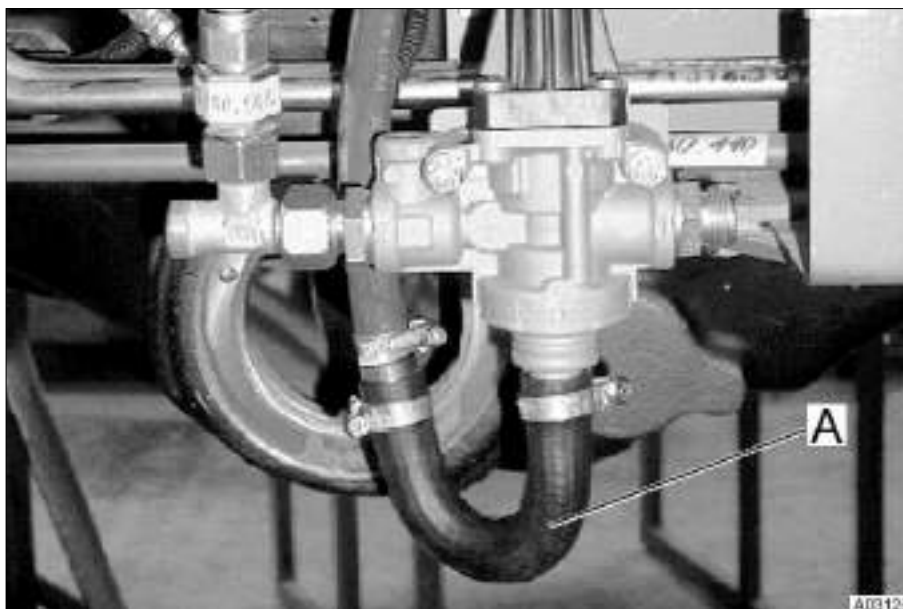


Note: Ensure clearance between hose clip (A) and lines

B = Rubber bend 916.201.091.070



C = Nozzle G916.201.092.010

D = Shorten existing hose by 60-70 mm.



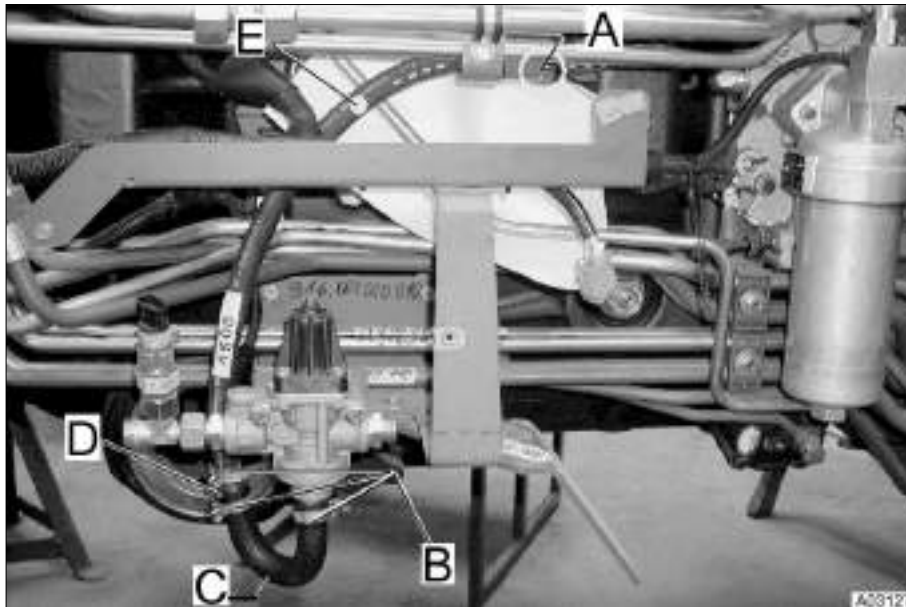
A = Hose bow 192.204.900.010 (without hole)

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| 27.07.2001 | | 5/8 | 2000 | G | 000005 |

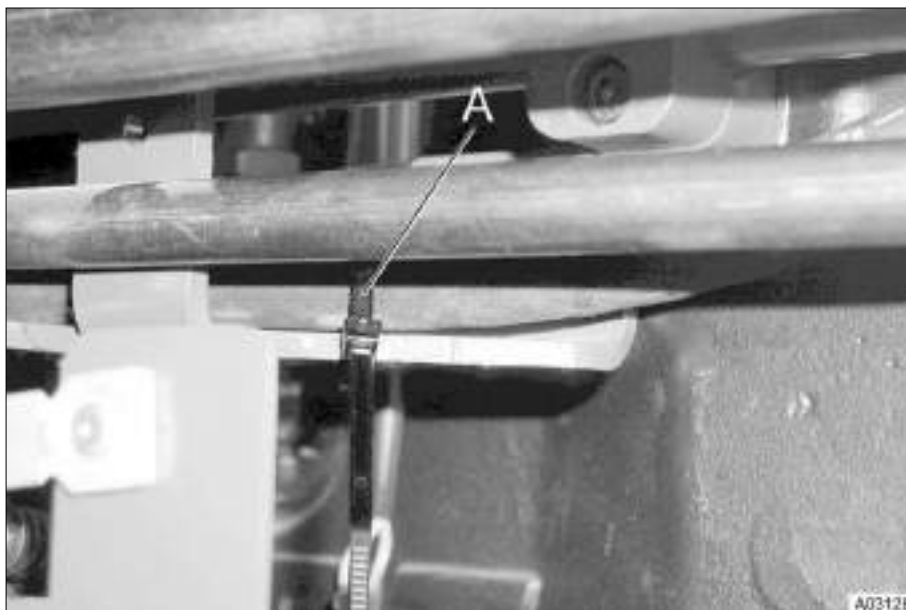
| | | |
|---|--|----------|
|   | Fitting instructions Repair | |
| Fav 900 | Engine / total system Fitting instructions for air filter ejector nozzle | G |

3. Version from 05.2001 to mid-09.2001

Compressed-air-driven ejector, refurbishment of dust discharge on right, angular socket




- A = Cable tie (see photo below)
- B = 3x clip X458.650.600
- C = Hose bow 192.204.900.010
- D = Reducer 916.201.091.040
- E = Pressure hose X604.178.000 (1500 mm)



- A = Cable tie X668.980.522

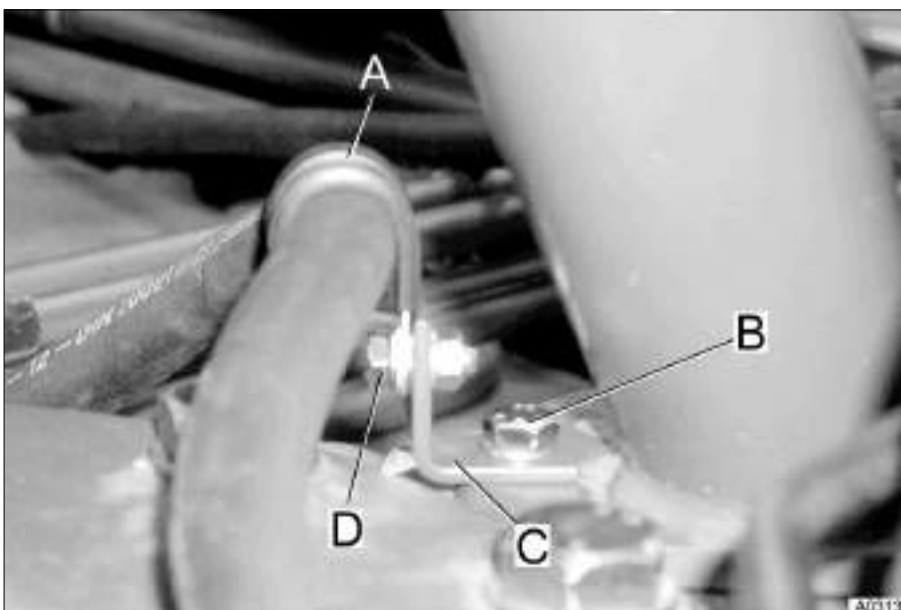
| Date | Version | Page | Fitting instructions for air filter ejector nozzle https://www.truck-manuals.net/ | Capitel | Index | Docu-No. |
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|  | <h1>Fitting instructions</h1> <div>Repair</div> | |
| Fav 900 | Engine / total system Fitting instructions for air filter ejector nozzle | <div>G</div> |

Hose path



A = Clip (see photo below)



- A = Clip RSGu 22/15 X459.075.800
- B = Existing screw
- C = Angle 345.101.070.140
- D = M6x16 screw, nut, spring washer

| Date | Version | Page | Fitting instructions for air filter ejector nozzle https://www.truck-manuals.net/ | Capitel | Index | Docu-No. |
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Fitting instructions

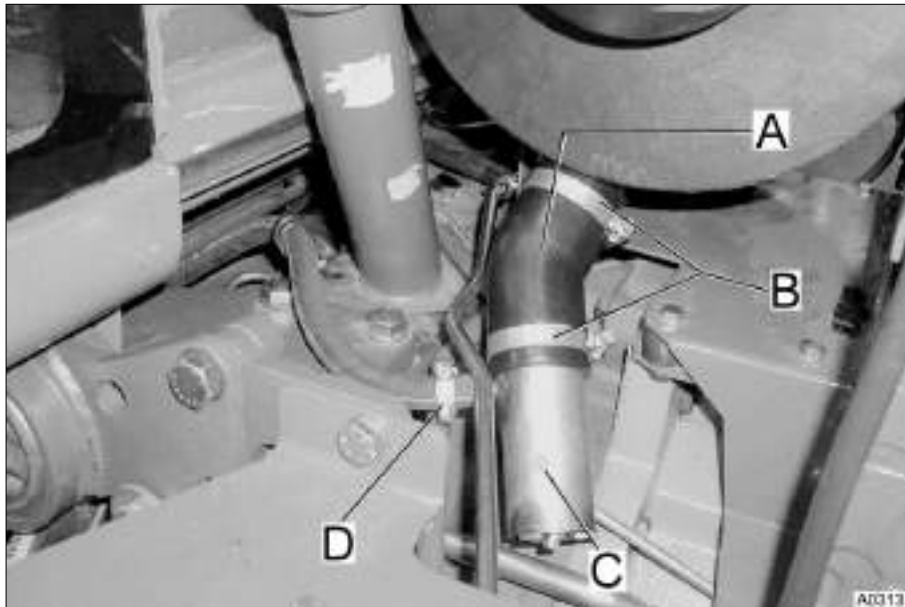
Repair

Fav 900

Engine / total system

Fitting instructions for air filter ejector nozzle

G



- A = Existing rubber bend
- B = 2x clip X458.648.000
- C = Nozzle G916.201.092.010
- D = Clip X458.650.600

Preliminary operations

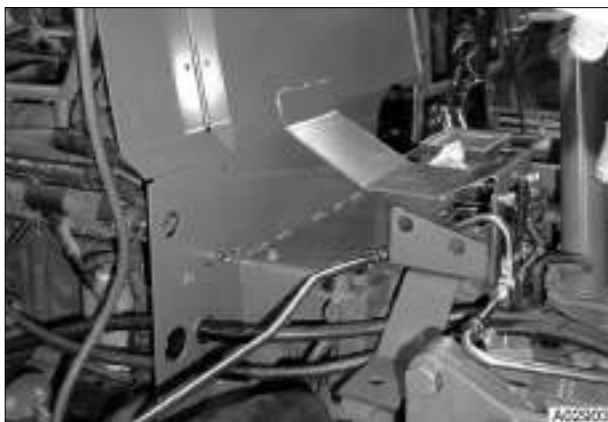
- Clean thoroughly the tractor (Engine Periphery and Radiator assembly).
- Evacuate air conditioning system.
- Disconnect battery.
- Dismantle Right and left cabin access.
- Dismantle rear covering panel.
- Lower rear power lift and tilt cabin to the Maximum.
- Dismantle the muffler and its protection linings.
- Remove right and left side panels.

**Dismantling and Reassembly procedure**

- Drain coolant (10Liters).



- Dismantle Intake air filter.
- Disconnect airconditionning "connectors".
- Dismantle Partition wall including Water tank and vent lines from the fuel tank.



- Assemble replacement partition wall, brackets for water tank and intake air Filter.

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| 11.12.2000 | a | 1/4 | | 2000 | G | 000001 |

Fav 900

Engine / General systems
Engine Periphery**G**

- Fit replacement vent lines and panel on the left side of the fuel tank.
- Put new tubes with corrugated protection tube into place.
- Replace aspiration tube of the fuel tank.



- Replace the connectors from the air conditioning tubes on both, cabin and engine side .
- Replace air conditioning tubes , 2 short ones, 1 long one.



- Wrap fitting through the partition wall with tape.



- Fix new brackets for air conditioning tubes onto the front maintaining mechanism of the side panel.
- Fit the air conditioning tubes with 2 cable ties.

| Date | Version | Page | Engine Periphery | Capitel | Index | Docu-No. |
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| 11.12.2000 | a | 2/4 | | 2000 | G | 000001 |



- Install new Air Filter with collector manifold.



- Install pipe and reducing unions onto the pressure controller.

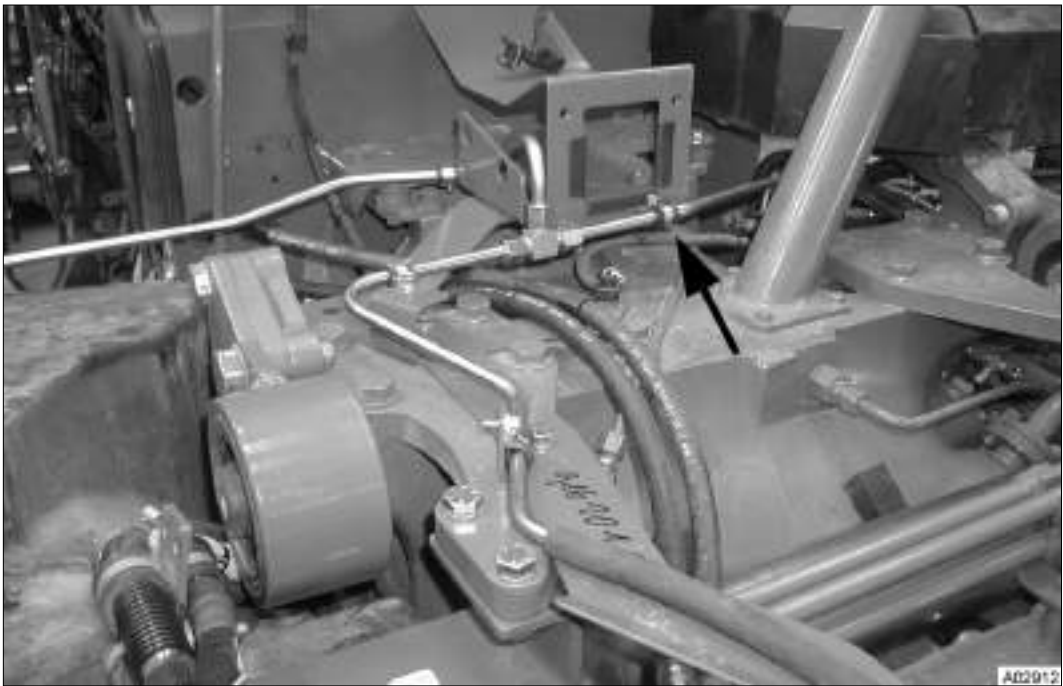
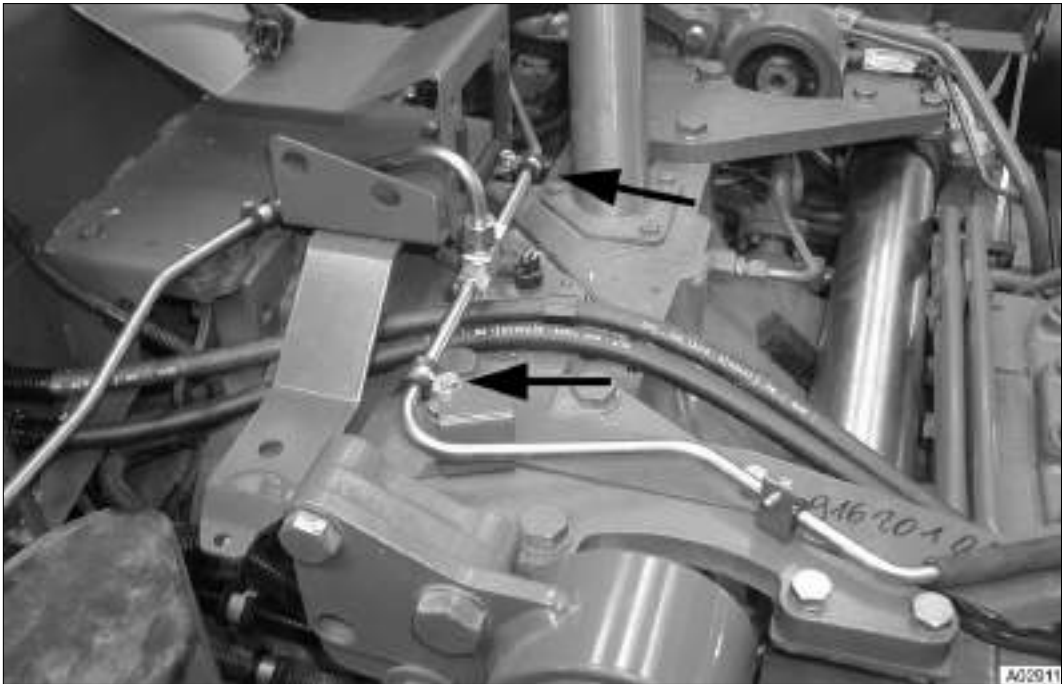




- Install the tube of the pressure controller behind the tank toward the air Filter.

Finishing operations

- Lower cabin, complet all connectors and put all screws for the cabin suspension into place .
- Install side panels ,Mufler, Air Intake Pipe as well as right and left cabin accesses.
- Complete coolant . Refill air conditionning system.
- Start engine and check all systems for eventual leaks.

| | | |
|---------|--|---|
| Fav 900 | Engine / General systems Engine Periphery | G |
|---------|--|---|



| | | | | |
|---|---|--|--|---|
|  | <p align="center">Service Information</p> <p align="center">Cleaning specifications for casing fans</p> | <p align="center">Group 2</p> | <p align="center">KDM 12/01</p> |  |
| <p>Farmer 400, Favorit 700, Favorit 900</p> | | <p align="center">Chapters 2000</p> | <p align="center">Reg. H</p> | <p align="center">Docu-No. 0000002</p> |

Under difficult operating conditions (severe dirt accumulation) etc., it is possible that as well as soiling the cooling system, the casing of the cooling fan will also be soiled. Deposits on the inside of the casing can occasionally lead to imbalance. It is therefore necessary to check the cooling fan for accumulated dirt and clean as required.

Machines concerned: Farmer 400
Favorit 700
Favorit 900 from veh.no. 400 - 1000 and from 3001

Cleaning Specifications:



If the fan is cleaned whilst fitted, using a high-pressure cleaner, the lance should be directed onto the fan from both the right and left sides of the tractor.

The high pressure of the cleaner will cause the fan to turn so that the entire inner surface of the fan casing and the impellers can be cleaned on both sides.

Ensure that the fan is carefully cleaned as incomplete cleaning can again lead to an imbalance.

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| | | | | |
|---|--|--|---|---|
|  | <p align="center">Service Information</p> <p align="center">Setting and checking the start of delivery</p> | <p align="center">Group 2</p> | <p align="center">KDM 17/01</p> |  |
| <p>Favorit 900</p> | <p align="center">Chapter No 2000</p> | <p align="center">Reg. H</p> | <p align="center">Doc-No. 000003</p> | |

Machines affected: 916/23/.... 916/24/....
 920/23/.... 920/24/....
 924/23/.... 924/24/....
 926/23/.... 926/24/....

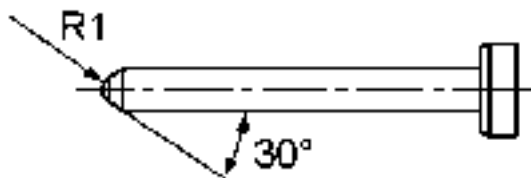
In order to be able to set the start of delivery correctly (refer to the training document or workshop manual), the measuring tip of the dial gauge must have a radius of 1 mm. If this radius is greater than 1 mm, exact calibration is impossible.

The start of delivery is set to **O.T.** (+- 0.5 degree).

If the start of delivery differs by more than 3 degrees, the EDC goes into fault mode and fault code **1.2.CA** is displayed.

A measuring pin with a radius of 1 mm can be ordered from our parts department.



Part number: X 899.980.245.101 Measuring pin FB-VP44



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| | | | | |
|---|--|-----------------------------------|----------------------------|---|
|  | Service Information Dustproof Starter or Starter with Reduction Gearing | Group 2 | KDM 20/01 |  |
| Farmer 300, 300C, 400, Favorit 500, 700, 800, 900, Xylon | | Chapter No. 2000 | Reg. H | Doc. No. 000005 |

1. Dustproof Starter for Water-cooled Deutz Engines

A dustproof starter is now standard fitment on Farmer 400 and Favorit 700 series with engine numbers above BF4M2013C 628445 (Farmer 409 - 411), BF6M2013C 629293 (Favorit 711 - 716), It is available as a spare part No. **F 716.900.060.060** and supersedes part no. F 716.900.060.010.

This starter may also be fitted to Farmer 300C, model F307 (117/./.....), F308 (118/./.....), F309 (119/./.....).

2. Starter with reduction gearing for MWM Engines

A (Magnetron) starter with epicyclic reduction gearing, which improves engine starting, is now available for Farmer 300 and Favorit 500 equipped with MWM engines.

Part No. C 514.900.060.100

Bosch Starter - G 514.900.060.100 is still available.

3. Dustproof starter for MAN Engines

A dustproof starter is now also available for Favorit 800, 900 and Xylon.



The part numbers are given in the table below.

| Serial No. | Old starter - part No. | Dustproof starter - part No. |
|---------------|------------------------|------------------------------|
| 816/21/2422 | F926.900.060.040 | F926.900.060.041 |
| 818/21/2548 | F926.900.060.040 | F926.900.060.041 |
| 822/21/2238 | F926.900.060.040 | F926.900.060.041 |
| 824/21/2586 | F926.900.060.040 | F926.900.060.041 |
| 916/21/1001 | F926.900.060.040 | F926.900.060.041 |
| 920/21/1001 | F926.900.060.040 | F926.900.060.041 |
| 924/21/1001 | F926.900.060.040 | F926.900.060.041 |
| 926/21/1264 | F926.900.060.040 | F926.900.060.041 |
| 520/24/0101 | F926.900.060.040 | F926.900.060.041 |
| 522/24/0101 | F926.900.060.040 | F926.900.060.041 |
| 524/24/0101 | F926.900.060.040 | F926.900.060.041 |
| 916/23/0101 * | F926.900.060.040 | F926.900.060.041 |
| 920/23/0101 * | F926.900.060.040 | F926.900.060.041 |
| 924/23/0101 * | F926.900.060.040 | F926.900.060.041 |
| 926/23/0101 * | F926.900.060.040 | F926.900.060.041 |

* Fitted as standard equipment from engine D0836LE501 9867596.

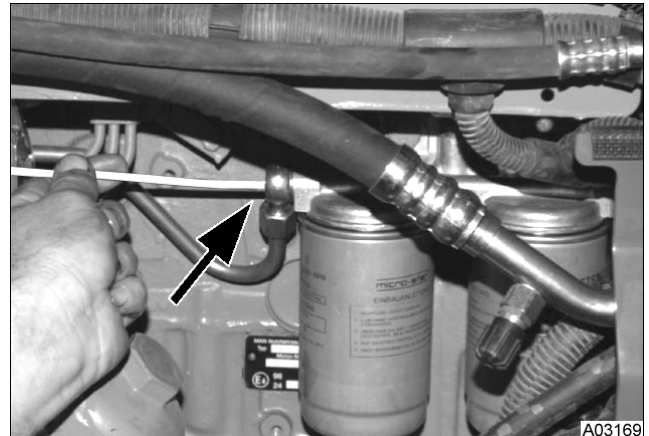
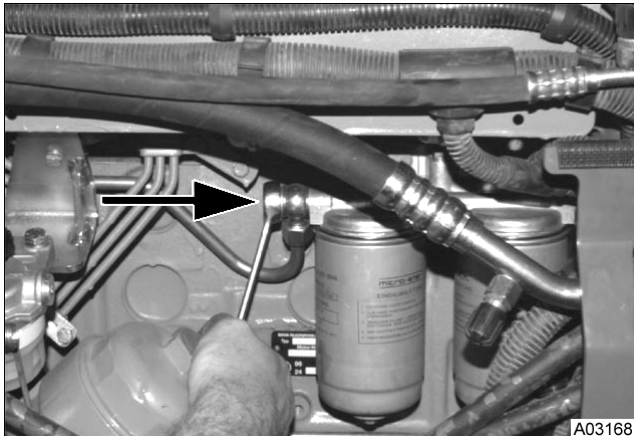
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| | | | | |
|---|--|-------------------|---------------------------|---|
|  | <h2 style="text-align: center;">Service Information</h2> <h3 style="text-align: center;">Checking Fuel Filter Housing</h3> | Group 2 | KDM 23/01 |  |
| Favorit 900 | Chapter No. 2000 | Reg. H | Doc. No. 000006 | |

During the next service of Favorit 900 series tractors, please check the fuel filter housing.

Tractor serial numbers concerned: 916.23....., 920.23....., 924.23....., 926.23.....



For the workshop

Preliminary work:

- Unscrew banjo bolt on filter housing.

Checking:

- Push a cable tie into hole.

If the cable tie can be pushed less than 55 mm into the hole, the filter housing does **not require changing**.

If the cable tie can be pushed more than 55 mm into the hole, parallel filter **F 824.200.710.580 must be changed**.

If the fuel filter housing needs to be changed, please complete the details below and fax it to number **+49(0)8342 / 77222** as soon as it is discovered. Then order the part and carry out the remedial work.

Veh. No.:

Filter housing changed

☐

Read out fault memory and record fault codes here:

Procedure:

Replacing the fuel filter assy **F 824.200.710.580**, and a labour allowance of 1.5 hrs may be claimed under warranty

For rapid processing, please complete the fields (HG, causal part no., description, damage code, page/item no. and time) on the warranty claim form as shown below.

| HG | Verursacherteil-Nr. | Bezeichnung | Bildtafel/Pos.-Nr. | Schadenscodes | KD-T-Eintrag | ja | nein |
|-------|---------------------|-----------------|--------------------|--|--------------|------|------|
| 99820 | F 824.200.710.580 | Parallel filter | 2210/1 | 361 | Arb.-Nr. | Std. | 1.5 |
| Stück | Eingebaute Teile | | Preis | Fehlercodes im Bordinformator: z.B. 6.1.04 | | | |

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Fav 900**Engine / Cylinder head
Checking compression****E**

- Warm up engine until coolant temperature reaches 60 to 80°C (140 - 176°F).
- Check valves clearance and adjust.
- Remove all injectors and injector holders.
- See values of compression in chapter "Service Data".

Starting with the 1st cylinder, fit new seal and tighten. Install test adaptor of compression recorder with threaded union and tighten.



Screw compression recorder onto test adaptor and insert test sheet.

Using the starter motor, turn engine until the indicator no longer deflects.

Connect compression recorder with test adapter to the other cylinders and proceed as above.



Depending on the design of the compression recorder, the engine can also be cranked directly from the compression recorder.

To do this, the starter has to be connected to the appropriate electrical leads.



Compare data and remove compression recorder and test adapter. Apply "Never Seeze" to contact faces of injector holders.

Fit injector holder and injectors using a new seal. Screw on union nut and tighten to specified torque.

Re-connect injection and leak-oil lines.

Note:

The union nut can be tightened with an open end wrench without removing the injection pipe.

| Date | Version | Page | Checking compression | Capitel | Index | Docu-No. |
|-----------|---------|------|----------------------|---------|-------|----------|
| 20.2.2001 | a | 1/1 | | 2010 | E | 000001 |

| | | |
|----------------|---|----------|
| Fav 900 | Engine / Cylinder head Checking valve timing | F |
|----------------|---|----------|

Checking valve timing

Shifting of the camshaft drive gear can result in severe engine damage.

It is therefore necessary to ensure a correct fit by checking the valve timing after repair.

The above takes into consideration that tappet push rods are not distorted!

Proceed as follows:

- Fit engine actuation device to flywheel housing.
- Remove crankcase venting pipe.
- Accurately set valve play of 1st cylinder.
- Actuate engine against rotating direction to approx. 40°C before TDP.
- Set dial gauge onto intake valve spring retainer of 1st cylinder and set at "0".
- Slowly turn crankshaft in rotating direction and watch the pointer:
- Immediately when the pointer moves, the intake valve opens.
- Take reading from graded scale on flywheel and compare with valve timing.

Note:

By fitting a dial gauge to both intake and exhaust valve spring retainers of the 1st cylinder, it is possible to check all valve timings and the valve stroke by continued turning of the engine. Valve stroke desired value: 5,0 to 5,7 mm (.197 - .224").

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| 20.2.2001 | a | 1/1 | 2010 | F | 000002 |

Fav 900**Engine / Cylinder head
Setting valve clearance****F**

Engine must be cold for adjusting valve clearance.
(max. coolant temperature 50° C (122°F))
Setting valve clearance.

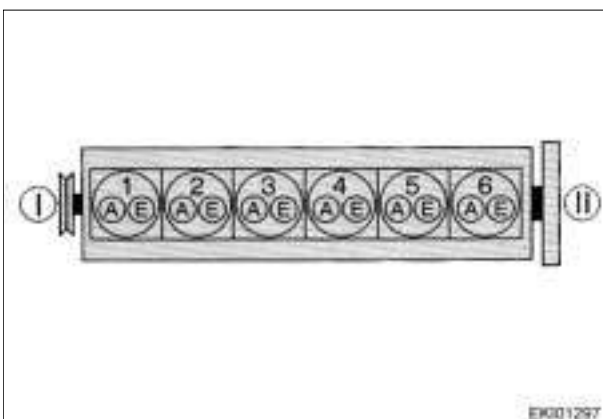


Rotate crankshaft using turning device until the piston of the cylinder to be set is at top dead centre (TDC) and the rocker arms are not loaded.
The valves of the synchronous cylinder are now overlapping.

Setting valves clearance:

| | | | | | |
|---|---|---|---|---|---|
| 1 | 5 | 3 | 6 | 2 | 4 |
| 6 | 2 | 4 | 1 | 5 | 3 |

Valves overlap on cylinder:



Layout of cylinder sequence and position of valves
I Fan end
II Flywheel end
A Exhaust valve
E Intake valve

| | | |
|----------------|---|----------|
| Fav 900 | Engine / Cylinder head Setting valve clearance | F |
|----------------|---|----------|

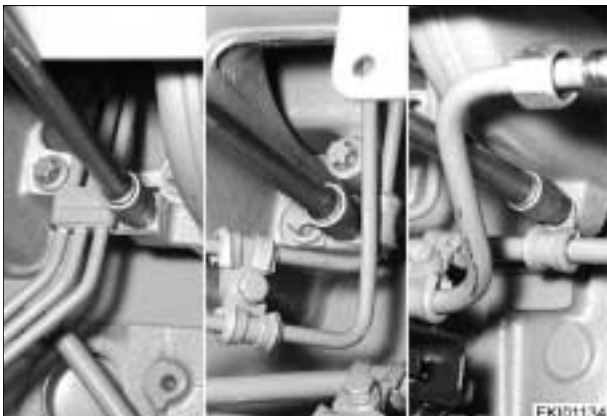


- Insert gauge between valve shaft and rocker .
- With valve setting tool loosen lock nut and turn setting screw until gauge can be moved with a slight resistance.
- Tighten lock nut.
- Check clearance again.
- Refit cylinder head covers.
- Tighten screws and bolts to adequate torque.

| Date | Version | Page | Setting valve clearance | Capitel | Index | Docu-No. |
|-----------|---------|------|-------------------------|---------|-------|----------|
| 15.2.2001 | a | 2/2 | | 2010 | F | 000003 |

Fav 900

Engine / Cylinder head Reassembling and refitting intake pipe

G**Removing intake pipe****Note:**

To avoid engine damage, always ensure clean conditions when working on intake system.

- Disconnect pressure sensor for intercooler
- Disconnect wiring to flame booster plug, to solenoid switch and to the temperature sensors.
- Remove fuel lines to flame booster plug and to solenoid valve.
- Remove wiring harness.
- Remove fuel filter.
- Remove fuel pre filter with manual lifting pump
- Remove collars of the injection lines and of the fuel lines which are fitted onto the intake manifold.

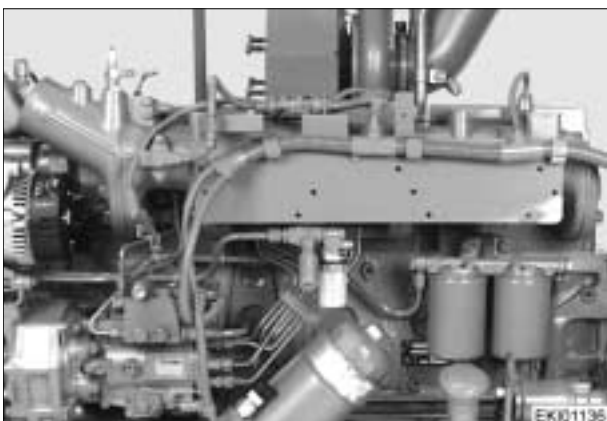


Loose and remove intake pipe fixing bolts on the cylinder head.

Detach intake pipe, remove traces of gasket residue from sealing faces of intake pipe and cylinder head.

Note:

Do not allow dirt particles to enter the inlet ports.

**Refitting intake pipe**

Position intake pipe using new gaskets.

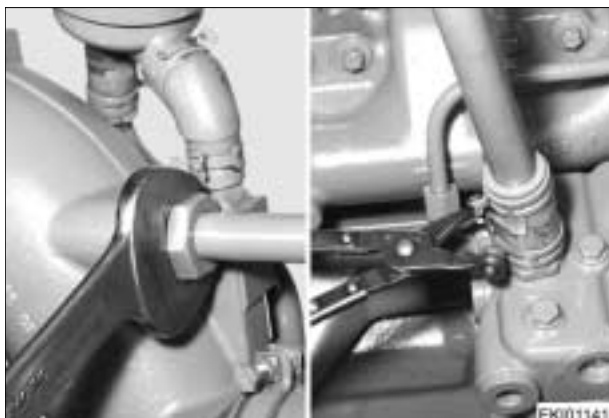
Insert fixing bolts.

Watch proper positioning of the gasket.

Tighten to specified torque.

replace all parts which have been removed before

Purge fuel system.

Fav 900**Engine / Cylinder head
Removing and refitting turbocharger****G****Removing turbocharger**

Remove crankcase venting (pressure control valve).

Remove air intake pipe from compressor to intake manifold.

Remove air intake manifold.



Remove oil return line and feed line.



Remove heat protection panel



Unscrew the turbocharger.

Remove turbocharger.

Note:

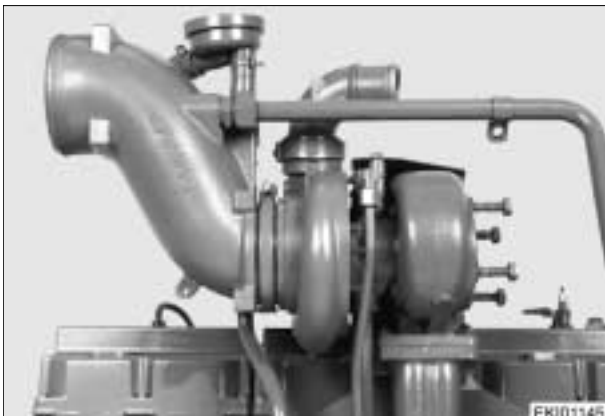
Shut all inlet and outlet ports in order to prevent particle contamination.

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Fav 900

Engine / Cylinder head

Removing and refitting turbocharger

G**Refitting the turbocharger**

Check intake pipe and exhaust manifold for eventual foreign objects.

Examine oil feed and return lines for eventual damage, jamming and leaks.

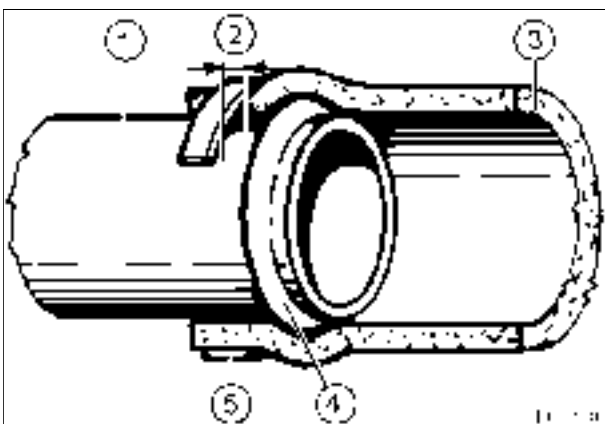
Replace all gaskets.

Refitting the turbocharger occurs in the inversed sequence as the removing

For refitting use new gaskets and new locking nuts.

Before connecting oil feed line, fill bearing case with clean engine oil.

Check all connection for tightness and absence of mechanical stress.

**Note:**

The clamped section of the hose must always be behind the collar of the hose.

1. Pipe
2. Gap
3. Hose
4. Collar
5. Hose clip

Note:

Use only clean water as a lubricant.

Fav 900

Engine / Cylinder head
Removing and refitting exhaust manifold

G**Removing the exhaust manifold**

Remove turbocharger.

Note:

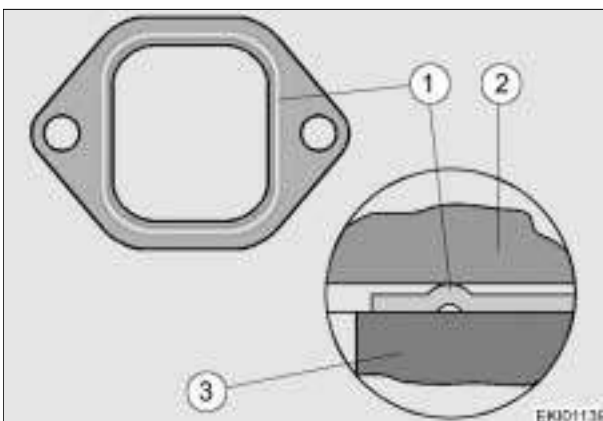
Protect exhaust port on turbocharger from contamination.

Unscrew and remove nuts from exhaust manifold.



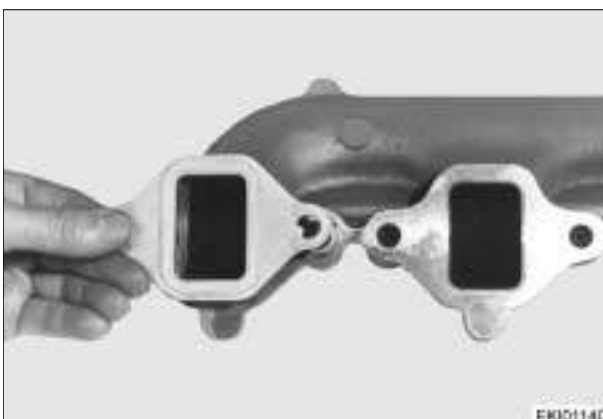
Guidance pins (visible on photograph) may be used.

Remove manifold.

**Refitting the exhaust manifold**

Clean sealing faces of both, cylinder head and manifold.

Bumped side (1) of gasket facing the cylinderhead (2), depression facing the manifold (3).



Insert screws and tighten to adequate torque.

Refit the turbocharger.

Fav 900

Engine / Cylinder head

Removing and refitting cylinder head

G**Removing the rocker**

Remove cylinder head cover.



Loosen clamping bolts and remove rocker arm.
Dismantling, overhauling and reassembling rocker assembly.

Removing the cylinder head

- Drain coolant,
- remove lines from injection nozzles,
- Remove intake pipe,
- Remove exhaust manifold,
- Remove coolant pipe.



Remove push rods.



Loosen cylinder head bolts in reverse sequence of tightening (for tightening torque values refer to chap 2000 Reg A).

Note:**Cylinder head bolts must not be re-used.**

Remove cylinder head and lay down in such way to prevent damage.

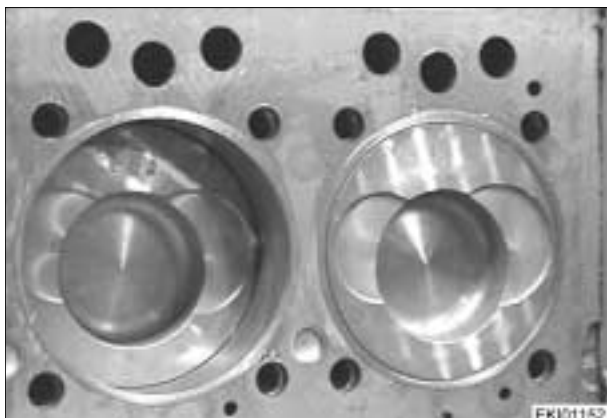
Remove cylinder head gasket.

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Engine / Cylinder head

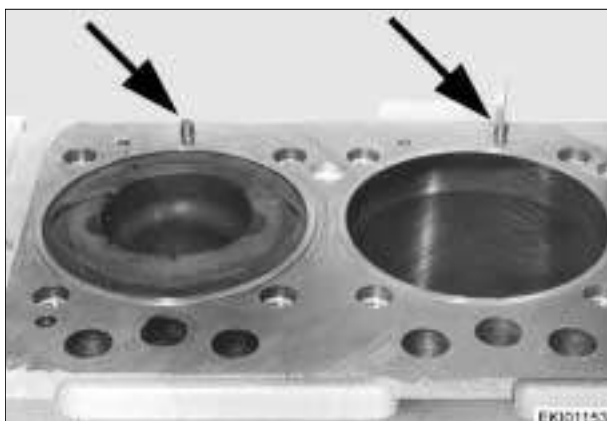
Removing and refitting cylinder head

G**Before refitting the cylinder head :**

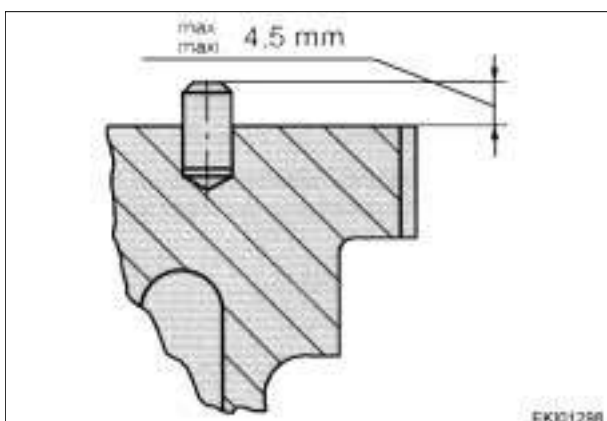
- Clean all the parts which have been removed.
- Clean sealing faces of cylinder head and crankcase, and blow out tapped holes in crankcase.
- In the event of repeated leaking, use the straight edge to check the sealing faces of crankcase and cylinder head for distortion.
- Uneven cylinder heads can be surface ground by up to 1 mm.
- Remachined sealing surfaces are measured in relation to the bore centre of the crankshaft bearing.

Note:

Sealing surface of the cylinder head and crankcase may only be cleaned manually by scraper and slight sandpaper on a polishing block.



Insert two 6h 8x10 DIN 7 straight pins per head into the leading surface of the crankshaft housing to locate the cylinder heads



If these straight pins need replacing, observe the max. projection of 4,5mm.

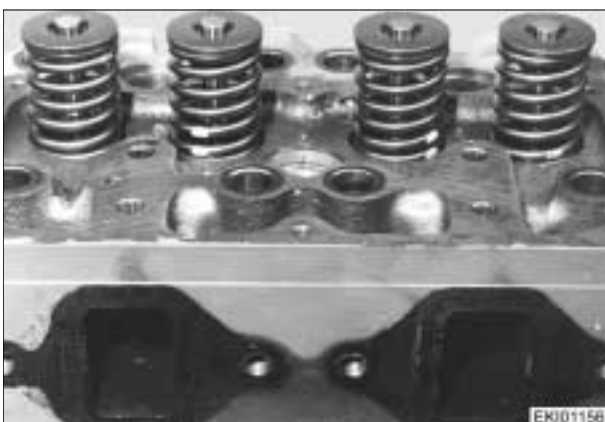
Fav 900

Engine / Cylinder head

Removing and refitting cylinder head

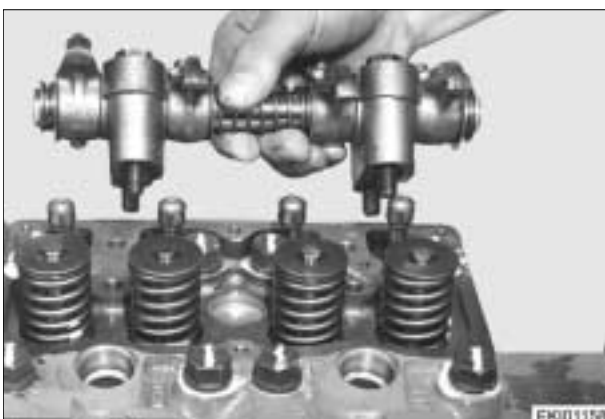
G**Refitting the cylinder head****Note:****Cylinder head gasket must always be replaced.**

Install a dry new gasket carefully positioned according to the hole pattern . Fit cylinder head.

**Note:**

To prevent distortion between cylinder heads and manifolds, we recommend the following steps :

- Refit cylinder heads using guidance bolts.
- Oil the new cylinder head bolts and their rest surface with "Optimoly Withe T" paste.
- Hand tighten new cylinder head bolts.
- Mount rectified ruler (Special tool) onto the exhaust side. Tighten screws at 20 Nm. If no ruler is available, fit exhaust pipe and tighten at 20 Nm.
- Tighten progressively cylinder head bolts in the indicated sequence at the prescribed torque.
- Remove the rectified ruler.

**Refitting the rocker assembly**

Check push rods for distortion and wear in the ball sockets.

When inserting the push rods ensure correct fit in the socket of the valve tappets.

Fit rocker arm bracket.

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Fav 900**Engine / Cylinder head
Removing and refitting cylinder head****G**

Tighten bolts slightly and align rocker arms with valves.

Subsequently tighten bolts to specified torque.



- Set valve clearance, chap 2010 Reg F
- Refit coolant pipe,
- Refit exhaust manifold,
- Refit intake pipe,
- Refit the injectors lines.



Refit cylinder head cover with a dry new gasket. Insert screws and tighten.

Fill up with coolant.

Tighten cylinder head bolts once more.

Fav 900

Engine / Cylinder head
Dismantling and reassembling the rocker arm assembly

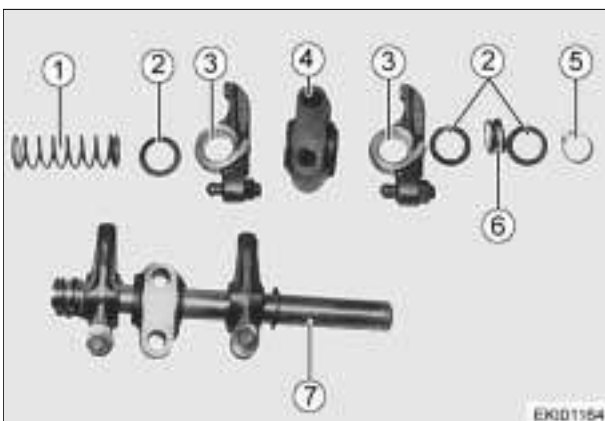
G**Dismantling the rocker arm assembly**

Remove rocker arm assembly

Clamp rocker bearing bracket in a vise (use non-metallic jaws).



Remove circlip.



Remove parts separately from the rocker shaft.

1 Central spring

2 Stop washer

3 Rocker arm

4 Rocker bearing bracket

5 Circlip

6 Outside spring

7 Rocker shaft

**Note:**

If the rocker bearing bushes need replacing, use new or reconditioned ready-to-install rocker arms.

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Engine / Cylinder head
Dismantling and reassembling the rocker arm assembly

G**Reassembling the rocker arm assembly**

Coat rocker bushes with "Optimol White T" paste.

Refit circlip on the rocker shaft.

Coat rockershaft and bearing bracket bore with "Optimol White T" paste.

Slide stop washer, outer spring, stop washer, rocker arm (end flush with bushing facing the bearing bracket) and bearing bracket into the rocker shaft.

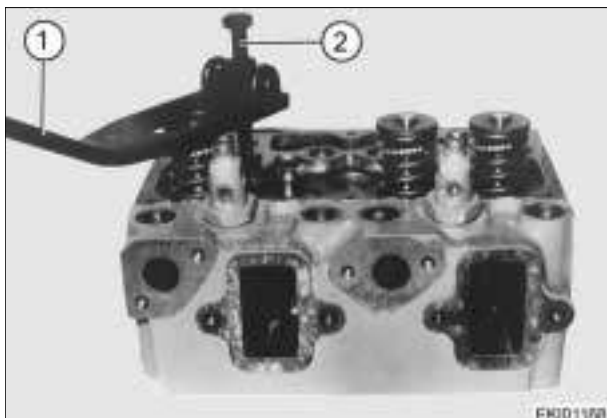
When clamping the assembled rocker shaft into the bearing bracket, ensure that the shaft end is supported. (Use non-metallic jaws).



Fit parts in the sequence shown, compressing springs, and insert circlip.

Refit rocker arm assembly, see chapter 2010 Reg G - Cylinder head removing and refitting.

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Fav 900**Engine / Cylinder head
Removing and refitting valves****G****Removing valves**

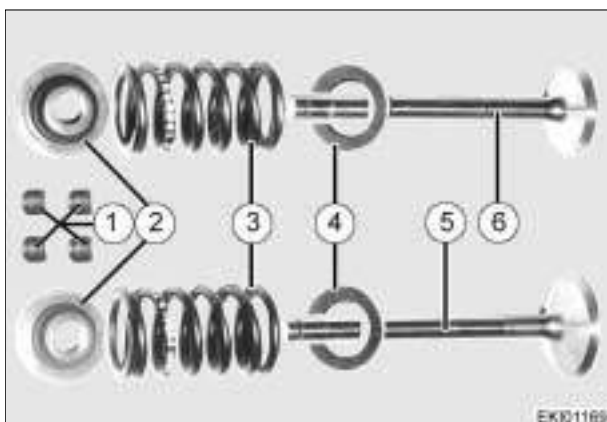
Remove rocker arm assembly and cylinder head (Chapter 2010 Reg G).

Note:

Valve springs and spring plates can be replaced without removing the cylinder head. This requires the appropriate piston to be at TDC.

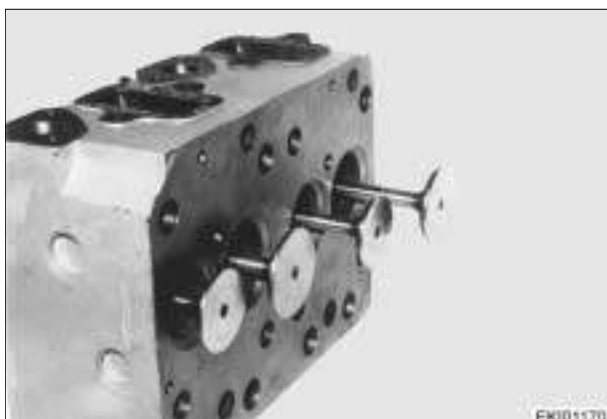
The use of a valve fitting tool is necessary.

- Place fitting lever to cylinder head.
- Turn screw (1) until the lever (2) is slightly raised.

**Note:**

If a valve bench is available, this can be used for the above operations.

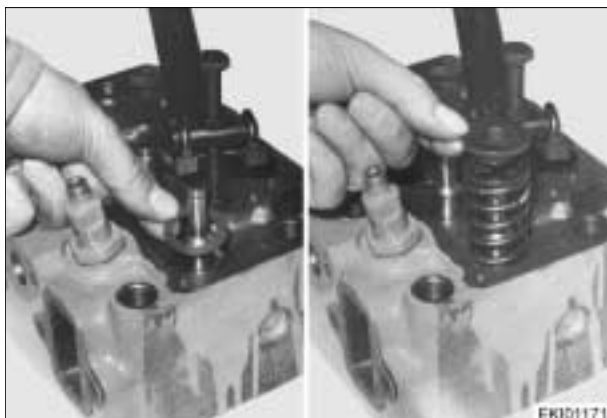
- Push valve fitting lever down and remove valve collets.
- Lift lever and swing to one side **Caution: Beware of spring tension. Danger of injury !**
- Remove upper spring plate (2), valve spring (3) and washer (4).
- Turn cylinder head over and extract intake (5) exhaust (6) valve.
- Check valves for damage and replace weak springs.
- Measure valve spring and replace weak springs.
- Check valve stem and guides for scoring and wear; if necessary, measure guides with a plug gauge.
- Check valve seats for severe wear and signs of burning, if necessary reseal valves or replace the insert.
- Remachine valve seat (following grinding machine manufacturer's instructions), or replace.

**Refitting valves**

Lubricate valve stems and insert into valve guides.

Note:

Minor valve seating damage can be removed by reseating using a valve grinding paste. When fitting new valves these must be reseated so that uniform seating is attained, if necessary machine the valve seat insert.

Fav 900**Engine / Cylinder head
Removing and refitting valves****G**

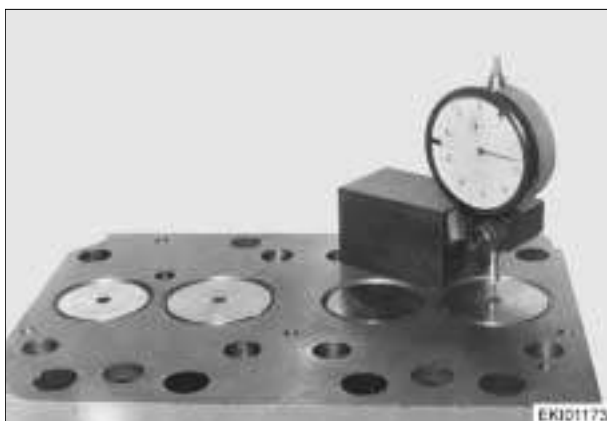
Turn cylinder head over.
Place valve fitting lever.
Fit washer, valve spring and upper spring plate.



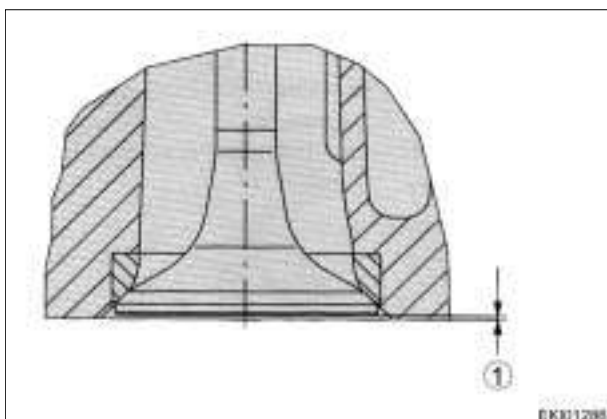
Compress spring with fitting lever and insert collets.

Note:

Make sure collets fit properly: they can cause severe damage by springing out.

**Measuring valve recess**

- Position gauge holder with dial gauge at the cylinder head.
- Press tip of gauge onto cylinder head.
- Set dial gauge at "0".
- Swing gauge towards valve head and read recess.



If after skimming the cylinder head faces, valve recess is inadequate or valve projection is excessive, the valve seat insert must be re-ground.

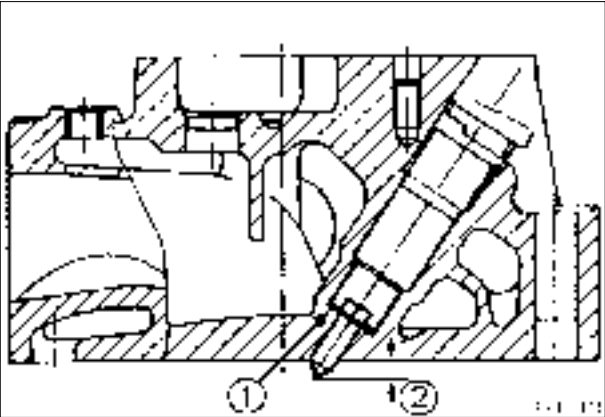
1 Valve recess

Note:

- When skimming the cylinder head sealing face, the max. dimension must not exceed 1 mm (0.039").
- After skimming, observe injection nozzle projection. Replace standard - copper sealing ring with a thicker one.

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- 1= Copper - Sealing ring
- 2 = Injection nozzle projection (2,68 - 3,47mm).
- Available sealing ring thicknesses : 0,5 / 1,0 / 1,5 / 2,0 / 2,5 / 3,0 mm (.020 / .039 / .059 / .079 / .098 / .118")

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Engine / Cylinder head

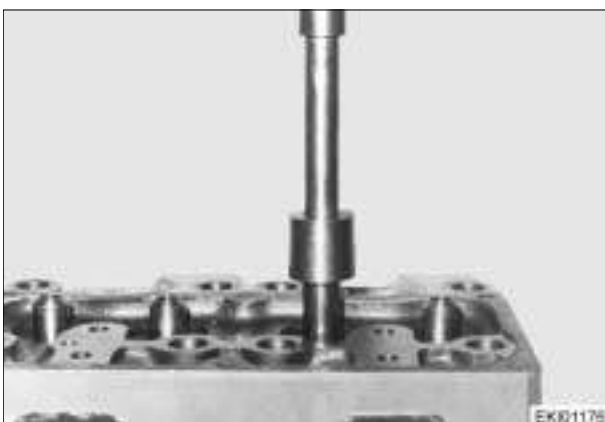
Removing and refitting valve guides.

G**Removing the valve guide**

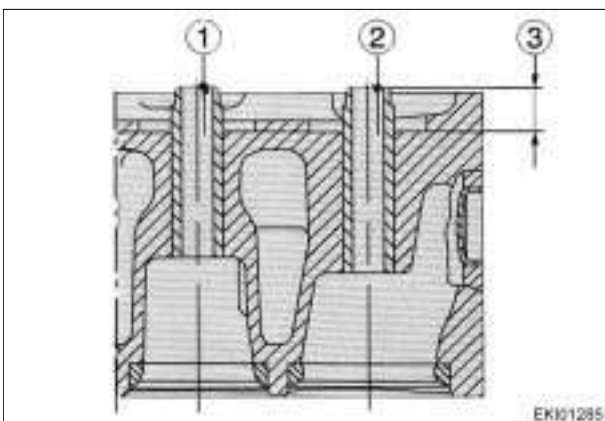
Removing and refitting the cylinder head.

Removing and refitting the valves.

Position cylinder head on a press with the combustion chamber side facing upwards. Use a mandrel to press out the valve guide.

**Refitting the valve guide**

Lubricate new valve guides and using a mandrel and spacer sleeve, press in from the rocker arm side.



Valve guides differ in length only.

1 Exhaust = shorter guide

2 Intake = longer guide

3 Press-in depth (see Servicing Data)

Press-in depth is governed by the spacer sleeve.

Note:

After replacing the valve guides it is necessary to re-grind the valve seats (see Servicing Data and instructions by the manufacturer of the valve lathe used in your workshop).

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Engine / Cylinder head

Replacing valve seat insert

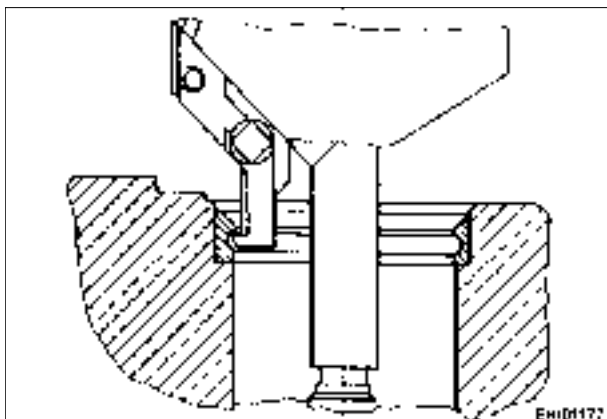
G

Remove valve seat insert

Note:

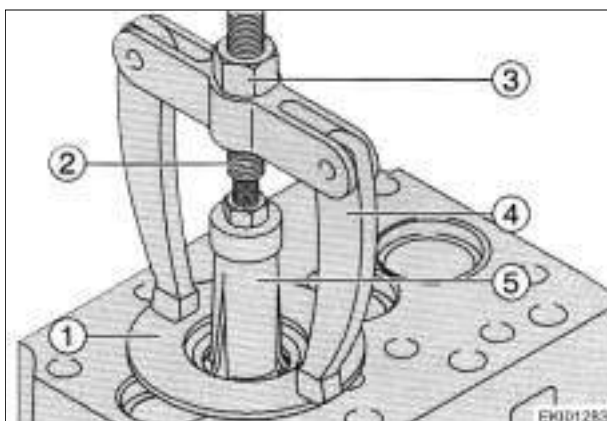
When replacing valve seat inserts, it is advisable to replace valve guides, since this is the only way to guarantee precise reseating of the new inserts.

A tool was therefore designed with which valve guidance and valve seat inserts can only be replaced together, or alternately the valve guides alone.



Using a valve lathe machine a 3 - 4 mm (.118-.157") wide groove in the valve valve seat inserts.

Insert internal extractor claw in the machined groove and tighten.

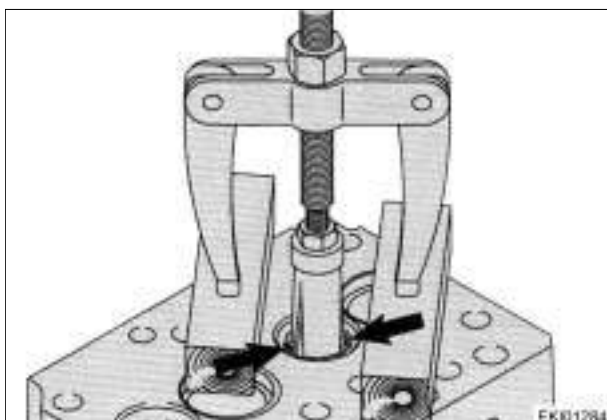


Note:

To prevent damage to the cylinder head face, insert a washer (1) or other suitable object underneath the feet (4) of the support legs.

Screw spindle (2) into extractor (5), align support legs (4) and extract valve seat insert by turning the nut (3).

Clean contact surface of insert in the cylinder head.



If a valve lathe is not available, proceed as follows:

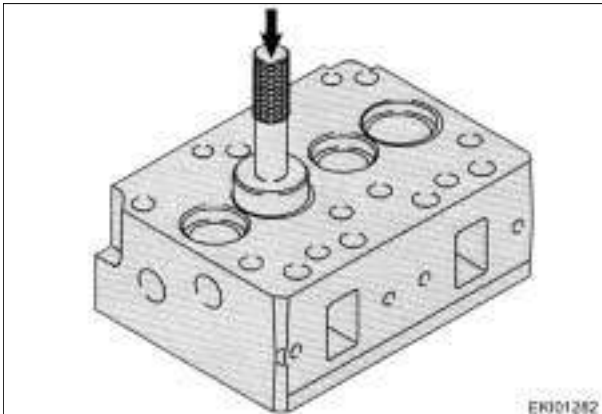
- Using an arc-welder, apply two welding beads to the valve seat (arrowed).
- Extract valve seat insert.
- Clean insert contact surface in the cylinder head.

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Engine / Cylinder head

Replacing valve seat insert

G**Replacing valve seat insert**

Immerse cylinder head in a hot water bath and heat up to approx. 80°C (176°F).

Supercool new insert to approx -200°C (-328°F) and insert into the cylinder head.

When the temperature has equalized, check by pressing in a mandrel to the end position.

Refit valve guides.

Note:

When replacing the valve seat inserts, it is necessary to re-machine valve seats.

Note:

After cooling down: re-machine valve seats.

After re-machining: clean cylinder head and check for leaks with a cylinder detector.

Overheating of the cylinder head (above +200°C / 392°F) causes the core plugs to become loose, and they must be replaced.

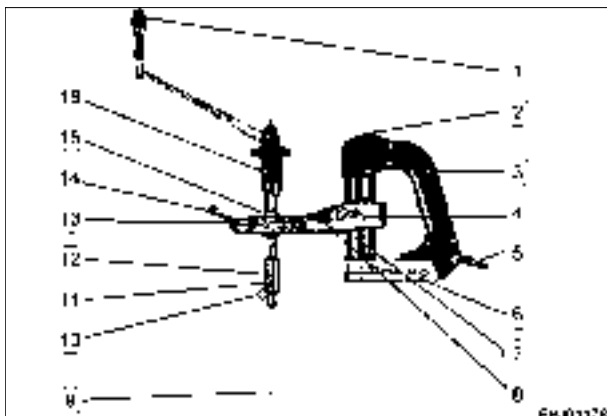
To do this, clean core holes, blow out ducts and press in new core plugs using a mandrel and "LOCTITE 270".

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Fav 900

Engine / Cylinder head

Re-machining the valve seats

G**Re-machining the valve seat**

(with Mira-Precision valve seat re-machining tool)

1. Crank
2. Rocker switch
3. Hand grip
4. Lubricating nipple
5. Mains supply
6. Solenoid valve with coil
7. Guide tube
8. Swivel arm
9. Guide mandrel
10. Cutter
11. Allen screw
12. Chuck
13. Lubricating nipple
14. Clamping lever
15. Guide ball
16. Thrust nut with mm-dial

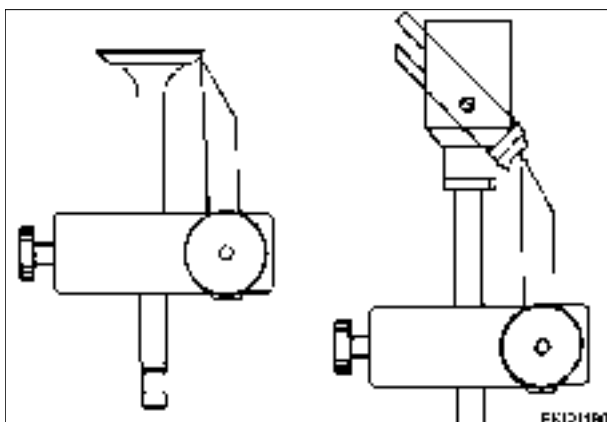


Select suitable guide mandrel, insert with open-end wrench (SW 12) and tighten.

Note:

For maximum precision, the guide mandrel must have a perfect fit.

Select cutting with appropriate valve face with a seat angle and insert.



Adjust cutter with setting gauge and secure with Allen screw.

Using a guide mandrel insert tool into valve guide.

Fav 900

Engine / Cylinder head

Re-machining the valve seats

G

Release clamping lever, fit solenoid flange on clamping plate, adjust the height to ensure the cutter is clear of valve seat.

Set rocker switch at position 1.

Tighten clamping lever.



Re-machine valve seat by evenly turning the crank handle in clockwise direction, this moving the thrust nut at the same time.

Note:

Turn the crank firmly and evenly but never in anticlockwise direction since this could cause the carbide cutting edge to break out.



When the re-machining process is completed, reduce working pressure of the cutter for a further 2-3 turns without thrust.

While still turning, reverse the thrust nut by 2-3-turns.

Switch into position 2 : to eliminate magnetic field.

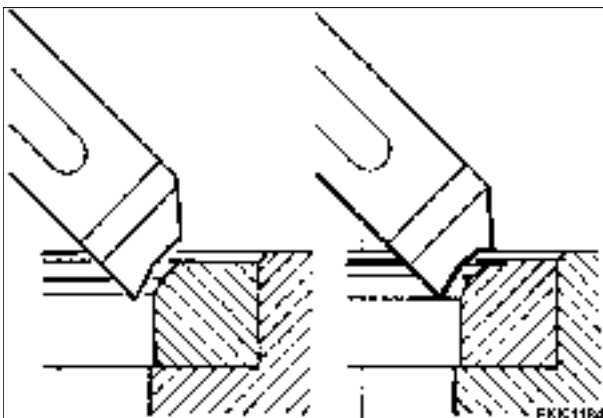
Now pull the entire Mira-tool out and insert into the next valve guide where the centering process is to be repeated.

The cutter setting remains the same for all intake exhaust valve seats.

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Engine / Cylinder head

Re-machining the valve seats

G

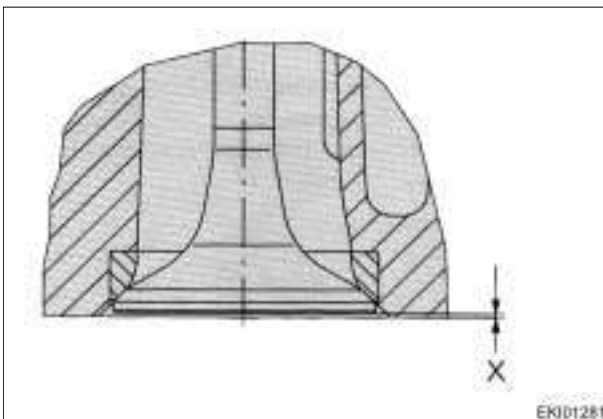
Observe specified seat angle.

**Note:**

When re-machining the valve seat inserts, only the minimum of material should be removed. Reference value will be value of valve recess.

If the cylinder head faces are re-machined (max. 1 mm (.039")), it is necessary also to re-machine the inserts in order to obtain the correct valve recess: When fitting new valves and inserts, machine out cylinder head to amount relative to the skimming of the cylinder head face.

Having skimmed the cylinder head face and machined the valve seat insert, the theoretical valve seat may have become too deep in the cylinder head or the seat surface may be too wide.



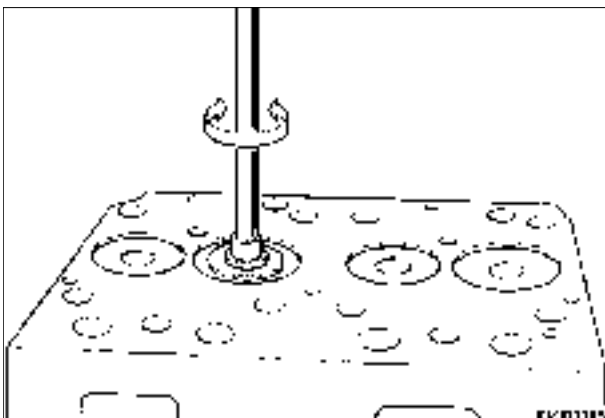
In this event the valve seat insert must be replaced.

Always observe the correct value for valve recess.

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Engine / Cylinder head

Reseating valves

G**Reseating valves**

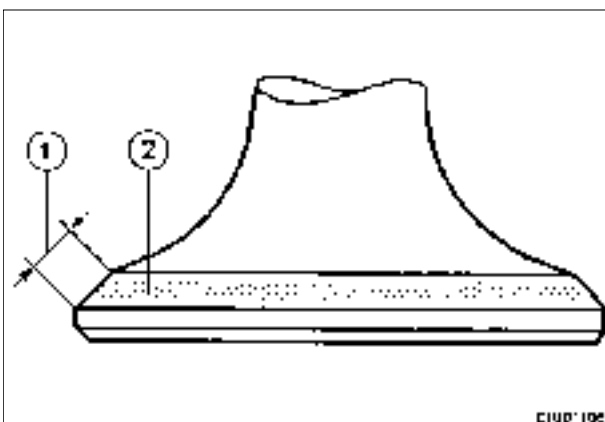
Apply grinding paste to the valve seating face.

Lubricate valve guide and insert valve.

With a valve grinding tool, regrind valve seat with spinning movements.

Note:

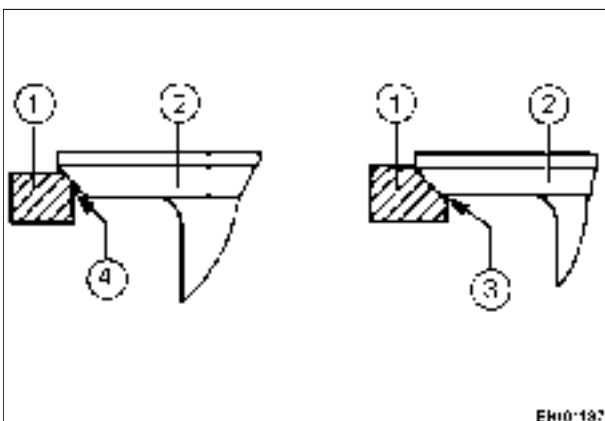
Do not allow grinding paste to come into contact with the valve stem and guide.



The re-grinding process of the valve seat must produce a perfect, closed grinding pattern.

The width of the grinding pattern is the result of a correctly machined valve seat insert.

1. Valve cone face
2. valve seat



1. Valve seat insert
2. Valve
3. Valve seat - too wide
4. Valve seat - correct

Note:

Excessively wide valve seats are favoring carbon deposits,

- Valve may leak -

Excessively narrow valve seats prevent rapid heat transfer from the valve to the cylinder head.

- Valves become scorched-



Repair instructions

Repair

Fav 900

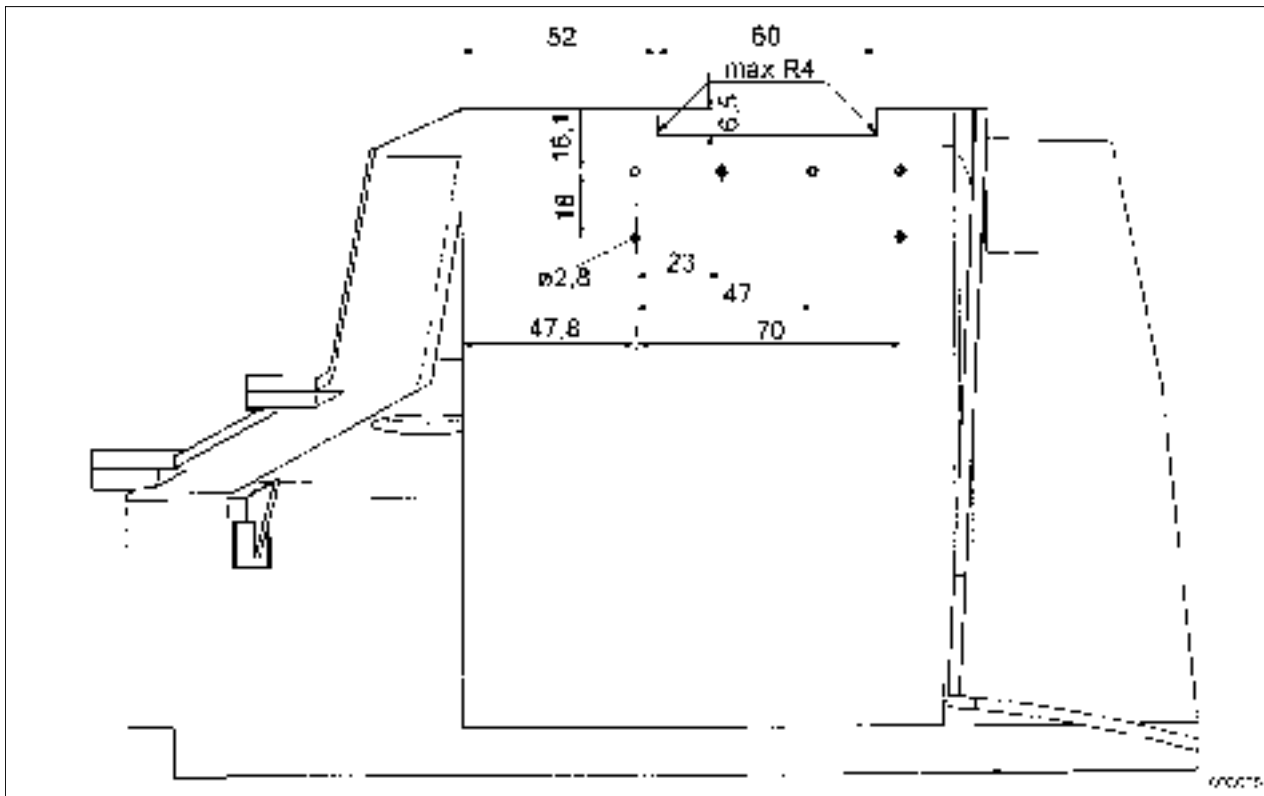
Engine / Speed control

Manual control modification to standard specification

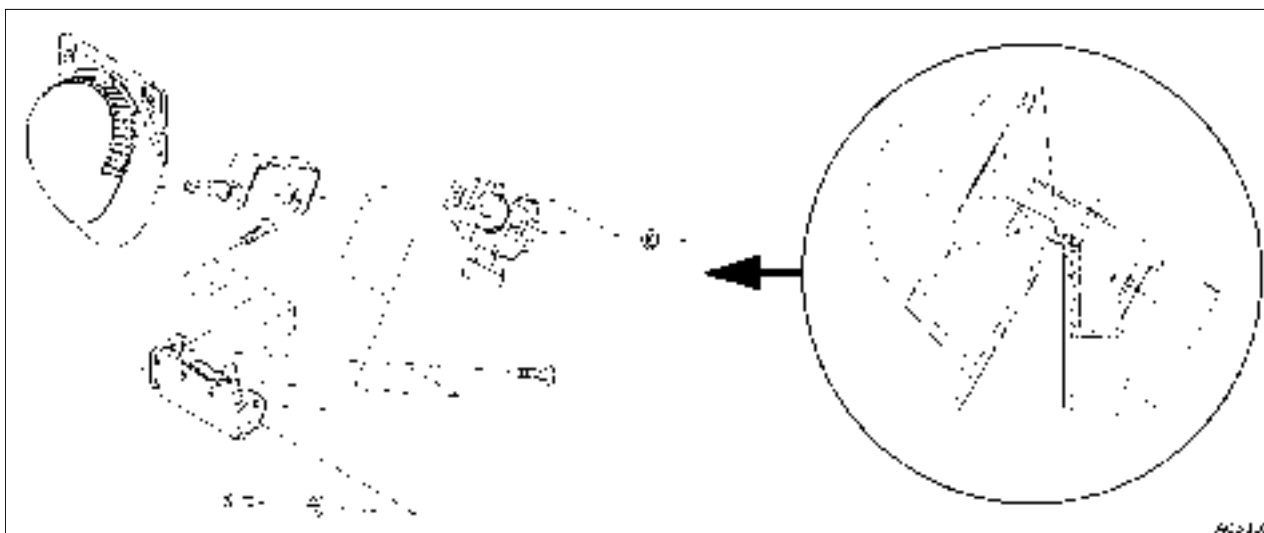
G

Serial no. 0401 - 0600

View of control console from rear



- Remove control console
- Rework 6.5 mm x 60 mm groove in accordance with drawing.
- Drill 6 bores of 2.8 mm \varnothing in accordance with drawing.



- Fit manual control as shown.

EKI 07.01 Schr en

AGCO GmbH & Co.

Johann-Georg-Fendt-Str. 4 D-87616 Marktoberdorf

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Draining the coolant

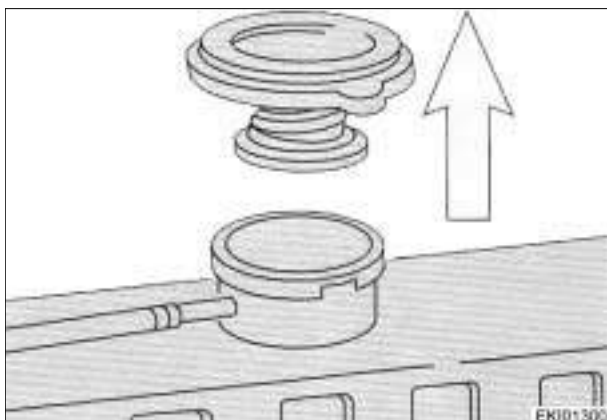


Caution:
Hot coolant may cause severe burns during draining!

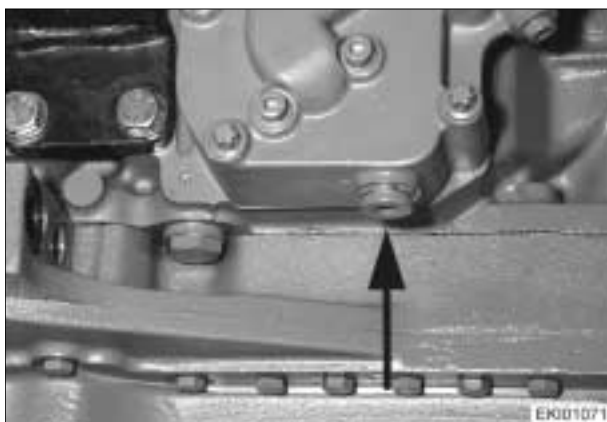
Drain coolant only on a **cooled down** engine as described:

Note:

Collect coolant in a pan and dispose of it properly!



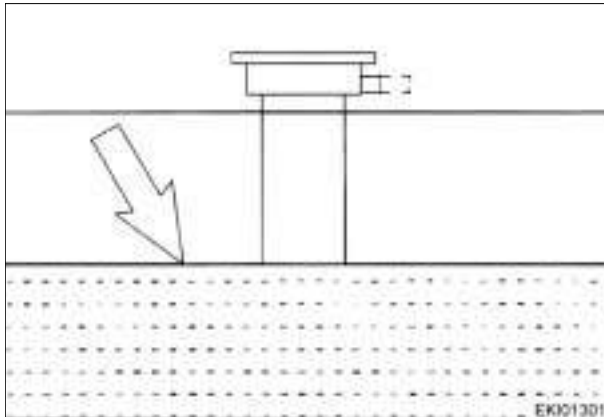
- Open shortly cover from expansion tank in order release pressure.



- Unscrew draining screws from Oil cooler case
- Then unscrew cover
- Drain coolant using a container with sufficient capacity

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**Filling Coolant**

(only on a cooled down engine)

Fill in an adequate mixture of tap water and antifreeze based on Ethylene - Glykol and corrosion preventer.

Refer to Lubricants - Chapter I 0000 Reg. A

Use a proper ratio water / Antifreeze.

- Tighten screw on oil filter body using a new gasket.
- Fill in slowly coolant mixture up to the adequate coolant level
- Put in place screw cap
- After a short engine operation time , check coolant level again

**Caution:**

If coolant level needs to be checked , the engine being at operating temperature, first open cover with safety valve to release pressure - then open carefully.

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Fav 900

Engine / Cooling

Removing and refitting the thermostatic valve

G**Removing the thermostatic valve**

- Drain coolant, chapter G 2050 Reg G
- Disconnect coolant hose from thermostatic valve.
Unscrew and remove the two screws (SW) and remove thermostat housing.



Remove thermostatic valve.

Check correct operation of thermostat as following:

- Place thermostatic valve in pot filled with water
- Heat water
- Measure opening temperature with an adequate thermometer
- Measure opening distance

Replace faulty thermostatic valve

**Refitting thermostatic valve**

Fit thermostatic valve with new O-seal "ensuring that the ball valve is pointing upwards" (TOP).

Note:

Never run engine without a thermostatic valve or bypass inserts.

Fit thermostat housing cover, insert screws and tighten. attach feed hose to radiator. Fill up with coolant.

**Replacing temperature sensor**

Disconnect connections

Unscrew temperature sensor from coolant pipe.

Screw in temperature sensor using "Loctite 648" and tighten to specified torque.

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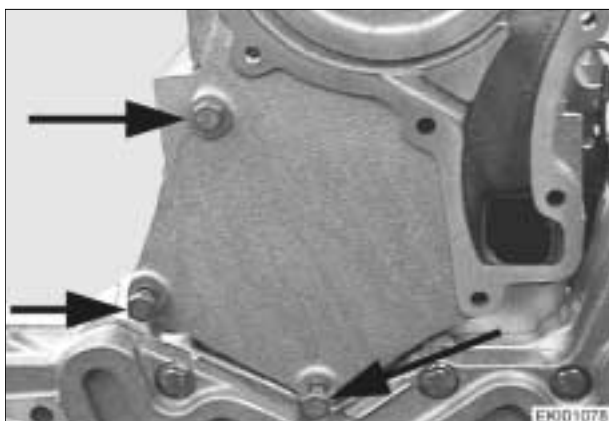
Fav 900**Engine /Cooling system
Removing and refitting water pump****G****Removing the pump lift section**

- Drain coolant.
- Unscrew fan
- Remove feed and drain lines.
- Remove V-belt.
- Remove cooling lines to air compressor
- Remove generator belt tensioner screw (1) top left
- Remove generator pod (2) on the top left
- Remove hub of Viscosity clutch



Unscrew and remove pump lift section.

Clean sealing faces of pump lift- and delivery sections.

**Removing the pump lift section**

Remove three screws (arrows) and remove the pump lift section.



Clean sealing faces of pump lift section and engine block.

Refitting the water pump lift section

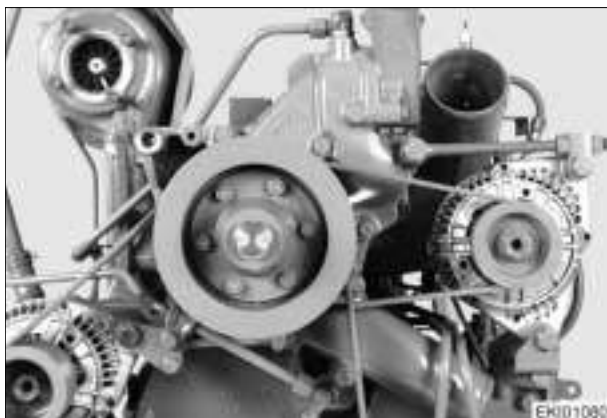
Install pump lift section with new gasket.
Tighten screws to specified torque.

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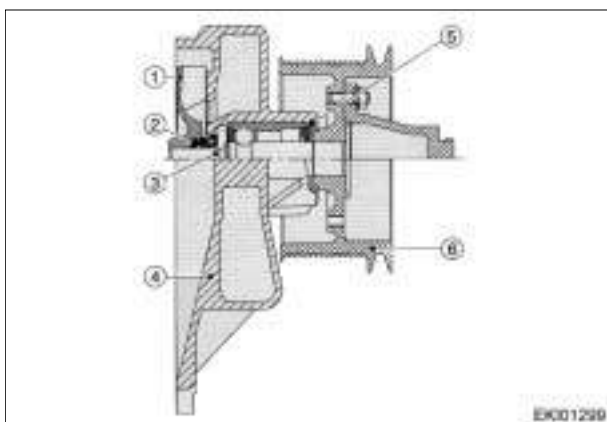
Fav 900

Engine /Cooling system

Removing and refitting water pump

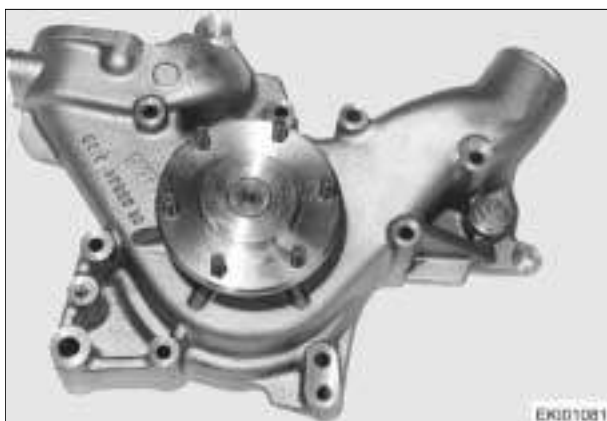
G**Refitting the water pump**

Replace seals on connecting pipe.
 Install water pump with new gasket.
 Tighten fscrews to specified torque.
 Put all removed parts back into place
 Fill up coolant.

**Overhauling the water pump.**

1. Impeller
2. Sliding ring gasket.
3. Water pump bearing.
4. Pump housing.
5. Circlip
6. V-belt pulley

Remove water pump



Clamp water pump lift section in a vise (use non-metallic jaws).

Remove V-belt pulley with pulling device.

Remove circlip from pump housing.

Invert water pump and fit into hydraulic press

Using a suitable mandrel (same as bearing shaft) press out bearing.

Note:

When the bearing is pressed out, the pump impeller is released.



Using a suitable mandrel, press out and replace sliding ring gasket.

Reassambling the water pump

Using pressing bush (special tool) press in a new sliding ring gasket as far as possible. See notes on fitting gasket !

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Fav 900

Engine /Cooling system

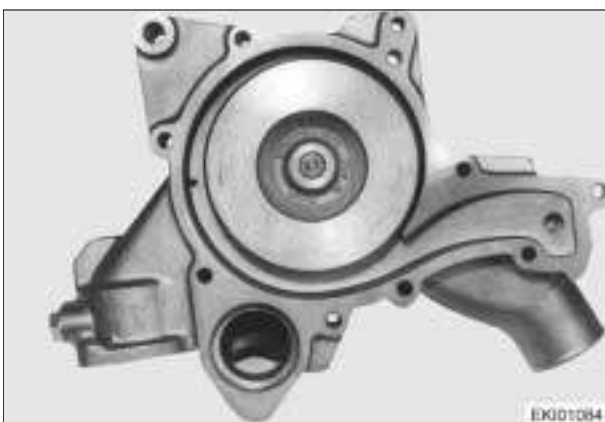
Removing and refitting water pump

G

Using a pressinf bush, press bearing into pump housing until contact is made.

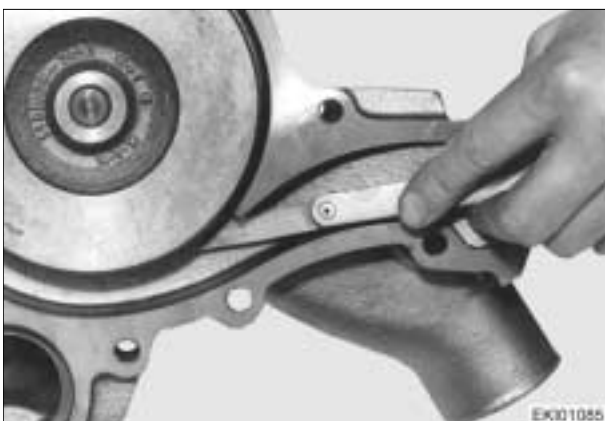
Insert circlip.

Press pulley into shaft flush with the plate



Invert water pump and let it rest on hub and bearing shaft.

Fit impeller to bearing shaft.



Gradually press impeller onto bearing shaft, using gauge to check for correct clearance.

Rotate impeller and check clearance at several points.

| | | |
|----------------|---|----------|
| Fav 900 | Engine /Cooling system Removing and refitting water pump | G |
|----------------|---|----------|

When repairing do not replace pump unless a leak has been found.

Depending on design, the sliding ring gasket of the water pump may allow small amounts of coolant to leak which may lead to water marks underneath the drain hole.

This does not call for a pump replacement.

It is advisable to check out the following points before replacing or repairing the pump:

- Is there a visible and repeated loss of water from the coolant on the circuit.
- Whether the loss is caused by discharge from the expansion tank (e.g. too full) or by leakages from the hoses, radiators etc.

Water pump needs to be replaced only if water is dripping while the engine is running or after it is switched off.

Fitting instructions for sliding ring gasket :

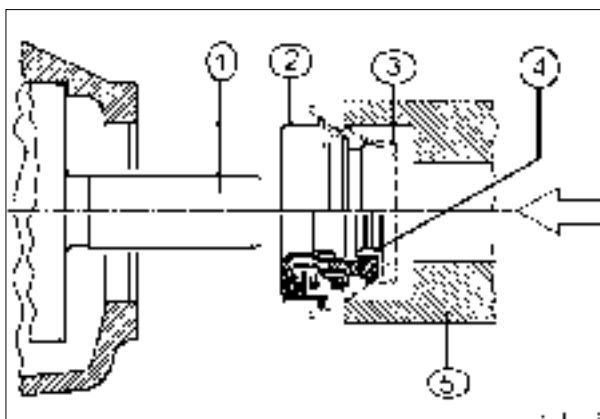
The ring gasket must be mounted "wet". Coat the shaft and sleeve (4) with a mixture of 50 % Water und 50 % alcohol or 35 % to 50 % antifreeze.

Do not use any other lubricant

Fit gasket "wet", i.e. coat retaining collar (1) and pump shaft (2) with a mixture of 50% water and 50% alcohol or a mixture of water and 35 to 50 % antifreeze to MAN in-house standard 324.

If there are any signs of scoring however slight, or other minor damage, apply a bead of Dirko Transparent sealing agent.

Position gasket with plastic cap (3) on shaft (1) and using assembly tool, press into housing until tool makes contact with the housing. Remove plastic cap.



Note:

Investigations have shown that in most cases pump damage is caused by the use of unsuitable coolants.

For trouble free operation use only radiator anti-corrosives by Fendt .

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Fav 900**Engine / Cooling system**
Removing and refitting coolant pipe**G****Removing the coolant pipe**

Drain coolant while engine is cold. Use a clean pan with sufficient capacity

- Remove injection lines
- Remove intake pipe
- Disconnect temperature sensor

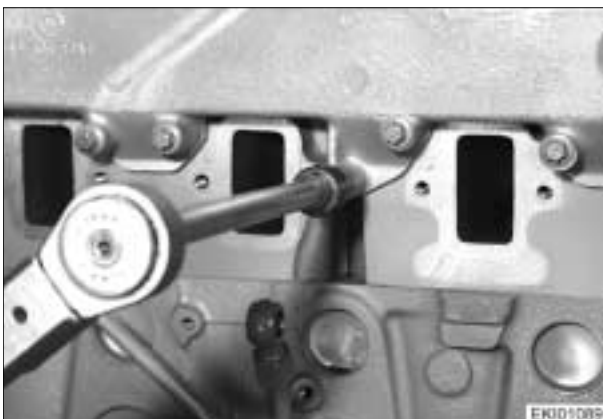


Unscrew and remove coolant pipe.

Remove gasket and clean all sealing faces.

**Refitting the coolant pipe**

Replace O-Rings of connecting pipe. Fit coolant pipe using new gaskets.



Insert screws and tighten to specified torque.

Note:

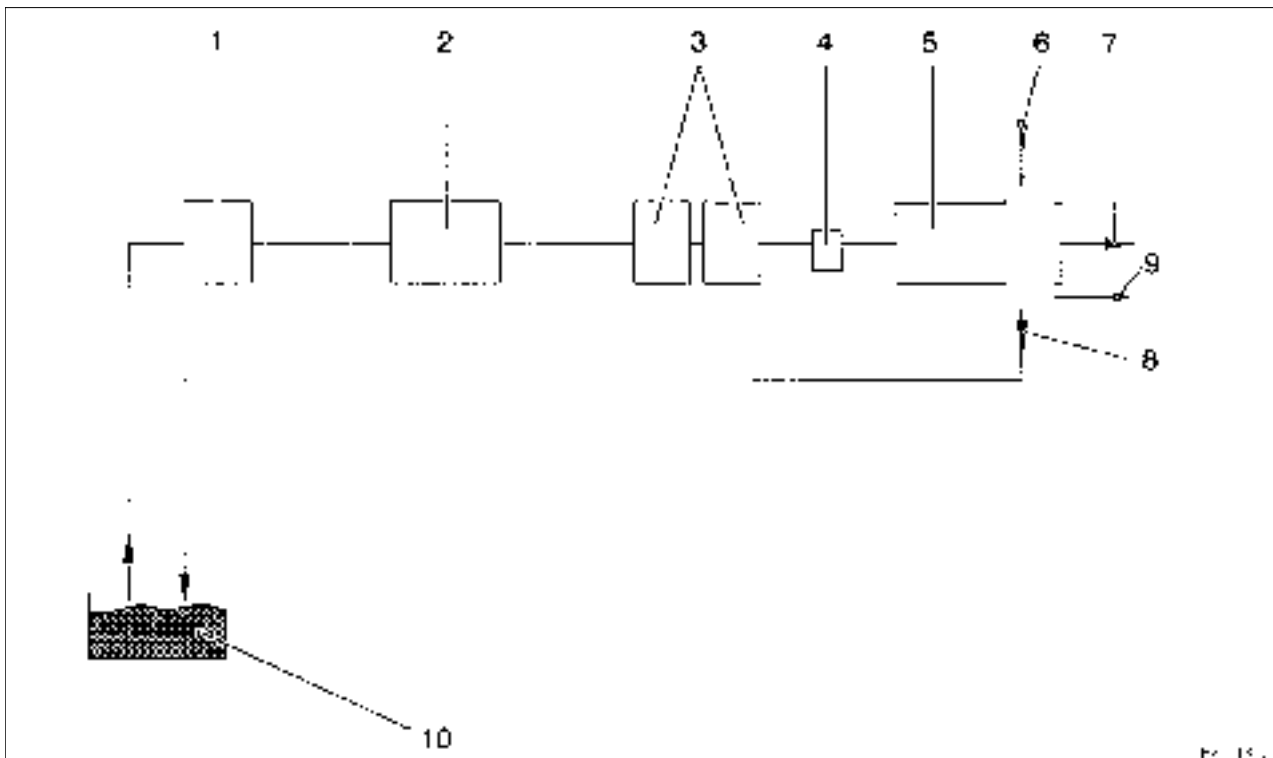
Insert the longer screws into the brackets for injectors.

- Reconnect temperature sensor,
- Refit intake pipe.
- Refit injection lines.
- Fill up with coolant.

| Date | Version | Page | Removing and refitting coolant pipe | Capitel | Index | Docu-No. |
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Fav 900

Engine / Fuel system
Layout of fuel system

C

1. Pre-filter with manual fuel lift pump
2. Fuel lift pump
3. Fuel filter
4. Measuring point for fuel pressure.
5. Injection pump
6. Return line from injection pump
7. Line to injector
8. Return tank
9. Line to heater plug
10. Fuel tank

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Layout of fuel system

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Fav 900

Engine / Fuel supply system

Fuel pre filter / Cartridge

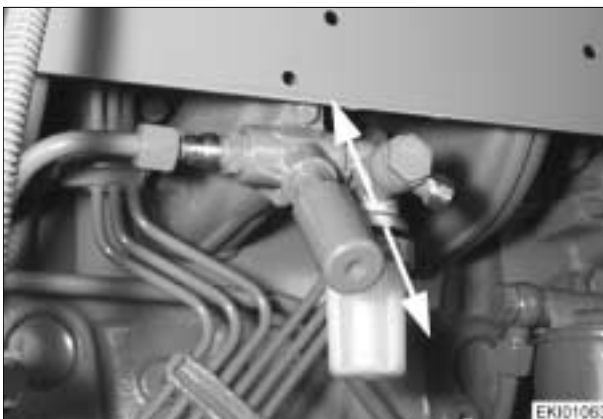
G**Cleaning pre - filter**

Disassemble pre - filter:

- Unscrew filter body



- Clean Filter body (1) and Sieve (2) with clean diesel fuel and dry it with compressed air
- Re - assemble with a new gasket
- Tighten filter body



- Actuate manual pump until overflow valve toward injection pump opens audibly.
- Start engine
- Check Pre - filter for eventual leaks

Note:

Purge air from fuel supply system - Chapter 2060 Reg. G

Fav 900

Engine / Fuel supply system

Fuel pre filter / Cartridge

G**Removing and refitting main fuel filter**

Disconnect fuel lines (1) .

Remove screws (2) and take off fuel filter.

Reassemble in reversed order and connect fuel lines with new sealing rings.

Purge air from fuel supply system.

**Replace filter element**

- Loosen filter element with chocking wrench and unscrew element manually
- Wet gaskets of replacement element with fuel.
- Screw in replacement element and tighten firmly by hand.
- Purge air from fuel supply system - Chapter 2060 Reg. G

**Note:**

Used fuel filters are hazardous waste

| Date | Version | Page | Fuel pre filter / Cartridge | Capitel | Index | Docu-No. |
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Fav 900

Engine / Fuel Supply System

Purging Air from Fuel Supply System

G

For Operating EDC Injection System, careful purging of the fuel Supply system is compulsory!

Unscrew purging screw of the fuel filter by one to two turns.



Actuate manual fuel lifting pump until fuel flows without any bubbles.

Repeat this procedure on the second purging screw

Check for leaks within the fuel supply system.



If air reaches the high pressure section of the injection pump (Type VP 44), a further purging step is to be carried out:

Purging the high pressure system becomes necessary when the engine does not start any more or if the tank went dry.

On steep slopes and with little fuel in the tank, air may be aspirated by the injection pump eventually. (Failure Code)

or after repairs on the fuel supply system.

Following steps must be carried out on at least 3 following cylinders :

- Loosen nut of the injection line on the injection valve approx 1/2 turn.
- Crank engine with starter motor until fuel runs out of .
- Tighten Nut (10 Nm) then for 60° angle.

Important:

Start engine and run it idle for approx. 30 sec in order to allow the complete system to purge residual air.

Caution:

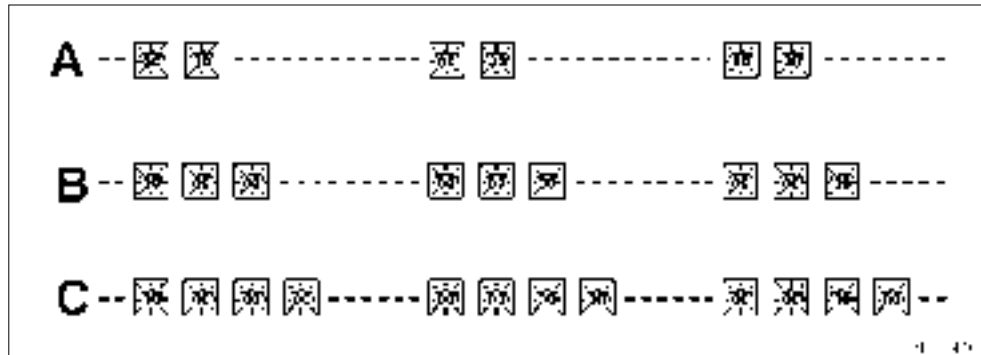
Fuel runs within the lines! Any fuel spill must be cleaned up with rags . Be aware of safety and environmental regulations!

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| 02.11.2000 | a | 1/1 | 2060 | G | 000001 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Engine / Cold-start system Faults in cold-start aid | B |
|---|---|----------|

The A012 - ECU detects faults in the cold-start aid and indicates them by flashing the heater-plug indicator using various flashing codes.

The indicator flashes for approx. 60 seconds.



The following are detected as faults:

Fault code A

- Interruption in R001 - heater-plug coil or its supply lead.

Fault code B

- Defective FU fuse in A012 - ECU, or absence of supply voltage (B+).

Fault code C

- Interruption in line to Y025 - valve, or in its coil.

In all these faults only the telltale flashes. Y025 - valve and R001 - heater plug remain switched off.

Note:

For details of measuring and testing cold-start aid see:

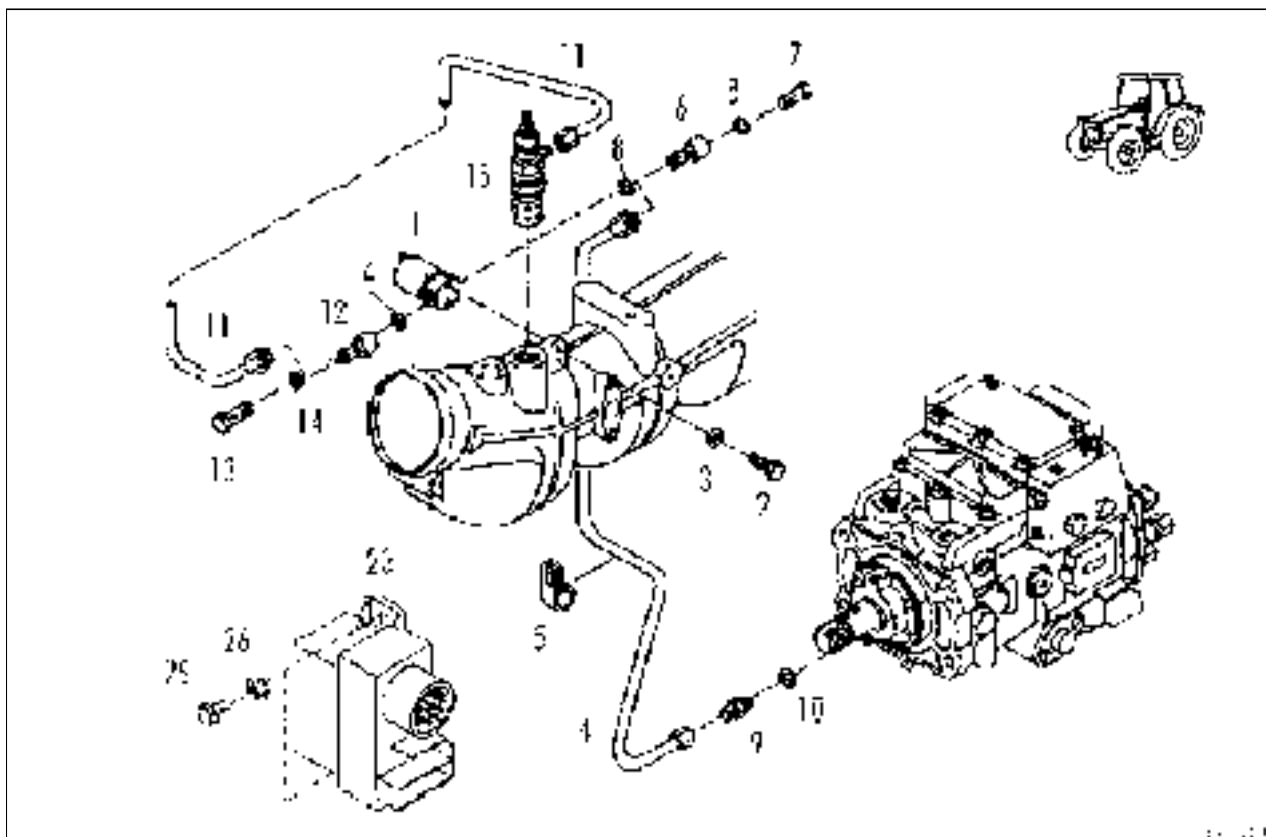
Chapter 9000 Reg. E - A012 - ECU, cold-start aid

Chapter 9000 Reg. E - Y025 / R001 - valve / heater plug

| Date | Version | Page | Faults in cold-start aid | Capitel | Index | Docu-No. |
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| 30.08.2001 | a | 1/1 | | 2180 | B | 000001 |

Fav 900

Engine / Cold-start system
Cold-start system connection plan

C

| Item | Designation | Item | Designation |
|------|------------------------------|------|----------------------------|
| 1 | Y025 - valve, cold-start aid | 10 | Usit ring |
| 2 | Hexagon screw | 11 | Fuel line |
| 3 | Washer | 12 | Banjo union |
| 4 | Fuel line | 13 | Hollow-core screw |
| 5 | Clip | 14 | Usit ring |
| 6 | Banjo union | 15 | R001 - heater plug |
| 7 | Hollow-core screw | 23 | A012 - ECU, cold-start aid |
| 8 | Usit ring | 25 | Hexagon screw |
| 9 | GE union | 26 | Washer |

Note:

For details of measuring and testing cold-start aid see:

Chapter 9000 Reg. E - A012 - ECU, cold-start aid

Chapter 9000 Reg. E - Y025 / R001 - valve / heater plug

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| 30.08.2001 | a | 1/1 | Cold-start system connection plan | 2180 | C |
| | | | | | 000001 |

Fav 900

Engine / Cold start booster

Removing and refitting heater plug

G**Remove heater plug**

Disconnect the heater plug.

Unscrew threaded union of fuel line.

Release lock nut of heater plug and remove plug.

**Refitting heater plug**

Unscrew the lock nut on the heater plug as far as possible. Wetten threads with "Curil T" sealant

Screw in heater plug to the end position of the lock nut and align with fuel line.

Reconnect fuel line and electrical connections.

Tighten lock nut.

**Checking solenoid valve for leaks**

Remove fuel line from heater plug: Make sure there are no fuel leaks when the engine is running and warm.

Removing the solenoid valve

- Remove fuel line.
- Remove electrical connection from valve.
- Unscrew both screws and remove solenoid valve

The valve cannot be repaired.

Damaged valves must be replaced.

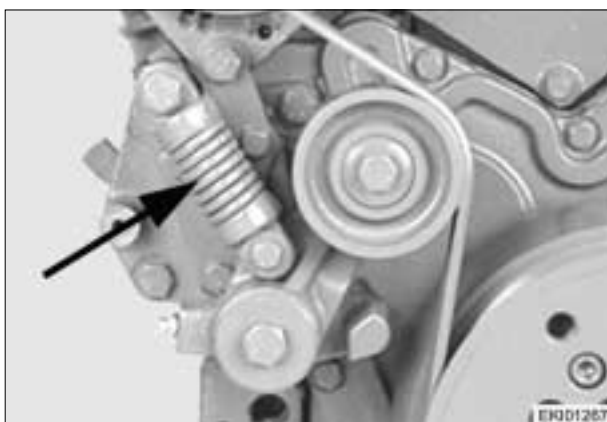
Refitting the solenoid valve

- Fit valve bracket.
- Connect fuel lines using new seals.
- Re- connect solenoid valve.

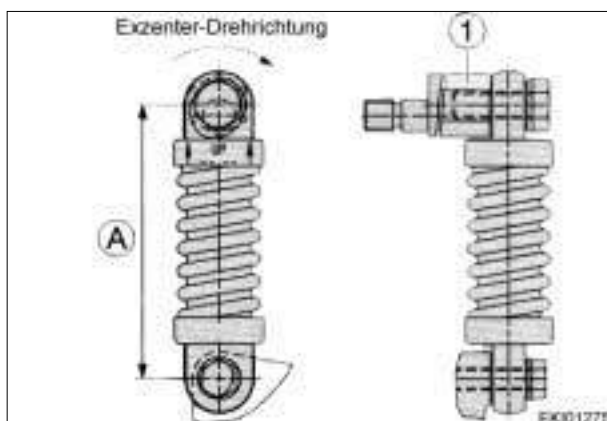
Fav 900**Engine / Short block
Power - belts****G****Generator right****Checking condition**

Power belt is maintenance free

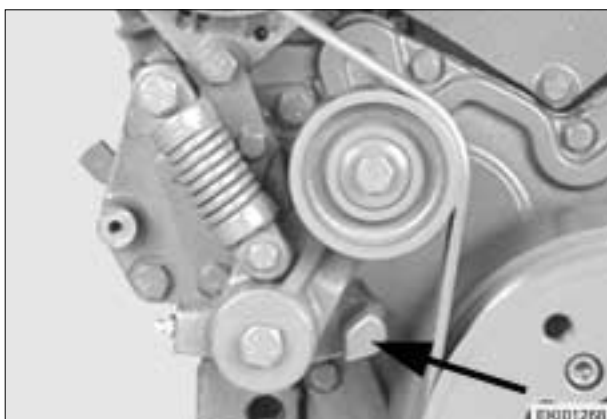
- Check belts for cracks, oiling-up, and signs of overheating and wear.
- Replace damaged belt.

**Checking tension**

Tensioning device (arrow) keeps permanently a constant tension on the power belt.

**Tensioner must be adjusted as follows:**

1. New tensioner: distance (A) = 92 ± 1 mm (3.62" \pm .04").
2. If distance (A) = 100 mm (3.94"), turn excenter to right to reach a distance of (A) = 92 ± 1 mm (3.62" \pm .04"), at least that the excenter (1) allows a reduction of A down to min 92 mm (3.62").
3. If the distance reaches (A) = 100 mm (3.94") and the excenter (1) is at the end position, the power belt must be replaced. Adjust a new power belt according to Point 1.



The replacement of the powerbelt becomes necessary if the tensioning lever comes to rest on console (Arrow).

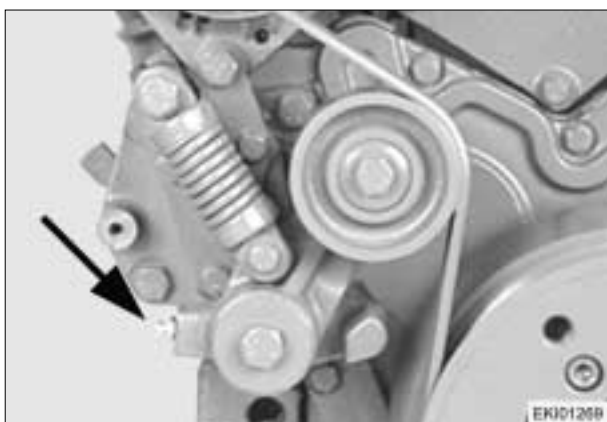
Note:**Distance of 100 mm (3.94") may cause a total failure of the belt drive because of insufficient tension.**

Fav 900**Engine / Short block
Power - belts****G****Replacing the powerbelt**

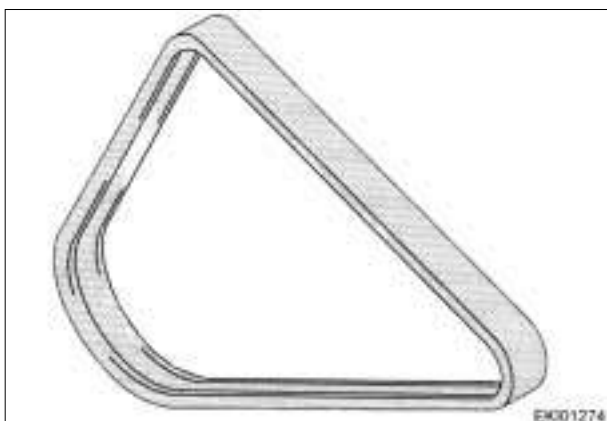
- Place adequate tool onto square shaft.
- Release tension from tensioner
- and remove powerbelt from the pulley .

Refitting :

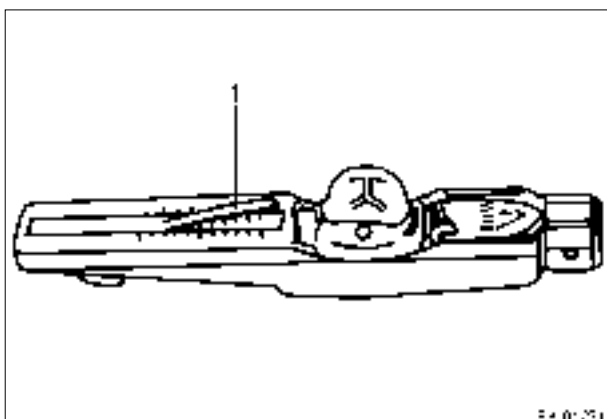
- Place powerbelt onto pulleys of crankshaft , generator and coolant pump.
- Set tensioner completely back.
- Place powerbelt onto pulley , release tensioner, remove special tool.



Grease the greasing point.

**Alternator left****Checking Powerbelt condition**

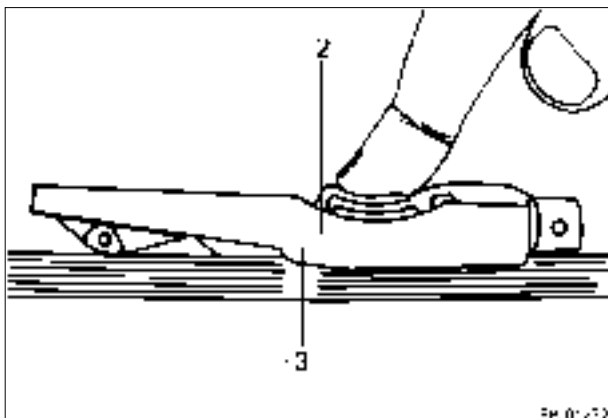
- Check belts for cracks, oiling-up, and signs of overheating and wear.
- Replace damaged belt.

**Checking tension**

For checking V-belt tension, use V-belt tension gauge.

- Press indicator arm (1) in the scale.

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| 26.02.2001 | a | 2/3 | Power - belts 2210 | G | 000016 |

Fav 900**Engine / Short block
Power - belts****G**

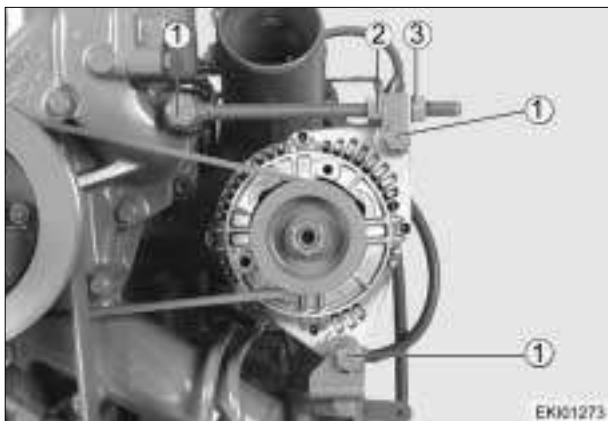
- Position tension gauge (2) in the center between the generator pulleys and the crankshaft.
- Slowly push pressure pad (3) down until the spring snaps out audibly and the indicator arm moves upwards.

Continued pressing after the spring has snapped out will result in an incorrect reading!

Determining the span force

| Span forces measured on the kg-scale of instrument | |
|--|----------------|
| Belt width | Poly V 790 K 4 |
| Newly fitted | |
| When fitting | 60 |
| After 10 minutes running | 45-50 |
| Minimal span force | 30 |
| Re adjust tension if minimum tension is reached. | 40 |

- Read tension force at the point of intersection of the upper side of the indicator arm (1) and the scale.
 - Before reading the values make sure that the indicator arm remains in its position.
- If the value does not agree with the specified setting, the Powerbelt tension must be reajusted.

**Tensioning / replacing powerbelt**

- Release clamping bolts(1).
- Loosen counternut (3).
- Adjust checking nut (2) for correct powerbelt tension.
- Retighten counternut and clamping bolts.

When replacing powerbelts, slacken checking nut (3) and swing alternator inwards.

Fav 900

Engine / Short block
Removing and refitting the starter engine

G**Removing the starter**

Disconnect earth terminal from battery.

Remove cables terminal 30 (thick cable) and terminal 50 from the starter.



Unscrew the screws and a nut from the starter motor flange and remove the starter motor.

Clean exterior of starter engine and check for damage.

Check flywheel ring gear for wear and damage by actuating the crankshaft by hand.

Check in particular the points which final engine oscillations occur ; i.e. when turned off, there are points where the engine comes to rest.

The starter engine pinion engages in these positions during start up.

On 6-cylinder engines these points are staggered by 180° ; i.e. there are 3 points.

To replace the starter ring gear see chapter 2000 Reg G.

**Refitting the starter**

Refit the starter in reverse order of removing, making sure cables are connected correctly. Observe torque values.

Reconnect battery.

On completion, check starter for correct functioning.

Fav 900

Engine / Short block

Removing and refitting generator

G**Generator right****Removing generator**

Disconnect earth cable from the battery.
Remove connections B+, D+ and W from the generator.



Remove V-belts.
Unscrew bolts (arrows).
Remove generator.

**Refitting generator.**

- Refit the generator.
- Check, and if necessary, correct cable connections.
- Tighten fixing bolts to specified torque.
- Tension V-belt.
- Fixing cables on generator.

After completion check generator for correct functioning.

Check voltage and charging current .

**Remove generator, left****Remove generator**

Disconnect earth cable from the battery.
Remove connections B+, D+ and W from the generator.

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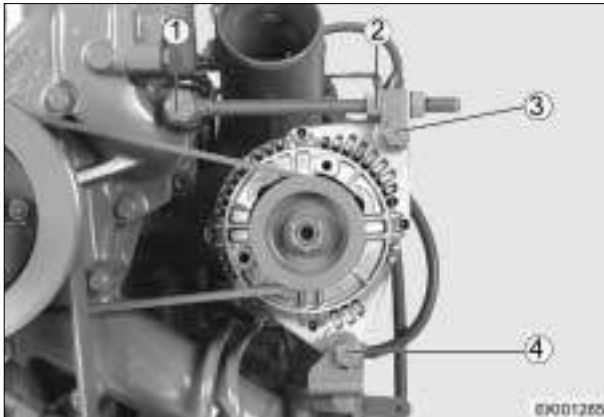
Removing and refitting generator

<https://www.truck-manuals.net/>

Fav 900

Engine / Short block

Removing and refitting generator

G

Loosen bolts(1), (3) and (4) from the generator and unscrew tensioning nut (2).

- Push generator toward the engine and take off the power belt.
- Unscrew the upper screws(3).
- Unscrew the lower screws (4).
- Remove generator.
- Check screw and guide for damage (i.e. cracks, bends, etc.) replace if necessary.



Refitting generator

- Refit the generator.
- Check, and if necessary, correct connections.
- Tighten fixing to specified torque.
- Tension V-belt.
- Fixing cables on generator.

After completion check generator for correct functioning.

Check voltage and charging current .

Fav 900

Engine / Short block

Removing and refitting air compressor

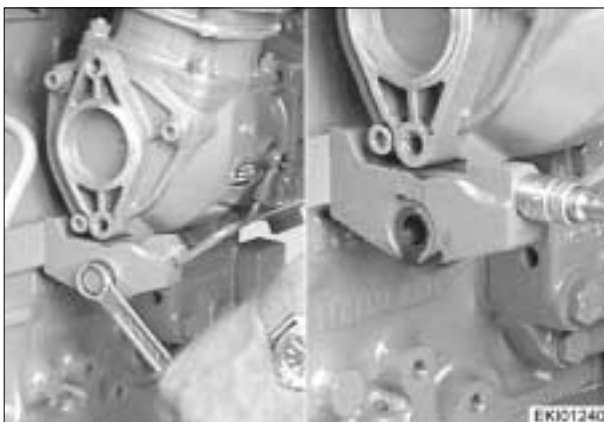
G**Removing the compressor**

Remove hydraulic pump or rear end cover,
Unscrew fan frame support bracket.

Remove oil feed line, air intake line and
compressed-air line.

Note:

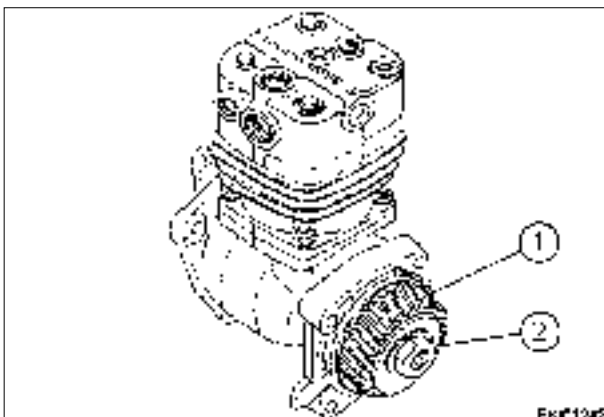
**For ease of assembly, mark position of
eccentric bearing support on timing case.**



To remove air compressor :



Unscrew the four screws and remove
compressor.

**Replace compressor**

To remove compressor drive gear (1) loosen nuts
(2).

Note:

**Do not swage compressor drive gear into a
vise (Even with soft jaws) for tightening or
loosening the nut of the compressor drive
gear. Risk of damaging drive gear!**

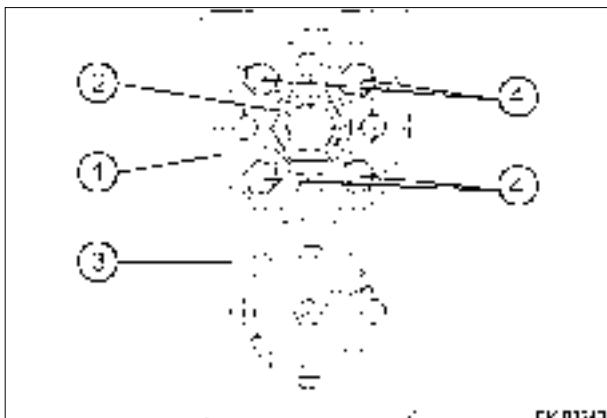
**For this reason, use mounting plate (3)
(Special Tool), as shown.**

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Fav 900

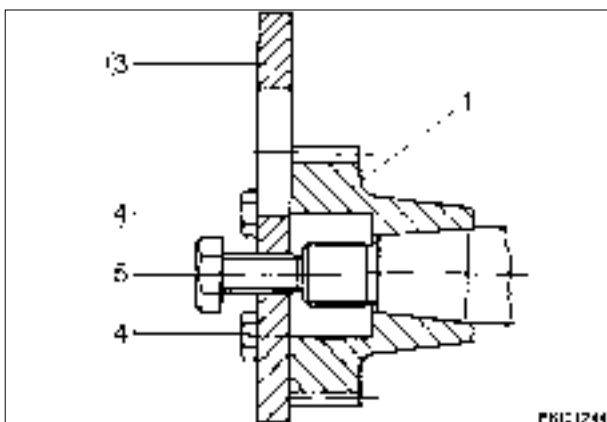
Engine / Short block

Removing and refitting air compressor

G

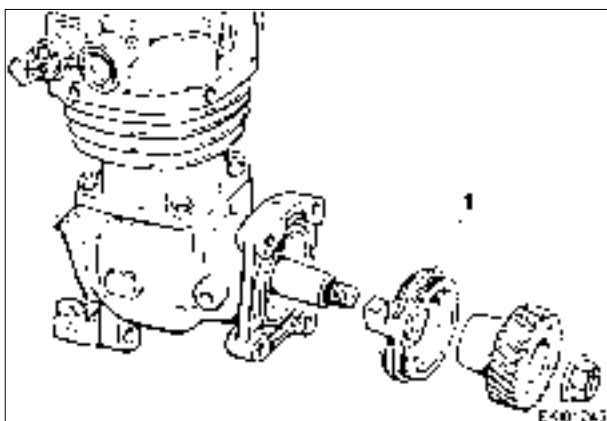
Tighten compressor drive gear (1) with 4 screws (4) on mounting plate (3) to 30 Nm (22.13 lbf-ft).
Loosen nut (2) .

Press out drive gear, fit mounting plate (3) with 4 screws (4) at the bottom side of the drive gear (2).



Screw (5) to be screwed into central threaded hole until drive gear comes loose.

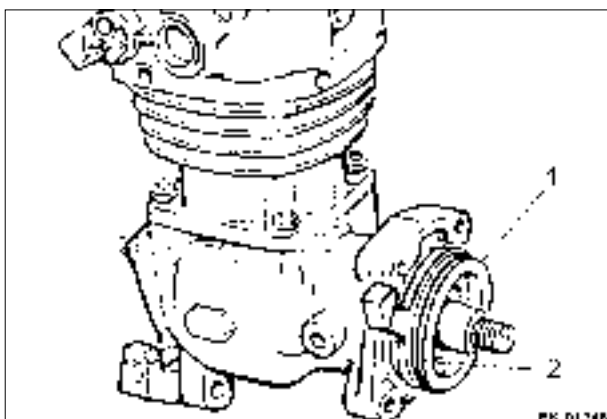
Remove drive gear and mounting plate.



Release eccentric flange (1) from compressor body with a soft hammer.

Remove flange from body.

Unscrew connecting fittings of coolant as well as of compressed air.



Clean eccentric flange (1) .

Replace and put silicon grease on O-Rings (2) .

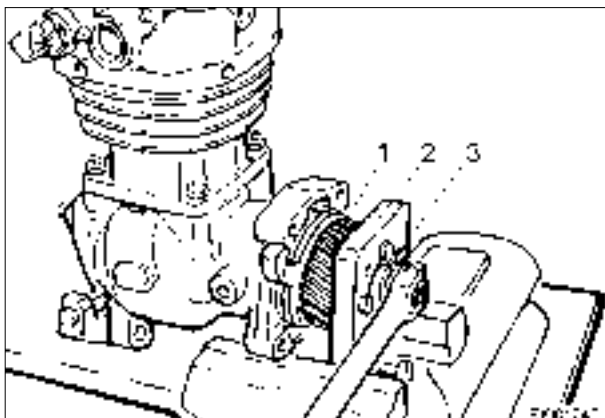
Put flange (1) into compressor body.

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Fav 900

Engine / Short block

Removing and refitting air compressor

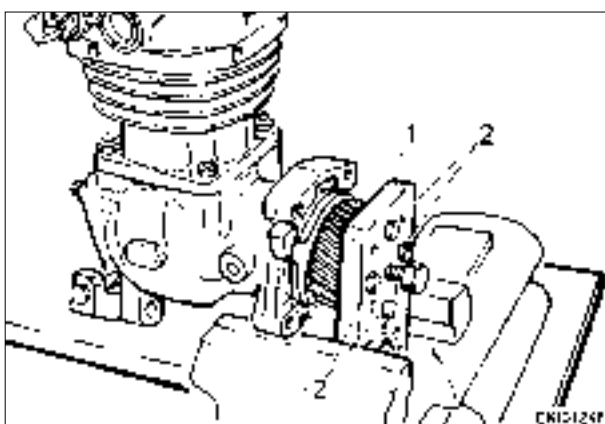
G

Place compressor drive gear (1) onto compressor crankshaft using mounting plate (2) (Special Tool).

Note:

Drive gear must be mounted free of grease or oil.

Tighten drive gear nut (3) at 200-250 Nm (148 - 184 lb-ft.).



Remove screws (2) of mounting plate (1) out of drive gear.

Remove mounting plate.

Screw and tighten connection fittings for coolant and compressed air using new gaskets into the cylinder.

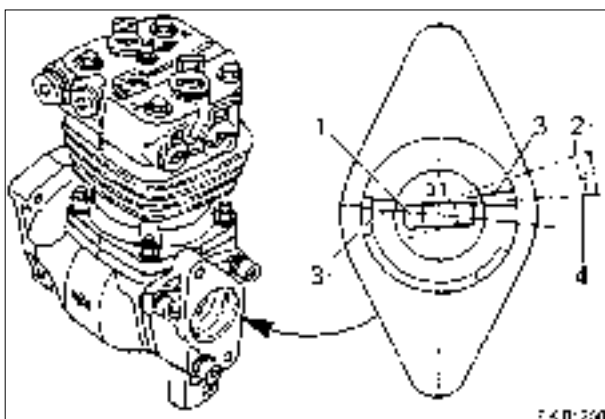
**Refitting the compressor**

Thoroughly clean sealing faces in compressor control timing case cover.

Use new gaskets and Oil O-rings with silicon oil. O-Rings on eccentric flange must be replaced and greased with silicon oil.

Position flywheel into "TDP" position.

Place lever from the compressor excenter flange onto the highest position.



Position compressor crankshaft in such a manner that "TDP" mark on top and the upper edge of the drive fork (1) in position (2) remains about 15° before the unmachined lowlaying part (3) .

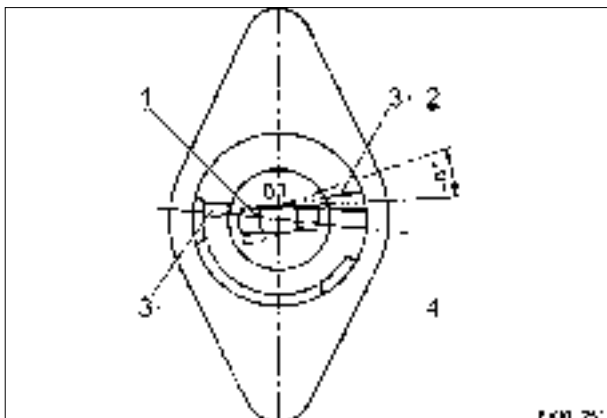
Place compressor into timing case using a new O-Ring .

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Fav 900

Engine / Short block

Removing and refitting air compressor

G

Due to the slanting teeth cut of the drive gear, the crankshaft will turn by approx 15° by placing the compressor into the timing case. In final position, the upper edge of the drive fork (1) must be in position (4) - flush with the unmachined lowlying part (3) .

If this position cannot be reached, the compressor must be removed and the crankshaft must be turned consequently.



Place 4 screws and tighten them in such a manner that the control eccentric can still be moved.

Screw in the screws of the rear side.

Place eccentric into the marked position of the compressor body.

Consult following pages for avoiding high wear by narrow clearance and excessive noise by excessive clearance, pinion clearance must be precisely adjusted.



Tighten in 3 steps the rear screws at the prescribed torque.

Connect coolant tubes.

Connect lubrication line, intake tube and compressed air line.

Complete coolant and check oil level within the engine.

Fit hydraulic pump or place the substitution cover.

Check all connections for leaks.



Check pinion clearance

Check can only be performed by completely mounted Timing Gear drive and by cold engine.

- Remove hydraulic pump or substitution cover.

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Fav 900

Engine / Short block

Removing and refitting air compressor

G

- Mount dial gauge onto the rear part of the compressor.
- Place shaft extension with dial gauge lever onto drive fork and tighten it in such a manner that the scanning finger of the dial gauge rests without clearance on the gauge lever.
- Turn softly lever with slight pressure axially toward the compressor shaft from one end to the other.

The pinion clearance can be read on the dial gauge.

If the pinion clearance is not OK , then it needs to be adjusted.



Checking backlash

Check backlash between drive wheel and camshaft timing gear by manually turning the knurled collar.

Read off result on the gauge and compare with admissible value.

- Unscrew screws as long as the bearing flange and position over drive shaft until the compressor can be actuated easily by turning the flange on the lever .
- By turning the eccentric the pinion clearance must be adjusted between 0,1 - 0,15 mm .

Note:

Position of level

upper = max clearance

down = minimum clearance



- Screw in 3 front screws and rear screws in three steps at the specified torque.
- Refit oil feed line, air intake line and compressor air line.

Screw the frame support bracket.

Refit hydraulic pump or rear end cover.

Fav 900

Engine / Short block

Replacing crankshaft front seal

G**Removing vibration damper**

Remove fan frame.

Remove power belt.

Unscrew vibration damper, remove vibration damper.

Check vibration damper and washer for damage; replace if necessary.

Remove oil splash ring.

**Replacing crankshaft front seal**

Lever out rotary shafttt with special tool.



Apply multi-purpose grease to sealing lips.

Fit new shaft sealing ring.

Note:**Do not damage sealing lips.**

Use press-in plate to drive shaft sealing ring into timing case until flush with recess .

**Refitting the vibration damper**

With surfaces free of grease and oil, position vibration damper including oil splash ring, insert screws and tighten to specified torque.

Refit power belt.

Place screws and tighten.

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Fav 900

Engine / Short block

Removing and refitting flywheel

G**Remove flywheel**

Loosen screws, holding starter ring gear in place with a large screwdriver, if necessary.

Unscrew and remove two screws on opposite side, replace with two guide mandrels (special tool).

Unscrew all screws and remove clutch flange.

Using two M10, ease off the flywheel.

Remove clutch flange and disc.

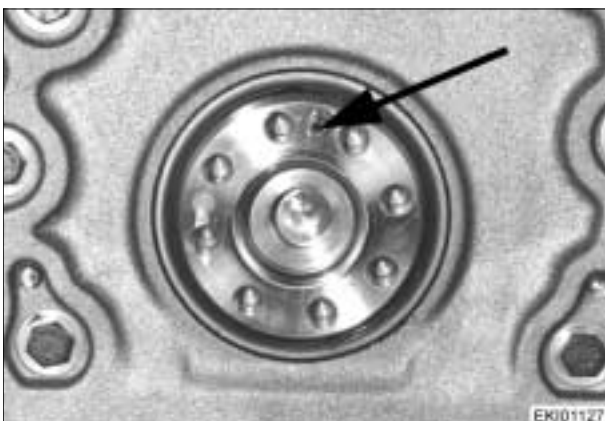
**Danger:**

The flywheel is very heavy.

Use suitable hoisting gear.



Clean and check flywheel.

**Refitting flywheel.**

Position flywheel on two guide mandrels, observing the correct alignment between centering pin (arrowed) and flywheel bore hole: Refit disc and clutch flange. Push on flywheel to end position.

Apply a small amount of oil to the screws.

Insert and tighten to specified torque, alternating sides.

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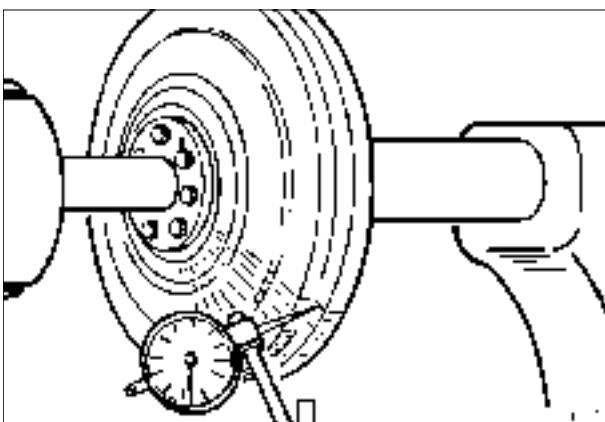
Engine / Short block

Removing and refitting flywheel

G**Replacing the starter ring gear**

Remove fly wheel.

Drill starter ring gear and force open with a chisel.

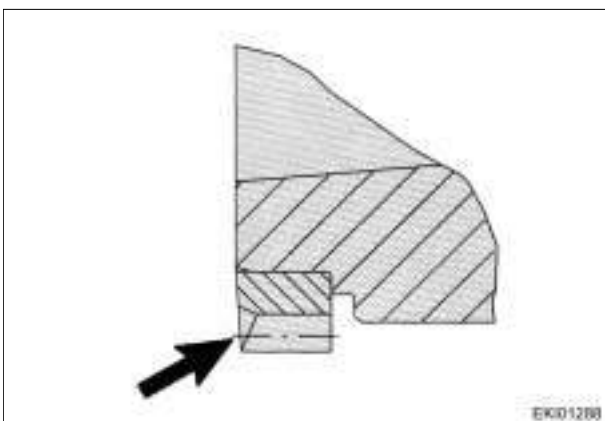
**Warning:****Do not damage the flywheel.****Note:**

Since the maximal permissible axial run-out of the starter ring gear must not be exceeded, it is advisable to determine flywheel deviation at ring gear contact face, before ring gear is shrunk on. If this is in excess of the specified value, the flywheel must be replaced.

Clamp flywheel to the hub.

Fit dial gauge to contact face of starter ring gear.

Rotate flywheel several turns by hand and observe gauge reading.



Heat new starter ring gear to approx. 220° to 240°C (428° - 464°F) and press on as far as possible.

**Warning:****Watch the position of chamfer (arrowed).**

Check maximal deviation.

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Short block Removing and refitting crankshshaft seal (flywheel). | G |
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**Removing shaft seal**

Remove flywheel.

Lever out sealing ring with special tool.

**Refitting the shaft seal**

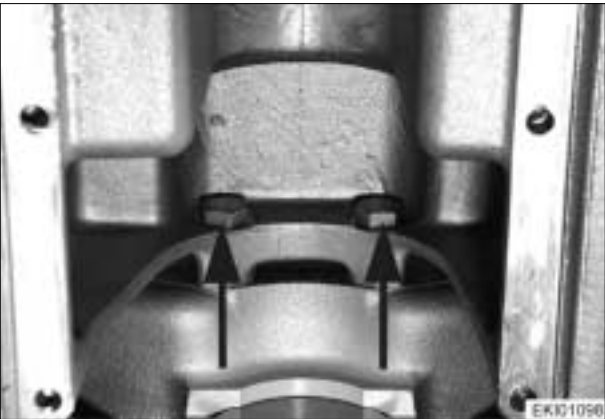
Apply a thin coat of multi-purpose grease to lips of new sealing ring.

Fit seal with open side facing the crankshaft using an expanding mandrel - drive in until properly aligned.

Refit the flywheel.

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| Fav 900 | Engine / Short block Removing and refitting flywheel housing. | G |
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Removing flywheel housing
Unscrew and remove the two screws (M16).



Then remove the two screws (M8), screw into the flywheel housing.



Unscrew screws which are fitted right and left on flywheel housing.

Fav 900

Engine / Short block

Removing and refitting flywheel housing.

G

Remove starter.

Remove flywheel.

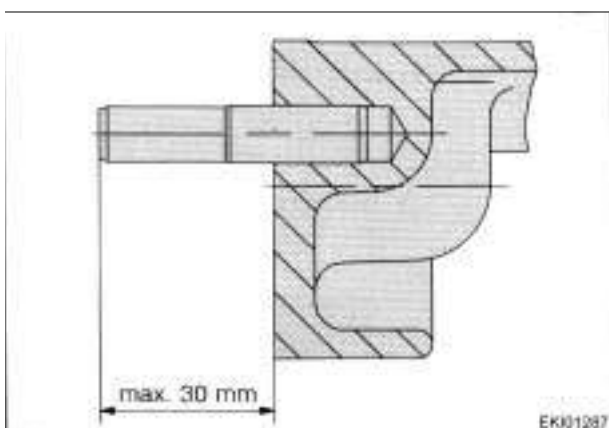
Unscrew and remove the fixing bolts.

Note:**For easy assembly use two fairly long guide pins.**

Remove flywheel housing.

**Caution:****The flywheel is very heavy.
Use suitable hoisting gear.**

Remove gasket residues from flywheel housing and crankcase.

**Note:****If the replacement guide pins are fitted, their projection must not exceed 30 mm: if this is exceeded, they will be in contact to flywheel throught the housing.****Refitting the flywheel housing.**

Coat flywheel sealing face with sealing compound "Terostat 63" and position on crankcase.

Insert screws (including those to the oil pan) and tighten to specified torque.

Refit flywheel.

Refit starter.

Fav 900

Engine / Short block
Removing and refitting the timing case.

G**Removing case cover**

Remove fan frame, vibration damper and air compressor.

Remove screws of timing case cover.

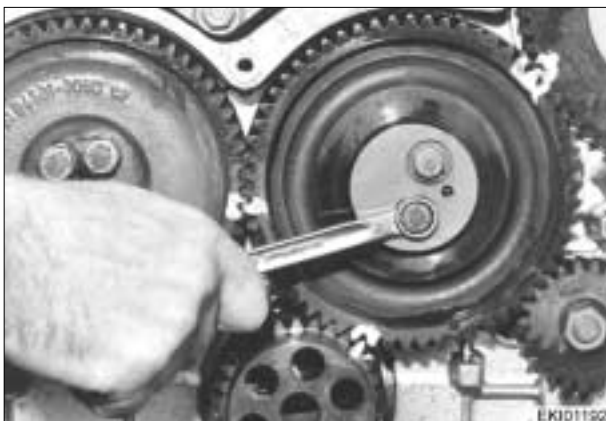
Remove cover.



1. Crankshaft timing gear
(observe "2-2-2" on intermediate gear)
2. Intermediate gear
3. Injection pump drive gear.
4. Oil pump drive gear.
5. Crankshaft timing gear
(observe "*-1" on intermediate gear).

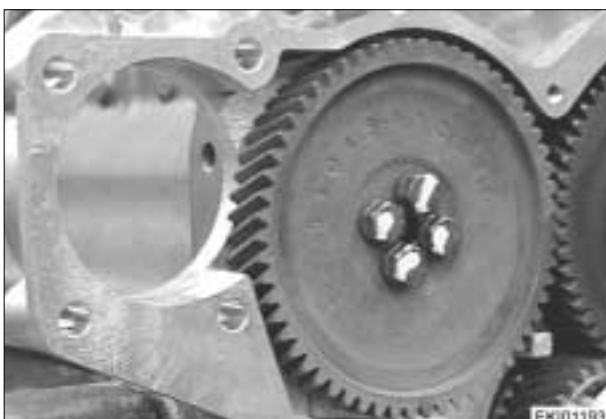
Note:

For easy reassembly mark timing gear appropriately before removing.

**Removing intermediate gear**

Remove injection pump

Unscrew hex screw, remove thrust washer and pull off intermediate gear by hand.

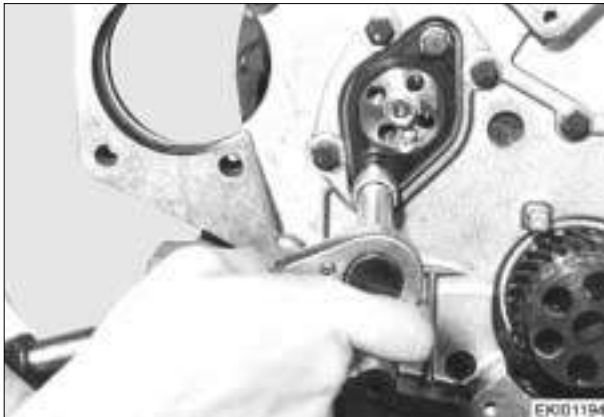
**Removing crankshaft timing gear**

- Lock up gear with a large screw-driver and remove screws. Avoid damage to the tooth flanks.
- Remove crankshaft timing gear.

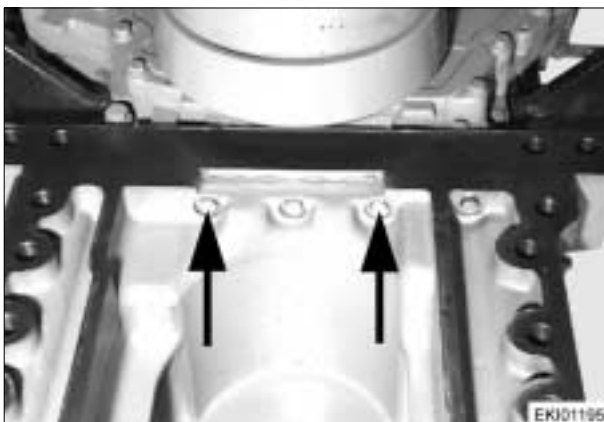
Fav 900

Engine / Short block

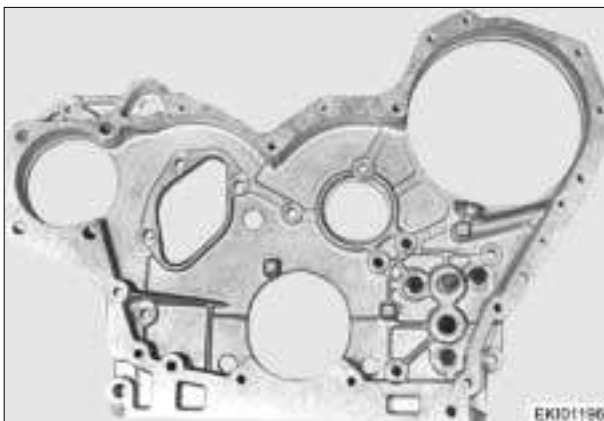
Removing and refitting the timing case.

G**Replacing crankshaft axial stop**

If necessary, replace crankshaft axial stop (thrust washer).

**Removing timing case**

Unscrew and remove screws (SW13) between oil pan and timing case.



Unscrew and remove all other screws.
Remove timing case.

**Refitting timing case**

Fit new gaskets to crankshaft housing.

Install timing case

Note:

Replacement studs of the injection pump must be inserted with "Loctite 648".

Insert screws and tighten to specified torque.

Note:

Ensure correct fit of gasket.

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Engine / Short block

Removing and refitting the timing case.

G**Refitting crankshaft timing gear**

Slide crankshaft timing gear onto the centering pin.

After fitting the intermediate gear tighten screws at the specified torque.

**Refitting intermediate gear**

Position intermediate gear.

Align camshaft and crankshaft with appropriate markings, insert intermediate gear.

Note:

Position of crankshaft timing gear in relation to intermediate gear is marked with "*-*1".

Position of camshaft timing gear in relation to intermediate gear is marked with "2-2-2".

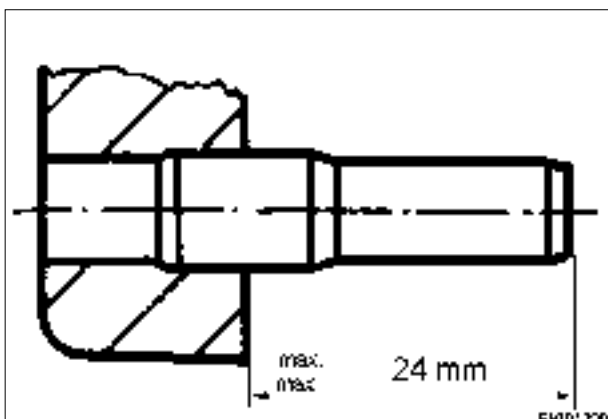


Fit thrust washer and insert screws .

Tighten screws of intermediate gear and camshaft gear at specified torque.

Refit injection pump gear.

Refit injection pump

**Note:**

Replacement centering pin must be driven in as far as possible; maximal projection is 24 mm. Shorten if necessary.

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| Fav 900 | Engine / Short block Removing and refitting the timing case. | G |
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Refit timing case cover with new gasket. Insert screws and tighten.

Refit vibration damper, Centaflex-coupling, front axle support, trunnion, alternator, Visco-fan and Power-belt.

Set valve clearance.

Refit cylinder head cover with a new dry gasket, insert screws and tighten.

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Engine / Short block

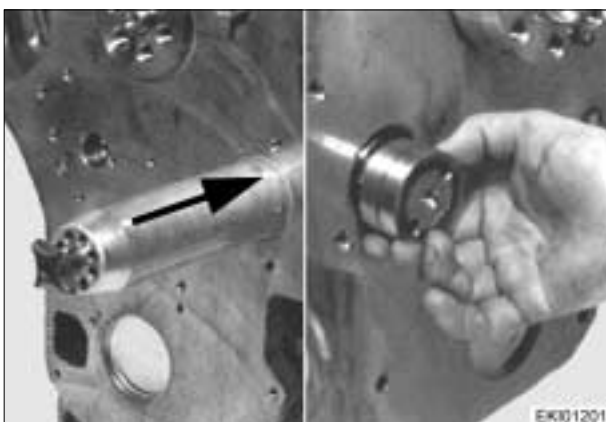
Removing and refitting camshaft

G**Removing camshaft**

- Remove oil pan
 - Remove timing case cover, idler gear and camshaft gear.
 - Remove flywheel housing
 - Remove rocker arm assembly and pushrods.
- Unscrew axial stop screws and remove axial stop.

Note:

Following photographs show the driving gears and timing case removed. The camshaft can be replaced without removing these parts.

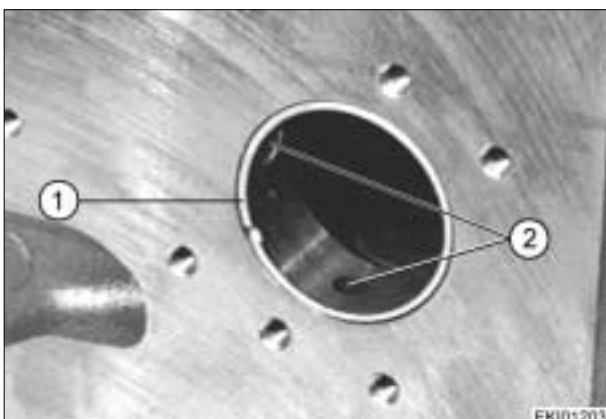


Put engine upside down in order to have the pushrods sliding toward the cylinder head in such a manner that they will not disturb the removing operation of the camshaft!

With a special mandrel push out camshaft from the timing case end, at the same time guiding it at the flywheel end.



Check tappets, replace if necessary.

**Replacing camshaft bearings**

Using a mandrel, drive out camshaft bushes.

Note:

Crankshaft must be removed.

Note:

On the new bushes the notch must be facing the fan end, and the oil channels should be aligned with those in the timing case.

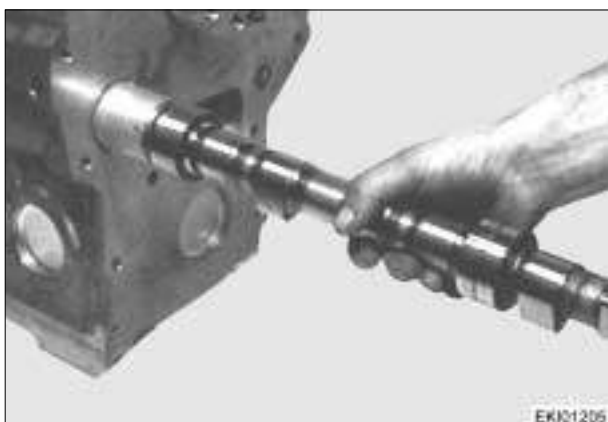
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Fav 900**Engine / Short block
Removing and refitting camshaft****G**

Using a mandrel and in new bushes towards fan until flush with the crankcase.

Note:

Bearing bushes must be machined to the required size. The crankcase must be cleaned with compressed air (oil channels) after this operation.

**Refitting the camshaft**

Slide guide mandrel into crankcase, insert camshaft in mandrel and refit camshaft into the crankcase.

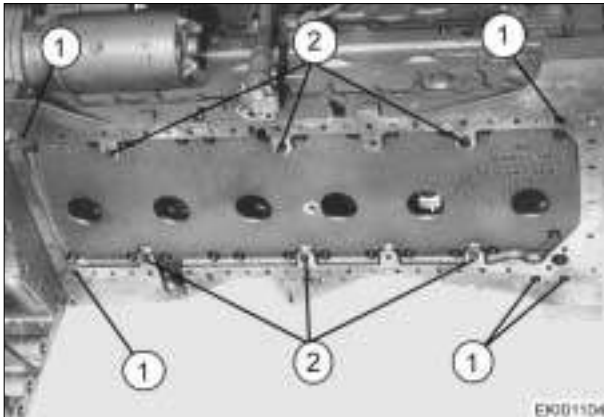


Refit axial stop, insert screws and tighten at specified torque.

Measure end clearance; if necessary replace thrust water.

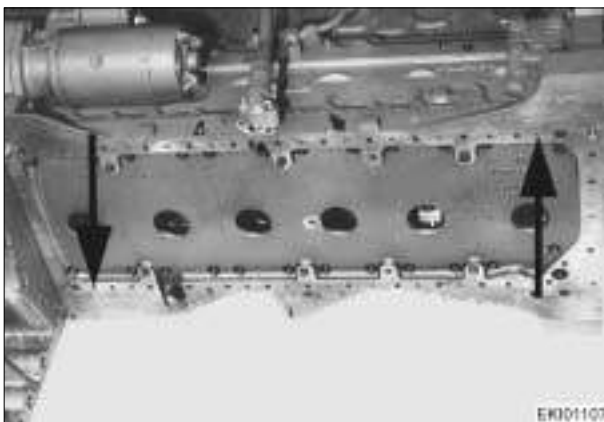


- Refit timing gear.
- Refit timing case.
- Refit oil pan and idler gear.
- Reconnect pushrod and refit rocker arm assembly.

Fav 900**Removing and refitting intermediate flange****G****Removing intermediate flange**

Unscrew and remove dipstick guide tube and undo oil filter cap.

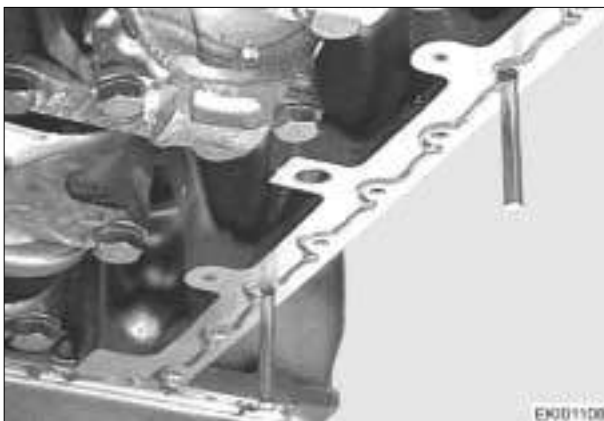
Place a jack, unscrew and remove screws (1)



Insert 2 (M8x60) screws (arrowed) and carefully separate oil pan and intermediate flange.

Clean flange.

Remove all gasket residue from flange and crankcase.

**Refitting the intermediate flange**

Coat flange sealing surface with sealant Terostat 63.

Using a jack, slowly raise the flange to the crankcase and insert screws.



Tighten screws at the specified torque.

Refit oil pan and oil intake line.

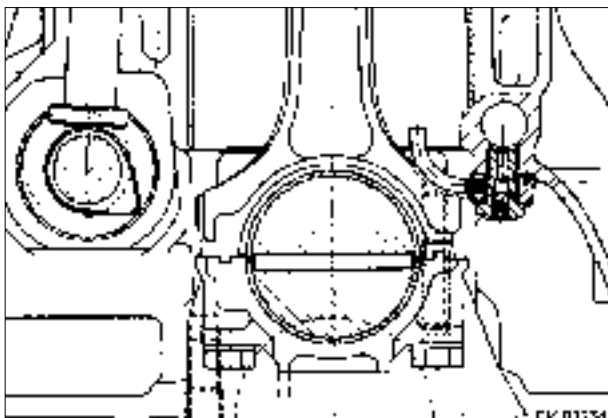
Screw on the flange.

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Engine / Short block

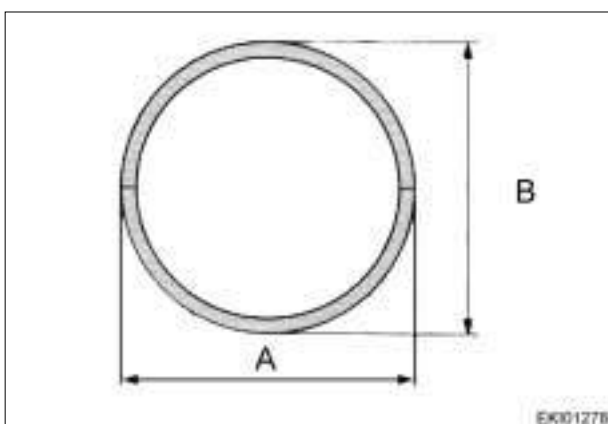
Removing and refitting con-rod bearing shells

G

Remove piston and con-rod assembly.

Note:

Con-rod bearing shells of open bearings can be used again as long as they produce perfect running.

**Note:**

When repairing con-rod bearing journals, use bearing shells of the relevant repair size.

Check spread of new bearing shells :

Place bearing shells together on a level surface.

Measure and note dimension "A".

Measure and note dimension "B".

Spread= A - B



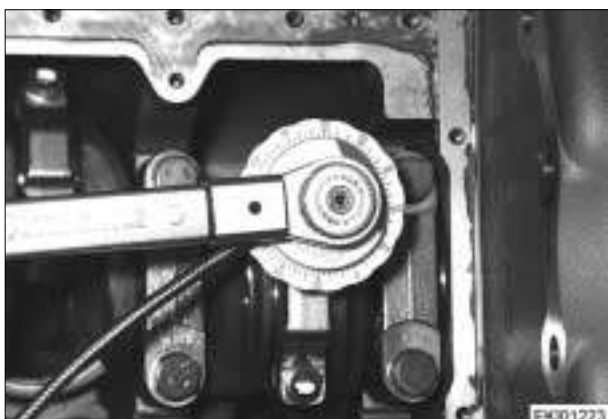
Fit new bearing shells to con-rod big-end and bearing caps.

Note:

Avoid damaging the running-in coating of the shells.

Apply a thin oil film to running surfaces of bearing shells.

Refit piston and con-rod assembly.

**Note:**

Never re-use con-rod bolts.

Tighten con-rod bolts only with bearings in place.

Insert new con-rod bolts and gradually tighten to specified torque.

Use torque angle indicator for final tightening process.

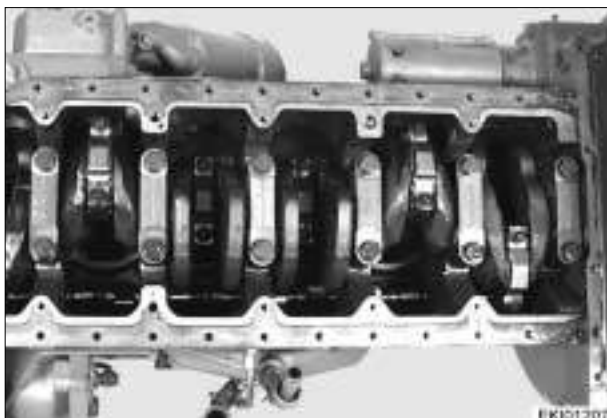
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Removing and refitting con-rod bearing shells

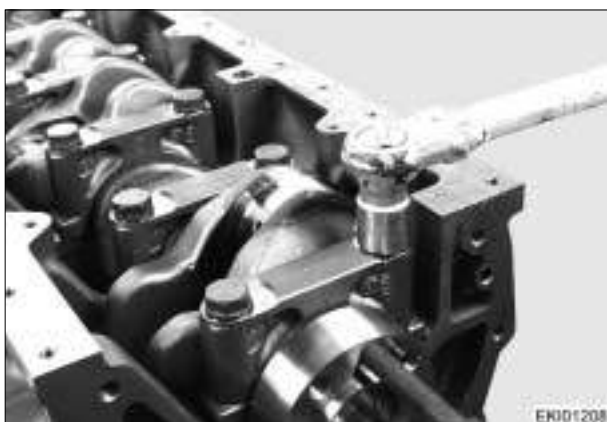
<https://www.truck-manuals.net/>

Fav 900

Engine / Short block
Removing and refitting the crankshaft

G**Removing and refitting the crankshaft**

- Remove oil pan, oil line and idler gear.
- Remove timing case and flywheel housing.
- Remove cylinder head.
- Remove piston and con-rod.



Gradually loosen screws of crankshaft bearing caps from the center outwards and remove: Take off bearing caps and arrange in order of assembly.

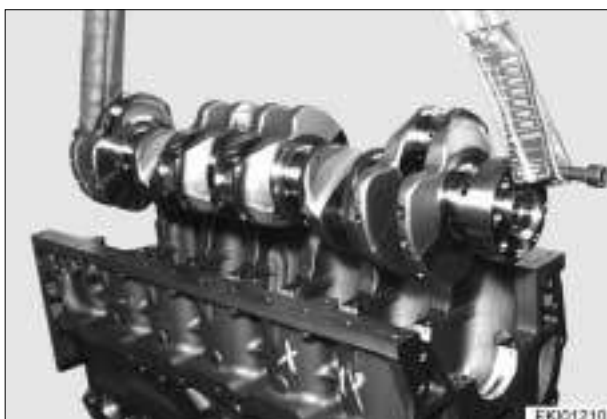
Note:

Bearing cap positions in relation to the crankcase are identified by numbers: bearing number 1 is at the fan end.

Remove bearing shells from bearing caps. If they have not been marked, identify bearing shells and caps appropriately.



Remove the lower part of the axial stop washer.



Lift crankshaft out of crank case using a rope or leather strap.

Note:

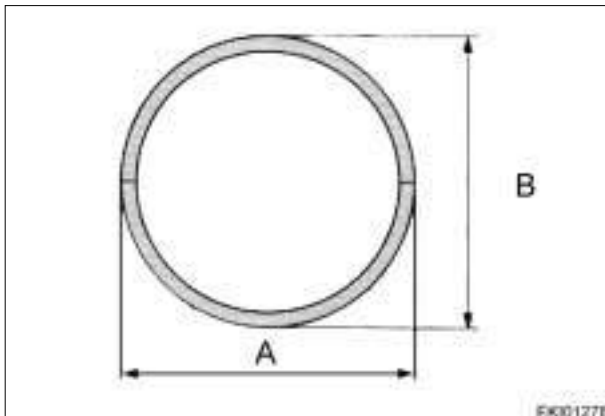
Do not use a steel cable as this could damage the bearing faces of the crankshaft journals.

Remove bearing shells from crankcase.

If they have not been marked, identify bearing shells and bearing caps appropriately.

Clean parts and check for wear; replace if necessary.

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Fav 900**Engine / Short block
Removing and refitting the crankshaft****G****Checking bearing shell spread**

Place bearing shells together on a level surface. Measure and note dimension "A", repeat for "B".

Spread = A - B.

**Refitting the crankshaft**

Clean oil ducts in crankcase and camshaft with dry compressed air.

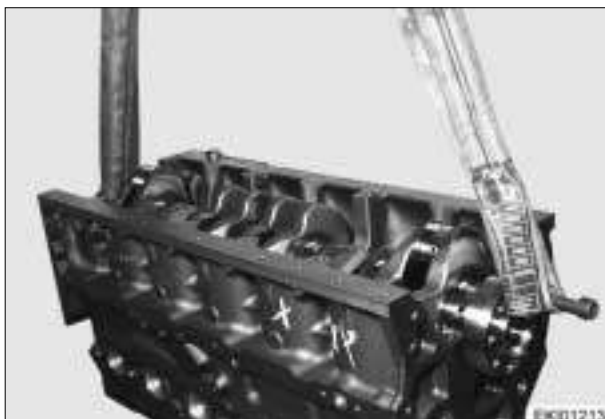


Thoroughly clean bearing shells and journals. Insert bearings shells in crankcase, observing identification numbers.

Stick the upper part of the axial to washer with grease onto crankcase.

Note:

When using new bearing shells, observe relevant repair size.



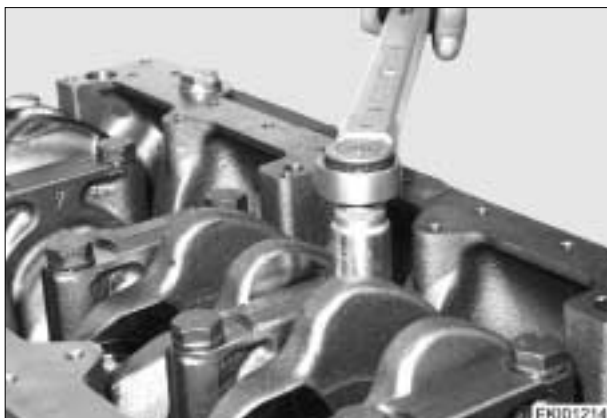
Lubricate running surfaces of bearing shells and fit crankshaft.

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Fav 900

Engine / Short block

Removing and refitting the crankshaft

G

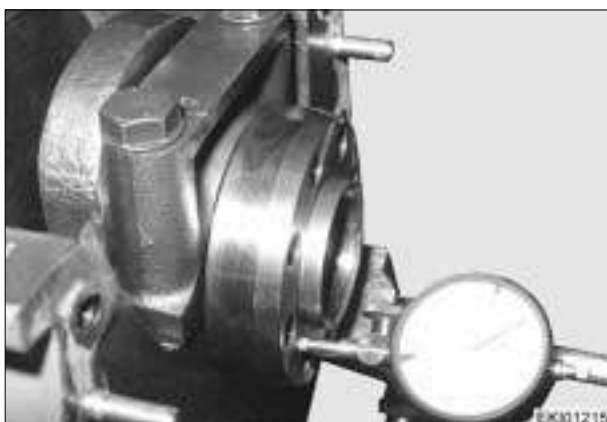
Match bearing caps to relevant bearing shells.

Lubricate running surfaces of bearing shells and fit caps.

Insert bearing cap screws and gradually tighten from the center outwards at specified torque.

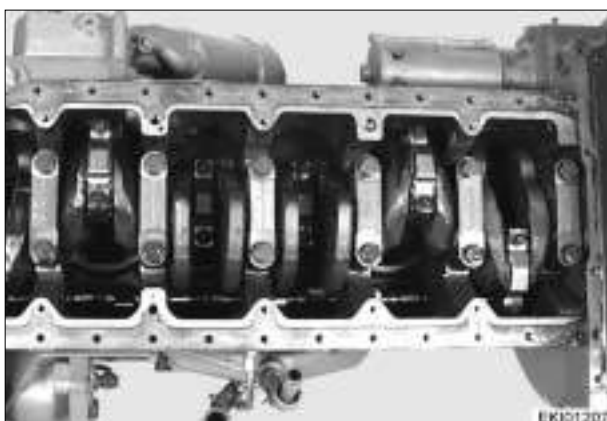
Note:

Faulty bearing caps cannot be replaced uniquely.

**Checking end play****Note:**

The end play of the crankshaft is determined by the condition of the main bearing.

- Position gauge holder with dial on the crankshaft.
- Press scanning tip of gauge onto flywheel flange or crankshaft.
- Press crankshaft back and forwards and read off end play on the dial gauge.
- If the maximal permissible end play is exceeded, all main bearings must be replaced.

**Assembling the engine**

- Refit piston and con rod assembly
- Check crankshaft for free running.
- Refit cylinder heads.
- Refit timing case, flywheel housing and flywheel.
- Refit oil pan, oil line and balancer gear.

Fav 900

Engine / Short block

Removing and refitting con-rod

G**Removing piston from con-rod**

- Remove oil pan, suction line and intermediate flange.
- Remove cylinder head.

Remove con-rod bearing cap bolts.



Remove con-rod bearing caps and bearing shells, applying light knocks with a plastic hammer if necessary.

Note:

Con-rod bearing caps are numbered to match the big-end and crankcase. Arrange in appropriate order.



Using a piece of hard wood, remove combustion residue (coking) from upper edge of cylinders.

Note:

Do not damage cylinder running surface.

Push con-rod on piston upwards.

Note:

Do not damage cooling oil - nozzle.

Place piston and con-rod next to the matching bearing cap. If available, use the special tray.

Carry out a visual check on piston and piston rings.

Note:

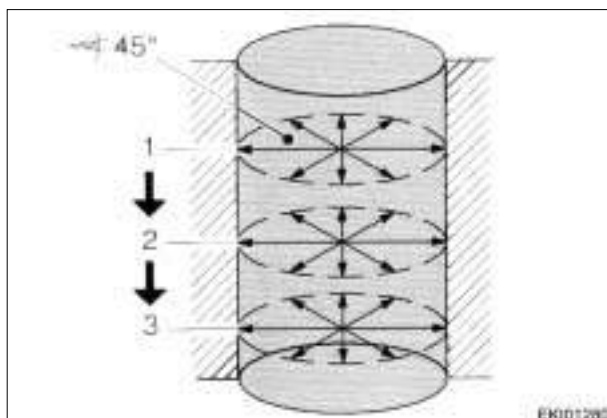
Repair pistons with a 0,2; 0,4 and 0,6 (.008", .016" and .024") increase in compression height are available for remachined crankcase sealing faces.

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Fav 900

Engine / Short block

Removing and refitting con-rod

G**Determining piston play**

Measure cylinder inside diameter with an internal micrometer at **three** levels (top to bottom) and radially at 45° to each other. Make a note of the values. Verify diameter of the new piston from the piston crown. Determine diameter of used pistons with an external micrometer (measured from lower edge of piston at right angles to pistons axis; for dimension see Service data). Make a note, subtract piston diameter from largest measured cylinder diameter.

The resulting value is the piston clearance. If clearance is excessive cylinder liner and piston must be replaced.

**Refitting piston and con-rod****Note:**

If, for whatever reason, pistons need to be replaced, measure the piston diameter or read dimension on piston crown to find out if replacement pistons were fitted previously. If so, use oversize pistons.

Apply a thin oil film to cylinder walls and pistons.

Note:

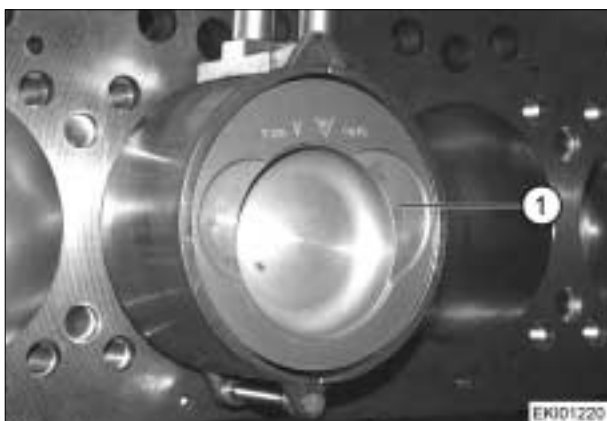
Use new con-rod shells.

Measure spread.

Thinly oil con-rod bearing shells and insert them into con-rod big end.

Offset piston ring gaps by 120°,

Slide on piston ring clamp and compress piston rings.

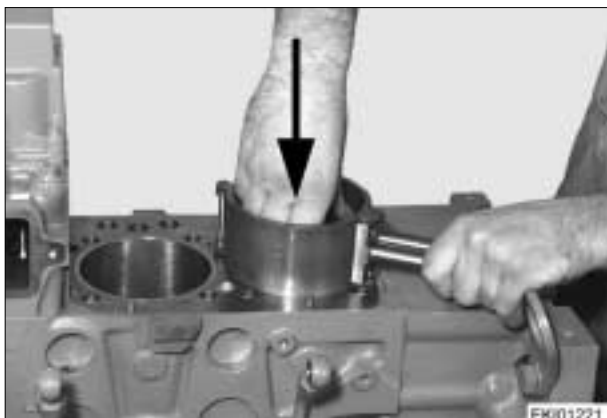


Insert piston and con-rod onto the cylinder, making sure that piston, conrod and cooling oil nozzle are assembled correctly.

Fav 900

Engine / Short block

Removing and refitting con-rod

G

Guide con-rod and insert piston until big end makes contact with the bearing journal.



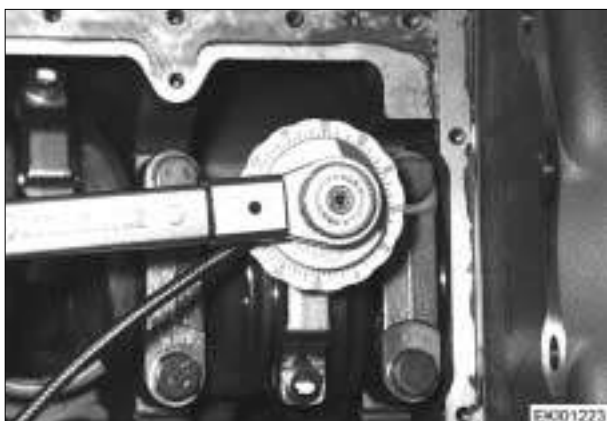
Fit con-rod bearing shells into bearing caps.

Fit bearing caps, making sure the numbers are matching.

Note:

Numbers on bearing cap and big end must be on the same side.

Chamfered side (Arrow) on con-rod cap must show toward cooling oil nozzle.

**Note:**

Never reuse con-rod bearing bolts .

Insert new con-rod bearing bolts and gradually tighten to specified torque.

Use torque angle indicator for final tightening process.

**Removing piston from con-rod**

Remove piston with con-rod.

Clamp con-rod in a vise, using non-metallic jaws.

Remove piston pin circlips.

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| 21.2.2001 | a | 3/5 | 2210 | G | 000009 |

Fav 900

Engine / Short block

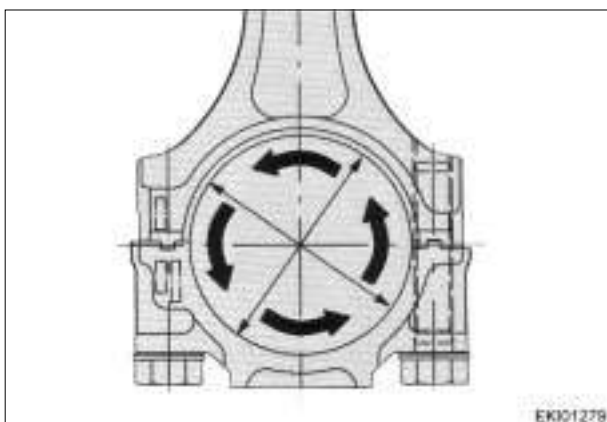
Removing and refitting con-rod

G

Press out piston pin, securely holding the piston.
Remove piston and depose it safely.

Note:

If the con-rod needs replacing, use ready-to-fit new bush or reconditioned con-rod.

**Measuring big-end con-rod bore**

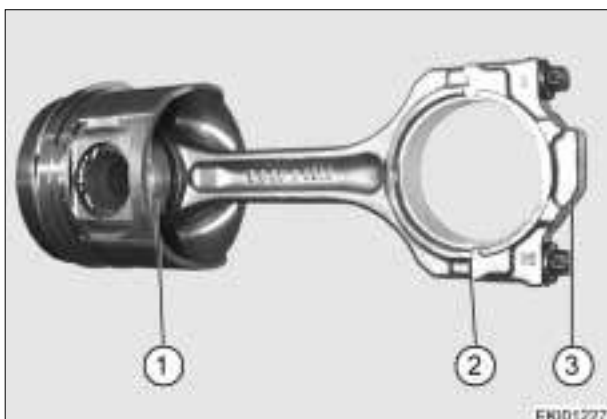
Screw on con-rod bearing caps (without bearing shells).

Mesure bore diameter with an internal micrometer.

Replace con-rod if this is in excess of the permissible variation.

**Refitting piston to con-rod**

Fit piston to con-rod, inserting piston pin, and fit circlips.



When reassembling, make sure that piston, con-rod and cooling oil nozzles are assembled correctly.

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| 21.2.2001 | a | 4/5 | 2210 | G | 000009 |

Fav 900

Engine / Short block
Removing and refitting con-rod

G**Measuring the piston projection**

Remove the cylinder heads.

Turn relevant piston to TDC.

Position gauge holder with dial on crankcase sealing face.

Set gauge at "0".



Carefully move dial gauge holder, lifting the gauge tip at the same time.

Lower tip onto piston crown and check dial reading for piston projection.

Fav 900

Engine / Short block

Removing and refitting the piston rings

G**Piston ring arrangement**

1. Compression ring (keystone ring)
2. Compression ring (chamfered ring)
3. Oil scraper ring (D-ring)

**Removing piston rings**

Remove piston and con-rod assembly.
Clamp con-rod in a vise, using non-metallic jaws.
Set piston ring pliers to piston diameter.



Position pliers at piston ring gap and pry rings out of the piston ring grooves.

Note:

The spring insert of the oil scraper ring causes greater tangential stress.

Carefully clean piston ring with a small piece of wood.

Avoid damage to piston ring grooves.

**Checking end clearance**

Fit piston rings to respective cylinder and determine end clearance with a feeler gauge.

If this is excessive, piston rings must be replaced.

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| 22.02.2001 | a | 1/2 | 2210 | G | 000010 |

Fav 900

Engine / Short block
Removing and refitting the piston rings

G**Refitting piston rings**

Using piston ring pliers, insert piston rings in relevant groove with "Top" facing upwards.



Using a feeler gauge, determine piston ring end play in the relevant piston ring grooves at several points.

If this is excessive, piston and piston rings must be replaced.

| Date | Version | Page | Removing and refitting the piston rings | Capitel | Index | Docu-No. |
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| 22.02.2001 | a | 2/2 | | 2210 | G | 000010 |

Fav 900**Engine / Short block
Replacing cylinder liners****G****Checking cylinder liners**

Measure cylinder inside diameter with an internal micrometer at three different levels (top to bottom) and radially at 45° to each other: Make a note of these values.

Determine piston clearance.

If worn beyond a useful life, both piston and cylinder liners must be replaced.

Note:

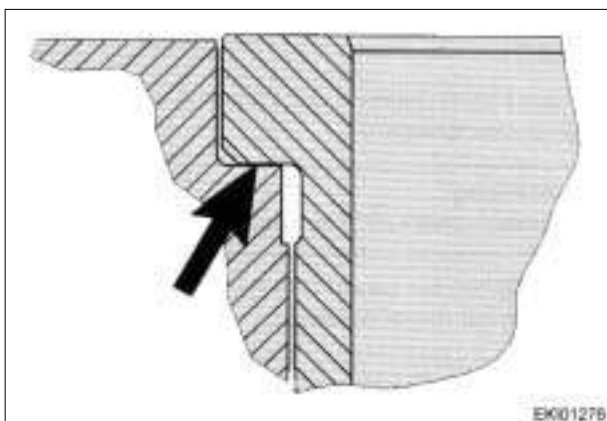
For the liner outer diameter an upper deviation of 0,5 mm (.020") is permissible.

**Removing the cylinder liner**

Removing cooling oil nozzles chapter 2312 Reg G.

Usually the cylinder liner can be removed by hand.

If not loosen slip-fit liner with extractor tool and remove.

**Refitting the cylinder liner****Note:**

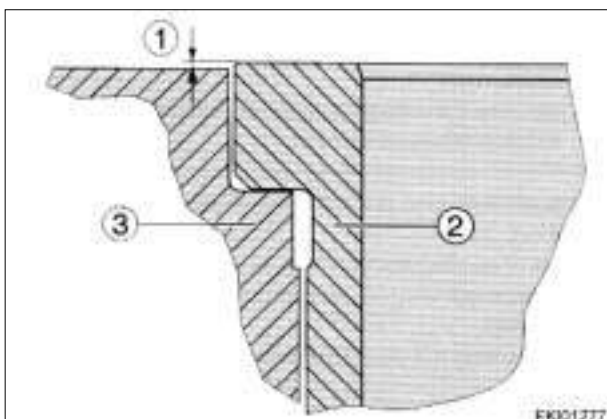
Before fitting, clean seating.

Position cylinder liner, making sure it is straight, and press in by hand.

The liner must make contact with the seat (arrowed).

The collar outer diameter should not be in contact with the bore.

Refit oil spray nozzle.



Check projection of liner (2) in relation to the crankcase(3).

Position gauge holder with dial at the crankcase sealing face.

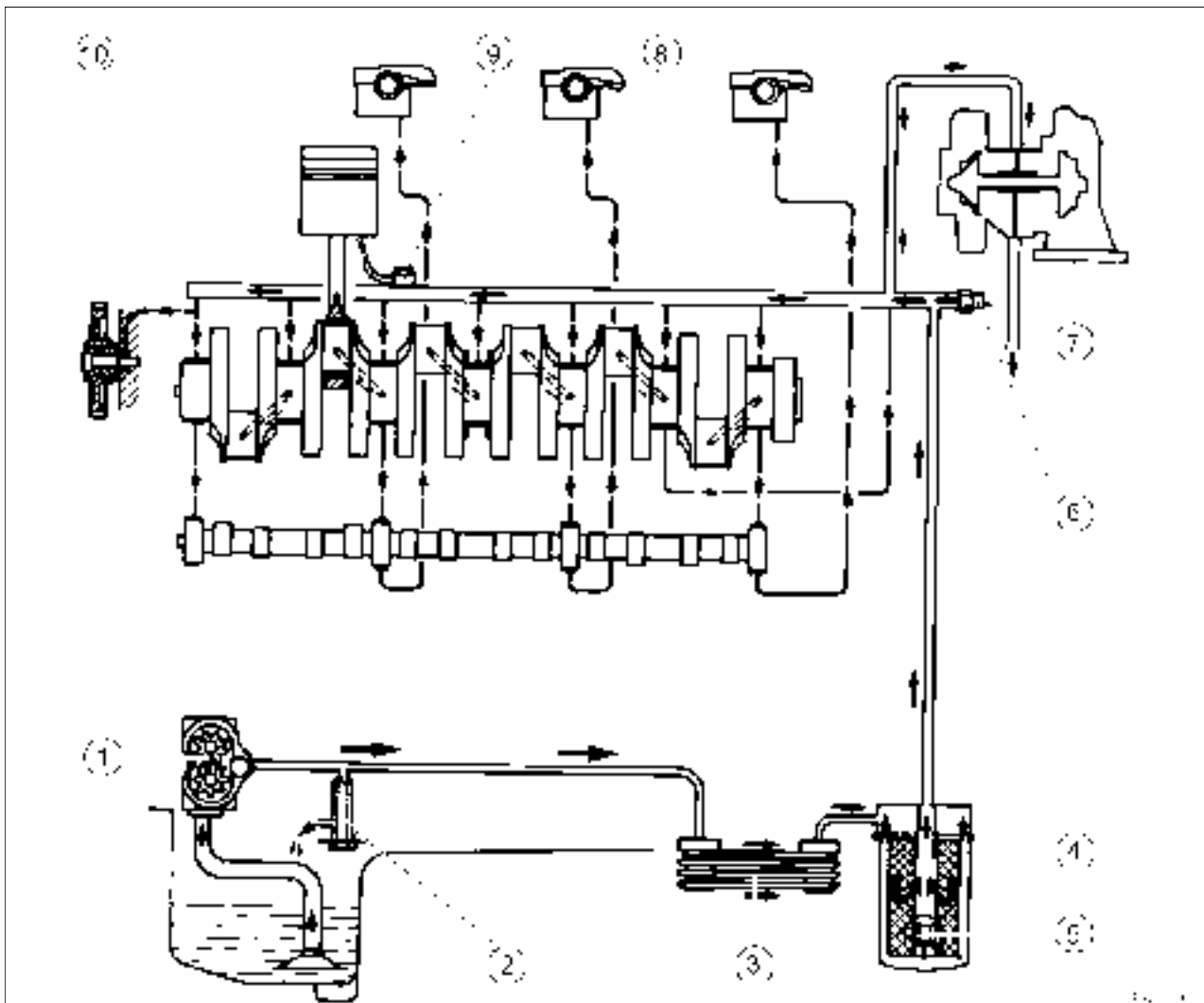
Measuring liner projection (1) at 4 points.

