

# **CRYSTAL HD**

RYSTAL HD 170

### **OPERATOR'S MANUAL**

2/2018

150 170

Tractor is Zetor. Since 1946.

#### ZETOR



This Operator's Manual for the Zetor tractors, which we are presenting to you will help you to become familiar with the operation and maintenance of your new tractor.

Although many of you have rich experience with the operation of other tractors, please, read the information contained in this Operator's Manual very carefully.

In the Manual you will find a lot of new information and get a perfect overview of how to use the tractor with maximum efficiency during various kinds of work.

If you observe the rules of tractor operation and maintenance and driving safety, your new tractor will become your reliable and long-term friend.

The manufacturer of the tractor wishes you thousands of hours of satisfactory work.

ZETOR Brno

The technical specifications and information about the design, equipment, material and appearance are valid at the time of print. The manufacturer reserves the right to implement changes.

The instructions for use are a part of the machine.

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#### LOCATION OF SERIAL NUMBERS



C18N029

- 1. Tractor data plate
- 2. Cab serial number
- 3. Engine serial number
- 4. Tractor serial number

When ordering spare parts and within all written and oral communication always specify the data of your tractor that should be written in the frames below.

Tractor type

Tractor serial number



**Engine serial number** 

#### LOCATION OF SERIAL NUMBERS

The 'right', 'left', 'front' and 'back' indications refer to the driving direction of the tractor.



C15N002

## Pay increased attention to the parts in the instructions for use and maintenance indicated with this symbol.

The symbol can be found next to all important warnings related to the operational safety. Follow these warnings and be particularly careful in these situations! Inform your colleagues and other users about these warnings.



The chapters indicated with this symbol should be carefully studied prior to operation, maintenance and tractor adjustment.



One of these symbols can be found next to all important warnings related to the operation, adjustment and repairs of the starter. Follow these warnings and be particularly careful in these situations!



This symbol is used to indicate the parts of the instructions for use related to the environmental protection. Or the parts describing handling of hazardous wastes.

\* This symbol is used to indicate accessories for the tractor mounted in the production site on the customer's request.



This symbol is used to indicate the parts of the instructions for use related only to the models equipped with the diesel particulate filter DPF.



This symbol is used to indicate hot surfaces. Increased care should be taken when working in their vicinity; risk of injury.



Accessories which are not mounted as a standard or \* on the customer's request in the production site (from the manufacturer) cannot be subject to a complaint!



This symbol identifies escape routes.

#### **General safety regulations**

- The tractor may only be operated by a trained person that has a valid driving licence and has been thoroughly acquainted with the operation and safety rules.
- Besides the safety instructions mentioned in the Operator's Manual you are obliged to respect generally valid safety and traffic rules of the country where the tractor is used.

#### **Proper clothing**

- Do not wear loose clothing and free flying long hair.
- During all work use suitable (prescribed) means of personal protection (working boots, gloves, goggles, etc.)

#### Starting the engine

- The engine cannot be started by driving the tractor downhill.
- The engine cannot be started by towing the tractor with another tractor.
- Only start the engine from the driver's seat with the shift lever and reversing lever in the neutral position, PTO switched off and the clutch pedal depressed.

### Life hazard when starting by means of short-circuiting the starter terminals!

- The key in the switch box must be in the 'I' position.
- When heating the engine with the \* electric heater first plug the power supply cord to the heater and only then to the electric mains. After the end of heating first disconnect the heater from the electric mains.



#### **Driving operation**

- Hoses of the hydrostatic steering, brakes and fuel system must be checked and replaced if any signs of damage are found. These are some examples of hose damage signs: cracks on the hose surface, releasing of pre-tensioning of hose connection (which can be verified by easy removal of the hose from the connection) and mechanical damage of the hose. Hoses with indicated service life must be replaced immediately after the expiration of the service period.
- During driving on roads with trailers and tools the brake pedals must be connected with a latch.
- The brakes and steering must be in the perfect condition all the time.
- Driving downhill without an engaged gear is forbidden.
- Switching the reversing lever at a speed over 10 km/h is forbidden.
- Pay special attention when driving on a slope and muddy, sandy, icy or uneven ground.
- Observe the maximum specified inclination angle, i.e. 12°.
- Respect the total permissible weight of the tractor and trailer specified on the data plate of the tractor or on the rear wheel mud-guard.
- Do not use the differential lock when driving into a bend.
- It is forbidden to get into and out of a moving tractor.
- When driving the tractor with agricultural machines attached to the front three-point hitch, reduce the driving speed to 15 km/h.
- When driving with machines attached to the rear hitches the load of the steered axle must not drop below 20% of the current weight of the set. With the driving speed reduced to 20 km/h the load of the steered axle may drop to 19% of the current weight of the set (set below 4.5 t) or to 18% of the current weight of the set (set exceeding (4.5 t).
- During aggregations of the tractor with machines pay attention to possible worsening of stability of the aggregated unit which may be influenced by the connected machine.
- During aggregation of Zetor tractors with machines and implements with high tensile resistance when the engine speed drops and the engine tends to stall, the 1R, 2R reduced gears must not be used for the work with these machines (risk of shaft twist-off).

#### Risk of the tractor overturning

The risk of the tractor overturning is increased especially when the following is used:

- a narrow wheel gauge
- inappropriate tractor travelling speed
- travel on the slope along a contour line or turning on the slope
- driving through ditches, depressions, near edges of ditches, chuckholes, steep slopes or when driving on edges of water courses and water areas
- driving up the steep slope, risk of overturning the tractor back
- driving with the trailer, semi-trailer or machine with the three-point hitch connection that lifts the centre of gravity of the tractor or combination of vehicles
- tilting of trailers and semi-trailers

# **Not all the cases that can cause overturning of the tractor are listed. Pay attention to driving of the tractor and be prepared to resolve situations which can threaten stability of the machine.**

#### Transportation of persons, operation

- The number of persons transported by the tractor must not exceed the number specified in the technical certificate of the tractor.
- Persons that are not authorized to work with the attached implement must not stand between the tractor and the hitched machine (implement).
- Before putting the tractor in motion make sure there is no person or obstacle in the driving direction.

#### Recovery, pushing

To recover a tractor that has sunk in mud use a tow bar or rope attached to the front hook

#### Never use chains! Rupture of the chain represents a danger of death!

- During recovery it is dangerous to stand near the towing rope.
- It is prohibited to use the tractor axles (individual wheels) as a winch for releasing a sunken tractor.
- The front hook should be only use to recover the entire tractor, i.e. without any trailer or another attached implement.
- Never recover the tractor with reduced gears engaged.
- When pushing other vehicles (trailers, implements, etc.) with the tractor never insert free wooden blocks or bars between the tractor and the pushed vehicle.
- In case of use of the tractor for wrecking or towing purposes, use only the rear hitch.
- When towing the tractor, the reduction gear shift lever must be in the neutral position.

#### Leaving the tractor

- Park the tractor only on an even land and where not possible, support with a shim assy.
- Do not park the tractor with an attached implement in the lifted position.
- Usually use the left-hand side tractor door when leaving the tractor. Look round whether any vehicle is coming, that could jeopardize your safety when leaving the tractor.
- Use steps and handles when leaving the tractor. When leaving the tractor by the right-hand side door pay attention being in space of shifting lever and hand throttle control.
- Brake the tractor with parking brake before leaving tractor with running engine.
- When leaving the tractor with tools connected in the front or rear three-point hitch, the three-point hitch with these tools must be lowered to the lower position.



• Before leaving the tractor, do not forget to secure the tractor by manual brake. Engaging a gear does not secure the tractor against rozjetím (clutch is disengaged), remove the key from the switchbox and lock the cabin.

#### With stopped engine only

- All work connected with refuelling, cleaning, lubricating and adjusting the tractor or attached implements may only be performed with the engine and moving parts of the tractor stopped except functional checks of the brakes, hydraulic system and charging.
- Before removing the side plates of the hood it is always necessary to stop the engine. The tractor engine can only run in a closed building or room if sufficient ventilation is ensured. Exhaust gases are harmful for health.

#### Fire prevention principles

- Refuel the tractor best after the end of work and with the engine stopped.
- Do not refill fuel up to the top of the fuel tank in summer. Wipe spilt fuel immediately.
- Do not refuel the tractor near open flame and do not smoke.
- Do not smoke and do not use open flame when inspecting the battery electrolyte level.
- Make sure that fire safety instructions are strictly observed in environments with an increased danger of fire (hay-lofts, straw-stacks, etc.).
- The tractors are not equipped with a fire extinguisher from the production plant.

#### Health and environment protection

- The tractors are not equipped with special filters of air aspirated to the cab. Therefore, they are not designed for work with aerosols and other harmful substances.
- Coolant, brake liquid, kerosene, diesel fuel, mineral oil and other oil products that are used for the operation and maintenance of the tractor may cause various skin disorders in case of direct contact with your skin and can irritate mucous membranes, eyes, the digestive system and upper respiratory ways. Some of them may even cause systemic poisoning when swallowed.
- Persons that handle oil products are obliged to strictly observe safety and hygienic regulations, use suitable means of protection and work in well ventilated rooms.



#### Working with oil products

- After the end of work or before a meal you should wash yourself with a mild agent and treat your hands with a suitable ointment or cream.
- When connecting and disconnection quick-couplers of the hydraulic circuits use any piece of cloth to remove residual oil remaining in the socket or on the plug of the quick-coupler.

Waste disposal

• When disposing of the tractor or its parts (incl. operation liquids) after the end of their service life you must observe relevant provisions of valid acts and implementation directives of these acts of the country where the tractor is used. The last seller of the tractor is obliged in accordance with the Waste Act to inform the consumer - during the sale of the tractor - about the way of collection of some used parts of the tractor. This is the case of oil and other operation liquids, batteries and tyres. These used products must be received from the consumer without any obligation of the consumer to pay for this service.

#### Preventive daily maintenance.

• Perform this maintenance daily or after every 8 - 10 hours of operation at the latest.

#### Safety cab

• If the protective frame of the safety cab is damaged by corrosion, an accident or otherwise, the safety cab must be replaced.

#### **Air-conditioning**

- Disassembling, turning or otherwise handling the screw union of the air-conditioning system is not allowed in any case. Sudden leak of the coolant may occur, causing quick local cooling. Contact or freezing of components in hands may cause serious damage of some tissues.
- The air-conditioning system is equipped with quick-couplers that make it possible to separate the cab from the tractor body if necessary without any coolant leak. Entrust interventions into the air-conditioning system to a specialized repair shop.

#### **Electric installation**

A No additional interventions into the electric installation (connection of other electric appliances) are permissible due to its possible overloading!

- The values of the electric installation are: Nominal voltage 12 V = Grounded minus pole (-) pole
- Using starting trucks or auxiliary power supplies with a different voltage or polarity may cause serious failures of the tractor.
- When handling the battery you must pay increased attention and avoid short-circuits. In tractors equipped with a battery disconnector switch the disconnector off when handling the battery.
- Zetor tractors must not be operated with a disconnected battery as this may lead to a serious failure of the tractor.

#### Work in a chemically aggressive environment

• If the tractor is operating in a chemically aggressive environment (e.g. working with chemical sprays, fertilizers, in environments with high concentrations of salt, etc.), it is always necessary to clean the tractor thoroughly from chemically aggressive substances and neutralize them after the termination of the work according to the manufacturer's instructions.

**Driver's seat** 

The driver's seat is equipped with a safety belt, this must be used for the operation of the tractor.

#### Front passenger's seat notification

#### ATTENTION:

Transportation of personnel on front passenger's seat is allowed only with road transportation.

Transportation of front passenger outside the seat designed for this purpose is forbidden.
Using the seat for front passenger during the work with a tractor (e.g. during the work on the fields) is explicitly forbidden.

- The use of safety belt on front passenger's seat is governed by valid regulations. In this respect, keep the regulations valid in the country, where the tractor is operated.

#### Protection of cab against aerosols

The cab of Zetor tractors in standard design is not designed for work with aerosols and other health hazardous substances.

The level of cab protection in standard design complies with **EN 15695-1:2009 standard - level 2** (only dust proof cab).



FH13N002



FH13N003

#### Level of external and internal noise

# **A** Exposure to higher levels of noise for longer time may cause hearing problems or even deafness. Protect your hearing with protective hearing devices, e.g. headphones, earplugs, etc.

The resulting noise levels when measuring the noise for the hearing of a person near the tractor according to **the Commission Delegated Regulation (EU) 2015/96, Annex III**.

The resulting noise levels when measuring the noise for the hearing of a driver according to the Commission Delegated Regulation (EU) 1322/2014, Annex XIII.

	Extornal noise		Noise at operator's seat (indoor).			
Crystal HD			tal HD 4x2		4x4	
tractor	During travel	Steady	Windows closed	Windows open	Windows closed	Windows open
HD 150	78.2	81.1	75.8	78.0	75.5	78.9
HD 170	79.1	81.1	75.6	78.1	75.4	78.8

#### The level of vibrations on driver's seat

ZETOR tractors are classified in category A in class I / II / III. Category A includes all tractors with a specified vibration level due to similar design specifications.

The table below shows the results of the test bench measurements according to EU Regulation 1322/2014, Annex XIV.

		Vibration values dB/m <sup>2</sup>		
Seat brand	Suspension	Vibration transmitted to the hands	Vibration transmitted to the legs	
SEARS SA 43810	pneumatic	109,8	101,2	

#### Aggregation tractor - machine/trailer

# While working with machines, trailers or semi-trailers, all instructions from the manufacturers of these aggregations must be adhered to!

#### Tractors equipped with front end loader

Zetor tractors in standard design are designed for agricultural use and are not intended for special purposes. Tractors intended to operate in the European Union must be equipped with a Falling Object Protective Structure (FOPS) to protect the driver from possible fall of objects when using a front loader. Countries that are not part of the European Union must comply with the applicable local regulations.

Zetor tractors are fitted with a cab roof which is not intended for tractors equipped with a front loader and which does not meet the OECD code 10 (FOPS) conditions.

If the front loader is to be future fitted, the tractor must be equipped with a cab roof that meets the OECD code 10 (FOPS).

ZETOR tractors may only be fitted with front loaders approved by ZETOR TRACTORS. Additional fitting of a front loader approved by ZETOR TRACTORS may only be carried out by a ZETOR Authorized Service Center.

The use of front loaders not approved by ZETOR TRACTORS is forbidden. Failure to observe this instruction may cause serious accidents. Carefully observe the operating instructions supplied by the front loader manufacturer.

Attachment points for assembly of the front loader to the tractor are specified in the manual of the loader manufacturer. The manual must be approved by the company ZETOR TRACTORS.

#### Principles for operating tractors equipped with front end loader

**Carefully study operation manual supplied by the manufacturer of front end loader.** In case of discord of Principles for operating tractors equipped with front end loader and operation manual for front end loader, which was supplied by the manufacturer of front end loader, the wording listed in operation manual supplied by the manufacturer of front end loader shall apply.