Permissible deviation = 0,01-0,06 mm (.0004 - .0024").

| Date | Version | Page | Replacing cylinder liners | | | Capitel | Index | Docu-No. |
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| 22.02.2001 | a | 1/1 | | | | 2210 | G | 000012 |

Fav 900

Engine / Lubrication
Layout of engine lubrication

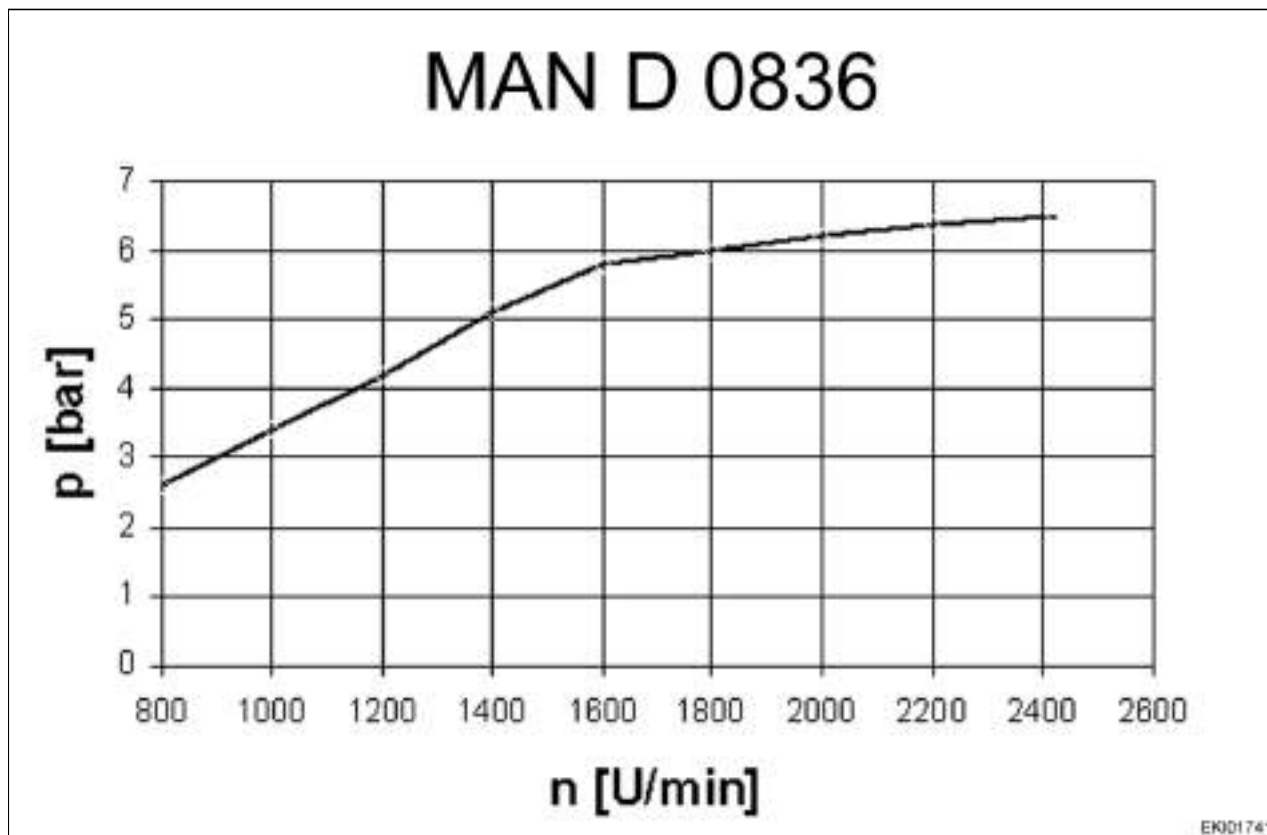
C

1. Lubrication Gear pump
2. Pressure relief valve
3. Oil cooler
4. Main stream oil filter
5. Oil filter Bypass valve
6. Oil pressure switch
7. Turbocharger
8. Main oil duct
9. Oil cooling nozzle
10. Intermediate timing gear

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| 09/03/2001 | a | 1/1 | 2312 | C | 000001 |

Fav 900

Engine / Lubrication
Lubrication pressure test

E**Engine oil pressure p and engine speed n****Conditions for engine oil pressure measurement**

- Check oil level, top up if necessary.
- SHPD engine oil, viscosity 10 W-40
- Engine is at operating temperature (5 to 6 bars on A007 - instrument panel correspond to water temperature of approx. 70 - 80°C).

Note:**Oil pressure values in new or overhauled engine**

If the required pressures are not achieved at the respective engine speed, this warning panel is shown on the A007 - instrument panel.

| | | |
|----------------|---|----------|
| Fav 900 | Engine / Lubrication Lubrication pressure test | E |
|----------------|---|----------|



B012 = Engine oil pressure sensor on oil filter bracket



Required measuring equipment:

Attach M16x1.5 measurement adapter and pressure gauge to filter bracket.

Adapter cable (DIY using plug G 816.900.043.030). Multimeter (voltmeter)

Pin 1 = earth

Pin 2 = signal voltage

Pin 3 = + supply 12 VDC

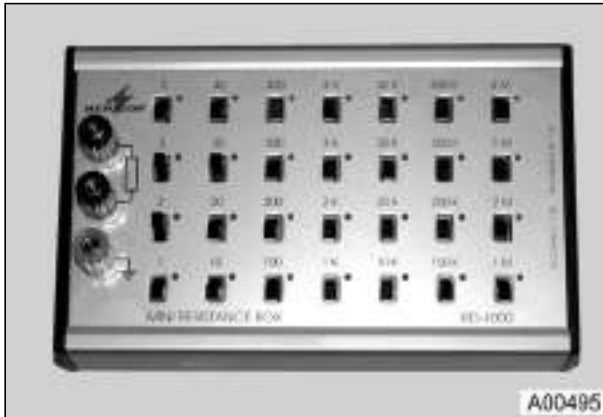
| Measurement | Pin | Target value | Pressure / bar | Note |
|-------------|-----|--------------|----------------|--|
| Supply | 3 | 12 VDC | | Check miniature fuse in A013 - fuse (25) |
| Earth | 1 | | | |
| Signal | 2 | 1.4 | 2.6 | |
| | | 1.7 | 3.4 | |
| | | 2.1 | 4.2 | |
| | | 2.6 | 5.1 | |
| | | 2.8 | 5.8 | |
| | | 2.9 | 6.0 | |
| | | 2.9 | 6.1 | |
| | | 3.0 | 6.4 | |
| | | 3.0 | 6.5 | |

Note:

All electrical readings +/- 10%

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| | | |
|----------------|---|----------|
| Fav 900 | Engine / Lubrication Lubrication pressure test | E |
|----------------|---|----------|



Testing engine oil pressure warning on A007 - instrument panel:

Disconnect electric cable from B012 - engine oil pressure sensor.

Connect adapter cable and resistor decade X 899.980.224.

Run engine and actuate appropriate resistance.



| Engine speed n rpm | Resistance R Ohm | Warning |
|-------------------------|------------------|---------|
| 800 | 25 | Yes |
| 1000 | 30 | Yes |
| 1200 | 34 | Yes |
| 1400 | 38 | Yes |
| 1600 | 42 | Yes |
| 1800 | 47 | Yes |
| 2000 | 51 | Yes |
| 2200 | 54 | Yes |
| 2420 | 61 | Yes |
| All readings +/- 10% | | |

Fav 900

Engine / Lubrication

Replacing oil filter

G**Replacing oil filter****Caution:**

**The cartridge is filled with hot oil.
Danger of severe burns.**

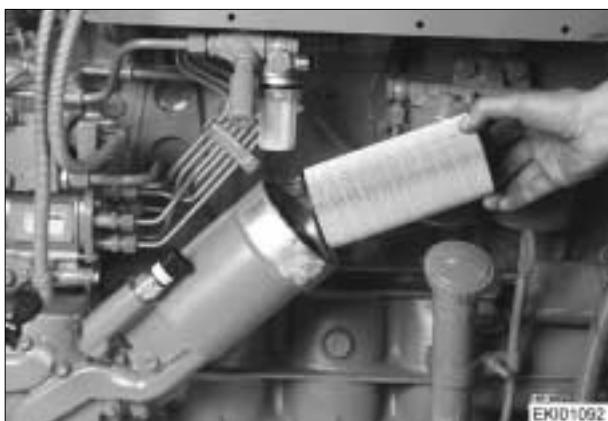
- Loosen filter lid 2 turns, wait about 5 minutes until all the remaining oil has drained from the oil filter housing in the oil pan.
- Remove cover completely .



- Pullt out filter cartridge with the central guiding tube.

Collect dripping oil using an appropriate recipient below cartridge.

- Replace cartridge.
- Replace O-Rings of the central tube and on the cover.
- Put cover and filter cartridge in place and tighten at 25 Nm .

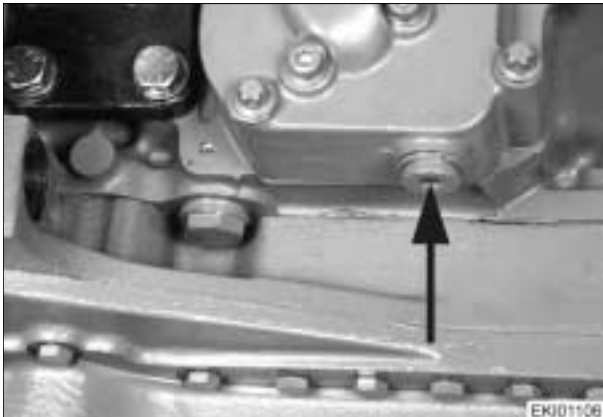


Fill up with engine oil and check for eventual leaks.

Check oil level.

Note:

Used oil and cartridge are hazardous waste.

Fav 900**Engine / Lubrication**
Removing and refitting oil cooler**G****Removing oil filter****Note:**

Used oils and filter cartridges are hazardous waste! Dispose properly!

Remove oil filter.

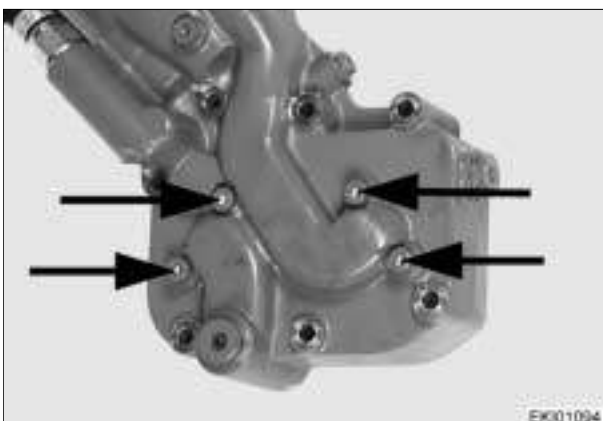
Unscrew drain plug (arrowed) from oil filter head and drain fluid into a container of adequate size.



Disconnect oil pressure sensor.

Remove screws from oil filter head.

Remove gasket residue from the sealing surfaces.



Remove screws from oil cooler.

Check oil cooler for damage; if necessary, replace.

Remove gasket residue from the sealing surfaces.

| | | |
|----------------|---|----------|
| Fav 900 | Engine / Lubrication Removing and refitting oil cooler | G |
|----------------|---|----------|

**Refit oil cooler**

Fit oil cooler to the oil filter head with new gaskets. Position oil filter head on engine block, using new gasket. Place screws and tighten.

**Warning:**

Make sure gasket fits properly.

Refit oil filter:

Screw in drain plug for coolant, using a new seal.

Connect sensor.

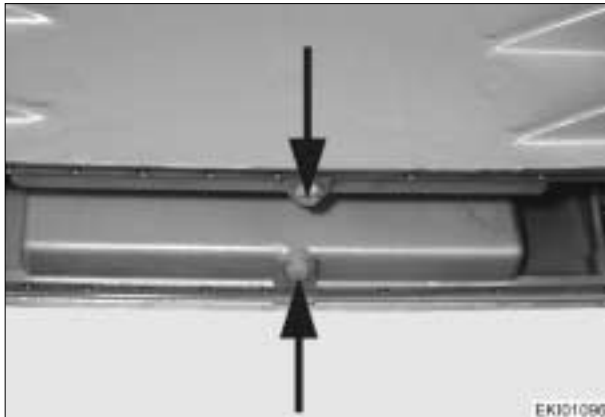
Check oil and coolant levels; top up if necessary.

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| 14.02.2001 | a | 2/2 | 2312 | G | 000002 |

Fav 900

Engine / Lubrication

Removing and refitting oil pan

G**Removing oil pan****Note:**

Used oils are hazardous waste. Dispose properly ! Respect safety regulations!

Pull out dipstick and remove filling cover..

Remove drain plug (Arrows) and drain oil.

Use a recipient with sufficient capacity.



Remove screws (arrowed) at the front of the oil pan (water pump).



Remove two screws as shown.



Then remove the two (M8) screws which are fully screwed (not shown) into the flywheel housing.

Note:

When removing the oil pan it is essential to use a jack : The oil pan is extremely heavy (approx. 100kg).

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Fav 900**Engine / Lubrication**
Removing and refitting oil pan**G**

Remove screws from flywheel housing (3 on each side of engine).

Position jack with cradle underneath the oil pan and remove all externally accessible screws from the oil pan.

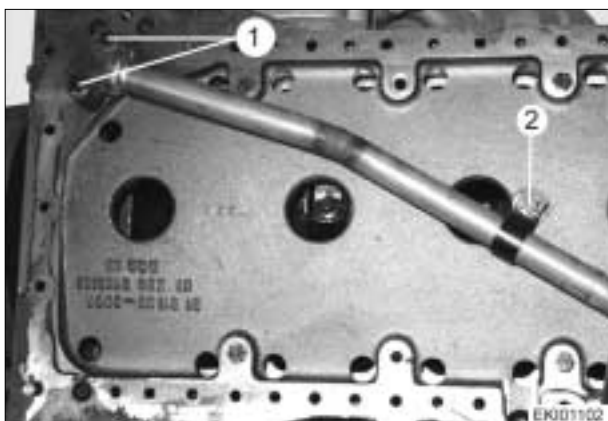
Note:

For ease of reassembling, note the screws sequence (l.e. short / long).



Insert two (M8*20)screws at the rear of the oil pan (arrowed) and slowly press down the oil pan.

Clean the oil pan and remove all gasket residue from pan and intermediate flange.

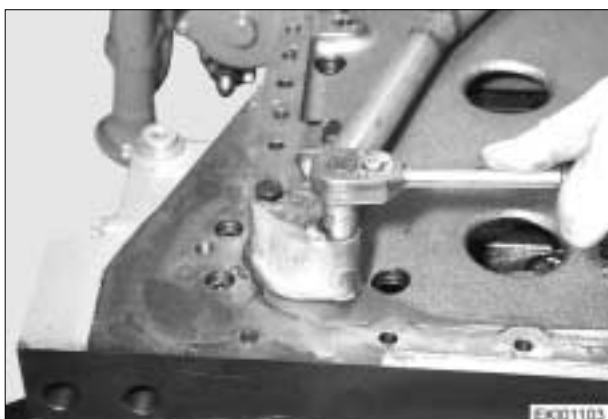
**Removing the oil intake line**

Remove screws from the bracket (2)

Remove screws from intake pipe flange(1).
Remove intake pipe and gasket.

Note:

Avoid dirt contamination of the oil duct.

**Refitting oil intake pipe**

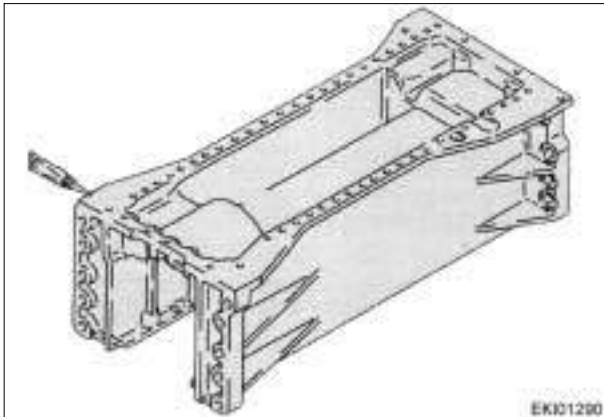
Position intake pipe and new gasket and insert screws by hand.

After fitting the bracket, tighten screws to specified torque. Replace O-rings.

Fav 900

Engine / Lubrication

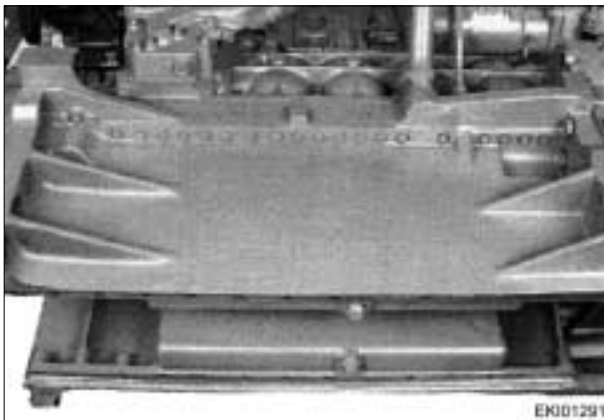
Removing and refitting oil pan

G**Refitting the oil pan**

Coat oil pan sealing surface with sealing compound "Terostat 63" avoiding bore holes.

Note:

The length of time between applying "terostat 6" and assembling must not exceed 20 minutes.



Using a jack, slowly raise the oil pan to the intermediate flange and insert fscscrews.

Tighten screws.

Fit clean drain plug together with new seal and tighten to specified torque.

Refill with new engine oil.

Check the oil pan for leaks

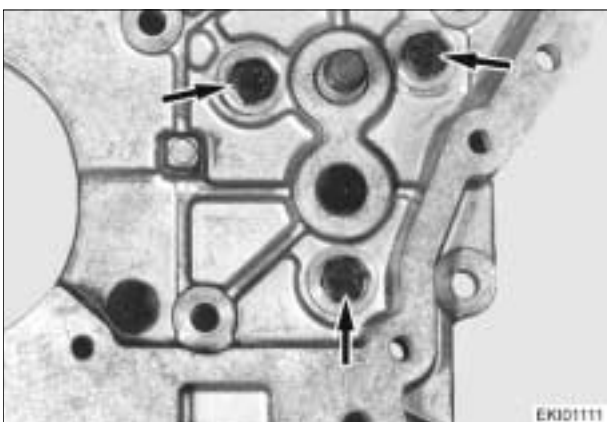
Fav 900**Engine / Lubrication**
Removing and refitting oil pump**G****Removing the oil pump gear wheel**

Remove the fan frame, Power belt, vibration damper, air compressor, generator and the timing case cover.

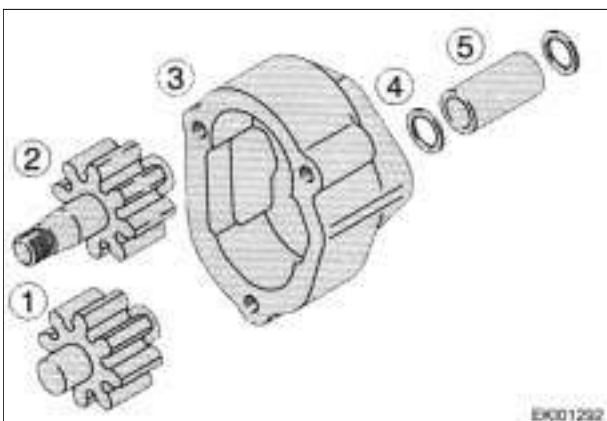
Unscrew nut of pump gear wheel, holding the crankshaft with a rotating device.

Remove washer and withdraw gear wheel from the cone using a puller.

Remove timing case.

**Removing the oil pump**

Remove screws (arrowed) and withdraw oil pump from the timing case.

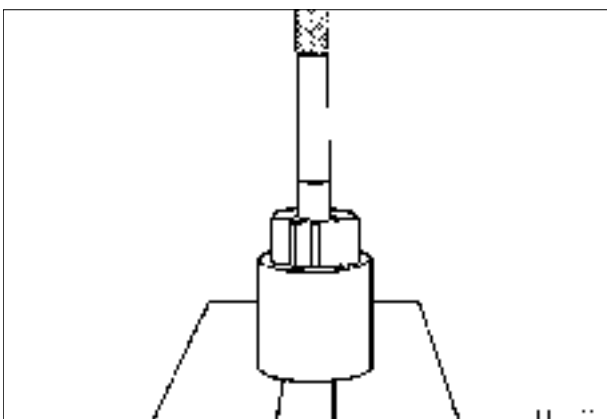
**Dismantling the oil pump**

Withdraw driving and driven gears (1 and 2) together with shafts and oil pipe from the housing (3).

Check gears and pump housing for wear.

Note:

Always replace O-Rings (4).

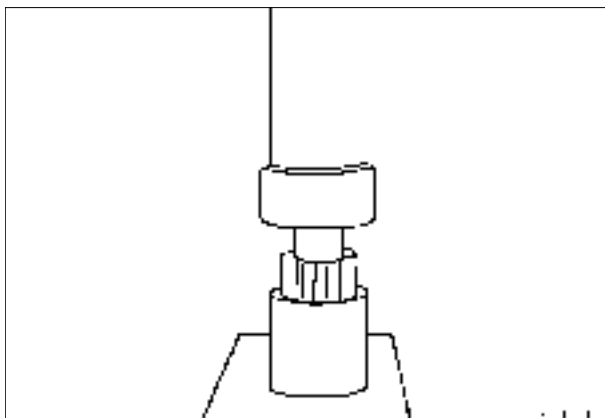


Insert gear wheel and shaft into the bush and push out with a suitable mandrel.

Fav 900

Engine / Lubrication

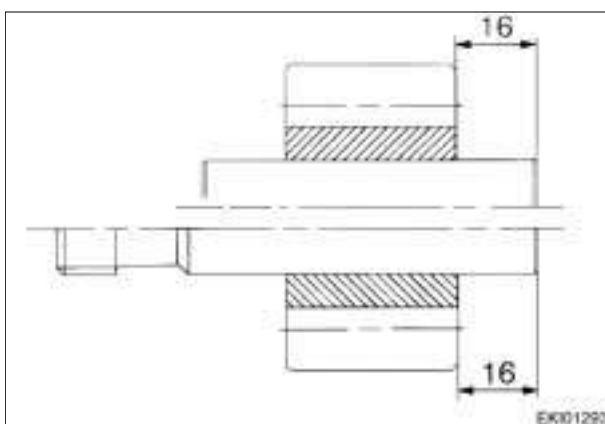
Removing and refitting oil pump

G**Reassembling the oil pump**

- Insert gear wheel in bush (2).
- Fit oil shaft.
- Slide on spacer sleeve (1) and press in shaft flush with the edge of the sleeve.

Note:

Bush(1) and spacer sleeve(2) are available as special tools.

**Note:**

The press in depth (16 mm) of the driving shaft is determined by the spacer sleeve.

Make sure there are no signs of scoring on the shaft after pressing in.

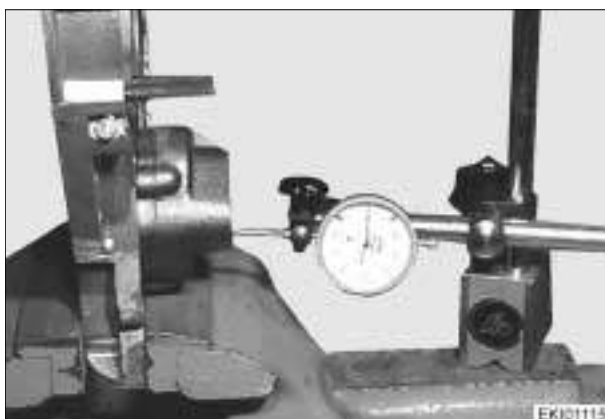
**Refitting the oil pump**

Clean sealing surfaces of timing case and oil pump: Position oil pump on timing case.

Insert screws with washers and tighten.

**Warning:**

Ensure drive shaft rotates easily.



checking end play of geared wheels (with oil pump in place)

Fit dial gauge as illustrated. Turn shaft to the stop position in one direction and set gauge at "0".

Press shaft in the opposite direction and take a reading of the movement.

Insert oil pipe into oil pump.

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| 14.2.2001 | a | 2/3 | 2312 | G | 000004 |

Fav 900

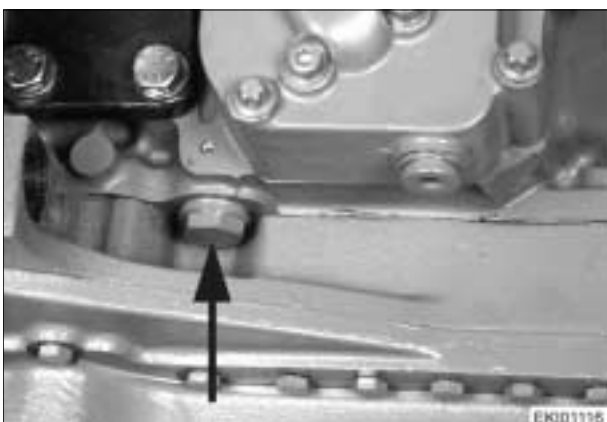
Engine / Lubrication

Removing and refitting oil pump

G**Refitting the oil pump gear.**

With the inner core free of grease, slide oil pump gear onto the ungreased drive shaft cone. Fit washer, screw on nut and tighten to specified torque.

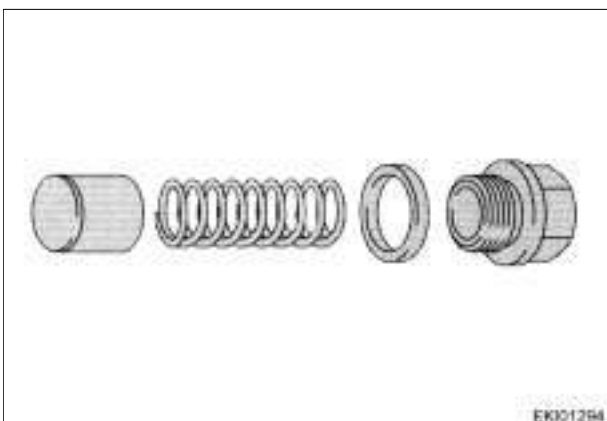
Remove the fan frame, Power-belt, vibration damper, air compressor, alternator and the timing case cover.

**Removing and refitting the pressure regulating valve****Note:**

The pressure regulating valve is accessible from the outside.

Unscrew and remove screw plug.

Remove sealing ring, compression spring and piston.



Check valve as illustrated and refit using a new seal.

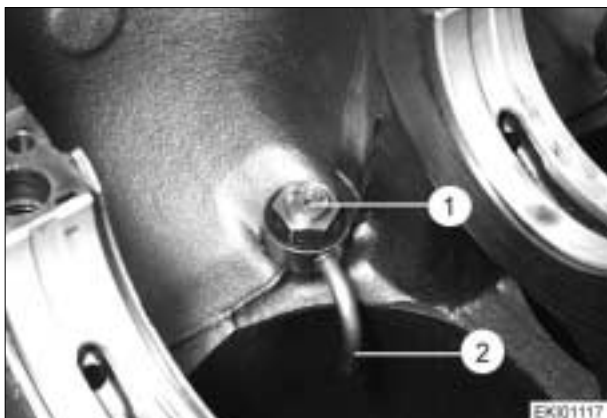
Assemble valve as illustrated and refit using a new seal.

Tighten screw plug to the specified torque.

Fav 900

Engine / Lubrication

Removing and refitting splash nozzle

G**Removing oil splash nozzle**

Remove oil pan and intermediate flange.

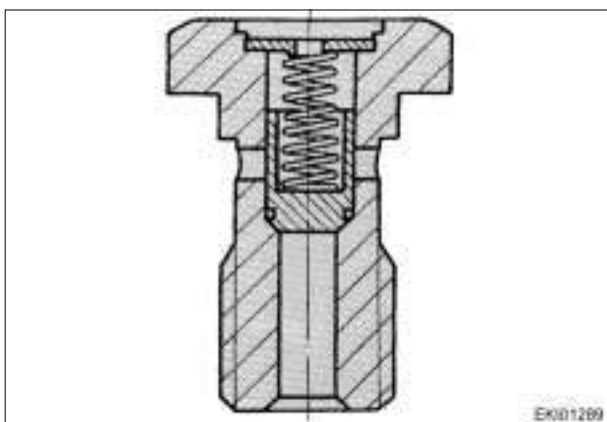
Note:

the nozzle can be removed and refitted without removing the crankshaft.

In the illustration on this page the crankshaft has been removed to allow a clear picture.

Unscrew and remove oil pressure valve (1) and nozzle (2).

Remove nozzle and valve assembly.

**Check oil splash nozzle valve.**

With a small screwdriver check whether the valve spring pressure is sufficient to push the valve piston onto the valve seat. If necessary, replace nozzle valve.

Observe opening pressure.

**Refitting oil splash nozzle**

Position nozzle, making sure that the adjusting ball (arrowed) on the nozzle body comes to rest in the appropriate hole (arrowed).



Insert oil pressure valve and tighten to specified torque.

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| 15.02.2001 | a | 1/1 | 2312 | G | 000005 |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Injection Pump EDC - Description | A |
|----------------|--|----------|

Injection System Fav 900 VP 44 (Fav. 900 / 23 /)

Common Injection systems on agricultural tractors

| | |
|-----------------------|---------------------------|
| Linear Injection Pump | Pressure approx. 1300 bar |
| Radial Injection pump | Pressure approx. 1700 bar |
| Pump- Injector system | Pressure approx. 2100 bar |
| Common - Rail | Pressure approx. 1400 bar |

Linear Injection Pump

One pump element per cylinder wich consists of pump cylinder and piston.

The engine drives a pump integrated cam shaft wich moves the pistons of the pump. A spring pushes the piston back ..

The piston course is invariable

Slanting control profile within the pistons allows variable Displacement wich is controlled by a control Rod. The desired displacement will be obtained by adjusting the control rod.

Common Rail System :

Generation of fuel pressure and the injection itself are controlled separately.

Injection pressure is generated independantly of engine speed and injection volume. The pressure is permanently available for injection within the "Rail"(storage).

The injection volume and time are determined by the electronic control module. Injection occurs via arespective solenoid valve for each cylinder (Injection unit). The solenoid valve is controlled by the injection control module..

Injection System Fav. 900 / 23 /..... (Facelift)

Radial piston pump

Die Radial piston pump with integrated spray adjustment are controlled electronically .

A single **High- pressure pump module** for all cylinders.

A **Vane type pump** lifts the fuel.

A **Radial piston pump** with a cam ring and 3 radial pistons generates the jhigh pressure.

A **High pressure solenoid valve** allows a defined injection volume.

Injection start and **Spray adjustment** will be controlled by the rotation of the **cam ring**

Two **electronic control modules** (Pump and Engine control module) are processing various control parameters.

| Date | Version | Page | EDC - Description | Capitel | Index | Docu-No. |
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| 10/2000 | a | 1/6 | | 2710 | A | 000001 |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Injection Pump EDC - Description | A |
|----------------|--|----------|

Function of FENDT EDC-Engine Steering :

The radial piston pump (VP 44) is equipped with 2 control modules for
E lectronic - **D** iesel - **C** ontrol

Engine control unit (A 021) processes all external Sensor - parameters.

- B025 Engine speed indicator
- B026 Needle motion sensor (effective injection start)
- B027 Coolant temperature
- B028 Charge air pressure probe

Engine control module determines

- Injection rating (Injection volume per cam angle)
- Injection volume
- Injection start

Engine control module (A 020) reads

- Injection pump speed
- Injection pump setting
- Fuel temperature (approx. 80-90 °C)

Engine control module controls

- High pressure solenoid valve (Q-MV)
- Spray control solenoid valve (SV-MV)

EDC BUS-System

See also : Chapter 9700 Reg. A "Concept of electronics" Fav 900/23/...)

Data communication between Engine control module MSG (A021) and pump control module PSG (A021) occurs via EDC-CAN-BUS (Diagram chapter 9000 Reg.C Sheet 33 ; EDC Engine control)

Engine control module communicates via transmission BUS (G-BUS) and via comfort control module (A002) with the Comfort-BUS (K-BUS)

Error codes are displayed on the dashpanel (A007) via BUS System.

(Diagram "Comfort-BUS and Transmission-BUS" ; Chapter 9000 Reg.C ; Sheet 21 and Sheet 26)

The Engine control module is equipped with a diagnostic connector (X412)

This connector allows the reading of the parameters from the Engine and Injection pump control modules.

"EDC - Diagnostic"

Note:

The Injection pump control module and the injection pump are matched.
For this reason replace only the complete injection pump.

In case of replacement of the engine control module by a module wich does not correspond to the engine type, all parameters (max. torque) will be limited and set for Fav. 916 (Error Code 1.1.A0)

This equally valid for erroneous End Of Line programming.

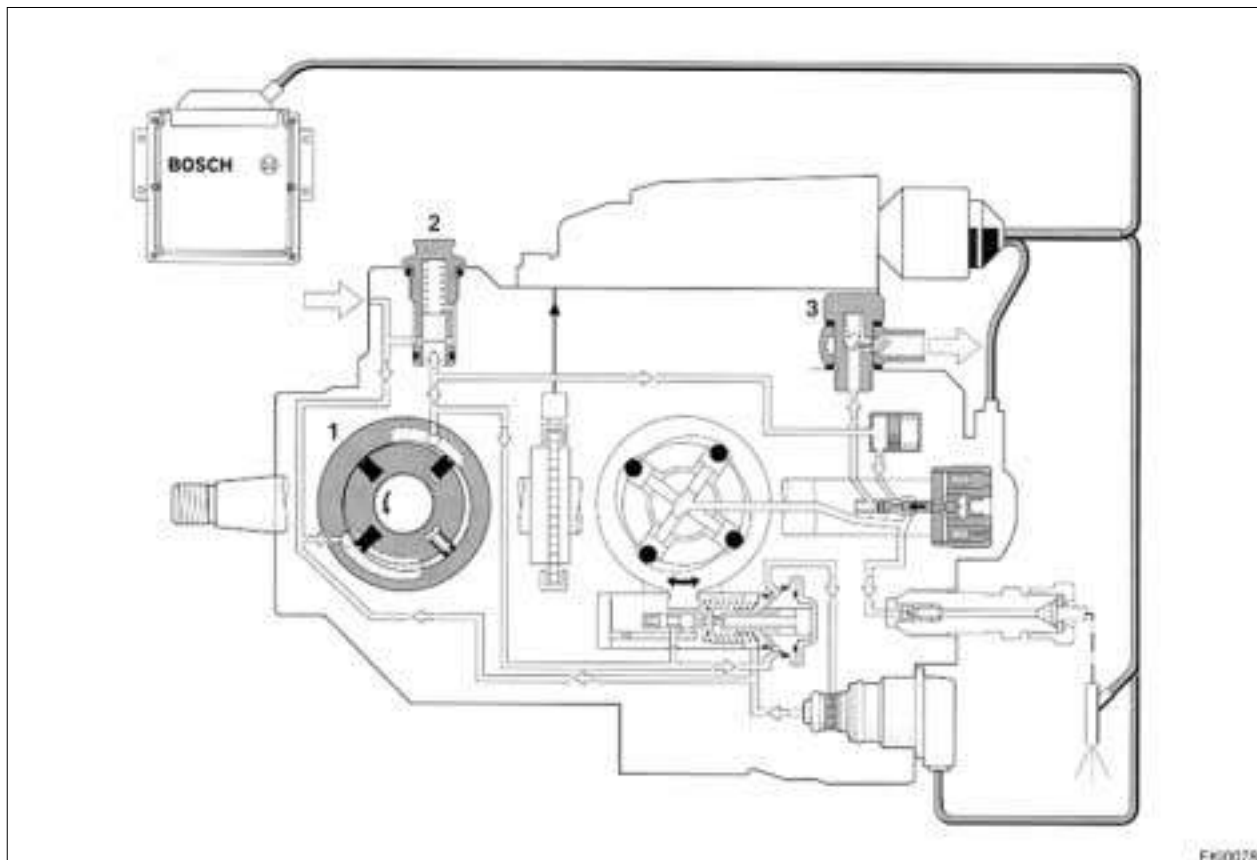
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Fav 900

Engine / Injection Pump EDC - Description

A

Low pressure circuit - Components of VP 44



| | |
|---|--|
| 1 | Vane type fuel lifting pump (rotated by 90°) |
| 2 | Pressure control valve (20 bar) |
| 3 | Overflow valve |

Vane type fuel lifting pump (1)

aspirates and conveys fuel by each turn to the radial piston pump in a nearly constant flow.

This generates the standby cavity pressure " **Pump internal pressure**" wich is depending on engine speed.

Pressure control valve (2)

Controls the Pump internal pressure. Opens in case of over pressure and shuts by "low pressure".

Overflow valve (3)

Releases a defined fuel flow toward fuel tank in case of reaching a defined Pump internal pressure.

| Pump internal pressure (bar) | n Engine (Upm) |
|--------------------------------|------------------|
| approx. 14 - 15 | 1200 |
| const. 20 | >1600 |

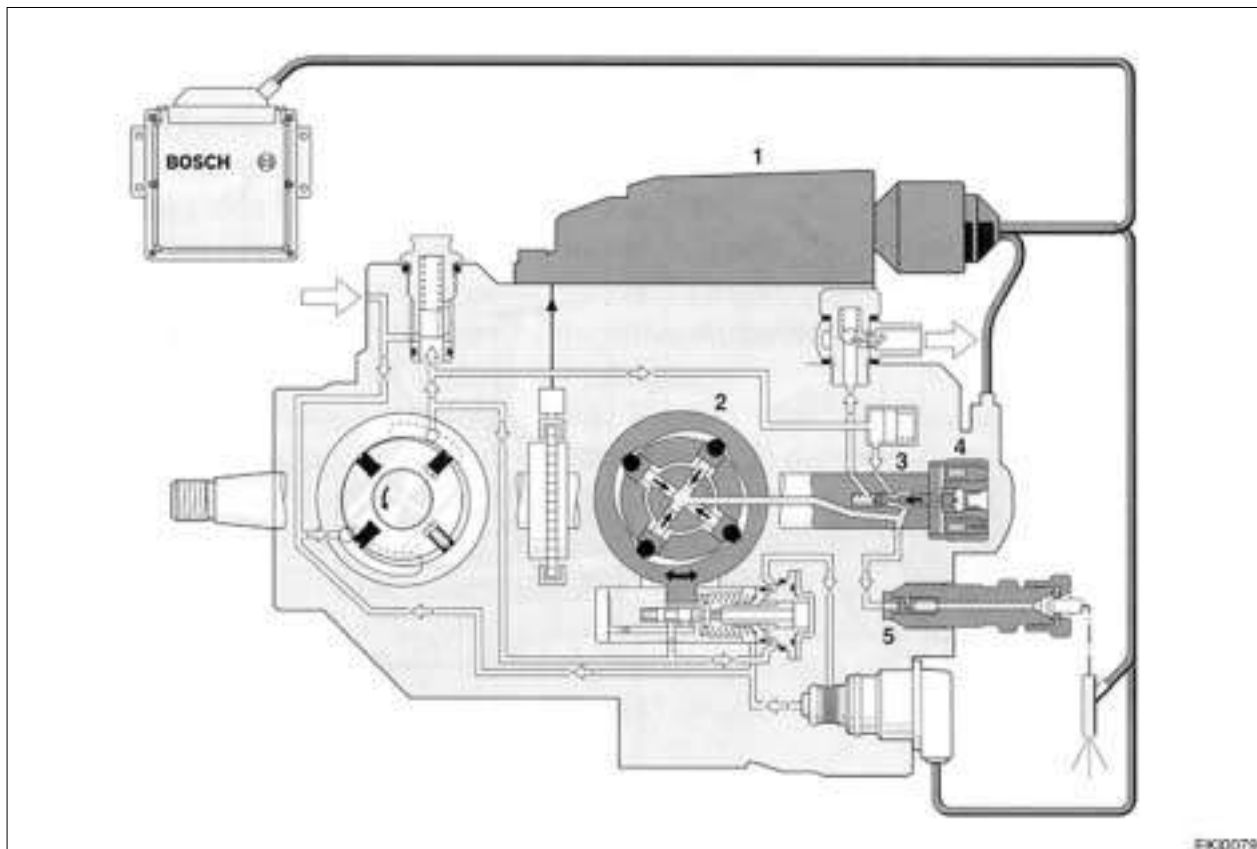
Fav 900

Engine / Injection Pump

EDC - Description

A

High pressure circuit - Components of VP 44



| | |
|---|--|
| 1 | Injection pump control module(A020) |
| 2 | Radial piston pump - High pressure pump (rotated by 90°) |
| 3 | Distribution body |
| 4 | High pressure solenoid valve (Q-MV) |
| 5 | Injection line fitting with return flow valve |

Radial piston pump - High pressure pump (2)

Fuel reaches the piston intakes of the high pressure section via the opened solenoid valve .
The cam ring, due to its elevations, presses the piston radially toward the centre of the pump . It compresses the fuel by every lift for the injection into the respective cylinder.

High pressure solenoid valve (4)

Controlled by the pump control module(A020), regulates the fuel supply for the high pressure radial piston pump.

The High pressure solenoid valve defines the injection volume and the injection rationg (Injection volume per degree of cam setting) for every individual injection.

The high pressure solenoid is monitored by the pump control module !

Distribution shaft with distribution body (3)

The shaft distributes fuel in such a manner that every cylinder will be supplied once via the injection line fitting for each pump rotation.

return flow valve (integrated in the injector line fitting) (5)

damps the shockwaves which occur by the shutting of the injectors.

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|---------|----------|------|---|----------|---------------|
| 10/2000 | a | 4/6 | EDC - Description 2710 | A | 000001 |

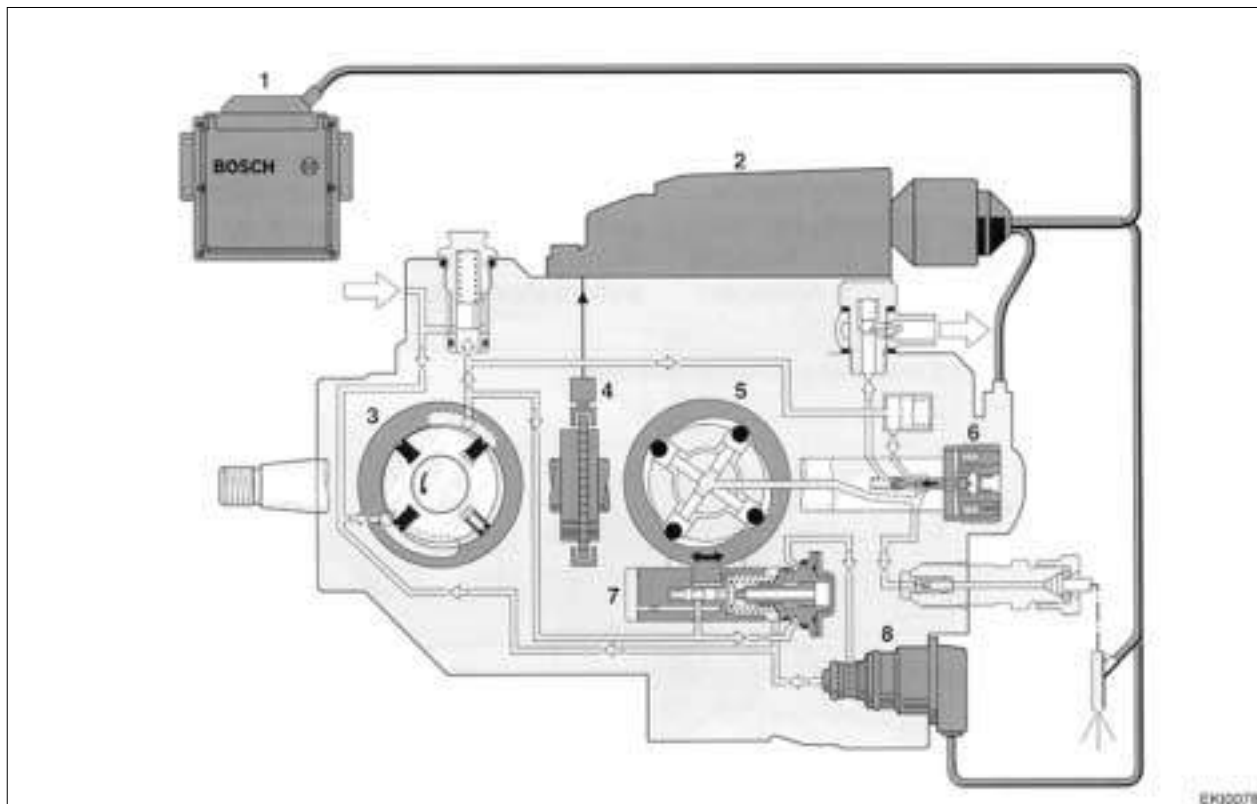
Fav 900

Engine / Injection Pump

EDC - Description

A

Sprax adjustment - VP44



| | |
|---|---|
| 1 | Engine control module (A021) |
| 2 | Injection pump control module (A020) |
| 3 | Vane type fuel lifting pump (rotated by 90°) |
| 4 | Angle sensor |
| 5 | Radial piston - High pressure pump (rotated by 90°) |
| 6 | High pressure solenoid valve (Q-MV) |
| 7 | Spray adjuster (rotated by 90°) |
| 8 | Spray adjustment valve ("Pacing valve") |

Spray adjuster (7)

The hydraulic spray adjuster with the pacing valve (8) is mounted on the lower pump body across the pistons and pump alignment.

The spray adjuster moves the cam ring according to the operating conditions, torque and speed, in order to adjust the injection start.

Note:

The pacing valve is not monitored !

If electric power is applied onto the injection pump, the pacing valve must "vibrate".

Angle sensor (DWS - System) (4)

The increment wheel (Sensor wheel) and the bracket for the sensor are fitted onto the driving shaft. The system detects the relative angle between driving shaft and cam ring.

This allows calculate the actual **Engine speed**, the **Spray adjuster position** and the **angular position of the cam shaft**

Needle motion sensor (B026)

Needle motion sensor to determine the adequate opening time of the injection nozzle.

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| 10/2000 | a | 5/6 | EDC - Description | 2710 | A |
| | | | | | 000001 |

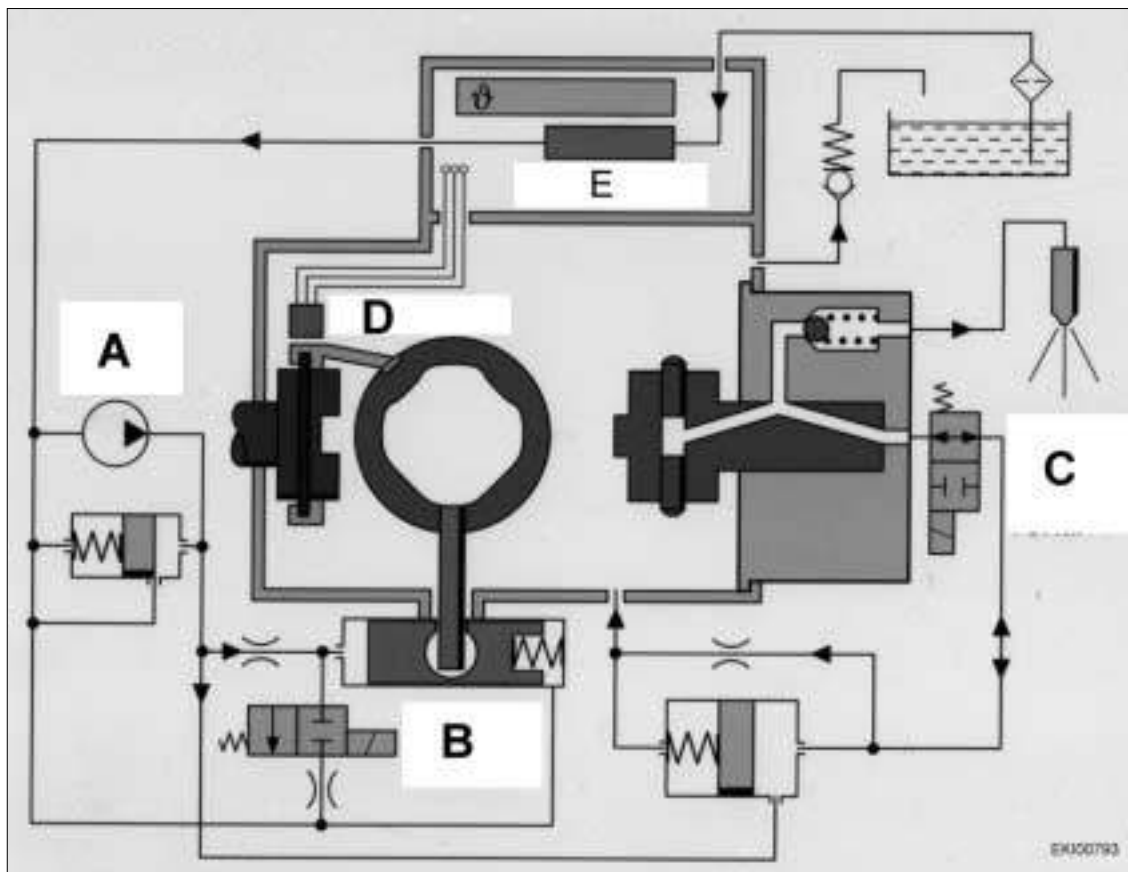
Fav 900

Engine / Injection Pump

EDC - Description

A**"real Injection start"**

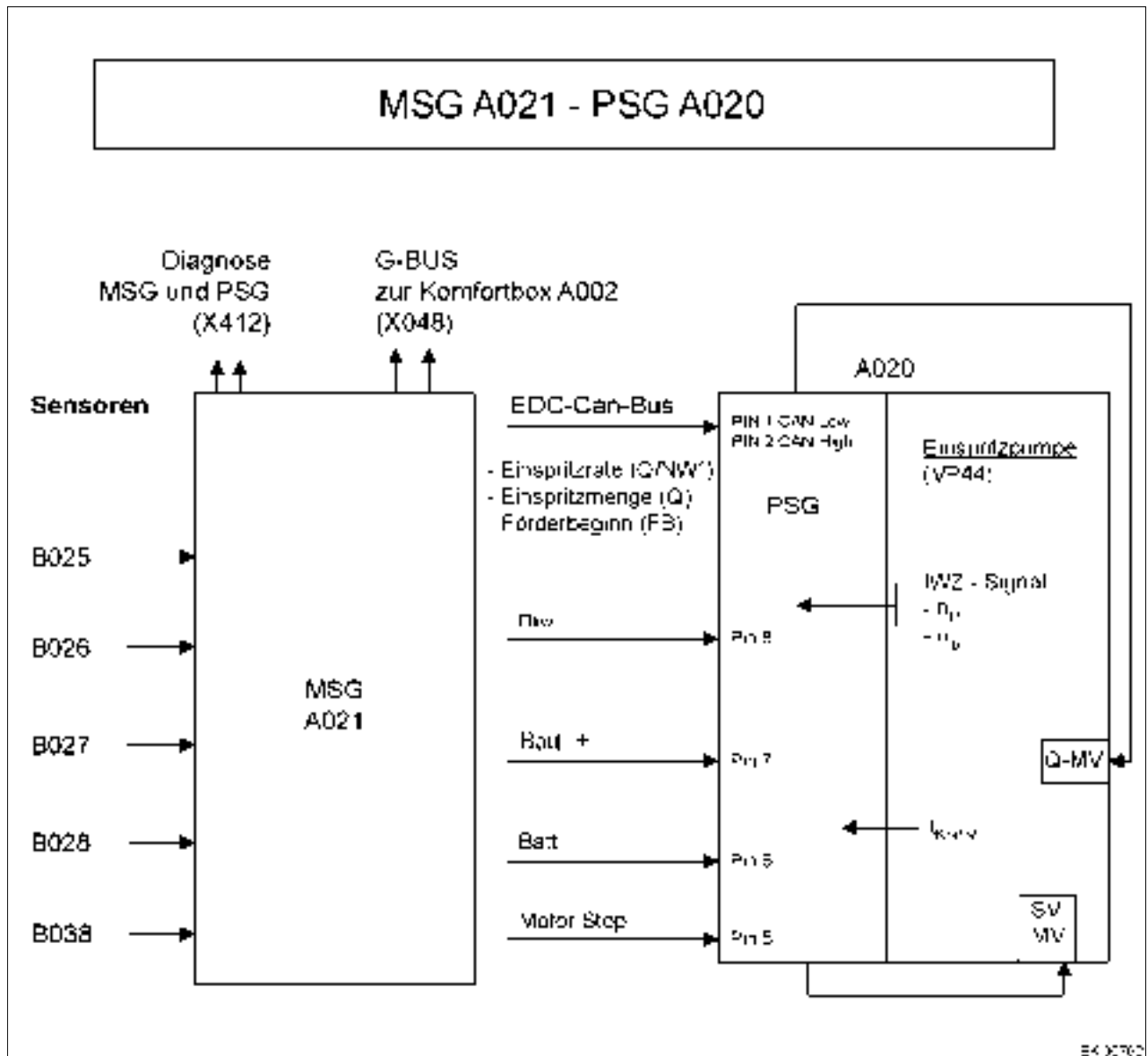
Signal will be processed by Engine Control Unit (1).

Principle of VP 44 operation

| | |
|---|--------------------------------------|
| A | Fuel lifting pump |
| B | Spray adjustment |
| C | High Pressure solenoid valve (Q-MV) |
| D | Position (angle) Sensor (IWZ-Sensor) |
| E | Pump Control Module (A020) |

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| 10/2000 | a | 6/6 | EDC - Description | 2710 | A |
| | | | | | 000001 |

| | | |
|----------------|---|----------|
| <i>Fav 900</i> | Engine / Injection Pump MSG A021 - PSG A020 | A |
|----------------|---|----------|



| | | | |
|-------|------------------------------|-------------|---|
| A020 | Injection Pump | B038 | Accelerator Pedal Position Sensor EDC |
| PSG | Pump Control Module | Q/°NW | Injection Rate |
| A021 | EDC Control Module (MSG) | Q | Injection Volume |
| X048 | Connection G-BUS | FB | Start of delivery |
| X412 | Diagnostic Interface | nKW | Crankschaft speed |
| Q-MV | High Pressure Solenoid Valve | Battery + | UB 30 , Battery + |
| SV-MV | Injection Controller | Sheet. - | 31 , Battery + |
| | | Engine Stop | Solenoid Valve Engine stop |
| B025 | Engine Speed Sensor | nP | Pump Speed |
| B026 | Needle Motion Sensor | alphaP | Pump setting |
| B027 | Coolant Temperature | t Fuel | Fuel temperature |
| B028 | Intake Air Pressure Sensor | IWZ | Inkremental - Way - time - System (Pump Position) |

| | | | | | | |
|------------|---------|------|---------------------|---------|-------|----------|
| Date | Version | Page | MSG A021 - PSG A020 | Capitel | Index | Docu-No. |
| 24.10.2000 | a | 1/1 | | 2710 | A | 000002 |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Injection Pump Speed Control EDC | A |
|----------------|--|----------|

Speed Control EDC Injection System via:

Possibilities of Speed Control

- Pedal position Sensor EST (B029)
- Hand Throttle Position Sensor (B035)
- Memory Keys MIN. and MAX. on Joystick A003
- Setting Speed MIN. and MAX. for Memory Keys using Terminal A008

Speed Control procedure

Accelerator pedal Position Sensor **B029** as Well as Terminal **A008** are directly connected to EST Control Module **A002** .

Hand Throttle position Sensor **B035** as Well as Memory Keys on Joystick **A003** are connected to EST Control Module **A002** and Comfort -BUS via Side Console **A004** .

EST Control Module **A002** processes Sensor Signals and leads signals according to priority via Transmission Bus to the EDC Control Module **A021**

EDC Control Module controls the Injection Pump VP44 to reach the required Engine Speed.

Note:

It is possible to fool Speed settings (Priority - Processing within EST Control Module A002)

Note:

Engine without load: Actual Engine speed (indicated on dash Panel) runs approx. 30 Rpm below the selected speed on the Terminal.

Monitoring and securing Speed Control

- Accelerator Pedal position Sensor EDC (B038)

Note:

Pedal position Sensors B029 and B038 are actuated simultaneously by the accelerator Pedal.

Monitoring Speed Control

Accelerator Pedal position Sensor **B038** is connected to EDC Control Module **A021** .

EDC Control Module **A021** emits "requested Speed " from **B038** onto EST Control Module **A002**

EST Control Module **A002** compares Signals from Pedal position Sensor **B029** with Pedal position Sensor **B038**

In case of Deviations (Plausibility Check) a Failure Code will be displayed on Dashpanel **A007**

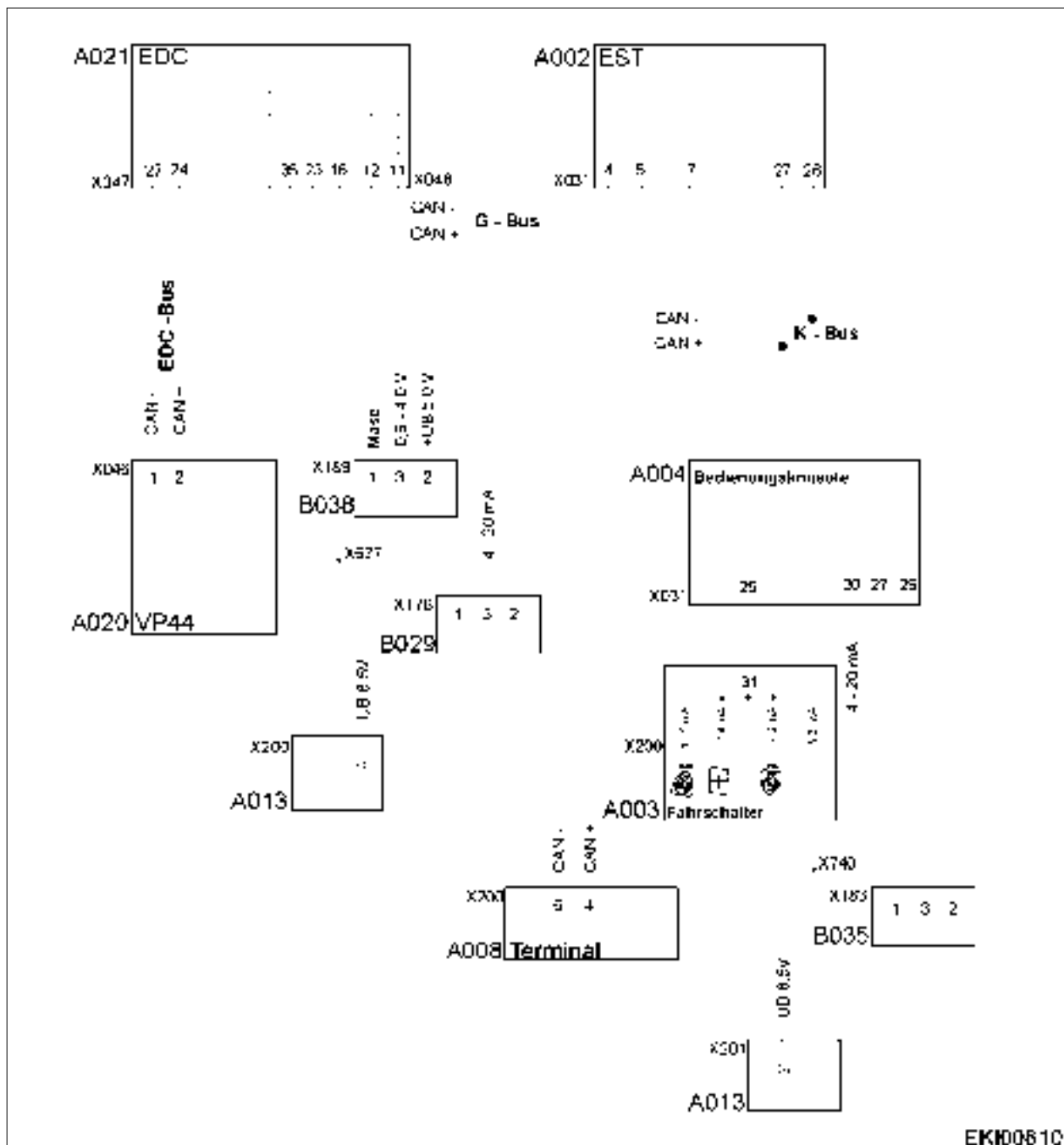
Securing Speed Control

In Case of EST Control Module Failure A002 or Transmission Bus Failure Speed Control Will occur through Pedal position Sensor B038. (restricted operation, no Hand Throttle or Memory keys Operation)

In case of simultaneous Failure of both Pedal position Sensors, Pump Control Module A020 will Automatically set 720 Rpm (Auxilliary Operation)

(Consult : Diagnostic EDC, Chapter 2000 Reg.B)

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| 25.11.2000 | a | 1/2 | 2710 | A | 000006 |

Fav 900**Engine / Injection Pump
Speed Control EDC****A****Diagram Speed Control Favorit 900 EDC**

EKM00610

| | | | |
|------|----------------------|-------------|-------------------------------|
| A002 | EST Control Module | B029 | Pedal position Sensor EST |
| A003 | Joystick | B035 | Hand Throttle position Sensor |
| A004 | Side Console | B038 | Pedal position Sensor EDC |
| A008 | Terminal | G-BUS | Transmission - BUS |
| A013 | Fuse Board | K-BUS | Comfort - BUS |
| A020 | Injection Pump (PSG) | EDC-BUS | EDC-BUS |
| A021 | EDC Control Module | X627 / X740 | Connection Earth Sensorics |

Note:

Joystick A003: If no Memory Key is actuated (MIN, MAX or Delete) , a current of approx. 5,3 mA is to be measured on Pin 31(Diagram)

| Date | Version | Page | Speed Control EDC | Capitel | Index | Docu-No. |
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| 25.11.2000 | a | 2/2 | | 2710 | A | 000006 |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Injection pump Electronic pump control / Engine stop | A |
|----------------|--|----------|

Electronic pump control: Starting process

Chapter 9000 Reg.C Sheet 33 (Diagramm EDC- Engine control)

Chapter 9000 Reg.C Sheet 2 (Diagramm Power supply +UB)

- Ignition lock **S002** connects supply voltage UB 15 to Engine Control module **A021** (Conector X048 ; Pin 15)
- MSG **A021** (Connector X048 ;Pin 27) connects Earth to relay **K020**
- Relay **K020** connects supply UB30 to MSG **A021** (Connector X048 ; Pin 3 and Pin4)
- MSG **A021** (Connector X048 ; Pin 18) connects Voltage onto Relay **K 021**
- Relay **K 021** connects Voltage UB30 onto Engine control module **A020** (Pin 7)

During cranking process, Engine control module A020 sets internally for an engine speed of approx. 720 rpm.

After cranking process, EDC - BUS will be established , and Engine control Module A021 will control engine speed.

Electronic Pump Control: Engine Stop

Chapter 9000 Reg.C Sheet 33 (Diagram EDC- Engine Control)

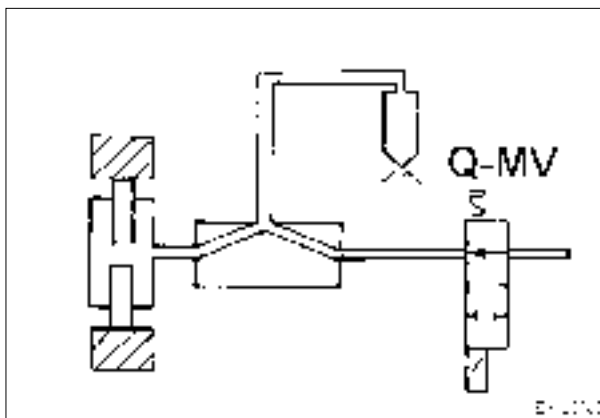
Chapter 9000 Reg.C Sheet 2 (Diagram Voltage supply +UB)

Engine will be stopped by the value "Injected volume set at 0".

High Pressure Solenoid valve Q-MV within injection pump is without power and so fully openend.

High pressure cannot be established.

Sketch: High pressure stage of the radial piston pump VP44



By setting ignition key into "0" position, Engine control module A021 receives signal: Engine Stop !

The Microprocessor within Engine Control unit A021 defines trough wich process the engine is to be stopped,

Engine Stop Processes

- Engine Control unit **A021** (Connector X047 : Pin20) supplies Voltage UB to Pump Control Unit **A020** (Pin 5)
- Engine Control unit **A021** (Connector X048 ; Pin18) interrups Voltage supply to Relay **K021** .No Voltage supply UB30 to Pump Control Unit **A020** .
- Engine Control unit **A021** (Connector X048 ; Pin 27) interrups Earth connection to Relay **K020** . No Voltage supply UB30 to Pump Control Unit **A020** .

| Date | Version | Page | Electronic pump control / Engine stop | Capitel | Index | Docu-No. |
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Fav 900

Engine / Injection pump

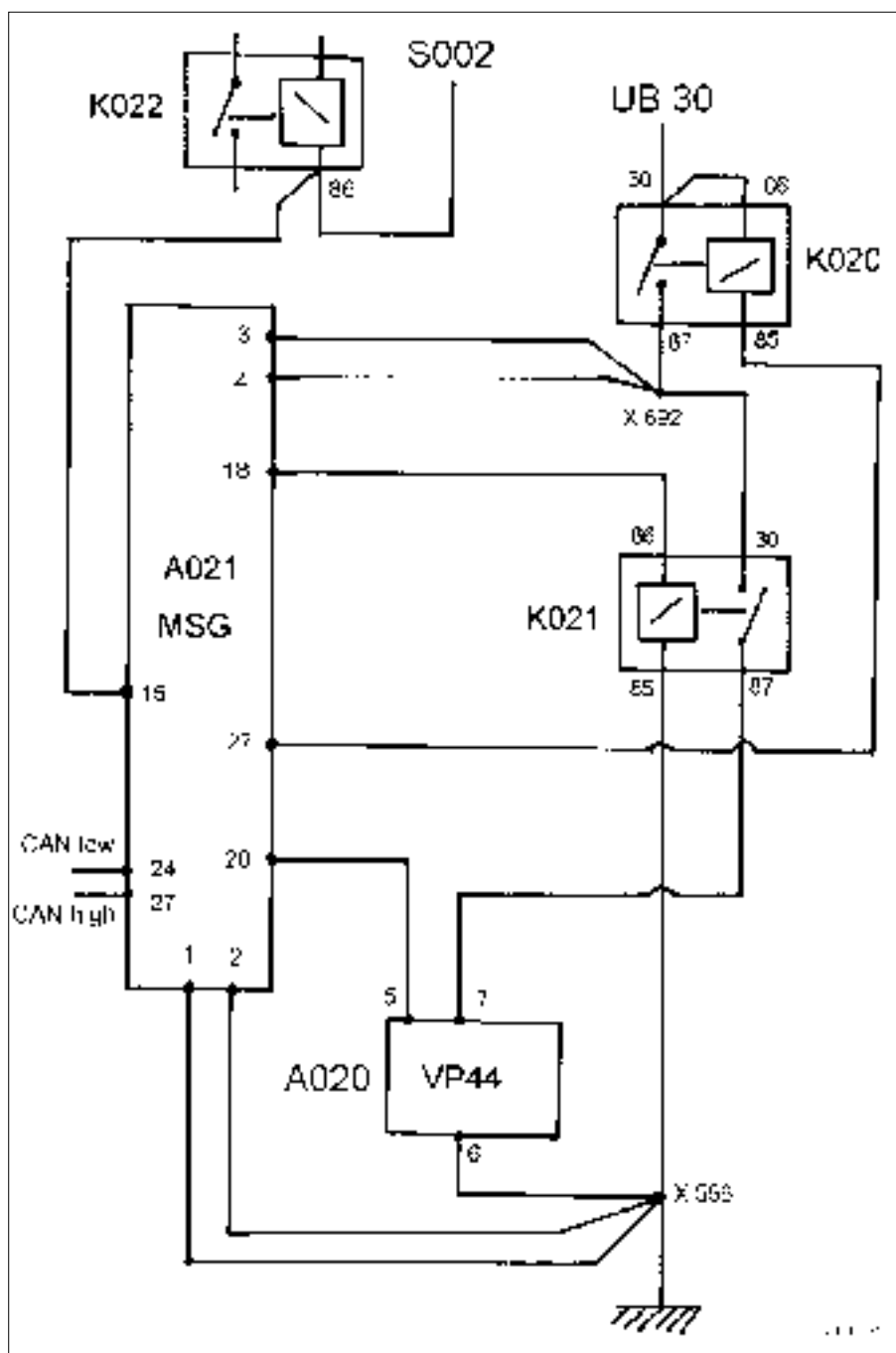
Electronic pump control / Engine stop

A

- Engine Control unit **A021** (Connector X047 ; Pin 24 / 27) sends signal "Injected volume set at 0" to Pump Control Unit **A020** via EDC CAN -BUS .

Note:

Engine Control Unit A021 defines with Engine Shut Down process will occur. This process allows Auto Diagnostic of the EDC Injection system.

Electric diagramm: Pump control

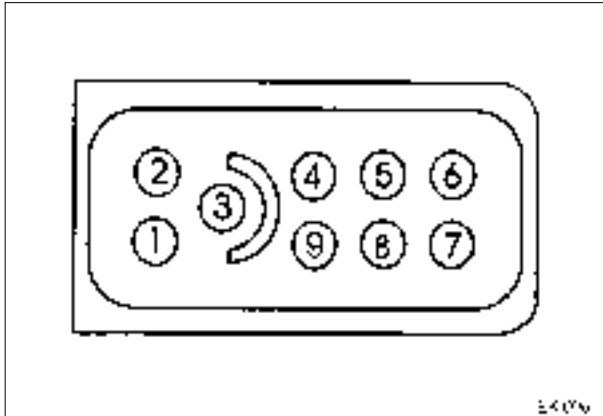
| | | | |
|------|------------------------------------|------|-------------------------|
| A020 | Injection pump VP44 | K022 | Relay UB 15 |
| A021 | Engine control module | S002 | Ignition lock |
| K020 | Relay UB 30 EDC | X692 | Connector UB 30 EDC |
| K021 | Relay Solenoid valve "Engine stop" | X556 | Earth point Cabin / EDC |

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| 14.11.2000 | a | 2/2 | Electronic pump control / Engine stop | 2710 | A |
| | | | | | 000004 |

| | | |
|----------------|--|----------|
| Fav 900 | Engine / Injection System Injection Pump - Auxilliary Operation | A |
|----------------|--|----------|

Auxilliary Operation Of EDC Injection Pump VP 44 (A020)

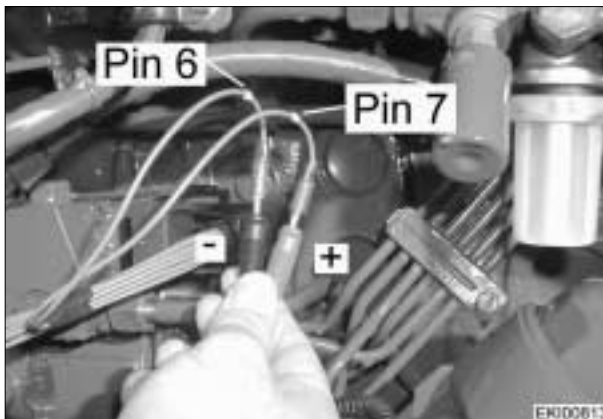
Injection Pump can be used in auxilliary operation if the electronic control becomes impossible due to Failure Codes.



Injection Pump A020 on:
Pin 7 (Battery +) and on
Supply externally 12 VDC with Adapting
Connector on Pin 6 (Battery -) .

Pin attribution on Pump Control module

| Pin | Wire.-Nr./ Colour | Attribution |
|-----|---------------------|--------------------------------|
| 1 | white / green | CAN Low |
| 2 | green | CAN High |
| 3 | -- | not attributed |
| 4 | -- | not attributed |
| 5 | 60303 | Engine Stop via Solenoid Valve |
| 6 | 31000 / white / red | Earth |
| 7 | 60017 / red | + U Battery |
| 8 | 60357 | Speed Input Signal |
| 9 | -- | not attributed |



Adapting Connector X 899.980.251.101

Connect Compact Conector with Injection pump.

Connect Insertion Cable with:

+ UB Kontakt (red) with Cable Nr. 7

Earth Contact (black) with Cable Nr. 6

| Date | Version | Page | Injection Pump - Auxilliary Operation | Capitel | Index | Docu-No. |
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| 06.11.2000 | a | 1/2 | | 2710 | A | 000003 |

Fav 900

Engine / Injection System

Injection Pump - Auxilliary Operation

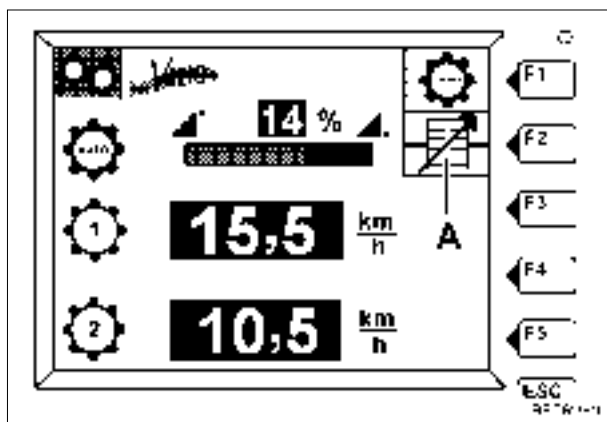
A

Connect **Insertion Cable** (Arrow) with Permanent socket 25 A (UB 30) .

Start engine via Ignition key



Warning:
Remove connection Adapting
Connector to - 25 A Socket !!

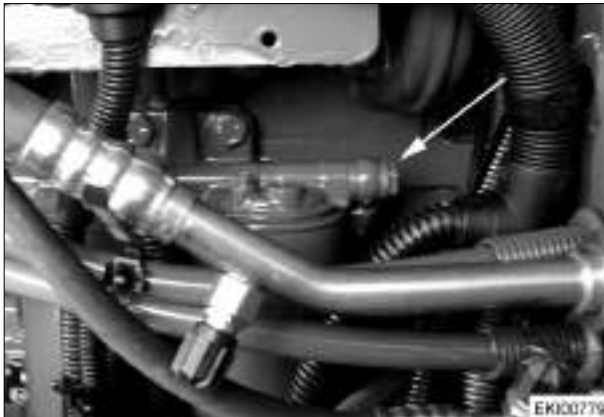
**Note:**

In Auxilliary operation, engine runs 720 U/ Rpm.

Deactivate Turboclutch function within Terminal A008 for driving tractor. (Consult Operating Manual Fav 900 / 7. Operation Vario Transmission).

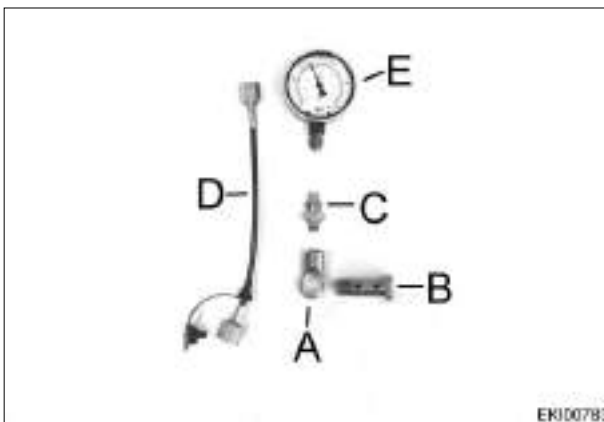
Fav 900

Engine / Injection Pump Pre - Pressure / Internal Pressure

E

Checking Pump Pressure of injection Pump VP 44 prüfen.

Loosen Hollow screw on Filter Body.



Measuring Case X 899.980.217.000

- A = Ring stub 14 mm
- B = Hollow screw M 14 x 1,5
- C = Test Connection M 10 x 1
- D = Test Hose
- E = Pressure Gauge (Range : 0 bar Absolute - 1,5 bar Relative)



Start Engine and run it through complete speed range.

Read Pressure on Pressure Gauge.

Requested pressure downstream of filter and upstream of Pump:

0,1 bar - 0,8 bar

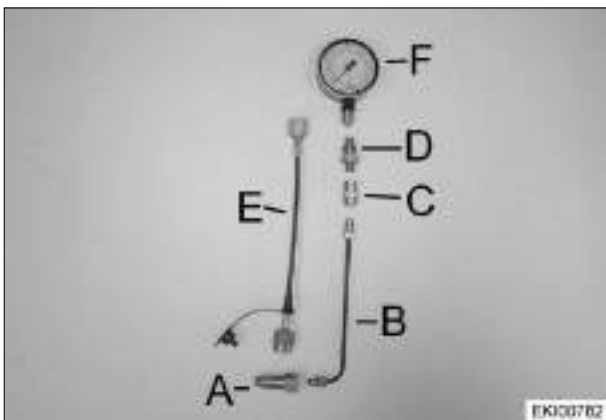
If this value cannot be reached **Filter may be contaminated**

Fav 900

Engine / Injection Pump Pre - Pressure / Internal Pressure

E

Checking Internal Pressure of VP 44 prüfen.
Remove sealing Screw.

**Measuring Case X 899.980.217.000**

- A = Adapter M 10 x 1 (X 596.135.000.000)
- B = Tube (X 596.340.400.000)
- C = Insertion Part (395.100.070.650)
- D = Test Connection M 10 x 1
- E = Test hose
- F = Pressure Gauge (Range until 60 bar)



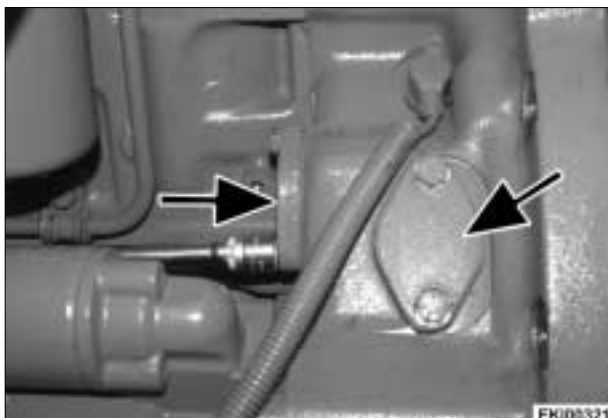
Start Engine - Read Pressure on Pressure Gauge.

If Values cannot be reached (Table) :

- Pre Pressure to low (Check Pre pressure)
- Vane Pump within injection pump worn out
- VE - Pump pump worn .

Requested Value Internal Pressure VP 44

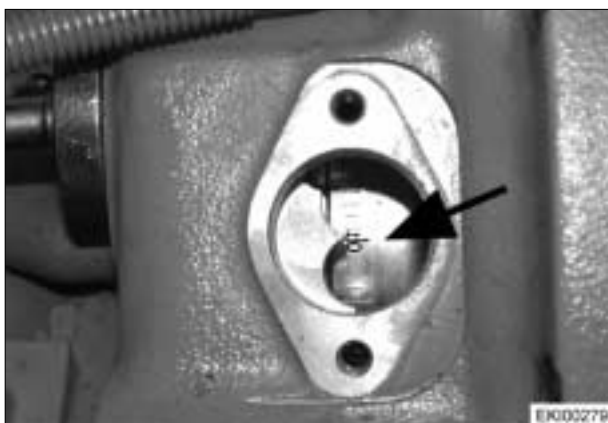
| Internal Pressure | n Engine |
|-----------------------|-----------|
| approx. 14 - 15 bar | 1200 Rpm |
| const. approx. 20 bar | >1600 Rpm |

Fav 900**Engine / Injection Pump
Checking Start of Delivery VP 44****E**

Remove cover (Arrows).



Set actuation tool (X 899.980.220.000).



Set 1st Cylinder in Top Dead Point (TDP) position (arrow).

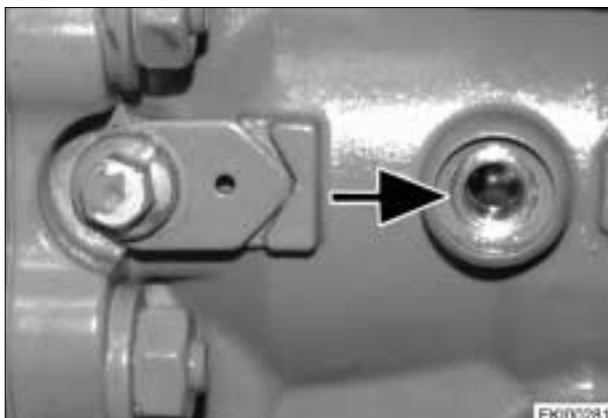


Remove sealing screw of TDP measuring point.

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Fav 900

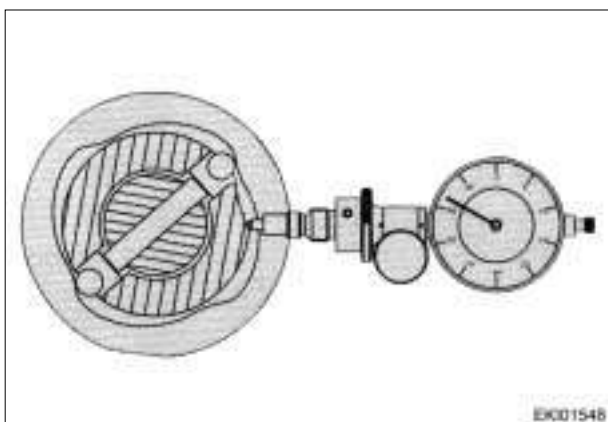
Engine / Injection Pump Checking Start of Delivery VP 44

E**Important:**

1. Cylinder (fan side) is in TDP Position, when the flat part of the control shaft can be recognized through the TDP measuring hole.

If the flat part cannot be recognized, turn the crank shaft further 360° with the actuation tool in order to place the flat part of the control shaft in front of the measuring hole.

Valves of the 6th cylinder (flywheel side) are in middle position.



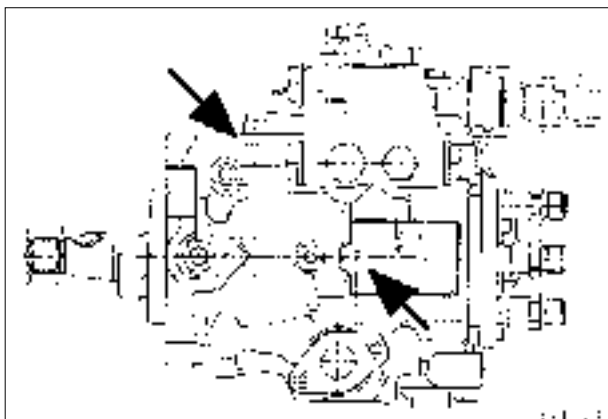
Turn crank shaft back by at least 20° before TDP and then set dial gauge with adaptor (X 899.980.245.000) into the TDP measuring Hole .

Note:

Use dial gauge with ball tip R=1 mm (0.039").



Set dial gauge into "0" display position.



3 - Digit Number: Identification (arrows) possible on following locations.

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Fav 900

Engine / Injection Pump

Checking Start of Delivery VP 44

E

Turn crankshaft back toward TDP until displacement (X . XX) which is indicated on the injection pump will be reached .

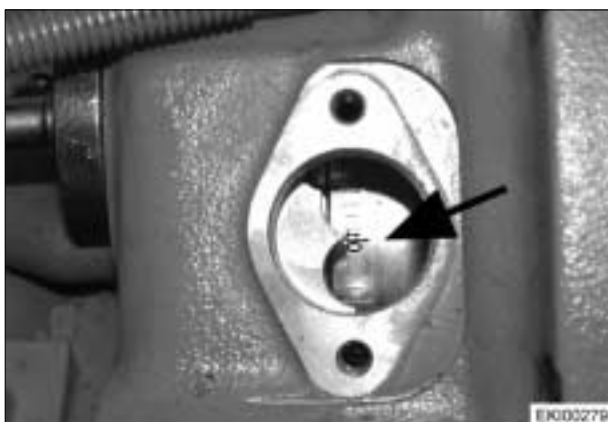
E.g.: Indicated Value on Injection Pump: 0.79

Consequently: Adjust TDP to reach 0,79 mm on dial gauge

Note:

Scanning head of dial gauge runs into slanted surface of the control shaft.

Do not turn crankshaft any further , risk of shearing the scanning head of the dial gauge.



TDP is correctly set when flywheel is in TDP position ($\pm 0,5^\circ$).

Note:

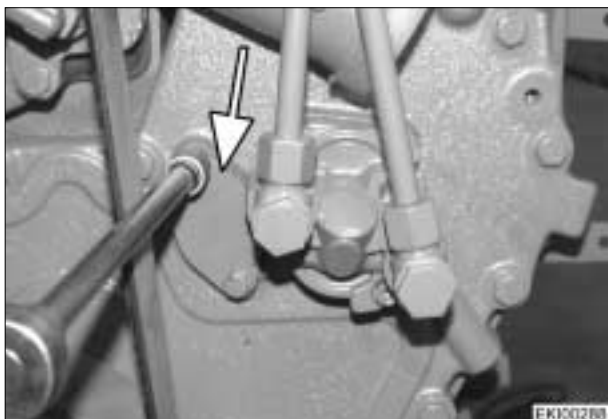
The effective start of delivery, approx. 6° vor O.T. (under full load) will be set automatically by the injection controller .

If the flywheel is in wrong position, start of delivery will not be correct (adjust start of delivery) .



Adjusting start of delivery

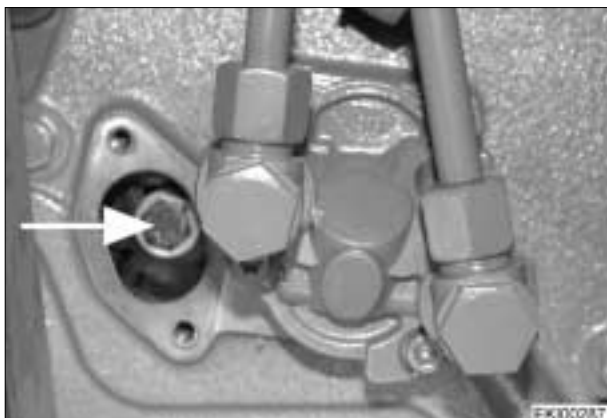
Remove dial gauge and adaptor.



Remove cover (M8)

Fav 900

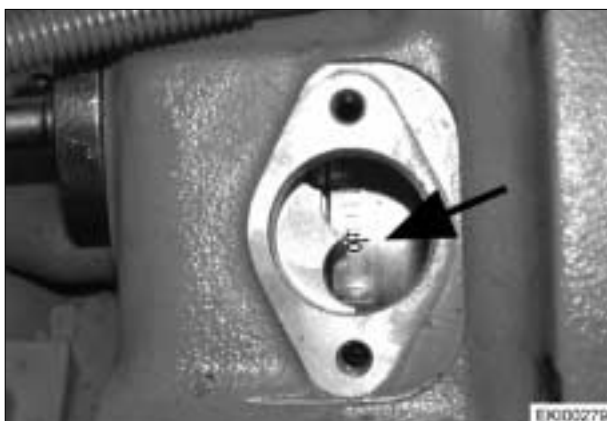
Engine / Injection Pump Checking Start of Delivery VP 44

E**Important:**

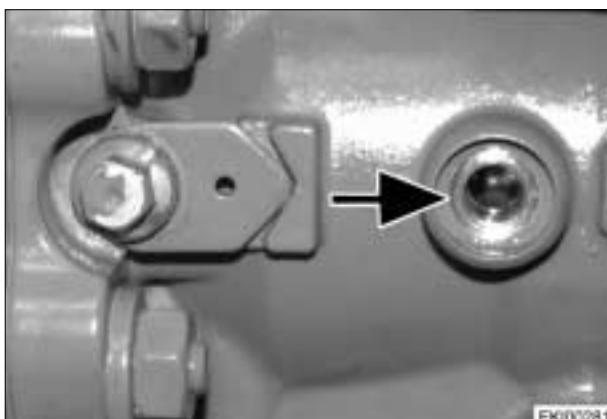
Do not loosen first visible screw (M8) (TDP Screw).



Turn crankshaft using the actuation tool and loosen the visible screws 2,3 and 4 .



Set first cylinder (fan side) using the actuation tool onto TDP (arrow).

**Important:**

1. Cylinder (fan side) is in TDP Position, when the flat part of the control shaft can be recognized through the TDP measuring hole.

If the flat part cannot be recognized , turn the crank shaft further 360° with the actuation tool in order to place the flat part of the control shaft in frontt of the measuring hole.

Valves of the 6th cylinder (flywheel side) are in middle position.

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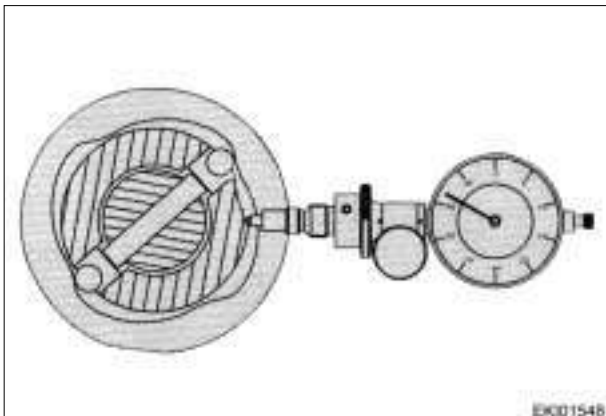
Checking Start of Delivery VP 44

<https://www.truck-manuals.net/>

Fav 900

Engine / Injection Pump

Checking Start of Delivery VP 44

E

Turn crank shaft back by at least 20° before TDP and then set dial gauge with adaptor (X 899.980.245.000) into the TDP measuring hole.

Note:

Use dial gauge with ball tip R=1 mm (0.039").



Set dial gauge into "0" display position.



Turn crankshaft back toward TDP until displacement (X . XX) which is indicated on the injection pump will be reached .

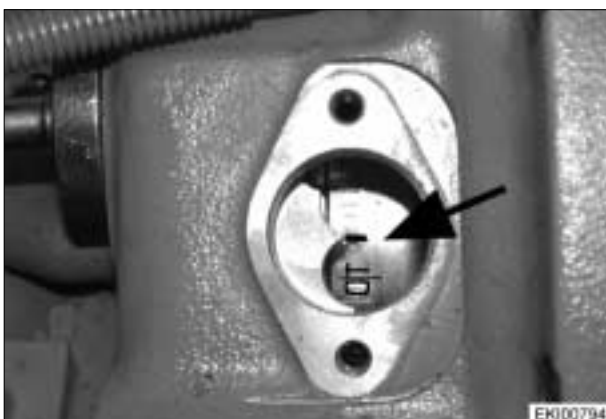
E.g. : Indicated value on injection pump: 0.79

Consequently : Adjust TDP to reach 0,79 mm on dial gauge

Note:

Scanning head of dial gauge runs into slanted surface of the control shaft.

Do not turn crankshaft any further , risk of shearing the scanning head of the dial gauge.



Start of Delivery point is wrong!

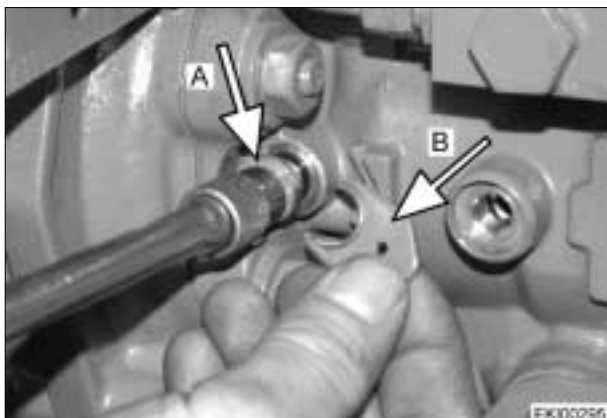
Requested value start of delivery: TDP (+/- 0,5°)

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Fav 900

Engine / Injection Pump

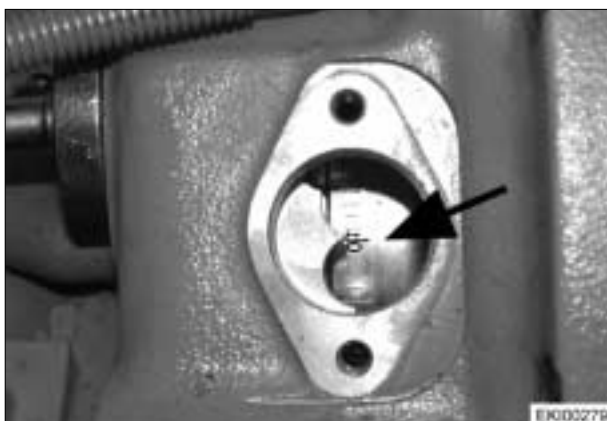
Checking Start of Delivery VP 44

E**Important:****Block injection pump. (Note sequence!)**

- Loosen locking screw (Pos. A).
- Remove spacer washer (Pos. B).
- Tighten locking screw (Pos. A) .



Loosen TDP screw.



Turn crankshaft further until start of delivery , TDP (+/- 0,5°) is reached.

Note:

If this position cannot be reached, the injection pump drive pinion must be shifted by one tooth.

Chapter 2700 Reg.G (Injection pump VP44 - Replacement)

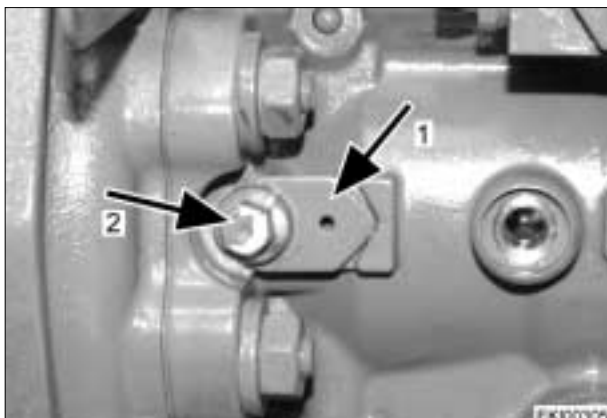


Tighten "TDP screw" at 25 Nm .

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Checking Start of Delivery VP 44

<https://www.truck-manuals.net/>

Fav 900**Engine / Injection Pump
Checking Start of Delivery VP 44****E**

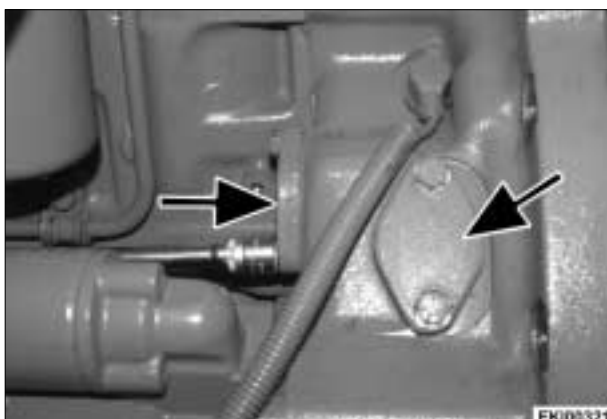
- Loosen locking screw (Pos..2)
- Put spacing washer (Pos. 1) into place
- Tighten locking screw (Pos.2) .

Check start of delivery as decribed.

Turn crankshaft with the actuation tool and tighten the visible screws 2,3 and 4 at 25 Nm. Put cover back in place.

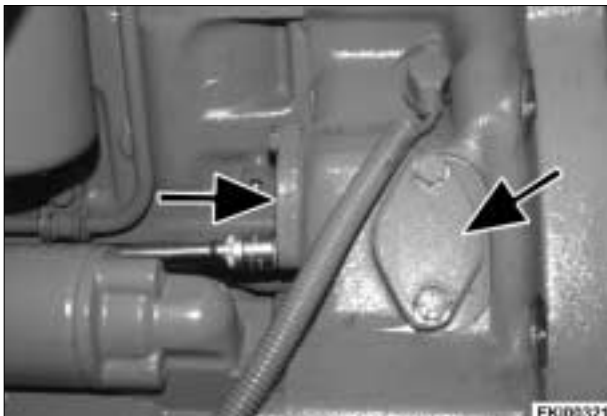


Put sealing screw TDP back into place.



Put cover (arrows) back into place.

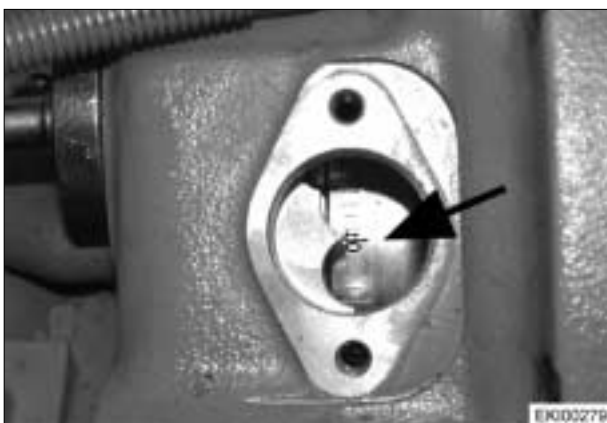
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| 01/2000 | b | 7/7 | 2710 | E | 000003 |

Fav 900**Engine / Injection Pump
Fuel Injection Pump VP 44 - Mounting - Dismounting****G**

Remove cover (arrows - left engine side).



Put actuation tool (X 899.980.220.000) into place



Set first cylinder into Top Dead Point position (TDP) (Arrow) using actuation tool.

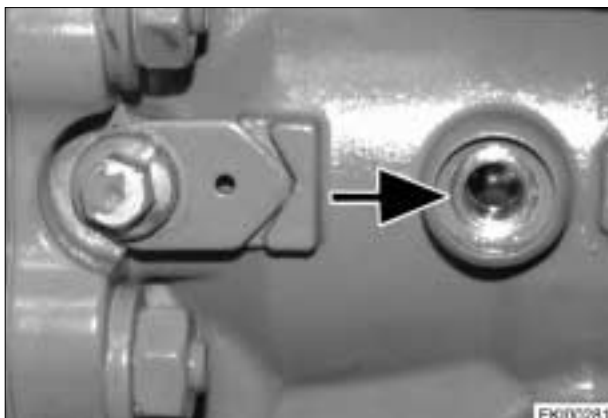


Remove screw TDP Measuring Point.

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| 01/2000 | b | 1/10 | | 2710 | G | 000002 |

Fav 900

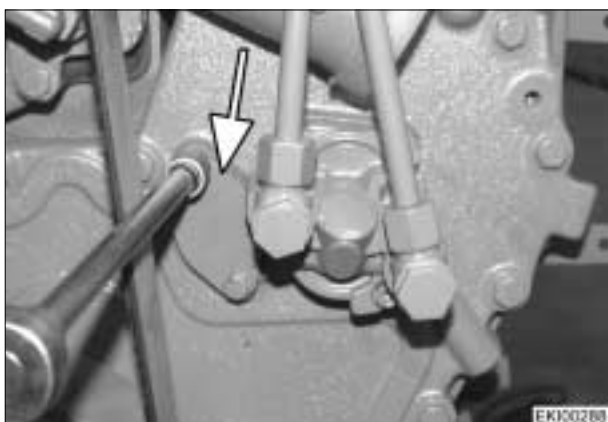
Engine / Injection Pump
Fuel Injection Pump VP 44 - Mounting - Dismounting

G**Important:**

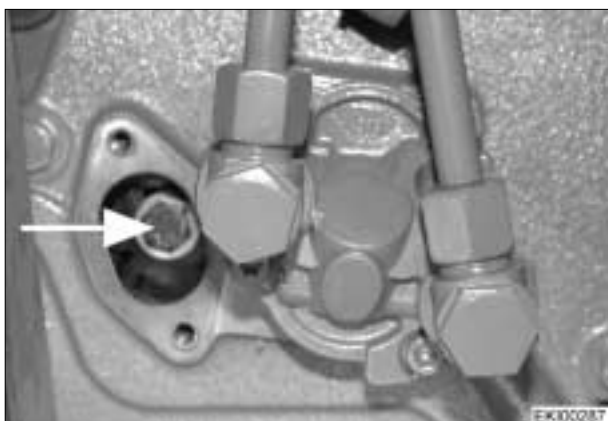
1. Cylinder will be in TDP Position, if the flat section of the control shaft appears in the TDP hole.

If the flat section does not appear on the control shaft, rotate the engine for another 360° into TDP position.

Valves of cylinder 6 (Flywheel side) are in central position.



Remove cover

**Important:**

Do not loosen first visible screw M8 (TDP screw)

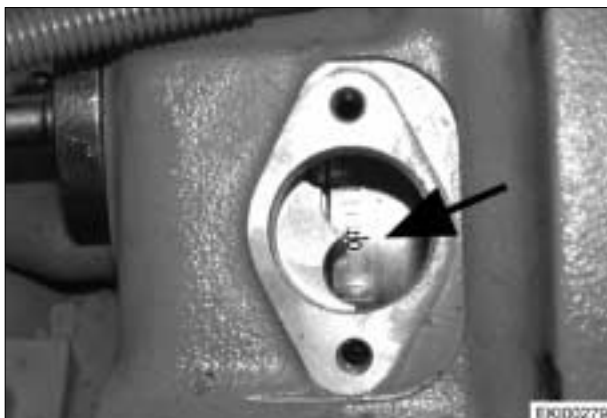


Rotate crank shaft in order to enable loosening of visible screws 2,3 and 4. (Necessary for the slantcut injection pump drive pinion)

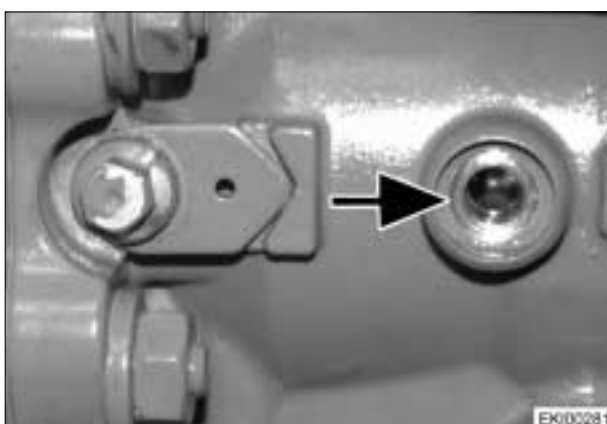
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| 01/2000 | b | 2/10 | | 2710 | G | 000002 |

Fav 900

Engine / Injection Pump
Fuel Injection Pump VP 44 - Mounting - Dismounting

G

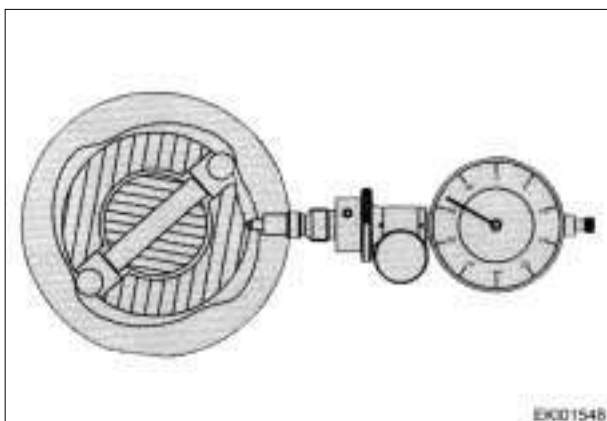
Put first cylinder into TDP position (Arrow) using the actuation tool.

**Important:**

1. Cylinder will be in TDP Position, if the flat section of the control shaft appears in the TDP hole

If the flat section does not appear on the control shaft, rotate the engine for another 360° into TDP position.

Valves of cylinder 6 (Flywheel side) are in central position.



Turn back the crank shaft by at least 20° before TDP and put dial gauge with adaptor (X 899.980.245.000) into the hole of TDP.

Note:

Use dial gauge with ball tip R=1mm (0.039").



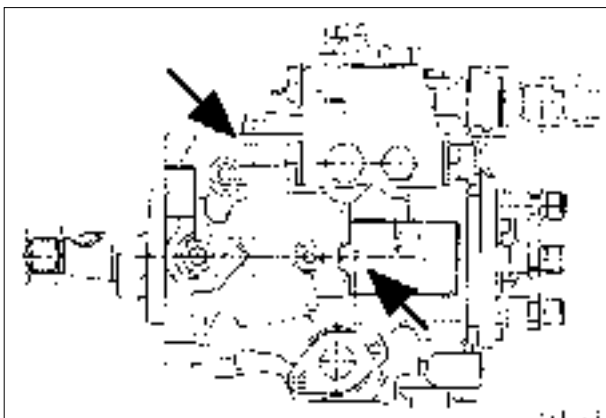
Set Dial gauge onto "0".

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| 01/2000 | b | 3/10 | Fuel Injection Pump VP 44 - Mounting - Dismounting | 2710 | G | 000002 |

Fav 900

Engine / Injection Pump

Fuel Injection Pump VP 44 - Mounting - Dismounting

G

3 - digit Number. Marking (arrows) is possible on following positions.



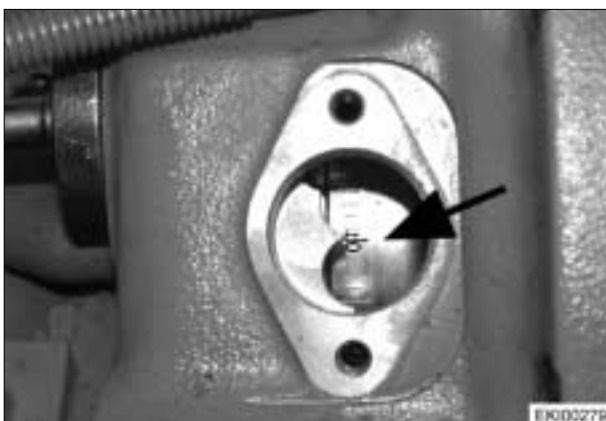
Move crank shaft again into TDP Position until the marked displacement (X . XX) will be reached.

e.G.: Displacement on injection pump 0.79 means 0,79 mm (0.0311") displacement on dial gauge

Note:

Scanning rod of dial gauge reaches the flat section of the control shaft.

Do not move the crank shaft any more , in order to avoid the sheering of the scanning rod.



Start of delivery will be adequate if the flywheel is in position TDO ($\pm 0,5^\circ$).

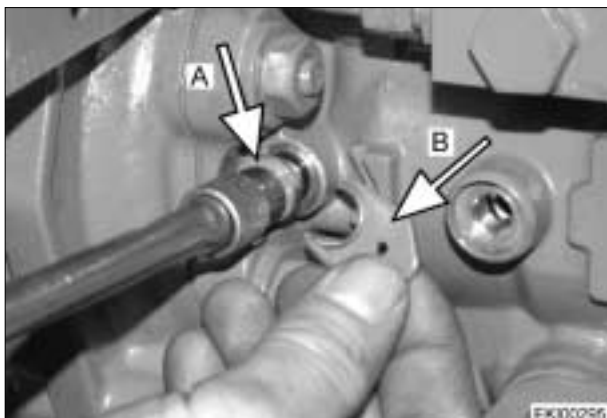
If this position is not correct, start of delivery point will not be correct.

(Check start of delivery, Chapter 2710 Reg.E)



Remove dial gauge and adaptor.

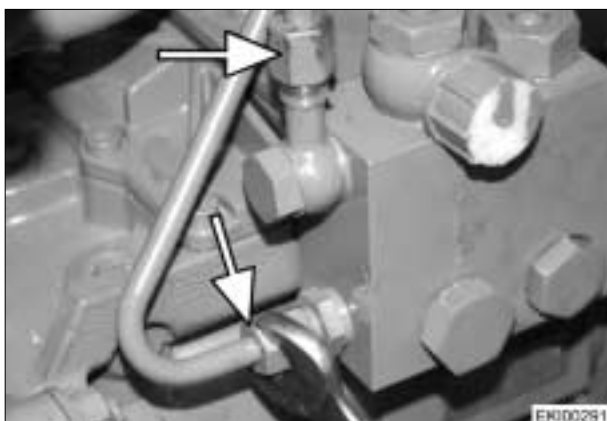
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| 01/2000 | b | 4/10 | 2710 | G | 000002 |

Fav 900**Engine / Injection Pump
Fuel Injection Pump VP 44 - Mounting - Dismounting****G****Important:****Block injection pump (follow sequence)**

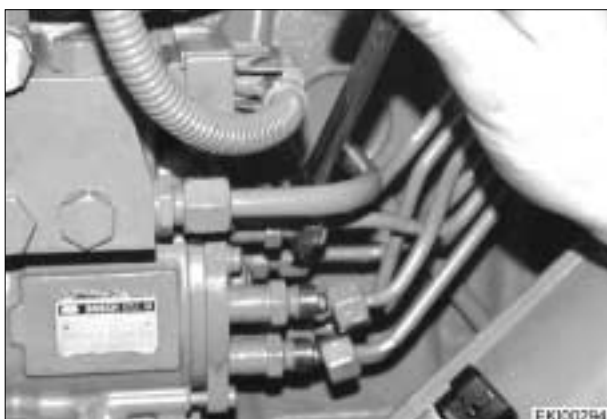
- Loosen locking screw (Pos. A).
- Remove spacing washer (Pos. B).
- Tighten locking screw (Pos. A).



Loosen "TDP screw"

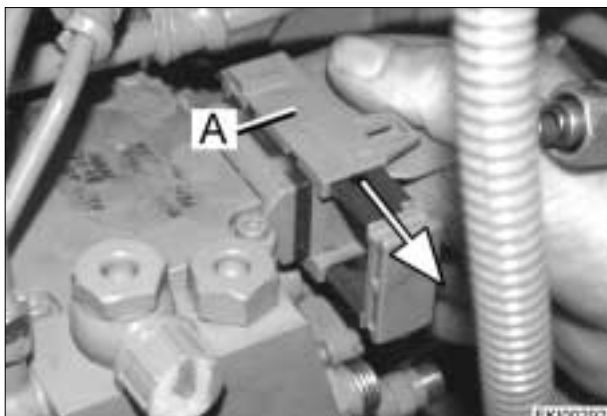


Loosen and remove "Cold Start tubing"

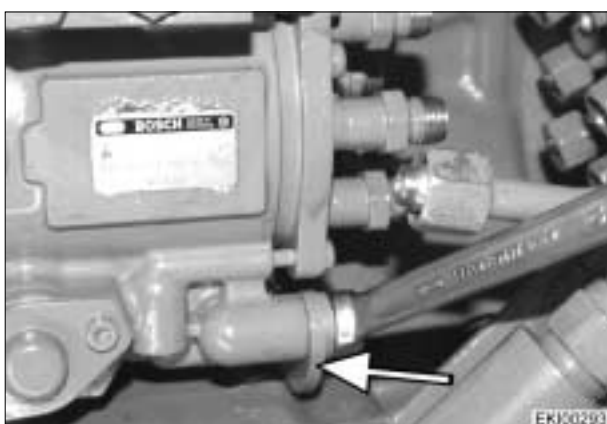


Loosen and remove injection lines.

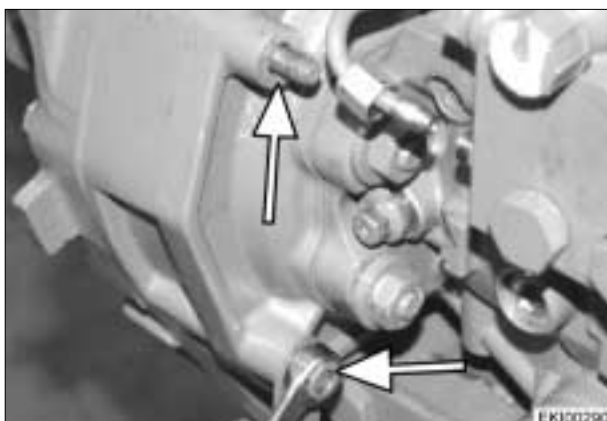
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| 01/2000 | b | 5/10 | | 2710 | G | 000002 |

Fav 900**Engine / Injection Pump
Fuel Injection Pump VP 44 - Mounting - Dismounting****G**

Pull out connector lock into arrow direction and then remove connector X046 (Pos. A) from injection pump.



Remove rear pump bracket



Remove 4 x nuts (M8) from pump flange (Arrows) .



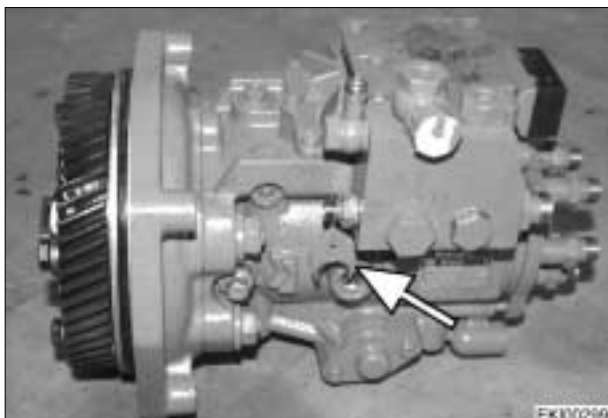
Remove injection pump.

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| 01/2000 | b | 6/10 | | 2710 | G | 000002 |

Fav 900

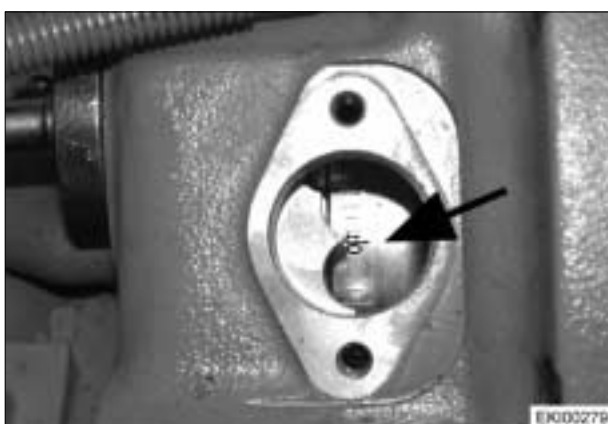
Engine / Injection Pump

Fuel Injection Pump VP 44 - Mounting - Dismounting

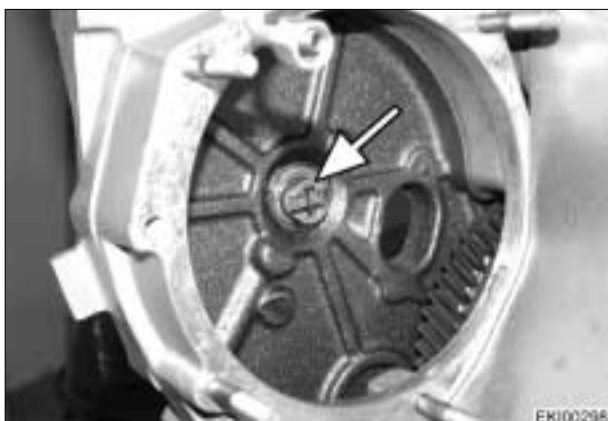
G

Settings of a new injection pump VP 44.

- Start of delivery from TDP of first cylinder (Fan Side) .
- Screws of injection pump drive pinion (4 x M8) are loose.
- Blocking screw is tightened without spacing washer.
- Spacing washer is tied on pump body.



Check TDP of the first cylinder.



Adjust fuel lifting pump drive (arrow) as well as the injection pump drive (arrow).



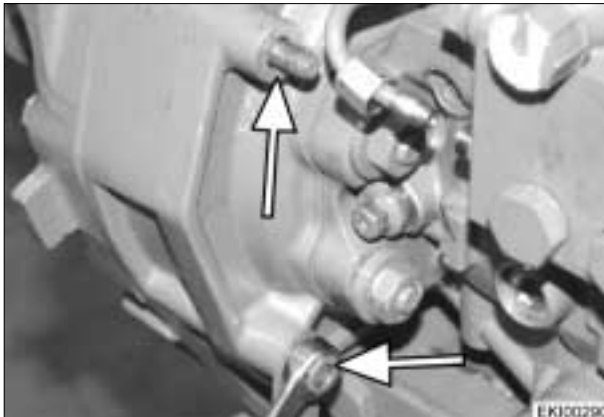
Put injection pump into place.

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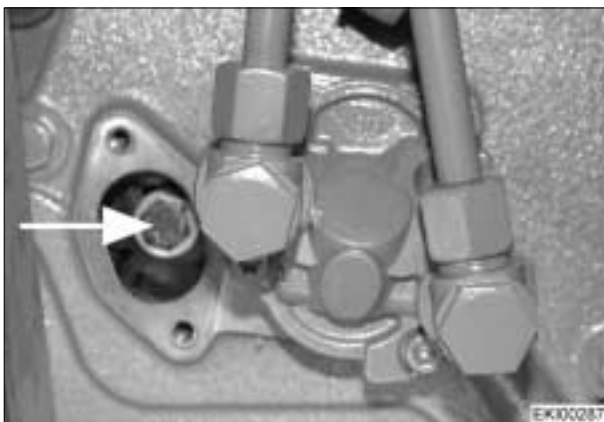
Fav 900

Engine / Injection Pump

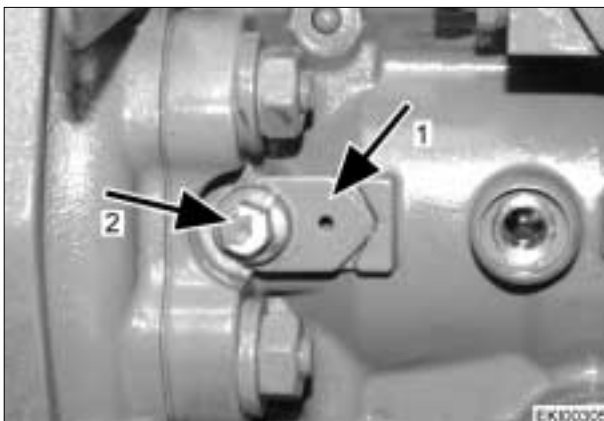
Fuel Injection Pump VP 44 - Mounting - Dismounting

G

Tighten 4 x nuts (M8) from pump flange (arrows) at 25 Nm .



Tighten first visible screw (M8) at 25 Nm .



- Loosen blocking screw (Pos. 2).
- Put spacing washer (Pos. 1) into place.
- Tighten blocking screw (Pos. 2).

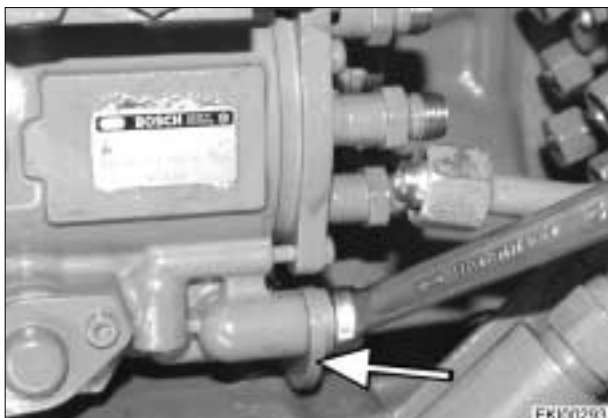


Turn crank shaft with the actuation tool and tighten visible screws 2,3 and 4 at 25 Nm . Put cover into place.

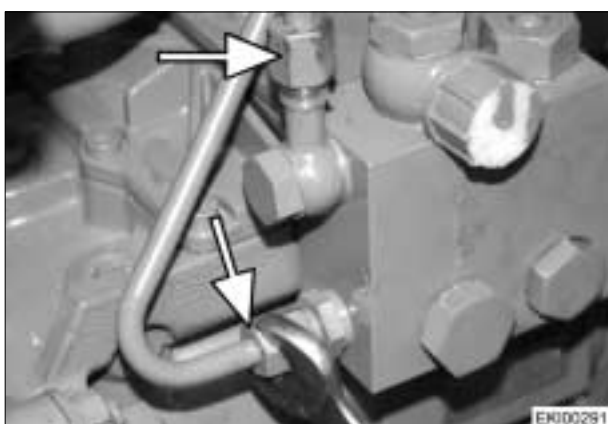
Note:

Check start of delivery point.

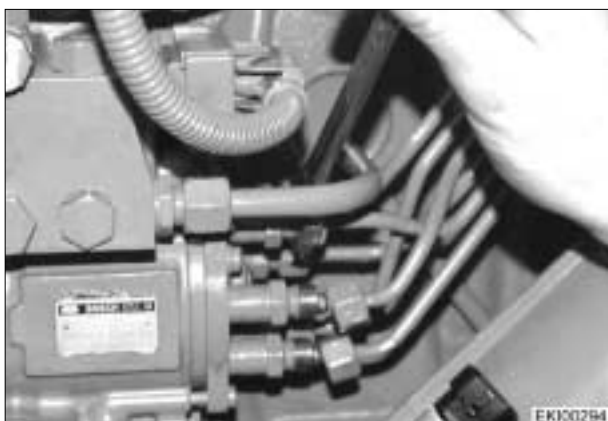
| Date | Version | Page | Capitel | Index | Docu-No. |
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| 01/2000 | b | 8/10 | Fuel Injection Pump VP 44 - Mounting - Dismounting | 2710 | G |

Fav 900**Engine / Injection Pump
Fuel Injection Pump VP 44 - Mounting - Dismounting****G**

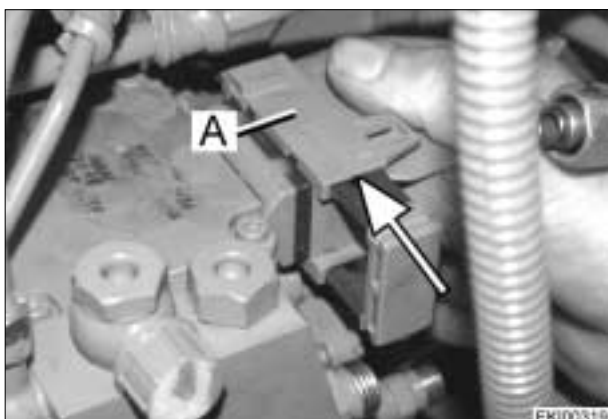
Put rear pump bracket into place.



Put cold start lines into place



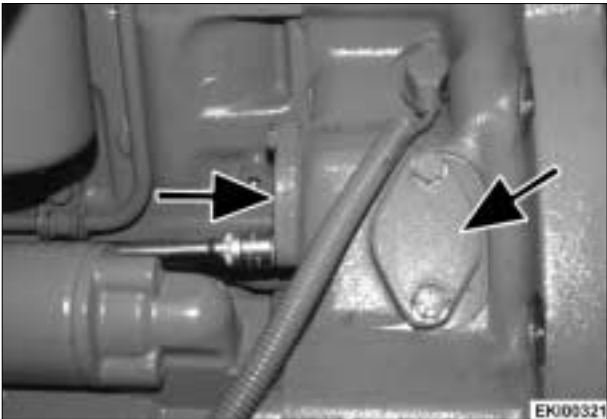
Put Injection lines into place.



Connect connector X046 (Pos. A) onto injection pump and put locking pin into place (arrow).

| Date | Version | Page | Fuel Injection Pump VP 44 - Mounting - Dismounting | Capitel | Index | Docu-No. |
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| | | |
|----------------|---|----------|
| Fav 900 | Engine / Injection Pump Fuel Injection Pump VP 44 - Mounting - Dismounting | G |
|----------------|---|----------|



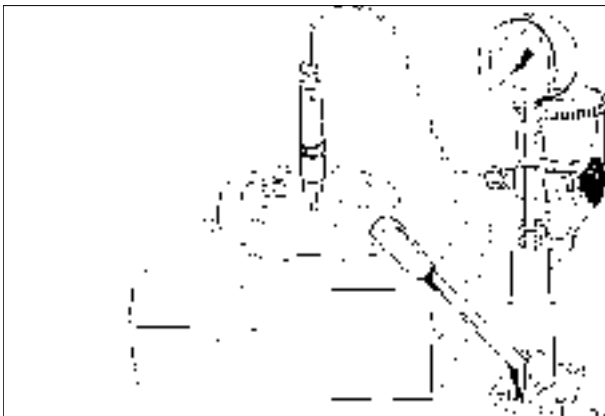
Note:
Purge air from the fuel supply system.
Chapter 2060 Reg. G

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| 01/2000 | b | 10/10 | Fuel Injection Pump VP 44 - Mounting - Dismounting | 2710 | G | 000002 |

Fav 900

Engine / Injection valves

Checking injection nozzles

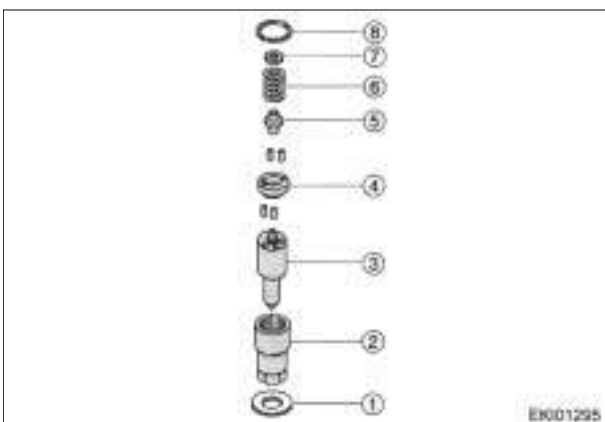
E**Checking injection nozzles**

With injection nozzle tester (manual test appliance) check nozzle for :

- - opening pressure (spray pressure)
- - leak tightness and
- - spray pattern.

Use clean test oil or diesel fuel.

Before testing, clean nozzle and check for wear.



- 1 = Seal
- 2 = Nozzle tensioning nut
- 3 = Injection nozzle
- 4 = Intermediate washer
- 5 = Pressure pin
- 6 = Compression spring
- 7 = Compensating washer
- 8 = Circlip

Check nozzle and its holder

Fit nozzle inlet connection to pressure line of test appliance

**Warning:**

The high injection pressure may cause severe injury.

Never touch the spray pattern!

Wear safety goggles!

1. Check opening pressure :

Connect pressure gauge , push hand lever down slowly until the nozzle ejects spray, vibrating slightly. Read off **Opening pressure** on the pressure gauge. If necessary, insert new washer.

If the pressure is too low, use a thinner washer (7), for excessive pressure use a thicker one.

High operating hours cause a reduction in the tension of the spring(6).

Which in turn slightly reduces the injection pressure. When repairing nozzles, always set opening pressure at the upper limit (+8bars).

Note:

Washers with 0,01mm (.0004") increments are available from 1,0 to 1,99 mm (.039" to .78").

2. Check for leaks :

Operate the hand lever.

At 20 bar (290 PSI) below the specified opening pressure the nozzle must be free from droplets for 10 secs.

3. Check jet :

With the pressure gauge **switched off** apply fast pumping movements: The nozzle should vibrate audibly and/or have even spray pattern.

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| 05.02.2001 | a | 1/3 | 2712 | E | 000001 |

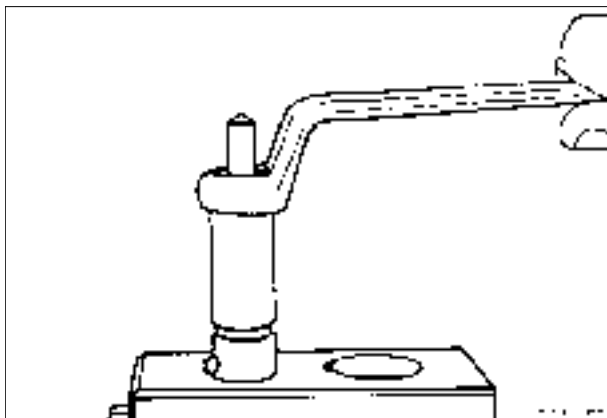
Fav 900

Engine / Injection valves

Checking injection nozzles

E

Nozzles meeting these three requirements may be used again.

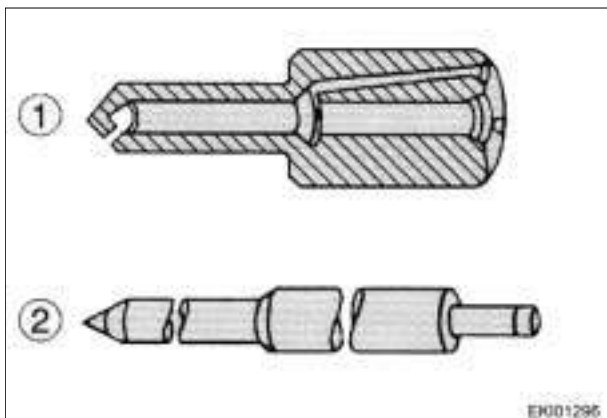


Dismantling injection nozzle

With the inlet opening facing downwards, fit nozzle holder and nozzle assembly into the holding device and clamp unit into the vise.

Unscrew threaded union, remove nozzle body, intermediate washer, pressure screw, compression spring and adjusting washer.

Remove the pressure pipe from the vise.



Overhauling injection nozzles

using a small piece of wood and petroleum or diesel fuel, clean interior of nozzle (1).

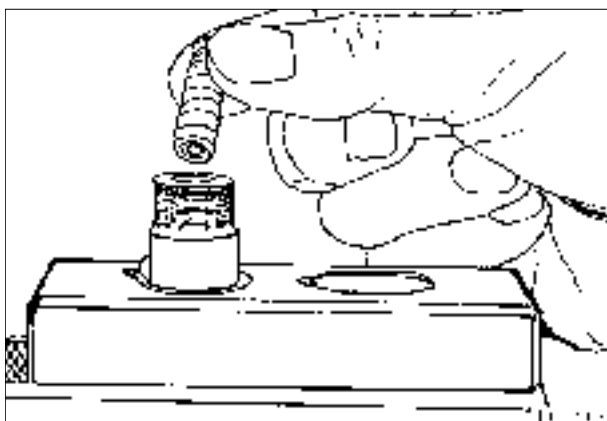
With a clean rag remove dirt from needle valve (2). Coked up needle sections can be placed on a lathe and cleaned with a soft wooden stick dipped in oil.

Note:

To prevent corrosion, do not touch rectified surfaces of the needle valve.

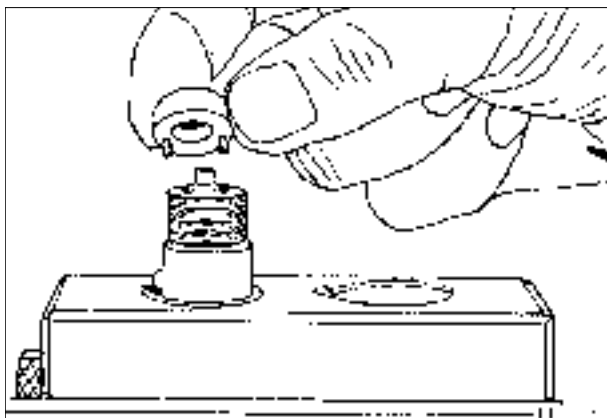
Needles and nozzles are paired and must not be interchanged.

Check clean components for wear and damage ; replace if necessary. Degrease all new parts.

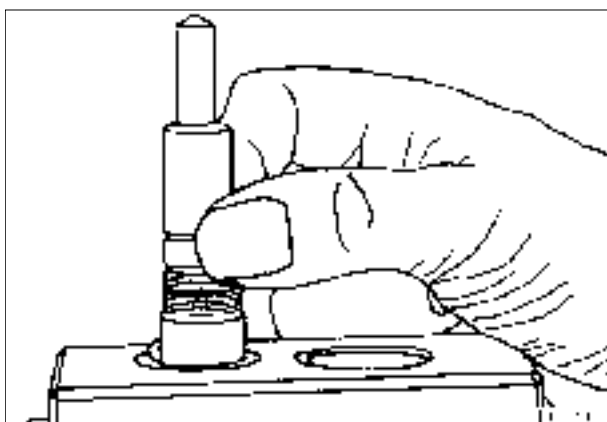


Reassembling injection nozzle

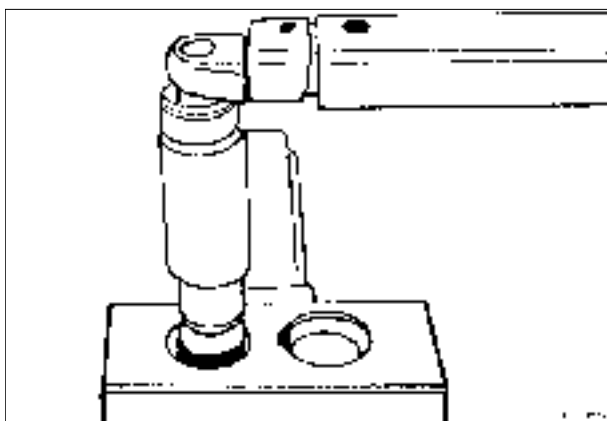
Remove pressure pipe connector from the vise and refit compression spring and adjusting washer.

Fav 900**Engine / Injection valves
Checking injection nozzles****E**

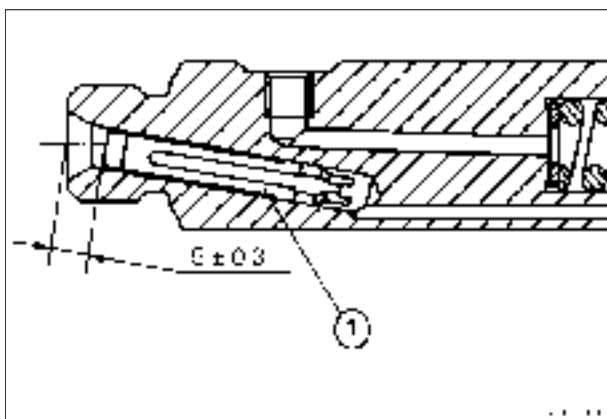
Test intermediate washer for wear.
Fit pressure pin and intermediate washer.



Dip nozzle and needle separately into filtered diesel fuel, and check slide resistance.
When the needle is withdrawn from the nozzle body by one third and released, it must drop back into the position by its own weight.
Fit injection nozzle observing the location of pins.



Screw on threaded union and tighten to specified torque.
Check injection nozzle on the test appliance.

**Observe correct seating of filter in the nozzle holder.**

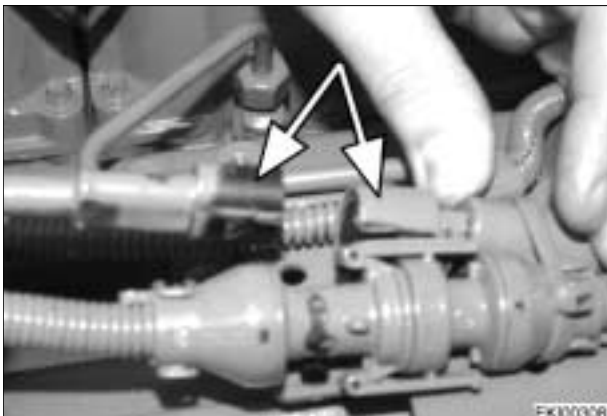
The cause for these problems may well be due to an off-center filter in the nozzle holder. The injection flow is throttled and slowed down, leading to engine problems.

Always measure the press-in depth of the filter in the nozzle holder inlet.

The permissible press-in depth is approx. 5 mm (.197").

If the filter can be inserted further, the nozzle holder must be replaced.

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| 05.02.2001 | a | 3/3 | 2712 | E | 000001 |

Fav 900**Engine / Injection valves**
Replacing Injection valve with needle Motion sensor**G**

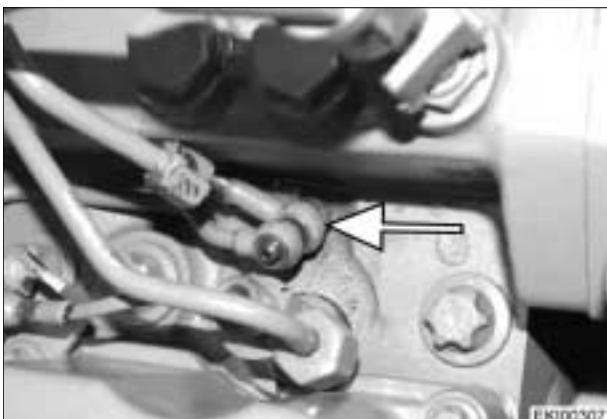
Disconnect connector X173 (Needle motion sensor EDC).



Disconnect fuel line from injector



Disconnect return lines from **all** Injectors.



Push return line in the direction of arrow.

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| 01/2000 | a | 1/3 | Replacing Injection valve with needle Motion sensor | 2712 | G | 000002 |

Fav 900**Engine / Injection valves**
Replacing Injection valve with needle Motion sensor**G**

Lead Cable through special tool (MAN 80996030246), Place special tool and unscrew the injector.



New Injector and Needle Motion Sensor



Place a new copper gasket.
Grease an put new gasket into place.

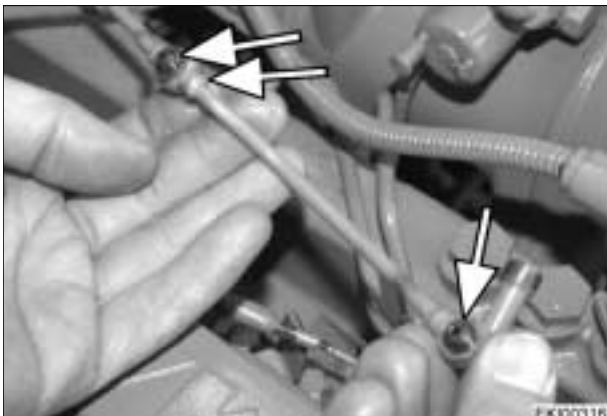


Lead Cable through special tool (MAN 80996030246), Place special tool and tighten the injector.

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| 01/2000 | a | 2/3 | 2712 | G | 000002 |

Replacing Injection valve with needle Motion sensor

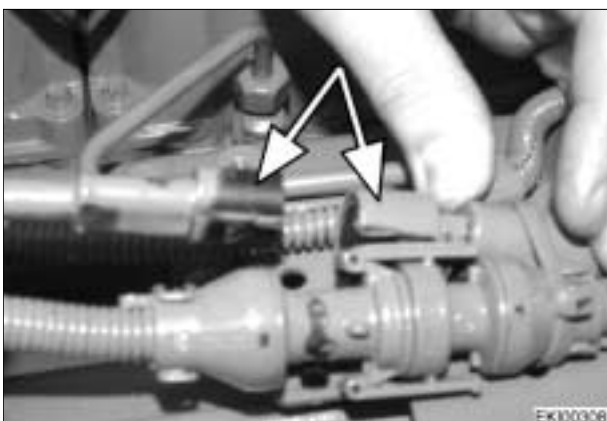
<https://www.truck-manuals.net/>

Fav 900**Engine / Injection valves**
Replacing Injection valve with needle Motion sensor**G**

Put new "usit" gaskets on the hollow screw on both sides of the return line .



Put return Linmes back into place.



Connect connector X173 (Needle motion sensor EDC).



Put fuel line from injector into place.

Important:
Purge air from the fuel supply system using the manual pump.

| Date | Version | Page | Replacing Injection valve with needle Motion sensor | Capitel | Index | Docu-No. |
|---------|---------|------|---|---------|-------|----------|
| 01/2000 | a | 3/3 | | 2712 | G | 000002 |



WERKSTATTHANDBUCH
WORKSHOPMANUAL
MANUEL D'ATELIER
MANUAL DE TALLER
MANUALE PER L'OFFICINA

FAVORIT 900

916 chassis no. 23/3001 and up

920 chassis no. 23/3001 and up

924 chassis no. 23/3001 and up

926 chassis no. 23/3001 and up

Note:

If not noted otherwise, is the document valid for the North-America version also (chassis no. 9xx/24/xxxx)

Ausgabe 12/2001 Edition

2

Xaver FENDT GmbH & CO.

Ein Unternehmen der AGCO-Corp.

Maschinen- und Schlepperfabrik, Marktoberdorf / Bayern Germany

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Telefon (0 83 42) 77-0 Telefax (0 83 42) 77-2 22 (Kundendienst)

Bestell-Nr. / order no. / no. De comande / no. Die ordinazione

X 990.005.040.010 en

Farmer 400
Fav 700
Fav 900

Front axle / Suspension
Control system function charts

A

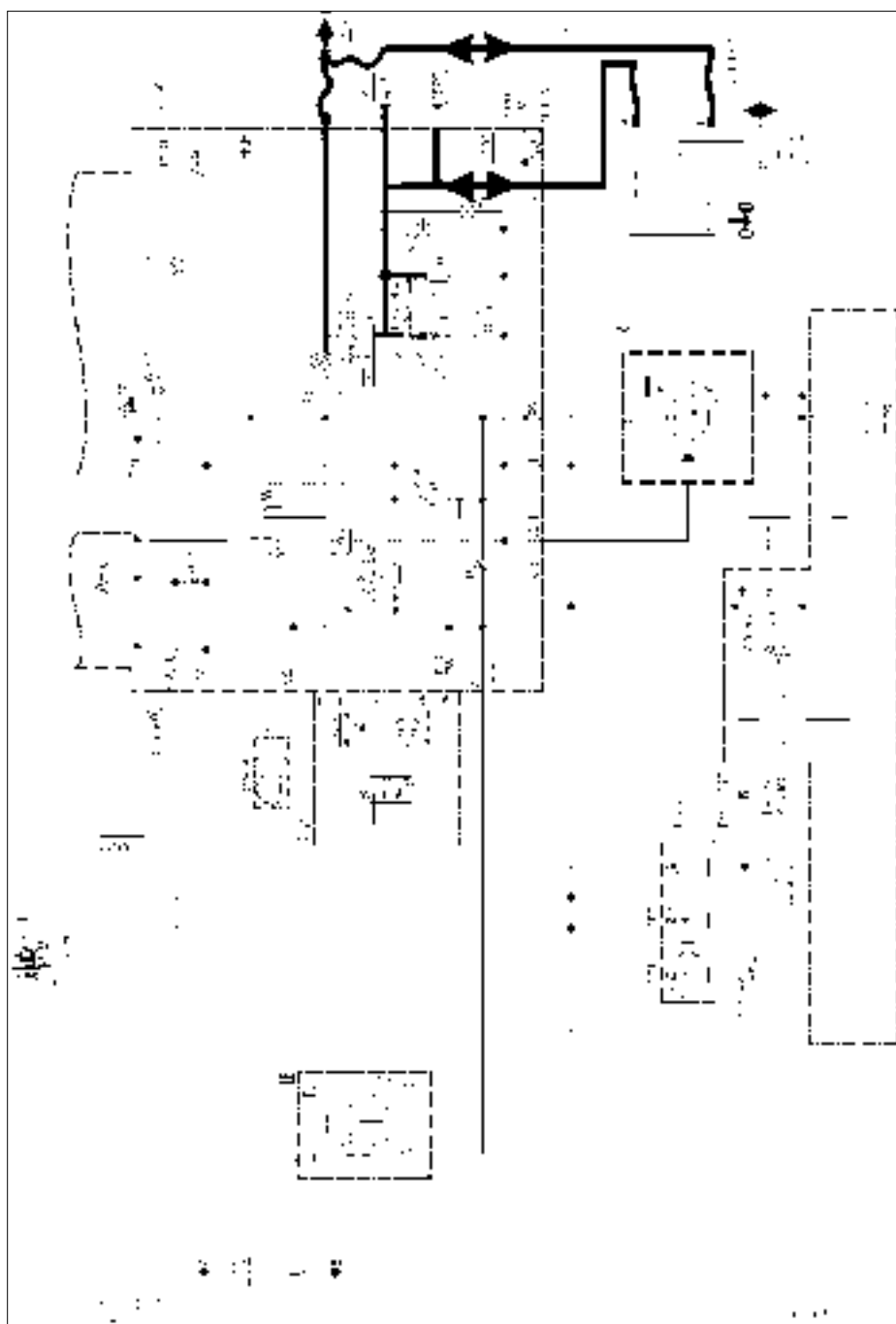
Operational status: Tractor suspension operational

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

Function

- Springing = oil passes between cylinder and nitrogen diaphragm accumulator
- Peak pressures are limited to 250 bar by pressure-relief valve DBV-HPS.
- Relevant e-box continuously determines average of all movements (position sensor B003).
- Any deviations (longer than 1.5 seconds) from level-controlled mid-position trigger correction (=raise).



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| 28.11.2000 | a | 1/5 | 3050 | A | 000001 |

Farmer 400
Fav 700
Fav 900

Front axle / Suspension
Control system function charts

A

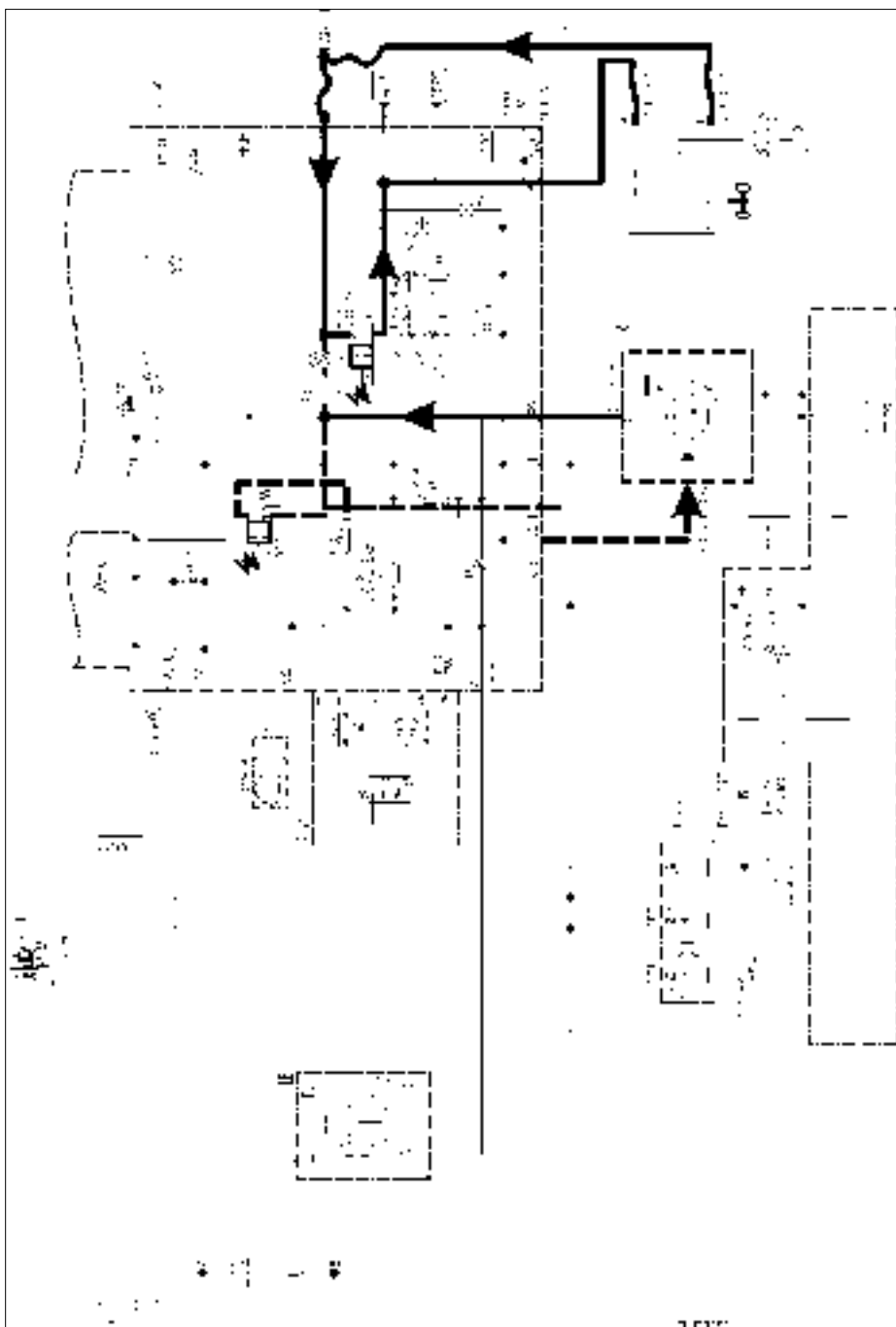
Operational status: "Raise"

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

Function.

- Charge valve MVL/Y012 activates LS pump PR.
- Fast-motion system when raising suspension ensures that oil displaced on rod side is fed back into shutoff valve RV2.
- Flow rate through aperture BL 3 determines lifting speed.



Farmer 400
Fav 700
Fav 900

Front axle / Suspension
Control system function charts

A

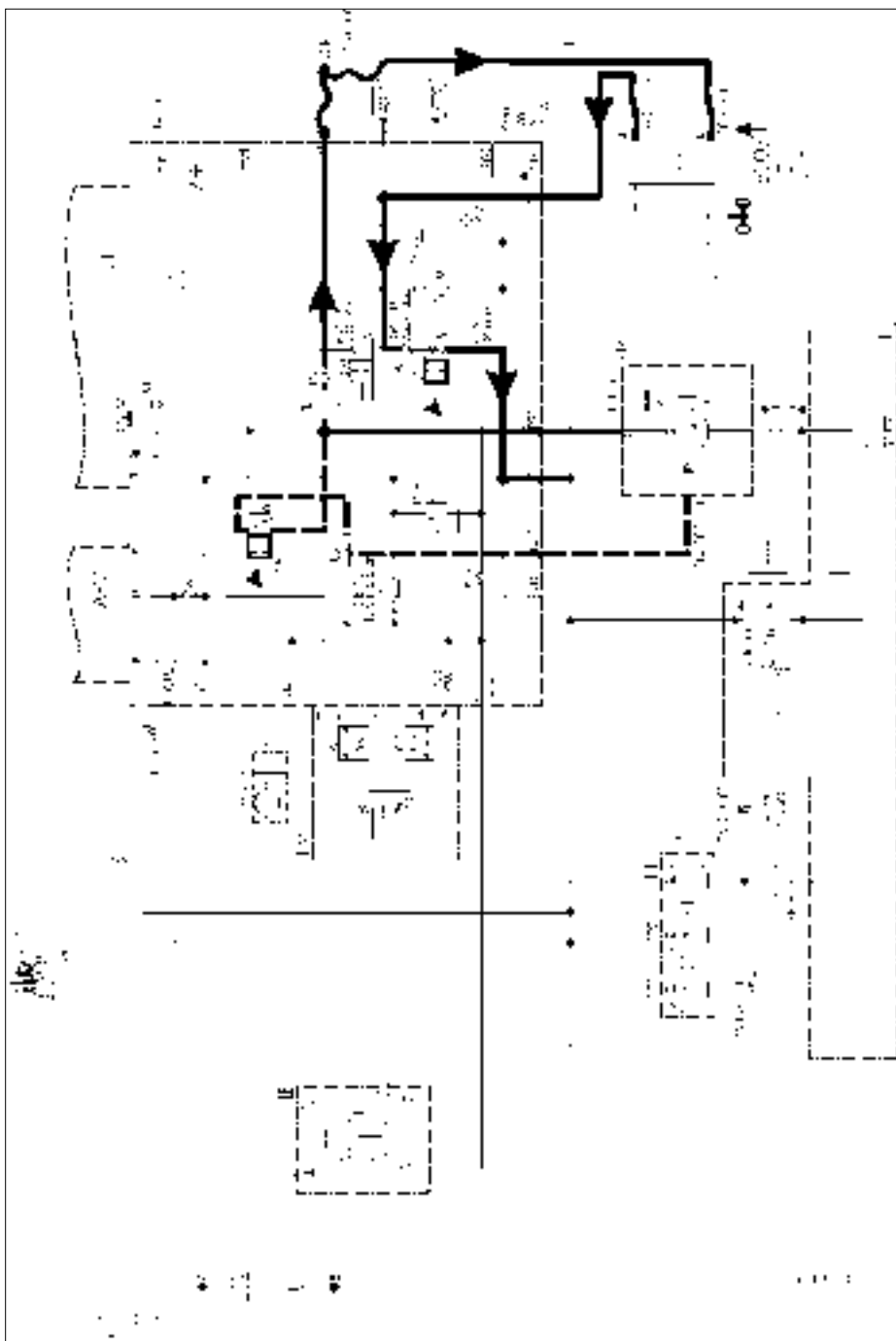
Operational status: "Lower"

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

Function

- Lower suspension (=lock) means "Draw axle in hydraulically".
- Charge valve MVL/Y012 activates LS pump PR.
- Flow rate through aperture BL 4 determines lowering speed.



Farmer 400
Fav 700
Fav 900

Front axle / Suspension
Control system function charts

A

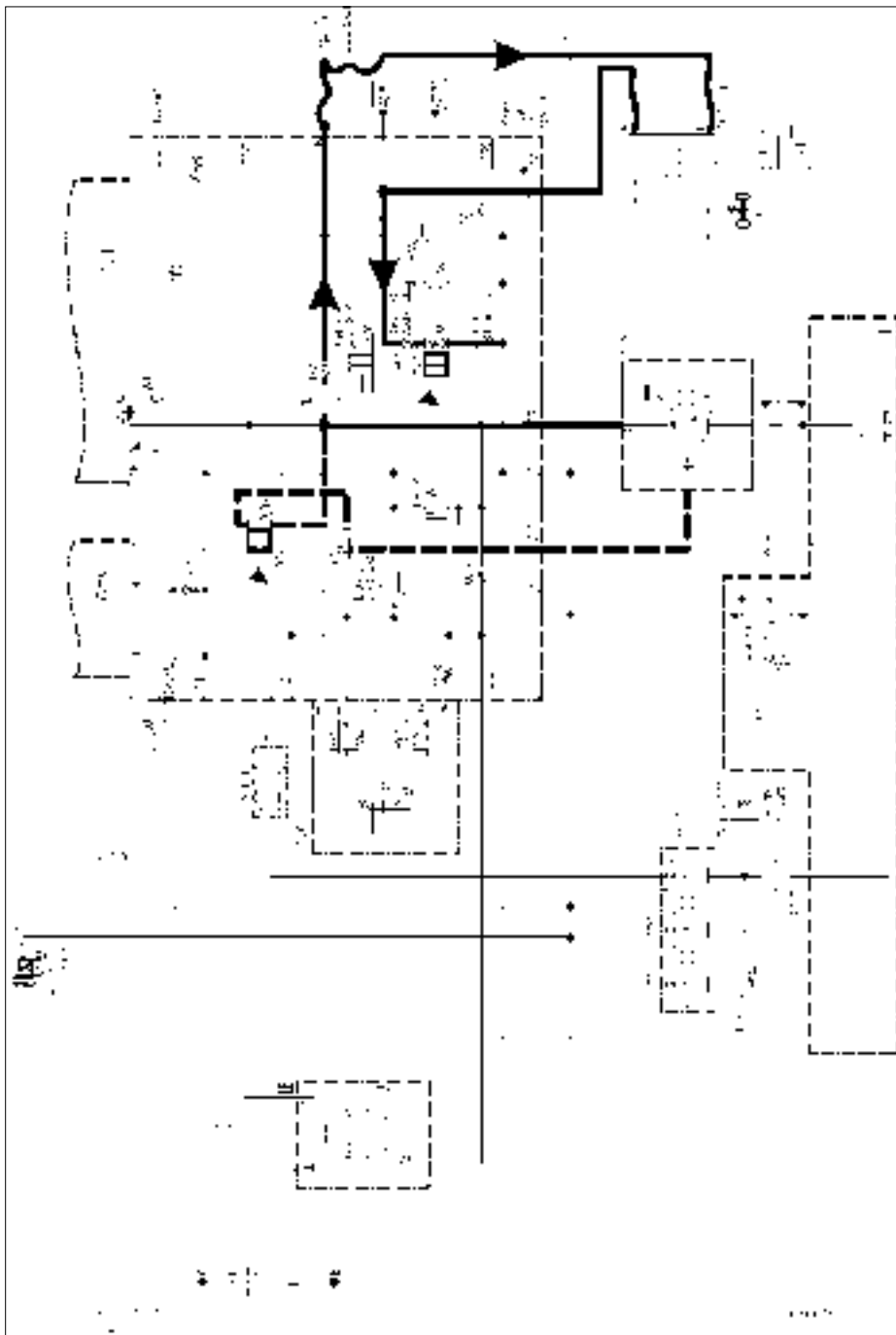
Operational status: "Locking suspension at end position"

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

Function

- "Lower" command remains active for 2 more seconds on reaching end position, i.e. axle is hydraulically locked with suspension cylinder.



| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Front axle / Suspension Control system function charts | A |
|---|---|----------|

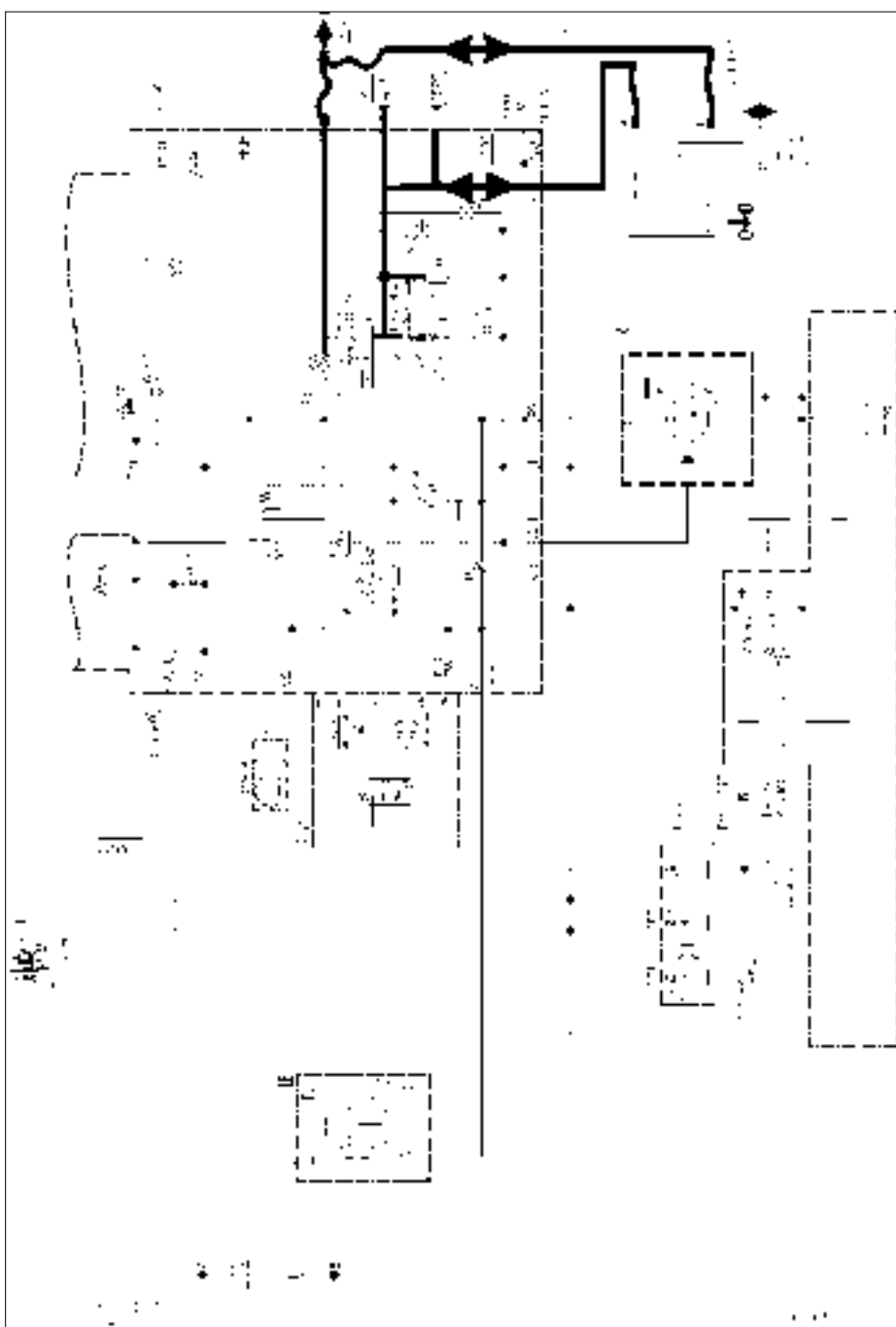
Operational status: "Suspension locked" = "Suspension OFF"

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

Function

- Axle is hydraulically locked, there is a constant pressure of 200 bar on rod side.
- This pressure cannot be relieved by key command or by switching engine off.
- This 200 bar pressure with accumulator volume ZSP (=energy!) must always be relieved when repair work is carried out between front-axle suspension and central control block ZSB!
- To do so, open stopcocks AV1 and AV2. This causes pressure in central control block to be discharged to tank.
- See also "Safety instructions" - Chapter 0000 Index A

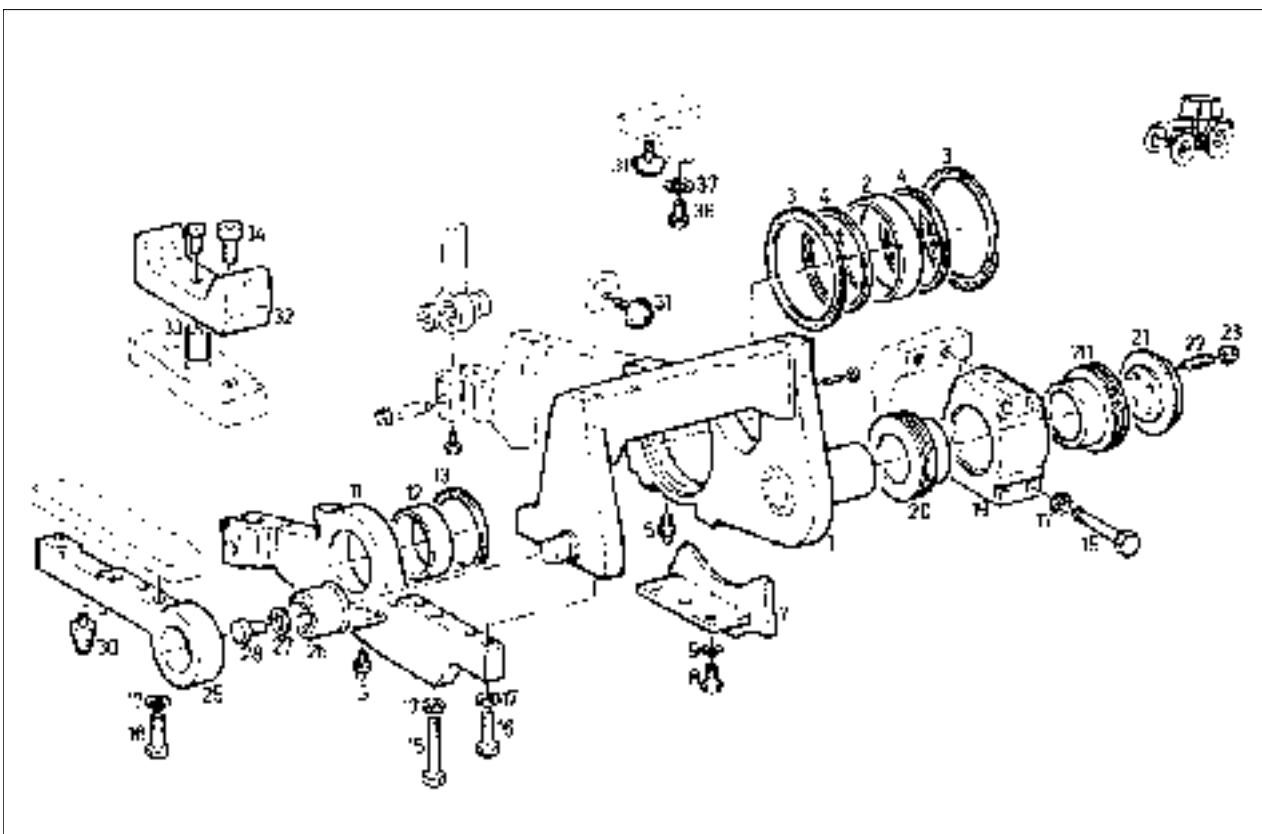


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| 28.11.2000 | a | 5/5 | 3050 | A | 000001 |

Fav 800
Fav 900

Front axle / Suspension
Installation and removal of cross-member

G



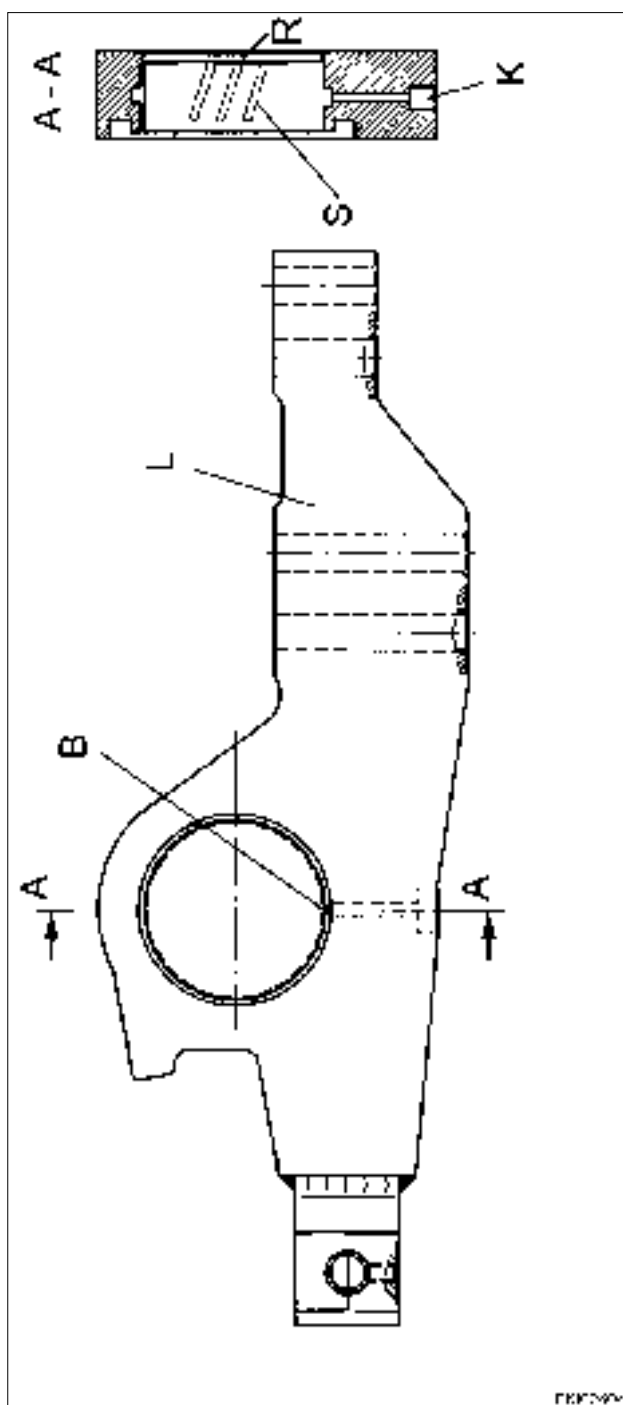
| Item | Designation | Item | Designation |
|------|----------------------------|------|-----------------------------------|
| 1 | Cross-member | 20 | Flanged bush |
| 2 | Bush | 21 | Washer |
| 3 | Sealing ring | 22 | Stud bolt |
| 4 | Thrust ring | 23 | Wheel nut |
| 5 | Lubricator | 25 | Support |
| 7 | Cardan shaft guard | 26 | Bush |
| 8 | M12x40-8.8 hexagon screw | 27 | Washer |
| 9 | Spring washer | 28 | M16x50-8.8 hexagon screw |
| 11 | Bearing plate | 30 | Snubber |
| 12 | Bush | 31 | Snubber |
| 13 | Sealing ring | 32 | Stop |
| 15 | M20x150-10.9 hexagon screw | 33 | Pin |
| 16 | M20x90-10.9 hexagon screw | 34 | M20x50-10.9 socket head cap screw |
| 17 | Spring washer | 36 | M20x30-8.8 hexagon screw |
| 19 | Bearing block | 37 | Washer |

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| 06.10.2001 | | 1/3 | 3050 | G | 000002 |

Fav 800
Fav 900

Front axle / Suspension
Installation and removal of cross-member

G



Note:

When fitting "version A" bearing plate (L) installation position of bush (B) must be noted!

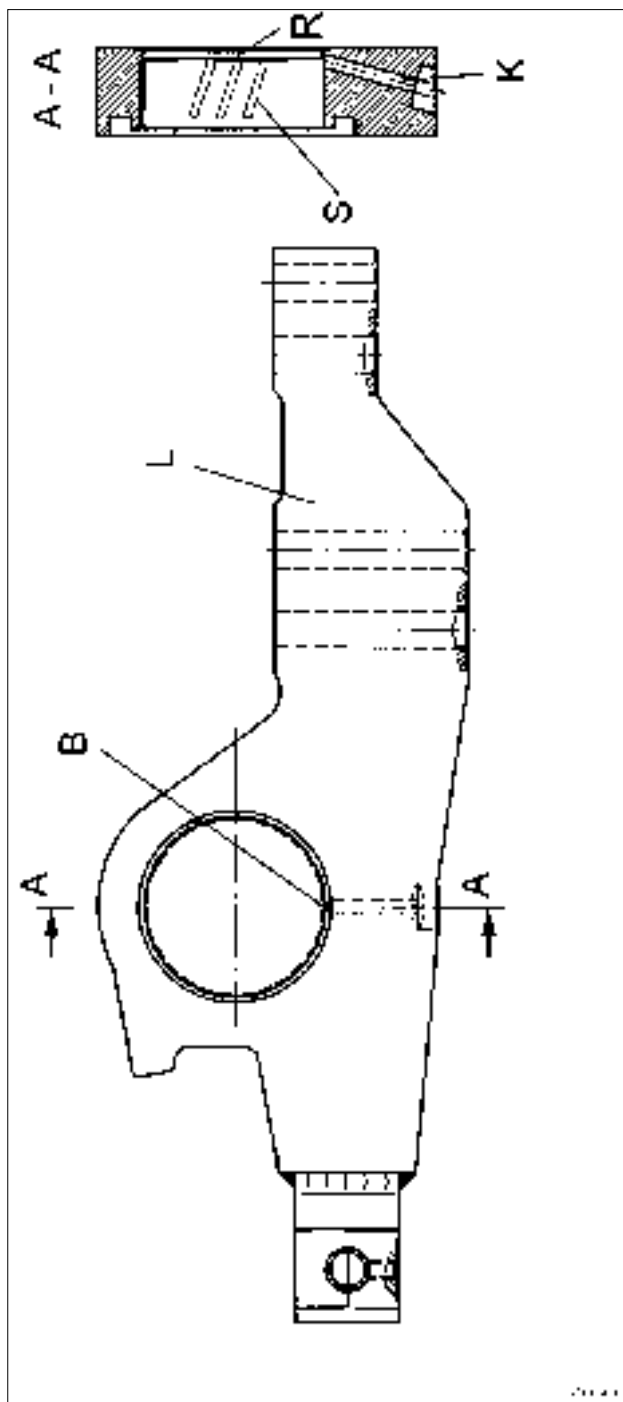
| Item | Designation | Fitting tip |
|------|---------------|---|
| L | Bearing plate | |
| B | Bush | Gap at joint of bush (B) lies above lubrication channel (K) Open side of oil grooves (S) faces lubricant chamber (R) |

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| 06.10.2001 | | 2/3 | 3050 | G | 000002 |

Fav 800
Fav 900

Front axle / Suspension
Installation and removal of cross-member

G

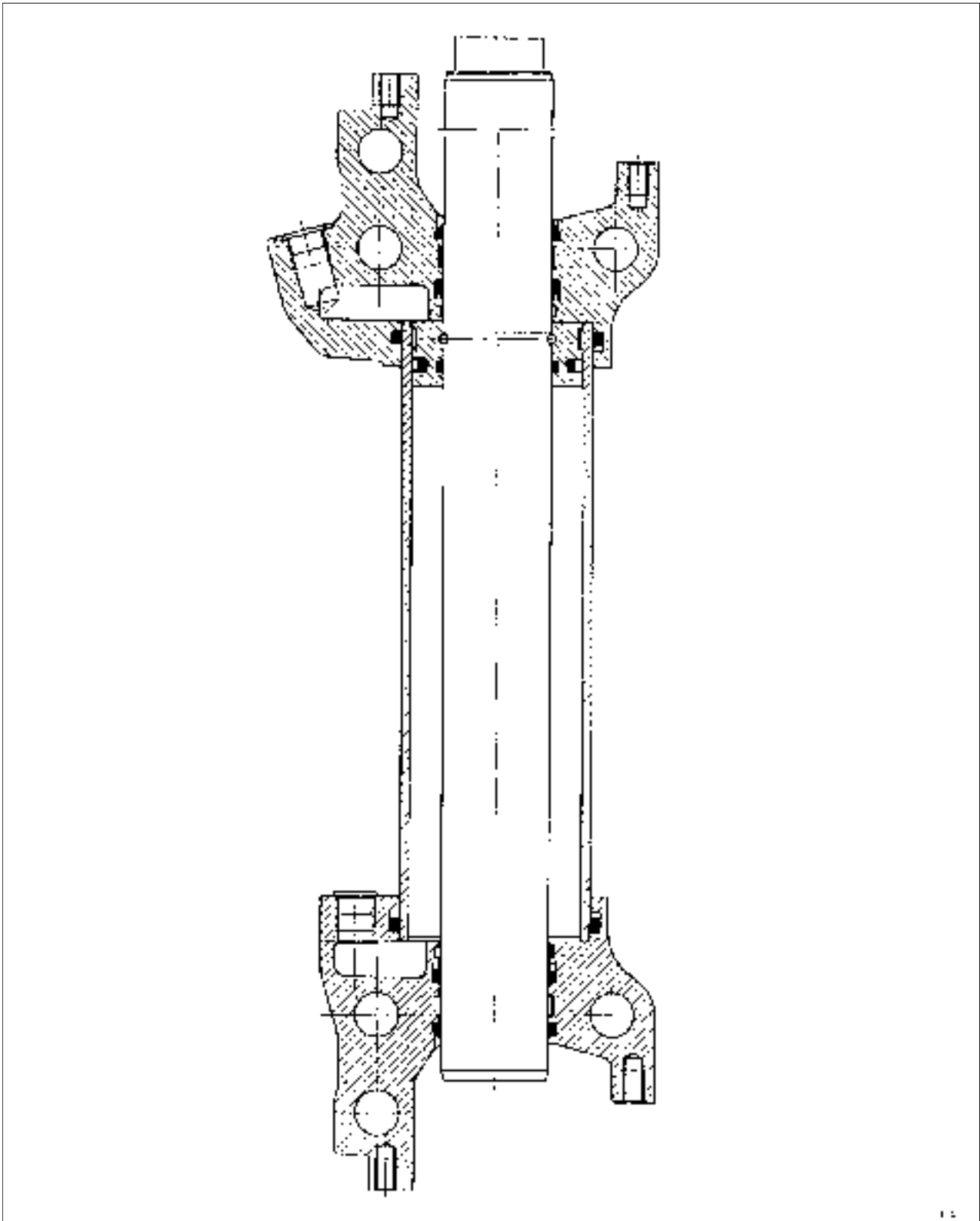


Note:

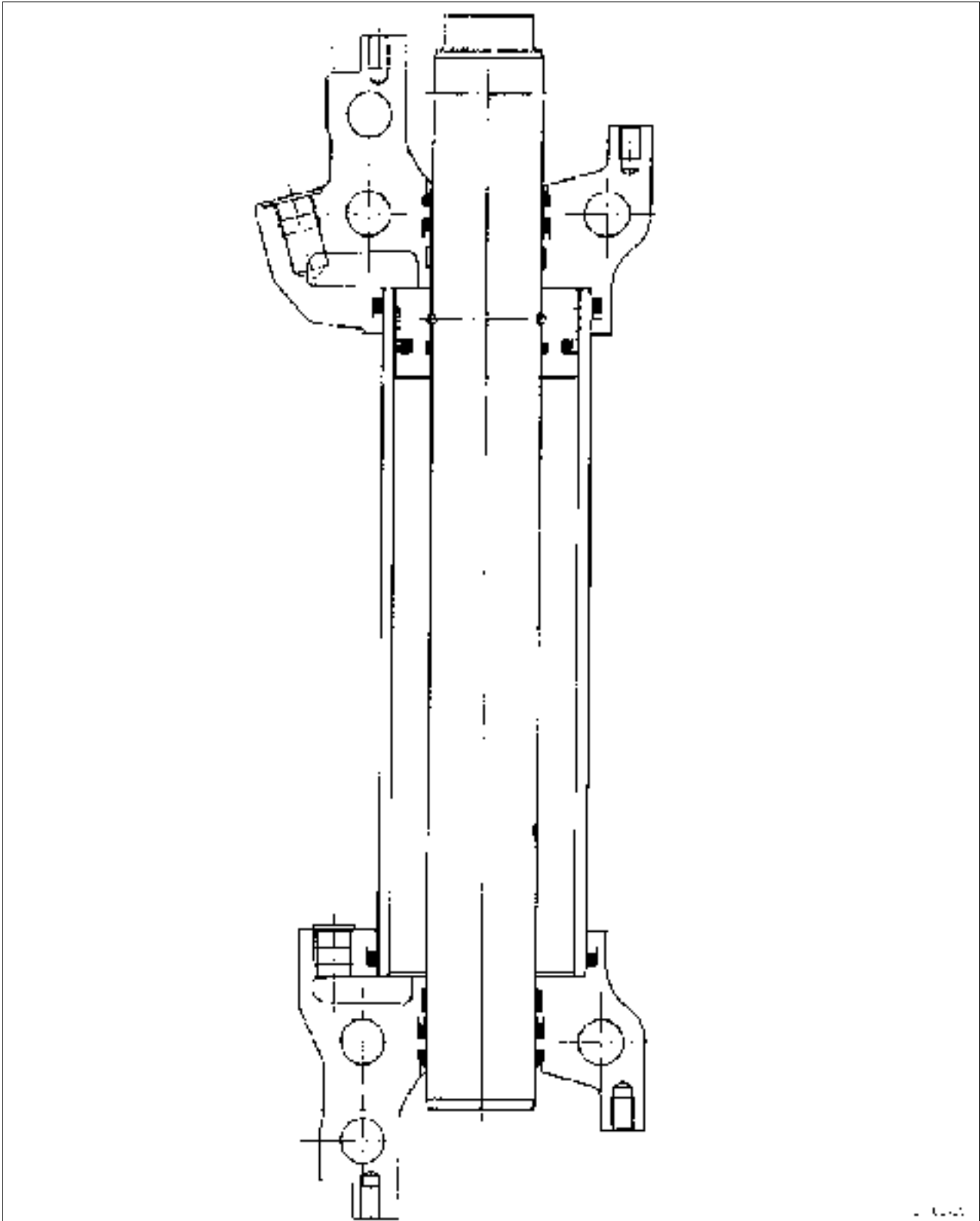
When fitting "version B" bearing plate (L) installation position of bush (B) must be noted!

| Item | Designation | Fitting tip |
|------|---------------|---|
| L | Bearing plate | |
| B | Bush | Gap at joint of bush (B) lies above lubrication channel (K) Open side of oil grooves (S) faces lubricant chamber (R) |

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| 06.10.2001 | | 3/3 | 3050 | G | 000002 |

Fav 900**Front axle / Steering cylinder
Technical drawing of steering cylinder****C****Steering cylinder - "version A"**

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| 17.10.2001 | a | 1/3 | 3120 | C | 000001 |

Fav 900**Front axle / Steering cylinder
Technical drawing of steering cylinder****C****Steering cylinder "version B"**

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| 17.10.2001 | a | 2/3 | 3120 | C | 000001 |

| | | |
|----------------|---|----------|
| Fav 900 | Front axle / Steering cylinder Technical drawing of steering cylinder | C |
|----------------|---|----------|

Note:

Chapter 3120 Reg. G - Sealing steering cylinder

Installation and removal of steering cylinder, see:

- front axle FENDT 060 F (X990.005.036.000)
- or FENDOC CD-ROM

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| 17.10.2001 | a | 3/3 | | 3120 | C | 000001 |

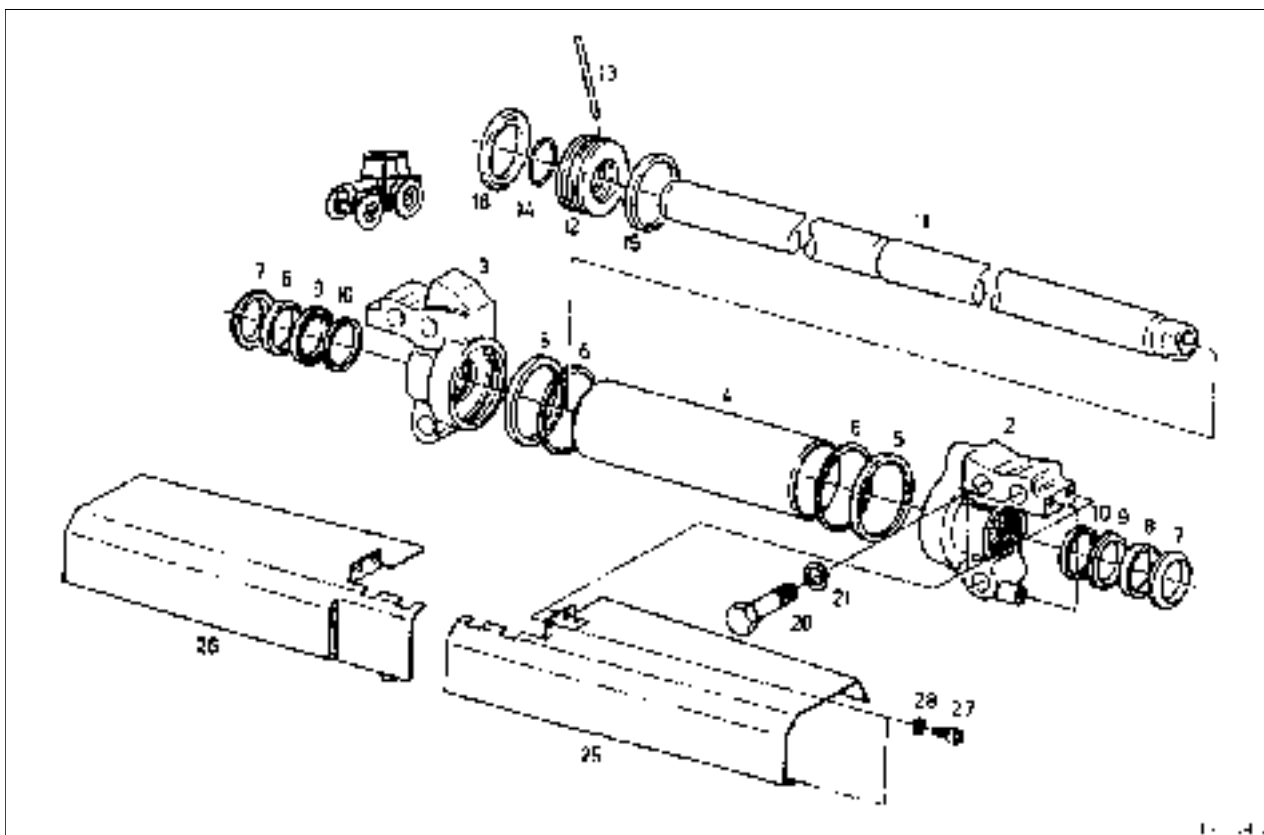
Fav 900

Front axle / Steering cylinder

Sealing steering cylinder

G

Steering cylinder - "version A" (up to Fav 900 /21/ ...)



| Item | Designation | Item | Designation |
|------|-------------------|------|---|
| 1 | Steering cylinder | 12 | Piston (not available individually) |
| 1 | Seal set | 13 | Locking wire (not available individually) |
| 2 | Bearing bush | 14 | Sealing ring (not available individually) |
| 3 | Bearing bush | 15 | Guide ring |
| 4 | Cylindrical tube | 16 | Form seal |
| 5 | Sealing ring | 20 | M20x80-10.9 hexagon screw |
| 6 | Locating ring | 21 | Spring washer |
| 7 | Oil scraper ring | 25 | Guard |
| 8 | Guide bush | 26 | Guard |
| 9 | V-seal | 27 | Socket head cap screw |
| 10 | Guide bush | 28 | Spring washer |
| 11 | Piston rod | | |

Note:

Installation position of sealing rings:

Chapter 3120 Reg. C - Technical drawing of steering cylinder

Installation and removal of steering cylinder, see:

- front axle FENDT 060 F (X990.005.036.000)
- or FENDOC CD-ROM

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| 17.10.2001 | a | 1/3 | 3120 | G | 000001 |

Sealing steering cylinder

<https://www.truck-manuals.net/>

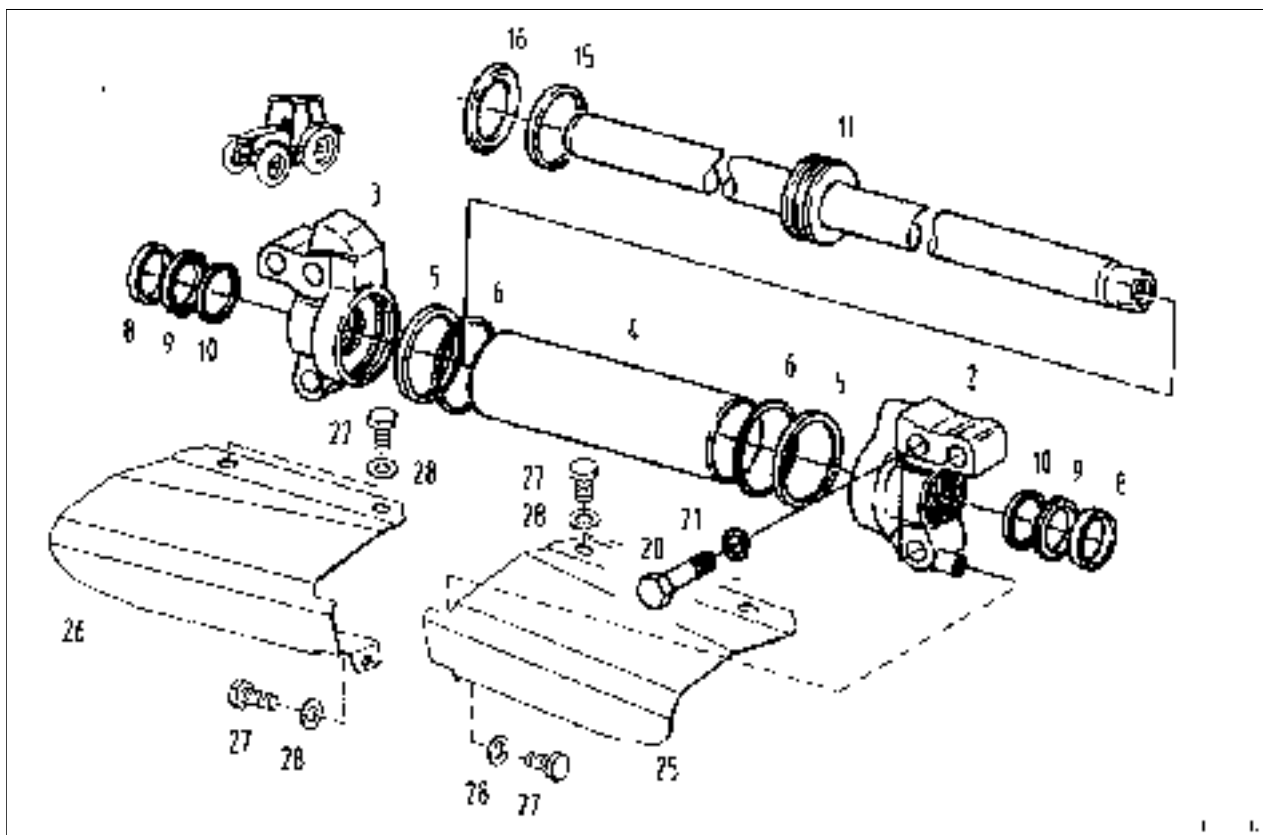
Fav 900

Front axle / Steering cylinder

Sealing steering cylinder

G

Steering cylinder - "version B" (from Fav 900 /23/3001)



| Item | Designation | Item | Designation |
|------|-------------------|------|---------------------------|
| 1 | Steering cylinder | 11 | Piston rod |
| 1 | Seal set | 15 | Guide ring |
| 2 | Bearing bush | 16 | Form seal |
| 3 | Bearing bush | 20 | M20x80-10.9 hexagon screw |
| 4 | Cylindrical tube | 21 | Spring washer |
| 5 | Sealing ring | 25 | Guard |
| 6 | Locating ring | 26 | Guard |
| 8 | Oil scraper ring | 27 | Hexagon screw |
| 9 | V-seal | 28 | Washer |
| 10 | Guide ring | | |

Note:

Installation position of sealing rings:

Chapter 3120 Reg. C - Technical drawing of steering cylinder

Installation and removal of steering cylinder, see:

- front axle FENDT 060 F (X990.005.036.000)
- or FENDOC CD-ROM

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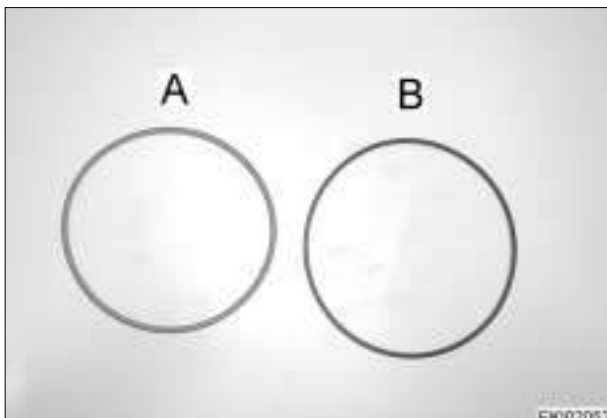
Sealing steering cylinder

<https://www.truck-manuals.net/>

Fav 900

Front axle / Steering cylinder

Sealing steering cylinder

G**Form seal (16) consists of:**

- O-ring (A)
- Sealing ring (B)



Warm sealing ring up carefully with hot-air blower.

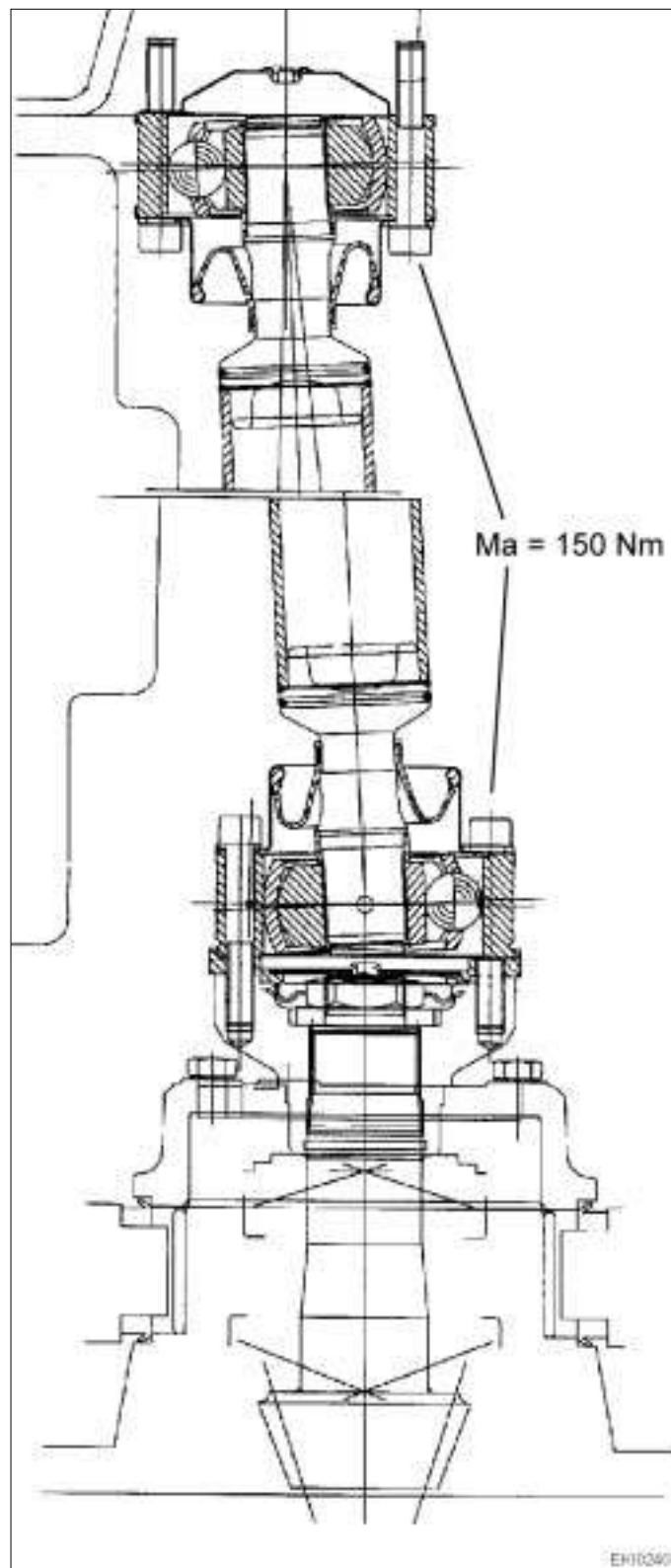
Note:**Take care not to burn sealing ring.****Caution:****Beware of hot surfaces!**

| Date | Version | Page | Sealing steering cylinder | Capitel | Index | Docu-No. |
|------------|---------|------|---------------------------|---------|-------|----------|
| 17.10.2001 | a | 3/3 | | 3120 | G | 000001 |

Fav 800
Fav 900

Front axle / Cardan shaft
Technical drawing of cardan shaft

C



Fitting tip for cardan shaft

Do not offset cardan shaft by more than 15°.

Note:

Chapter 3180 Reg. G - Installation and removal of cardan shaft

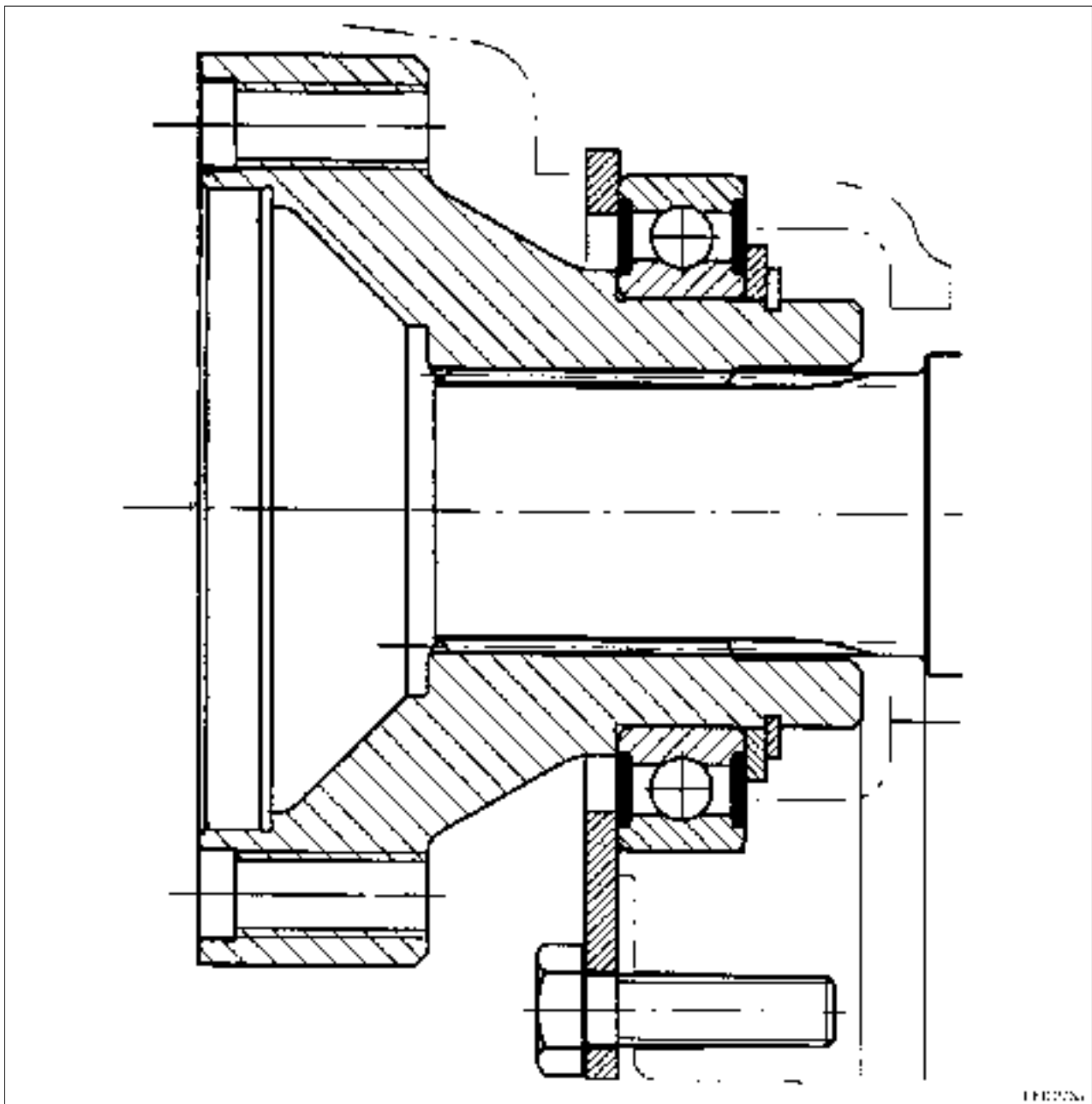
| Date | Version | Page | Capitel | Index | Docu-No. |
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| 05.10.2001 | a | 1/1 | 3180 | C | 000004 |

Fav 900
Favorit 800

Front axle / Cardan shaft
Technical drawing of front-wheel drive

C

Front-wheel drive - "version A"



Note:

We recommend no longer fitting "version A" bearing during repairs but instead converting to "version B" bearing.

Corresponding conversion kits for Fav 800 and Fav 900 are listed in "FENDOS spare parts catalogue".

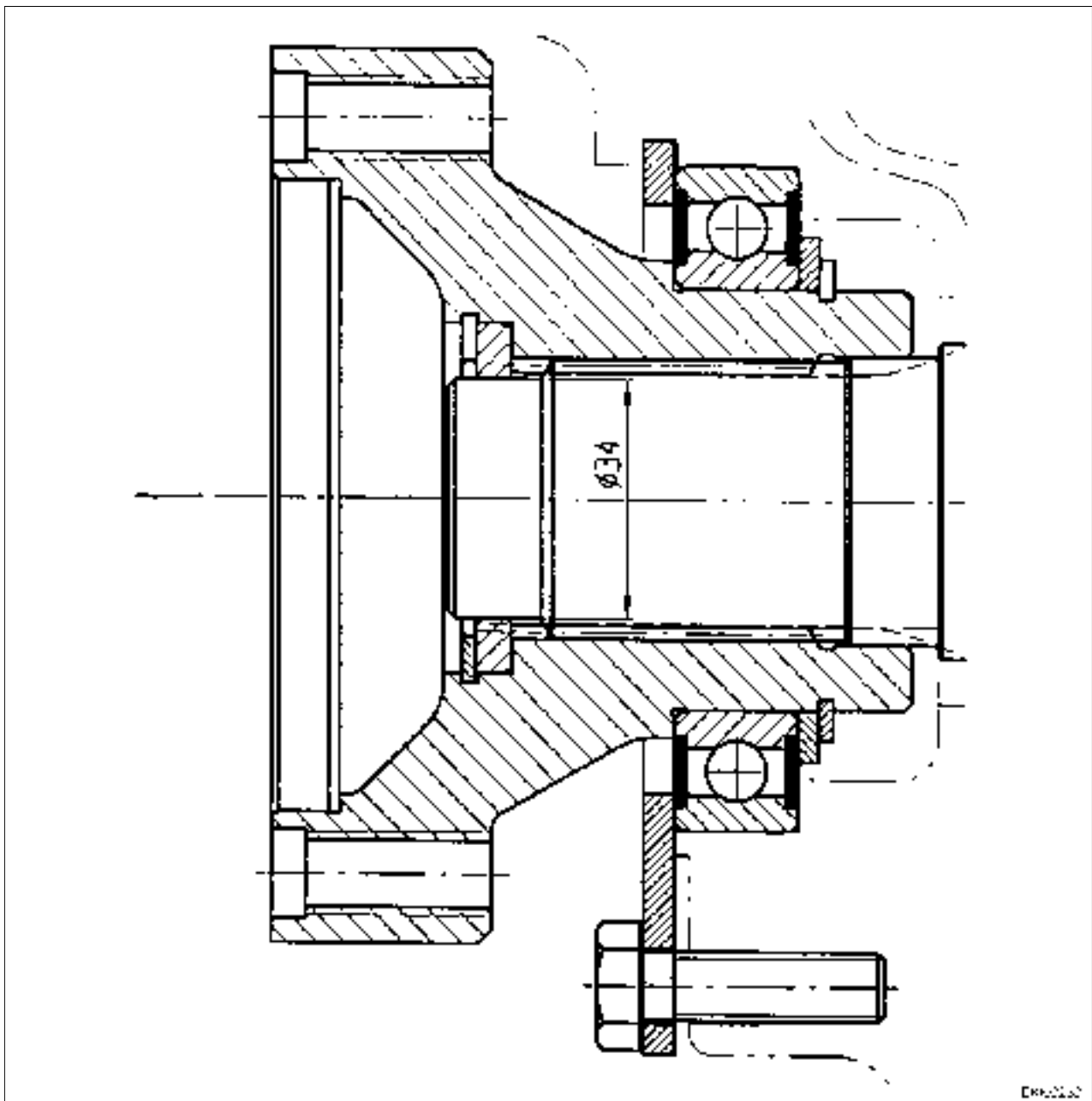
| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 04.09.2001 | a | 1/2 | 3180 | C | 000003 |

Fav 900
Favorit 800

Front axle / Cardan shaft
Technical drawing of front-wheel drive

C

Front-wheel drive - "version B"

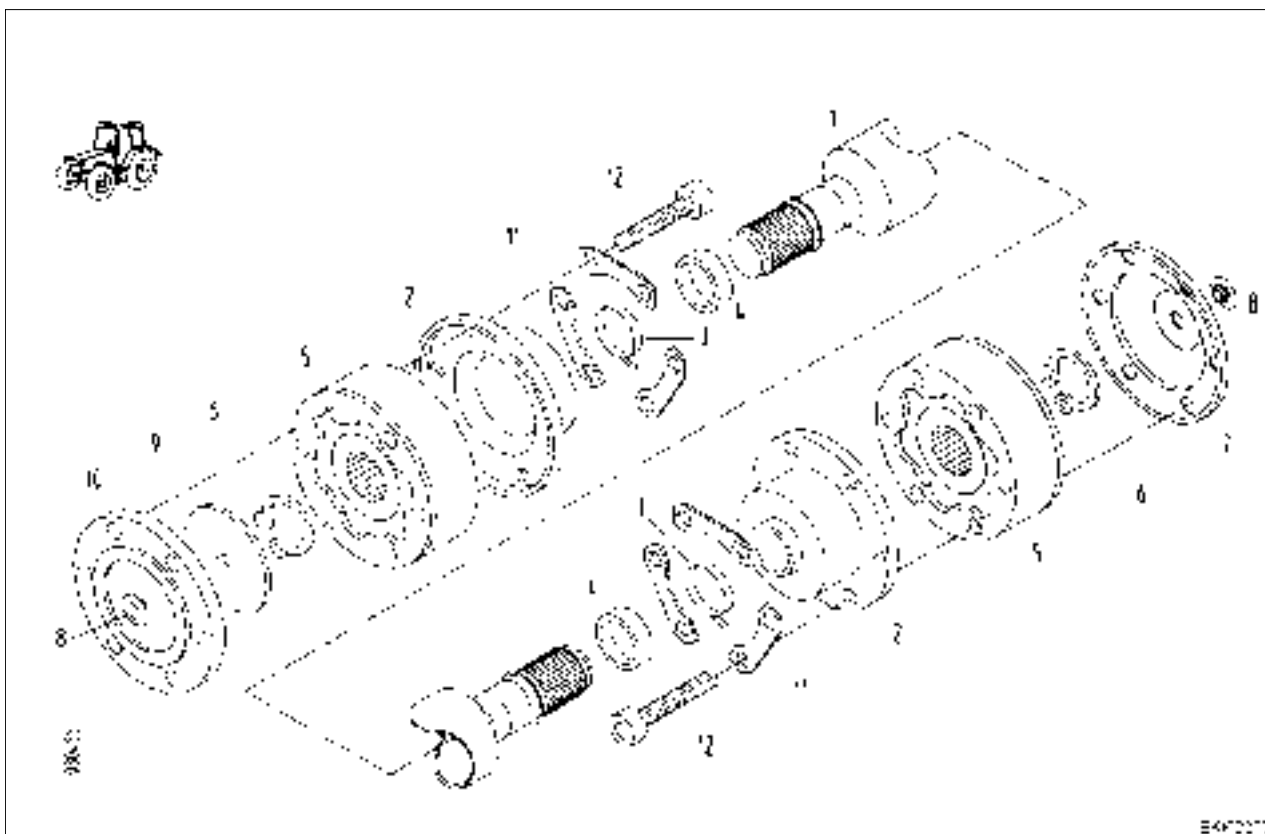


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| 04.09.2001 | a | 2/2 | 3180 | C | 000003 |

Fav 900

Front axle / Cardan shaft

Removing and fitting the cardan shaft

G

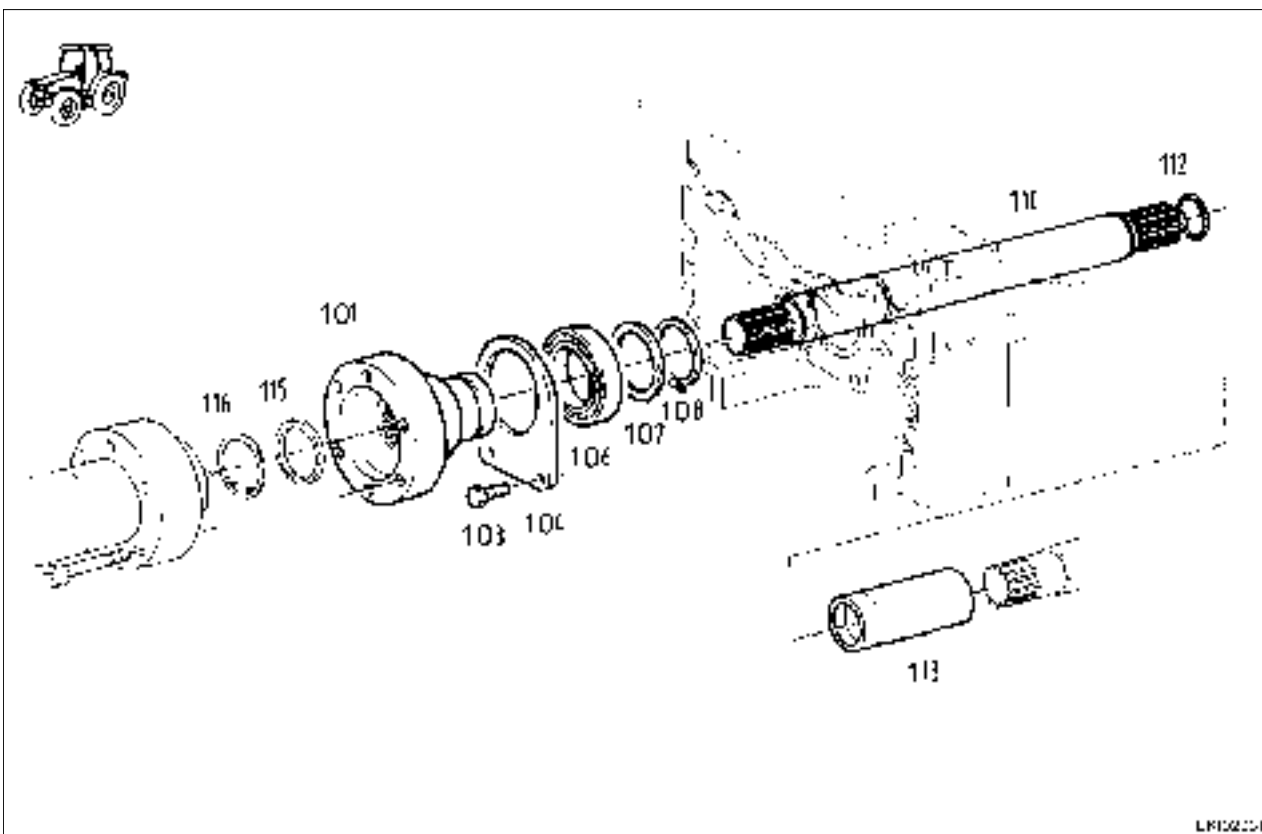
| Item | Designation | Item | Designation |
|------|-----------------|------|------------------------------------|
| 1 | Cardan shaft | 8 | Rubber plug |
| 2 | Cap | 9 | Washer |
| 3 | Hose clamp band | 10 | Intermediate flange |
| 4 | Ring | 11 | Shim |
| 5 | CV joint | 12 | Socket head cap screw |
| 6 | Circlip | 13 | High-pressure grease X 902.002.473 |
| 7 | Screw cap | | |

Fav 900

Front axle / Cardan shaft

Removing and fitting the cardan shaft

G



| Item | Designation | Item | Designation |
|------|--------------------------|------|--------------|
| 101 | Flange | 110 | Shaft |
| 103 | Hexagon screw | 112 | O-ring |
| 104 | Tab washer | 113 | Splined bush |
| 106 | Deep-groove ball bearing | 115 | Ring |
| 107 | Locating ring | 116 | Circlip |
| 108 | Circlip | | |

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| 03.09.2001 | a | 2/6 | 3180 | G | 000002 |

Fav 900

Front axle / Cardan shaft

Removing and fitting the cardan shaft

G



Removing cardan shaft (1)

- Raise suspension.
- Jack up one wheel from front axle and one from rear, taking appropriate safety precautions.



Open cover in cab floor.

Attach auxiliary lever to range control (C).
Shift transmission to neutral (mid-position)
(to turn cardan shaft (1)).



Unscrew cover plate (arrowed) under oil pan.



Loosen socket head cap screws on front- and rear-axle side.

Note:

Secure cardan shaft against turning by using handbrake.

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Fav 900

Front axle / Cardan shaft

Removing and fitting the cardan shaft

G



Front-axle side

Prop cardan shaft up with trestle.

Remove CV joint (5) and intermediate flange (10).

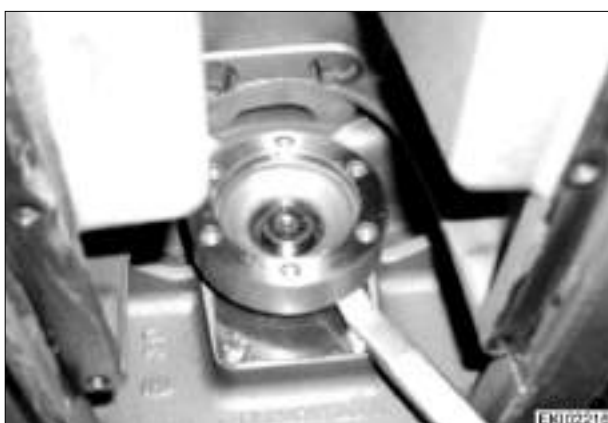
Note:

Do not offset cardan shaft (1) by more than 15°.



Transmission site

Remove CV joint (5).



Fitting cardan shaft (1)

Check play in deep-groove ball bearing (106).

If necessary, fit new deep-groove ball bearing (106).

Note:

Chapter 3180 Reg. C - Technical drawing of front-wheel drive



Check cap (2) (with bellows) for damage.

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Fav 900

Front axle / Cardan shaft

Removing and fitting the cardan shaft

G



Grease CV joint (5).

Quantity: approx. 150g

High-pressure grease X 902.002.473.000

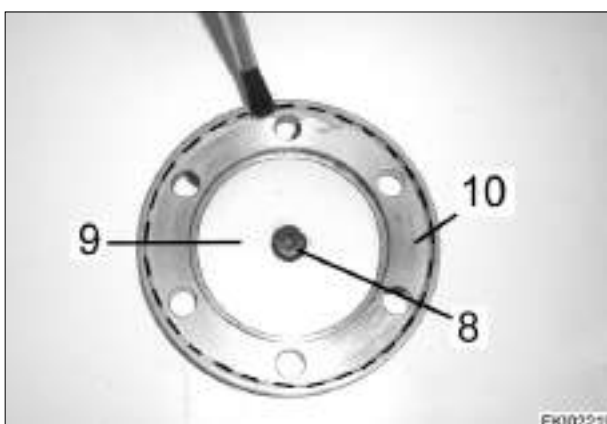
Note:

Any grease which accumulates in and expands bellows during lubrication should be pushed towards joint using finger or smooth, blunt object.

Bellows must not be allowed to twist.

Note:

With new cardan shaft (1) CV joints (5) are lubricated with high-pressure grease.



Seal washer (9) with Fermatex X 903.050.801 sealant (non-curing).

Seal intermediate flange (10) with Fermatex X 903.050.801 sealant (non-curing).

Check rubber plug (8) for damage and fit new one, if necessary.



Transmission side

Locate CV joint (5).

Note:

For ease of fitting prop cardan shaft up with trestle on front axle.

Note:

Do not offset cardan shaft (1) by more than 15°.



Front-axle side

Locate CV joint (5) and intermediate flange (10) with washer (9).

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Removing and fitting the cardan shaft

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Fav 900

Front axle / Cardan shaft

Removing and fitting the cardan shaft

G

Place shim (11) under socket head cap screws (12) and then tighten as far as stop.



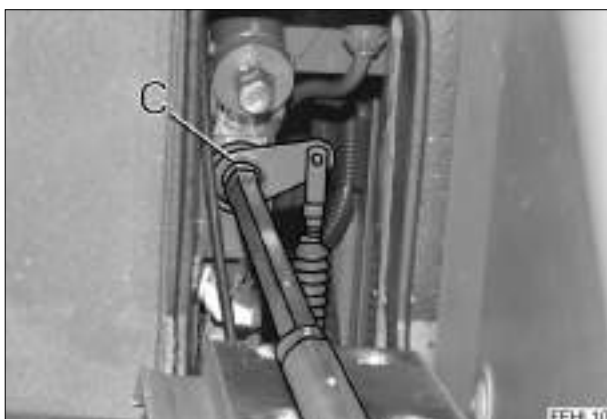
Tighten all socket head cap screws (12) to **150 Nm**.

Note:
Secure cardan shaft against turning by using handbrake.



Screw cover plate (arrowed) in place under oil pan.

Tighten M10x35 - 10.9 hexagon screws to **69 Nm**.



Unjack tractor.

Shift range control to stage I or stage II using auxiliary lever.

Test-drive tractor.

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Steering / General system Functional description | A |
|---|---|----------|

Comparison with Fav 500, Xylon, Fav 800 etc.:

Unchanged:

- Same function
- Same pressure values
- Same principle
- First priority in hydraulic system and immediate operational readiness when engine is running (i.e. independently of other systems)

New:

- All the main control components are now flange-mounted on the central control block ZSB (e.g. priority valve, see Fig. 1) or incorporated internally.
- The pressure-relief system for the auxiliary pump DBV-L (see Fig. 2) is generally no longer in the steering unit LE nor provided in the form of a separate external valve, but is incorporated in the central control block ZSB.

Test instructions / cross-references:

- The hydraulic function of the steering system must not be viewed in isolation, see general test instructions "Test instructions and log for general hydraulic functions" 9600/E/-----
- The "Performance test / Overview" 4000/E/----- sheet provides an initial guide.
- The "Auxiliary pump PL and priority valve" 4000/E/----- special test instructions can be used to connect the auxiliary pump to the circuit.
- Please see "Control system function charts" for the different operational statuses when steering.

Available pumps:

- The steering system has two pumps available to it, with the LS pump PR (=inclined-disc axial-flow piston pump) servicing the steering system in the "normal scenario".
- Both pumps are isolated from each other in terms of both pressure and volume by the non-return valves RV3 and RV4, i.e. the auxiliary pump PL does not feed into the LS pump PR and the LS pump PR does not feed into the auxiliary pump PL. The non-return valves RV3 and RV4 are integral components of the central control block ZSB
- LS pump PR (=inclined-disc axial-flow piston pump):
- The maximum working pressure of the LS pump PR is fixed at the pump controller; this pressure must never be increased (rise in oil temperature, consequential damage and voiding of warranty)
- Auxiliary pump PL (= gear pump = fixed-displacement pump)
- The auxiliary pump PL pumps oil constantly, independently of the engine speed; it is therefore part of the hydraulic system's cooling circuit.
- The auxiliary pump PL only takes over responsibility for steering in the "need scenario". If the tractor also has a hydraulic trailer brake, the auxiliary pump generates the instantaneous pressure in the trailer brake.
- The commonly used name "steering pump" is therefore not appropriate; the term "auxiliary pump" is better and will be used in future.
- Pressure relief for the auxiliary pump PL is provided by the DBV-L valve in the central control block ZSB (see Fig. 2).

Steering / "normal scenario"

- The LS pump PR normally services the steering system.
- The LS pump makes its maximum working pressure (=200 bar) available to the steering system.

Steering / "need scenario"

- A need only arises if the LS pump PR is exhausted by the current oil demand, and the steering system still requires a higher pressure.
- The priority valve PVL ensures that the auxiliary pump PL is automatically connected to the circuit.

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Steering / General system Functional description | A |
|---|---|----------|

- In the need scenario, i.e. when the priority valve PVL has connected the auxiliary pump PL, a maximum of 190 bar is reached in the steering cylinder.
- The need scenario has to be simulated to check that connection of the pump functions properly and to test the maximum pressure.

Monitoring (possible fault codes 5.1.98; 5.1.99; 5.1.9A; 5.1.9B)

- The hydraulic oil level in the Fav 700 and Fav 900 is monitored by means of the level switch FSG / S036.
- The maximum temperature of the entire hydraulic system is monitored by thermostat TWK-KOET / B013 (warning message only).
- The pressure-operated switch DOE-A / S025 monitors the operation of the LS pump PR to ensure the minimum pressure.
- The flow monitor DOE-PL / S026 monitors the function of the auxiliary pump PL to ensure the minimum flow (note: in FENDOS this part can be found under "High-pressure filter".)
- The electrical operational readiness of both switches is monitored separately, although both components are connected to the same contact in the e-box.
- In FENDIAS the joint signal can be found under "Enhanced control / steering monitor".

Appendix:

The photos below are merely a guide for the different components. Please refer to the chapters "Tractor / General system 0000/D/-----" and "Electrics / General system 9000/D/-----" for precise details of the current installation locations.

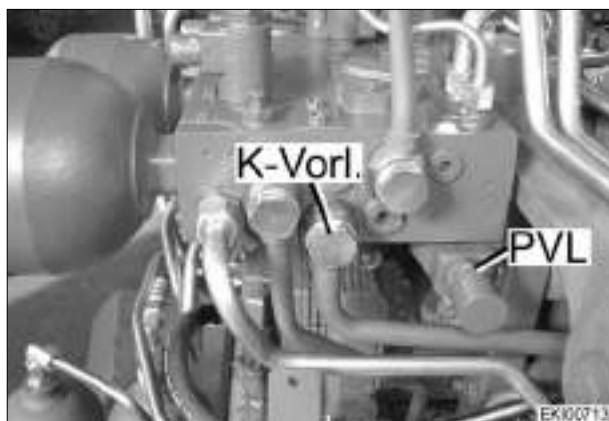


Fig. 1

Central control block ZSB and flange-mounted priority valve PVL

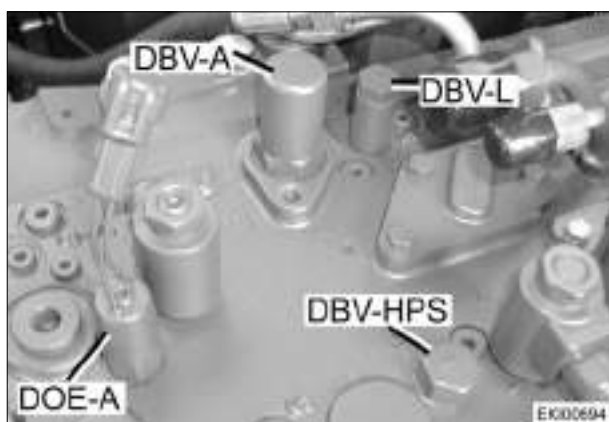


Fig. 2

Top of central control block ZSB with pressure-operated switch DOE-A / S025, pressure-relief valve for the auxiliary pump DBV-L and max. pressure-relief valve (=safety valve) DBV-A

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| Farmer 400 Fav 700 Fav 900 | Steering / General system Functional description | A |
|---|---|----------|

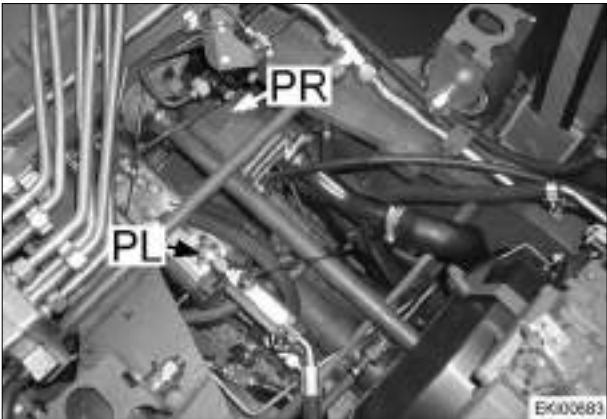


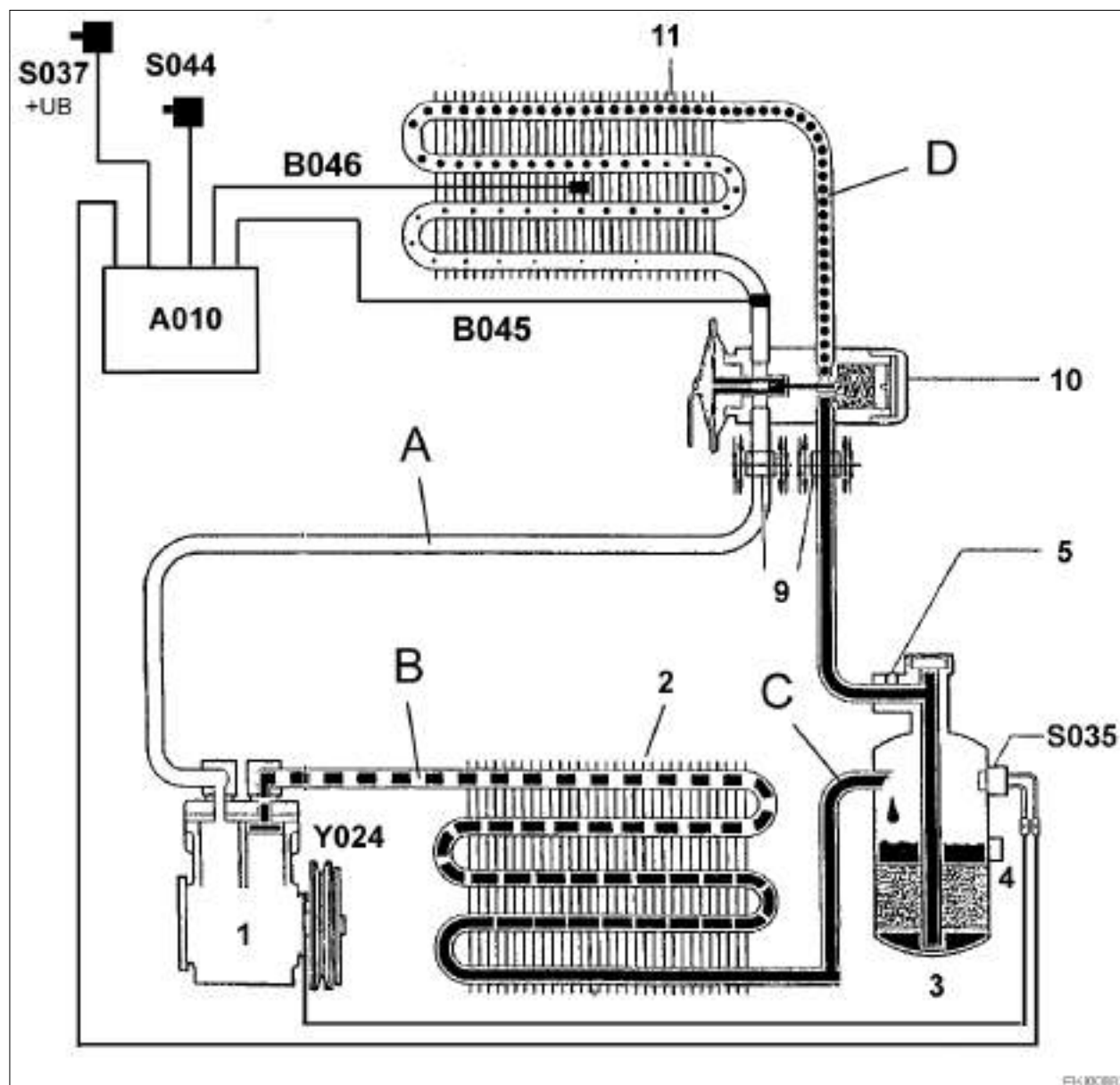
Fig. 3
Installation location of LS pump PR and auxiliary pump PL in Fav 700 and Farmer 400

Farmer 400
Fav 700
Fav 900

Air-conditioning / General system
Function

A

Refrigerant circuit



| | | | |
|------|------------------------|------|---------------------------|
| 1 | Compressor | B046 | Temp. sensor 1 |
| 2 | Condenser | S035 | High-/low-pressure switch |
| 3 | Reservoir | S037 | Fan switch |
| 4 | Inspection glass | S044 | AC potentiometer |
| 5 | Fuse | Y024 | Magnetic clutch |
| 9 | Connector | | |
| 10 | Expansion valve | A | Intake pressure, gaseous |
| 11 | Evaporator | B | High pressure, gaseous |
| | | C | High pressure, liquid |
| | | D | Intake pressure, liquid |
| A010 | Thermostat, electronic | | |
| B045 | Temp. sensor 2 | | |

| Date | Version | Page | Function | Capitel | Index | Docu-No. |
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| 12.12.2000 | b | 1/3 | | 5500 | A | 000001 |

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Air-conditioning / General system Function | A |
|----------------------------------|--|----------|

Functional description of refrigerant circuit

The **compressor** (1) entrains gaseous refrigerant and compresses it.

The **condenser** (2) liquefies the gaseous refrigerant.

The **reservoir** (3), also termed "drier", serves as the storage vessel and absorbs any moisture from the refrigerant.

The **expansion valve** (10), also termed the injector, is a regulator which injects the optimum volume of refrigerant into the evaporator.

The refrigerant which is injected in liquid form is evaporated in the **evaporator** (11). The coldness generated is directed into the cab on the air current from the fan.

Functional description of climate-control system

The air current temperature is selected using potentiometer **S044** .

Temperature sensor **B046** measures the temperature in the fan's air current.

Temperature sensor **B045** measures the temperature in the intake pipe area (danger of icing).

Thermostat **A010** switches +UB to the magnetic clutch **Y024** of the AC compressor.

Thermostat A010 interrupts the power supply to the magnetic clutch Y024 if:

- temp. sensor **B046** indicates the set air current temperature.

or

- temp. sensor **B045** indicates icing of the intake pipe.

+UB supply to thermostat **A010** : from fusebox **X050 fan 17** via fan switch **S037**.

System temperature monitor (overheating)

The **fuse** is fitted at the top of the reservoir for safety reasons. It melts at temperatures above 112°C, and the refrigerant escapes. The reservoir and refrigerant must be replaced.

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|------------|----------|------|----------|-------------|----------|---------------|
| 12.12.2000 | b | 2/3 | | 5500 | A | 000001 |

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Air-conditioning / General system Function | A |
|----------------------------------|--|----------|

AC system pressure monitor

The high-pressure/low-pressure switch **S035** is mounted on the reservoir (drier) (see refrigerant circuit drawing).

Switch **S035** monitors the compression in the reservoir.

Operating points: high-pressure/low-pressure switch S035

| | (High pressure) maximum pressure (bar) | (Low pressure) minimum pressure (bar) |
|---------------|---|--|
| Switch open | 28 +/- 2 | < 2 |
| Switch closed | 22 +/- 2 | > 2 |

If the compression in the system becomes too high (>28 bar), switch **S035** interrupts the power supply to the magnetic clutch **Y024**.

Possible causes of an excessive pressure in the system are:

- Overheating (condenser soiled)
- Expansion valve iced up
- System overfilled (too much refrigerant)

If the compression in the system becomes too low (<2 bar), switch **S035** interrupts the power supply to the magnetic clutch **Y024**.

Possible causes of an inadequate pressure in the system are:

- Leaks in the system
- System inadequately filled (too little refrigerant)

Maintenance of the air-conditioning (see also tractor operating manual)

- Refrigerant 134 a
- With the compressor running, the white ball must be floating in the upper half of the inspection glass (on the reservoir). (If necessary, top up with refrigerant.)
- If the blue ball turns pink, this is an indication of moisture in the system.
- Various manufacturers offer filling units for evacuating and filling the air-conditioning system. (For details of how to fill the air-conditioning system, please refer to the filling-unit operating manual.)
- Even in winter the air-conditioning system should be switched on for approx. 10 min every month, with ventilation set to recirculation mode. (**Note:** If the system remains unused for too long, the low-temperature oil (compressor lubricant) and the refrigerant can separate!)
- Air-conditioning compressor v-belt: v-belt tension (strand force) measured in the centre between the pulleys with an "Optibelt tension gauge", strand force 400+50 N (40+5 Kp) - profile 13mm

Power consumption of air-conditioning system

- When first switched on approx. 6 kW (= 8 bhp)
- In operation approx. 4 kW (= 5 bhp)

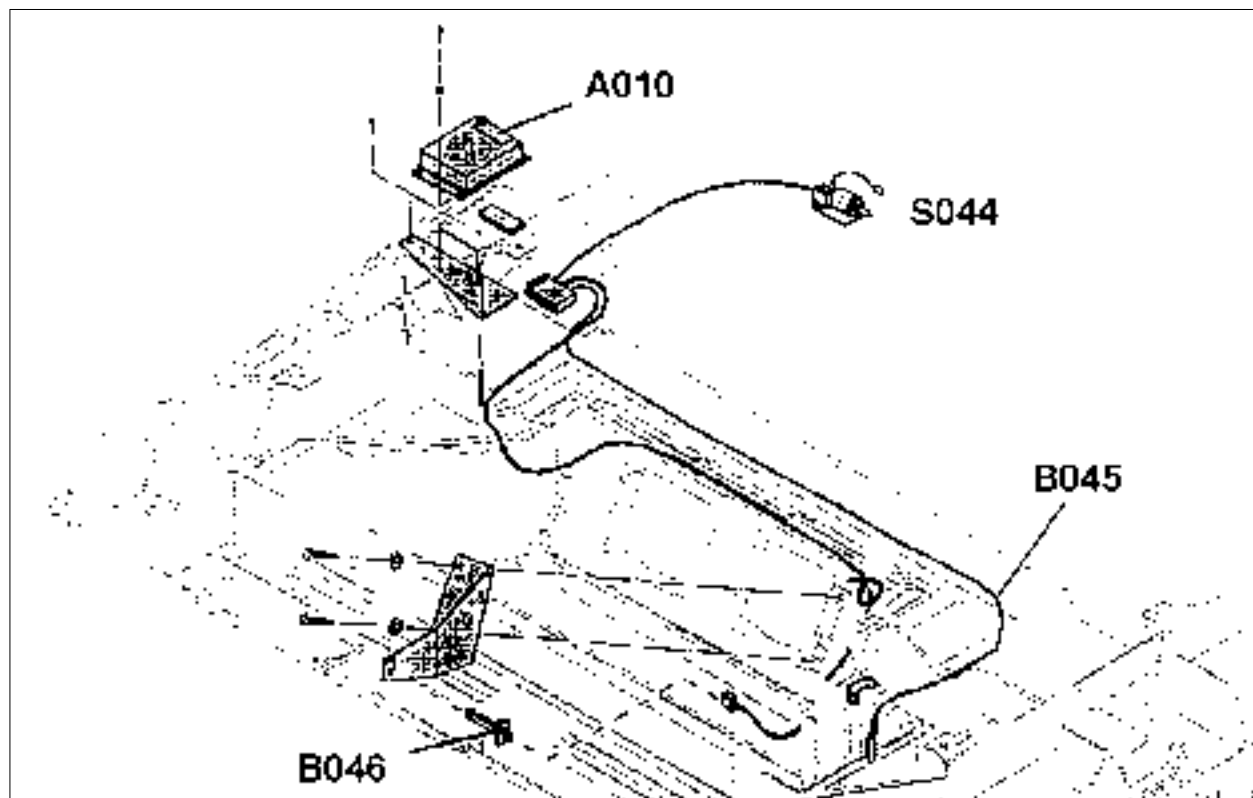
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| 12.12.2000 | b | 3/3 | | 5500 | A | 000001 |

Farmer 400
Fav 700
Fav 900

Air-conditioning / Electric cables Checking air-conditioning electrics

E

Component locations: air-conditioning control system



A010 = Thermostat, electronic

B045 = Temperature sensor 2

B046 = Temperature sensor 1

S044 = AC potentiometer

Preliminary work:

- Remove roof
- Detach ventilation system Bowden cable
- Remove panels

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| 15.12.2000 | b | 1/3 | 5570 | E | 000001 |



in other words, the sensor resistance decreases with increasing ambient temperature.

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Air-conditioning / Electric cables Checking air-conditioning electrics | E |
|---|---|----------|

Pin assignment: A010 - electronic thermostat

| Pin | Wire no./colour | Function |
|-----|-----------------|-----------------------------|
| 1 | brown | Earth |
| 2 | - | Not assigned |
| 3 | red | S037 - fan switch (+UB) |
| 4 | black/yellow | Y024 - magnetic clutch |
| 5 | blue | B045 - temp. sensor 2 (NTC) |
| 6 | brown | B045 - temp. sensor 2 (NTC) |
| 7 | white | B045 - temp. sensor 1 (NTC) |
| 8 | white | B045 - temp. sensor 1 (NTC) |
| 9 | brown/yellow | S044 - AC potentiometer |
| 10 | brown/yellow | S044 - AC potentiometer |

Note:**Chapter 5500 Index A - Functional description****Chapter 9000 Index E - A010 - Electronic thermostat****Chapter 9000 Index E - B045 - Temperature sensor 2****Chapter 9000 Index E - B046 - Temperature sensor 1****Chapter 9000 Index E - S044 - AC potentiometer**

| | | |
|----------------|---|----------|
| Fav 900 | Cab / General system Raising cab | G |
|----------------|---|----------|

Equipment required:

- Hoist (cab approx. 700 kg)
- Hoisting sling
- Trestles (8000 kg)

Preliminary work:

- Lower rear power lift.
- Prop tractor, taking appropriate safety precautions, and remove both rear wheels.
- Remove panels on right side.
- Remove exhaust and air intake!



Raise side sections and remove cover panel.



Remove left and right support plates.



Carefully open coolant-water cap.



Caution:
When engine is hot - danger of
scalding injury!

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| 09.05.2001 | a | 1/5 | | 8100 | G | 000005 |

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| Fav 900 | Cab / General system Raising cab | G |
|----------------|---|----------|

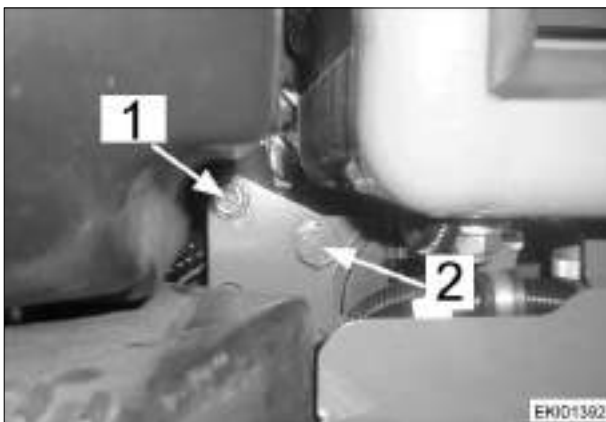


Disconnect heating system water hoses.

Note:

Connect water hoses together and tighten using hose clips.

Coolant-water circuit is now closed. Engine can be operated if required!



Left cab mount:

Screw (1) = loosen

Screw (2) = remove



Remove left cable loom bracket, seen in direction of travel.



Remove cover panel and exhaust panel and loosen right cab mount. Repeat in same manner on other side.

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| Fav 900 | Cab / General system Raising cab | G |
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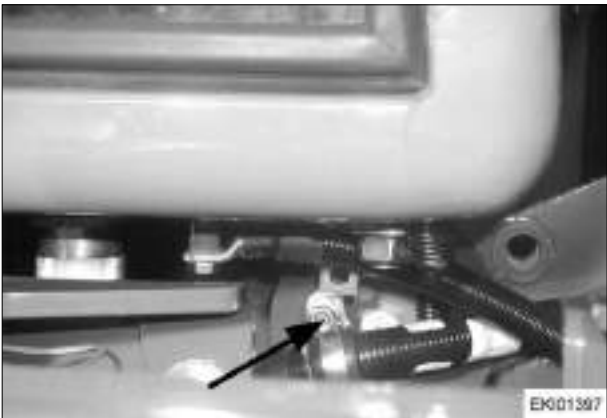
Remove cover on EPC/DA switchover.



Remove support at rear left and right and fit in tilted position (arrowed).



Remove earthing point on left, seen in direction of travel (item A).



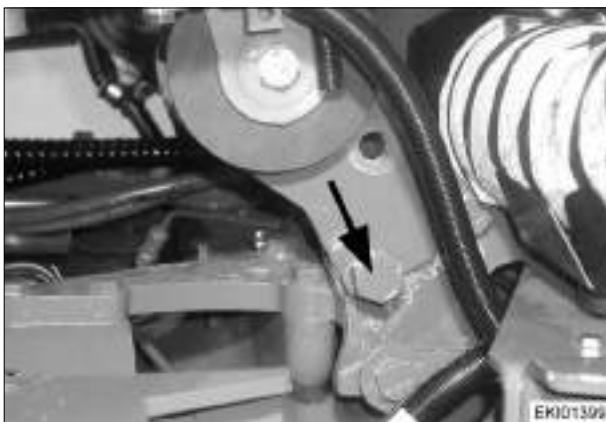
Remove right cable loom bracket, seen in direction of travel.

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| Fav 900 | Cab / General system Raising cab | G |
|----------------|---|----------|



Attach cab to hoist by front mirror bracket, taking appropriate safety precautions!



Raise cab, then peg cab mount left and right with M20 screw (arrowed).

Note:

When raising, ensure clearance of all components.



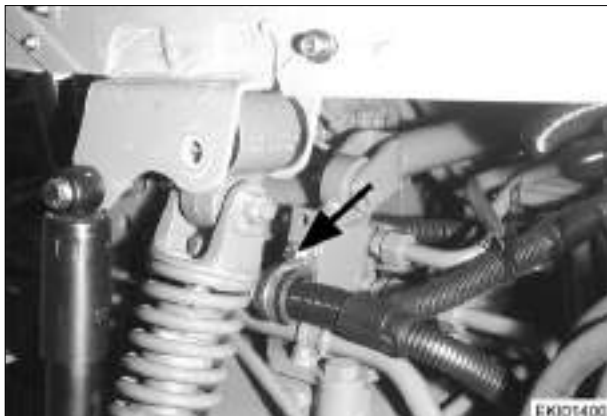
Raise cab at rear. Attach cab at rear to hoist, taking appropriate safety precautions.



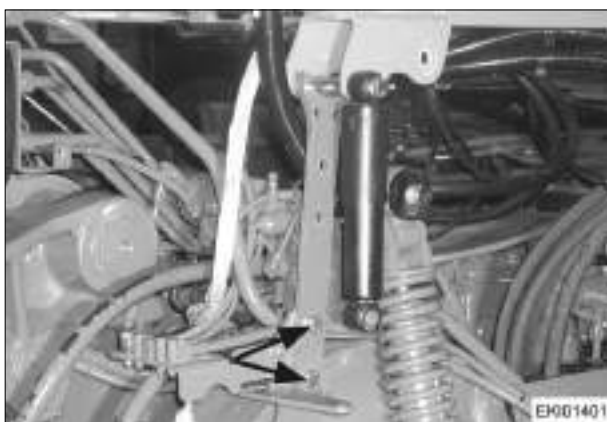
Unscrew rear left and right cab mount fastening screws (arrowed) and left and right damper fastening screws.

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| Fav 900 | Cab / General system Raising cab | G |
|----------------|---|----------|



Remove cable loom bracket (arrowed) on right in direction of travel and also remove earthing point if necessary.



Raise cab.

Note:

When raising, ensure clearance of all components.

Fit support at rear right and left, see arrow for position.

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| 09.05.2001 | a | 5/5 | | 8100 | G | 000005 |

Fav 900**Cab / General system**
Lowering cab**G**

Attach cab at rear to hoist, taking appropriate safety precautions.

Remove support at rear right and left.

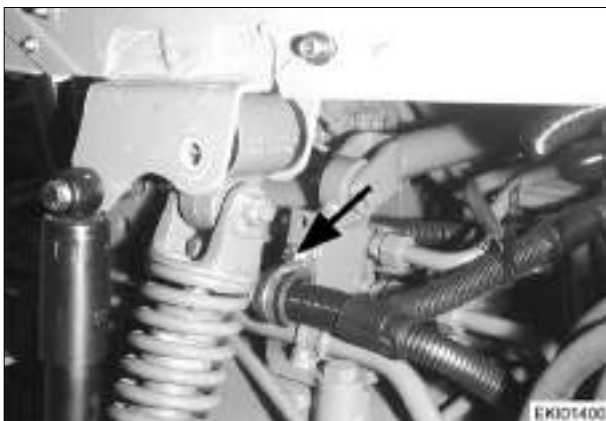
Lower cab carefully.

Ensure clearance of all components.



Tighten cab mount rear left and right and also damper fastening screws.

Fit support (see photo).

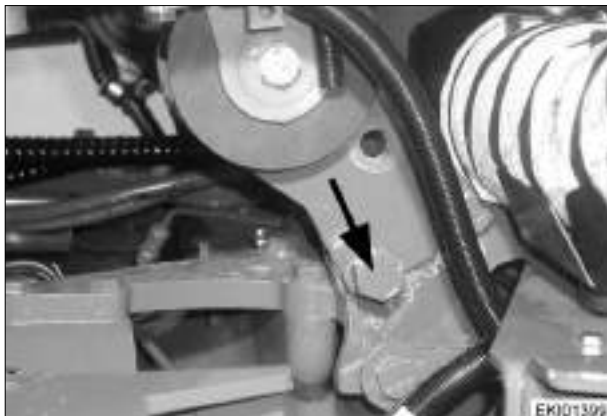


Fit cable loom bracket (arrowed), and also fit earthing point if this was removed earlier.

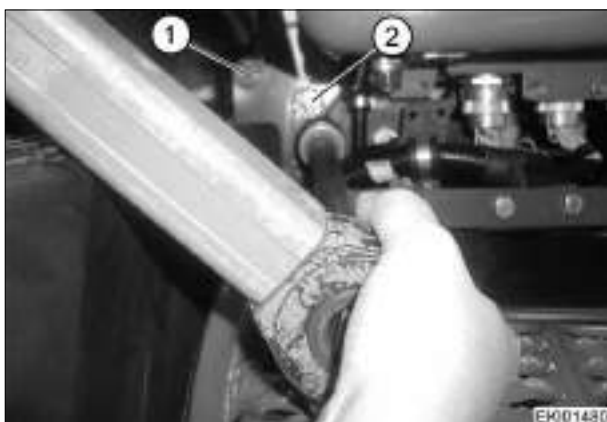


Attach cab to hoist under front mirror bracket, taking appropriate safety precautions!

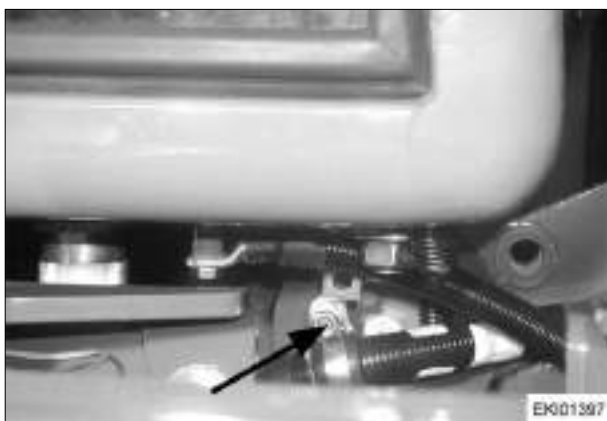
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| 21.05.2001 | a | 1/4 | | 8100 | G | 000007 |

Fav 900**Cab / General system**
Lowering cab**G**

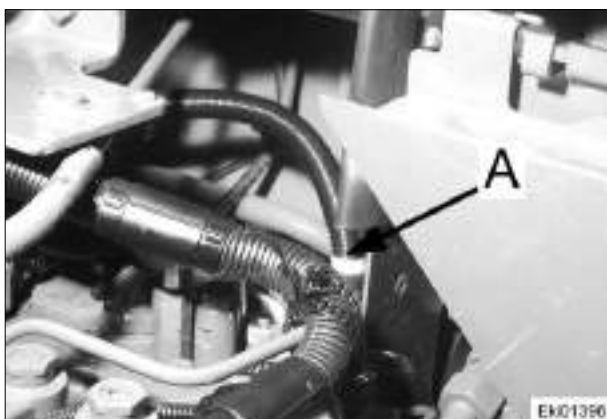
Remove M20 screw (arrowed) on left and right.
Lower cab.
Ensure clearance of all components.



Coat thread of hexagon screws with synthetic bonding agent X903.050.084.
Tighten M20 hexagon screws (2) to 402 Nm and M16 (1) to 210 Nm.



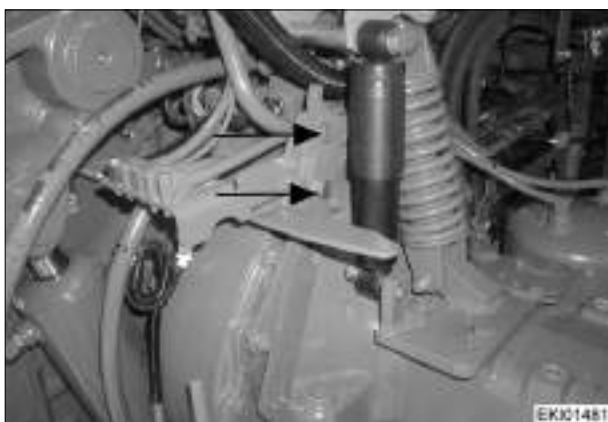
Fit right cable loom bracket, seen in direction of travel.



Fit bracket of earthing point on right (item A).

Fav 900**Cab / General system**
Lowering cab**G**

Fit cover panel and exhaust cover.



Move support at rear left and right from tilted position to driving position (arrowed).



Fit cover to EPC/DA switchover.



Fit left cable loom bracket, seen in direction of travel.

| | | |
|----------------|--|----------|
| Fav 900 | Cab / General system Lowering cab | G |
|----------------|--|----------|



Fit heating system water hoses.
Check coolant. Top up if necessary.



Fit left and right support plates.



Fit cover panel and side sections.

Concluding work :

Fit exhaust and air intake.

Fit panels on right side.

Fit rear wheels.

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| | | |
|----------------|--|----------|
| Fav 900 | Cab / General system Removing cab | G |
|----------------|--|----------|

Equipment required:

- Hoist (cab approx. 700 kg)
- Hoisting yoke (DIY, see Chapter 9920 Reg. A)
- Trestles (800 kg)

Preliminary work:

- Lower rear power lift.
- Prop tractor, taking appropriate safety precautions, and remove both rear wheels.
- Remove panels on right side.
- Remove exhaust and air intake.



Raise side sections and remove cover panel.



Remove left and right support plates.



Carefully open coolant water drain plug.

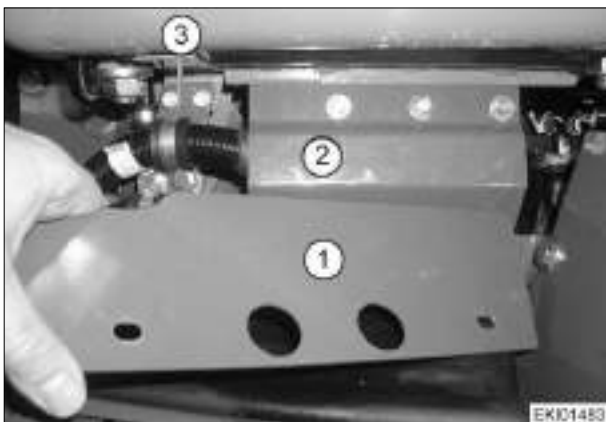


Caution:
When engine is hot - danger of
scalding injury!

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| 10.5.2001 | a | 1/6 | 8100 | G | 000006 |

Fav 900**Cab / General system**
Removing cab**G**

Disconnect heating system water hoses.

**Left side**

Remove cover panel (1), cover of cable coupler (2) and cable loom bracket (3).



Disconnect cable couplers.



Remove engine cover and coolant hoses of air-conditioning system.

Note:**Only disconnect coolant hoses at these screw couplings. Internal valves prevent refrigerant from escaping.**

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| 10.5.2001 | a | 2/6 | | 8100 | G | 000006 |

Fav 900**Cab / General system
Removing cab****G**

Remove panel

Disconnect electric cable couplers.

Remove cable clips and earth cable.

**Right side**

Empty air compressor at drain valve and disconnect pipe.



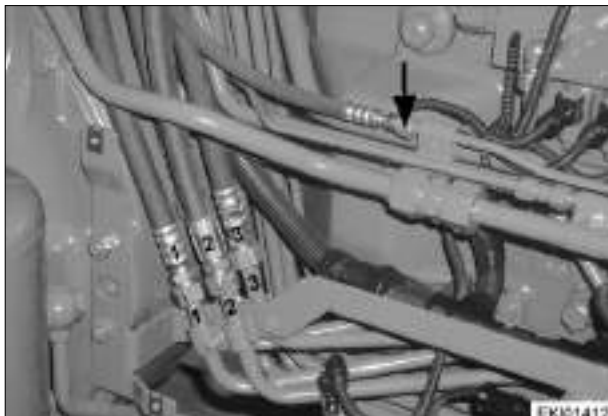
Remove footplate.



Disconnect cable coupler.

Remove cable loom bracket (arrowed) and earth cable (arrowed).

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Fav 900**Cab / General system
Removing cab****G**

Label and disconnect steering system hydraulic lines.

Seal with sealing plugs.

Disconnect LS line (arrowed).



Remove plugs on right and left B-pillars of cab.



Screw lift arms of hoisting yoke to B-pillar on left and right.



Fit hoisting yoke and attach cab, taking appropriate safety precautions.

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Fav 900**Cab / General system
Removing cab****G**

Remove hexagon screw from cab mount.
Remove other side in same manner.



Remove two hexagon screws from rear cab mount (arrowed).
Remove other side in same manner.



Raise cab slightly.
Disconnect hydraulic lines from 5V6 selector valve.
Collect any draining Pentosin (oil).



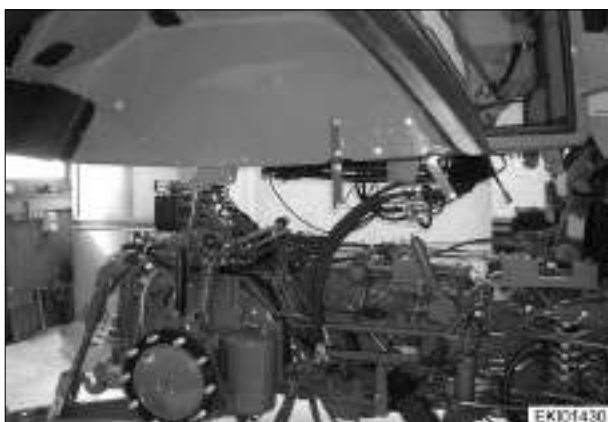
Remove hydraulic line from 4V5 pressure-relief valve, coupling with bracket.
Collect any draining Pentosin (oil).

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| Fav 900 | Cab / General system Removing cab | G |
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Disconnect compressed-air line from handbrake cylinder.

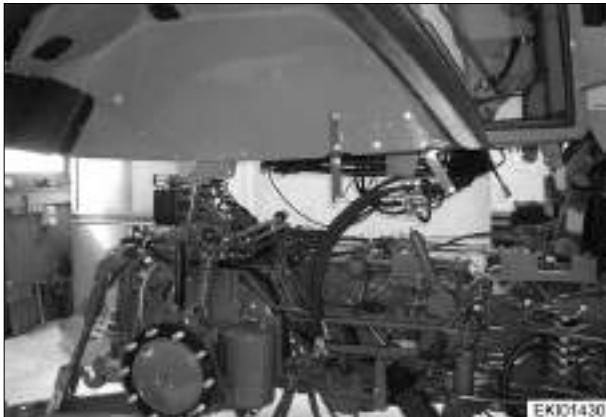


Note:
Raise cab.
Ensure clearance for all components.



Danger:
Do not walk or stand under
suspended loads!

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| 10.5.2001 | a | 6/6 | | 8100 | G | 000006 |

Fav 900**Cab / General system
Fitting cab****G**

Attach cab to hoist, taking appropriate safety precautions and raise above transmission. Ensure clearance of all components.

**Danger:**

Do not walk or stand under suspended loads!



Fit hydraulic lines to 5V6 selector valve.



Fit hydraulic line to 4V5 pressure-relief valve with bracket.



Fit pressure pipe to brake cylinder.

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| | | | | | 000008 |

| | | |
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| Fav 900 | Cab / General system Fitting cab | G |
|----------------|---|----------|



Lower cab fully.

Fit hexagon screw to cab mount on both left and right.

Tighten M16 hexagon screw to 210 Nm.



Fit two hexagon screws and spacer sleeve.

Tighten M12 to 86 Nm.

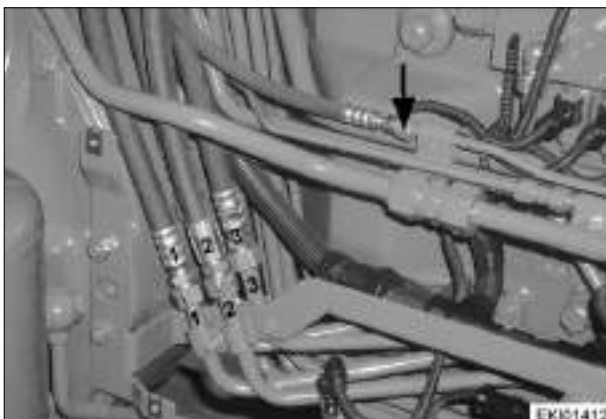
Tighten M16 to 210 Nm.

Fit opposite side in same manner.



Remove complete hoisting yoke.

Fit sealing plugs to left and right B-pillars.



Connect steering system hydraulic lines as per labels.

Fit LS line (arrowed).

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Fav 900**Cab / General system
Fitting cab****G**

Connect cable coupler.

Fit cable loom bracket (arrowed) and earth cable.



Fit cover panel.



Connect compressed-air line to distributor.



Connect cable couplers.

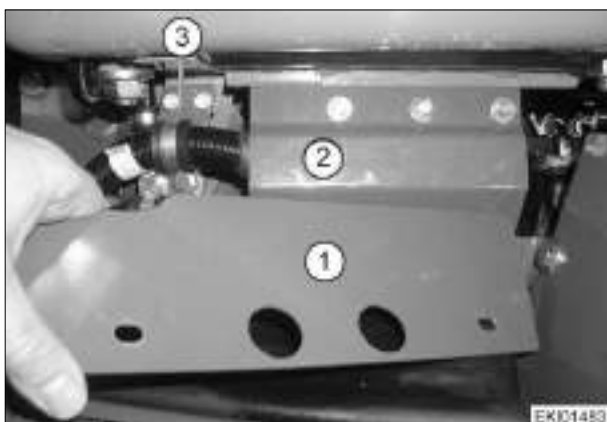
Fit cable clip and earth cable.

Fit panel.

| | | |
|----------------|---|----------|
| Fav 900 | Cab / General system Fitting cab | G |
|----------------|---|----------|



Connect cable couplers.



Fit cover panel (1), cover of cable coupler (2) and cable loom bracket (3).



Fit air-conditioning coolant hoses.
Fit engine cover.



Fit heating system water hoses.
Check coolant. Top up if necessary.

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| Fav 900 | Cab / General system Fitting cab | G |
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Fit left and right support plates.



Fit cover panel and side sections.

Concluding work:

Fit exhaust and air intake.

Fit panels on right side.

Fit rear wheels.



Bleeding brake hydraulic system, see Chapter 1070 Reg. G.

Bleeding clutch hydraulic system, see Chapter 1100 Reg. G.

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|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Rear power lift - functional description | A |
|---|---|----------|

Comparison with Fav 500, Xylon, Fav 800 etc. (in brief):

Unchanged:

- Operating principle
- EPC-DA switchover via twin-block ball valve
- 230 bar pressure-relief valve in EPC valve
- Possible danger when switching from EPC to DA as a result of pressure equalisation between different consumers (gravity-loaded)
- Safety measures

New:

- Location of EPC valve between first and second control valves
- EPC valve with two separate main pistons
- "Lower" valve with integral oil-leakage shutoff valve
- No specific floating position required in valve
- Automatic activation of shock load damping system with option of setting closing speed on terminal
- Only the "actual" signal lines are included in the relevant electrical circuit diagram; the bus messages to the terminal, to the ECU A002, to the electrohydraulic control valve and to the terminal A008 cannot be seen in the circuit diagram.

Following movements are possible for rear power lift:

1. "EPC lift"
2. "EPC lower / regulate"
3. "EPC transport"
4. "DA lift"
5. "DA lower"

Other operational statuses are:

6. Floating position
7. Shock load damping
8. Electrohydraulic remote control

Safety precautions

- In all modes EPC box is only activated at minimum engine speed of 400 rpm, i.e. it must always be guaranteed that even automatically induced movement - e.g. lowering implement - can quickly be corrected by driver with active LS pump (speed figure is delivered to EPC box via K-bus).
- Switch S048 on EPC-DA multiway valve prevents possibility of dual operation.

1. "EPC lift"

The "Lift" command can be triggered by

- rapid lift control on control console with "Lift" command, or
- depth setting (= setpoint potentiometer), or
- "END" rocker switch on joystick, when in automatic mode, or
- automatic correction with active shock load damping, or
- external buttons (S027 and S029) at cab on right and left
- Any external commands immediately lock all other EPC functions.

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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Rear power lift - functional description | A |
|---|---|----------|

Explanation of functions:

a) Electrical

- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position
- This position is detected by solenoid switch S048 and transmitted to EPC box A005 pin 12, i.e. EPC box is active.
- "Lift" solenoid Y021 of EPC valve is supplied with power by EPC box A005 pin 55 (12 volts).

b) Hydraulically

- Load power/load-sensing system connection is active when "Lift" valve is active.
- If LS pump PR is not yet active, current load pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pumping and pressure regulation, i.e. it pumps required volume at required pressure.
- Should LS pump already be active elsewhere with higher pressure demand, "surplus" pressure at EPC valve's pressure governor is limited to power lift load level.
- Max. lifting speed is defined as cross-section (= fixed aperture) in EPC valve.
- Hydraulic oil then comes from EPC valve output directly to lift side of power lift cylinders.
- Displaced oil returns to tank via multiway valve AV4.

c) Mechano-hydraulically

- Lifting of largest possible implement to full height is primarily limited by three-point linkage setting (top link length and coupling point) and,
- for maximum safety, by working pressure of LS pump PR (this pressure is fixed and must never be increased!).

Safety system:

- Max. pressure protection of LS pump with pressure-relief valve DBV-A in central control block
- During every lift operation - except with external buttons S027 and S029 - max. height is activated by safety end shutoff, i.e. "Lift" process is automatically shut off.

2. "EPC lower / regulate"

The "Lower" command can be triggered by

- rapid lift control at control console with command "Lower = regulate", or
- depth setting (= setpoint potentiometer), or
- "END" rocker switch on joystick, when in automatic mode, or
- external buttons (S028 and S030) at cab on right and left
- Any external commands immediately lock all other EPC functions.

Explanation of functions:

a) Electrical

- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position.
- This position is detected by solenoid switch S048 and transmitted to EPC box A005 pin 12, i.e. EPC box is active.
- "Lower" solenoid Y022 of EPC valve is supplied with power by EPC box A005 pin 19 (12 volts).
- Lowering speed is set as infinitely variable setpoint in terminal's "Rear power lift" control menu and
- transmitted by EPC box as pulse-width-modulated (PWM) power signal to electrically proportional "Lower" valve.

b) Hydraulically

- "EPC lower" works without LS command and without active intervention of LS pump PR.
- Displaced oil from lift cylinder moves to open "Lower" valve.
- "Lower" valve opens its cross-section in accordance with setpoint flow rate.
- If lowering is activated by external button S028 or S030, "Lower" valve automatically moves to medium lowering speed, i.e. to medium flow rate.

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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Rear power lift - functional description | A |
|---|---|----------|

c) Mechano-hydraulically

- Theoretical depth of power lift is determined by setpoint specification and regulated, i.e. adapted as function of hybrid control system.
- Lowering speed actually achieved, however, depends on implement weight and oil viscosity, i.e. it is impossible to lower three-point linkage in EPC mode without implement and with cold oil.

3. "EPC transport"

"EPC transport" setting is automatically reached when

- power lift has reached end position with "Lift = END" (detected by rear position sensor B030)

Explanation of functions:

a) Electrical

- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position
- This position is detected by solenoid switch S048 and transmitted to EPC box A005 pin 12, i.e. EPC box is active.
- Actual position is detected by rear power lift position sensor B030 and transmitted as voltage signal to EPC box A005.

b) Hydraulically

- Without LS command and without active intervention of LS pump PR
- Implement weight generates hydraulic counterpressure in lift cylinder.
- Dynamic peak pressures while driving are brought under control by 230 bar pressure-relief valve in EPC valve.
- Leak-free integrity of system is ensured by integral control valve in "Lower" valve (i.e. with this EPC valve fitted, no separate, hydraulically resettable non-return valve is needed any longer).

4. "DA lift"

5. "DA lower" (pressing downwards)

The "DA lift" and "DA lower" commands can only be activated by

- analogue setpoint command of second valve (normally "blue" at crossgate lever)

Explanation of functions:

General:

- For power lift DA function second control valve 1.2/Y016 with A and B connections (corresponding to - and +) is used instead of EPC valve.

a) Electrical

- Block multiway valve, consisting of AV3 and AV4, is in "DA" position.
- This position is detected by solenoid switch S048 and transmitted to EPC box A005 pin 12, i.e. EPC box is no longer active in supplying power to control valve.
- "Lift" or "Lower" command from external buttons (S027-S030) is transmitted from EPC box via K-bus to ECU A002.
- Set lift height limit at terminal is not active, and EPC end shutoff is also ignored.

Fav 700 single ECU

- The single ECU A002 is responsible for actuating the electrohydraulic control valves (and for the transmission); the command for the valve comes via the transmission bus (=G-bus).

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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Rear power lift - functional description | A |
|---|---|----------|

Fav 700 twin ECU

- The ECU A002 is responsible for actuating the electrohydraulic control valves; the command to the valve comes via the special valve bus (=V-bus).

b) Hydraulically

- Load power / LS connection is active when main piston is deflected to lift or lower.
- If LS pump PR is not yet active, current LS pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (1.2 valve, EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pumping and pressure regulation, i.e. it pumps required volume at required pressure.
- Should LS pump already be active elsewhere with higher pressure demand, "surplus" pressure at electrohydraulic control valve's pressure governor is limited to power lift load level.
- Lifting and lowering speed (flow rate) is taken from currently set value of second valve at terminal.
- Hydraulic oil for lifting or lowering then goes directly to lift system cylinders from electrohydraulic control valve 1.2 output.
- Displaced oil returns to tank via multiway valve AV3 and AV4.

c) Mechano-hydraulically

- Power lift moves to mechanical end stop in lift cylinder with external command "Lift" or "Lower" and generates 200 bar there (= max. standby pressure).

Safety systems:

- Max. pressure protection of LS pump with pressure-relief valve DBV-A in central control block

Operational statuses**6. Floating position**

- EPC valve has no special floating position.

Explanation of functions:

a) General

- Floating position is activated - as previously - by max. depth setting.
- However, "floating" is also active at higher power lift position as soon as no more weight is available for lowering or if implement is on ground before lowest position is reached.

b) Electrically:

- ECU A005 receives voltage of 10 scale graduations setting from depth-setting potentiometer.
- Any control commands, e.g. to lift slightly, are suppressed, i.e.
- "Lower" valve receives constant power.

c) Hydraulically

- With "Lower" valve active and "Lift" valve inactive (i.e. in neutral), connection is made between both load powers and tank line - as with previous floating position.

7. Shock load damping

- This is automatically active after upper end position (B030) has been reached when lifting implement.
- Speed at which shock load damping is enabled can be set at terminal in rear power lift menu (see Operating Manual).

Background:

Oscillation of mounted implement while driving results in pressure peaks which cannot be brought smoothly under control in 230 bar pressure-relief valve of EPC valve.

Function / principle of shock load damping system:

Based on draft-sensing pin signals (B030 / B031), downward oscillations of implement are damped by specific opening and closing of "Lower" valve. This prevents further escalation.

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9. Electrohydraulic remote control (optional extra)

For more details please see also "Electrohydraulic remote control" Chapter 8618 Index A and Index E Reason / use:

Some implements - e.g. sugar beet topper-lifter - have their own position sensor (component designation not available). This mode is sometimes referred to as "momentary-contact control".

Connection / required adaptation:

Relevant circuit diagram: "Electrohydraulic control"

External sensor is connected to white socket X015 at rear of tractor. This works from EPC box A005 with same 9.5 V supply voltage at same pin 39 and with same earth at same pin 20 as tractor sensor B030. Specific contact - pin 48 - is available for signal from external sensor.

EPC box itself detects any connected external sensor and then continues to work with this signal, i.e. no further action is necessary.

Diagnostics:

Because it has its own contact, external sensor can also be checked by diagnostics system in event of electrical signal faults (fault code 8.3.26).

Faults in the earth power supply (common terminal; socket X015 not available = sensor not connected) are not self-testing and may be confusing.

Appendix:

For a guide to various components / current and precise installation position see "Tractor / General system", Chapter 0000 Index D and "Electrics / General system" Chapter 9000 Index D

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Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC

Rear power lift - functional description

A

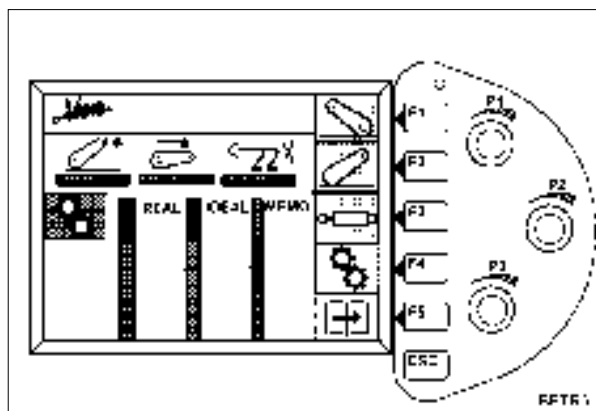


Fig. 1

Terminal A008

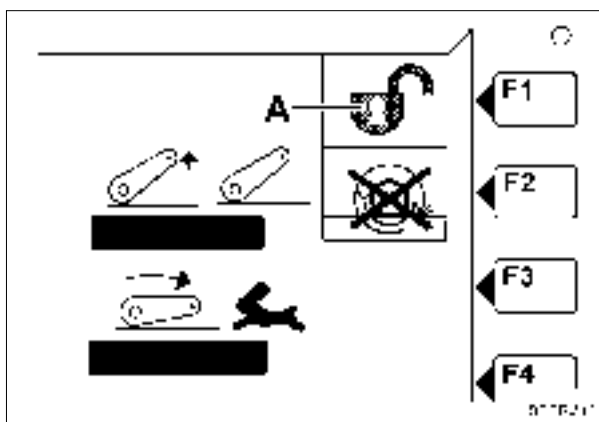
First main menu level

Fig. 2

Power lift lock pictogram

Lock can be opened:

Key F1 or

operate rapid lift control.

Lock is automatically locked:

when actuating external buttons (Lift / Lower)

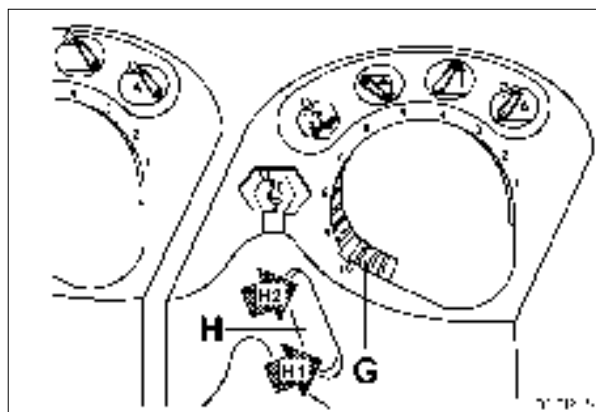


Fig. 3

Rear power lift

Control console A004

H = rapid lift control

H1 = lower and regulate

H2 = lift

G = depth control



Fig. 4

Key on membrane keypad with "Active" LED on control console
Rapid lowering system only available on rear power lift



Fig. 5

Key on membrane keypad with "Active" LED on control console
Rapid lowering system only available on rear power lift

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Power lift / Electrohydraulic control EPC

Rear power lift - functional description

A



Fig. 6
 Key on membrane keypad on control console
Hitch-lift only available on rear power lift

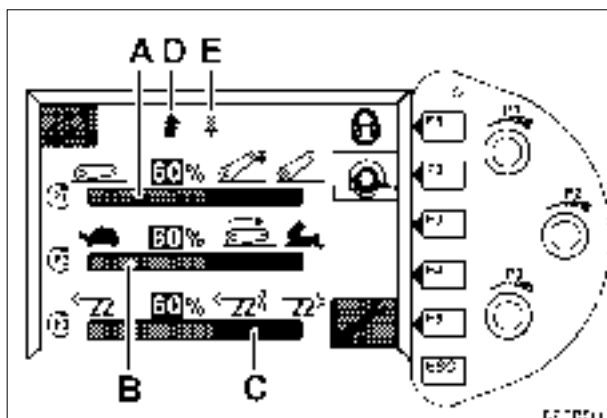


Fig. 7
 Rear power lift
 Terminal A008
Display and setting menu
 A = lift height limit
 B = lowering speed
 C = position/traction hybrid control
 D = lifting movement at present
 E = lowering movement at present



Fig. 8
 Fav 700 rear power lift
EPC/DA switchover AV3/AV4
 with solenoid switch S048 (behind cover panel)



Fig. 9
 Fav 900 rear power lift
EPC/DA switchover AV3/AV4
 with solenoid switch S048 (behind cover panel)

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Rear power lift - functional description

A



Fig. 10

External buttons S027-S030

for lifting and lowering, left and right
 (in photo on right)

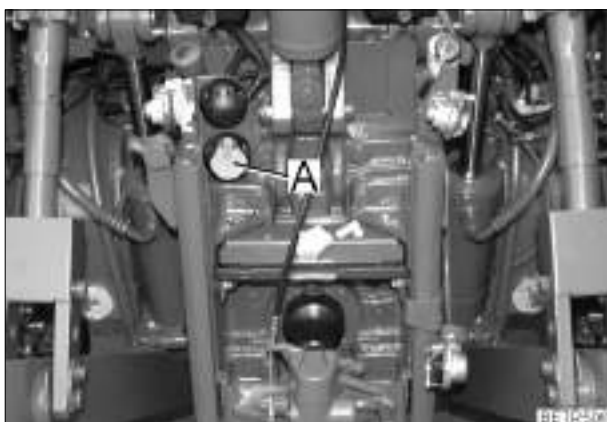


Fig. 11

Remote control

Item A = socket X015 for connecting external
 position sensor

Socket and contact labelling is same as with 7-pin
 trailer socket X018, though with different
 meaning:

L = free

54g = signal to EPC box pin 48

31 = EPC box earth pin 20

R = free

58R = 9.5 V supply for EPC box 39

54L = free

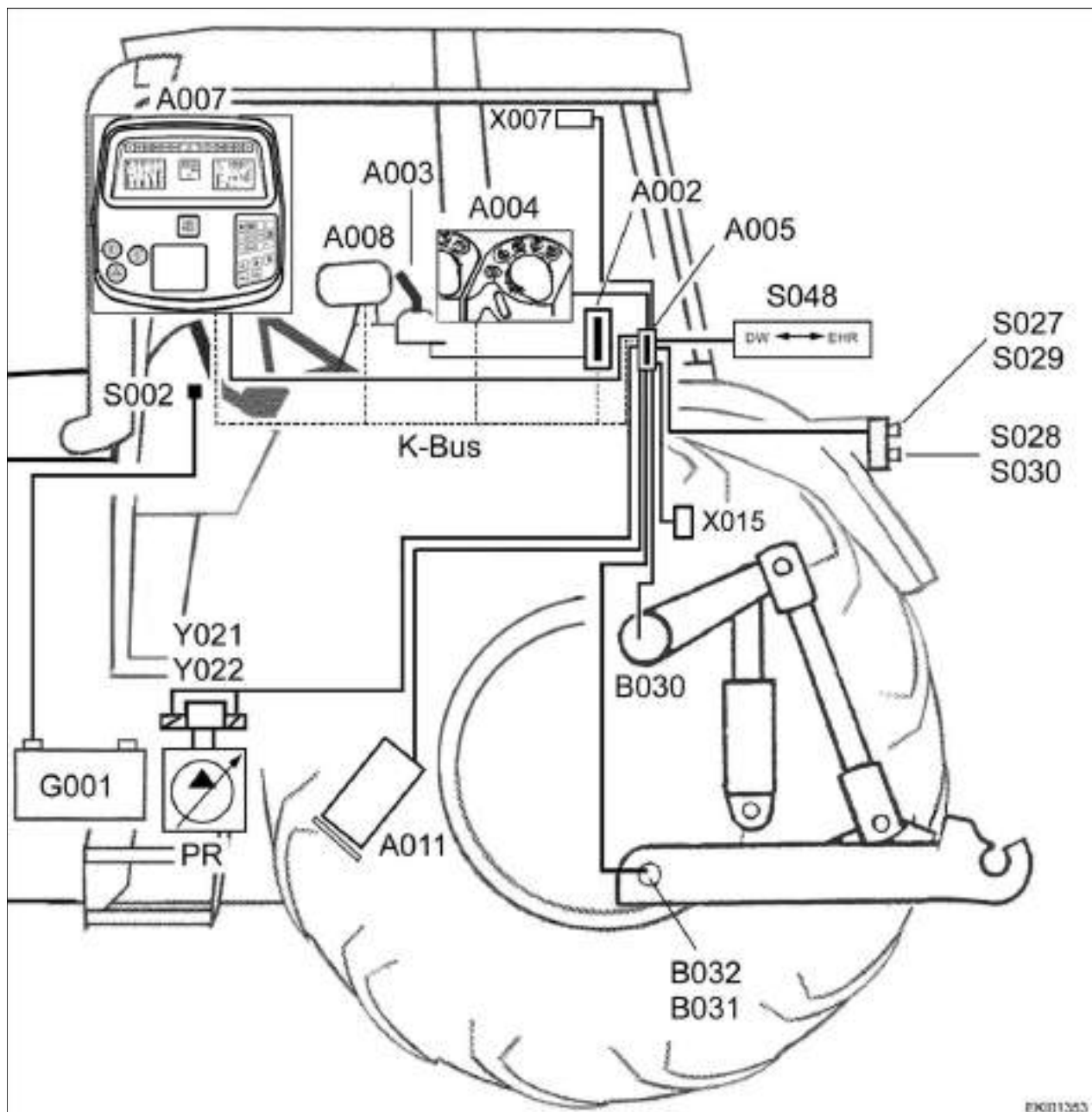
58L = free

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Power lift / Electrohydraulic control
Rear power lift EPC-C

A



| | | | |
|------|----------------------------------|-------|---|
| A002 | Enhanced controls e-box | K-bus | Enhanced controls bus |
| A003 | Joystick | PR | LS pump |
| A004 | Control console | S002 | Ignition-starter switch |
| A005 | EPC e-box | S027 | External EPC "Lift" button, right |
| A007 | Instrument panel | S028 | External EPC "Lower" button, right |
| A008 | Vario terminal | S029 | External EPC "Lift" button, left |
| A011 | Radar sensor | S030 | External EPC "Lower" button, left |
| B030 | Rear EPC position sensor | S048 | EPC/DA switchover solenoid switch |
| B031 | Rear EPC right draft-sensing pin | X007 | Implement socket cable coupler |
| B032 | Rear EPC left draft-sensing pin | X015 | Cable coupler for remote control socket |
| G001 | Battery | Y021 | "EPC lift" solenoid valve |
| | | Y022 | "EPC lower" solenoid valve |

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Working with EPC-C ECU (A005)

Position control

The controlled variable is the position of the lift assembly relative to the tractor and thus the working depth of the mounted implements.

The "Position" sensor **B030** , which monitors the position of the lifting shaft, supplies the actual value.

Draft force control

The controlled variable is the draft force at the bottom link. If this is kept constant, the tractor power is used to the optimum extent, for example when ploughing on rolling terrain and in non-homogeneous soil.

The actual value of the "KMB" draft-sensing pin **B031 / B032** is the change in the voltage in the signal line. This is caused by the change in the magnetic field in the draft-sensing pin when subjected to tensile or compressive loads by the bottom links in a horizontal plane.

The draft force is corrected by changing the working depth of the mounted implement (e.g. plough).

Hybrid control

The actual value of the position and draft force is mixed in an adjustable ratio at the Vario terminal **A008** and processed as the controlled variable.

The hybrid control enables changes in the working depth resulting from varying soil resistances, as occur when using pure draft control, to be reduced.

Floating position

In this the setpoint working depth is set to the max. working depth (item 10) on the control console **A004** .

The position and draft force actual values are not processed as controlled variables. The height of the lift arms is maintained by the self-supporting implement.

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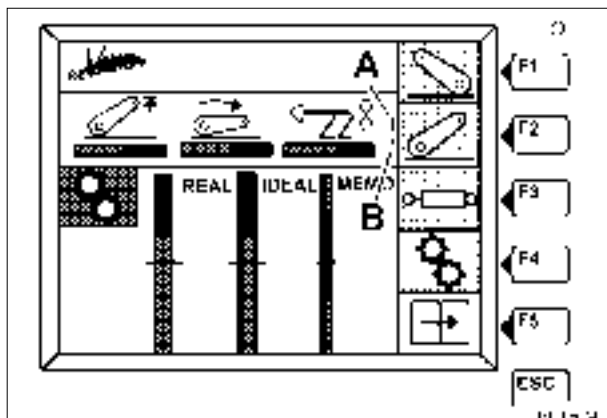
Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC

Operation and control conditions of EPC-C

A

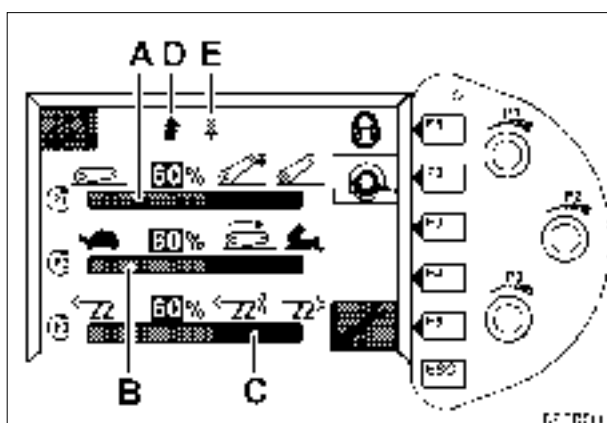
Electronic power lift control (EPC) settings



Press F2 to display rear EPC submenu.

A = power lift rises

B = power lift lowers



Current settings are shown by three bar displays (A, B, C).

Arrow symbols (D, E) are displayed when power lift is being raised or lowered.

Adjustments can be made using three rotary controls (P1, P2, P3).

Settings at Vario terminal A008

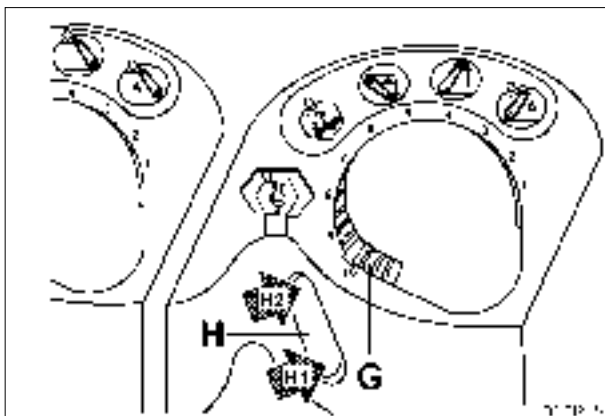
- A = **Lift height limit** (as % of maximum lift height)
- B = **Lowering speed** "lowering throttle valve" (as % of maximum lowering speed)
 100% setting ("Hare") = max. lowering speed
 0% setting ("Tortoise") = power lift does not lower
 Lowering speed is infinitely adjustable between these two positions.
- C = **Position/draft force hybrid control**
 0% corresponds to pure draft force control (e.g. plough)
 100% corresponds to pure position control (e.g. fertiliser distributor)
E.g. 60% setting means: 60% position control and 40% draft force control
- F1 = **Unlock lift control** (- or operate rapid lift control at control console A004 -)
Lock is automatically closed when external Raise / Lower S029 / S030 switches are operated.

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Power lift / Electrohydraulic control EPC
Operation and control conditions of EPC-C

A



Operation at control console A004

G = Setpoint / depth control (item 10 on setting scale = floating position)

H = Rapid lift control with transport lock

"Stop" mid-position = Electronic systems disabled (no correction)

End "Raise" position (H2) = Transport position with shock load damping for mounted implement

Go "Control" position (H1) = Lower or implement is moved to setpoint depth.



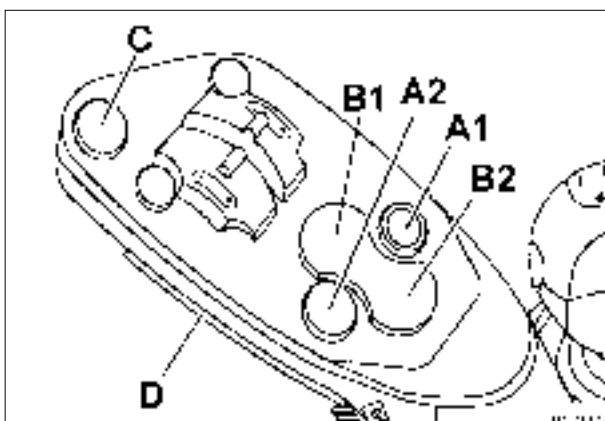
Rapid lowering system, power lift moves to floating position and then regulates to setpoint depth (e.g. plough at headland)



Hitch lift, locking of hitch



Rear power lift "Automatic" pressed, rapid lift control toggle switch is transferred to rear EPC rocker switch on joystick.



Operation at joystick A003

A1 / A2 = Front enhanced power lift switch (position control) (optional extra)

B1 = Go "Control" position = lower or implement is moved to setpoint depth.

B2 = End "Raise" position = raise rear power lift (as far as lift height limit "stop")

D = Activating control must be pressed when actuating rocker switch (B1 and B2) and switches A1 and A2 (front enhanced power lift, optional extra).

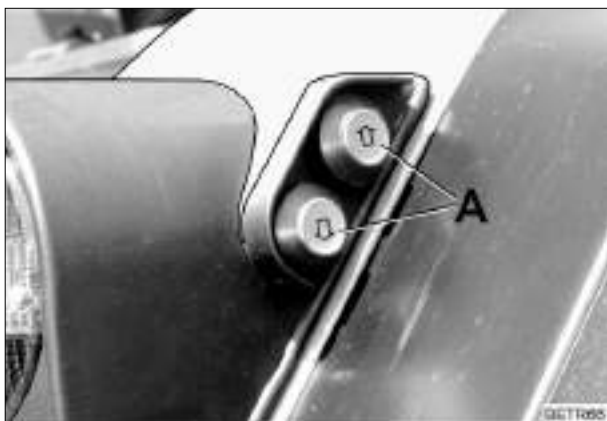
C = Stop key, lift assembly (front / rear) remains in current position.
(Emergency OFF)

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Operation and control conditions of EPC-C | A |
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Rear control of power lift

The power lift can be operated externally (without control system) using control **(S029 / S030)** on rear mudguard.

Lift is raised and lowered as long as control is pressed; this is used for mounting and detaching implements from the outside. The fail-safe circuit is then initiated, and the EPC-C must be re-activated when operated from inside the cab.



The pushbuttons on the right or left at the rear light cluster are used to raise or lower the lift.
The fail-safe circuit is initiated (power lift locks).
External operation is possible at any position of the rapid lift control.

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Power lift / Electrohydraulic control EPC
Operation and control conditions of EPC-C

A

Actuation by means of auxiliary control unit (EPC-DA switchover)

If the three-way valve **AV3 / AV4** is switched, the EPC ECU **A005** and the **EPC-C** control valve are disabled.

The rear power lift is operated via the auxiliary control unit 1.2 ("blue") in DA mode.

The rear power lift can be used to press (no control action).



Danger:

Lower all mounted implements at front and rear!

Before switching to DA mode, disconnect implements from auxiliary control unit 1.2 blue at rear connection and multi-coupling. Unintended movements of the implements, front loader and rear power lift could otherwise occur.

The tractor must be propped if the power lift is used for repair purposes (pressing mode) e.g. for changing a tyre!

Switching from EPC to DA

- Lower lift assembly (with implemented mounted).
- Switch crossgate lever to **floating position**.
- Switch lever to **DA** position (forwards)

Switching back from DA to EPC

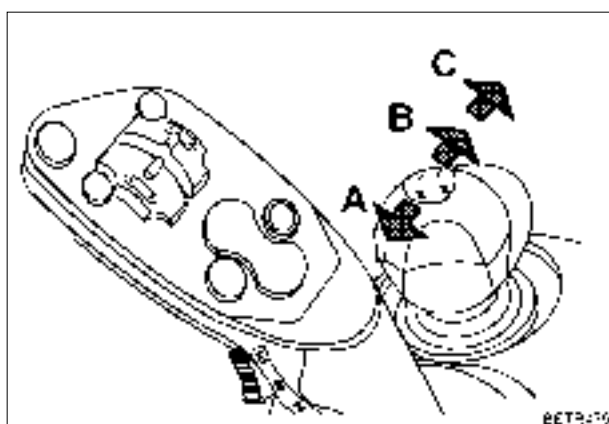
- Lower lift assembly completely.
- Switch crossgate lever to **floating position**.
- Switch lever to **EPC** position (backwards).
- Unlock EPC (operate rapid lift control).

Operating power lift in DA mode (auxiliary control unit 1.2 "blue")

- A = Raise
- B = Lower or Press
- C = Floating position

Note:

Ground-following implements may only be operated in floating position.



Note:

Rear power lift operation, see also tractor operating manual

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Power lift / Electrohydraulic control EPC
Operation and function of shock load damping system

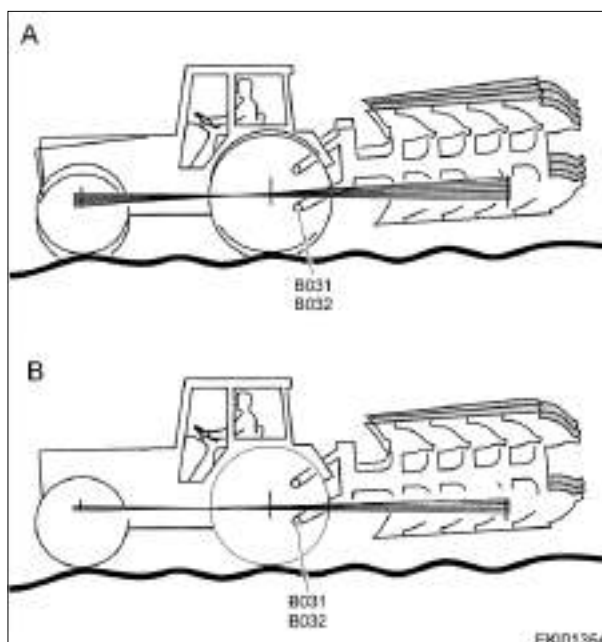
A

Functional description of shock load damping system

Pitching can be induced in tractors with heavy mounted implements by uneven tracks and roads. The draft-sensing pins (**B031 / B032**) are used to measure lower-link loads in order to reduce front-axle load changes when transporting heavy mounted implements and thus to increase steerability.

The draft-sensing pin signals are evaluated via the EPC ECU **A005**

The EPC ECU **A005** feeds electronic signals to the **EPC** controller. **The signals trigger a lowering motion which has a damping effect.**



A: without shock load damping

Front axle and implement oscillate.

B: with shock load damping

Damping lowering motions initiated by the draft-sensing pins (B031/B032) reduce the oscillations. Result: smooth roadability, safe driving

Benefits of shock load damping

- Pitching is reduced.
- Steerability increases (front wheels do not lift so easily).
- Travel speed can be increased.
- Ride comfort is improved.
- Dynamic loads are reduced.
- Stabilisation of the absolute lift height above ground

Note:

If the shock load damping system is faulty:

Check for clearance of mounted implement (note bottom link category).

If implement coupling is faulty, draft-sensing pins (B031/B032) feed incorrect signals to EPC ECU A005.

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When is shock load damping actuated?

Shock load damping is actuated if the following criteria are met:

The EPC must be unlocked (open lock in Vario terminal or operate rapid lift control on control console).

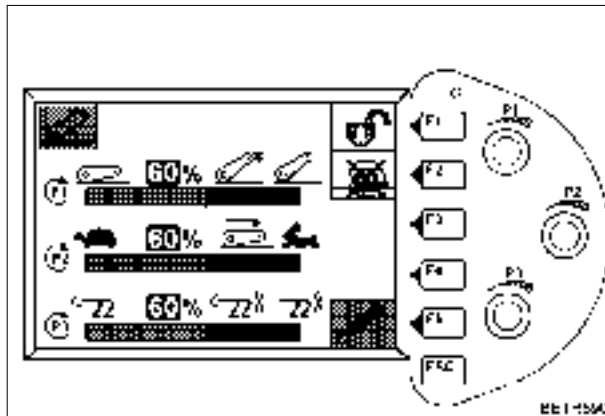
The **rapid lift control** on the control console must be in the **transport position** ("Raise" position).

The tractor must be driving faster than the **shock load damping actuation speed** (setting on Vario terminal A008).

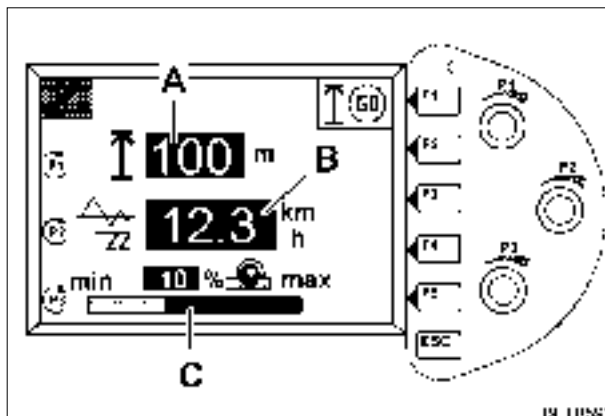
If the shock load damping actuation speed is exceeded, the lift assembly lowers by approx. 3% to the mean oscillation axis.

If the speed is 25% less than the shock load damping actuation speed, the lift assembly is raised by approx. 3%.

Adjusting the actuation speed for shock load damping



Press F5 and this submenu is displayed.



Use rotary control (P2) to set display (B) to desired actuation speed.

Adjustment range 0 - 30 km/h

A = Calibration of radar sensor A011 (see tractor operating manual)

C = Setpoint wheel slip for slip control of rear power lift (see tractor operating manual)

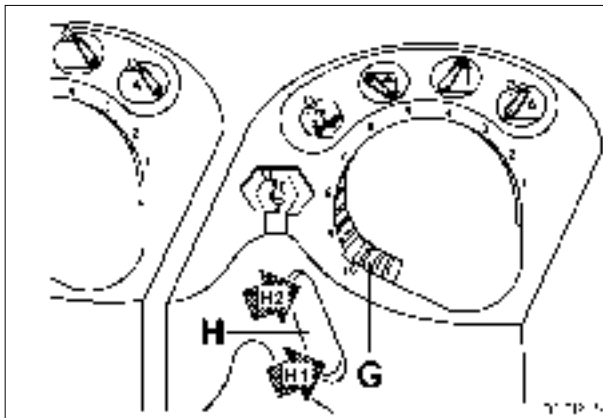
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Power lift / Electrohydraulic control EPC
Operation and function of shock load damping system

A

Driving on road (shock load damping and transport lock)



Operate rapid lift control (H) (lift assembly unlocked) and set to Raise position (H2).

Shock load damping is activated and is engaged if actuating speed is exceeded.

Set depth control (G) fully to right (position 0) (transport lock).

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Operation and function of electronic slip control

A

Functional description of electronic slip control (radar)

(Optional extra)



Caution:

The tractor is fitted with a radar sensor. Do not look into the radar sensor's radiation range (microwaves).

A relatively large degree of slip by the drive wheels is physically unavoidable if optimum use of the tractor's draft force is to be made in the field.

If, however, slip exceeds 25 - 30%, unacceptable disadvantages ensue.

In order to monitor slip, the **actual travel speed** is determined via a **radar sensor A011** and compared with the **bevel pinion speed sensor B015** (travel speed display).

The speed signals from the radar sensor **A011** and the bevel pinion speed sensor **B015** are processed in the EPC ECU **A005**.

Increasing slip acts on the EPC ECU A005 in just the same way as increasing draft force.

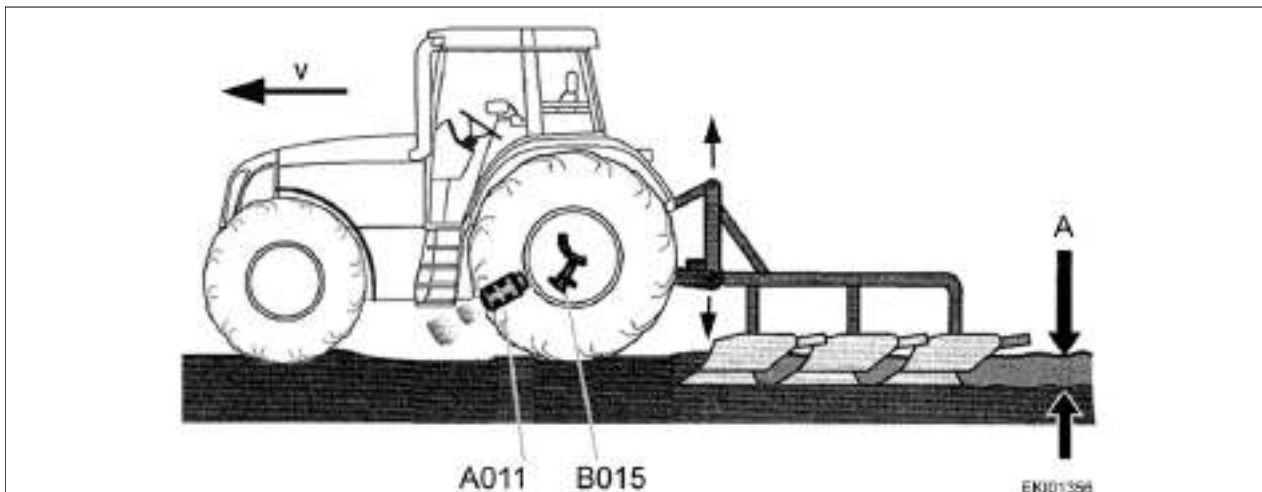
The rear power lift rises if slip increases and therefore reduces the draft force of the mounted implement by reducing the working depth.

Slip control offers the following benefits:

- Time and fuel inputs are reduced.
- Tyre wear is reduced.
- Soil impact is reduced.
- Demands on the driver are reduced.
- The chance of becoming stuck is avoided.

Wheel slip calculation formula (%)

Wheel slip % = (speed B015 - speed A011) / (speed B015) x 100%



A011 = Radar sensor

B015 = Bevel pinion speed sensor

A = Working depth

v = Travel speed

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Operation and function of electronic slip control

<https://www.truck-manuals.net/>

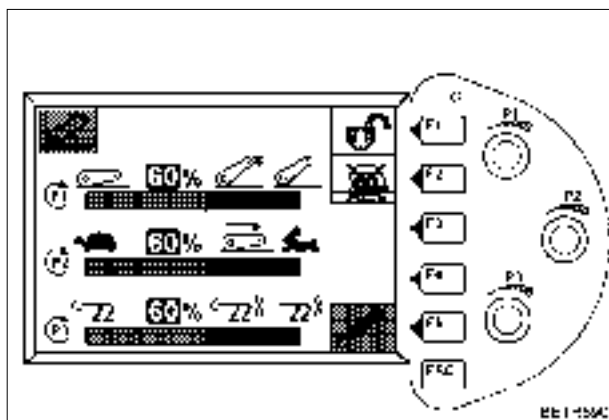
Farmer 400
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Power lift / Electrohydraulic control EPC

Operation and function of electronic slip control

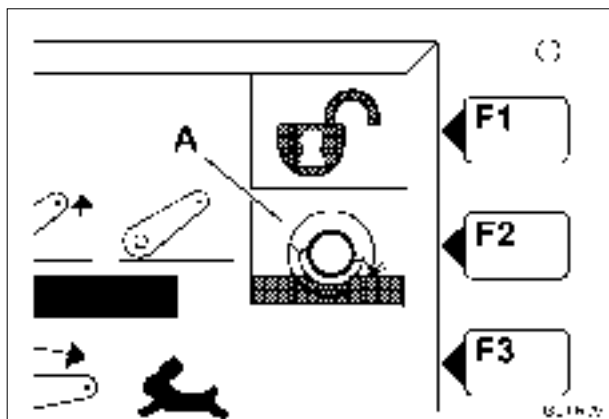
A

Electronic slip control settings



Switching electronic slip control on and off

Call up rear power lift submenu.

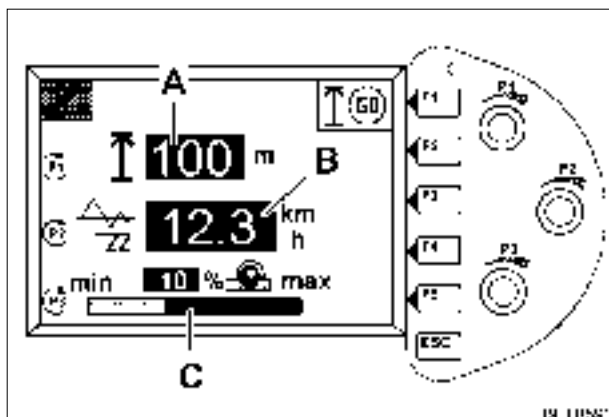


A = Electronic slip control is switched on and off by pressing F2.

Slip control remains activated as long as tractor is moving. If it is stationary for longer than 30 sec, slip control switches off automatically.

Press F2 again to reactivate slip control.

Slip control does not operate in floating position or position control mode.



Setting wheel slip

C = Use rotary control P3 to set display showing percentage wheel slip at which lift assembly is raised. **Setting range from 3% to 60% wheel slip**

A = Gauge length for radar sensor calibration

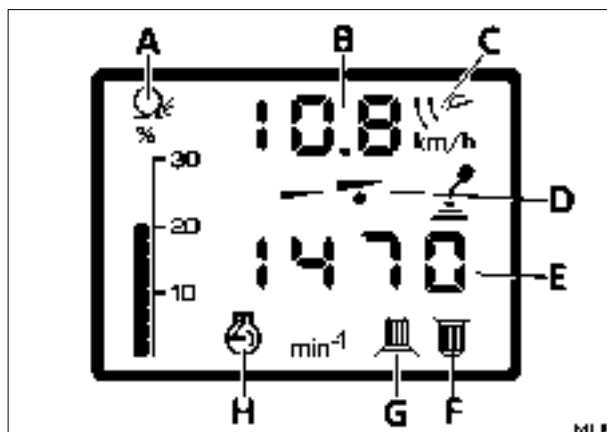
B = Shock load damping actuation speed (see Chapter 8610 Reg.A - Operation and function of shock load damping)

Farmer 400
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Fav 900

Power lift / Electrohydraulic control EPC

Operation and function of electronic slip control

A



A = Display: current slip (%)

B = Speed display in km/h

based on theoretical speed measurement from transmission speed, signal from bevel pinion speed sensor B015

based on actual speed measurement from signals from radar sensor A011, pictogram (C) is displayed. Above 15 km/h the system automatically switches to theoretical speed measurement. Slip display (A) and pictogram (C) disappear.

D = Display for speed range (I, II)

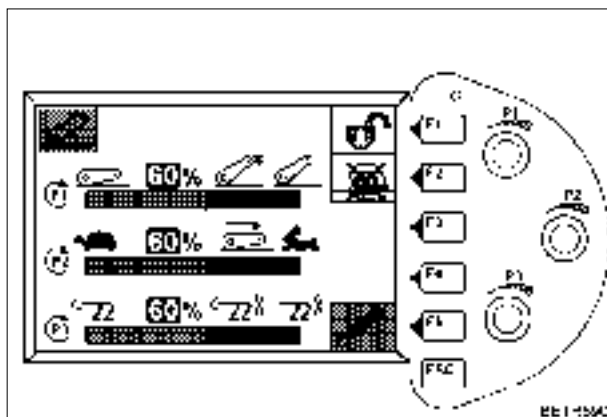
H, G, F = Preset display for engine, front PTO, rear PTO

E = Speed display (rpm) for engine, front PTO, rear PTO

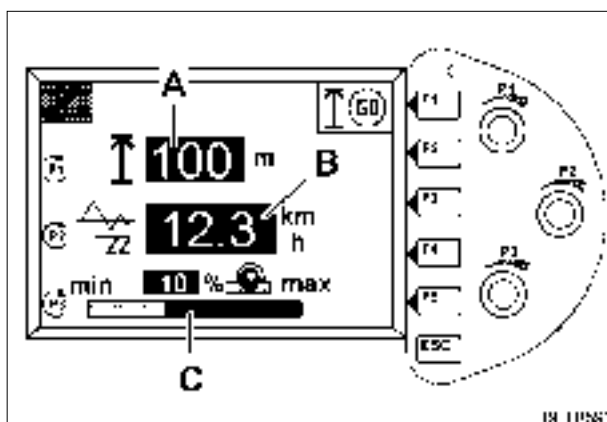
Calibrating radar sensor A011

Accurately measure and mark out gauge length of between 30 m and 100 m (e.g. 100).

Position tractor front wheel precisely on start mark.



Press F5 and this submenu is displayed.



A = Using rotary control (P) set display to measured distance (e.g. 100 m).

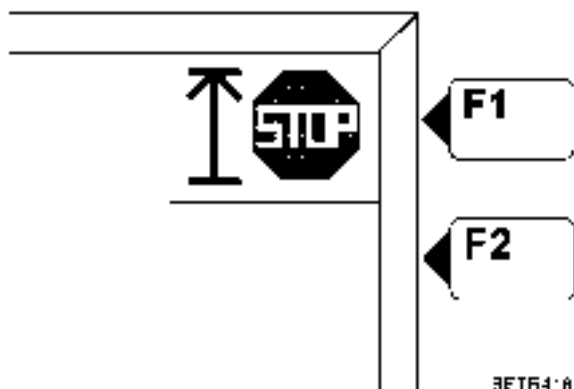
Press F1.

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Power lift / Electrohydraulic control EPC
Operation and function of electronic slip control

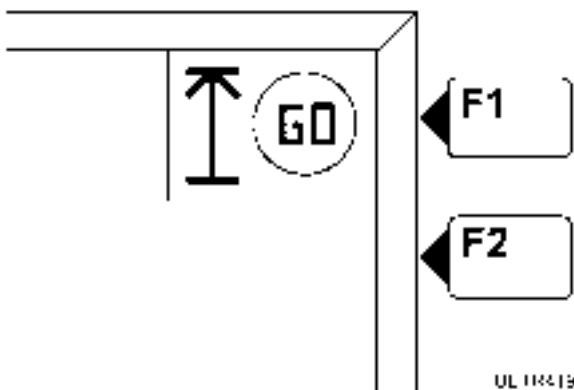
A

Display changes from "GO" to "STOP".

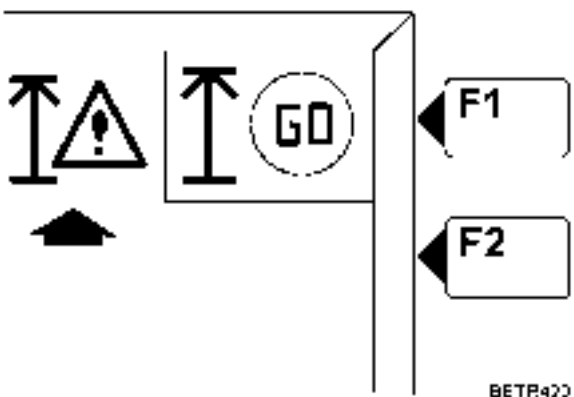


Pull away in tractor and stop with front wheel on end mark of gauge length.
 Press F1.

If instructions have been followed correctly, "GO" is displayed again.



If warning symbol (arrowed) is also displayed, calibration procedure must be repeated.
 Check whether input distance matches measured distance.
 Repeat calibration process.



Note:

"Wheel slip setting" and "Radar calibration" are always displayed on terminal A008.
 If no radar sensor A011 is connected, display is meaningless.

Note:

If radar sensor A011 is retrofitted, this must be input into end-of-line program (Fendias).

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| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Operation and function of electronic slip control | A |
|---|--|----------|

Radar sensor technical specifications

Two signals are needed to determine slip: one for the actual speed and one for the theoretical. A bevel pinion speed sensor B015 (Hall-effect sensor) is used to measure the theoretical speed.

A radar sensor A011 is used to measure the actual speed.

The radar sensor A011 works on the Doppler principle.

It supplies a pulse frequency which is proportional to the actual speed.

The pulse frequency depends on the mounting angle of the radar sensor A011 on the tractor.

On Fendt tractors the radar sensor A011 is mounted at an angle of 53° to the road surface.

With this mounting angle the radar sensor A011 has a pulse frequency of approx. 95 pulses/m.

The EPC ECU A005 converts the pulse frequency of 95 pulses/m to the standardised signal of 130 pulses/m and transmits it to the implement socket X007.



Photo shows Fav 700.

A011 = Radar sensor (optional extra)

| Technical specifications, radar sensor A011 | |
|--|----------------------|
| Supply voltage Ub15, fuse F048 in X051 | 12.0 VDC to 14.0 VDC |
| Speed range | 0.4 - 70 km/h |
| Accuracy | +/- 1% |
| Mounting angle | 53° to road surface |
| Transmission angle | 15° |
| Output signal | 95 +/- 10% pulses/m |
| Transmission frequency | 24.125 GHz |

Note:

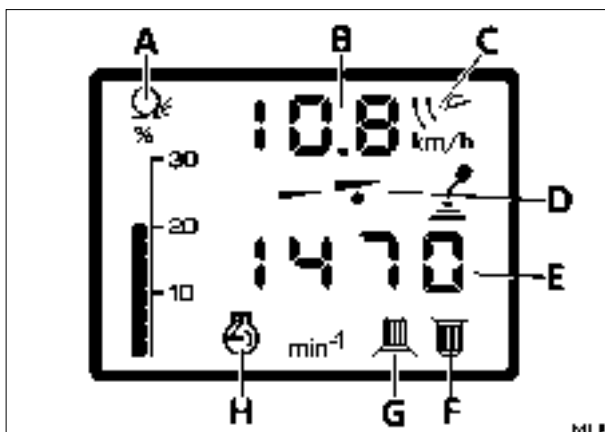
Chapter 9000 Reg.E - Measuring and testing radar sensor A011

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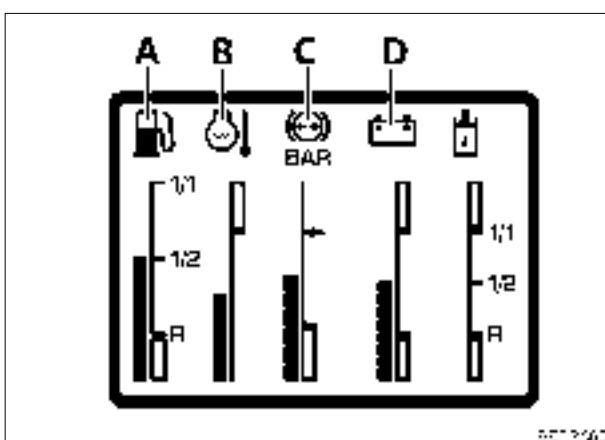
Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Activating LCD display for radar sensor A011 and compressed air

A



Display for radar sensor A011 (A)



Display for compressed air tank pressure (C)

If a radar sensor A011 or an air compressor is retrofitted, the LCD display on the instrument panel A007 must be activated.

- Activating LCD display with EOL program (with notebook).

Note:

EOL = end of line

or

- Activating LCD display in instrument panel A007

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Farmer 400
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Fav 900

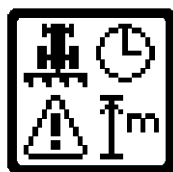
Power lift / Electrohydraulic control EPC
Activating LCD display for radar sensor A011 and compressed air

A

Activating LCD display in instrument panel A007



Ignition ON
Press key (BI).



EKI01626

Function selection is displayed.



EKI01628

Press 3 keys simultaneously.



EKI01627

Function selection is displayed.



EKI01621

Press one key until pictogram for radar sensor A011 flashes.



EKI01622

Press key.
Pictogram changes from 0 to I.
I => display for radar sensor A011 is activated.



EKI01623

Press key
LCD display is active, and time and operating hours are shown on multi-display.

Note:

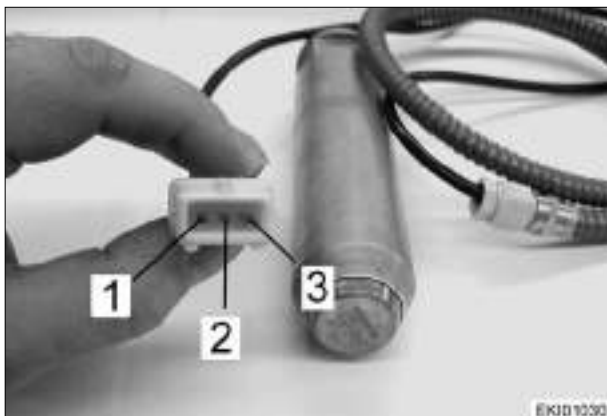
Activate display for compressed air tank pressure in same manner.

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| 18.06.2001 | a | 2/2 | Activating LCD display for radar sensor A011 and compressed air | 8610 | A | 000007 |

Farmer 400
Fav 700
Fav 900

Power lift / EPC electrohydraulic power lift control
B031/B032 - draft-sensing pin, functional description

A



B031 / B032 - draft-sensing pin

The draft-sensing pin is in the form of the bearing pin for the bottom links which can electrically detect the forces in a given direction at the articulation point.

A transformer is mounted in a bore in the pin symmetrically to the shear plane of the bearing points to measure the shear forces acting on the pin. Together with the pin enclosing it, this transformer forms a magnetic circuit.

The draft-sensing pin B031/B032 is fed with a 9.5 VDC supply voltage at contacts 1 (-) 3 (+).

The supply voltage is converted into an alternating voltage in draft-sensing pin B031/B032.

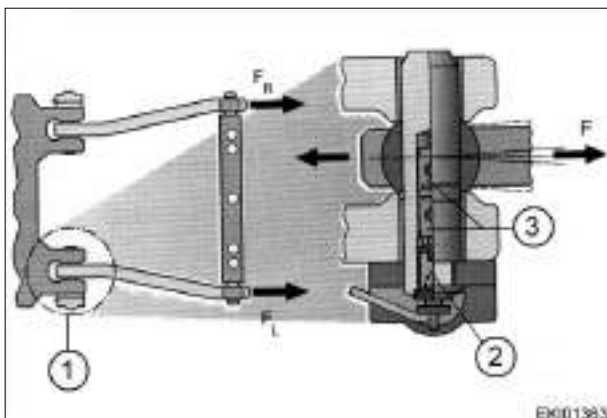
If draft-sensing pin B031/B032 is subjected to a shear load by tensile and compressive forces between the bearing points, the pin's magnetic properties change.

As a result of this change, the voltage at the signal line changes, contact 2.

When not subjected to a load (neutral) there is a voltage of approx. 4.75 VDC at the signal line.

This changes when there is a load.

The change is proportional to the load F and is a function of the direction. Account must be taken of the installation position.



Tensile and compressive forces F on draft-sensing pin B031/B032

F = Tensile or compressive force

FR = Forces acting on right bottom link

FL = Forces acting on left bottom link

1 = Bottom link bearing

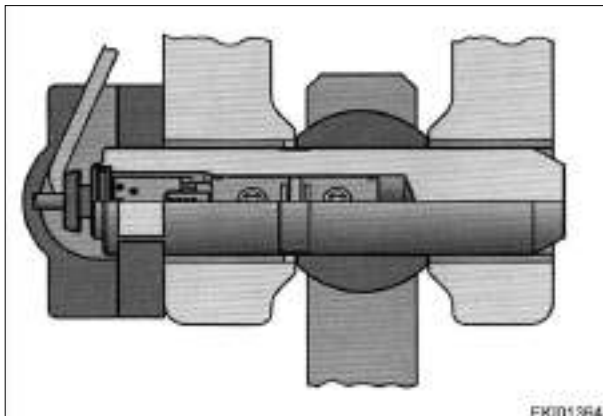
2 = Integrated electronics

3 = Coils, transformer

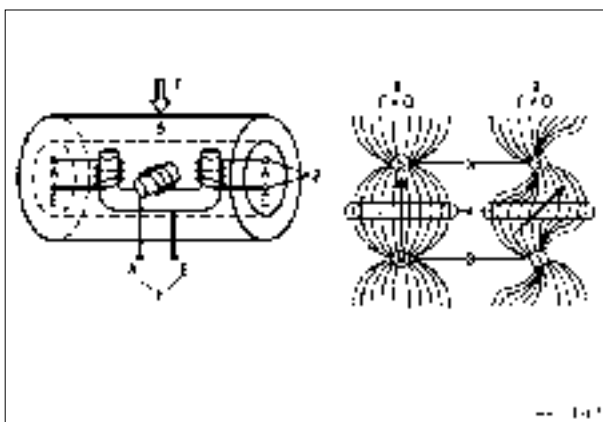
Farmer 400
Fav 700
Fav 900

Power lift / EPC electrohydraulic power lift control
B031/B032 - draft-sensing pin, functional description

A



Design of draft-sensing pin B031/B032



Operating principle of draft-sensing pin B031/B032

- 1 = Primary coil
- 2 = Secondary coil
- 3 = Primary pole face
- 4 = Secondary pole face
- 5 = Steel sleeve
- F = Tensile or compressive force
- a = Symmetrical magnetic field
- B = Asymmetrical magnetic field

Technical specifications of draft-sensing pin B031/B032

| | |
|----------------------------|-------------------|
| Supply voltage | 9.5 VDC |
| Signal: | |
| Tensile / compressive load | 2.5 VDC / 7.5 VDC |
| Neutral | 4.7 VDC |
| Rated load | |
| Farmer 400 | 60 kN (6.0 t) |
| Fav. 700 | 90 kN (9.0 t) |
| Fav. 900 | 90 kN (9.0 t) |
| Overload limit | 120 kN (12 t) |

Farmer 400
Fav 700
Fav 900

Power lift / EPC electrohydraulic power lift control
B030 - position sensor, functional description

A



B030 - position sensor

The role of the inductive position sensor B030 is to record angular information.

The mechanical angular information is transmitted via a shaft to the rotor which is made of magnetically soft material.

The induction in the two spools changes as a function of the angular position, because of the eccentricity of the rotor.

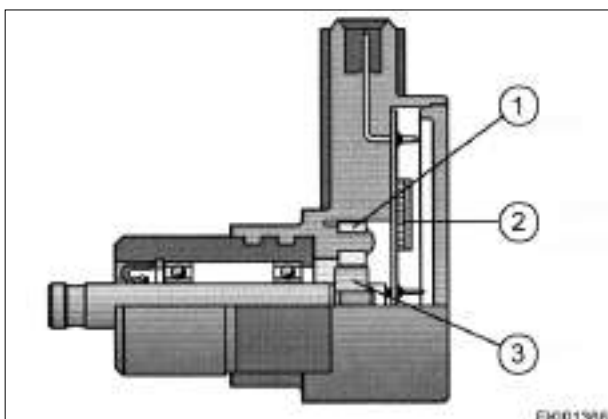
The position sensor B030 works on the inductive voltage divider principle.

An integral electronic system generates an alternating voltage to supply the inductive voltage divider.

The output signal is demodulated (rectified) in turn and is then available as a voltage signal for further processing in the EPC e-box A005.

Features of position sensor B030

- Inductive position sensor measuring element
- Shaft can be rotated mechanically.
- Integrated electronics with temperature compensation
- Output angle proportional to angle
- Neutral point and sensitivity calibrated.



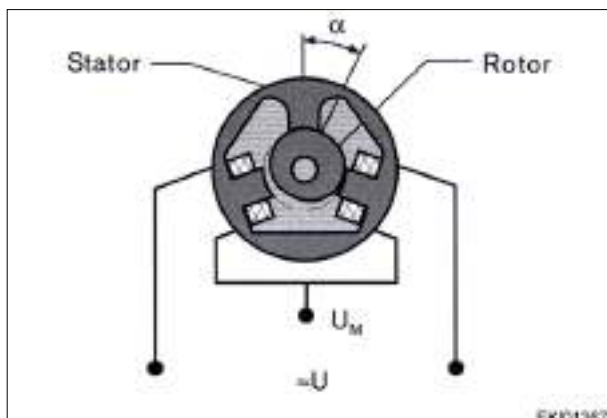
Design of position sensor B030

- 1 = Stator
- 2 = Integrated electronics
- 3 = Rotor (eccentric)

Farmer 400
Fav 700
Fav 900

Power lift / EPC electrohydraulic power lift control
B030 - position sensor, functional description

A



alpha = Rotational angle

U = + supply

U_M = Signal voltage

Technical specifications for position sensor B030

| | |
|-----------------------------------|-----------------|
| Supply voltage | 9.5 VDC |
| Signal: | |
| Lift assembly lowered | approx. 2.3 VDC |
| Lift assembly raised | approx. 7.4 VDC |
| Standard route of position sensor | +/- 40° |



Note:

When installed, the notch (arrowed) in the actuating shaft points to the electrical connection.

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / EPC electrohydraulic power lift control A005 - EPC e-box, functional description | A |
|---|---|----------|

**A005 - EPC e-box**

The EPC's "brain" is the EPC e-box - A005.

The EPC e-box - A005 compares the target values (depth control, lift height, lowering speed, transport position and power lift control) **with the actual values** (position sensor B030, draft-sensing pin B031/B032, external position sensor).

The EPC e-box - A005 provides power for the "Lift" solenoid valve Y021 and the "Lower" solenoid valve Y022 of control valve EHR 23 - LS.

In the slip control system (optional extra) the EPC e-box - A005 compares the transmission speed signal (speed sensor B015) with the radar speed signal (A011). In the event of a difference between the two signals, the EPV e-box - A005 takes responsibility for slip control.

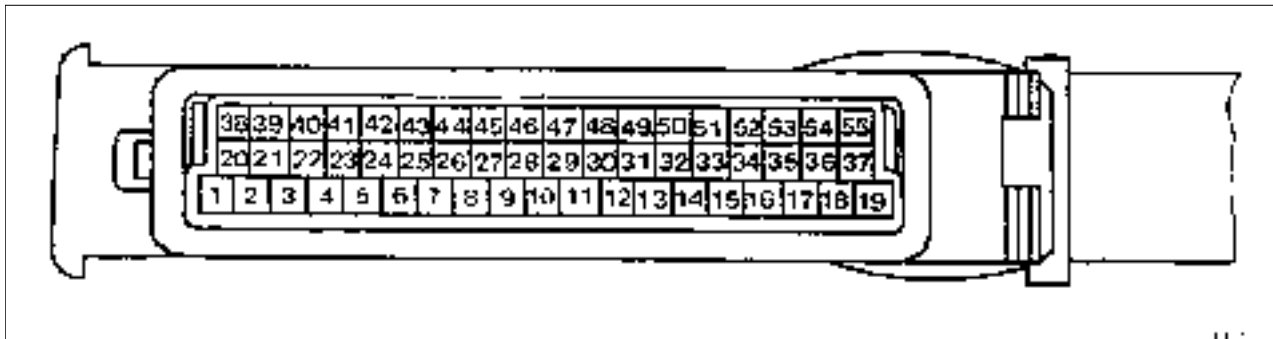
The EPC e-box - A005 receives a speed signal (pin 23) from the radar sensor A011. This signal is converted into a standardised signal and transmitted to the **implement socket X007** via pin 17.

Technical specifications of EPC e-box - A005

| | |
|-----------------------------|----------------|
| Operating voltage (battery) | 12 -15 VDC |
| Power consumption: | |
| Lift assembly at rest | Approx. 0.2 A |
| Lift assembly in motion | Max. 3.8 A |
| Ambient temperature | -30°C to +65°C |

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| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / EPC electrohydraulic power lift control A005 - EPC e-box, functional description | A |
|---|--|----------|

Pin assignment for EPC e-box - A005**Plan view of handle recess (plug)**

| | | | |
|----|--|----|---|
| 1 | Depth control earth | 29 | Not assigned |
| 2 | Depth control supply | 30 | Not assigned |
| 3 | Not assigned | 31 | Signal from right "Lift" button S027 |
| 4 | Not assigned | 32 | Not assigned |
| 5 | Not assigned | 33 | K-bus |
| 6 | UB 15 EPC e-box A005 | 34 | Not assigned |
| 7 | Position sensor B030 signal | 35 | Not assigned |
| 8 | Depth control signal | 36 | Not assigned |
| 9 | EPC e-box earth A005 | 37 | Not assigned |
| 10 | UB 30 EPC e-box A005 | 38 | Draft-sensing pin B031/B032 earth |
| 11 | Not assigned | 39 | Supply for position sensor B030 and external sensor at X015 |
| 12 | EPC-DA solenoid switch | 40 | Draft-sensing pin B031/B032 supply |
| 13 | Signal to implement socket GSD X007 and at instrument panel A007 | 41 | Not assigned |
| 14 | K-bus | 42 | Not assigned |
| 15 | Not assigned | 43 | Draft-sensing pin B032 signal |
| 16 | Not assigned | 44 | Not assigned |
| 17 | Actual travel speed (radar) at GSD X007 | 45 | EPC e-box earth A005 |
| 18 | Not assigned | 46 | Not assigned |
| 19 | "Lower" solenoid valve (EPC control valve) Y022 | 47 | UB 30 at EPC e-box A005 |
| 20 | Earth for position sensor B030 and for external control sensor | 48 | External sensor signal at X015 (electrohydraulic remote control) |
| 21 | Not assigned | 49 | Not assigned |
| 22 | Not assigned | 50 | Signal from left "Lower" button S030 |
| 23 | Radar sensor A011 signal at EPC e-box A005 and instrument panel A007 | 51 | Signal from right "Lower" button S028 |
| 24 | Not assigned | 52 | Signal from left "Lift" button S029 |
| 25 | Right draft-sensing pin signal B031 | 53 | Earth for "Lift" and "Lower" solenoid valves at control valves Y021, Y022 |
| 26 | Not assigned | 54 | Not assigned |
| 27 | Not assigned | 55 | "Lift" solenoid valve (EPC control valve) Y021 |
| 28 | Supply to external lift buttons S027, S028, S029, S030 | | |

Note:

For electrical readings at contacts please see Chapter 9000 Index E - Measuring and testing

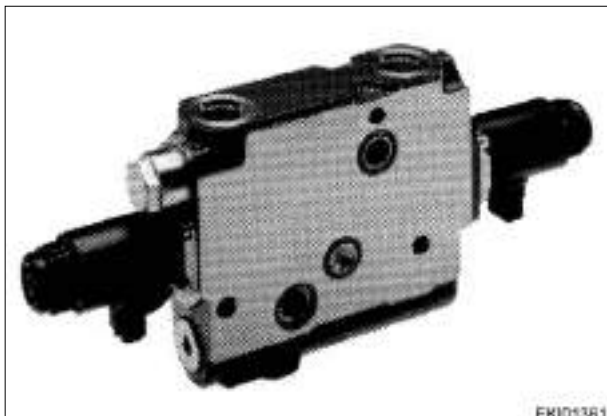
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Farmer 400
Fav 700
Fav 900

Power lift / EPC electrohydraulic power lift control
Control valve EHR 23 - LS

A

Control valve EHR 23 - LS, functional description



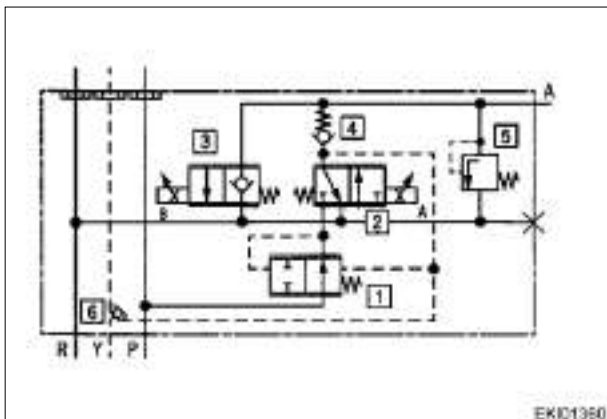
Control valve EHR 23 - LS

The valve has been designed in disc mode so that it can be incorporated in series SB 23 LS directional control valve units.

The control valve is the actuating element in the closed-loop control circuit and therefore the link between the hydraulics and electrics/electronics.

It consists of one main valve and two flange-mounted proportional magnets.

The control valve has 3 switching statuses which are assigned to the functions "Neutral", "Lift" and "Lower". The control valve's proportional magnets ensure that the coil current is transformed into a proportional oil flow, thereby generating a lifting or lowering speed which is proportional to the system deviation.



Control valve EHR 23 - LS (hydr. circuit diagram)

| | | | |
|---|--|---|---|
| 1 | 3-way pressure governor | A | To hydraulic cylinder |
| 2 | 3/2 proportional directional control valve, "Lift" | R | To return flow |
| 3 | Proportional throttle valve, "Lower" | P | From variable-displacement pump PR |
| 4 | Non-return valve | Y | Control connection for variable-displacement pump (LS line) |
| 5 | Secondary pressure-relief valve | | |
| 6 | "LS pressure" shuttle valve | | |

| Date | Version | Page | Control valve EHR 23 - LS | Capitel | Index | Docu-No. |
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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / EPC electrohydraulic power lift control Control valve EHR 23 - LS | A |
|---|---|----------|

Description of control valve (hydr. circuit diagram)

The control EHR valve 23 - LS is divided into three sections:

Section (1) is a 3-way pressure governor for:

neutral operation

and load compensation (3-way flow controller in "Lift" direction).

Load compensation means: The proportional magnet (A) deflects the valve slide (2). The slide deflection is a measure of the flow rate. If the load-sensing pressure (LS pressure) now rises, the variable-displacement pump PR is deflected further, and the working pressure increases.

The 3-way pressure governor (1) maintains the valve's flow rate at a constant level, irrespective of the working pressure.

Section (2) is a 3/2 proportional directional control valve:

for controlling the "Lift" function.

Section (3) is a proportional throttle valve in the form of a control valve:

for controlling the "Lower" function.

Non-return valve (4):

disconnects the Lift and Lower valve.

Secondary pressure-relief valve (5):

to protect the consumer against overload (max. pressure = 230 +19 bar).

Shuttle valve (6):

to pick up the respective maximum load-sensing pressure of the consumers and to transmit it to the LS terminal plate.

Technical specifications of control valve EHR - 23 - LS

| Technical specifications | EPC C |
|--|--|
| Rated flow | 80 l/min |
| Max. permissible pressure, ducts Y and P | 250 bar |
| Max. permissible pressure, duct R | 30 bar, though less than load-sensing pressure |
| Control principle | Load-sensing (LS pressure) |
| Voltage | 12 VDC |
| Actuation system | Electromagnetically controlled |
| Set pressure | 230 +19 bar |

Note:

EPC control valve for Fav 700 and Fav 900 with control-pressure bore for electrohydraulic control valve.

EPC control valve for Farmer 400 without control-pressure bore for electrohydraulic control valve.

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / EPC electrohydraulic power lift control Power lift and service hydraulics (hydraulic section) troubleshooting table | B |
|---|---|----------|

| Power lift and service hydraulics (hydraulic section) troubleshooting table | | |
|---|---|--|
| Fault | Cause | Remedy |
| 1. Power lift switched to DA auxiliary control unit. Power lift does not lift and lower. | 1. No or too little oil in hydraulic tank | 1. Check oil level / top up. |
| 2. Power lift switched to EPC. Operate control valve manually, power lift does not lift and lower. | 2. Fault in control valve. | 2. Replace control valve. |
| 3. Power lift switched to EPC. Operate control valve manually. Power lift lifts and lowers. However, cannot be operated electrically/ electronically. | 3. Fault in electrics / electronics | 3. See Faults in electrical / electronic systems, Chapter 8610 Index B |
| 4. Power lift and/or external cylinder, e.g. front loader, lifts too little when hydraulic oil is warm | 4a. Min. hydraulic pressure of 200 bar is not being reached. Measure pressure. | 4a. Check pressure-relief valve DBV-A. Setpoint: 230 bar |
| | 4b. Fault in LS pump PR. | 4b. Test LS pump PR with flow-rate meter. Replace LS pump PR if necessary. |
| | 4c. Mounted implement too heavy. | 4c. Connect mounted implement differently. If necessary, mount lighter implement. |
| 5. Power lift does not go to end shutoff | 5a. No overtravel at lift arms | 5a. Set power lift end shutoff. Chapter 8610 Index F |
| | 5b. Position sensor B030 gives incorrect signal values | 5b. Position sensor B030, Measuring and testing - Chapter 9000 Index E |
| | 5c. Mounted implement non-standard (too wide), or category not correctly set, or implement too heavy. | 5c. Adapt mounted implement to standard, set category in line with standard, reduce implement weight. |
| 6. Power lift lowers load a little and then lifts it again (approx. every 20 sec). | 6a. Internal leak in lift cylinder. | 6a. Seal pressure pipe at lift cylinder and subject lift assembly to load. - If lift assembly lowers, replace lift cylinder, seal lift cylinder. |
| | 6b. Internal leak in control valve. | 6b. Seal pressure pipes at lift cylinder and subject lift assembly to load. - If lift assembly does not lower, replace control valve. |
| 7. Hydraulic oil becomes too warm | 7. Oil flow setting at relevant auxiliary control unit too high | 7. Check oil flow setting. |
| 8. Power lift lowers and lifts in floating position setting | 8. Mounted implement | 8. Mounted implement not in accordance with correct standard. Check mounted implement for lateral clearance. |

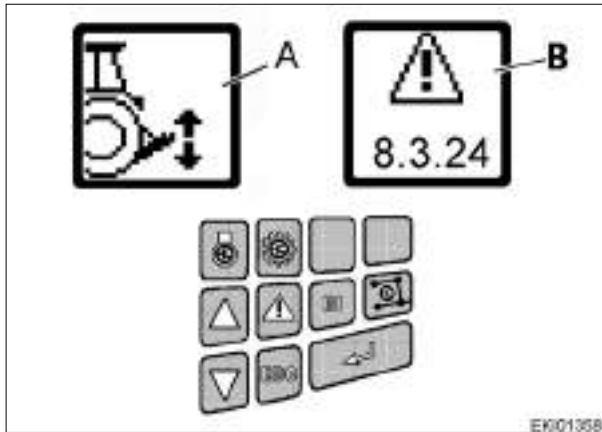
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| 17.04.2001 | a | 1/1 | Power lift and service hydraulics (hydraulic section) troubleshooting table 8610 | B | 000001 |

Farmer 400
Fav 700
Fav 900

Power lift / EPC electrohydraulic power lift control
Faults in electrical/electronic systems

B

EPC - C fault warning



In event of faults in EPC - C, "rear power lift" pictogram (A) appears on multi-display, and warning light also flashes.



Press key, relevant fault code (B) is displayed, i.e. rear power lift fault code (see fault code table - Chapter 0000 Index B)

Clear fault warning.

Clearing a fault warning does not eliminate fault, it is merely no longer displayed.



Press key and hold



then press key ---> displayed fault code is no longer displayed.

Note:

Each current fault warning must be individually confirmed.

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / EPC electrohydraulic power lift control Faults in electrical/electronic systems | B |
|---|---|----------|

Apart from EPC faults, the EPC e-box A005 also detects faults in the control console A004 (EPC control module) and joystick A003 (automatic operation). These faults are displayed on the instrument panel A007.

If such a fault occurs, the EPC - C goes to "STOP" and halts automatic operation.



EPC control module on the control console A004. The control console A004 is connected to the EPC e-box A005 via the K-bus.



Automatic operation of the rear power lift via the joystick A003. The joystick A003 is connected to the ECU A002. The ECU A002 is connected to the EPC e-box A005 via the K-bus.

Note:

See also electronics concept for Vario 700 - Chapter 9700 Index A

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Farmer 400
Fav 700
Fav 900

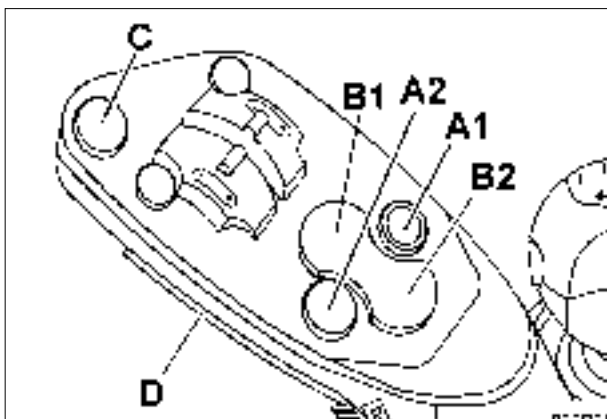
Power lift / EPC electrohydraulic power lift control
Faults in electrical/electronic systems

B

Effects of faults: buttons for automatic operation

After fault warnings from following buttons,

EPC - automatic (control console)



C = Lift assembly stop button (front/rear)

B1 = Position: GO, "Regulate"

B2 = Position: end, "Lift"

A1 , A2 , D = no fault detection by EPC e-box
 A005

it is only possible to return to automatic operation once EPC e-box A005 has received fault-free message from relevant button.

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / EPC electrohydraulic power lift control Faults in electrical/electronic systems | B |
|---|---|----------|

Fault classification by EPC e-box A005

| Diagnostics function in EPC e-box A005 | | |
|--|---|---------------------|
| | Detect fault | |
| | | |
| | Store fault | |
| | | |
| | Fault weighting | |
| Serious faults | Intermediate faults | Minor faults |
| - control stops - restart only possible via ignition switch | - control stops - restart by unlocking systems | - control continues |

| Serious faults at EPC e-box A005 | | | |
|---|------------------------------------|------------------------|---|
| Fault code | Brief description | Pin no. on A005 | Possible cause of fault |
| 8.3.11 | EPC e-box A005, "Lift" output | 55 | - +supply short-circuit - earth short-circuit - solenoid Y021 short-circuit - cable break in solenoid lead or fault in solenoid - fault in EPC e-box A005 |
| 8.3.12 | EPC e-box A005, "Lower" output | 19 | - +supply short-circuit - earth short-circuit - solenoid short-circuit - cable break in solenoid lead or fault in solenoid - fault in EPC e-box A005 |
| 8.3.14 | External left "Raise" button S029 | 52 | - +supply short-circuit - earth short-circuit (only for button operation) - earth short-circuit at pin 28 |
| 8.3.15 | External left "Lower" button S030 | 50 | - +supply short-circuit - earth short-circuit (only for button operation) - earth short-circuit at pin 28 |
| 8.3.16 | UB 9.5 VDC | 2, 39, 40 | - UB 9.5 VDC less than 1 VDC |
| 8.3.17 | +UB 30 battery voltage | 10, 47 | - UB 30 greater than 18 VDC |
| 8.3.18 | External right "Lift" button S027 | 31 | - +supply short-circuit - earth short-circuit (only for button operation) - earth short-circuit at pin 28 |
| 8.3.19 | External right "Lower" button S028 | 51 | - +supply short-circuit - earth short-circuit (only for button operation) - earth short-circuit at pin 28 |

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / EPC electrohydraulic power lift control Faults in electrical/electronic systems | B |
|---|---|----------|

| Intermediate faults at EPC e-box A005 | | | |
|---------------------------------------|---------------------------------------|-----------------|---|
| Fault code | Brief description | Pin no. on A005 | Possible cause of fault |
| 8.3.22 | Position sensor B030 | 7 | - +supply short-circuit - earth short-circuit - +supply cable break - earth cable break - signal line cable break |
| 8.3.23 | EPC depth control | 8 | - +supply short-circuit - earth short-circuit - earth cable break - signal line cable break |
| 8.3.26 | External sensor (external controller) | 48 | - +supply short-circuit - earth cable break |

Note on diagnostics for external sensor (see also Chapter 8618)

The EPC - C switches to electrohydraulic remote control when a proper external sensor signal is detected. If the sensor is missing, the electrohydraulic remote control is switched off. Absence of an external sensor is a normal operating scenario. Because there is no "Electrohydraulic remote control" switch position, the EPC - C does not know when it may diagnose or indicate the absence of the external sensor. For this reason comprehensive external sensor diagnostics is not possible.

Every time the external sensor is connected or disconnected, or in the case of a fault which has the same effect, the EPC - C locks.

| Minor faults at EPC e-box A005 | | | |
|--------------------------------|------------------------------|-----------------|---|
| Fault code | Brief description | Pin no. on A005 | Possible cause of fault |
| 8.3.31 | Right draft-sensing pin B031 | 25 | - +supply short-circuit - earth short-circuit - +supply cable break - earth cable break - signal line cable break |
| 8.3.32 | Left draft-sensing pin B032 | 43 | - +supply short-circuit - earth short-circuit - +supply cable break - earth cable break - signal line cable break |
| 8.3.33 | UB 30 battery voltage | 10, 47 | UB 30 less than 11.2 VDC |

Note on diagnostics for draft-sensing pins B031 / B032

In the event of a draft-sensing pin B031 / B032 failing, the current signal value is frozen after the response time to prevent unwanted upward/downward movements, e.g. because of a loose contact. The relevant movement is therefore only possible to a limited extent or not at all.

Note:

See also

Chapter 0000 Index B - Fault code table for Vario tractors

Chapter 9000 Index E - A005 - EPC box

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| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Rear power lift troubleshooting flowchart | B |
|---|--|----------|

Cause:**Rear power lift cannot be raised or lowered.****Jerky motion when rear power lift is raised or lowered.**

| | | | | |
|--|-----|--|----|--|
| | | EPC/DA switchover | No | Switch to EPC |
| | | Yes | | |
| | | | | |
| | | | | |
| Correct settings in terminal A008 | Yes | Correct settings in terminal A008 (lowering throttle valve). | | |
| | | No | | |
| | | | | |
| | | | | |
| | | Operate EPC control valve manually. | | |
| | | | | |
| | | | | |
| | | Rear power lift OK | No | Three-point linkage: Check cat. 2, cat. 3 setting. Sluggish movement in lift cylinder. Hydraulics: Check oil level. Internal leak in hydraulic cylinder. EPC control valve defective |
| | | Yes | | |
| | | | | |
| | | Check pin 12, EPC-DA switchover at EPC ECU A005. | | |
| | | Note: switch S048 open (0VDC) = EPC ON switch S048 closed (+UB) = EPC OFF Check + supply, power consumption and resistance at solenoid valve Y021/Y022 (Chapter 9000 Reg. E) | | |
| | | | | |
| | | | | |
| EPC/DA solenoid switch S048 does not open. | No | Electrical reading OK | | |
| | | Yes | | |
| | | | | |
| | | | | |
| + supply from EPC ECU A005 Raise, pin 55; Lower, pin 19; earth, pin 53 Short-circuit in solenoid Y021/Y022 Break in cable | | Calibrate position sensor B030 (Chapter 0000 Reg.A) Check position sensor B030 (Chapter 9000 Reg.A) | | |

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| | | |
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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Rear power lift troubleshooting flowchart | B |
|---|--|----------|

| | | |
|--|--|--|
| | Draft-sensing pin B031/B032 (Chapter 9000 Reg. E) | |
| | Electrical reading OK | No |
| | Yes | +supply and earth from EPC ECU A005 (if draft- sensing pins B031/B032 are overloaded, A005 shuts down) |
| | Check EPC ECU A005. (Chapter 9000 Reg. E and Chapter 8610 Reg. E) Depth control signal (pin 8) defective, (signal comes from control con- sole A004) (Chapter 9000 Reg. E and Chapter 8610 Reg. E) Rapid lift control on con- trol console A004 defec- tive. (Signal comes from control console A004 and runs via K-bus to EPC ECU A005.) Note: Arrows in terminal A008 are shown when ra- pid lift control switch si- gnal is correct. | Break in cable |
| | Electrical reading OK | |
| | No | |
| | Check K-bus (Chapter 9000 Reg. E) | |

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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Rear power lift troubleshooting flowchart | B |
|---|--|----------|

Note:

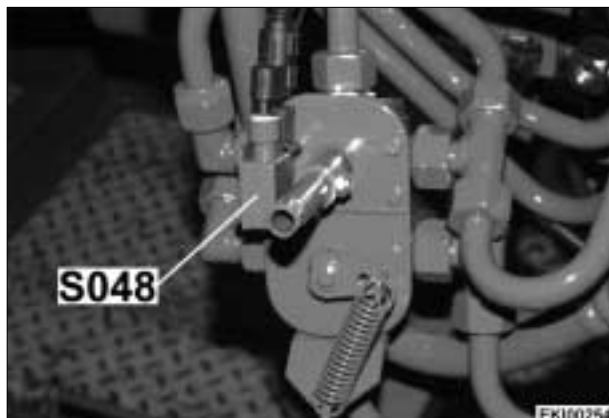
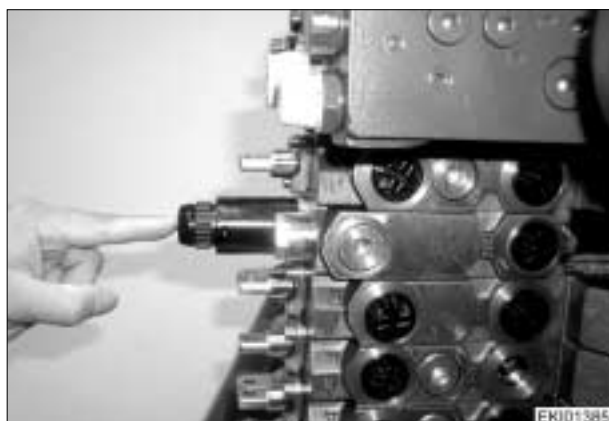
Electric circuit diagrams.

Farmer 400, Fav 700

Chapter 9000 Reg. C - Electrohydraulic power lift control - Sheet 22

Fav 900 chassis number 23/3001 and up

Chapter 9000 Reg. C - Electrohydraulic power lift control - Sheet 23

**S048** = EPC/DA switchover solenoid switch

Operate EPC control valve manually.

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| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Faults in slip control (radar A011) | B |
|---|--|----------|

| Slip control troubleshooting table | | |
|-------------------------------------|---|---|
| Fault | Cause | Remedy |
| Slip control switches off by itself | Not a fault: automatic shutdown after tractor is stationary for more than 30 sec | Activating slip control, Chapter 8610 Reg.A |
| Displayed speed is incorrect | Tractor's longitudinal tilt has changed following tyre change. In other words, nominal mounting angle of radar sensor A011 has changed. | Calibrating radar sensor A011; Chapter 8610 Reg.A |
| | Configuration of radar sensor A01, i.e. mounting angle has changed. | Check attachment, calibrate radar sensor A011. |
| | Scanning area is too smooth / too even (e.g. water) | |

Note:

The radar sensor A011 is not monitored, i.e. there is no fault code display on the instrument panel A007.



Photo shows Fav 700.

A011 = Radar sensor

| Technical specifications and settings for radar sensor A011 | | |
|---|----------------------------|---|
| Mounting angle | 53 degrees to road surface | Necessary for correct reflection |
| Transmission angle | 15 degrees | There must not be any other components within this transmission angle |
| + supply | 12 VDC to 14 VDC | Fuse F048 in X051 |
| | Working range 9 - 16 VDC | |
| Power consumption | approx. 0.5 A | |

Note:

See also:

Chapter 8610 Reg. A - EPC-C rear power lift

Chapter 8610 Reg. A - Operation and function of electronic slip control

Chapter 9000 Reg. E - A005 - EPC ECU

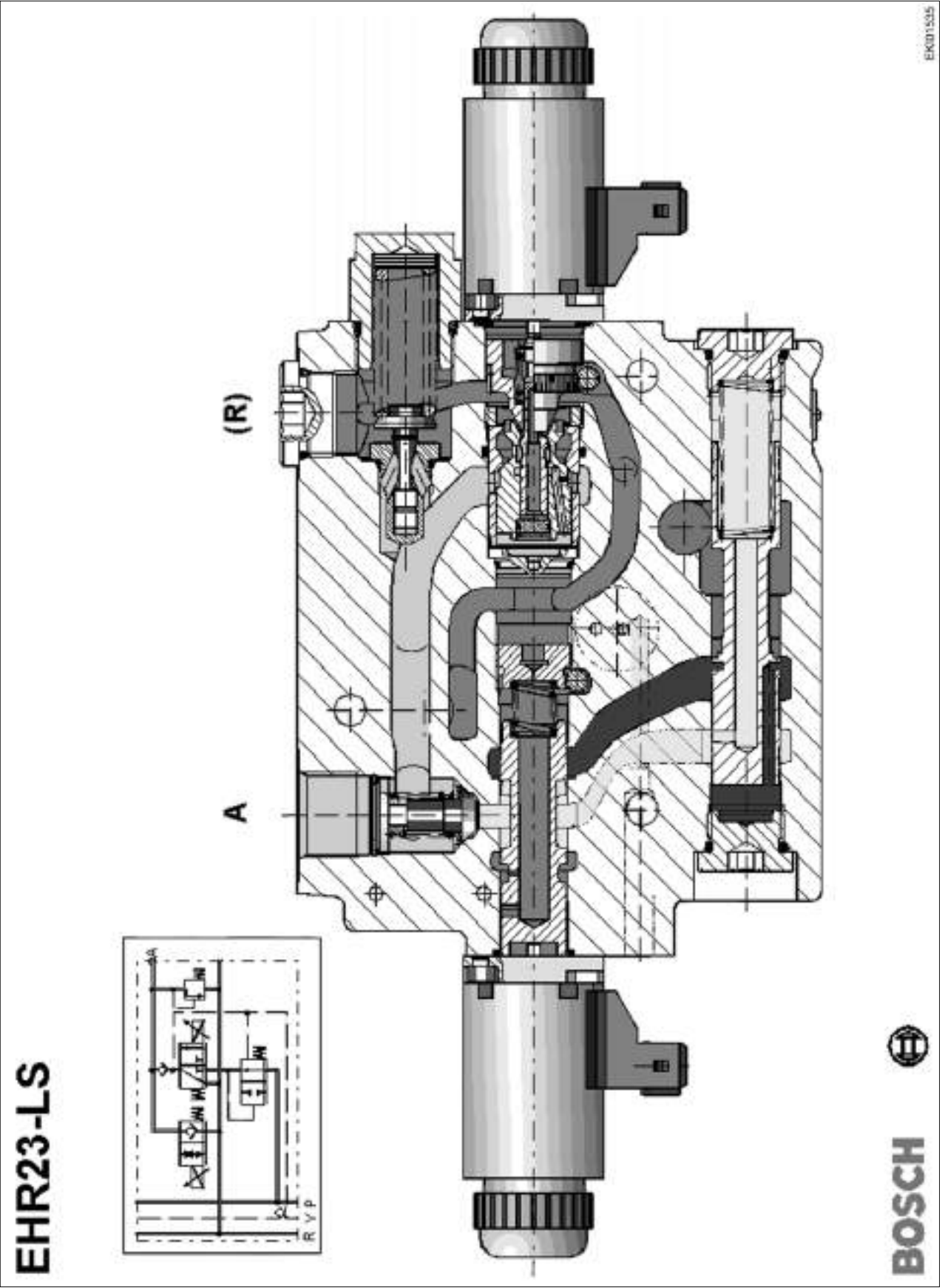
Chapter 8610 Reg. E - Slip control performance test

Chapter 9000 Reg. E - A011 - radar sensor

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| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / EPC electrohydraulic power lift control Sectional view and circuit diagram of EHR 23 - LS | C |
|---|---|----------|

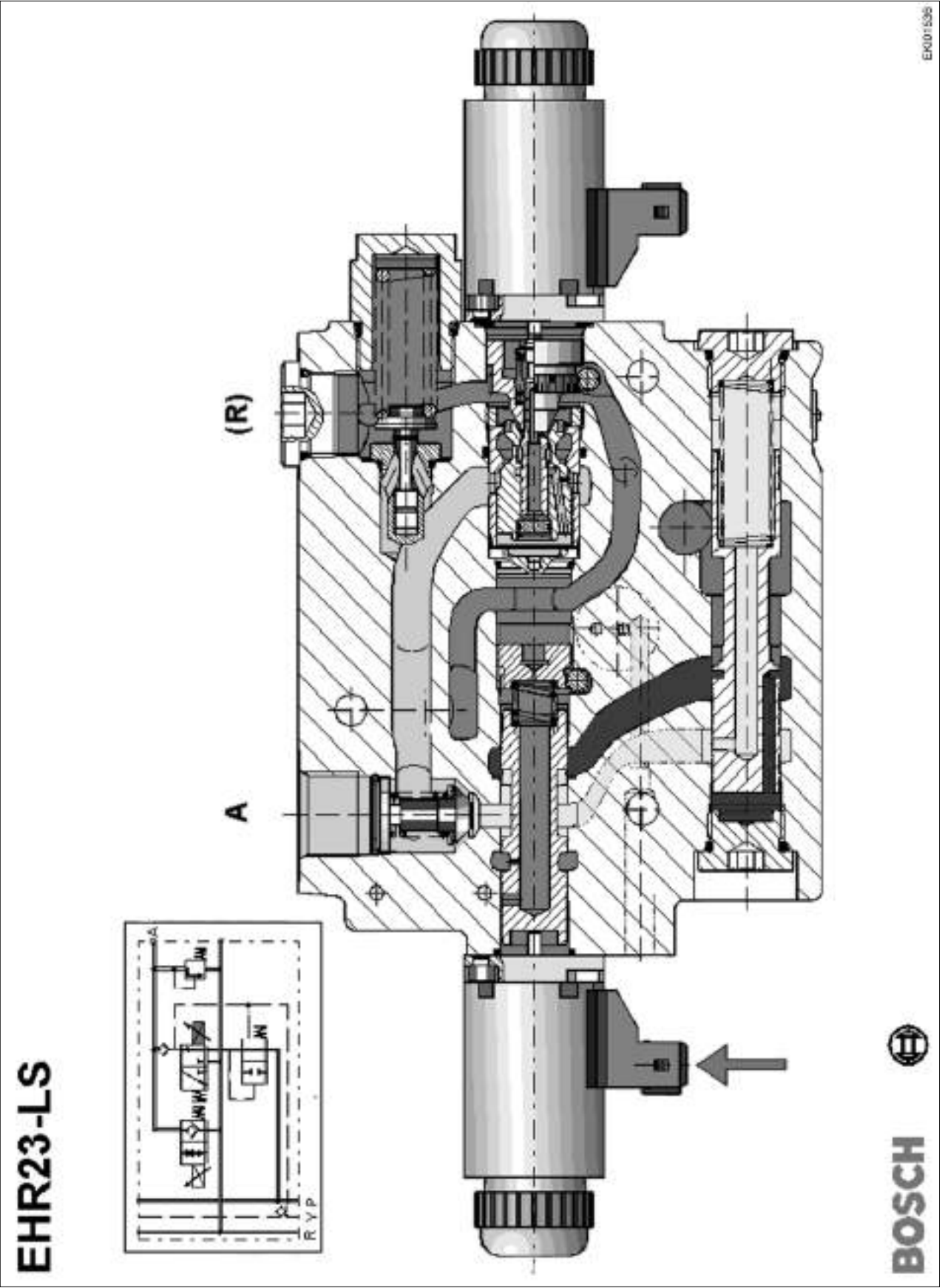
Neutral position



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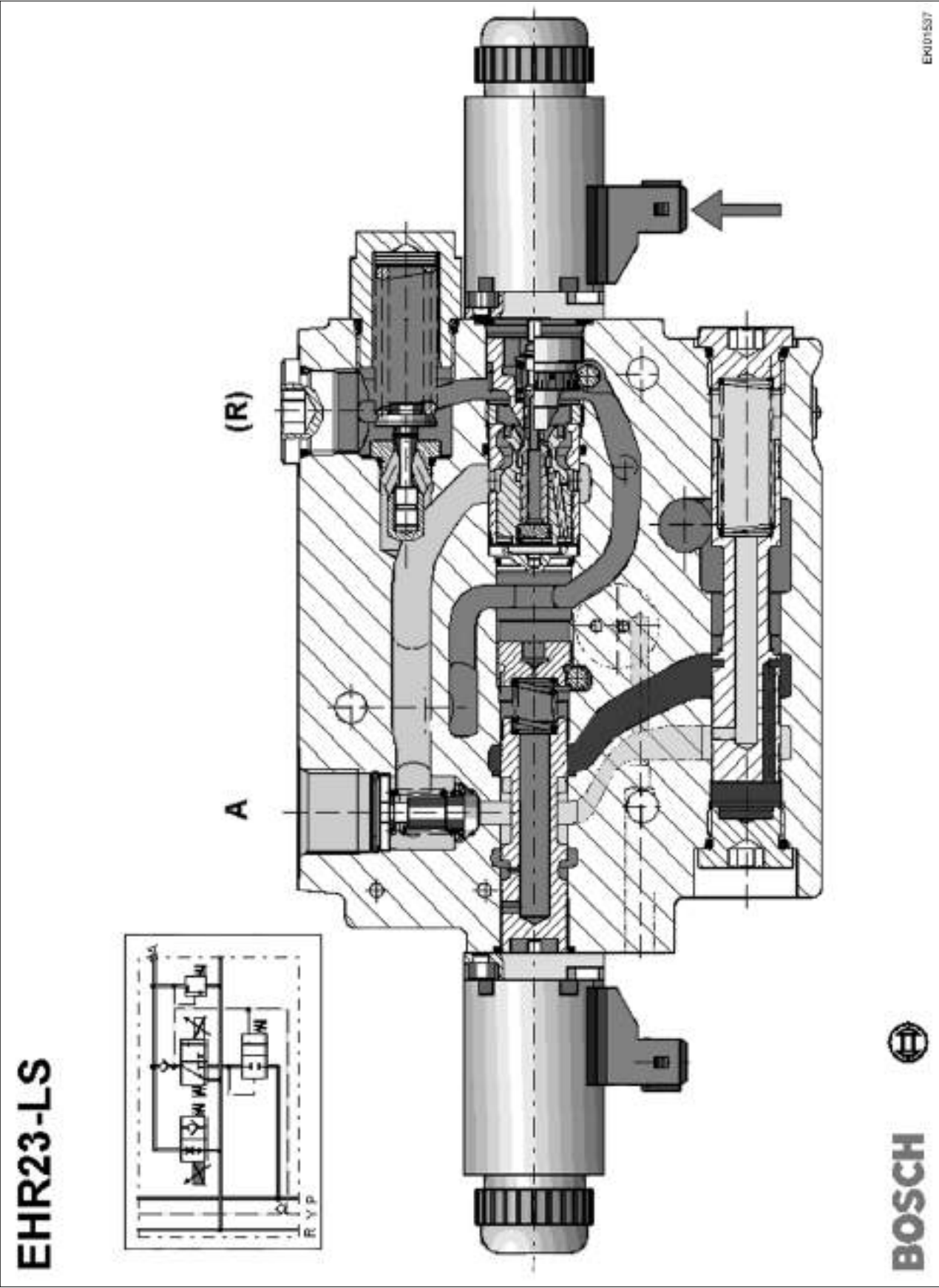
Lift position



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| | | |
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| Farmer 400 Fav 700 Fav 900 | Power lift / EPC electrohydraulic power lift control Sectional view and circuit diagram of EHR 23 - LS | C |
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Lower position



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| | | |
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| <i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i> | Power lift / Electrohydraulic control Rear power lift control system function charts | C |
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| | | |
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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control Rear power lift control system function charts | C |
|---|---|----------|

1st operational status:

EPC lift

- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position
- In this EPC position relevant solenoid switch S048 is open; EPC ECU A005 is therefore active.
- "Lift" solenoid Y021 of EPC control valve receives power from EPC ECU A005.
- Load line/load-sensing system connection is active when "Lift" valve is active.
- If LS pump PR is not yet active, current load pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pump flow rate and pressure control.
- Should LS pump already be active elsewhere with higher pressure demand, "surplus" pressure at EPC valve's pressure governor is limited to power lift load level.
- Hydraulic oil comes from EPC valve output directly to lift side of power lift cylinders.
- Displaced oil returns to tank via multiway valve AV4.

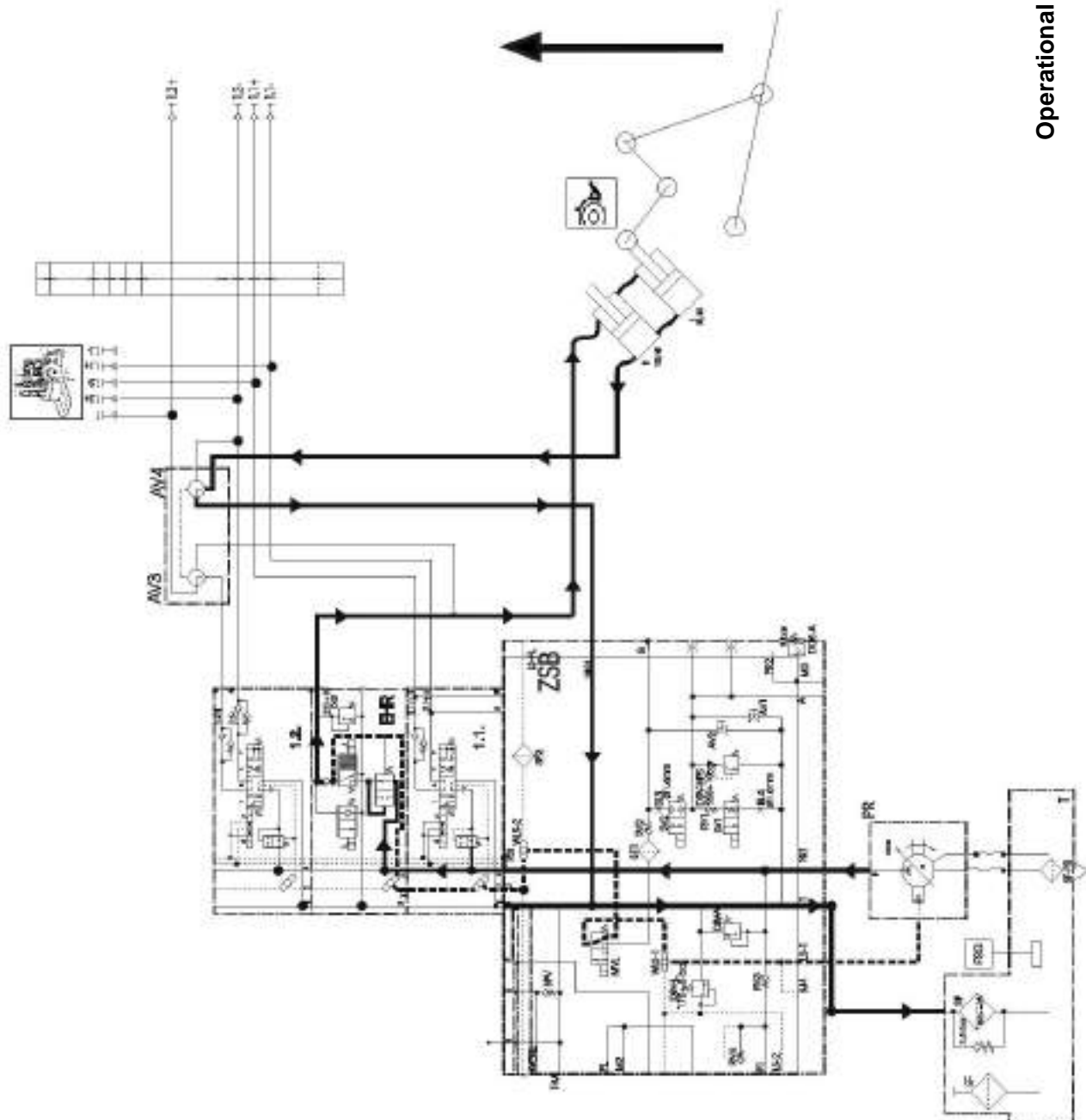
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Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control
Rear power lift control system function charts

C

Operational status: EPC lift



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| <i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i> | Power lift / Electrohydraulic control Rear power lift control system function charts | C |
|--|---|----------|

2nd operational status:

EPC lower / regulate

- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position
- In this EPC position relevant solenoid switch S048 is open; EPC ECU A005 is therefore active.
- "Lower" solenoid Y022 of EPC control valve receives power from EPC ECU A005.
- "EPC lower" could also function without LS pump, but active LS pump (=minimum engine speed) is necessary for safety reasons.
- "EPC lower" functions without LS command.
- Displaced oil from lift cylinder moves to open "Lower" valve.

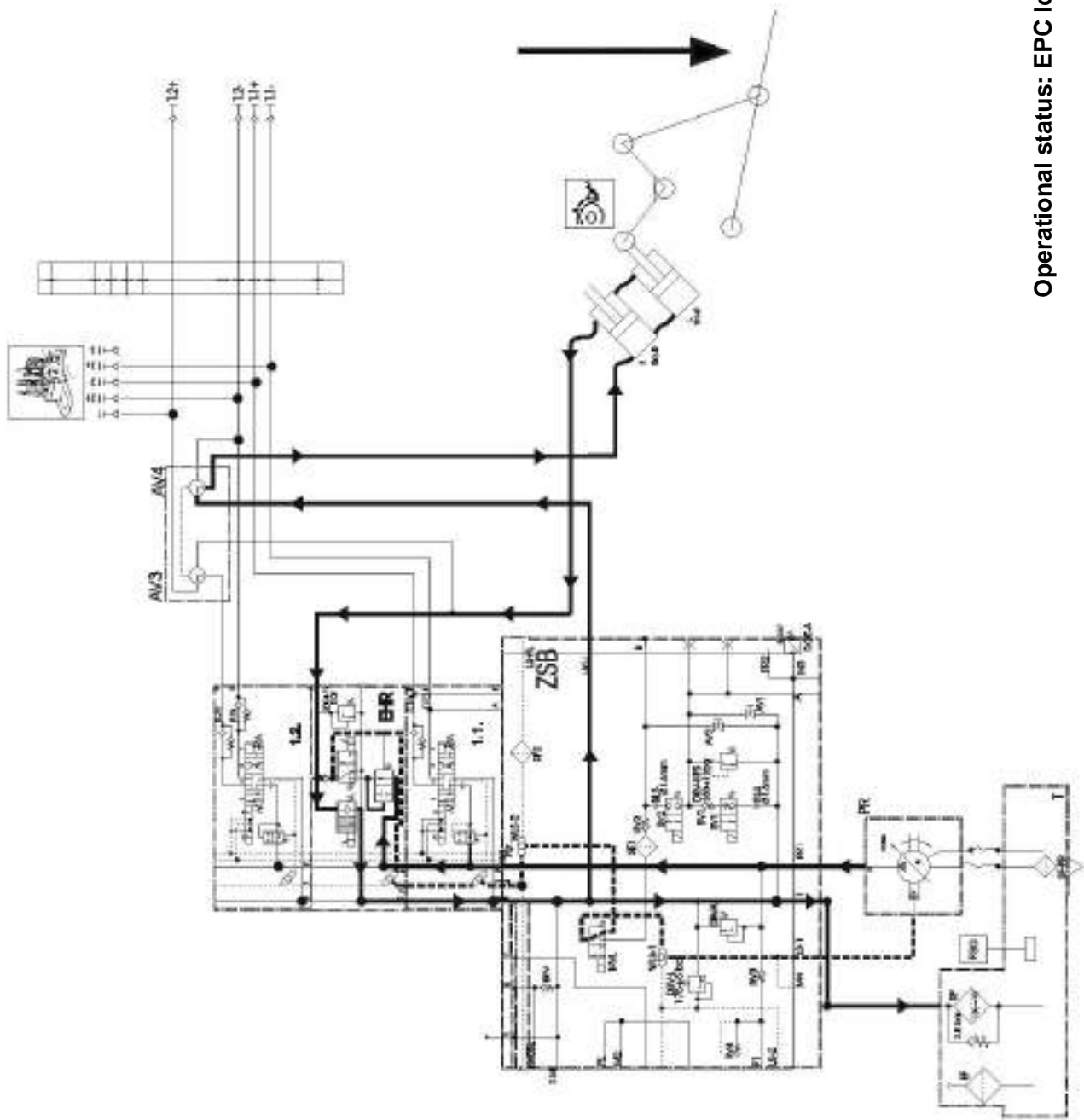
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Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control
Rear power lift control system function charts

C

Operational status: EPC lower / regulate



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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control Rear power lift control system function charts | C |
|---|---|----------|

3rd operational status:

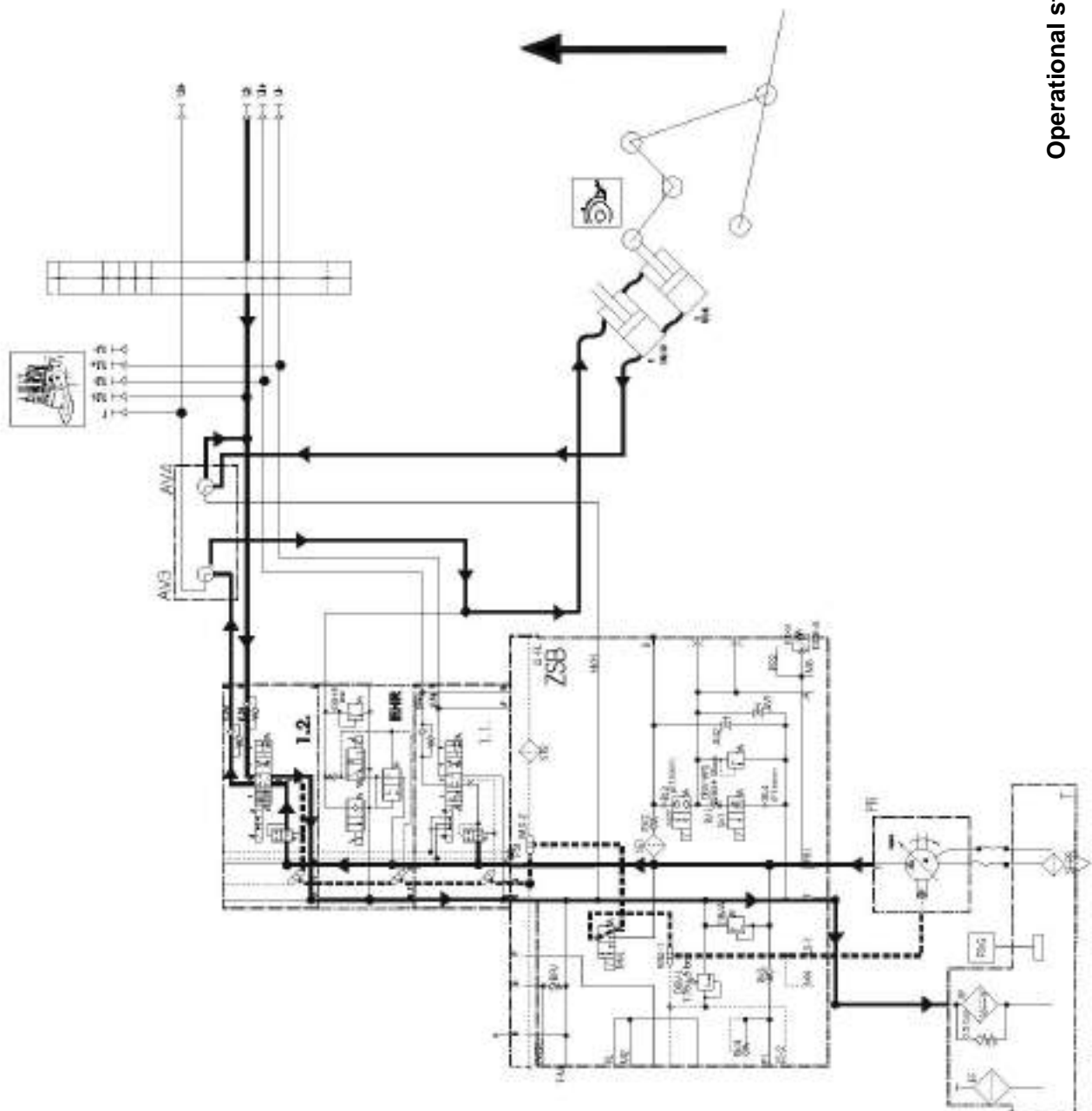
DA lift

- Control valve 1.2 is used for DA functions.
- Block multiway valve, consisting of AV3 and AV4, is in "DA" position.
- In this DA position relevant solenoid switch S048 is closed; EPC ECU A005 is therefore disabled.
- When main piston is moved in lifting direction, load line / LS connection is activated.
- If LS pump PR is not yet active, current load pressure = LS pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (1.2 valve, EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pump flow rate and pressure control.
- Hydraulic oil for lifting is then delivered directly to lift side of power lift cylinders from electrohydraulic control valve 1.2 output.
- Displaced oil returns to tank via multiway valve AV3 and AV4.