- The use of front end loader for transporting material at places accessible to the public is forbidden.
- The use of front end loader for transporting material in places inaccessible to the public is possible only in a limited way. In such case, instructions in user's manual supplied by the loader manufacturer must be observed.
- Observe local valid regulations at all times.
- A strict ban on transportation and lifting of people by means of loader is in effect.
- No matter whether the front end loader is loaded or empty, no-one may stand in front of the loader if it is in lifted position. When driving with a lifted loader, there is a risk of load transported by front end loader falling (there is a risk of disrupting the balance of the tractor).
- Never leave the tractor standing with the loader in lifted position.
- If it is necessary to open the bonnet of the engine at intervention, disconnect the front end loader first or secure hydraulic rollers of front end loader by metallic props designed for this purpose.
- Hydraulic circuit of the front end loader is designed in such a way to endure the maximum operation pressure of 20 MPa (200 bar). Do not do any changes on couplers of hydraulic circuit hoses.
- Any front end loader ZETOR mounting without observing the recommendation of ZETOR TRACTORS valid to the day of pur-chase revokes the validity of guarantee for the whole of supply.
- The loader may be used, maintained and repaired only by people who perfectly know the machine and who are informed about potential risks.
- When driving on roads do not transport any material on the front end loader.
- It is necessary to observe special instructions related to accidents prevention and general rules related to technical safety, la-bour medicine, labour hygiene and regulation defining operation on roads.
- The manufacturer does not bear any responsibility for any potential damage incurred as a result of changes conducted on the loader without their consent.
- Do not ever adjust the front end loader by yourselves and do not use the adjusted front end loader without prior ZETOR's ap-proval. The loader may become dangerous as a result of not observing these instructions. ZETOR TRACTORS shall not be held responsible in case of any damage or injury.
- Use front end loader without additional weights on the tractor (danger of mutual contact). The load of front and rear drive axle must not exceed the maximum permitted load listed in the manual. The use of front end loader requires mounting of counter weight in the rear part of the tractor.
- Each working tool was reconstructed for the purpose of specific usage and has its own tolerance of resistance and tightness.
- It is forbidden to use front end loader for cultivating soil and stubbing. Such work needs to be done with a special tool, front end loader is not designed for doing this.
- Using controls which would set the loader into motion without driver holding the gear shifting lever is strictly forbidden and re-sults in installation not meeting the prescribed standard.
- To penetrate the loaded material, better use the kinetic energy of the tractor rather than pressing force which causes higher strain of both the loader and the tractor.
- Do not overload hydraulic parts if the load is too heavy or pistons are in end positions.
- Control the loader exclusively from driver's seat, if you are sitting on driver's seat.
- Do not leave the seat if you have not blocked any movement of controls.
- No people can be present in the working zone of the loader.
- When working with a lifted loader, mind electric and external cables etc.
- Loader/tractor set needs to be parked on a horizontal and solid base, the arms of the lifting device must be set in the lower position

You will find more information in user's manual to front end loader.

#### Important notification: Work always safely and with consideration.

#### Zetor tractors used for work in the woods

Standard tractors Zetor do not provide sufficient protection for operation in forest terrain as, for example, protection against a fal-ling tree or branch on a cab or penetration of objects to a cab.

If Zetor tractor is utilized for forest work, a tractor operated within the European Union must be protected against these risks.

It is necessary to observe applicable local valid regulations in countries which are not part of the European Union.

To ensure this protection, it is advisable to conduct assembly of a specific protective structure, like for example FOPS / OPS (Fal-ling Object Protective Structure / Operator Protective Structure), tested according to standards for forest machines.

# Only forest superstructures approved by ZETOR TRACTORS can be mounted to ZETOR tractors.

In case of additional assembly of further tractor equipment for working in the woods, full responsibility is borne by the supplier and manufacturer of the protective structure that all the safety regulations (e.g. OPS / FOPS), all the conditions of homologation (e.g. the area of driver's view, lighting, parameters, permissible weight etc.) are met, same as for the provision of due assembly of pro-tective equipment. The supplier/manufacturer of protective construction is also obliged to conduct all the necessary validation (approval) steps required by the legislature of the country in which the tractor is operated.

#### Safety labels

- Important parts of the machine are equipped with safety labels warning against possible danger. Restore damaged or illegible labels and replenish missing ones.
- New components installed during the repair should be provided with up-to-date safety symbols. The safety symbols must be clearly visible!

#### NOTES

#### Preventive daily maintenance

Perform this maintenance daily or after every 8 - 10 hours of operation at the latest.



C18N037

#### **Fuel system leaks**

Check the fuel system for leaks, including the fuel tank. Repair any leaks immediately. The hole for draining dirt from the fuel tank is found in its bottom.



C18N038

#### Engine oil level

After unscrewing and removing the oil dip-stick check the oil quantity in the engine and then check the connection of the engine lubrication system for leaks. Maintain the oil level between the dipstick marks.



C18N039

#### **Cooling system**

Check the connections of the engine cooling system for leaks and the coolant quantity in the expansion tank. Replenish the missing quantity up to the upper mark indicated MAX. The minimum acceptable cooling liquid level is indicated by the MIN mark.

Only release the overpressure plug when the coolant has cooled down! There is a danger of scalding!



C18N040

#### Windshield washer tank

Windshield washer tank is placed on the rear wall of the cabin from the outside side. The washer tank capacity is 2 litres.

In summer the reservoir should be filled with distilled water or mixture for washers.

Antifreeze mixture for washers must be used in winter season for filling the washer tank.





#### Washer nozzle

The washer nozzle is situated in the upper part of the hood and is adjustable by needle or steel wire of maximum diameter 0,8 mm.



C18N042

#### Fluid reservoir for front axle brake control

Check the front axle brake fluid tightness and the amount of fluid in the leveling container.

The front brake control fluid reservoir is located on the right side of the engine.

Keep the liquid level within 3/4 of the container content (max. level) to 1/2 of the container content (minimum fluid level).

The **TITAN ZH LHM PLUS** hydraulic oil is used as a fluid in the hydraulic system of the front axle brake control.



C18N011

**TITAN ZH LHM PLUS is not compatible with synthetic hydraulic fluids and therefore must not be mixed with them.** Under no circumstances TITAN ZH LHM PLUS should be mixed with brake fluids of DOT type!

#### Hydrostatic steering

- check tightness of screws and nuts of the control rods and levers
- check state of all hoses of hydraulic control circuits whether they are not damaged and oil is not leaking



C18N043

#### Air cleaner

Repeated pressing the cup located on the bottom of the air cleaner cover in the direction of the arrows will blow out the dirt caught in the air cleaner cover.

Perform other cleaning tasks:

- every day when working with front-mounted implements or in a dusty environment

- every 100 engine hours.

- always when the relevant instrument panel light is on See the chapter: **Maintenance instructions** 



P18N102

#### **Cab filtration**

Check and if necessary clean the cab ventilation air filters installed in the front overhang of the roof.

The filter exchange interval depends on the dustiness of the working environment.

Partial regeneration can be performed by beating out or blowing with compressed air.

Do the cleaning or replacement of the filter elements after removing the covering grills in the roof overhang. At the customer's request we supply filters with active carbon.





C18N044

#### Hitches

Check the condition of the hitching and attachment systems of the tractor and trailer.



C18N045

#### Inspection of fouling of coolers

Open the front cowl and check the plates of the engine radiator of engine cooling liquid and air conditioning condenser, the cooler of oil of the front PTO shaft and the cooler of the gear oil (if the tractor is equipped with them) for fouling.

In case of fouling clean the cooler plates with pressure air.

#### After work with front implements and in case of cooler clogging

After working with front-mounted implements:

- Check the leakage of the connections of the front three-
- point hitch control external hydraulic circuit
- Perform the air cleaner maintenance
- Check the radiators clogging

In case of the radiators clogging:

- Release and slide the radiator to the left side of the tractor

- Clean the engine radiator front walls (gearbox radiator, air conditioning condenser) with compressed air (blow air in the direction from the engine)

- Remove remaining dirt from underneath so as not to resuck it



C15N012

#### Tyres and wheels

Check the air pressure in the front and rear tyres. Depending on the character of work adjust the pressure to the recommended value. Check and if necessary retighten the bolts of the front and rear wheels.



Never drive with loose wheel bolts!



C18N046

#### Short functional test

After starting the engine check whether the hydrostatic steering failure, engine lubrication and charging indicators have gone off.

Verify the function of the hydraulic steering circuits and check them for leaks.



C18N001

#### **Tractor operation brakes**

When the engine is running, wait until the minimum air pressure indicator on the dashboard goes out and then check for leaks of the tractor's operation brakes air system and the effectiveness of the tractor's service brakes.



C18N002

#### **Trailer brakes**

#### Trailer air brakes

Check tightness of the air system of the brakes and effectiveness of brakes of the tractor with a trailer.

#### Trailer hydraulic brakes

Check tightness of hydraulic brakes of the trailer and effectiveness of brakes of the tractor with a trailer.



C18N047

#### NOTES

Tractor user must be properly acquainted with recommended operating and safety rules for safe tractor operation in advance. It is too late to do it within operation!

Safety cabin

Use the left side of the tractor to enter and exit the cab.

To enter and exit the cab, use the footrest and hold the handles.

Pay special caution in the gear shift lever area and the manual fuel lever.

The safety cab is equipped with tinted glass as standard.



C18N048

#### Opening the door from the outside

Door can be opened from the outside by pressing a button. Left door can be locked.



C18N049

#### Opening the door from the inside

Lever for opening the door from the inside
 Lever for opening the door from the inside

The door is held by a gas strut with a full opening.

*It is forbidden driving with open door due to its possible damage.* 



#### **Rear window**

Is equipped with a handle and in an open position is locked by gas spruts. Rear window is heated.

When driving on an uneven surface we recommend to secure the window in a closed position - danger of window cracking. Before starting the work with the machinery Before starting the work with mounted in three-point hitch of the tractor, make sure that there is not a danger of collision between the mounted tools with maximum lifting of rear threepoint hitch and open rear window. In case of collision we recommend to work with a closed window.

#### Side window

The window is secured in the partly open position with a plastic latch. You can open the door by lifting the latch towards yourself upwards and pushing it into the groove. Then, the window will be secured in the fixed position.



C15N025



FHD18N014

#### **Emergency exits**

In case of overturning of the tractor or blocking the exit from the tractor use the left or the right door, the rear opening window or the roof opening window as emergency exits.



C18N050

#### **Hinged lid**

It is opened by turning the locking lever of the cover (1) and by pressing the locking lever in the upward direction. The swing cover is closed with the opposite procedure.

By opening of the swing cover, the total height of the tractor is increased. Therefore always close the cover when driving through or parking in places with a reduced internal diameter.



C15N026

#### Adjustable screen and cover of the swing lid

Pull out the adjustable screen of the front window (1) by pulling the hand rail in the arrow direction. To return to the original position, shortly pull the hand rail in the direction of the arrow and release the hand rail. The sliding cover of the swing lid (2) is closed and opened with pressure or by pulling the slots in the arrow direction.





#### Shelf

Shelf is placed on the left side of driver's seat. Toolbox is placed in the rear part of the cabin behind the driver's seat.



C18N051



C18N052

#### **Rear view mirrors**

Before the drive or starting the work, adjust rear view mirrors so that they enable to monitor the whole drive way or working field.



#### Internal lighting

To be turned on and off by means of a button marked with the arrow.



F13BN014

#### Cabin steps illumination

The cabin light is located in the cab roof above the cabin door.

The cabin steps illumination lights up for two minutes when the ignition key is moved from position I to position 0.



C18N030

If the cabin step illumination is on, do not disconnect the battery by the battery disconnect. Disconnect the battery only after the cabin steps illumination is off.

#### Aggregation opening

Aggregation opening serves for cabelling or Bowden control of aggregated tools placement. Pull to protrude the part of sealing of rear window in

upward direction. Put the aggregated tool control through the originated hole.

Insert cabelling or Bowden controls to the holes of passage of aggregation opening. Return the sealing of the rear window to its original position by exercising pressure.



#### Driver's seat



FHD18N081

# Only adjust the driver's seat when the tractor is stationary and is braked by the handbrake. There is a risk of injury or accident when adjusting the seat while driving.

1 - Bottom seat cushion - longitudinal adjustment controller (after lifting the controller, it is possible to adjust longitudinally only the bottom seat cushion)

2 - Seat turning controller (after lifting the controller the seat can be rotated)

3 - Seat height adjustment controller (after lifting the controller and relieving the seat the seat is raised to the upper position, the seat can be adjusted to the lower positions when the seat is loaded while the controller is held lifted, the seat can be adjusted to the lower positions)

4 - Seat vibration absorption controller (controller upwards moves the seat to the floating position to absorb the vibrations, controller downwards fixes the seat position)

5 - Seat suspension damping adjustment controller (by turning the knob, it is possible to adjust the suspension of the seat cushion)

6 - Seat longitudinal adjustment controller (by raising the lever the seat can be adjusted longitudinally, return it to the original position to lock the seat)

7 - Seat tilt controller (by raising the lever the backrest inclination can be set, return it to the original position to lock the backrest position)

8 - Controller for height and suspension adjustment according to the driver's weight (pushing the upper part of the controller increases the air pressure in the pneumatic suspension of the seat for heavier drivers,

pushing the lower part of the controller reduces the air pressure in the pneumatic suspension of the seat for lower driver weight, the controller returns to the centered position automatically after release)

9 - Armrest height adjustment controller (by turning the controller to both sides it is possible to increase or decrease the armrest, which are set independently of each other by own controller)

10 - Seat heating controller (switch; by pressing the upper part of the switch the seat heating is switched on, this status is signaled by the light on the switch, press the lower part of it to turn off)

### **Only use the seat heating when the engine is running.**

11 - Height-adjustable backrest (the backrest can be extended upwards or pushed downwards, the backrest is automatically locked in the adjusted position)

12 - Document pocket

13 - Lumbar support seat cushion controller (turn the knob left or right to adjust the shape of the lumbar support)

When using the seat of the driver's seat, there should be no object on the seat that could act as an insulator (eg blanket, pillow, etc.). This may result in overheating of the seat heating system and consequent damage to the health or driver's seat.

If you have a reduced sensation of temperature, impaired feeling of pain or sensitive skin, you may be at risk of burns when using the seat heating.
#### Passenger's seat

Passenger's seat is tiltable and placed on the left mudguard of the cabin.



C15N047

#### Seat tilting out

Passenger's seat to be tilted out in the direction of an arrow (1) upward. Locking of the seat is done automatically.

#### Seat tilting

Lift the passenger's seat in the direction of an arrow (2), pull the lever (3) to the direction of the driver's seat, tilt the seat in the direction of an arrow (4).

#### Tilting and protrusion of steering wheel

Tilting column of steering wheel enables variable setting of position of the steering wheel both in terms of angle and height.

#### Height setting of steering wheel

The setting is done by protrusion or retracting the steering wheel after unlocking arrestment by turning a lever (1) in the direction of an arrow. After setting the steering wheel, lock the lever (1) by tightening in the direction of an arrow.

#### Angle setting of steering wheel

Setting is done by tilting the steering wheel after unlocking the lock by turning the lever (2) in the direction of the arrow. After setting the steering wheel, secure the lever (2) by retightening against the direction of the arrow.

#### Control panel on the right column of the cabin

- 1 Washer button
- 2 Front wiper blade programming switch
- 3 Rear wiper switch
- 4 Two point front wiper switch
- 5 Rear screen heater switch
- 6 Rear mirror heater switch
- 7 Rear working light switch
- 8 Front working light switch



C18N055



FHD18N006

#### Windscreen wiper

The windscreen wiper switch is located on the right pillar of the cab.

The two-speed windscreen wiper motor is controlled by a two-position switch.

- 0 front wiper off
- 1 slower windscreen wiper operation
- 2 faster windscreen wiper operation



Front wiper speed switch

The windscreen intermittent wiper is switched by the switch located on the right pillar of the cab.

Setting the wiping cycle length:

Turn the intermittent wiper on, after the windscreen is wiped turn it off, wait the desired interval between the wipes and turn it on again.