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| | | |
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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control Rear power lift control system function charts | C |
|---|--|----------|

Operational status: DA lift



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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control Rear power lift control system function charts | C |
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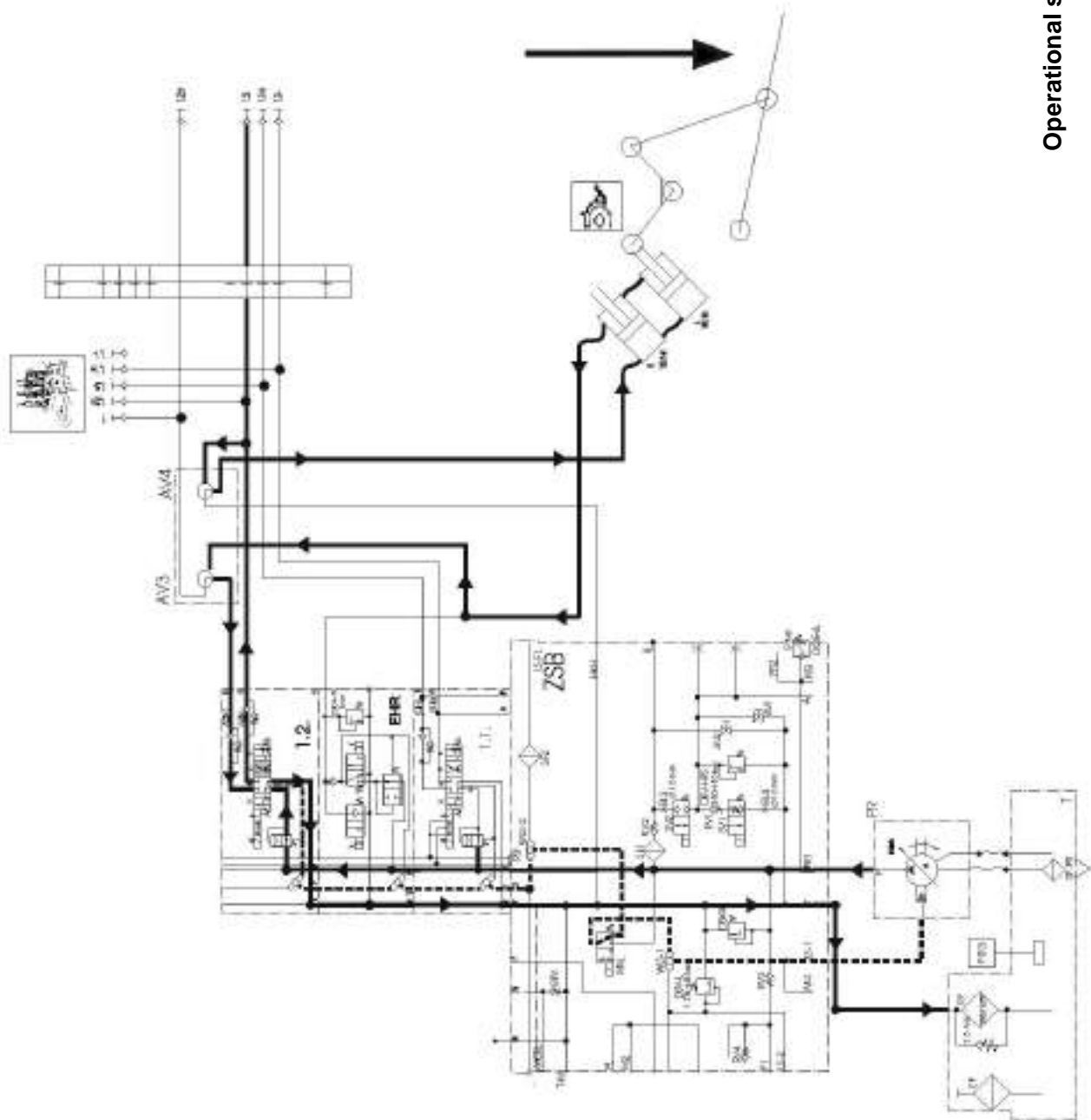
4th operational status:

DA lower

- Control valve 1.2 is used for DA functions.
- Block multiway valve, consisting of AV3 and AV4, is in "DA" position.
- In this DA position relevant solenoid switch S048 is closed; EPC ECU A005 is therefore disabled.
- When main piston of valve 1.2 is moved in lowering direction, load line/LS connection is activated.
- If LS pump PR is not yet active, current load pressure = LS pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (1.2 valve, EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pump flow rate and pressure control.
- Hydraulic oil for lowering is then delivered directly to lowering side of power lift cylinders from electrohydraulic control valve 1.2 output.
- Displaced oil returns to tank via multiway valve AV3 and AV4.

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Operational status: DA lower



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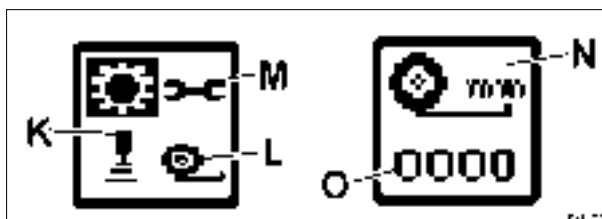
| | | |
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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Slip control performance test | E |
|---|--|----------|

Slip control performance test (radar sensor A011)

Prerequisites:

- **Calibrating radar sensor - Chapter 8610 Reg. A - Operation and function of electronic slip control**

- **Enter circumference of rear tyres in mm.**



Note:

Tyre circumference can vary depending on particular tyres fitted. Note tyre manufacturer's specifications.



Press key, screen as shown (K) appears, pictogram (L) flashes.

L = Enter tyre size

M = Calibration function of rear/front PTO clutch



Press key, screen as shown (N) appears, 1st digit (O) flashes.



Press one key repeatedly until desired figure is displayed.



Press key. Set remaining three digits as per 1st digit.



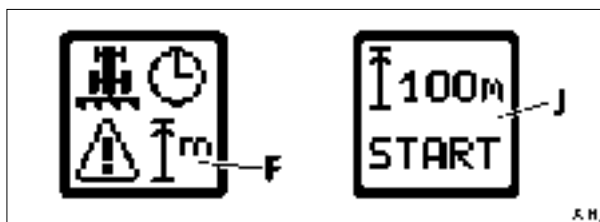
Press key

- Switch ignition OFF and ON (reset).
The new input is saved.

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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Slip control performance test | E |
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- Calibrating speed display



Note:

During the calibration process the tractor may only be driven using the clutch pedal.

If the joystick A003 is used, the **ACTIVE** pictogram which is displayed deletes the calibration process menu when the tractor stops at the gauge points.

- Accurately measure and mark out gauge length of between 30 m (minimum) and 100 m (maximum).
Press key (BI) to display function selection.



BI



F



J

Press one key repeatedly until "Calibrating speed display" pictogram (F) flashes.

Press key, screen as shown (J) appears, 1st digit of distance flashes.

Distance must now be set to length of measured distance, e.g. 50 m.



F



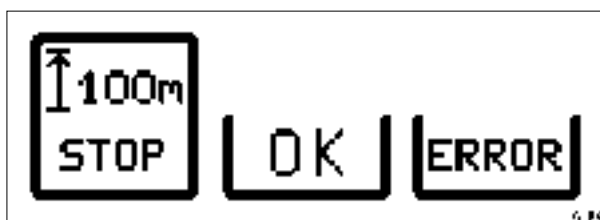
J

Press one key repeatedly until desired figure is displayed, e.g. 0..

Press key. Set remaining two digits as per 1st digit, e.g. 050.

Once last digit has been confirmed, "START" flashes.

- Position tractor front wheel precisely on start mark.



J

Press key, display changes from "START" to "STOP".

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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Slip control performance test | E |
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- Pull away in tractor and stop with front wheel on end mark of gauge length.
Press key. If process is carried out correctly, "OK" is displayed.



Press key. Time and operating hours are displayed.



If "ERROR" is displayed, calibration must be repeated as follows:



Press key, measured distance input screen is displayed.

- Check whether input distance matches measured distance.
- If necessary, set input distance to measured distance as described above and repeat calibration process.



Press key. Time and operating hours are displayed.

- Test section should be as dry and rough as possible.

| Testing slip control in motion | | |
|--------------------------------|---|--|
| Test stages | | Meaning / explanation |
| 1. | Engine running / tractor stationary | |
| 2. | Unlock rear EPC | |
| 3. | Set position/draft force hybrid control to 30% draft force ratio at terminal A008 | |
| 4. | Set wheel slip to approx. 5% at terminal A008 | |
| 5. | Set setpoint depth control to 6 on scale. | |
| 6. | Rapid lift control to Lower = control action | Power lift goes to mid-height in controlled state |
| 7. | Activate radar sensor A011 on terminal A008 | Rear power lift responds to this and rises briefly |
| 8. | Pull away in straight line at approx. 5-6 km/h and then | |
| 9. | make a tight right turn | Slight speed difference occurs (= slip) between radar sensor A011 path on inside of arc and theoretical path in centre of tractor (bevel pinion speed sensor B015) |
| 10. | Required reaction: rear power lift rises briefly and "Raise" arrow is displayed on terminal A008 | |
| 11. | Drive straight on again | |
| 12. | Required reaction: rear power lift lowers briefly again and "Lower" arrow is displayed on terminal A008 | |

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| | | |
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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Slip control performance test | E |
|---|--|----------|

**Danger:**

During the slip control performance test (stationary test) please ensure that all 4 wheels of the tractor are jacked up because of the risk of an accident!

Engage 4WD when tractor is jacked up.

| Slip control test when stationary | | |
|-----------------------------------|--|--|
| Test stages | | Meaning / explanation |
| 1. | Load bottom link | |
| 2. | Jack tractor up (all 4 wheels) | |
| 3. | Engine running / tractor stationary | |
| 4. | Set position/draft force hybrid control to 30% draft force ratio at terminal A008 | |
| 5. | Unlock rear EPC | |
| 6. | Rapid lift control to Lower = control action | |
| 7. | Set depth control such that load weight is just above ground | |
| 8. | Pull away at approx. 5-6 km/h | |
| 9. | Required reaction: rear power lift remains in set position. | |
| 10. | Activate radar sensor A011 on terminal A008 | |
| 11. | Required reaction: rear power lift rises and "Raise" arrow is displayed on terminal A008 | Bevel pinion speed sensor B015 displays a speed. Radar sensor A011 shows speed of 0 km/h (slip). |

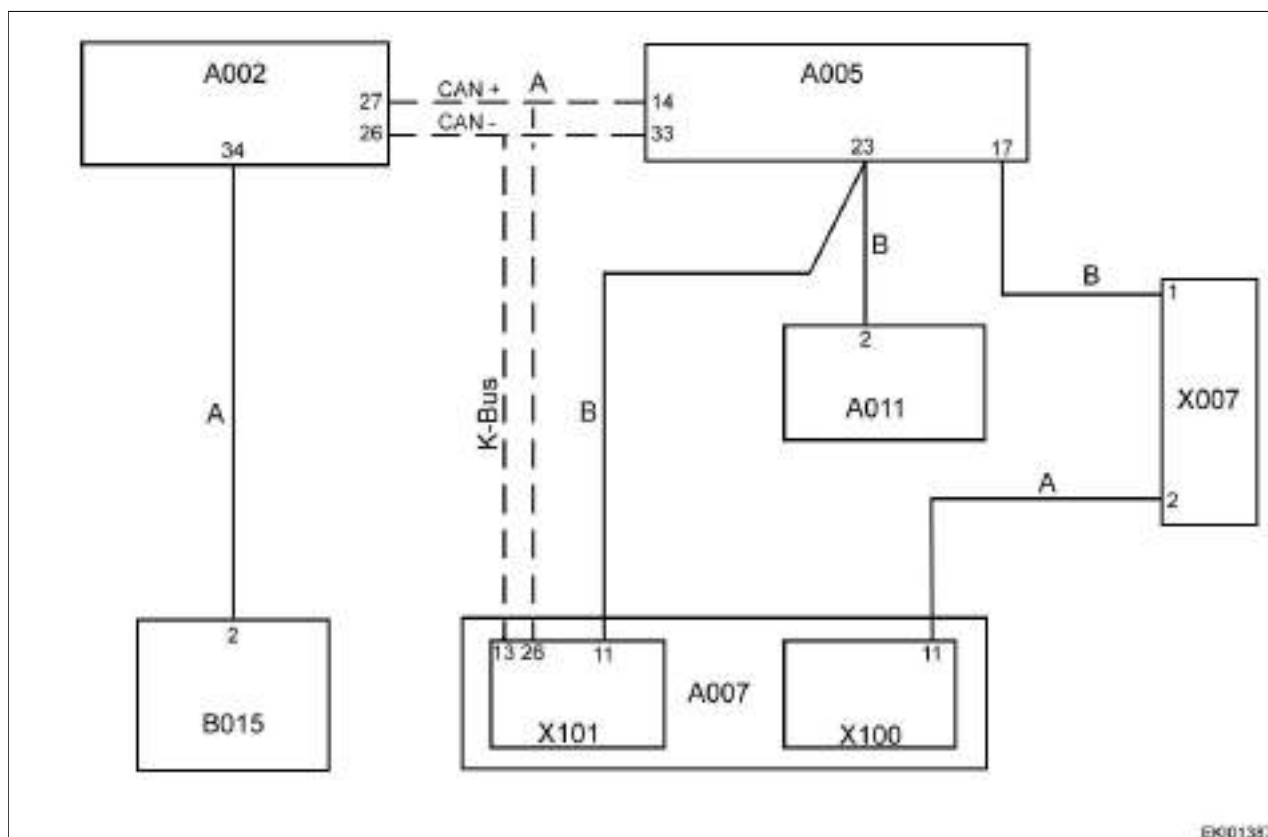
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Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Slip control performance test

E

Control loop of slip control



| Item | Designation | Item | Designation |
|------|---------------------------|------|--------------------------------|
| A002 | ECU | X007 | Implement socket |
| A005 | EPC ECU | X100 | Instrument panel plug (blue) |
| A007 | Instrument panel | X101 | Instrument panel plug (yellow) |
| A011 | Radar sensor | | |
| | | A | "Theoretical speed" signal |
| B015 | Bevel pinion speed sensor | B | "Actual speed" signal |

The bevel pinion speed sensor B015 transmits the "theoretical speed" (A) to the ECU A002.

The radar sensor A011 transmits the "actual speed" (B) to the EPC ECU A005 and to the instrument panel A007.

The ECU A002 is connected to the EPC ECU A005 and the instrument panel A007 via the K-bus.

The "theoretical speed" (A) is transmitted to the EPC ECU A005 and the instrument panel A007 via the K-bus.

EPC ECU A005 ---> slip control (see also: Chapter 8610 Reg.A - Operation and function of electronic slip control)

Instrument panel A007 ---> speed and slip display

Note:

Above 15 km/h the system automatically switches to theoretical speed display. The slip and speed display are cleared. Below 15 km/h the actual speed is displayed again on the instrument panel A007.

The slip control in the EPC ECU A005 remains active irrespective of the speed.

Implement socket X007 ---> implement control system (e.g. spraying computer)

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| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Slip control performance test | E |
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The accuracy of the "theoretical speed" signal (A) from the bevel pinion speed sensor B015 is a function of the tractor speed

- Speed < 15 km/h (maximum display accuracy)
- Calibrating speed display

The ECU A002 counts the pulses per metre. The instrument panel A007 then calculates the "theoretical speed" (A) from the number of pulses.

- 15 km/h < speed < 20 km/h
- Enter tyre size.

The ECU A002 counts the revolutions of the bevel pinion shaft. The instrument panel A007 calculates the "theoretical speed" (A) from the number of bevel pinion shaft revolutions and the input tyre circumference.

- Speed > 20 km/h
- Specified (maximum) tyre circumference in EOL program
(EOL = end of line)

The ECU A002 counts the revolutions of the bevel pinion shaft. The instrument panel A007 calculates the "theoretical speed" (A) from the number of bevel pinion shaft revolutions and the maximum tyre circumference specified in the EOL program.

The maximum tyre circumference specified in the EOL program limits the ultimate maximum speed.

Note:

The transitions between the speed ranges < 15 km/h, < 20 km/h and > 20 km/h are fluid. In other words the calculation of the theoretical speed (A) becomes similar.

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| 07.05.0001 | a | 6/6 | 8610 | E | 000003 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Setting power lift end shutoff | F |
|---|---|----------|



Overtravel of rear power lift = 15 mm

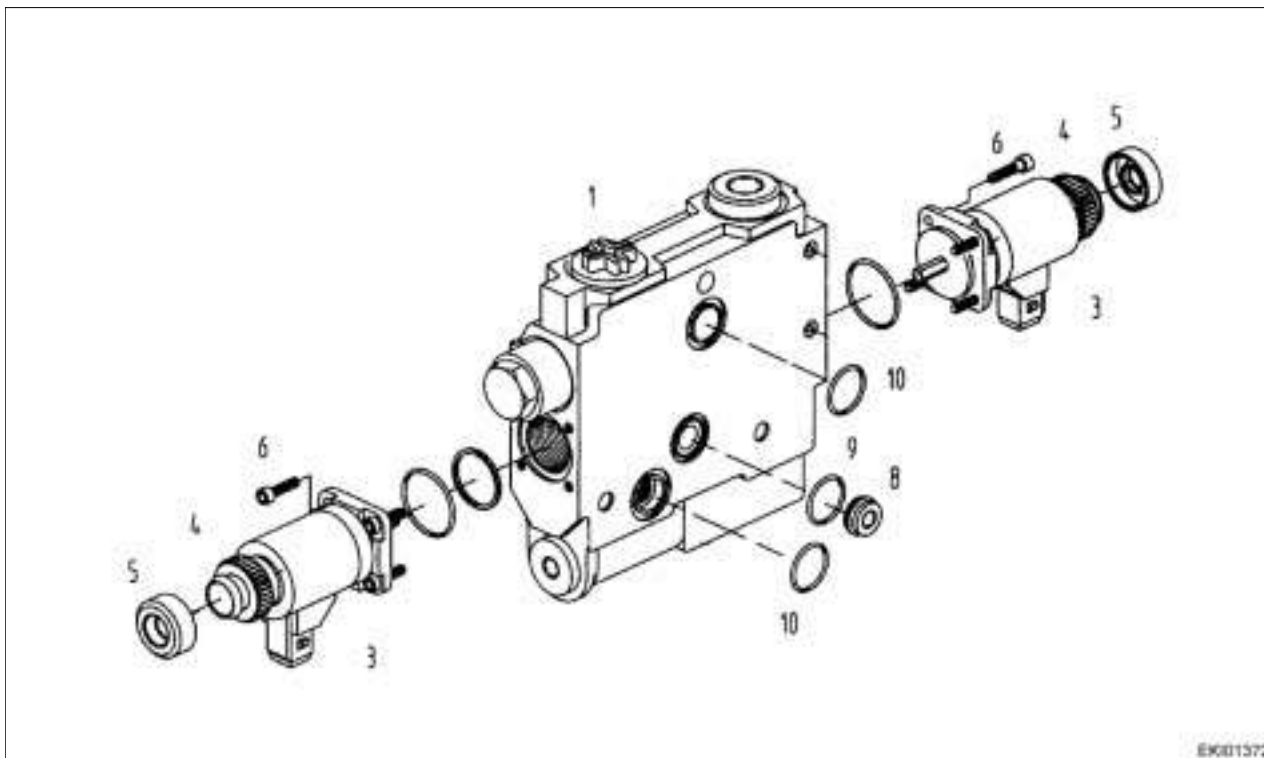
Note:
The overtravel is set by means of the position sensor B030.
For setting, see Chapter 8610 Reg.G -
Installing and removing position sensor B030.

| Date | Version | Page | Setting power lift end shutoff | Capitel | Index | Docu-No. |
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| 14.05.01 | a | 1/1 | | 8610 | F | 000001 |

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
 EPC control valve - replacing graduable magnet valves Y021/Y022

G



| Item | Designation | Item | Designation |
|------|----------------------------------|------|-----------------------|
| 1 | Control valve EHR 23 - LS | 6 | Socket head cap screw |
| 1 | Seal set | 8 | Shuttle valve |
| 3 | Graduable magnet valve Y021/Y022 | 9 | O-ring |
| 4 | Solenoid | 10 | O-ring |
| 5 | Protective cap | | |

Note:

The work was carried out on a control valve which had been removed from the tractor for greater clarity.

Important:

Retrofitting and repair work on the service hydraulics must be carried out with very great attention to cleanliness. The smallest particles of dirt in the control circuit can prevent the control motion or cause automatic deflection.

If the EPC control valve is removed, the hydraulic oil must be drained (to prevent the hydraulic system from being emptied via the return flow).

Hydraulic oil quantities

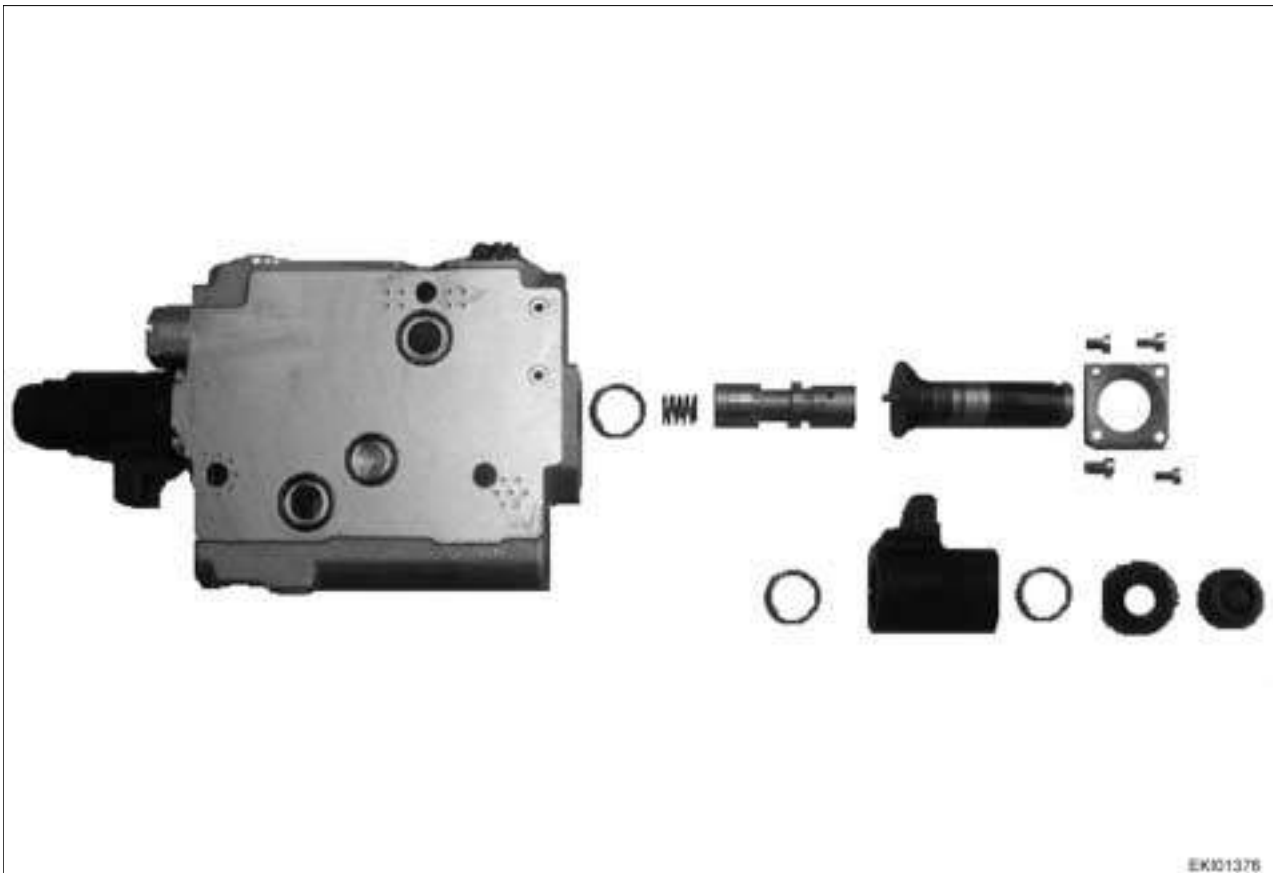
- Farmer 400 = approx. 42 l
- Fav 700 = approx. 50 l
- Fav 900 = approx. 70 l

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| 25.04.2001 | a | 1/4 | EPC control valve - replacing graduable magnet valves Y021/Y022 8610 | G | 000001 |

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
 EPC control valve - replacing graduable magnet valves Y021/Y022

G



Removing "Raise" graduable magnet valve Y021

Unscrew knurled nut with protective cap (5).

Loosen socket head cap screws (6) and remove graduable magnet valve Y021 (magnet core) (3).

Installing "Raise" graduable magnet valve Y021

Insert new O-ring into EPC control valve housing.

Check graduable magnet valve Y021 (magnet core) (3) for ease of movement and install.

Tighten flange using 4 socket head cap screws (6) crosswise in stages.

Locate new O-ring on graduable magnet valve Y021 (magnet core).

Locate solenoid.

Insert new O-ring into knurled nut.

Tighten knurled nut. **Tightening torque = 3.5 +1 Nm**

Locate protective cap (5).

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| 25.04.2001 | a | 2/4 | EPC control valve - replacing graduable magnet valves Y021/Y022 8610 | G | 000001 |

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
 EPC control valve - replacing graduable magnet valves Y021/Y022

G



Removing "Lower" graduable magnet valve Y022

Unscrew knurled nut with protective cap (5).

Loosen socket head cap screws (6) and remove graduable magnet valve Y022 (magnet core) (3).

Fitting "Lower" graduable magnet valve Y022

Insert new O-ring into EPC control valve housing.

Check graduable magnet valve Y022 (magnet core) (3) for ease of movement and install.

Tighten flange using 4 socket head cap screws (6) crosswise in stages.

Locate new O-ring on graduable magnet valve Y022 (magnet core).

Locate solenoid.

Insert new O-ring into knurled nut.

Tighten knurled nut. **Tightening torque = 3.5 +1 Nm**

Locate protective cap (5).



Note:

If EPC control valve was removed from valve array:

Assembly of valve array, see also

Chapter 9620 Reg.G -

Control valves SB 23 LS - EHS

Tighten M8-10.9 DIN 934 hexagon screws to 30 +3 Nm.

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| 25.04.2001 | a | 3/4 | EPC control valve - replacing graduable magnet valves Y021/Y022 | 8610 | G |
| | | | | | 000001 |

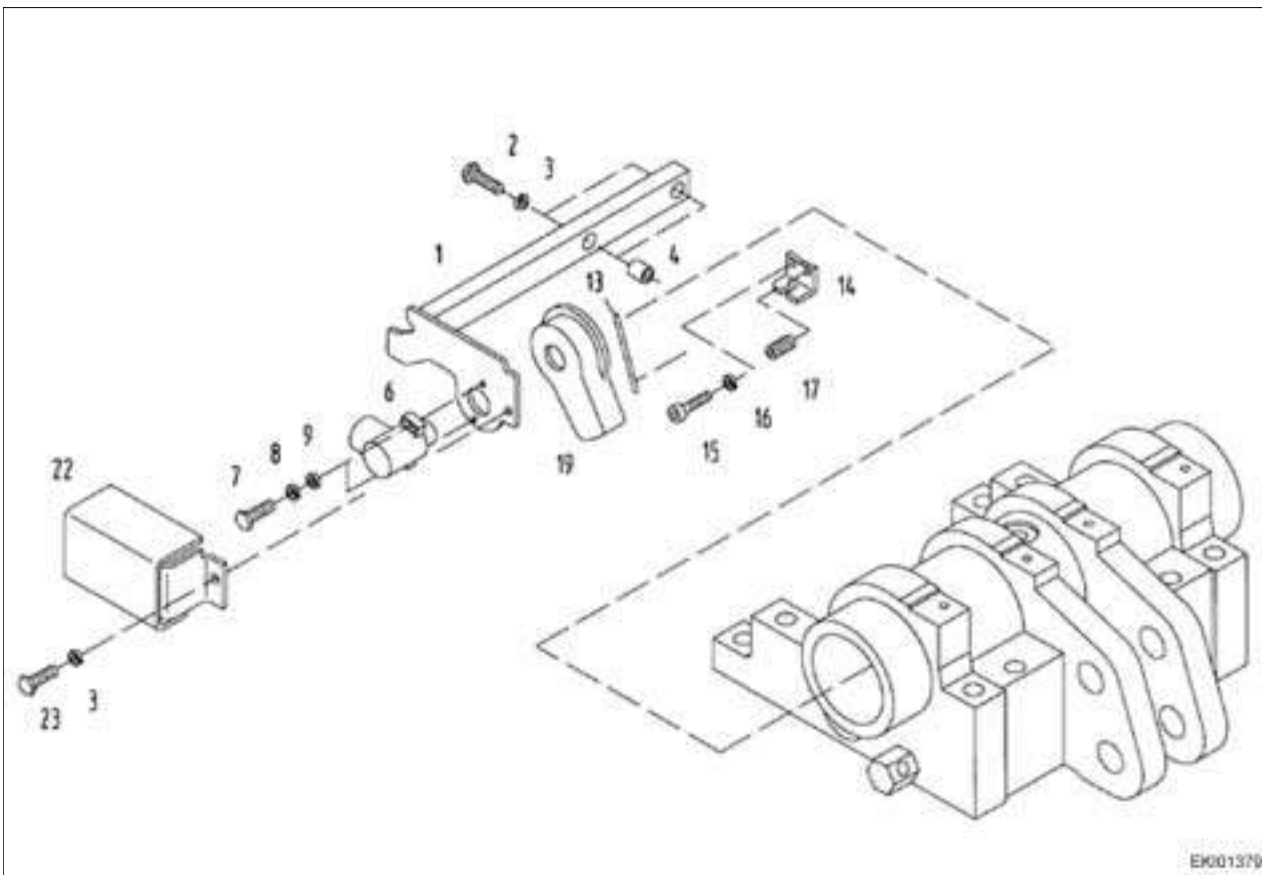
| | | |
|--|--|----------|
| <i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i> | Power lift / Electrohydraulic control EPC EPC control valve - replacing graduable magnet valves Y021/Y022 | G |
|--|--|----------|

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| 25.04.2001 | a | 4/4 | EPC control valve - replacing graduable magnet valves Y021/Y022 | 8610 | G | 000001 |

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Installation and removal of position sensor B030

G



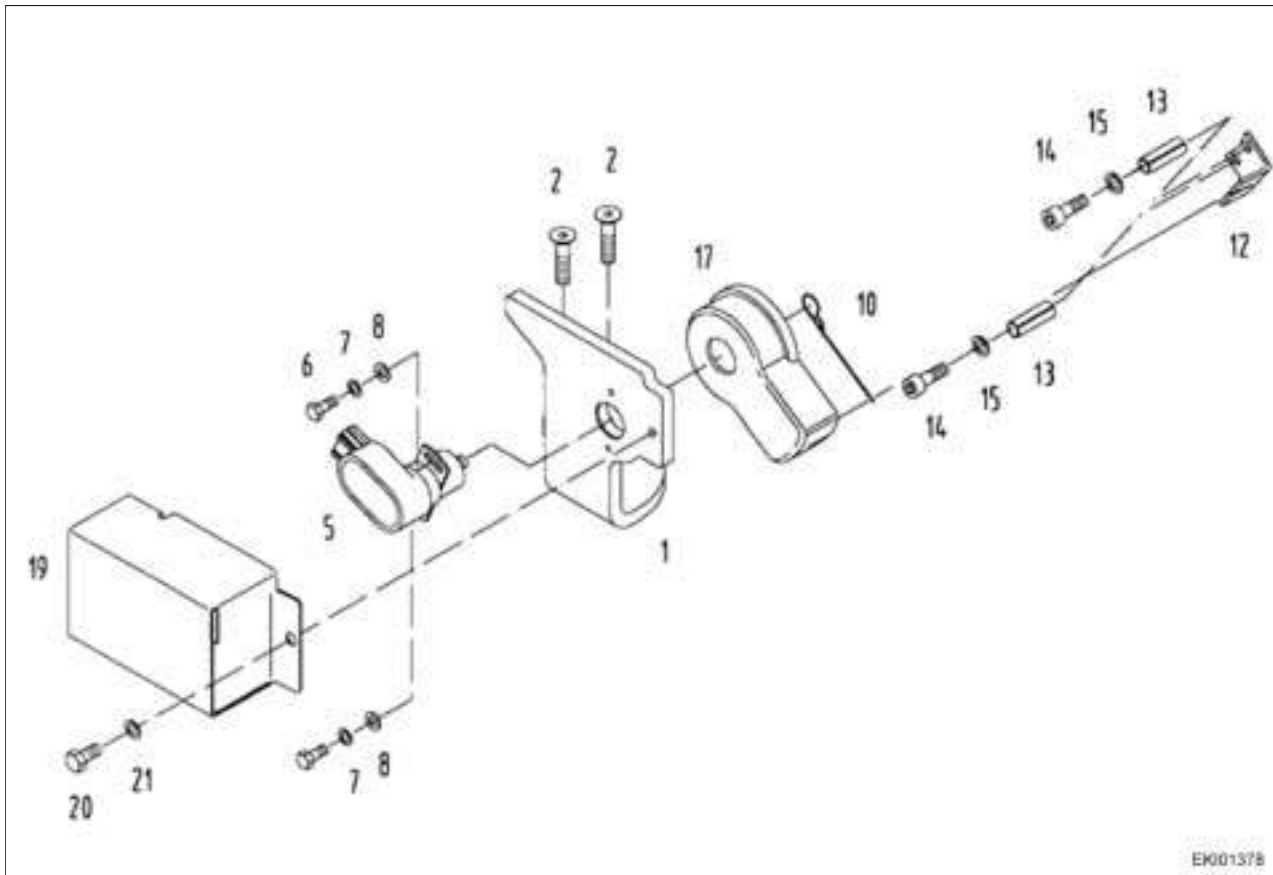
Fav 900 chassis number 23/3001 and up

| Item | Designation | Item | Designation |
|------|----------------------|------|-----------------------|
| 1 | Bracket | 13 | Spring wire |
| 2 | Hexagon screw | 14 | Angle bracket |
| 3 | Spring washer | 15 | Socket head cap screw |
| 4 | Sleeve | 16 | Spring washer |
| 6 | Position sensor B030 | 17 | Dowel pin |
| 7 | Hexagon screw | 19 | Cover |
| 8 | Spring washer | 22 | Guard |
| 9 | Washer | 23 | Hexagon screw |

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Installation and removal of position sensor B030

G



Fav 700, Farmer 400

| Item | Designation | Item | Designation |
|------|----------------------|------|-----------------------|
| 1 | Bracket | 13 | Dowel pin |
| 2 | Countersunk screw | 14 | Socket head cap screw |
| 5 | Position sensor B030 | 15 | Spring washer |
| 6 | Hexagon screw | 17 | Cover |
| 7 | Spring washer | 19 | Guard |
| 8 | Washer | 20 | Hexagon screw |
| 10 | Spring wire | 21 | Spring washer |
| 12 | Angle bracket | | |

Note:

The work shown was carried out on a Fav 900 chassis no. 23/3001 or above.

Carry out installation and removal of position sensor B030 in Farmer 400, Fav 700 in same manner.

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| 26.04.2001 | a | 2/5 | 8610 | G | 000002 |

Installation and removal of position sensor B030

<https://www.truck-manuals.net/>

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Installation and removal of position sensor B030

G



Release bracket (1).



Disconnect electrical connections for position sensor B030 and for handbrake solenoid switch S015.

Remove bracket (1) complete with position sensor B030.



Remove guard (19) and release position sensor B030.



Installing position sensor B030

Default setting for Fav 900 chassis number 23/3001 and up: screw position sensor B030 exactly in centre of slots (position of lift arms is unimportant).

Default setting for Fav 700, Farmer 400: position sensor B030 can only be mounted in one position.

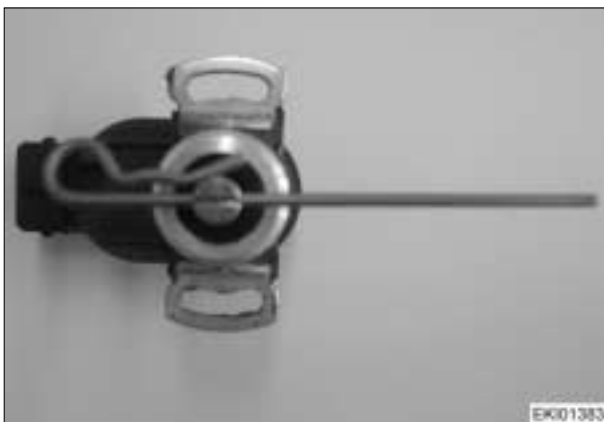
Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Installation and removal of position sensor B030

G



Notch (arrowed) in actuating shaft faces electrical connection.



Spring wire (13) must project opposite notch (arrowed) (notch faces short end of spring wire).



Locate guard (19).



Fit bracket (1) complete with position sensor B030.

Spring wire (13) must extend into angle bracket (14).

Connect electrical connections for position sensor B030 and for handbrake solenoid switch S015.

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Installation and removal of position sensor B030

G



Calibrate position sensor B030.

Calibration of rear EPC, code 8001 (depth control) and 8002 (position sensor B030)

For calibration procedure see Chapter 0000 Reg.F

Note:

In event of "ERROR" message:

Move rear power lift against mechanical stop using switch S027/S029.

Connect adapter cable (DIY) to position sensor B030.

Connect multimeter to pins 1 and 2.

Loosen hexagon screws and adjust position sensor B030 in slots until signal voltage of approx. 7.1 VDC is displayed.

Screw position sensor B030 tight in slots and repeat calibration process 8002.

(See also Chapter 9000 Reg.E)



Check: overtravel of rear power lift

Fully raise lift arms (set lift height limit to 100%)

Press switch (S029 / S027) at rear. Lift arms rise approx. 15 mm further against mechanical stop.

Note:

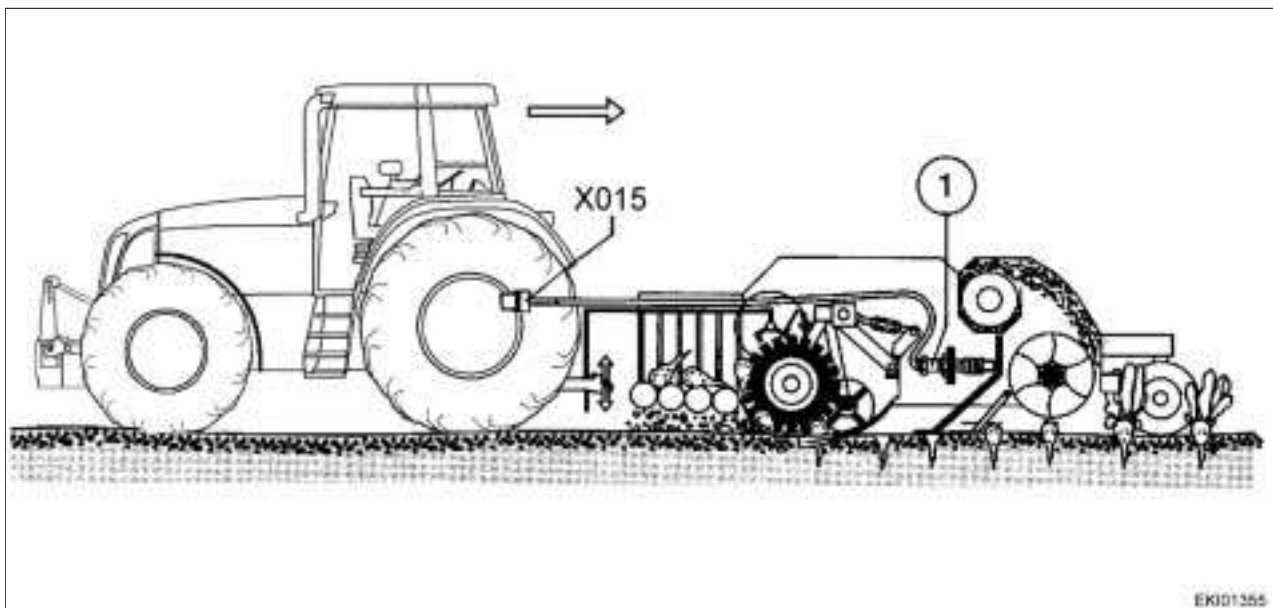
Overtravel of approx. 15 mm can also be smaller, though a slight overtravel must be available.

Farmer 400
Fav 700
Fav 900

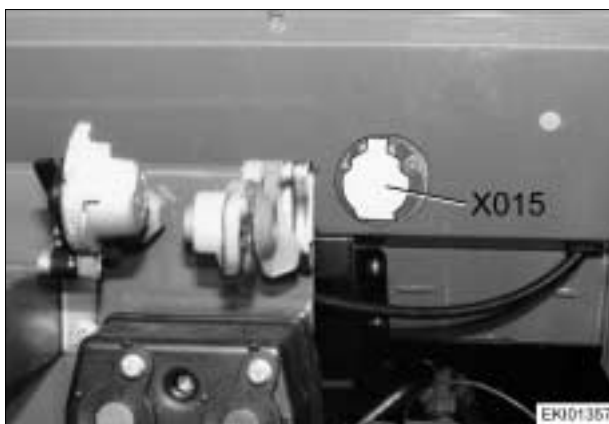
Power lift/Electrohydraulic remote control
Operation and function of electrohydraulic remote control

A

Electrohydraulic remote control



The electrohydraulic remote control is used with mounted implements which have to be held at a preset distance from the ground. The photo shows the example of a beet lifter. In this the position of the implement frame relative to the soil surface is measured and maintained at a constant height via the EPC by means of a sliding skid (feeler control) which is connected to the inductive position sensor (1).



This type of control is automatically switched on when the feeler sensor is electrically connected to the EPC system via socket X015 (see photo).

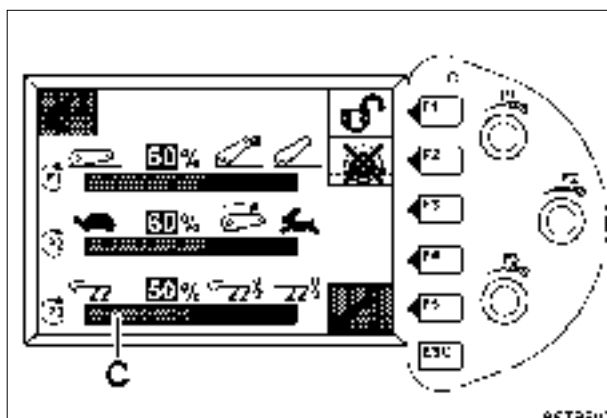
| Date | Version | Page | Capitel | Index | Docu-No. |
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| 17/04/2001 | a | 1/2 | Operation and function of electrohydraulic remote control | 8618 | A |
| | | | | | 000001 |

Farmer 400
Fav 700
Fav 900 chassis num-

Power lift/Electrohydraulic remote control Operation and function of electrohydraulic remote control

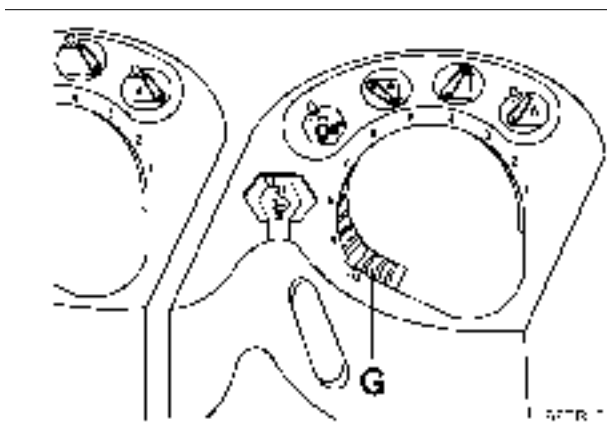
A

Setting working depth



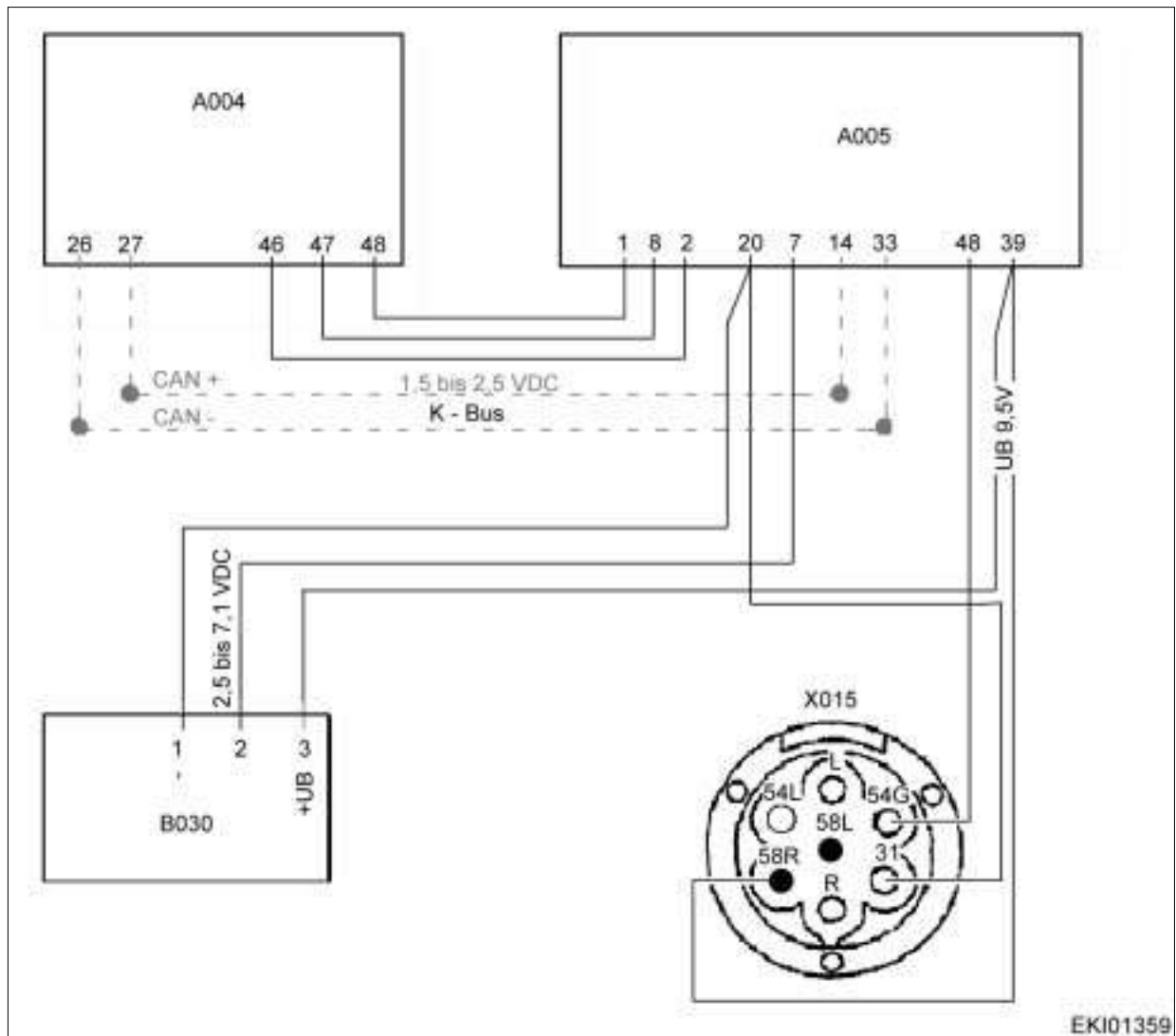
The working depth must be set on a level field.

- Set mid-position (hybrid control) approximately (bar display C) using rotary control (P3).
- Raise feeler sensor on implement using crank handle.



- Stop tractor.
- Lower feeler sensor until first lift pulse occurs.
- Start work, check working depth, correct feeler sensor such that depth control (G) in mid-position (position 5) reaches desired working depth.
- Correct draft force/position ratio using rotary control (P3) if system deviations on implement are too large or too small.

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic remote control Electrohydraulic remote control / terminal diagram | A |
|---|---|----------|



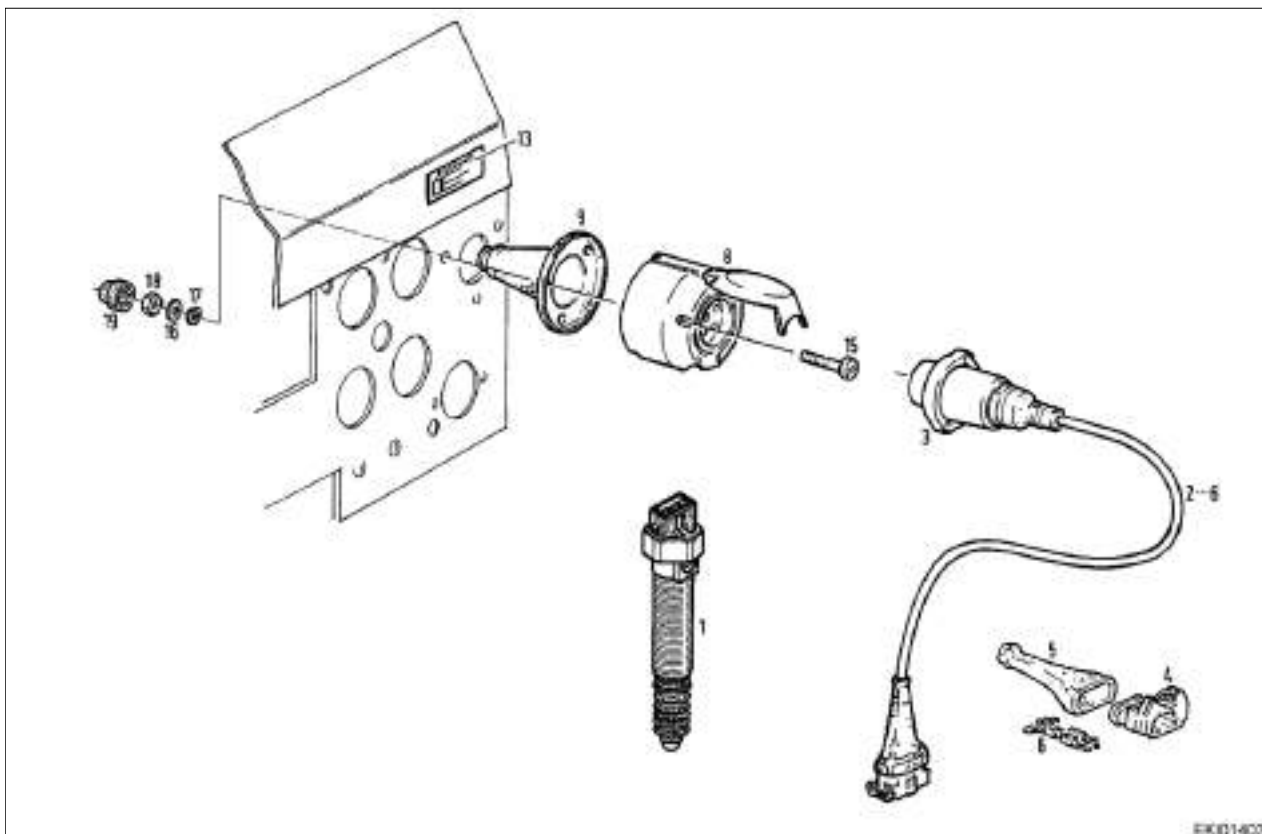
| | |
|------|--|
| A004 | Control console |
| 46 | Depth control supply 9.5 VDC |
| 47 | Depth control signal 1.2 to 8.5 VDC |
| 48 | Depth control earth |
| A005 | EPC ECU |
| 1 | Depth control earth |
| 2 | Depth control supply 9.5 VDC |
| 7 | External position gauge signal 2.5 to 7.1 VDC |
| 8 | Depth control signal 1.2 to 8.5 VDC |
| 20 | Earth |
| 39 | External position gauge signal 9.5 VDC |
| 48 | External signal |
| B030 | Rear EPC position sensor |
| X015 | Electrohydraulic remote control socket cable coupler |

Farmer 400
Fav 700
Fav 900

Power lift/Electrohydraulic remote control
External position gauge - functional description

A

External position gauge (MWL ext.)



| Item | Designation | Item | Designation |
|------|-------------------------|------|------------------------|
| 1 | External position gauge | 13 | Instruction plate |
| 2 | Extension cable | 15 | Self-tapping screw |
| 3 | 7-pin plug | 15 | Socket head cap screw |
| 4 | Plug housing | 16 | Washer |
| 5 | Protective cap | 17 | Spring washer |
| 6 | Timer contact | 18 | Hexagon nut |
| 8 | Socket X015 | 19 | Hexagon protective cap |
| 9 | Cap | | |

The position of the mounted implement is detected by an external position gauge via a sliding skid and converted to an electrical signal.

The external position gauge works on the inductive voltage divider principle.

The external position gauge consists essentially of two coils and a moving ferrite core which is moved by the sliding skid of the mounted implement.

An a.c. voltage is generated via an integrated electronic system to supply the inductive voltage divider. The output signal in turn is demodulated (rectified) and fed to socket X015.

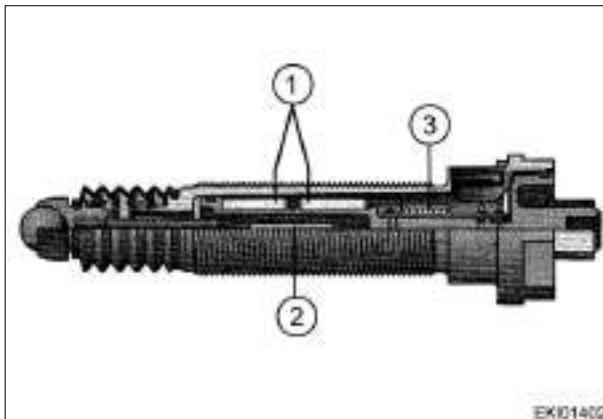
Farmer 400
Fav 700
Fav 900

Power lift/Electrohydraulic remote control
External position gauge - functional description

A

Features of the external position gauge

- Axially movable feeler with spring bias
- Inductive gauge (MWL)
- Integrated electronic system with temperature compensation
- Output signal proportional to travel
- Neutral point and sensitivity are calibrated.



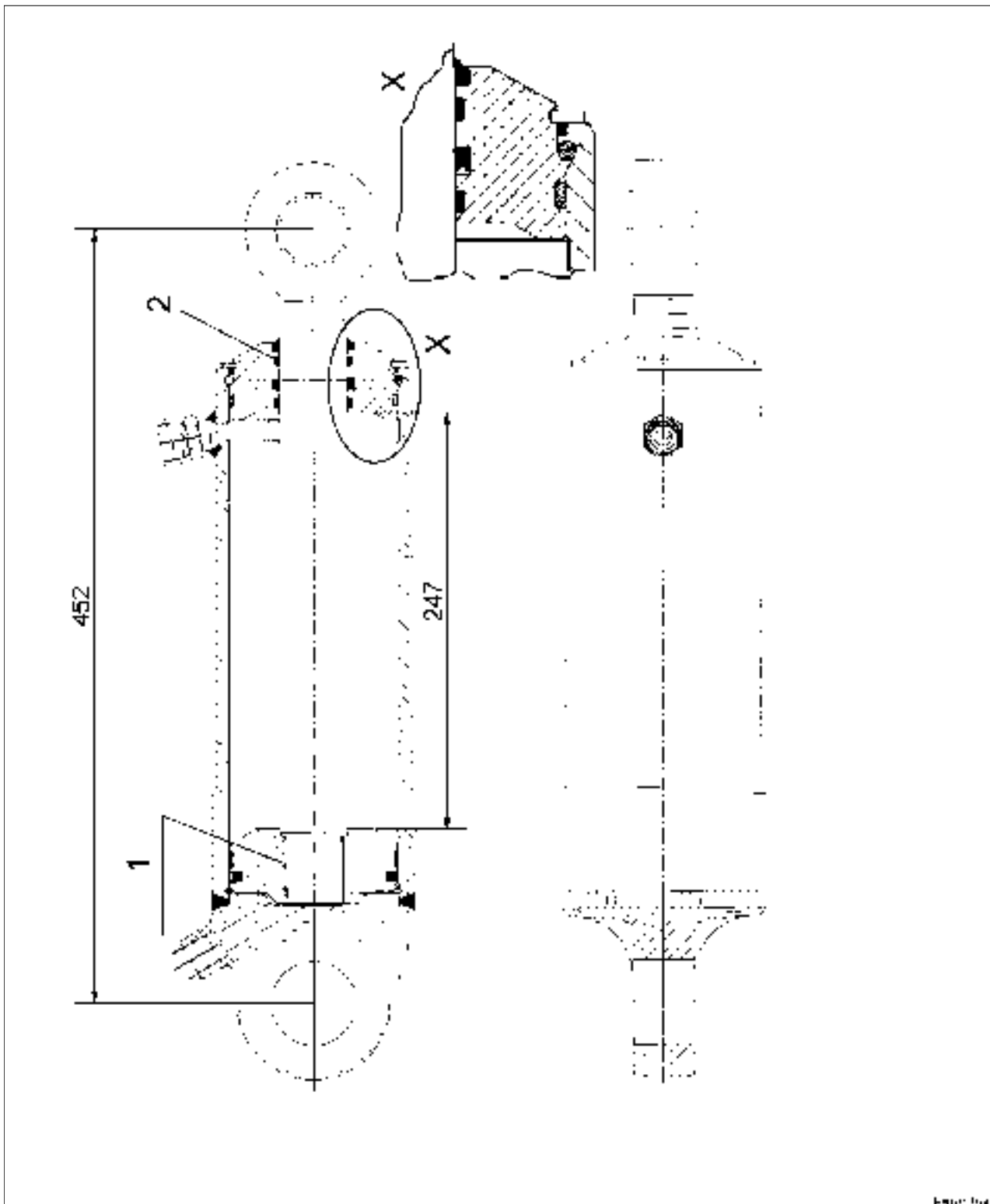
- 1 = coils
 2 = ferrite core
 3 = integrated electronics

Technical specifications of external position gauge (MWL ext)

| | |
|------------------------------|---|
| + supply | 9.5 VDC |
| Signal voltage | 2.4 VDC - 7.1 VDC |
| Mechanical feeler stroke | 13 mm |
| Principal dimensions | 33 mm, 147 mm long with external thread for calibration |
| Electrical measurement range | 10 mm |

Fav 900

Power lift / Controlled power lift
Lift cylinder 40/100, 247/452

C

| Item | Fitting tip |
|------|--|
| 1 | Secured with synthetic bonding agent X 903.050.084 |
| 2 | Immerse in oil |

| Date | Version | Page | Lift cylinder 40/100, 247/452 | Capitel | Index | Docu-No. |
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| 12.07.2001 | a | 1/2 | | 8631 | C | 000003 |

| | | |
|----------------|--|----------|
| Fav 900 | Power lift / Controlled power lift Lift cylinder 40/100, 247/452 | C |
|----------------|--|----------|

40/100 = piston rod diameter / piston diameter

247/452 = cylinder stroke / mounting dimension

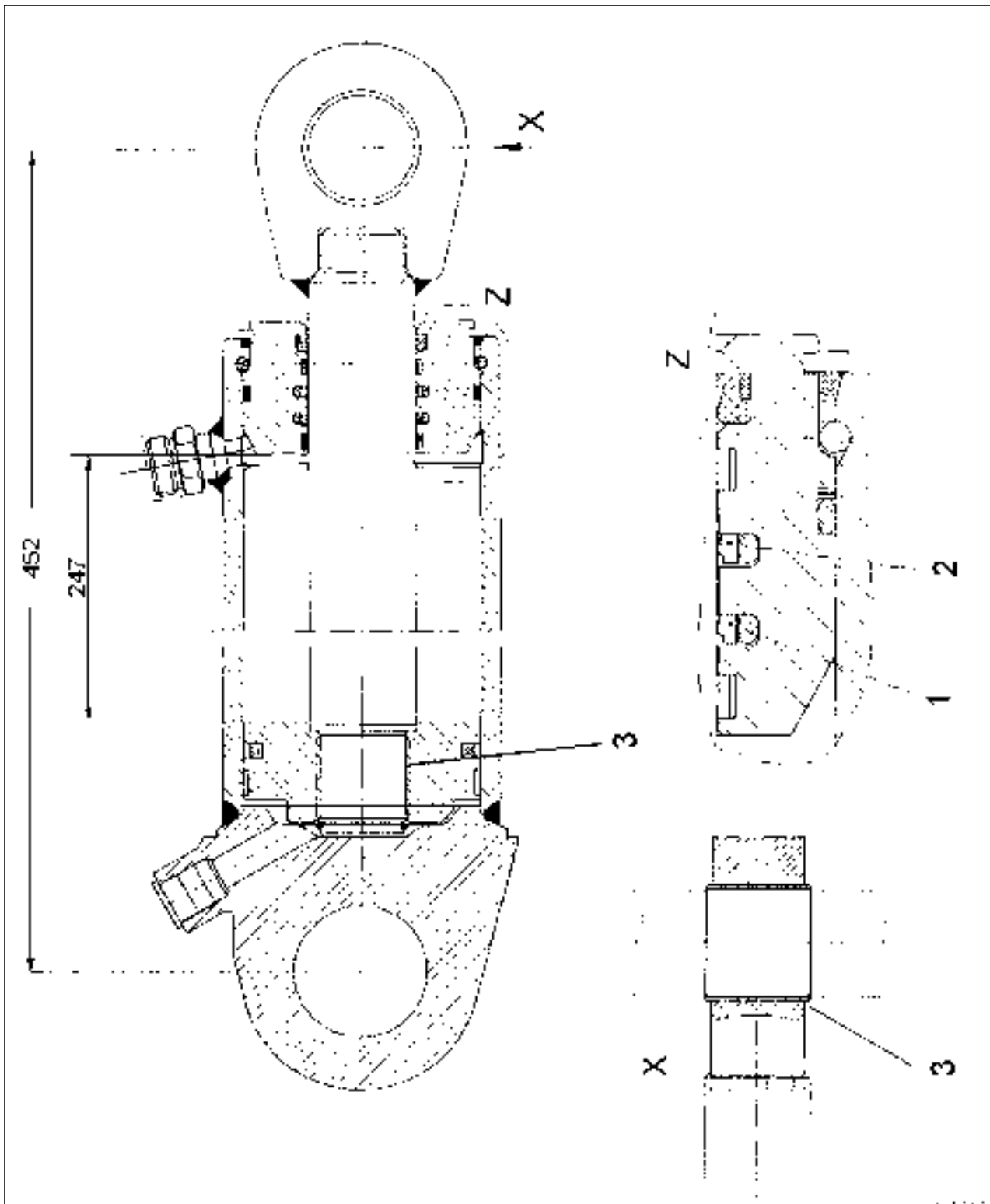
Note:

See also Chapter 8631 Reg. G - Repairing lift cylinder

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Fav 900

Power lift / Controlled power lift
Lift cylinder 40/90, 257/452

C

| Item | Fitting tip |
|------|---|
| 1 | Material PTFE filled with bronze, (colour: grey) |
| 2 | Material PU, (colour: yellow) |
| 3 | Contact surfaces secured with synthetic bonding agent X 903.050.084 |

| Date | Version | Page | Lift cylinder 40/90, 257/452 | Capitel | Index | Docu-No. |
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| | | |
|----------------|--|----------|
| Fav 900 | Power lift / Controlled power lift Lift cylinder 40/90, 257/452 | C |
|----------------|--|----------|

40/90 = piston rod diameter / piston diameter

247/452 = cylinder stroke / mounting dimension

Note:

See also:

Chapter 8631 Reg. G - Repairing lift cylinder

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| | | |
|----------------|---|----------|
| Fav 900 | Power lift / Controlled power lift Repairing lift cylinder | G |
|----------------|---|----------|

Lift cylinder Fav 900 / 21 /

The following are installed, depending on chassis number:

Lift cylinder 40/90, 247/452

Lift cylinder 40/100, 247/452

Note:

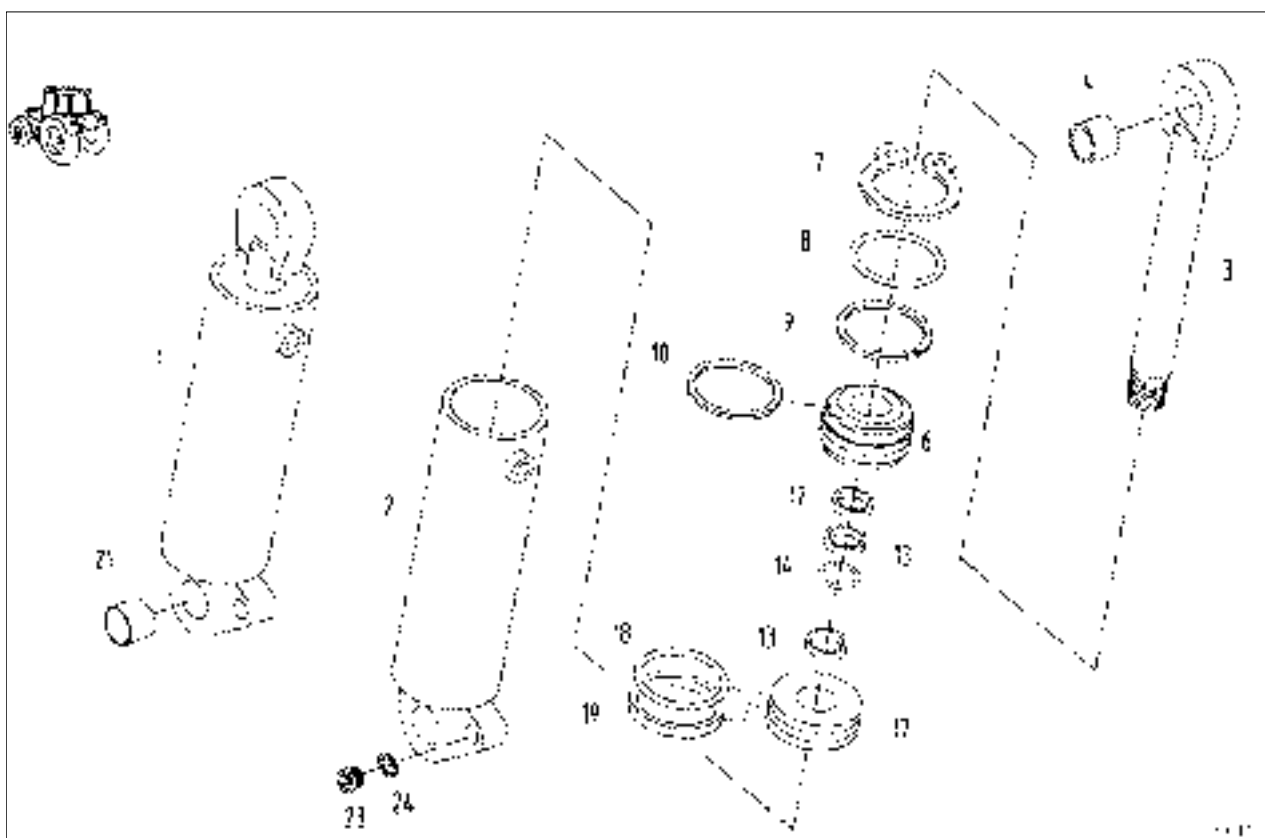
See also Fendos spare parts catalogue

Lift cylinders for Fav 900 chassis number 23/3001 and up

Lift cylinder 40/100, 247/452

Lift cylinder 40/100, 247/452**Note:**

Fit lift cylinder 40/90, 247/452 in same manner.



| Item | Designation | Item | Designation |
|------|--|------|------------------|
| 1 | Lift cylinder, double-acting | 12 | Oil scraper ring |
| 1 | Seal set | 13 | Guide ring |
| 2 | Cylindrical tube (not available individually) | 14 | V-seal |
| 3 | Piston rod | 17 | Piston |
| 4 | Bearing bush | 18 | Guide ring |
| 6 | Guide bush | 19 | Form seal |
| 7 | Circlip | 21 | Bearing bush |
| 8 | O-ring | 23 | Drain plug |
| 9 | Snap ring | 24 | Sealing ring |
| 10 | Form seal | | |

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| | | |
|----------------|--|----------|
| Fav 900 | Power lift / Controlled power lift Repairing lift cylinder | G |
|----------------|--|----------|

Note:**See also:**

Chapter 8631 Reg. C - Lift cylinder 40/100, 247/452

Chapter 8631 Reg. C - Lift cylinder 40/90, 247/452

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| | | |
|------------------|--|----------|
| All types | Air compressor / General system Troubleshooting flowchart, air compressor | B |
|------------------|--|----------|

**Warning:**

Always disconnect the red coupling head (storage tank) first when unhitching the trailer or trailed vehicle.

(Only then is the trailer or trailed vehicle secured against rolling away!)

Pressure regulator vents too frequently without the brake being operated

| | | |
|--|--------|---|
| Pressure regulator vents too frequently without the brake being operated | | |
| | | |
| | | |
| Check operating range (pressure) of pressure regulator | Not OK | Set pressure regulator (fit new one if necessary) |
| | | |
| | | |
| OK | | |
| | | |
| Check air compressor for leaks - screw couplings - drain valve - non-return valve in pressure regulator | | |

Tank pressure incorrect

| | | |
|--|-------------------|--|
| Tank pressure not OK | | |
| | | |
| | | |
| Check B019-sensor, compressed-air volume (Chapter 9000 Reg. E) | Display incorrect | Fit new B019-sensor, compressed-air volume |
| to do so, connect test pressure gauge to storage tank coupling head (red) and compare with display on A007-display unit. | | |
| | | |
| | | |
| Display correct | | |
| | | |
| | | |
| Check air compressor for leaks | Leak found | Repair leak(s) |
| | | |
| No leak | | |
| | | |
| See "Air compressor filling time too long" fault scenario | | |

| Date | Version | Page | Troubleshooting flowchart, air compressor | Capitel | Index | Docu-No. |
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| | | |
|------------------|--|----------|
| All types | Air compressor / General system Troubleshooting flowchart, air compressor | B |
|------------------|--|----------|

Air compressor filling time is too long

| | |
|---|--|
| Air compressor filling time is too long | |
| I | |
| Is the pressure regulator cut-out pressure reached? To check, connect test pressure gauge to storage tank coupling head (red) and compare with display on A007-display unit. | |

| | |
|---|---|
| Cut-out pressure is reached | |
| I | |
| Check air compressor for leaks in braked and unbraked mode | Leak found |
| I | Repair leak(s) |
| No leak | I |
| I | Filling time still too long |
| Dirt in pressure regulator | Yes |
| | I |
| Check condition of pressure regulator. - Remove pressure pipes from air compressor to pressure regulator, check that they are clear, fit new ones if necessary | Check air compressor and fit new one if necessary |
| I | |
| Filling time still too long | |
| Yes | |
| I | |
| Check air compressor and fit new one if necessary | |

| | |
|--|--|
| Cut-out pressure is not reached | |
| I | |
| Leaks in pressure regulator in filling phase at vent point | No |
| Yes | Check brake system for leaks in braked and unbraked mode |
| I | |
| Fit new pressure regulator | |
| I | |
| Filling time still too long | |
| Yes | |
| I | |
| Check brake system for leaks in braked and unbraked mode | |

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| | | |
|------------------|--|----------|
| All types | Air compressor / General system Troubleshooting flowchart, air compressor | B |
|------------------|--|----------|

Residual pressure at yellow coupling head, with brake not actuated

| | | |
|---|----|---|
| Residual pressure at yellow coupling head, with brake not actuated | | |
| I | | |
| Ignition ON | | |
| I | | |
| Handbrake fully released? (Detach linkage from trailer valve if necessary.) | No | Set handbrake linkage |
| Yes | | |
| I | | |
| Set master brake cylinder (Chapter 1070 Reg. E) | | |
| I | | |
| Pressure drops | No | Compressed-air advance control system setting |
| Yes | | Chapter 1070 Reg. E (Setting of magnet for solenoid switch S005/S006) |
| I | | |
| Air compressor OK | | |

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| | | |
|------------------|--|----------|
| All types | Air compressor / General system Troubleshooting flowchart, air compressor | B |
|------------------|--|----------|

Dual-line trailer advances on tractor when braking

| | | |
|---|--|--|
| Dual-line trailer advances on tractor when braking | | |
| I | | |
| Check pressure at tractor coupling heads | | |

| | | |
|--|----|---|
| Pressures at coupling heads match | | |
| I | | |
| Measure braking force at trailer brake cylinders; note proportioning valve setting | | |
| I | | |
| Pressure (braking force) OK? | No | Set trailer proportioning valve, check trailer brake system |
| Yes | | |
| I | | |
| Check trailer brake cylinders, check trailer's mechanical wheel brake | | |

| | | |
|--|----|--|
| Storage pressure (red coupling head) is incorrect | | |
| I | | |
| Check tank pressure | | |
| I | | |
| Tank pressure (8.1 bar) | No | See "Tank pressure incorrect" fault scenario |
| Yes | | |
| I | | |
| Check braking force at trailer brake cylinders; note proportioning valve setting | | |

| | | |
|---|--|--|
| Braking force (yellow coupling head) not OK | | |
| I | | |
| - compressed-air advance control system | | |
| Chapter 1070 Reg. E (Setting of magnet for solenoid switch S005/S006) | | |
| - check trailer valve, fit new one if necessary | | |

| Date | Version | Page | Troubleshooting flowchart, air compressor | Capitel | Index | Docu-No. |
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| | | |
|------------------|--|----------|
| All types | Air compressor / General system Troubleshooting flowchart, air compressor | B |
|------------------|--|----------|

Trailer does not brake (single-line brake system) (optional extra)

| | | |
|--|----------------------|---|
| Trailer does not brake (single-line brake system) | | |
| I | | |
| Check pressure at coupling head (black) (approx. 5.0 - 5.5 bar). | No | Check tractor brake system |
| Yes | | Chapter 8800 Reg. C - Air compressor plan |
| I | | |
| Pressure drop when braking (pressure drop in trailer control line to 0 bar) | | |
| Check pressure drop with foot-brake and handbrake | Pressure drop not OK | Check tractor brake system |
| I | | Chapter 8800 Reg. C - Air compressor plan |
| Pressure drop OK | | |
| I | | |
| Check pressure at trailer brake cylinder and in air tank. | Pressure not OK | Check trailer brake valve, proportioning valve, lines and hoses. Fit new items if necessary |
| Bear proportioning valve setting in mind! Guidelines: empty approx. 1.5 bar; half load approx. 3.0 bar; full load > 4.5 bar | | |
| I | | |
| Pressure OK | | |
| I | | |
| Check mechanical wheel brakes and brake pads, set trailer brake cylinders | | |

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| 05.11.2001 | a | 5/7 | 8800 | B | 000001 |

| | | |
|------------------|--|----------|
| All types | Air compressor / General system Troubleshooting flowchart, air compressor | B |
|------------------|--|----------|

Trailer does not brake (dual-line brake system)

| | | |
|--|-----------------|---|
| Trailer does not brake (dual-line brake system) | | |
| | | |
| Storage pressure (7.0 to 8.1 bar) | No | Check tractor brake system |
| Yes | | |
| | | |
| Check pressure in trailer control line (yellow) approx. 7.0 to 8.0 bar Check pressure build-up with footbrake and handbrake | Pressure not OK | Check tractor brake system |
| | | |
| Pressure OK | | |
| | | |
| Check pressure at trailer brake cylinder and in air tank. | Pressure not OK | Check trailer brake valve, proportioning valve, lines and hoses. Fit new items if necessary |
| Bear proportioning valve setting in mind! Guidelines: empty approx. 2.0 bar; half load approx. 4.0 bar; full load > 6.0 bar | | |
| | | |
| Pressure OK | | |
| | | |
| Check mechanical wheel brakes and brake pads, set trailer brake cylinders | | |

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| 05.11.2001 | a | 6/7 | 8800 | B | 000001 |

| | | |
|------------------|--|----------|
| All types | Air compressor / General system Troubleshooting flowchart, air compressor | B |
|------------------|--|----------|

Leak(s) in tractor air compressor

| | | |
|---|-----|--|
| Leak(s) in tractor air compressor | | |
| Fill air compressor until pressure regulator vents | | |
| | | |
| Switch engine off, ignition ON | | |
| | | |
| | | |
| Connect test pressure gauge to storage tank coupling head (red). Reduce pressure to 7.0 bar. Read off pressure at test pressure gauge and do not actuate brake any more | | |
| | | |
| Pressure change is more than 0.1 bar after 5 minutes | No | Press brake down fully and lock |
| Yes | | Read off pressure at test pressure gauge after 3 minutes. Pressure change |
| | | |
| Locate and repair leak Coupling heads, trailer control valve, pressure regulator, drain valve, screw couplings | Yes | No |
| | | |
| | | Start engine and fill air compressor completely (8.1 bar). Switch engine off, brake not actuated |
| | | Check pressure regulator for leaks |

Note:

Chapter 8800 Reg. C - Air compressor plan

Chapter 8800 Reg. E - Overview of air compressors

Chapter 8800 Reg. E - Checking dual-line brake system in tractor

Chapter 8800 Reg. E - Checking single-line brake system in tractor

Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)

Chapter 8820 Reg. F - Trailer control valve (single-line)

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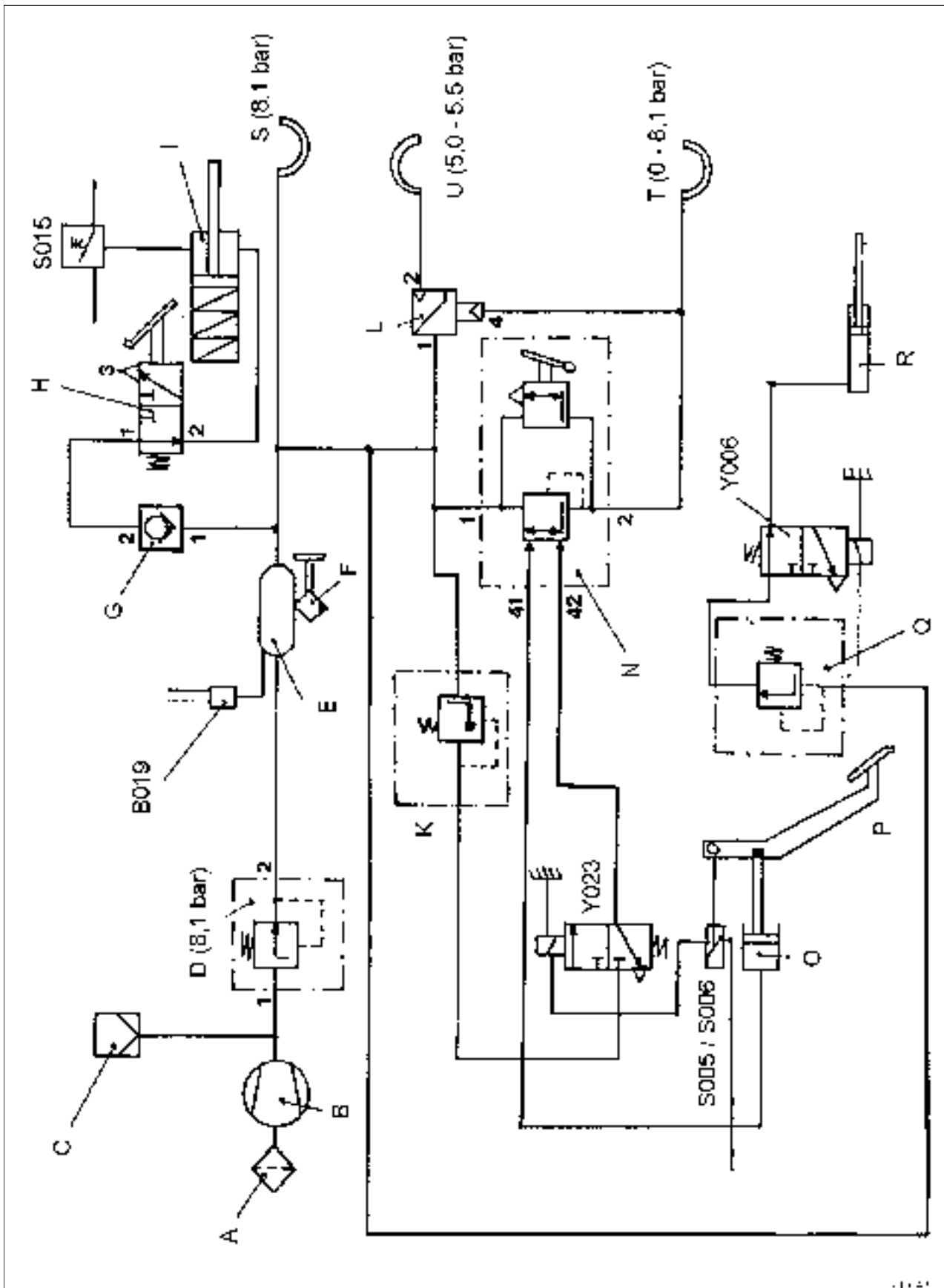
| | | |
|----------------|--|----------|
| Fav 900 | Air compressor / General system Air compressor plan | C |
|----------------|--|----------|

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Fav 900

Air compressor / General system
Air compressor plan

C



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| 19.10.2001 | a | 2/3 | 8800 | C | 000001 |

Air compressor plan

<https://www.truck-manuals.net/>

| | | |
|----------------|--|----------|
| Fav 900 | Air compressor / General system Air compressor plan | C |
|----------------|--|----------|

| Item | Designation | Item | Designation |
|------|---|------|---|
| A | Air filter | Y023 | 3-way directional control valve (pilot valve) |
| B | Compressor | N | Trailer control valve |
| C | Antifreeze pump | S005 | Switch, right brake |
| D | Pressure regulator 8.1 bar | S006 | Switch, left brake |
| E | Air tank Standard: two tanks (each 10 l) connected in parallel Optional extra: four tanks (each 10 l) connected in parallel | O | Service brake |
| | | P | Brake pedal |
| | | Q | Spill valve |
| F | Drain valve | Y006 | Valve, exhaust brake |
| B019 | Pressure sensor, compressed air | R | Exhaust brake |
| G | Non-return valve | S | Coupling head, red 8.1 bar (storage tank) |
| H | Handbrake valve | | |
| I | Accumulator (handbrake) | T | Coupling head, yellow 0 - 8.1 bar (brake) |
| S015 | Switch, handbrake | | |
| K | Pressure regulator, advance control | U | Coupling head, black 5.0 - 5.5 bar (single-line brake) |
| L | Trailer control valve (single-line brake) | | |

Note:

Chapter 8800 Reg. B - Troubleshooting flowchart, compressed air

Chapter 8800 Reg. D - Position of components, air compressor

Chapter 8800 Reg. E - Overview of air compressors

Chapter 8800 Reg. E - Checking dual-line brake system in tractor

Chapter 8800 Reg. E - Checking single-line brake system in tractor

Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)

Chapter 8820 Reg. F - Trailer control valve (single-line)

| Date | Version | Page | Capitel | Index | Docu-No. |
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Fav 900

Air compressor / General system

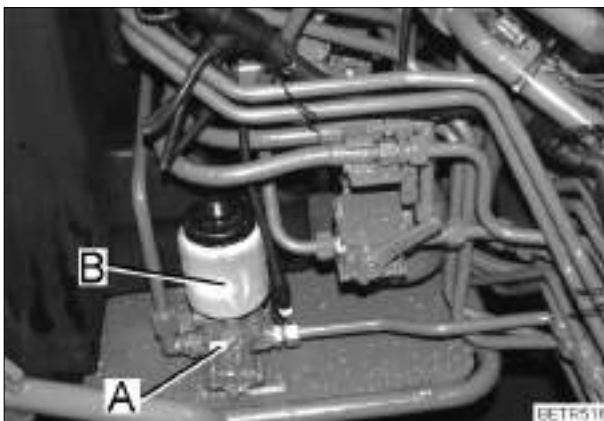
Position of components, air compressor

D**Air filter**

On engine bulkhead

**Compressor**

Right side of engine

**Antifreeze pump****When there is a risk of frost**

- Move lever of antifreeze pump (A) to I = open.
- Fill antifreeze tank (B) with ethyl alcohol (X 902.015.003).

At end of winter operation

- Move lever to 0 = closed.

Remove panel at right entrance step.

**Pressure regulator (8.1 bar)**

Right side of tractor



| Date | Version | Page | Position of components, air compressor | Capitel | Index | Docu-No. |
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| 08.11.2001 | a | 1/5 | | 8800 | D | 000002 |

| | | |
|----------------|---|----------|
| Fav 900 | Air compressor / General system Position of components, air compressor | D |
|----------------|---|----------|

**Air tank and drain valve**

Standard: 2 air tanks (20 l)

Optional extra: 4 air tanks (40 l)

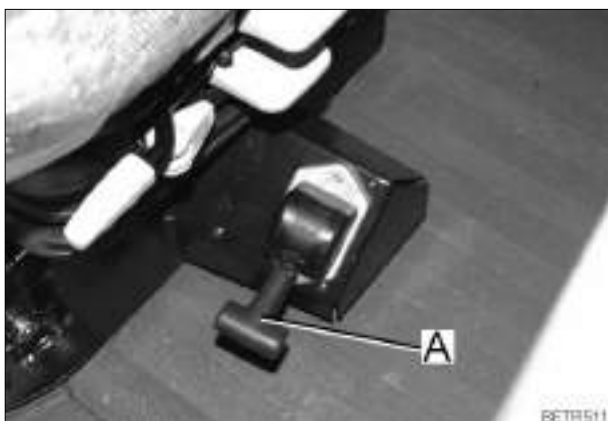
Left and right sides of tractor

**Spill valve (to exhaust brake)**

On left air tank



Remove guard.

**Pneumatic handbrake valve**

On left in cab

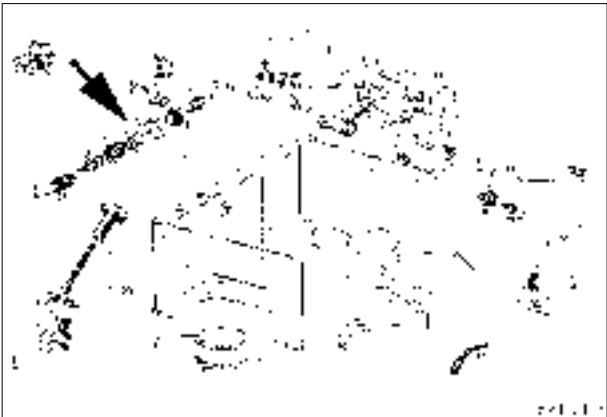
**Accumulator (handbrake)**

On left at rear of tractor



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| 08.11.2001 | a | 2/5 | 8800 | D | 000002 |

| | | |
|----------------|---|----------|
| Fav 900 | Air compressor / General system Position of components, air compressor | D |
|----------------|---|----------|

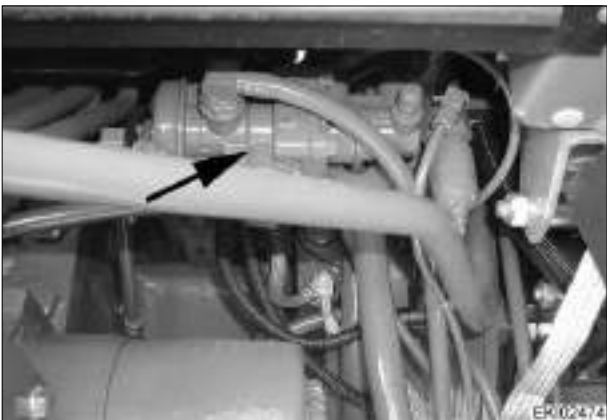


Non-return valve (note fitting direction of non-return valve)

In cab under seat bracket

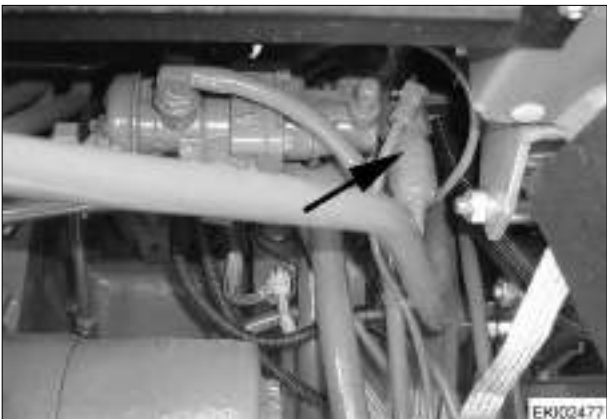


Remove panel.



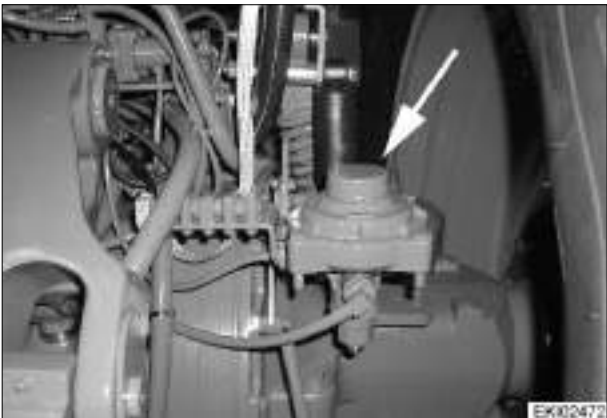
Trailer control valve (dual-line brake)

On right at rear of tractor



Pressure regulator (advance control)

On right at rear of tractor



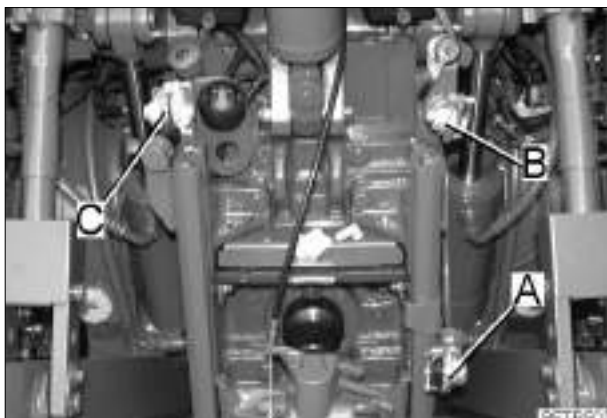
Trailer control valve (single-line brake)

On right at rear of tractor

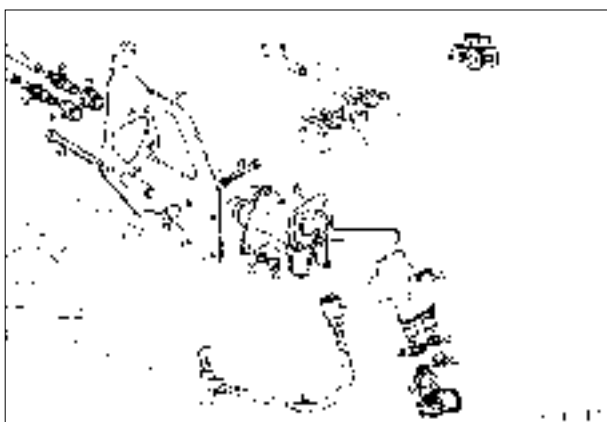


| Date | Version | Page | Position of components, air compressor | Capitel | Index | Docu-No. |
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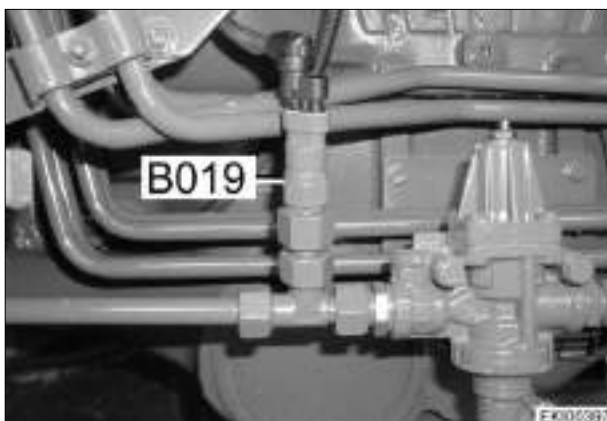
| | | |
|----------------|---|----------|
| Fav 900 | Air compressor / General system Position of components, air compressor | D |
|----------------|---|----------|



- A = Coupling head (black), single-line brake system connection
- B = Coupling head (red), dual-line system, storage tank
- C = Coupling head (yellow), dual-line system, brakes



Coupling head (Italy)



B019 - pressure sensor, compressed air

Note:

Chapter 9000 Reg. E - Measuring and testing

Right side of tractor



Y006 - valve, exhaust brake

Front left on radiator



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| 08.11.2001 | a | 4/5 | 8800 | D | 000002 |

| | | |
|----------------|---|----------|
| Fav 900 | Air compressor / General system Position of components, air compressor | D |
|----------------|---|----------|

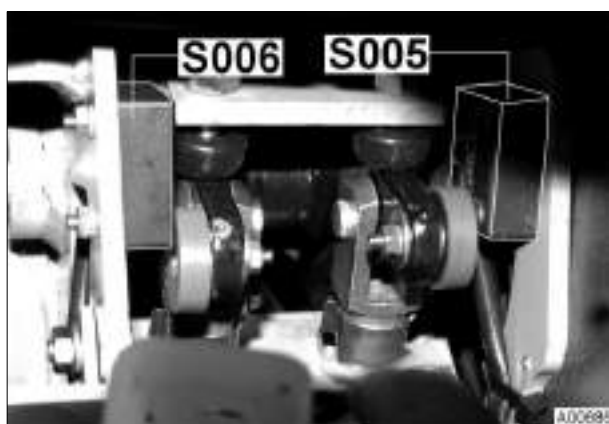


Y023 - 3-way directional control valve (pilot valve)

Note:

Chapter 9000 Reg. E - Measuring and testing

On right at rear of tractor



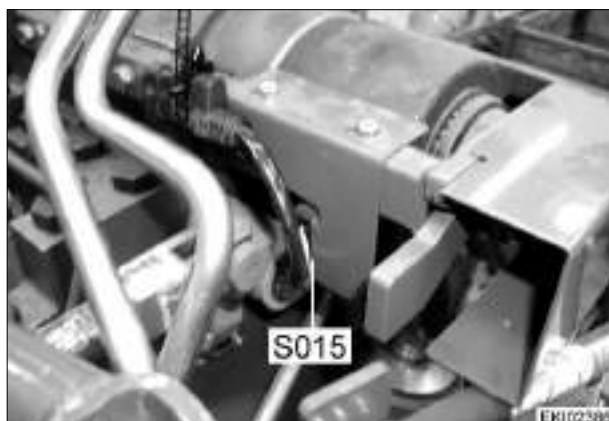
S005 / S006 - switch, brake

Note:

Chapter 9000 Reg. E - Measuring and testing

Chapter 1070 Reg. E - Setting magnet for solenoid switch S005/S006

At top of steering column



S015 - handbrake switch

Note:

Chapter 9000 Reg. E - Measuring and testing
Vario transmission goes to "Neutral" when handbrake is operated

On left at rear of tractor



Note:

Chapter 8800 Reg. C - Air compressor plan

Chapter 8800 Reg. E - Overview of air compressors

Chapter 8800 Reg. E - Checking dual-line brake system in tractor

Chapter 8800 Reg. E - Checking single-line brake system in tractor

Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)

Chapter 8820 Reg. F - Trailer control valve (single-line)

| Date | Version | Page | Position of components, air compressor | Capitel | Index | Docu-No. |
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| 08.11.2001 | a | 5/5 | | 8800 | D | 000002 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Air compressor / General system Overview of air compressors | E |
|----------------------------------|---|----------|

Overview of air compressors

| Model | Cubic capacity [ccm] | Tank pressure [bar] | Tank volume [l] |
|------------|-------------------------|------------------------|--------------------------|
| Farmer 400 | 159 | 8.1 | 15 |
| Fav 700 | 229 | 8.1 | 20 |
| Fav 900 | 213 | 8.1 | 20 (optional extra 40 l) |

Filling times (at rated speed)

| Operating pressure [bar] | Cubic capacity [ccm] | Tank volume [l] | Time [sec] |
|-----------------------------|-------------------------|--------------------|---------------|
| 8.1 | 159 | 15 | approx. 30 |
| 8.1 | 229 (Fav 700) | 20 | approx. 30 |
| 8.1 | 213 (Fav 900) | 20 | approx. 35 |

13. Performance test and checking for leaks

Venting pressure

Pressure regulator must vent at approx. 8.1 bar (8 bars on LCD display).

In event of discrepancies, adjust pressure regulator on air tank.

Tightness against leaks

Weekly checks with engine off:

Pressure drop with full system may not exceed 0.5 bar in 2 hours.

Check trailer advance-braking control system.

- Fill air compressor until pressure regulator vents
- With footbrake not actuated and handbrake released, yellow coupling head must be unpressurised.
- After 20 mm footbrake pedal travel there must be pressure of 0.5 - 1 bar acting on yellow coupling head.

In event of discrepancies, adjust solenoid switch (S005 / S006) on footbrake pedal (see Favorit 700 Workshop Manual, Chapter 1070 Reg. F).

Check trailer control line (single-line system).

- With brake released, pressure at black coupling head must be 5.1 - 5.5.
 - When footbrake or handbrake is actuated, pressure must drop to 0 bar.
- Setting at trailer control valve (single-line system)

Setting handbrake

- Set such that there is no pressure at yellow coupling head with handbrake released.
- With 50% handbrake handle travel, pressure should rise to 7.0 - 7.8 bar.

Setting at linkage between trailer control valve (dual-line system) and brake cylinder.

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| 29.10.2001 | a | 1/2 | 8800 | E | 000001 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Air compressor / General system Overview of air compressors | E |
|---|--|----------|

Test pressures in bar

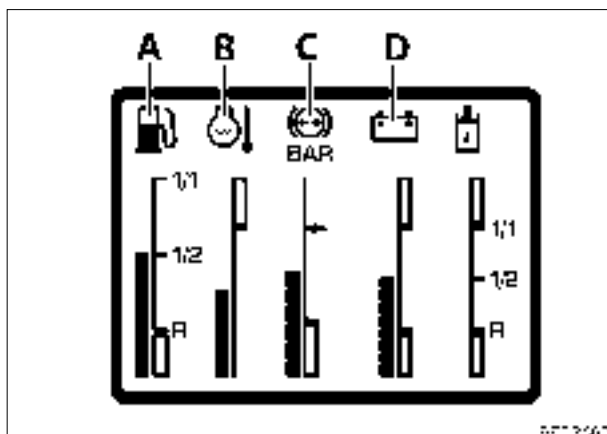
| Brake not actuated | Brake actuated approx. 20 mm | Brake fully actuated | Connection |
|---------------------------|-------------------------------------|-----------------------------|----------------------------|
| 8.1 | 7.8 - 8.1 | 7.0 - 8.0 | Red (A Italian version) |
| 5.1 - 5.5 | 3.9 - 4.5 | 0 | Black |
| 0 | 0.5 - 1.0 | 7.0 - 7.8 | Yellow (M Italian version) |

| Date | Version | Page | Overview of air compressors | Capitel | Index | Docu-No. |
|------------|---------|------|-----------------------------|---------|-------|----------|
| 29.10.2001 | a | 2/2 | | 8800 | E | 000001 |

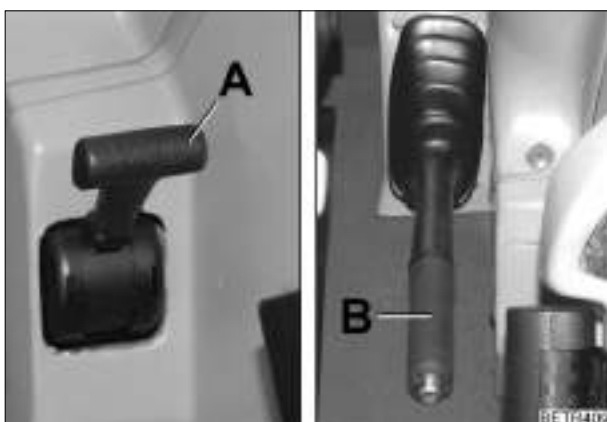
All types

Air compressor / General system

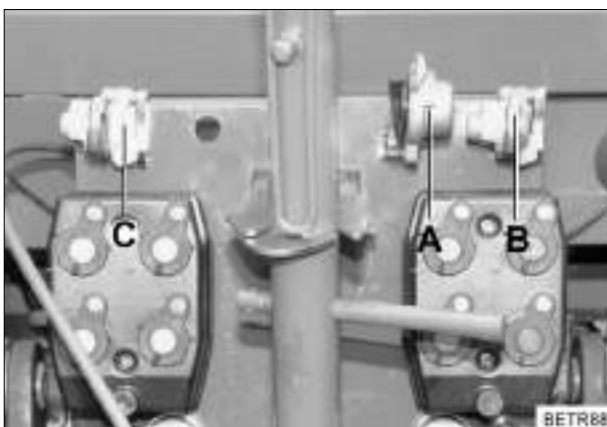
Checking single-line brake system in tractor

E**C** = Compressed-air volume

Fill air compressor until cut-out pressure is reached.

**A** = Pneumatic handbrake**B** = Mechanical handbrake (optional extra)

Release handbrake.

**A** = Coupling head (black), single-line brake system connection**B** = Coupling head (red), dual-line system, storage tank**C** = Coupling head (yellow), dual-line system, brakes

Connect test pressure gauge to coupling head (black).

Target value: 5.0 - 5.5 bar

Actuate footbrake.

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|------------|---------|------|---------|-------|----------|
| 06.11.2001 | a | 1/2 | 8800 | E | 000002 |

Checking single-line brake system in tractor

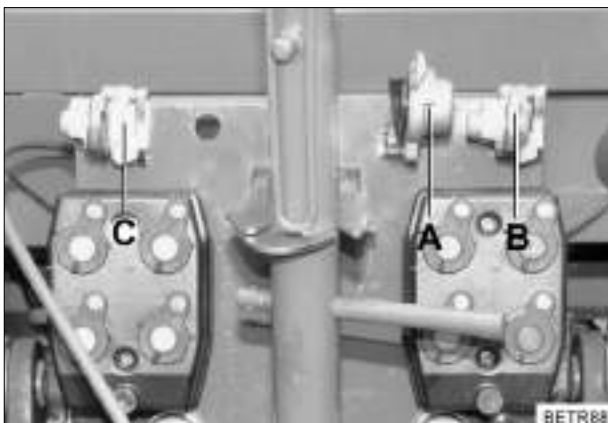
<https://www.truck-manuals.net/>

All types

Air compressor / General system

Checking single-line brake system in tractor

E

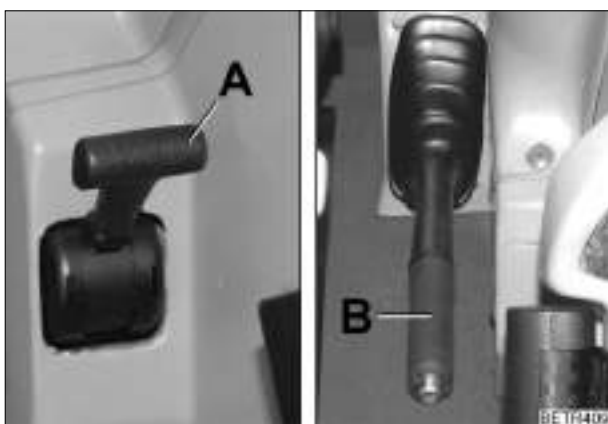


Note pressure drop while operating carefully until brake pedal is fully depressed.

- Partial braking of 1.0 bar (measurable at yellow coupling head). Pressure drop at black coupling head of 1.3 - 2.5 bar
- Full braking. Pressure at black coupling head, target value: 0 bar



Release footbrake again.



Actuate handbrake

Pressure at black coupling head, target value: 0 bar

Note:

Chapter 8800 Reg. B - Troubleshooting flowchart, air compressor

Chapter 8800 Reg. C - Air compressor plan

Chapter 8800 Reg. E - Overview of air compressors

Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)

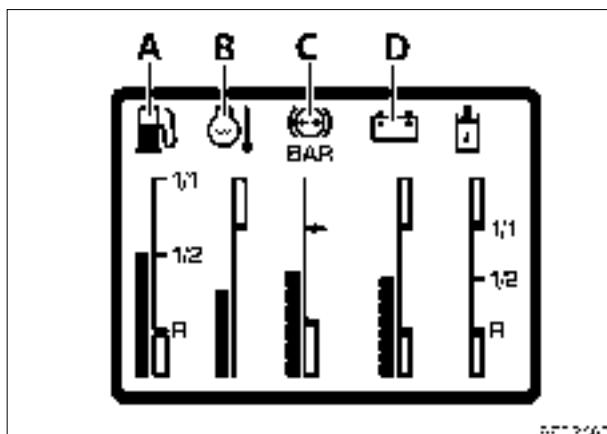
Chapter 8820 Reg. F - Trailer control valve (single-line)

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| 06.11.2001 | a | 2/2 | 8800 | E | 000002 |

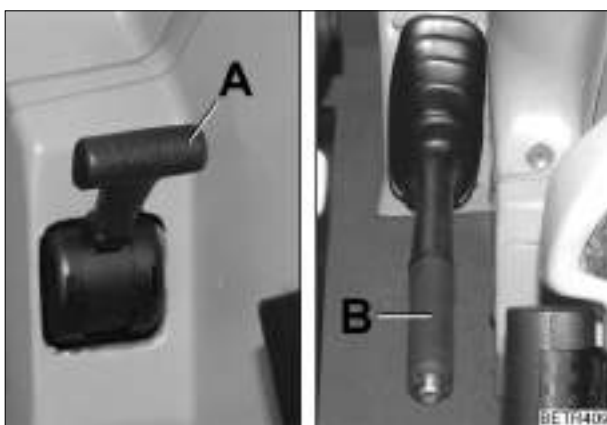
All types

Air compressor / General system

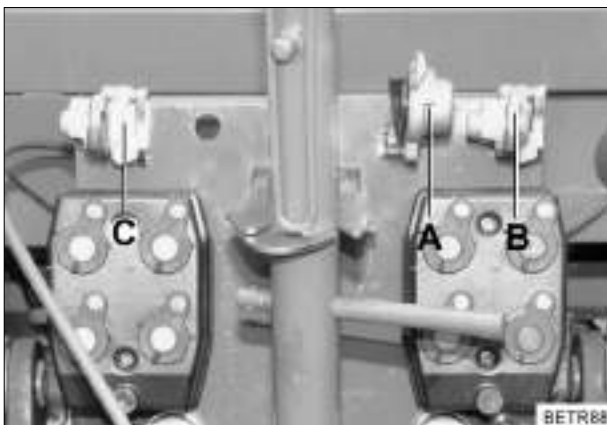
Checking dual-line brake system in tractor

E**C** = Compressed-air volume

Fill air compressor until cut-out pressure is reached.

**A** = Pneumatic handbrake**B** = Mechanical handbrake (optional extra)

Release handbrake.

**A** = Coupling head (black), single-line brake system connection**B** = Coupling head (red), dual-line system, storage tank**C** = Coupling head (yellow), dual-line system, brakes

Connect test pressure gauge to coupling head (yellow).

Target value: 0 bar

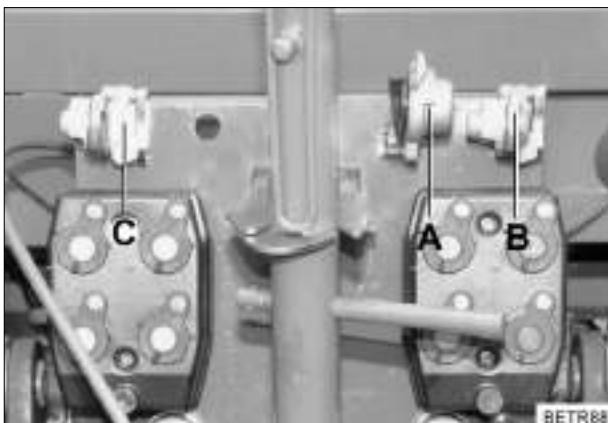
Actuate footbrake.

| Date | Version | Page | Capitel | Index | Docu-No. |
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| 06.11.2001 | a | 1/2 | 8800 | E | 000003 |

All types

Air compressor / General system

Checking dual-line brake system in tractor

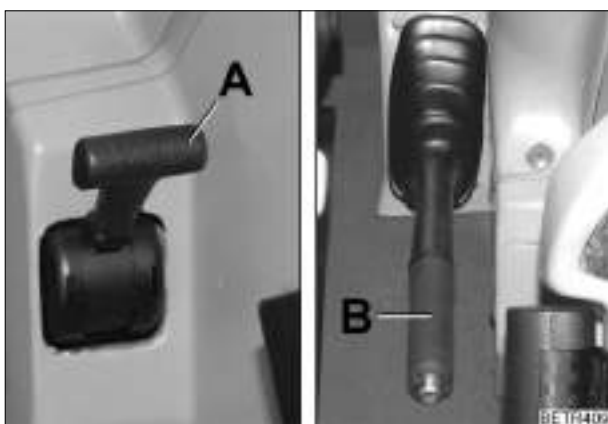
E

Note steady pressure increase while operating carefully until brake pedal is fully depressed.

- Full braking. Pressure at yellow coupling head, target value: 7.0 - 8.1 bar



Release footbrake again.



Actuate handbrake.

Pressure at yellow coupling head
Rapid pressure rise to 7.0 - 8.1 bar

Note:

Chapter 8800 Reg. B - Troubleshooting flowchart, air compressor

Chapter 8800 Reg. C - Air compressor plan

Chapter 8800 Reg. E - Overview of air compressors

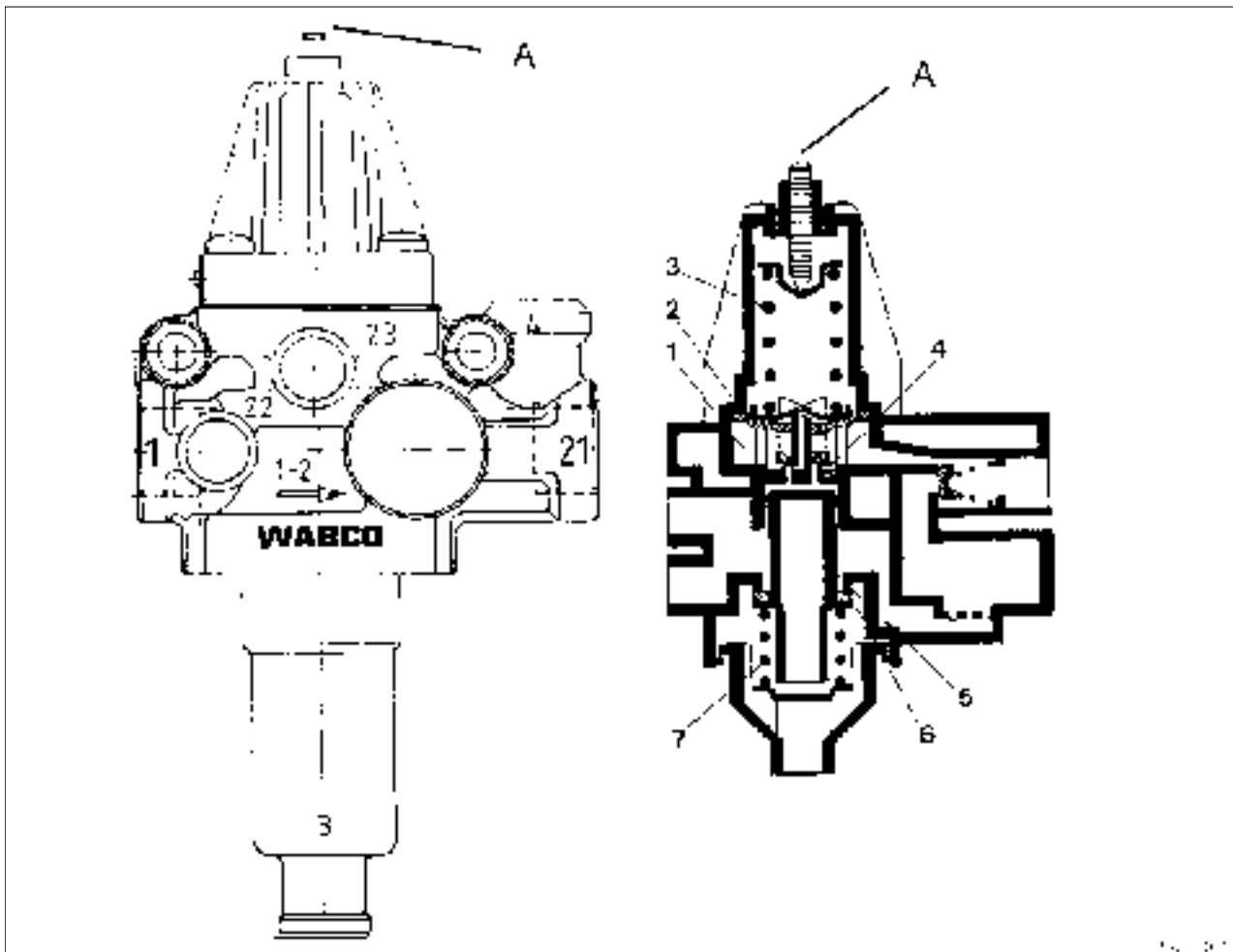
Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)

Chapter 8820 Reg. F - Trailer control valve (single-line)

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 06.11.2001 | a | 2/2 | 8800 | E | 000003 |

*All types*Air compressor / Brake fittings
Setting pressure regulator (8.1 bar)**F****Setting pressure regulator (8.1 bar)****Warning:****The brake system may only be set by a specialist workshop!****Note:**

Before adjustment of the pressure regulators, see also:
Chapter 8800 Reg. B - Troubleshooting flowchart, air compressor



| Item | Designation | Item | Designation |
|------|------------------|------|----------------|
| A | Stud bolt | 4 | Inlet seat |
| 1 | Chamber | 5 | Cut-out piston |
| 2 | Membrane | 6 | Outlet seat |
| 3 | Regulator spring | 7 | Spring |

Turn stud bolt (A) to left (regulator spring is relaxed). = **Pressure is reduced.**

Turn stud bolt (A) to right (regulator spring is tensioned). = **Pressure is increased.**

| Date | Version | Page | Setting pressure regulator (8.1 bar) | Capitel | Index | Docu-No. |
|------------|---------|------|--------------------------------------|---------|-------|----------|
| 06.11.2001 | a | 1/1 | | 8820 | F | 000001 |

| | | |
|------------------|--|----------|
| All types | Air compressor / Brake fittings Trailer control valve (single-line) | F |
|------------------|--|----------|

Trailer control valve (single-line brake system) (optional extra)

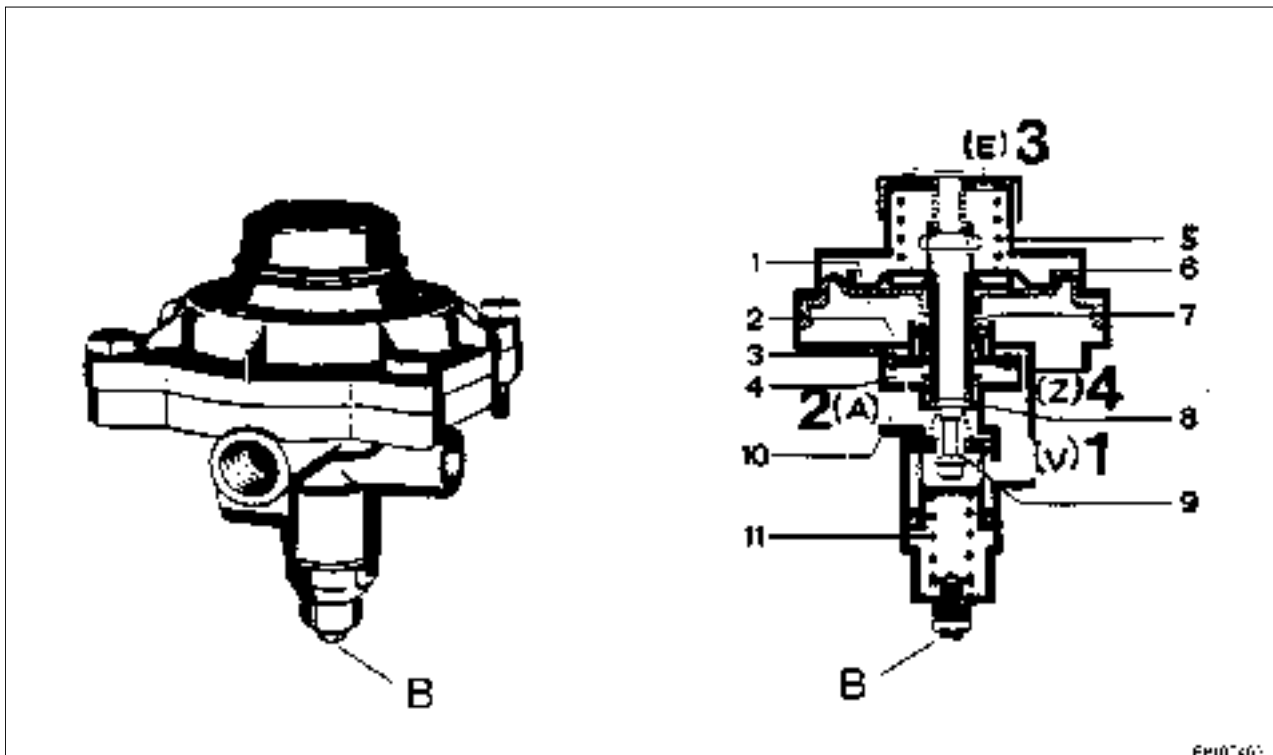


Warning:

The brake system may only be set by a specialist workshop!

Note:

Before adjusting trailer control valve (single-line), see also:
Chapter 8800 Reg. B - Troubleshooting flowchart, air compressor



| Item | Designation | Item | Designation |
|------|--------------------|------|-----------------------------|
| A | Stud bolt | 6 | Diaphragm piston |
| 1 | Chamber | 7 | Valve sleeve |
| 2 | Chamber | 8 | Outlet (double plug valve) |
| 3 | Graduated piston | 9 | Inlet (double plug valve) |
| 4 | Chamber | 10 | Chamber |
| 5 | Compression spring | 11 | Compression spring |

| Item | Designation | Item | Designation |
|-------|---|-------|----------------------------------|
| 1 (V) | Feed (from supply line) | 3 (E) | Vent point |
| 2 (A) | Connection to trailer control line (single-line, black) | 4 (Z) | Connection of trailer brake line |

Turn stud bolt (B) to left (regulator spring is relaxed). = **Pressure is reduced.**

Turn stud bolt (B) to right (regulator spring is tensioned). = **Pressure is increased.**

| Date | Version | Page | Trailer control valve (single-line) | Capitel | Index | Docu-No. |
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| 06.11.2001 | a | 1/2 | | 8820 | F | 000002 |

| | | |
|------------------|--|----------|
| All types | Air compressor / Brake fittings Trailer control valve (single-line) | F |
|------------------|--|----------|

Set pressure with brake not actuated at connection 2(A) ---> 5.0 - 5.5 bar

| Test values | |
|---|-------------------------------------|
| Regulated pressure at connection 4 (Z) | Pressure at connection 2 (A) |
| 0.4 bar | 1.1 - 1.3 bar pressure drop |
| 5.5-6.0 bar | 0 bar |

Note:

Chapter 8800 Reg. C - Air compressor plan

| Date | Version | Page | Trailer control valve (single-line) | Capitel | Index | Docu-No. |
|------------|----------|------|-------------------------------------|-------------|----------|---------------|
| 06.11.2001 | a | 2/2 | | 8820 | F | 000002 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system Labelling of electrical cables and connectors | A |
|---|---|----------|

Labelling of electrical cables

Cable label:

| Cable label | |
|---------------------|----------------------------------|
| For example: | |
| W | Wire |
| F | Cable loom |
| 0204 | Sequential number |
| ws | Colour |
| 1 | Cross-section (mm ²) |

Cable looms (selection):

| Label | Designation | Cable loom |
|-------|-----------------|---------------------------------|
| WR | Wire, chassis | Chassis cable loom |
| WF | Wire, cab base | Cab base cable loom |
| WK | Wire, cab | Cab cable loom |
| WA | Wire, starter | Starter wiring |
| WWK | Wire, cab wiper | Wiper motor wiring (windscreen) |

Cable colours:

| Designation | Cable colour |
|------------------------------|--------------------------------------|
| General | White (ws), black printing |
| +UB 30 (battery +) | Red (rt) |
| +UB 15 (switched +) | Black (sw) |
| +UB 58 (lighting) | Grey (gr), basic colour for lighting |
| +UB 58 lighting left | Grey/black (gr_sw) |
| +UB 58 lighting right | Grey/red (gr_rt) |
| +UB supply to sensor systems | Yellow (ge) |
| Vehicle earth | Brown (br) |
| Electronics earth | Brown/white (br_ws) |
| Sensor system earth | Brown/yellow (br_ge) |

Labelling of connectors

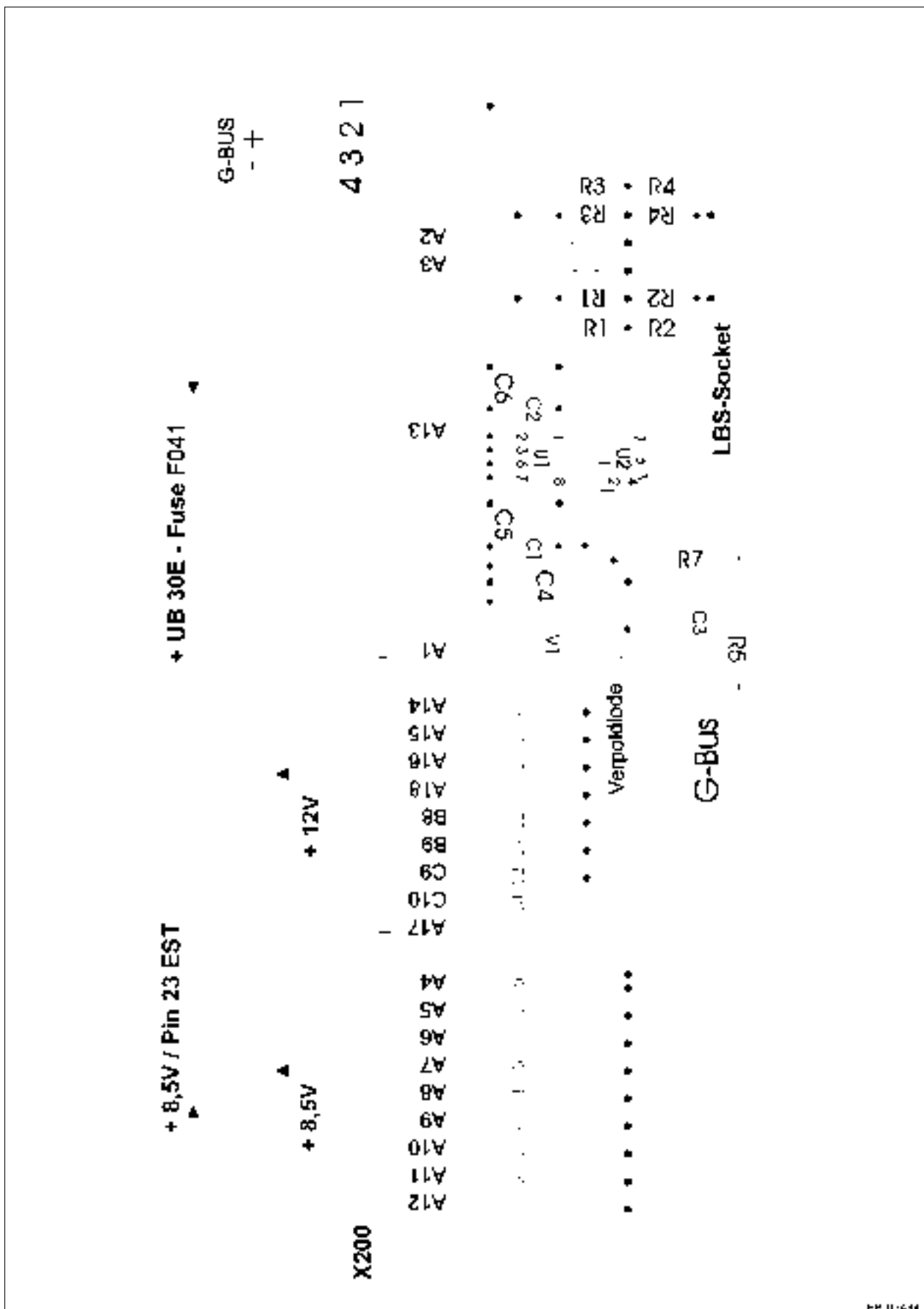
In general the connector name is printed on the cable loom.

| Connector | Designation |
|-------------|---|
| X000 - X499 | Component connector and cable loom connectors |
| X500 - X599 | Vehicle earthing point |
| X600 - X899 | Connector |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
A013 - fuse board, detail drawing from X200

A



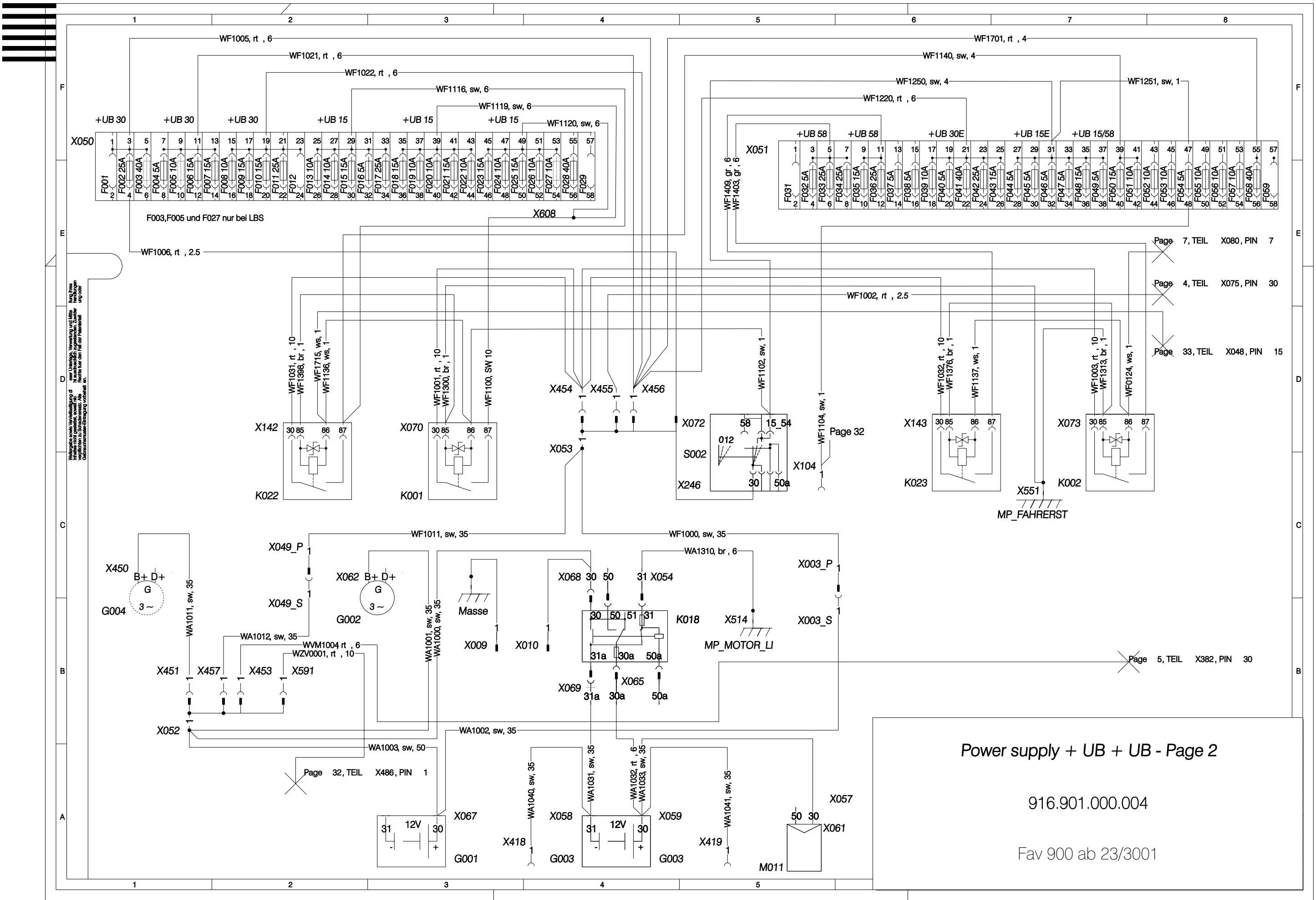
| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|---------|------|---|-------|----------|
| 06/2000 | a | 1/1 | A013 - fuse board, detail drawing from X200 | 9000 | A |

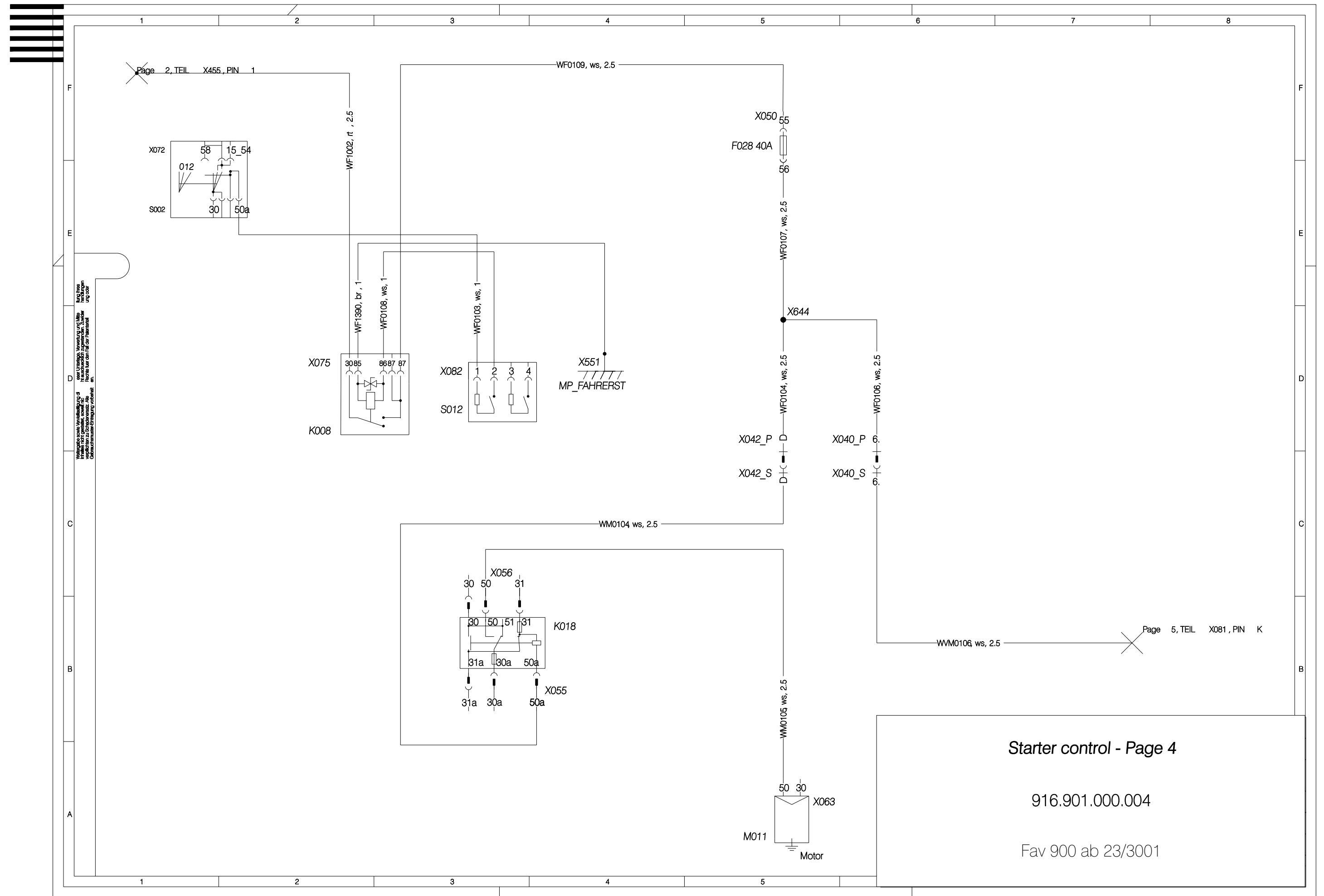
| | | |
|----------------|---|----------|
| Fav 900 | Electrics / General system Circuit diagram overview for Favorit 900 | C |
|----------------|---|----------|

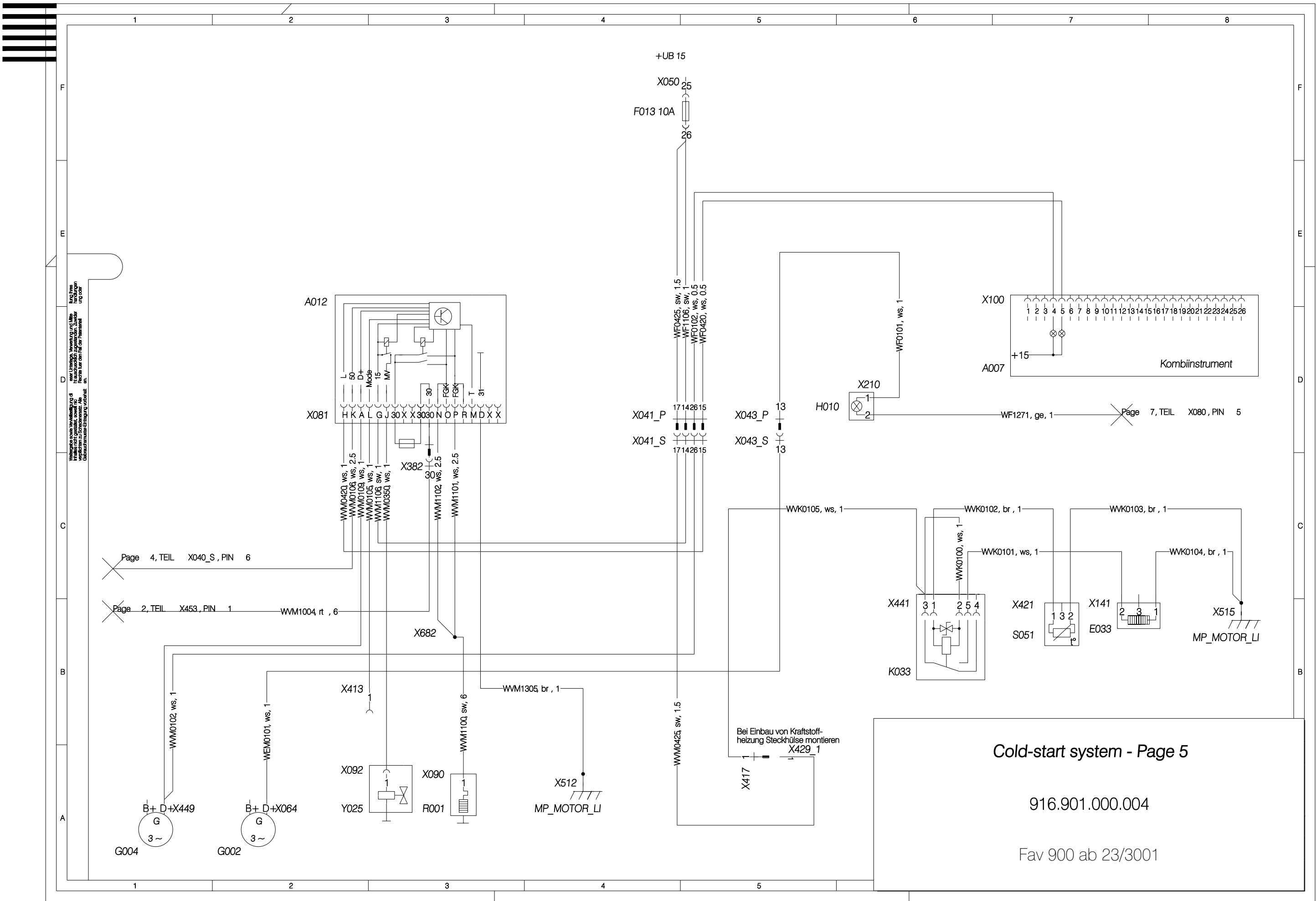
Contents of circuit diagrams

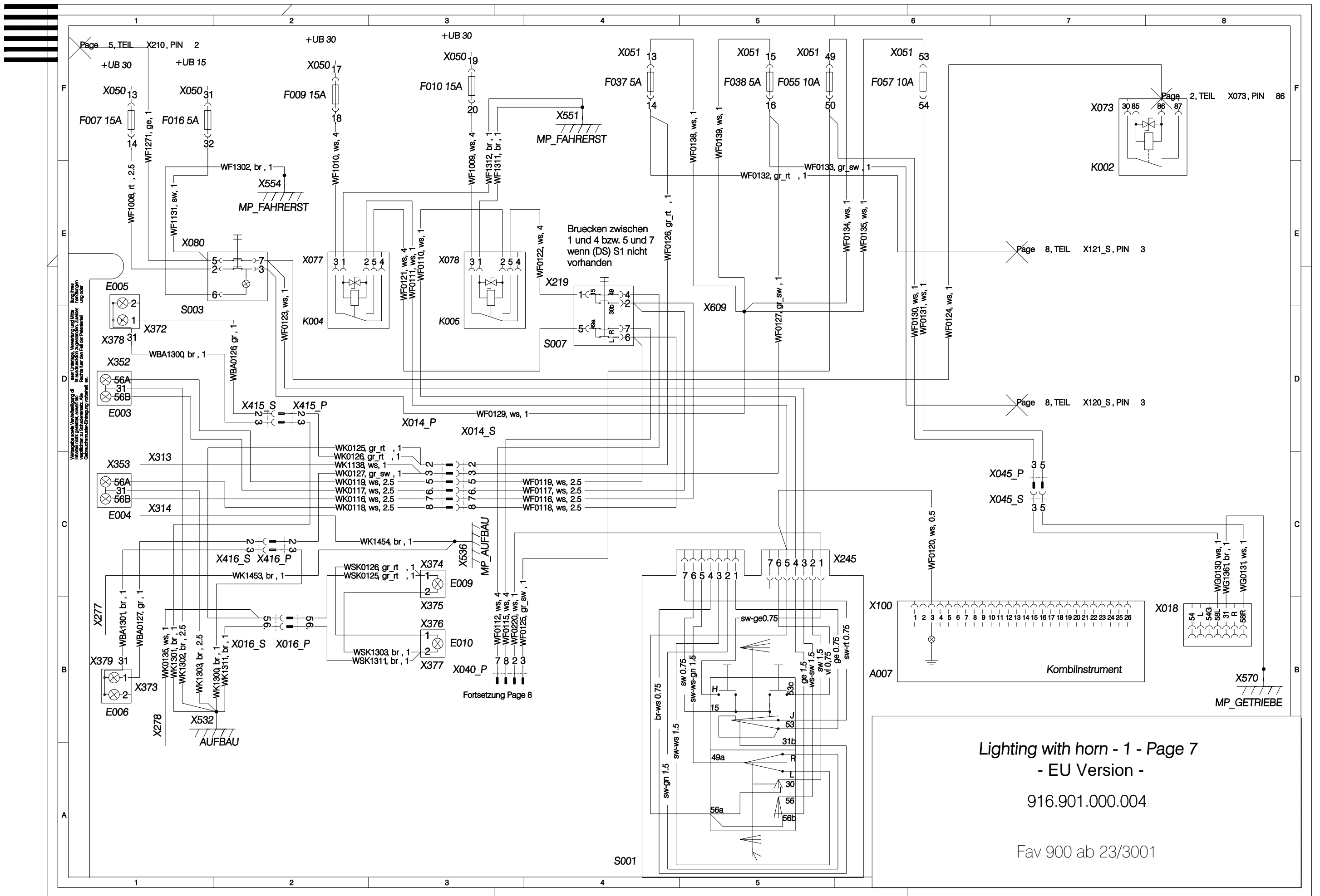
| | |
|----------|---|
| Sheet 2 | = Power supply + UB |
| Sheet 3 | = Earthing system |
| Sheet 4 | = Starter control |
| Sheet 5 | = Cold-start system |
| Sheet 6 | = Exhaust brake and engine stop |
| Sheet 7 | = Lighting STVZO (German specifications) plan 1 (EU - version) |
| Sheet 7 | = Lighting plan 1 (NA - version) |
| Sheet 8 | = Lighting with horn STVZO (German specifications) plan 2 (EU - version) |
| Sheet 9 | = Lighting with horn STVZO plan 2 (NA - version) |
| Sheet 9 | = Indicators (EU - version) |
| Sheet 9 | = Indicators (NA - version) |
| Sheet 10 | = Brake lights, compressed-air advance control system |
| Sheet 11 | = Wipers and revolving signal light |
| Sheet 12 | = Front working lights, EPC light |
| Sheet 13 | = Rear working lights |
| Sheet 14 | = Lighting, cab and radio (EU - version) |
| Sheet 14 | = Lighting, cab and radio (NA - version) |
| Sheet 15 | = Ventilation and air-conditioning |
| Sheet 16 | = Heater |
| Sheet 17 | = Heated rear window, electric mirrors |
| Sheet 18 | = Socket and open line couplings (EU - version) |
| Sheet 18 | = Socket and open line couplings (NA - version) |
| Sheet 19 | = Implement socket, event counter socket |
| Sheet 20 | = Power supply to electronic systems |
| Sheet 21 | = Enhanced control bus (K-bus) |
| Sheet 22 | = Instrument panel |
| Sheet 23 | = Electrohydraulic power lift control |
| Sheet 24 | = Electric valves 1 (+UB valves, valve bus, hydraulics monitoring system) |
| Sheet 25 | = Spool valves 2 (front power lift, 3rd hydraulic circuit, valve operation) |
| Sheet 26 | = Transmission bus (G-bus) |
| Sheet 27 | = Transmission control unit |
| Sheet 28 | = Transmission emergency control |
| Sheet 29 | = Suspension |
| Sheet 30 | = PTO (EU - version) |
| Sheet 30 | = PTO (NA - version) |
| Sheet 31 | = 4WD and diff. lock |
| Sheet 32 | = LBS (agricultural bus system) |
| Sheet 33 | = EDC control unit |

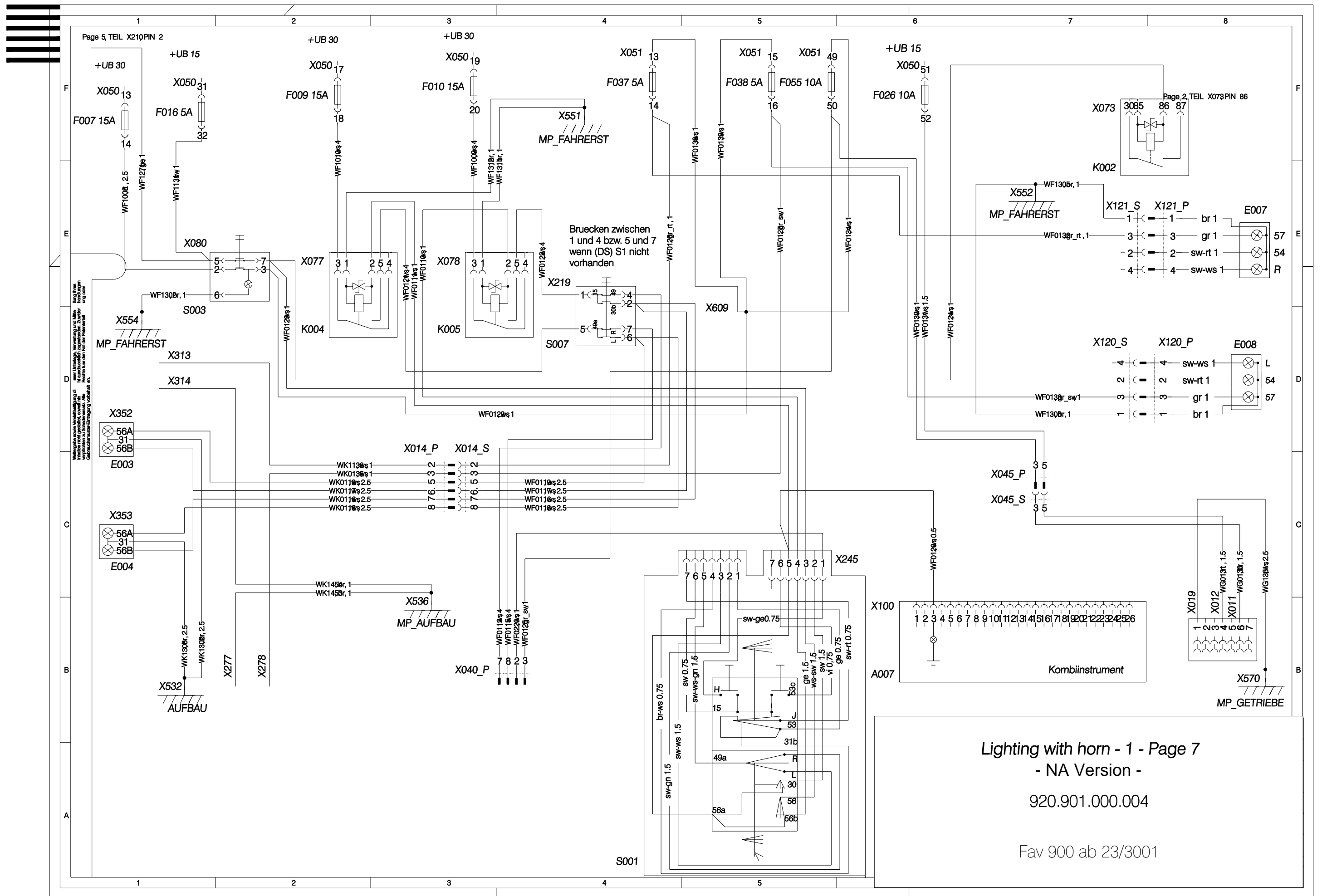
| Date | Version | Page | Circuit diagram overview for Favorit 900 | Capitel | Index | Docu-No. |
|---------|----------|------|--|-------------|----------|---------------|
| 12/2000 | b | 1/1 | | 9000 | C | 000034 |

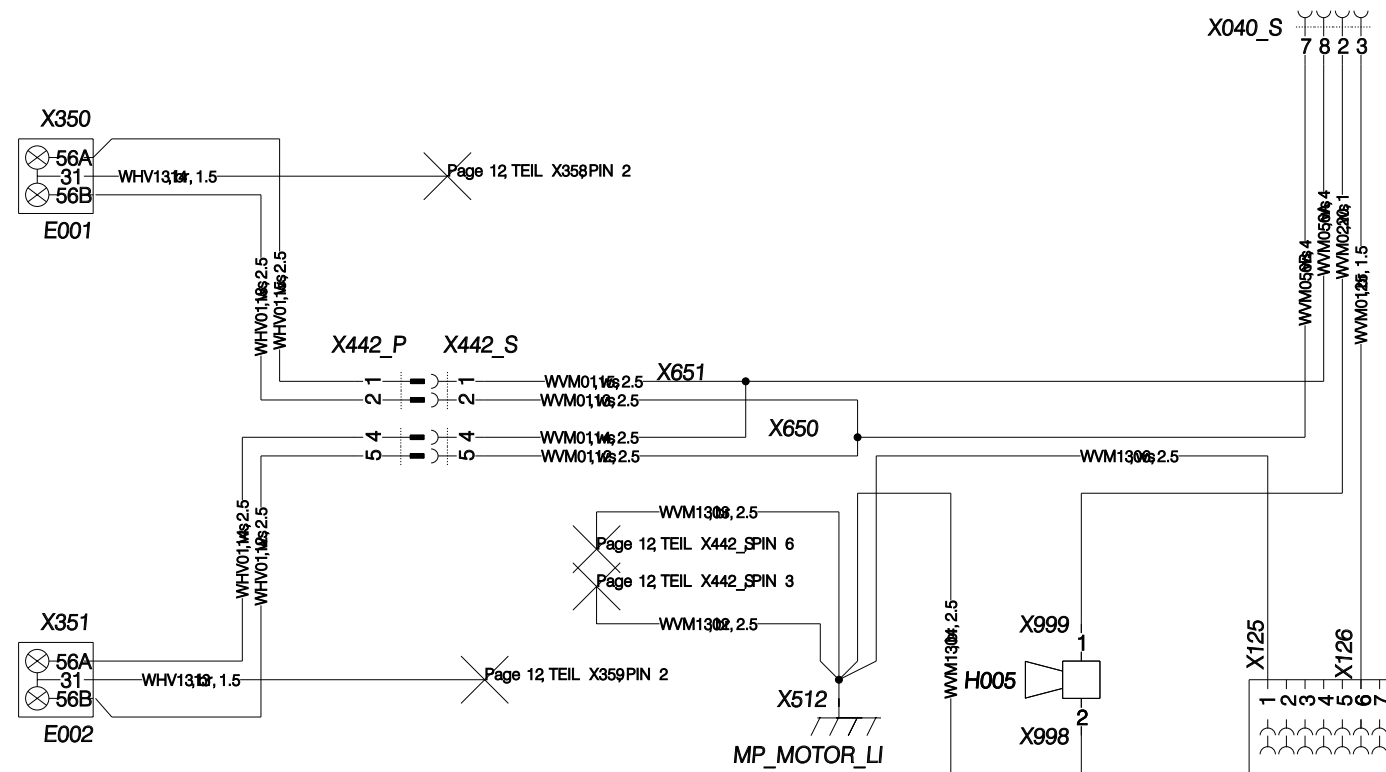










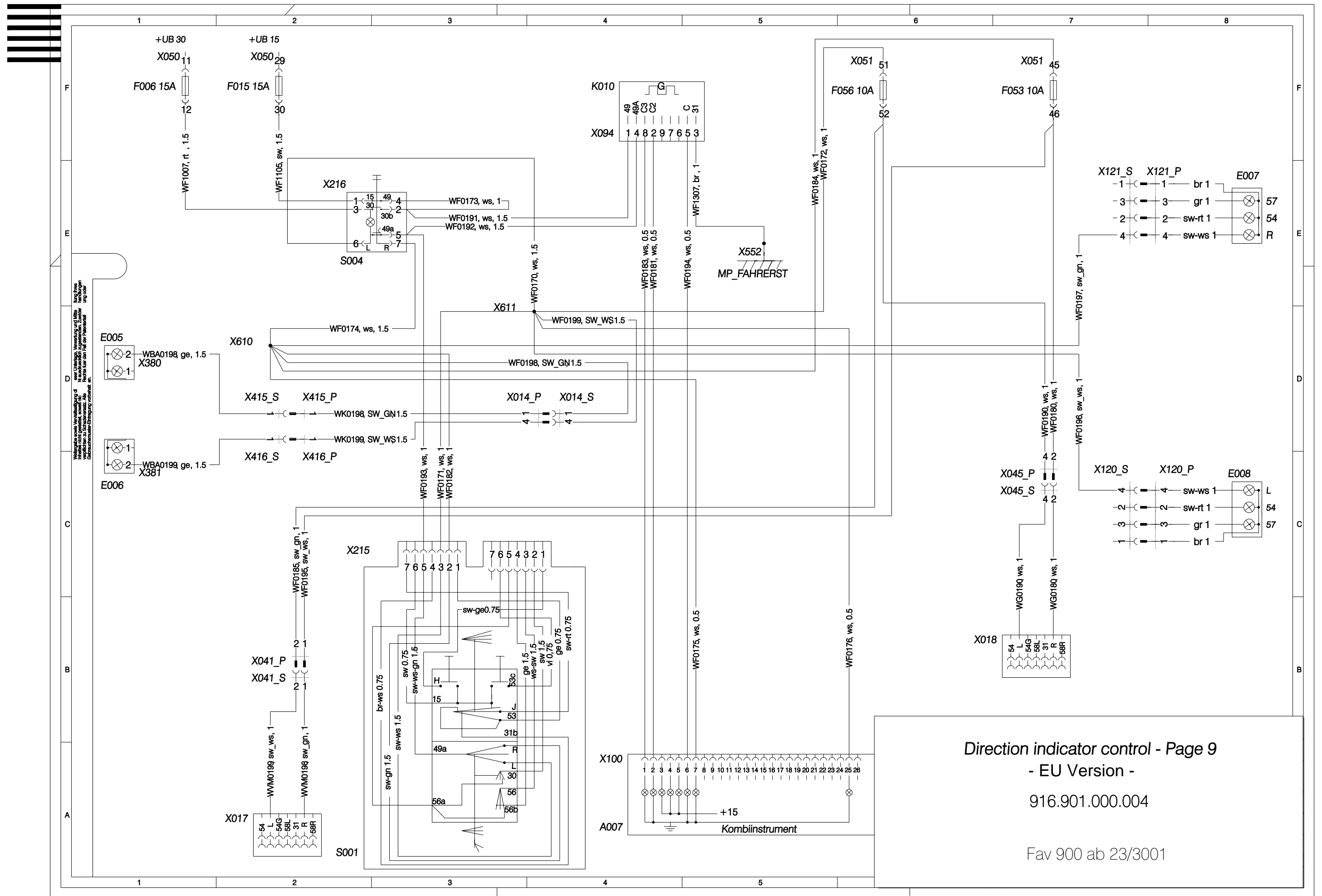


Lighting with horn - 2 - Page 8

- NA Version -

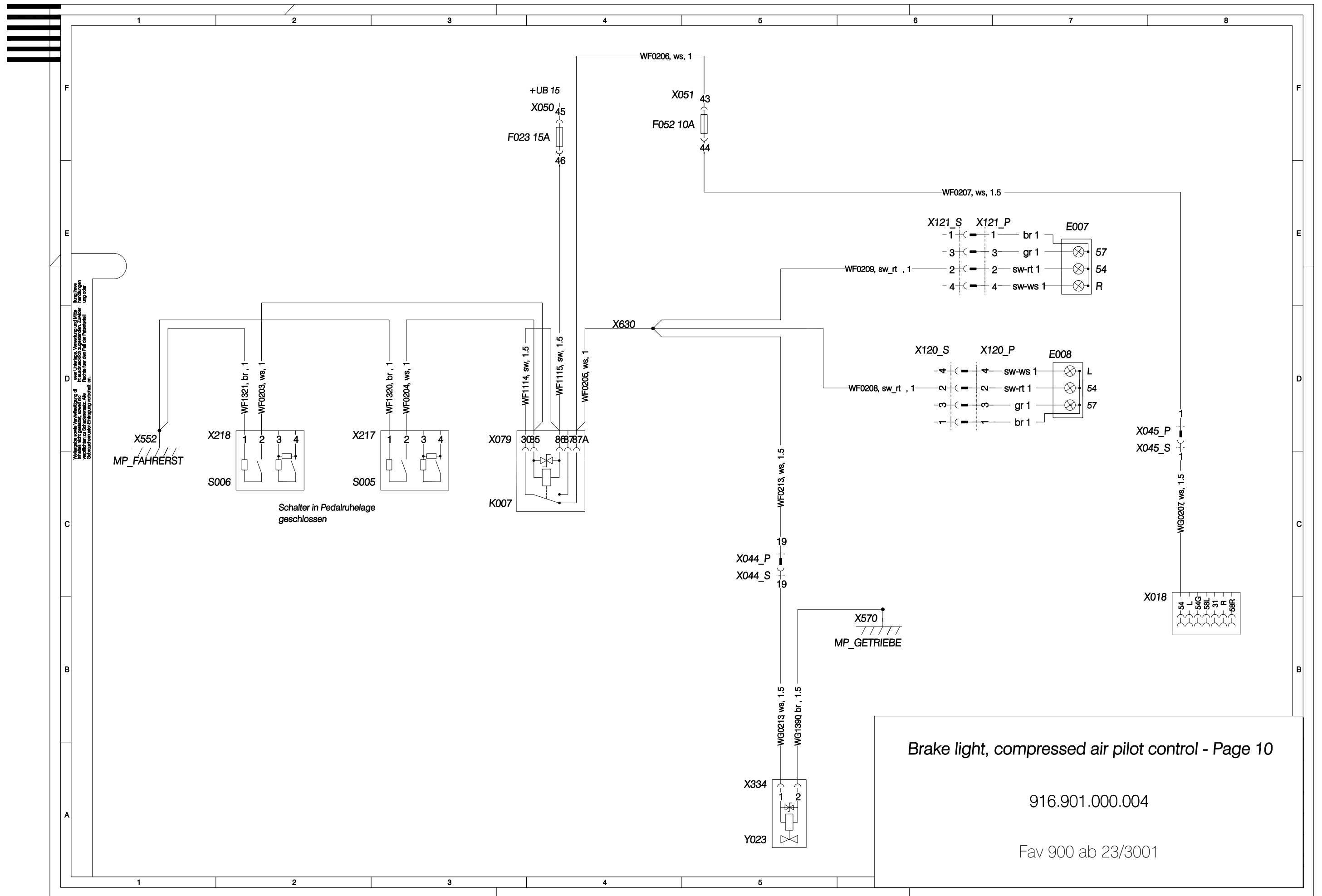
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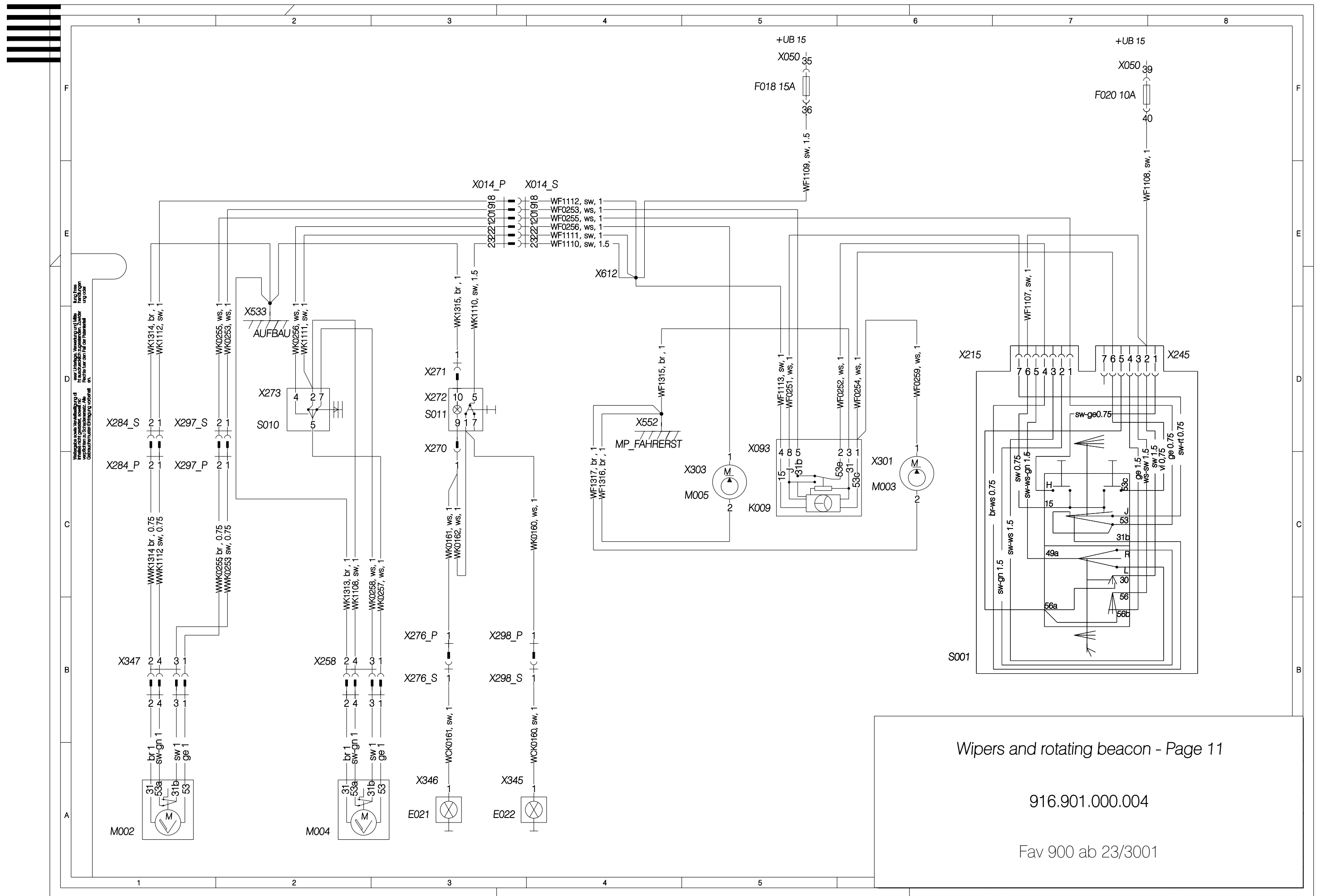
Fav 900 ab 23/3001

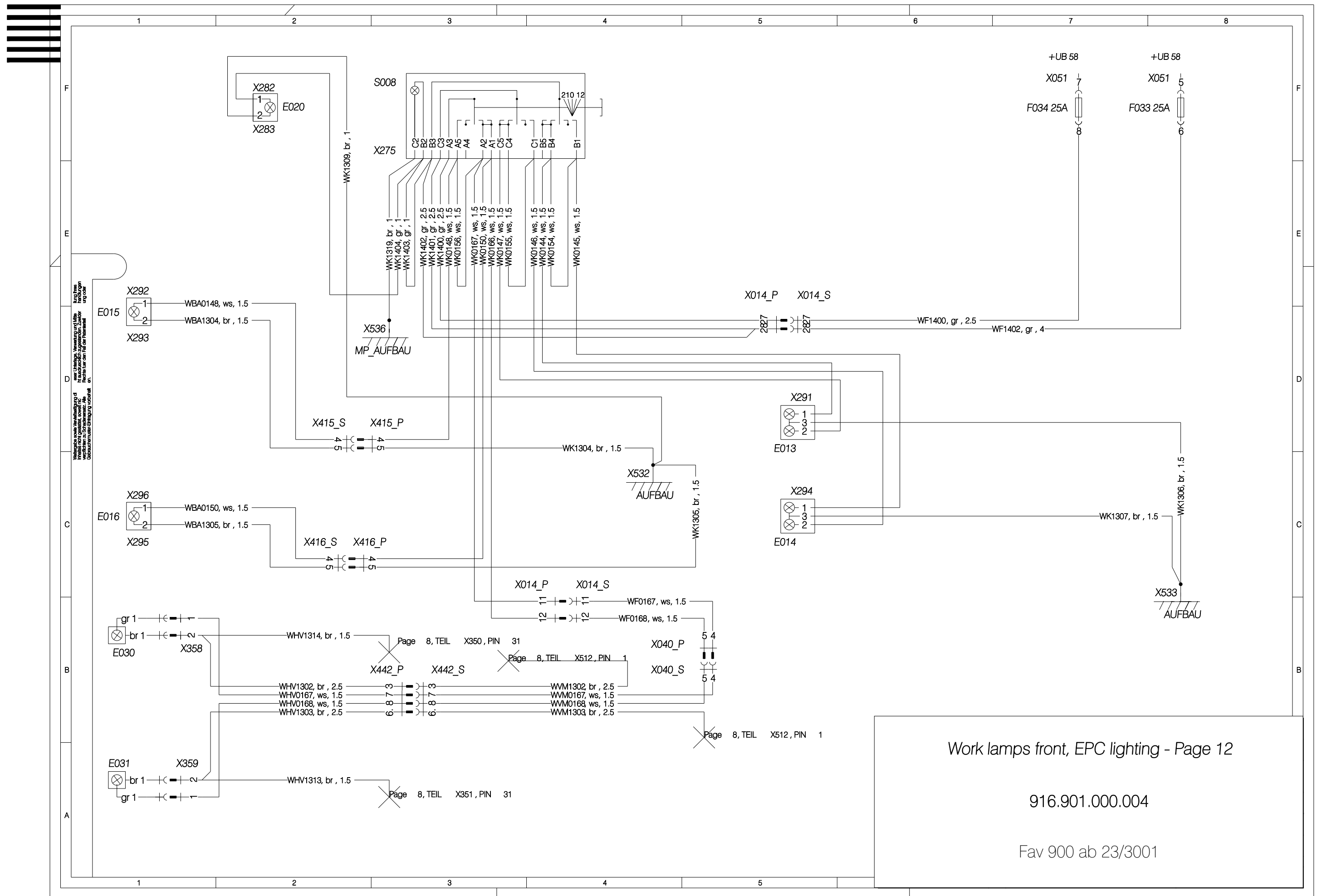


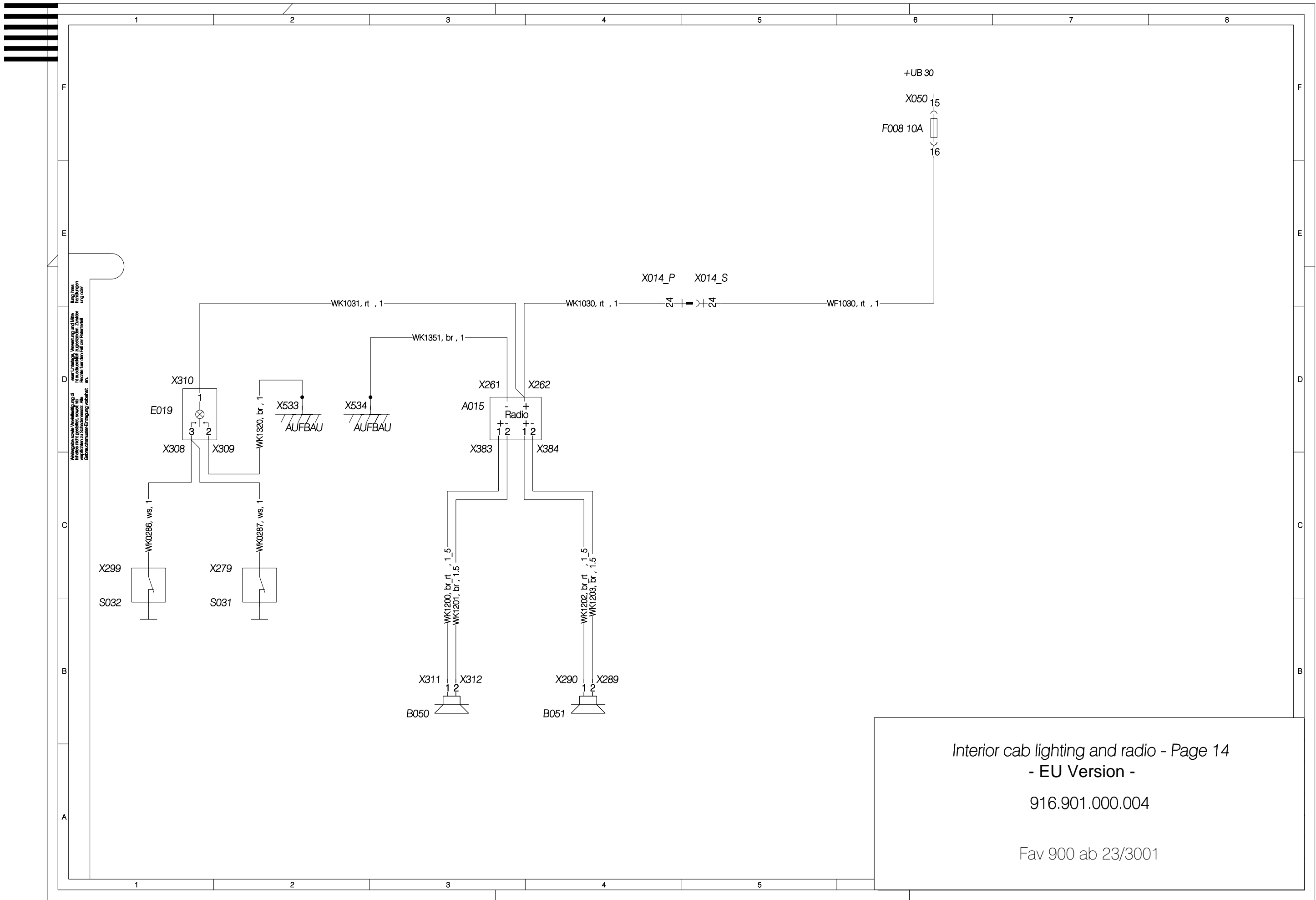
Direction indicator control - Page 9
- EU Version -
916.901.000.004

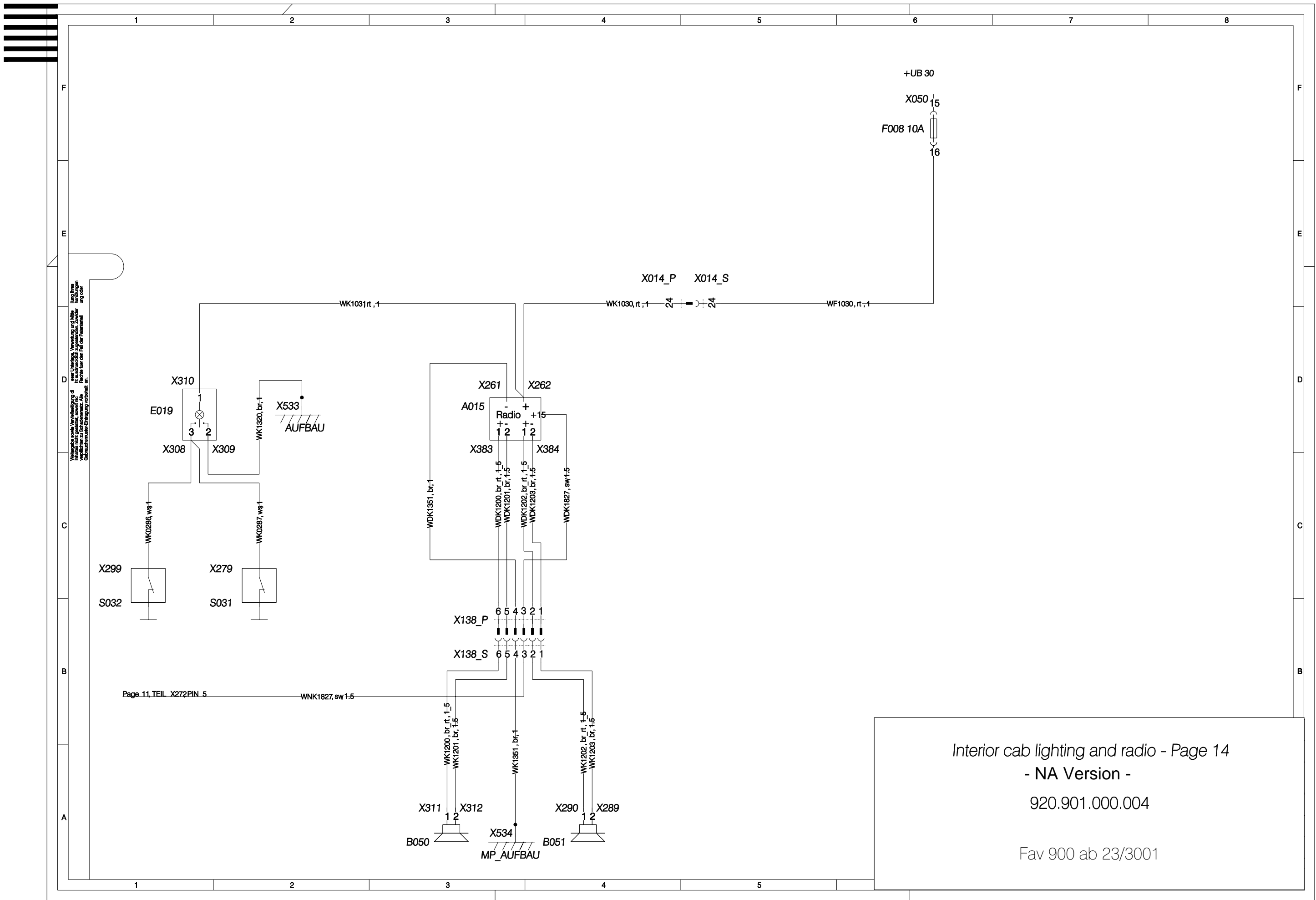
Fav 900 ab 23/3001



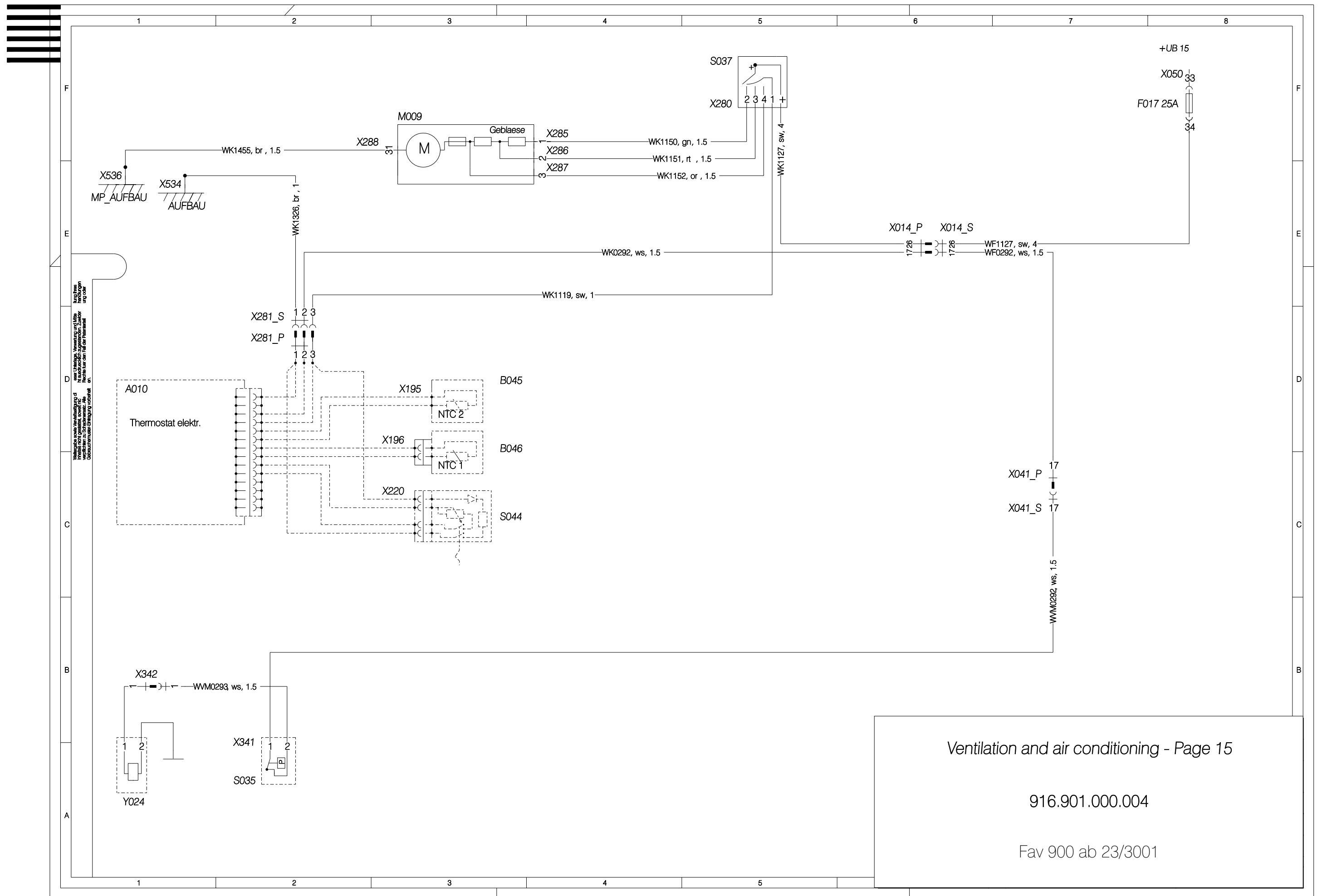








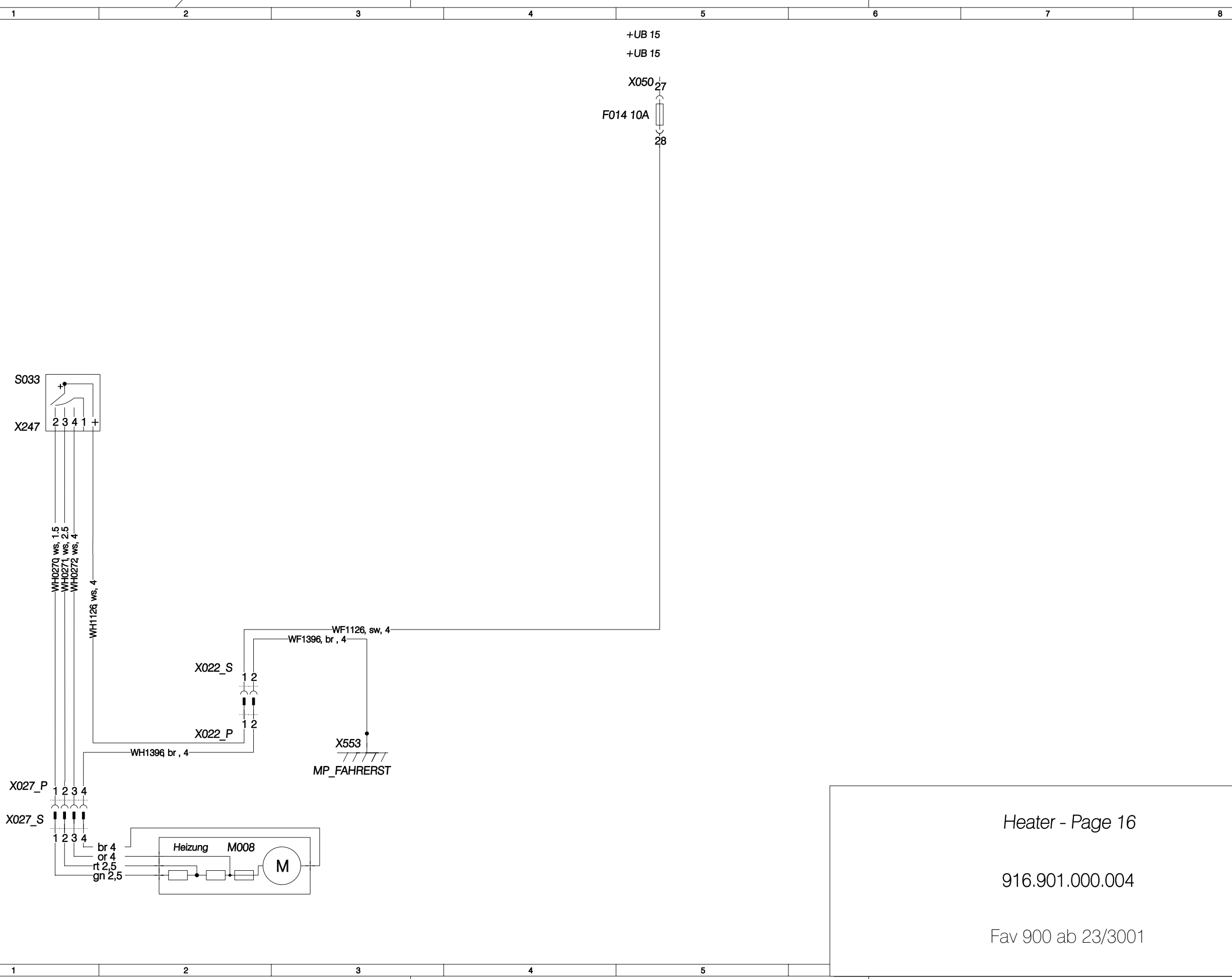
Interior cab lighting and radio - Page 14
- NA Version -
920.901.000.004
Fav 900 ab 23/3001



Ventilation and air conditioning - Page 15

916.901.000.004

Fav 900 ab 23/3001

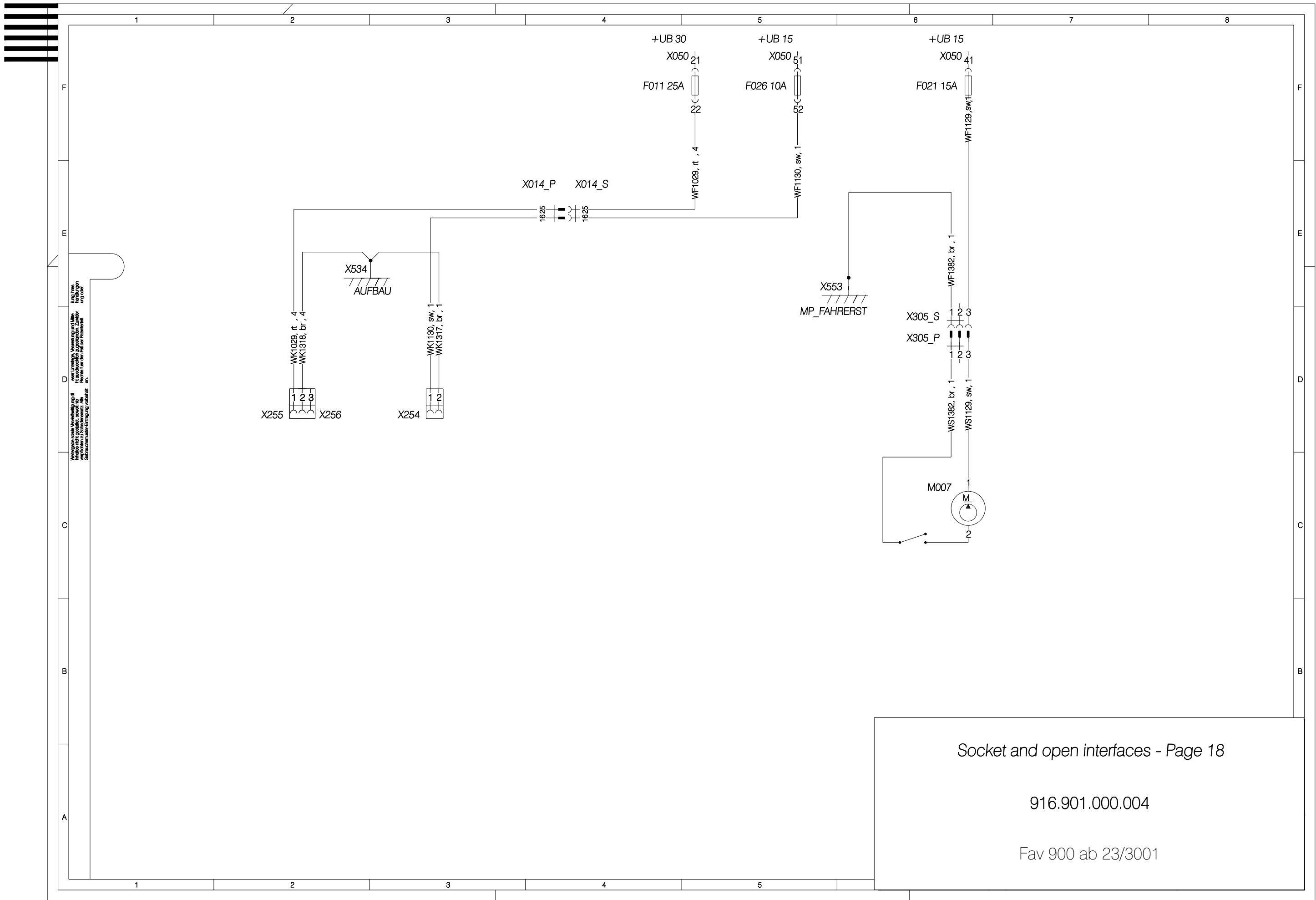


Wichtig: wenn Verdrahtung d
r nicht passt, sonst mo
glicherweise Schaden an
den Bauteilen. Einbau
nach Anleitung vornehmen.

Heater - Page 16

916.901.000.004

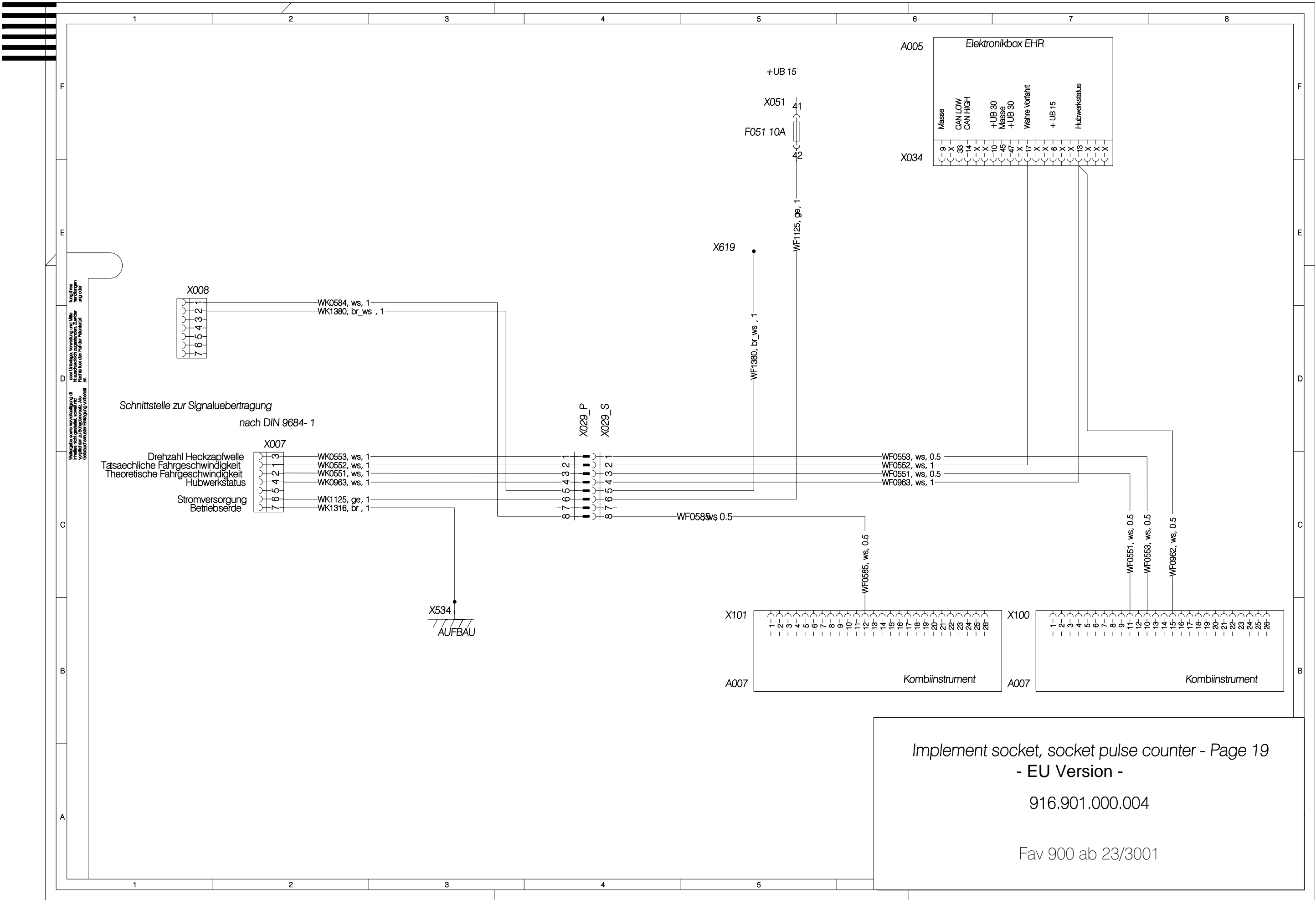
Fav 900 ab 23/3001



Socket and open interfaces - Page 18

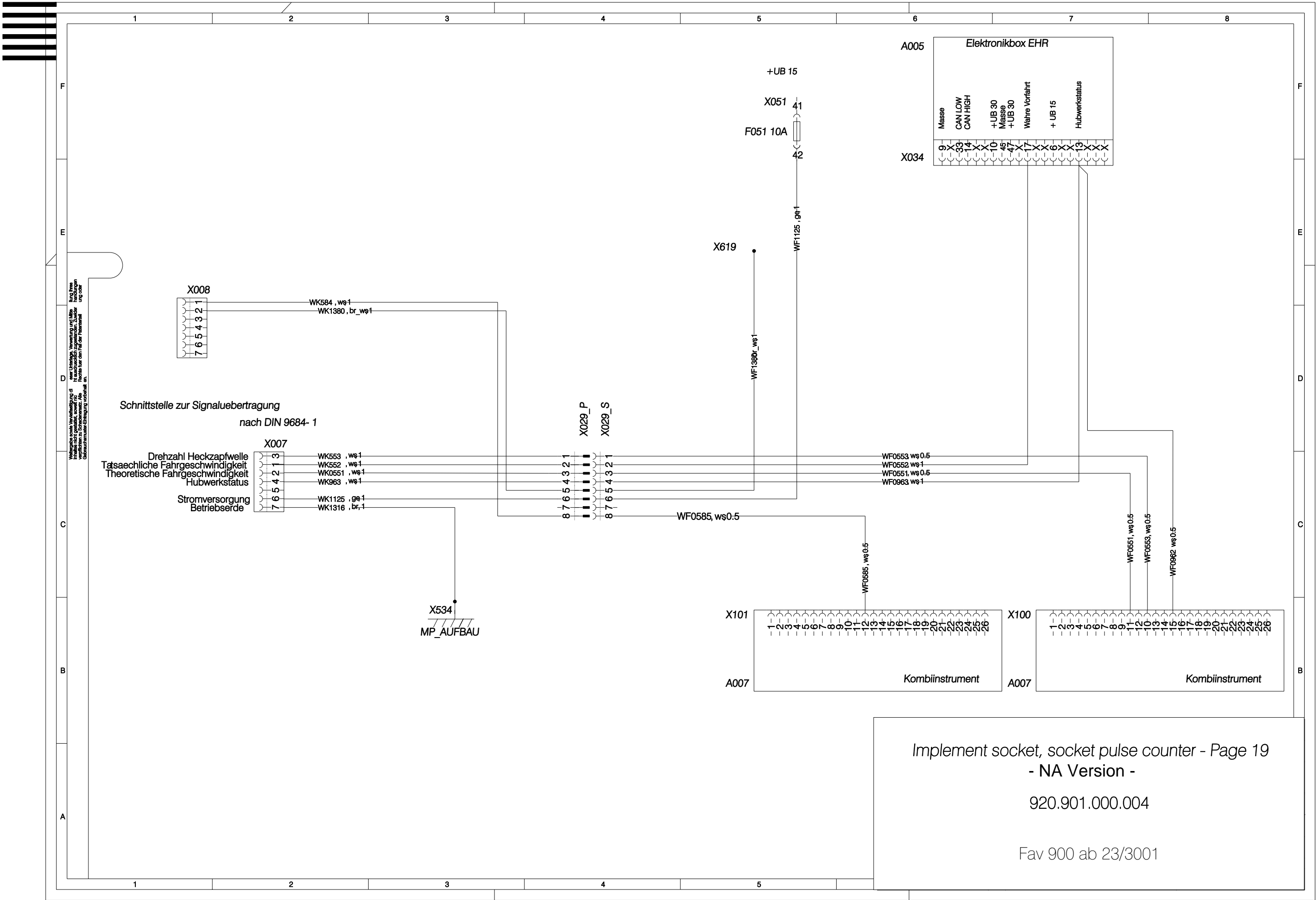
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Fav 900 ab 23/3001



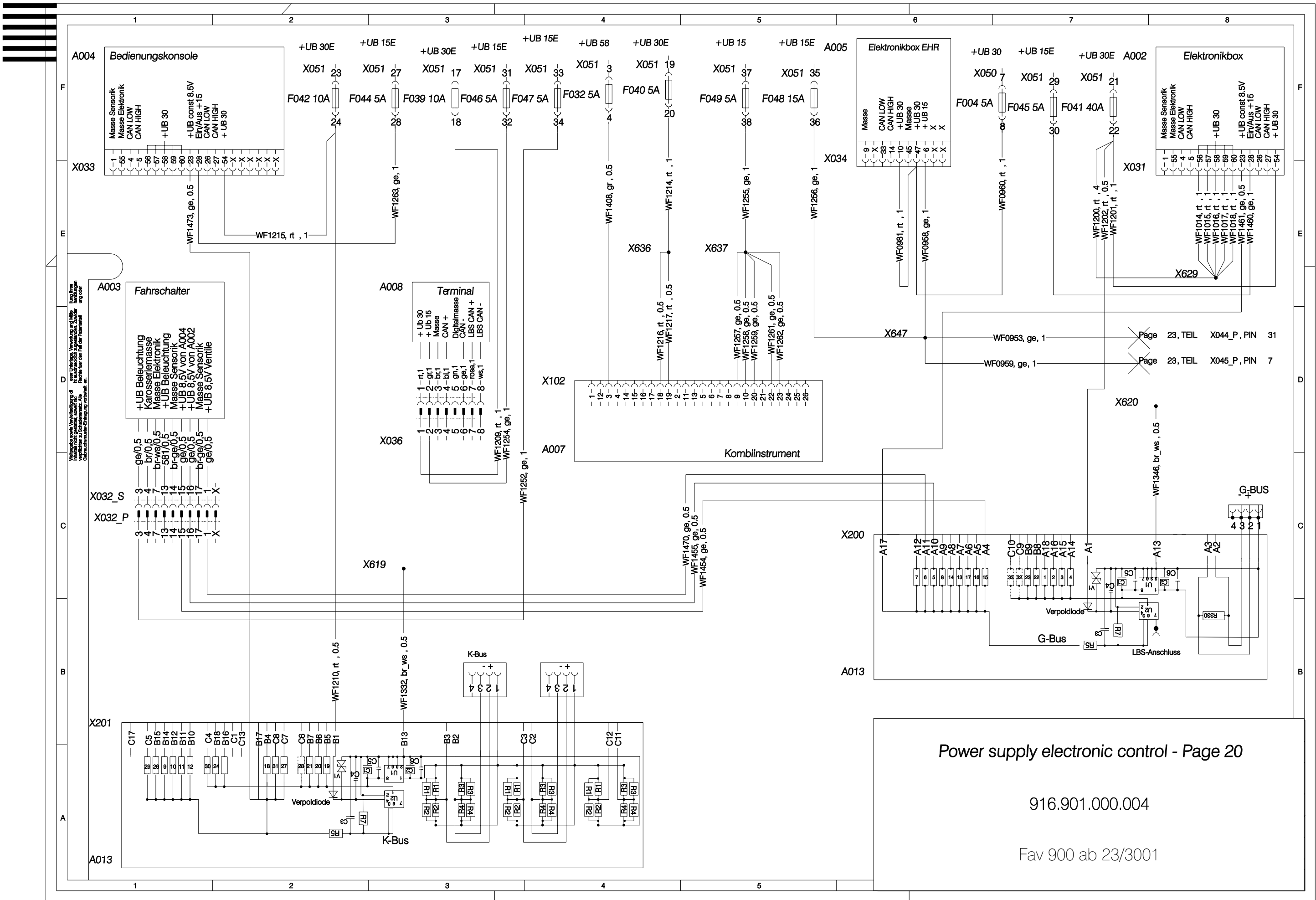
Implement socket, socket pulse counter - Page 19
- EU Version -
916.901.000.004

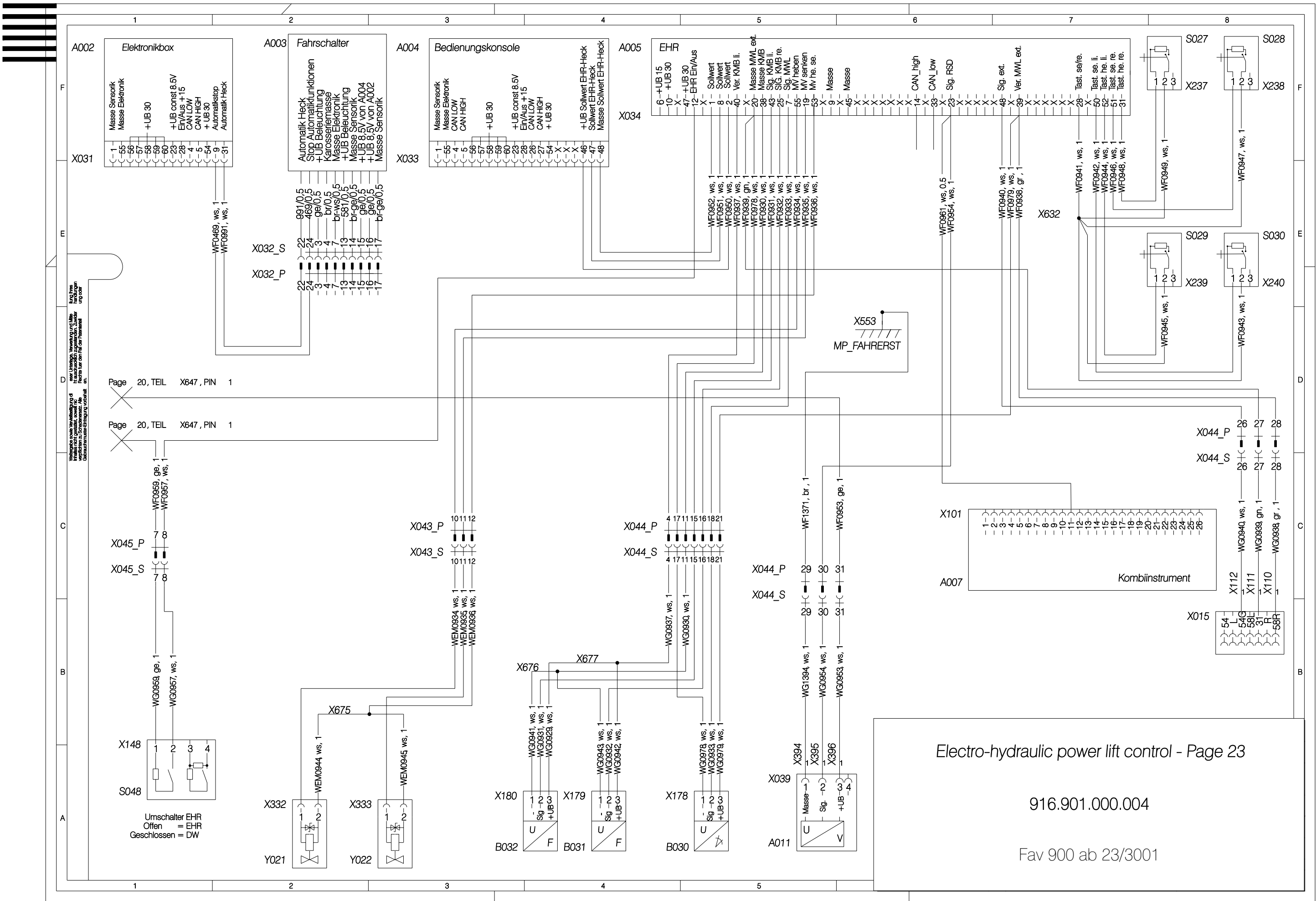
Fav 900 ab 23/3001

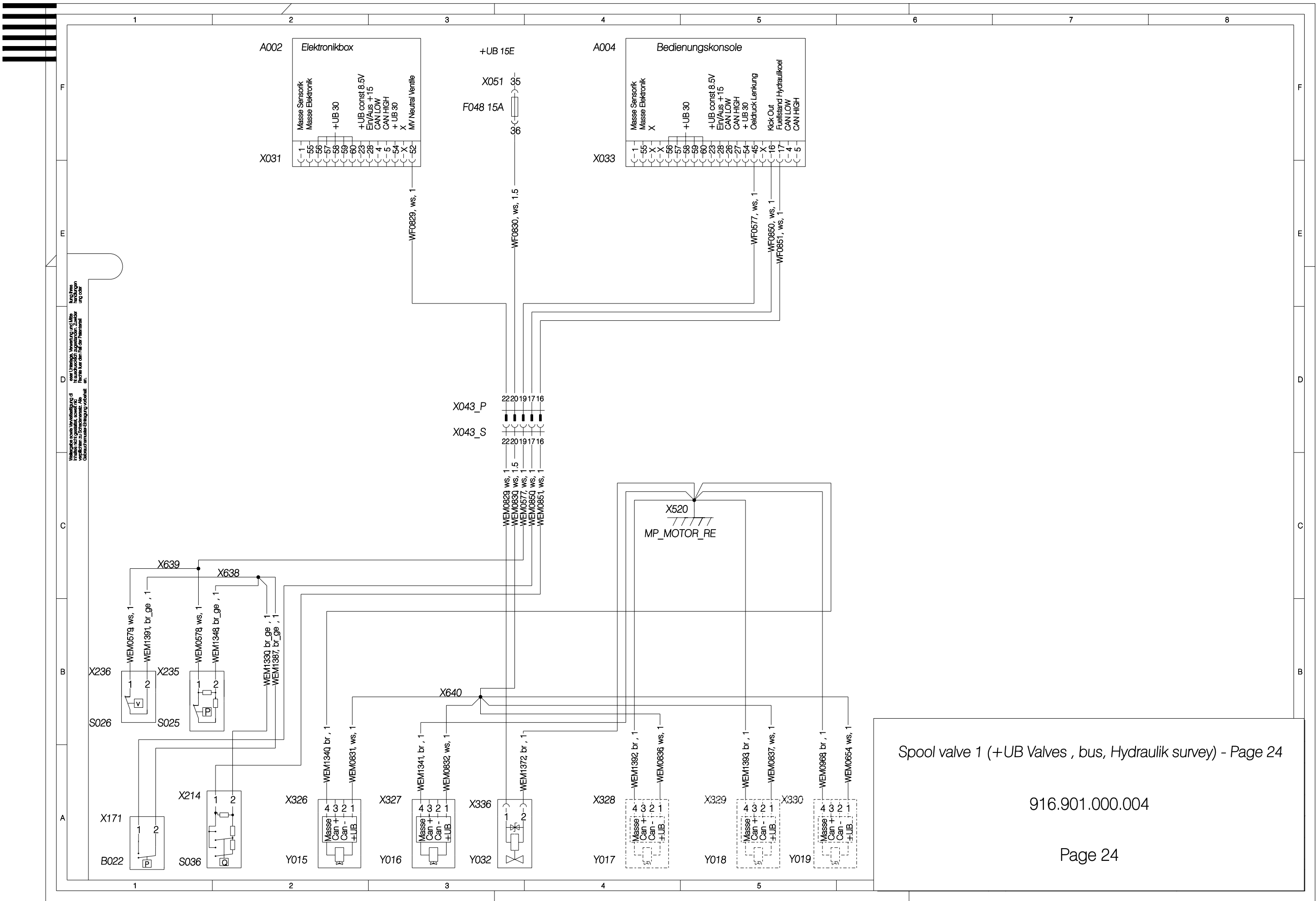


Implement socket, socket pulse counter - Page 19
- NA Version -
920.901.000.004

Fav 900 ab 23/3001



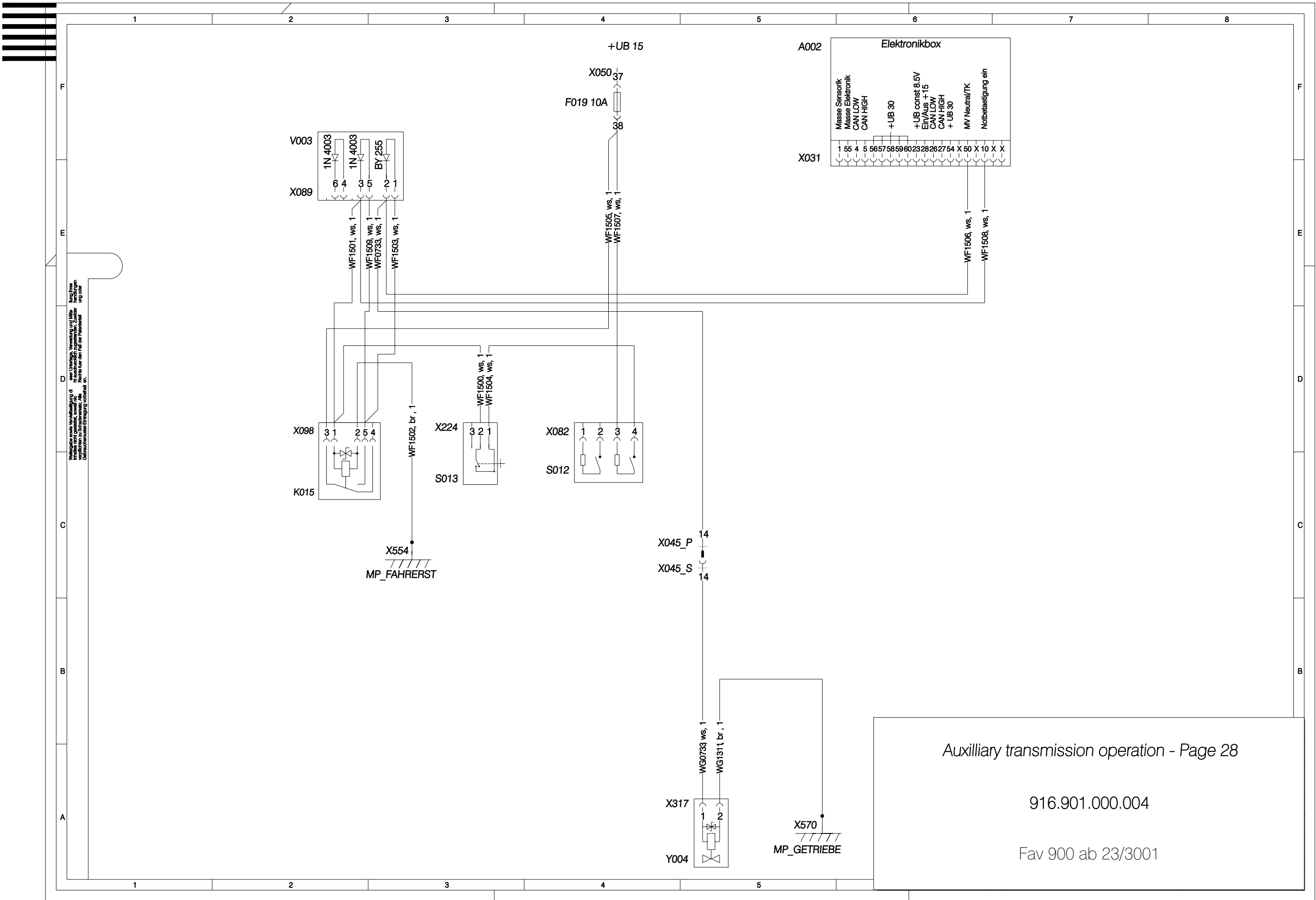


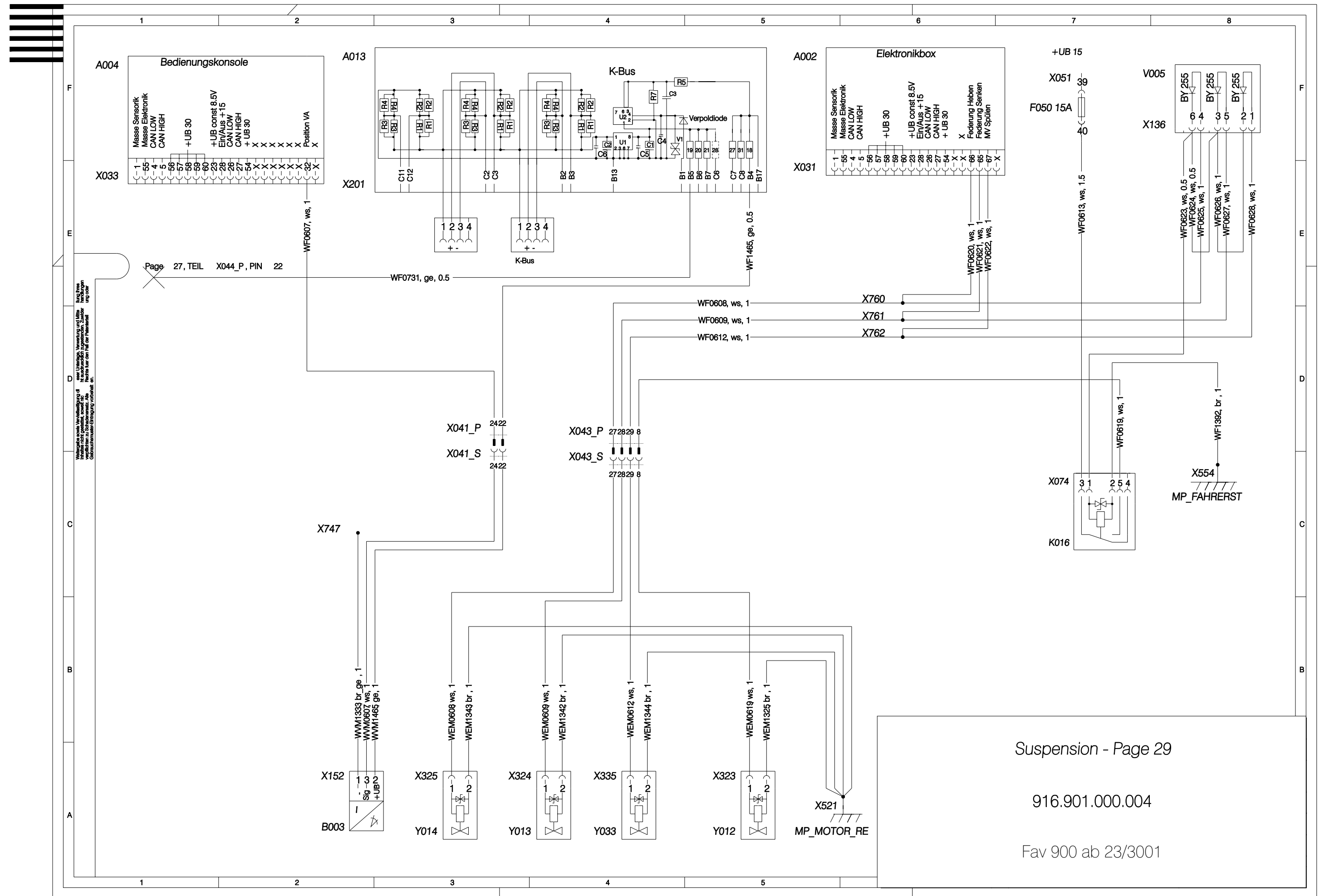


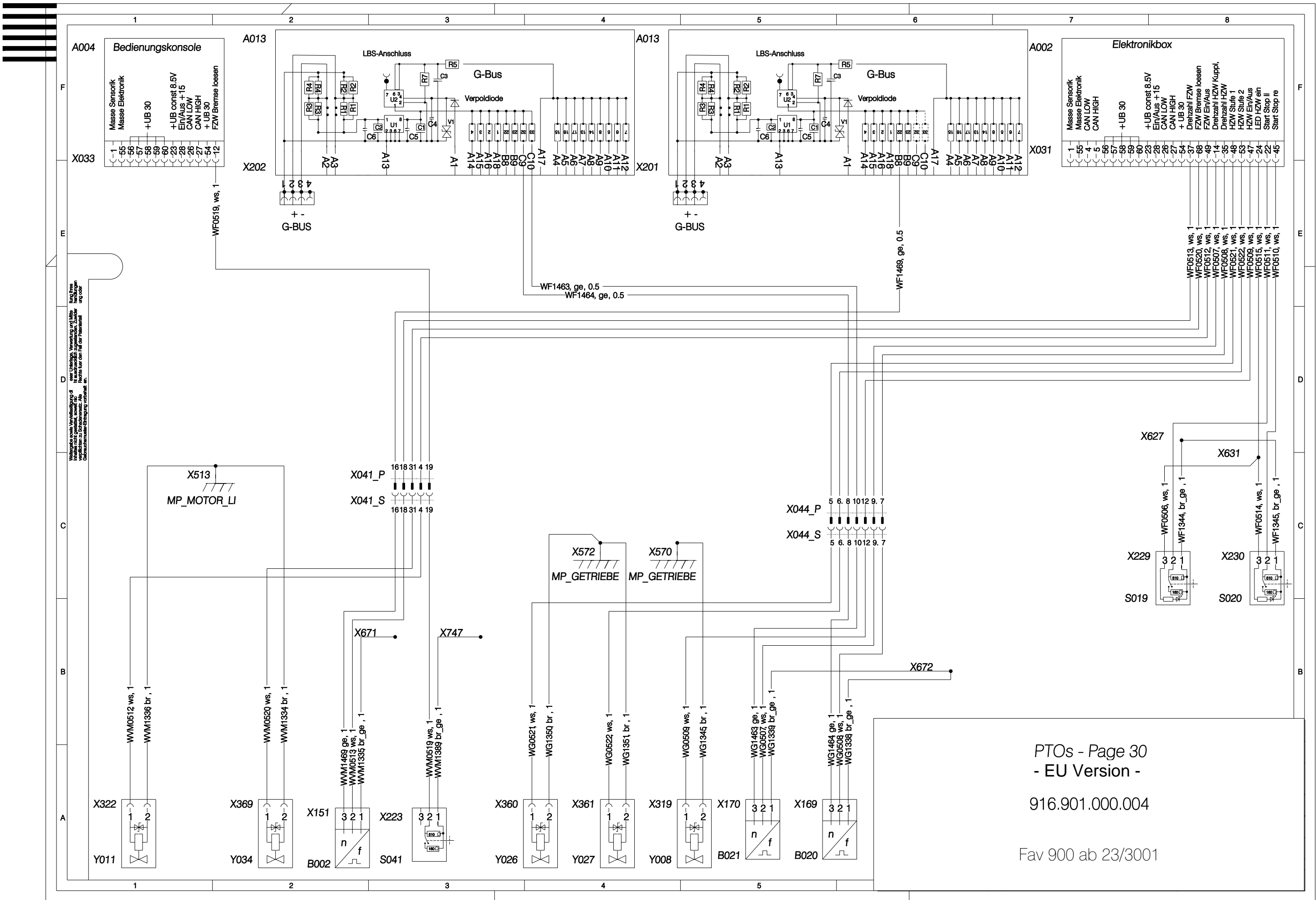
Spool valve 1 (+UB Valves , bus, Hydraulik survey) - Page 24

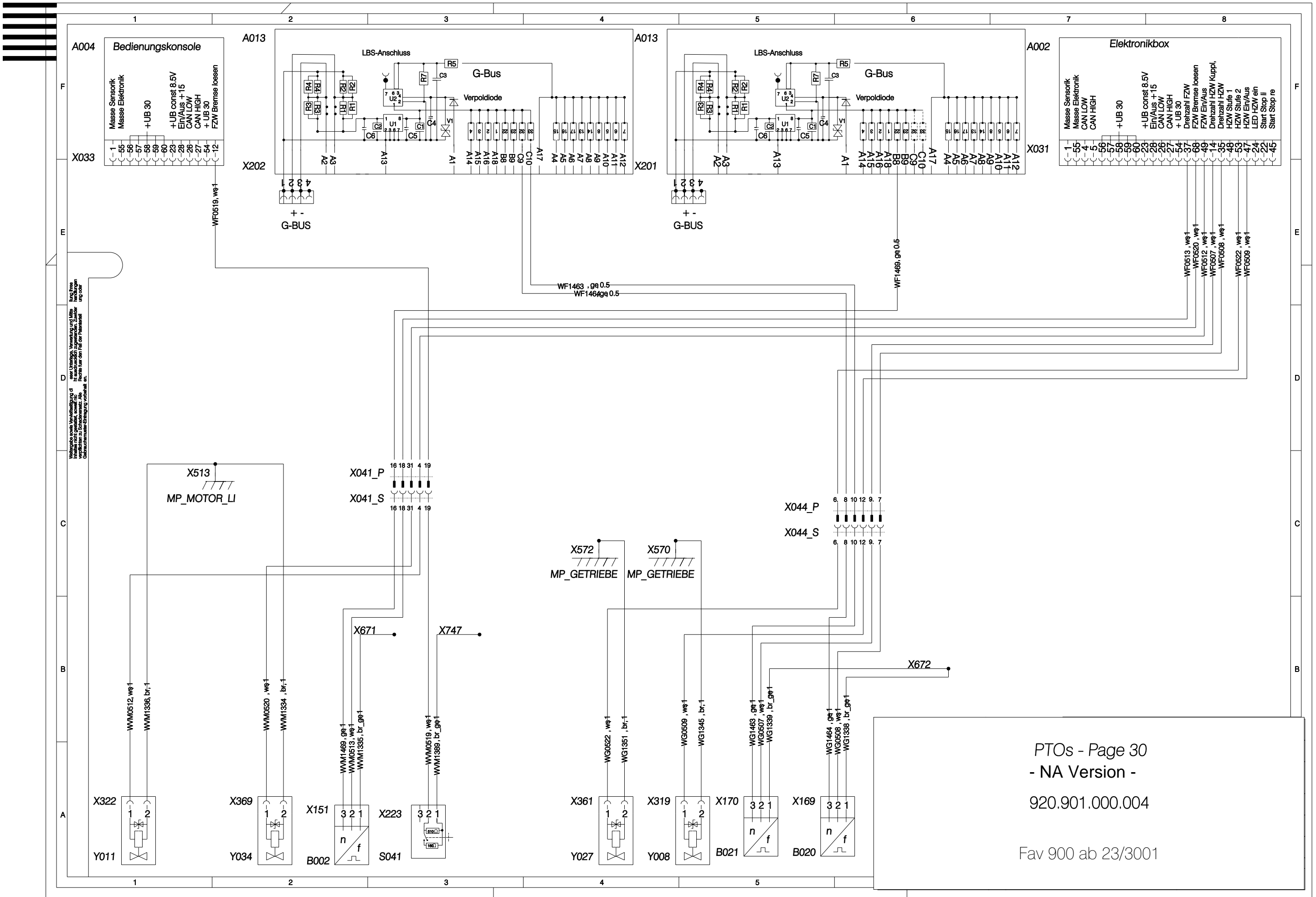
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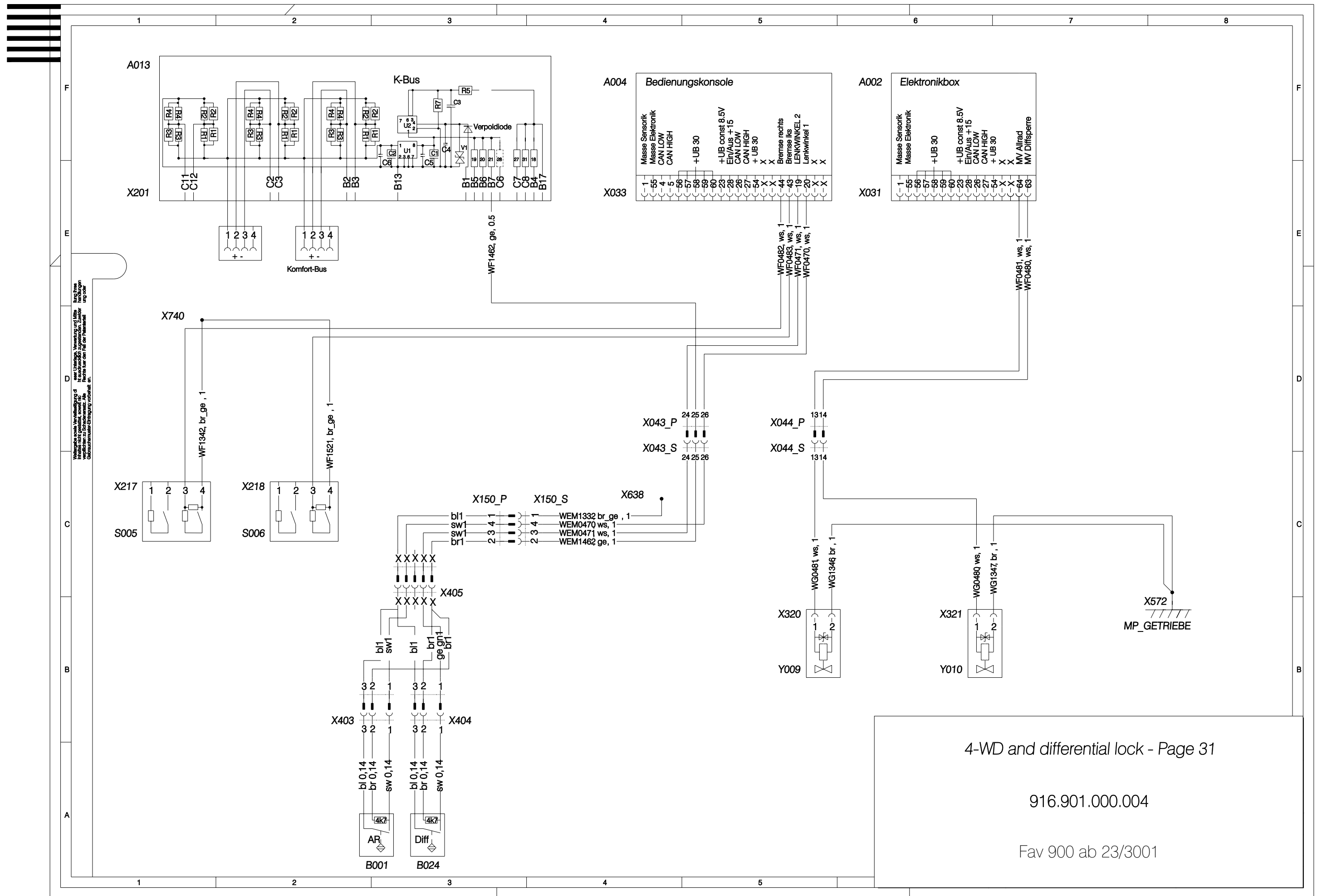
Page 24



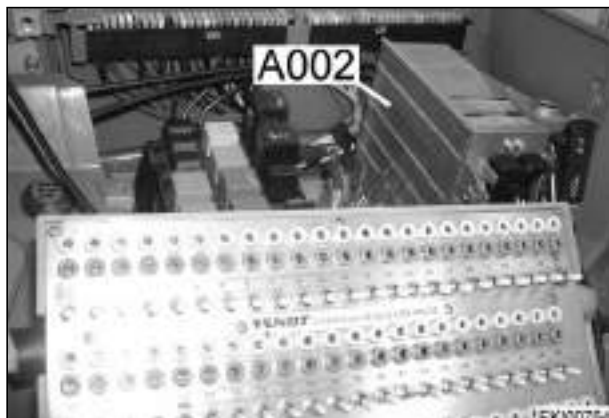








| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A002 - e-box | E |
|---|--|----------|



Connect e-adapter box X 899.980.208.100 directly to A002 e-box.

Verifying power supply

Note:
Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|---------------------|-----|----------------------|-----------|---|
| +UB 15 supply | 28 | 12.0 VDC to 14.0 VDC | | Fuse (F045) in X051 or in wiring. See also electronics power supply circuit diagram (sheet 19) |
| Sensor system earth | 1 | | | |

| | | | | |
|---------------------|----|----------------------|--|----------------------------------|
| +UB 30 supply | 54 | 12.0 VDC to 14.0 VDC | | Fuse (F041) in X051 or in wiring |
| Sensor system earth | 1 | | | |

| | | | | |
|---------------------|--------------------|----------------------|--|--|
| +UB 30 supply | 56, 57, 58, 59, 60 | 12.0 VDC to 14.0 VDC | | Fuse (F041) in X051 or in wiring, X629 connector UB 30 |
| Sensor system earth | 1 | | | |

Pin assignment and signal values

Note:
Ignition "ON"
Connect e-adapter box X 899.980.208.100 directly to A002 - e-box.

All readings +/- 10%

Description of ECU signal type, see Chapter 9700 Index A

| Pin | Pin description | Signal type | Signal at component | Signal from e-box (break in cable) |
|-----|-------------------------------|-------------|---------------------|------------------------------------|
| 1 | Analogue earth (sensor earth) | Earth | | |

| Date | Version | Page | Capitel | Index | Docu-No. |
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| 02.11.2000 | a | 1/6 | A002 - e-box | 9000 | E 000028 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A002 - e-box | E |
|---|---|----------|

| Pin | Pin description | Signal type | Signal at component | Signal from e-box (break in cable) |
|-----|--|---------------------------|---|------------------------------------|
| 2 | A009 Actuator unit Supply | Digital output | 0 V 12 V | |
| 3 | Not assigned | | | |
| 4 | Transmission bus | - wire | approx. 2.8 V | |
| 5 | Transmission bus | + wire | approx. 1.7 V | |
| 6 | B016 Angular resolver Range sensor | Current input 4-20 mA | 1 V | 0 V |
| 7 | B018 Angular resolver Setpoint engine speed | Current input 4-20 mA | 1.2-3.6 V | 0 V |
| 8 | B017 Angular resolver Clutch pedal | Current input 4-20 mA | 0.8-3.6 V | 0 V |
| 9 | A003 Joystick Automatic stop | Current input 4-20 mA | 1.0 V 2.9 V | 0 V |
| 10 | S013 Emergency mode push-button | Current output 4-20 mA | 0.4 V | |
| 11 | A003 Crossgate lever Signal valve no. 1 (yellow) | Analogue input 0-8.5 V | 6.9 V- 5.8 V- 4.0 V- 1.8 V- 1.0 V | |
| 12 | B010 Hall-effect sensor engine 1 | Frequency input | 5.4 V 1.1 V | 7.3 V |
| 13 | B014 Speed sensor Hydrostatic unit/speed | Frequency input | 5.4 V 1.1 V | 7.3 V |
| 14 | B021 Hall-effect sensor Rear PTO clutch | Frequency input | 5.4 V 1.1 V | 7.3 V |
| 15 | Not assigned | | | |

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| 02.11.2000 | a | 2/6 | A002 - e-box 9000 | E | 000028 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A002 - e-box | E |
|---|---|----------|

| Pin | Pin description | Signal type | Signal at component | Signal from e-box (break in cable) |
|-----|--|-----------------------------|--|------------------------------------|
| 16 | A003 Joystick v + | Digital input | 5.1 V | 8.0 V |
| 17 | A003 Joystick Operating range Neutral | Digital input | 5.1 V 2.4 V | 8.0 V |
| 18 | B015 Speed sensor Bevel pinion/rotational direction | Digital input | 5.1 V 2.4 V | 8.0 V |
| 19 | A009 Actuator unit Reference F/R | Digital input | 5.1 V 2.4 V | 8.0 V |
| 20 | A003 Joystick | Digital input | 5.1 V 2.4 V | 8.0 V |
| 21 | A003 Crossgate lever Rest position | Digital input | 2.4 V | 8.0 V |
| 22 | S019 "PTO on" switch Left rear | Digital input | 5.1 V 2.4 V | 8.0 V |
| 23 | A013 fuse board ABC Enhanced controls e-box 8.5 V output | 8.5 V output for sensors | 8.5 V | 8.5 V |
| 24 | S019 / S020 "PTO on" switch rear, (LED) | Digital output | 0 V 12 V | 0 V |
| 25 | A003 Joystick LED Neutral | Digital output | 12 V 0 V | 12 V |
| 26 | A002 Enhanced controls e-box CAN interface | - wire | approx. 3.0 V | |
| 27 | A002 Enhanced controls e-box CAN interface | + wire | approx. 1.8 V | |
| 28 | A002 Enhanced controls e-box Electronics On / Off +15 | D+ input | 12 V | 0 V |
| 29 | B008 High-pressure sensor | Current input 0-20 mA | 0.8 V | 0 V |
| 30 | A003 Joystick Acceleration I-IV | Current input 0-20 mA | I=3.6V- I=2.7V- I=1.8V- I=0.9V- | 0 V |

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| 02.11.2000 | a | 3/6 | A002 - e-box 9000 | E | 000028 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A002 - e-box | E |
|---|---|----------|

| Pin | Pin description | Signal type | Signal at component | Signal from e-box (break in cable) |
|-----|---|-------------------------------|--|------------------------------------|
| 31 | A003 Joystick Automatic rear | Current input 0-20 mA | 1.0 V | 0 V |
| 32 | A003 Joystick Automatic front | Current input 0-20 mA | 1.0 V | 0 V |
| 33 | A003 Crossgate lever Signal valve no. 2 (blue) | Analogue input 0-8.5 V | 6.9V - 5.8V - 4.0V - 1.8V - 1.0V | 0 V |
| 34 | B015 Speed sensor Bevel pinion/speed | Frequency input | 5.4 V 1.1 V | 7.3 V |
| 35 | B020 Hall-effect sensor Rear PTO | Frequency input | 5.4 V 1.1 V | 7.3 V |
| 36 | B011 Hall-effect sensor engine 2 | Frequency input | 5.4 V 1.1 V | 7.3 V |
| 37 | B002 Hall-effect sensor Front PTO | Frequency input | 5.4 V 1.1 V | 7.3 V |
| 38 | A003 Joystick v - | Digital input | 5.1 V | 8.0 V |
| 39 | S014 Switch Rapid reversing | Digital input | 5.1 V 2.4 V | 8.0 V |
| 40 | A003 Joystick | Digital input | 5.1 V 2.4 V | 8.0 V |
| 41 | A003 Joystick Rest position | Digital input | 2.4 V | 8.0 V |
| 42 | B014 Speed sensor Hydrostatic unit/rotational direction | Digital input | 2.4 V 5.1 V | 8.0 V |
| 43 | A003 Joystick Rapid reversing | Digital input | 5.1 V | 8.0 V |
| 44 | A003 Joystick Cruise control | Digital input | 5.1 V | 8.0 V |
| 45 | S020 "PTO on" switch right rear | Digital input | 5.1 V 2.4 V | 8.0 V |

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| 02.11.2000 | a | 4/6 | A002 - e-box 9000 | E | 000028 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A002 - e-box | E |
|---|---|----------|

| Pin | Pin description | Signal type | Signal at component | Signal from e-box (break in cable) |
|------------|---|----------------------------|---------------------|------------------------------------|
| 46 | Y006 Solenoid valve Exhaust brake | Pulse width output | 0 V 12 V | 0 V |
| 47 | Y008 Solenoid valve Rear PTO | Pulse width output | 0 V 12 V | 0 V |
| 48 | Y026 Solenoid valve PTO stage I | Pulse width output | 0 V 12 V | 0 V |
| 49 | Y011 Solenoid valve Front PTO | Pulse width output | 0 V 12 V | 0 V |
| 50 | Y004 Solenoid valve | Pulse width output | 0 V 12 V | 0 V |
| 51 | Y005 Solenoid valve Speed limiter | Pulse width output | 0 V 12 V | 0 V |
| 52 | Y032 Solenoid valve neutral Control pressure electr. valves | Pulse width output | 0 V 12 V | 0 V |
| 53 | Y027 Solenoid valve PTO stage II | Pulse width output | 0 V 12 V | 0 V |
| 54 | A002 Enhanced controls e-box + UB 30 | + UB 30 | 12 V | 0 V |
| 55 | A002 Enhanced controls e-box Electrics/digital earth | Electrics/digital earth | | |
| 56.. 60 | A002 Enhanced controls e-box | +UB Output stage supply | 12 V | 0 V |

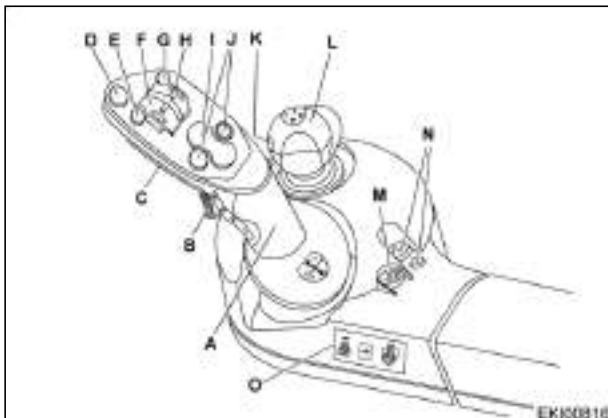
| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|----------|------|------------------------------------|----------|---------------|
| 02.11.2000 | a | 5/6 | A002 - e-box 9000 | E | 000028 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A002 - e-box | E |
|---|--|----------|

| Pin | Pin description | Signal type | Signal at component | Signal from e-box (break in cable) |
|-----|---|----------------|---------------------|------------------------------------|
| 61 | Y002 Solenoid valve Range I | Digital output | 0 V 12 V | 0 V |
| 62 | Y003 Solenoid valve Range II | Digital output | 0 V 12 V | 0 V |
| 63 | Y010 Solenoid valve Diff. lock | Digital output | 0 V 12 V | 0 V |
| 64 | Y009 Solenoid valve 4WD | Digital output | 12 V 0 V | 0 V |
| 65 | Y013 Solenoid valve Lower suspension | Digital output | 0 V 12 V | 0 V |
| 66 | Y014 Solenoid valve Raise suspension | Digital output | 0 V 12 V | 0 V |
| 67 | Y033 Solenoid valve Charge/flush suspension | Digital output | 0 V 12 V | 0 V |
| 68 | Y028 Solenoid valve PTO stage III | Digital output | 0 V 12 V | 0 V |

v+ = accelerate, v- = decelerate, FT = membrane keypad, WS = rocker switch

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| 02.11.2000 | a | 6/6 | 9000 | E | 000028 |

Fav 900**Electrics / General system
A003 joystick****E**

- A = Joystick
- B = Acceleration control
- C = Activating control
- D = Stop key EPC - PTO control
- E = Floating position spool valve green or blue
- F = Raising / lowering spool valve green or blue
- G = Floating position spool valve red or yellow
- H = Raising / lowering spool valve red or yellow
- I = Rear power lift - PTO control
- J = Front power lift - PTO control
- K = 3rd hydraulic circuit on front loader
- L = Crossgate lever, raising / lowering and floating position spool valves yellow/blue or red/green
- M = Range control
- N = Neutral switch with LED
- O = EDC control module



Bottom right of driver's seat bracket
Connect e-adapter box X 899.980.208.100 to cable coupler X032.

Note:
Ignition "ON"

| Test | Pin | Switch position | Target value A | Target value B | Condition | Possible cause of fault |
|---------------------|-----|-----------------|----------------|----------------|-----------|---|
| Supply to A002 | 16 | | 8.5 VDC | | | Miniature fuse (5) within A013 or within wiring |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|---------------------|----|--|---------|--|--|--|
| Supply to A002 | 15 | | 8.5 VDC | | | Miniature fuse (15) within A013 or within wiring |
| Sensor system earth | 14 | | | | | |

| Date | Version | Page | A003 joystick | | | Capitel | Index | Docu-No. |
|------------|----------|------|---------------|--|--|-------------|----------|---------------|
| 29.11.2000 | b | 1/5 | | | | 9000 | E | 000051 |

| | | |
|----------------|---|----------|
| Fav 900 | Electrics / General system A003 joystick | E |
|----------------|---|----------|

| Test | Pin | Switch position | Target value A | Target value B | Condition | Possible cause of fault |
|------------------------------------|-----|-----------------|----------------|----------------|-----------|-------------------------|
| Acceleration control (ramp switch) | 2 | 4 | 0.94 VDC | 4.6 mA | | |
| | | 3 | 1.91 VDC | 9.4 mA | | |
| | | 2 | 3.14 VDC | 15.4 mA | | |
| | | 1 | 4.05 VDC | 19.7 mA | | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|---------------------|----|--|---------|---------|------------------------------------|--|
| Cruise control | 5 | | 5.0 VDC | 9.6 mA | | |
| | | | 2.5 VDC | 19.0 mA | Activated - push joystick to right | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|---------------------------|----|--|---------|---------|---|--|
| Joystick in rest position | 6 | | 2.5 VDC | 19.0 mA | | |
| | | | 5.0 VDC | 9.6 mA | Push joystick forward, backward, left and right | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|------------------------|----|--|---------|---------|-----------------------|--|
| Rapid direction change | 8 | | 5.0 VDC | 9.6 mA | | |
| | | | 2.5 VDC | 19.0 mA | Push joystick to left | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|-------------------|---|--|--------------------|--|------------------------|--|
| "Neutral" display | 9 | | 12 VDC to 13.0 VDC | | Neutral switch to "ON" | |
| Earth | 4 | | | | | |

| | | | | | | |
|--------------------------|----|--|---------|---------|--------------------|--|
| Neutral" operating range | 11 | | 5.0 VDC | 9.6 mA | Neutral activated | |
| | | | 2.5 VDC | 19.0 mA | Push back and hold | |
| Earth | 4 | | | | | |

| | | | | | | |
|---------------------|----|--|---------|---------|----------------------------|--|
| Activation | 10 | | 5.0 VDC | 9.6 mA | | |
| | | | 2.5 VDC | 19.0 mA | Activating control pressed | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|-----------------------------------|----|--|---------|---------|----------------|--|
| Switching operating ranges I / II | 12 | | 5.0 VDC | 9.6 mA | | |
| | | | 2.5 VDC | 19.0 mA | Switch pressed | |
| Sensor system earth | 14 | | | | | |

| Fav 900 | | Electrics / General system | | | | | E |
|--------------------------------------|-----|----------------------------|----------------------|-------------------|--------------------------------|--|-------------------------|
| A003 joystick | | | | | | | |
| Test | Pin | Switch position | Target value A | Target value B | Condition | | Possible cause of fault |
| Rear automatic control toggle switch | 22 | Neutral | 1.2 VDC | 5.4 mA | | | |
| | | Raise | 1.9 VDC | 8.9 mA | | | |
| | | Lower | 3.0 VDC | 14.5 mA | | | |
| Earth | 4 | | | | | | |
| Stop - automatic function | 24 | | 1.1 VDC | 5.3 mA | | | |
| | | | 3.0 VDC | 14.4 mA | | | |
| Earth | 4 | | | | | | |
| Transmission ratio, forwards | 26 | | 5.0 VDC | 9.5 mA | | | |
| | | | 2.4 VDC | 19.0 mA | Push joystick forward and hold | | |
| Sensor system earth | 14 | | | | | | |
| Transmission ratio, reverse | 25 | | 5.0 VDC | 9.5 mA | | | |
| | | | 2.4 VDC | 19.0 mA | Push joystick back and hold | | |
| Sensor system earth | 14 | | | | | | |
| + UB lighting | 3 | | 12.0 VDC to 13.0 VDC | | | | |
| Earth | 4 | | | | | | |
| + UB lighting dimmer | 13 | | 7.0 VDC to 12.0 VDC | 6.3 mA to 10.0 mA | | | |
| Earth | 7 | | | | | | |



Dimmer control at top of instrument panel. Current and voltage will vary.

| | | |
|----------------|---|----------|
| Fav 900 | Electrics / General system A003 joystick | E |
|----------------|---|----------|

| Test | Pin | Switch position | Target value A | Target value B | Condition | Possible cause of fault |
|---------------------------------|-----|-----------------|----------------|----------------|-----------|---|
| Crossgate lever, supply to A002 | 1 | | 8.5 VDC | | | Miniature fuse (6) within A013 or within wiring |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|---|----|--|---------|--|--|--|
| Crossgate lever, rest position (signal to A002 - ECU) | 29 | | 2.4 VDC | | | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|----------------------|----|-------------------|---------|---------|--|--|
| Valve no. 1 (yellow) | 18 | Neutral | 4.0 VDC | 54.5 mA | | |
| | | Raise | 1.8 VDC | 22.5 mA | | |
| | | Lower | 5.8 VDC | 81.5 mA | | |
| | | Floating position | 6.9 VDC | 96.4 mA | | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|---------------------|----|-------------------|---------|---------|--|--|
| Valve no. 2 (blue) | 23 | Neutral | 4.0 VDC | 54.5 mA | | |
| | | Raise | 5.8 VDC | 81.5 mA | | |
| | | Lower | 1.8 VDC | 22.5 mA | | |
| | | Floating position | 1.0 VDC | 14.5 mA | | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|--------------------|----|--------------|----------|--|--|--|
| Relay, 3rd circuit | 21 | Not actuated | 12.0 VDC | | | |
| | | Actuated | 0 VDC | | | |
| Earth, 3rd circuit | 20 | | | | | |

| | | | | | | |
|----------------------------------|----|-------------------|---------|---------|--|--|
| Rocker switch, valve no. 3 (red) | 27 | Neutral | 1.0 VDC | 5.3 mA | | |
| | | Raise | 1.4 VDC | 7.2 mA | | |
| | | Lower | 2.9 VDC | 14.0 mA | | |
| | | Floating position | 3.6 VDC | 17.0 mA | | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|------------------------------------|----|-------------------|---------|---------|--|--|
| Rocker switch, valve no. 4 (green) | 28 | Neutral | 1.0 VDC | 5.3 mA | | |
| | | Raise | 1.4 VDC | 7.2 mA | | |
| | | Lower | 2.9 VDC | 14.0 mA | | |
| | | Floating position | 3.6 VDC | 17.0 mA | | |
| Sensor system earth | 14 | | | | | |

| Date | Version | Page | A003 joystick | Capitel | Index | Docu-No. |
|------------|----------|------|---------------|-------------|----------|---------------|
| 29.11.2000 | b | 4/5 | | 9000 | E | 000051 |

| | | |
|----------------|---|----------|
| Fav 900 | Electrics / General system A003 joystick | E |
|----------------|---|----------|

| Test | Pin | Switch position | Target value A | Target value B | Condition | Possible cause of fault |
|---------------------|-----|-----------------|----------------|----------------|------------------|-------------------------|
| Max. engine speed | 31 | Not actuated | 1.1 VDC | 5.3 mA | | |
| | | Actuated | 2.1 VDC | 10.5 mA | Actuate and hold | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|---------------------|----|--------------|---------|--------|------------------|--|
| Min. engine speed | 31 | Not actuated | 1.1 VDC | 5.3 mA | | |
| | | Actuated | 1.5 VDC | 7.3 mA | Actuate and hold | |
| Sensor system earth | 14 | | | | | |

| | | | | | | |
|-----------------------|----|--------------|---------|--------|------------------|--|
| Maintain engine speed | 31 | Not actuated | 1.1 VDC | 5.3 mA | | |
| | | Actuated | 2.9 VDC | 14 mA | Actuate and hold | |
| Sensor system earth | 14 | | | | | |

The "Store engine speeds" function is cancelled under the following conditions:

1. Speed greater than 18 km/h and footbrake actuated.
2. Speed greater than 18 km/h and exhaust brake actuated.
3. Relevant keys pressed again.
4. Higher value than stored value is reached using accelerator or hand throttle.
5. Hand throttle actuation involving engine speed change of greater than 150 rpm.

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A004 - control console | E |
|---|---|----------|



Connect e-adapter box X 899.980.208.100 directly to A004 - control console.

Checking power supply to A004 - control console

Note:

Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|-----------------------|-----------------|------------------|-----------|---|
| +UB15 supply | 28 | 12 VDC to 14 VDC | | Fuse (F044) in X051 or in wiring |
| Sensor system earth | 1 | | | |
| +UB30 supply | 54 | 12 VDC to 14 VDC | | Fuse (F042) in X051 or in wiring |
| Sensor system earth | 1 | | | |
| +UB30 supply | 56,57,5-8,59,60 | 12 VDC to 14 VDC | | Fuse (F042) in X051 or in wiring, X604 connector UB30 |
| Sensor system earth 1 | 1 | | | |

Pin assignment and signal values

Note:

Ignition "ON"

Connect e-adapter box X 899.980.208.100 directly to A004 - control console.

All readings +/- 10%

Description of control console signal type, see Chapter 9700 Index A

| Pin | Pin description | Signal type | Signal at component | Signal from A004 (break in cable) |
|-----|-----------------|-------------|---------------------|-----------------------------------|
| 1 | Analogue earth | | | |
| 2 | Not assigned | | | |
| 3 | Not assigned | | | |
| 4 | Not assigned | | | |

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| 6.3.2001 | a | 1/4 | | 9000 | E | 000092 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A004 - control console | E |
|---|---|----------|

| Pin | Pin description | Signal type | Signal at component | Signal from A004 (break in cable) |
|-----|---|---------------|---|-----------------------------------|
| 5 | Not assigned | | | |
| 6 | A003 valve no. 4 (green) | Current input | Neutral 5.3 mA + (raise) 7.2 mA - (lower) 14 mA Neutral 1.0 V + (raise) 1.4 V - (lower) 2.9 V | 0 V |
| 7 | A003 valve no. 3 (red) | Current input | Neutral 5.3 mA + (raise) 7.2 mA - (lower) 14 mA Neutral 1.0 V + (raise) 1.4 V - (lower) 2.9 V | 0 V |
| 8 | A004 front power lift target value | Current input | Item 10: 4.0 mA Item 0: 20 mA Item 10: 0.8 V Item 0: 4.0 V | 0 V |
| 9 | B040 front power lift position angular resolver | Current input | Lower limit position: 5.9 mA Upper limit position: 18.8 mA Lower limit position: 1.0 V Upper limit position: 3.8 V | 0 V |
| 10 | Not assigned | | | |

| Pin | Pin description | Signal type | Signal at component | Signal from A004 (break in cable) |
|-----|--|---------------|---|-----------------------------------|
| 11 | Not assigned | | | |
| 12 | Not assigned | | | |
| 13 | Not assigned | | | |
| 14 | Not assigned | | | |
| 15 | Not assigned | | | |
| 16 | B022 pressure-operated switch kickout, NA version only | Digital input | 5.1 V and 2.4 V | 8.0 V |
| 17 | S036 hydraulic oil level switch | Digital input | Full 5.8 V Empty 3.8 V | 8.0 V |
| 18 | S015 handbrake switch | Digital input | Brake released 2.4 V Brake applied 5.1 V | 8.0 V |
| 19 | B047 steering angle switch (4WD and diff. lock) | Digital input | For figures see Chapter 9000 Index E (B047) | 8.0 V |
| 20 | B047 steering angle switch (4WD and diff. lock) | Digital input | For figures see Chapter 9000 Index E (B047) | 8.0 V |

| Date | Version | Page | A004 - control console | Capitel | Index | Docu-No. |
|----------|----------|------|------------------------|-------------|----------|---------------|
| 6.3.2001 | a | 2/4 | | 9000 | E | 000092 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A004 - control console | E |
|---|---|----------|

| Pin | Pin description | Signal type | Signal at component | Signal from A004 (break in cable) |
|-----|--|--------------------------|--|-----------------------------------|
| 21 | B009 output temperature sensor | Digital input | For figures see Chapter 9000 Index E (B009) | 8.0 V |
| 22 | S017 clogged filter pressure-operated switch | Digital input | System OK 2.4 V Pressure filter clogged 5.1 V | 8.0 V |
| 23 | A013 fuse board ABC | 8.5 V output for sensors | 8.5 V | 8.5 V |
| 24 | Not assigned | | | |
| 25 | Not assigned | | | |
| 26 | CAN-low | - wire | approx. 2.9 V | |
| 27 | CAN-high | + wire | approx. 1.7 V | |
| 28 | A004 control console electronics On / Off +15 | D+ input | 12 V | 0 V |
| 29 | A003 joystick, hand throttle memory keys only on Fav 900/23/3001 (EDC) | | For values see chapter 2710 section A speed adjustment EDC | |
| 30 | B035 hand throttle angular resolver only on Fav 900/23/3001 (EDC) | | For values see chapter 2710 section A speed adjustment EDC | |

| Pin | Pin description | Signal type | Signal at component | Signal from A004 (break in cable) |
|-----|--|---------------|---|-----------------------------------|
| 31 | Not assigned | | | |
| 32 | B003 suspension angular resolver | Current input | Upper limit position: 8.2 mA Lower limit position: 18 mA Upper limit position: 1.6 V Lower limit position: 3.6 V | |
| 33 | Not assigned | | | |
| 34 | S047 exhaust brake plunger-operated switch | Digital input | Switch not actuated 2.4 V Switch actuated 5.1 V | 8.0 V |
| 35 | S045 reversing system solenoid switch) | Digital input | Forwards 5.1 V Reverse 2.4 V | 8.0 V |
| 36 | Not assigned | | | |
| 37 | Not assigned | | | |
| 38 | Not assigned | | | |
| 39 | S034 coolant level switch | Digital input | Level OK: 2.4 V too low 5.1 V | 8.0 V |
| 40 | S022 external switch, lower front power lift | Digital input | Rest position 5.1 V Lower 2.4 V | 8.0 V |

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| 6.3.2001 | a | 3/4 | A004 - control console 9000 | E | 000092 |

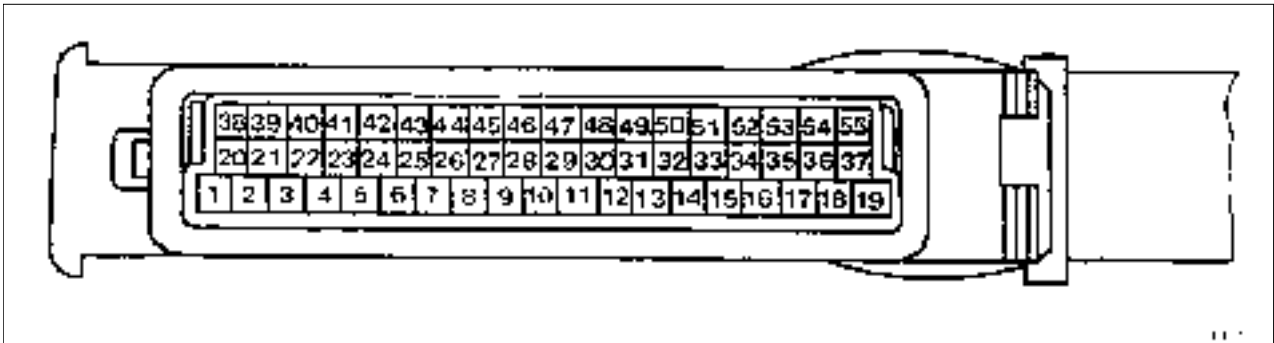
| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A004 - control console | E |
|---|---|----------|

| Pin | Pin description | Signal type | Signal at component | Signal from A004 (break in cable) |
|-----|---|---|--|-----------------------------------|
| 41 | S021 external switch, raise front power lift | Digital input | Rest position: 5.1 V Raise: 2.4 V | 8.0 V |
| 42 | S023 solenoid switch to lock front power lift external switch | Digital input | 5.1 V or 2.4 V | 8.0 Vnde |
| 43 | S006 left brake solenoid switch | Digital input | Not actuated 2.4 V Actuated 5.1 V | 8.0 V |
| 44 | S005 right brake solenoid switch | Digital input | Not actuated 2.4 V Actuated 5.1 V | 8.0 V |
| 45 | S025 / S026 steering pressure-operated switch / flow monitor | Digital input | System OK: 5.1 V, for further test stages see Chapter 9000 Index E (S025/S026) | 8.0 V |
| 46 | A005 EPC e-box, target value rear EPC +UB | +UB, when measuring, earth at pin 48 (A005) | 9.5 V | 0 V |
| 47 | A005 EPC e-box, target value rear EPC | when measuring, earth at pin 48 (A005) | Item 10: 1.2 V Item 0: 8.5 V | 10 V |
| 48 | A005 EPC e-box, target value rear EPC earth | Earth | | |
| 49 | Not assigned | | | |
| 50 | A004 control console, front power lift target value | Current input | Item 10: 4 mA Item 0: 20 mA Item 10: 0.8 V Item 0: 4 V | 0 V |

| Pin | Pin description | Signal type | Signal at component | Signal from A004 (break in cable) |
|-------|---|-------------------------|---------------------|-----------------------------------|
| 51 | Not assigned | | nde | |
| 52 | Not assigned | | | |
| 53 | Not assigned | | | |
| 54 | A004 control console, +UB 30 | Supply | 12 V | 0 V |
| 55 | A004 control console, electronics earth | Digital earth | | |
| 56-60 | A004 control console | Output stage supply +UB | 12 | 0 V |
| 61-68 | Not assigned | | | |

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| 6.3.2001 | a | 4/4 | | 9000 | E | 000092 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A005 - ECU, lift assembly | E |
|---|--|----------|

A005 - pin assignment of cable loom plug

Note:

Connect e-adapter box X 899.980.208.100 directly to A005 using adapter cable X 899.980.208.205. Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--|--------------------------------|--|
| Supply | 47 | approx. 12 VDC | Engine stopped | Fuse (F045) or in wiring |
| | | approx. 13 VDC to 14 VDC | Engine running | |
| Earth | 9 | | | |
| Supply | 47 | Voltage drop: max. 1 VDC over last measurement | Also connect approx. 55 W bulb | Voltage must remain stable even under load |
| Earth | 9 | | | |

| Date | Version | Page | A005 - ECU, lift assembly | Capitel | Index | Docu-No. |
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| 28.11.2000 | b | 1/5 | | 9000 | E | 000046 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A005 - ECU, lift assembly | E |
|---|--|----------|

**Note:**

If voltage drop is greater, remove contact resistances (e.g. at fuse).

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--|--------------------------------|--|
| Supply | 10 | approx. 12 VDC | Engine stopped | Fuse (F045) or in wiring |
| | | approx. 13 VDC to 14 VDC | Engine running | |
| Earth | 9 | | | |
| Supply | 10 | Voltage drop: max. 1 VDC over last measurement | Also connect approx. 55 W bulb | Voltage must remain stable even under load |
| Earth | 9 | | | |

| Test | Pin | Requested value | Condition | Possible cause of fault |
|--------|-----|--|--------------------------------|--|
| Supply | 6 | approx. 12 VDC | Engine stopped | Fuse (F045) or in wiring |
| | | approx. 13 VDC to 14 VDC | Engine running | |
| Earth | 9 | | | |
| Supply | 6 | Voltage drop: max. 1 VDC over last measurement | Also connect approx. 55 W bulb | Voltage must remain stable even under load |
| Earth | 9 | | | |

| Test | Pin | Target value | Condition | Possible cause of fault |
|------------------------------------|-----|--------------|---------------------------------|-------------------------|
| S048 - switch, EPC / DA switchover | 12 | 0 VDC | Switchover to EPC (S048, open) | |
| | | 12 VDC | Switchover to DA (S048, closed) | |
| Earth | 9 | | | |

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| 28.11.2000 | b | 2/5 | | 9000 | E | 000046 |

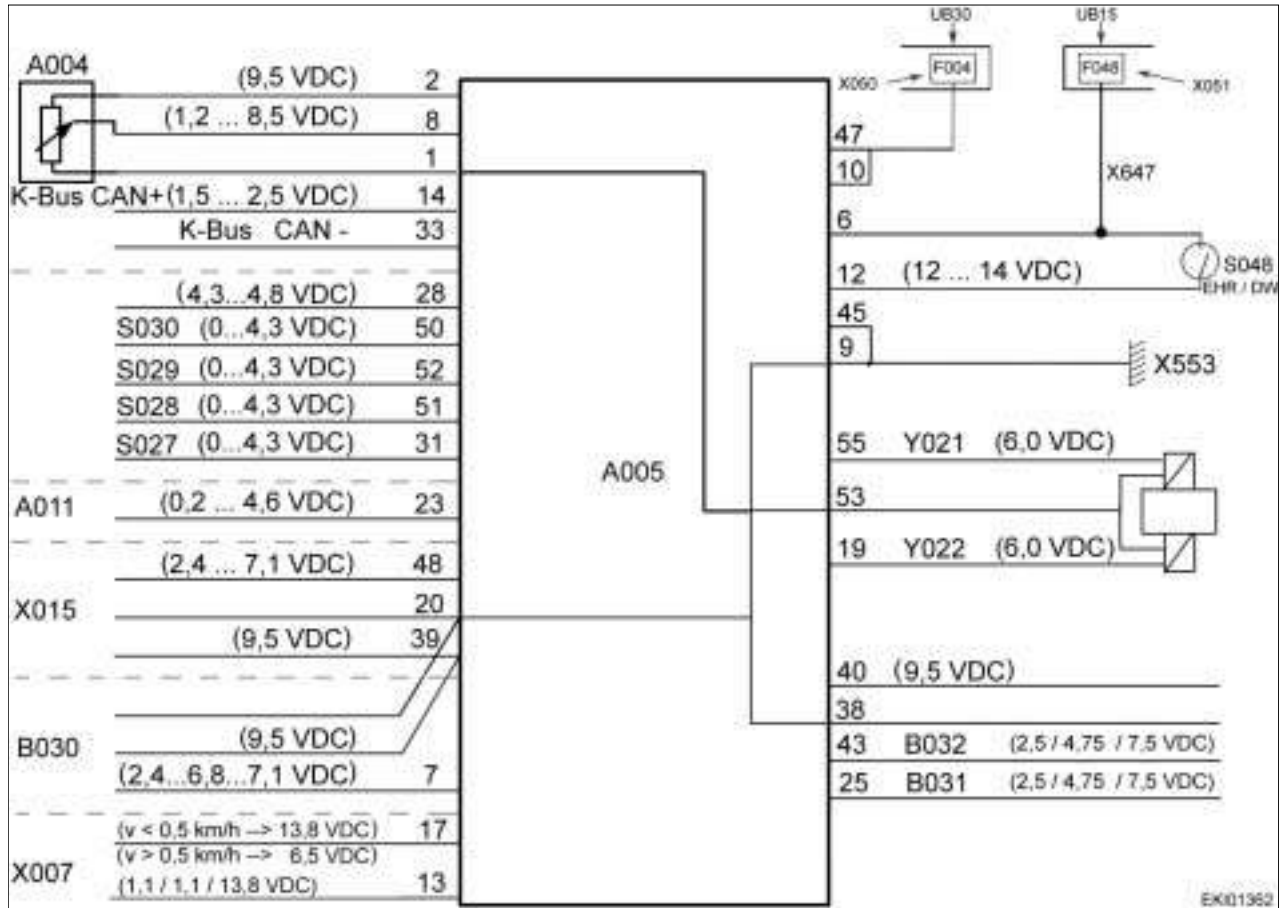
Farmer 400
Fav 700
Fav 900

Electrics / system in general
A005 - ECU, lift assembly

E

Note:

Maximum load on S048 - switch, EPC / DA switchover 10 W.



Note:

All readings +/- 10%

| Pin | Component |
|-----|--|
| 1 | Depth control earth |
| 2 | Depth control supply (9.5 VDC) |
| 6 | +UB15 connector (12 VDC to 14 VDC) |
| 7 | Signal B030 - sensor, rear power lift position (lift assembly lowered - 2.4 VDC; lift assembly raised - 6.7 VDC; mechanical stop, ext. switch - 7.1 VDC) |
| 8 | Depth control signal (1.2 VDC to 8.5 VDC) |
| 9 | Cab earthing point (X553) |
| 10 | +UB30 connector (12 VDC to 14 VDC) |
| 12 | UB15 connector / EPC / DA switchover (X647) |
| 13 | Rapid lift control output (lower - 1.1 VDC; stop - 1.1 VDC; raise - 13.8 VDC) for X007 |
| 14 | Enhanced controls bus CAN-high |
| 17 | Actual travel speed (X007) |
| | Travel speed less than 0.5 km/h (13.8 VDC) |
| | Travel speed greater than 0.5 km/h (6.5 VDC) depending on travel speed |
| 19 | Y022 - valve, lowering (6 VDC) |
| 20 | Earth for ext. position gauge and B030 - sensor, rear power lift position |
| 23 | Signal A011 - sensor; radar (0.2 VDC to 4.6 VDC) |

| Date | Version | Page | Capitel | Index | Docu-No. |
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| 28.11.2000 | b | 3/5 | A005 - ECU, lift assembly | 9000 | E |
| | | | | | 000046 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A005 - ECU, lift assembly | E |
|---|--|----------|

| Pin | Component |
|------------|---|
| 25 | B031 - sensor, draft-sensing pin right (tensile load - 2.5 VDC; neutral - 4.75 VDC; compressive load - 7.5 VDC) |
| 28 | External control supply (not actuated - 4.8 VDC; actuated - 4.3 VDC) |
| 31 | S027 - switch, raise rear power lift, right (not actuated - 0 VDC; actuated - 4.3 VDC) |
| 33 | Enhanced controls bus CAN-low |
| 38 | Draft-sensing pin earth |
| 39 | Supply for ext. position gauge and B030 - sensor, rear power lift position (9.5 VDC) |
| 40 | Draft-sensing pin supply (9.5 VDC) |
| 43 | B032 - sensor, draft-sensing pin left (tensile load - 2.5 VDC; neutral - 4.75 VDC; compressive load - 7.5 VDC) |
| 45 | Cab earthing point (X553) |
| 47 | UB30 connector (12 VDC to 14 VDC) |
| 48 | Electrohydraulic remote control signal via socket X015 (2.4 VDC to 7.1 VDC) |
| 50 | S030 - switch, lower rear power lift, left (not actuated - 0 VDC; actuated - 4.3 VDC) |
| 51 | S028 - switch, raise rear power lift, right (not actuated - 0 VDC; actuated - 4.3 VDC) |
| 52 | S029 - switch, raise rear power lift, left (not actuated - 0 VDC; actuated - 4.3 VDC) |
| 53 | Control valve earth |
| 55 | Y021 - valve, raising (6 VDC) |

| Component number | Component |
|-------------------------|--|
| A004 | ECU, control console (depth control potentiometer) |
| A005 | ECU, lift assembly |
| A011 | Sensor, radar |
| B030 | Sensor, rear power lift position |
| B031 | Sensor, draft-sensing pin right |
| B032 | Sensor, draft-sensing pin left |
| F004 | Fuse, EPC relay UB |
| F048 | Fuse, EPC supply |
| K-Bus | Enhanced controls bus |
| S027 | Switch, raise rear power lift, right |
| S028 | Switch, lower rear power lift, right |
| S029 | Switch, raise rear power lift, left |
| S030 | Switch, lower rear power lift, left |
| S048 | Switch, EPC / DA switchover |
| X007 | Implement socket cable coupler |
| X015 | Electrohydraulic remote control socket |
| X050 | Fuse holder 1 compl. |
| X051 | Fuse holder 2 compl. |
| X553 | Cab earthing point |
| X647 | UB 15 connector (EPC / DA switchover) |
| Y021 | Valve, raising |
| Y022 | Valve, lowering |

Note:

Signal from depth control system passes via pin 8 to EPC-C e-box A005.

Signal from rapid lift control passes via K-bus to EPC-C e-box A005.

Signals from rapid lowering system, hitch lift lock and rear power lift automatic system pass via K-bus to EPC-C e-box A005.

Validity:

relevant e-box = G 716.860.100.055 and further sequential end numbers.

| Date | Version | Page | A005 - ECU, lift assembly | Capitel | Index | Docu-No. |
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| 28.11.2000 | b | 4/5 | | 9000 | E | 000046 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A005 - ECU, lift assembly | E |
|---|--|----------|

Applicability:

previous versions of Fav 700 - twin e-box with end numbers 051 to 054 are interchangeable with current latest versions.

Explanation and comparison with EPC-C box:

- (fitted to Fav 500; Xylon; Fav 800 and Fav 900 up to 23/3000)

New

- Terminal setting options for rear power lift mean that several pin assignments are no longer applicable, though this has to be programmed via K-bus (see pins 14,33).
- Only "actual" signal cables are shown in relevant electrical circuit diagrams (EPC control system). Bus messages to terminal, e-box A002, instrument panel A007 and terminal A008 cannot be seen in circuit diagram (see "CAN enhanced controls bus circuit diagram").

Unchanged

- Setpoint / depth settings in control console A004 as voltage potentiometer
- Connection to K-bus and CAN1
- Electrical values of power lift components

Testing and diagnostics:

- Generally applicable circuit diagram: "Electrohydraulic power lift control"
- Other circuit diagrams required: "Power supply", "Earthing system", "Implement socket", "Electronics power supply", "Enhanced controls bus", and "Instrument panel"
- Following test equipment is required to carry out electrical measurements directly on EPC box: 68-pin adapter box X 899.980.208.100 and 68-pin/55-pin intermediate adapter cable X 899.980.208.208
- "EPC rear" menu should be used in FENDIAS.
- Please refer to Electrical Block Diagram for terminal diagram for pulse counting with on-board computer using external switch.....

Note:

Chapter 8610 Index B - Rear power lift troubleshooting plan

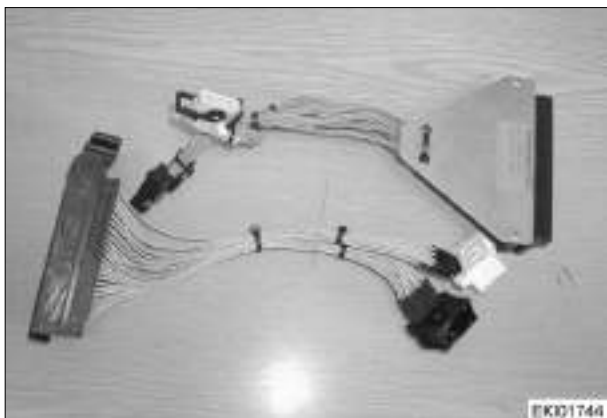
Chapter 9000 Index C - Electrical circuit diagrams

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| 28.11.2000 | b | 5/5 | | 9000 | E | 000046 |

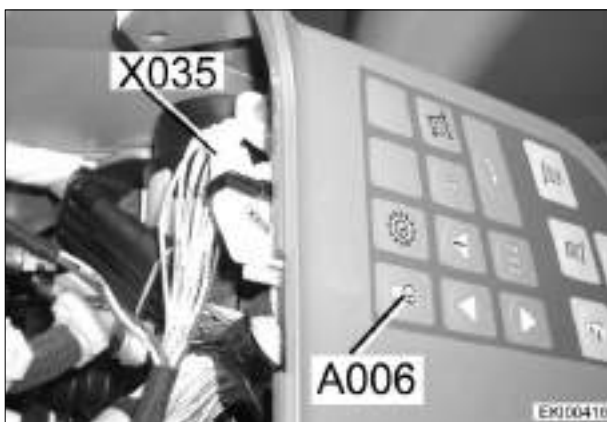
Farmer 400
Fav 700
Fav 900

Electrics / General system
A006 - front dashboard keypad

E



Connect e-adapter box X 899.980.208.100 to A006 - front dashboard keypad using adapter cable X 899.980.208.207.



A006 - front dashboard keypad
Connector X035

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system A006 - front dashboard keypad | E |
|---|---|----------|

| Connector X035 | | | |
|--------------------------|---|--|------------------|
| Earth from pin 12 | | | |
| Ignition ON | | | |
| Pin | Pin description | Condition | Signal |
| 1 | A007 - instrument panel Connector X101 | Switch not actuated Switch actuated | 210 mV 102 mV |
| 2 | A007 - instrument panel Connector X101 | | 94 mV |
| 3 | A007 - instrument panel Connector X101 | Switch not actuated Switch actuated | 210 mV 102 mV |
| 4 | A007 - instrument panel Connector X101 | | 94 mV |
| 5 | A007 - instrument panel Connector X101 | Switch not actuated Switch actuated | 210 mV 102 mV |
| 6 | A007 - instrument panel Connector X101 | Switch not actuated Switch actuated | 94 mV |
| 7 | A007 - instrument panel Connector X101 | Switch not actuated Switch actuated | 210 mV 102 mV |
| 8 | A007 - instrument panel Connector X101 | | 94 mV |
| 9 | Not assigned | | |
| 10 | A007 - instrument panel Connector X102 | | 12 VDC to 14 VDC |
| 11 | Not assigned | | |
| 12 | Earth X554 | | |
| 13-18 | Not assigned | | |

Note:**All readings +/- 15%**

The A006 - front dashboard keypad is a diode circuit which processes voltage signals from the A007 - instrument panel.

When a switch is actuated, it must be possible to measure a slight variation in voltage (mV range).

| Date | Version | Page | A006 - front dashboard keypad | Capitel | Index | Docu-No. |
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| 20.07.2001 | a | 2/2 | | 9000 | E | 000131 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system A007 - instrument panel | E |
|---|---|----------|

| Connector X100 (blue) | | | |
|--|--|--|---|
| Earth from pin 18 connector X101 (yellow) | | | |
| Ignition ON | | | |
| Pin | Pin description | Condition | Signal |
| 1 | K010 - relay for direction indicator controller C3 | Connected trailer lighting | 12 VDC pulse |
| 2 | K010 - relay for direction indicator controller C2 | Connected trailer lighting | 12 VDC pulse |
| 3 | S001 - control stalk | Main beam indicator: Main beam off Main beam on | 0 VDC 12 VDC to 14 VDC |
| 4 | G004 - generator 2 (Fav 900) G002 - generator (Farmer 400, Fav 700) | Battery charge indicator: Ignition on, engine off Ignition on, engine on | 0 VDC 12 VDC to 14 VDC |
| 5 | A012 - cold-start aid | Preheating, indicator flashing Indicator goes out | 12 VDC pulse 12 VDC to 14 VDC |
| 6 | K010 - direction indicator controller relay | Actuate turn indicator | 12 VDC pulse |
| 7 | X610 - right turn indicator connector | Actuate turn indicator | 12 VDC pulse |
| 8 | H006 - beeper | Continuous tone | approx. 9 VDC |
| 9 | | Intermittent tone | 12 VDC pulse |
| 10 | X007 - implement socket | Rear PTO speed: PTO off PTO on | 0 VDC or 13.8 VDC (depending on ratchet wheel) approx. 6.5 VDC |
| 11 | X007 - implement socket | Transmission signal: Speed 0 km/h Speed greater than 0.1 km/h | 13.8 VDC approx. 6.5 VDC |
| 12 | Not assigned | | |
| 13 | A013 - fuse board B (X201) | CAN-low | 2.5 VDC to 3.5 VDC |
| 14 | Not assigned | | |
| 15 | A005 - EPC ECU | Lift status for X007 - implement socket: Lower Stop Raise | 1.1 VDC 1.1 VDC 13.8 VDC |
| 16 | B013 - hydraulic oil thermostat | Temperature < approx. 95°C Temperature > approx. 95°C (warning display) | 12 VDC to 14 VDC 0 VDC |
| 17 | B004 - underpressure switch | Underpressure < approx. 65 mbar Underpressure > approx. 65 mbar | 12 VDC to 14 VDC 0 VDC |
| 18 | Not assigned | | |
| 19 | S024 - brake-fluid sensor | Float at top Float at bottom | 12 VDC to 14 VDC 0 VDC |
| 20-24 | Not assigned | | |
| 25 | X611 - left turn indicator connector | Turn indicator actuated | 12 VDC pulse |
| 26 | A013 - fuse board B (X201) | CAN-high | 1.5 VDC to 2.5 VDC |

Note: All readings +/- 10%

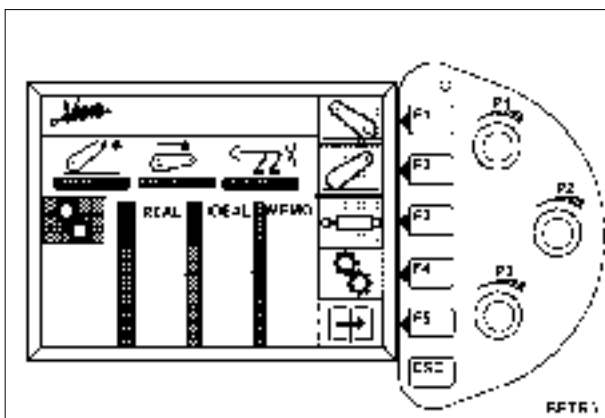
| Date | Version | Page | A007 - instrument panel | Capitel | Index | Docu-No. |
|----------|---------|------|-------------------------|---------|-------|----------|
| 16.07.01 | a | 2/4 | | 9000 | E | 000128 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general

A008 - terminal, operation of rotary potentiometers

E



If settings can no longer be changed via potentiometers P1 - P3, proceed as follows:

1. Switch off tractor ignition
2. Hold down keys F1, F3 and F5 on terminal at same time as turning ignition on.
3. Instead of Fendt start page, blue screen is now displayed containing following data.



"Encoder 1" to "Encoder 3" shows current status and numerical values of three potentiometers. If you turn relevant potentiometer, 4-digit figure counts pulses up or down hexadecimally.

If you turn potentiometer slowly, following sequence should be observed:

00 -> 01 -> 11 -> 10 -> 00 etc.

If you turn in opposite direction, then sequence read correspondingly from left to right is applicable.

If figures do not appear when you actuate relevant potentiometer, there is a fault.

Press ESC key to exit blue screen, and Fendt start page is then displayed.

or

Switch ignition off and on to exit blue screen, and Fendt start page is then displayed.

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| 05/2000 | a | 1/1 | A008 - terminal, operation of rotary potentiometers | 9000 | E |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general A009 - actuator unit | E |
|---|---|----------|



| Pin | Function |
|-----|---------------|
| 1 | WD PWM |
| 2 | CAN 2+ |
| 3 | Reference F/R |
| 4 | + UB 30 |
| 5 | CAN 2- |
| 6 | + UB from ECU |
| 7 | Digital earth |
| 8 | Tractor earth |

Note:

Connect adapter cable X 899.980.246.207 to cable coupler X037.
Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|-----------------------|-----|---|-----------------------------------|---|
| Electric motor supply | 4 | 12 - 14 VDC | | Verification of fuse (F043) |
| Earth | 8 | | | |
| Electric motor supply | 4 | Voltage drop: max. 1 VDC over last measurement | Also connect approx. 55 W bulb | Voltage must remain stable even under load |
| Earth | 8 | | | |
| UB from e-box | 6 | 12.0 VDC to 14.0 VDC | | |
| Digital earth | 7 | | | |
| Reference F/R | 3 | 2.4 VDC or 5.0 VDC | | If voltage reading is approx. 2.4 VDC, turn emergency control briefly to left. If voltage reading is approx. 5.0 VDC, turn emergency control briefly to right. |
| Digital earth | 7 | | | |
| CAN 2+ | 2 | 1.5 VDC - 2.5 VDC | | |
| Digital earth | 7 | | | |
| CAN 2- | 5 | 1.5 VDC - 3.5 VDC | | |
| Digital earth | 7 | | | |

| Date | Version | Page | A009 - actuator unit | Capitel | Index | Docu-No. |
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| 12/1999 | a | 1/1 | | 9000 | E | 000016 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system A010 - electronic thermostat | E |
|----------------------------------|---|----------|



| Pin | Colour | Function |
|-----|--------------|----------------------|
| 1 | Brown | Earth |
| 2 | - | Not assigned |
| 3 | Red | S037 (+UB) |
| 4 | Black/yellow | Y024 (+UB) |
| 5 | Blue | B045 - sensor |
| 6 | Brown | B045 - sensor |
| 7 | White | B046 - sensor |
| 8 | White | B046 - sensor |
| 9 | Brown/yellow | S044 - potentiometer |
| 10 | Brown/yellow | S044 - potentiometer |

| Pin | Pin description | Condition | Signal |
|---------|-------------------------|--|--------------------------------------|
| 1 | Earth | | |
| 2 | Not assigned | | |
| 3 | S037 - fan switch | Ignition ON Fan switch ON Fan switch OFF | 12 VDC to 14 VDC 0 VDC |
| 4 | Y024 - magnetic clutch | Ignition ON A010 switches on A010 switches off | 12 VDC to 14 VDC 0 VDC |
| 5 6 | B045 - temp. sensor 2 | Disconnect A010 | approx. 1.18 kOhm at 20°C |
| 7 8 | B046 - temp. sensor 1 | Disconnect A010 | approx. 10 kOhm at 20°C |
| 9 10 | S044 - AC potentiometer | Disconnect A010 Max. position Min. position | approx. 60 ohms approx. 10.4 kOhm |

Note:

All readings +/- 10%

B045 and B046 are Negative Temperature Coefficient sensors, in other words, the sensor resistance decreases with increasing ambient temperature.

The A010 - electronic thermostat switches as a function of:

- S037 - fan switch (**A010 supply**)
 - S044 - AC potentiometer (**setpoint**)
 - B046 - temp. sensor 1 in air current (**actual value**)
 - B045 - temp. sensor 2 on evaporator (**safeguard against system icing up**)
 - S035 - high-pressure/low-pressure switch (**coolant circuit protection**)
- Voltage (12 VDC to 14 VDC) to Y024 - magnetic clutch (air-conditioning compressor switches on)**

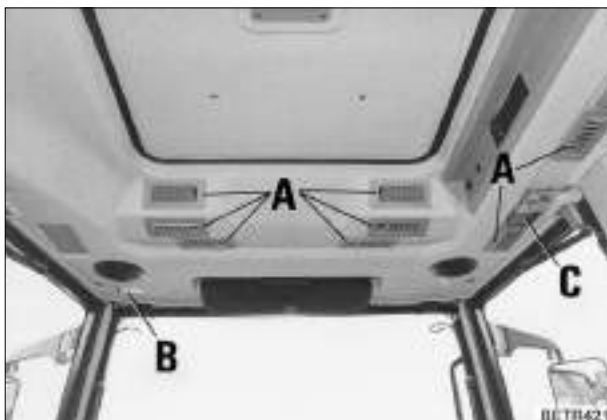
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| 18.07.2001 | a | 1/2 | A010 - electronic thermostat 9000 | E | 000129 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system A010 - electronic thermostat | E |
|----------------------------------|---|----------|

Fault location in air-conditioning

Air-conditioning compressor does not switch on

1. Check X050, fuse F017 (UB 15) (supply for M009 - fan and A010 - electronic thermostat).
2. Supply Y024 - magnetic clutch with 12 VDC from external source (check: does magnetic clutch operate?).
3. Check S037 - fan switch for continuity (supply to A010 - electronic thermostat. "Green telltale").
4. Check S035 - high-pressure/low-pressure switch for continuity (check refrigerant circuit).
5. Check all connectors for continuity.
6. Check voltage output of A010 - electronic thermostat at Y024 - magnetic clutch.
7. Check operation of B045 - sensor, B046 - sensor and S044 - potentiometer (see table above).



Checking performance of air-conditioning

- Hold thermometer in fan air current and measure air current temperature directly at air nozzle outlet (A).

Target value: approx. 6°C - 8°C at 25°C ambient temperature

Note:

Set recirculation switch to recirculation mode to ensure optimum cooling performance.

Note:

If target value is not achieved, recirculation filter, condenser or evaporator may be soiled/clogged (please see Operating Manual for details of how to clean).

Note:

See also:

Chapter 5500 Reg. A - Functional description

Chapter 5570 Reg. A - Electrical check on air-conditioning

Chapter 9000 Reg. C - Electric circuit diagrams

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| 18.07.2001 | a | 2/2 | A010 - electronic thermostat | 9000 | E |
| | | | | | 000129 |

Farmer 400
Fav 700
Fav 900

Electrics / General system
A011 - radar sensor

E



A011 = Radar sensor

Note:

See also :

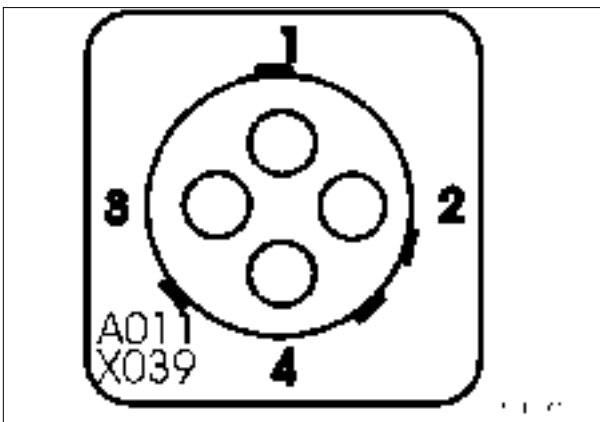
Chapter 8610 Reg. A - Operation and function of electronic slip control

Chapter 8610 Reg. B - Faults in slip control (radar A011)

Chapter 9000 Reg. E - X007 - Implement socket

Chapter 9000 Reg. E - A005 - EPC ECU

Chapter 8610 Reg.E - Slip control performance test



| Radar plug X039 | |
|-----------------|--------------|
| Pin | Function |
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |
| 4 | Not assigned |

To radar plug X039

| | Test condition | Target value | Directly to radar sensor A011 |
|-------------------|----------------|-----------------|--|
| + supply | Ignition ON | 12 - 14 VDC | Pins 3 and 1. |
| Power consumption | Ignition ON | approx. 0.5 ADC | Measure at fuse F048 (isolate consumers A005 and S048 in parallel) |

To EPC ECU A005

| | Test condition | Target value | Directly to EPC ECU A005 |
|--------|--------------------------------------|-----------------|--------------------------|
| Signal | Tractor driving slower than 0.5 km/h | approx. 0.2 VDC | Pins 23 and 9. |
| | ... faster than 0.5 km/h | approx. 4.6 VDC | |

To implement socket X007

| | Test condition | Target value | Directly to implement socket X007 |
|--------|--------------------------------------|------------------------|-----------------------------------|
| Signal | Tractor driving slower than 0.5 km/h | 12 - 14 VDC (UB) | Pins 1 and 7. |
| | ... faster than 0.5 km/h | approx. 6.5 VDC (UB/2) | |

| Date | Version | Page | A011 - radar sensor | Capitel | Index | Docu-No. |
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| 10.05.01 | a | 1/1 | | 9000 | E | 000127 |

Farmer 400
Fav 700
Fav 900

Electrics / General system
A012 - ECU, cold-start aid

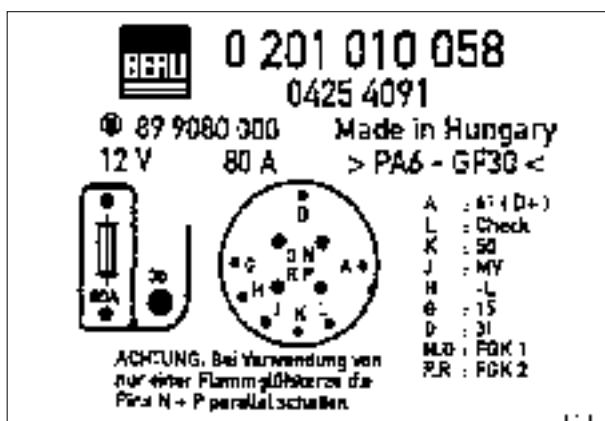
E



Farmer 400, Fav 700



Fav 900 chassis number 23/3001 and up



Pin assignment for A012 - ECU, cold-start aid



At bottom of A012 - ECU, cold-start aid
X382 = Terminal for pin 30 (B+)

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| 09.08.2001 | a | 1/12 | A012 - ECU, cold-start aid | 9000 | E |
| | | | | | 000147 |

Farmer 400
Fav 700
Fav 900

Electrics / General system
A012 - ECU, cold-start aid

E

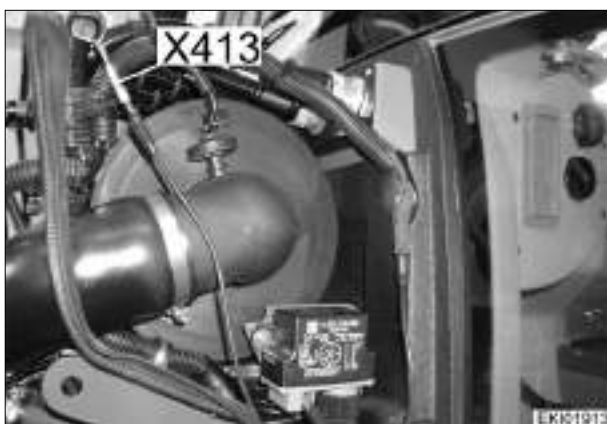


At bottom of A012 - ECU, cold-start aid

FU = 80 amp fuse

Note:

A012 - ECU shown removed for greater clarity.



Farmer 400, Fav 700

To check cold-start system at temperature > glow-stop temperature (2.5°C)

Open screw cap and connect contact X413 to vehicle earth.

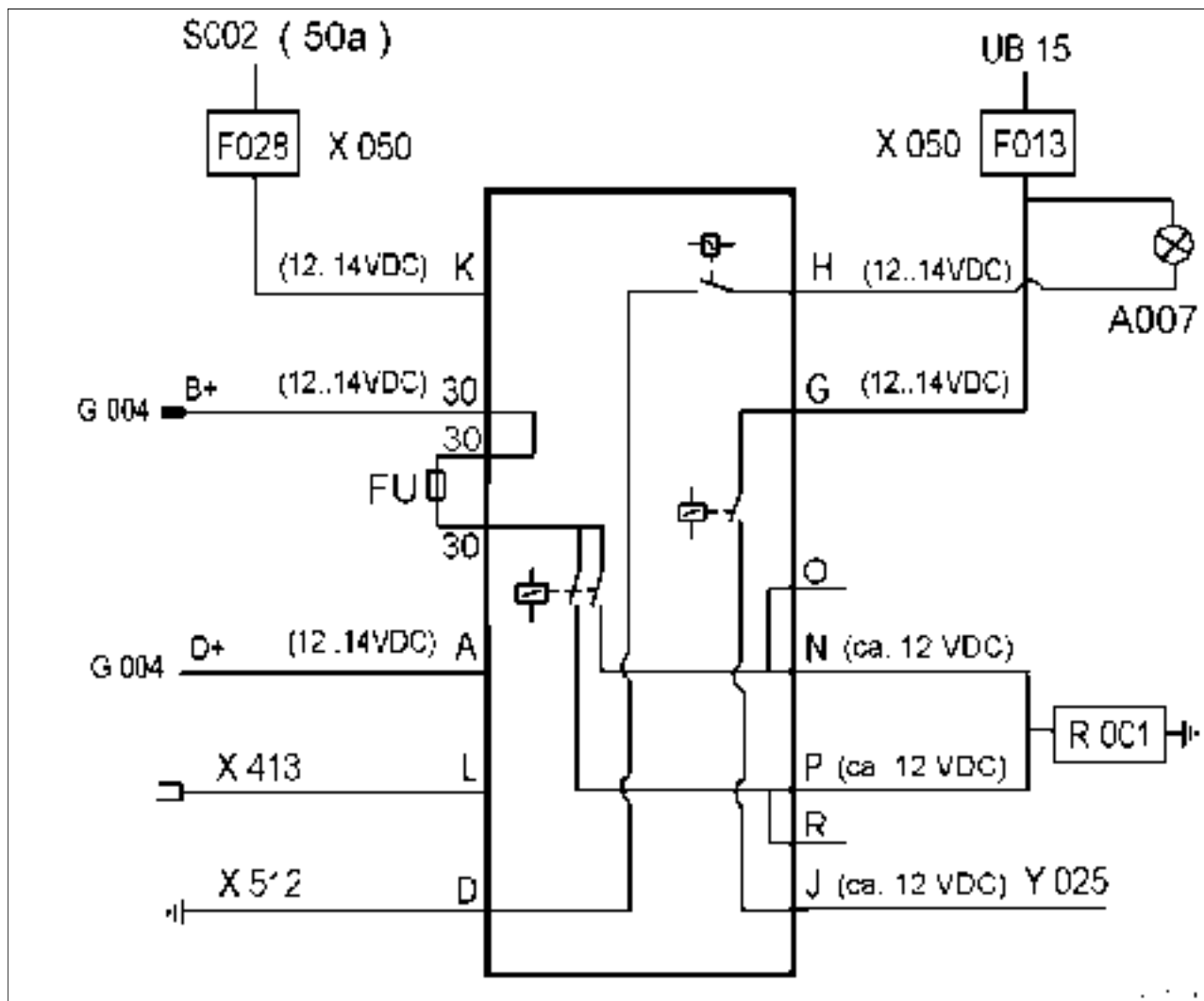


Fav 900 chassis number 23/3001 and up

To check cold-start system at temperature > glow-stop temperature (2.5°C)

Open T-piece of cable loom and connect contact X413 to vehicle earth.

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system A012 - ECU, cold-start aid | E |
|---|---|----------|



| Item | Designation | Item | Designation |
|------|--|------|---|
| A | G002 / G004 - generator indicator D+ | X050 | Fuse holder 1 |
| D | X512 - left engine earthing point links | 30 | G002 / G004 - generator B+ |
| G | Preheating (supply) | FU | 80 amp fuse |
| H | Telltale in A007 - display unit | | |
| J | Y025 - valve, cold-start aid | B+ | Battery + (generator) |
| K | S002 - switch, ignition (50a) | D+ | Dynamo + (generator) |
| L | Check (cold-start system, temperature > glow-stop temperature (2.5°C)) | UB15 | Switched voltage after battery (output S002 - switch, ignition) |
| N,P | R001 - heater plug | 50a | Battery changeover relay, output for starter control unit |
| O,R | Not assigned | | |

Note:

Note.
G002 - generator (Farmer 400, Fav 900)

G004 - generator (Fav 900 chassis number 23/3001 and up)

Note:

Chapter 9000 Index C - Cold-start system circuit diagram

Chapter 9000 Index C - Starter motor control unit circuit diagram

| | | | | | | |
|------------|---------|------|----------------------------|---------|-------|----------|
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| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system A012 - ECU, cold-start aid | E |
|---|--|----------|

Note:

Unless otherwise stated, all current values refer to rated voltage of 12 VDC.

| Pin | Pin designation Signal | Function |
|-----|------------------------------------|--|
| A | (D+) | Generator indicator (dynamo+). As long as engine is running at sufficiently high speed, G002/G004 - generator charging voltage is present. |
| | 5 mA - 20 mA at 12 VDC | |
| | Engine running / UD+ > 9 VDC | |
| | Engine not running / UD+ < 2.5 VDC | |

| Pin | Pin designation Signal | Function |
|-----|---------------------------|---|
| L | Check | To check A012 - ECU at temperatures > 0°C this terminal must be connected to vehicle earth. |
| | Max. 50 mA | |

| Pin | Pin designation Signal | Function |
|-----|---------------------------|--|
| K | 50 (17) | S002 - switch, ignition. If starter motor is operated, battery voltage can be measured here. |
| | Min. 5 mA | |
| | Max. 100 mA | |

| Pin | Pin designation Signal | Function |
|-----|---------------------------|--|
| G | 15 (19) | Ignition (preheating). If battery voltage is connected to this pin (by turning S002 - switch), A012 - ECU starts preheating. Voltage must not be interrupted at this pin throughout operation since program sequence of A012 - ECU is otherwise disrupted. |
| | Max. 8 A | |
| | Fuse F013 (X050) | |

| Pin | Pin designation Signal | Function |
|-----|------------------------------|--|
| J | Y025 - valve, cold-start aid | Output for Y025 - valve is connected to pin G (input terminal 15). Protection against short-circuit is provided by fuse F013 (X050). |
| | Approx. 2.5 A | |

| Pin | Pin designation Signal | Function |
|-----|---------------------------------|---|
| H | Telltale in A007 - display unit | Telltale is connected here to A007 - display unit. Output switches vehicle earth to telltale which is supplied with power via its second pin. |
| | 3 W / 12 VDC | |

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| 09.08.2001 | a | 4/12 | | 9000 | E | 000147 |

| | | |
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| Farmer 400 Fav 700 Fav 900 | Electrics / General system A012 - ECU, cold-start aid | E |
|---|--|----------|

| Pin | Pin designation | Function |
|-----------|---------------------------------|---|
| | Signal | |
| N,O / P,R | R001 - heater plug | A012 - ECU switches voltage at pin 30 (screw connection) to plug pins via relay (in ECU) with two pins. If only one heater plug is to be used, outputs N and P should be used in parallel. Two plug-in contacts are designed for operating each heater plug with maximum continuous current each of 35 A. Protection is provided by fuse located in A012 - ECU. |
| | Approx. 80 A ON | |
| | Approx. 35 A continuous current | |
| | per heater plug | |

Note:

Chapter 9000 Index A - Terminal designation (pins) to DIN 72 552

Chapter 9000 Index E - Y025 / R001 - valve, cold-start aid / heater plug



At bottom of A012 - ECU, cold-start aid

FU = 80 amp fuse**Note:****A012 - ECU shown removed for greater clarity.**

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| 09.08.2001 | a | 5/12 | A012 - ECU, cold-start aid | 9000 | E |
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| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system A012 - ECU, cold-start aid | E |
|---|--|----------|

Control data for A012 - ECU, cold-start aid

Preheating times

The R001 - heater plug requires this time to reach a temperature which can ignite the fuel in the air current.

The preheating time depends on the on-board voltage.

The A012 - ECU measures the relevant voltage for the preheating time 3 sec +/- 1 sec after the R001 - heater plug is switched on.

| UB | Preheating time |
|---------------|------------------------|
| [Volt] | [sec] |
| 9.6 | 45 +/- 10% |
| 10.6 | 35 +/- 10% |
| 11.6 | 25 +/- 10% |
| 12.6 | 18 +/- 10% |
| 13.6 | 15 +/- 10% |
| 14.6 | 12 +/- 10% |
| 16.0 | System switches off |

Start standby time

The start standby time indicates how long it is still possible to start the engine with the aid of the cold-start system after the preheating time has finished.

The telltale in the A007 - display unit flashes during this time.

The start standby time depends on the on-board voltage.

The A012 - ECU measures the relevant voltage for the start standby time shortly after its start.

| UB | Start standby time |
|---------------|---------------------------|
| [Volt] | [sec] |
| 9.6 | 30 +/- 10% |
| 10.6 | 30 +/- 10% |
| 11.6 | 30 +/- 10% |
| 12.6 | 20 +/- 10% |
| 13.6 | 10 +/- 10% |
| 14.6 | 8 +/- 10% |
| 16.0 | System switches off |

Attempted start

If the battery voltage is applied to pin K (50) of A012 - ECU, this is interpreted as a start signal after 250 ms +/- 50 ms. The afterburn phase begins with the first downward transition of the starter signal.

Safety cut-out time

After a failed start, or if pin A (D+) becomes or remains de-energised for another reason, the A012 - ECU switches off the Y025 - valve and the R001 - heater plug at the end of the safety cut-out time.

The safety cut-out time is 20 sec +/- 10%.

Glow stop

At temperatures > the glow-stop temperature, operation of the cold-start aid is not required.

The telltale in the A007 - display unit flashes to show that the engine is ready for an immediate start.

The glow-stop temperature is 2.5 °C +/- 2.5°C.

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| 09.08.2001 | a | 6/12 | | 9000 | E | 000147 |

| | | |
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| Farmer 400 Fav 700 Fav 900 | Electrics / General system A012 - ECU, cold-start aid | E |
|---|--|----------|

Afterburn time

Afterburning with the engine running ensures better fuel combustion and faster warming of the engine to an ideal operating temperature.

The afterburn time depends on the resistance of the temperature sensor in the A012 - ECU when preheating starts.

| Sensor temperature | Afterburn time |
|----------------------------|------------------------------|
| [°C] | [sec] |
| Tolerance +/- 2.5°C | Tolerance +/- 1.0 sec |
| > 2.5 | 0 |
| 2.5 | 60 |
| - 12.5 | 80 |
| - 22.5 | 100 |
| - 32.5 | 120 |
| < - 32.5 | 120 |

Clocking heater plug output

While afterburning is taking place, the output at the R001 - heater plug is limited by clocking (voltage ON - voltage OFF - voltage ON - etc.) pins P,N (A012 - ECU).

If the voltage at pin G (A012 - ECU) rises above approx. 11.5 VDC during afterburning, the outputs for the R001 - heater plug are clocked such that an effective voltage of approx. 11.5 VDC is applied at the outputs.

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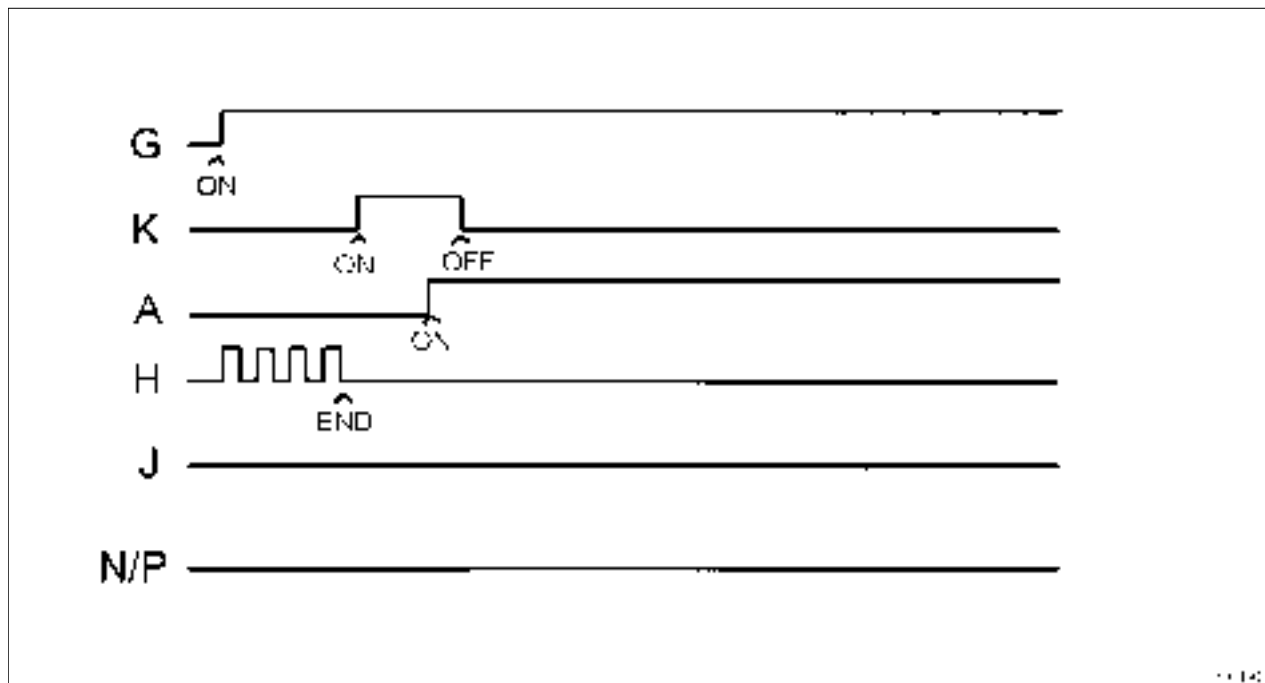
Farmer 400
Fav 700
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Electrics / General system
A012 - ECU, cold-start aid

E

Flow diagrams for the A012 - ECU, cold-start aid

Normal engine start, temperature > glow-stop temperature (2.5°C +/- 2.5°C)



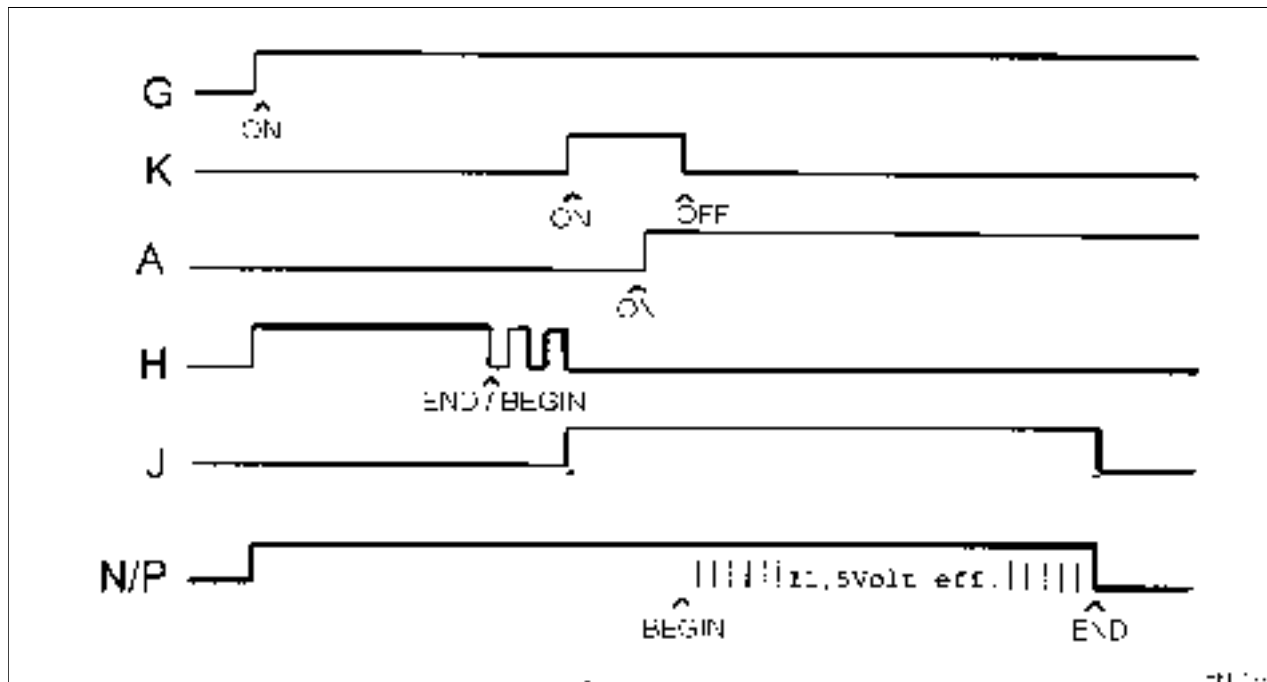
| Pin | Function | Note |
|-----|---------------------------------------|--|
| G | S002 - switch, ignition (terminal 15) | Supply for A012 - ECU |
| K | M001/M011 - starter (terminal 50) | Starter control unit |
| A | G002/G004 - generator (D+) | Battery charge indicator |
| H | Telltale in A007 - display unit | Start standby: telltale flashes |
| J | Y025 - valve, cold-start aid | Y025 - valve remains switched off (no fuel feed to R001) |
| N/P | R001 - heater plug | No preheating and III afterburning III |

Farmer 400
Fav 700
Fav 900

Electrics / General system
A012 - ECU, cold-start aid

E

Normal engine start, temperature < glow-stop temperature (2.5°C +/- 2.5°C)



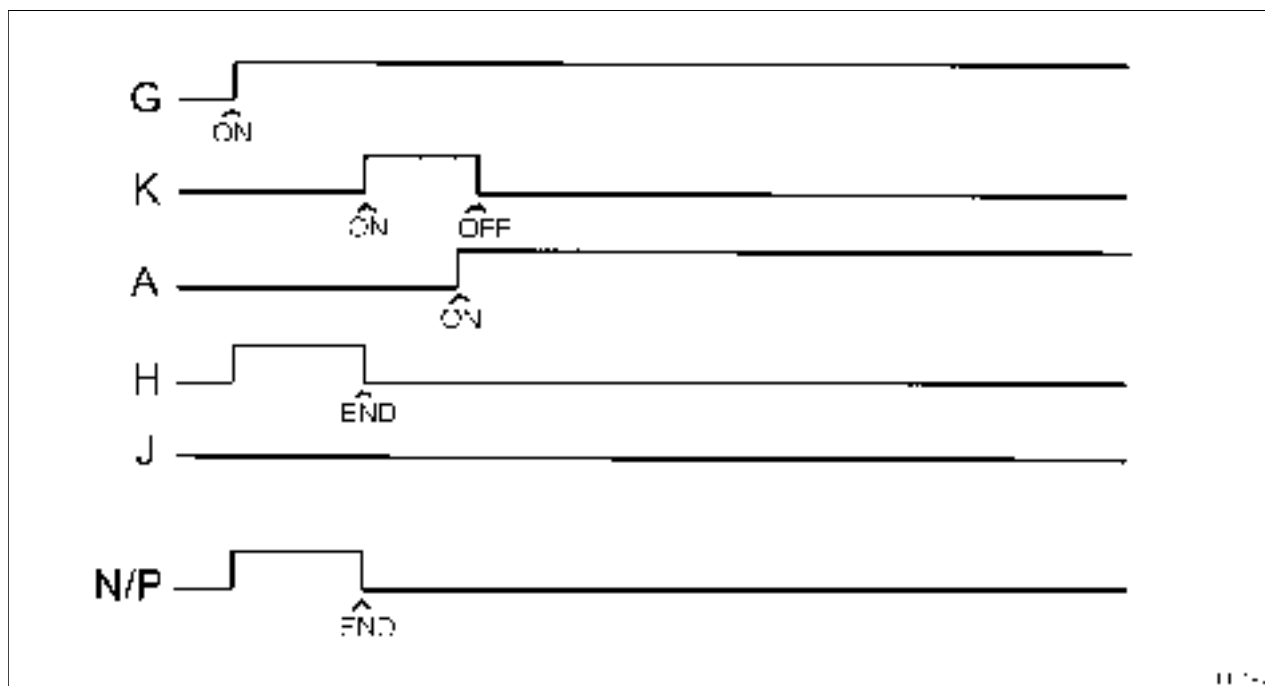
| Pin | Function | Note |
|-----|---------------------------------------|---|
| G | S002 - switch, ignition (terminal 15) | Supply for A012 - ECU |
| K | M001/M011 - starter (terminal 50) | Starter control unit |
| A | G002/G004 - generator (D+) | Battery charge indicator |
| H | Telltale in A007 - display unit | Preheating: telltale illuminated Start standby: telltale flashes |
| J | Y025 - valve, cold-start aid | Y025 - valve is powered (fuel feed to R001) |
| N/P | R001 - heater plug | Phase 1 = preheating Phase 2 = III afterburning III |

Farmer 400
Fav 700
Fav 900

Electrics / General system
A012 - ECU, cold-start aid

E

Engine started before end of preheating time, temperature < glow-stop temperature (2.5°C +/- 2.5°C)



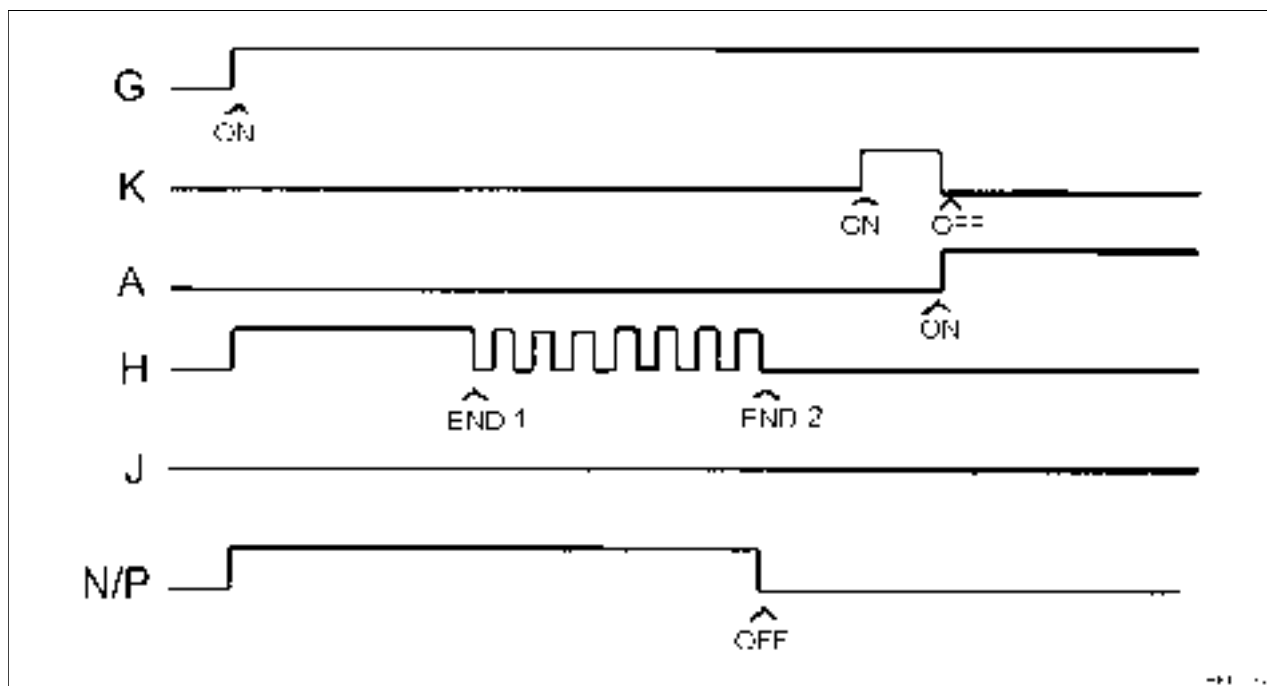
| Pin | Function | Note |
|-----|---------------------------------------|--|
| G | S002 - switch, ignition (terminal 15) | Supply for A012 - ECU |
| K | M001/M011 - starter (terminal 50) | Starter control unit |
| A | G002/G004 - generator (D+) | Battery charge indicator |
| H | Telltale in A007 - display unit | Preheating: telltale illuminated Preheating terminated prematurely. |
| J | Y025 - valve, cold-start aid | Y025 - valve remains switched off (no fuel feed to R001) |
| N/P | R001 - heater plug | Preheating terminated prematurely, no III afterburning III |

Farmer 400
Fav 700
Fav 900

Electrics / General system
A012 - ECU, cold-start aid

E

Engine start after end of start standby time, temperature < glow-stop temperature (2.5°C +/- 2.5°C)



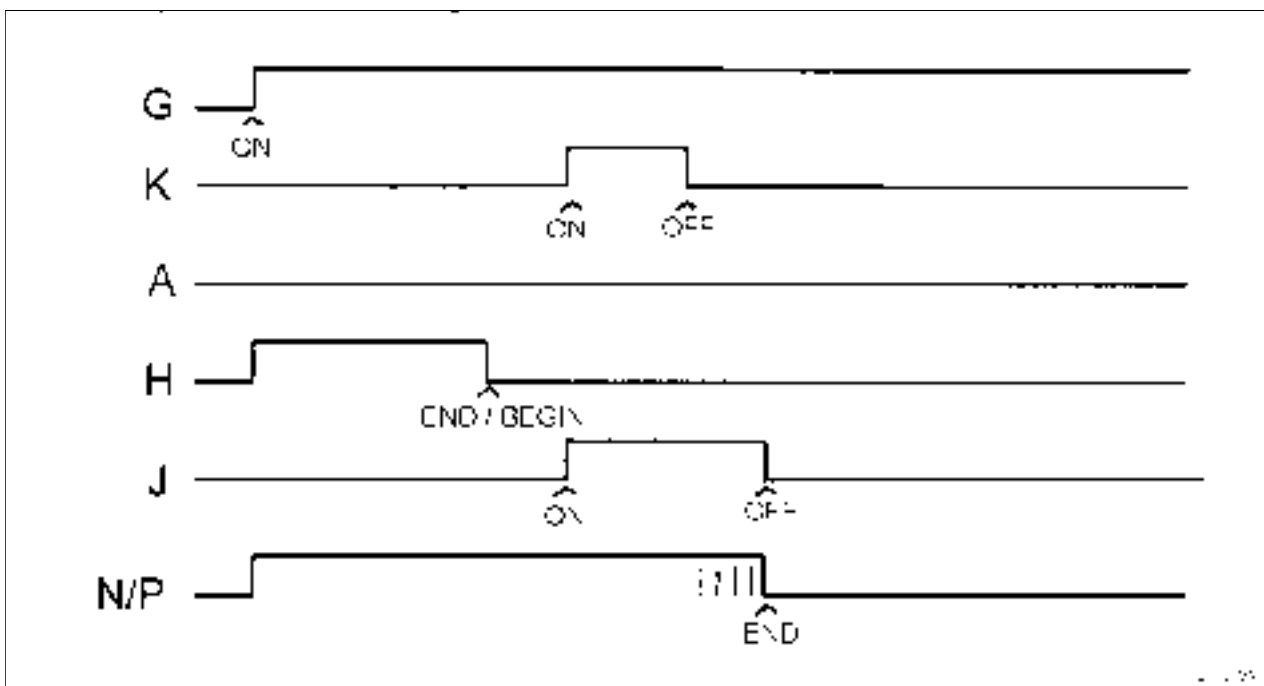
| Pin | Function | Note |
|-----|---------------------------------------|---|
| G | S002 - switch, ignition (terminal 15) | Supply for A012 - ECU |
| K | M001/M011 - starter (terminal 50) | Starter control unit |
| A | G002/G004 - generator (D+) | Battery charge indicator |
| H | Telltale in A007 - display unit | Preheating: telltale illuminated Start standby: telltale flashes |
| J | Y025 - valve, cold-start aid | Y025 - valve remains switched off (no fuel feed to R001) |
| N/P | R001 - heater plug | Phase 1 = preheating No III afterburning III |

Farmer 400
Fav 700
Fav 900

Electrics / General system
A012 - ECU, cold-start aid

E

Failed start, no generator signal at terminal D+, temperature < glow-stop temperature (2.5°C +/- 2.5°C)

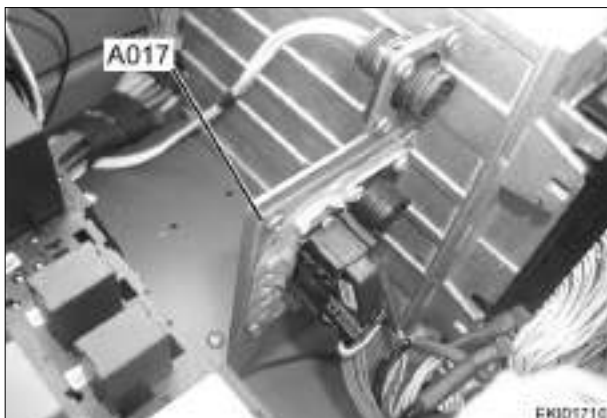


| Pin | Function | Note |
|-----|---------------------------------------|---|
| G | S002 - switch, ignition (terminal 15) | Supply for A012 - ECU |
| K | M001/M011 - starter (terminal 50) | Starter control unit |
| A | G002/G004 - generator (D+) | Battery charge indicator remains switched off |
| H | Telltale in A007 - display unit | Preheating: telltale illuminated Start standby: telltale is extinguished |
| J | Y025 - valve, cold-start aid | Y025 - valve is powered (fuel feed to R001) |
| N/P | R001 - heater plug | Phase 1 = preheating Phase 2 = III afterburning III after safety period afterburning is terminated |

Farmer 400
Fav 700
Fav 900

Electrics / General system
A017 - PCB, LBS

E



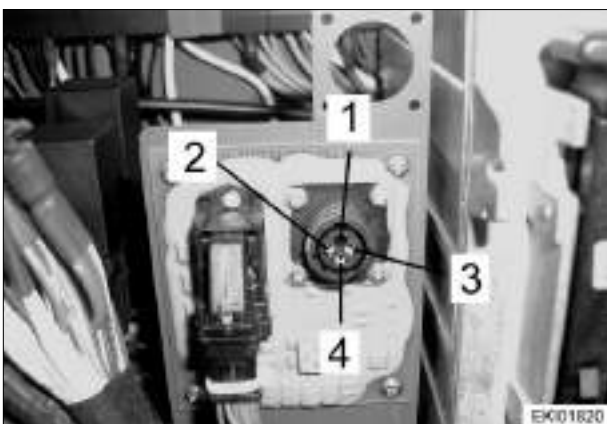
A017 = PCB, LBS

LBS = LBS is the German abbreviation for Agricultural Bus System, for data transmission between tractor and implement

Note:

Chapter 9000 Reg. C - LBS

Chapter 9700 Reg. A - Electronic concept



| Pin | Function |
|-----|---------------|
| 1 | Not assigned |
| 2 | CAN + |
| 3 | CAN - |
| 4 | Digital earth |

CAN + , i.e. low voltage level

CAN - , i.e. high voltage level

Digital earth (electronics earth), connection between A017 - PCB and vehicle earth

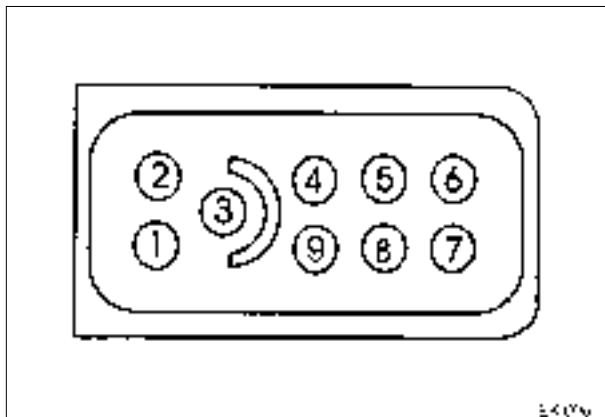
Note:

Ignition "ON"

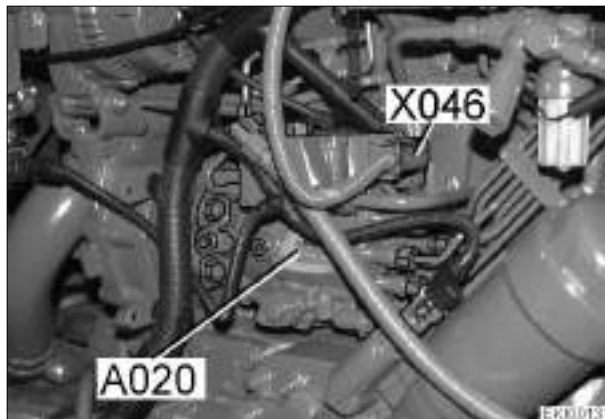
| Test | Pin | Target value | Condition | Remark |
|-------|-----|-----------------|-----------|--|
| LBS | 2 | approx. 2.1 VDC | | Target values are approximate and are subject to variations according to volume of momentarily transmitted data. |
| CAN + | | | | |
| Earth | 4 | | | |
| LBS | 3 | approx. 2.9 VDC | | Target values are approximate and are subject to variations according to volume of momentarily transmitted data. |
| CAN - | | | | |
| Earth | 4 | | | |

| Date | Version | Page | A017 - PCB, LBS | Capitel | Index | Docu-No. |
|------------|---------|------|-----------------|---------|-------|----------|
| 01.08.2001 | a | 1/1 | | 9000 | E | 000139 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system A020 - ECU, VP44 | E |
|----------------|--|----------|



| Pin | Function |
|-----|-------------------------------|
| 1 | CAN-low |
| 2 | CAN-high |
| 3 | Not assigned |
| 4 | Not assigned |
| 5 | Solenoid valve shut-off |
| 6 | Earth |
| 7 | + UB 30 |
| 8 | Rotational speed input signal |
| 9 | Not assigned |



Connect e-adapter cable X899.980.251.101 directly to A020 - ECU, VP44.

Note:
Ignition "OFF".

| Test | Pin | Target value | Condition | Possible cause of fault |
|---------------------------|-----|--------------|-----------|-------------------------|
| Solenoid valve (shut-off) | 5 | 5.7 kOhm | | |
| | 6 | | | |

| | | | | |
|------------------|---|----------|--|--|
| Pump electronics | 7 | 3.4 kOhm | | |
| | 6 | | | |

Note:
Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|---------|-----|-----------------|-----------|-------------------------|
| CAN-low | 1 | approx. 2.5 VDC | | Fuse - F041 |
| Earth | 6 | | | |

| | | | | |
|----------|---|-----------------|--|-------------|
| CAN-high | 2 | approx. 2.6 VDC | | Fuse - F041 |
| Earth | 6 | | | |

| Date | Version | Page | A020 - ECU, VP44 | Capitel | Index | Docu-No. |
|------------|---------|------|------------------|---------|-------|----------|
| 04.10.2001 | a | 1/2 | | 9000 | E | 000154 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system A020 - ECU, VP44 | E |
|----------------|--|----------|

| Test | Pin | Target value | Condition | Possible cause of fault |
|-------------------------|-----|--------------|-----------------------------|-------------------------|
| Solenoid valve shut-off | 5 | 0 VDC | | |
| | | 12 VDC | When engine is switched off | |
| Earth | 6 | | | |

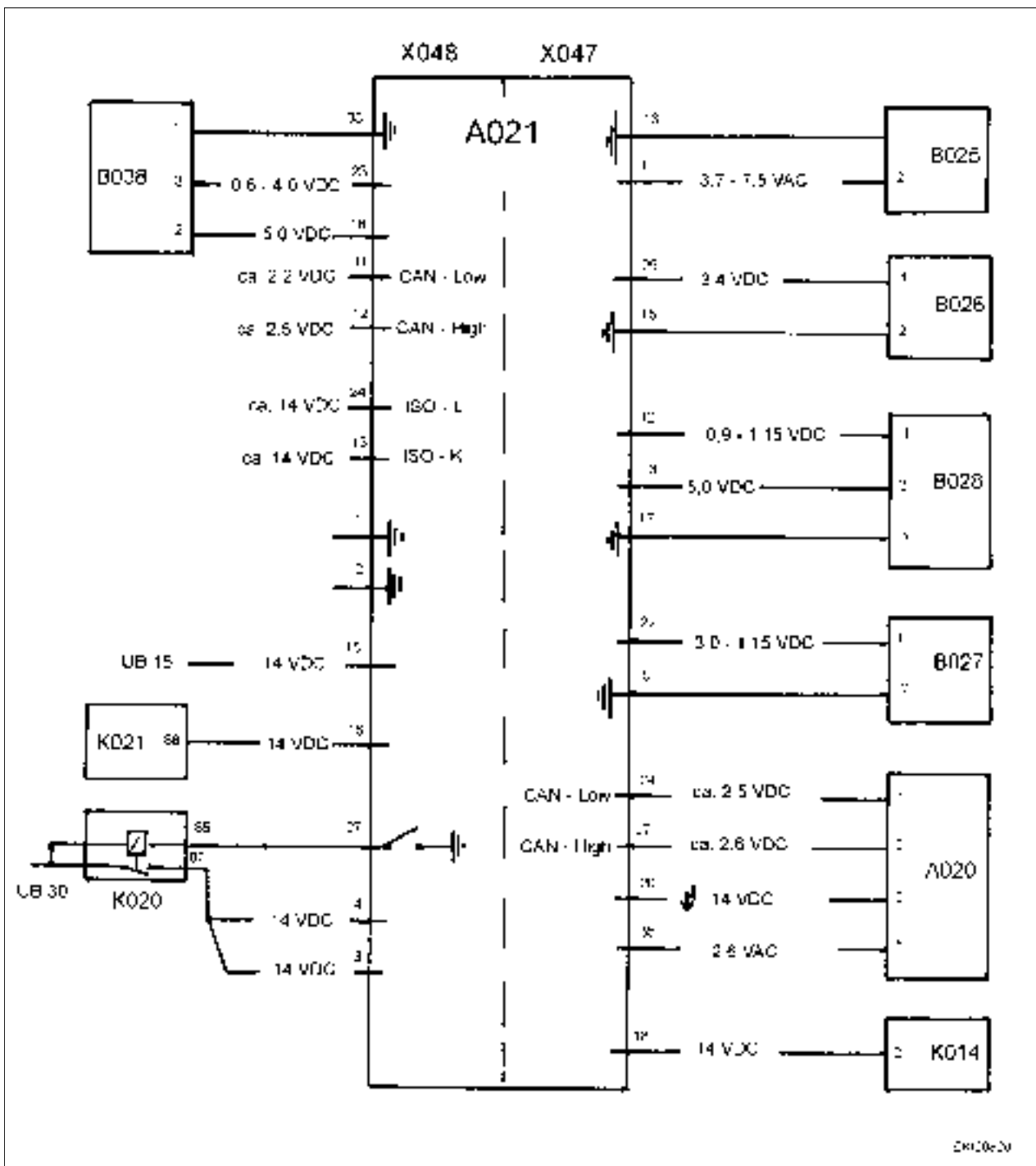
| | | | | |
|---------|---|-----------------|--|-------------------|
| + UB 30 | 7 | 12 VDC - 14 VDC | | K021 or fuse F058 |
| Earth | 6 | | | |

| | | | | |
|-------------------------------|---|---------|--|--|
| Rotational speed input signal | 8 | 2.6 VAC | | |
| Earth | 6 | | | |

Fav 900

Electrics / General system

A021- EDC control module, block diagram

E

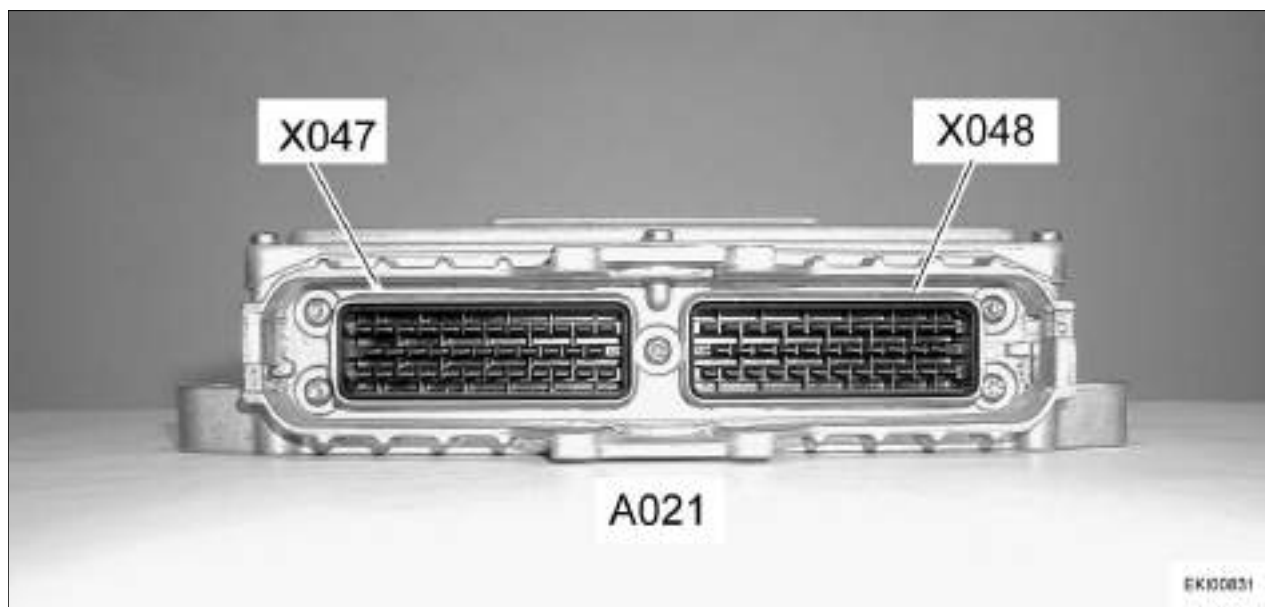
| | | | |
|------|-----------------------------|------|------------------------------|
| A020 | Pump control unit | B038 | Accelerator sensor, EDC |
| A021 | EDC control module | K014 | Exhaust brake relay |
| B025 | EDC speed sensor | K020 | EDC UB 30 relay |
| B026 | Needle motion sensor | K021 | Shutoff solenoid valve relay |
| B027 | Water temperature sensor | X047 | Engine connector |
| B028 | Intercooler pressure sensor | X048 | Body connector |

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---|-------|----------|
| 09.05.0001 | a | 1/2 | A021- EDC control module, block diagram | 9000 | E |
| | | | | | 000140 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system A021- EDC control module, block diagram | E |
|----------------|--|----------|

Pin assignment for EDC control module A021

| | |
|-----------|-----------|
| 12.....1 | 12.....1 |
| 23.....13 | 23.....13 |
| 35.....24 | 35.....24 |

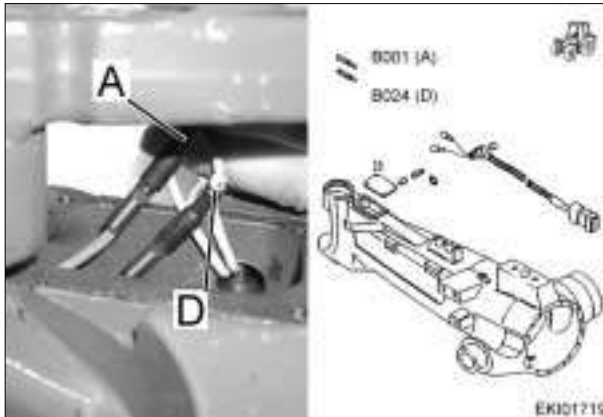
**Note:**

- Chapter 9000 Reg. C - EDC control module circuit diagram, sheet 33
- Chapter 9000 Reg. C - Exhaust brake and engine stop circuit diagram, sheet 6
- Chapter 2710 Reg. A - EDC speed adjustment
- Chapter 2710 Reg. A - EDC control module (A021) and pump control unit (A020)
- Chapter 2710 Reg. A - Electric pump actuation / engine stop
- Chapter 2710 Reg. A - Fuel injection pump emergency mode
- Chapter 2000 Reg. B - EDC troubleshooting plan

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|----------|------|-------------|----------|---------------|
| 09.05.0001 | a | 2/2 | 9000 | E | 000140 |

Fav 900

Electrics / General system
B001 / B024 - sensor, steering angle 1 / 2

E

B001 = Sensor, steering angle 1 (4WD)

B024 = Sensor, steering angle 2 (diff. lock)

**Connector X150**

| Pin | Function |
|-----|------------|
| 1 | Earth |
| 2 | + supply |
| 3 | Diff. lock |
| 4 | 4WD |

Note:**Ignition "ON"****Engine running (hydraulic steering)**

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|-----------|--|
| Supply | 2 | 12 VDC | | Miniature fuse (21) within A013 or within wiring |
| Earth | 1 | | | |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system B001 / B024 - sensor, steering angle 1 / 2 | E |
|----------------|--|----------|

| | | | Left-hand curve | | Right- hand curve | | |
|---------------------------------------|-----------------|-----------------|----------------------------|----------------|----------------------------------|-----------------|-----------------|
| Steering angle | >=30° | >=25° | >=15° | 0° | >=15° | >=25° | >=30° |
| B001 - sensor 1 (4WD) | 0 VDC | 0 VDC | approx. 12 VDC | approx. 12 VDC | 12 VDC | 0 VDC | 0 VDC |
| 4WD | Off | Off | On | On | On | Off | Off |
| Connector X150 Earth 1 Signal 4 | | | | | | | |
| B024 - sensor 2 (diff. lock) | 0 VDC | 0 VDC | 0 VDC | approx. 12 VDC | 0 VDC | 0 VDC | 0 VDC |
| Diff. lock | Off | Off | Off | On | Off | Off | Off |
| Connector X150 Earth 1 Signal 3 | | | | | | | |

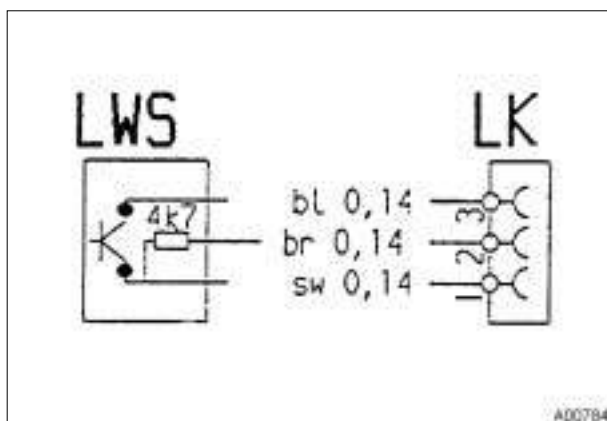
Note:

Sensors, steering angle 1 / 2 are not monitored via self-diagnostic test system.

| Pin assignment for B001 / B024 sensor, steering angle 1 / 2 | | | |
|--|-------------------------|--|-------------------------------|
| Sensor | X150 - connector | A004 - ECU, control console | A013 - board, fuse |
| B001 - sensor (4WD) | | | |
| 1 | 4 | 20 | |
| 2 | 2 | | Miniature fuse 21 |
| 3 | 1 | 1 | |
| B024 - sensor (diff. lock) | | | |
| 1 | 3 | 19 | |
| 2 | 2 | | Miniature fuse 21 |
| 3 | 1 | 1 | |

Note:

Chapter 9000 Reg. C - Electric circuit diagrams



LWS = sensor, steering angle

LK = cable coupler (connector)

3 bl = pin 3 blue = earth

2 br = pin 2 brown = power supply

1 sw = pin 1 black = signal

Resistance; sensor, steering angle
(pins 1 and 2) = 4.7 kOhm +/- 5%

| Date | Version | Page | | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 31.07.2001 | a | 2/4 | B001 / B024 - sensor, steering angle 1 / 2 | 9000 | E | 000137 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system B001 / B024 - sensor, steering angle 1 / 2 | E |
|----------------|--|----------|

Spacing; sensor, steering angle

When installed there must be a gap of **0.6 +/- 0.2 mm** between sensor and knuckle pin.

Note:

For details of setting procedure see Workshop Manual, planetary steering drive shaft 060 F Order no. X990.005.036

Operation of 4WD shift

4WD OFF

In this position 4WD is "actively" disengaged.

Actively disengaged means that engine must be running and **transmission system pressure (18 bar)** must be available in order to disengage 4WD clutch.

Y009 - valve, 4WD is energised ---> 12 - 14 VDC.

Front-wheel drive clutch is closed by means of spring force and opened by means of hydraulic pressure.

4WD is permanently engaged if electrical, electronic or transmission hydraulic systems fail.

4WD ON (100% engaged)

Y009 - valve, 4WD is not energised ---> there is no transmission system pressure at front-wheel drive clutch.

4WD automatic

When 4WD automatic is set, 4WD is engaged and disengaged in accordance with following table:

To ensure that 4WD automatic function is working, steer to one side and then back again out of straight line.

| Condition | 4WD |
|---|-----------|
| Steering angle left / right < 25° | On |
| Steering angle left / right > 25° | Off |
| Theoretical speed < 15 km/h | On |
| Theoretical speed > 15 km/h | Off |
| Once v < 15 km/h again, automatically ----> | On |
| Brake actuated , not actuated | No effect |

| Date | Version | Page | B001 / B024 - sensor, steering angle 1 / 2 | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 31.07.2001 | a | 3/4 | | 9000 | E | 000137 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system B001 / B024 - sensor, steering angle 1 / 2 | E |
|----------------|--|----------|

Operation of diff. lock control

Diff. lock OFF

Y010 - valve, diff. lock is not energised ---> there is no transmission system pressure at diff. lock.

Diff. lock can no longer be engaged if electrical, electronic or transmission hydraulic systems fail.

Diff. lock ON (100% engaged)

Y010 - valve, diff. lock is energised ---> 12 - 14 VDC

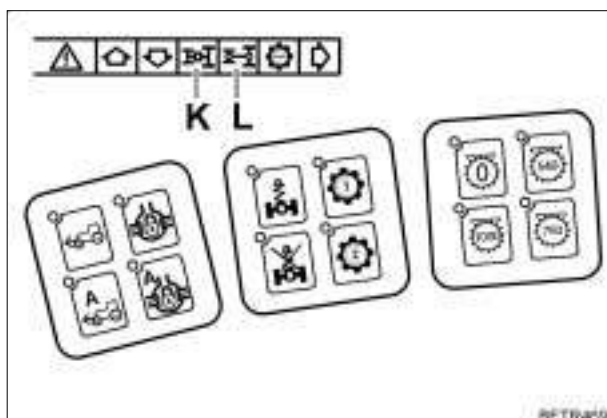
Diff. lock is engaged by means of **transmission system pressure (18 bar)** and disengaged by means of spring force.

Diff. lock automatic

When diff. lock automatic is set, diff. lock is engaged or disengaged in accordance with following table:

To ensure that diff. lock automatic function is working, steer to one side and then back again, out of straight line.

| Condition | Diff. lock |
|-----------------------------------|--|
| Steering angle left / right < 15° | On |
| Steering angle left / right > 15° | Off |
| Theoretical speed < 15 km/h | On |
| Theoretical speed > 15 km/h | Off |
| | For automatic mode press Automatic key again |
| Brake actuated | Off |
| Brake not actuated | On |



Note:

Please refer to Operating Manual for details of operating 4WD and diff. lock control.

K = 4WD telltale

L = Diff. lock telltale

| Date | Version | Page | | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 31.07.2001 | a | 4/4 | B001 / B024 - sensor, steering angle 1 / 2 | 9000 | E | 000137 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B002 - front PTO speed Hall-effect sensor | E |
|----------------------------------|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |

Note:

Connect adapter cable X 899.980.246.205 directly to component B002.

Ignition ON

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------------|-----|--------------------|----------------------|--|
| Supply | 3 | 12 VDC to 14 VDC | | Micro fuse (22) within A013 or in wiring |
| Earth | 1 | | | |
| Speed signal | 2 | approx. 1.5 VDC | Front PTO rotating | A) Reading 7.3 VDC, fault in component B) Reading 0 VDC: - Unplug component and measure at plug - If reading is 0 VDC, fault in A002 (pin 37) or in wiring - If reading is 7.3 VDC, fault in component |
| | | 1.1 VDC or 5.4 VDC | Front PTO stationary | |
| Earth | 1 | | | |
| | | | | |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Speed signal | 37 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

| Date | Version | Page | B002 - front PTO speed Hall-effect sensor | Capitel | Index | Docu-No. |
|-----------|---------|------|---|---------|-------|----------|
| 19.2.2001 | a | 1/1 | | 9000 | E | 000064 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B003 - suspension angular resolver | E |
|---|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | + supply |
| 3 | Signal |

Note:

Connect adapter cable X 899.980.246.205 directly to component B003.
Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|----------------|-----|----------------------------------|----------------------|---|
| Supply | 2 | 8.5 VDC | | Micro fuse (18) in A013 or in wiring |
| Earth | 1 | | | |
| Signal voltage | 3 | approx. 1.4 VDC +/-0.3 VDC | Upper limit position | |
| | | approx. 2.7 VDC +/-0.3 VDC | Mid-position | |
| | | approx. 3.6 VDC | Lower limit position | |
| | | | "Suspension locked" | |
| Earth | 1 | | | |

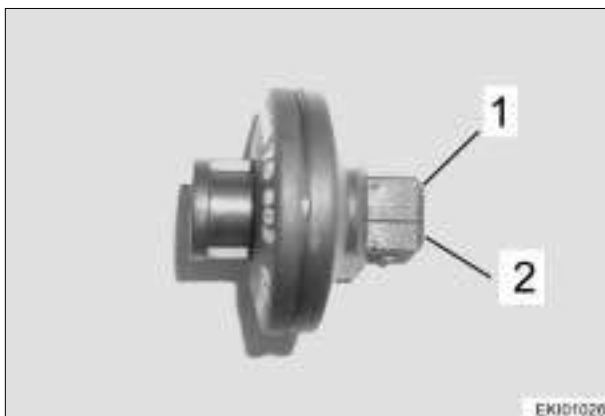
| Measuring points on A004 - control console | Pin |
|--|-----|
| Earth | 1 |
| Signal | 32 |

Note:

Adjusting suspension sensor, code 7666 - Chapter 0000 Index F

| Date | Version | Page | B003 - suspension angular resolver | Capitel | Index | Docu-No. |
|-----------|---------|------|------------------------------------|---------|-------|----------|
| 13.2.2001 | a | 1/1 | | 9000 | E | 000053 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B004 - underpressure switch | E |
|----------------------------------|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Note:

Connect adapter cable X 899.980.246.201 directly to component B004.

| Underpressure mbar | Resistance Ohm | Fault code |
|-----------------------|----------------------------|-------------------------------------|
| < 65 | Infinite Switch open | |
| > 65 | approx. 0 Switch closed | - Warning beep - Warning display |

**Checking warning display (clogged air filter) on instrument panel A007.**

Ignition ON

Disconnect line coupling X153 from underpressure switch B004.

Connect line coupling X153, pin 1 to vehicle earth.

Note:

See circuit diagram, instrument panel - Chapter 9000 Index C



Clogged air filter warning display

| Measuring point on A007 - instrument panel | Pin |
|--|--------------------|
| Earth | 18 and 5 (X101) |
| Signal | 17 (X100) |

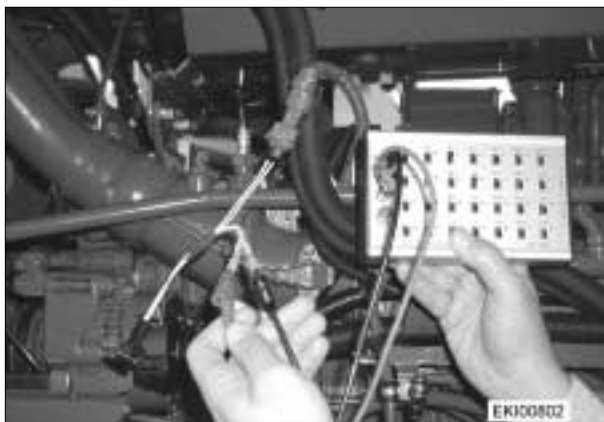
| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|-----------------------------|-------|----------|
| 14.2.2001 | a | 1/1 | B004 - underpressure switch | 9000 | E |
| | | | | | 000054 |

Fav 900

Electric / System in General
B005 - Engine coolant Temperature sensor (Dashpanel A007)

E

| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |



| Temperature °C | Resistance Ohm | Failure code |
|--------------------------|----------------|---|
| 20 (1 Bar) | ca. 55 K | |
| 60 (1 Bar) | approx. 9,7 K | |
| 90 (8 Bars) | approx. 3,3 K | |
| approx. 105 (11 Bars) | approx. 2,0 K | green - red: Limit |
| 108 | approx. 1,8 K | - Warning Beep - Warning- display |

Checking (Engine Coolant temperater) Warning within Daspanel A007 .

Component B005 separately.

Connect adaptor connector X 899.980.251.102 onto Conector X154 .

Connect resistor decade X 899.980.224 .

Select desired Resistance (according to table) .

Ignition "ON".

Warning Beep and Display (Engine Coolant temperature) must appear on Dashpanel A007.



Warning Engine coolant temperature

| Measuring Point on Dashpanel A007 | Pin |
|-----------------------------------|----------|
| Earth | 5 and 18 |
| Signal | 25 |

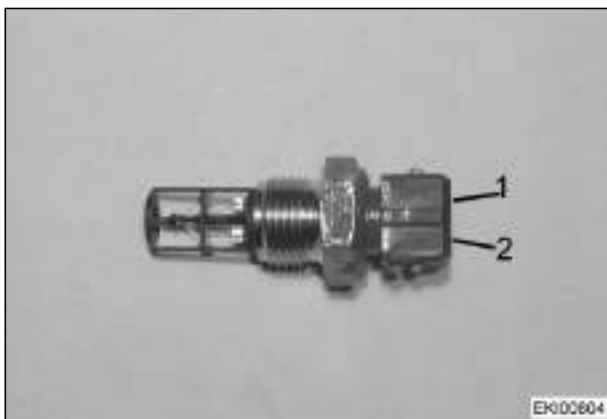
| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---|-------|----------|
| 23.11.2000 | a | 1/1 | B005 - Engine coolant Temperature sensor (Dashpanel A007) | 9000 | E |

000040

Farmer 400
Fav 700
Fav 900

Electric / System in General
B006 -Intake Air Temperature Sensor

E



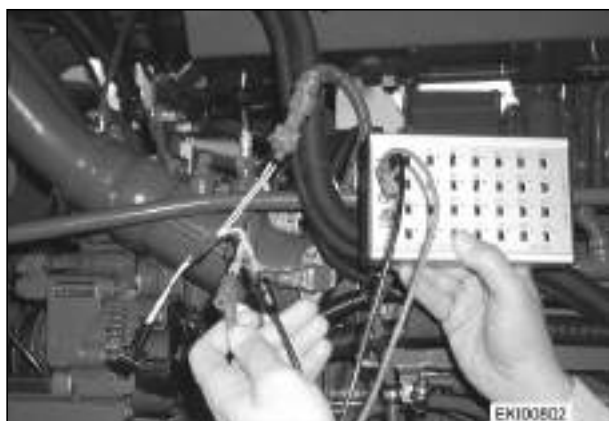
| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Values (Resistance) of Intake Air Temperature Sensor B006

| Temperature °C | resistance Ohm | failure Code |
|-------------------|--------------------|---------------------------------|
| 0 | 16 K +/- 7% | |
| 20 | 6,5 K +/- 7% | |
| 30 | 4,0 K +/- 7% | |
| 60 | 1,2 K +/- 7% | |
| 73 | 0,8 - 0,9 K +/- 7% | Warning Display Warning Beep |
| 90 | 0,4 K +/- 7% | |
| 120 | 0,2 K +/- 7% | |



Warning Display Intake Air Temperature



Checking Warning Display with resistor decade

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electric / System in General B006 -Intake Air Temperature Sensor | E |
|---|--|----------|

Checking Warning Display with resistor decade

Component B006 separately

Connect Adaptor Connectro X 899.980.251.102 onto connector X155.

Connect resistor decade X 899.980.224 and select desired Value.

Ignition "ON".

Continuous Beep and Warning is displayed on dashpanel A007 .

| Measuring Point on Dashpanel A007 | Pin |
|-----------------------------------|-----------|
| | |
| Earth | 15 and 18 |
| Signal | 26 |

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|----------|------|-------------|----------|---------------|
| 24.11.2000 | a | 2/2 | 9000 | E | 000042 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B008 - high-pressure sensor | E |
|---|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |

Note:

Connect adapter cable X 899.980.246.205 directly to component B008.
Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|----------------------|-----------|---|
| Supply | 3 | 12.0 VDC to 14.0 VDC | | Micro fuse (3) within A013 or within wiring |
| Earth | 1 | | | |

| | | | | |
|--------|---|---------|--|--|
| Signal | 2 | 0.8 VDC | | |
| Earth | 1 | | | |



Connect e-adapter box 899.980.208.100 to A002.

| Test | Pin | Target value | Condition | Possible cause of fault |
|-------------------|-----|----------------|--|-------------------------|
| Power consumption | 29 | approx. 4.0 mA | Connect ammeter to pin 29 of test socket green and yellow. Switch toggle switch (29) to Isolate. | |

| Date | Version | Page | B008 - high-pressure sensor | Capitel | Index | Docu-No. |
|---------|---------|------|-----------------------------|---------|-------|----------|
| 02/2000 | a | 1/2 | | 9000 | E | 000001 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B008 - high-pressure sensor | E |
|---|--|----------|

**Warning:**

All four wheels of tractor must be jacked up for following test (to prevent accidents).

Leave engine running.

Engage speed range II.

Actuate handbrake and footbrake.

Actuate neutral switch such that both F/R lights light up.

Switch to forward or reverse in cab.

Carry out high-pressure test for maximum of 5 seconds only (to prevent oil temperature from rising too much).

| Test | Pin | Engine speed n | Target value current / mA | Pressure bar |
|----------------------|-----|-------------------|------------------------------|-----------------|
| Power consumption | 29 | - | 4.0 | 0 |
| | | 800 | 6.4 | 90 |
| | | 1400 | 17.0 | 480 |
| | | | 8.0 | 150 |
| | | | 9.4 | 200 |
| | | | 10.8 | 250 |
| | | | 12.2 | 300 |
| | | | 13.5 | 350 |
| | | | 14.9 | 400 |
| | | | 16.2 | 450 |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Signal | 29 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|---------|------|-------------|----------|---------------|
| 02/2000 | a | 2/2 | 9000 | E | 000001 |

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electronics / system in general B009 - output temperature sensor | E |
|----------------------------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |



| Temperature in °C | Resistance Ohm | Fault code |
|-------------------|----------------|------------|
| 50 | 150 | |
| 60 | 105 | |
| 95 | 40 | |
| 105 | 35 | |
| 110 | 30 | 4.1.53 |

Note:

Connect adapter cable X 899.980.251.102 to connector X158.

Component B009 remains isolated.

Ignition "ON".

Connect resistor decade X 899.980.224 and select desired value.

Warning must be displayed on instrument panel. Fault code is stored.

**Note:**

Warning message is displayed on instrument panel from 95°C upwards in range II. Warning message is always displayed at 105°C and above. In addition, fault code 4.1.53 is stored at 110°C and above.

| Measuring points on A004 - control console | | Pin |
|--|--|-----|
| Earth | | 1 |
| Signal | | 21 |

| Date | Version | Page | B009 - output temperature sensor | | Capitel | Index | Docu-No. |
|---------|---------|------|----------------------------------|--|---------|-------|----------|
| 02/2000 | a | 1/1 | | | 9000 | E | 000017 |

Single e-box

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B010 - engine speed sensor 1 | E |
|---|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |

Note:

Connect adapter cable X 899.980.246.205 directly to component B010.
Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------------|-----|----------------------------|----------------|---|
| Supply | 3 | 12.0 VDC to 14.0 VDC | | Micro fuse (4) within A013 or within wiring |
| Earth | 1 | | | |
| Speed signal | 2 | 1.5 VDC | Engine running | A) Reading 7.3 VDC, fault in component. B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 12) or in wiring. - If reading is 7.3 VDC - fault in component. |
| | | 1.0 VDC or 5.4 VDC | Engine stopped | |
| Earth | 1 | | | |
| | | | | |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Speed signal | 12 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

| Date | Version | Page | B010 - engine speed sensor 1 | Capitel | Index | Docu-No. |
|---------|---------|------|------------------------------|---------|-------|----------|
| 06/2000 | a | 1/1 | | 9000 | E | 000003 |

<https://www.truck-manuals.net/>

Single e-box

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B011 - engine speed sensor 2 | E |
|---|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |

Note:

Connect adapter cable X 899.980.246.205 directly to component B011.
Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------------|-----|----------------------------|----------------|---|
| Supply | 3 | 12.0 VDC to 14.0 VDC | | Micro fuse (2) within A013 or within wiring |
| Earth | 1 | | | |
| Speed signal | 2 | 1.5 VDC | Engine running | A) Reading 7.3 VDC, fault in component. B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 36) or in wiring. - If reading is 7.3 VDC - fault in component. |
| | | 1.0 VDC or 5.4 VDC | Engine stopped | |
| Earth | 1 | | | |
| | | | | |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Speed signal | 36 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|---------|------|---|----------|---------------|
| 06/2000 | a | 1/1 | B011 - engine speed sensor 2 9000 | E | 000004 |

<https://www.truck-manuals.net/>

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system B012 - engine oil pressure sensor | E |
|---|---|----------|

**Note:**

Checking engine oil pressure sensor:
see Lubrication pressure test -
Chapter 2312 Reg. E

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|----------|------|--|-------------|---------------|
| 20.07.2001 | a | 1/1 | B012 - engine oil pressure sensor | 9000 | E |
| | | | | | 000130 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
B013 - hydraulic oil temperature switch

E



| Pin | Function |
|--------------|----------|
| 1 | Signal |
| Screw socket | Earth |

| Temperature °C | Resistance Ohm | Fault code |
|----------------|----------------------------|-------------------------------------|
| < 94 +/-3 | Infinite Switch open | |
| > 94 +/-3 | approx. 0 Switch closed | - Warning beep - Warning display |



Checking warning display (hydraulic oil temperature) on instrument panel A007

Ignition ON

Disconnect line coupling X162 from temperature sensor B013.

Connect line coupling X162 to vehicle earth.

Note:

See circuit diagram, instrument panel - Chapter 9000 Index C

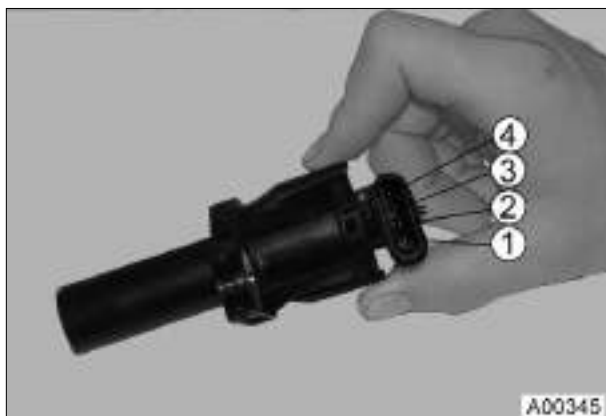


Hydraulic oil temperature warning display

| Measuring point on instrument panel A007 | Pin |
|--|-----|
| Signal | 16 |

| Date | Version | Page | B013 - hydraulic oil temperature switch | Capitel | Index | Docu-No. |
|-----------|---------|------|---|---------|-------|----------|
| 14.2.2001 | a | 1/1 | | 9000 | E | 000056 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B014 - speed sensor for hydrostatic accumulator shaft | E |
|---|--|----------|



| Pin | Function |
|-----|-----------------------------|
| 1 | Earth |
| 2 | Speed signal |
| 3 | + supply |
| 4 | Rotational direction sensor |

Note:

Connect adapter cable X 899.980.246.206 directly to component B014.
Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|-----------|--|
| Supply | 3 | 8.5 VDC | | Micro fuse (16) within A013 or within wiring |
| Earth | 1 | | | |

| | | | | |
|--------------|---|--------------------|----------------------------------|--|
| Speed signal | 2 | 3.0 VDC | Tractor moving at approx. 5 km/h | A) Reading 7.3 VDC: fault in component B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 13) or in wiring - If reading is 7.3 VDC - fault in component. |
| | | 1.0 VDC or 5.0 VDC | Tractor stationary | |
| Earth | 1 | | | |

| | | | | |
|----------------------|---|---------|----------------------------|--|
| Rotational direction | 4 | 5.1 VDC | Forwards at approx. 5 km/h | A) Reading 8.0 VDC: fault in component B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 42) or in wiring. - If reading is 8.0 VDC, fault in component. |
| | | 2.4 VDC | Reverse at approx. 5 km/h | |
| Earth | 1 | | | |

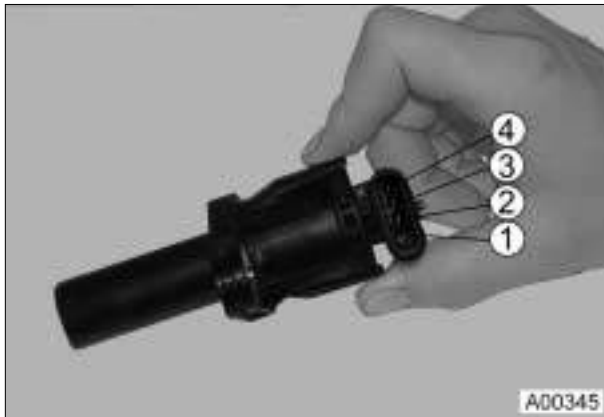
| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Speed signal | 13 |
| Rotational direction | 42 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

| Date | Version | Page | | Capitel | Index | Docu-No. |
|---------|----------|------|---|-------------|----------|---------------|
| 06/2000 | b | 1/1 | B014 - speed sensor for hydrostatic accumulator shaft | 9000 | E | 000005 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B015 - bevel pinion speed sensor | E |
|---|---|----------|



| Pin | Function |
|-----|-----------------------------|
| 1 | Earth |
| 2 | Speed signal |
| 3 | + supply |
| 4 | Rotational direction sensor |

Note:

Connect adapter cable X 899.980.246.206 directly to component B015.
Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|-----------|---|
| Supply | 3 | 8.5 VDC | | Micro fuse (7) within A013 or within wiring |
| Earth | 1 | | | |

| | | | | |
|--------------|---|--------------------|----------------------------------|--|
| Speed signal | 2 | 3.0 VDC | Tractor moving at approx. 5 km/h | A) Reading 7.3 VDC: fault in component B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 34) or in wiring - If reading is 7.3 VDC - fault in component. |
| | | 1.0 VDC or 5.0 VDC | Tractor stationary | |
| Earth | 1 | | | |
| | | | | |

| | | | | |
|----------------------|---|---------|----------------------------|---|
| Rotational direction | 4 | 2.4 VDC | Forwards at approx. 5 km/h | A) Reading 8.0 VDC: fault in component B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 18) or in wiring. - If reading is 8.0 VDC fault in component. |
| | | 5.1 VDC | Reverse at approx. 5 km/h | |
| Earth | 1 | | | |
| | | | | |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Speed signal | 34 |
| Rotational direction | 18 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

| Date | Version | Page | B015 - bevel pinion speed sensor | Capitel | Index | Docu-No. |
|---------|---------|------|----------------------------------|---------|-------|----------|
| 06/2000 | a | 1/1 | | 9000 | E | 000006 |

Single e-box

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B016 - range rotary position sensor | E |
|---|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | + sppy |
| 3 | Signal |

Note:

Connect adapter cable X 899.980.246.205 directly to component B016.

Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|----------------|-----|--------------|-----------|--|
| Supply | 2 | 8.5 VDC | | Micro fuse (13) within A013 or within wiring |
| Earth | 1 | | | |
| Signal voltage | 3 | 4.0 VDC | Range 1 | |
| | | 1.0 VDC | Range 2 | |
| Earth | 1 | | | |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Signal voltage | 6 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

Adjustment Chapter 0000 Index F

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|---------|------|-------------|----------|---------------|
| 06/2000 | a | 1/1 | 9000 | E | 000007 |

<https://www.truck-manuals.net/>

Farmer 400
Fav 700
Fav 900

Electrics / system in general
B017 - clutch pedal rotary position sensor

E



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | + supply |
| 3 | Signal |



Remove hatch cover at top of steering column, then remove instrument panel.

Connect adapter cable X 899.980.246.205 directly to component B017.

Note:
 Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|-----------|---|
| Supply | 2 | 8.5 VDC | | Micro fuse (8) within A013 or within wiring |
| Earth | 1 | | | |

| | | | | |
|----------------|---|---------|---------------------------|--|
| Signal voltage | 3 | 0.8 VDC | Clutch pedal not actuated | |
| | | 4.0 VDC | Clutch pedal actuated | |
| Earth | 1 | | | |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Signal voltage | 8 |

Note:
 Checking A002 - e-box, Chapter 9000 Index E
 Adjustment Chapter 0000 Index F

| Date | Version | Page | B017 - clutch pedal rotary position sensor | Capitel | Index | Docu-No. |
|---------|---------|------|--|---------|-------|----------|
| 06/2000 | a | 1/1 | | 9000 | E | 000008 |

Single e-box

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

| | | |
|-------------------------------------|---|----------|
| Farmer 400 Fav 700 | Electrics / system in general B018 - setpoint engine speed rotary position sensor | E |
|-------------------------------------|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | + supply |
| 3 | Signal |

Note:

Connect adapter cable X 899.980.246.205 directly to component B018.
Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------------|-----|--------------|--------------------------|--|
| Supply | 2 | 8.5 VDC | | Micro fuse (14) within A013 or within wiring |
| Earth | 1 | | | |
| Speed signal | 3 | 1.2 VDC | Accelerator not actuated | |
| | | 3.6 VDC | Accelerator actuated | |
| Earth | 1 | | | |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Speed signal | 7 |

Note:

Checking A002 - e-box, Chapter 9000 Index E
Adjustment Chapter 0000 Index F

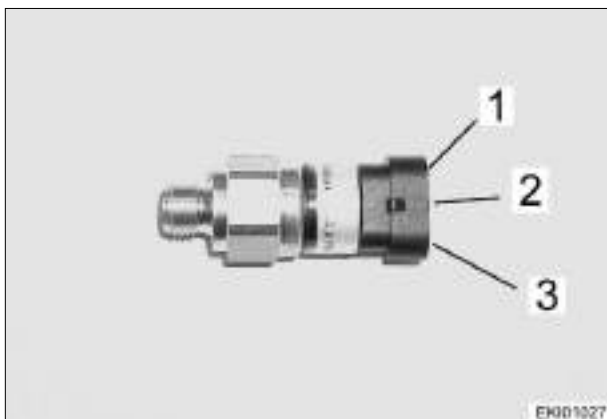
| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|---------|------|---|----------|---------------|
| 06/2000 | a | 1/1 | B018 - setpoint engine speed rotary position sensor 9000 | E | 000009 |

<https://www.truck-manuals.net/>

Farmer 400
Fav 700
Fav 900

Electrics / system in general
B019 - compressed-air pressure sensor

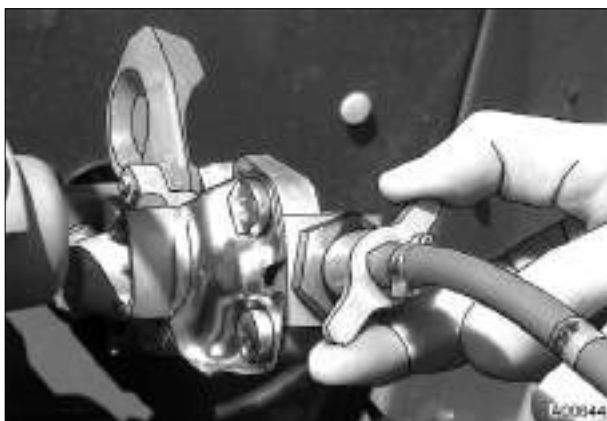
E



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |

Note:

Connect adapter cable X 899.980.246.205 directly to component B019.



Release pressure from air compressor. Connect test pressure gauge to red coupling head (container).

Connect pin 1 (earth) and pin 2 (signal) to pressure transducer B019.

Start engine.

Note:

Pressure regulator vents at approx. 8.3 bar.

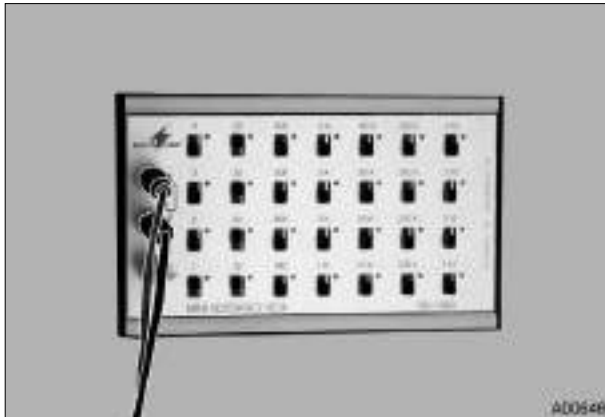


| Voltage | Pressure | Display |
|---------|----------|-------------------|
| VDC | bar | bars |
| 0.2 | 0 | 1 flashing |
| 0.6 | 2 | 1 flashing |
| 0.95 | 4 | 2 flashing |
| 1.25 | 6 | 5 |
| 1.65 | 8 | 7 |
| 2.4 | 12 | Theoretical value |
| 3.5 | 16 | Theoretical value |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
B019 - compressed-air pressure sensor

E



Checking display (compressed-air volume) on instrument panel A007

Connect adapter cable X 899.980.246.205 to connector X168.

Connect resistor decade X 899.980.224 and select desired value (see table).

Ignition "ON".

Compressed-air volume is displayed on instrument panel.

| Resistance Ohm | Display bars |
|-------------------|-----------------|
| 45 | 1 flashing |
| 55 | 2 flashing |
| 60 | 3 flashing |
| 64 | 4 |
| 74 | 5 |
| 81 | 6 |
| 91 | 7 |
| 103 | 8 |

| Measuring points on A007 - instrument panel | Pin |
|--|--------------------|
| Earth | 5 and 18 (X101) |
| Signal | 24 (X101) |

+ supply 12 VDC: fuse board A013 / fuse 25

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B020 - rear PTO shaft speed sensor | E |
|----------------------------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |

Note:

Connect adapter cable X 899.980.246.205 directly to component B020.

Ignition ON

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------------|-----|--------------------|----------------|--|
| Supply | 3 | 12 VDC to 14 VDC | | Micro fuse (32) within A013 or within wiring |
| Earth | 1 | | | |
| Speed signal | 2 | approx. 1.5 VDC | PTO rotating | A) Reading 7.3 VDC, fault in component B) Reading 0 VDC: - Unplug component and measure at plug - If reading is 0 VDC, fault in A002 (PIN 35) or in wiring - If reading is 7.3 VDC, fault in component |
| | | 1.1 VDC or 5.4 VDC | PTO stationary | |
| Earth | 1 | | | |
| | | | | |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Speed signal | 35 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|---------|-------|----------|
| 17.2.2001 | a | 1/1 | 9000 | E | 000062 |

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B021 - rear PTO shaft clutch output speed sensor | E |
|----------------------------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |

Note:

Connect adapter cable X 899.980.246.205 directly to component B021.

Ignition ON

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------------|-----|--------------------|----------------|--|
| Supply | 3 | 12 VDC to 14 VDC | | Micro fuse (33) within A013 or in wiring |
| Earth | 1 | | | |
| Speed signal | 2 | approx. 1.5 VDC | PTO rotating | A) Reading 7.3 VDC, fault in component B) Reading 0 VDC: - Unplug component and measure at plug - If reading is 0 VDC, fault in A002 (PIN 14) or in wiring - If reading is 7.3 VDC, fault in component |
| | | 1.1 VDC or 5.4 VDC | PTO stationary | |
| Earth | 1 | | | |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Earth | 1 |
| Speed signal | 14 |

Note:

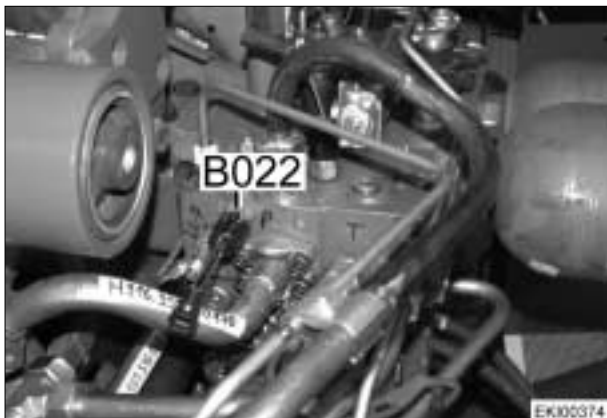
Checking A002 - e-box, Chapter 9000 Index E

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|--|----------|---------------|
| 19.2.2001 | a | 1/1 | B021 - rear PTO shaft clutch output speed sensor 9000 | E | 000063 |

Fav 700
Fav 900

Electrics / General system
B022 - sensor, kickout (NA version only)

E



On central control block ZSB

B022 = sensor, kickout



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Note:

Ignition 'OFF'

Measure resistance directly at sensor.

| Test | Pin | Target value | Condition | Possible cause of fault |
|------------|-----|--------------|--|-------------------------|
| Resistance | 1 | 510 ohms | Y015-Y019 - valve not actuated | |
| | | 121 ohms | Y015-Y019 - valve operating against pressure | |
| | 2 | | LS pressure > 175 +/- 5 bar | |



Connect e-adapter box X 899.980.208.100 directly to A004 - ECU.

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---|-------------|---------------|
| 30.08.2001 | a | 1/3 | B022 - sensor, kickout (NA version only) | 9000 | E |
| | | | | | 000152 |

| | | |
|----------------------------------|---|----------|
| Fav 700 Fav 900 | Electrics / General system B022 - sensor, kickout (NA version only) | E |
|----------------------------------|---|----------|

| Measuring points on A004 - ECU, control console | Pin |
|---|-----|
| Signal | 16 |
| Sensor system earth | 1 |

Note:

Ignition 'ON'

Start tractor.

Unlock Y015-Y019 - valves.

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|---|--|
| Signal | 16 | 5.1 VDC | Y015-Y019 - valve not actuated (LS pressure < 175 +/- 5 bar) | A Reading 8.0 VDC, fault in component |
| | | 2.4 VDC | Y015-Y019 - valve operating against pressure (LS pressure > 175 +/- 5 bar) | B Reading 0 VDC: - Unplug component |
| Earth | 1 | | | - If reading is 0 VDC, fault in A004 ECU (pin 16) or in wiring - If reading is 8.0 VDC, fault in component. |

Note:

If fault is detected, fault code A.1.DA is output.

Consequence: no kickout function possible

Operation of B022 - sensor, kickout

- B022 - sensor passes signal to A004 - ECU (**load-sensing pressure > 175 +/- 5 bar**).
- A004 - ECU transmits CAN message to A002 - ECU via K-bus.
- A002 - ECU transmits CAN message to Y015-Y019 - valves via G-bus.
- All preselected Y015-Y019 - valves move to neutral position.

Note:**North American version (NA):**

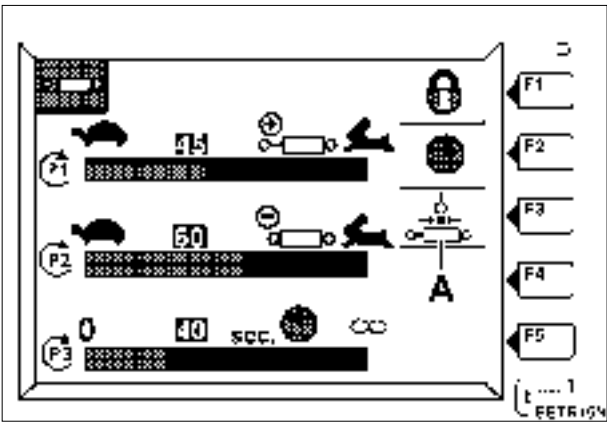
B022 - sensor, mounted on central control block.

Kickout function is activated via end-of-line program (EOL) .**European version (EU):**B022 - sensor not mounted on central control block.Kickout function is deactivated via end-of-line program (EOL).

| Date | Version | Page | B022 - sensor, kickout (NA version only) | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 30.08.2001 | a | 2/3 | | 9000 | E | 000152 |

| | | |
|--------------------|--|---|
| Fav 700 Fav 900 | Electrics / General system B022 - sensor, kickout (NA version only) | E |
|--------------------|--|---|

Presetting kickout function (N orth A merican version only)



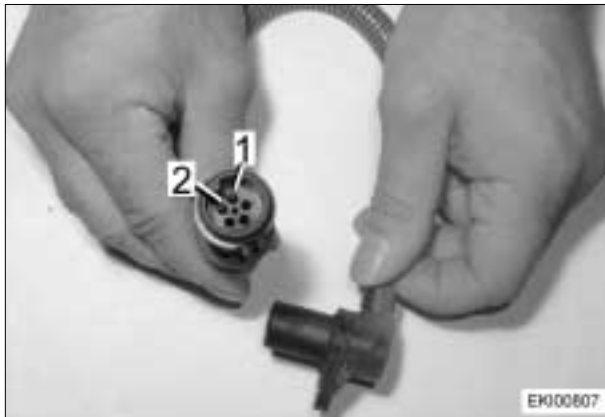
On A008 - terminal

Select Y015-Y019 - valve.

Isolate or lock kickout function (A) by pressing F3.

If load-sensing pressure is greater than 175 +/- 5 bar for longer than 1 sec, selected Y015-Y019 - valves move to neutral position.

| | | |
|----------------|---|----------|
| Fav 900 | Electric / System in General B025 - Speed sensor EDC | E |
|----------------|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |

Note:

Connect Adaptor Connector X 899.980.251.105 directly onto Component B025 .

Multimeter set on Range VAC !

Ignition "ON".

| Test | Pin | Reque- sted Value | Condition | Possible Origin of failure |
|--------------|-----|--|--|--|
| Speed Signal | 2 | approx. 3,7 VAC approx. 7,5 VAC | Engine runs approx. 800 Rpm approx. 2350 Rpm | A) Value 0 VAC: Failure within Component or within Wiring (Earth or Signal wire) |
| Earth | 1 | | | |

Internal resistance of Speed Sensor EDC B025 = approx. 0,9 KOhm

| Measuring Points on EDC Control Module A021 (X047) | Pin |
|---|-----|
| Earth | 13 |
| Speed signal | 1 |

Note:

Diagnostic program EDC - Chapter 2000 Reg. B (F.C. 1.2.84)

| Date | Version | Page | B025 - Speed sensor EDC | Capitel | Index | Docu-No. |
|------------|---------|------|-------------------------|---------|-------|----------|
| 28.11.2000 | | 1/1 | | 9000 | E | 000048 |

| | | |
|----------------|---|----------|
| Fav 900 | Electric / System in General B026 - Needle Motion Sensor | E |
|----------------|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Note:

Connect Adaptor Connector X 899.980.251.104 directly onto Component B026
Ignition "ON".

| Test | Pin | Reque- sted Value | Condition | Possible Origin of failure |
|--------|-----|----------------------|----------------|---|
| Signal | 1 | ca. 3,4 VDC | Engine stopped | A) Value 12 VDC: Failure within Component or within Wiring (Signal wire). B) Value 0 VDC: within Wiring (Short Circuit). |
| | | ca. 3,4 VDC | Engine runs | |
| Earth | 2 | | | |

Internal resistance of needle Motion Sensor B026 = ca. 104 Ohm

| Measuring Points on EDC Control Module - A021 (X047) | Pin |
|---|-----|
| Earth | 15 |
| Signal | 29 |

Note:

Diagnostic program EDC - Chapter 2000 Reg. B (F.C. 1.2.1A)

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|-------------------------------------|-------|----------|
| 28.11.2000 | a | 1/1 | B026 - Needle Motion Sensor 9000 | E | 000047 |

| | | |
|----------------|---|----------|
| Fav 900 | Electric / System in General B027 - Engine Coolant Temperature Sensor EDC | E |
|----------------|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Note:

Connect Adaptor Connector X 899.980.251.102 directly onto Component B027 .
Ignition "ON".

| Temperature (°C) | Resistance (Ohm) |
|------------------|------------------|
| 15 - 30 | 3,6 K - 1,3 K |
| 75 - 80 | 460 - 230 |

Signal (3) at 30° - 90° C = 3,0 - 1,15 VDC

Value 0 VDC, Failure within Component or within Wiring (Signal wire).