The desired interval between wiping is automatically set.

0 - intermittent wiper off

1 - intermittent wiper on



FHD18N008

#### Rear window wiper

The rear window wiper switch is located on the right pillar of the cab.

The single-speed wiper of the rear window is controlled by a single-position switch.

0 - rear window wiper off

1 - rear window wiper on



FHD18N009

#### Windscreen washer

The front window washer control button is located on the right pillar of the cab.

The windscreen washer is activated by pressing the button. The washer operates as long as the button is pressed after the button is released, it returns to the off position. The maximum running time of the washer pump is 20 seconds.

The front wiper automatically wipes the windscreen when washer is used. The time of wiping depends on the length of the washer operation.

- 0 windscreen washer off
- 1 windscreen washer on



FHD18N010

#### Upper working lights switching on



C18N056

The upper working lights are switched on by pressing the bottom of the switches located on the panel on the right pillar of the cab. Turning the lights on is indicated by the illuminated symbol on the switch.

- A front working lights
- B rear working lights

#### Control panel on the right rear mudguard



FHD18N012

Controls are located on the control panel on the right rear fender

- 1 Hydraulic outlets control panel (more in the chapter HYDRAULIC EQUIPMENT)
- 2 Manual throttle lever
- 3 Joystick
- 4 Engine revolutions preselection buttons (more in the chapter 'RUNNING OPERATION')
- 5 Electrohydraulic control panel (more in the chapter ELECTROHYDRAULICS)
- 6 Switches and controls
- 7 Rear PTO preselction lever (more in the chapter AGRICULTURAL MACHINES DRIVE)
- 8 Three-pin socket
- 9 12V / 10A mounting socket, not for lighter
- 10 7-pin socket
- 11 Lighter
- 12 Two-socket socket

#### Switches located on the control panel



FHD18N013

- 1 Front drive axle control switch (more in the chapter 'RUNNING OPERATION')
- 2 Differential locks switch (more in the chapter 'RUNNING OPERATION')
- 3 Multiplier preselection switch (more in the chapter 'RUNNING OPERATION')
- 4 Front drive axle suspension settings switch (more in the chapter RUNNING OPERATION)
- 5 Front drive axle suspension lock switch (more in the chapter 'RUNNING OPERATION')
- 6 Tractor front height adjustment switch (more in the chapter 'RUNNING OPERATION')
- 7 Front PTO switch (more in the chapter AGRICULTURAL MACHINES DRIVE)
- 8 Rear PTO switch (more in the chapter AGRICULTURAL MACHINES DRIVE)
- 9 Rear PTO clutch auto disengage switch (more in the chapter AGRICULTURAL MACHINES DRIVE)
- 10 Rear PTO speed selector switch (more in the chapter AGRICULTURAL MACHINES DRIVE) 11 - Joystick activation or front hydraulic outlets terminal switch (more in the chapter HYDRAULIC EQUIPMENT)
- 12 Activation of external hydraulic outlets switch (more in the chapter HYDRAULIC EQUIPMENT)
- 13 One pedal brake activation switch (more in the chapter RUNNING OPERATION)

#### Panel of the instrument panel

a - light switch (off, parking, main)

b - switch of dipped-beam in the tractor mask and work light on the tractor cab

c - fog light switch (off - on). Turning the fog light on is signaled by the illuminated symbol on the switch.

d - work light switch in bonnet mask (off - on). Turning the work lights on is indicated by the illuminated symbol on the switch.

e - warning light switch. The warning light function is signaled by the flashing indicator on the dashboard.
f - work light switch (off - on). Turning the work lights on is indicated by the illuminated symbol on the switch.
g - beacon switch (off - on). Turning the beacon on is

indicated by the illuminated symbol on the switch. h - temporary deactivation of the trailer brakes button. More in the chapter RUNNING OPERATION.

i - toggle switch, dipped and high beam headlamps and acoustic and light horns

j - switch box

k - reversing lever. More in the chapter RUNNING OPERATION.



FHD18N091

#### Lights switch

a - illumination off

b - side and end point lights on, illumination of licence label, illuminated

c - all devices on in 'b' position. Lower beam head lights or head beam lights are engaged (according to the position of direction lights, lights and horn switches).



FHD18N095

#### Lights switch between the grill and the cabin

The dipped beam of the tractor can be switched between the dimmed lights in the bonnet (a) and the dimmed lights on the tractor cab (b) by using the switch.

Only use the dimmed light on the tractor cab (b) when the headlight covering tools are attached to the front threepoint hitch. Turning on the lights on the tractor cabin is indicated by the illuminated symbol on the switch. The high beam can only be lit in the bonnet mask.



C18N057

#### Direction lights, lower beam head lights, head lights and horn switches

a - Acoustic horn - press the switch in the direction of an axis

- b Lower beam head lights
- c Direction lights to the right
- d Direction lights to the left
- e Acoustic horn
- f Lower beam headlights



X139

igwedge M When the signal lamps are turned on, the acoustics signal is activated.

#### Switch box

Switchbox is placed on the dashboard, see arrow.



C15N053

#### Switch box key in the position (0)

The voltage of all the equipment controlled via the key is disconnected. The key can be removed.



C18N058

#### Switch box key in the position (I)

The voltage is connected to all the equipment excluding starter. The key is in this position with the engine running.



C18N059

#### Switch box key in the position (II)

Starter and supply of all equipment is connected in this position apart from wipers, washer, cab ventilator and air condition. After starting, the key automatically returns back to 'l' position.



C18N060

#### Manual throttle

a - idle run
b - maximum supply
The lever enables to set engine revolutions in the whole range (a) to (b).



FHD18N015

#### Pedals and levers

- 1 travel clutch pedal
- 2 foot brake pedals joint by a catch
- 3 throttle pedal

#### **Reversing lever**

- **F** front driving; lever in the front
- N neutral
- **R** back driving; lever at the back

#### Gear shifting lever

- main gear shifting lever
- 1. button for disengaging clutch on the head of gear shifting
- 2. buttons of shifting individual gears of multiplier



C18N061



X212a



C18N062

#### Gear shifting scheme

Reversing speeds can be shifted only by means of reversing lever. The scheme is placed on the head of gear shifting lever.



C18N063

#### Road and reduced speeds shifting lever

The lever is placed on the right side of driver's seat.

Η-	Road speeds
N -	Neutral
L -	Reduced speeds



#### PTO revolutions preselection lever

The lever (1) is placed on the right side of driver's seat. For more information see the chapter on Drive of agricultural machines.



FHD18N016

#### Manual brake lever and coupling for semi-trailer control lever

1 - Handbrake lever, more in the chapter 'RUNNING OPERATION'

2 - Hinge control lever for single-axle trailer, more in the chapter TRANSPORTATION USE



FHD18N017

#### **Battery disconnector**



C18N064

The battery disconnector is located on the left side of the tractor behind the driver's stairs.

- A Battery connected
- B Battery disconnected

C - Disconnector plate is located on the cover of the accumulator battery

 $\wedge$ 

Attention! When the engine is switched off, the control unit of the engine and of the exhaust system remains active for about 2 minutes because of storage of the engine operation data and drawing of urea back into the tank. During this time the supply of current from the accumulator must not be interrupted. Do not disconnect the accumulator before this time expires.

After connecting the battery using the battery disconnecting switch, wait at least 30 seconds before turning on the ignition key.

#### Heating control panel, \* air-condition

The control panel of the heating and of the air conditioning is located on the right side of the lower view of the cabin roof.

- A valve heating controller
- B fan controller
- C air conditioner switch
- D controller of air circulation in the cabin



C18N065

#### Heating valve control (A)

- a heating valve closed
- b heating valve opened



- 0 ventilator off
- 1 slowly run of ventilator
- 2 medium run of ventilator
- 3 maximum run of ventilator



C18N066



C18N067

#### Switch air-condition (C)

Do engagement and disengagement of air-condition system function by switching the switch with a symbol of snow flake (C).

You will set the air-condition system going by pressing the switch (the symbol of snow flake lights up).

You will disengage the air-condition system by repeated press of switch (snow flake symbol switches off).



C18N068

#### Air circulation in cabin control (D)

a - Surrounding (outside) air is sucked in through filters to cabin - sucking the air from cabin is closed.
b - Air is sucked in from the space of the cabin and again blown off to the cabin (inner air recirculation for fast adjustment of temperature in the cabin).

The intake of air from the outside of the cabin is completely locked and there is no surplus pressure in the cabin which would prevent pervasion of unfiltered air to the cabin! Do not use this position of the control with work of the tractor!



C18N069

#### Proper function of the heating and air-condition system

It is necessary to create surplus pressure in the cabin for proper function of the heating or air-condition. We therefore recommend you to close all the windows and doors and tilting cover of the cabin.



C18N070

#### Fast heating of the cabin area

Proceed accordingly:

1 - Turn the heating valve control (A) to the position on the right (fully opened heating valve).

2 - Set air circulation in cabin control (D) to the position of inner circulation.

3 - Select applicable gear of the ventilator run (position 1, 2, 3) by ventilator control (B).

4 - Set the expiration under the requested angle to avoid direct fanning of the people in the cabin.

5 - After heating the space of the cabin, set the air circulation in the cabin control (D) to the position of sucking the outer air - see fig.  $F_02_17b$  position (a)

#### Fast cooling of the space of the cabin

Proceed accordingly:

1 - Switch the heating valve control lever (A) to the position to the left

2 - Set the air circulation in the cabin lever (D) to the position of outer air sucking

3 - Select an applicable gear of the ventilator run (position 1, 2, 3) by ventilator control (B)

4 - Switch the air-condition system by a switch (C)

5 - Set expiration under the requested angle so that direct fanning of people in the cabin does not occur (the possibility of illness due tointensive cooling of parts of body).



C18N071



C18N072

#### Immediately after cooling the cabin

Immediately after cooling the cabin and lowering the inner temperature on the required values, we recommend the following:

- Switch over the control of air circulation (D) from position (b - air re-circulation) to position (a - outer air suction)

- Do the continuous regulation of the air temperature with air condition on by opening the heating valve (A). The air entering the cabin from expiration is not so intensively dried with this setting.

- Continuous temperature control with air-condition on can be also done by lowering the output of ventilator by switching the control (B) to position 1 or 2.

# 

C18N073

#### Operation of heating or air-condition with tractor's work

With engaged inner recirculation of air is the inflow of fresh air closed and there is foul air in the space of the cabin by operator. This state can cause the feeling of fatigue and there can also be penetration of dust to the cabin because of the loss of surplus pressure. **Note:** Set the control (D) according to individual requirements on temperature to the position between (a) and (b) so that the ventilator sucks the air from the outside of the cabin through filters, when working.

When spraying pesticides and using the heating filter with active carbon, the recirculation controller should be in position 'air is drawn into from the outside' and the fan controller should be in the position 'fan maximum work' to create overpressure in the cabin.



C18N074

#### Air-condition and heating registers (A)



F13BN010

Positionable heating and air-condition registers, front (A), rear (B).

#### Front windshield (B) defrosting

To ensure quick defrosting of the front windshield direct the central heating outlets (1) under the angle of approx. 45° towards the windshield. Direct the side outlets (2) under the angle of approx. 45° to the cab corners. After defrosting of the front windshield direct the side outlets to the side glasses of the doors as necessary and gradually defrost them. After defrosting direct the outlets in such a way that the air should not be blown directly to the driver, but down to the driver's legs.



F13BN011

#### \*Air filter with active carbon



F13BN015

Active carbon filters are installed in the placed of standard dust filter and the replacement is done in the same way as with standard filters. Filter must be inserted with the white side to the grid. Assembly instructions are found in the chapter 'Maintenance instructions'.

Filter is used only when spraying pesticides, then it must be replaced back by a paper filter because the flying dust would clog the carbon filter very fast.

The recirculation control must be in the position 'air is sucked from the outside'.

Ventilator control must be in the position 'maximum ventilator run'.

#### WARNING: filter does not provide full protection against toxic substances - Wear protective gloves when manipulating with the filter.

- Do not clean the filter and do not blow through with compressed air.

**CALC** DANGER: Replace the active carbon filter every 200 hours or 36 months (date of production is given on the filter). If you happen to smell pesticides in the cabin, replace the filter immediately and have the sealing of the cabin checked. Used filters must be damaged in specialized collection centres.

## $\mathbf{M}$

When spraying pesticides and using heating filters with active carbon, the recirculation control must be in the position of 'air sucked from the outside' and the ventilator control 'maximum ventilator run' for creating surplus pressure in the cabin.

### $\mathbf{M}$

When spraying pesticides, increased care should be taken when entering or exiting the tractor because of possible contamination of the working area. Follow the safety instructions for handling pesticides according to the valid legislation of the country where the tractor is used, type of the hazardous substance, instructions of the manufacturer of the hazardous substance and manufacturer of the carried or towed sprinkler.

#### Fuel tank

By default, a plastic tank of 300 liters is fitted for all types of tractors.



C18N075

#### Fuel tank drain plug

Plug for draining dirt and fuel off the fuel tank is in its bottom.



C18N076

#### Minimum fuel amount in the fuel tank

It is not recommended to ride the tractor in terrain when the fuel level light (orange) is lit.

Air may be sucked into the fuel system and the engine stopped.

Refuel before entering the rugged terrain.



C18N077

#### Urea tank

The tank for urea is located in the left side of the tractor and is equipped with the blue plug of the filling hole. The tank volume is 32 litres.



C18N078



Other media, even a small amount (e.g. diesel oil), lead to the destruction of the system. If e.g. diesel oil was loaded and is present in the system, the whole system of urea injection must be replaced!

If the loaded medium (e.g. diesel oil) does not reach the guide or export pump I of the dosing module, all you have to do is to empty and thoroughly clean urea tanks. Maintain cleanliness.

#### Instrument panel - signal lamps



P18N039

1 - green - signal lamp of left direction lamps

2 - blue - distance lights signal lamp Lights up with distance lights on.

3 - green - signal lamp of direction lights of the 1st trailer

4 - green - signal lamp of direction lights of the 2nd trailer

5 - orange - warning signal lamp

6 - blue - operational protection signal lamp. It is lit up when there is disagreement between operational values of tractor groups.

7 - red - STOP signal lamp

8 - orange - urea level signal lamp. More information in chapter SYSTEM OF ADDITIONAL TREATMENT OF EXHAUST GASES.

9 - red - urea level signal lamp. More information in chapter SYSTEM OF ADDITIONAL TREATMENT OF EXHAUST GASES.

10 - orange - SCR failure signal lamp. More information in chapter SYSTEM OF ADDITIONAL TREATMENT OF EXHAUST GASES.

11 - red - SCR failure signal lamp. More information in chapter SYSTEM OF ADDITIONAL TREATMENT OF EXHAUST GASES.

12 - not used

13 - green - signal lamp of right direction lamps

14 - red - signal lamp of the temperature of the cooling liquid. It is activated when the engine is overheated.

15 - red - AC generator signal lamp. When the engine is running, the signal lamp is activated during charging failure.

16 - orange - fuel level signal lamp. It is on with the remaining fuel 0 - 1/4 of the tank volume.

17 - not used

18 - not used

19 - orange - signal lamp of the differential closure. More information in chapter DRIVING.

20 - green - signal lamp for connection of the front axle drive. More information in chapter DRIVING.

21 - red - signal lamp of a failure in the hydrostatic control system

22 - red - signal lamp of a failure of brakes

23 - red - hand brake signal lamp

24 - red - signal lamp of the minimum air pressure in brake system. It is activated with the air pressure drop below the critical limit.

25 - not used

26 - orange - signal lamp of trailer brake failure, it is activated in the case of the brake system failure when the trailer is equipped with ABS.

27 - orange - signal lamp of full DPF filter. More information in chapter SYSTEM OF ADDITIONAL TREATMENT OF EXHAUST GASES.

28 - red - signal lamp of full DPF filter. More information in chapter SYSTEM OF ADDITIONAL TREATMENT OF EXHAUST GASES.

29 - green - signal lamp of sufficient temperature in the exhaust manifold. It is activated when the temperature of exhaust gases is higher than 250°C. It flashes in case that regeneration of the diesel particulate filter (DPF) is being performed. More information in chapter SYSTEM OF ADDITIONAL TREATMENT OF EXHAUST GASES.

30 - red - lubrication signal lamp. While the engine is running, it is activated when the engine oil pressure drops below the critical limit.

31 - orange - glowing signal lamp

32 - orange - signal lamp of full air cleaner. While the engine is running, it is activated when the engine oil cleaner is full and indicates maintenance of the engine oil cleaner must be performed.

#### Instrument panel - instruments



P18N040

- A coolant thermometer
- B fuel gauge
- C engine speedometer
- D information display

#### Instrument panel - buttons



P18N041

A - reset button, exit from menu of the instrument panel

B - enter button, entry to menu of the instrument panel, item selection confirmation in the instrument panel menu

C - button for rolling up in the instrument panel menu

D - button for rolling down in the instrument panel menu

#### **Display description**



FHSX18N002

The basic display shows the following values:

- 1 position of the reversing gear lever (more in the chapter RUNNING OPERATION)
- 2 gear indicator of the torque multiplier, 1, 2 or 3 is displayed according to the selected gear
- 3 position of the driving and reduced speed gear lever (more in the chapter RUNNING OPERATION)
- 4 low air pressure indicator in the tractor's air pressure system
- 5 graphical representation of the air pressure in the tractor's air pressure system
- 6 air pressure in the tractor's air pressure system
- 7 the information display part
- 8 name of the on-screen menu
- 9 maintenance interval display, disabled DPF regeneration display
- 10 torque multiplier selector switch signalization (more in the chapter RUNNING OPERATION)
- 11 Information on PTO shaft modes and rpm, more in chapter AGRICULTURAL MACHINES
- 12 front axle drive power on signaling
- 13 differential lock switch signaling
- 14 tractor's travel speed display

#### Display - change of display



P18N041

By repeated pressing of buttons (C) and (D) you can click between individual displays of data on the display (so called screens).

Press the button (C) or (D) for longer time to initiate automatic switching between individual screens which is performed while you keep the button pressed.

When the key in the switch box is moved to position I, the home screen is displayed on the display.



C15N030

#### After about three seconds the main screen is displayed on the display.

- 1 current coolant temperature
- 2 current battery voltage
- 3 current ambient air temperature





1 - total operating hours (the value cannot be reset)

2 - operating hours of the tractor since the last reset of the value

3 - total distance covered (the value cannot be reset)

4 - distance covered by the tractor since the last reset of the value



1 - Urea consumption

- 2 DPF soot clogging degree
- 3 DPF ash clogging degree

4 - Amount of urea in the tank in percents; if the amount of urea in the tank is higher than 50% then OK symbol is shown



C18N015

- 1 Engine revolutions
- 2 Engine load
- 3 Instant fuel consumption
- 4 Indication of selected engine speed preset memory



F18N055

- 1 immediate fuel consumption in L/100 km
- 2 average fuel consumption in L/100 km since the last reset of the value
- $\ensuremath{\textbf{3}}$  average fuel consumption in L/hour since the last reset of the value
- 4 fuel consumed since the last reset of the value



P18N046

There are data regarding automatic switching off of the rear PTO shaft; more information in the chapter **Power of Agricultural Machines**.



PHS18N020

On this screen, you will find the data regarding the automatic torque multiplier and the engine speed presets, more in the chapter **Driving operation**.

1 - display of engine speed set in which a higher degree of multiplier is set

- 2 display of engine speed set with lower gearing
- 3 display of engine speed set in memory no. 1
- 4 display of engine speed set in memory no. 2



FHD18N005



PHS18N008

#### 1 - treated area in hectares

2 - treated area - average in hectares per hour

3 - fuel consumption - average in liters per hectare

4 - fuel consumption in liters from the beginning of the record of the treated area.

#### Display - display of air pressure in the air-pressure system of the tractor



P18N075

The air pressure in the tractor's air pressure system is displayed on the instrument panel display.

1 - the air pressure symbol, white illuminated, has no signaling function.

2 - Red display area, gradual filling of the field with red color indicates the increase of the air pressure in the tractor's air pressure system in the range of 0 bar to 10 bar. At a pressure of 0 bar the area is black.

3 - Green display area, gradual filling of the field with green color indicates the increase in the air pressure in the tractor's air pressure system from 10 bar to the maximum set pressure. At a pressure of less than 10 bar the field is red.

4 - Area displaying the numerical value of the air pressure in the tractor 's air pressure system. If the air pressure is lower than 10 bar, the background is red, if the air pressure is higher than 10 bar, the background of the area is green.

5 - The low air pressure warning light turns on when the air pressure in the tractor's air pressure system is less than 10 bar.

#### Indication of low air pressure in the compressed air system of the tractor

area (2) is filled with red color according to the current air pressure in the air pressure system,

area (3) is white

area (4) is red illuminated

lamp (5) is lit

#### Display - warning of low air pressure in the air-pressure system of the tractor

If the air pressure in the tractor's air intake drops below 10 bar, a warning is displayed and a beep sounds. Stop working and wait until the air pressure in the tractor's air pressure system rises.



P18N100

**Caution:** If the air pressure in the tractor's air pressure system is less than 10 bar, the rear wheels of the tractor are braked irrespective of the handbrake lever position.

#### **Display - resetting data**



P18N047

The procedure for resetting data on the main screens where the data can be reset is as follows:

1 - Use the buttons (C) and (D) to select display of the corresponding main screen.

2 - Reset the data by longer pressing of the button (A) (RESET).

If you press the button (A), all data that can be reset on the selected screen would be reset.

#### Display - manual brake

If the tractor is not braked by a manual brake, a warning is displayed on a display (letter **P** in a circle) and at the same time a sound signal is heard. See the chapter "Driving operation" for more.





FHD18N004

#### Display - service menu

Entering the service menu: Enter the service menu by longer pressing of the button (B) (ENTER). Use the buttons (C) and (D) to select the items. The

selected item is marked with a frame.

Exiting the service menu:

Press the button (A) to return from the service menu to the main screen.



#### Service menu

The service menu contains the following items: **Display setings**- setting the backlight **Failure history** - contains a list of errors by individual nodes of the tractor

**Performance Monitor** - allows tracking of the processed area

Settings - allows calibration of the travel speed, calibration of front axle turn sensors, resetting service interval

Engine setup - allows setting of DPF burn regeneration blocking

Language - allows to set the menu language

Info - allows to display the SW version of the instrument panel

#### Display - indicator of service inspection intervals



P18N070

The warning regarding an approaching maintenance date (service interval) is displayed if there are less than 25 operating hours remaining to the planned maintenance.

The maintenance symbol (1) is shown on the display of the instrument panel.

When the key in the switch box is moved from the position 0 to the position I, the main screen appears on the display and after several seconds the warning regarding an approaching maintenance (B) with the number of operating hours of the tractor (2) remaining to the maintenance date are displayed on the display.

#### Exceeding the service interval

In case of exceeding the service interval, the maintenance alert (1) with the number of operating hours 0 is displayed on the display when the key in the switch box is moved from the position 0 to the position I.



P18N071

#### Zeroing (reset) of the indicator of service inspection intervals





# When the maintenance was performed, zero (reset) the indicator of service inspection intervals.

Enter the service menu by pressing the button (B) for a longer time.

Use the (C) and (D) keys to select the **settings** item marked with the arrow (1). By pressing the button (B) enter the menu

Use the (C) and (D) keys to select the **service** item marked with the arrow (2). By pressing the button (B) enter the service menu

Long press the button (A) to reset the service interval indicator. At the position indicated by the arrow (3), the symbol 500hrs will appear after the reset is complete.

Return to the home screen by pressing the (A) button.

#### **Error signalling**

Errors arising during tractor operation are indicated by switching the corresponding signal lamp, acoustic signal and error message in the instrument panel display. If the error is indicated, the signal lamp still glows, even though the display is switched to the next display.

If the error is not eliminated or the indicated state has not returned to a normal state:

the corresponding signal lamp glows

when the tractor is switched off, the key in the switch box is moved to position I and then the engine is started, the corresponding signal lamp is switched on again and the error message runs through the display.

1 - The signal lamp of a serious defect of the system (red).

- 2 The signal lamp of a less serious defect of the system (orange).
- 3 Operational protection signal lamp (blue).



P18N048

#### **Display - error messages**

During tractor operation, three types of error messages may appear in the display.

#### A. - Warning of operational protection,

that a small deviation from the set values or error by the operator occurred. The warning is displayed in the display for about 10 seconds and then the display is switched to the previously set main screen.

The state is indicated by the signal lamp The tractor can be used without limitation.

#### B. - Less serious defects of the system

If a less serious defect of the system occurs, the defect number is displayed in the display for about 10 seconds. Then the display of the defect is minimized into the main field.

All the tractor's functions remain active; it can happen that some of the functions is not undepreciated.

The state is indicated by the signal lamp





#### If this situation occurs, finish the work and contact the service centre.

#### C. - Serious defects of the system

The display cannot be switched to another screen.

The state is indicated by the signal lamp



If this situation occurs, stop the tractor immediately and contact the service centre.

#### Description of the display of error messages

- 1 The symbol of the defect significance.
- 2 Node of the tractor where the defect appeared.
- 3 Main display field defect code.
- 4 Secondary display field defect specification.



P18N074

#### Symbols of tractor nodes



#### **Display - history of defects**





Press the button (B) to enter the service menu

1 - use the buttons (C) and (D) to select the item listing of defects; press the button (B) to enter the screen selection of tractor nodes from which you want the listing of defects to be displayed.

2 - use the buttons (C) and (D) to select the tractor node from which you want the listing of defects to be displayed; press the button (B) to enter the screen displaying the listing of defects for the selected tractor node.

3 - the listing of defects of the selected tractor node; use the buttons (C) and (D) to scroll between individuals defects

The table of the listing of defects contains the following columns:

Nr. - sequence number of the defect record

SPN - defect code

FMI - code for defect specification

OC - number of defect repetitions

Repeatedly press the button (A) to return to the main screen.

#### Display - setting language mutation



P18N077

Press the button (B) to enter the service menu

1 - use the buttons (C) and (D) to select the item **Language**; press the button (B) to enter the screen with language mutations.

2 - use the buttons (C) and (D) to select the required language mutation and press the button (B) for confirmation. The instrument panel is switched to the selected language mutation.

Press the button (A) to return to the main screen.

Press the button (B) to enter the service menu

1 - use the buttons (C) and (D) to select the item **Language**; press the button (B) to enter the screen with language mutations.

2 - use the buttons (C) and (D) to select the required language mutation and press the button (B) for confirmation. The instrument panel is switched to the selected language mutation. Press the button (A) to return to the main screen.

Let *f* you want to change metric units to Anglo-Saxon, select the language mutation ENG. IMP.

For changing metric units to Anglo-Saxon, choose ENGLISH IMPERIAL language mutation. For changing metric units to US, select the ENGLISH US language mutation.

#### Display - backlight of display





Press the button (B) to enter the service menu

a - use the buttons (C) and (D) to select the item **Display settings**, press the button (B) to enter the screen with the display settings menu.

b - the display settings menu contains these items:

1 - day mode, high intensity of the display backlight

2 - night mode, low intensity of the display backlight

3 - automatic mode; automatically switches between the day and night mode of the display backlight depending on the intensity of lighting around the tractor The selected mode is marked by the tick. Use the buttons (C) and (D) to select the required item for the mode change; the selected item is marked with a frame and press the button (B) for confirmation.

Press the button (A) to return to the main screen.

#### Display - setting of day and night backlight of the display





Enter the display settings menu.

a - Use the buttons (C) and (D) to select the item for the day display backlight. Long press the button (B) to enter the screen for the display backlight setting (b).

b - Use the buttons (C) and (D) to move the slider for changing the intensity of the display backlight. The change of the backlight in percentage is indicated above the slider (3). 100 percent is maximum backlight and 0 % is minimum backlight.

Press the button (B) to confirm the changed value of the display backlight and return to the display settings menu.

Press the button (A) to return to the display settings menu without changing the original value of the display backlight.

Use the buttons (C) and (D) to select the item (2) and repeat the same procedure as for the item (1).

#### Display - setting the automatic mode of the display backlight





Enter the display settings menu.

a - Use the buttons (C) and (D) to select the item (1) for the automatic mode of the display backlight. Long press the button (B) to enter the screen for setting the automatic mode of the display backlight (b). b - The screen for setting the automatic mode of the display backlight contains two items

2 - setting the intensity of the lighting around the tractor when the day and night display backlights are automatically switched

3 - switching delay eliminating repeated switching between the day and night display backlights, e.g. in the case of light flashes, etc.

Use the buttons (C) and (D) to select the item (2) and long press the button (B) to enter the screen (c). c - Use the buttons (C) and (D) to move the slider (5) changing the intensity of the lighting around the tractor when the day and night display backlights are automatically switched. The change of the backlight in percentage is indicated above the slider (4).

Press the button (B) to confirm the changed value and return to the menu of setting the automatic mode of the display backlight.

Press the button (A) to return to the menu for setting the automatic mode of the display backlight without changing the original value.

Use the buttons (C) and (D) to select the item (3) and long press the button (B) to enter the screen (d). d - Use the buttons (C) and (D) to move the slider (7) for changing the delay of switching the day and night display backlight. The change of the backlight in seconds is indicated above the slider (6).

Press the button (B) to confirm the changed value and return to the menu of setting the automatic mode of the display backlight.

Press the button (A) to return to the menu for setting the automatic mode of the display backlight without changing the original value.

#### Display - setting and calibration



C18N018

Press the button (B) to enter service menu

- 1 with buttons (C) and (D) select **Settings**, by pressing (B) go to the setup menu screen.
- 1 Calibration of the clutch couplings
- 2 Calibration of the travel speed
- 3 Calibration of the front axle sensors
- 2 Resetting the service interval

2 - Use the (C) and (D) buttons to select the desired function, press (B) to confirm the selection. Return to the home screen by pressing the (A) button.

#### Travel speed calibration



The instrument panel after assembly in the factory is calibrated. Perform a new calibration of the travel speed:

- after a considerable tyre wear
- when installing new tyres
- during replacement of the instrument panel

#### Calibration procedure

- indicate the track of the length of 100 m on a suitable place

- inflate the tractor tyres to the specified pressure; see the tables of these Instructions for Use
- start the engine

- park the tractor at the start of the 100m track

- press the button (B) to enter the service menu

a - Use the buttons (C) and (D) to select the item calibration indicated with the arrow and press the button (B) to enter the calibration menu.

b - Use the buttons (C) and (D) to select the item speed indicated with the arrow and press the button (B) to enter the speed menu.

c - The following values are displayed on the screen of the speed menu:

1 - tractor type

2 - range of permissible values valid for a given type and performance of the tractor, the values cannot be changed

- 3 the value stored during the last calibration of the travel speed
- press the button (B) to enter the next screen

d - The screen with the prompt to travel 100 m is displayed; press the button (B) to start the calibration of the travel speed.