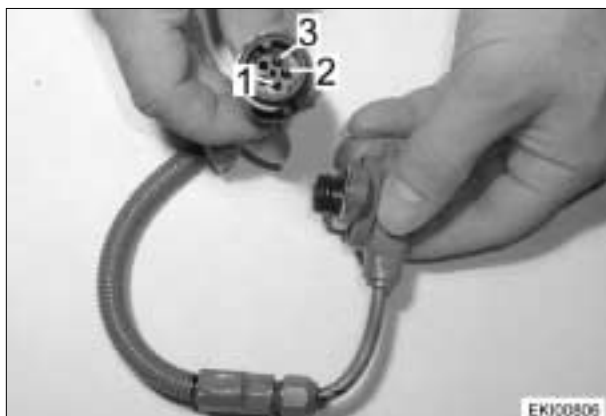
| Measuring Points on EDC Control Module A021 (X047) | Pin |
|---|-----|
| Earth | 5 |
| Signal | 22 |

Note:

**Diagnostic program EDC - Chapter 2000 Reg. B (F.C. 1.2.87)
eventually . Engine Power loss without Failure Code!**

| Date | Version | Page | | Capitel | Index | Docu-No. |
|------------|----------|------|---|-------------|----------|---------------|
| 29.11.2000 | a | 1/1 | B027 - Engine Coolant Temperature Sensor EDC | 9000 | E | 000050 |

| | | |
|----------------|---|----------|
| Fav 900 | Electric / System in General B028 --Intake Air Pressure sensor | E |
|----------------|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | + Supply |
| 3 | Earth |

Note:

Connect Adaptor Connectorl X 899.980.251.103 directly onto Component B028 .
Ignition "ON".

| Test | Pin | Reque- sted Value | Condition | Possible Origin of failure |
|--------|-----|----------------------|---|---|
| Supply | 2 | 5,0 VDC | | A021 EDC MSG or within Wi- ring |
| Earth | 3 | | | |
| Signal | 1 | 0,9 VDC | Cold engine, Engine stopped | A) Value 0 VDC, Failure within Component or within Wiring (Signal wire). B) Value 4,8 VDC: Failure within Component or within Wiring (Earth wire). |
| | | 0,9 VDC | Cold engine, Engine runs approx. 800 Rpm. | |
| | | 1,15 VDC | approx. 2350 Rpm. | |
| Earth | 3 | | | |

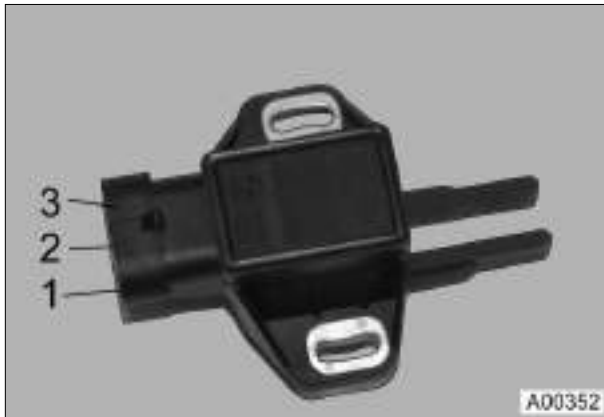
| Measuring points on EDC Control Unit A021 (X407) | Pin |
|--|-----|
| Earth | 17 |
| Signal | 12 |
| + Supply | 23 |

Note:

Diagnostic program EDC - Chapter 2000 Reg. B (F.C. 1.2.85)
eventually . Egin Power loss without Failure Code!

| Date | Version | Page | B028 --Intake Air Pressure sensor | Capitel | Index | Docu-No. |
|------------|---------|------|-----------------------------------|---------|-------|----------|
| 28.11.2000 | a | 1/1 | | 9000 | E | 000044 |

| | | |
|----------------|---|----------|
| Fav 900 | Electric / System in General B029 - Accelerator Pedal sensor EST (red) | E |
|----------------|---|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | + Supply |
| 3 | Signal |

Note:

Connect Adaptor Connector X 899.980.246.205 directly onto Component B029
Ignition "ON".

| Test | Pin | Reque- sted Value | Condition | Possible Failure Origin |
|--------|-----|----------------------|-----------|--|
| Supply | 2 | 8,5 VDC | | Fuse (17) within A013 or within wiring |
| Earth | 1 | | | |

| | | | | |
|--------|---|-----------------------------|--------------------------------|---|
| Signal | 3 | Approx. 4 VDC approx. 20 mA | Accelerator Pedal not actuated | Value . 0 VDC: Value: 0 mA: Failure within Component, Failure within Wiring (Earth or Signal Wire) |
| | | Approx. 0,7 VDC ca. 4 mA | Pedal actuated | |
| Earth | 1 | | | |

| measuring Points on EST Control module A002 . | Pint |
|---|------|
| Earth | 1 |
| Signal | 7 |

+ Supply 8,5 VDC: Fuse Board A013 / Fuse 17

Note:

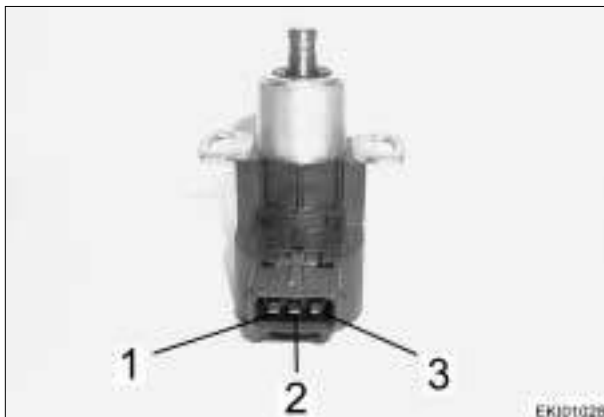
Diagnostic program EDC - Chapter 9000 Reg. B (F.C. 4.1.06)
Description Engine speed Control EDC - Chapter 2710 Reg. A
Calibration 4005 - Chapter 0000 Reg.F (Calibration Accelerator Pedal)

| Date | Version | Page | B029 - Accelerator Pedal sensor EST (red) | Capitel | Index | Docu-No. |
|------------|---------|------|---|---------|-------|----------|
| 24.11.2000 | a | 1/1 | | 9000 | E | 000043 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
B030 - position sensor reading

E



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |



Note:

Voltage measurement using adapter cable (DIY)

Made from: 3-core adapter cable

(H 205.860.100.020)

Connect adapter cable directly to component B030.

Note:

Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|-----------------|-----------------------|---|
| Supply | 3 | 9.5 +/- 7% VDC | | Supply and earth come from A005 (EPC box) |
| Earth | 1 | | | |
| Signal | 2 | approx. 2.5 VDC | Lift assembly lowered | |
| | | approx. 6.8 VDC | Lift assembly raised | |
| | | approx. 7.1 VDC | Mech. stop | |
| Earth | 1 | | | |

| Measuring points on A005 - EPC box | Pin |
|------------------------------------|-----|
| Earth | 20 |
| Signal | 7 |
| + supply | 39 |

Note:

Checking EPC box A005 - Chapter 9000 Index E

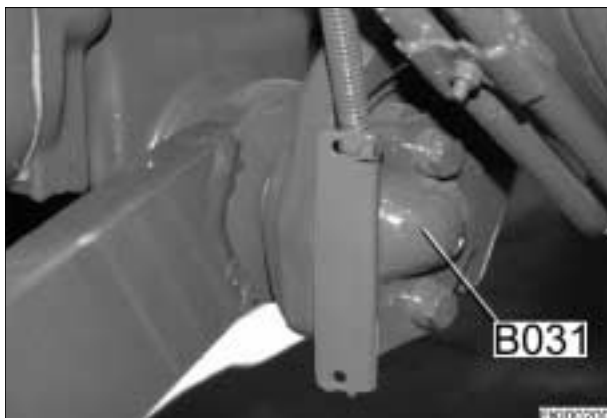
Adjustment Chapter 9000 Index F

| Date | Version | Page | B030 - position sensor reading | Capitel | Index | Docu-No. |
|-----------|---------|------|--------------------------------|---------|-------|----------|
| 15.2.2001 | a | 1/1 | | 9000 | E | 000058 |

Farmer 400
Fav 700
Fav 900

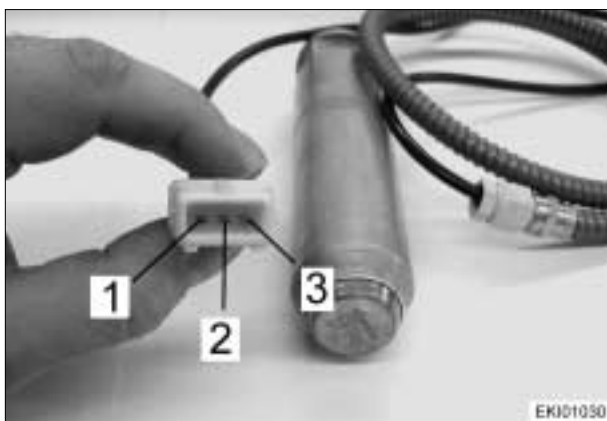
Electrics / system in general
B031 / B032 - draft-sensing pin right / left

E



On left and right bottom links (draft-sensing pin B032 and draft-sensing pin B031)

Draft-sensing pin measures tensile and compressive loads in bottom links.



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |
| 3 | + supply |



Note:

Voltage measurement using adapter cable (DIY)

Made from: 3-core adapter cable (H 205.860.100.020)

Connect adapter cable directly to component B031.

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B031 / B032 - draft-sensing pin right / left | E |
|---|---|----------|



When checking signal voltage, press bottom link back with tyre lever.

Note:
Ignition ON

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|------------------|------------------|--|
| Supply | 3 | 9.5 +/- 7% VDC | | Supply and earth come from A005 (EPC box) (in event of overload A005 switches off) |
| Earth | 1 | | | |
| Signal | 2 | 2.5 VDC | Tensile load | |
| | | 4.75 +/- 10% VDC | Neutral | |
| | | 7.5 VDC | Compressive load | |
| Earth | 1 | | | |

Measuring points on B031 (right draft-sensing pin)

| Measuring points on A005 - EPC box | Pin |
|------------------------------------|-----|
| Earth | 38 |
| Signal | 25 |
| + supply | 40 |

Measuring points on B032 (left draft-sensing pin)

| Measuring points on A005 - EPC box | Pin |
|------------------------------------|-----|
| Earth | 38 |
| Signal | 43 |
| + supply | 40 |

| Date | Version | Page | B031 / B032 - draft-sensing pin right / left | Capitel | Index | Docu-No. |
|-----------|----------|------|--|-------------|----------|---------------|
| 16.2.2001 | b | 2/3 | | 9000 | E | 000059 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general B031 / B032 - draft-sensing pin right / left | E |
|---|--|----------|

Technical specifications of draft-sensing pins B031/B032

| | |
|----------------------------|-------------------|
| Supply voltage | 9.5 VDC |
| Signal: | |
| Tensile / compressive load | 2.5 VDC / 7.5 VDC |
| Neutral | 4.7 VDC |
| Rated load | |
| Farmer 400 | 60 KN (6.0 t) |
| Fav. 700 | 90 KN (9.0 t) |
| Fav. 900 | 90 KN (9.0 t) |
| Overload limit | 120 KN (12 t) |

Note:

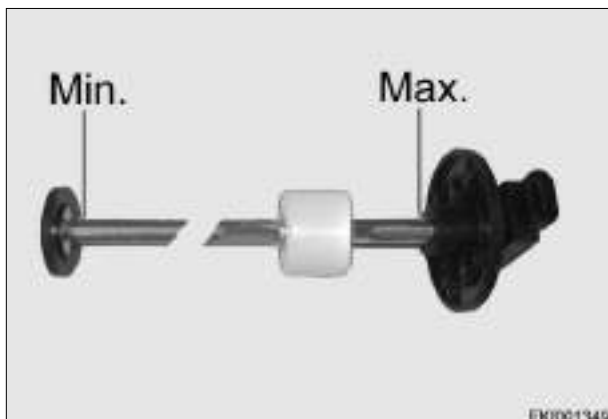
Chapter 9000 Index E - Checking A005 - ECU, EPC

Chapter 8610 Index A - B031/B032 - functional description of draft-sensing pins

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|----------|------|-------------|----------|---------------|
| 16.2.2001 | b | 3/3 | 9000 | E | 000059 |

Fav 900

Electrics / General system
B034 - fuel tank level sensor

E

| Pin | Function |
|----------------|--------------|
| 1 | Signal |
| 2 | Not assigned |
| 3 | Earth |
| Resistances at | |
| Min. | 20 ohms |
| Max. | 500 ohms |

Note:

Connect adapter cable X 899.980.246.205 directly to B034.
 Measure resistance using multimeter (ohmmeter).
 Fill tank with fuel.



| Checking B034 - sensor, fuel: (These are only guideline figures) | | |
|---|------------|--------|
| Resistance Ohms | Bars | Litres |
| 20 | 0 flashing | 0 - 25 |
| 50 | 1 reserve | 30 |
| 170 | 5 - 1/4 | 122 |
| 320 | 10 - 1/2 | 260 |
| 410 | 13 - 3/4 | 380 |
| 500 | 16 - 1/1 | 508 |
| 500 | 16 | 540 |


**Checking fuel display on instrument panel
 A007**

Connect adapter cable X 899.980.246.205 to line coupling X182
 (connection to B034 remains isolated).

Connect resistor decade X 899.980.224 .

Ignition "ON"

Select desired resistance (see table) and compare figures.

Note:

Allow preconditioning time of approx. 1 minute.

| | | |
|----------------|--|----------|
| Fav 900 | Electric / System in General B035 - Hand throttle Position Sensor | E |
|----------------|--|----------|



| Pin | Function |
|-----|--------------|
| 1 | Earth |
| 2 | + Versorgung |
| 3 | Signal |

Note:

Connect Adaptor Connector X 899.980.246.205 directly onto Component B035 .
Ignition "ON".

| Test | Pin | Reque- sted Value | Condition | Possible Origin of failure |
|------------------|-----|-------------------------------------|-----------|--|
| Supply | 2 | 8,5 VDC | | Value 0 VDC, Failure within Wiring, Fuse board, Fuse |
| Earth | 1 | | | |
| Signal Amplitude | 30 | approx. 4 VDC ap- prox. . 20 mA | Pos. max. | Value 0 VDC: Failure within Component or within Wiring (Earth or Signal wire). |
| or | | approx. 0,7 VDC ap- prox. 4,0 mA | Pos. min. | |
| Current | | | | |
| Earth | 1 | | | |

| Measuring Points on A004 - Side console | Pin |
|---|-----|
| Earth | 1 |
| Signal (Setting Hand Throttle) | 30 |

+ Supply : Fuse 26 of Fuse board A013

Note:

Diagnostic program EDC - Chapter 2000 Reg. B(F.C. 1.1.7E)
Description Engine speed Control EDC - Chapter 2710 Reg. A
Calibration 4002 - Chapter 0000 Reg.F (Calibration Hand Throttle)

| Date | Version | Page | B035 - Hand throttle Position Sensor | Capitel | Index | Docu-No. |
|------------|---------|------|--------------------------------------|---------|-------|----------|
| 29.11.2000 | a | 1/1 | | 9000 | E | 000049 |

| | | |
|----------------|--|----------|
| Fav 900 | Electric / System in General B038 - Accelerator Pedal position Sensor EDC (yellow) | E |
|----------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | + Supply |
| 3 | Signal |

Note:

Connect Adaptor Connector X 899.980.246.205 directly onto Component B038 .
Ignition "ON".

| Measurement | Pin | Requested Value | Condition | Possible origin of Error |
|-------------|-----|-----------------|-----------|--|
| Supply | 2 | approx. 5 VDC | | Supply cable disconnected: A021 - EST EDC (X048) PIN 16 |
| Earth | 1 | | | |

| | | | | |
|---|---|---------------------|--------------------------------|--|
| Signal Amplitude or Current | 3 | 0,55 VDC - 0,65 VDC | Accelerator Pedal not actuated | If Accelerator pedal will be actuated and Value remains constant at 0,6 VDC or approx. 4,5 VDC: Component failure, Wiring failure (Signal Wire) Value approx. 5 VDC: Earth wire disconnected, Component Failure |
| | | 4,0 VDC 4,5 VDC | Accelerator Pedal actuated | |
| | 1 | | | |

| Measuring Points on A021 - EDC Control Module (X048) | Pin |
|--|-----|
| Earth | 35 |
| Signal | 23 |
| + Supply | 16 |

Note:

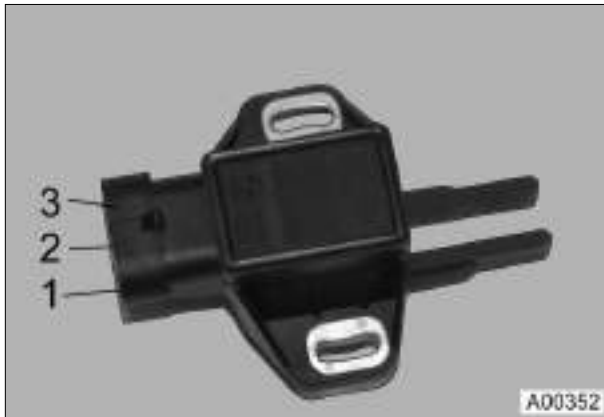
Diagnostic Program EDC - Chapter 2000 Reg. B (F.C. 1.1.01)

Description Speed Control EDC - Chapter 2710 Reg. A

Calibration 4005 - Chapter 0000 Reg.F (Calibration Accelerator Pedal Position Sensor)

| Date | Version | Page | | Capitel | Index | Docu-No. |
|------------|---------|------|---|---------|-------|----------|
| 28.11.2000 | a | 1/1 | B038 - Accelerator Pedal position Sensor EDC (yellow) | 9000 | E | 000045 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system B040 - sensor, front power lift position | E |
|----------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | + supply |
| 3 | Signal |

Note:

Connect adapter cable X 899.980.246.205 directly to component B040.
Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|---------------------------------|--|
| Supply | 2 | 8.5 VDC | | Miniature fuse (11) within A013 or within wiring |
| Earth | 1 | | | |
| Signal | 3 | 4.2 | Power lift upper limit position | |
| | | 1.5 | Power lift lower limit position | |
| Earth | 1 | | | |

Note:

All readings +/- 10%

| Measuring point on A004 - control console | Pin |
|---|-----|
| Earth | 1 |
| Signal | 9 |

Note:

Checking A004 - control console, Chapter 9000 Reg. E
Calibration, Chapter 0000 Reg. F

| Date | Version | Page | B040 - sensor, front power lift position | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 01.08.2001 | a | 1/1 | | 9000 | E | 000138 |

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system B045 - sensor, air-conditioning 2 (anti-icing protection) | E |
|----------------------------------|--|----------|



Remove cab roof. Top right between A- and B-pillar at air-conditioning expansion valve.

B045 = sensor, air-conditioning (NTC2).

Prevents expansion valve from icing up when air-conditioning is on.
Temperature + 1°C to 4°C

Note:

NTC = <U>N</U>egative <U>T</U>emperature <U>C</U>oefficient

in other words, the sensor resistance decreases with increasing ambient temperature.

| Test | Pin | Target value | Condition | Remark |
|------------|-----------|-------------------|-----------------------------|---|
| Resistance | 1 (blue) | approx. 1.18 kOhm | At 20°C ambient temperature | Sensor (NTC) resistance decreases with increasing ambient temperature |
| | 2 (brown) | | | |

Note:

All readings +/- 10%

Note:

Chapter 5500 Reg. A - Air-conditioning / General system, operation

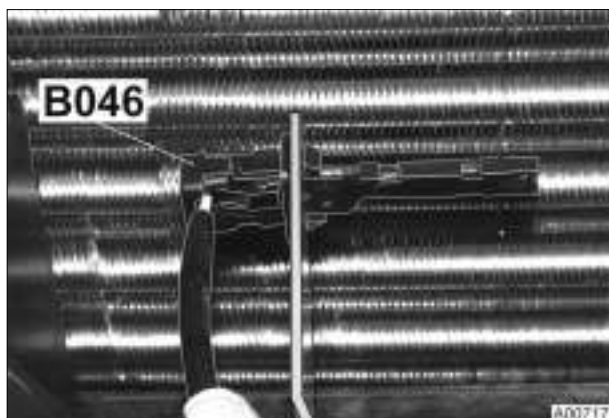
Chapter 5570 Reg. E - Electrical check on air-conditioning

| Date | Version | Page | | Capitel | Index | Docu-No. |
|------------|---------|------|---|---------|-------|----------|
| 02.08.2001 | a | 1/1 | B045 - sensor, air-conditioning 2 (anti-icing protection) | 9000 | E | 000141 |

Farmer 400
Fav 700
Fav 900

Electrics / General system
B046 - sensor, air-conditioning 1 (in air current)

E



Remove roof cover from cab, then unscrew plastic cover.

B046 = Sensor, air-conditioning 2 (NTC 1).

Regulates cooling air when air-conditioning is on.

Note:

NTC = Negative **T**emperature **C**oefficient

in other words, the sensor resistance decreases with increasing ambient temperature.

| Test | Pin | Target value | Condition | Remark |
|------------|-----------|-----------------|-----------------------------|---|
| Resistance | 1 (white) | approx. 10 kOhm | At 20°C ambient temperature | Sensor (NTC) resistance decreases with increasing ambient temperature |
| | 2 (white) | | | |

Note:

All readings +/- 10%

Note:

Chapter 5500 Reg. A - Air-conditioning / General system, operation

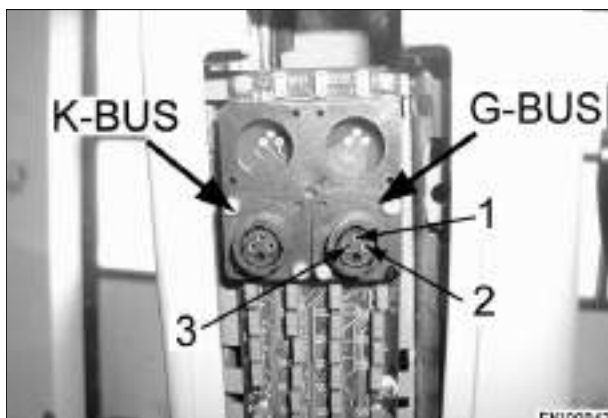
Chapter 5570 Reg. E - Electrical check on air-conditioning

| Date | Version | Page | B046 - sensor, air-conditioning 1 (in air current) | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 02.08.2001 | a | 1/1 | | 9000 | E | 000142 |

Fav 900

Electric / System in General

CAN - BUS

E**K - Bus = Comfort - Bus for:**

Data reading and Diagnostic via Interface K - Bus (Fendias)

End of Line (EOL) programming of tractor via Interface K - Bus

G-Bus = Transmission - Bus

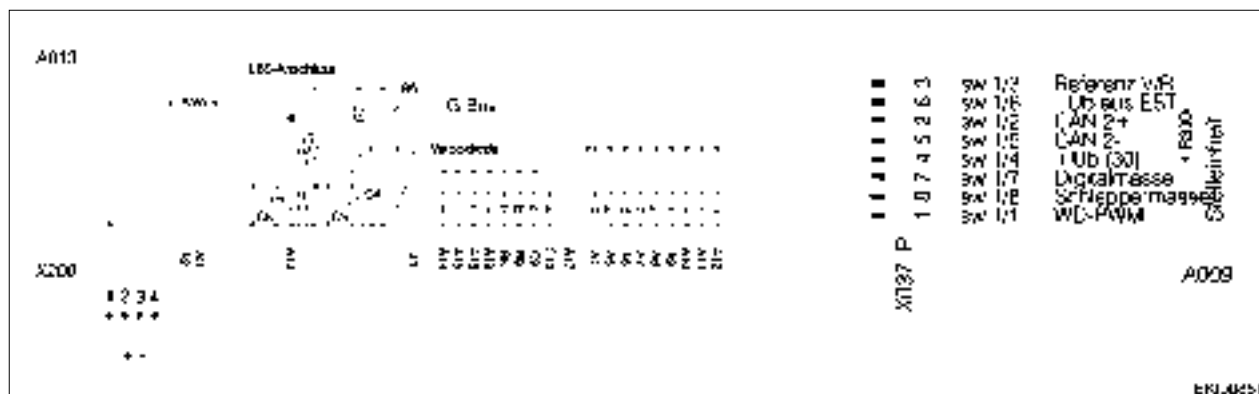
Data Transmission (between EST Control Module A002, spool Valves Y015..Y019, Transmission control Module A009, EDC Control Module A021)

End of Line (EOL) Programming (Programming Spool Valves) via Interface G-Bus

Note:

EST Control module A002 links G-Bus to K-Bus

Checking Transmission Bus Termination



Multimeter in Range "Ohm ", check Pin 2 and Pin 3.

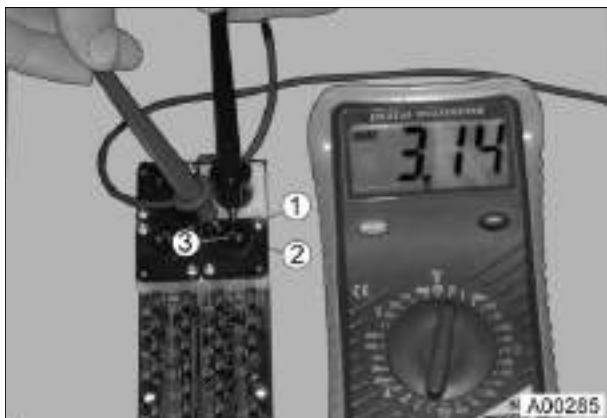
G-Bus Termination on Fuse board A013 = 300 Ohm

G-Bus Termination on Transmission Control Module A009 = 300 Ohm

Termination Resistors are connected parallelly.

Resulting Resistance approx. 162 Ohm

| | | |
|----------------|---|----------|
| Fav 900 | Electric / System in General CAN - BUS | E |
|----------------|---|----------|



Checking CAN-Bus on the Socket
Requested values, consult table

Note:
Ignition "ON"

| Test | KontaktPin | Requested value | Condition | Remark |
|-------|------------|---------------------|--|--|
| G-Bus | 2 | 1,5 VDC to ???5 VDC | + UB 8,5V from A002 EST (Pin23). | Supply from fuse F041 (X051). Indicated values are approximative and are subject to variations according to the volume of momentarily transmitted Data. |
| | 1 | | | |
| G-Bus | 3 | 2,5 VDC to 3,5 VDC | | |
| | 1 | | | |
| K-Bus | 2 | 1,5 VDC to 2,5 VDC | + UB 8,5V from A004 Side Console (Pin 23). | Supply from Fuse F042 (X051). Indicated values are approximative and are subject to variations according to the volume of momentarily transmitted Data. |
| | 1 | | | |
| K-Bus | 3 | 2,5 VDC to 3,5 VDC | | |
| | 1 | | | |

Important:

Fav. 900/23/..... und Fav. 700 are equipped with different Bus-Systems (Baud Rate).
Components such as Spool valves are not interchangeable !

Note:

Chapter 9700 Reg. A - Electronics Concept Fav.900/23/.....
Chapter 9000 Reg. C - Electric Diagram Comfort Bus (K-Bus) Sheet 21
Chapter 9000 Reg. C - Electric Diagram Transmission Bus (G-Bus) Sheet 26
Chapter 9000 Reg. C - Electric Diagram Voltage supply Electronics Sheet 20

| Date | Version | Page | CAN - BUS | Capitel | Index | Docu-No. |
|-----------|---------|------|-----------|---------|-------|----------|
| 6.12.2000 | a | 2/2 | | 9000 | E | 000052 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
G001 - battery

E



G001 = battery

Check battery charge with aid of open-circuit voltage.

Test conditions: ambient temperature approx. 27°C



For six hours before test do not charge battery or connect to consumer. Disconnect earth cable from battery.

Connect multimeter (voltmeter).

Target values at 27°C:

12.8 VDC = **full**

12.1 VDC to 12.25 VDC = **1/2**

11.4 VDC to 11.8 VDC = **empty**



Complaint: battery goes flat without any consumers being switched on.

Check discharge current using multimeter (ammeter).

Switch off all consumers. Disconnect battery's earth cable, and connect multimeter (ammeter) in series.

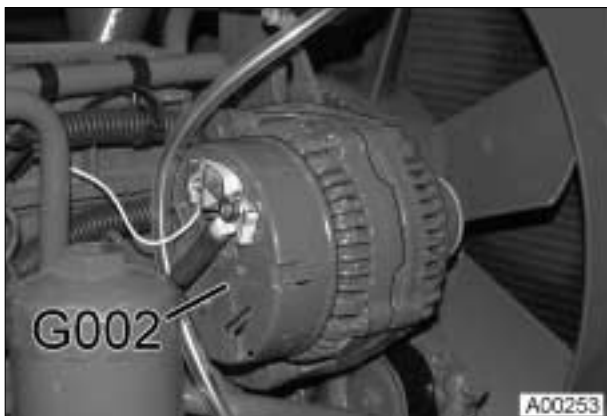
Consumption must not exceed 50 mA.

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|----------------|-------|----------|
| 21.2.2001 | a | 1/1 | G001 - battery | 9000 | E |
| | | | | | 000081 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
G002 - generator

E



G002 = **generator**

Measure limit voltage using multimeter (voltmeter):

With engine running,
 battery charge indicator goes out.

Connect B+ on generator and earth.

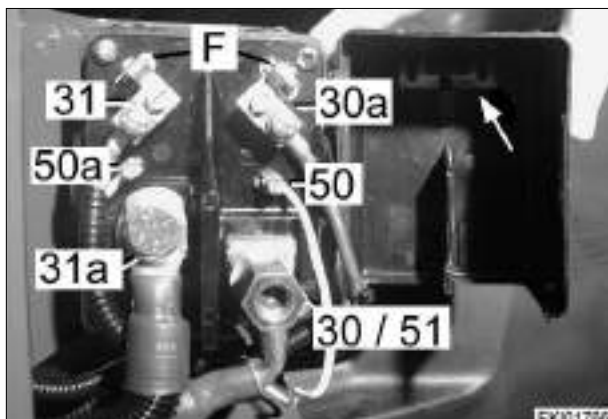
Target value: at 20°C ambient temperature 13.8 to 14.5 VDC.

In event of discrepancies have generator G002 repaired in specialist workshop.

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|----------|------|-------------------------|-------------|---------------|
| 22.2.2001 | a | 1/1 | G002 - generator | 9000 | E |
| | | | | | 000082 |

Fav 900

Electrics / General system
K018 - relay, battery switch

E

| Pin | Function |
|---------|-----------------|
| 30 / 51 | +UB G001 |
| 30a | +UB G003 |
| 31 | Earth (X514) |
| 31a | - negative G003 |
| 50 | M011 - pin 50 |
| 50a | S002 - pin 50a |
| F | 80 A fuses |
| Arrow | Spare fuses |



Note:
Ignition "OFF"
Disconnect battery (negative terminal).
Remove terminals 31a and 30 / 51 from K018.

| Test | Pin | Target value | Condition | Remark |
|------------|---------------------|---------------|-----------|--------|
| Resistance | 31a, 50, 31 and 50a | No continuity | | |
| | 30 | | | |

| | | | | |
|------------|-----|------------|--|--|
| Resistance | 30a | Continuity | | |
| | 30 | | | |



Note:
Remove terminals 30a, 31, 50 and 50a from K018.
Apply 12 VDC to terminals 31 and 50a from external source.

| Date | Version | Page | K018 - relay, battery switch | Capitel | Index | Docu-No. |
|------------|---------|------|------------------------------|---------|-------|----------|
| 24.07.2001 | a | 1/2 | | 9000 | E | 000132 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system K018 - relay, battery switch | E |
|----------------|--|----------|

| Test | Pin | Target value | Condition | Remark |
|------------|-----|---------------|-----------|--------|
| Resistance | 31a | No continuity | | |
| | 31 | | | |

| | | | | |
|------------|----|------------|--|--------------------------------|
| Resistance | 31 | Continuity | | Internal resistance of battery |
| | 30 | | | |

| | | | | |
|------------|-----|------------|--|--|
| Resistance | 50 | Continuity | | |
| | 30a | | | |

Connect leads to K018 and battery.

Put K018 under load:

Disconnect X046 - cable coupler from A020 (fuel injection pump).

| Test | Pin | Target value | Condition | Remark |
|---------------|-----|----------------|---------------|--|
| Voltage | 30 | approx. 12 VDC | Ignition "ON" | Measurement carried out at pin 30 of starter motor |
| Vehicle earth | | | | |

| | | | | |
|---------------|----|--------------------------|-----------------------|--|
| Voltage | 30 | approx. 21 VDC to 24 VDC | Operate starter motor | Measurement carried out at pin 30 of starter motor |
| Vehicle earth | | | | |

Note:

Chapter 9000 Reg. E - M011 - starter, 24 V starter motor

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---|----------|---------------|
| 24.07.2001 | a | 2/2 | K018 - relay, battery switch 9000 | E | 000132 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
M002 / M004 - front / rear wiper motor

E



In windscreen:

M002 = **front wiper motor**



X347 = **cable coupler** to front wiper motor



Testing wiper motor M002

Switch on ignition and wiper motor.

Connect yellow electric cable and earth (wiper motor) at cable coupler X347.

If voltage is present and wiper motor M002 is not running, wiper motor M002 is defective.



Testing wiper shut-off (park position)

Ignition "ON"

Connect black/green electric cable and earth (wiper motor) at cable coupler X347.

Is voltage present?

Switch wipers on, wiper motor runs.

Connect black electric cable and earth (wiper motor).

Voltage pulsates. If voltage does not pulsate, end shut-off in wiper motor is defective.

| Date | Version | Page | M002 / M004 - front / rear wiper motor | Capitel | Index | Docu-No. |
|-----------|---------|------|--|---------|-------|----------|
| 21.2.2001 | a | 1/2 | | 9000 | E | 000077 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
M002 / M004 - front / rear wiper motor

E



In rear window:

M004 = rear wiper motor

Note:

Test rear wiper motor in same manner as front wiper motor M002.

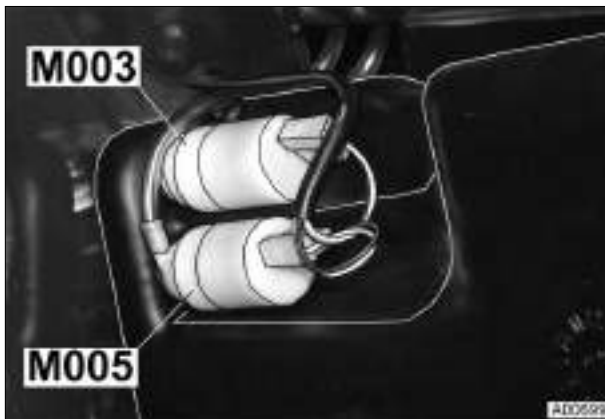


Remove panels on rear wiper motor M004.

X258 = **cable coupler** on rear wiper motor

| Date | Version | Page | M002 / M004 - front / rear wiper motor | Capitel | Index | Docu-No. |
|-----------|---------|------|--|---------|-------|----------|
| 21.2.2001 | a | 2/2 | | 9000 | E | 000077 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system M003 - wiper pump, front | E |
|---|--|----------|



| Pin | Function |
|-----------|----------|
| 1 (white) | + supply |
| 2 (brown) | Earth |



Check power consumption of M003 - wiper pump.
Remove fuse no. F020 (10 A) from fuse holder 1 (X050).

Connect multimeter (ammeter) in place of fuse.

Note:

Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).

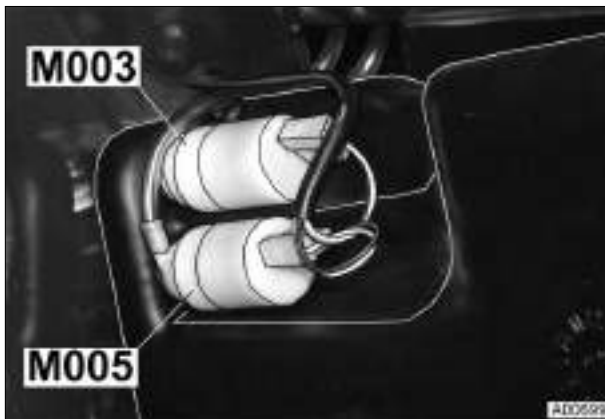
Note:
Ignition "ON"

| Test | Pin | Target value | Condition | Remark |
|-------------------|-------------------|--------------|--------------------------------|-----------------------|
| Power consumption | Between fuse F020 | approx. 3 A | Actuate windscreen washer | + supply to fuse F020 |
| | | 0 A | Windscreen washer not actuated | |

Note:
All readings +/- 10%

| Date | Version | Page | M003 - wiper pump, front | Capitel | Index | Docu-No. |
|------------|---------|------|--------------------------|---------|-------|----------|
| 30.07.2001 | a | 1/1 | | 9000 | E | 000134 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system M005 - wiper pump, rear | E |
|---|---|----------|



| Pin | Function |
|-----------|----------|
| 1 (white) | + supply |
| 2 (brown) | Earth |



Check power consumption of M005 - wiper pump.
Remove fuse no. F018 (15 A) from fuse holder 1 (X050).

Connect multimeter (ammeter) in place of fuse.

Note:

Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Remark |
|-------------------|-------------------|---------------|---|-----------------------|
| Power consumption | Between fuse F018 | approx. 2.6 A | S010 - switch, rear wiper motor Stage 1: M004 - wiper motor running M005 - wiper pump stationary | + supply to fuse F018 |
| | | approx. 4.9 A | S010 - switch, rear wiper motor Stage 2: M004 - wiper motor running M005 - wiper pump running | |

Note:

All readings +/- 10%

| Date | Version | Page | M005 - wiper pump, rear | Capitel | Index | Docu-No. |
|------------|---------|------|-------------------------|---------|-------|----------|
| 30.07.2001 | a | 1/1 | | 9000 | E | 000135 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
M007 - seat adjustment motor (compressor)

E



On driver's seat spring unit: remove rubber bellows.

M007 = **seat adjustment motor (compressor)**



Remove panel at bottom right rear on driver's seat.

X305 = **cable coupler** for seat adjustment motor M007



Testing seat adjustment motor

Test power consumption.

Fuse no. 21 in fuse holder 1

Actuate seat adjustment motor M007 and read off power consumption.

Target value: 7.0 amps +/- 10%

Note:

See electric circuit diagram - Chapter 9000 Index C

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|----------|------|-------------|----------|---------------|
| 21.2.2001 | a | 1/1 | 9000 | E | 000078 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
M008 - heater fan

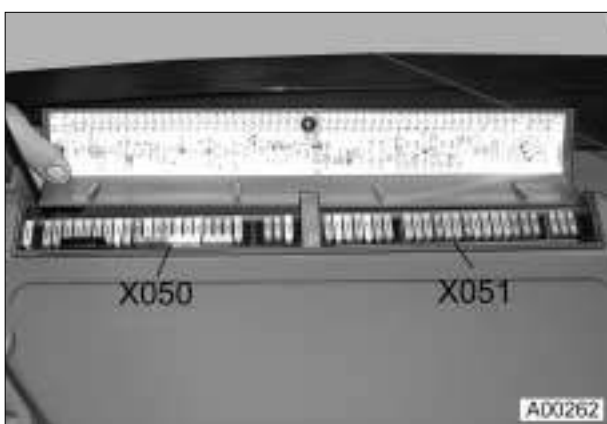
E



Remove sheet-metal panel at rear above power lift (on Fav 700).

M008 = **heater with fan motor**

X027 = **cable coupler** for heater fan motor



X050 = fuse holder 1 compl.

X051 = fuse holder 2 compl.

Fuse assignment from left to right nos. 1 to 29



Measure power consumption of heater fan motor.

Remove fuse no. 14 from fuse holder 1 (X050).

Connect multimeter (ammeter) in place of fuse.

Note:

Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).



Start motor and read off power consumption.

| Switch position | Ampere |
|-----------------|--------|
| 0 | 0 |
| 1 | 4.5 |
| 2 | 9.0 |
| 3 | 14.2 |

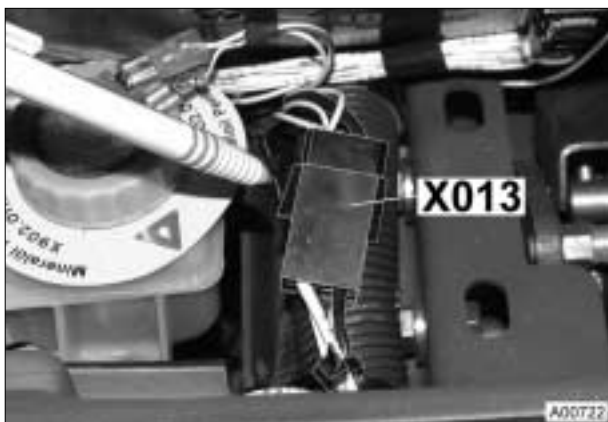
Farmer 400
Fav 700
Fav 900

Electrics / system in general
M008 - heater fan

E



S033 = **heater control** (three-stage)



Remove hatch cover at top front of steering column.

X013 = **cable coupler for heater control**

| Date | Version | Page | M008 - heater fan | Capitel | Index | Docu-No. |
|-----------|---------|------|-------------------|---------|-------|----------|
| 22.2.2001 | a | 2/2 | | 9000 | E | 000087 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
M009 - fan

E



Remove roof cover from cab, then unscrew plastic cover:

M009 = **fan** levels 1, 2 and 3 for air-conditioning.



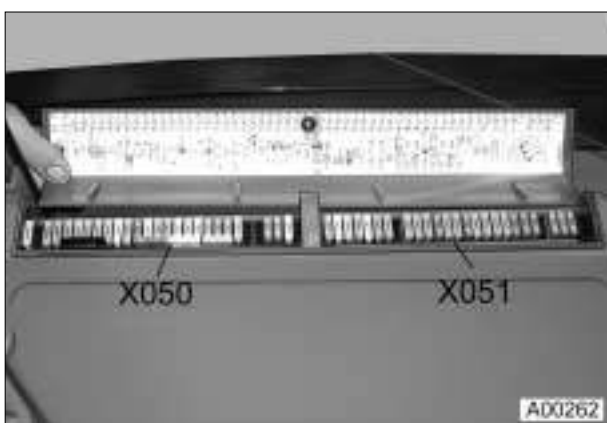
Checking fan:

Checking power consumption of fan motor:

Remove fuse no. 17 from fuse holder 1. Connect multimeter (ammeter) in place of fuse.

Note:

Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).



At right rear in cab:

Remove cover.

X050 = fuse holder 1 compl.

X051 = fuse holder 2 compl.

Fuse assignment from left to right nos. 1 to 29



Run engine and read off power consumption.

| Switch position | Ampere |
|-----------------|--------|
| 0 | 0 |
| 1 | 4.3 |
| 2 | 9.8 |
| 3 | 17.0 |

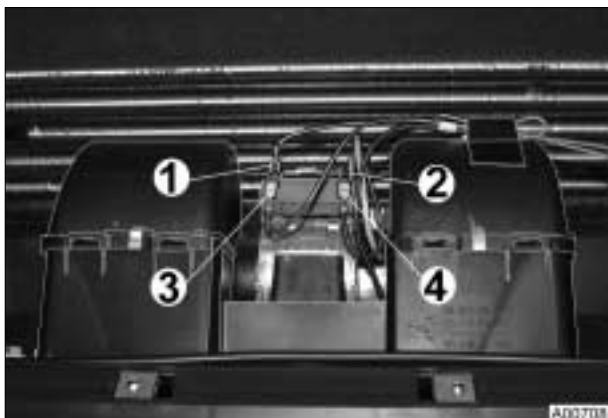
All readings +/- 10%

Farmer 400
Fav 700
Fav 900

Electrics / system in general

M009 - fan

E



Mark and disconnect electrical leads.

- 1 = orange
- 2 = yellow
- 3 = green
- 4 = red



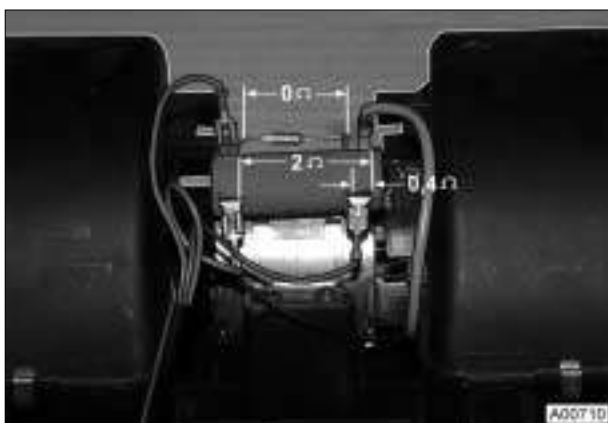
Checking overheating fuse

Behr can supply resistor with overheating fuse as spare part.

In event of complaint that power supply is OK, but fan motor will not run:

Test with multimeter (ohmmeter):

Target value: resistance of overheating fuse approx. 0 ohm.



Checking resistances

Target value for overall resistance: approx. 2 ohms

This total resistance is made up of 1.6 + 0.4 ohms.

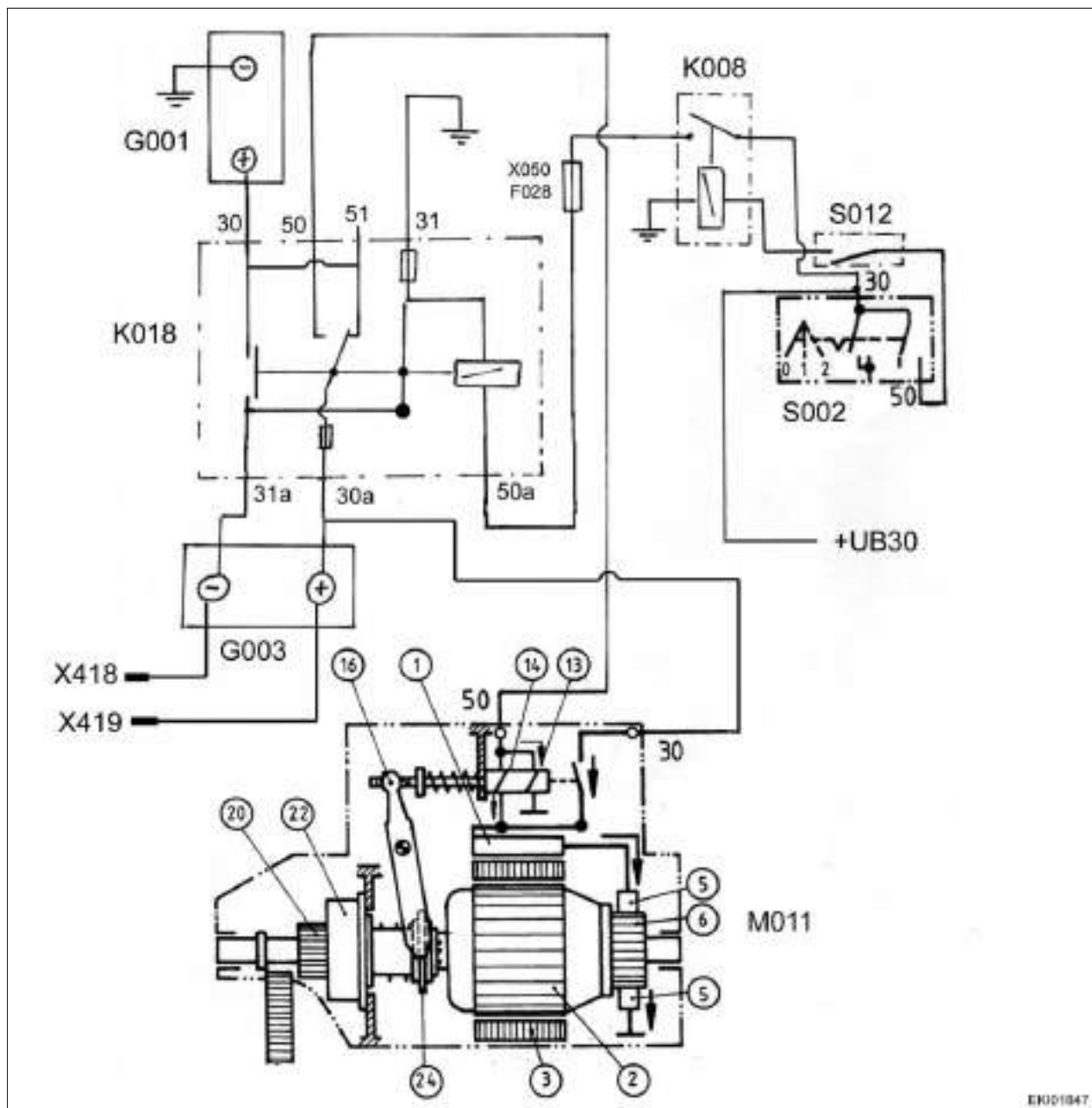
Note:

Electric circuit diagrams - Chapter 9000 Index C

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 21.02.2001 | a | 2/2 | 9000 | E | 000073 |

M009 - fan

Plan of 24 V starter motor system



| Item | Designation | Item | Designation |
|------|------------------|-------|--|
| 1 | Exciter winding | G001 | Battery 1 |
| 2 | Rotor | G003 | Battery 2 |
| 3 | Pole shoe | K008 | Relay, starter inhibitor |
| 5 | Carbon brushes | K018 | Relay, battery switchover |
| 6 | Commutator | M011 | 24 V starter motor |
| 13 | Holding winding | S002 | Switch, ignition |
| 14 | Pull-in winding | S012 | Switch, starter inhibitor |
| 16 | Engaging lever | X050 | Fuse holder 1 |
| 20 | Pinion | X418 | External start terminal - |
| 22 | Roller freewheel | X419 | External start terminal + |
| 24 | Guide ring | +UB30 | Supply for S002 - switch (12 - 14 VDC) |

| Date | Version | Page | M011 - starter, 24 V starter motor | Capitel | Index | Docu-No. |
|------------|---------|------|------------------------------------|---------|-------|----------|
| 07.08.2001 | a | 1/3 | | 9000 | E | 000145 |

Fav 900

Electrics / General system
M011 - starter, 24 V starter motor

E

Disconnect X046 - connector for A020 - ECU, VP44.

Note:

When starter motor is turned (test procedure) EDC faults are displayed on A007 - display unit.



| Pin | Function |
|-----|---|
| 30 | Input direct from battery positive terminal |
| 50 | Starter control unit |

**Testing voltage drop when starting**

Actuate M011 - starter.

Measure voltage at pin 30 of M011 - starter (24 VDC) using voltmeter.

Target value: approx. 20 VDC (at 20°C ambient temperature).

Note:

If S002 - switch is not actuated, there is + UB (12 VDC) at pin 30 of M011 - starter.

When S002 - switch is actuated, K018 - relay switches G001/G003 - batteries in series. M011 - starter turns.

Fav 900

Electrics / General system
M011 - starter, 24 V starter motor

E

Checking power consumption of M011 - starter

Measure power consumption at pin 30 of M011 - starter using clip-on or standard ammeter.

Target value: approx. 350 amps (at 20°C)

Note:

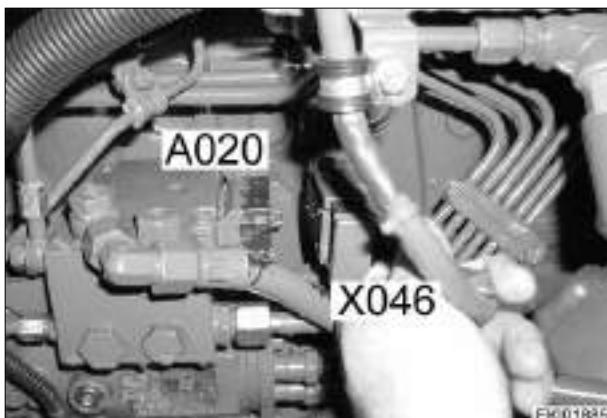
Target value of approx. 20 VDC / 350 amps depends on charge in G001 / G003 - batteries and on temperature (ambient temperature and / or engine temperature).

If approx. value is not reached, G001 / G003 - batteries and / or supply lead via relay circuit (positive and earth) are not OK.

Note:

Chapter 9060 Reg. B - Troubleshooting table for M011 - 24 V starter motor

Chapter 9000 Reg. E - K018 - relay, battery switchover



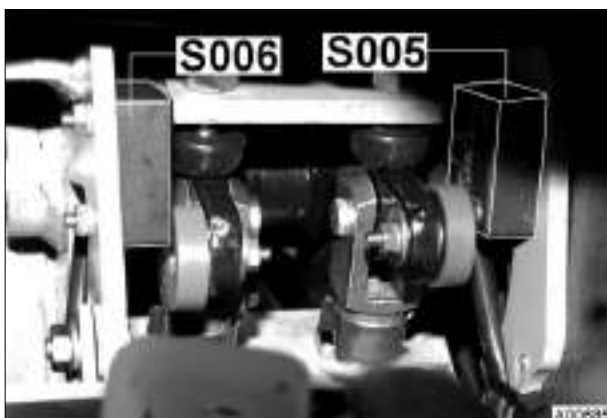
On completion of measurements on M011 - starter:

- Connect X046 - connector for A020 - ECU, VP44.
- Clear fault memory in A007 - display unit.

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S005 / S006 right / left magnetic brake switch

E

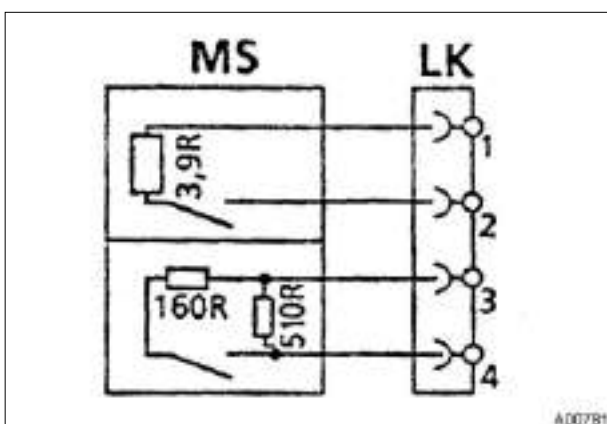


At top on brake pedals; shown with clutch/brake reservoir removed for greater clarity.

S005 = **right brake solenoid switch**

S006 = **left brake solenoid switch**

To test, connect adapter cable
(DIY using connector G 816.900.043.040).



Note:

Solenoid switches S005 and S006 are closed with pedal in rest position.

Pins 1 and 2 for brake light and compressed-air advance control system solenoid valve.

Pins 3 and 4 for differential lock control.
For pin assignment see drawing



Connect multimeter (ohmmeter) and test each solenoid switch.

Connect pins 1 and 2:

Pedal in rest position approx. 3.9 ohms

Pedal depressed, infinite resistance.

Connect pins 3 and 4:

Pedal in rest position approx. 121 ohms

Pedal depressed approx. 510 ohms

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S005 / S006 right / left magnetic brake switch

E



Connect multimeter (voltmeter) and test each solenoid switch.

Ignition "ON".

Connect pins 1 and 2:

Pedal in rest position approx. 0.3 VDC

Pedal depressed Ub approx. 12 VDC

Connect pins 3 and 4:

Pedal in rest position approx. 2.4 VDC

Pedal depressed approx. 5,0 VDC

Note:

Electric circuit diagram - Chapter 9000 Index C

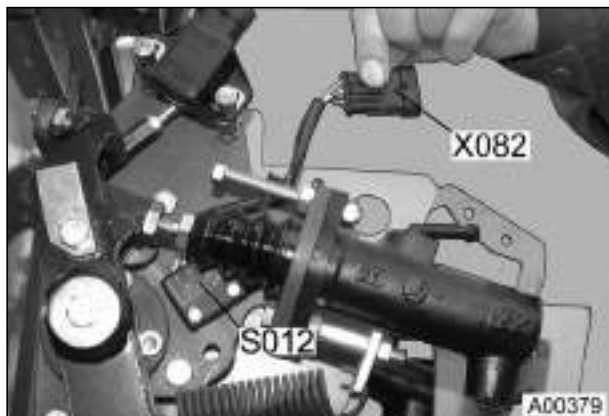
Setting magnet for solenoid switch - Chapter 1070 Index E

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|---------|-------|----------|
| 20.2.2001 | a | 2/2 | 9000 | E | 000069 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S012 - starter inhibitor switch

E



Note:

Connect adapter cable X 899.980.246.206
 directly to component S012.
 Ignition "OFF".

| Test | Pin | Target value | Condition | Possible cause of fault |
|------------|-----|--------------|----------------------------------|-------------------------|
| Resistance | 1 | 3.8 ohms | Clutch pedal actuated | |
| | | Infinite | Clutch pedal not actuated | |
| | 2 | | | |
| Resistance | 3 | 3.8 ohms | Clutch pedal actuated | |
| | | Infinite | Clutch pedal not actuated | |
| | 4 | | | |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S013 Emergency mode push-button

E



S013 = **Emergency mode button** to engage Emergency mode if electronics fail.

Engage Emergency mode:

Ignition on or engine running.

Depress clutch and press Emergency mode button.



Following display appears on instrument panel.



Press key (arrowed) several times.



Fault code 4.1.59 is displayed briefly on instrument panel.

Note:

However, this fault code is not stored. It is normal for this fault code to be displayed in Emergency mode.

| Date | Version | Page | Capitel | Index | Docu-No. |
|--------|----------|------|--|-------------|---------------|
| 4/2000 | b | 1/2 | S013 Emergency mode push-button | 9000 | E |
| | | | | | 000024 |

Farmer 400
Fav 700
Fav 900

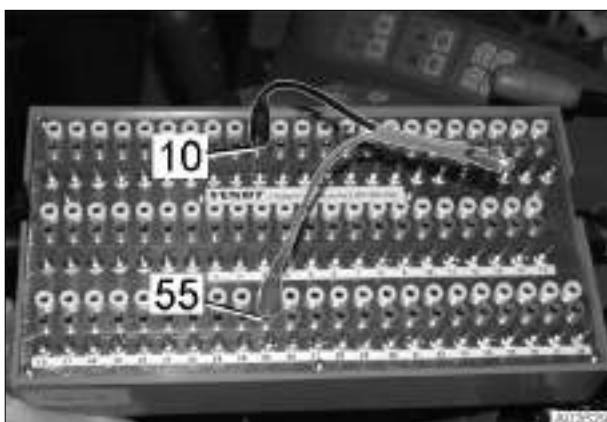
Electrics / system in general
S013 Emergency mode push-button

E



Note:

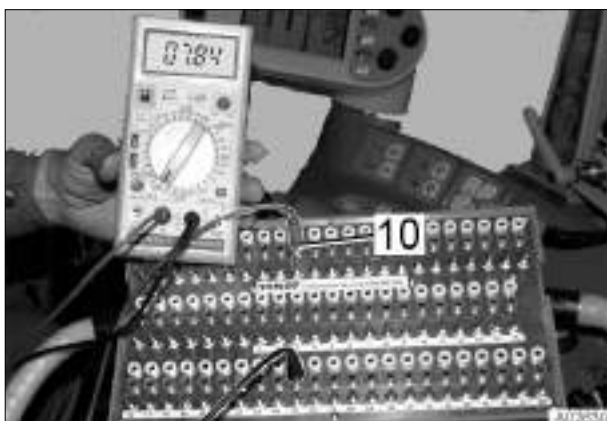
Emergency mode is not engaged. However, fault code 4.1.59 is displayed on instrument panel = fault in wiring or other interruption, e.g. defective relay, see transmission emergency mode circuit diagram.



Test: Connect e-adapter box up to **chassis no. 714 / 716 21/2000 to A001 transmission e-box**, from 711 / 712 21/1001 onwards and chassis no. 714 / 716 21/2000 to A002 e-box .

Isolate pin 10. Connect approx. 2 W bulb across pins 10 and 55 (bulb does not light up).

Fault code 4.1.59 is no longer displayed. There is definitely a fault.



System is OK:

Emergency mode is **not engaged**.

Approx. 7 mA flows across pin 10.

Emergency mode is **engaged**.

No current flows across pin 10.

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S014 - rapid reversing control

E



| Pin | Function |
|-----|--------------|
| 1 | Signal |
| 2 | Earth |
| 3 | Not assigned |



Remove steering column cover.
Connect adapter cable X 899.980.246.204 to
X225 - rapid reversing control cable coupler.

Note:
Ignition "OFF".

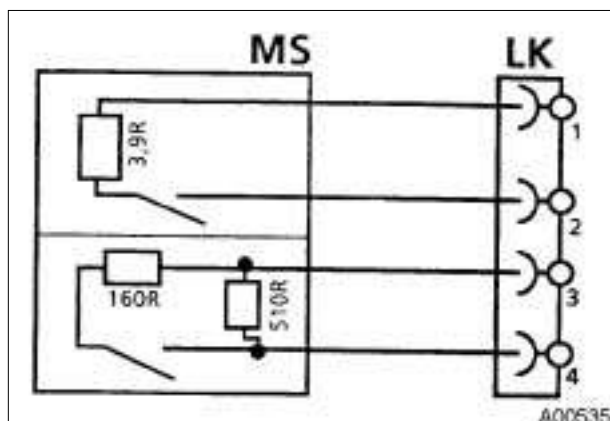
| Test | Pin | Target value | Condition | Remark |
|------------|-----|--------------|---------------------------|--------|
| Resistance | 1 | 121 ohms | Switch pressed | |
| | | 510 ohms | Switch not pressed | |
| | 2 | | | |

Note:
Ignition "ON"

| Test | Pin | Target value | Condition | Remark |
|---------|-----|--------------|---------------------------|--------|
| Voltage | 1 | 2.4 VDC | Switch pressed | |
| | | 5.1 VDC | Switch not pressed | |
| Earth | 2 | | | |

| Date | Version | Page | S014 - rapid reversing control | Capitel | Index | Docu-No. |
|---------|---------|------|--------------------------------|---------|-------|----------|
| 03/2000 | a | 1/1 | | 9000 | E | 000126 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general S015 - handbrake switch | E |
|----------------------------------|---|----------|



| Pin | Function |
|-----|--------------|
| 1 | Not assigned |
| 2 | Not assigned |
| 3 | Signal |
| 4 | Earth |

Note:

Connect adapter cable X 899.980.246.206 directly to component S015.
Ignition "ON".

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|---------------|-------------------------|
| Signal | 3 | 2.4 VDC | Handbrake off | |
| | | 5.1 VDC | Handbrake on | |
| Earth | 4 | | | |

| Measuring points on A004 - control console | Pin |
|--|-----|
| Earth | 1 |
| Signal | 18 |

Note:

Checking A004 - control console, Chapter 9000 Index E

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|---------|------|---------|-------|----------|
| 03/2000 | a | 1/1 | 9000 | E | 000037 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S017 - filter clogging pressure-operated switch

E



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |



Remove pressure-operated switch.
 Plunger (arrowed) must be actuated in test.

Note:
Before fitting, oil thread of pressure-operated switch, locate sealing ring and turn until stop is reached.

| Test | Pin | Target value | Condition | Possible cause of fault |
|------------|-----|--------------|-----------------------------|-------------------------|
| Resistance | 1 | 121 ohms | Plunger not actuated | |
| | | 510 ohms | Plunger actuated | |
| | 2 | | | |

Note:

Connect adapter cable X 899.980.246.204 directly to component S017.
 Ignition "ON".

| | | | | |
|--------|---|---------|---|--|
| Signal | 1 | 2.4 VDC | Oil temperature < 0° or clogged pressure filter | A) Reading 8.0 VDC, fault in component. B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A004 (PIN 22) or in wiring - If reading is 8.0 VDC, fault in component. |
| | | 5.1 VDC | | |
| Earth | 2 | | | |

| Measuring points on A004 - control console | Pin |
|--|-----|
| Earth | 1 |
| Signal | 22 |

Note:

Checking A004 - control console, Chapter 9000 Index E

| Date | Version | Page | S017 - filter clogging pressure-operated switch | Capitel | Index | Docu-No. |
|---------|---------|------|---|---------|-------|----------|
| 06/2000 | a | 1/2 | | 9000 | E | 000010 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S017 - filter clogging pressure-operated switch

E



406533

Note:

Warning (pressure filter clogged) is displayed on instrument panel if following conditions are met:

1. Engine running.
2. Transmission oil temperature greater than 50°C (thermo switch resistance < 150 ohms).
3. Pressure differential upstream and downstream of pressure filter > 5 bar.
4. Items 1 to 3 must obtain for longer than two minutes.

| Date | Version | Page | S017 - filter clogging pressure-operated switch | Capitel | Index | Docu-No. |
|---------|---------|------|---|---------|-------|----------|
| 06/2000 | a | 2/2 | | 9000 | E | 000010 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S019 / S020 - left / right rear "PTO on" switch

E



On left and right mudguard at rear:

S019 = **"PTO on" switch left rear**

S020 = **"PTO on" switch right rear**

Connect e-adapter box X 899.980.208.100 directly between cable loom and e-box A002.



Testing switch S019:

Connect pins 1 and 22.

Switch toggle switches of e-adapter box to Isolate.

Target values:

Switch not actuated approx. 510 ohms

Switch actuated approx. 121 ohms

Connect pins 1 and 22.

Ignition "ON"

Target values:

Switch not actuated approx. 5 VDC

Switch actuated approx. 2.4 VDC

Connect pins 1 and 24.

Ignition "ON"

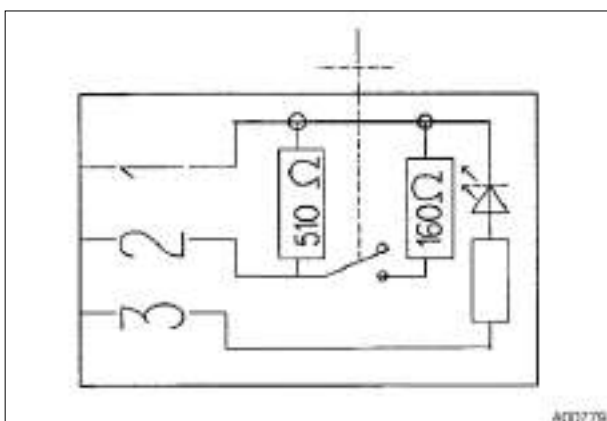
Target value: PTO on U_b = approx. 12 VDC

Target value for "PTO off" approx. 0.06 VDC

Note:

Testing of switch S020 in same manner as switch S019.

For pin assignment and test values see table.



Pin assignment of switches S019 / S020

1 = earth

2 = switch on / off

3 = switch illumination on / off

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general S019 / S020 - left / right rear "PTO on" switch | E |
|---|--|----------|

Pin assignment and test values of switch S019

| Pin no. Left switch S019 | Pin no. E-box A002 | Switch Not pressed Ohm / VDC | Switch Pressed Ohm / VDC | PTO On VDC | PTO Off VDC |
|---|---|---|---|---------------------------------------|---|
| 1 | 1 | approx. 510 / 5.0 Pin no. 1 and 22 | approx. 121 / 2.4 Pin no. 1 and 22 | approx. 12 Pin no. 1 and 24 | approx. 0.06 Pin no. 1 and 24 |
| 2 | 22 | | | | |
| 3 | 24 | | | | |

Pin assignment and test values of switch S020

| Pin no. Right switch S020 | Pin no. E-box A002 | Switch Not pressed Ohm / VDC | Switch Pressed Ohm / VDC | PTO On VDC | PTO Off VDC |
|--|---|---|---|---------------------------------------|---|
| 1 | 1 | approx. 510 / 5.0 Pin no. 1 and 45 | approx. 121 / 2.4 Pin no. 1 and 45 | approx. 12 Pin no. 1 and 24 | approx. 0.06 Pin no. 1 and 24 |
| 2 | 45 | | | | |
| 3 | 24 | | | | |

Note:**Electric circuit diagram - Chapter 9000 Index C**

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|---------|-------|----------|
| 20.2.2001 | a | 2/2 | 9000 | E | 000070 |

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Electrics / system in general S021 - external switch, "Raise" front power lift | E |
|----------------------------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |
| 3 | Free |

Note:

Ignition "OFF".

Measure resistance directly at switch.

| Test | Pin | Target value | Condition | Possible cause of fault |
|------|-----|--------------|---------------------------|-------------------------|
| | 1 | 510 ohms | Switch not pressed | |
| | | 121 ohms | Switch pressed | |
| | 2 | | | |



Connect e-adaptor box X899.980.208.100 directly to A004 - control console.

Note:

Ignition "ON".

| Test | Pin | Target value | Condition | Remark |
|--------|-----|--------------|---------------------------|---|
| Signal | 41 | 5.1 VDC | Switch not pressed | |
| | | 2.4 VDC | Switch pressed | |
| Earth | 1 | | | |
| Signal | 41 | 9.5 mA | Switch not pressed | Switch toggle switch of e-adaptor box pin 41 to Isolate |
| | | 19 mA | Switch pressed | |

Note:

Checking A004 - control console, Chapter 9000 Index E

| Date | Version | Page | Capitel | Index | Docu-No. |
|----------|----------|------|-------------|----------|---------------|
| 9.3.2001 | a | 1/1 | 9000 | E | 000110 |

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Electrics / system in general S022 - external switch, "Lower" front power lift | E |
|----------------------------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |
| 3 | Free |

Note:

Ignition "OFF".

Measure resistance directly at switch.

| Test | Pin | Target value | Condition | Possible cause of fault |
|------|-----|--------------|---------------------------|-------------------------|
| | 1 | 510 ohms | Switch not pressed | |
| | | 121 ohms | Switch pressed | |
| | 2 | | | |



Connect e-adapter box X 899.980.208.100 directly to A004 - control console.

Note:

Ignition "ON".

| Test | Pin | Target value | Condition | Remark |
|--------|-----|--------------|---------------------------|---|
| Signal | 40 | 5.1 VDC | Switch not pressed | |
| | | 2.4 VDC | Switch pressed | |
| Earth | 1 | | | |
| Signal | 40 | 9.5 mA | Switch not pressed | Switch toggle switch of e-adapter box pin 40 to Isolate |
| | | 19 mA | Switch pressed | |

Note:

Checking A004 - control console, Chapter 9000 Index E

| Date | Version | Page | Capitel | Index | Docu-No. |
|----------|----------|------|-------------|----------|---------------|
| 9.3.2001 | a | 1/1 | 9000 | E | 000114 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S024 - brake fluid level sensor

E



Remove hatch cover at top front of steering column.

S024 = **brake fluid level sensor**

Note:

Brake fluid must not be used. Only Pentosin CHF11S, order no. X 902.011.622, is permissible.



Checking brake-fluid sensor:

Unscrew cover of brake-fluid reservoir.

Ignition "ON".

Operate float.

Float at bottom = warning display

Float at top = no warning display



Warning display: brake and clutch oil level too low

Display with buzzer and warning light

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|--|-------------|---------------|
| 19.2.2001 | a | 1/1 | S024 - brake fluid level sensor | 9000 | E |
| | | | | | 000068 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Pressure-operated switch S025 and flow monitor S026

E

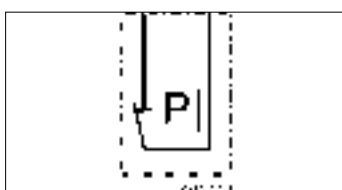
Pressure-operated switch S025

Component description, function and testing

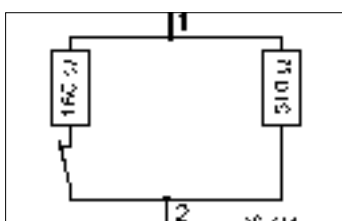
- Possible other designations: pressure switch
- Versions (chronological)

| | Operating point | Feature | Validity |
|---|-----------------|---------|------------------|
| 1 | 25 bar | | |
| 2 | 8 bar | | from ... onwards |

- Installation: **tightening torque Nm**
- Function break-contact with resistor circuit



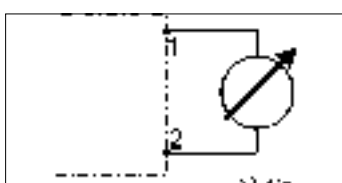
Circuit diagram symbol



Detailed circuit diagram

- Terminals / labels

| Pin | Meaning |
|-----|---------|
| 1 | Signal |
| 2 | Earth |



Test circuit

- Test values

| Position | Meaning | Condition | Condition in tractor | Test value |
|----------|---------|-----------|--|------------|
| 0 | Rest | Closed | Actual pressure is less than switching pressure | 120 ohms |
| 1 | Active | Open | Actual pressure is greater than switching pressure | 510 ohms |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Pressure-operated switch S025 and flow monitor S026

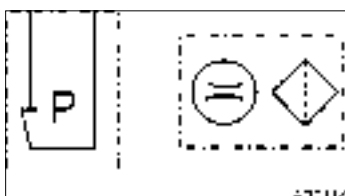
E

Flow monitor S026

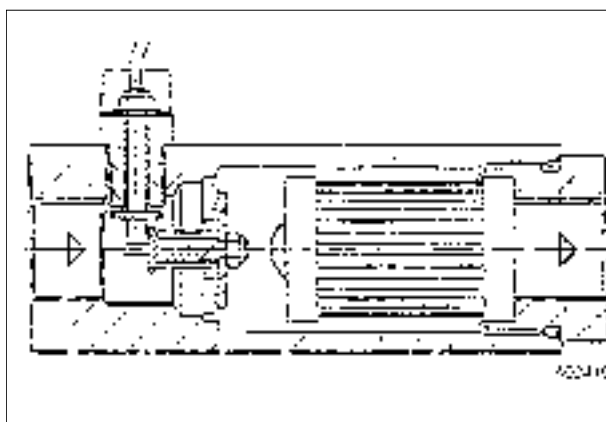
Component description, function and testing

- Possible other designations: high-pressure filter (=FENDOS)
- Versions (chronological): in earlier types auxiliary pump was monitored by pressure-operated switch
- Installation: **oil flow direction as per stamped arrow**
- Function; Switching properties: **opening** of baffle plate depends on flow, i.e. static pressure does not cause opening. Operating points depend on oil temperature, i.e. the warmer the oil, the larger the oil flow must be to open switch.
- Characteristics:

| Reference values | At approx. 30°C oil temperature | At approx. 65°C oil temperature |
|---|---------------------------------|---------------------------------|
| Oil volume increasing Switch opens at | 6-6.5 l/min | 8.6-9.7 l/min |
| Oil volume decreasing Switch closes at | approx. 5.5 l/min | 9.7-8.2 l/min |



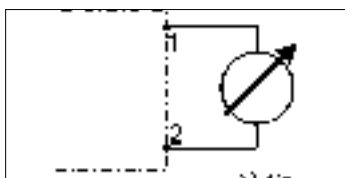
Circuit diagram symbols



Detailed internal structure

- Terminals / labels

| Pin | Meaning |
|-----|---------|
| 1 | Signal |
| 2 | Earth |



Test circuit

- Test values:

| Position | Meaning | Condition | Condition in tractor | Test value ohms |
|----------|---------|-----------|----------------------|-----------------|
| 0 | Rest | Closed | Insufficient oil | 0 |

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|----------|---------|------|---------|-------|----------|
| 6.3.2001 | a | 2/9 | 9000 | E | 000091 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Pressure-operated switch S025 and flow monitor S026 | E |
|----------------------------------|---|----------|

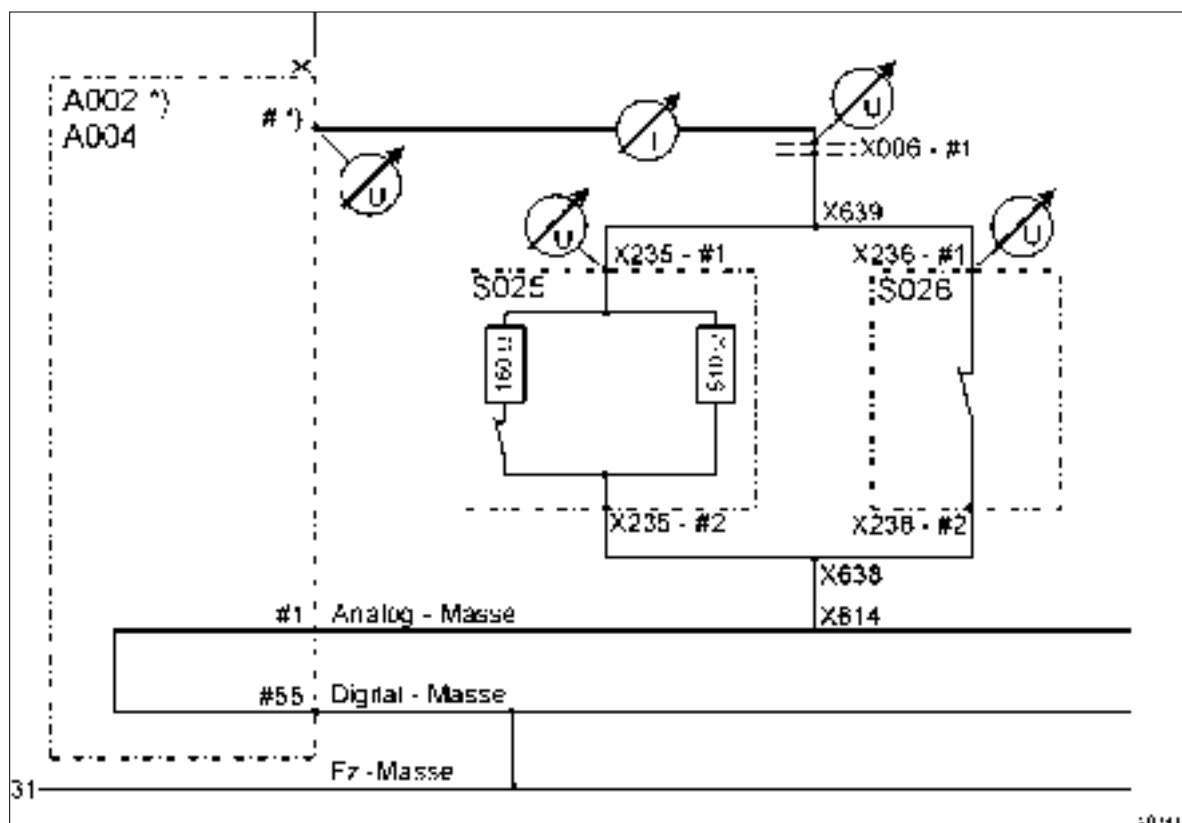
| Position | Meaning | Condition | Condition in tractor | Test value ohms |
|----------|---------|-----------|----------------------|-----------------|
| 1 | Active | Open | Sufficient oil | Infinite |

Pressure-operated switch and flow monitor

Function and testing on tractor

1st operating scenario: "everything OK"

Outline circuit diagram with measuring points:



Notes on electrical measurements:

- Voltage measurements (volts): between measurement pin and analogue, digital or vehicle earth
- Current measurements (mA): using 68-pin adapter box between green and yellow measurement pins
- Test values at e-box and at 31-pin cable coupler X006 are identical

| Tractor condition | Component condition | | Measuring point | | | Test value | |
|-------------------|-------------------------------|-------------------|--------------------------|------|-----------------|------------|------|
| | Pressure-operated switch S025 | Flow monitor S026 | | | Measurement pin | | |
| Ignition ON | Closed | Closed | E-box *) | *) | *) | 0 | VDC |
| | | | | | | 0 | mADC |
| | | | Pressure-operated switch | X235 | 1 | 0 | VDC |
| | | | Flow monitor | X236 | 1 | 0 | VDC |
| Engine running | Open | Open | E-box *) | *) | *) | 5.1 | VDC |

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|----------|---------|------|--|----------|---------------|
| 6.3.2001 | a | 3/9 | Pressure-operated switch S025 and flow monitor S026 9000 | E | 000091 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Pressure-operated switch S025 and flow monitor S026 | E |
|----------------------------------|---|----------|

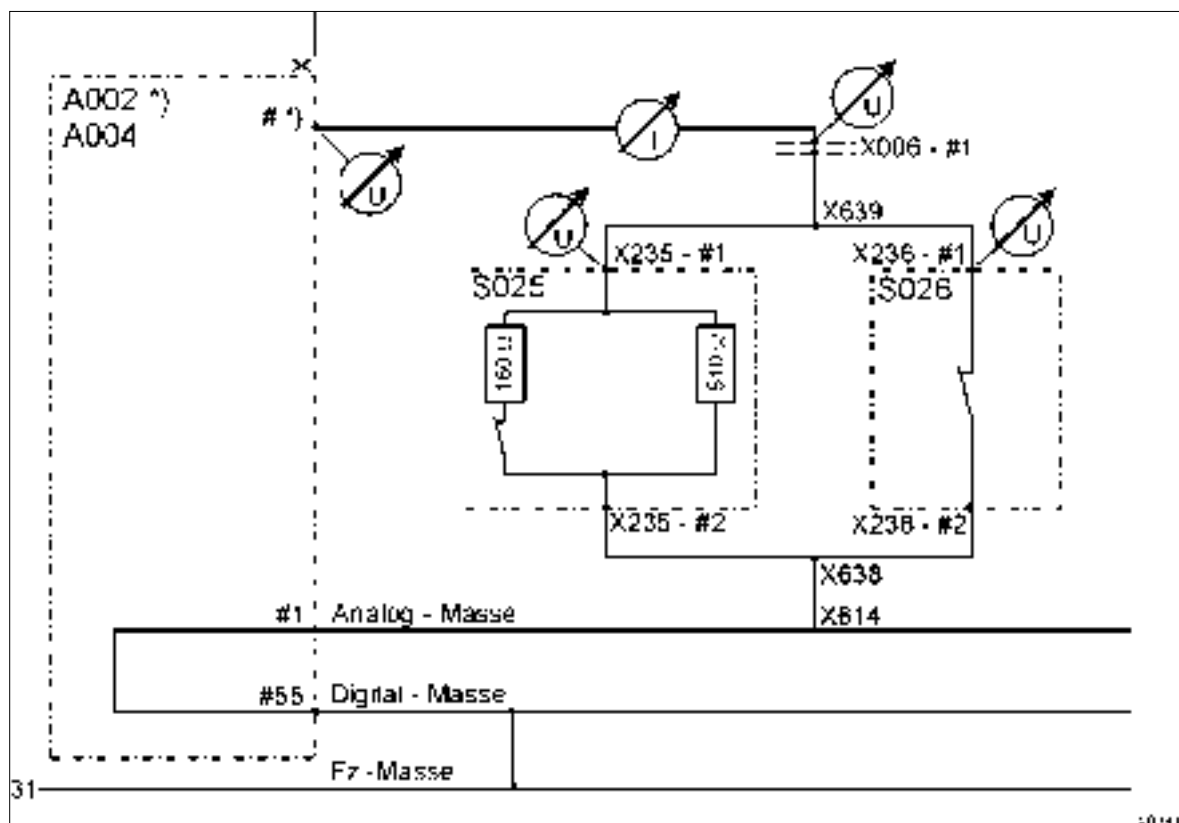
| | | | | | | | |
|--|--|--|--------------------------|------|---|-----|------|
| | | | | | | 9.5 | mADC |
| | | | Pressure-operated switch | X235 | 1 | 5.1 | VDC |
| | | | Flow monitor | X236 | 1 | 5.1 | VDC |

*)

| Modification | Validity | E-box | Interface | Measurement pin |
|--------------------|---------------------------------|-------|-----------|-----------------|
| Twin-box version | FAV700 up to chassis no. < 2000 | A002 | X031 | 44 |
| Single-box version | | A004 | X033 | 45 |

2nd operating scenario: "Malfunctions"

Outline circuit diagram with measuring points

**Notes on electrical measurements:**

- Voltage measurements (volts): between measurement pin and analogue, digital or vehicle earth
- Current measurements (mA): using 68-pin adapter box between green and yellow measurement pins
- Test values at e-box and at 31-pin cable coupler X006 are identical

| Tractor condition | Component condition Hydraulics condition | Measuring point | Test value Fault code |
|-------------------|---|-----------------|--------------------------|
|-------------------|---|-----------------|--------------------------|

| Date | Version | Page | Capitel | Index | Docu-No. |
|----------|---------|------|--|----------|---------------|
| 6.3.2001 | a | 4/9 | Pressure-operated switch S025 and flow monitor S026 9000 | E | 000091 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Pressure-operated switch S025 and flow monitor S026 | E |
|---|--|----------|

| | | | | | | |
|---|---|------------------------------|------|----|--------|------|
| Engine running, engine speed still under 1000 rpm | - Pressure-operated switch does not open or closes again or | E-box *) | *) | *) | 2.4 | VDC |
| | | Pressure- operated switch | X235 | 1 | 19 | mADC |
| | - Pressure is not reached or dissipates again | Flow monitor | X236 | 1 | 2.4 | VDC |
| | | | | | 5.1.98 | |
| Engine running, engine speed still under 1000 rpm | - Flow monitor does not open or closes again or | E-box *) | *) | *) | 0 | VDC |
| | | Pressure- operated switch | X235 | 1 | 27.5 | mADC |
| | - Volume is not reached or dissipates again | Flow monitor | X236 | 1 | 0 | VDC |
| | | | | | 5.1.99 | |
| over 1000 rpm | | | | | | |

*)

| Modification | Validity | E-box | Interface | Measure- ment pin |
|--------------------|------------------------------------|-------|-----------|----------------------|
| Twin-box version | FAV700 up to chassis no. < 2000 | A002 | X031 | 44 |
| Single-box version | | A004 | X033 | 45 |

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|----------|---------|------|--|----------|---------------|
| 6.3.2001 | a | 5/9 | Pressure-operated switch S025 and flow monitor S026 9000 | E | 000091 |

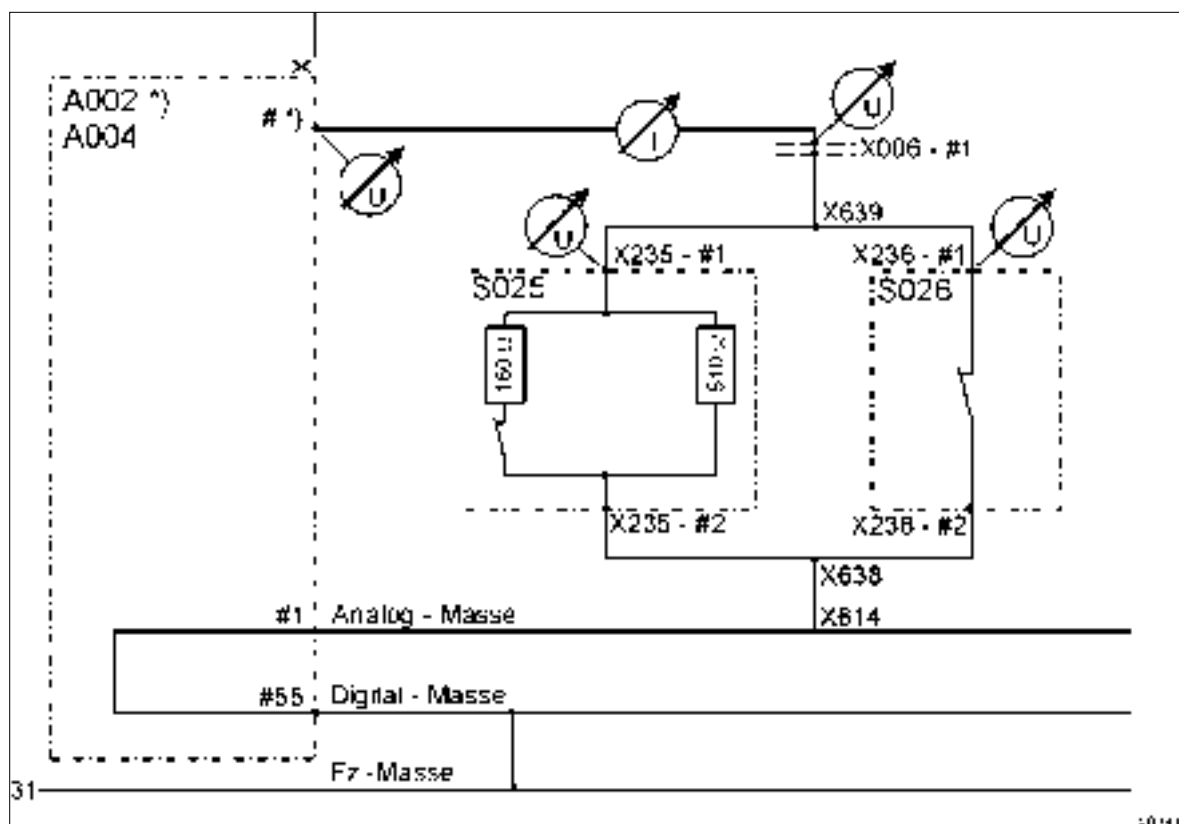
Farmer 400
Fav 700
Fav 900

Electrics / system in general
Pressure-operated switch S025 and flow monitor S026

E

3rd operating scenario: "cable break"

Outline circuit diagram with measuring points



Notes on electrical measurements:

- Voltage measurements (volts): between measurement pin and analogue, digital or vehicle earth
- Current measurements (mA): using 68-pin adapter box between green and yellow measurement pins
- Test values at e-box and at 31-pin cable coupler X006 are identical

| Component condition | Measuring point | | | Test value / fault code | | |
|---|--------------------------|------|----|-------------------------|------------------|-----|
| | | | | Ignition ON | Engine running | |
| Interruption (cable break) between e-box *) and connector X639 | E-box *) | *) | *) | 8 | 8 | VDC |
| | Pressure-operated switch | X235 | 1 | 0 | 0 | VDC |
| | Flow monitor | X236 | 1 | 0 | 0 | VDC |
| | | | | 5.1.9A 5.1.9B | 5.1.9A 5.1.9B | |
| Interruption (cable break) between X639 and pressure-operated switch S025 | E-box *) | *) | *) | 0 | 8 | VDC |
| | Pressure-operated switch | X235 | 1 | 0 | 0 | VDC |
| | Flow monitor | X236 | 1 | 0 | 8 | VDC |
| | | | | - | 5.1.9B | |
| Interruption (cable break) between X639 and flow monitor S026 | E-box *) | *) | *) | 2.4 | 5.1 | VDC |
| | Pressure-operated switch | X235 | 1 | 2.4 | 5.1 | VDC |
| | Flow monitor | X236 | 1 | 0 | 0 | VDC |
| | | | | 5.1.9A | - | |

| Date | Version | Page | Capitel | Index | Docu-No. |
|----------|---------|------|--|----------|---------------|
| 6.3.2001 | a | 6/9 | Pressure-operated switch S025 and flow monitor S026 9000 | E | 000091 |

| | | | | | |
|---|--|--|--|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Pressure-operated switch S025 and flow monitor S026 | | | | E |
|---|--|--|--|--|----------|

| | | | | | | |
|--|--------------------------|------|----|--------|--------|-----|
| Interruption (cable break) between X638 and earth | E-box *) | *) | *) | 8 | 8 | VDC |
| | Pressure-operated switch | X235 | 1 | 8 | 8 | VDC |
| | Flow monitor | X236 | 1 | 8 | 8 | VDC |
| | | | | 5.1.9A | 5.1.9B | |

*)

| Modification | Validity | E-box | Interface | Measurement pin |
|--------------------|------------------------------------|-------|-----------|-----------------|
| Twin-box version | FAV700 up to chassis no. < 2000 | A002 | X031 | 44 |
| Single-box version | | A004 | X033 | 45 |

| Date | Version | Page | Pressure-operated switch S025 and flow monitor S026 | Capitel | Index | Docu-No. |
|----------|---------|------|---|---------|-------|----------|
| 6.3.2001 | a | 7/9 | | 9000 | E | 000091 |

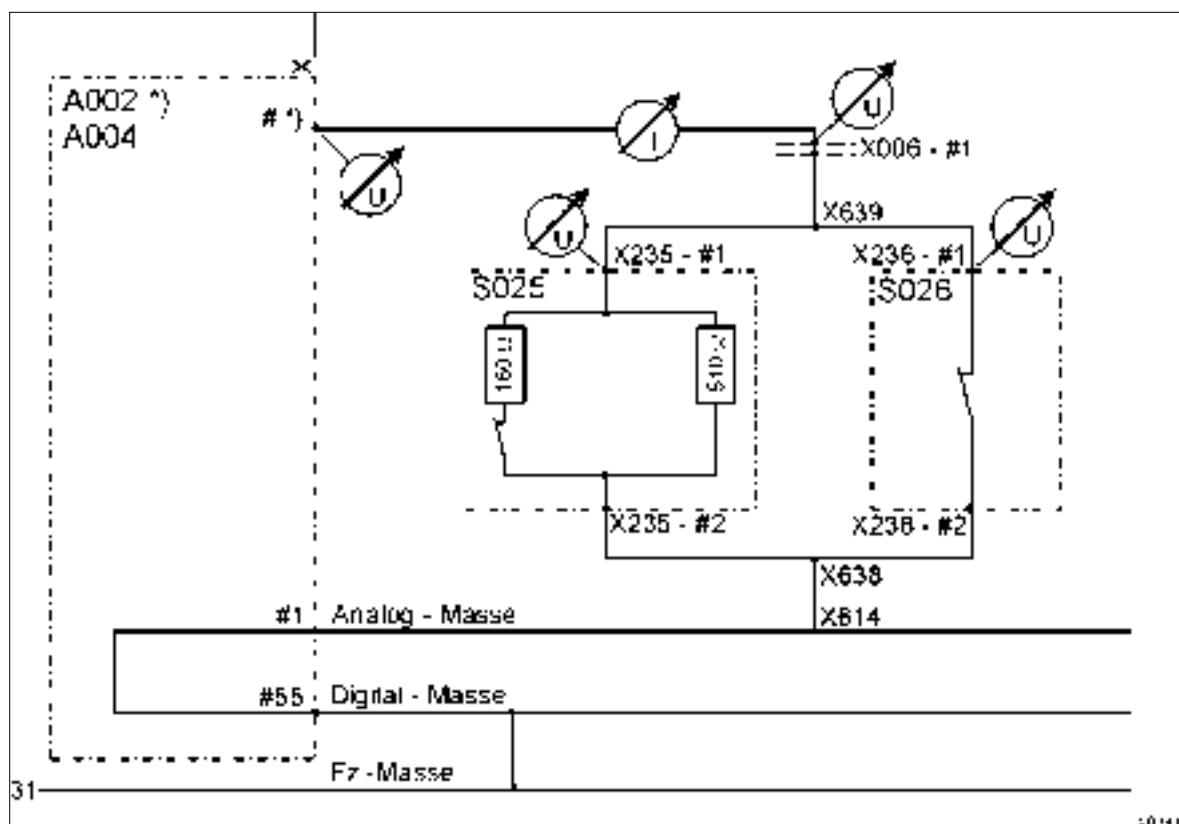
Farmer 400
Fav 700
Fav 900

Electrics / system in general
Pressure-operated switch S025 and flow monitor S026

E

4th operating scenario: "Components disconnected"

Outline circuit diagram with measuring points



Notes on electrical measurements:

- Voltage measurements (volts): between measurement pin and analogue, digital or vehicle earth
- Current measurements (mA): using 68-pin adapter box between green and yellow measurement pins
- Test values at e-box and at 31-pin cable coupler X006 are identical

| Component condition | Measuring point | | | Test value / fault code | | | |
|---|--------------------------|------|----|-------------------------|------------------|------------------|-----|
| | | | | Ignition ON | Engine running | over 1000 | |
| Only pressure-operated switch S025 disconnected | E-box *) | *) | *) | 0 | 8 | 8 | VDC |
| | Pressure-operated switch | X235 | 1 | 0 | 8 | 8 | VDC |
| | Flow monitor | X236 | 1 | 0 | 8 | 8 | VDC |
| | | | | 5.1.9A 5.1.9B | 5.1.9A 5.1.9B | 5.1.9A 5.1.9B | |
| Only flow monitor S026 disconnected | E-box *) | *) | *) | 2.4 | 5.1 | 5.1 | VDC |
| | Pressure-operated switch | X235 | 1 | 2.4 | 5.1 | 5.1 | VDC |
| | Flow monitor | X236 | 1 | 2.4 | 5.1 | 5.1 | VDC |
| | | | | 5.1.9A | 5.1.9A | 5.1.9A | |

| Date | Version | Page | Pressure-operated switch S025 and flow monitor S026 | Capitel | Index | Docu-No. |
|----------|---------|------|---|---------|-------|----------|
| 6.3.2001 | a | 8/9 | | 9000 | E | 000091 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Pressure-operated switch S025 and flow monitor S026 | E |
|---|--|----------|

| | | | | | | | |
|--|--------------------------|------|----|------------------|------------------|------------------|-----|
| Pressure-operated switch S025 and flow monitor S026 disconnected | E-box *) | *) | *) | 8 | 8 | 8 | VDC |
| | Pressure-operated switch | X235 | 1 | 8 | 8 | 8 | VDC |
| | Flow monitor | X236 | 1 | 8 | 8 | 8 | VDC |
| | | | | 5.1.9A 5.1.9B | 5.1.9A 5.1.9B | 5.1.9A 5.1.9B | |

*)

| Modification | Validity | E-box | Interface | Measurement pin |
|--------------------|---------------------------------|-------|-----------|-----------------|
| Twin-box version | FAV700 up to chassis no. < 2000 | A002 | X031 | 44 |
| Single-box version | | A004 | X033 | 45 |

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|----------|----------|------|---|----------|---------------|
| 6.3.2001 | a | 9/9 | Pressure-operated switch S025 and flow monitor S026 9000 | E | 000091 |

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general S027 - external right rear "Raise" power lift switch | E |
|----------------------------------|--|----------|



| Pin | Function |
|-----|--------------|
| 1 | Power output |
| 2 | Power input |
| 3 | Not assigned |

Note:

Switches are connected directly to EPC e-box A005 without intermediate cable coupler.

Note:

Ignition "OFF". Measure resistance directly at switch.

| Switch position | | | Resistance |
|-------------------|--------|--------------------|----------------|
| 0 = rest position | Open | Switch not pressed | Infinite |
| 1 = active | Closed | Switch pressed | approx. 4 ohms |

Note:

Connect e-adapter box X899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

Voltage measurement refers to earth at pin no.1 at EPC e-box A005

| Test | Pin | Target value | Condition | Possible cause of fault |
|----------------|-----|--------------|--------------------|-------------------------|
| + supply | 28 | 4.8 VDC | Switch not pressed | |
| | | 4.3 VDC | Switch pressed | |
| Earth | 1 | | | |
| Signal voltage | 31 | 0 VDC | Switch not pressed | |
| | | 4.3 VDC | Switch pressed | |
| Earth | 1 | | | |

| Measuring points on A005 EPC e-box | Pin |
|------------------------------------|-----|
| Power output | 31 |
| Power input | 28 |

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|------------|---------|------|--|---------|-------|----------|
| 24.04.2001 | a | 1/1 | S027 - external right rear "Raise" power lift switch | 9000 | E | 000094 |

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general S028 - external right rear "Lower" power lift switch | E |
|----------------------------------|--|----------|



| Pin | Function |
|-----|--------------|
| 1 | Power output |
| 2 | Power input |
| 3 | Not assigned |

Note:

Switches are connected directly to EPC e-box A005 without intermediate cable coupler.

Note:

Ignition "OFF". Measure resistance directly at switch.

| Switch position | | | Resistance |
|-------------------|--------|--------------------|----------------|
| 0 = rest position | Open | Switch not pressed | Infinite |
| 1 = active | Closed | Switch pressed | approx. 4 ohms |

Note:

Connect e-adapter box X 899899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

Voltage measurement refers to earth at pin no.1 at EPC e-box A005

| Test | Pin | Target value | Condition | Possible cause of fault |
|----------------|-----|--------------|--------------------|-------------------------|
| + supply | 28 | 4.8 VDC | Switch not pressed | |
| | | 4.3 VDC | Switch pressed | |
| Earth | 1 | | | |
| | | | | |
| Signal voltage | 51 | 0 VDC | Switch not pressed | |
| | | 4.3 VDC | Switch pressed | |
| Earth | 1 | | | |

| Measuring point on A005 EPC e-box | Pin |
|-----------------------------------|-----|
| Power output | 51 |
| Power input | 28 |

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|------------|---------|------|--|---------|-------|----------|
| 24.04.2001 | a | 1/1 | S028 - external right rear "Lower" power lift switch | 9000 | E | 000096 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general S029 - external left rear "Raise" power lift switch | E |
|----------------------------------|---|----------|



| Pin | Function |
|-----|--------------|
| 1 | Power output |
| 2 | Power input |
| 3 | Not assigned |

Note:

Switches are connected directly to EPC e-box A005 without intermediate cable coupler.

Note:

Ignition "OFF". Measure resistance directly at switch.

| Switch position | | | Resistance |
|-------------------|--------|--------------------|----------------|
| 0 = rest position | Open | Switch not pressed | Infinite |
| 1 = active | Closed | Switch pressed | approx. 4 ohms |

Note:

Connect e-adapter box X 899899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

Voltage measurement refers to earth at pin no.1 at EPC e-box A005

| Test | Pin | Target value | Condition | Possible cause of fault |
|----------------|-----|--------------|--------------------|-------------------------|
| + supply | 28 | 4.8 VDC | Switch not pressed | |
| | | 4.3 VDC | Switch pressed | |
| Earth | 1 | | | |
| Signal voltage | 52 | 0 VDC | Switch not pressed | |
| | | 4.3 VDC | Switch pressed | |
| Earth | 1 | | | |

| Measuring point on A005 EPC e-box | Pin |
|-----------------------------------|-----|
| Power output | 52 |
| Power input | 28 |

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|------------|---------|------|---|---------|-------|----------|
| 24.04.2001 | a | 1/1 | S029 - external left rear "Raise" power lift switch | 9000 | E | 000098 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general S030 - external left rear "Lower" power lift switch | E |
|----------------------------------|---|----------|



| Pin | Function |
|-----|--------------|
| 1 | Power output |
| 2 | Power input |
| 3 | Not assigned |

Note:

Switches are connected directly to EPC e-box A005 without intermediate cable coupler.

Note:

Ignition "OFF". Measure resistance directly at switch.

| Switch position | | | Resistance |
|-------------------|--------|--------------------|----------------|
| 0 = rest position | Open | Switch not pressed | Infinite |
| 1 = active | Closed | Switch pressed | approx. 4 ohms |

Note:

Connect e-adapter box X 899899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

Voltage measurement refers to earth at pin no.1 at EPC e-box A005

| Test | Pin | Target value | Condition | Possible cause of fault |
|----------------|-----|--------------|--------------------|-------------------------|
| + supply | 28 | 4.8 VDC | Switch not pressed | |
| | | 4.3 VDC | Switch pressed | |
| Earth | 1 | | | |
| | | | | |
| Signal voltage | 50 | 0 VDC | Switch not pressed | |
| | | 4.3 VDC | Switch pressed | |
| Earth | 1 | | | |

| Measuring point on A005 EPC e-box | Pin |
|-----------------------------------|-----|
| Power output | 50 |
| Power input | 28 |

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|------------|---------|------|---|---------|-------|----------|
| 24.04.2001 | a | 1/1 | S030 - external left rear "Lower" power lift switch | 9000 | E | 000102 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
S034 - coolant level switch

E



Open bonnet. At top in coolant water reservoir:

S034 = **coolant level switch**

To test switch S034 when installed:

Connect adapter cable (DIY using connector G 816.900.043.020) and multimeter (voltmeter).

Ignition "ON"

Target values:

Radiator full = approx. 2.4 VDC

Radiator empty or level too low approx. 5.1 VDC



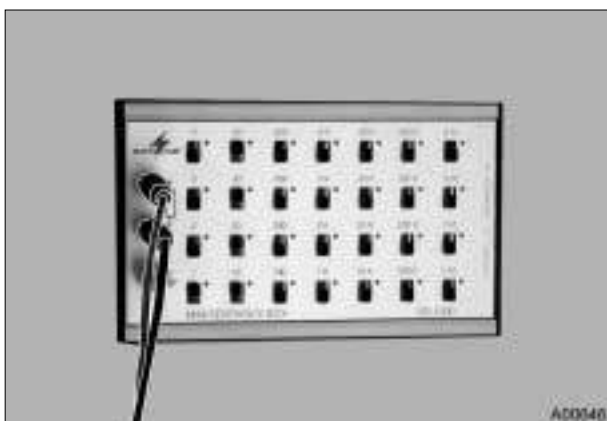
To test switch S034 when removed:

Connect multimeter (ohmmeter) to electrical terminals.

Target values:

Float at bottom = approx. 510 ohms

Float at top = approx. 121 ohms



Checking warning display with resistor decade

Component S034 isolated.

Connect adapter cable (DIY using connector G 816.900.043.020) to line coupling.

Connect resistor decade X 899.980.224 and select desired value.



Warning display: low coolant level

Display with buzzer and warning light

Fault code 5.1.9E (coolant level too low or empty)

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|------------|---------|------|-----------------------------|-------|----------|
| 19.02.2001 | a | 1/1 | S034 - coolant level switch | 9000 | E |
| | | | | | 000067 |

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Electrics / system in general S036 - hydraulic oil level sensor | E |
|----------------------------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Note:

Unlike other level sensors (e.g. fuel tank) this level sensor is connected to control console A004 and is therefore self-testing.

Note:

Measure resistance directly at level sensor S036

| Test | Pin | Target value | Level sensor position | Tank condition | Position of internal switches | |
|--------|-----|--------------|-----------------------|-------------------|-------------------------------|----------|
| | | | | | Switch 1 | Switch 2 |
| Signal | 1 | 820 ohms | 0 = rest position | Setpoint quantity | Open | Open |
| | | 260 ohms | 2 | Empty | Closed | Closed |
| Earth | 2 | | | | | |

Note:

See electric circuit diagram Chapter 9000 Index C - valves 1

| Measuring points on A004 - control console | Pin |
|--|-----|
| Earth | 1 |
| Signal | 17 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system S047 - switch, exhaust brake | E |
|---|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Earth |
| 2 | Signal |



Connect e-adapter box X 899.980.208.100 directly to A004 - ECU.

| Measuring points on A004 - ECU, control console | Pin |
|---|-----|
| Earth | 1 |
| Signal | 34 |

| Test | Pin | Target value | Condition | Possible cause of fault |
|------------|-----|--------------|----------------------------|-------------------------|
| Resistance | 2 | 121 ohms | S047 - switch not actuated | |
| | | 510 ohms | S047 - switch actuated | |
| | 1 | | | |

Single ECU

711 / 712 from 21/1001 onwards - 714 / 716 from 21/2001 onwards,

Testing

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / General system S047 - switch, exhaust brake | E |
|---|--|----------|

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|----------------------------|--|
| Signal | 34 | 2.4 VDC | S047 - switch not actuated | A Reading 8.0 VDC, fault in component |
| | | 5.1 VDC | S047 - switch actuated | B Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A004 ECU (pin 34) or in wiring - If reading is 8.0 VDC, fault in component. |
| Earth | 1 | | | |

Note:

Chapter 9000 Reg. E - Checking A004 - ECU, control console

Exhaust brake circuit, Fav 900 chassis number 23/3001 and up

S047 - switch, exhaust brake transmits signal to A004 - ECU, control console.

A004 - ECU, control console transmits CAN message to A002 - ECU, enhanced control via K-bus.

A002 - ECU, enhanced control forwards CAN message to A021 - ECU, EDC via G-bus.

A021 - ECU, EDC switches voltage (12 - 14 VDC) to K014 - relay, exhaust brake at pin 18.

K014 - relay, exhaust brake switches +supply (12 - 14 VDC) to Y006 - valve, exhaust brake.

Exhaust brake circuit for Fav 711/712 chassis number 21/1001 and up, 714/716 chassis number 21/2001 and up, Farmer 400

S047 - switch, exhaust brake transmits signal to A004 - ECU, control console.

A004 - ECU, control console transmits CAN message to A002 - ECU, enhanced control via K-bus.

A002 - ECU, enhanced control switches voltage (12 - 14 VDC) to Y006 - valve, exhaust brake at pin 46.

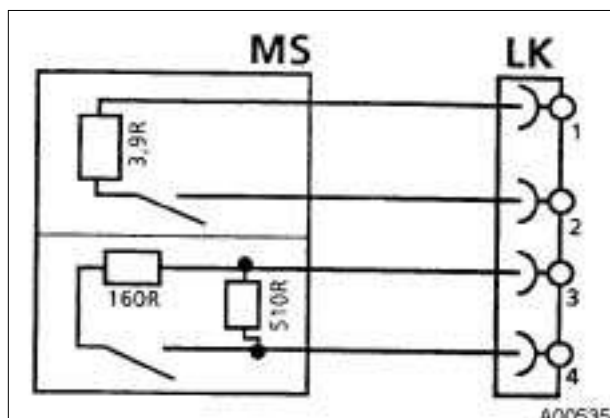
Note:

Chapter 9000 Reg. C - Electric circuit diagrams

Chapter 9700 Reg. A - Electronic concept

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|------------|---------|------|--------------------------------------|-------|----------|
| 31.07.2001 | a | 2/2 | S047 - switch, exhaust brake 9000 | E | 000136 |

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Electrics / system in general S048 - "EPC / DA switchover" solenoid switch | E |
|----------------------------------|--|----------|



| Pin | Function | |
|-----|----------|---------------------------------|
| 1 | Supply | Non-self-testing switch section |
| 2 | Signal | |
| 3 | Free | Self-testing switch section |
| 4 | Free | |

Note:

Connect e-adapter box X 899.980.208.100 directly to A005 EPC box using adapter cable X 899.980.208.208.

Ignition "ON"

| Test | Pin | Target value | Condition | Remark |
|---------------|-----|--------------|------------|--------------------------|
| Signal | 2 | 0 VDC | EPC active | Solenoid switch open |
| | | 12 VDC | DA active | Solenoid switch closed |
| | | | | + UB 12 V from fuse F048 |
| Vehicle earth | | | | |

| Measuring points on A005 - EPC box | Pin |
|------------------------------------|---------|
| Signal | 12 |
| Earth | 9 or 45 |

Note:

Checking EPC box A005 - Chapter 9000 Index E

| Date | Version | Page | | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 26.03.2001 | a | 1/1 | S048 - "EPC / DA switchover" solenoid switch | 9000 | E | 000124 |

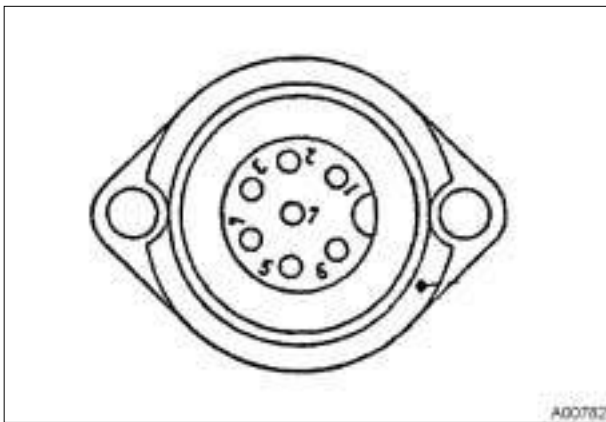
Farmer 400
Fav 700
Fav 900

Electrics / system in general
X007 - implement socket cable coupler

E

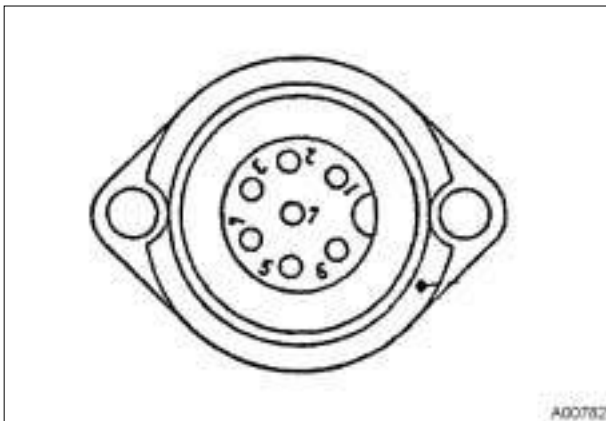


7-pin implement socket **X007** supplies signals for operating trailed and mounted implements.
 e.g. speed signals for operating a spray computer.

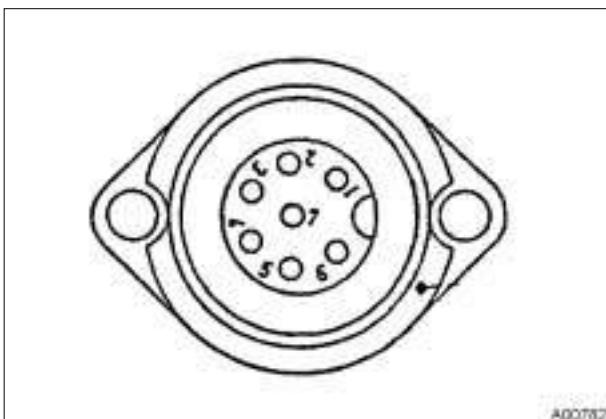


Pin assignment in implement socket X007

1 = radar signal (optional extra)
 (130 pulses per metre travelled)
 Speed 0 to 0.5 km/h = approx. 13.8 VDC
 Speed greater than 0.5 km/h = approx. 6.5 VDC



2 = transmission signal
 (130 pulses per metre travelled)
 Speed 0 km/h = approx. 13.8 VDC
 Speed greater than 0.1 km/h = approx. 6.5 VDC



Transmission signal can be checked using on-board computer on instrument panel A007 or with terminal A008.

Bridge from implement socket **X007**, pin 2 (transmission signal) to implement socket **X008** pin 1 (external counter).

On on-board computer select menu for external counter (see Operating Manual).

Drive 10 m so that number of pulses per 10 m can be read off on on-board computer, e.g. 1300 pulses.

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|----------|------|--|-------------|---------------|
| 22.2.2001 | b | 1/3 | X007 - implement socket cable coupler | 9000 | E |
| | | | | | 000089 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
X007 - implement socket cable coupler

E

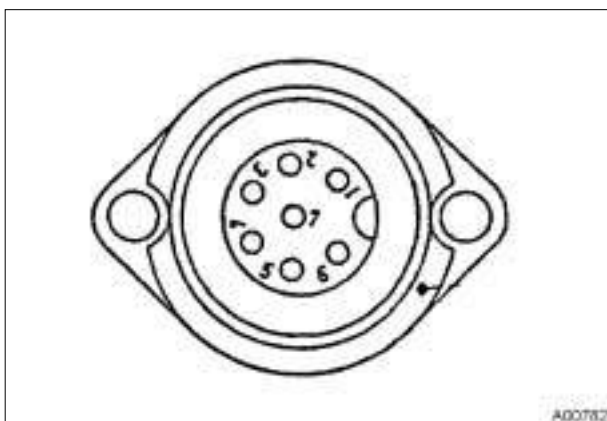
Note:

Farmer 400 and Fav 700 have external counter (integrated in area meter) in on-board computer of instrument panel A007. External counter (integrated in area meter) in terminal A008 is not functional.

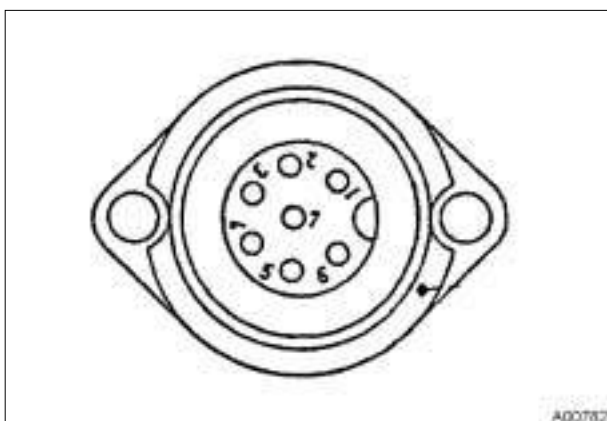
Fav 900:

Version 1 : External counter (integrated in area meter) in on-board computer of instrument panel A007 and external counters (integrated in area meter) in terminal A008. External counter (integrated in area meter) in terminal A008 is not functional.

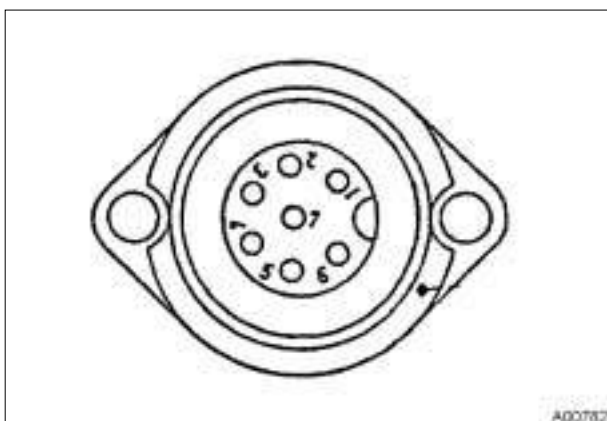
Version 2 : Only external counter (integrated in area meter) in terminal A008. External counter (integrated in area meter) in terminal A008 is functional.



- 3 = PTO speed
 (40 pulses per PTO revolution)
 PTO **off** = approx. 13.8 VDC
 PTO **on** = approx. 6.5 VDC



- 4 = rapid lift control (can also be used for external starting of on-board computer (area meter).
 Rapid lift control in
 Lower (Regulate) position = approx. 1 VDC
 Stop position = approx. 1 VDC
 Raise position = Ub, approx. 12 VDC (cannot be subjected to load)



- 5 = Not assigned
 6 = On-board power supply Ub 15 = approx. 12 VDC (switched positive)
 7 = earth

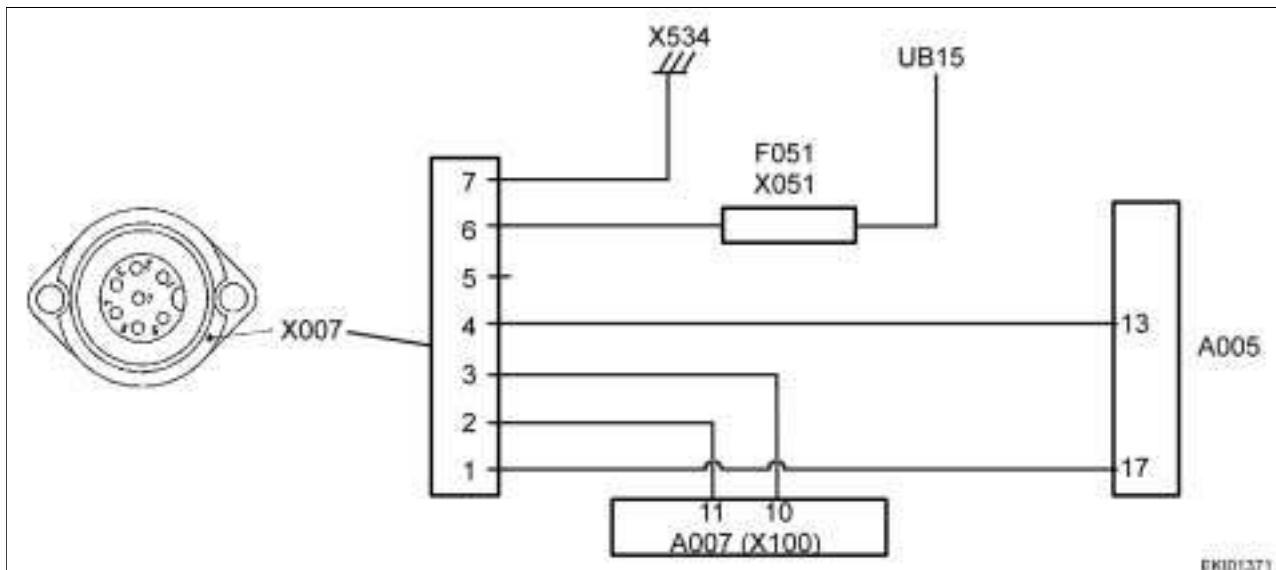
| Date | Version | Page | X007 - implement socket cable coupler | Capitel | Index | Docu-No. |
|-----------|----------|------|---------------------------------------|-------------|----------|---------------|
| 22.2.2001 | b | 2/3 | | 9000 | E | 000089 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
X007 - implement socket cable coupler

E

Block diagram of implement socket X007



| Component number | Component |
|------------------|---|
| A005 | EPC e-box |
| A007 | Instrument panel |
| F051 | +UB 15 supply fuse |
| X007 | Implement socket |
| X051 | Fuse holder 2 |
| X100 | Cable coupler to instrument panel A007 (blue) |
| X534 | Vehicle body earth point |

| Readings and pins on implement socket X007 | | |
|--|---|---|
| Pin | Signal | Reading |
| 1 | Radar signal - if available: Speed 0-0.5 km/h Speed greater than 0.5 km/h | approx. 13.8 VDC (UB) approx. 6.5 VDC (UB2) |
| 2 | Transmission signal Speed 0 km/h Speed greater than 0.1 km/h | approx. 13.8 VDC (UB) approx. 6.5 VDC (UB2) |
| 3 | PTO speed PTO off PTO on | approx. 13.8 VDC (UB) approx. 6.5 VDC (UB2) |
| 4 | EPC rapid lift control - actuation system on control console A004 - actuation system on joystick A003 Rapid lift control in Lower (Regulate) position Rapid lift control in Stop position Rapid lift control in Raise position | approx. 1 VDC approx. 1 VDC approx. 13.8 VDC (UB) |
| 5 | Not assigned | |
| 6 | On-board power supply UB 15 (switched positive) | approx. 13.8 VDC (UB) |
| 7 | Earth at X534 | |

UB = battery voltage (approx. 13.8 VDC)

Note:

Connect adapter cable (DIY) to implement socket X007.

(Measurement can also be carried out without adapter cable, though measurement errors are possible because of small bush pins.)

| Date | Version | Page | X007 - implement socket cable coupler | Capitel | Index | Docu-No. |
|-----------|----------|------|---------------------------------------|-------------|----------|---------------|
| 22.2.2001 | b | 3/3 | | 9000 | E | 000089 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general

X008 - on-board computer counter input cable coupler (implement socket)

E



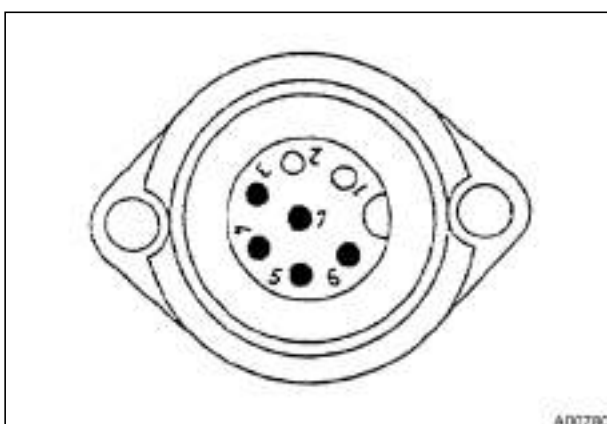
At top right rear in cab:

X008 = **on-board computer counter input cable coupler** (blue implement socket)

Implement socket X008 is 7-pin, of which only pins 1 and 2 are assigned.

Solenoid switch (event counter) is fitted to mounted implement.

Closing is displayed as number on instrument panel A007.

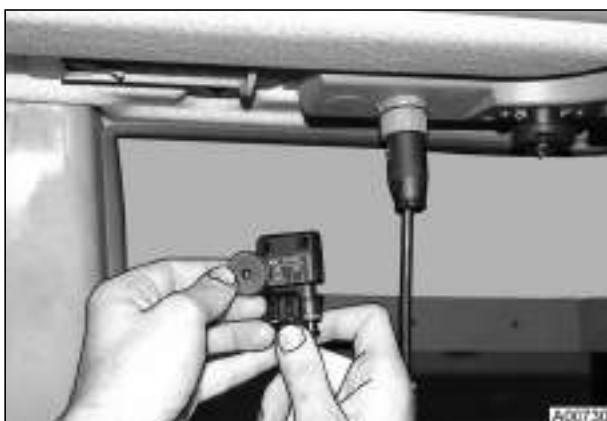


Pin assignment of implement socket X008

1 = Signal to instrument panel A007
(pin 12 - yellow cable coupler X101)

2 = earth

3 to 7 = not assigned, pins sealed.



Plug connection cable with external counter (solenoid switch) into implement socket X008.

Ignition "ON".

Select menu for external counter (see Operating Manual) on on-board computer (instrument panel A007).

Pass magnet over solenoid switch. Switching pulses are displayed on on-board computer.

Component can also be tested by means of bridge between pins 1 and 2 on implement socket X008.

| Date | Version | Page | | Capitel | Index | Docu-No. |
|-----------|---------|------|---|---------|-------|----------|
| 22.2.2001 | a | 1/2 | X008 - on-board computer counter input cable coupler (implement socket) | 9000 | E | 000088 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general X008 - on-board computer counter input cable coupler (implement socket) | E |
|---|--|----------|



Connection cable with external counter (solenoid switch)

1 x **counter cable loom** = H 916.970.010.010

1 x **solenoid switch** = H 312.100.070.500

1 x **magnet** = X 830.120.050.000

Note:

Farmer 400 and Fav 700 have external counter (integrated in area meter) in on-board computer of instrument panel A007.

- External counter (integrated in area meter) in terminal A008 has no function .

Fav 900

Version 1 : External counter (integrated in area meter) in on-board computer of instrument panel A007 and area meter (integrated in area meter) in terminal A008.

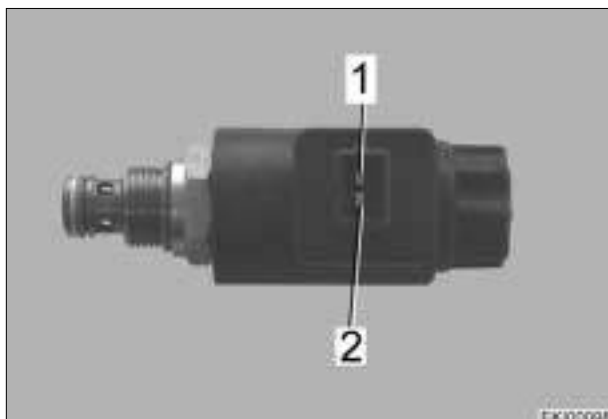
- External counter (integrated in area meter) in terminal A008 is not functional.

Version 2 : Only external counter (integrated in area meter) in terminal A008.

- External counter (integrated in area meter) in terminal A008 is functional.

| Date | Version | Page | | Capitel | Index | Docu-No. |
|-----------|----------|------|---|-------------|----------|---------------|
| 22.2.2001 | a | 2/2 | X008 - on-board computer counter input cable coupler (implement socket) | 9000 | E | 000088 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Y002 - range 1 solenoid valve | E |
|---|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Note:

Connect adapter cable X 899.980.246.201 directly to component Y002.
Ignition "OFF".

| Test | Pin | Target value | Condition | Remark |
|------------|-----|--------------|-----------|--------|
| Resistance | 1 | 8.8 ohms | | |
| | 2 | | | |



Connect e-adapter box 899.980.208.100 directly to A002 e-box.

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Remark |
|-------------------|-------------------|--------------|---|--|
| Power consumption | Between 56 and 61 | 1.5 A | Switch toggle switch of e-adapter box pin 61 to Isolate | When switching over, range control 1 solenoid valve is only briefly energised, hence this test method is required. |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Vehicle earth | |
| Signal | 61 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

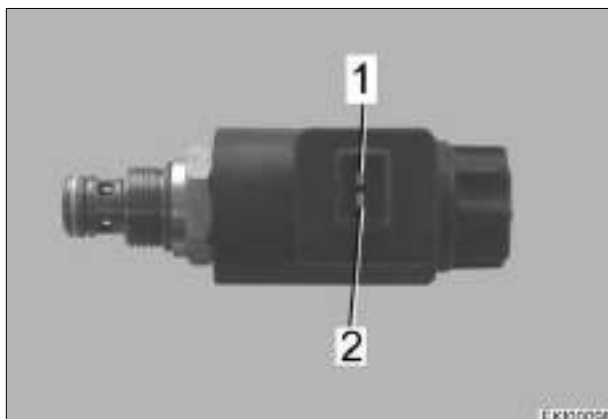
| Date | Version | Page | Y002 - range 1 solenoid valve | Capitel | Index | Docu-No. |
|---------|---------|------|-------------------------------|---------|-------|----------|
| 05/2000 | a | 1/1 | | 9000 | E | 000011 |

Single e-box

711 / 712 <- - 21/1001; 714 / 716 <- - 21/2001; Fav 900 <- - 23/3001;>

Testing

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Y003 - range 2 solenoid valve | E |
|---|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Note:

Connect adapter cable X 899.980.246.201 directly to component Y003.
Ignition "OFF".

| Test | Pin | Target value | Condition | Remark |
|------------|-----|--------------|-----------|--------|
| Resistance | 1 | 8.8 ohms | | |
| | 2 | | | |



Connect e-adapter box X 899.980.208.100 directly to A002 e-box.

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Remark |
|-------------------|-------------------|--------------|---|--|
| Power consumption | Between 56 and 62 | 1.5 A | Switch toggle switch of e-adapter box pin 62 to Isolate | When switching over, range control 2 solenoid valve is only briefly energised, hence this test method is required. |

| Measuring points on A002 - e-box | Pin |
|----------------------------------|-----|
| Vehicle earth | |
| Signal | 62 |

Note:

Checking A002 - e-box, Chapter 9000 Index E

| Date | Version | Page | Y003 - range 2 solenoid valve | Capitel | Index | Docu-No. |
|---------|---------|------|-------------------------------|---------|-------|----------|
| 05/2000 | a | 1/1 | | 9000 | E | 000012 |

<https://www.truck-manuals.net/>

| | | |
|----------------------------------|---|---|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Y004 - transmission neutral solenoid valve / turboclutch valve | E |
|----------------------------------|---|---|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Note:

Ignition "OFF" - measure resistance directly at solenoid valve

| Test | Pin | Target value | Condition | Remark |
|------------|-----|--------------|----------------------------|--------------------------------|
| Resistance | 1 | 6.4 ohms | 20°C solenoid temperature | See circuit diagram: |
| | | 9.7 ohms | 150°C solenoid temperature | Transmission emergency control |
| | 2 | | | |



Connect e-adapter box X 899.980.208.100 directly to A002 e-box.

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Remark |
|-------------------|-----|--------------|--|---|
| Power consumption | 50 | 0 A | Neutral switch actuated, both F/R lights flash | Switch toggle switch of e-adapter box pin 50 to Isolate |

| Test | Pin | Target value | Engine speed | Remark |
|-------------------|-----|--------------|--------------|---|
| Power consumption | 50 | 0 A | 0 rpm | Switch toggle switch of e-adapter box pin 50 to Isolate |
| | | 0.46 A | 800 rpm | |
| | | 0.74 A | 1000 rpm | |
| | | 1.23 A | 1200 rpm | |
| | | 1.71 A | 1400 rpm | |

| Date | Version | Page | | Capitel | Index | Docu-No. |
|---------|---------|------|--|---------|-------|----------|
| 05/2000 | a | 1/1 | Y004 - transmission neutral solenoid valve / turboclutch valve | 9000 | E | 000013 |

Single e-box

711 / 712 <-- 21/1001; 714 / 716 <-- 21/2001; Fav 900 <-- 23/3001;

Testing

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Y005 - speed limiter solenoid valve | E |
|---|--|----------|



| Pin | Function |
|-----|----------|
| 1 | Signal |
| 2 | Earth |

Note:

Connect adapter cable X 899.980.246.201 directly to component Y005.
Ignition "OFF".

| Test | Pin | Target value | Condition | Possible cause of fault |
|------------|-----|--------------|-----------|-------------------------|
| Resistance | 1 | 6.5 ohms | | |
| | 2 | | | |



Connect e-adapter box X 899.980.208.100 directly to A002 - e-box.

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|-------------------|-----|-------------------|---|-------------------------|
| Power consumption | 51 | 800 mA ± 50 mA | Switch toggle switch of e-adapter box pin 51 to Isolate | |

Note:

If current is exceeded or is not reached, transmission is locked at 30 km/h maximum.

| Date | Version | Page | Y005 - speed limiter solenoid valve | Capitel | Index | Docu-No. |
|---------|---------|------|-------------------------------------|---------|-------|----------|
| 05/2000 | a | 1/1 | | 9000 | E | 000032 |

<https://www.truck-manuals.net/>

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Y006 - exhaust brake solenoid valve

E



At rear on engine bulkhead

Y006 = **exhaust brake solenoid valve**

Note:

Shown with cab removed for greater clarity.



Measure resistance of solenoid Y006 directly at solenoid valve using multimeter (ohmmeter).

Target value: 13.5 ohms +/- 5% at 20°C



Measure power consumption of exhaust brake solenoid valve Y006 using adapter cable (DIY using connector G 816.900.043.020) and multimeter (ammeter).

Ignition "ON".

Target value: 0.8 amps +/- 10%, depending on temperature and battery voltage.

| Date | Version | Page | Y006 - exhaust brake solenoid valve | Capitel | Index | Docu-No. |
|-----------|---------|------|-------------------------------------|---------|-------|----------|
| 21.2.2001 | a | 1/1 | | 9000 | E | 000079 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system Y008 / Y009 / Y010 - valve, rear PTO / 4WD / diff. lock | E |
|----------------|--|----------|



| Pin | Function |
|----------------------------|-------------------|
| 1 | 12 volt actuation |
| 2 | Vehicle earth |
| | |
| Y008 - valve Rear PTO | ON / OFF |
| Y009 - valve 4WD | ON / OFF |
| Y010 - valve Diff. lock | ON / OFF |

Note:**Resistance (R)****Ignition OFF**

Connect adapter cable X 899.980.246.201 directly to Y008 / Y009 / Y010 - valve.

Current (I)

Connect e-adapter box X 899.980.208.100 directly to A002 - ECU, enhanced control.

Ignition ON

| Valve | Position | U [VDC] | I [ADC] | R [Ohm] |
|----------------------------|----------|------------|------------|------------|
| Y008 - valve Rear PTO | ON / OFF | UB / 0 | 1.7 | 7.4 |
| Y009 - valve 4WD | ON / OFF | 0 / UB | 1.5 | 8.1 |
| Y010 - valve Diff. lock | ON / OFF | UB / 0 | 1.5 | 8.1 |

Note:**All readings +/- 10%****UB = battery voltage = 12 VDC - 14 VDC**

| Measuring points on A002 - ECU, enhanced control | Pin |
|--|-----|
| Y008 | 47 |
| Y009 | 64 |
| Y010 | 63 |
| Vehicle earth | |

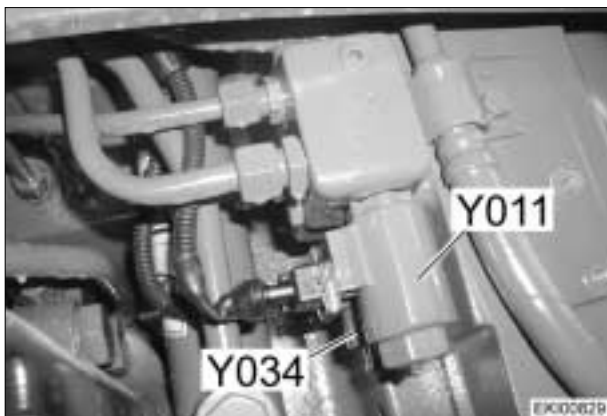
Note:**Chapter 9000 Reg. E - A012 - ECU, enhanced control**

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 24.08.2001 | a | 1/1 | 9000 | E | 000149 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Y011 - front PTO solenoid valve

E



Fav 900

Y011 = front PTO solenoid valve

Connect adapter cable (DIY using cable loom H 514.900.040.070) to solenoid valve Y011.

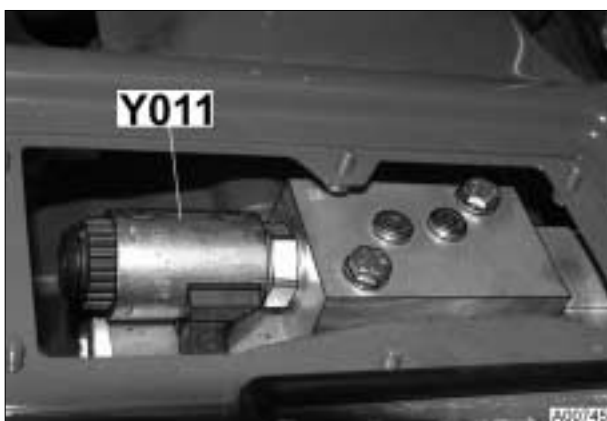
Measure resistance using multimeter (ohmmeter).

Y011 = **approx. 7.4 ohms**

Test power consumption using multimeter (ammeter).

Y011 = **front PTO on = approx. 1.7 amps**

All readings +/- 10%



Farmer 400, Fav 700

Open bonnet and remove cover panel.

Y011 = front PTO solenoid valve

Connect adapter cable (DIY using cable loom H 514.900.040.070) to solenoid valve Y011.

Measure resistance using multimeter (ohmmeter).

Y011 = **approx. 7.4 ohms**

Test power consumption using multimeter (ammeter).

Y011 = **front PTO on = approx. 1.7 amps**

All readings +/- 10%

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|----------|------|-------------|----------|---------------|
| 21.2.2001 | b | 1/1 | 9000 | E | 000076 |

| | | |
|----------------|---|----------|
| Fav 900 | Electrics / General system Y012 - "Charge" suspension solenoid valve | E |
|----------------|---|----------|



| Pin | Function |
|-----|-------------------|
| 1 | 12 volt actuation |
| 2 | Vehicle earth |

Note:

Ignition "OFF"

Connect adapter cable X 899.980.246.201 directly to Y012 - "Charge" suspension solenoid valve.

| Test | Pin | Target value | Condition | Remark |
|--------|-----|--------------|-----------|--------|
| Signal | 1 | 8 ohms | | |
| Earth | 2 | | | |

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|--|--------------------------------|
| Signal | 1 | 12 VDC | Suspension: raise or lower or oil preheater (=flush) | Fuse F050 in X051 or in wiring |
| Earth | 2 | | Actuation via K016 - suspension valves relay | |



Connect e-adapter box 899.980.208.100 to cable coupler X043 using adapter cable X 899.980.208.205.

| Date | Version | Page | Y012 - "Charge" suspension solenoid valve | Capitel | Index | Docu-No. |
|------------|---------|------|---|---------|-------|----------|
| 04.09.2001 | a | 1/2 | | 9000 | E | 000153 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system Y012 - "Charge" suspension solenoid valve | E |
|----------------|--|----------|

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|-----------|-----|--------------|---|-------------------------|
| Actuation | 8 | 1.5 A | Suspension: raise or lower or oil preheater (=flush) | |
| | | | Switch toggle switch of e-adapter box pin 8 to Iso-late | |

Instructions for applied-voltage test on valves:

1. Disconnect existing actuation lead (open toggle switch or remove bridge on adapter box).
2. Connect external voltage source to **component contact**.
3. External voltage source: pins 56, 57 ... or 60 on ECU A002 or battery / power supply unit

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|--|----------|---------------|
| 04.09.2001 | a | 2/2 | Y012 - "Charge" suspension solenoid valve 9000 | E | 000153 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Y013 - "Lower" suspension solenoid valve

E



Warning:

Solenoid valves Y013 / SV1 and Y014 / SV2 look similar outwardly, but they must not be confused!

Distinguishing features:

Solenoid valve Y013 / SV1 = valve body yellow-chromed finish and no counterbore

Solenoid valve Y014 / SV2 = valve body white-chromed finish with counterbore



| Pin | Function |
|-----|-------------------|
| 1 | 12 volt actuation |
| 2 | Vehicle earth |

Note:

Ignition "OFF".

Connect adapter cable X 899.980.246.201 directly to Y013 - "Lower" suspension solenoid valve.

| Test | Pin | Target value | Condition | Remark |
|--------|-----|--------------|-----------|--------|
| Signal | 1 | 8 ohms | | |
| Earth | 2 | | | |

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|----------------------|-------------------------|
| Signal | 1 | 12 VDC | Suspension: Lowering | |
| Earth | 2 | | | |

Single e-box

711 / 712 > 21/1001 - 714 / 716 > 21/2001; 900 > 23/3001

Testing

| | | |
|---|--|----------|
| <i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i> | Electrics / system in general Y013 - "Lower" suspension solenoid valve | E |
|---|--|----------|

Note:

Connect e-adapter box 899.980.208.100 directly to A002 e-box.

Ignition "ON".

"Load valve" Y012 / MVL must be operational for movement to be carried out.

| Test | Pin | Target value | Condition | Possible cause of fault |
|-----------|-----|--------------|---|-------------------------|
| Actuation | 65 | 1.5 A | Suspension: Lower. Remains energised for 2 seconds after reaching end position (B008). | |
| | | | Switch toggle switch of e-adapter box pin 65 to Isolate | |

Instructions for applied-voltage test on valves, if required:

1. Disconnect existing actuation lead (open toggle switch or remove bridge on adapter box).
2. Connect separate voltage source to **component contact**.
3. Separate voltage source: pins 56, 57 ... or 60 on e-box A002 or battery/power supply unit

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|----------|------|-------------|----------|---------------|
| 01/2000 | a | 2/2 | 9000 | E | 000120 |

<https://www.truck-manuals.net/>

| | | |
|----------------------------------|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Y014 - "Raise" suspension solenoid valve | E |
|----------------------------------|--|----------|

**Warning:**

Solenoid valves Y013 / SV1 and Y014 / SV2 look similar outwardly, but they must not be confused!

Distinguishing features:

Solenoid valve Y013 / SV1 = valve body yellow-chromed finish and no counterbore

Solenoid valve Y014 / SV2 = valve body white-chromed finish with counterbore



| Pin | Function |
|-----|-------------------|
| 1 | 12 volt actuation |
| 2 | Vehicle earth |

Note:

Ignition "OFF".

Connect adapter cable X 899.980.246.201 directly to Y014 - "Raise" suspension solenoid valve.

| Test | Pin | Target value | Condition | Remark |
|--------|-----|--------------|-----------|--------|
| Signal | 1 | 8 ohms | | |
| Earth | 2 | | | |

Note:

Ignition "ON"

| Test | Pin | Target value | Condition | Possible cause of fault |
|--------|-----|--------------|-------------------|-------------------------|
| Signal | 1 | 12 VDC | Suspension: Raise | |
| Earth | 2 | | | |

Note:

Connect e-adapter box 899.980.208.100 directly to A002 - e-box.

Ignition "ON".

"Load valve" Y012 / MVL must be operational for movement to be carried out.

| Test | Pin | Target value | Condition | Possible cause of fault |
|-----------|-----|--------------|---|-------------------------|
| Actuation | 66 | 1.5 A | Suspension: Raise | |
| | | | Switch toggle switch of e-adapter box pin 66 to Isolate | |

| Date | Version | Page | Y014 - "Raise" suspension solenoid valve | Capitel | Index | Docu-No. |
|---------|---------|------|--|---------|-------|----------|
| 01/2000 | a | 1/2 | | 9000 | E | 000122 |

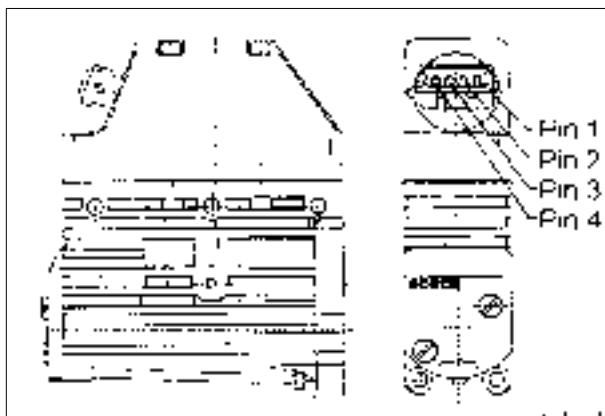
| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Y014 - "Raise" suspension solenoid valve | E |
|---|--|----------|

Instructions for applied-voltage test on valves, if required:

1. Disconnect existing actuation lead (open toggle switch or remove bridge on adapter box).
2. Connect separate voltage source to **component contact**.
3. Separate voltage source: pins 56, 57 ... or 60 on e-box A002 or battery/power supply unit

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|----------|------|-------------|----------|---------------|
| 01/2000 | a | 2/2 | 9000 | E | 000122 |

| | | |
|----------------------------------|---|----------|
| Fav 700 Fav 900 | Electrics / system in general Y015-Y019 - SB 23 - LS - EHS control valve | E |
|----------------------------------|---|----------|



| Pin | Function |
|-----|----------|
| 1 | +UB |
| 2 | CAN-low |
| 3 | CAN-high |
| 4 | Earth |

Conventional electrical performance test consisting of measuring resistance is not permissible with this valve!

Note:

Valves are assigned, tape-end programming (G-bus).

Crossgate lever is adjusted (adjustment "1001").

Control pressure is present (measuring point M5 - 22bar).

Ignition ON, start tractor.

| Test | Pin | Target value | Condition | Possible cause of fault |
|----------|-----|--------------|-----------|--|
| + supply | 1 | 12 VDC | | Fuse (F048) in fuse holder X051 or in wiring |
| Earth | 4 | | | |

Extended testing of SB23-LS-EHS:

All valves with exception of valve under test must be electrically isolated.



Measure power consumption of Y015-Y019 SB-LS-EHS control valve.

Remove fuse F048 (15 A) from fuse holder X051.

Connect multimeter (ammeter) in place of fuse.

Note:

Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).

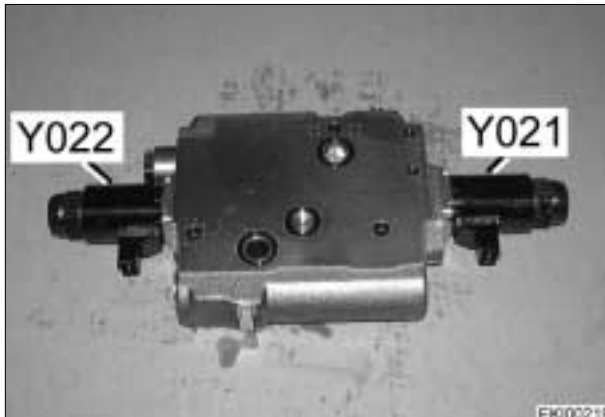
| Test | Pin | Target value | Valve: position / actuation |
|-------------------|-----|--------------|-----------------------------|
| Power consumption | 1 | 260 mA | Neutral |
| | | 500 mA | Raise |
| | | 535 mA | Lower |
| | | 620 mA | Floating position |

Note:

All readings +/- 15%

| Date | Version | Page | Y015-Y019 - SB 23 - LS - EHS control valve | Capitel | Index | Docu-No. |
|----------|----------|------|--|-------------|----------|---------------|
| 8.3.2001 | b | 1/1 | | 9000 | E | 000104 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electronics / system in general Y021 "Raise" control valve | E |
|---|---|----------|



| Pin | Function |
|-----|-----------|
| 1 | Actuation |
| 2 | Earth |

Note:

Ignition "OFF".

Measure resistance directly at solenoid valve

| Test | Pin | Target value | Condition | Remark |
|--------|-----|--------------|-----------|--------|
| Signal | 1 | 2.2 ohms | | |
| Earth | 2 | | | |

Note:

Connect e-adapter box X 899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

| Test | Pin | Target value | Condition | Remark |
|-----------|-----|--------------|-----------|--------|
| Actuation | 55 | 6.0 VDC | | |
| Earth | 53 | | | |

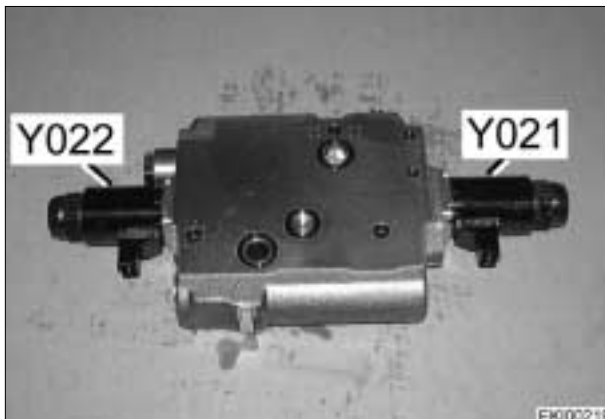
| | | | | |
|-----------|----|-----------------|------------|---|
| Actuation | 55 | 1.25 A to 3.0 A | EPC: Raise | Switch toggle switch of e-adapter box pin 55 to Isolate |
|-----------|----|-----------------|------------|---|

Note:

Checking EPC e-box A005 Chapter 9000 Index E

| Date | Version | Page | Y021 "Raise" control valve | Capitel | Index | Docu-No. |
|---------|---------|------|----------------------------|---------|-------|----------|
| 12/1999 | a | 1/1 | | 9000 | E | 000111 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Electronics / system in general Y022 "Lower" control valve | E |
|---|--|----------|



| Pin | Function |
|-----|-----------|
| 1 | Actuation |
| 2 | Earth |

Note:

Ignition "OFF".

Measure resistance directly at solenoid valve

| Test | Pin | Target value | Condition | Remark |
|--------|-----|--------------|-----------|--------|
| Signal | 1 | 2.2 ohms | | |
| Earth | 2 | | | |

Note:

Connect e-adapter box X 899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

| Test | Pin | Target value | Condition | Remark |
|-----------|-----|--------------|-----------|--------|
| Actuation | 19 | 6.0 VDC | | |
| Earth | 53 | | | |

| Test | Pin | Target value | Condition | Remark |
|-----------|-----|-----------------|--|---|
| Actuation | 19 | Max. 2.2 A | 100% position control | Switch toggle switch of e-adapter box pin 19 to Isolate |
| | | 3.2 A to 3.5 A | From 30% draft control | |
| | | 0.95 A to 3.5 A | Depending on position of lowering throttle valve | |

Note:

Checking EPC e-box A005 Chapter 9000 Index E

| Date | Version | Page | Y022 "Lower" control valve | Capitel | Index | Docu-No. |
|---------|---------|------|----------------------------|---------|-------|----------|
| 12/1999 | a | 1/1 | | 9000 | E | 000112 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Y023 - compressed-air advance control system solenoid valve

E



Right rear next to power lift

Y023 = **compressed-air advance control system solenoid valve**

Checking compressed-air advance control system solenoid valve:

Remove plug.

Connect adapter cable (DIY using connector G 816.900.043.020) and multimeter (ohmmeter) to solenoid valve Y023.

Target value: 13.2 ohms +/- 5%



Connect adapter cable and multimeter (ammeter) and provide power.

Ignition "ON".

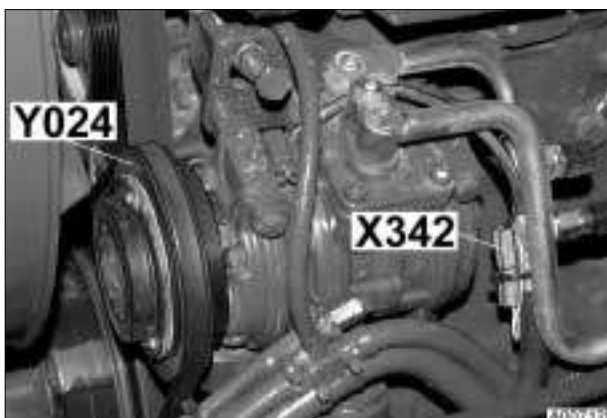
Actuate brake pedals.

Target value: approx. 1 amp

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Y024 - air-conditioning magnetic clutch

E



On left-hand side of engine:

Y024 = **air-conditioning magnetic clutch**

X342 = **cable coupler** for air-conditioning magnetic clutch



Measure resistance of solenoid of magnetic clutch Y024 using multimeter (ohmmeter).

Target value: 3.8 +/- 0.5 ohms at 20°C

Earthing point (arrowed) for magnetic clutch Y024



Measure gap between spring plate and v-belt pulley at several locations using two feeler gauges.

Target value: 0.5 +/- 0.15 mm

In event of discrepancies, correct by means of spacer rings under spring plate. Coat thread of spring plate mounting screws with synthetic bonding agent X 903.050.084 and tighten to 14 Nm.

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|---|-------|----------|
| 21.2.2001 | a | 1/1 | Y024 - air-conditioning magnetic clutch 9000 | E | 000074 |

| | | |
|----------------------------------|--|---|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Y025 / R001 - cold-start aid / heater plug solenoid valve | E |
|----------------------------------|--|---|

Note:

All tests were carried out on Fav 700.

Tests on Farmer 400 and Fav 900 should be carried out in same manner.

**Farmer 400, Fav 700**

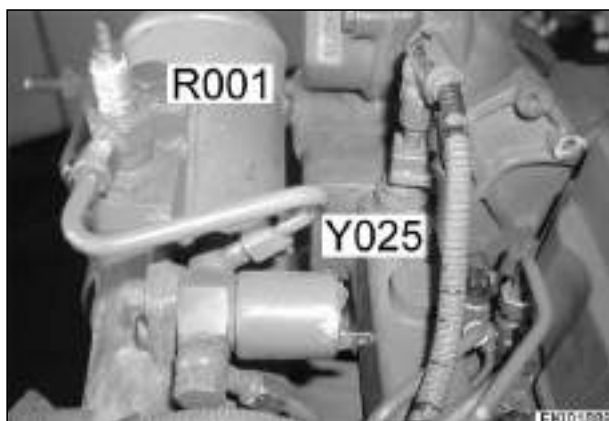
Open bonnet. At front on intake pipe

R001 = **heater plug**

Y025 = **cold-start aid solenoid valve**

Note:

Shown with engine removed for greater clarity.

**Fav 900 chassis number 23/3001 and up**

Open left side of bonnet. At front on intake pipe

R001 = **heater plug**

Y025 = **cold-start aid solenoid valve**

Note:

Shown with engine removed for greater clarity.

**Checking heater plug R001**

Air temperature below 2.5°C +/- 2.5°C

(minimum heater-plug temperature)

Ignition ON, heater-plug indicator must light up.

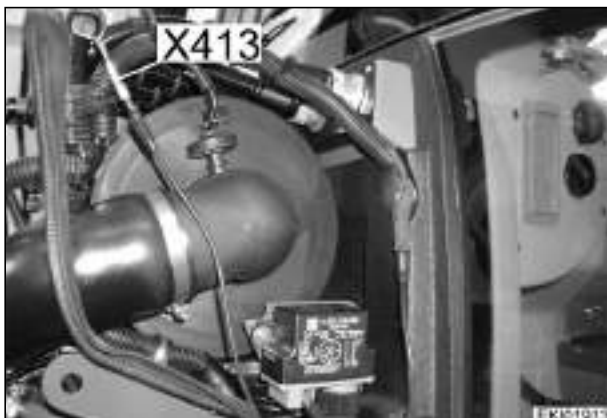
Check heater plug by touching it to see if it is warm.

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|---------|------|---|-------|----------|
| 20.2.2001 | b | 1/5 | Y025 / R001 - cold-start aid / heater plug solenoid valve 9000 | E | 000072 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Y025 / R001 - cold-start aid / heater plug solenoid valve

E



Farmer 400, Fav 700

Checking cold-start system at temperatures > minimum heater-plug temperature (2.5°C +/- 2.5°C)

Open screw cap and connect contact X413 to vehicle earth.



Fav 900 chassis number 23/3001 and up

Checking cold-start system at temperatures > minimum heater-plug temperature (2.5°C +/- 2.5°C)

Open T-piece of cable loom and connect contact X413 to vehicle earth.



If plug does not heat up, measure voltage at electrical terminal of heater plug R001 using multimeter (voltmeter).

Ignition "ON"

Target value: at least 10.5 VDC

If voltage is below 10.5 VDC, check electrical cables according to circuit diagram.



Checking resistance of heater plug R001

Unscrew electrical cables from heater plug.

Measure resistance using multimeter (ohmmeter).

Target value: 0.5 +/- 0.1 ohm

Note:

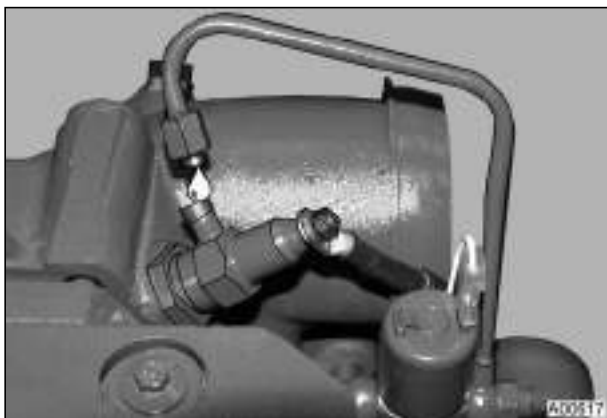
Calibrate multimeter (test internal resistance) before carrying out measurement.

| Date | Version | Page | | Capitel | Index | Docu-No. |
|-----------|----------|------|---|-------------|----------|---------------|
| 20.2.2001 | b | 2/5 | Y025 / R001 - cold-start aid / heater plug solenoid valve | 9000 | E | 000072 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Y025 / R001 - cold-start aid / heater plug solenoid valve

E



If heater plug R001 is OK and voltage is present, check fuel feed.

Detach fuel line from heater plug.

Farmer 400, Fav 700: Remove plug from "Engine off" solenoid valve Y007.

Fav 900 chassis number 23/3001 and up: Remove compact plug from A020 - ECU, EDC.

Note:

Confirm EDC fault.

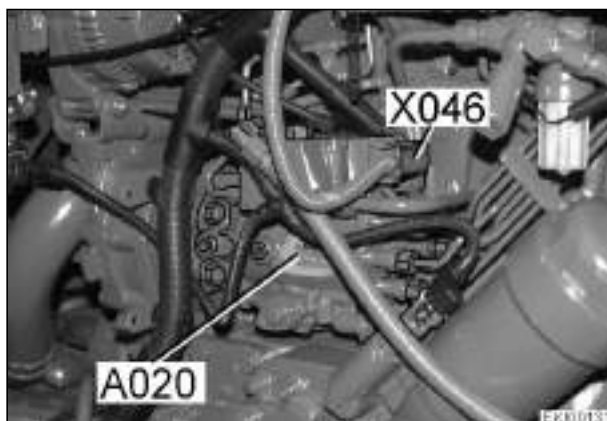
Air temperature below 2.5°C +/- 2.5°C

Operate starter motor.

Fuel must flow from line.



Farmer 400, Fav 700: "Engine off" solenoid valve Y007



Fav 900 chassis number 23/3001 and up: Compact plug X046 on A020 - ECU, EDC

| Date | Version | Page | Capitel | Index | Docu-No. |
|-----------|----------|------|--|-------------|---------------|
| 20.2.2001 | b | 3/5 | Y025 / R001 - cold-start aid / heater plug solenoid valve | 9000 | E |
| | | | | | 000072 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electrics / system in general Y025 / R001 - cold-start aid / heater plug solenoid valve | E |
|---|---|----------|



If no fuel flows from line, check that solenoid valve Y025 is functioning.

Farmer 400, Fav 700: Remove plug from "Engine off" solenoid valve Y007.

Fav 900 chassis number 23/3001 and up: Remove compact plug from A020 - ECU, EDC.

Note:

Confirm EDC fault.

Air temperature below 2.5°C +/- 2.5°C

Operate starter motor.

Check voltage at electrical terminal of solenoid valve Y025.

Target value: approx. 12 VDC

If necessary, check electrical cables according to circuit diagram, or fit new solenoid valve Y025.



Remove heater plug R001 for testing.

Connect cable and fuel line.

Farmer 400, Fav 700: Remove plug from "Engine off" solenoid valve Y007.

Fav 900 chassis number 23/3001 and up: Remove compact plug from A020 - ECU, EDC.

Note:

Confirm EDC fault.

Operate starter motor.

Blow on plug to enhance flame.

Clearly visible flame must be present.

Fit new heater plug R001 if necessary.

Switching functions of cold-start system (see electric circuit diagrams - Chapter 9000 Index C)

Preheating (voltage 12 VDC)

Ignition "ON". At low temperatures heater-plug indicator lights up and shows when engine is ready to start. **At ambient temperature** (air temperature) above 2.5°C +/- 2.5°C no preheating.

Actuation sequence

Voltage is applied to contact 30 of cold-start aid and is transferred via 80 amp fuse to cold-start aid e-box.

Ignition ON, relay K001 closes, voltage is present at fuse F013.

There is voltage at contact G of cold-start aid. Contact H sends earth signal from cold-start aid to instrument panel for heater-plug indicator.

At cold-start aid ambient temperature of below 2.5°C +/- 2.5°C relay in cold-start aid closes. Voltage present at contacts N and P - heater plug R001 glows. Once indicator on instrument panel flashes, engine is ready to start.

Depress clutch pedal, solenoid switch S012 closes, there is voltage at relay K008 and relay closes. Voltage is transferred via fuse F028 and contact K to cold-start aid. Relay in cold-start aid closes, there is voltage at contact J of cold-start aid, solenoid valve Y025 opens, fuel flows to heater plug R001 when engine is turning over.

| Date | Version | Page | | Capitel | Index | Docu-No. |
|-----------|----------|------|---|-------------|----------|---------------|
| 20.2.2001 | b | 4/5 | Y025 / R001 - cold-start aid / heater plug solenoid valve | 9000 | E | 000072 |

Farmer 400
Fav 700
Fav 900

Electrics / system in general
Y025 / R001 - cold-start aid / heater plug solenoid valve

E



Cold-start aid (e-box) A012



At bottom of e-box of cold-start aid A012
X382 = terminal for contact 30



At bottom of e-box of cold-start aid A012
FU = 80 amp fuse

Note:
Shown with e-box of cold-start aid A012 removed for greater clarity.

Note:

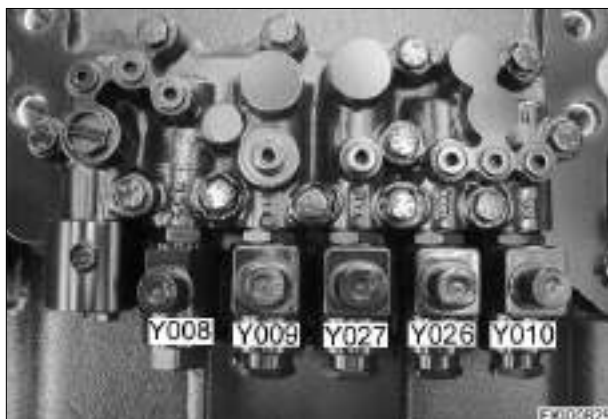
Chapter 0000 Index D - Position of components

Chapter 9000 Index C - Electrical circuit diagrams

Chapter 9000 Index E - A012 - ECU, cold-start aid

| Date | Version | Page | | Capitel | Index | Docu-No. |
|-----------|----------|------|--|-------------|----------|---------------|
| 20.2.2001 | b | 5/5 | Y025 / R001 - cold-start aid / heater plug solenoid valve | 9000 | E | 000072 |

| | | |
|----------------|---|----------|
| Fav 900 | Electrics / General system Y026 / Y027 - rear PTO valve, stage 1 / stage 2 | E |
|----------------|---|----------|



| Pin | Function |
|----------------|-------------------|
| 1 | 12 volt actuation |
| 2 | Vehicle earth |
| | |
| Y026 (stage 1) | 540 or 750 rpm |
| Y027 (stage 2) | 1000 rpm |

Note:**Ignition OFF****Connect adapter cable X 899.980.246.201 directly to Y026 / Y027 - valve.**

| Test | Pin | Target value | Condition | Remark |
|------------|-----|--------------|-----------|--------|
| Y026 | | | | |
| Resistance | 1 | 8.1 ohms | | |
| Earth | 2 | | | |
| Y027 | | | | |
| Resistance | 1 | 8.1 ohms | | |
| Earth | 2 | | | |

Note:**Connect e-adapter box X 899.980.208.100 directly to A002 - ECU, enhanced control.**

| Test | Pin | Target value | Condition | Remark |
|-------|-----|--------------|-------------|--------|
| Y026 | | | | |
| Power | 1 | 1.5 A | Ignition ON | |
| Earth | 2 | | PTO ON | |
| Y027 | | | | |
| Power | 1 | 1.5 A | Ignition ON | |
| Earth | 2 | | PTO ON | |

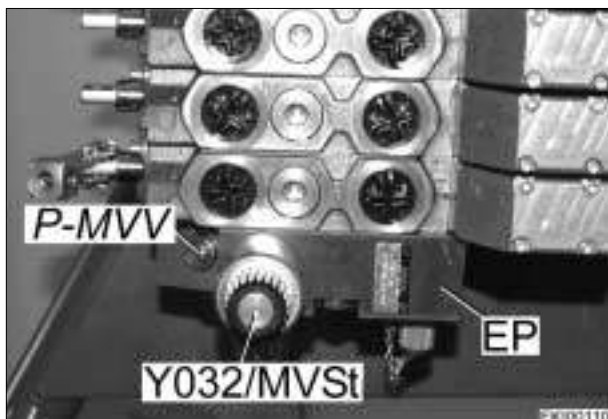
Note:**All readings +/- 10%**

| Measuring points on A002 - ECU, enhanced control | Pin |
|--|-----|
| Y026 | 48 |
| Y027 | 53 |
| Vehicle earth | |

Note:**Chapter 9000 Reg. E - A012 - ECU, enhanced control**

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 08.08.2001 | a | 1/1 | 9000 | E | 000146 |

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Electrics / system in general Y032 - "Control pressure valve" solenoid valve | E |
|----------------------------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | + supply |
| 2 | Earth |

Note:

Ignition "OFF".

Measure resistance directly at solenoid valve

| Test | Pin | Target value | Condition | Possible cause of fault |
|----------|-----|----------------|-----------|--|
| + supply | 1 | 4.6 ± 0.5 ohms | | Fuse (F048) in fuse holder X051 or in wiring |
| Earth | 2 | | | |

Note:

Ignition "ON".

| Test | Pin | Target value | Target value | Condition |
|----------|-----|--------------|--------------|------------------------|
| + supply | 1 | 12 VDC | 2.5 A | Engine speed > 400 rpm |
| Earth | 2 | | | |

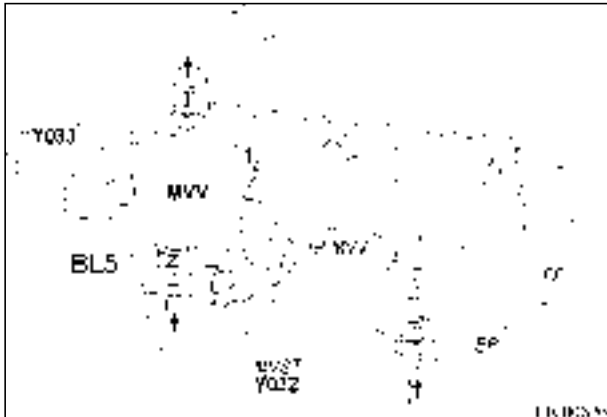
All readings +/- 10%

Note:

Chapter 9000 Index C - Electric circuit diagram valves 1

| Date | Version | Page | Capitel | Index | Docu-No. |
|----------|----------|------|-------------|----------|---------------|
| 8.1.2001 | b | 1/1 | 9000 | E | 000108 |

| | | |
|----------------------------------|---|----------|
| <i>Fav 700</i> <i>Fav 900</i> | Electrics / General system Y033 - valve, flushing (oil preheater) | E |
|----------------------------------|---|----------|



Fav 700 (external heater circuit)



Fav 700, Fav 900 chassis number 23/3001 and up (integral heater circuit)



| Pin | Function |
|-----|-------------------|
| 1 | 12 volt actuation |
| 2 | Vehicle earth |

Note:

Ignition "OFF".

Connect adapter cable X 899.980.246.201 directly to Y033 - valve, flushing.

| Test | Pin | Target value | Condition | Note |
|--------|-----|--------------|-----------|------|
| Signal | 1 | 10 ohms | | |
| Earth | 2 | | | |

Note:

All readings +/- 10%

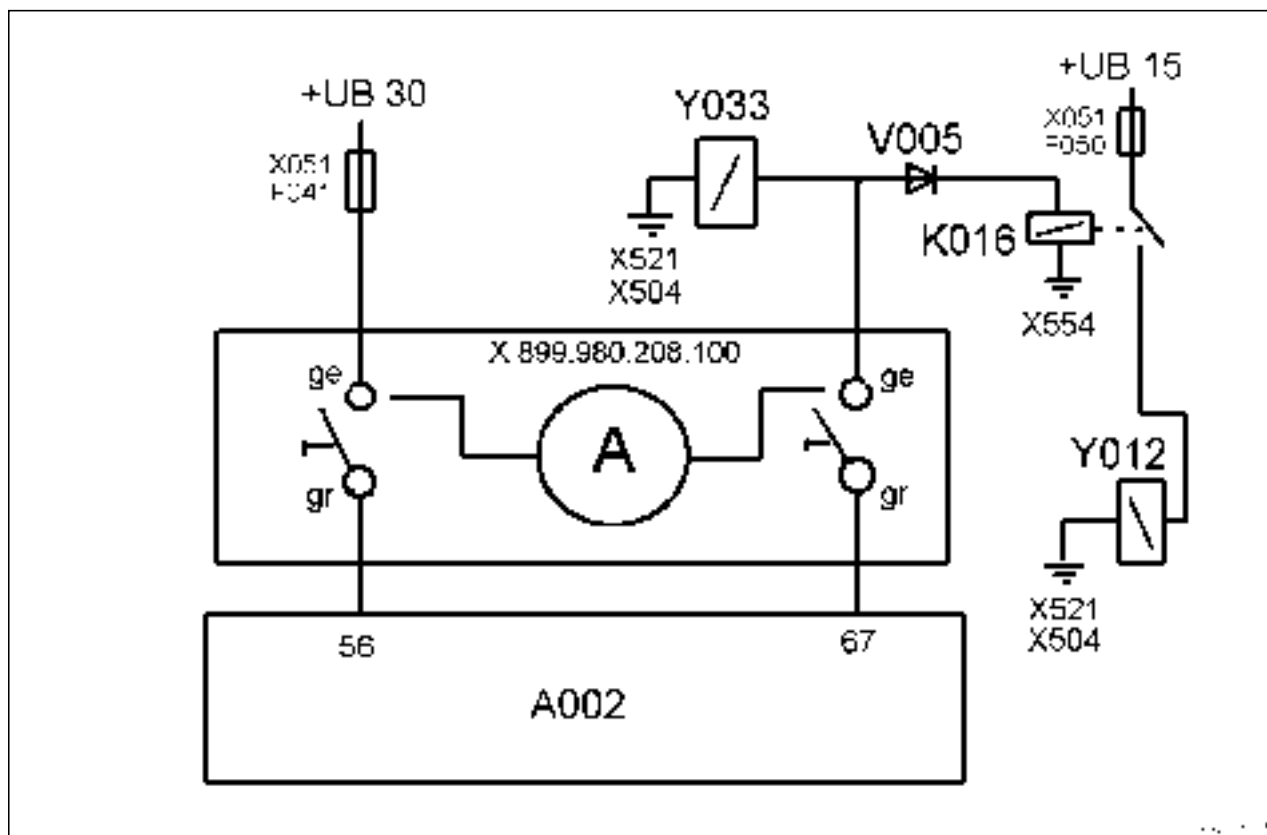
| Date | Version | Page | | Capitel | Index | Docu-No. |
|------------|----------|------|---|-------------|----------|---------------|
| 29.08.2001 | a | 1/3 | Y033 - valve, flushing (oil preheater) | 9000 | E | 000151 |

Fav 700
Fav 900

Electrics / General system
Y033 - valve, flushing (oil preheater)

E

Measuring power consumption (I)
Test tips or simulating oil preheater



| Item | Designation | Item | Designation |
|------|--|---------|---|
| A002 | ECU, enhanced control | X554 | Earthing point |
| K016 | Relay | | |
| V005 | Diode, group | + UB 30 | Direct from battery positive |
| Y012 | Valve, charging | + UB 15 | Switched positive |
| Y033 | Valve, flushing | | |
| X051 | Fuse holder 2 compl. Fuse - F041 Fuse - F050 | | 68-pin e-adaptor box X 899.980.208.100 |
| X504 | Earthing point (Fav 700) | ge | Yellow bush |
| X521 | Earthing point (Fav 900) | gr | Green bush |

- Connect e-adaptor box X 899.980.208.100 directly to A002 ECU, enhanced controls.
- Isolate toggle switch pin 56 at e-adaptor box.
- Isolate toggle switch pin 67 at e-adaptor box.
- **Connect ammeter (A)** between **yellow bush of pin 67** and **yellow bush of pin 56** (to measure power consumption).

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Electrics / General system Y033 - valve, flushing (oil preheater) | E |
|----------------------------------|--|----------|

| Test | Pin | Target value | Condition | Possible cause of fault |
|-------|-----|---------------|-------------------------|--|
| Power | 56 | Approx. 1.4 A | K016 - relay plugged in | G001 - battery discharged Fault in K016 - relay |
| | 67 | | | Fault in V005 - diode |

Note:

All readings +/- 10%

Other test option

Provide external power supply to Y033 - valve, flushing (as described above).

Start tractor.

Oil preheater is switched on (audible sound of hydraulics).**Note:**Oil preheater is not indicated on A008 - terminal.**Note:**

Chapter 9000 Index C - Electrical circuit diagrams

Chapter 9000 Index E - Y012 - "Charge" suspension solenoid valve

Chapter 9690 Index E - Hydraulic oil preheater

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|----------|------|-------------|----------|---------------|
| 29.08.2001 | a | 3/3 | 9000 | E | 000151 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / General system Y034 - valve, release brake (front PTO) | E |
|----------------|--|----------|



| Pin | Function |
|-----|-------------------|
| 1 | 12 volt actuation |
| 2 | Vehicle earth |

Note:**Resistance (R)**

Ignition OFF

Connect adapter cable X 899.980.246.201 directly to Y034 - valve.

Current (I)

Connect e-adapter box X 899.980.208.100 directly to A002 - ECU, enhanced control.

Ignition ON

| Valve | Position | U [VDC] | I [ADC] | R [Ohm] |
|--|----------|------------|------------|------------|
| Y034 - valve Release brake, front PTO | ON / OFF | 0 / UB | 1.5 | 8.1 |

Note:

All readings +/- 10%

UB = battery voltage = 12 VDC - 14 VDC

| Measuring points on A002 - ECU, enhanced control | Pin |
|--|-----|
| Y034 | 68 |
| Vehicle earth | |

Note:

Chapter 9000 Reg. E - A012 - ECU, enhanced control

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 24.08.2001 | a | 1/1 | 9000 | E | 000150 |

| | | |
|----------------|---|----------|
| Fav 900 | Electrics / Fuses Fuse assignment - fuse holders A013, X050 and X051 | C |
|----------------|---|----------|

**Danger:**

Use only genuine fuses! Electrical system will be destroyed if fuses with too high ratings are used. Beware of fire risk!

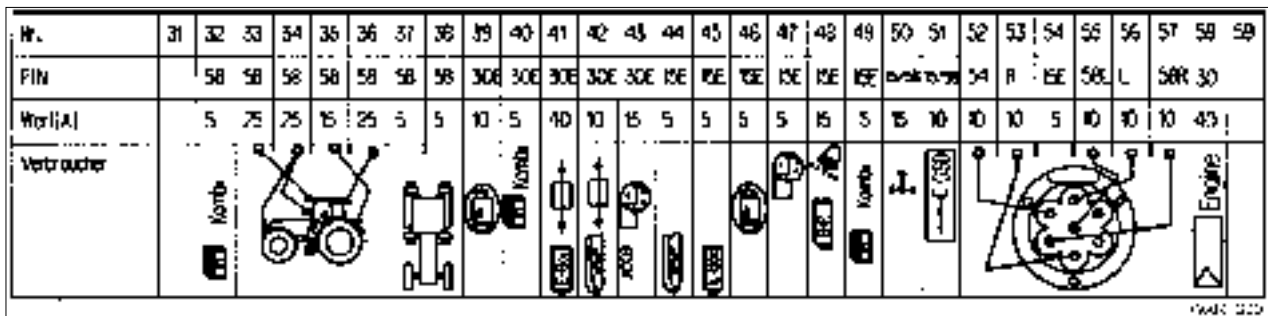
Fuse holder X050

| No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | |
|-----------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| Pin | | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 50 | 15 | |
| Wert(A) | | 25 | 40 | 5 | 10 | 25 | 15 | 10 | 15 | 15 | 25 | | 10 | 25 | 15 | 5 | 40 | 15 | 10 | 10 | 15 | 10 | 15 | 10 | 15 | 10 | 10 | 40 | 25 | |
| Verbraucher | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 915.901.040.131 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Fuse no. | Pin | Rating (A) | Consumer |
|----------|-----|------------|---|
| 1 | - | - | - |
| 2 | 30 | 25 | Heater plug starter switch position ON |
| 3 | 30 | 40 | LBS implement socket |
| 4 | 30 | 5 | EPC relay Ub |
| 5 | 30 | 5 | LBS implement socket CAN-bus terminal |
| 6 | 30 | 15 | Hazard warning lights pushbutton |
| 7 | 30 | 15 | Headlights pushbutton |
| 8 | 30 | 10 | Radio, cab lighting |
| 9 | 30 | 15 | Relay no. 56a (headlights) |
| 10 | 30 | 15 | Relay no. 56b (dipped headlights) |
| 11 | 30 | 25 | Socket 25 A |
| 12 | 30 | - | - |
| 13 | 15 | 10 | Cold-start aid |
| 14 | 15 | 25 | Heater control |
| 15 | 15 | 15 | Hazard warning lights pushbutton |
| 16 | 15 | 5 | Headlights pushbutton |
| 17 | 15 | 25 | Fan switch |
| 18 | 15 | 15 | Front wipers pulse generator |
| 19 | 15 | 10 | Starter inhibitor switch, emergency control relay |
| 20 | 15 | 10 | Control stalk (multifunction control stalk) |
| 21 | 15 | 15 | Driver's seat |
| 22 | 15 | 10 | Exhaust brake |
| 23 | 15 | 15 | Brake relay |
| 24 | 15 | 10 | 3rd hydraulic circuit relay |
| 25 | 15 | 15 | Heated rear window, heated mirror |
| 26 | 15 | 10 | Socket 10 A |
| 27 | 15 | 10 | LBS implement socket |
| 28 | 50 | 40 | Heater plug starter switch position Start |
| 29 | 15 | 25 | not allocated |

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| 11.12.2000 | a | 1/3 | Fuse assignment - fuse holders A013, X050 and X051 | 9040 | C | 000003 |

| | | |
|----------------|---|----------|
| Fav 900 | Electrics / Fuses Fuse assignment - fuse holders A013, X050 and X051 | C |
|----------------|---|----------|

Fuse holder X051

| Fuse no. | Pin | Rating (A) | Consumer |
|----------|-------|------------|---|
| 31 | - | - | - |
| 32 | 58 | 5 | Instrument panel |
| 33 | 58 | 25 | Front working lights switch |
| 34 | 58 | 15 | Front working lights switch |
| 35 | 58 | 15 | Rear working lights switch |
| 36 | 58 | 25 | Rear working lights switch |
| 37 | 58 | 5 | Right rear tail light, right sidelight |
| 38 | 58 | 5 | Left rear tail light, left sidelight |
| 39 | 30E | 10 | Terminal, communications box load circuit |
| 40 | 30E | 5 | Instrument panel |
| 41 | 30E | 40 | Enhanced control ECU, fuse board A |
| 42 | 30E | 10 | Control console, fuse board B |
| 43 | 30E | 15 | Actuator unit control |
| 44 | 15E | 5 | Control console |
| 45 | 15E | 5 | Enhanced control ECU |
| 46 | 15E | 5 | Vario terminal |
| 47 | 15E | 5 | Joystick |
| 48 | 15E | 15 | EPC, radar sensor, spool valves, EPC/DA |
| 49 | 15E | 5 | Instrument panel |
| 50 | 15/58 | 15 | Heater valves |
| 51 | 15/58 | 10 | Implement socket, communications box load circuit |
| 52 | 54 | 10 | Trailer socket |
| 53 | R | 10 | Front socket on front power lift, trailer socket |
| 54 | 15E | 5 | Test connection |
| 55 | 58L | 10 | Front socket on front power lift, trailer socket |
| 56 | L | 10 | Front socket on front power lift, trailer socket |
| 57 | 58R | 10 | Trailer socket |
| 58 | 30 | 40 | EDC control unit |
| 59 | - | - | - |

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| 11.12.2000 | a | 2/3 | Fuse assignment - fuse holders A013, X050 and X051 9040 | C | 000003 |

| | | |
|---|--------------------------|----------|
| Fav 900 | Electrics / Fuses | C |
| Fuse assignment - fuse holders A013, X050 and X051 | | |

Fuse holder A013

| Zeichnung | Traversekabel | Komponente | Traversekabel |
|-----------|---------------|--|---------------|
| 01 | X200/18 | | |
| 02 | X200/16 | Hallgeber Motor 2 | X160 |
| 03 | X200/15 | Hochdrucksensor | X157 |
| 04 | X200/14 | Hallgeber Motor 1 | X159 |
| 05 | X200/10 | Fahrschalter Getriebe | X032 |
| 06 | X200/11 | Fahrschalter el. Ventile | X032 |
| 07 | X200/12 | Drehwinkelgeber Kugelkopf | X164 |
| 08 | X200/09 | Drehwinkelgeber Kurbelwellen | X166 |
| 09 | X201/14 | | |
| 10 | X201/12 | | |
| 11 | X201/11 | Drehwinkelgeber Lager Frontachse | X165 |
| 12 | X201/10 | | |
| 13 | X200/07 | Drehwinkelgeber Fahrschalter | X165 |
| 14 | X200/08 | | |
| 15 | X200/04 | Fahrschalter (Bedienkonsole) | X032 |
| 16 | X200/05 | Drehwinkelgeber Hydrostat. Accumulator | X163 |
| 17 | X200/06 | Drehwinkelgeber Pedal | X176 |
| 18 | X201/04 | Drehwinkelgeber Federung | X152 |
| 19 | X201/05 | | |
| 20 | X201/06 | | |
| 21 | X201/07 | Drehwinkelgeber | X403 X404 |
| 22 | X201/08 | Hallgeber Zentr. Achse | X151 |
| 23 | X201/09 | Temp. Getriebe Gehäuse | X158 |
| 24 | X201/18 | | |
| 25 | X201/16 | Motorbremse und Druckluftgeber | X161 X168 |
| 26 | X201/15 | Drehwinkelgeber Handgas | X183 |
| 27 | X202/07 | | |
| 28 | X202/06 | | |
| 29 | X202/05 | Fahrschalter (el. Gas) | X032 |
| 30 | X202/04 | | |
| 31 | X202/08 | | |
| 32 | X202/09 | Hallgeber Zentr. Achse | X169 |
| 33 | X202/10 | Hallgeber Zentr. Achse | X170 |

| Fuse | Con- nector | Components | Comp. conn. |
|------|----------------|--|----------------|
| 01 | X200/18 | - | |
| 02 | X200/16 | Engine Hall-effect sensor 2 | X160 |
| 03 | X200/15 | High-pressure sensor | X157 |
| 04 | X200/14 | Engine Hall-effect sensor 1 | X159 |
| 05 | X200/10 | Transmission control unit, joystick | X032 |
| 06 | X200/11 | - | - |
| 07 | X200/12 | Bevel pinion speed sensor | X164 |
| 08 | X200/09 | Clutch pedal position sensor | X166 |
| 09 | X201/14 | | |
| 10 | X201/12 | | X032 |
| 11 | X201/11 | | |
| 12 | X201/10 | Spool valves, joystick | X032 |
| 13 | X200/07 | Range sensor position sensor | X165 |
| 14 | X200/08 | | |
| 15 | X200/04 | - | - |
| 16 | X200/05 | Speed sensor for hydrostatic accumulator shaft | X163 |
| 17 | X200/06 | Accelerator position sensor | X176 |
| 18 | X201/04 | Suspension position sensor | X152 |
| 19 | X201/05 | | |
| 20 | X201/06 | | |
| 21 | X201/07 | Steering angle sensor | X403 X404 |
| 22 | X201/08 | Front PTO Hall-effect sensor | X151 |
| 23 | X201/09 | Transmission temperature sensor | X158 |
| 24 | X201/18 | | |
| 25 | X201/16 | Engine oil pressure and compressed-air sensor | X161 X168 |
| 26 | X201/15 | Hand throttle position sensor | X183 |
| 27 | X202/07 | | |
| 28 | X202/06 | - | - |
| 29 | X202/05 | Electronic accelerator, joystick | X032 |
| 30 | X202/04 | - | - |
| 31 | X202/08 | - | - |
| 32 | X202/09 | Rear PTO Hall-effect sensor | X169 |
| 33 | X202/10 | Rear PTO Hall-effect sensor after clutch | X170 |

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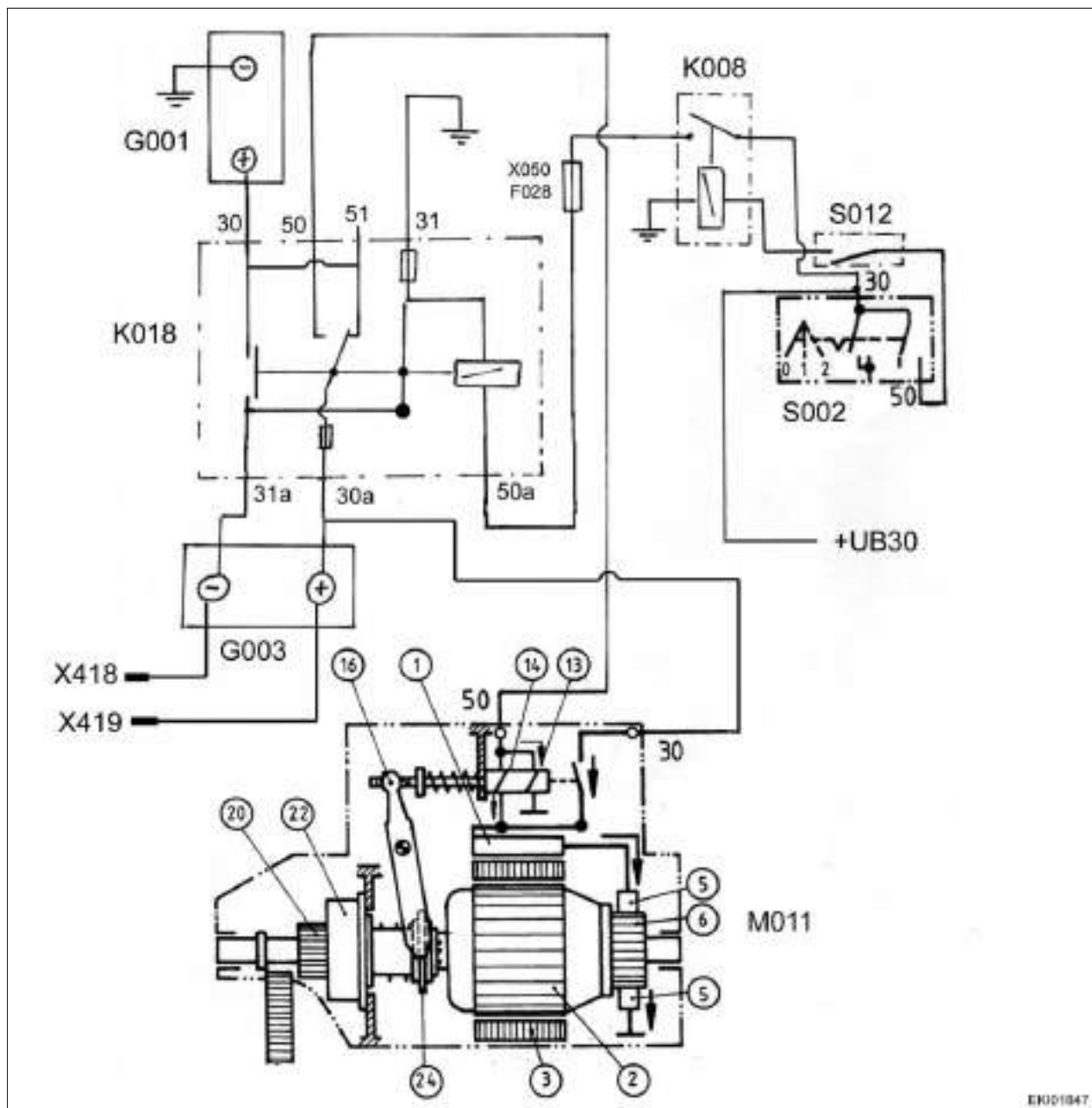
Fav 900

Electrics / Starter motor system

Troubleshooting table for M011 - starter, 24 V starter motor

B

Plan of 24 V starter motor system



| Item | Designation | Item | Designation |
|------|------------------|-------|--|
| 1 | Exciter winding | G001 | Battery 1 |
| 2 | Rotor | G003 | Battery 2 |
| 3 | Pole shoe | K008 | Relay, starter inhibitor |
| 5 | Carbon brushes | K018 | Relay, battery switchover |
| 6 | Commutator | M011 | 24 V starter motor |
| 13 | Holding winding | S002 | Switch, ignition |
| 14 | Pull-in winding | S012 | Switch, starter inhibitor |
| 16 | Engaging lever | X050 | Fuse holder 1 |
| 20 | Pinion | X418 | External start terminal - |
| 22 | Roller freewheel | X419 | External start terminal + |
| 24 | Guide ring | +UB30 | Supply for S002 - switch (12 - 14 VDC) |

| Date | Version | Page | Troubleshooting table for M011 - starter, 24 V starter motor | Capitel | Index | Docu-No. |
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| 07.08.2001 | a | 1/3 | | 9060 | B | 000001 |

| | | |
|----------------|---|----------|
| Fav 900 | Electrics / Starter motor system Troubleshooting table for M011 - starter, 24 V starter motor | B |
|----------------|---|----------|

Note:

Supply +UB30 for S002 - switch, ignition see
Chapter 9000 Reg. C - Electric circuit diagrams (power supply +UB)

Note:

Chapter 9000 Reg. A - Terminal designation to DIN 72 552

| Fault: when switching on, starter shaft does not rotate or rotates too slowly | |
|--|---|
| Cause | Remedy |
| F028 fuse in X050 defective | Change fuse (40 amps) |
| G001, G003 - battery discharging | Charge battery |
| G001, G003 - battery defective | Test with battery tester, fit new battery if necessary |
| Battery cable clamps are loose, oxidised, poor earth connection. | Tighten cable clamps, clean terminal head cable clamps and grease with acid-proof grease. |
| Starter terminals or brushes have short-circuit to earth. | Eliminate short-circuit to earth. |
| Starter carbon brushes are not in contact with commutator, are jammed in their guideways, are worn, broken, oil-covered or soiled. | Inspect, clean or fit new carbon brushes; if necessary, clean guideways in brush holders. |
| S002 - switch, S012 - switch, K008 - relay, K018 - relay damaged. (Components loose so switch or relay does not switch on, burned-out) | Check switch, relay; fit new one, if necessary. |
| Relay of M011 - starter damaged | Have starter repaired in specialist workshop. |
| Voltage drop in cables excessive, cables damaged, cable connections loose. Terminals and plug-and-socket connections oxidised. | Inspect starter cables and their connections. |

| Fault: rotor rotates, but pinion does not engage | |
|---|--|
| Cause | Remedy |
| Pinion bearing clogged | Clean bearing point and lightly oil. |
| Mechanical damage to pinion or gearwheel, burrs | File burrs down; if necessary, fit new pinion and gearwheel. |

| Fault: when switching on, starter rotor rotates, pinion engages properly, but engine does not turn over | |
|--|---|
| Cause | Remedy |
| G001, G003 - battery insufficiently charged | Charge G001, G003 - battery |
| Inadequate carbon brush pressure | Inspect, clean or fit new carbon brushes. |
| Starter relay or K018 - relay defective | Check relay for continuity. |
| Excessive voltage drop in cables | Inspect cables and their connections. |
| Freewheeling clutch slipping | Have freewheeling clutch repaired in specialist workshop. |

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| 07.08.2001 | a | 2/3 | Troubleshooting table for M011 - starter, 24 V starter motor 9060 | B | 000001 |

| | | |
|----------------|--|----------|
| Fav 900 | Electrics / Starter motor system Troubleshooting table for M011 - starter, 24 V starter motor | B |
|----------------|--|----------|

M011 - starter runs on after S002 - switch has been released

| Cause | Remedy |
|--|--|
| S012 - switch does not switch off or starter relay or K008 - relay or K018 - relay does not disconnect | Switch engine off immediately, check relay |

Fault: pinion does not disengage once engine starts

| Cause | Remedy |
|-----------------------------------|--|
| Return spring stretched or broken | Have M011 - starter repaired in specialist workshop. |

**Caution:**

If M011 - starter is removed, disconnect earth cables from G001 and G003 - batteries.