- e The screen is displayed (e)
  - The travel speed is lower than 10 km/h
  - After covering the whole distance of 100 m stop the tractor on the marked end of the track
  - Press the button (B)

f - The screen where the original value of the calibration (4) and the new value of the calibration (5) are presented is displayed. Save the new value by pressing the button (B). If the calibration was properly performed, the service menu appears on the display after pressing the button (B).

g - If the new value of the calibration (f) of the position (5) is outside the range of the set values (c) of the position (2), the error message (g) is shown on the screen. Press the button (B) to return to service menu without changing the original value of the calibration. Repeat the whole calibration process.

## If this situation occurs after replacement of the wheels for wheels of different dimensions than original, it is probable that the new wheel dimensions are not suitable for this type of the tractor.

#### Setting of steering sensors of the front axle





Front axle turn sensors

- with any front axle geometry intervention.
- When replacing the front axle turn sensors.
- When replacing the instrument panel.
- When replacing the front axle.

#### **Calibration procedure**

- Mark the 15 m long track in a suitable space.
- Inflate tractor tires to the prescribed pressure.
- Start the engine.
- Pull the tractor to the beginning of the track.
- Enter the service menu by pressing the button (B) for a longer time.

- Use the (C) and (D) keys to select the **settings** item marked with the arrow (1). By pressing the button (B) enter the menu

- Use the (C) and (D) keys to select the **steering** item marked with the arrow (2). By pressing the button (B) enter the menu

- Drive the tractor straight 15 meters forward and stop the tractor.

- Press the (A) button to save the values and return to the primary screen. Display - machined area

The processed area display shows the processed area in hectares.

- 1 processed area in hectares
- 2 processed area average in hectares per hour
- 3 fuel consumption average in litres per hectare

4 - fuel consumption in litres from the start of the recording of the processed area.

The width of the processed area (i.e., the work width of the tools) must be set for proper calculation of the processed area.



PHS18N008

#### Machined area menu





Enter the service menu by longer pressing of the button (**B**). Use the buttons (**C**) and (**D**) to select the processed area item indicated with the arrow (**a**). Press the button (**B**) to enter the processed area menu (**b**). The processed area menu (**b**):

(1) - user selection - adjustment of the width of the processed area (i.e., the work width of the tools)

- (2) start of the recording of the processed area
- (3) end of the recording of the processed area
- (4) delete the recorded processed area for the selected user
- (5) delete the recorded processed area for all users

#### Processed area - user selection



PSH18N010

Enter the processed area menu - user selection.

Three aggregation widths can be adjusted for each user.

There is an extra memory of the processed area for each user.

In the use selection menu (a) use the buttons (**C**) and (**D**) of one out of three users. Shortly press the button (**B**) to select the user with the set aggregation. Long press the button (**B**) to enter the menu for setting the aggregation for the selected user (b).

- (1) user code and aggregation number
- (2) set width of aggregation

Use the buttons (**C**) and (**D**) to select the required aggregation width and shortly press the button (**B**) for confirmation. The selected aggregation is marked by the tick (3). Return to the main screen by repeatedly pressing the button (**A**).

#### The processed area - setting of the width of aggregation



PHS18N011

In the aggregation width menu, each of the three preset values of the aggregation width can be changed for each user.

Enter the aggregation setting menu for the selected user.

Use the buttons (**C**) and (**D**) to select the aggregation that you can change and press the button (**B**). The aggregation is marked by the tick (1).

Long press the button (**B**) to enter the value change mode (aggregation width). The value indicating the aggregation width starts flashing (2).

Press the button (A) to reset the value of the aggregation width; 0,00 is displayed.

By pressing the button (**B**) the first position of the value (3) is selected and starts flashing. Use the buttons (**C**) and (**D**) to change the value 0 to the required one. By pressing the button (**B**) go to the next position (4) that starts flashing.

Use the buttons  $(\hat{\mathbf{C}})$  and  $(\mathbf{D})$  to change the value **0** to the required one. Press the button  $(\mathbf{B})$  to go to the next position (5) that starts flashing.

Use the buttons (C) and (D) to change the value 0 to the required one. Long press the button (B) to save the newly the set aggregation width.

Return to the main screen by repeatedly pressing the button (A).
#### Machined area record





Enter the aggregation settings menu.

Make sure you have the correct user and the aggregate width (1) preset or set the user and the width of the aggregation. Each user has their own processed area values recorded; when a user changes, the processed area on the primary screen displays values valid for the selected user.

By pressing the ( $\mathbf{C}$ ) and ( $\mathbf{D}$ ) buttons select the item (2) and press the ( $\mathbf{B}$ ) key to start the recording of the processed area (the item is marked with a check mark).

From now on, when the tractor is in motion, the area being processed will be recorded, depending on the aggregate width and the distance traveled.

## The processed area is only recorded when the arms of the rear three-point hitch are lowered in the working position or when the front or rear PTO is switched on or the conditions are met together.

The recording of the processed area ends when you select the item (3) and (B) by pressing the (C) and (D) buttons in the menu of the processed area and exit the recording of the processed area (marked with a check mark).

If you re-start the recording of the processed area, the newly read values are added to the already stored values.

If you need to change a user during the recording of the workspace, close the record of the workspace, select another user and the width of the aggregate, start the recording of the processed area again, the newly read values are added to the already stored values for the newly selected user.

To reset the processed area values for the selected user, use ( C ) and ( D ) buttons to select the item (4) and press button ( B ) to reset the values.

To reset the processed area for all users, use ( C ) and ( D ) buttons to select the item (5) and press button ( B ) to reset the values.

When you return to the main screen, there will be no value for the processed area display field



The reset values can not be restored in any way.

#### System of treatment of exhaust gases - setting

The regeneration of the diesel particulate filter in case of increased temperature of exhaust gases is performed at higher engine load. The system of regeneration of the diesel particulate filter DPF can be controlled through the menu of the engine setting on the instrument panel. The regeneration can be controlled in two modes. The mode of automatic regeneration of the diesel particulate filter and inhibition of regeneration of the DPF filter (for safety reasons only).

Note: Setting of individual modes is described in Chapter System of Treatment of Exhaust Gases.

#### Instrument panel - warning

#### **Replenish fuel**

When the fuel signal lamp (orange) is lit up, the prompt to refill the fuel appears in the display for about 3 seconds. If the fuel is not refilled, the prompt always appears in the display when the key is moved from the position '0' to the position '1' for about 3 seconds. The fuel signal lamp is permanently on.



P18N094

#### Add urea



P18N030

The amount of urea in the tank is displayed on the instrument panel display on the primary screen. a - The actual urea state in percent is displayed.

b - A low level of urea in the tank is signaled on the dashboard, the low urea level indicator red (1) or orange (2). With the low urea warning light, the fault indicator (4) or stop indicator (3) on the instrument panel illuminates.

c - You will also be prompted to add urea to the tank along with an acoustic signal.

### Refill the urea tank whenever refueling.

The amount of urea in the tank is displayed on the instrument panel on the main screen.

a - If the urea level is higher than 50%, it is displayed as OK on the instrument panel. If the amount is below 50%, the real amount of urea in percentage is displayed.

b - Small amount of urea in the tank is indicated on the instrument panel by the red (1) or orange (2) signal lamp of low urea level. The signal lamp of low urea level is activated simultaneously with the fault signal lamp (4) or the stop signal lamp (3) on the instrument panel.

c - Simultaneously the prompt to add urea to the tank appears together with an acoustic signal.



#### High temperature of the cooling liquid





High temperature of the cooling liguid is indicated in several stages of warning

A - informative - reduce the engine power

B - warning - stop the tractor, set the engine to idling until the temperature of the cooling liquid is reduced C - caution - stop the engine, wait until the temperature of the cooling liquid is reduced and check the level of the cooling liquid; if the cooling liquid starts to be overheated again when the engine is started, stop the engine and contact the service centre

## If high temperature of cooling liquid is indicated (warning), the reaction of the system is reduced engine power by 25%.

#### Low level of the cooling liquid



C18N022

Low level of the cooling liguid is indicated in several stages of warning

A - informative

B - warning - the cooling liquid must be replenished

C - caution - stop the engine, wait until the temperature of the cooling liquid is reduced and replenish the cooling liquid

Do not release the overpressure plug unless the cooling liquid is cold! Danger of scald burns!

#### High temperature of the engine oil





High temperature of the engine oil is indicated in several stages of warning

A - informative - reduce the engine power

B - warning - stop the tractor, set the engine to idling until the temperature of the engine oil is reduced C - caution - stop the engine, wait until the temperature of the engine oil is reduced and check the level of the engine oil; if the engine oil starts to be overheated again when the engine is started, stop the engine and contact the service centre

#### High air temperature in the engine air intake system





High air temperature in the engine air intake system is indicated in several stages of warning

A - informative - reduce the engine power

B - warning - stop the tractor, set the engine to idling until the air temperature in the engine air intake system is reduced

C - caution - stop the engine and wait until the temperature in the engine air intake system is reduced; if the air in the engine air intake system starts to be overheated again when the engine is started, stop the engine and contact the service centre

#### Water in the coarse filter of fuel



C18N025

High water level in the coarse filter of fuel is indicated in several stages of warning

A - informative - it will be necessary to perform defecation of the fuel coarse filter (see chapter Maintenance Guidelines)

B - warning - it will be necessary to perform defecation of the fuel coarse filter (see chapter Maintenance Guidelines)

C - caution - stop the engine and perform defecation of the fuel coarse filter (see chapter Maintenance Guidelines)

#### High oil temperature in the gearbox



PHS18N042

A - Caution - Stop tractor, let the engine idle until the transmission oil temperature drops

B - Warning - Fault in sensor circuit, stop engine and contact service

#### Full pushing filter of the gearbox distributor



PHS18N043

A - Caution - Replace the gearbox oil filter cleaner insert (see the maintenance instructions chapter) B - Warning - Fault in the sensor circuit, contact service

#### Signalling of driver's seat



PHS18N047

A - signalling - the operator left the driver's seat, sit back on the driver's seat

B - defect - there is a defect in the circuit of the safety switch of the driver's seat, some functions of the tractor may be restricted, contact the service

#### Indication of speed and engine power reduction



C18N026

- A signaling of engine power reduction by 30%
- B signaling of engine power reduction by 30% and reduction of engine speed to 1250 rpm

#### Clutch couplings overheating signalization



C18N090

The danger of overheating of the clutch couplings is indicated by several warning levels

A - informative - a risk of overheating of the clutch couplings

B - warning - a risk of overheating of the clutch couplings, adjust the working mode of the tractor so that the couplings are less loaded

C - warning - overheated clutch couplings, stop the work, stop the tractor, let the engine idle, move the reversing lever to neutral position and wait until the temperature of the clutch couplings decreases (no warning will be displayed on the display)

#### Signalization of a need to replace engine oil outside the service interval



C18N028

Replace the engine oil and engine oil filter.

If the tractor has a high load or frequent regeneration of the DPF, engine oil degradation has occurred and motor oil has to be changed prior to the maintenance interval. This is signaled by a warning on the instrument panel display.

The oil change warning on the instrument panel display can be turned off by pressing the (A) button on the dashboard and going back to the display of the basic screens.

When the engine oil change warning is turned off, the orange light for a minor fault of the system remains lit. The next time the key in the ignition switch is moved from 0 to I position, the engine oil change warning is displayed again.

After replacing the engine oil, the oil change warning is to be deleted using the Deutz (sw Serdia) diagnostic software.

#### **Rear PTO speed lever position indication**



C18N029

If the rear PTO speed control lever (2) is in the neutral position, the notification on the dashboard appears when the rear PTO switch (1) is switched on.

#### NOTES

The tractor is equipped with the engine fulfilling emission limits STAGE IV and TIER 4f. The compliance with the emission limit is achieved, among others, by the combination of two systems of treatment of exhaust gases:

**a** - Diesel Particulate Filter (DPF) designed for purification of exhaust gases. In the diesel particulate filter, solid particles (carbon black) formed during incomplete combustion of diesel fuel are gathered and then burnt. The oxidation catalyst (DOC) is a part of the DPF unit as well.

**b** - SCR - the SCR abbreviation stands for system for cleaning of exhaust gases of diesel engines using the selective catalytic reduction decreasing the amount of NOx in the exhaust gases. At the same time, the reduction agent injected into the exhaust system reacts in SCR catalyst with NOx emissions contained in exhaust gases which are reduced to nitrogen (N2) and water (H2O). The control of the injected amount of urea is performed using the control unit itself in connection with the control unit of the engine.

To ensure proper functioning of the system, several its parts are monitored so to meet the required emission limits:

- The level and quality of urea injected in the catalyst SCR.
- The amount of NOx in exhaust gases and temperature in the system.
- Detection of an illegal intervention and any handling to put the system out of order.

#### **Conditions for DPF operation**

During operation of the tractor, the DPF filter is clogged with solid particles generated by the fuel combustion as the engine is running.

Passive regeneration of the clogged DPF filter occurs in the event of an increased exhaust temperature above 250 ° C at higher engine load.

Active particle filter regeneration must be triggered by the tractor operator under predefined conditions.

#### **DPF** signalization

DPF filtering activities and malfunctions are signaled by the instrument panel LEDs

- the orange light (1) flashes and the orange light (4) is on - the DPF filter is soothed - DPF filter regeneration is required

- red light (2) blinks and the orange light (4) is on - DPF filter clogged with ash - contact service center

- green LED illuminated - DPF filter regeneration



C18N032

#### **DPF filter regeneration**



C18N033

By flashing the DPF orange light and turning on the orange warning light (A), the DPF signals the need to start the DPF filter regeneration.

The operator must start the DPF filter regeneration in the instrument panel menu.

Regeneration is carried out on a standing tractor with an idling engine that is braked by the handbrake (B), the reversing lever is moved to the neutral position (C) and the PTO clutch is off (D).



C18N034

By pressing the button (B) enter the menu

1 - Use the (C) and (D) buttons to select ENGINE SETUP and press the (B) button to confirm.

- 2 select the item REGEN. FORCED press the button (B) to confirm
- 3 if the tractor is stationary with the engine idling, press the button (B) to confirm



C18N035

- 4 If the tractor is braked by the handbrake and the PTOs are switched off, confirm the button (B)
- 5 Notice that the ECU now controls the engine operation, not operator
- 6 DPF regeneration start
- 7 Preheating of the engine



C18N036

8 - the regeneration of the DPF has begun, and the estimated time of the regeneration is displayed in the bottom line

9 - cooling the system after the regeneration is complete, **DO NOT SWITCH OFF THE ENGINE**!

10 - DPF filter regeneration is complete, you can continue to work with the tractor without restrictions

Do not stop the engine during regeneration of DPF (the green signal lamp flashes) - there is a risk of damage of the system of treatment of exhaust gases. Do not stop the engine immediately after regeneration of DPF filter.Leave the engine idling at low revolutions until sufficient decrease of temperature of the system of treatment of exhaust gases is achieved!

#### Conditions for SCR system operation

The amount of urea in the tank is displayed on the instrument panel. If the amount of urea in the tank is exhausted when the engine is running, the injector in the exhaust manifold is in danger of being damaged and the engine power can be reduced. The catalytic reduction is stopped and the amount of harmful emissions in exhaust gases is increased. When urea is added in the tank, the catalytic reduction is restored.