Note:

Chapter 9000 Reg. E - Measuring and testing electrical components

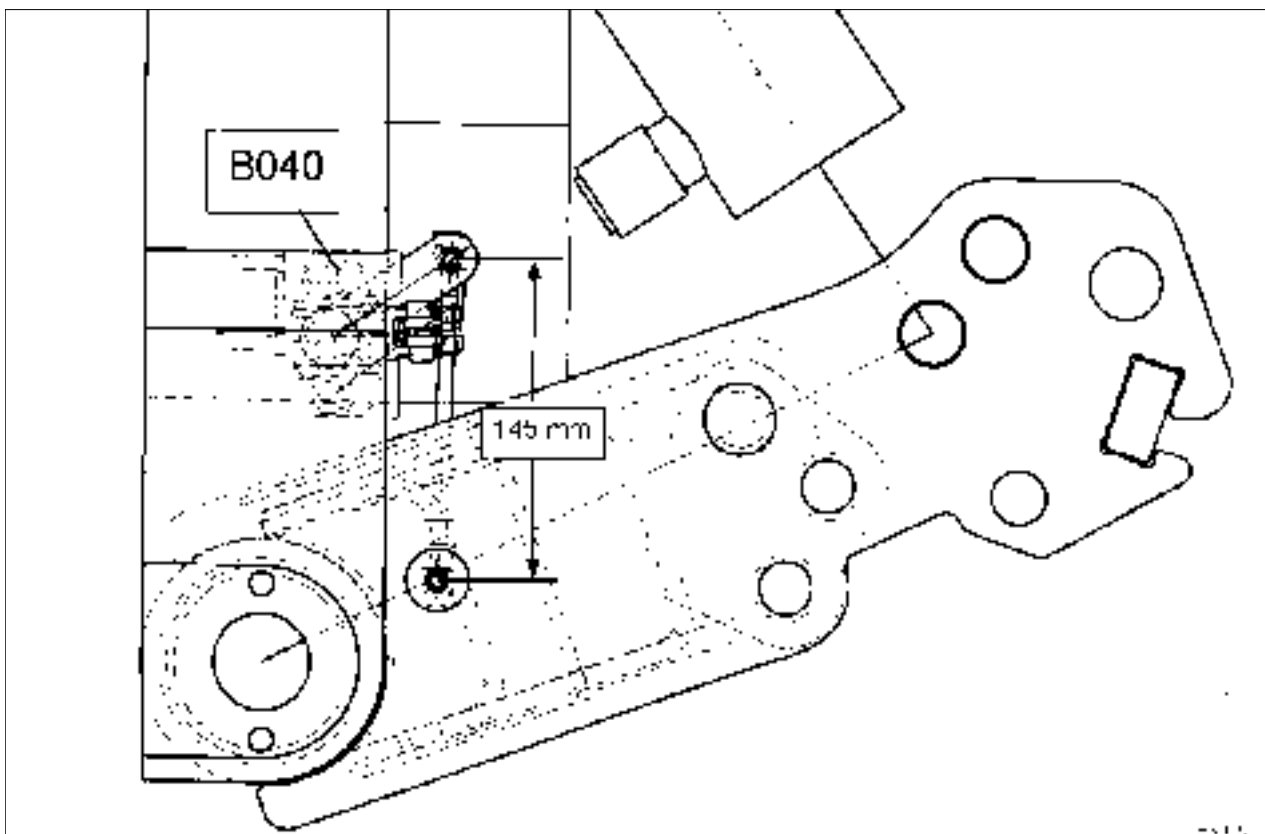


- Using jump leads, connect external start terminal + (X419) to positive terminal of battery which is delivering power (12 - 14 VDC).
- First connect jump lead to negative terminal of battery providing power (12 - 14 VDC), then to external start terminal (X418).

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Fav 900

Front power lift / Enhanced-control power lift
B040 - sensor, front power lift position

F

Replacing B040 - sensor, front power lift position:

Fully lower front power lift.

Unscrew guard and disconnect connector X188.

Replace B040 - sensor, front power lift position.

Note:

Can only be mounted in one position. Set linkage to distance of 145 mm (see drawing).



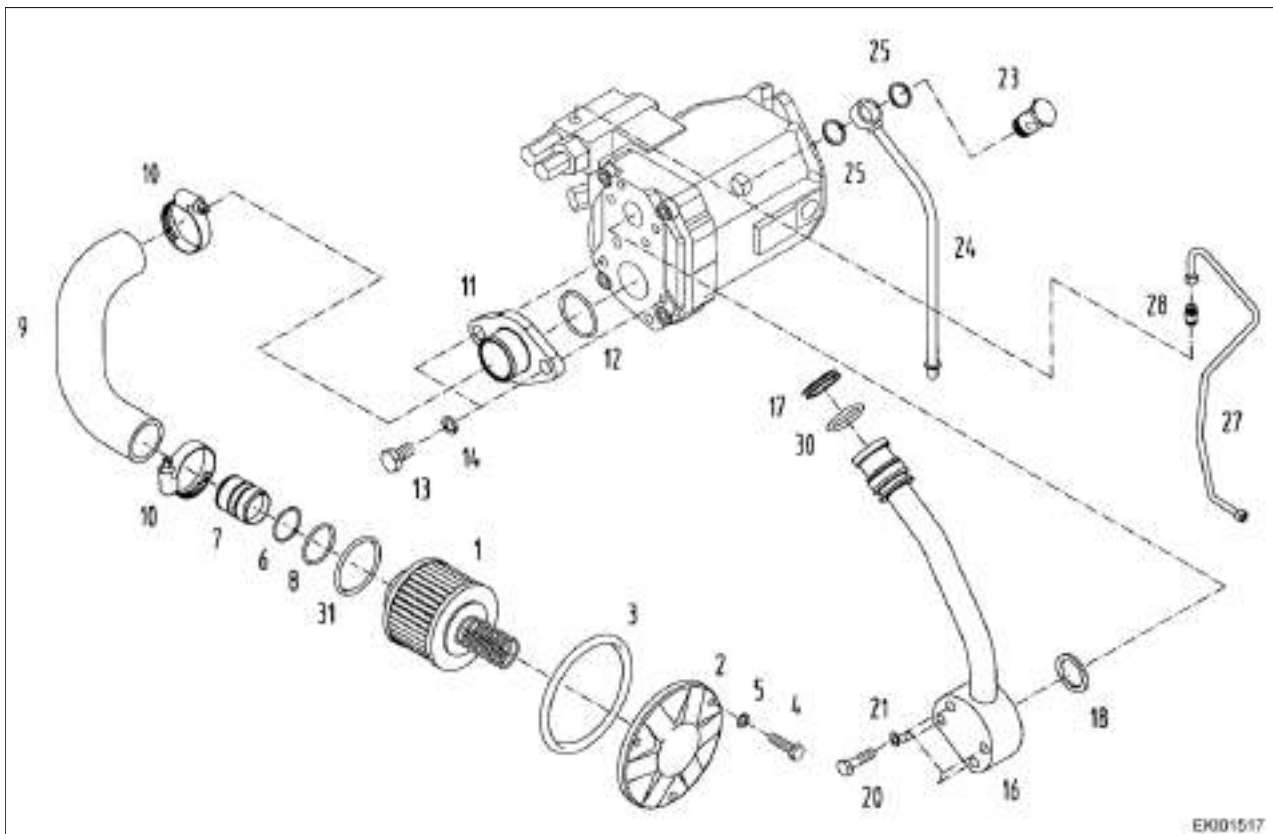
Calibrate B040 - sensor, front power lift position.

Calibration - enhanced-control power lift,
code 9002

Note:

For details of calibration porcedure, see
Chapter 0000 Reg. F.

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| 30.08.2001 | a | 1/1 | B040 - sensor, front power lift position | 9260 | F |
| | | | | | 000001 |

Fav 900
**Hydraulic pump assembly / LS pump
Installation and removal of LS pump**
G

| Item | Designation | Item | Designation |
|------|---------------|------|------------------------|
| 1 | Intake filter | 14 | Spring washer |
| 2 | Cover | 16 | Pressure pipe |
| 3 | O-ring | 17 | V-section sealing ring |
| 4 | Hexagon screw | 18 | Sealing ring |
| 5 | Spring washer | 20 | Hexagon screw |
| 6 | Snap ring | 21 | Spring washer |
| 7 | Intake socket | 23 | Hollow-core screw |
| 8 | O-ring | 24 | Oil leakage line |
| 9 | Hose bend | 25 | Sealing ring |
| 10 | Hose clip | 27 | Control line |
| 11 | Intake flange | 28 | GE socket |
| 12 | O-ring | 30 | O-ring |
| 13 | Hexagon screw | 31 | O-ring |

| | | |
|----------------|--|----------|
| Fav 900 | Hydraulic pump assembly / LS pump Installation and removal of LS pump | G |
|----------------|--|----------|

Preliminary work:

- Lower rear power lift.
- Prop tractor, taking appropriate safety precautions, and remove right rear wheel.
- Lower rear power lift.
- Remove panels on right side.

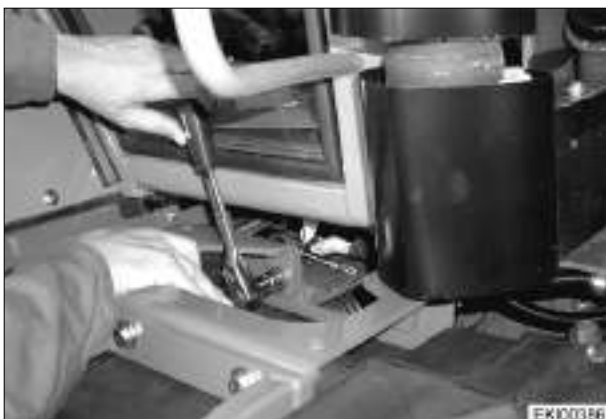
**Removing LS pump**

Remove front panel.

Remove right engine cover.

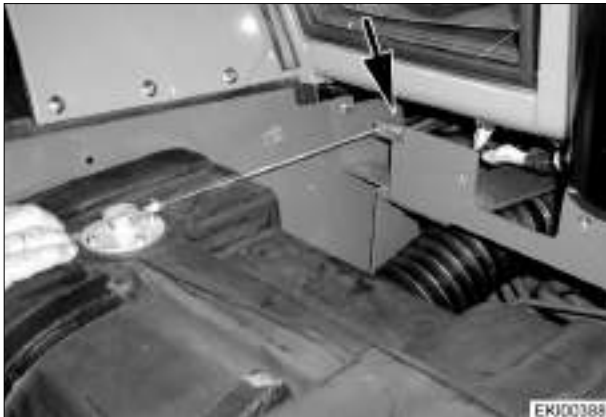


Remove footplate.



Remove right step.

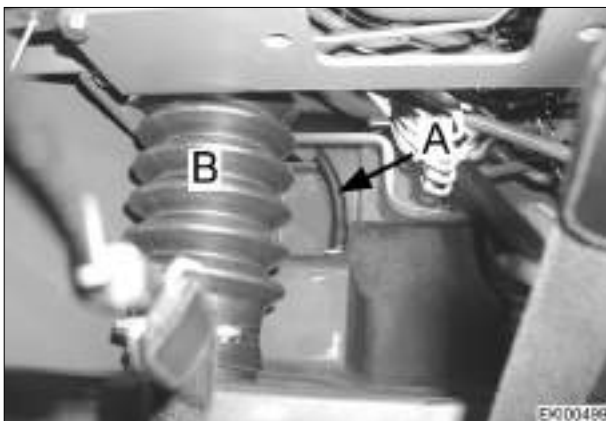
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Fav 900**Hydraulic pump assembly / LS pump
Installation and removal of LS pump****G**

Withdraw auxiliary tank on right as far as retaining cable.



Cap fuel hose at bottom using hose clamp.
Pump fuel out of auxiliary tank.



Release both hose clips.
Withdraw connecting hoses A and B.
Remove retaining cable.

Note:

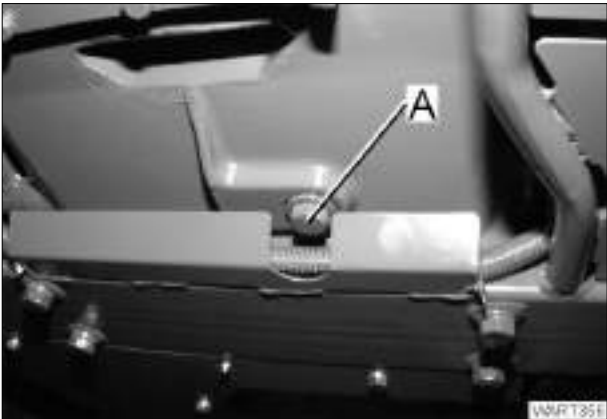
Pump fuel off as far as level of upper connecting pipe B.



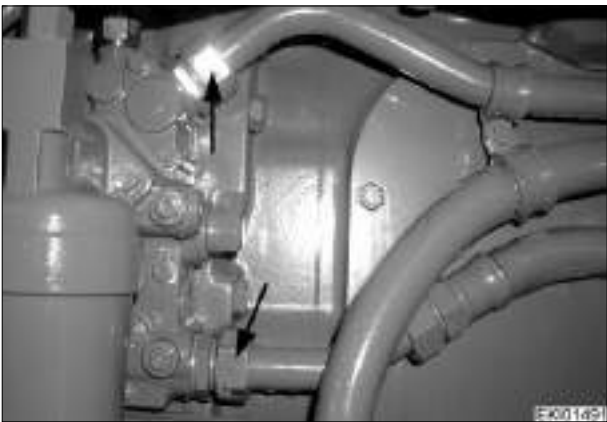
Withdraw venting tube from fuel tank.
Remove auxiliary tank.

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| | | |
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| Fav 900 | Hydraulic pump assembly / LS pump Installation and removal of LS pump | G |
|----------------|--|----------|



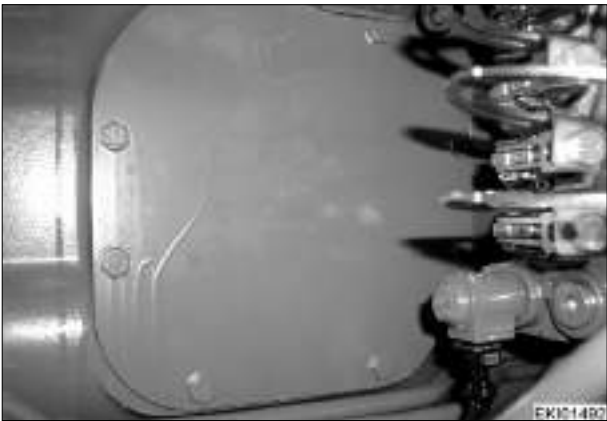
Drain hydraulic oil. Volume approx. 70 l.



Disconnect both hydraulic lines (arrowed).



Disconnect hydraulic lines at connector (arrowed).
Remove both hydraulic lines.



Remove hatch cover.

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Fav 900**Hydraulic pump assembly / LS pump
Installation and removal of LS pump****G**

Remove cover (arrowed) from return-flow filter and remove entire filter unit.



Release hose clip (arrowed).

Remove intake pipe.

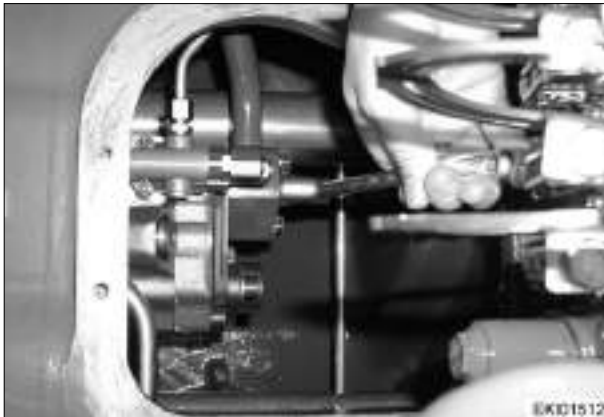
Withdraw intake socket with pipe bend from intake filter.



Remove LS pump - central control block (ZSB) pressure pipe.



Remove V-section sealing ring (17) (arrowed) from pressure pipe.

Fav 900**Hydraulic pump assembly / LS pump
Installation and removal of LS pump****G**

Remove 4 M10 hexagon screws (20) from pressure pipe (16), pull pressure pipe inwards out of housing.



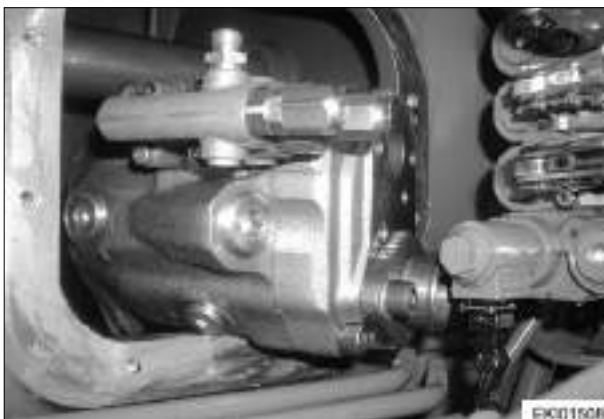
Remove control line (27) (load-sensing system).



Remove 2 M12 hexagon screws from LS pump retaining flange.

Support LS pump with timber prop through hatch and withdraw pump out of gearing.

Withdraw pump through hatch.

**Installing LS pump**

Screw in two M12 guide pins (fitting aid).

Fit new gasket.

Insert LS pump through hatch and locate on guide pins.

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Fav 900**Hydraulic pump assembly / LS pump
Installation and removal of LS pump****G****Note:**

If drive gearing of LS pump does not engage,
turn engine using
cranking device X 899.980.220.000.



Unscrew guide pins and fit LS pump using
M12 hexagon screws.

Tighten M12 hexagon screws to **86 Nm** .

Note:

**Shown with tractor disconnected for greater
clarity.**

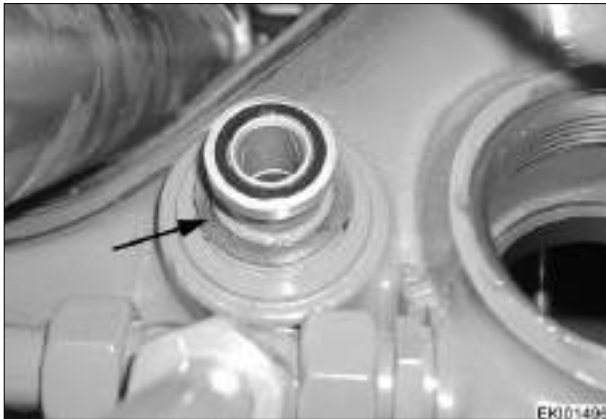


Fit control line (27) (load-sensing system).



Fit new sealing rings to pressure pipe (16) and
grease.

Fit pressure pipe (16) and tighten M10 hexagon
screws (20) to **50 Nm** .

Fav 900**Hydraulic pump assembly / LS pump
Installation and removal of LS pump****G**

Fit V-section sealing ring (17) (arrowed) to pressure pipe (16).



Pre-assemble hose bend (9) and intake socket (7).

Clip snap ring (6) in place.

Note:

Insert new O-ring in intake filter housing and grease.



Fit pre-assembled intake pipe.

Note:

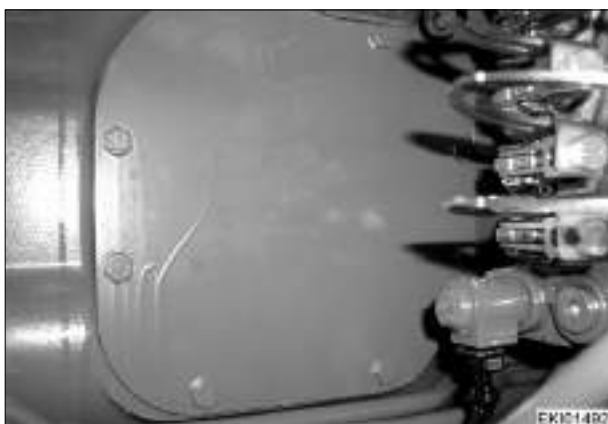
Slide intake socket (7) on until snap ring (6) engages.



Fit filter housing with new O-ring.

Fav 900**Hydraulic pump assembly / LS pump
Installation and removal of LS pump****G**

Fit new filter element and hand-tighten filter cover.



Clean flange surface, coat with sealant X 903.050.074.000 and fit cover.



Locate new sealing ring on pressure pipe and grease.



Fit pressure pipe to LS pump and to central control block (ZSB).

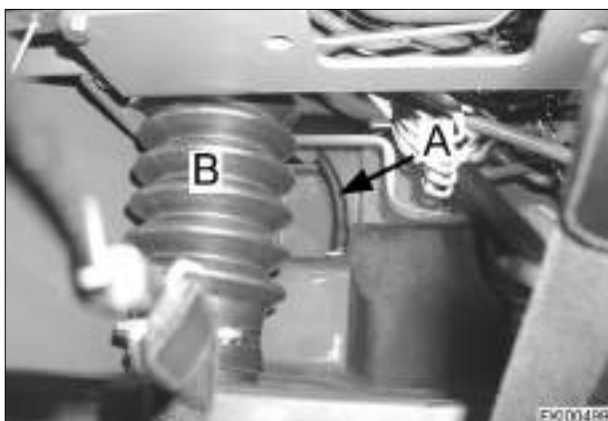
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Fav 900**Hydraulic pump assembly / LS pump
Installation and removal of LS pump****G**

Connect hydraulic lines (to transmission oil cooler) to valve unit.



Connect hydraulic lines (to transmission oil cooler) to connector (arrowed).



Fit right auxiliary tank with retaining cable.
Slide both connecting hoses A and B on and tighten hose clips.

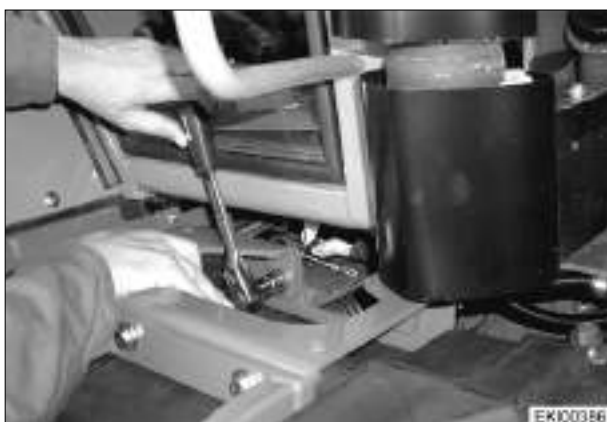


Fit venting tube.

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Fav 900**Hydraulic pump assembly / LS pump
Installation and removal of LS pump****G**

Release hose clamp.



Insert auxiliary tank and fit right step.

**Fill with oil using pump, preferably via return-flow coupling. (Oil is filtered in return flow.)**

If this is not possible, unscrew venting filter (A) and fill with oil through this opening.

Comply with specifications for oil type and quantity.

Initial fill approx. 70 l

Note:**See also :****Chapter 0000 Reg. A - Fuels and lubricants**

Check hydraulic system for performance and leaks.

If necessary, bleed load-sensing line at central control block (ZSB).

Concluding work:

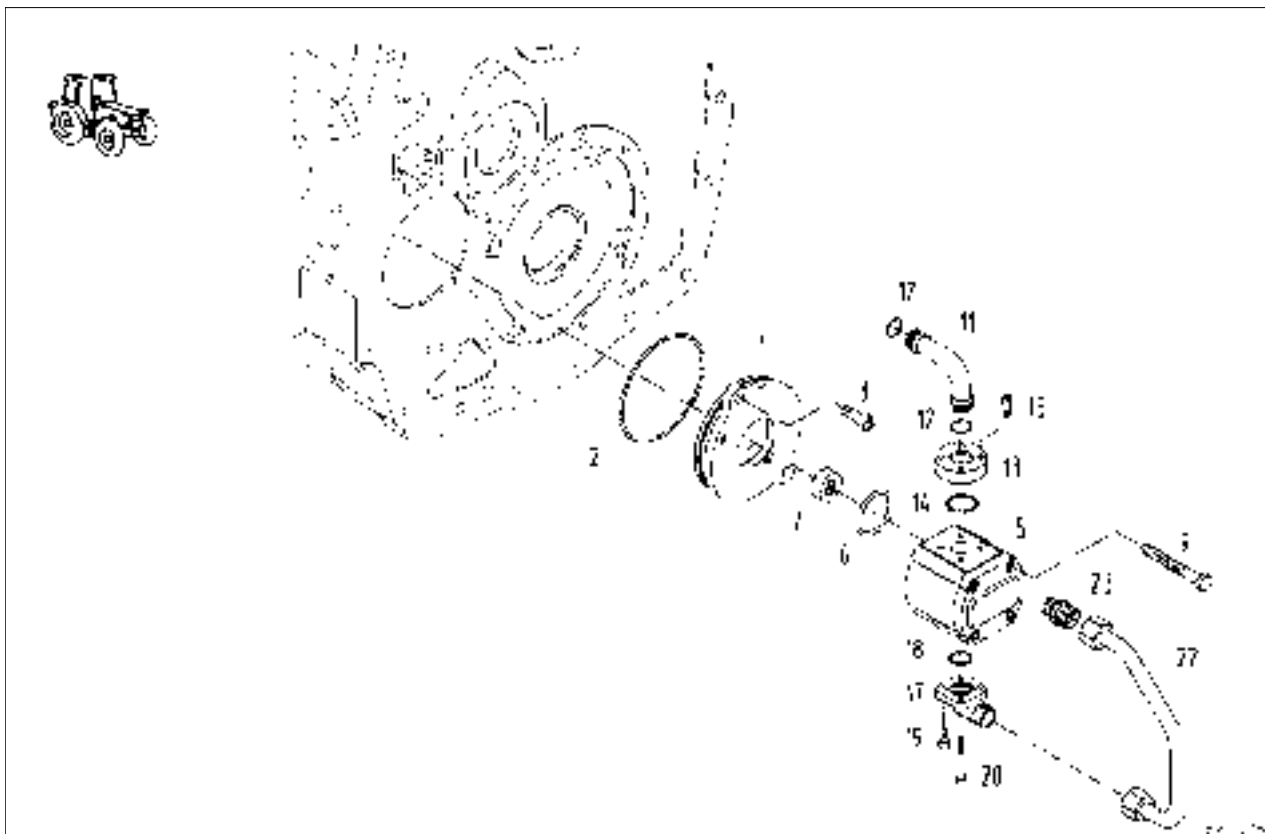
Fit panels on right side.

Fit right rear wheel.

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| 28.05.2001 | a | 11/11 | 9410 | G | 000001 |

Fav 900

Hydraulic pump assembly / Transmission pump Installation and removal of 1P1 - servopump

G

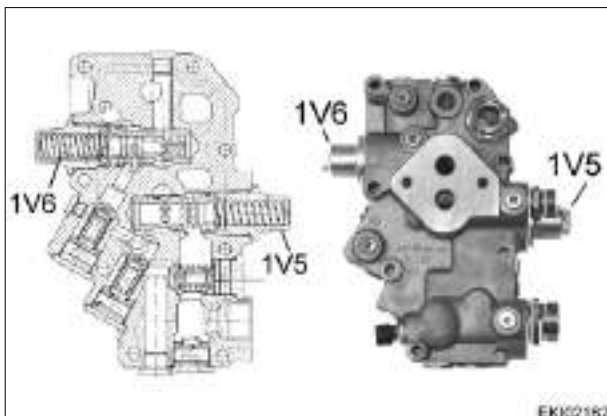
| Item | Designation | Item | Designation |
|------|-----------------------|------|-----------------------|
| 1 | Centering cover | 13 | Intake flange |
| 2 | O-ring | 14 | O-ring |
| 3 | Socket head cap screw | 15 | Socket head cap screw |
| 5 | 1P1 - servopump | 17 | Flange socket |
| 5 | Seal set | 18 | O-ring |
| 6 | O-ring | 19 | Socket head cap screw |
| 7 | Driver | 20 | Socket head cap screw |
| 9 | Hexagon screw | 22 | Pressure pipe |
| 11 | Bend | 23 | Screw socket |
| 12 | O-ring | | |

Note:

Chapter 1005 Reg. C - Transmission hydraulic circuit diagram with key

Chapter 1005 Reg. E - Transmission pressure test

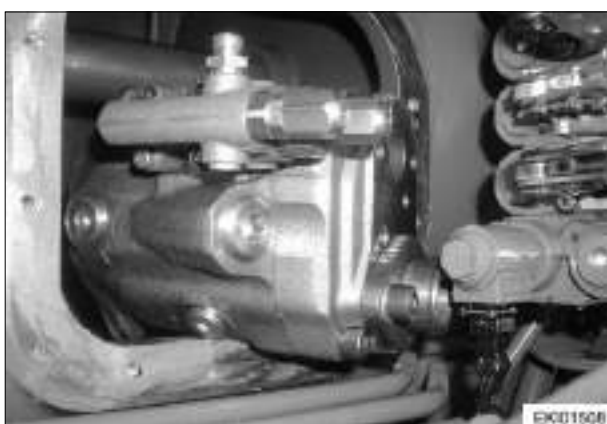
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| 23.08.2001 | a | 1/6 | 9420 | G | 000001 |

Fav 900**Hydraulic pump assembly / Transmission pump
Installation and removal of 1P1 - servopump****G**

If minimum pressure (approx. 25 bar) is not generated, check

1V5 = servopump pressure-relief valve

1V6 = servocircuit pressure-relief valve for leaks.

**Removing servopump (5)****Preliminary work:**

Remove PR - LS pump via hatch.

Chapter 9400 Reg. G - Installation and removal of PR - LS pump

Install and remove 1P1 - servopump via hatch.

Note:

Work was carried out on disconnected tractor for greater clarity.

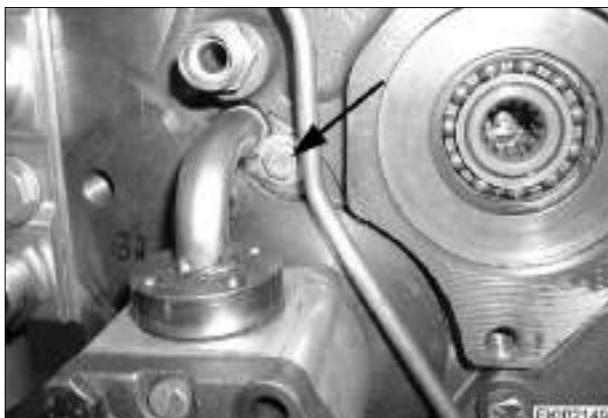


Remove pressure pipe (22).



Remove intake flange (13).

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| 23.08.2001 | a | 2/6 | 9420 | G | 000001 |

Fav 900**Hydraulic pump assembly / Transmission pump
Installation and removal of 1P1 - servopump****G**

Unscrew screw (arrowed).



Remove bend (11) with intake flange (13).



Unscrew two hexagon screws (9) and remove servopump (5).



Servopump (5) and driver (7)

Fav 900

Hydraulic pump assembly / Transmission pump Installation and removal of 1P1 - servopump

G**Installing servopump (5)**

Insert O-ring (6) into groove in servopump (5) and grease.



Unscrew flange socket (17).

Insert O-ring (18) into groove in flange socket (17) and grease.



Tighten flange socket (17) crosswise and in stages to **10 Nm**.



Place driver (7) against drive lug of servopump (5).

Note:

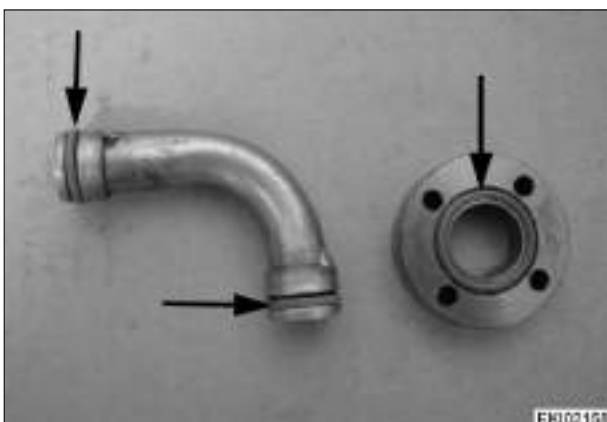
Drive lug of servopump (5) and driven lug of pump drive are offset by 90° relative to each other.

To prevent incorrect fitting one groove in driver (7) is caulked in each case.

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 23.08.2001 | a | 4/6 | 9420 | G | 000001 |

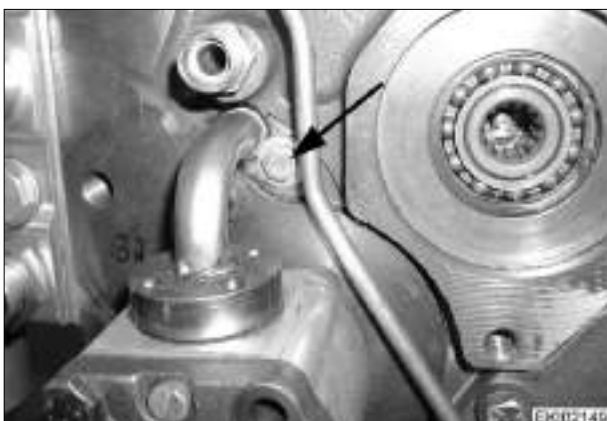
Fav 900**Hydraulic pump assembly / Transmission pump
Installation and removal of 1P1 - servopump****G**

Locate driver (7) and tighten servopump (5) in uniform stages to **49 Nm**.



Insert O-rings (12) into grooves in bend (11) and grease.

Insert O-ring (14) into groove in intake flange (13) and grease.



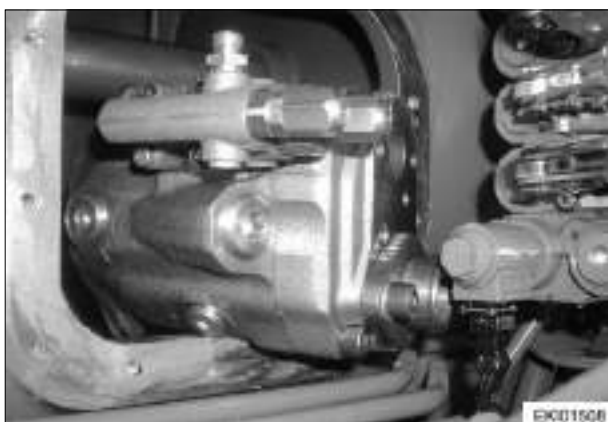
Fit bend (11) with intake flange (13) and secure with screw (arrowed).



Tighten intake flange (13) uniformly.

Fav 900**Hydraulic pump assembly / Transmission pump
Installation and removal of 1P1 - servopump****G**

Fit pressure pipe (22).

**Concluding work:**

Fit PR - LS pump via hatch.

Note:**Chapter 9400 Reg. G - Installation and removal
of PR - LS pump**

| | | |
|----------------------------------|---|----------|
| Fav 700 Fav 900 | Hydraulic pump assembly / Steering pump PL - auxiliary pump | E |
|----------------------------------|---|----------|

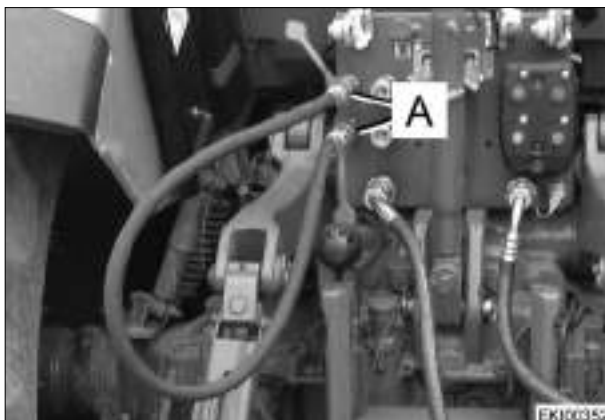
General:

- Operation and pressure for auxiliary pump connection can only be checked on tractor in event of **need scenario** .
- Need scenario exists when LS pump is exhausted by current oil demand and pressure demand from steering system is still higher than current working pressure of LS pump.

Verification by bypassing control valves:



Connect 250 bar pressure gauge to measuring point M2 on central control block.



Short-circuit any control valve using hydraulic hose.

E.g. + yellow valve connected to - yellow valve

Test stages

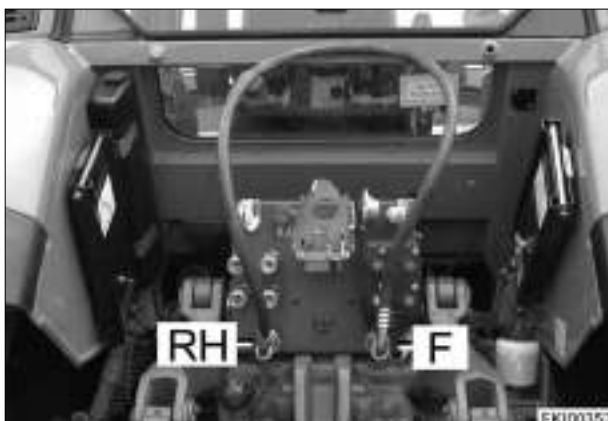
1. Start engine, idling speed.
2. Set relevant control valve to max. flow.
3. Open valve (permanent setting).
4. Move steering to full lock.
5. Check pressure at pressure gauge (measuring point M2) - **TARGET 190 bar** .
Enter readings in copy of test report (document 9600 E 000003).

| Date | Version | Page | PL - auxiliary pump | Capitel | Index | Docu-No. |
|---------|---------|------|---------------------|---------|-------|----------|
| 05/2000 | a | 1/3 | | 9430 | E | 000001 |

| | | |
|----------------------------------|---|----------|
| Fav 700 Fav 900 | Hydraulic pump assembly / Steering pump PL - auxiliary pump | E |
|----------------------------------|---|----------|

Verification using external pressure supply:

Connect 250 bar pressure gauge to measuring point M2 on central control block.



Connect terminal F = external pressure supply and RH = free return flow using hydraulic hose.

Test stages

1. Start engine, idling speed.
2. Move steering to full lock.
3. Check pressure at pressure gauge (measuring point M2) - **TARGET 190 bar** .
Enter readings in copy of test report (document 9600 E 000003).

Verification without pressure hose:**Test stages**

1. Start engine, idling speed.
2. Move steering to full lock
3. Fully lower rear power lift (without implement) or front loader (empty).
4. Move steering almost to full lock (release steering wheel.)
5. Raise rear power lift or front loader while simultaneously moving steering to full lock.

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|---------|------|------------------------------------|----------|---------------|
| 05/2000 | a | 2/3 | PL - auxiliary pump 9430 | E | 000001 |

| | | |
|----------------------------------|---|----------|
| Fav 700 Fav 900 | Hydraulic pump assembly / Steering pump PL - auxiliary pump | E |
|----------------------------------|---|----------|

Steering system response:

- Steering can be operated throughout using normal manual force, i.e. even when auxiliary pump is connected.
- At full lock engine is subjected to slight load and reduces its idling speed.

Pressure gauge readings:

| | Pressure gauge readings at M2 |
|---------------|--------------------------------------|
| Free steering | Depending on force requirement |
| At full lock | 190 bar |

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / General system Hydraulics comparison of Fav 700 with Fav 500, 800, 900 and XYLON | A |
|----------------------------------|--|----------|

Abridged version and hydraulics comparison

| | FAVORIT 700 | FAV 900, 800, 500, XYLON |
|---------------------------------------|--|---|
| Feature | Central control block (ZSB) with integral switching and functional components | Components located externally in pipes |
| LS pump | Inclined-disc axial-flow piston pump with pressure and flow rate regulation | |
| Minimum standby pressure | 42-45 bar | 20-23 bar |
| Starting process | First preliminary stage - without 22 bar control pressure - parallel oil preheating at low temperatures | Directly to standby |
| Swivel angle Volumetric capacity | Initially limited to 40 cm ³ /rev Approx. 100 l/min From Oct 98 max. 45 cm ³ /rev Approx. 110 l/min | Limited to 40 cm ³ /rev Approx. 100 l/min |
| Design | Compression and intake connections radially in cover From Oct 98 on axial face in cover | |
| Control pressure differential | 20 bar | |
| Max. working pressure | 200 bar | |
| Auxiliary pump | Gear pump 11 cm ³ /rev 34 l/min | Gear pump 16 cm ³ /rev 39-41 l/min |
| Connection precondition | LS pump exhausted and steering heavy | |
| Max. pressure | 190 bar | |
| Location / drive | On transmission | On engine |
| Monitor | Active above 1000 rpm engine speed; separate monitor | Only active above 1800/1000; common monitor |
| LS pump | 25 bar or 8 bar pressure-operated switch | 0.5 / 5 bar pressure-operated switch |
| Auxiliary pump | Flow monitor | 0.5 bar pressure-operated switch / flow monitor |
| Oil level | Level sensor (= switch) | Level sensor (= sensor) |
| Oil level display/messages | Normal / empty warning / empty fault message | At min and max: flashing bars |
| Positions | Solenoid switch at front power lift shutoff From 6/99: Solenoid switch at EPC/DA switch | Solenoid switch at EPC/DA switch |
| Control valve type | SB 23 LS-EHS | SB 23 LS |
| Actuation system | Electrohydraulic with CAN-bus ("V-bus") and control pressure of 22 bar | Mechanical |
| | Programmable assignment button / valve yellow / blue / red / green (red / green / yellow / blue) | Fixed assignment control lever / valve yellow / blue / red / green |
| Volume setting | Electrically proportional | Mechanical preset |
| Rear EPC valve, spool valve type | "Disc" valve, two-piece | Flange-mounted valve, one-piece |
| Front power lift control valve | Last valve / integral | Separately enclosed / lockable |
| E-box | Fendt | Bosch |
| EPC-DA | Integrated in central control block | |

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|----------|------|--|----------|---------------|
| 12/1999 | a | 1/3 | Hydraulics comparison of Fav 700 with Fav 500, 800, 900 and XYLON 9600 | A | 000003 |

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / General system Hydraulics comparison of Fav 700 with Fav 500, 800, 900 and XYLON | A |
|----------------------------------|--|----------|

Abridged version and hydraulics comparison (Forts.)

| | FAVORIT 700 | FAV 900, 800, 500, XYLON |
|--|--|---|
| Switchover | Spool valves, key on control console | |
| | From 6/99: externally enclosed Mechanical block ball valve | Externally enclosed Mechanical block ball valve |
| Possible option | - | Pressure sensor (regulator) for front and rear power lift |
| Shuttle valves | Principle, operation, required quantity | |
| - position | Integrated in central control block | Externally enclosed in part |
| Maintenance (acc. to op. hours) | | |
| Return flow filter change | Initially after 500, then every 1000 | |
| Control pressure microfilter | Initially after 500, (see Maintenance Schedule) | (Not available) |
| Oil change | Initially after 1000, then every 1000 | |
| High-pressure filter in flow monitor | Maintenance-free | |
| | Oil grade as per Maintenance Schedule | |
| | Commissioning specification (LS pump) | |
| Measuring and testing of existing pressure-measuring points | M1 (not required and therefore not available) M2 = auxiliary pump M3 = LS pump M4 = LS pressure (marked at central control block) M5 = 22 bar control pressure (at end plate) | M1 = LS pump (depending on accessibility) M2 = auxiliary pump M3 = LS pump |

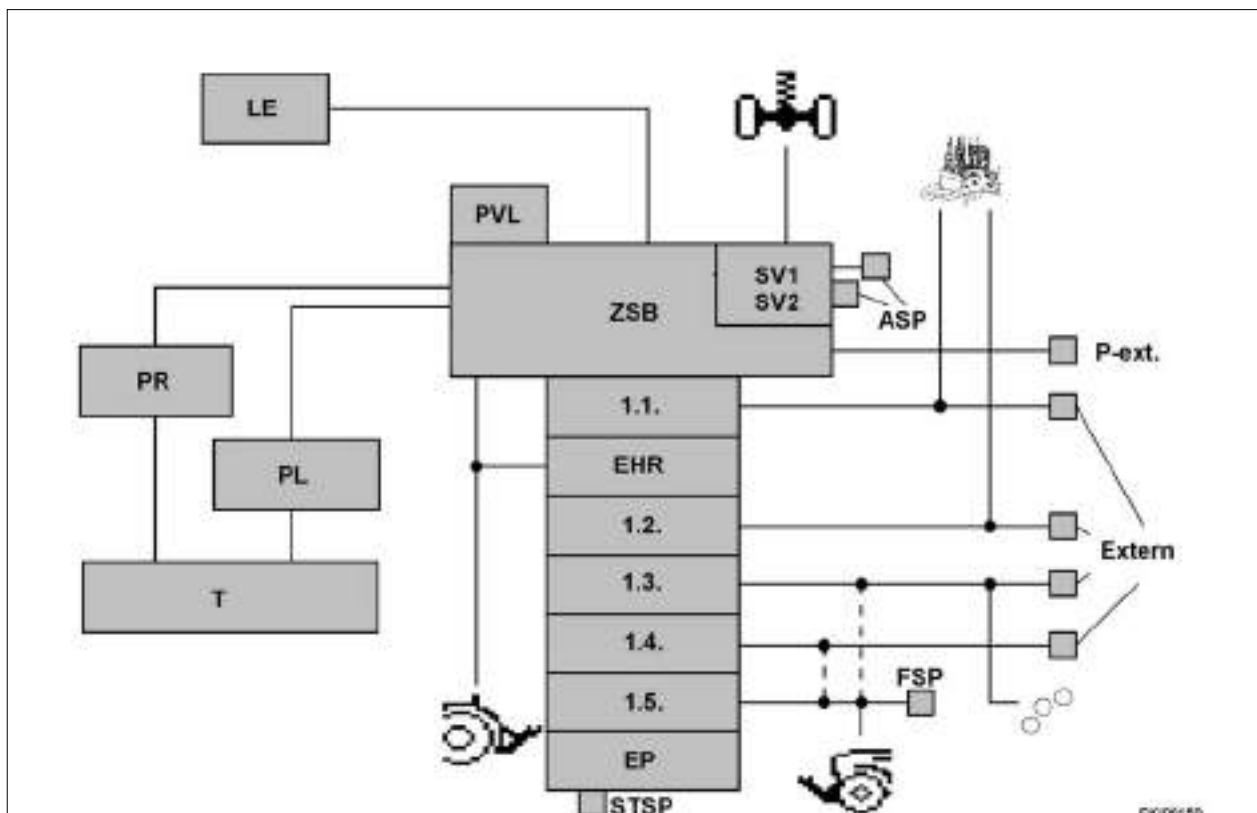
| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|----------|------|-------------|----------|---------------|
| 12/1999 | a | 2/3 | 9600 | A | 000003 |

Fav 700
Fav 900

Hydraulics / General system

Hydraulics comparison of Fav 700 with Fav 500, 800, 900 and XYLON

A



| | | | |
|-----------|-------------------------------------|----------|---|
| LE | Steering | 1.2. | Control valve 2nd position |
| PR | LS pump | 1.3. | Control valve 3rd position |
| PL | Auxiliary pump | 1.4. | Control valve 4th position |
| T | Hydraulic oil tank | 1.5. | Control valve 5th position (enhanced-feature front power lift) |
| PVL | Steering priority valve | EP | End plate |
| ZSB | Central control block | STSP | Control pressure accumulator |
| SV1 / SV2 | Lower suspension / Raise suspension | FSP | Front power lift accumulator |
| ASP | Suspension accumulator | P-ext. | External pressure connection |
| 1.1. | Control valve 1st position | External | Rear connections |
| EPC | EPC lift / lower | | |

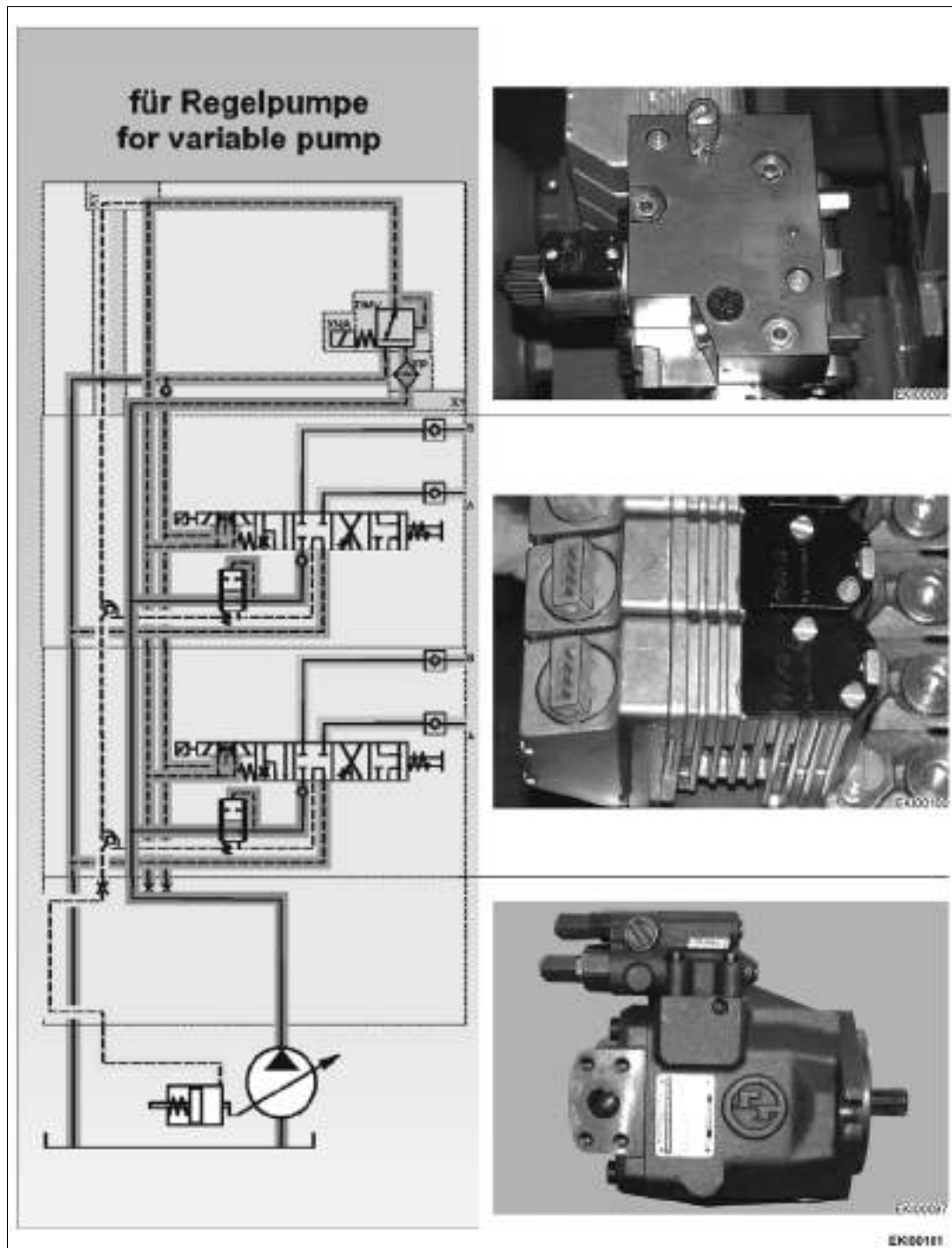
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|---------|---------|------|--|----------|---------------|
| 12/1999 | a | 3/3 | Hydraulics comparison of Fav 700 with Fav 500, 800, 900 and XYLON 9600 | A | 000003 |

Fav 700
Fav 900

Hydraulics / General system
Hydraulic circuit design

A

**Hydraulics control system function chart for
electrohydraulic control units SB 23 LS-EHS**

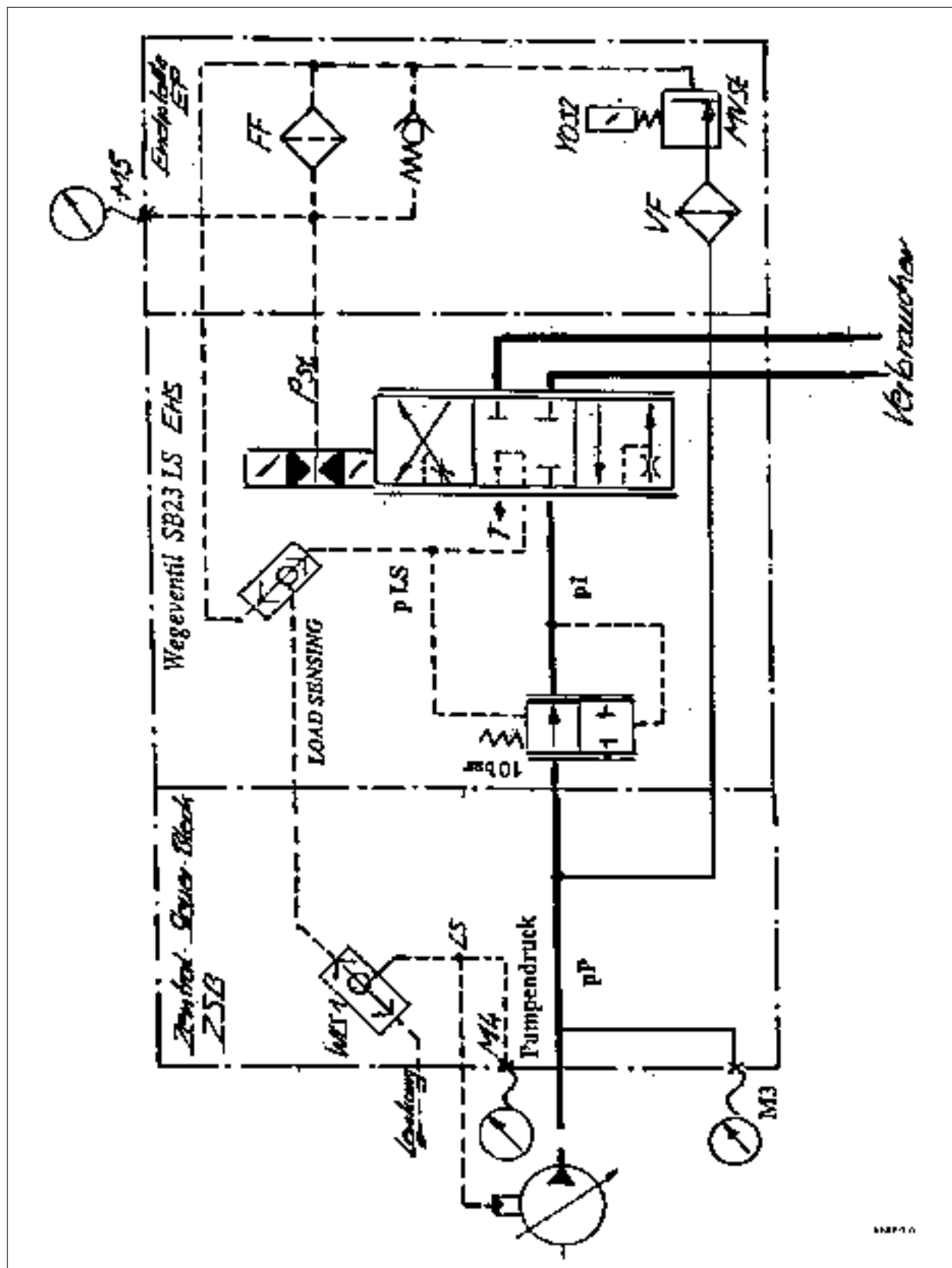


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| 01/2001 | a | 1/1 | 9600 | A | 000005 |

Hydraulic circuit design

<https://www.truck-manuals.net/>

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|----------------------------------|---|----------|
| <i>Fav 700</i> <i>Fav 900</i> | Hydraulics / General system 22 bar control pressure | A |
|----------------------------------|---|----------|



| | | | | | | |
|------------|---------|------|-------------------------|---------|-------|----------|
| Date | Version | Page | 22 bar control pressure | Capitel | Index | Docu-No. |
| 11.01.2001 | a | 1/1 | | 9600 | A | 000006 |

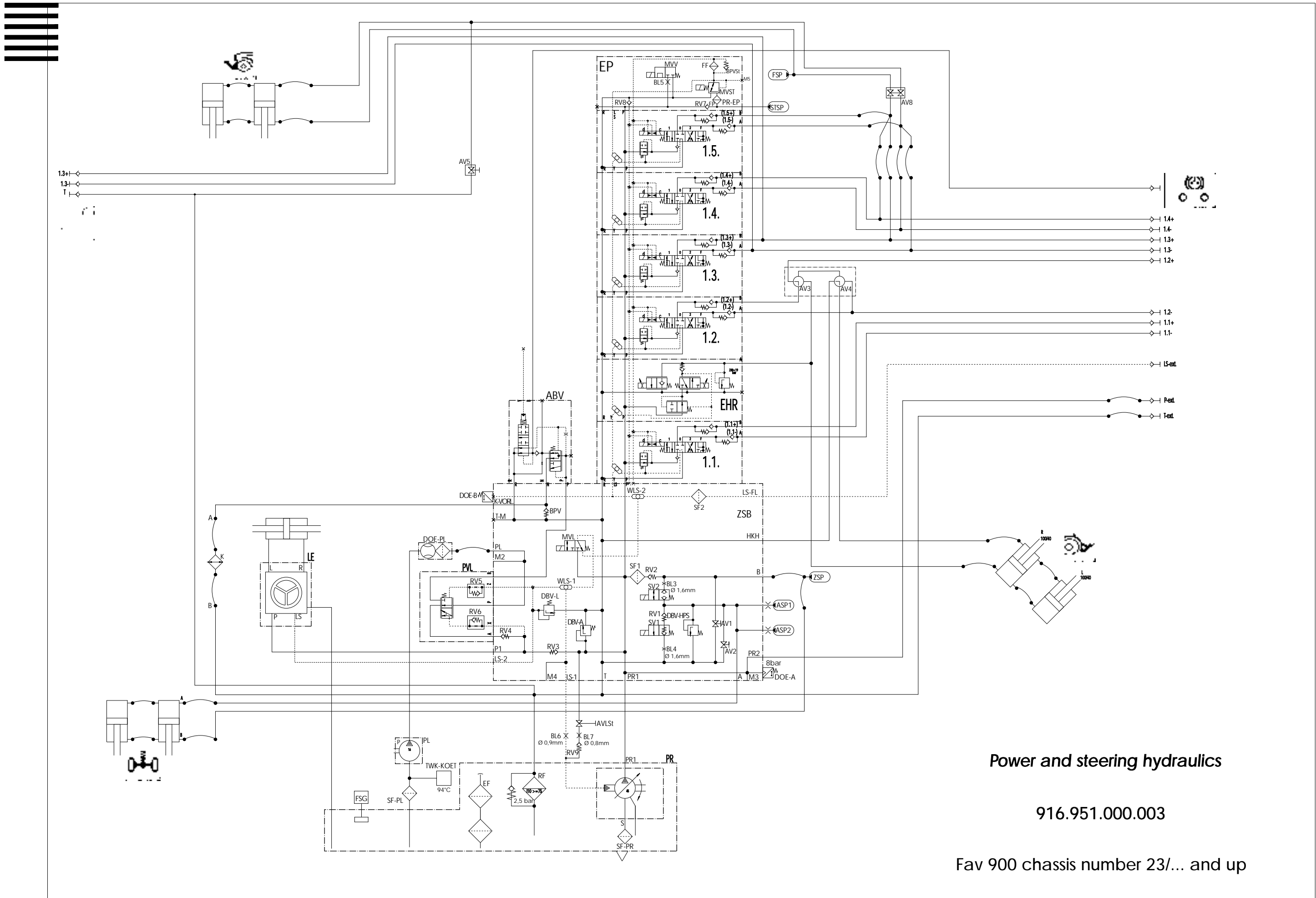
| | | |
|----------------|---|----------|
| Fav 900 | Hydraulic - Equipment / System in General Hydraulic Diagram with legend | C |
|----------------|---|----------|

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| 10/2000 | a | 1/5 | 9600 | C | 000003 |

| | | |
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| Fav 900 | Hydraulic - Equipment / System in General Hydraulic Diagram with legend | C |
|----------------|--|----------|

| | | | | | |
|---------------|------|--|------------|------|--|
| 1.1. | Y015 | Spool Valve 1st Layer | MVV | Y033 | Flush Solenoid Valve |
| 1.2. | Y016 | Spool Valve 2nd Layer | N on ABV | | Return to Tank |
| 1.3. | Y017 | Spool Valve 3rd Layer | P | | Output PR1 - Spool Valves |
| 1.4. | Y018 | Spool Valve 4th Layer | P on ABV | | Connection PL (Auxilliary Pump) on ZSB |
| 1.5. | Y019 | Spool Valve 5th Layer | P on LE | | Pressure Line Steering |
| A on ZSB | | Suspension Lifting (ZSB) | P on PVL | | Input PL (Auxilliary Pump) |
| A on PVL | | Output PVL toward Steering | P on PR | | Outlet Load Sensing Pump |
| A an K | | Inlet Radiator | P ext. | | Externeal Pressure Connection |
| ABV | | Hydraulic Traler braking Valve | P1 | | Load sensing Pump toward Steering |
| ABV-external. | | Connector hydraulic Traler braking Valve | PL | | Auxilliary Pump |
| ASP1 | | Accumulator Suspension | PL1 | | Input Load Sensing Pump |
| ASP2 | | Accumulator Suspension | PR | | Load Sensing Pump |
| AV1 | | Shutoff Pressure Relief Suspension | PR1 | | Input Load Sensing Pump |
| AV2 | | Shutoff Pressure Relief Suspension | PR2 | | Output P - external |
| AV3 | | Toggle Valve EPC - DA | PR-EP | | Input PR (Load Sensing Pump) Final plate |
| AV4 | | Toggle Valve EPC - DA | PSt on ZSB | | Control Pressure 22 bar on Main Control Bloc ZSB |
| AV5 | | Toggle Valve SA - DA Front Powerlift | PVL | | Priority Valve |
| AV8 | | Shutoff valve FKH - Valve 1.3. | R | | Return Additional Valvave |
| B | | Connection Lowering Suspension | R on ABV | | Relief of Trailer Braking Valve |
| B on ABV | | Connector hydraulic Tubing - Rear Connectors | R on LE | | Steering Toward Steering Cylinder |
| B on PVL | | Return over trailer Braking Valve | RF | | Return Filter to tank |
| B on K | | Radiator Output | RV1 | | Shutoff valve Suspension |
| BL3 | | Orifice 1,6mm Lifting Suspension | RV2 | | Shutoff valve Suspension |
| BL4 | | Orifice 1,6mm Lowering Suspension | RV3 | | Shutoff valve Auxilliary Pump toward Load sensing Pump |
| BL5 | | Orifice 1,5mm Oil Heating | RV4 | | Shutoff valve Load sensing Pump toward Auxilliary Pump |
| BPV | | radiator Bypass Valve | RV5 | | Shutoff valve within Final Plate |
| BPVSt | | Bypass Valve within Final Plate | RV6 | | Shutoff valve within Priority valve |
| DBV-A | | Pressure Limiting Valve Load Sensing Pump 230 bar | RV7 | | Shutoff valve Final Plate |
| DBV-HPS | | Pressure Limiting Valve 250 bar - Suspension | RV8 | | Shutoff valve Final Plate |
| DBV-L | | Pressure Limiting Valve Steering 175 bar | S | | Aspiration Load sensing Pump |
| DOE-A | S025 | Pressure Switch 8 bar (Monitoring Load Sensing Pump) | SF1 | | Filter 0,200mm Suspension |
| DOE-B | | Connection for Kick-out Switch B022 | SF2 | | Filter 0,200mm LS - external |
| DOE-PL | S026 | Flow Monitor (Monitoring Auxilliary Pump) | SF-PL | | Filter upstream Auxilliary Pump |
| EF | | Cover Filling Point Hydraulic tank | SF-PR | | spiration Filter Load sensing Pump |
| EPC | Y021 | EPC - Lifting | STSP | | Accumulator Control Pressure |
| EPC | Y022 | EPC - Lowering | SV1 | Y013 | Lowering - Suspension |
| EP | | Final plate | SV2 | Y014 | Lifting - Suspension |
| FF | | Filter in Final Plate (grid) 0,025 mm | SV3 | Y030 | electric switching EPC - DA locked |
| FF | | Filter in Final Plate (grid) 0,025 mm | SV3 | Y030 | electric switching EPC - DA locked |
| FSP | | Accumulator Front Powerlift | SV4-VS | Y031 | EPC - DA Switching locked |
| HKH | | Rear powerlift | T | | Return - Tank |
| K | | Hydraulic Oil Radiator | T-EP | | Return MVV via Final Plate |
| K-Vorl. | | Output Auxilliary Pump | T on LE | | Return from Steering |
| L on LE | | Steering toward steering Cylinder | T-M | | Input - Return Multiple Coupler |
| LE | | Steering | T-RH | | Return Line external from Rear |
| LS | | Output LS to Control Valve | TSt on ZSB | | Tetum Pump Control Presssureaon Main Control Bloc |
| LS-external. | | LS - Connection, external | TWK -KOET | B013 | Temperature Switch Hydraulic Oil |
| LS1 | | LS toward Load Sensing Pump | TWK -KOET | S040 | Temperature Switch Hydraulic Oil 15°/25° C (Twin Control Module Fav 700) |
| LS2 | | LS toward Steering | VF | | Filter in Final Plate |
| LS-FL | | LS - external | WLS-1 | | Togglng Valve |
| M2 | | Mearuring Point Auxilliary Pump | WLS-2 | | Togglng Valve (external LS) |
| M3 | | Mearuring Point Load Sensing Pump | X on PVL | | Input PR (Load Sensing Pump) |
| M4 | | Mearuring Point LS | Y on ABV | | Connection Brake Control Hose |
| M5 | | Mearuring Point Control pressure 22 in Final plate | Z on PVL | | Input LS - Pressure, Steering |
| MVL | Y012 | Charge Valvel (Suspension, Oil Heating) | ZSB | | Main Control Bloc |
| MVSt | Y032 | Solenoid Valve Neutral (Valves) | ZSB | | Main Control Bloc |

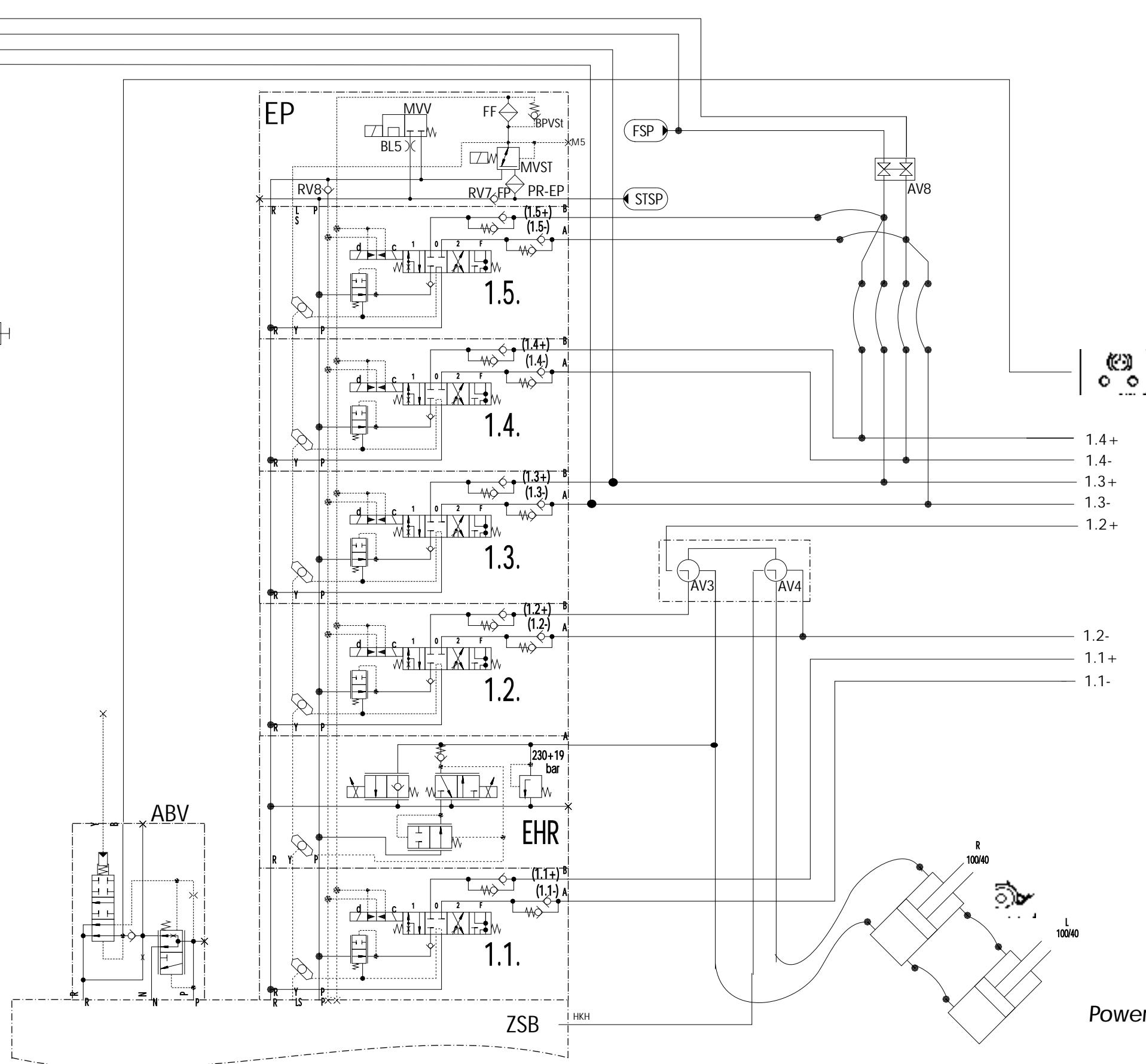
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Power and steering hydraulics

916.951.000.003

Fav 900 chassis number 23/... and up



Power and steering hydraulics

916.951.000.003

Fav 900 chassis number 23/...and up

Fav 900

Hydraulik Equipment / System in General

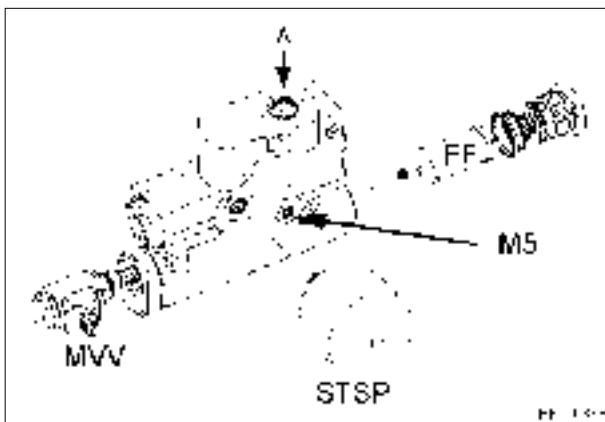
Overview Measuring Points

D

- M2** = Meßstelle Hilfspumpe
M3 = Measuring Point Load Sensing Pump
M4 = Measuring Point Load Sensing Control Pressure



Top Side of Main Control Bloc (ZSB)



- M5** = Control Pressure
 Lower Side of final Plate



More detailed Test Instructions, consult : "Test procedure and Protocol for hydraulic Functions";

| | | | |
|----|------|---|--|
| M2 | pPL | Values Test Instruction / case of necessity 1) | minimal Circulation Pressure (depeding on Oil Temperature and flow) in case of necessity 1) and full steering 190 bar Case of necessity is given when load sensing pump is "busy" with oil needs of actually active oil receptors and steering requires an higher oil-pressure as the momentarily operating pressure. |
| M3 | pPR | | all Pressures of Load Sensing Pump · min. Standby pressure · aktual Operating Pressure · max. Standby pressure Further functions (Speed, cold start , Hot Start) are active during engine Start. More detailed description in " Starting Process und statuses of the Load Sensing Pump and " Hydraulic Oil Heating" |
| M4 | p LS | | LS- Pressure (= Control / Signal) on Load Sensing Pump |
| M5 | p St | | Control Pressure for actuation of Spool Valves 1....5 |

| | | |
|----------------------------------|---|----------|
| Fav 700 Fav 900 | Hydraulics / General system Test report - fax template | E |
|----------------------------------|---|----------|

| | | | | |
|-------------|------------------|--|------|-----------------|
| Fendt | | Test report / overall hydraulics operation | | Measurement no. |
| Chassis no. | Op. hrs. reading | Keyword | Name | Date |
| | | | | Time |

| Starting condition | LS pump pressure | LS pressure | Control pressure | Auxiliary pump pressure | Other results |
|--|---|---|--|---|-----------------|
| - engine idling - all valves in neutral - no steering; suspension locked | (bar) Measuring point M3 on central control block ZSB | (bar) Measuring point M4 on central control block ZSB | (bar) Measuring point M5 on end plate EP | (bar) Measuring point M2 on central control block ZSB | Oil temperature |

| A | LS pump test | SETPOINT ACTUAL | SETPOINT ACTUAL | SETPOINT ACTUAL | SETPOINT ACTUAL | ACTUAL |
|-----|--|------------------------------------|--------------------|--------------------|--------------------|--------|
| A1 | Min. standby pressure (for starting process see separate test) | 42-45 | 22 +/-1 | 22 +/-1 | Min | |
| A2 | Free steering when stationary to left / right | Depending on resistance 22 +/-1 | | Min | | |
| A3 | Steering to stop to left / right | 200 / 200 | 200 / 200 | 22 +/-1 | Min | |
| A4 | Control valve 1 Lift / Lower | 200 / 200 | 200 / 200 | 22 +/-1 | Min | |
| A5 | Control valve 2 Lift / Lower | 200 / 200 | 200 / 200 | 22 +/-1 | Min | |
| A6 | Control valve 3 Lift / Lower | 200 / 200 | 200 / 200 | 22 +/-1 | Min | |
| A7 | Control valve 4 Lift / Lower | 200 / 200 | 200 / 200 | 22 +/-1 | Min | |
| A8 | Control valve 5 Lift / Lower | 200 / 200 | 200 / 200 | 22 +/-1 | Min | |
| A9 | Rear EPC with external pushbutton to stop | 200 | 200 | 22 +/-1 | Min | |
| A10 | Front power lift with external pushbutton to stop | 200 | 200 | 22 +/-1 | Min | |
| A11 | Suspension ON or during lifting | 200 | 200 | 22 +/-1 | Min | |

| Date | Version | Page | Test report - fax template | Capitel | Index | Docu-No. |
|---------|---------|------|----------------------------|---------|-------|----------|
| 12/2000 | a | 1/2 | | 9600 | E | 000001 |

| | | |
|----------------------------------|---|----------|
| Fav 700 Fav 900 | Hydraulics / General system Test report - fax template | E |
|----------------------------------|---|----------|

| | | | | |
|-------------|------------------|--|------|-----------------|
| Fendt | | Test report / overall hydraulics operation | | Measurement no. |
| Chassis no. | Op. hrs. reading | Keyword | Name | Date |
| | | | | Time |

| | | | | | | |
|--|--|---|---|--|---|-----------------|
| | Starting condition | LS pump pressure | LS pressure | Control pressure | Auxiliary pump pressure | Other results |
| | - engine idling - all valves in neutral | (bar) Measuring point M3 on central control block ZSB | (bar) Measuring point M4 on central control block ZSB | (bar) Measuring point M5 on end plate EP | (bar) Measuring point M2 on central control block ZSB | Oil temperature |
| | - no steering; suspension locked | | | | | |

| | | | | | | |
|----|--|--------------------|--------------------|--------|-------------------------|--|
| B | Auxiliary pump test - short-circuit hose at valve p of P-ext - valve at max. volume or - raise power lift and meanwhile | | | | | |
| B1 | free steering when stationary | Min. or after load | Min. or after load | 22 ± 1 | Depending on resistance | |
| B2 | Steering to stop to left / right | Min / after load | Min / after load | 22 ± 1 | 190 / 190 | |

| | | | | | | |
|----|--|-------------------|-------------------|-------------------|-------------------|--|
| C | Further measurements (special conditions / combinations / order / settings / implements) | Setpoint / Actual | Setpoint / Actual | Setpoint / Actual | Setpoint / Actual | |
| C1 | | | | | | |
| C2 | | | | | | |
| C3 | | | | | | |

Farmer 400
Fav 700
Fav 900

Hydraulics / Central control block

Central control block

A

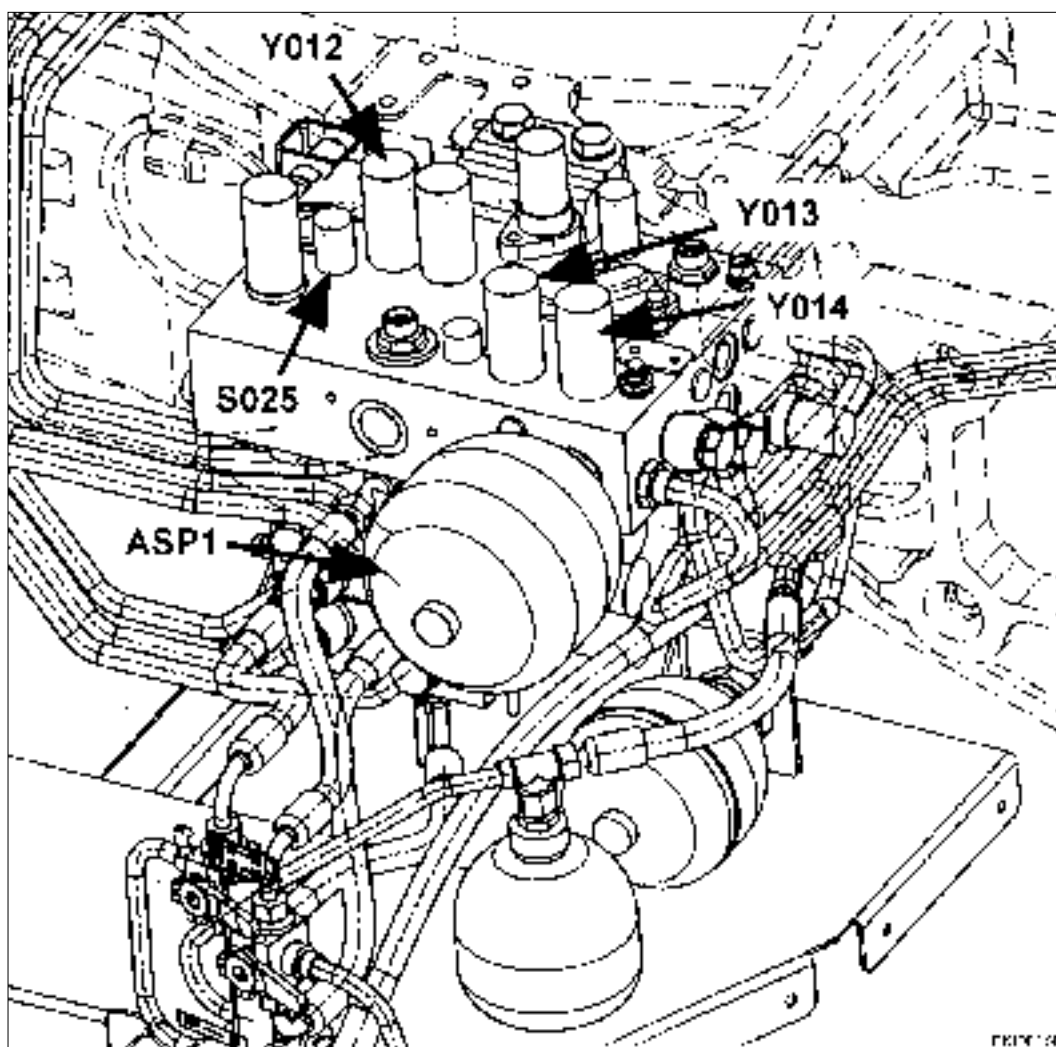
The central control block incorporates important hydraulic functions. This has enabled a large number of hydraulic hose connections to be saved.

The following components are integrated in the central control block (ZSB):

- Front-axle suspension valves
- Steering system valves
- Pressure-relief valves
- Shuttle valves (WLS 1+2)
- Non-return valves

The following are flange-mounted:

- Electrohydraulic control units SB 23 LS - EHS
- EPC valve
- Nitrogen accumulator for front-axle suspension
- External LS connection
- Measurement points M2, M3 and M4



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| 10/1999 | a | 1/3 | 9610 | A | 000001 |

Central control block

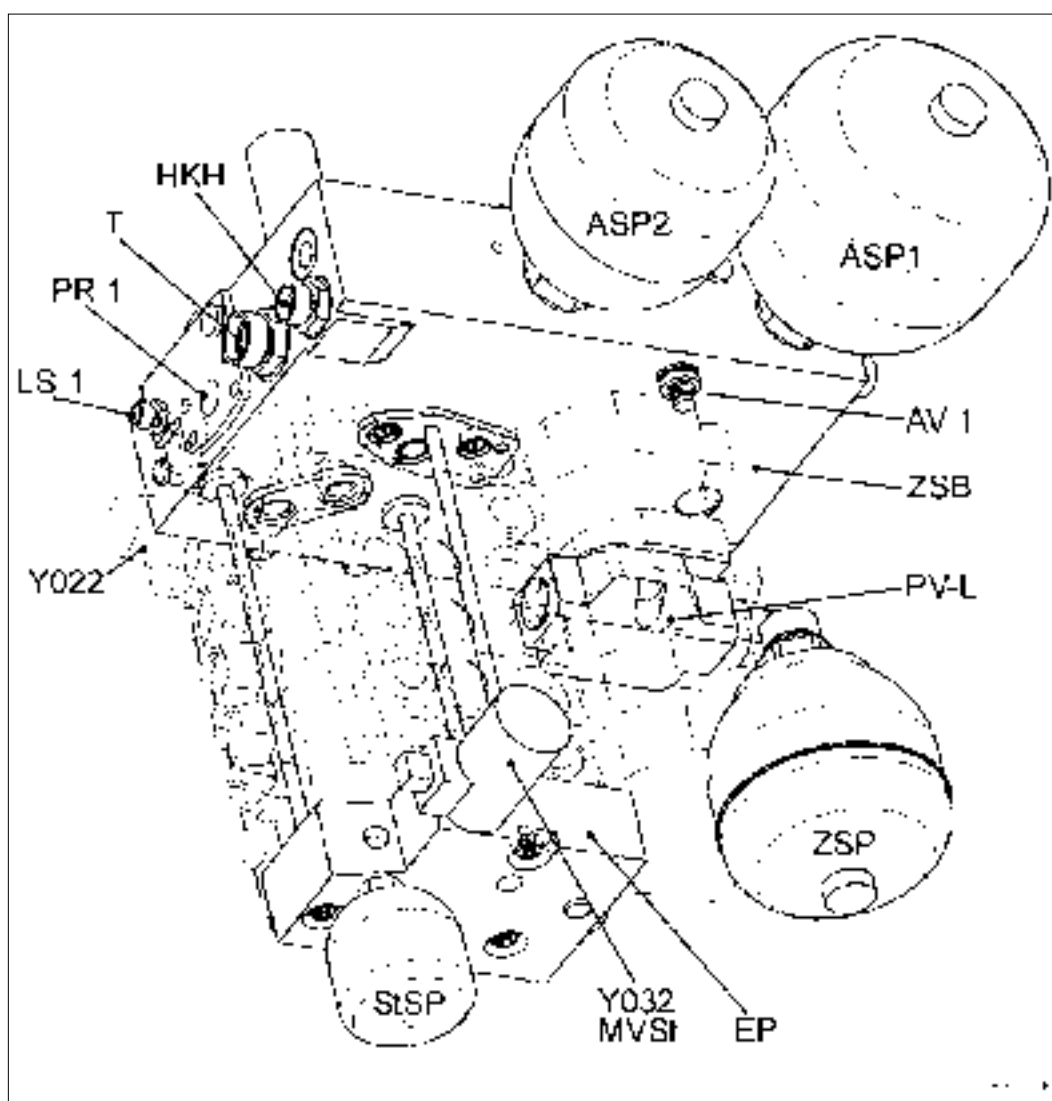
<https://www.truck-manuals.net/>

Farmer 400
Fav 700
Fav 900

Hydraulics / Central control block
Central control block

A

PR 1 = LS pump inlet
 LS 1 = LS pump outlet
 HKH = Rear power lift EPC/DA
 T = Tank outlet
 AV 1 = Pressure relief for front-axle suspension
 ZSB = Central control block
 PV-L = Steering priority valve (to connect auxiliary pump if required)
 EP = End plate (22 bar control pressure)
 Y022 = Lower EPC valve
 Y032 = Pressure-reducing valve (22 bar control pressure)
 ASP 1 = Suspension accumulator
 ASP 2 = Suspension accumulator
 ZSP = Auxiliary suspension accumulator
 STSP = End plate nitrogen accumulator

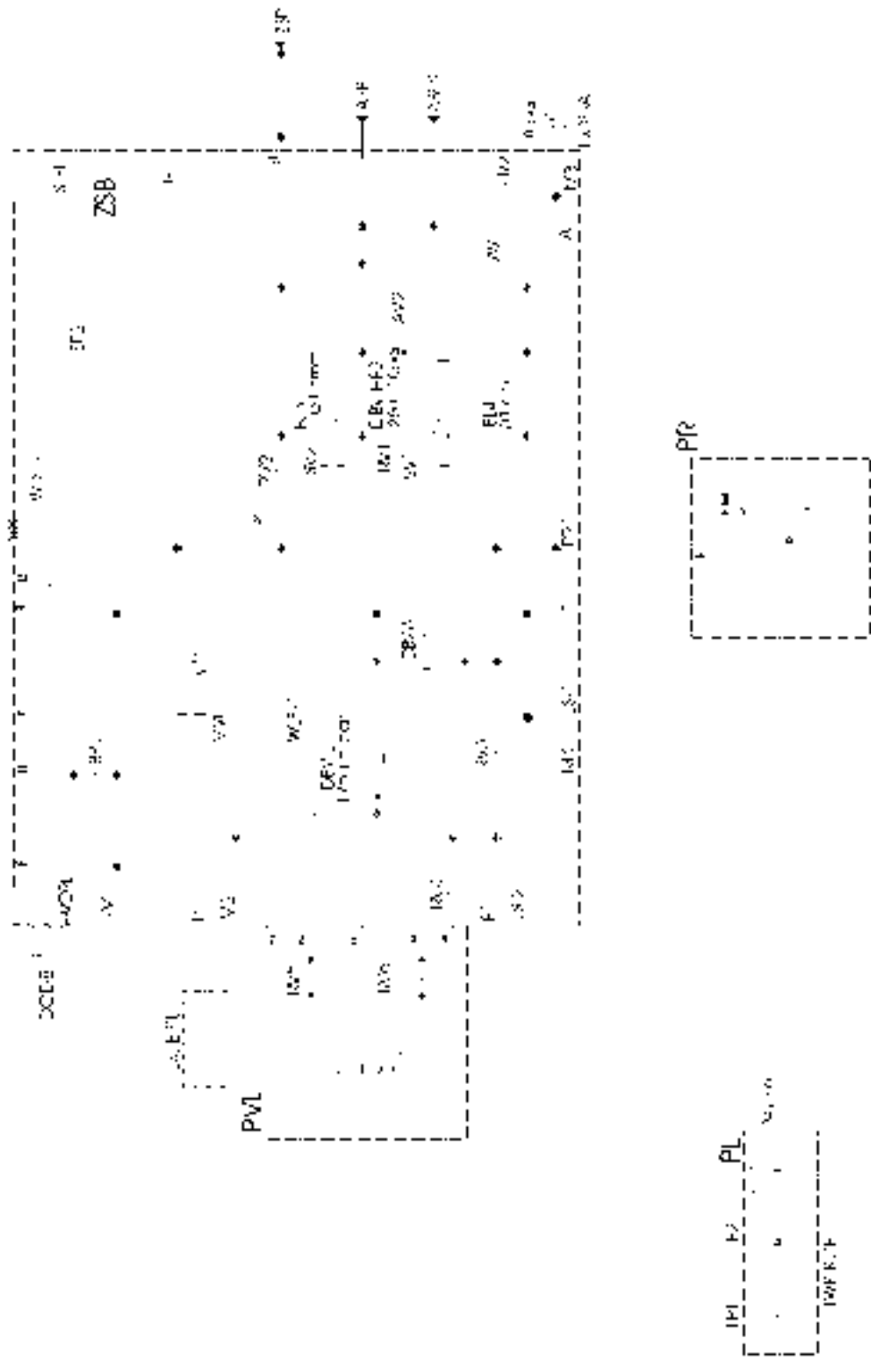


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Central control block

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| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Hydraulics / Cetral control block Central control block | A |
|----------------------------------|---|----------|



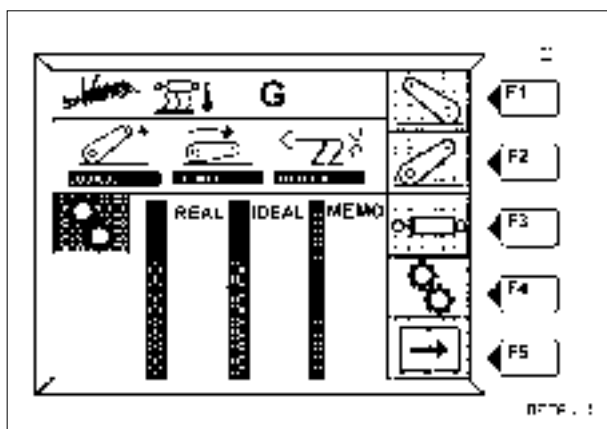
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| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / Valve assemblies Control valves SB 23 LS - EHS / Emergency mode | A |
|----------------------------------|--|----------|

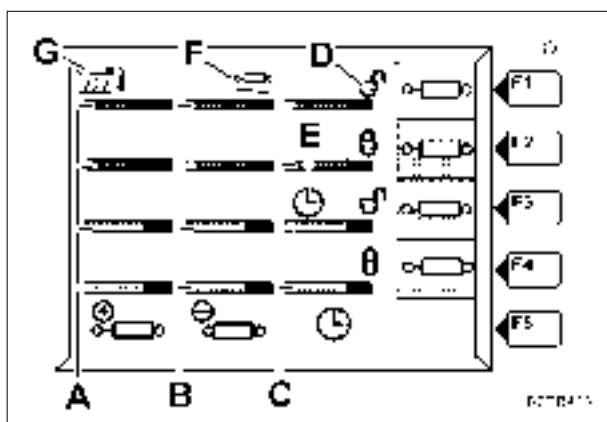
Note:

The SB 23LS electrical auxiliary control valves used in the Fav 700 are identical in terms of function to the auxiliary control valves for the Fav 900 of chassis number 23/... and higher but must not be fitted in the latter tractor type.

The electrical auxiliary control valves (Bosch SB 23LS - EHS with CAN actuation) are equipped with flow rate adjustment and a floating position and are therefore individually adaptable for any consumer. The valve functions are set via the control console.



Press **key F3** and valve setting submenu seen at left is displayed.



A = bar display, flow rate, lifting

B = bar display, flow rate, lowering

C = bar display, actuating time

D = lock pictogram, valve locking ON/OFF

E = clock pictogram, displayed when relevant valve is switched on by timer function

F = cylinder pictogram, displayed while relevant valve is in floating position

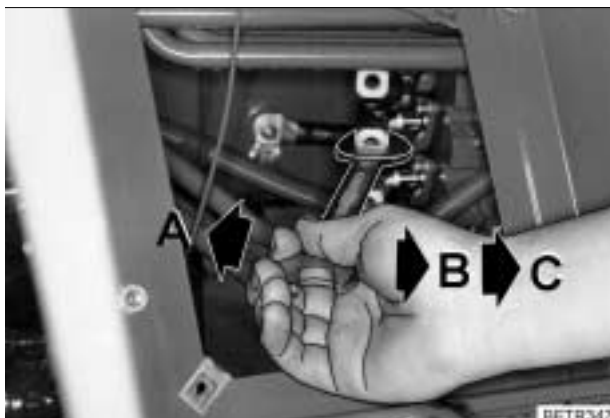
F1-F5 = move to submenu of individual valves

| Date | Version | Page | Capitel | Index | Docu-No. |
|---------|----------|------|--|----------|---------------|
| 10/1999 | b | 1/6 | Control valves SB 23 LS - EHS / Emergency mode 9620 | A | 000002 |

Fav 700
Fav 900

Hydraulics / Valve assemblies
Control valves SB 23 LS - EHS / Emergency mode

A



Manual mode: Fav 700

In the event of electronic failure, the individual valves can also be operated manually.

- Remove cover on right entrance step.
- Use spanner (22 mm) to actuate valve.

Actuation directions:

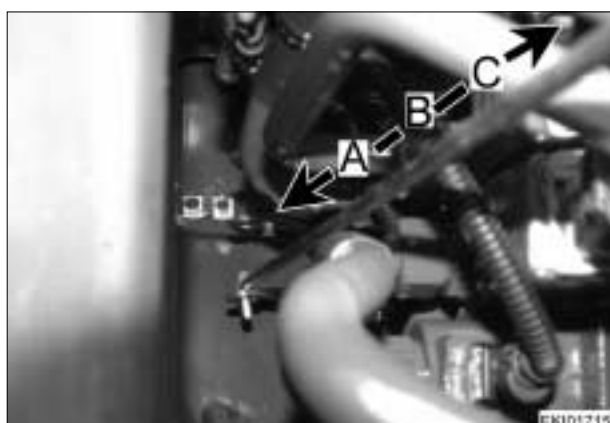
- A = Lifting
B = Lowering
C = Floating position



Manual mode:

Fav 900 chassis number 23/3001 and up

Linkage (A) behind cover at entrance step (right).



Actuate valves using linkage.

Actuation directions:

- A = Lifting
B = Lowering
C = Floating position



Pictogram shown at left is displayed during manual mode with engine running.

Note:

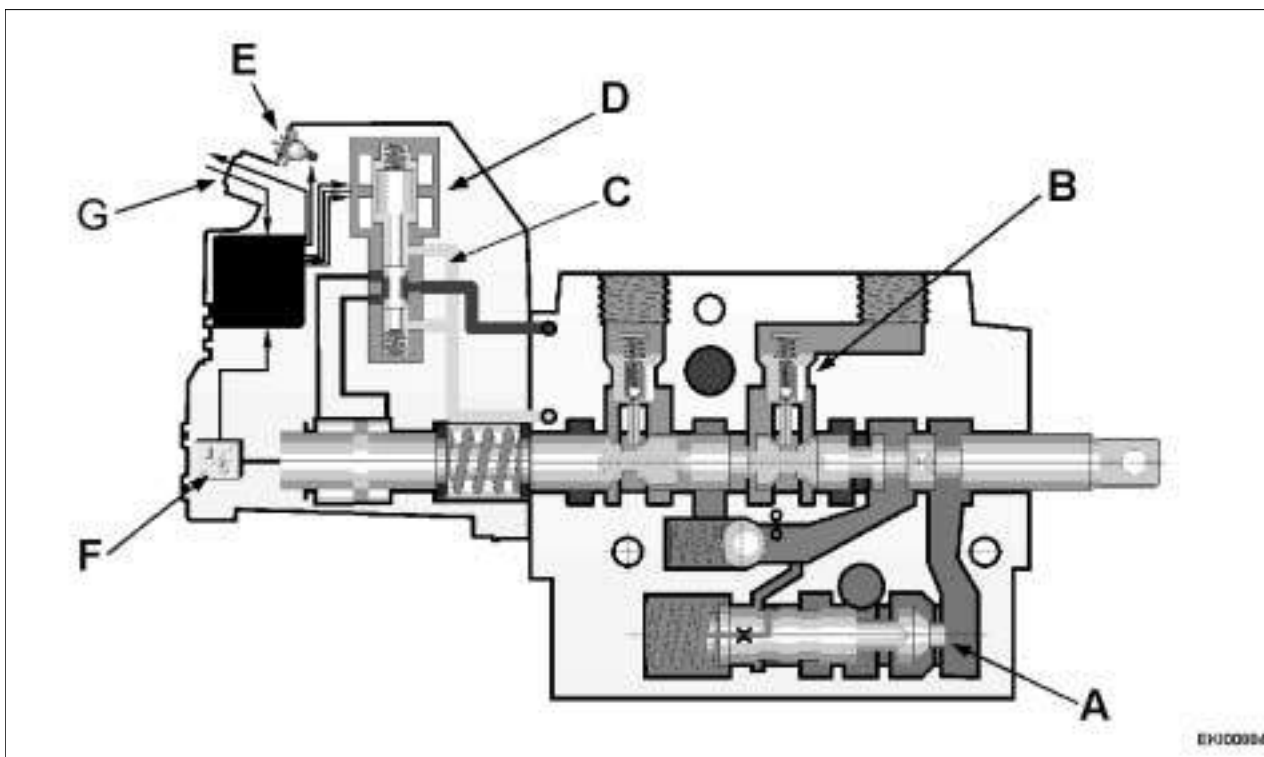
After manual mode, valves can only be actuated again using crossgate lever or joystick after resetting (engine ON/OFF).

| Date | Version | Page | Control valves SB 23 LS - EHS / Emergency mode | Capitel | Index | Docu-No. |
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| 10/1999 | b | 2/6 | | 9620 | A | 000002 |

Fav 700
Fav 900

Hydraulics / Valve assemblies
Control valves SB 23 LS - EHS / Emergency mode

A



| | | | |
|---|-------------------------|---|--|
| A | Pressure governor | E | Diagnostics: optical display; fault signal |
| B | Shutoff valve | F | Inductive position sensor |
| C | Control pressure 22 bar | G | CAN setpoint |
| D | Pilot valve | | |

The spool valves have four connecting leads:

- **Pin 1** +Ub (connected via relay K 011 up to 714/716..../21/2000).
- **Pin 2:** Can -
- **Pin 3:** Can +
- **Pin 4:** earth

The valve supply and also the hydr. pilot pressure (pst.) of 22 bar (connected via pressure-reducing valve Y032 in the end plate EP) are only connected with the engine running.

When the engine is switched off, therefore, a valve can only be actuated via mechanical emergency control directly at the valve.

As far as valve diagnostics is concerned, this means that the power supply and the CAN-bus can only be tested (Fendias notebook) with the engine running.

Self-testing of the valves is transmitted to the ECU (e-box) solely via the CAN and then forwarded to the instrument panel (fault code).

Valve operation can be monitored visually using the LED on the valve connector. In the event of a fault, flashing codes are emitted in accordance with the Bosch coding system (see table).

Verification is possible by supplying Ub 12 V directly to the valve.

- Pin 1 = Ub
- Pin 4 = earth

If flashing code [1 pause 1] - only with direct power supply - appears, this means that the valve's electronics system is basically OK.

"Flashing code" fault code table

| Date | Version | Page | Control valves SB 23 LS - EHS / Emergency mode | Capitel | Index | Docu-No. |
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| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / Valve assemblies Control valves SB 23 LS - EHS / Emergency mode | A |
|----------------------------------|--|----------|

| Flashing code | | |
|--|--|---|
| Fault | | |
| First flashing sequence (after lengthy pause) | Second flashing sequence (after short pause) | |
| 0 | 0 | No fault (LED is off) |
| Component or CAN fault | | |
| 1 | 1 | Receipt message 1 missing / e.g. ECU not at CAN, direct power supply to valve |
| 1 | 2 | Receipt message 2 missing |
| 1 | 3 | Implausible receipt message 1 / ECU sends incorrect message content |
| 1 | 4 | Implausible receipt message 2 |
| 1 | 5 | Potentiometer / PWM fault / only if valve was wrongly programmed by Bosch |
| 1 | 6 | EEPROM inconsistent |
| 1 | 7 | No fault, but valve switched off for > 1s and may only switch back on after receipt of setpoint = neutral |
| Minor faults | | |
| 2 | 1 | Undervoltage |
| 2 | 2 | Overvoltage, not dangerous |
| 2 | 3 | Slide does not reach required position |
| 2 | 4 | Slide is deflected too far |
| 2 | 5 | Floating position is not reached |
| 2 | 6 | Manual operation |
| Only with CAN if faults 21 and 22 do not switch valve off | | |
| 3 | 1 | Undervoltage < 8V, valve switches off output stage |
| 3 | 2 | Overvoltage 36-45V, valve switches off output stage |
| Serious faults with internal safety cutout | | |
| 4 | 1 | High overvoltage (> approx. 45 V) |
| 4 | 2 | Output stage fault (output stage for pilot solenoid valve) |
| 4 | 3 | Position sensor fault |
| Extremely serious faults with internal safety cutout, external shutoff required | | |
| 8 | 1 | Valve slide cannot be returned to neutral position |
| 8 | 2 | Valve slide not in neutral position when switching on |

| Date | Version | Page | Capitel | Index | Docu-No. |
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| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / Valve assemblies Control valves SB 23 LS - EHS / Emergency mode | A |
|----------------------------------|--|----------|

Shut down control valve (Emergency mode).

If the electronics fail or if a control valve seizes mechanically, all the control valves lock.

The following steps must be taken if a control valve fails:

| Step | Purpose | Action |
|------|--|---|
| 1 | Determine which control valve has failed | Read and clear fault code Chapter 0000 Reg. B |
| 2 | Lower implement | Manual mode (see above) |
| 3 | Flush control valves hydraulically | Manual mode (see above) |
| 4 | If fault recurs and control valves lock | Shut down control valve (Emergency mode so that you can continue to work with remaining control valves) |



Procedure for shutting down control valve:

Remove connector.



Start tractor.

Valve fault is shown on A007 - instrument panel (display with buzzer and warning light).

Cancel fault message:



Press key and hold.



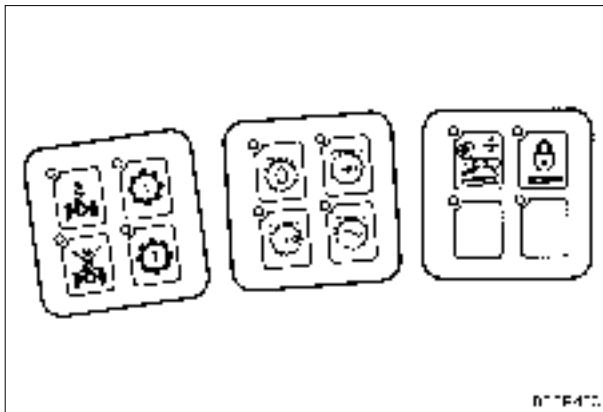
Then press key.

Stored fault messages must be cancelled individually. Cancelling fault message does not remove fault, it is simply no longer displayed.

Fault will be displayed again next time tractor is started.

| Date | Version | Page | Control valves SB 23 LS - EHS / Emergency mode | Capitel | Index | Docu-No. |
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| | | |
|----------------------------------|---|----------|
| Fav 700 Fav 900 | Hydraulics / Valve assemblies Control valves SB 23 LS - EHS / Emergency mode | A |
|----------------------------------|---|----------|



Unlock control valves with key and continue working with remaining control valves.

Important:

Control valve which has been shut down must remain in neutral position when engine is started.

If not:

- temperature can rise in hydraulic circuit
- noise in pump

Note:

For further information on repairing and on troubleshooting with control valves see **Chapter 9600**

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| 10/1999 | b | 6/6 | 9620 | A | 000002 |

Fav 900

Hydraulic Equipment / Valves

Final Plate

A

Final Plate (EP)

The final Plate is flanged below the last spool valve SB 23 - EHS . Solenoid Valve Neutral **MVSt** (Y032) and solenoid Valve **MVV** (Y033) are mounted onto Final Plate.

Solenoid Valve **MVSt** Controls the Control Pressure 22 bar .

Measuring Point **M5** for checking Control Pressure 22 bar

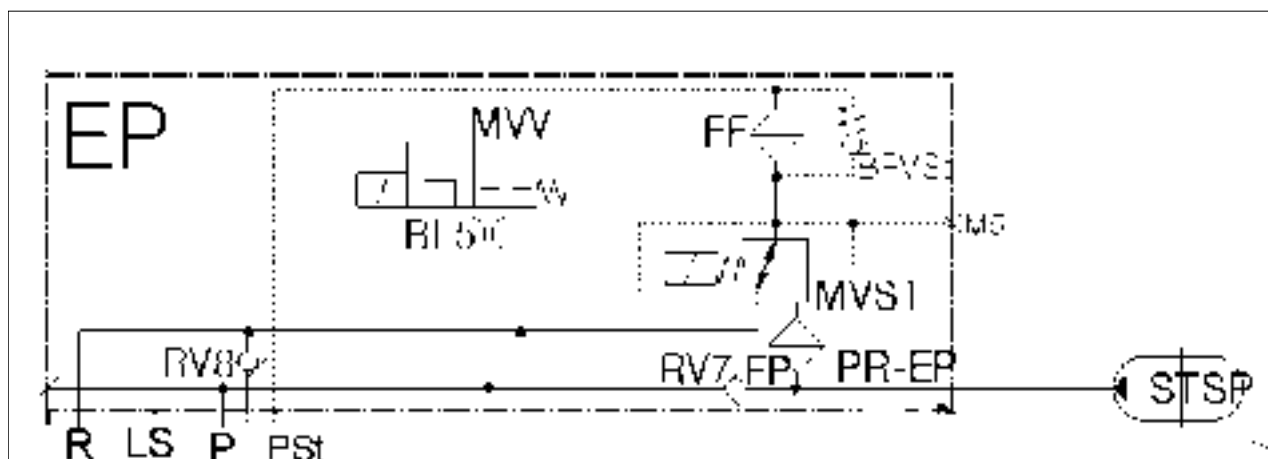
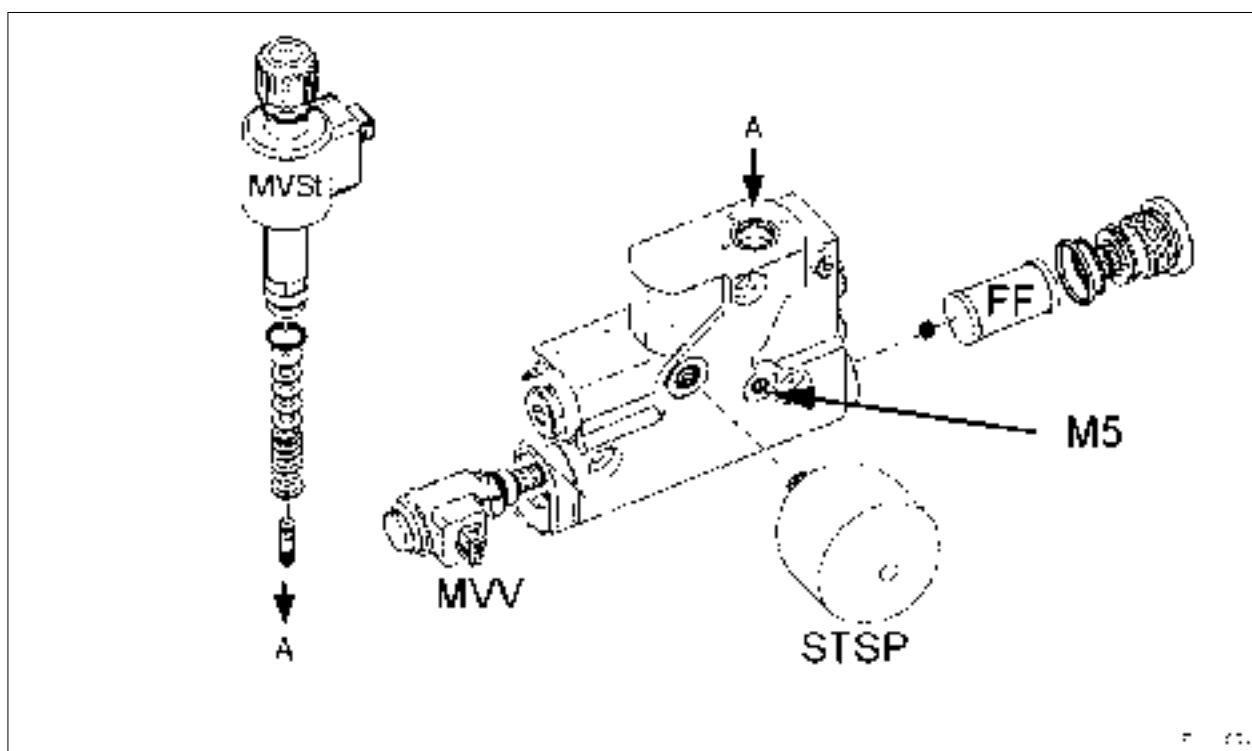
Solenoid Valve **MVV** is a flush valve with integrated orifice (BL5) and will be activated for Oil heating.

Accumulator **STSP** ensures continuity of Control Pressure.

Filter **FF** 0,025 mm is integrated upstream of Control Circuit. **Consult Maintenance schedule**

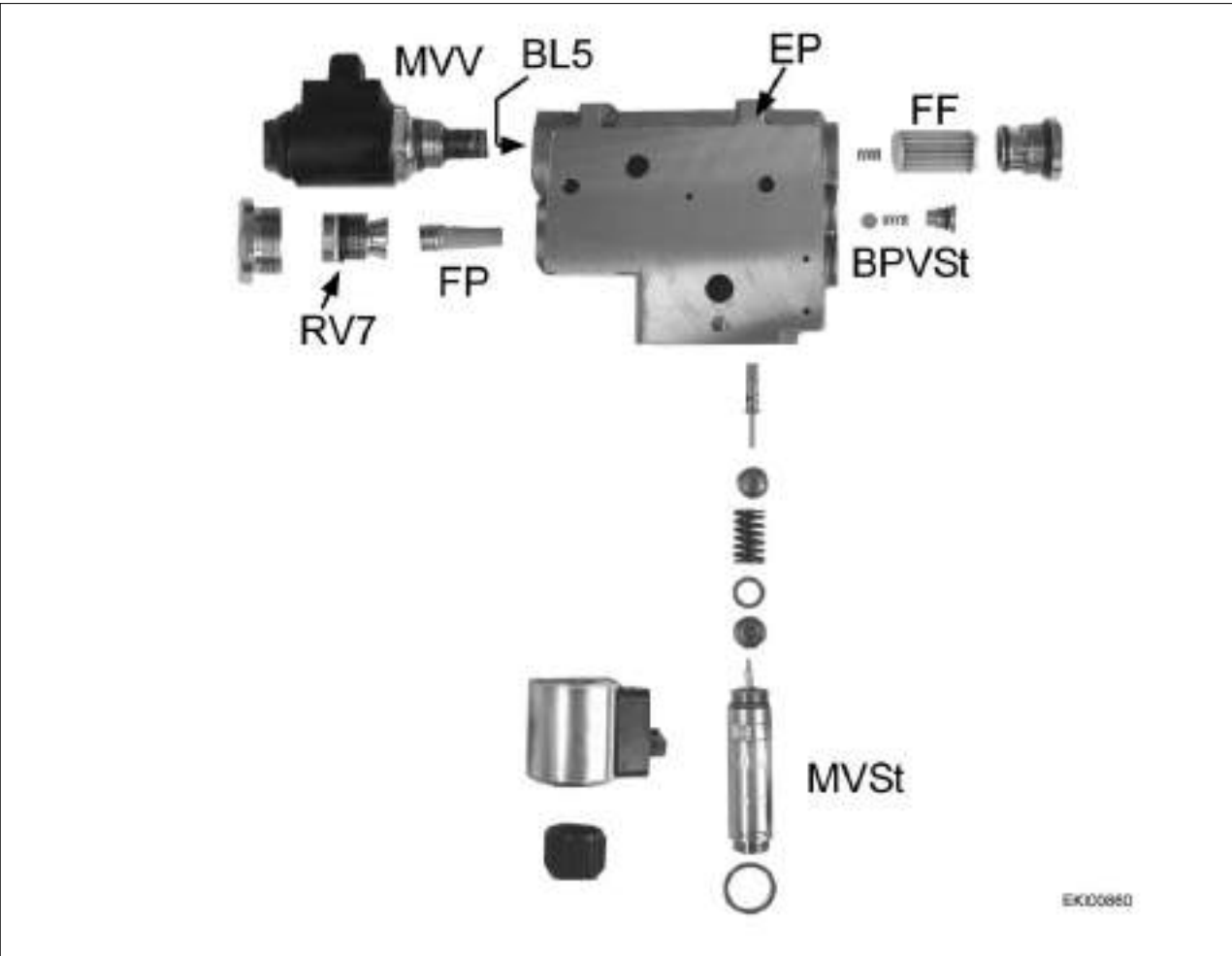
Electric Check of Solenoid Valves see Chapter 9000 Reg. E.

Diagram Register 9000 Sheet 24 and Sheet 29.



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| 6.12.2000 | a | 1/3 | Final Plate | 9620 | A |
| | | | | | 000001 |

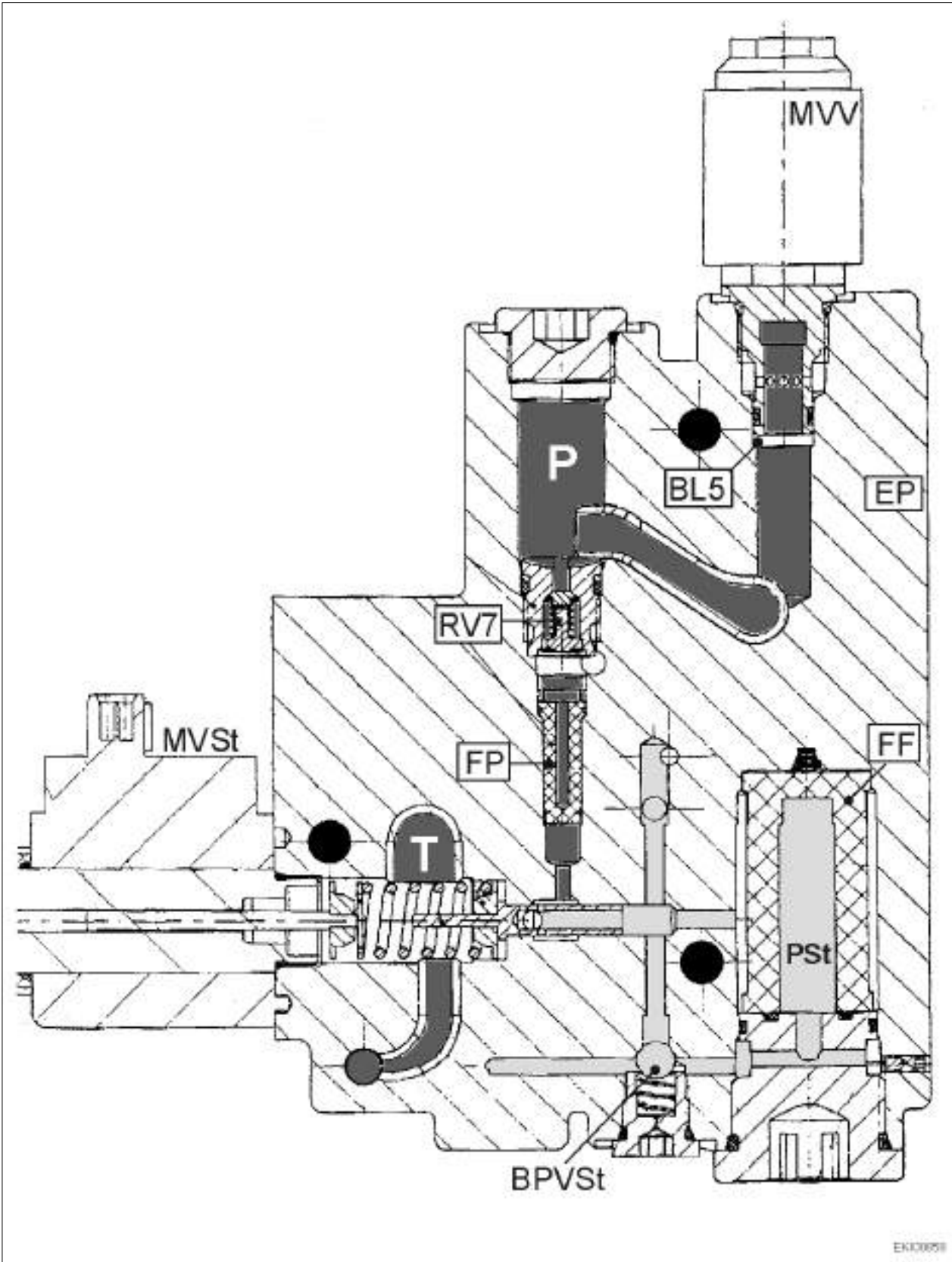
| | | |
|----------------|--|----------|
| Fav 900 | Hydraulic Equipment / Valves Final Plate | A |
|----------------|--|----------|



| Identification- hydraulic | Identification - electric | Component | Function |
|------------------------------|---------------------------|--|--------------------------------------|
| MVV | Y033 | Flush Valve | Oil Heating |
| MVSt | Y032 | Solenoid Valve Neutral (Spool Valves) | Control Pressure 22 bar |
| FF | | Filter | Control Pressure 0,025 mm |
| FP | | Filter | Pre - Filter 0,1 mm in P -Channel |
| BPVSt | | Bypass valve | Safety for Filter |
| BL5 | | Orifice | Oil Heating |
| RV7 | | Non Return Valve | Accumulator Pressure |
| EP | | Final Plate | |

| | | | | | | |
|-----------|---------|------|-------------|---------|-------|----------|
| Date | Version | Page | Final Plate | Capitel | Index | Docu-No. |
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| | | |
|---------|---|---|
| Fav 900 | Hydraulic Equipment / Valves Final Plate | A |
|---------|---|---|



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| 6.12.2000 | a | 3/3 | | 9620 | A | 000001 |

Fav 700
Fav 900

Hydraulics / Valve fitting

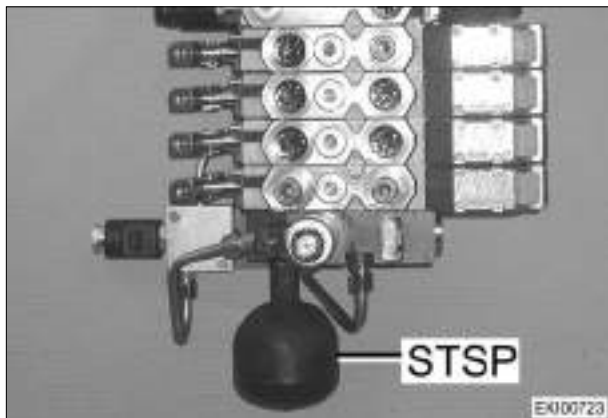
Nitrogen diaphragm accumulator - STSP

E

If the control pressure (p_{St}) falls to approx. 16 bar when actuating the SB 23 LS-EHS control valves, the control valves lock.

Possible cause: leaks in the diaphragm accumulator - STSP

The method for testing the diaphragm accumulator - STSP is described below.



| Nitrogen diaphragm accumulator | | |
|--|--------------------|--------------------|
| | Volume [litres] | Pressure [bar] |
| Version A | 0.16 | 16 |
| Version B | 0.32 | 16 |
| When fitting a new diaphragm accumulator: Fit a version B diaphragm accumulator | | |

Diaphragm accumulator operating principle



V0 = Rated volume (0.32 litre)

p0 = Initial gas pressure (16 bar)

V1 = Discharged diaphragm accumulator

P1 = Min. working pressure (approx. 17 bar)

V2 = Full diaphragm accumulator

p2 = Max. working pressure (200 bar)

Whereas in pneumatic systems the medium used - air - can be directly compressed to store energy, a hydraulic fluid is hardly compressible at all.

An inert gas (nitrogen) is used so that it can be stored under pressure nonetheless.

This is compressed by the hydraulic fluid in a pressure vessel and then expands, if necessary, when hydraulic fluid is discharged.

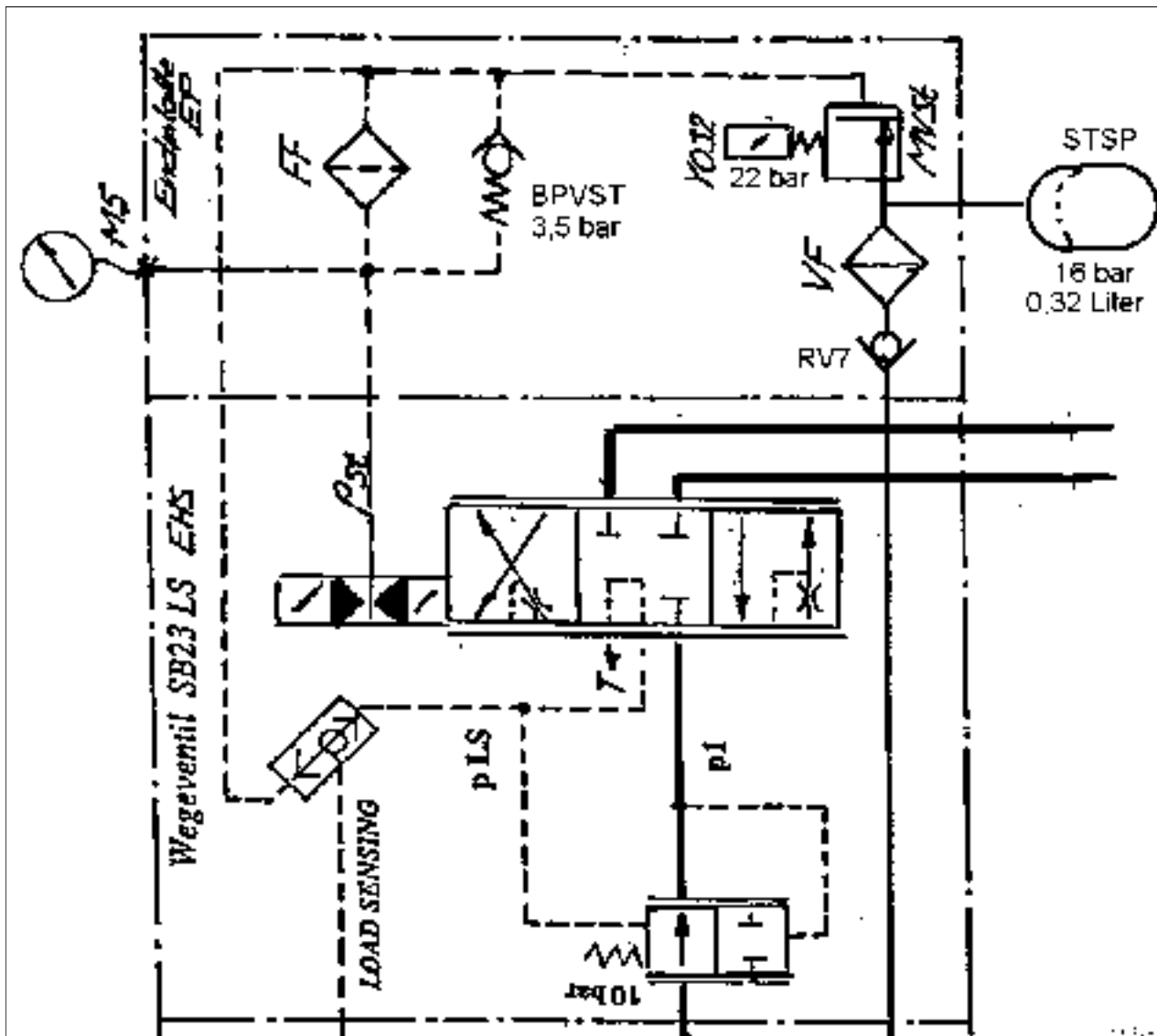
To ensure that the nitrogen does not mix with the hydraulic fluid (and produce foam), the accumulator is divided into two chambers by an elastic diaphragm (diaphragm accumulator).

Fav 700
Fav 900

Hydraulics / Valve fitting
Nitrogen diaphragm accumulator - STSP

E

Circuit diagram: end plate - EP with diaphragm accumulator - STSP

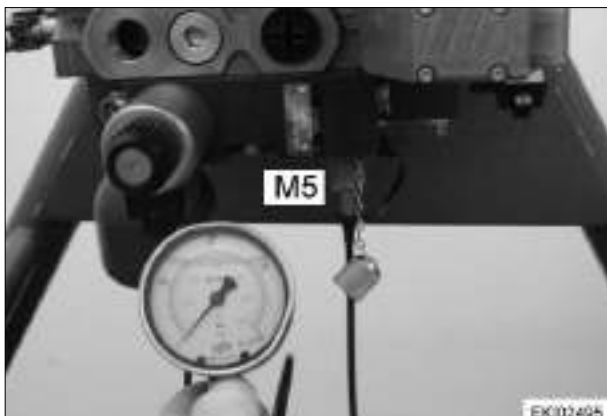


| Item | Designation | Item | Designation |
|------|---------------------------------|------|---------------------------|
| EP | End plate | FF | Microfilter (paper) |
| RV7 | Non-return valve | M5 | Pressure-measuring point |
| VF | Prefilter (sintered metal) | T | Return flow |
| STSP | Diaphragm accumulator | pSt | Control pressure (22 bar) |
| MVSt | Control pressure solenoid valve | PLS | Load-sensing pressure |
| Y032 | Control pressure solenoid valve | P1 | Pump pressure |

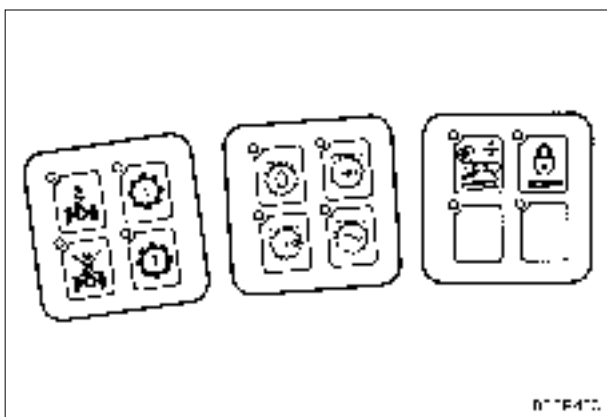
Fav 700
Fav 900

Hydraulics / Valve fitting
Nitrogen diaphragm accumulator - STSP

E



Connect pressure gauge (measurement range 40 bar) to measuring point M5.



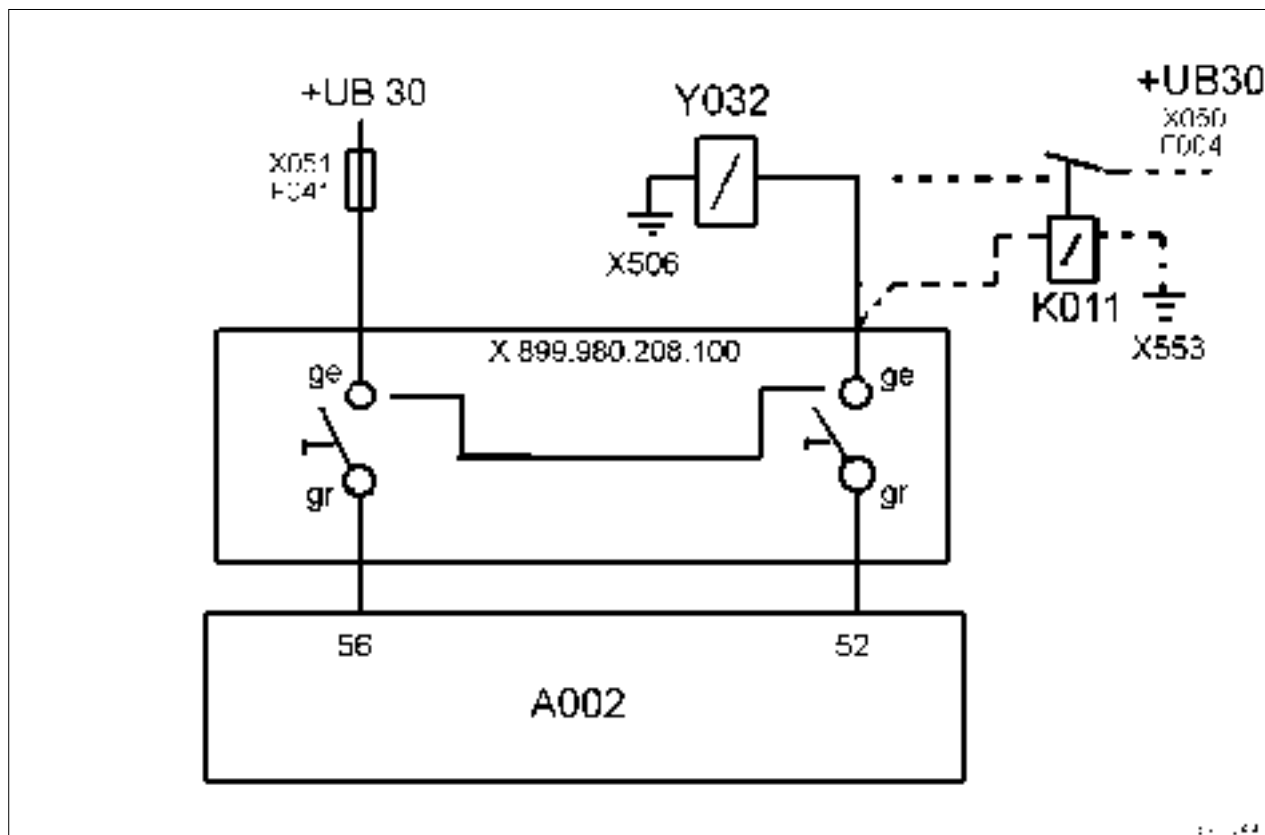
Start tractor and unlock control valves by pressing key.

Y032 - control pressure solenoid valve is energised (control pressure of 22 bar is generated).

Switch tractor off (ignition OFF) and provide external power source for Y032 - control pressure solenoid valve.

Fav 700
Fav 900

Hydraulics / Valve fitting
Nitrogen diaphragm accumulator - STSP

E**Drawing of external power source for Y032 - control pressure solenoid valve**

Fav 711/712 /21/ chassis number 1001 and up; 714/716 /21/ chassis number 2001 and up
Fav 900 /23/ chassis number 3001 and up

Fav 714/716 /21/ chassis number up to 2000 (Y032 - control pressure solenoid valve is actuated via K011 - relay)

- Connect e-adapter box X 899.980.208.100 directly to A002 ECU, enhanced controls.
- Isolate toggle switch pin 56 at e-adapter box.
- Isolate toggle switch pin 52 at e-adapter box.
- Provide external power source for Y032 - control pressure solenoid valve.

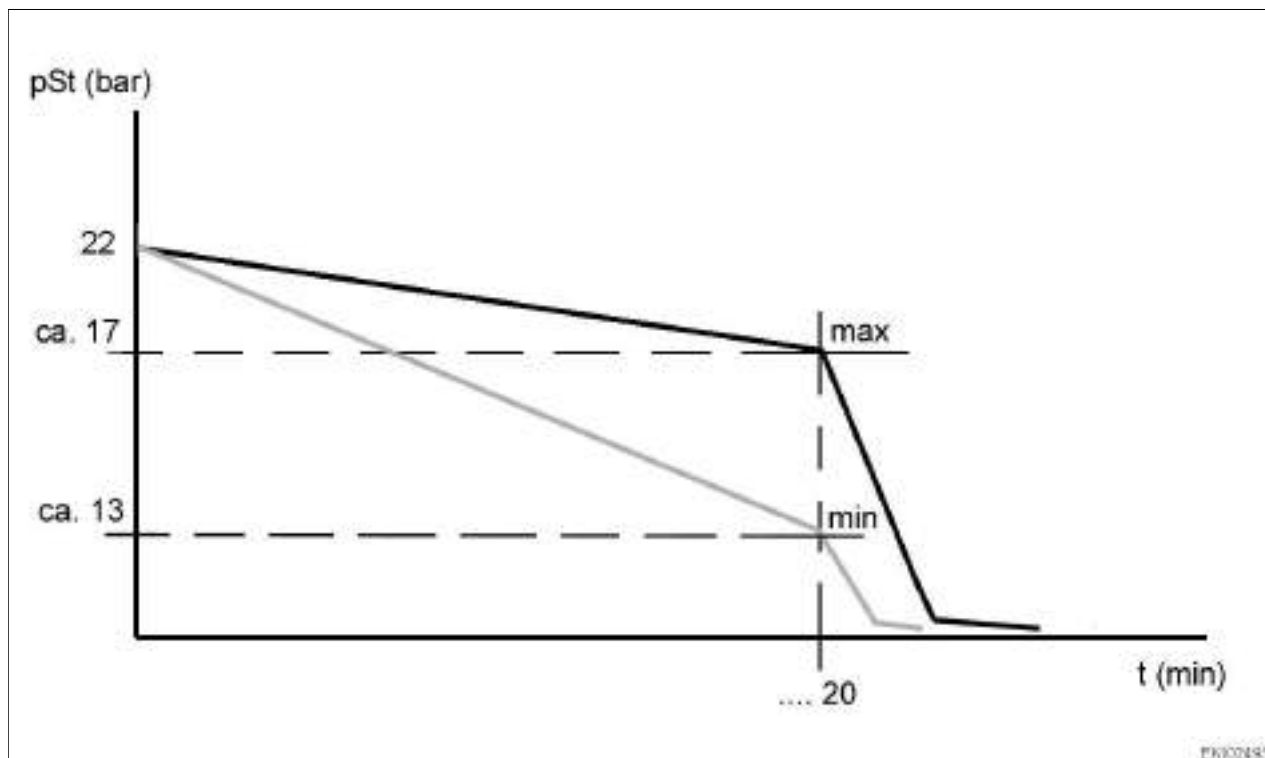
| Date | Version | Page | Nitrogen diaphragm accumulator - STSP | Capitel | Index | Docu-No. |
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| 04.12.2001 | a | 4/5 | | 9620 | E | 000002 |

Fav 700
Fav 900

Hydraulics / Valve fitting
Nitrogen diaphragm accumulator - STSP

E

Pressure curve at measuring point M5



pSt = Control pressure (measured at measuring point M5)

Testing diaphragm accumulator - STSP

- Start tractor and unlock control valves.
- Control pressure of 22 bar is generated.
- Switch tractor off (ignition OFF).
- Provide external power source for Y032 - control pressure solenoid valve.
- The nitrogen diaphragm accumulator feeds more oil so that the control pressure is maintained.
- The control pressure of 22 bar gradually dissipates via the pilot valves (in the electric control valves) and via the load-sensing line (over a period of approx. 20 min).
- Once the pressure in the diaphragm accumulator has been relieved, the control pressure falls quickly

Target values:

Max. accumulator pressure (diaphragm accumulator relieved) approx. 17 bar

Min. accumulator pressure (diaphragm accumulator relieved) approx. 13 bar

If the accumulator pressure (diaphragm accumulator relieved) falls below approx. 13 bar:

- internal leak in diaphragm accumulator - STSP
- leak in non-return valve - RV7
- leak in pilot valve of electric control valves
- leak in load-sensing line to LS pump - PR

Note:

The time (t) in which the control pressure (pSt) falls depends on:

- the tolerances in the pilot valve (electric control valves) and in the load-sensing line
- the hydraulic oil temperature

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| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / Valve fitting Setting valve number / Changing valve number | F |
|----------------------------------|--|----------|



| Pin | Function |
|-----|----------|
| 1 | +UB |
| 2 | CAN-low |
| 3 | CAN-high |
| 4 | Earth |

Note:

The control valves of type SB 23LS used in the Fav 700 are identical in function to the control valves for Fav 900 chassis number 23/3001 and up but must not be fitted to this tractor type. Reason: The CAN-bus connections in the Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.

Colour coding of control valves

1st layer (standard) = yellow

2nd layer (standard) = blue

3rd layer (standard) = red

4th layer (optional extra) = green

5th layer (optional extra) = Enhanced control front power lift

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| 30.07.2001 | a | 1/7 | Setting valve number / Changing valve number 9620 | F | 000001 |

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / Valve fitting Setting valve number / Changing valve number | F |
|----------------------------------|--|----------|

Fendt diagnostics program - "Fendias" (programming and diagnostics)

Note:

For further information on "Fendias" see
"Fendias" operating manual (EOLwin - UNIwin - VARIOwin)

End of line program (EOL)

- Select tractor type.
- Select "Special functions" submenu item

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| 30.07.2001 | a | 2/7 | Setting valve number / Changing valve number 9620 | F | 000001 |

| | | |
|----------------------------------|---|----------|
| <i>Fav 700</i> <i>Fav 900</i> | Hydraulics / Valve fitting Setting valve number / Changing valve number | F |
|----------------------------------|---|----------|

"Special functions" submenu

Sonderfunktion

| | |
|------------------------------|-------------------------------|
| Fahrzeugdaten | EEPROM-Inhalt EST |
| Umwandlung EST | EEPROM-Inhalt Kombiinstrument |
| Fehlerspeicher löschen | EEPROM-Inhalt EHR |
| Ventil-Nr. setzen | EEPROM-Inhalt Bedienkonsole |
| Ventil-Nr. ändern | EEPROM-Inhalt Bedienterminal |
| Terminal-FLASH programmieren | |
| Zurück | |

Vorgang

Selection

- Setting valve number
- Changing valve number

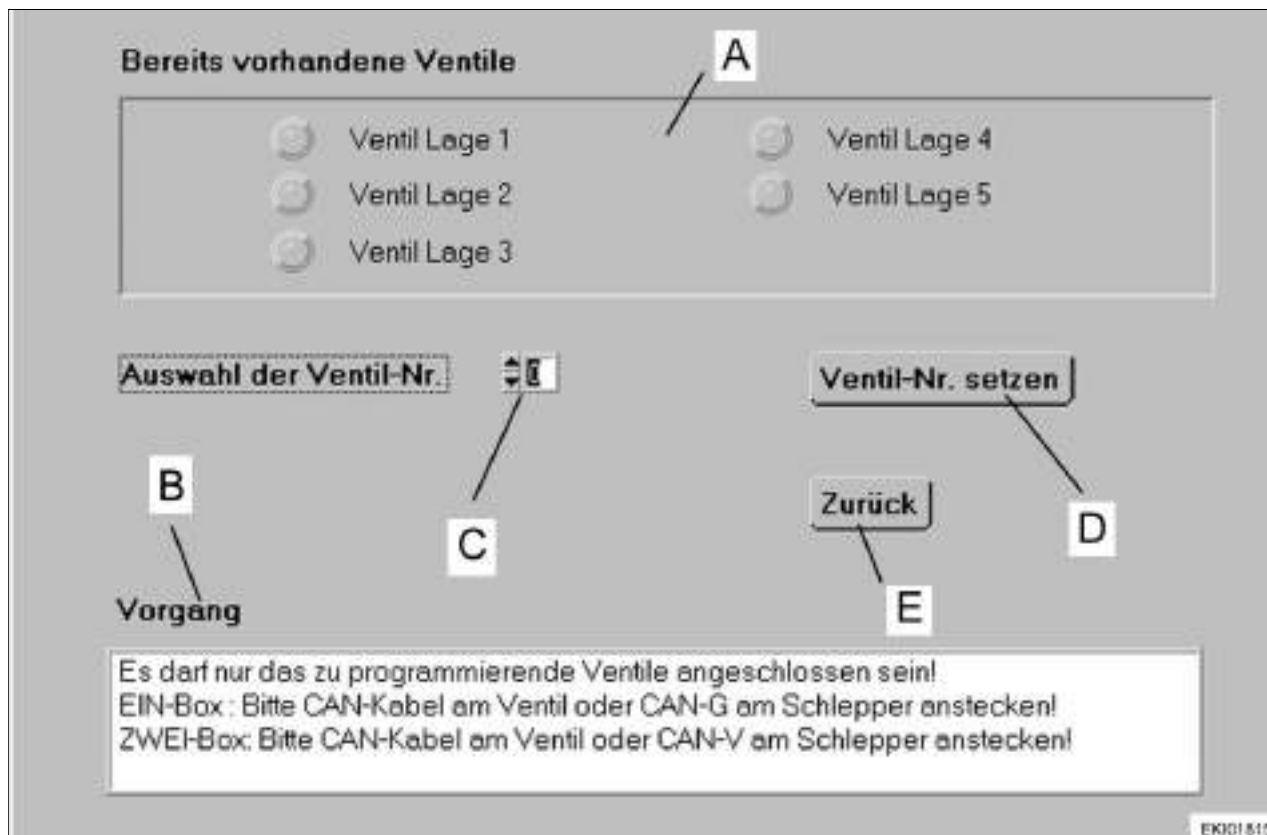
| Date | Version | Page | | Capitel | Index | Docu-No. |
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| 30.07.2001 | a | 3/7 | Setting valve number / Changing valve number | 9620 | F | 000001 |

Fav 700
Fav 900

Hydraulics / Valve fitting
Setting valve number / Changing valve number

F

"Setting valve number" submenu



| Item | Designation | Item | Designation |
|------|-------------------------------------|------|---|
| A | Display of already available valves | D | Confirm here to start valve programming |
| B | Programming process (sequence) | E | Back to "Special functions" submenu |
| C | Valve number to be set (programmed) | | |

Note:

Irrespective of its position, enhanced control front power lift (optional extra) should always be set to address 5.

In Fav 714/716 chassis number up to 21/2000 (twin e-box) engine must be running to set/change valves.

Fav 700
Fav 900

Hydraulics / Valve fitting
Setting valve number / Changing valve number

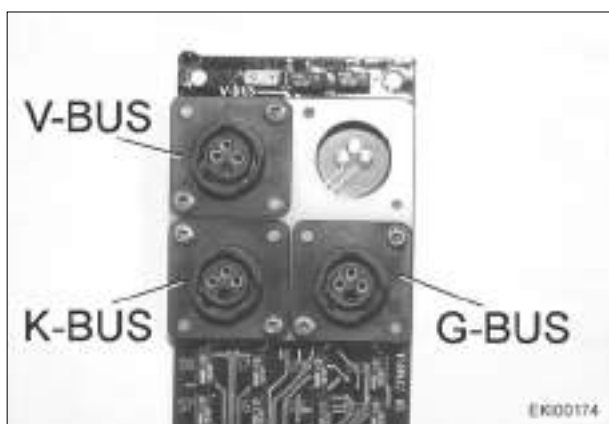
F



Setting valve number

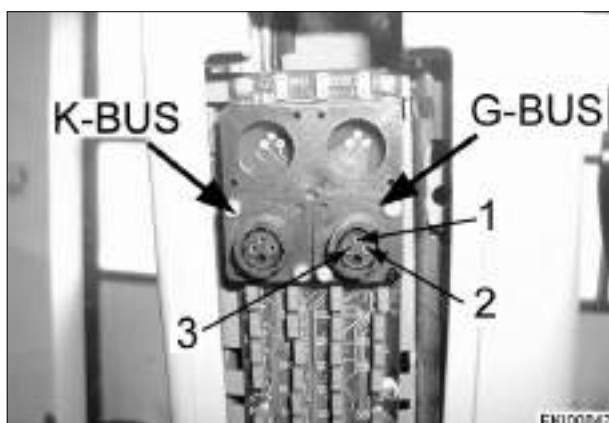
To set (program) electric control valves

Only the control valve to be set may be connected. All other valves must be disconnected.



Fav 714 / 716 up to 21/2000

Connect CAN cable to V-bus (valve bus).



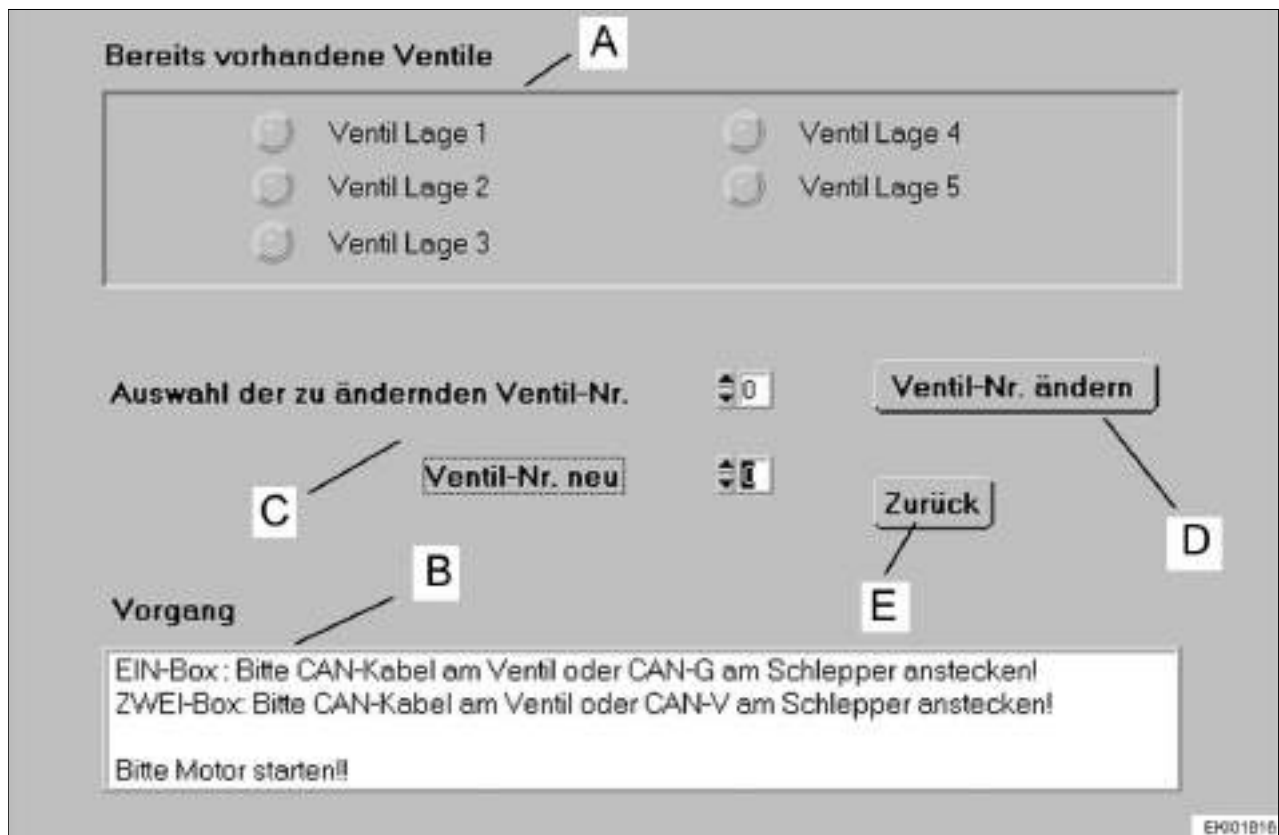
**Fav 711/712 chassis number 21/1001 and up
and Fav 714/716 chassis number 21/2001 and up**

Fav 900 chassis number 23/3001 and up

Connect CAN cable to G-bus (transmission bus).

Fav 700
Fav 900

Hydraulics / Valve fitting
Setting valve number / Changing valve number

F**"Changing valve number" submenu**

| Item | Designation | Item | Designation |
|------|-------------------------------------|------|---|
| A | Display of already available valves | D | Confirm here to start valve programming |
| B | Programming process (sequence) | E | Back to "Special functions" submenu |
| C | Valve number to be set (programmed) | | |

Note:

Irrespective of its position, enhanced control front power lift (optional extra) should always be set to address 5.

In Fav 714/716 chassis number up to 21/2000 (twin e-box) engine must be running to set/change valves.

| Date | Version | Page | Setting valve number / Changing valve number | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 30.07.2001 | a | 6/7 | | 9620 | F | 000001 |

Fav 700
Fav 900

Hydraulics / Valve fitting

Setting valve number / Changing valve number

F



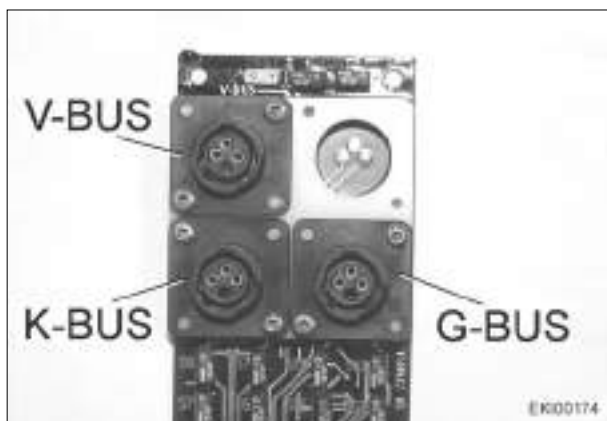
Changing valve number

All control valves remain connected.

- If control valves are not preset (programmed) when supplied, their address is "0". Once such a control valve has been fully installed, it can be moved from its "0" address to its new address.
- A further option is when troubleshooting, for example if you wish to swap the 3rd layer control valve for the 4th layer control valve. However, this requires the use of a third unoccupied address, as described in the example below.

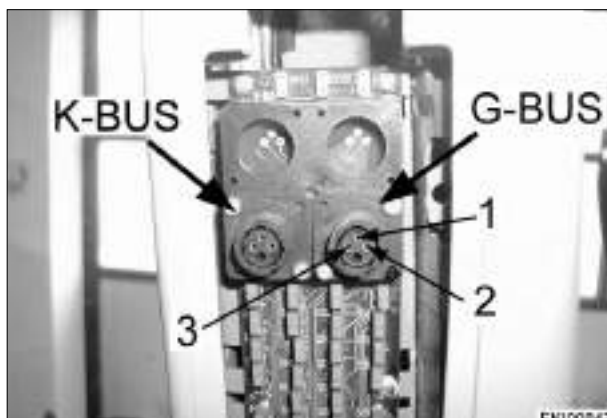
"Changing valve number" procedure

1. Change valve 3 to valve 0.
2. Change valve 4 to valve 3.
3. Change valve 0 to valve 4.
4. Reprogramming to the original settings is carried out in the same way via address 0.



Fav 714 / 716 up to 21/2000

Connect CAN cable to V-bus (valve bus).



Fav 711/712 chassis number 21/1001 and up and Fav 714/716 chassis number 21/2001 and up

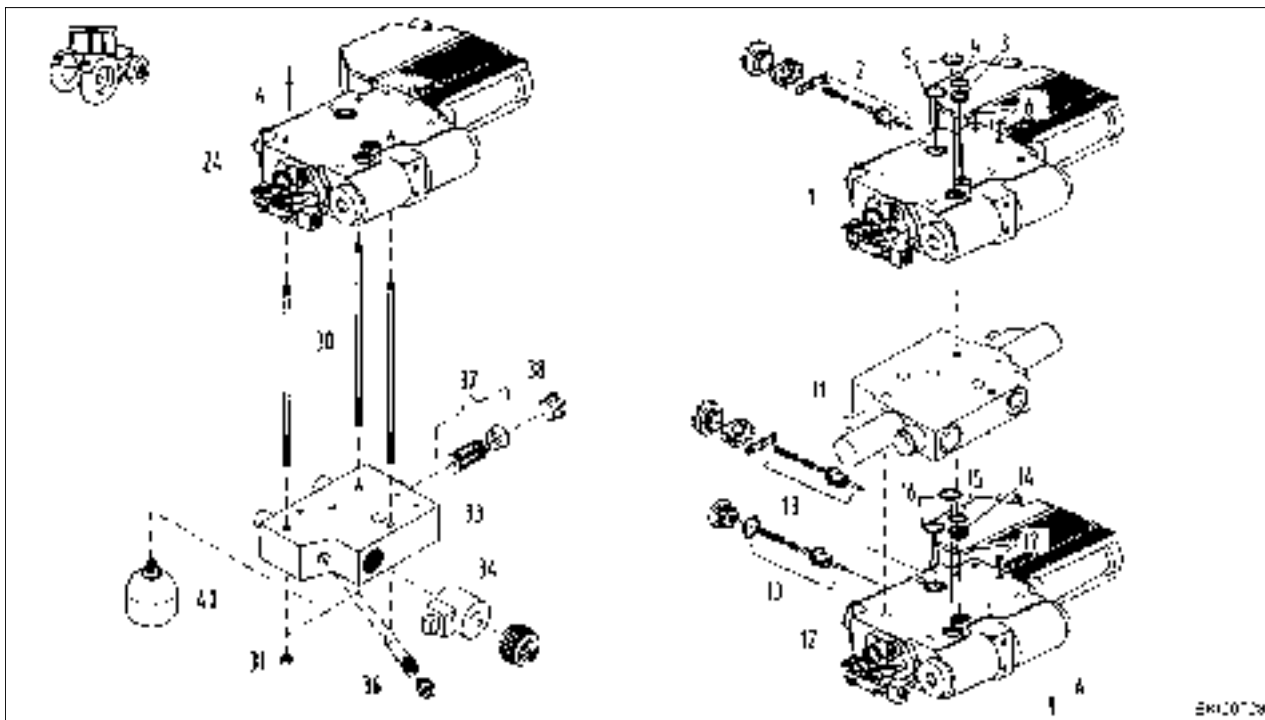
Fav 900 chassis number 23/3001 and up

Connect CAN cable to G-bus (transmission bus).

Fav 700
Fav 900

Hydraulics / Valve fitting
Fitting and removing SB 23 LS-EHS control valves

G



| Item | Designation | Item | Designation |
|------|---------------------------|------|---------------------------|
| 1 | Directional control valve | 16 | O-ring |
| 2 | Parts set | 24 | Directional control valve |
| 3 | Shuttle valve | 30 | Stud bolt |
| 4 | O-ring | 31 | Hexagon nut |
| 5 | O-ring | 33 | End plate |
| 11 | EPC valve | 34 | Solenoid |
| 12 | Seal set | 36 | Filter |
| 13 | Parts set | 37 | Filter |
| 14 | Shuttle valve | 38 | Drain plug |
| 15 | O-ring | 40 | Diaphragm accumulator |

Note:

Retrofitting and repair work on the service hydraulics must be carried out with very great attention to cleanliness. The smallest particles of dirt in the control circuit can prevent the control movement or cause an unintentional movement.

Note:

The control valves of type SB 23LS used in the Fav 700 are identical in function to the control valves for Fav 900 chassis number 23/3001 and up but must not be fitted to this tractor type. Reason: The CAN-bus connections in the Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.

Note:

The work was carried out on a Fav 700.

Carry out work on the Fav 900 chassis number 23/3001 and up in the same way.

| Date | Version | Page | Fitting and removing SB 23 LS-EHS control valves | Capitel | Index | Docu-No. |
|----------|---------|------|--|---------|-------|----------|
| 23.07.01 | a | 1/8 | | 9620 | G | 000002 |

| | | |
|----------------------------------|---|----------|
| Fav 700 Fav 900 | Hydraulics / Valve fitting Fitting and removing SB 23 LS-EHS control valves | G |
|----------------------------------|---|----------|

Colour coding of control valves

1st layer (standard) = yellow

2nd layer (standard) = blue

3rd layer (standard) = red

4th layer (optional extra) = green

5th layer (optional extra) = Enhanced control front power lift

**Removing control valve (2nd layer "blue")****Fav 900 chassis number 23/3001 and up**

Remove auxiliary fuel tank.

Note:**See Fav 900 Workshop Manual.****Chapter 1050 Index G - Detaching the clutch/gearbox housing**

Loosen 6 screws and remove entire battery case.



Remove G001 - battery.

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| 23.07.01 | a | 2/8 | Fitting and removing SB 23 LS-EHS control valves 9620 | G | 000002 |

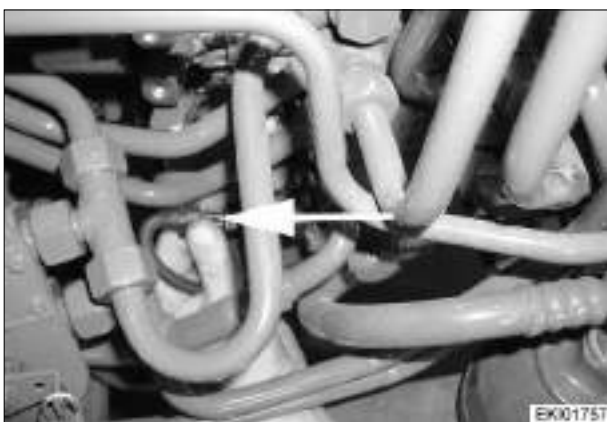
Fav 700
Fav 900

Hydraulics / Valve fitting
Fitting and removing SB 23 LS-EHS control valves

G



Remove entrance step.



At end plate - EP:

Label and disconnect connector Y032 - control pressure solenoid valve.

Label and disconnect connector Y033 - preheater solenoid valve.



Disconnect connectors Y015 - Y019.



Fav 700

Remove hydraulic tank cover. This prevents hydraulic oil from continuing to run.

Fav 700
Fav 900

Hydraulics / Valve fitting

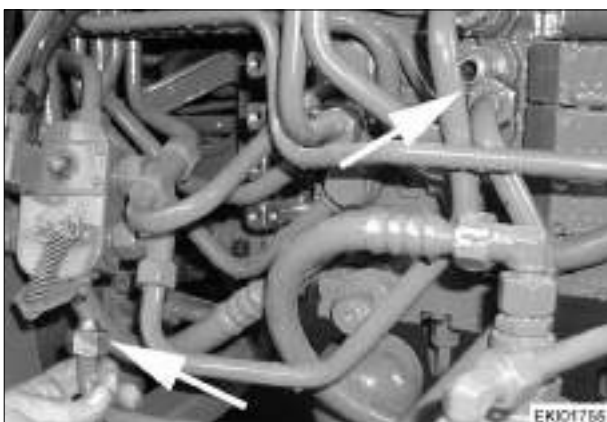
Fitting and removing SB 23 LS-EHS control valves

G



Fav 900

Remove hydraulic tank cover. This prevents hydraulic oil from continuing to run.



Remove obstructing hydraulic line.



Remove diaphragm accumulator - STSP.

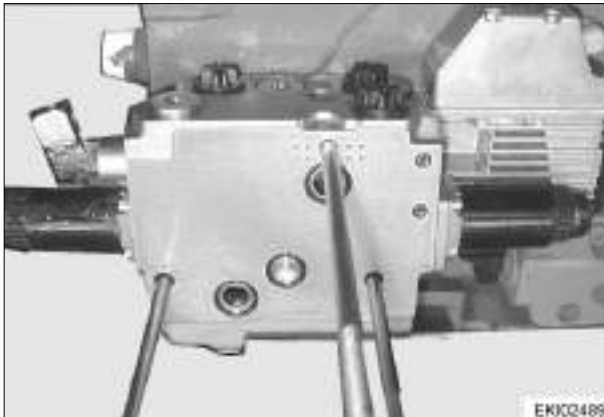


Remove end plate - EP.

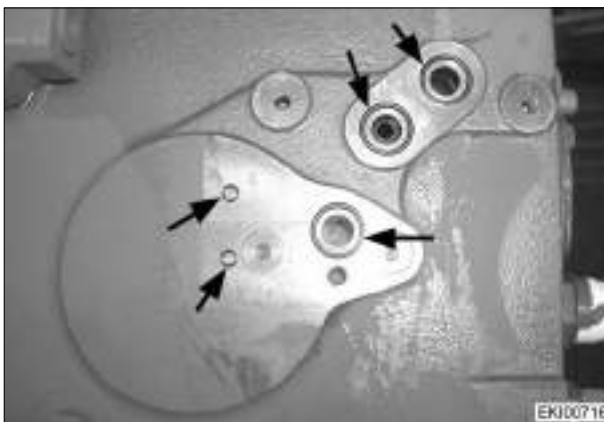
Note:

Shuttle valves of control valve may drop out!!

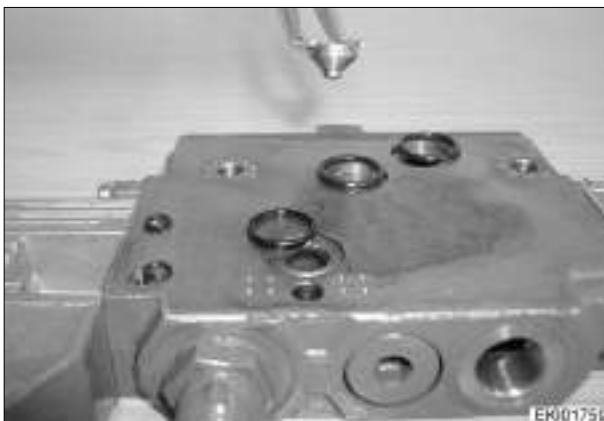
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Fav 700
Fav 900**Hydraulics / Valve fitting**
Fitting and removing SB 23 LS-EHS control valves**G**

Remove all control valves and EPC valve.

**Fitting control valve**

Locate new O-ring on flange surface of central control block - ZSB and grease.

**Note:**

The control valves of type SB 23LS used in the Fav 700 are identical in function to the control valves for Fav 900 chassis number 23/3001 and up but must not be fitted to this tractor type.

Reason: The CAN-bus connections in the Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.

Insert O-rings.

Insert shuttle valve.



Grease O-rings and shuttle valve.

Fav 700
Fav 900

Hydraulics / Valve fitting

Fitting and removing SB 23 LS-EHS control valves

G



- Locate control valve (first layer).
- Grip control valve with locking clamp (arrowed).

Note:

Take care not to damage flange surfaces of control valves.

Take care also not to damage O-rings and shuttle valve.

- Screw hydraulic lines to control valve (hydraulic lines hold control valve).
- Release locking clamp.
- Locate EPC valve and other control valves in same manner.

Note:

Shown on model for greater clarity.



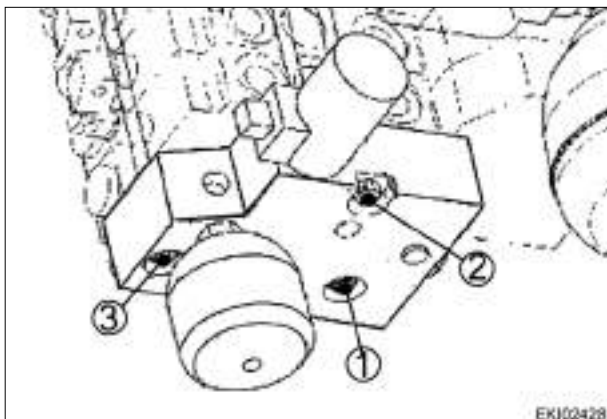
Note:

Before fitting end plate - EP change microfilter - FF. <

Thoroughly clean filter housing and control-pressure bores in end plate - EP.

Chapter 9620 Index A - End plate - EP

Chapter 9620 Index G - Removing and fitting control pressure microfilter FF



Lightly oil stud bolt threads.

Locate end plate - EP.

Tighten **M8-10.9** hexagon nuts in order (see photo).

- Move control valves to stop.
- Tighten M8-10.9 hexagon nuts to **30 +3 Nm**.

Fav 700
Fav 900

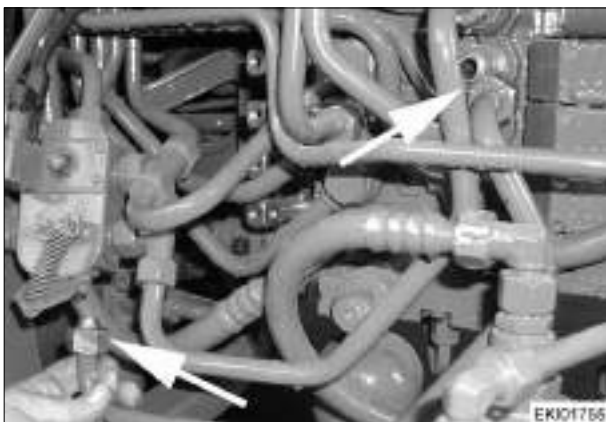
Hydraulics / Valve fitting

Fitting and removing SB 23 LS-EHS control valves

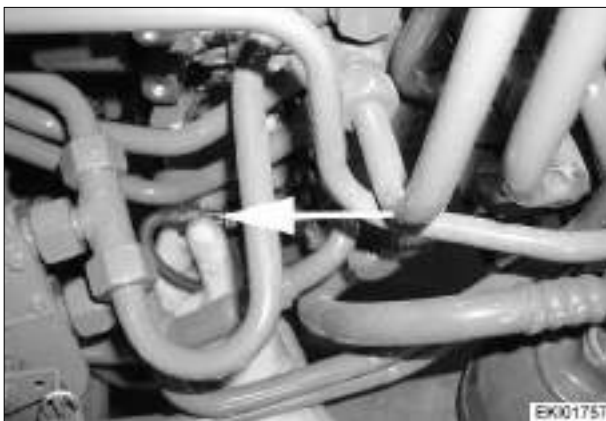
G



Fit diaphragm accumulator - STSP.



Fit other hydraulic lines.



At end plate - EP:

Connect connector X336 to Y032 - control pressure solenoid valve.

Connect connector X335 to Y033 - preheater solenoid valve.



Connect connectors to control valves
Y015 - Y019.

X326 = Y015 (1st layer)

X327 = Y016 (2nd layer)

X328 = Y017 (3rd layer)

X329 = Y018 (4th layer)

X330 = Y019 (5th layer = enhanced control front power lift)

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Fav 700
Fav 900

Hydraulics / Valve fitting
Fitting and removing SB 23 LS-EHS control valves

G



Fav 700

Fit hydraulic tank cover.



Fav 900

Fit hydraulic tank cover.



Note:

New control valves are set (programmed) to "Address 0".

Setting (programming) control valve
Chapter 9620 Index F - Setting control valve /
Changing valve number

Test control valves Y015 - Y019 for tightness against leaks and operation.

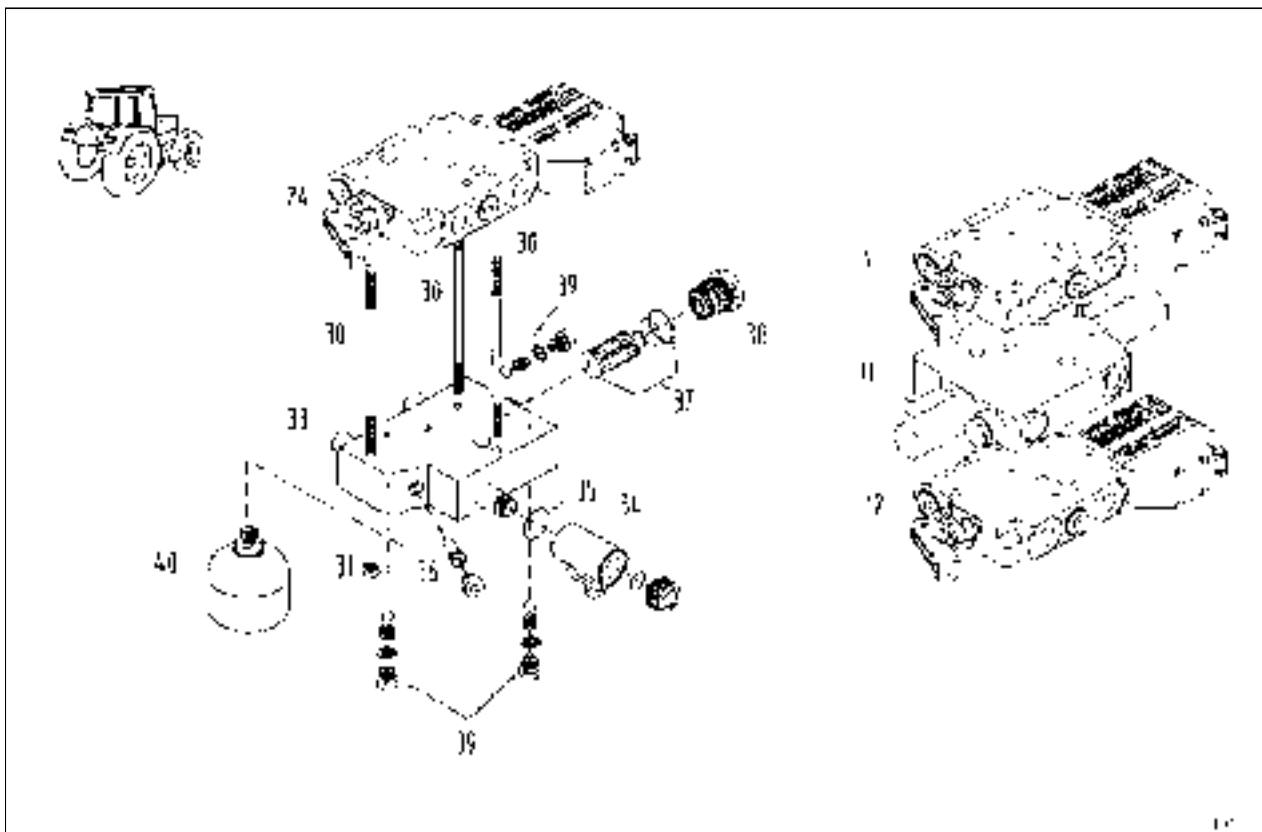
Fit G001 - battery, battery case and entrance step.

Fav 700
Fav 900

Hydraulics / Valve fitting
Removing and fitting control pressure microfilter - FF

G

Fav 700 end plate (external oil heater circuit)



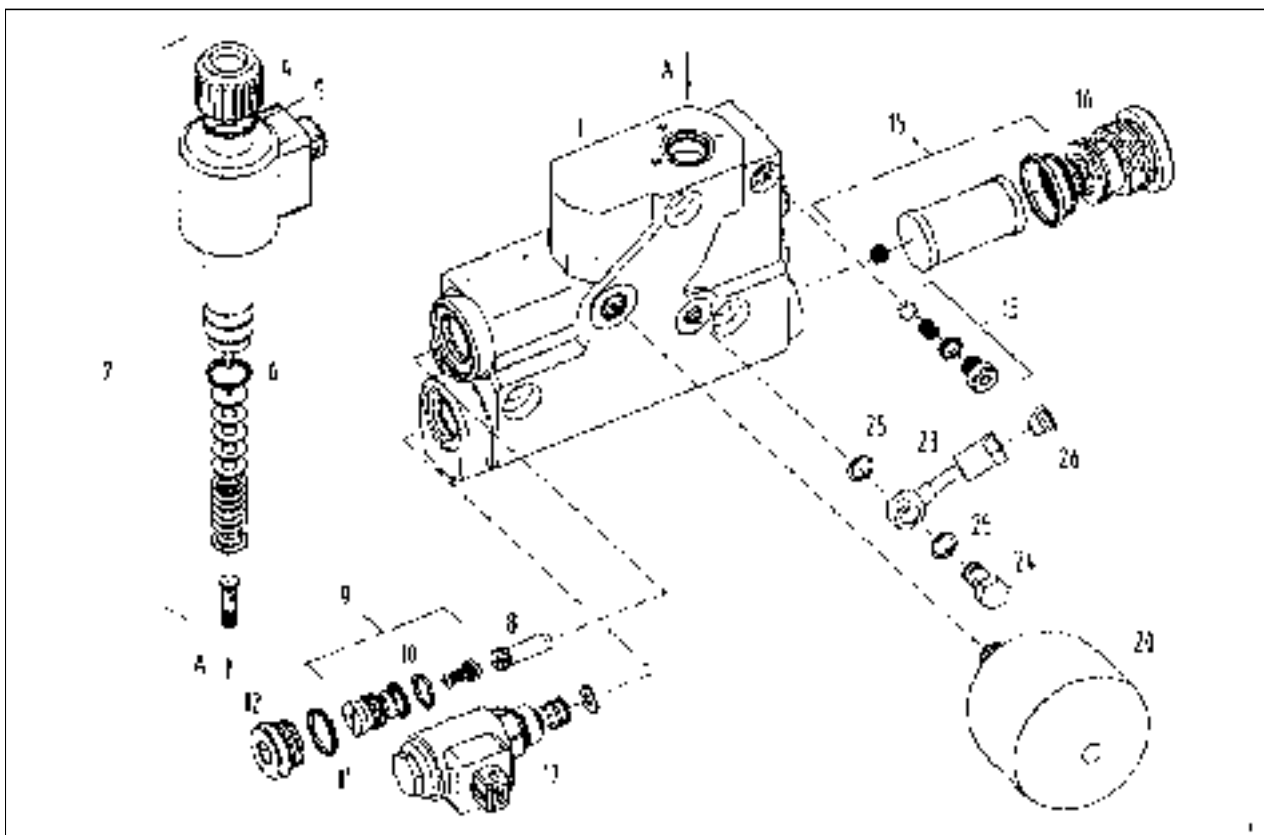
| Item | Designation | Item | Designation |
|------|---|------|--|
| 1 | Control valve, 1st layer | 34 | Y032 - control pressure solenoid valve |
| 11 | EPC valve | 35 | O-ring |
| 12 | Control valve, 2nd layer | 36 | Prefilter - VF (sintered metal) |
| 24 | Control valve, 3rd layer | 37 | Microfilter - FF (paper) and O-rings |
| 30 | M8-10.9 stud bolt (depending on number of control valves) | 38 | Drain plug |
| 31 | M8-10.9 hexagon nut | 39 | Parts set |
| 33 | End plate - EP | 40 | Diaphragm accumulator |

Fav 700
Fav 900

Hydraulics / Valve fitting
Removing and fitting control pressure microfilter - FF

G

Fav 700 / Fav 900 chassis number 23/3001 and up (integral oil heater circuit)



| Item | Designation | Item | Designation |
|------|--|------|--------------------------------------|
| 1 | End plate - EP | 13 | Parts set |
| 2 | Y032 - control pressure solenoid valve | 15 | Microfilter - FF (paper) and O-rings |
| 4 | Gland nut | 16 | Drain plug |
| 5 | O-ring | 17 | Y033 - preheater solenoid valve |
| 6 | O-ring | 20 | Diaphragm accumulator |
| 8 | Prefilter - VF (sintered metal) | 23 | Pressure pipe |
| 9 | Non-return valve - RV7 | 24 | Hollow-core screw |
| 10 | O-ring | 25 | Sealing ring |
| 11 | O-ring | 26 | Drain plug |
| 12 | Drain plug | | |

Note:

Retrofitting and repair work on the service hydraulics must be carried out with very great attention to cleanliness. The smallest particles of dirt in the control circuit can prevent the control movement or cause an unintentional movement.

Note:

The work was carried out on a Fav 700.

Carry out work on the Fav 900 chassis number 23/3001 and up in the same way.

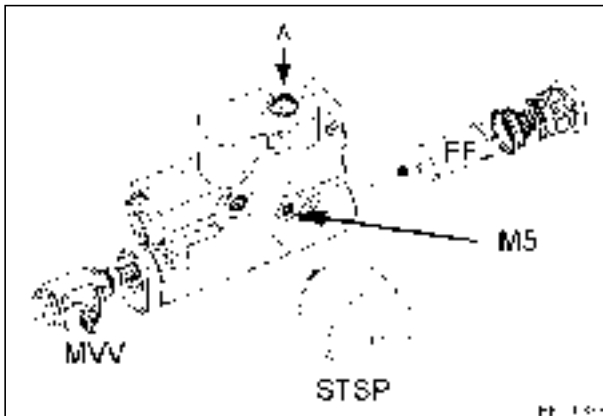
| Date | Version | Page | | Capitel | Index | Docu-No. |
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| 25.07.2001 | a | 2/7 | Removing and fitting control pressure microfilter - FF | 9620 | G | 000003 |

Fav 700
Fav 900

Hydraulics / Valve fitting

Removing and fitting control pressure microfilter - FF

G



Maintenance interval for control pressure microfilter FF

- every 4 years
- after repair to/replacement of a control valve

Note:

Operating Manual - Maintenance Schedule



Preliminary work for Fav 700:

- Remove battery case.
- Remove G001 - battery.



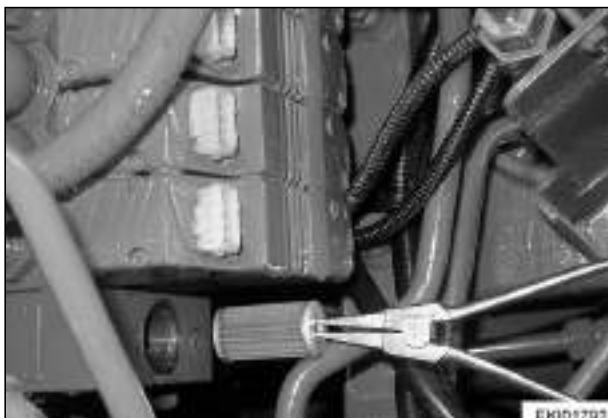
Preliminary work for Fav 900:

- Remove front panel.

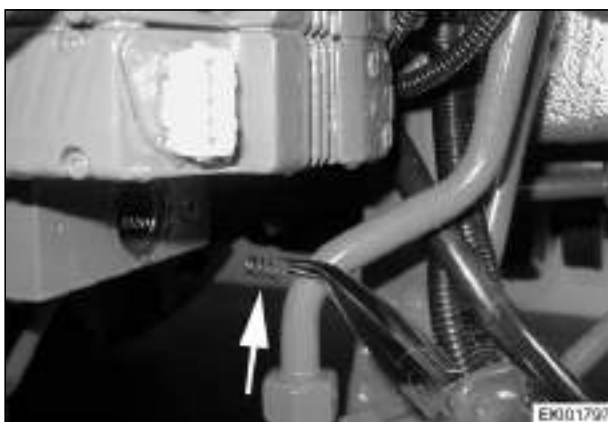


Loosen drain plug.

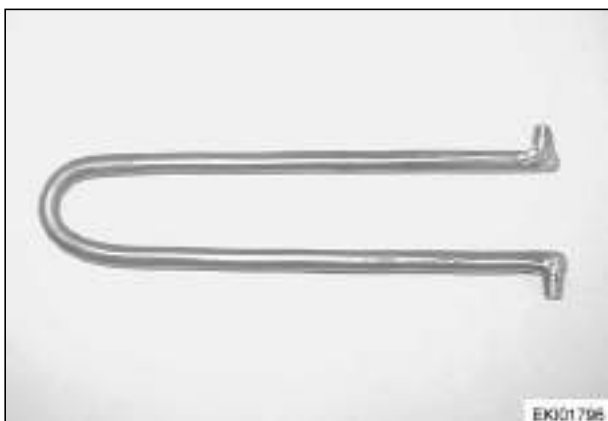
| Date | Version | Page | | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 25.07.2001 | a | 3/7 | Removing and fitting control pressure microfilter - FF | 9620 | G | 000003 |

Fav 700
Fav 900**Hydraulics / Valve fitting**
Removing and fitting control pressure microfilter - FF**G**

Carefully withdraw microfilter - FF.



Withdraw compression spring.



Special tool

**Fav 700****End plate - EP with external heater circuit**
(hydraulic oil preheater)

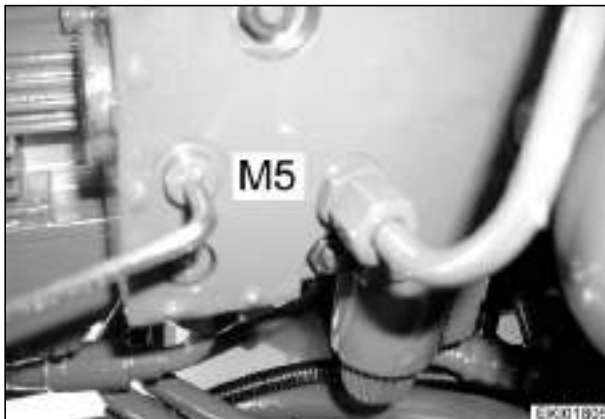
Close control-pressure bores with special tool.

Note:**Chapter 9620 Index A - End plate - EP**

Fav 700
Fav 900

Hydraulics / Valve fitting
Removing and fitting control pressure microfilter - FF

G



Fav 700

**End plate with external heater circuit
(hydraulic oil preheater)**

Open measuring point M5.



**Fav 700 and Fav 900 chassis number 23/3001
and up**

**End plate with integral heater circuit
(hydraulic oil preheater)**

Close control-pressure bores with special tool.