## **Operation of the tractor without the SCR (selective catalytic reduction) system is prohibited!**

#### Conditions for proper functioning of the system

- temperature of cooling liquid must be higher than 60°C,
- working temperature of the catalyst must be higher than 250°C
- outdoor temperature must be higher than -20°C,
- engine revolutions must be higher than 1,000 rpm
- requirement for the withdrawn torque must be higher than 20%.

### If urea freezes, the tank is electrically heated. If no melting during 70 min occurs, the engine power together with the corresponding error message are activated.

#### Urea (Aqueous Urea Solution AUS 32, DEF)

The used reagent is a mixture of 32.5% solution of synthetic urea and demineralized water. It is used as a reducing agent NOx for additional treatment of exhaust gases by SCR (selective catalytic reduction) of motor vehicles with diesel engines.

The product is labelled as Urea or AUS 32 (AUS: Aqueous Urea Solution) and complies with the standard ISO 22241-1 Reducing agents NOX AUS 32.

The urea solution AUS 32 is known in USA and North America as Diesel Exhaust Fluid (DEF).

The lifetime of urea without the loss of the quality is influenced by storage conditions. It crystallizes at ambient temperature below -11°C and at ambient temperature over +35°C it initiates hydrolytic reaction which means that a slow decomposition to ammonia and carbon dioxide begins. It is essential to protect unprotected vessels from direct sunlight.

Barrels must not be stored longer than one year!

Pay attention to the resistance of the used materials and store vessels.

Urea freezes below the temperature of -11°C.

## To ensure proper functioning of the SCR system, urea with the concentration of 32.5% must be used!

#### Principles for safe handling of urea (AUS 32, DEF)

#### Contact with skin

- Prolonged or repeated contact may cause skin irritation.

#### **Contact with eyes**

- Prolonged or repeated contact may cause eye irritation. Rinse eyes with plenty of water for at least 15 minutes. If irritation persists, visit a physician.

#### Ingestion

- In case of ingestion of small quantities, toxic effects are not likely. Higher amount may cause intestinal or stomach problems. Do not induce vomiting. Drink half a litre of water or milk. In case of ingestion of a larger than small quantity, visit a physician.

#### **Fire-fighting measures**

- The product has fire extinguishing properties.

#### **Extinguishing means**

- If the material got in the fire, use large amount of water for extinguishing.

#### Accidental release measures

- Minimize contact of the spilled material with the soil so that you do not allow product to reach surface or underground water courses.

- Soak up the spilled material with dry soil, sand or other non-flammable material.

#### Error signalling of SCR system

Defects of the SCR system when the engine is running are indicated by glowing of the red (1) or orange (2) signal lamp on the instrument panel and by the subsequent acoustic signal. If the error is not eliminated, it is indicated every time when the engine is started. The reason for the indication may be in not meeting the required amount of NOx in exhaust gases, defect of the urea injection system or bad urea quality. According to the severity of the error message, the warning signal lamp (4) or the stop signal lamp (3) are activated together with the signal lamps (1, 2).

If there is an unprofessional intervention in the system of selective catalytic reduction, an error is indicated and the system is switched into an emergency operation mode of the tractor with a reduced engine power.



P18N029

type of indication	urea signal lamp		defect	acoustic	reduction of the engine power and
	signal lamp	colour	signal lamp	signal	engine revolutions
warning		orange	$\langle ! \rangle$	1 x 1 s	
1st degree of limitation		orange	$\langle \cdot \rangle$	1 x 1 s	reduction of power by 25%
2nd degree of limitation		red	STOP	2 x 3 s	reduction of power by 50%, reduction of max. engine revolutions to 1,250 rpm

#### Indication of DPF and SCR errors on the display of the instrument panel

Error messages with the signal lamps and acoustic signal are accompanied by indication on the display of the instrument panel.

- 1 The symbol of the defect significance.
- 2 Node of the tractor where the defect appeared.
- 3 Main display field defect code.
- 4 Secondary display field defect specification.

5 - Service symbol. **Note:** More information in chapter Instrument Panel



P18N031

#### Indication of amount of urea in the tank



P18N030

The amount of urea in the tank is displayed on the instrument panel display on the primary screen. a - The actual urea state in percent is displayed.

b - A low level of urea in the tank is signaled on the dashboard, the low urea level indicator red (1) or orange (2). With the low urea warning light, the fault indicator (4) or stop indicator (3) on the instrument panel illuminates.

c - You will also be prompted to add urea to the tank along with an acoustic signal.

#### Refill the urea tank whenever refueling.

/!`

type of indication	amount of urea in the tank	of urea signal lamp		display - prompt to	defect	acoustic	reduction of power
		signal Iamp	display type	refill urea	signal lamp	signal	and limitation of engine revolutions
1st degree of warning	less than 20%		orange signal lamp activated	short-time display (3 s)		1 x 1 s	
2nd degree of warning	less than 15%		orange signal lamp flashes (0.5 Hz)	short-time display (3 s)		1 x 1 s	
3rd degree of warning	less than 10%		orange signal lamp flashes (0.5 Hz)	Continuous display (The prompt disappears after pressing any button on the instrument panel.)	$\Leftrightarrow$	2 x 3 s	
1st degree of limitation	less than 5%		orange signal lamp flashes (1 Hz)	Continuous display (The prompt disappears after pressing any button on the instrument panel.)	$\diamondsuit$	2 x 3 s	reduction of power by 25%
2nd degree of limitation	less than 3%		red signal lamp flashes (2 Hz)	Continuous display	STOP	2 x 3 s	reduction of power by 50%, limitation of max. engine revolutions to ca. 1,250 rpm)

#### Reduction of the engine power and engine revolutions

If there is a serious error in the system or if the level of urea in the tank is low, the reaction of the system is reduced engine power output and revolutions. According to the error type, so-called one-stage or two-stage reduction of engine output is performed.

stage 1	reduction of power by 25%
stage 2	reduction of power by 50% and limitation of max. engine revolutions to ca. 1,250 rpm

## A serious error can be caused by unauthorised interference in the system of treatment of exhaust gases!



P18N032

If the first phase of the reduced engine power and engine revolutions is approaching, it is indicated for the tractor operator on the display of the instrument panel (1) or (2) together with an acoustic signal and indication of signal lamps. After the transitional period of 10 h for Stage IV (97/68/EC) or 1.5 h for Tier 4f (EPA) expires, limitation of the engine power with continuous starting is activated.

Note: A warning message on the display (1) or (2) is displayed according to the type of the tractor.



P18N033

If the serious error is not eliminated, the second phase of the reduced engine power and engine revolutions is performed. It is indicated to the tractor operator on the display of the instrument panel (1) or (2) together with an acoustic signal and indication of signal lamps. After the transitional period of 10 h for Stage IV (97/68/EC) or 2.5 h for Tier 4f (EPA) expires, limitation of the engine power with continuous starting is activated.

Note: A warning message on the display (1) or (2) is displayed according to the type of the tractor.

#### Long-term shutdown of tractor

During a long-term shutdown of the tractor, the urea filling must be drained from the tank. Before operating the tractor, the urea tank must be filled with a new filling again and the urea filter element must be replaced and the urea tank must be refilled with fresh material.

## The urea filling should not stay in the tank longer than four month and then it should be replaced.

#### Repairs and maintenance of the system of additional treatment of exhaust gases

The system requires use of permissible operating fluids which are referred to in this manual In case of signalling errors in the system of additional treatment of exhaust gases proceed according to instructions contained in this manual or contact authorized service.

All repairs and maintenance of the system of additional treatment of exhaust gases must always be performed by a professional service All interventions in the system, except authorized service, are prohibited.



Before a drive with the new tractor get to know how to shift gears and try individual positions of the shifting lever when the engine is stopped.

During normal operation and before you set up, make sure that the technical condition ensures safe operation of the tractor.

#### Starting the engine

#### $\mathbf{\Lambda}$

After connecting the battery using the battery disconnecting switch, wait at least 30 seconds before turning on the ignition key.



FHD18N018

- 1 When starting the engine, the operator must sit on the driver's seat.
- 2 Handbrake the tractor.
- 3 Move the PTO shaft speed lever to neutral position.
- 4 Insert the key into the ignition switch position 0.
- 5 Depress the clutch pedal.
- 6 Move the main shift lever to neutral.
- 7 Move the reversing lever under the steering wheel to neutral.
- 8 Switch the ignition key from position 0 to position I. The glow plug light lights up.
- 9 Wait until the glow plug light goes off (the time depends on the coolant temperature).
- 10 Turn the key from position I to position II (start) immediately after the lamp switches off (max. 5 sec).

11 - When the engine is started, release the ignition key immediately, it will automatically return to position I.

- Do not start for more than 20 s.
- 12 Loosen the clutch pedal.

#### Blocking of the start

If the engine cannot be started and the defect signal lamp is flashing, it means that blocking of the start was activated by electronic regulation of the engine and this way the engine is protected.

The blocking of the start is interrupted when the key in the switch box for about 30 seconds is moved to position 0.

#### Non-permitted starting



It is prohibited to start the tractor by short-circuiting the terminals of the starter. Perform starting from the driver's seat only. During any handling or repair of the starter, the minus pole of the battery and all gear shift levers, including shifting of the PTO shaft, must be in the neutral position. The terminals of the starter are covered with a cover.



pikt\_2

#### If you do not succeed in starting the engine

Return the key to '0' position. Wait 60 second and repeat the start.

Never help the stopping engine by a starter. You are being exposed to the danger of starter damage.



C18N079

#### Immediately after start

#### When the engine is started, leave it idling without load for ca. 2 minutes.

During this time, perform checking of lubrication, charging, hydrostatic control (signal lamps must not be illuminated) and other functions ensuring proper operation of the engine. The time of engine operation without load must be adhered to, especially in winter period.

#### **Engine heating**



C18N080

**C** Do further heating of the engine during the drive. The heating of the engine by lengthy idle run or sharp increase in revolutions is harmful to the engine. If the temperature of coolant has not reached 45°C, do not exceed the engine revolutions over 2000 rpm.

Caution: If the air pressure in the tractor's air pressure system is less than 10 bar, the rear wheels of the tractor are braked irrespective of the hand brake lever position and the tractor can not be started until the air pressure in the tractor's air pressure system reaches at least 10 bar. When attempting to start the tractor at low air pressure in the tractor's air pressure system, there is a risk of damage to the clutch system.

#### Error signalling

Errors arising during tractor operation are indicated by switching the corresponding signal lamp, acoustic signal and error message in the instrument panel display. If the error is indicated, the signal lamp still glows, even though the display is switched to the next display. If the error is not eliminated or the indicated state has not returned to a normal state:

the corresponding signal lamp glows

when the tractor is switched off, the key in the switch box is moved to position I and then the engine is started, the corresponding signal lamp is switched on again and the error message runs through the display.

1 - The signal lamp of a serious defect of the system (red).

2 - The signal lamp of a less serious defect of the system (orange).

3 - Operational protection signal lamp (blue).

More information in chapter Instrument panel



P18N048

#### Indication of the limitation of the engine power and engine revolutions

If there is a serious error in control or auxiliary systems of the engine, SCR system or if the level of urea in the tank is low, the reaction of the system is reduced engine power output and revolutions.

According to the error type, so-called one-stage or twostage reduction of engine output indicated by glow of the signal lamps (1) and (2) is performed.

stage 1	Reduction of engine power by 25 %	signal lamp (1) glows
stage 2	Reduction of engine power by 50% Reduction of engine revolutions to 1,250 rpm	signal lamp (2) glows



#### Signalling errors in the system of additional treatment of exhaust gases



C18N081

The label with a short description of indication of errors in the system of additional treatment of exhaust gases and subsequent activities of operators is located in the right bottom corner of the windshield (A). On the label (B) in the left part there is a combination of signal lamps glowing or flashing on the instrument panel indicated using pictograms including their colours and the pictogram of the sounding acoustic warning signal. In the right part of the label a required reaction of the tractor operator is described.

#### 1. Add urea.

- 2. Add urea. The engine power will be limited.
- 3. Add urea. Engine revolutions will be minimised.
- 4. Increase the engine load or contact service. The engine power will be limited.
- 5. Contact service. The engine power will be limited and engine revolutions will be minimised.

#### **Diesel particle filter**



The exhaust system of a tractor is equipped with a diesel particle filter which serves for cleaning exhaust fumes. Solid particles (carbon particles) are collected and burned in diesel particle filter which originate by burning diesel.

#### Filter of solid particles - indication of operation and failures of the system



P18N058

The activity of a DPF filter is indicated by lights (1), (2) and (3) on the instrument panel. More in the chapters **Instrument panel** and **Exhaust gas aftertreatment.** 

#### Diesel particle filter regeneration

During operation of the tractor, the DPF filter is clogged with solid particles generated by the fuel combustion as the engine is running.

The clogged DPF filter is regenerated (cleaned) by the increased exhaust temperature of the standing tractor during engine run. *WARNING: When regenerating the DPF particulate filter, the temperature of the exhaust gases and the surface of the particulate filter will rise sharply. There is an increased risk of fire or explosion if DPF particulate filter regeneration occurs in an* 

There is an increased risk of fire or explosion if DPF particulate filter regeneration occurs in an environment with a fire hazard or in an explosive environment.

When working with a tractor in an environment where the risk of fire or explosive atmospheres occurs, the DPF filter regeneration must be immediately interrupted or the environment left for the DPF filter regeneration.

More in chapters Dashboard and Exhaust Gas Treatment System.

## During operation of the tractors with the engine equipped with the filter of solid particles avoid long-term operation at idling or at low engine load.

#### Driver's seat - safety switch

The driver's seat is equipped with a safety switch which signalizes the system of driver abandoning the driver's seat.

If the tractor is started, there is nobody on the driver's seat and reversing lever under the steering wheel is shifted to  ${\bf F}$  or  ${\bf R}$  position,  ${\bf N}$  position is shifted automatically and tractor does not start.

If this situation occurs, it is necessary to sit on the driver's seat, to return the reversing lever under the steering wheel to N position and then to select the direction of drive again (F or R).



FH12N069

#### **Reversing lever**

The selection of the direction of travel drive is done by reversing lever (forward, backward).

- **F** driving forward
- N neutral
- R driving backward

The lever also serves for starting the tractor without the depressed clutch pedal.



X212a

#### **Reversing lever position signalization**

The individual positions of reversing lever are signalized by a sign (1) on the display.

Î Î	driving forward	
Ζ	Neutral	
ţ	driving backward	



FHSX18N021

#### Gear shifting

The tractors are equipped with a five-gear synchronized gearbox, three-gear torque multiplier, reversing and two-gear reduction.

Five-gear gearbox is shifted by main shifting lever with buttons for disengaging the travel clutch (1) and for shifting the individual gears of multiplier (2).



PHS18N005

#### Shifting road and reduced speeds

- H road speeds
- N neutral
- $\ensuremath{\textbf{L}}$  reduced speeds

Shifting of gears of the main gearbox with reduced speeds is the same as with road speeds. Considering low speed of the tractor, change nearly always means moving off from rest.





f18n018

**Road and reducing speeds lever position signalization** The individual positions of a gear and reduced gearshift levers are indicated by a sign (1) on the instrument panel display.

Ŷ	Road gear shifts
Ś.	Neutral shifts
	Reduced shifts



FHSX18N022

#### The principles of appropriate use of tractors

## The listed principles for tractor's operation serve for facilitating the operation and guarantee corresponding service life of travel clutch!

#### The description of the system of travel clutches

The tractor is equipped with two individual travel clutches, one for travelling forward and one for travelling backward.

The selection of the driving direction and also the choice of a specific travel clutch is done by shifting the reversing lever under the steering wheel from neutral position to the position forward or backward.

#### The way of controlling the travel clutch by

- 1 Reversing lever
- 2 Clutch control button on the head of reversing lever
- 3 Clutch pedal

#### The differences in ways of controlling the travel clutch by

#### 1 - By shuttle shift lever

This mode of operation has an automatic start function.

When the shuttle shift lever is moved to neutral, the clutch is disengaged.

When the shuttle shift lever is moved to the forward or reverse position, the clutch is engaged and then the tractor starts to slide smoothly in the direction determined by the reversing lever.

The speed of the clutch engaging and the smoothness of the start is controlled by the electronic control unit based on the information stored in the calibration and the operator can not influence it.

 $\mathbf{\Lambda}$ 

## The automatic start-up function is more gentle to the clutch connections than the clutch pedal control, so for the normal operation of the tractor when starting, shifting or reversing, use the clutch control with automatic start-up.

#### 2 - By clutch control knob on gear shift lever

This mode of operation has the function of automatic clutch engagement.

When the clutch control button is pressed on the gearshift lever, the clutch is disengaged.

When the clutch control button is released on the gearshift lever, the clutch engages.

The speed of the clutch engaging is controlled by the electronic control unit based on the information stored in the calibration and the operator can not influence it.

#### 3 - By clutch pedal

When the clutch pedal is depressed, the clutch is disengaged.

When the clutch pedal is released, the clutch engages.

The switching speed of the clutch is dependent on the clutch pedal's releasing speed.

The clutch pedal does not allow automatic start-up and the operation affects the speed and smoothness of the start.

#### In normal operation, use the clutch pedal only to stop the tractor.

For the need for sensitive travel eg when connecting the tool or when handling the tractor in confined spaces, if even the reduced gears are not too slow, use the clutch pedal for a short time.

 $\mathbf{A}_{\mathbf{I}}$ 

It is forbidden to regulate the tractor speed by partially pressing the clutch pedal at engine speeds above 1 200 rpm. Do not use the clutch pedal as a footrest. There is a risk of a lifespan reducing or failure of the clutch.

#### Interrupted sound signal



PHS18N052

If the tractor speed is controlled by a partial pressing the clutch pedal at engine speeds above 1 200 rpm, an intermittent beep sounds and a warning on the instrument panel display is displayed. If this occurs, immediately depress the clutch pedal fully or release the clutch pedal to the upper position and wait until the acoustic signal ceases. Reduce the engine speed below 1 200 rpm, then continue with the tractor operation.

Dead start of the tractor

Caution: If the air pressure in the tractor's air pressure system is less than 10 bar, the rear wheels of the tractor are braked irrespective of the hand brake lever position and the tractor can not be started until the air pressure in the tractor's air pressure system reaches at least 10 bar. When attempting to start the tractor at low air pressure in the tractor's air pressure system, there is a risk of damage to the clutch system.

If at dead start, engine revolutions are higher than 1400 rpm L gear of multiplier is automatically shifted, not depending on the switch of multiplier pre-selection on dashboard being on or off. If the multiplier pre-selection switch on the dashboard is on at dead start, L gear of multiplier is shifted automatically independent on the number of engine revolutions at dead start (i.e. when the engine revolutions are lower than 1400 rpm).

A very fast dead start can cause overloading of driving gear, increased fuel consumption, excessive wear of tyres and damage to load. Use dead start on the 1<sup>st</sup> gear only when driving with heavy trailer to the slope and in difficult terrain.

#### Dead start of tractor in regular operation - automatic dead start function

- Use the control of travel clutch by reversing lever under the steering wheel for dead start of the tractor.

- Select the slowliest L gear of torque multiplier for dead start of the tractor.

*Note:* When starting or stopping the engine of the tractor, the fastest gear **H** is always automatically shifted. - If the road and reducing speeds shifting lever is shifted in the group of road speeds, shift the lowest gear speed for tractor dead start with respect for operational conditions.

- Use the lowest possible engine revolutions for tractor's dead start, such that there is no turn off. After the switch of travel clutch, increase the engine revolutions according to your needs.

#### Dead start by means of automatic dead start function

Automatic dead start function is in the shift of reversing lever with engaged applicable gear followed by dead start without using the clutch pedal or clutch control buttons.

- 1. Start the engine.
- 2. Shift appropriate gear for starting the engine.
- 3. Release the manual brake, if you are standing on a slope, brake the tractor by foot brake.

4. When shifting the reversing lever form neutral to the requested direction of tractor drive (forward or backward), the tractor starts.

5. When you increase the engine revolutions simultaneously, release the foot brake.

## When depressing the clutch pedal, the automatic dead start function is put off from operation.

Dead start of tractor in regular operation - clutch pedal

/!` In regular operation use the clutch pedal only for stopping the tractor. For the need of delicate inching, e.g. when connecting the tools or when manipulating with tractor in crammed spaces, if even the reduced gears are not slow enough, use the clutch pedal only for short time.

It is forbidden to control the speed of tractor by partial depression of clutch pedal with engine revolutions higher than 1200 rpm. Do not use the clutch pedal as a foot rest. There is a risk of limited service life or failures of travel clutches.

#### Dead start - using the clutch pedal

- 1. Start the engine.
- 2. Depress the clutch pedal.
- 3. Select road and reduced speeds.
- 4. Shift an applicable gear for starting the tractor.
- 5. Shift the reversing lever to the direction requested (forward or backward).
- 6. Slightly increase the engine revolutions.
- 7. Prepare the manual brake for unbraking.
- 8. Release the clutch pedal only to the point of travel engagement and with simultaneous increase of revolutions continue in a continuous release of the clutch pedal.

9. Fully unbrake the manual brake.

10. Start smoothly and slowly.

Ţ Use this way of dead start when you need to inch carefully, for example when connecting tools etc.

#### Change the direction of drive

#### Change the direction of drive by means of reversing lever

Change the direction of drive by means of reversing lever is done with travel speed lower than 10km/h. When you attempt to change the direction of drive in speed higher than 10 km/h, acoustic signal starts (uninterrupted tone) and the tractor engages neutral. The signal switches off after the shift of reversing lever back to N position, when depressing the clutch pedal or pressing the button of switching clutch on the head of gear shifting lever. It is also necessary to lower the travel speed of tractor under 10km/h, shift the reversing lever to neutral position and to repeat the shifting of requested direction.

### Keeping the following instructions when changing the direction of the drive, contributes to prolonging service life of travel clutches.

• For changing the direction of the drive of tractor use reversing lever under the steering wheel without using the clutch pedal.

· For changing the direction of the drive of tractor, select the slowliest gear L with torque multiplier.

• For changing the direction of the drive of tractor, select lower gear with regard for the subsequent dead start and tractor load.



Changing the direction of drive by means of reversing lever is done at tractor travel speed lower than 10km/h. When you try to change the direction of drive at the speed of more than 10 km/h, an acoustic signal starts (uninterrupted tone), the signal switches off after the shift of the lever back to N position, when depressing the clutch pedal or pressing the button for switching off the clutch on the head of the gear shifting lever.

- 1. Lower the travel speed of tractor under 10km/h by means of brake pedal.
- 2. Shift the reversing lever to the requested direction of tractor drive.
- 3. The tractor stops automatically and travels in the requested direction.
- 4. Continue in smooth dead start of the tractor with simultaneous incresae of engine revolutions.

## Should the tractor speed drop below 10km/h, tractor shift neutral and it is necessary to lower the travel speed of tractor under 10km/h, shift the reversing lever to neutral position and to repeat the shifting to the required direction.

When depressing the clutch pedal, the automatic function is put off operation. If the above mentioned is done subsequently after the attempt to change the direction of drive above 10 km/h, it is necessary to lower the travelling speed of tractor below this speed. In opposite case, after the release of clutch pedal the neutral remains shifted.

#### Change the direction of drive - using the clutch pedal

- 1. Depress the clutch pedal and stop the tractor by foot brake.
- 2. Shift the reversing lever to the requested direction of tractor drive.

3. Release the clutch pedal only to the point of travel engagement and with simultaneous increase of engine revolutions continue in smooth release of the clutch pedal.

4. Start smoothly and slowly.

#### **Gear shifting**

- To shift gears while driving, control the clutch by the clutch control knob on the gearshift knob.

- When shifting, press and hold the clutch control knob on the gearshift lever, release the accelerator pedal, disengage the gear, engage the gear, release the button, and then increase the engine speed.

- If the operating conditions allow, use the multiplier preselection function.

#### Gear shifting - Using the clutch pedal

Depress the clutch pedal (clutch disengaged). At the same time release the pedal of foot throttle and shift the applicable gear speed. Release the clutch pedal smoothly (clutch is being engaged) and at the same time increase the engine revolutions.

#### Gear shifting - using the clutch control button on the head of gear shifting lever

Press the clutch control button on the head of gear shifting lever. At the same time release foot throttle pedal and shift the applicable gear speed. Release the button of clutch control (clutch is being engaged) and at the same time increase the engine revolutions.

*Note:* Clutch pedal is always preselected to the use of button of clutch control on the head of gear shifting lever.

#### Blocking the automatic dead start function

With some failures of travel clutches system, the function of automatic dead start is blocked. This situation is signalized by an inscription displayed on a display. In this case reversing lever under the steering wheel serves only for the selection of direction of drive, the button for clutch control on gear shifting lever does not work. For dead start of tractor and gear shifting, it is possible to use only clutch pedal.

If this situation occurs, finish your work and contact service.



PHS18N032

#### Engine speed preselection system

The engine speed preselection system is used to automatically maintain engine speeds that are preset in memory no.1 or memory no.2.



FHD18N056

The engine speed preselection buttons are located on the control panel on the right rear fender (A)

Buttons description (B)

- 1 engine speed preselection automatic mode selection button
- 2 engine speed preselection revolutions increase button
- 3 engine speed preselection revolutions decrease button
- 4 engine speed preset 2 button
- 5 engine speed preset 1 button

The value of revolutions stored in each memory preset is displayed on one of the basic screens on the instrument panel display (C)

- 1 value of engine revolutions stored in memory 1
- 2 value of engine revolutions stored in memory 2

If the engine speed preset system is activated, the selected memory is displayed on one of the basic screens on the instrument panel display (D)

The backlight of the buttons is white and turns on with the side lights. If the relevant function is turned on by pressing the button, the backlight of the button changes to green.

#### Description of the engine speed preselection functions



FHD18N057

1 - Engine speed preselection system automatic button

by pressing the button the automatic modes of preselected engine speed is enabled, it is signaled by the backlight of the button (1)

#### Field mode

a - memories 1 and 2 are automatically switched depending on the position of the external hydraulic circuit controllers

b - memories 1 and 2 are automatically switched depending on the position of the arms of the rear threepoint hitch



### Switching the memory depending on the position of the external hydraulic is superior to the memory switching depending on the position of the arms of the rear three-point hinge.

#### Stationary mode

when the rear or front PTO is switched on in the stationary mode, the engine speed is set according to the speed stored in the memory 2,

when the rear or front PTO is turned off in the stationary mode, the engine speed is set according to the speed stored in the memory 1 (more in the chapter AGRICULTURAL MACHINE DRIVE

#### 2 - Increase of preselected motor speed button

pressing briefly to increase the set engine speed in the selected memory by 10 rpm, by long press the motor speed increases continuously while holding the button.

#### 3 - Decrease of preselected motor speed

pressing briefly to decrease the set engine speed in the selected memory by 10 rpm, by long press the motor speed decreases continuously while holding the button.

#### 4 - Engine speed preset memory button 2

Press the button to set the motor speed according to the preset values in memory 2, the switching is signaled by the backlight of the button (4). It is possible to set the engine idle speed up to 1900 rpm.

#### 5 - Engine speed preset memory button 1

Press the button to set the motor speed according to the preset values in memory 1, the switching is signaled by the backlight of the button (5). It is possible to set the engine speed in the range from 1350 rpm to the maximum engine speed.

#### Set engine speed and store engine speed preset values



FHD18N058

The basic settings can be made in several ways

For a stationary tractor with an idle engine or for a moving tractor:

#### Setting method 1

Set the base display (A) on the instrument panel display.

On the motor speed preset button panel press the relevant memory button (4) or (5), the button pressing is signaled by the backlight.

The engine speed is increased to the level according to the set values in the selected memory.

Increase of preselected motor speed - pressing the button (2) briefly to increase the set engine speed in the selected memory by 10 rpm, by long press the motor speed increases continuously while holding the button. Decrease of preselected motor speed - pressing the button (3) briefly to decrease the set engine speed in the selected memory by 10 rpm, by long press the motor speed decreases continuously while holding the button.

On the display of the instrument panel on the screen (A), observe the current engine speed.

The speed adjusted by the buttons (2) and (3) is automatically stored in the selected memory.

When the adjustment is complete, set the instrument panel base display (B) and check that the stored values are correct.

#### Setting method 2

If you only need to increase the set engine speed stored in the relevant memory, press the relevant memory button.

Set the desired engine speed with pedal or manual throttle and hold the corresponding memory button. When the button backlight blinks three times, the new values are saved.

Set the instrument panel base display (B) and check that the stored values are correct.

#### Setting method 3

Do not press the memory buttons (4) or (5), press the (2) and (3) buttons to set the engine speed, the buttons (4) and (5) start to blink.

Press the buttons (4) or (5) long to save the set values to the appropriate memory, the buttons (4) and (5) stop blinking.

To stop setting without saving new values, depress the clutch or brake pedal, the values stored in memory 1 and 2 remain unchanged, the buttons (4) and (5) stop blinking and the engine speed adjusts according to the position of the pedal or manual throttle.

#### Setting method 4

Do not press the memory buttons (4) or (5). Set the desired engine speed with pedal or manual throttle and hold the corresponding memory button to which you want to store the actual engine speed. When the corresponding button backlight blinks three times, the new values are saved.

When working with the aggregated machine at low motor load and on memory 1 or 2, it is possible that the engine speed will be higher than the speed set in the appropriate memory due to the low load; if this occurs, decrease the engine speed with the button (2) to the desired level.

#### Driving the tractor using the engine speed preselection system

On the motor speed preset button panel press the relevant memory button (4) or (5), the button pressing is signaled by the backlight.

The engine speed is increased to the level according to the set values in the selected memory. If necessary, increase or decrease the speed set in the selected memory by using the (2) and (3) buttons.

By depressing the accelerator pedal or the hand throttle lever, the engine speed can be raised above the speed set in the appropriate memory. When the accelerator pedal or the manual throttle lever is released, the engine speed returns to the level set in the selected memory. Pressing the backlit button (4) or (5) repeatedly turns off the engine speed preset control, the backlight of the respective button goes off and the engine speed returns to the level set by the accelerator pedal or hand throttle.

The engine speed preselection system is switched off, the backlit memory button (4) or (5) goes out and the engine speed is adjusted according to the position of the accelerator pedal or manual throttle position in the following cases:

1 - When the brake pedal is depressed at a tractor speed below 25 km / h when the engine speed drops by at least 10%.

2 - When the brake pedal is depressed at a trailer speed exceeding 25 km / h, if the brake pedal is depressed for at least 2 seconds.

3 - When the clutch pedal is depressed or by pressing the clutch release button on the shift lever.



FHD18N059

#### Automatic engine speed preset mode



FHD18N060

The automatic engine speed preset mode is controled by pressing the button (1) on the control panel on the right rear fender (A).

Turn on the automatic mode by pressing the button (1), it is signaled by the backlight of the button (1). Press the (1) button again to deactivate, the button illumination (1) goes out.