Clean threaded bore and filter housing with spray cleaner.



Remove special tool.

Insert compression spring with a little grease.

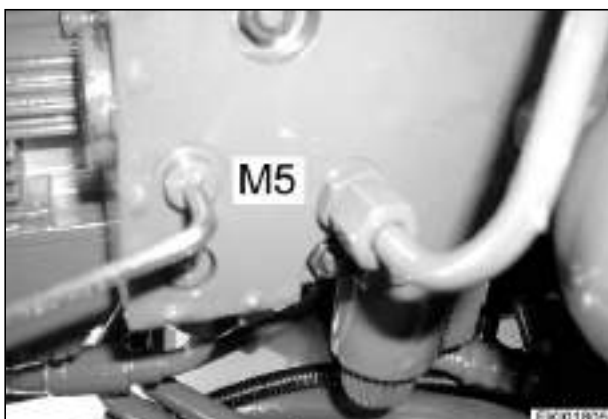
| Date | Version | Page | | Capitel | Index | Docu-No. |
|------------|---------|------|--|---------|-------|----------|
| 25.07.2001 | a | 5/7 | Removing and fitting control pressure microfilter - FF | 9620 | G | 000003 |

Fav 700
Fav 900**Hydraulics / Valve fitting**
Removing and fitting control pressure microfilter - FF**G**

Insert microfilter - FF.



Fit new O-rings to drain plug.

Tighten drain plug to **125 +40** Nm.**Fav 700****End plate with external heater circuit**
(hydraulic oil preheater)Tighten drain plug of measuring point M5 to
20 +5 Nm .

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / Valve fitting Removing and fitting control pressure microfilter - FF | G |
|----------------------------------|--|----------|



Test tractor for tightness against leaks.
Refit other items removed from tractor.

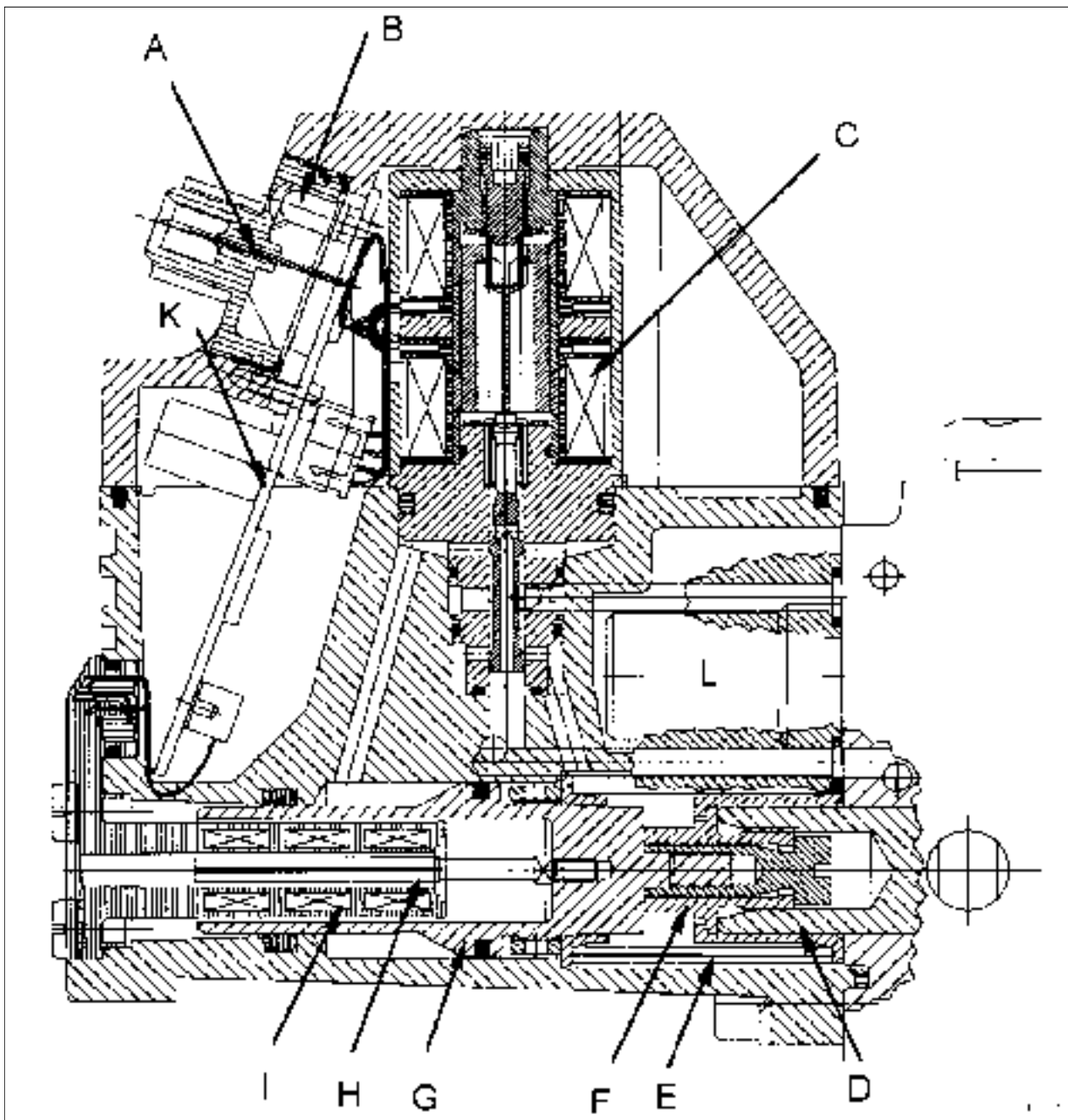
| Date | Version | Page | Capitel | Index | Docu-No. |
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| 25.07.2001 | a | 7/7 | Removing and fitting control pressure microfilter - FF 9620 | G | 000003 |

Fav 700
Fav 900

Hydraulics / Valve assemblies
Installation and removal of pilot valve

G

Electrohydraulic actuator unit for control valve SB 23 LS-EHS



| Item | Designation | Item | Designation |
|------|---------------------------------|------|---------------------------------|
| A | 4-pin plug (supply and CAN-bus) | G | Actuating piston |
| B | Diagnostics LED | H | Bar core position sensor |
| C | Pilot valve | I | Coil position sensor |
| D | Directional control valve slide | K | PCB |
| E | Return spring | L | Space for pressure-relief valve |
| F | Adapter | | |

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| 25.07.2001 | a | 1/6 | Installation and removal of pilot valve 9620 | G | 000004 |

| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / Valve assemblies Installation and removal of pilot valve | G |
|----------------------------------|--|----------|

Pilot valve may not be removed and installed during warranty period!!

Note:

Retrofitting and repair work on service hydraulics must be carried out with very great attention to cleanliness. Smallest dirt particles in control circuit can prevent control motion or cause unintentional action.

Note:

The SB 23LS electrical control valves used in the Fav 700 are identical in terms of function to the control valves for the Fav 900 of chassis number 23/3001 and higher but must not be fitted in the latter tractor type.

Reason: CAN-bus connections for Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.



Preliminary work in Fav 700:

- Remove battery case.
- Remove G001 - battery.



**Preliminary work in Fav 900
chassis number 23/3001 and up**

- Remove front panel.

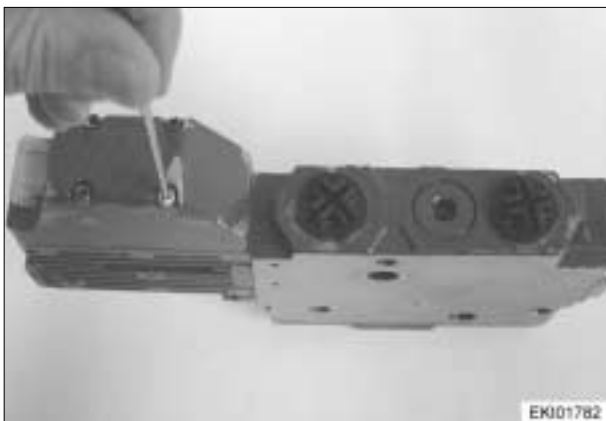
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| 25.07.2001 | a | 2/6 | 9620 | G | 000004 |

Fav 700
Fav 900**Hydraulics / Valve assemblies**
Installation and removal of pilot valve**G**

Label and disconnect control valve connector.



Remove control valve.

Note:**Chapter 9620 Reg. G - Installation and removal of control valves SB 23 LS-EHS**

Remove cover from electrohydraulic actuator unit.

Note:**Take care not to damage PCB (K) (see sectional view).****Remove connector from pilot valve and remove pilot valve.****Note:****Pull plug in straight line out of connector (pilot valve). Plug is not clipped in place!!****Note:****Take care not to damage connector of position sensor (I) (see drawing).**

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| 25.07.2001 | a | 3/6 | Installation and removal of pilot valve 9620 | G | 000004 |

Fav 700
Fav 900

Hydraulics / Valve assemblies

Installation and removal of pilot valve

G



Installing pilot valve

Check plunger of pilot valve for ease of movement.



Locate O-rings on pilot valve.



Insert pilot valve and connect pilot valve connector.

Note:

Offer plug in straight line to connector (pilot valve). Plug is not clipped in place!!

Note:

Check that connector of position sensor (I) is correctly seated (see drawing).



Check cover seal for damage.

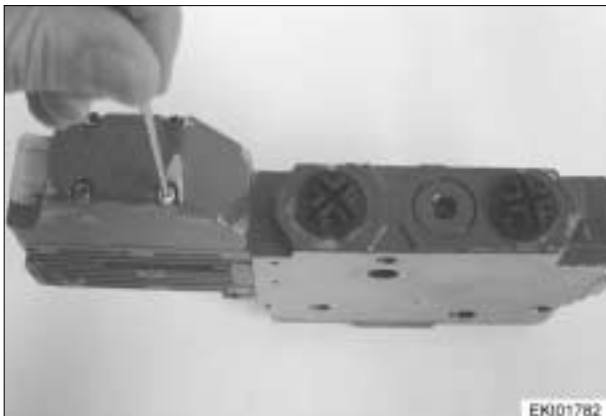
| Date | Version | Page | Installation and removal of pilot valve | Capitel | Index | Docu-No. |
|------------|---------|------|---|---------|-------|----------|
| 25.07.2001 | a | 4/6 | | 9620 | G | 000004 |

Fav 700
Fav 900

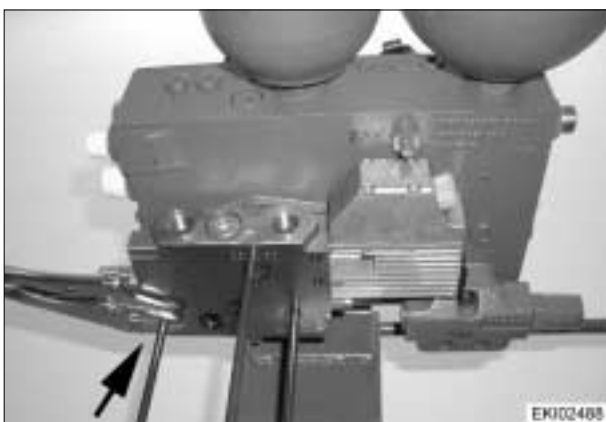
Hydraulics / Valve assemblies

Installation and removal of pilot valve

G



Tighten cover of electrohydraulic actuator unit.



Insert control valve.

Note:

Chapter 9620 Reg. G - Installation and removal of control valves SB 23 LS-EHS



Note:

Change microfilter - FF before fitting end plate - EP.

Thoroughly clean filter housing and control-pressure bores in end plate - EP.

Chapter 9620 Reg. A - End plate - EP

Chapter 9620 Reg. G - Installation and removal of control pressure microfilter FF



Connect control valve connector.

X326 = Y015 (1st layer)

X327 = Y016 (2nd layer)

X328 = Y017 (3rd layer)

X329 = Y018 (4th layer)

X330 = Y019 (5th layer = enhanced control front power lift)

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| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulics / Valve assemblies Installation and removal of pilot valve | G |
|----------------------------------|--|----------|



Carry out performance test on control valve.
Check tractor for leaks.
Refit all other items removed from tractor.

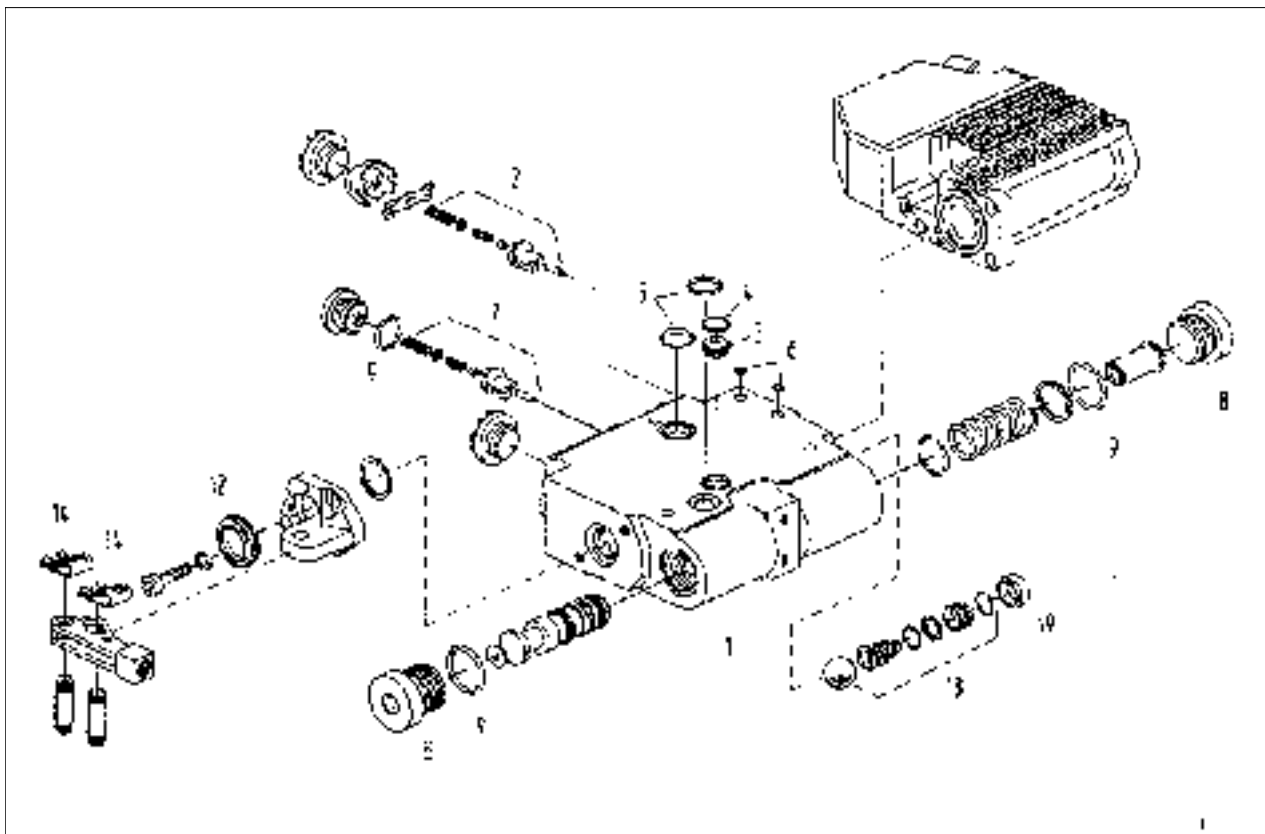
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Farmer 400
Fav 700
Fav 900

Hydraulics / Valve fitting

Removing and fitting a shutoff valve

G



| Item | Designation | Item | Designation |
|------|---------------------------|------|-----------------|
| 1 | Control valve | 8 | Drain plug |
| 1 | Seal set | 9 | O-ring |
| 2 | Parts set (shutoff valve) | 12 | Scraper ring |
| 3 | Shuttle valve | 14 | Locating spring |
| 4 | O-ring | 18 | Parts set |
| 5 | O-ring | 19 | Sealing plug |
| 6 | O-ring | | |

Note:

Retrofitting and repair work on the service hydraulics must be carried out with very great attention to cleanliness. The smallest particles of dirt in the control circuit can prevent the control movement or cause an unintentional movement.

Note:

The control valves of type SB 23LS used in the Fav 700 are identical in function to the control valves for Fav 900 chassis number 23/3001 and up but must not be fitted to this tractor type. Reason: The CAN-bus connections in the Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.

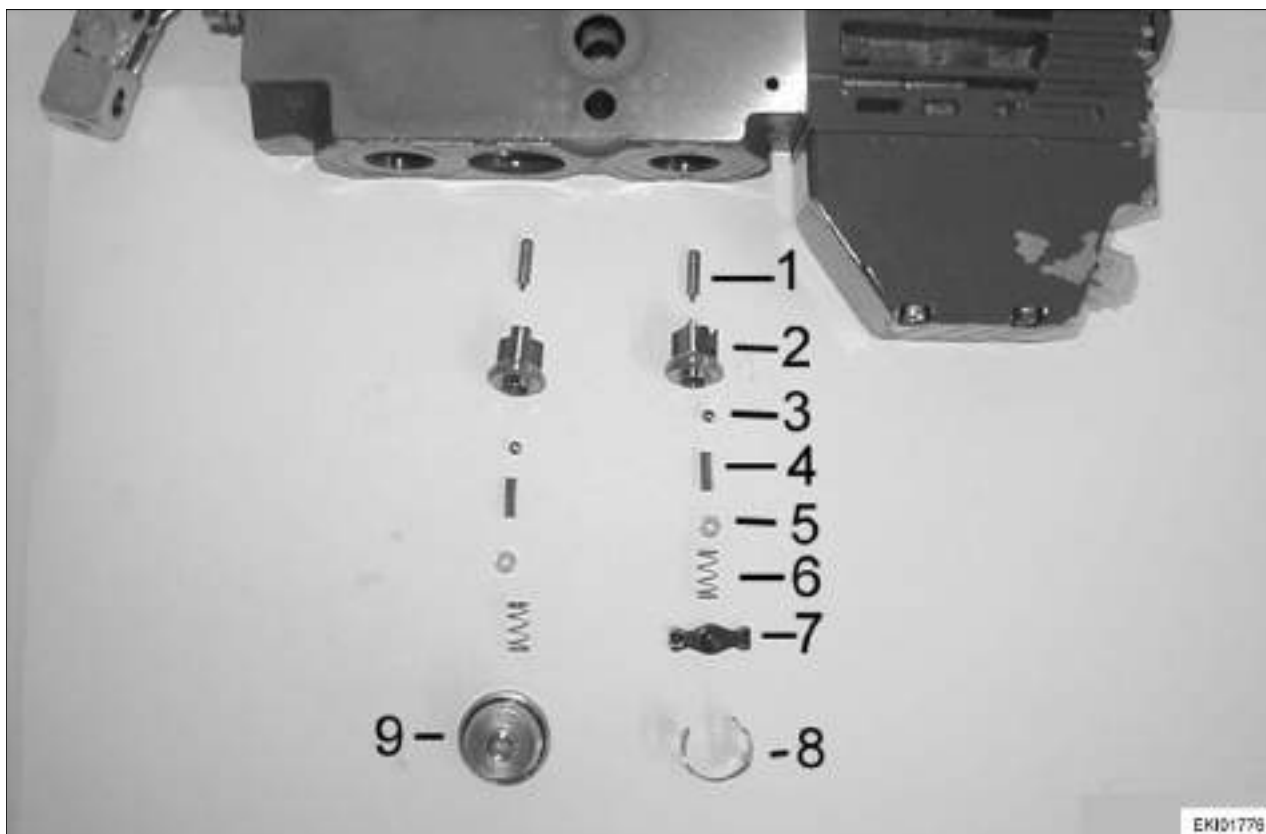
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| 26.07.2001 | a | 1/8 | 9620 | G | 000005 |

Farmer 400
Fav 700
Fav 900

Hydraulics / Valve fitting

Removing and fitting a shutoff valve

G



Removing shutoff valve

- Move control valve slide to neutral position.
- Press hoop of circlip (8) upwards.
- Turn circlip (8) through 90° to left.
- Press retaining plate (7) downwards, turn through approx. 90° (turning circlip at same time) and withdraw diagonally upwards.
- Remove closing spring (6), washer (5), spring (4), ball (3), valve cone (2) and clamping bolt (1).
- Clean connection bore.

Fitting shutoff valve

- Insert clamping bolt (1) with lug facing upwards.
- Insert valve cone (2).
- Insert ball (3).
- Insert spring (4).
- Insert washer (5).
-

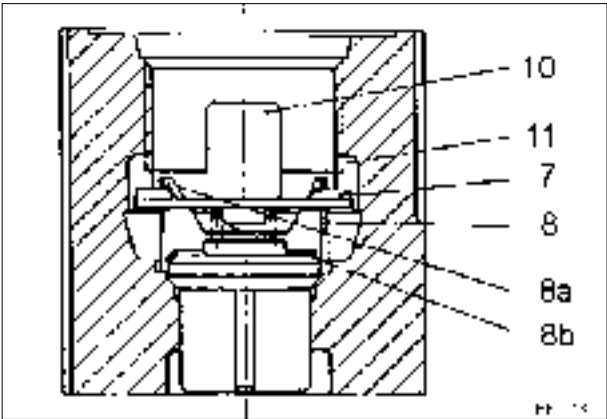
Note:

Grease parts set (1-6) to aid fitting.

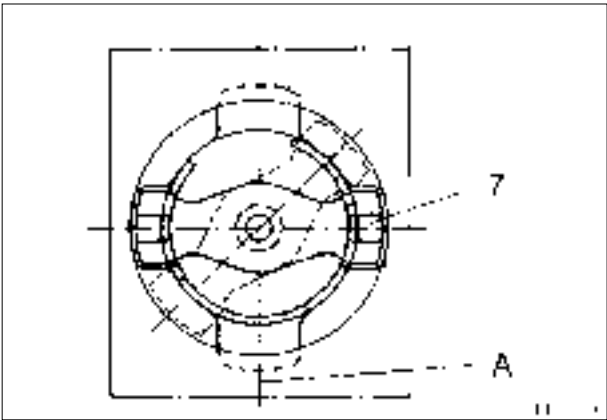
- Locate circlip (8) such that open side is parallel to control valve slide axis (pointing to mechanical actuation system).
- Place closing spring (6) on washer (5).
- Insert retaining plate (7) (lug for spring guide pointing downwards) diagonally over large cast pockets (parallel to control valve slide axis). Press closing spring (6) downwards with retaining plate (7) and turn through approx. 90° to right with circlip (8) until lugs engage in small cast pockets.
- Turn circlip (8) back to left until hoops are vertically above retaining plate. Press hoops downwards as far as stop (to secure).

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| 26.07.2001 | a | 2/8 | 9620 | G | 000005 |

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Hydraulics / Valve fitting Removing and fitting a shutoff valve | G |
|---|--|----------|



- 10 = Large cast pockets
- 11 = Small cast pocket
- 7 = Retaining plate
- 8 = Circlip
- 8a = Hoop of circlip (8)
- 8b = Recess in circlip (8)



- A = Control valve slide axis
- 7 = Retaining plate

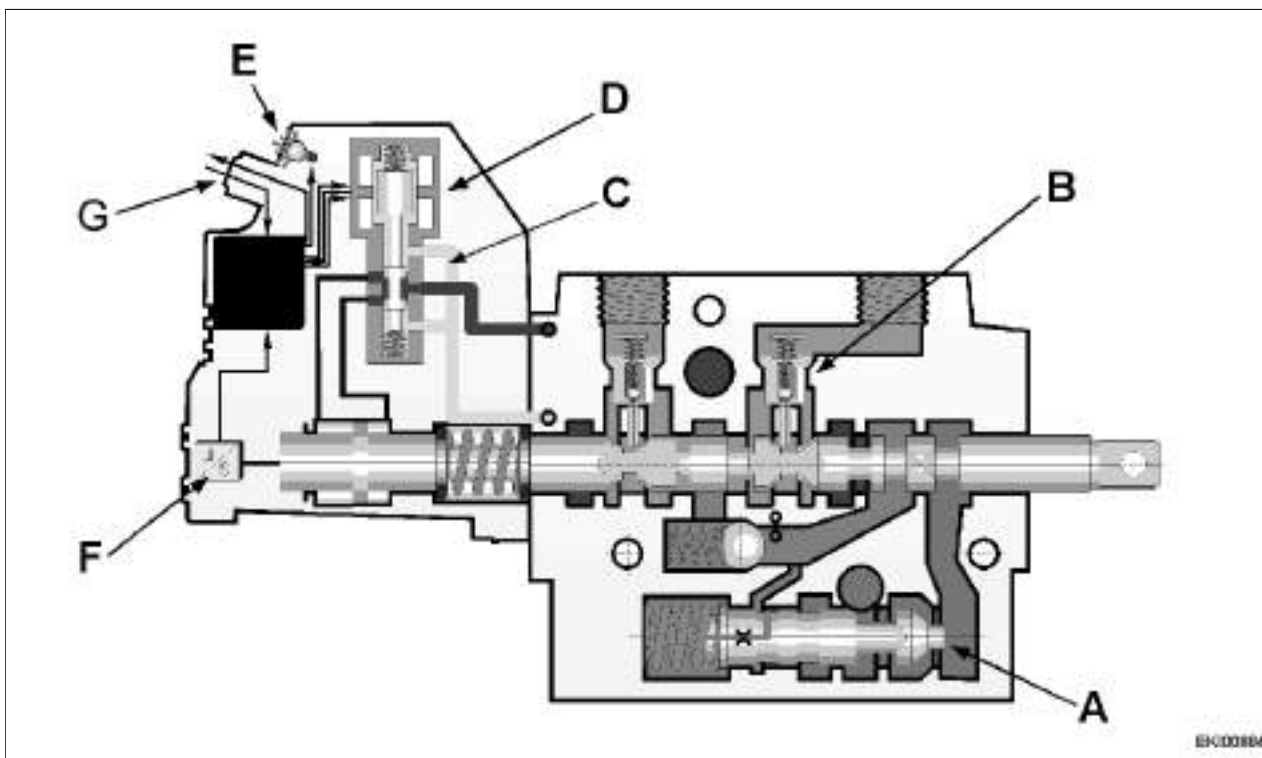
Farmer 400
Fav 700
Fav 900

Hydraulics / Valve fitting

Removing and fitting a shutoff valve

G

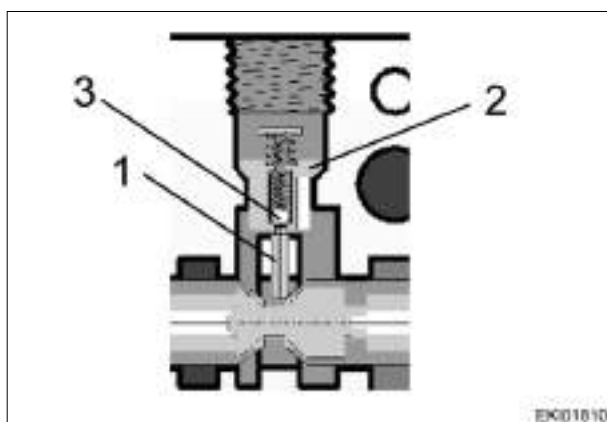
Default setting of shutoff valve (B)



| | | | |
|---|-------------------------|---|--|
| A | Pressure governor | E | Diagnostics: optical display; fault signal |
| B | Shutoff valve | F | Inductive position sensor |
| C | Control pressure 22 bar | G | CAN setpoint |
| D | Pilot valve | | |

Measuring play between valve cone (2) and clamping bolt (1)

Determine length of clamping bolt (1).



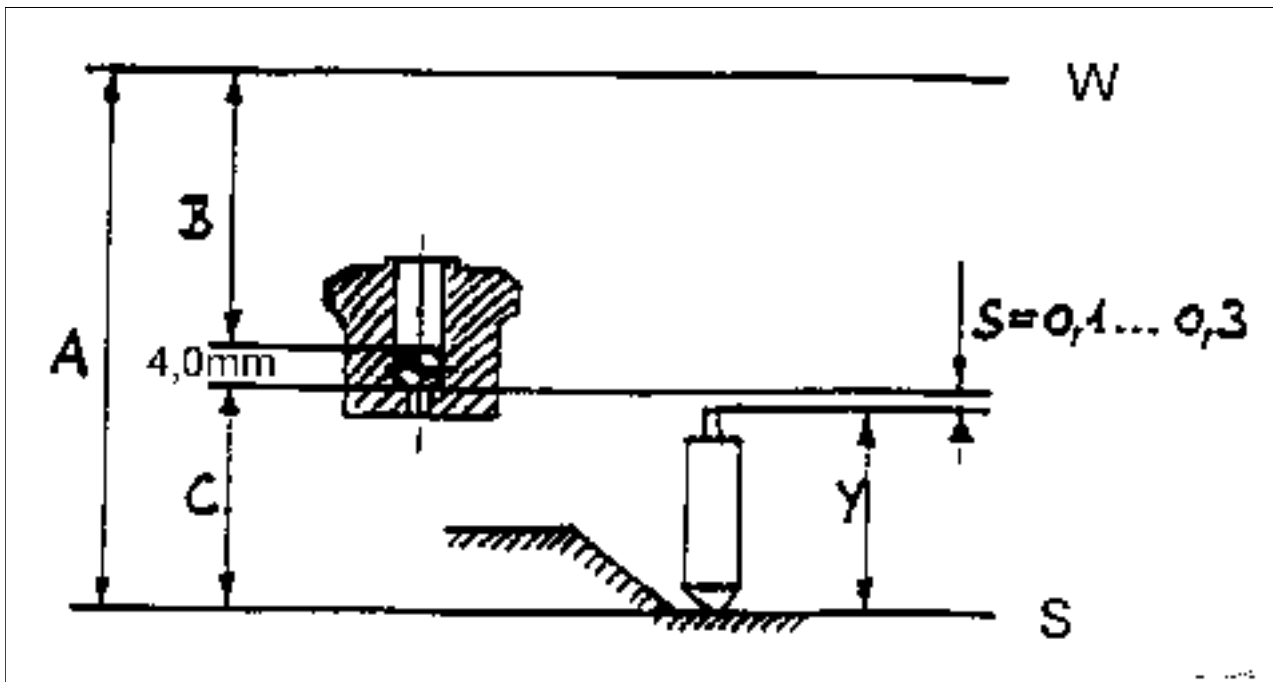
Clamping bolt (1) must be adapted when replacing or fitting new shutoff valve for first time.

Farmer 400
Fav 700
Fav 900

Hydraulics / Valve fitting Removing and fitting a shutoff valve

G

Drawing showing how to determine clamping bolt length Y



W = Top edge of control valve
S = Top edge of control valve slide

- Control valve is in neutral position!!
- Measure distance A (from top edge of control valve to control valve slide).
- Insert valve cone with ball (diameter = 4mm) into housing.
- Measure distance B (from top edge of control valve to ball).
- Determine clamping bolt length Y.

Fitting space: $C = A - (B + 4\text{mm})$

Clamping bolt length: $Y = C - (0.1\text{mm} - 0.3\text{mm})$

- Remove valve cone.
- Insert calculated clamping bolt.
- Fit shutoff valve in accordance with fitting instructions.

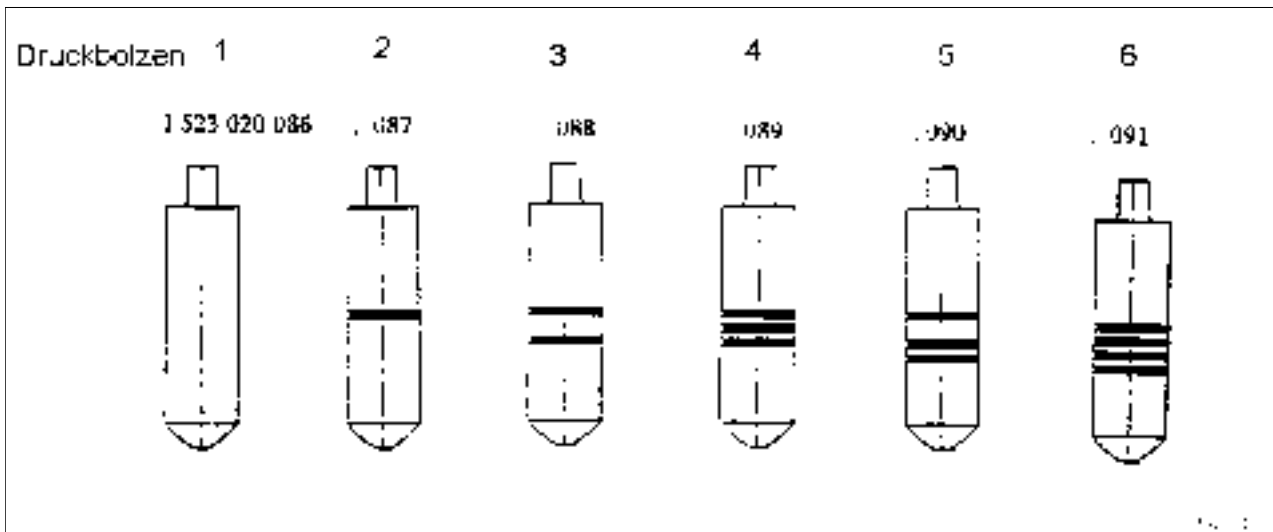
Farmer 400
Fav 700
Fav 900

Hydraulics / Valve fitting

Removing and fitting a shutoff valve

G

Markings on clamping bolts



| | Part no. Bosch | Length of clamping bolt | Marking |
|-----------------|-------------------|----------------------------|---------------|
| Clamping bolt 1 | 1 523 020 086 | Y=15.55 -0.1mm | No groove |
| Clamping bolt 2 | 1 523 020 087 | Y=15.70 -0.1mm | One groove |
| Clamping bolt 3 | 1 523 020 088 | Y=15.85 -0.1mm | Two grooves |
| Clamping bolt 4 | 1 523 020 089 | Y=16.00 -0.1mm | Three grooves |
| Clamping bolt 5 | 1 523 020 090 | Y=16.15 -0.1mm | Three grooves |
| Clamping bolt 6 | 1 523 020 091 | Y=16.30 -0.1mm | Four grooves |

Note:

Order parts set for shutoff valve in accordance with FENDOS spare parts catalogue.

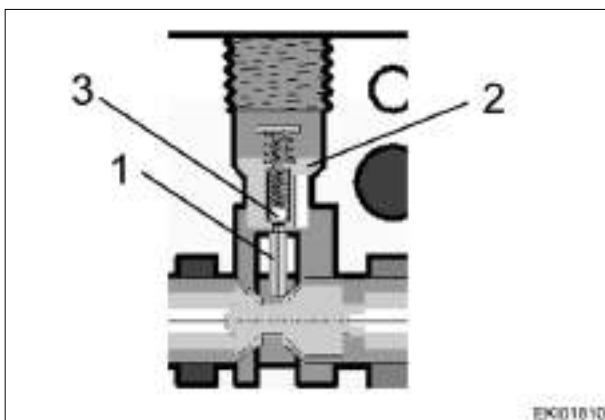
Farmer 400
Fav 700
Fav 900

Hydraulics / Valve fitting

Removing and fitting a shutoff valve

G

Test opening points of shutoff valve.



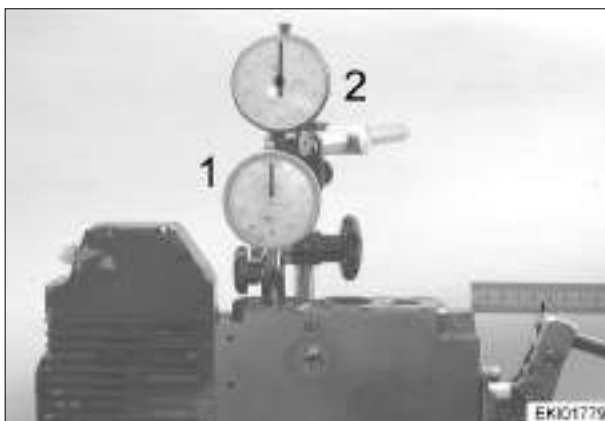
Testing opening points of shutoff valve

Default setting for shutoff valve is achieved via clamping bolts (1) of different lengths.

Note:

Step 1: Ball (3) (pressure-relief valve) opens.

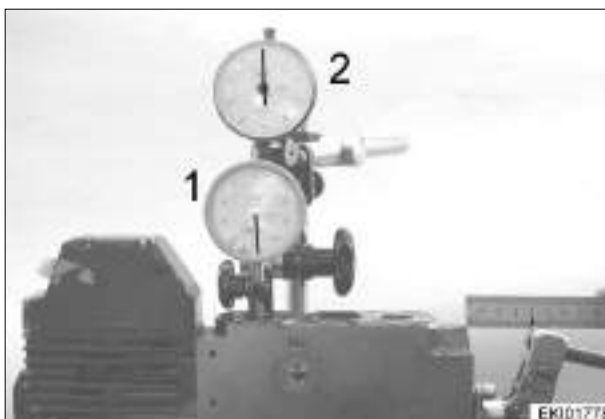
Step 2: Valve cone (2) (shutoff valve) opens.



Place gauge (item 1) on retaining plate (7).

Place gauge (item 2) on valve cone (2).

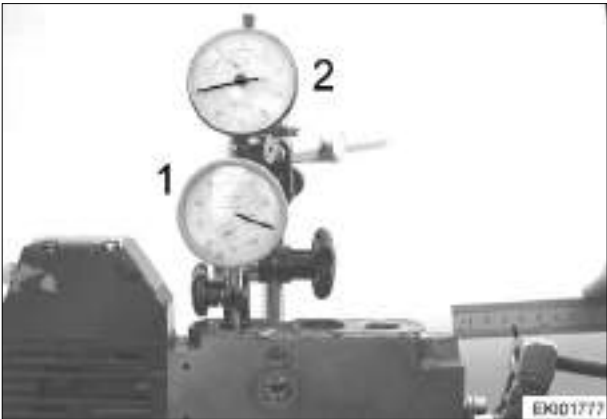
Set both gauges to "0".



Deflect control valve slide with manual control.

Clamping bolt (1) runs up edge of control valve slide. Ball (3) (pressure-relief valve) is raised.

| | | |
|---|--|----------|
| Farmer 400 Fav 700 Fav 900 | Hydraulics / Valve fitting Removing and fitting a shutoff valve | G |
|---|--|----------|

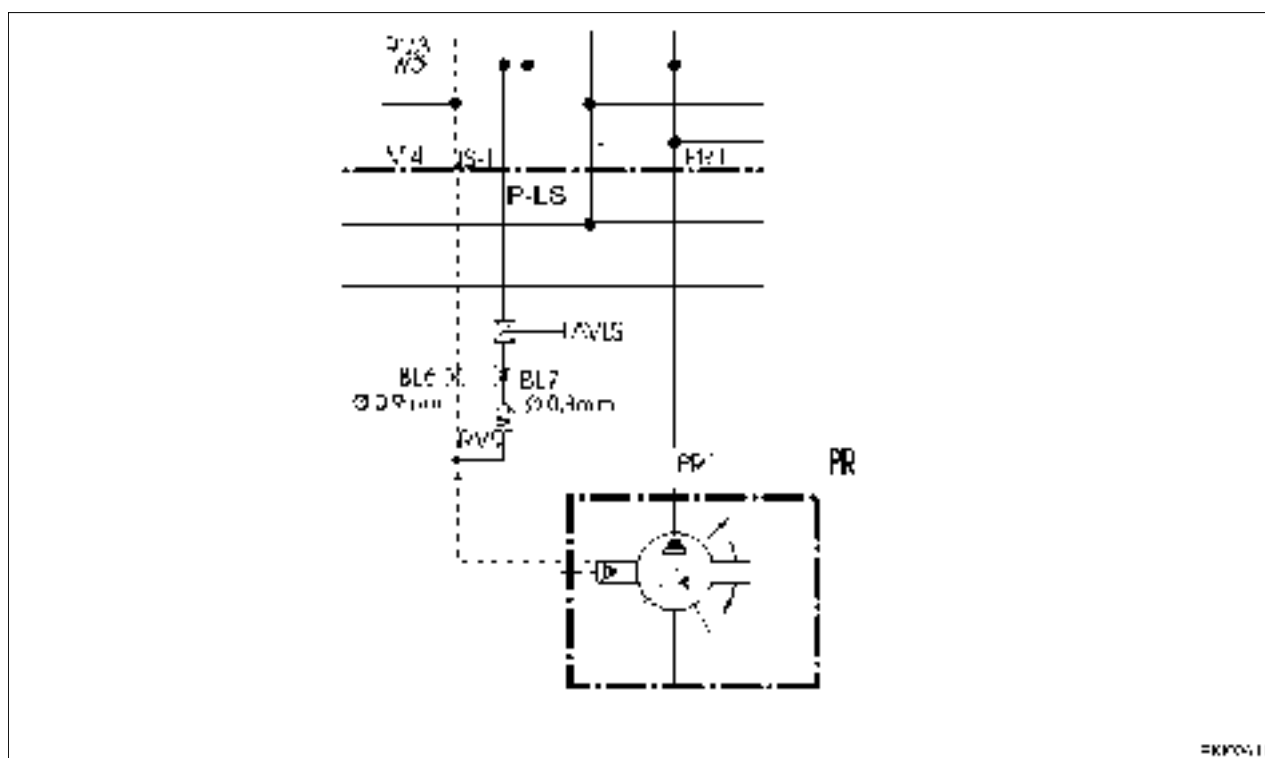


Deflect control valve slide further with manual control.
Valve cone (2) (shutoff valve) is raised.

| | | |
|----------------|--|----------|
| Fav 900 | Hydraulic Equipment / External Pressure Control LS-Pressure Enhancement | A |
|----------------|--|----------|

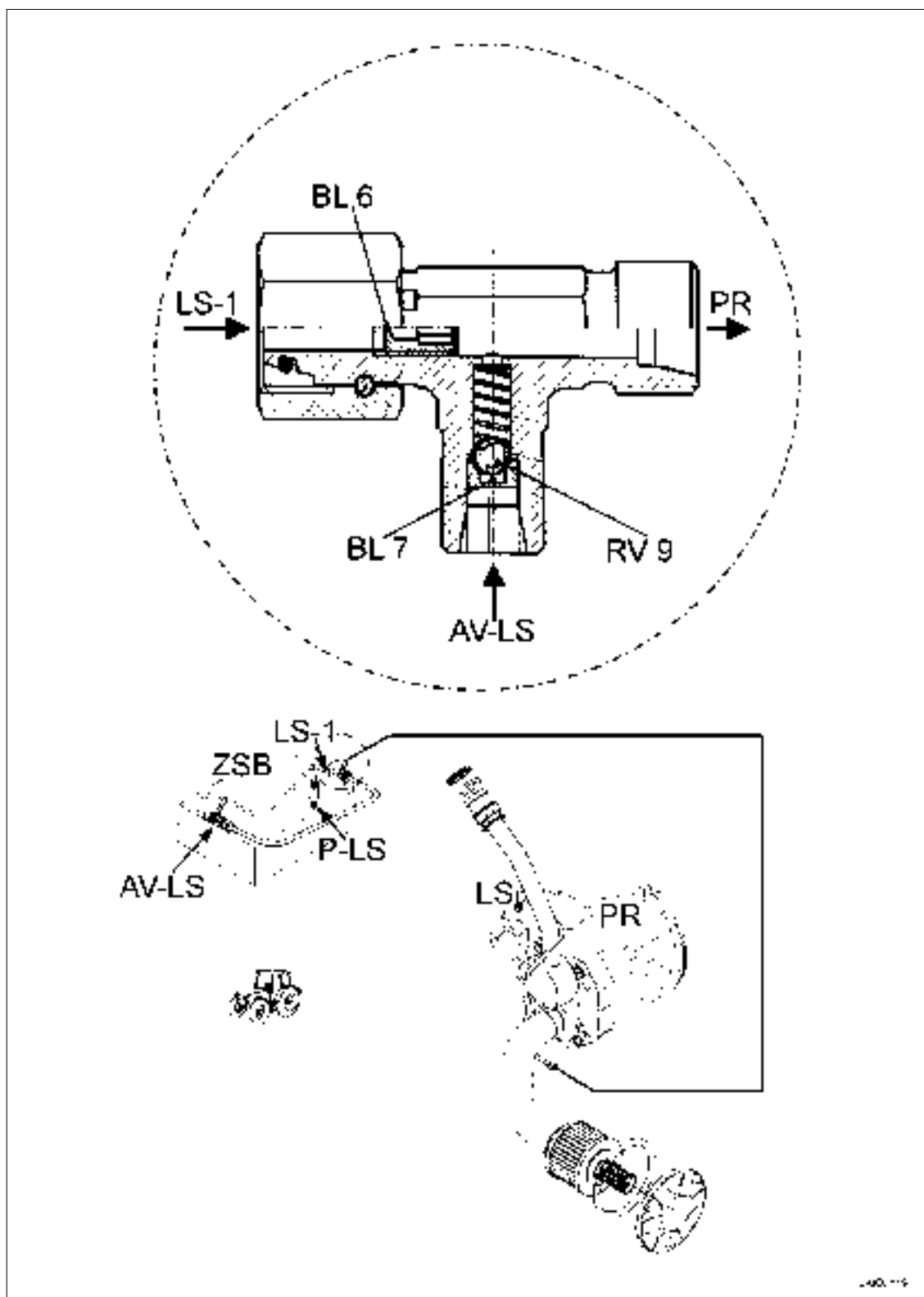
Generalities:

| | |
|---|---|
| Further Names: (e.g Operating Manual) | "External Pressure increase" |
| Applications: | All Tractors with the Option "External Pressure Control" |
| Reason: | Hydraulic hoses are creating substantial pressure losses within P - Hose, in such an extend that the Difference of control Pressure (Control - delta - p) on the Implement Control Bloc will not be sufficient. As a result the Load Sensing Pump will not generate full Power. |
| Goal : | Increasing Control Pressure difference on external Valve |
| Prinzip: | By opening shutoff valve AVLS, load sensing pump Pressure will be partially (approx 8 bar) led to the LS - Pressure. Advantage: Basic hydraulic settings will not be modified. Pressure Increase is independant of the control Pressure. |
| Detailed - Function: | A small oil flow of the load sensing pump is led via the Orifice BL 7 to LS - Line. Due to the added flow, the Control Pressure Level will be offset upstream of the LS Pump by approx. 8 bar on top of the losses in the LS line. |
| Detailed - Function: Orifice BL 6 in LS: | generates the Pressure difference of approx. 8 bar |
| Orifice BL 7 in P: | Flow 1 - 1,5 l/min |
| Non Return Valve RV9 | Reliability of steering (Without RV9, steering Pressure could fail in case of an overloaded Load Sensing Pump) |
| Monitoring: | None |

Detailed Diagram

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| 06.12.2000 | a | 1/3 | LS-Pressure Enhancement | 9666 | A |
| | | | | | 000001 |

Location and "L-Stub"



| | | |
|----------------|--|----------|
| Fav 900 | Hydraulic Equipment / External Pressure Control LS-Pressure Enhancement | A |
|----------------|--|----------|

References:

| | Location (Short Description) | Consult Document: |
|------------------------------|---|-------------------|
| Measuring Points: M3 and M4: | Top Side of Main Control Bloc (ZSB) | 9600/D/... |
| Measuring Points: M5 | Lower side of the final Plate of the Valves Stack. | 9600/D/... |
| Non Return Valve RV9 | Integrated within L Stub (LS-Line on the Top Side of the main control Bloc ZSB) | |
| Orifice BI 6 | | |
| Orifice BI 7 | | |

Note:**Connection on Load Sensing Pump:****up to Chassis Number 21/3000:****(????) Bajonett - Connector Flange / Tube****ab Fg 23/3001:****see Graphic, Tube and Flange are one piece****Short Test Procedure:**

| Tractor - Hydraulics | | still locked | unlocked |
|----------------------|-------------------|--|---|
| | In operation for: | Steering, Suspension, Rear Powerlift and external Control Bloc | additional for Spool Valves; among others Front Powerlift |


Per Default: Shutoff Valve AVLS Shut

| Tractor - Hydraulics | | | still locked | unlocked |
|------------------------------------|-----|----|---------------|-------------------|
| Control Pressure Valve MVSt / Y032 | | | not activated | 12 Volt activated |
| Measuring Point | | | | |
| Pressure Load sensing Pump | pP | M3 | 20...23 bar | 42...45 bar |
| LS - Pressure | pLS | M4 | 0 | 22 bar |
| Control Pressure | pSt | M5 | 0 | 22 bar |

Pressure enhancement active / Shutoff valve AVLS opened valid for Oil temperature approx. 50° C.

| Tractor - Hydraulics | | | locked | unlocked |
|------------------------------------|-----|----|---------------|-------------------|
| Pressure Control Valve MVSt / Y032 | | | not activated | 12 Volt activated |
| Pressure Load sensing Pump | pP | M3 | 30...37 bar | 60...75 bar |
| LS-Pressure | pLS | M4 | 3...5 bar | 30...42 bar |
| Control Pressure | pSt | M5 | 0 | 22 bar |

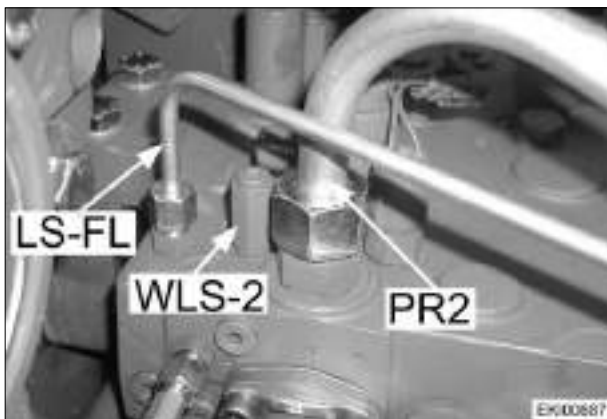
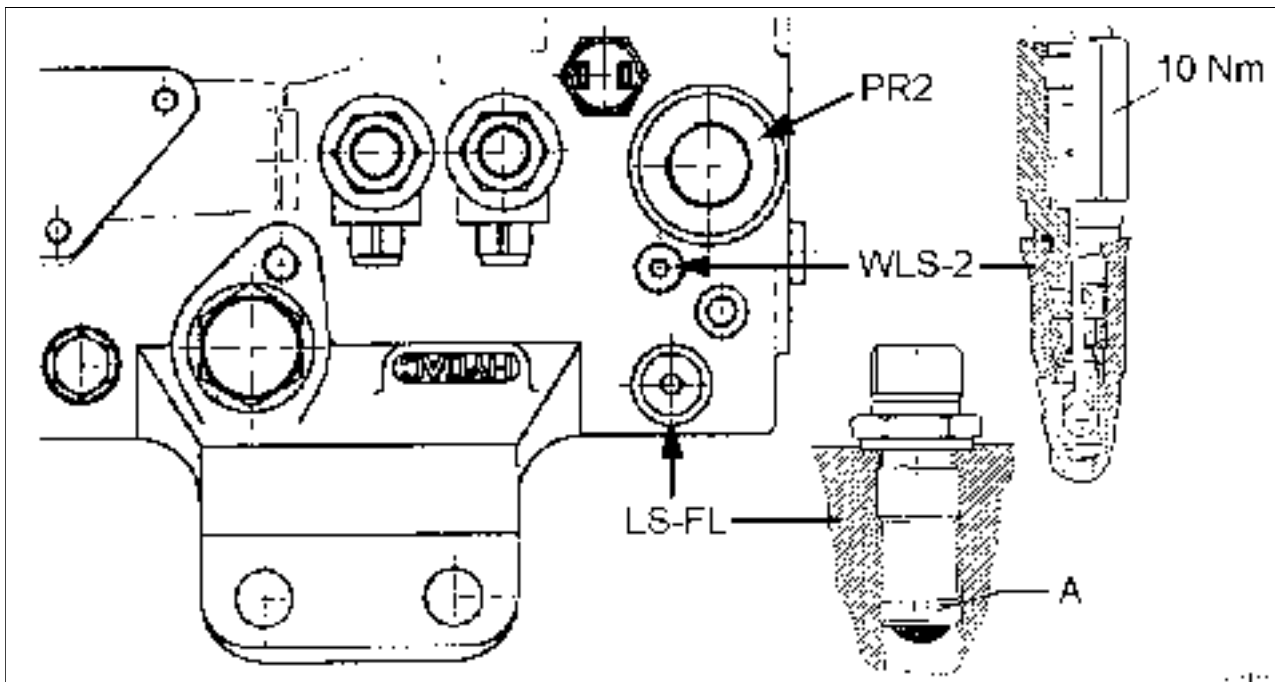
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| | | |
|--|--|---|
|  | <h1>Fitting instructions</h1> <div>Repair</div> | |
| Farmer 400 Fav 700 Fav 900 | Hydraulic systems / external pressure supply Fitting instructions for external pressure supply | <div style="font-size: 2em; font-weight: bold;">G</div> |

CONTENTS

1. Central control block
2. Farmer 400
3. Favorit 700
4. Favorit 900 from serial no. 3001

1. Central control block



- Screw strainer (A) into mount (LS-FL) and hand-tighten using screwdriver.

LS-FL = To external LS mount.

WLS-2 = Tighten shuttle valve no. 2 to 10 Nm (lever shuttle valve).

PR2 = To external pressure supply mount.

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AGCO GmbH & Co.
Johann-Georg-Fendt-Str. 4 D-87616 Marktoberdorf

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Fitting instructions

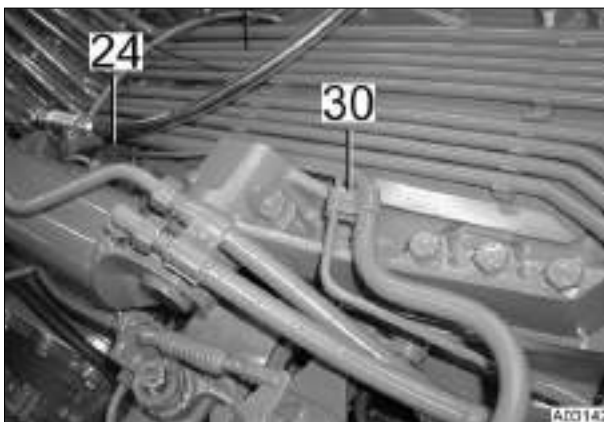
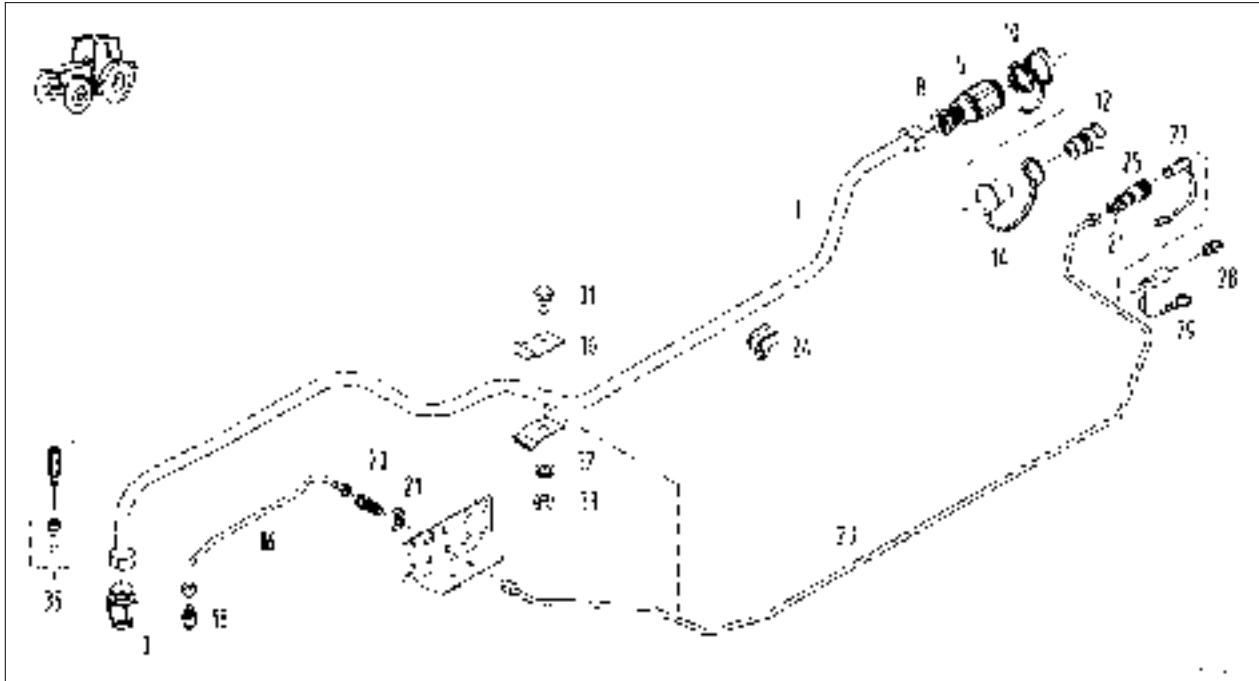
Repair

Farmer 400
Fav 700
Fav 900

Hydraulic systems / external pressure supply
Fitting instructions for external pressure supply

G

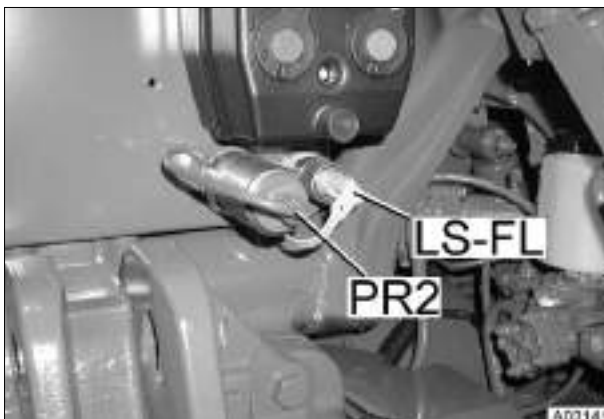
2. Farmer 400




- Screw 2 clips (30) to LS control line (23) and external pressure supply (1).

1x M6x28 8.8 hexagon bolt
1x M6 hexagon bolt
1x spring washer

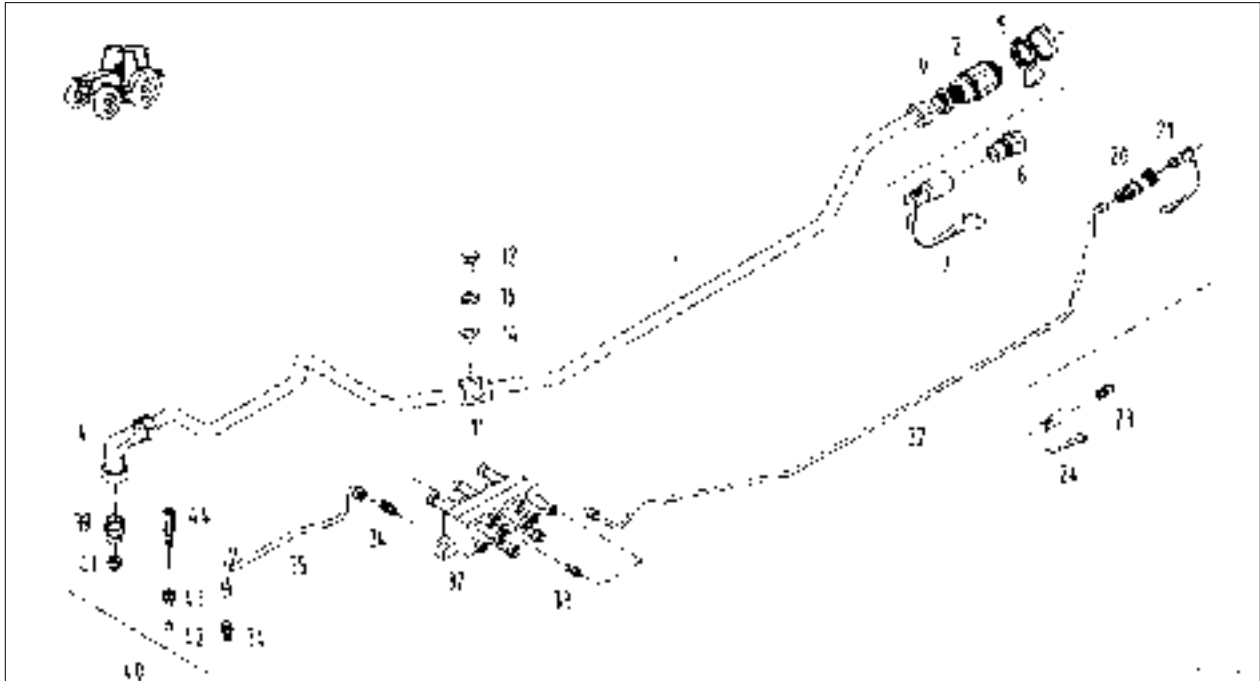
- Attach LS control line (23) with cable fastener (24).



LS-FL = External LS mount
PR2 = External pressure supply mount

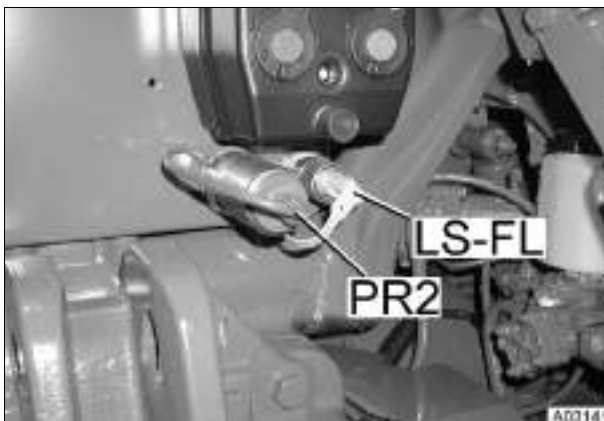
| | | |
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|  | <h1>Fitting instructions</h1> <div>Repair</div> | |
| Farmer 400 Fav 700 Fav 900 | Hydraulic systems / external pressure supply Fitting instructions for external pressure supply | <div>G</div> |

3. Favorit 700




- Screw on external pressure supply (1) with pipe collar (11).

1 x M6x16 8.8 hexagon bolt
1x washer
1x spring washer

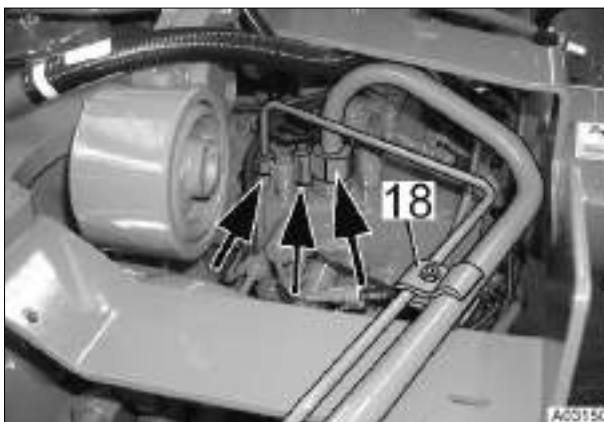
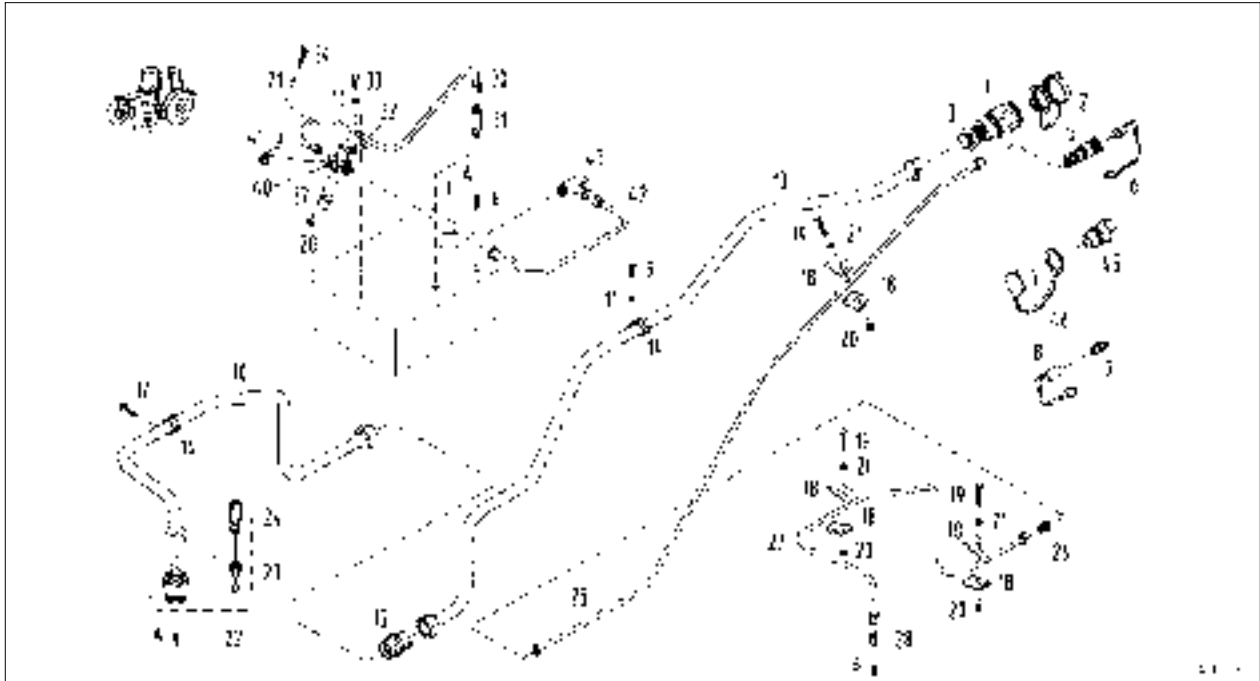


LS-FL = External LS mount
PR2 = External pressure supply mount

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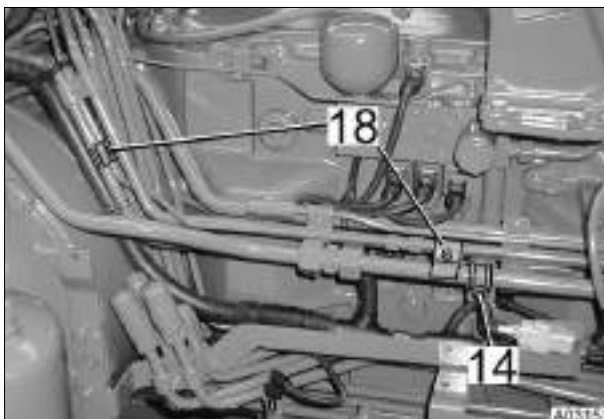
| | | |
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| Farmer 400 Fav 700 Fav 900 | Hydraulic systems / external pressure supply Fitting instructions for external pressure supply | <div style="font-size: 2em; font-weight: bold;">G</div> |

4. Favorit 900 from serial no. 3001



- Screw 2 clips (18) to LS control line and external pressure supply.

1x M6x20 8.8 hexagon bolt
1x M6 hexagon bolt
1x spring washer



- Screw on pipe collar (14).
- Screw 2 clips (18) in place in each case.

1x M6x20 8.8 hexagon bolt
1x M6 hexagon bolt
1x spring washer

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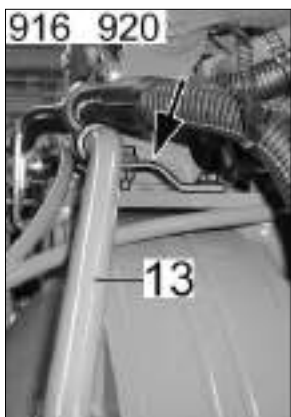
Fitting instructions

Repair

Farmer 400
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Fav 900

Hydraulic systems / external pressure supply
Fitting instructions for external pressure supply

G



- Screw pressure pipe (13) to right rear axle.

916, 920


- 1x angle
- 1x M8x16 8.8 hexagon bolt
- 1x spring washer
- 1x pipe collar
- 1x M8x20 8.8 hexagon bolt
- 1x M8 hexagon bolt
- 1x spring washer

924, 926

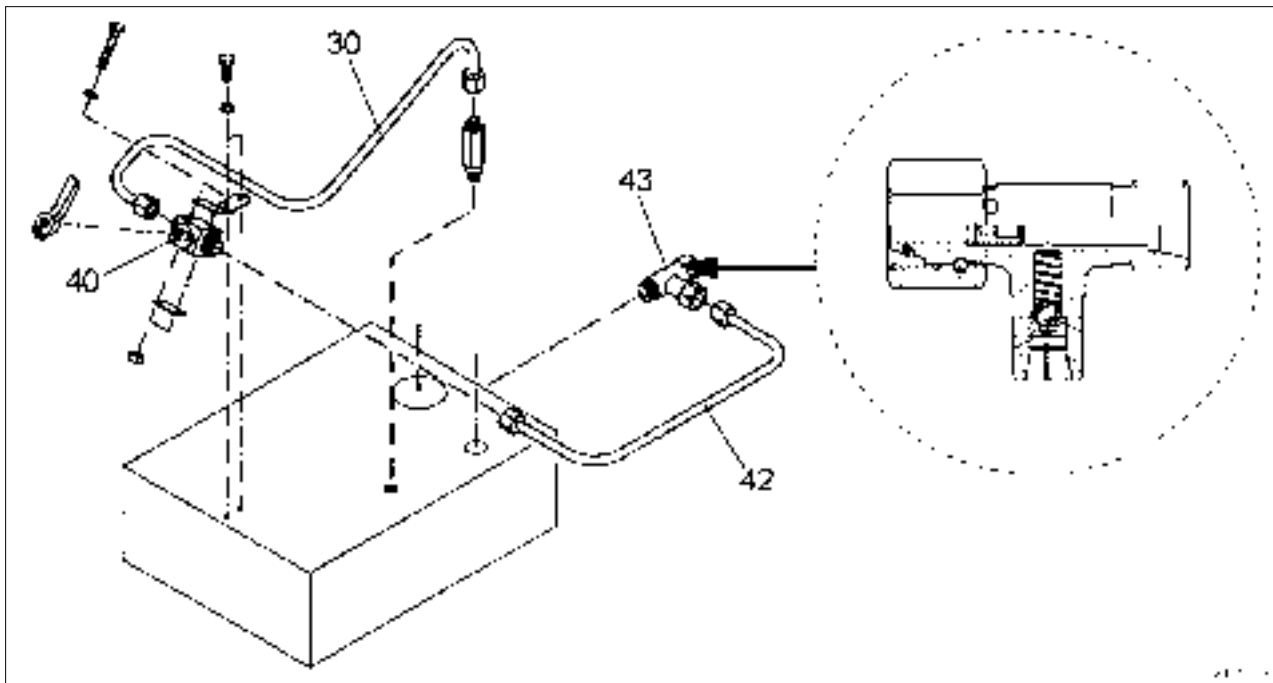
- 1x pipe collar
- 1x M8x20 8.8 hexagon bolt
- 1x spring washer



- LS-FL = External LS mount
- PR2 = External pressure supply mount

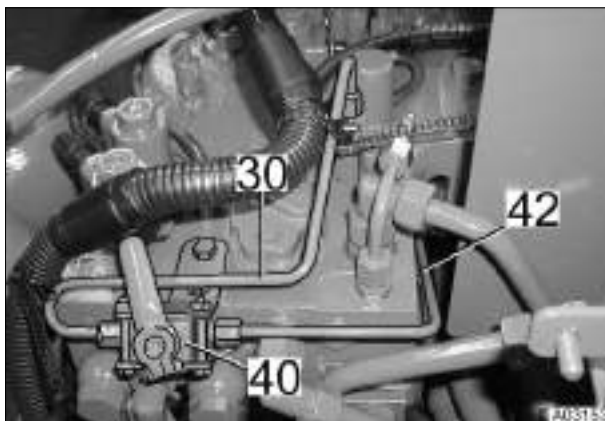
| | | |
|--|--|---|
|  | <h1>Fitting instructions</h1> <div>Repair</div> | |
| Farmer 400 Fav 700 Fav 900 | Hydraulic systems / external pressure supply Fitting instructions for external pressure supply | <div style="font-size: 2em; font-weight: bold;">G</div> |

LS pressure increase



Note:

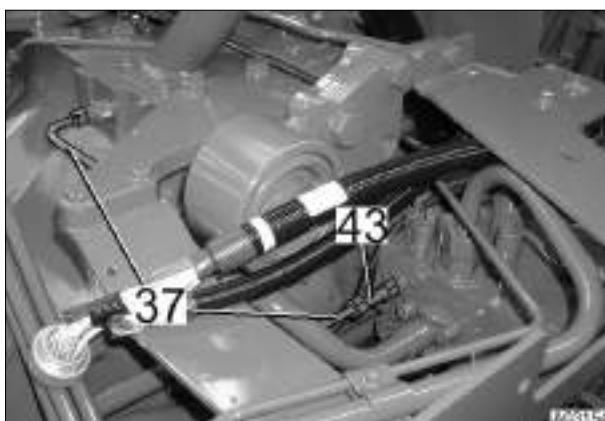
For a detailed description of the LS pressure increase please refer to the Favorit 900 workshop manual, chapter 9666 A 00001.



- Screw on 2-way ball valve (40).

1x support
2x M8x12 8.8 hexagon bolt
2x spring washer
1x shackle
2x M6x40 8.8 hexagon bolt
2x M6 hexagon bolt
2x spring washer

- Screw on pressure pipes (30, 42).



- Unscrew existing pressure pipe (37).
- Screw on L-coupling (43).
- Screw supplied pressure pipe and pressure pipe from 2-way ball valve (42) to L-coupling.

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| | | |
|----------------------------------|--|----------|
| Fav 700 Fav 900 | Hydraulic Equipment / Additional Valves Hydraulic Oil Heating | E |
|----------------------------------|--|----------|

Alterations compared to Twin EST Control Modules Version

- Temperature Switch S040 obsolete
- Additional Valve MVV/Y033 will be supplied directly

1. Activating Conditions

- Temperature Sensor from Spool Valve 1.1 indicates < 0°C (Temperature can only be read via FENDIAS) and...
- Engine Speed (Speed Sensor B010) indicates more than 650 Rpm for at least 30 second.

2. Procedure

- Additional Valve MVV/Y033 will be supplied directly from EST Contro Module A002 .
- Charge Valve MVL/Y012 is supplied by the same EST PIN via Diod Group V005 and Relay K016
- Charge Valve triggers Load sensing Pump PR to 200 bar.
- This Pressure generates a flow of approx. 20 l/Min. via Orifice BI5 toward Return Pressure.
- This pressure loss generates approx . 8 kW heating energy.
- Hot oil flushes the Valves stack toward the tank. This justifies the expression "Fluish Valve" wich appears in FENDIAS.
- During Oil Heating a distinct noise can be heard.
- A slight engine speed Loss will be noticed during Oil Heating since the Energy mut be generated by the Engine.

3. Eventual Interruption of the Oil Heating.

- If Engine Speed (Engine Speed sensor B010)drops below 500 Rpm
- Heating will automatically resume if Engine Speed reaches for at least 30 Seconds > 650 Rpm.

4. Duration of Oil Heating . Switch Off conditions

- If Temperature Sensor within Spool Valve 1.1 indicates >5°C (Temperatur only to be read with FENDIAS r)
- Approx. 15....20 Minutes will be needed for an initial Oil Temperature of - 20°C.

5. Failure Codes:

- Only one Failure Code will be possible since Solenoid Valve MVV/Y033 is directly supplied from the single EST Control Module
- Failure Code A.1.F1 appears , If the contol Module cannot supply the valve (e.g. discontinued Wire) or if current exceeds max value of the corresponding output (In this case the control Module limits the max. Current and deactivates the output)

6. Tes Instructions and Simulation of Oil Heating

- Temperature Sensors within Spool Valves cannot be "fooled " Oil Heating can only be simulated by....
- supplying simoultaneously both solenoid valves Y012 und Y033.
- Connect 68pole -Adaptor Module to ESZ Control Module E-Box A002 ; Open both switches wich are controlling the valves and lead 12 V to the yellow socket e.g. from Pin 56,
- The hydraulic Part of Oil Heating is a part of the test sequences in the Document "Test Instruction and Protocol for the Hydraulic functions"

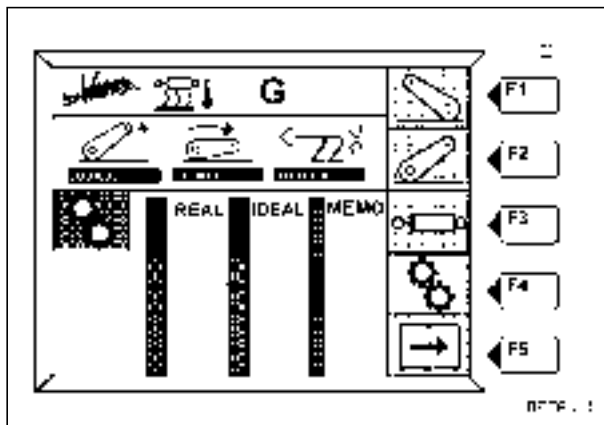
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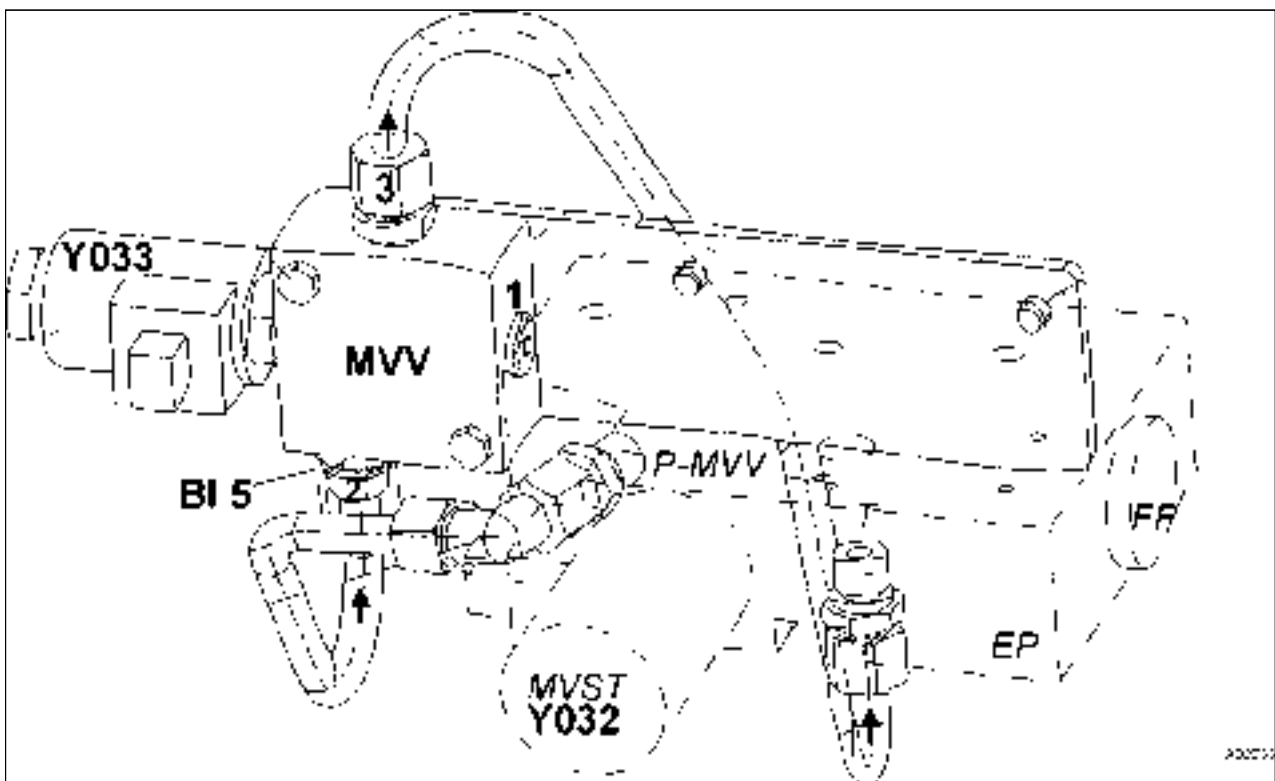
Hydraulic Equipment / Additional Valves

Hydraulic Oil Heating

E



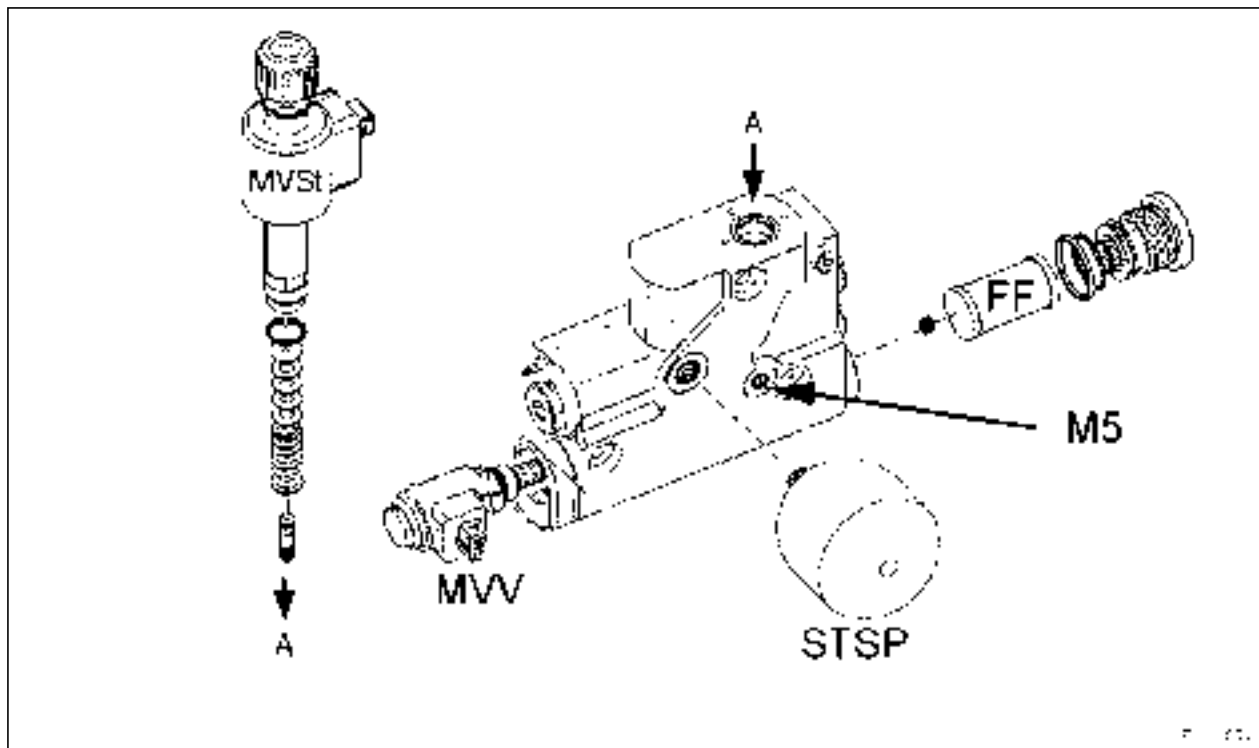
Display in Terminal during Oil Heating



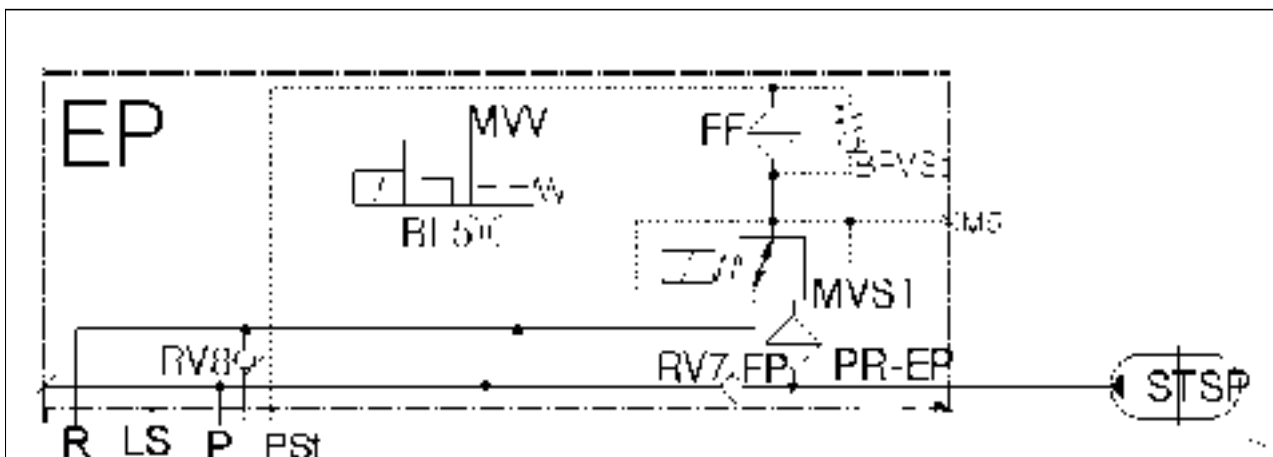
Location of Additional Valve MVV/Y033, valid for Fav 700 Single and twin EST Control Module versions

Fav 700
Fav 900

Hydraulic Equipment / Additional Valves
Hydraulic Oil Heating

E

Fav 900 / Final Plate with integrated Additional Valve MVV/Y033 (Picture shows equally :
MVSt= Control Pressure Valve ; FF=Filter; M5= Measuring Point Control Pressure



Detailed Diagram of the final Plate with integratd Additional Valve MVV for Fav 900

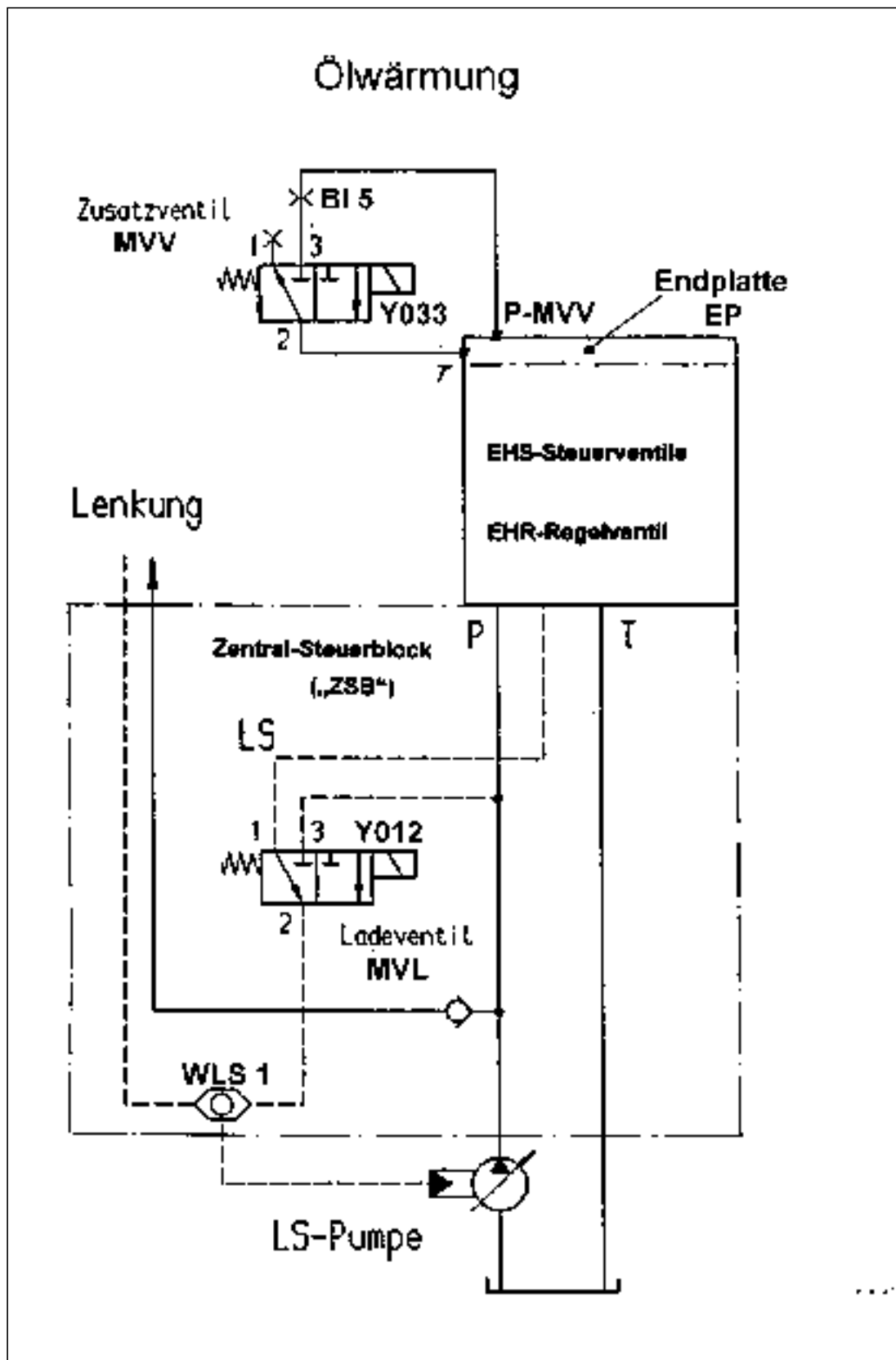
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Hydraulic Equipment / Additional Valves

Hydraulic Oil Heating

E



Hydraulic Principle diagram

Remarks to Fav 900: Additional Valve MVV and Orifice BI5 are integrated within the final Plate.

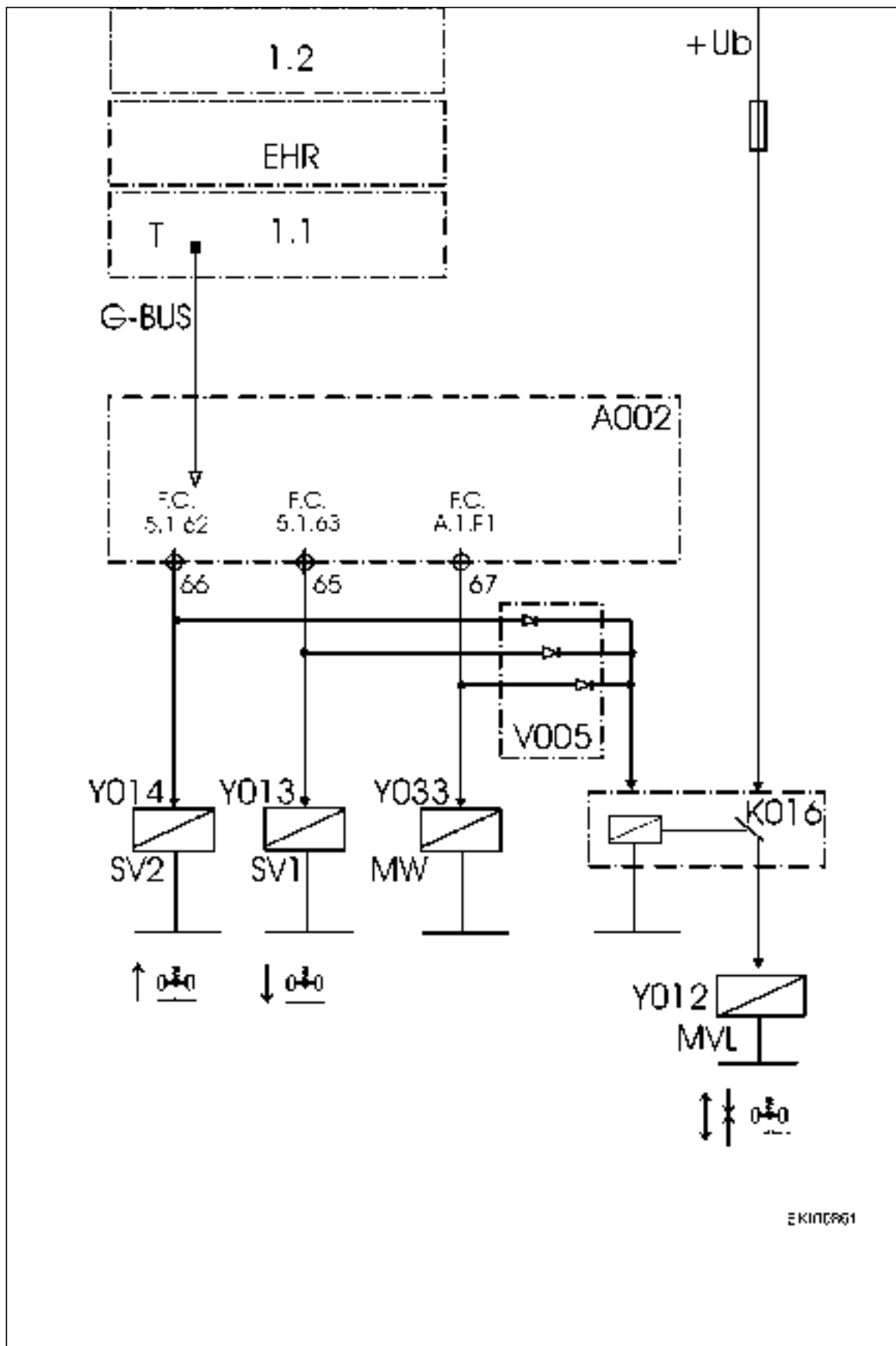
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Hydraulic Oil Heating

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Fav 700
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Hydraulic Equipment / Additional Valves
Hydraulic Oil Heating

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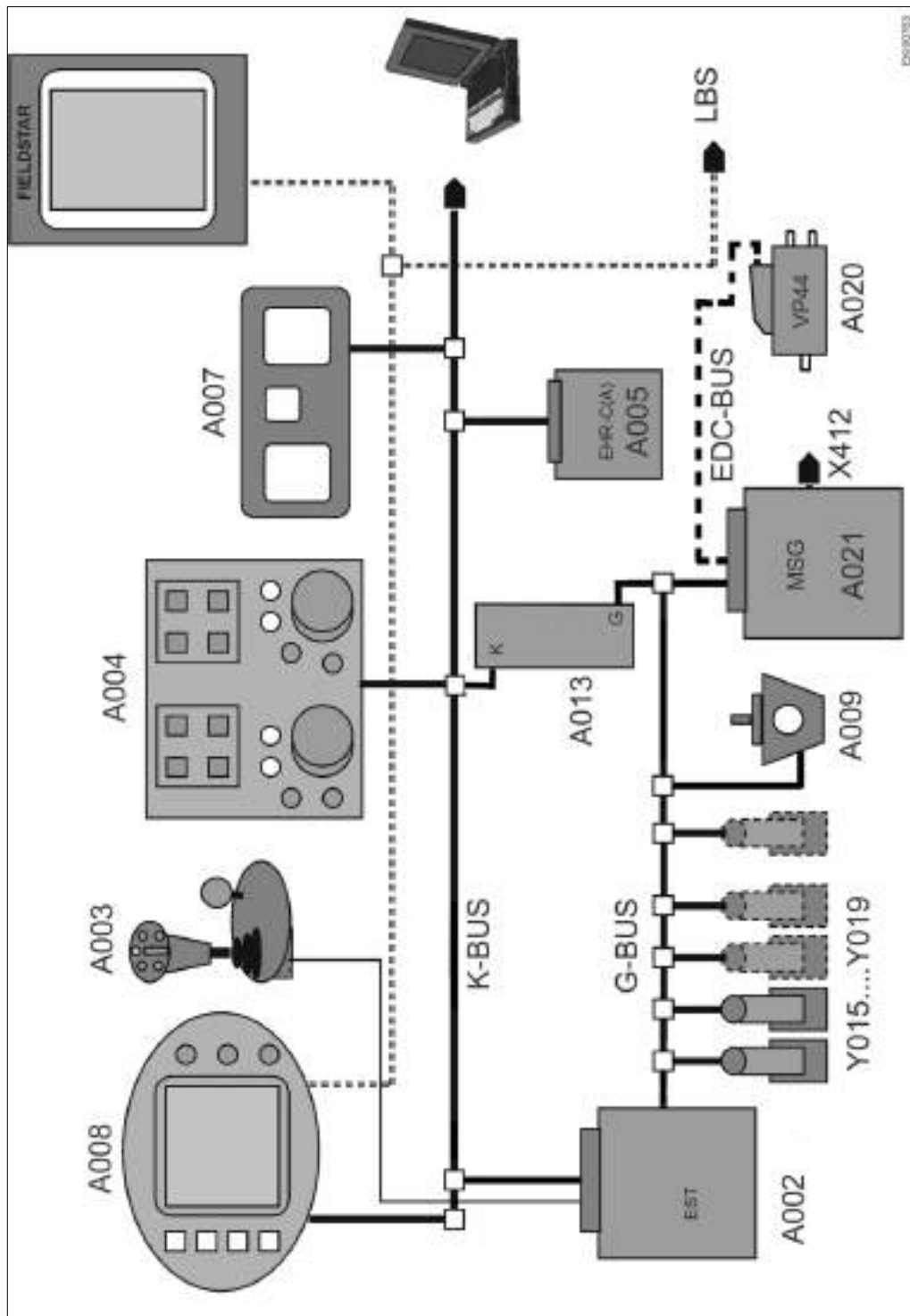
Elektric Principle Diagram

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| | | |
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| <i>Fav 900</i> | <p>Elektronics / Systems in General</p> <p>Concept of Electronics Fav.900/23/... with LBS (Fieldstar) terminal</p> | A |
|----------------|--|----------|



| | | | |
|------|-----------------------------|---------|----------------------------|
| A002 | EST Comfort Control Module | A020 | Injection Pump VP 44 |
| A003 | Joystick | A021 | EDC Control Module |
| A004 | Side Console | X412 | Diagnostic A020/A021 |
| A005 | EPC Control Module | G-BUS | Transmission-BUS |
| A007 | Dashpanel | K-BUS | EST Comfort - BUS |
| A008 | Terminal | EDC-BUS | EDC-BUS |
| A009 | Transmission Control Module | LBS | LBS - Fieldstar (optional) |
| A013 | Fuse Board | | |

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| 24.10.2000 | a | 1/1 | Concept of Electronics Fav.900/23/... with LBS (Fieldstar) terminal | 9700 | A | 000007 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electronics / General system Functional description of sensors and ECU A002 | A |
|---|---|----------|

Functional description of components with frequency inputs on ECU

Sensors with frequency inputs

| | |
|------|------------------------------------|
| B002 | Front PTO Hall-effect sensor |
| B010 | Engine Hall-effect sensor 1 |
| B011 | Engine Hall-effect sensor 2 |
| B014 | Hydrostat speed sensor |
| B015 | Bevel pinion speed sensor |
| B020 | Rear PTO Hall-effect sensor |
| B021 | Rear PTO clutch Hall-effect sensor |

The enhanced controls ECU **A002** delivers a basic signal voltage of **7.3 VDC**.

This basic signal voltage is reduced when Hall-effect sensors are connected: to **1.1 VDC or 5.4 VDC** (depending on the ratchet wheel setting) by resistor circuits in the Hall-effect sensor.

The ECU calculates the rotational frequency of the shaft (rotational speed) from the number of voltage fluctuations (1.1 VDC and 5.4 VDC).

Functional description of components with digital inputs on ECU

Switches and buttons at digital inputs

| | |
|------|--|
| A003 | Joystick, v + |
| A003 | Joystick, mid-position |
| A003 | Joystick, v - |
| A003 | Joystick, activating key |
| A003 | Joystick, rapid reversing |
| A003 | Joystick, cruise control |
| A003 | Operating range Neutral |
| A003 | Speed range I / II |
| S014 | Rapid reversing control |
| A003 | Crossgate lever, mid-position |
| S019 | PTO ON key, rear left |
| S020 | PTO ON key, rear right |
| B014 | Bevel pinion speed sensor / rotational direction |
| B015 | Hydrostat speed sensor |

The enhanced controls ECU **A002** delivers a basic signal voltage of **8.0 VDC**.

Depending on the position of the switch, the basic signal voltage from the ECU is reduced: to **2.4 VDC** (internal resistance of component 121 ohms) or **5.1 VDC** (internal resistance of component 510 ohms).

The desired function is carried out in the ECU because of the voltage level.

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| 02.11.2000 | a | 1/2 | Functional description of sensors and ECU A002 9700 | A | 000008 |

| | | |
|----------------------------------|---|----------|
| Farmer 400 Fav 700 Fav 900 | Electronics / General system Functional description of sensors and ECU A002 | A |
|----------------------------------|---|----------|

Functional description of components with digital output on ECU

Sensors with digital output

| | |
|------|--|
| Y002 | Speed range I solenoid valve |
| Y003 | Speed range II solenoid valve |
| Y010 | Diff. lock solenoid valve |
| Y009 | 4WD solenoid valve |
| Y013 | Lower suspension solenoid valve |
| Y014 | Raise suspension solenoid valve |
| Y033 | "Charge/flush suspension" solenoid valve |
| Y028 | PTO stage III solenoid valve |

The enhanced controls ECU **A002** delivers a voltage of:

0 VDC or 12 VDC (black - white) to energise the solenoid valves.

In the event of a mechanical or electrical fault in the component or cable loom, the component is briefly energised, then the ECU detects the fault and switches the voltage off.

Functional description of components with an ECU pulse width output

Sensors with pulse width output

| | |
|------|---|
| Y004 | Neutral / turboclutch solenoid valve |
| Y005 | Speed governor solenoid valve |
| Y006 | Exhaust brake solenoid valve |
| Y008 | Rear PTO clutch solenoid valve |
| Y011 | Front PTO clutch solenoid valve |
| Y026 | PTO stage I solenoid valve |
| Y027 | PTO stage II solenoid valve |
| Y032 | Solenoid valve for control pressure of spool valves |

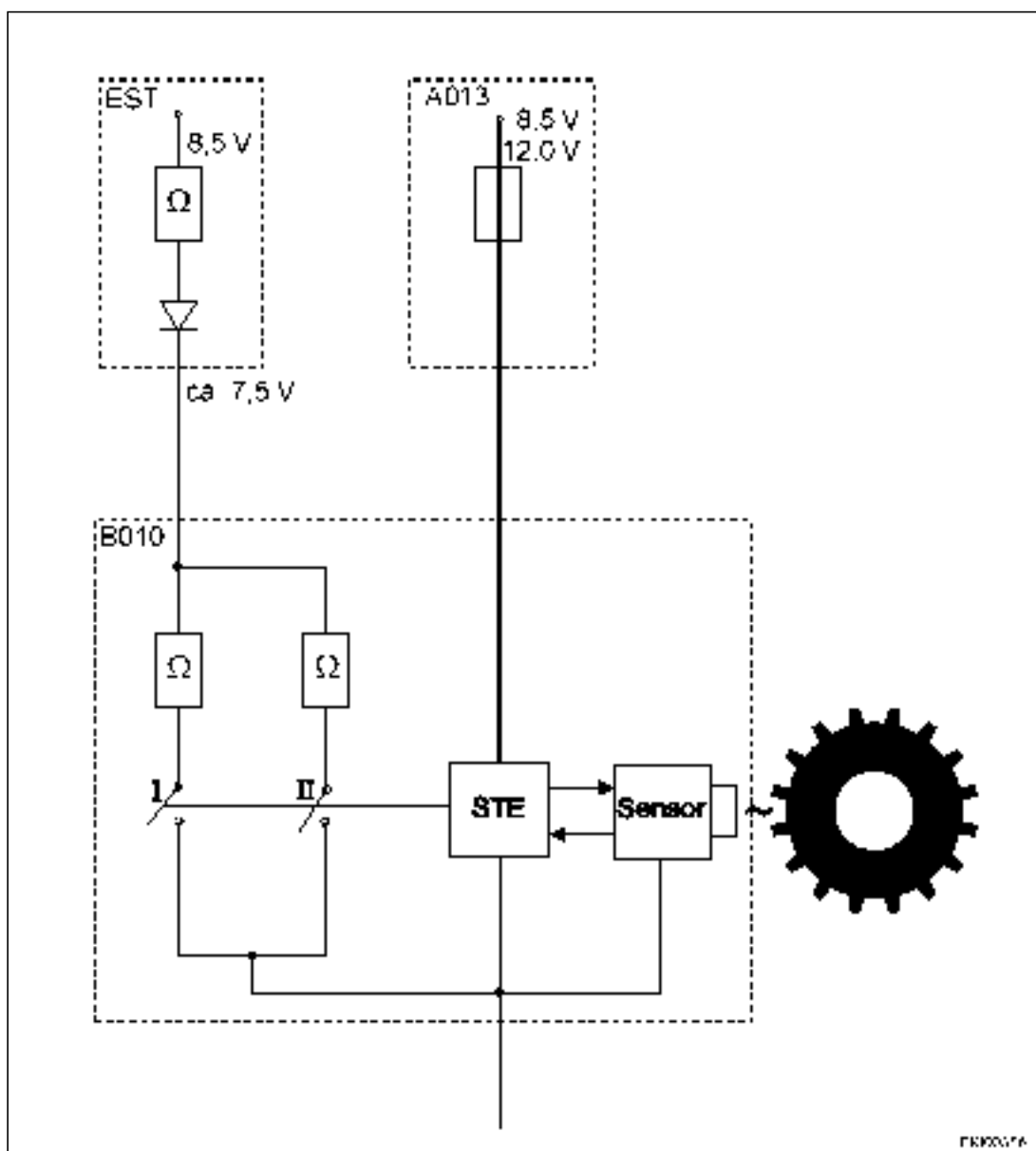
The enhanced controls ECU **A002** delivers a voltage of

0 VDC or 12 VDC to energise the solenoid valves.

The **voltage increase to 12 VDC** or the **voltage shutoff to 0 VDC** is **proportional** .

In the event of a mechanical or electrical fault in the component or cable loom, the component is briefly energised, then the ECU detects the fault and switches the voltage off.

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| 02.11.2000 | a | 2/2 | 9700 | A | 000008 |



EST - electronic control unit (ECU)
B010 - engine Hall-effect sensor 1
 (example)

A013 - fuse board (X200, X201, X202)
STE - control unit

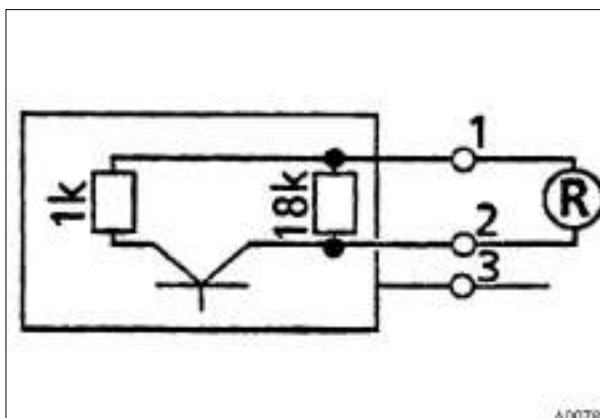
| | Switch I | Switch II | Fault code |
|-------------------------|----------|---------------|------------|
| Supply voltage OK | Closed | Closed / open | No |
| Fault in supply voltage | Open | Open | Yes |

If there is an interruption in the signal line or a short-circuit in the signal line after earth, a fault code is displayed in both cases. (Load on power source in the ECU is outside the tolerance.)

Farmer 400
Fav 700
Fav 900

Electronics / Sensors
Electrical circuit diagram - speed sensor

A



Speed sensor pin assignment

- 1 = Earth
- 2 = Speed signal
- 3 = + supply 12 to 14 VDC

Measure resistance at pin 2 and pin 1

Hall-effect sensor disconnected (no + supply)

Resistance R = 18 kohms

Measure signal voltage at pin 2 and pin 1

ECU A002 supplies basic signal voltage of approx. **7.3 VDC** to pin 2.

Ratchet wheel setting A

Signal voltage = **approx. 5.4 VDC** , resistance 18 kohms

Ratchet wheel setting B

Signal voltage = **approx. 1.1 VDC** , total resistance (parallel connection) from 18 kohms and 1 kohm

Measure + supply at pin 3 and pin 1

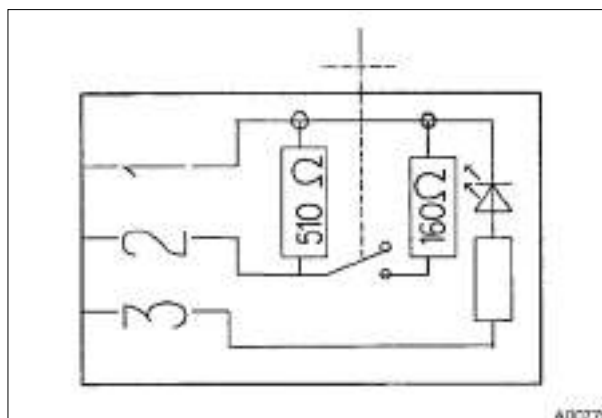
Voltage = **12 to 14 VDC** (depending on on-board power supply)

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| 23.2.2001 | a | 1/1 | 9700 | A | 000010 |

Farmer 400
Fav 700
Fav 900

Electronics / Sensors
Electrical circuit diagram - switches/buttons/controls

A



Switch pin assignment

- 1 = Earth
- 2 = Switch on / off
- 3 = Light switch on / off

Measure resistance at pin 2 and pin 1

Switch open

Resistance R = **510 ohms**

Switch closed

Resistance R = $1 / (1/510 + 1/160) =$ **121 ohms**

Measure signal voltage at pin 2 and pin 1

ECU A002 supplies basic signal voltage of approx. **8.0 VDC** to pin 2.

Switch open

Resistance R = 510 ohms => signal voltage (between pins 2 and 1) = **5.1 VDC**

Switch closed

Resistance R = 121 ohms => signal voltage (between pins 2 and 1) = **2.4 VDC**

Measure "Lighting switch" voltage at pin 3 and pin 1.

Voltage = 0 VDC or 12 VDC (depending on switch position)



Note:

Functional description of sensors and ECU A002 - Chapter 9700 Index A

Electrical circuit diagrams - Chapter 9000 Index C

Electrical / electronic components - Measuring and testing - Chapter 9000 Index E

| Date | Version | Page | Capitel | Index | Docu-No. |
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| 23.2.2001 | a | 1/1 | Electrical circuit diagram - switches/buttons/controls 9700 | A | 000011 |

| | | | | |
|---|--|---------------------------------|----------------------------|---|
|  | Service Information Description of Damage for Fault Messages 4.1.A1, 4.1.A5 | Group 8 | KDM 24/01 |  |
| Farmer 400, Favorit 700, 900 | | Chap. No. 9700 | Reg. H | Doc. No. 000001 |

To determine the cause of damage when fault messages **4.1.A1**, **4.1.A5** occur, we need a more detailed description of the damage.

We must be able to replicate your fault search from the data in the guarantee claim form. Please follow the procedure below during your fault search.

Deviations from the data and measurement values given below must be noted on the guarantee claim form.

If no data is given, we will return the guarantee claim unprocessed.

For this detailed fault search, to replace the actuator we will reimburse for 2.5 hours plus 0.5 - 1.0 hours depending on the fault.

How often, and at what intervals do the fault messages occur

| | |
|---------|----------------|
| Number: | Time interval: |
|---------|----------------|

Under what conditions of use do the fault messages occur

| | | |
|--|------------|------|
| Starting, engine | warm | cold |
| External temperature | approx. °C | |
| Cooling OK | yes | no |
| Warning message gear box temperature too high (95° in drive range II only) | yes | no |
| Fault message repeated after restart after a waiting time of around 30 seconds | yes | no |

For the workshop

The following test routines must also be performed:



1. Faults 4.1.A1 and/or 4.1.A5 are permanently active

- Open cover in cab floor and check play on emergency control (slight play approx. 1 mm), reset if necessary.
- If there is no play, release bolts on emergency control and repeat the drive test.
- Otherwise perform the following test routine.

2. Faults 4.1.A1 and/or 4.1.A5 occur occasionally

To determine the fault more precisely, a special test routine must be performed on the actuator.

The same ambient conditions should be present during testing as when the fault occurred (e.g. temperature).



| | | | | |
|---|--|---------------------------------|----------------------------|---|
|  | Service Information Description of Damage for Fault Messages 4.1.A1, 4.1.A5 | Group 8 | KDM 24/01 |  |
| Farmer 400, Favorit 700, 900 | | Chap. No. 9700 | Reg. H | Doc. No. 000001 |

Perform the following preparatory work:

- Connect ammeter,
Remove fuse F043 and connect meter (measurement range at least 3A) between the contacts.
- Connect voltmeter,
Connect actuator adapter cable (X899.980.246.207, 8-pin) to actuator connection.
Connect meter to Pin 4 (+UB of fuse F043) and Pin 8 (earth).
- You should be able to read the two meters at the same time. If you do not have two meters, measure the current and voltage in succession.
- Connect PC and in the Gearbox menu, select diagnosis window Gearbox Adjustment. When the fault occurs, you can determine the adjustment angle.
- Start engine.
- Select neutral on gearbox.
- Adjust range selection (adjustment code 4003).
If picture A00437 is output, press neutral button.
- Select acceleration 'Ramp' I and set minimum acceleration (0.02 or 0.03 km/h) (see Operating Instructions Favorit 700 Chapter 7.3).
This adjustment then causes the actuator to move through its range in the smallest possible steps. Engine speed approx. 1400 rpm.
- Release hand brake (chock tractor wheels).
Press neutral button.
Press Activation button, push drive lever forwards and hold. The gearbox ratio is adjusted in the forward direction until the maximum setting is reached (takes around 7 minutes) or a fault occurs.



The gearbox adjustment can be monitored on the terminal. During the adjustment process, the current consumption (heavily temperature-dependent) in good condition is up to approx. 100 mA +/- 50 mA. Beware, meter display will jump.

| | | | | |
|---|--|---------------------------------|----------------------------|---|
|  | Service Information Description of Damage for Fault Messages 4.1.A1, 4.1.A5 | Group 8 | KDM 24/01 |  |
| Farmer 400, Favorit 700, 900 | | Chap. No. 9700 | Reg. H | Doc. No. 000001 |

The following table describes the electrical effects which can occur during checking and their possible fault causes.

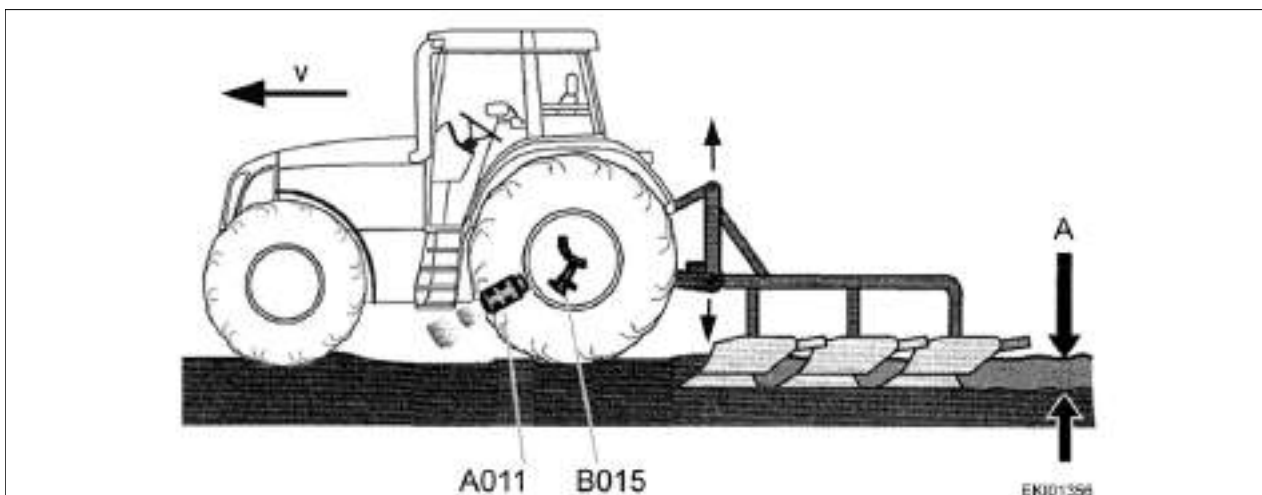
For the workshop

| | | |
|--|-------|--|
| Voltage constant and current moves towards zero | Yes → | Change actuator unit |
| no | | |
| ↓ | | |
| Voltage falls suddenly | Yes → | Check power supply to actuator (+Ub) |
| No | | |
| ↓ | | |
| Voltage constant and current rises (up to 2500 mA) | Yes → | a) Play in emergency control Test actuator over entire adjustment range (slight play approx 1mm) and reset if necessary. b) Repeat adjustment process. If fault persists, establish adjustment angle. If the actuator always cuts out at 120° , the speed limiter valve may be faulty. c) If the actuator cuts out at another angle, carefully remove the actuator from the gearbox block (without twisting the control shaft) and use your fingers to check the control shaft for ease of movement. If difficult to move, then open gearbox and check mechanically. d) If the gearbox has no movement difficulty, replace the actuator. |
| No | | |
| ↓ | | |
| Release emergency control on suspicion and refit with slight play. Release tractor again. | | |

Farmer 400
Fav 700
Fav 900

Electronics / Radar sensor
Description of A011 - radar sensor

A



A011 = radar sensor

B015 = bevel pinion speed sensor

A = working depth

V = travel speed



Drawing shows Fav 700

A011 - radar sensor (optional extra)

Note:

See:

Chapter 8610 Reg. A - Operation and function of electronic slip control

Chapter 8610 Reg. A - Activating LCD for radar sensor A011 and compressed air

Chapter 8610 Reg. B - Faults - slip control (radar sensor A011)

Chapter 8610 Reg. E - Slip control performance test

Chapter 9000 Reg. E - X007 - implement socket

Chapter 9000 Reg. E - A011 - radar sensor

Chapter 9000 Reg. E - A005 - EPC ECU

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| 10.07.2001 | a | 1/1 | 9730 | A | 000001 |

Fav 900

Electronic / Control unit

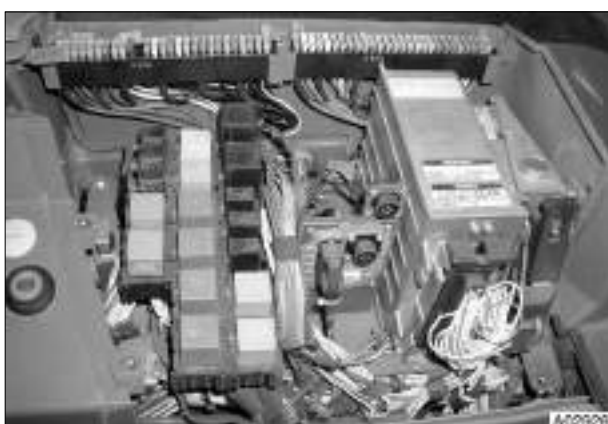
Replacing Eproms in A002 - EST Control module

G



Preliminary operations

- Connect CAN-Cable onto K-Bus .
- Before starting work, read Vehicle Data with diagnostic PC and memorize vehicle features .

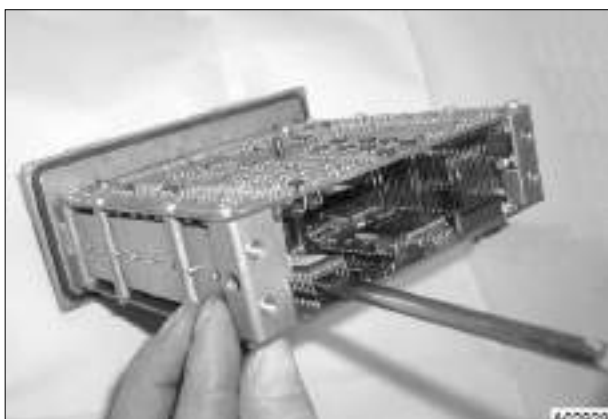


Extraction and putting the E-Prom into place

- Disconnect and dismount EST Control module (A002).



- Loosen 4 screws.



- Cut the 2 Cable ties.
- Loosen softly E-proms with a screw driver and extract E- Proms.

Note:

Avoid any touching of the printed circuits with fingers.

| Date | Version | Page | Replacing Eproms in A002 - EST Control module | Capitel | Index | Docu-No. |
|------------|---------|------|---|---------|-------|----------|
| 05.07.2001 | a | 1/2 | | 9740 | G | 000002 |

Fav 900

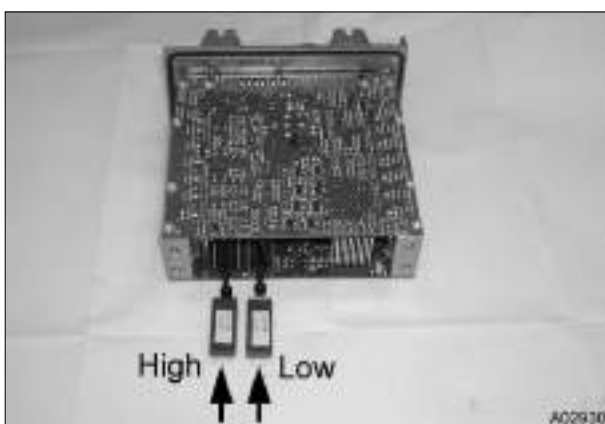
Electronic / Control unit

Replacing Eproms in A002 - EST Control module

G



- Insert new cable ties.



- Put in place new E-proms and secure them with the cable ties.

(Notice notch see arrow)

Replacement E-proms

High = Vario V0_90

Low = Vario V0_90

**Programming the tractor.**

- End Of Line (EOL) software min. 4.8
- Calibrate transmission (consult Service-Training ML-200).

Important:

Data will only be memorized after the "Click" of the Relay in EST Control Module can be heard.

Check all functions of the Side Console (A004), Terminal (A008) and Joystick (A003) .

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|---------|------|---------|-------|----------|
| 05.07.2001 | a | 2/2 | 9740 | G | 000002 |

Replacing Eproms in A002 - EST Control module

<https://www.truck-manuals.net/>

Fav 900

Electronic / Control unit

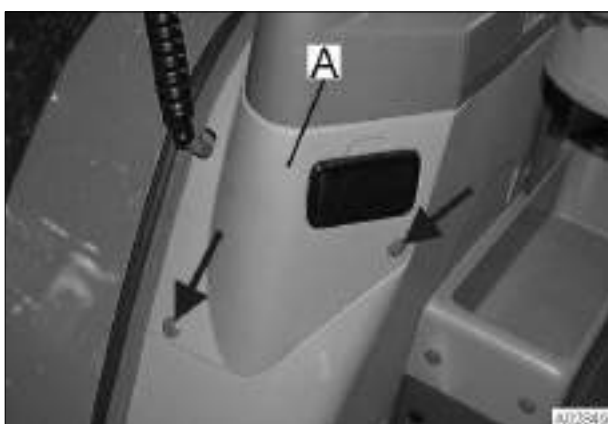
Replacing Eproms in A004 - Control console

G



Preliminary operations

- Connect CAN-Cable onto K-Bus .
- Before starting work, read Vehicle Data with diagnostic PC and memorize vehicle features.



Extraction and putting the E-Prom into place

- Loosen screws (arrows).
- Dismantle lining (A).



- Remove the console of manual accelerator.



- Remove cover (A).

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| 05.12.2001 | a | 1/3 | 9770 | G | 000005 |

**Remove Side Console.**

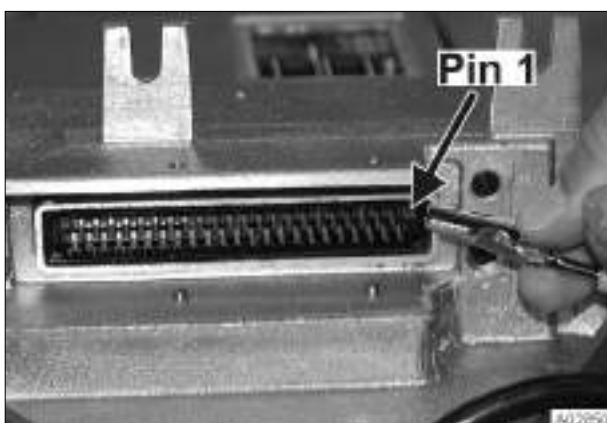
- Loosen screws (arrows).
- Separate connectors (A/B).
- Loosen Earth cable (C) .



- Loosen Nuts (arrows).

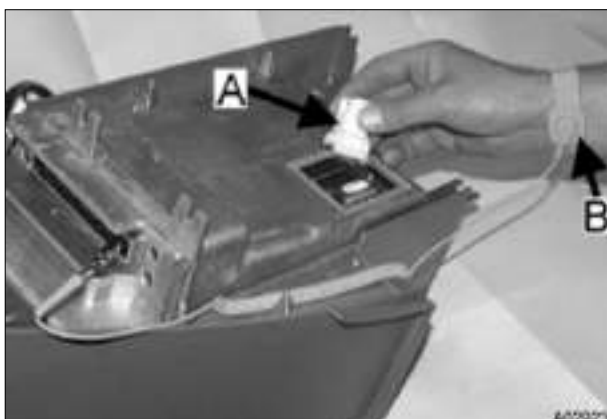
Note:

Notice Earth cable assembly.

**Important:**

Uniquely extract and replace E-Proms with an Earthing Bracelet (B) and the appropriate Extracting Tool (A) .

- Connect Earthing bracelet onto Pin 1 of the side console.



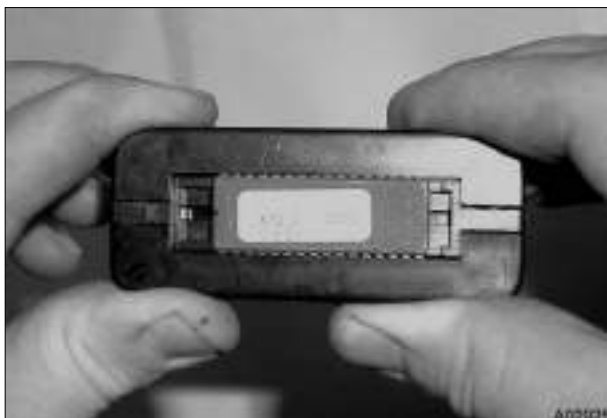
- Extract E-proms with Extracting Tool. While replacing E- proms notice the respective identification numbers (last digits).

Fav 900

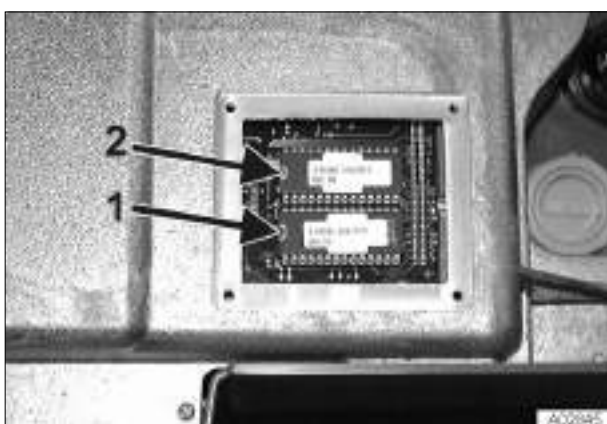
Electronic / Control unit

Replacing Eproms in A004 - Control console

G



- Align E-proms with clamp rail.



- Replacing E-proms .
Watch proper positionning of replacment E-proms.
The **Notch** (see Arrows) of the socket must correspond to notch in E-prom.

Replacement E-proms

- 1 = AGCO 21 EVN
- 2 = AGCO 21 ODD



- Put sticker into place on the side console (see Arrows).

Important:

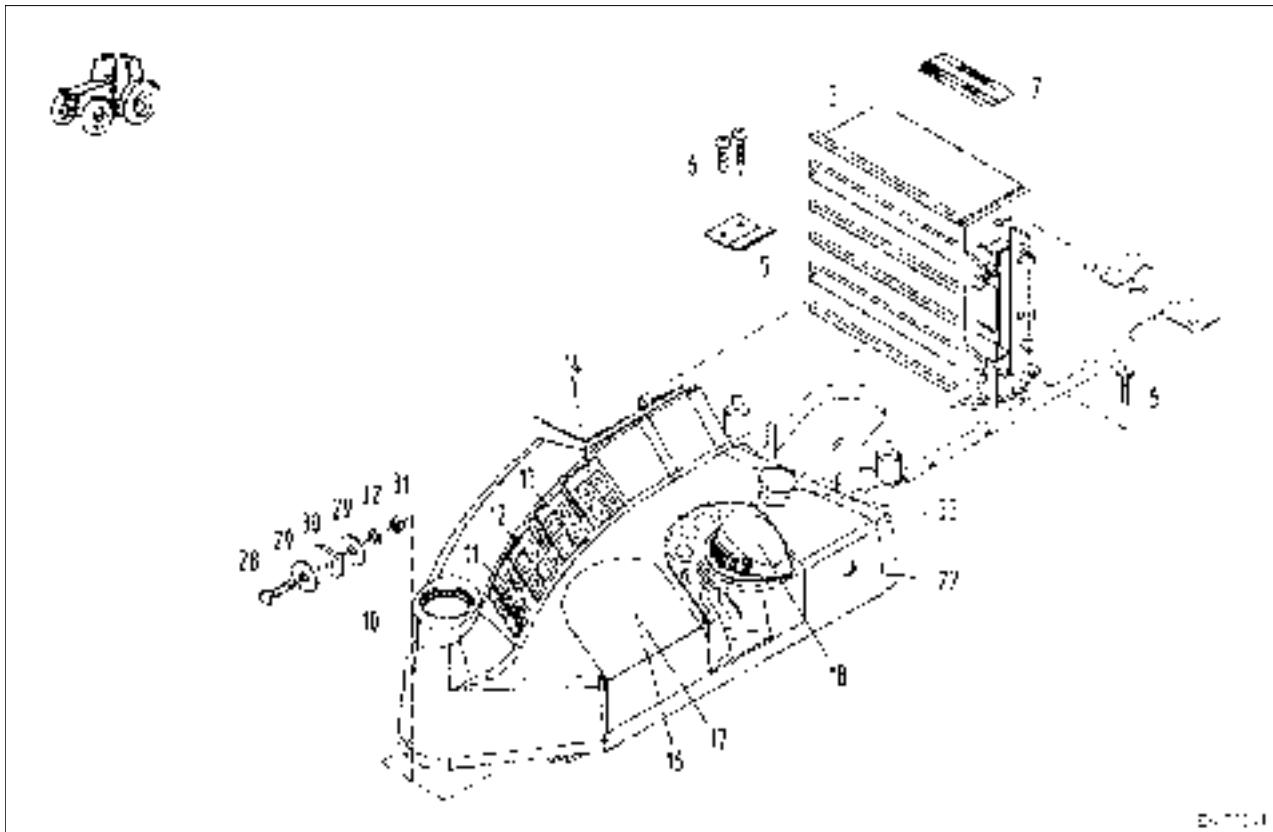
Check all functions of the Side Console (A004) , Terminal (A008) and Joystick (A003) .

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| 05.12.2001 | a | 3/3 | 9770 | G | 000005 |

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Removing and fitting rear module in A004 - control console

G

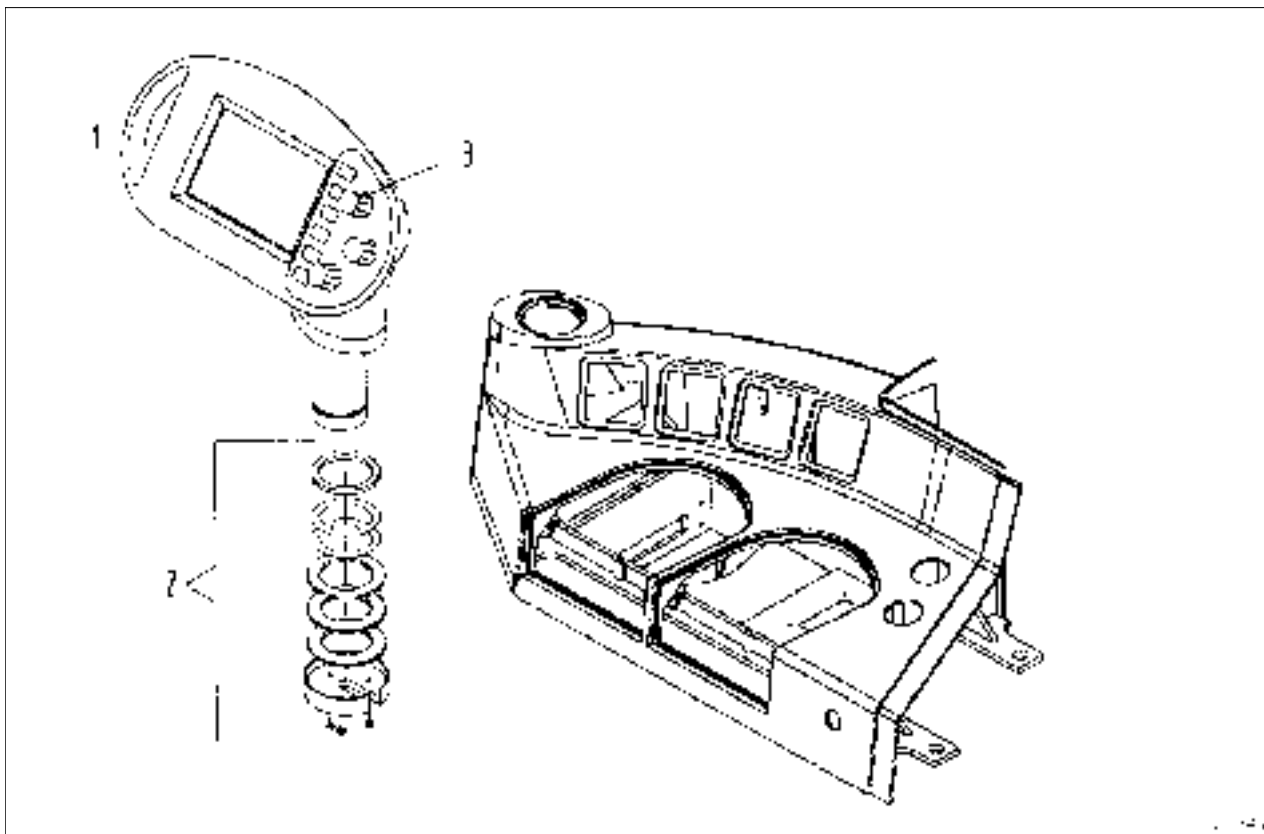


| Item | Designation | Item | Designation |
|------|-----------------------------|------|-----------------------|
| 3 | A002 - ECU | 16 | Joystick (Farmer 400) |
| 5 | Leaf spring | 17 | Blanking cover |
| 6 | Self-tapping screw | 18 | Rear module |
| 7 | Adhesive sign | 22 | Cover |
| 10 | A008 - control console | 28 | Hexagon screw |
| 11 | 4WD / diff. lock | 29 | Washer |
| 12 | Cruise control / suspension | 30 | Sheet-metal nut |
| 13 | PTO | 31 | Hexagon nut |
| 14 | Spool valves | 32 | Spring washer |
| 16 | Front module | 33 | Blanking plug |

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
 Removing and fitting rear module in A004 - control console

G

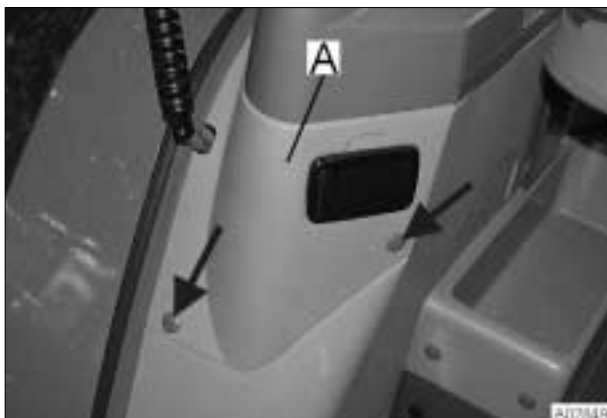


| Item | Designation | Item | Designation |
|------|---------------------|------|-----------------------------|
| 1 | A008 - terminal | 3 | Repair kit (rotary control) |
| 2 | Repair kit (flange) | | |

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Removing and fitting rear module in A004 - control console

G



Removing rear module

Note:

Front module is removed and fitted in same manner.

Note:

Fitting sequence illustrated using Fav 900 chassis number 23/3001 and up.

Fitting sequence on Farmer 400 and Fav 700 should be carried out in same manner.

- Loosen screws (arrowed).
- Remove side panel (A).



Only in Fav 900 chassis number 23/3001 and up

remove two screws, if present, for hand throttle support.



Remove cover (A).



Removing A004 - control console

- Loosen screws (see arrows).
- Disconnect plug-and-socket connection (A/B).
- Release earth cable (C).

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Removing and fitting rear module in A004 - control console

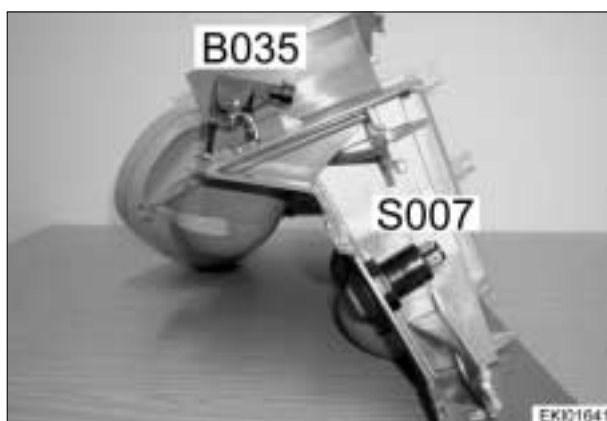
G



Loosen nuts (see arrows).

Note:

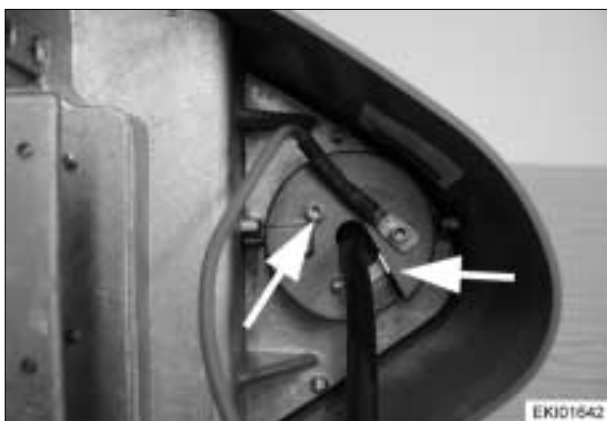
Ensure that earth cable is connected when fitting unit.



Disconnect B035 - sensor (hand throttle) connector.

Disconnect S007 - switch (auxiliary lighting) connector

and remove A004 - control console.



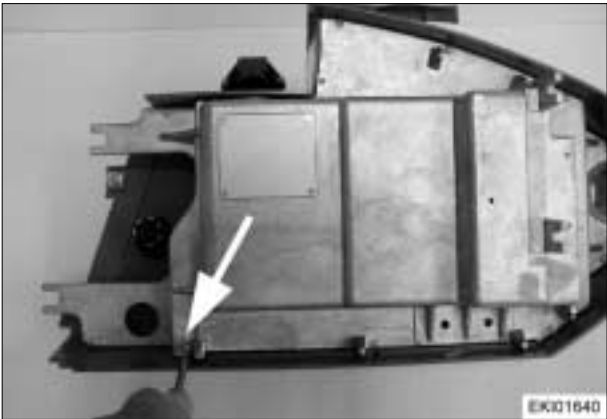
Mark position of cover for A008 - terminal.

Loosen three hexagon socket screws.



Remove A008 - terminal.

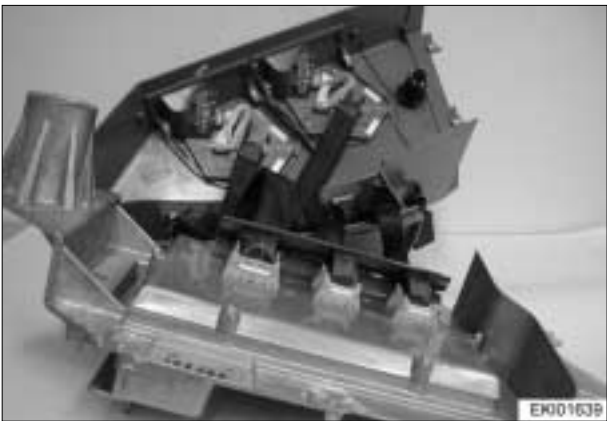
| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Removing and fitting rear module in A004 - control console | G |
|---|---|----------|



Loosen screw coupling between upper and lower sections.



Only in Farmer 400
Loosen two hexagon socket screws (joystick attachment).



Remove upper housing section.



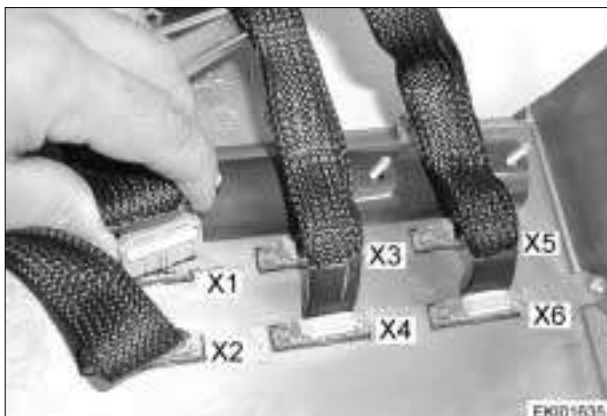
Remove clamping rail.

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| 02.07.2001 | a | 5/10 | Removing and fitting rear module in A004 - control console | 9770 | G | 000004 |

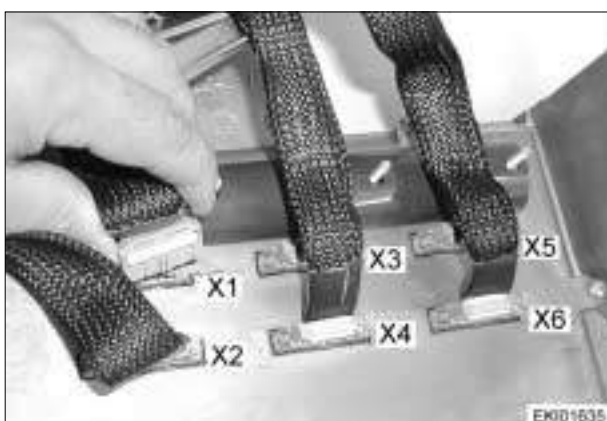
Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Removing and fitting rear module in A004 - control console

G

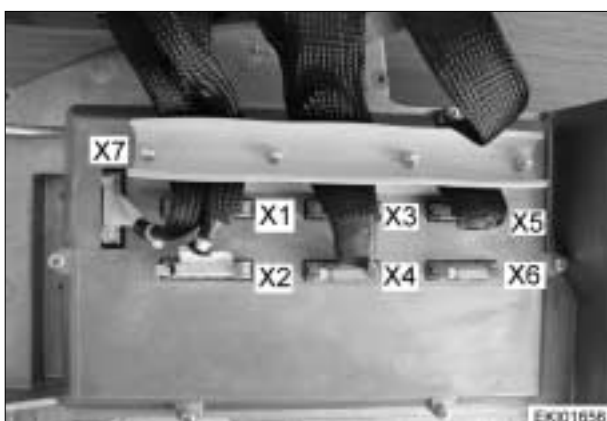


Detach connector (X1) at control unit.



Pin assignment: Fav 700 and Fav 900

- X1 = Connector, rear module
- X2 = Connector, front module
- X3 = Connector, 4WD / diff. lock
- X4 = Connector, cruise control / suspension
- X5 = Connector, PTO
- X6 = Connector, spool valves



Pin assignment: Farmer 400

- X1 = Connector, rear module
- X2 = Connector, joystick
- X3 = Connector, 4WD / diff. lock
- X4 = Connector, cruise control / suspension
- X5 = Connector, PTO
- X6 = Not assigned
- X7 = Connector, joystick



Release Velcro fastener.

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| 02.07.2001 | a | 6/10 | Removing and fitting rear module in A004 - control console 9770 | G | 000004 |

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Removing and fitting rear module in A004 - control console

G

Loosen two screws

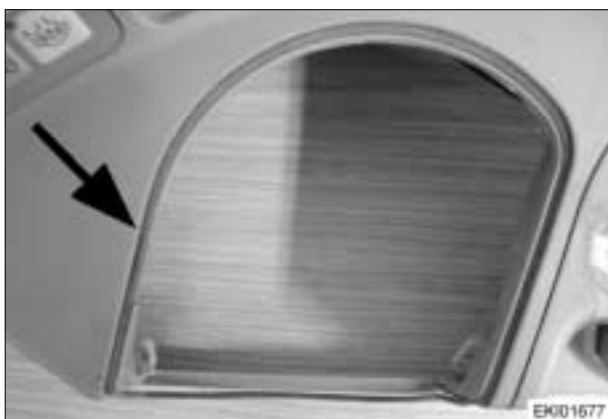


Remove rear module.



Fitting rear module

Check seal of rapid lift control for damage.



Check seal for damage.

Farmer 400
Fav 700
Fav 900

Power lift / Electrohydraulic control EPC
Removing and fitting rear module in A004 - control console

G



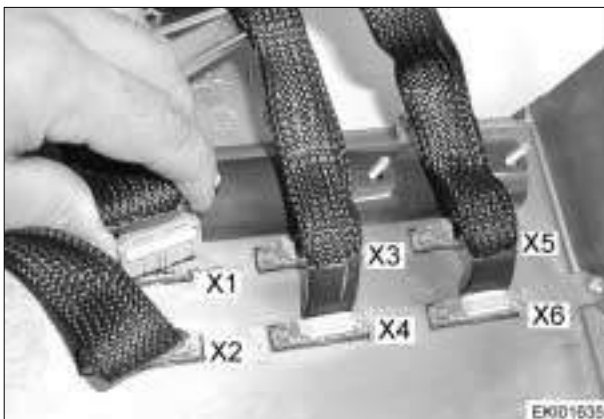
Fit new rear module.

Align rear module such that width of gap between rear module and upper housing section, seen from front, is as uniform as possible.

Fit two fastening screws.



Fit Velcro tape to cable.



Attach connector to control unit.

Note:

Ensure proper engagement of connector!

Attach cable to housing using Velcro.



Fit clamping rail.

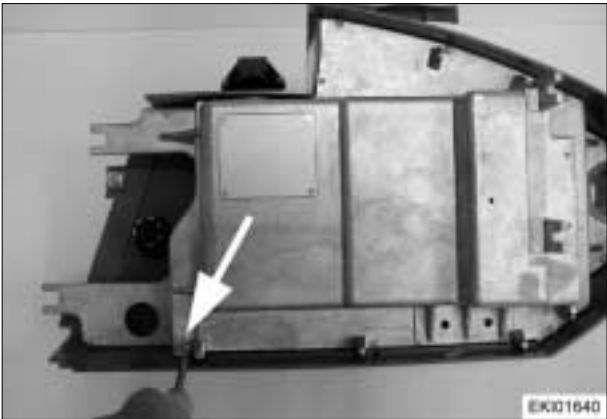
Note:

Check cable for clearance!

Do not squash cable!

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|------------|---------|------|--|---------|-------|----------|
| 02.07.2001 | a | 8/10 | Removing and fitting rear module in A004 - control console | 9770 | G | 000004 |

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Removing and fitting rear module in A004 - control console | G |
|---|---|----------|



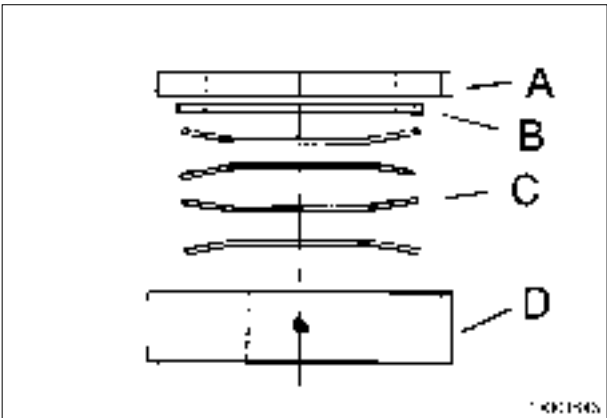
Screw lower and upper housing sections together.



Only in Farmer 400
Screw two hexagon socket screws home (joystick attachment).

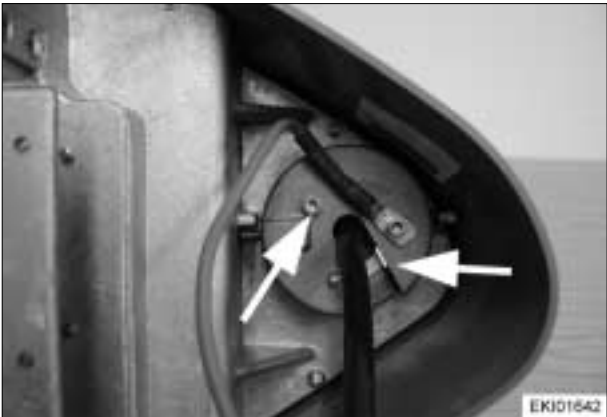


Fit A008 - terminal.



Note position of belleville springs when fitting A008 - terminal.
A = Thrust ring
B = Washer
C = Belleville spring
D = Cover
Note:
Note installation position of dowel pin.
Lightly grease thrust ring (A).

| | | |
|---|---|----------|
| Farmer 400 Fav 700 Fav 900 | Power lift / Electrohydraulic control EPC Removing and fitting rear module in A004 - control console | G |
|---|---|----------|



Tighten three hexagon socket screws.



Mount A004 - control console on tractor.
Fitting sequence as for removing
A004 - control console.

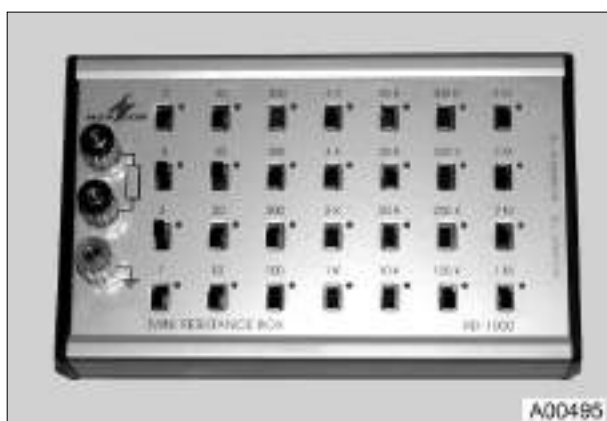


Note:
Calibration - rear EPC,
code 8001 and 8002 (rear module)
or
calibration - enhanced-control front power lift,
code 9001 and 9002 (front module)
Check functions of A004 - control console.

| | | |
|--|---|----------|
| | Service / Special tools Special tools | A |
|--|---|----------|

**X 899.980.188**

Hose-clamp hook for sealing hose assemblies

**X 899.980.224**

Resistor decade for testing electronic display instruments

**X 899.980.208.100**

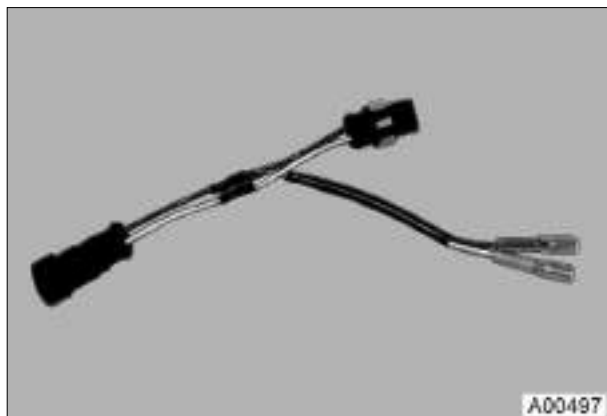
E-adapter box for universal testing of electrical and electronic systems

**X 899.980.208.205**

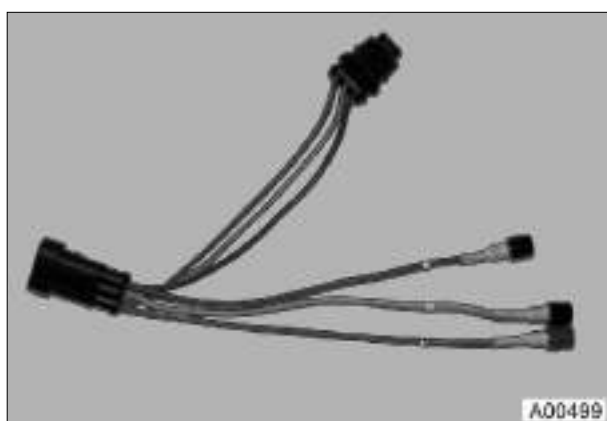
Adapter cable, 31-pin to 68-pin

| Date | Version | Page | Capitel | Index | Docu-No. |
|------------|----------|------|----------------------|-------------|---------------|
| 22.03.2001 | b | 1/4 | Special tools | 9920 | A |
| | | | | | 000001 |

| | | |
|--|---|----------|
| | Service / Special tools Special tools | A |
|--|---|----------|

**X 899.980.246.204**

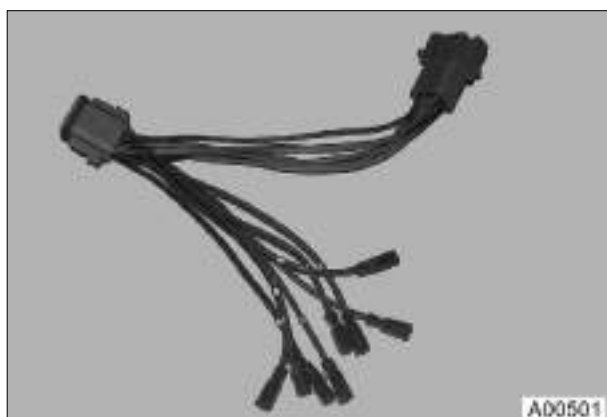
Adapter cable for 2-pin cable coupler

**X 899.980.246.205**

Adapter cable for 3-pin cable coupler

**X 899.980.246.206**

Adapter cable for 4-pin cable coupler

**899.980.246.207**

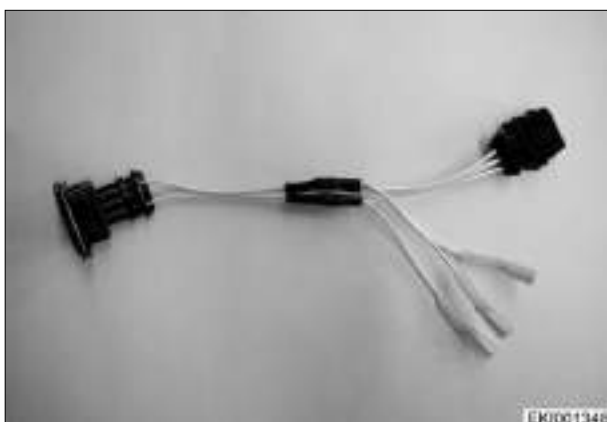
Adapter cable for 8-pin cable coupler

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| 22.03.2001 | b | 2/4 | | 9920 | A | 000001 |

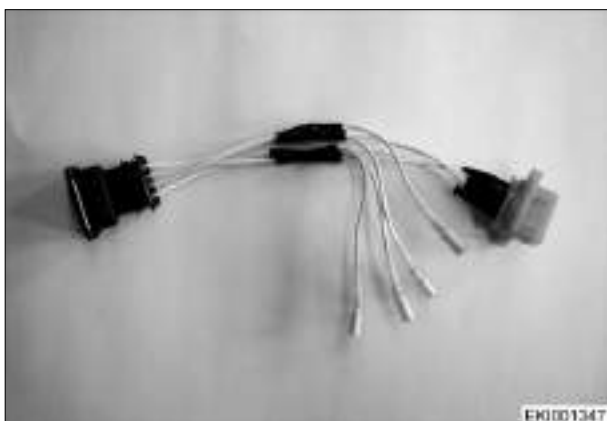
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**X 899.980.246.201**

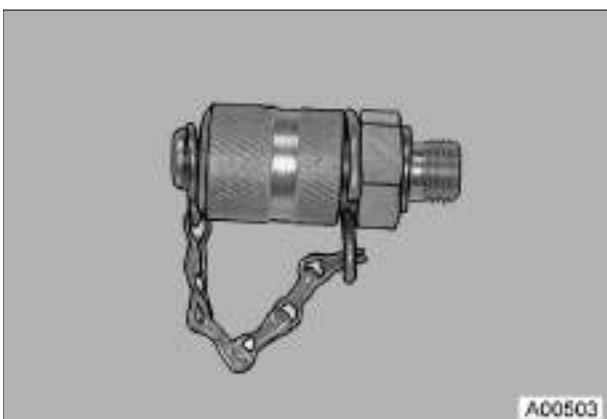
Adapter cable for 2-pin cable couplers, e.g. solenoid valves (4WD, PTO, diff. lock, EPC, front-axle suspension)

**X 899.980.246.202**

Adapter cable for 3-pin cable couplers, e.g. solenoid valves (4WD, PTO, diff. lock, EPC, front-axle suspension)

**X 899.980.246.203**

Adapter cable for 4-pin cable couplers, e.g. solenoid valves (4WD, PTO, diff. lock, EPC, front-axle suspension)

**X 598.303.000**

Screw coupling with M10x1 thread for measuring hydraulic pressures

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Portable test set containing 8 pressure gauges, 8 high-pressure hoses, 8x M10x1 screw couplings and 2x M10x1 - M12x1.5 adapters. Pressure gauge ranges: 1x 16 bar, 5x 40 bar, 2x 600bar
Obtainable from: Hydrotechnik GmbH, Holzheimer Str. 94-96, D-65549 Limburg, Germany, Tel.: +49 (0)6431/40040, order no. 3101-69-04.00



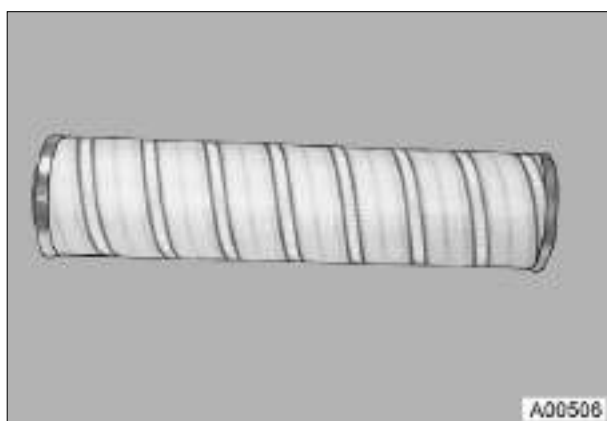
External oil-filling unit with superfine pressure filter; always required if high-pressure circuit in ML transmission has been opened

X 899.980.255.000

Oil filling unit

X 899.980.255.100

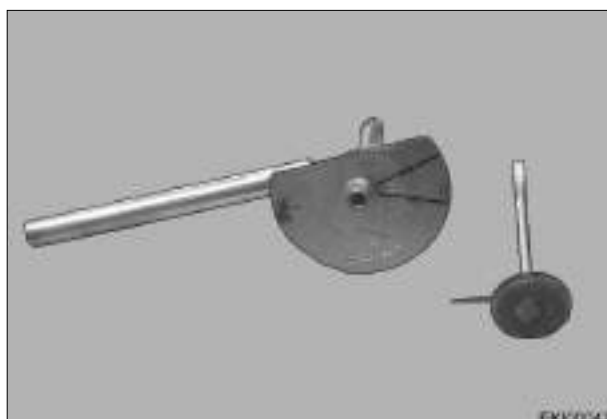
Superfine filter element



X 899.980.221.100

Superfine filter element in oil-filling unit (Fa. Pall)

NOTE: New oil-filling unit is supplied without superfine filter element.

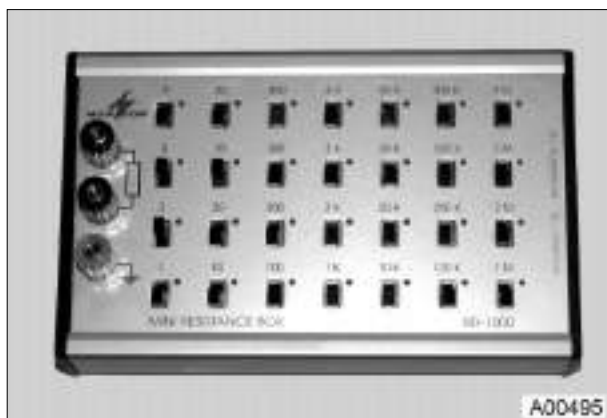


X 899.980.236

Valve clearance setting tool

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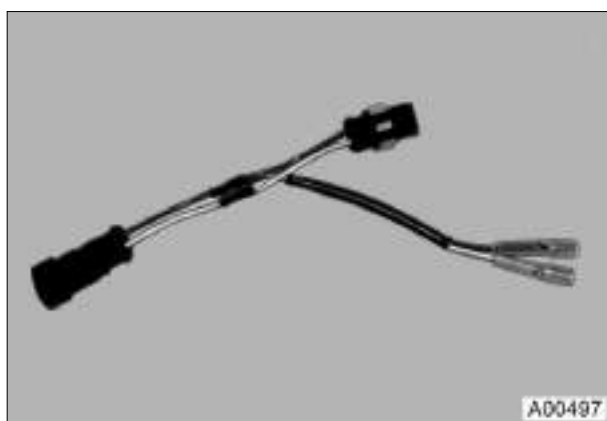
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| Fav 900 | Service / Special tools Special tools EDC - Injection System | A |
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**X 899.980.224**

Resistors Decade for testing Instruments

**X 899.980.208.100**

E-Adaptor Module for universal electric and electronic testing

**X 899.980.246.204**

Adaptor Connector for Twin Pole Connectors

**X 899.980.251.105**

Adaptor Connector for Speed Sensors EDC (B025)

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**X 899.980.251.104**

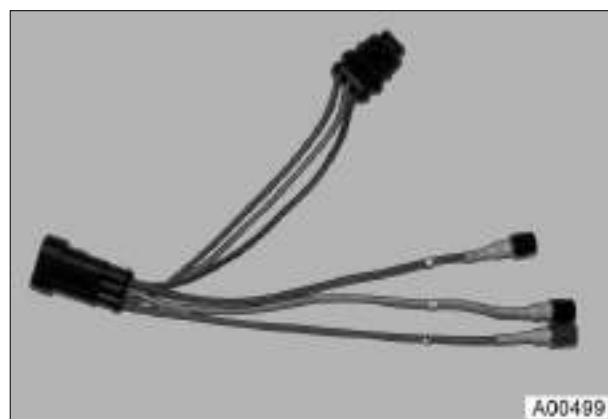
Adaptor Connector for Needle Motion Sensor (B026)

**X 899.980.251.102**

Adaptor Connector for Coolant Temperature Sensor EDC (B027)

**X 899.980.251.103**

Adaptor Connector for Intake Pressure Sensor (B028)

**X 899.980.246.205**

Adaptor Connector for 3-pole Connectors

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X 899.980.251.101

Neues Foto
New picture

EKID0876

X 899.980.251.101

Adaptor Connector for Pump Control Module A020



EKID0876

X 899.980.251.106

Adaptor Connector for EDC Control Module A021

- Adaptor Connector for Connector X047
- Adaptor Connector for Connector X048
- Adaptor Connector on X 899.980.208.100 (E-Adaptor Module)



EKID0870

X 899.980.245.000

Adaptor for Dial Gauge on Injection Pump VP44

Meßuhr für Einstellung VP44

Neues Foto
New picture

EKID0877

Dial Gauge (100 / Division)

Extension 30 mm

Measuring-Top, Ball

(Accessories - trade)

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**X 899.980.217.000**

Test Case (Pre pressure , Internal pressure) for Rotating Injection pumps (all Types)

Inhalt

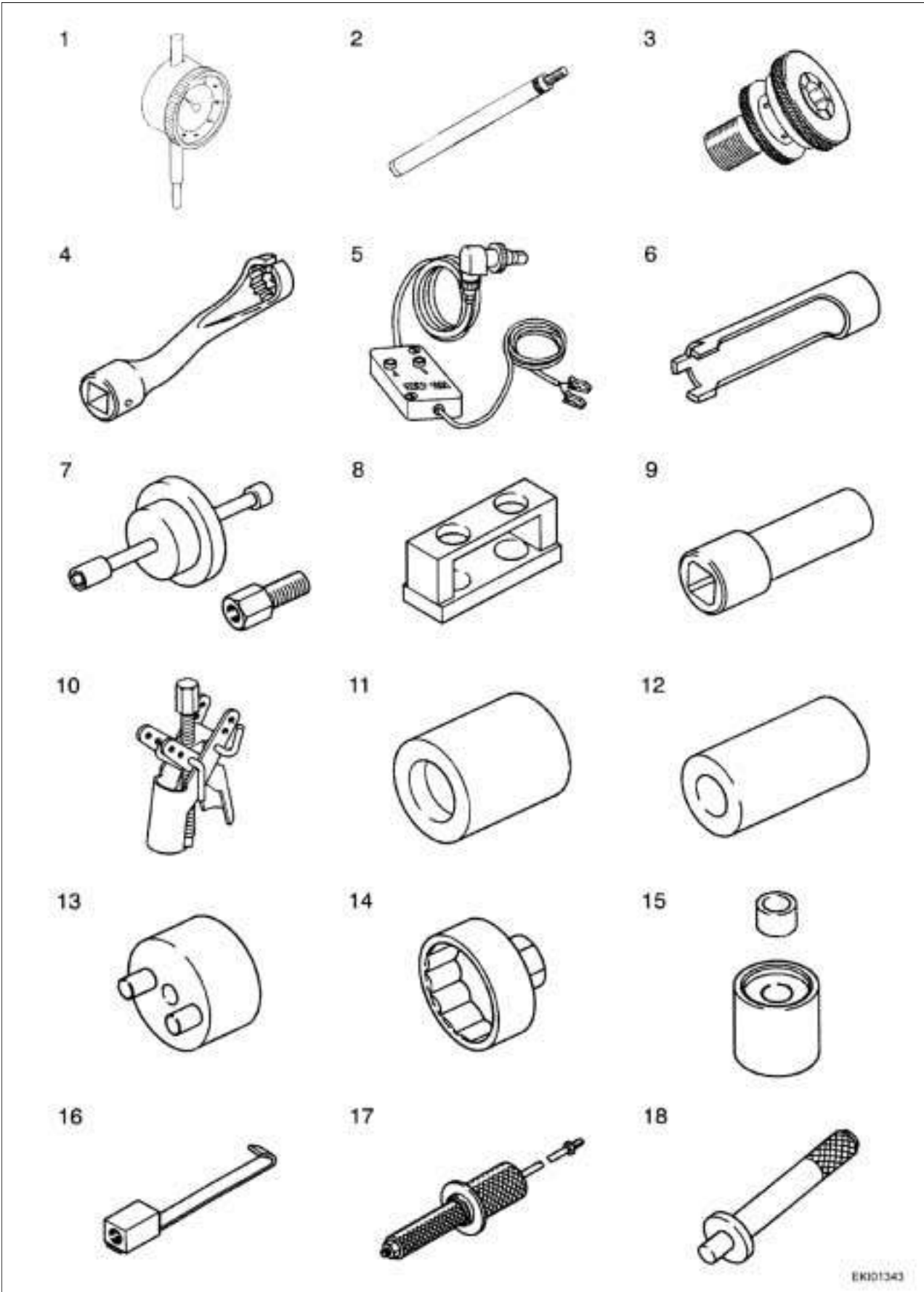
- Pressure Gauges Range 0 bar absolute to 1,5 bar Relative
- Pressure Gauges Range 60 bar
- Minimes connector M10 x1
- Test Tube
- Twin stub Screws
- Stub Screws
- Hollow screw M12 x 1,5
- Hollow screw M14 x 1,5
- Ring stub 14 mm
- Adaptor M10 x 1 (X 596.135.000.000)
- Tube (X 596.340.400.000)
- Insert (395.100.070.650)

**X 899.980.204.000**

Injector Wrench for Injector with needle Motion Sensor

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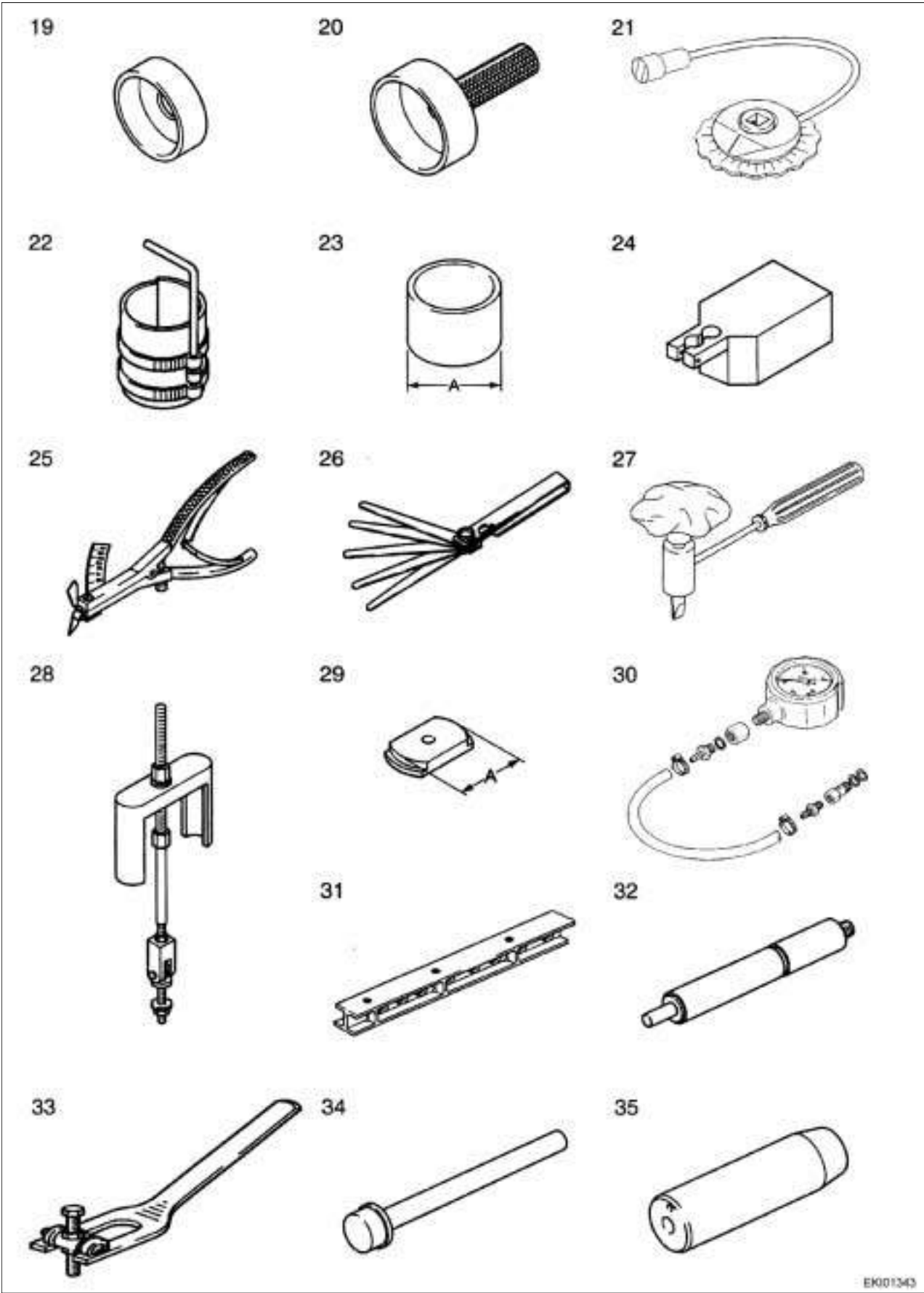
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| Schema - Nr. | Description | Reference |
|-----------------|---|--|
| 1 | Dial gauge for checking and setting start of delivery. | 08.71000-1205* |
| 2 | Scanning extension for 1 | 80.99605-0266* |
| 3 | Adaptor for 1 | X 899.980.245.00-0** |
| 4 | Special wrench (SW 17) for injection pressures lines | 80.99605-6002* |
| 5 | Optical Signal generator for setting start of delivery | 80.99605-6002* |
| 6 | Tenon wrench for injection valve holder , with opening needle motion sensor. | 80.99603-0240* |
| 7 | Puller for injection valves. Adaptor | 80.99602-0011* 80.99602-0059* |
| 8 | Fitting tool for injection valve | 80.99606-0008* |
| 9 | Socket wrench for injection valve | 80.99603-0024* |
| 10 | Extractor for water pump pulley and flange | 83.09143-6060* |
| 11 | Pressing bush for sliding ring gasket in water pump | 80.99617-0091* |
| 12 | Pressing bush for water pump bearing shaft | 80.99635-0008* |
| 13 | Pressing plate for water pump impeller | 80.99614-0016* |
| 14 | Wrench for Oil filter cartridge | 80.99603-0254* |
| 15 | Pressing device for valve guides for oil pump camshaft Consist of Contact bush Spacer bush | 80.99604-0055* 80.99604-0056* 80.99604-0057* |
| 16 | Extractor hook percussion type extractor | 80.99602-0127* |
| 17 | Percussion type extractor to 16 | 80.99602-0016* |
| 18 | Slip-on grip for all pressing plates | 80.99617-0129* |

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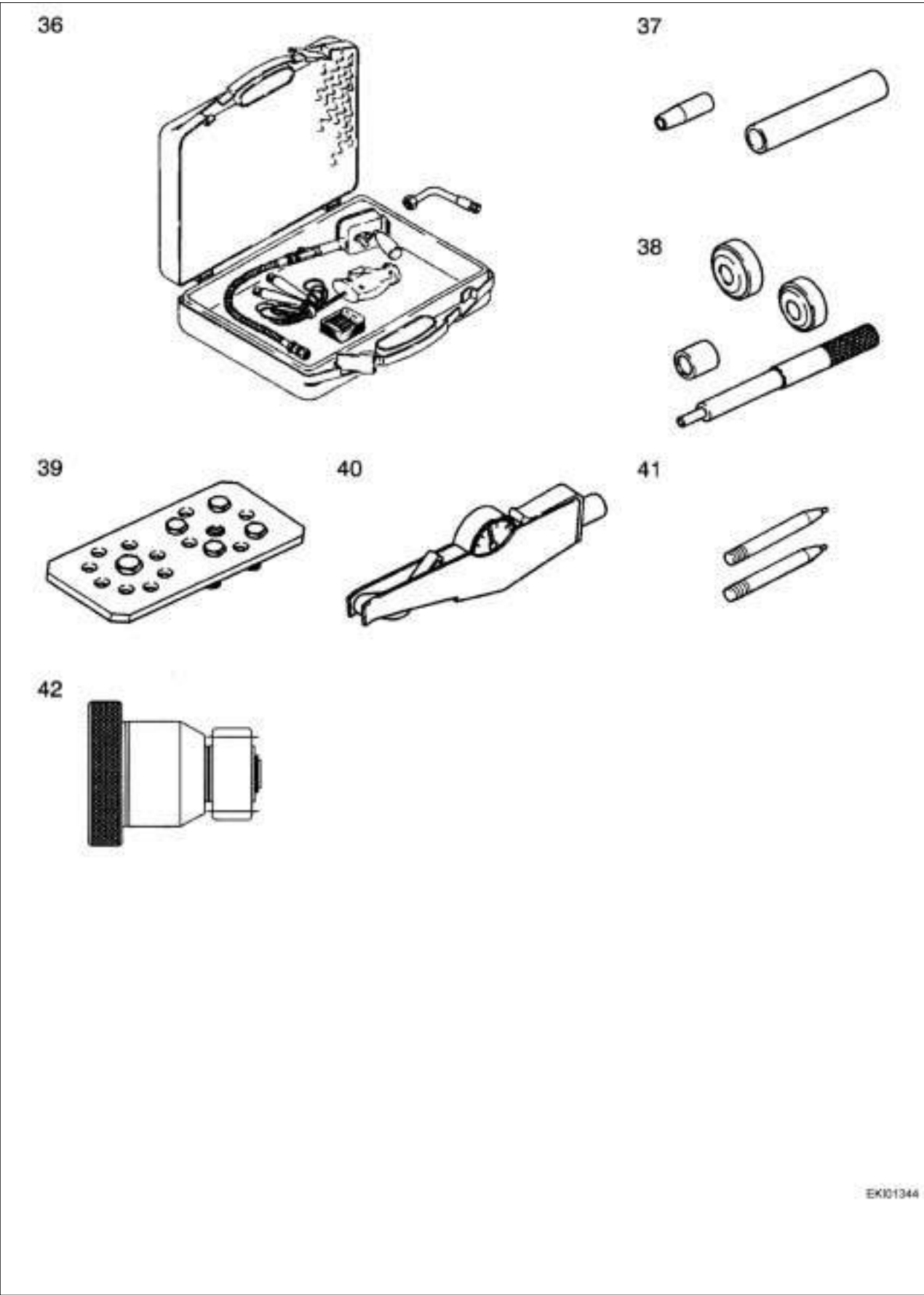
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| Diagram Nb. | Description | Reference |
|-------------|--|----------------|
| 19 | Percussion type extractor to 18 | 80.99602-0016* |
| 20 | Slip-on grip for all pressing plates | 80.99617-0129* |
| 19 | Pressing plate for front crankshaft seal | 80.99617-0073* |
| 20 | Pressing plate for front crankshaft seal, flywheel end | 80.99614-0032* |
| 21 | Dial for torque wrench and torque angle. | 80.99607-0134* |
| 22 | Piston ring clamp | 80.99613-0035* |
| 23 | Sliding bush Ø 108 mm | 83.09144-0057* |
| 24 | Dial gauge bracket | 80.99605-0172* |
| 25 | Piston ring pliers | 83.09144-6090* |
| 26 | Scanner gauge 0,2 / 0,25 / 0,35 / 0,4 / 0,5, for valve setting | 80.99607-0076* |
| 27 | Valve setting wrench | 80.99603-6007* |
| 28 | Cylindre liner extractor, (Set). | 80.99602-0019* |
| 29 | Extractor plate Ø 107,8 mm | 80.99602-0123* |
| 30 | Intake air pressure gauge 0 to 2,5 bar, (Set). | 80.99605-6010* |
| 31 | Ruler for Cylinder heads | 80.99607-0044* |
| 32 | Test connector for compression recorder. | X899.980.205** |
| 33 | Valve fitting lever | 80.99606-0301* |
| 34 | Mandrel for inserting camshaft | 80.99617-0060* |
| 35 | Mandrel for pressing camshaft bearing bushes in and out | A5.00026-1136* |

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| Diagram - Nb. | Description | Reference |
|------------------|--|---------------------|
| 36 | Compression recorder | 80.99605-0164* |
| | - Angle adaptor | 81.98110-0099* |
| | - Diagram discs (Packs of 100 pieces) | 80.99605-0165* |
| 37 | Mounting tube for valve rod bushings | 80.99606-0287* |
| | Press tube for valve rod bushings | 80.99604-0106* |
| 38 | Press in and out device for valve guides including pressing plate for valve seat rings | 80.99604-0050* |
| | Device consisting of: | |
| | Press mandrel for valve guides | 80.99604-0051* |
| | Pressing bush (spacer bush) | 80.99604-0052* |
| | pressing plate for inlet valve seat ring | 80.99604-0114* |
| | pressing plate for exhaust valve seat ring | 80.99604-0054* |
| 39 | Mounting plate for compressor drive gear. | 80.99606-0078* |
| | necessary | |
| | 4 Screws M 8*22 DIN 933 | 06.01304-7114* |
| | 1 Screw M 12*30 DIN 933 | 06.01304-7317* |
| | Belt tension gauge (typ1; 200 - 600N) | X899.980.218** |
| 40 | Belt tension gauge (typ1; 500 - 1500N) | X899.980.219** |
| 41 | Guide mandrel (2 off) for fitting flywheel, see sketch for manufacturing. | |
| 42 | Crankshaft actuating device. | X899.980.220.0-00** |

Note:

* MAN-tools without a Fendt-spare part number can be ordered by MAN-Service-Centres.

** Fendt-spare part number

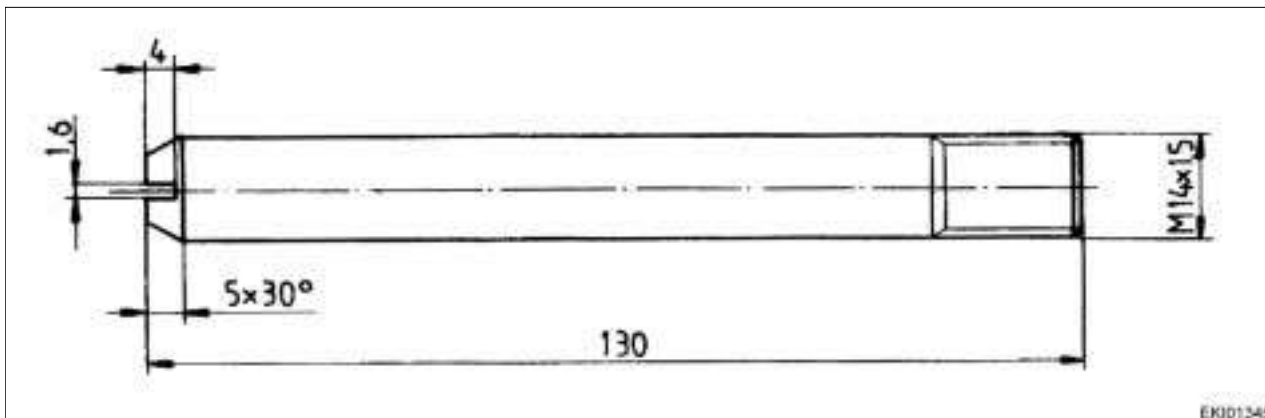
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| Fav 900 | Engine / Generalities Special tools | A |
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Tools to be manufactured

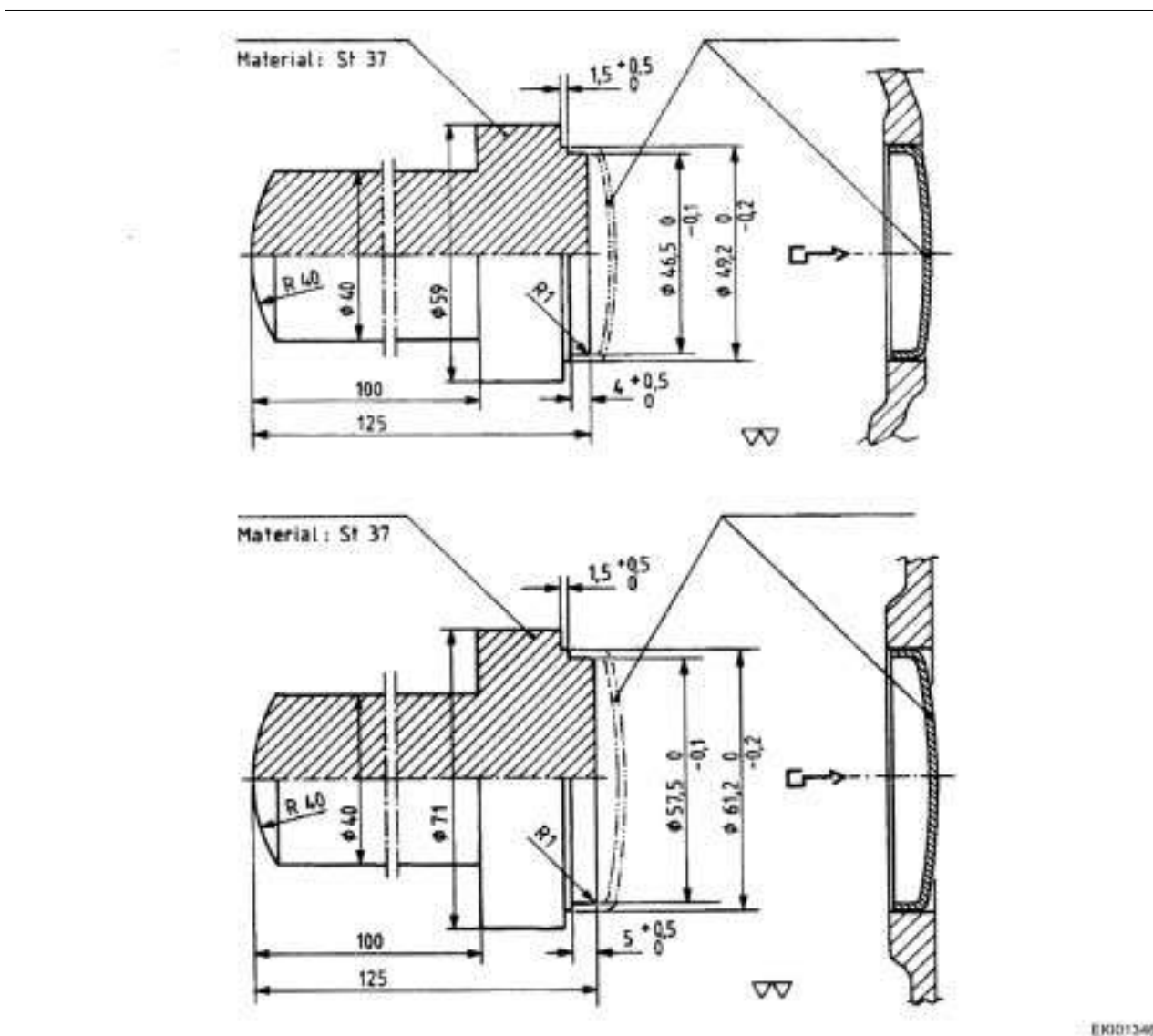
Guide mandrel for flywheel assembly

Material: made from M14*140



Pressing mandrels for sealing caps

Ø 50,1 mm, Ø 62,1 mm



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