The automatic engine speed preset mode operates in two modes, either in field mode or in stationary mode, using the shaft in stationary mode.

#### Automatic engine speed preset mode for operation in field mode

The field mode works only at a tractor speed below 20 kph.

If the arms of the rear three-point suspension are in the upper position - the position set as OFF LIMIT (C) or higher, the engine speed is set according to the speed stored in memory 1 (4).

If the arms of the rear three-point linkage are in the lower position - the position is set to ON LIMIT (C) or lower and any external hydraulic circuit control (B) is moved to position (n), the motor speed is set according to the speed stored in memory 2 (5).

If the arms of the rear three-point linkage are in the lower position - the position is set to ON LIMIT (C) or lower and any external hydraulic circuit control (B) is moved to position (a) the engine speed is set according to the speed stored in the memory 2 (5).

If the arms of the rear three-point linkage are in the lower position - the position is set to ON LIMIT (C) or lower and any external hydraulic circuit control (B) is moved to position (b) the engine speed is set according to the speed stored in the memory 2 (5), in case the external hydraulic circuit control (B) is set with time unlimited flow.

If the arms of the rear three-point linkage are in the lower position - the position is set to ON LIMIT (C) or lower and any external hydraulic circuit control (B) is moved to position (b) the engine speed is set according to the speed stored in the memory 2 (5), in case the external hydraulic circuit control (B) is set with time limited flow, the engine speed is set according to the speed stored in memory 1 (4) after the oil flow is ended. If the arms of the rear three-point linkage are in the lower position - the position is set to ON LIMIT (C) or lower and any hydraulic control circuit (B) is moved from position (b) to position (n), the motor speed is set according to the speed stored in memory 1 (4).



For proper field operation, the limits of the rear three-point hitch (memory switching), both engine speed and multiplier presets (for work and for rotation at the headland) must be properly set. Depressing the clutch pedal or by pressing the clutch button on the shift lever or by activating the brakes does not affect the memory switching function.

#### **Recommendation:**

This mode is suitable for field work, seedling, plowing, soil preparation, etc. (there is a reduction in the amount of work at the headland where the machine itself adjusts the rotation as needed - at headland lower, at work higher). For proper operation at work, it is necessary to set the desired speed in memory 2 higher than the required speed for automatic multiplier shifting to a higher speed of multiplier. If you want the multiplier automation not to set to a lower speed of multiplier (at the headland) then it is necessary to set the speed in memory 1 higher than the speed for automatic shift to the lower speed of the multiplier. If you want the multiplier automation to set the lowest speed of multiplier (at the headland), it is necessary to set the speed in memory 1 lower than the speed for automatic shift to the lower speed of the multiplier.

#### Automatic engine speed preset mode for PTO operation in stationary mode



FHD18N061

Stationary mode only works when starting the front or rear PTO shaft in the stationary mode of operation (more in the chapter 'AGRICULTURAL MACHINE DRIVE').

When the tractor is stationary, press the (1) button to turn on the automatic engine speed preselection mode (A).

#### Rear PTO Shaft

When the rear PTO is switched on in stationary mode, the engine speed is set according to the speed stored in memory 2.

When the rear PTO is switched off in the stationary mode by pressing the button on the right rear fender panel or by the buttons on the rear fender (B), the engine speed is set according to the speed stored in the memory 1.

When the rear PTO is switched on again by pressing the button on the right rear fender panel or by the buttons on the rear fender (B), the engine speed is set according to the speed stored in memory 2.

Front PTO Shaft

When the front PTO is switched on in stationary mode, the engine speed is set according to the speed stored in memory 2.

When the front PTO is switched off in the stationary mode by pressing the button on the right rear fender panel (C), the engine speed is set according to the speed stored in the memory 1.

When the front PTO is switched on again by pressing the button on the right rear fender panel (C), the engine speed is set according to the speed stored in memory 2.

# For correct operation of the stationary mode, it is necessary to set both motor speeds correctly and that to brake the tractor by the hand brake all the time! Depressing the clutch pedal or by pressing the clutch button on the shift lever or by activating the brakes does not affect the memory switching function.

#### **Recommendation:**

When the handbrake is released, the automatic stationary mode switches to automatic field mode. This mode is suitable for working with chippers, crushers, pumps, etc. (there is fuel and noise savings if there is no immediate need to crush, split).

For work with economical independent rear PTO shaft speeds, it is recommended to set the speed of the memory 2 to approximately 1600 rpm.

For work with standard independent reverse PTO speeds, it is recommended to set the speed of the memory 2 to approximately 1930 rpm.

#### Three-gear torque multiplier

Three-gear multiplier is a standard equipment of all types of tractors. Shifting individual gears of three-gear multiplier is controlled by two buttons on the head of main gear shifting lever.

H-	Increasing travel speed
L-	Decreasing travel speed

It is done without travel clutch pedal depressed (under load).

#### Signalization of multiplier function

Individual shifted gears of the multiplier are indicated by the symbol (1) on the display of the instrument panel.

3	highest gear (fastest)
2	medium gear
1	lowest gear (slowest)



PHS18N033



PHS18N034

#### Increasing, decreasing the travel speed by two gears

2xH	Increases the travel speed by two gears
2xL	Decreases the travel speed by two gears



PHS18N036

#### **Multiplier preselection switch**



FHD18N019

The multiplier selector switch is located on the control panel on the right rear fender. Switching on is signaled by the on-screen symbol on the switch and the symbol on the dashboard display. If the preset switch is off, the multiplier gears can be set by the buttons on the gear shift lever. If the preset switch is on, multiplier gears are automatically set depending on the engine speed according to preset values.

#### Automatic multiplier shifting

The system for automatic shifting of the multiplier is activated by the switch of multiplier preselection. If the switch of the multiplier preselection is activated (the signal lamp on the switch is on and the symbol on the display of the instrument panel is shown), the gears of the multiplier are automatically shifted depending on the engine revolutions according to the pre-stored values. The system for automatic shifting of the multiplier is not depending on the shifted gear. If the switch of multiplier preselection is activated, the engine can be switched on and off and the stored values (engine revolutions) do not change.

#### Reading of values (engine revolutions) for automatic shifting of the multiplier

The values for automatic shifting of the multiplier are always read when the tractor is going or standing with the engine running, the main gear shift lever is in the neutral position, the reversing lever is in the forward driving direction F, the switch of the multiplier preselection is switched off and engine revolutions are higher than 700 rpm. If the previous conditions are met, the system remembers the following:

**a** - engine revolutions when the button **L** on the gear shift lever for automatic shifting of the gears of the multiplier to decrease the travel speed was used for the last time

**b** - engine revolutions when the button **H** on the gear shift lever for automatic shifting of the gears of the multiplier to increase the travel speed was used for the last time

The difference between the engine revolutions for **a** and **b** must be higher than 300 rpm.

#### Display of values (engine revolutions) for automatic shifting of the multiplier

The values (number of engine revolutions) stored by the system for automatic shifting of the multiplier when the buttons L and H are used are displayed on the corresponding main screen. More information in chapter INSTRUMENT PANEL.

#### Example of use:

You are going on the tractor with the deactivated switch of multiplier preselection and with the multiplier shifted to gear **2**. At 1,600 rpm of the engine press the button **L** on the gear shift lever and thus the torque multiplier is shifted to **1**. Now increase the engine revolutions to 1,900 rpm and press the button **H** on the gear shift lever and thus the torque multiplier is shifted back to **2**. Continue going on the tractor. Now activate the switch of multiplier preselection on the instrument panel. From this moment, automatic shifting is performed by the system of the multiplier without the driver's intervention. The shifted gears of the multiplier torque are as follows:

**a** - when engine revolutions drop below 1,600 ppm, the multiplier is automatically shifted to a lower gear (travel speed decreases)

**b** - when engine revolutions increase above 1,900 ppm, the multiplier is automatically shifted to a higher gear (travel speed increases)

## The values 1,600 and 1,900 rpm of engine needed for automatic shifting of the multiplier used in this example are purely indicative, in real the engine revolutions are adjusted by the driver according to the specific use of the tractor.

If the switch of multiplier preselection is activated, the gears of the multiplier can also be shifted manually using the buttons on the gear shift lever, but only within the range of set values (engine revolutions), i.e. in the used example within the range of engine revolutions from 1,600 to 1,900 rpm; when the revolutions for automatic shifting of the multiplier gear are reached, the multiplier is automatically shifted without the driver's intervention. In this case (activated switch of multiplier preselection) the manual shifting of the multiplier using the buttons on the gear shift lever do not influence the values (engine revolutions) which are saved in the system for automatic shifting of the multiplier. After turning off the switch of multiplier preselection on the instrument panel (the signal lamp on the switch is on), the gears of the multiplier can be shifted manually only using the buttons on the gear shift lever.

## **A**Caution!

During travel of the tractor, when the switch of the multiplier preselection is switched off, the system for automatic shifting of the multiplier continually reads values (engine revolutions) with every use of the buttons H or L on the gear shift lever. After the switch of the multiplier preselection is switched on, the last read values (engine revolutions) are used by the system for automatic shifting of the multiplier, i.e. the values read during the last use of the buttons H or L on the gear shift lever with the deactivated switch of multiplier preselection.

#### Recommendation

Before turning on the switch of multiplier preselection on the instrument panel while the tractor is in motion perform manual shifting of the multiplier gear using the buttons H and L (once with the button H and once with the button L) on the gear shift lever at the required engine revolutions. The values (engine revolutions) are saved and when the switch of multiplier preselection is started again, shifting of the multiplier gears will be performed automatically by the system for automatic shifting of the multiplier according to the engine revolutions.

If the switch of multiplier preselection is activated, in the event of travel clutch release, e.g. while shifting gears, stopping and subsequent starting of a tractor or while using reversal, a suitable multiplier gear is adjusted by the system for automatic shifting of the multiplier automatically when the travel clutch is then activated.
#### Front drive axle control



FHD18N020

The front drive axle control button is located on the panel on the right rear fender.

Pressing the part of the button marked with the front axle drive enabling switches on the manual drive mode of the front drive axle, after releasing the button returns to its original position.

Pressing the part of the button marked with the auto symbol switches on the automatic mode of the front axle control, after releasing the button returns to its original position.

Turning on the front axle drive is signaled by the illuminated symbol on the instrument panel display, the illuminated instrument panel warning light and the illuminated button.

With the parked tractor (trailer braked, engine stopped, ignition key switched off) the drive of the front drive axle is disconnected.

After restarting the engine, the front drive axle returns to the mode in which it was before the engine was switched off.

## When both brake pedals are depressed, the front axle drive will automatically connect.

#### Driving with engaged front axle drive

# Use front drive axle when rear wheels slip to increase the tractor's traction. It is not recommended to drive with engaged front axle drive on the roads or hard surfaces (driving with engaged front axle drive causes increased wear of front tyres).

Permanent engagement of front drive axle is admitted if there is an agricultural machine or tools mounted to the tractor from the front. This condition is listed in instructions manual of an applicable machine. The maximum permitted speed of these sets is 15 km.h<sup>-1</sup>.

#### Front Drive Axle Control - Manual Mode

To activate the front drive axle in manual mode press the button, which returns to its original position after releasing. To deactivate the front drive axle, press the button again.

Turning on the front axle drive is signaled by the illuminated symbol on the instrument panel display, the illuminated instrument panel warning light and the illuminated button.

#### Automatically disconnect the front axle - manual mode

If the drive speed exceeds 25 kph, the front axle drive is automatically disconnected.

Automatic drive disconnection is signaled by flashing a symbol on the instrument panel display, dashboard light and a button symbol.

The front wheel drive is automatically disconnected after the lights stop flashing.

When the drive speed drops below 25 kph, the drive of the front axle can be connected by pressing the button again. At speeds above 25 kph the front axle drive can be connected by pressing the flashing button again. By long pressing the button the front axle is permanently connected for the entire duration of the tractor ride (without automatic disconnecting). The front axle will remain on even if the running speed exceeds 25 kph. Parking the tractor will automatically disconnects the front axle. This status is signaled by the **PERM** symbol on the instrument panel display

Switching from manual to automatic mode can only be performed after the manual mode is turned off.

### Front Drive Axle Control - Automatic Mode

To activate the front drive axle in automatic mode press the button in its part with **AUTO** symbol, the button then returns to its original position after releasing. To deactivate the front drive axle, press the button again. Turning on the front drive axle in automatic mode is signaled by the **AUTO** symbol on the instrument panel display.



F18N027



F18N028

#### Automatic front axle control mode

With the automatic front axle control enabled, the front axle drive will automatically connect if one of the following situations occurs:

1. The drive speed is less than 25 kph.

2. The rear three-point hitch arms are not raised to the position where the PTO clutch is automatically disconnected (see section AGRICULTURAL MACHINES DRIVE).

At drive speed exceeding 25 kph or when the arms the rear three-point hitch is lifted to the position where the PTO clutch is automatically disengaged, the front axle drive disengages.

If the front axle drive has been disconnected due to a travel speed higher than 30 kph, the front axle drive will not be automatically connected when the drive speed is drops below and must be connected by pressing the button.

If the front axle drive has been disconnected due to the position of the rear three-point hitch arms, the fron axle drive will be automatically connected after the front three-point hitch arm is moved back to the position where the rear PTO shaft clutch is automatically connected.

Switching from automatic to manual mode can be done by pressing the manual mode button.

#### Suspension front drive axle

Tractors may also be equipped with a suspension of a front drive axle.

The control buttons of the suspended front axle (1), (2) and (3) are located on the panel in the right rear fender. The button (1) is used to turn on the automatic suspension mode of the front drive axle.

The (2) button is used to lock the front axle suspension. Use the (3) button to adjust the height of the tractor's front.

When a tractor speed exceeds 13 kph, the front drive axle passes into automatic mode in which the axle is automatically kept approximately halfway through the suspension stroke.



FHD18N021

## When operating the tractor on the road, the front axle must be set to the center position (automatic suspension mode) to avoid glaring of the opposing driver.

#### Automatic front axle suspension mode

After pressing the bottom of the button (1), the front drive axle passes into automatic mode in which the axle is automatically kept approximately halfway through the suspension stroke.

This mode is indicated by the illuminated symbol on the button (1).

The axle suspension is working correctly. You can turn off auto mode by pressing the button (1) again.



FHD18N022

#### Front axle suspension suspension blocking mode

When the lower part of the button (2) is pressed, the front drive axle suspension is locked, the tractor front is lowered to the lowest position. This mode is indicated by the illuminated symbol on the button (2).

The suspension of the axle is not working and the axle behaves as unsuspended. The front axle suspension blocking mode can be deactivated by pressing the button (2) again.

Always use this mode while working with the front loader.



FHD18N023

#### Height adjustment of the front part of the tractor

To adjust the height of the front of the tractor, press the button (3). The automatic mode and the front axle suspension must be switched off.

Holding the top of the button for a long time, the front of the tractor rises up after a certain delay, rising up while holding the button until the end position of the suspension is reached.

Holding the bottom of the button for a long time, the front of the tractor is lowered after a certain delay, descending until the end of the suspension is held.

When a tractor speed exceeds 13 kph, the front drive axle passes into automatic mode in which the axle is automatically kept approximately halfway through the suspension stroke.

#### Axle lock control of rear and front axle



FHD18N024



FHD18N025

The differential locks control button is located on the panel on the right rear fender. To activate the the differential locks press the button, which returns to its original position after releasing.

Pressing the top of the button switches on the manual mode of the differential locks control.

Pressing the down button part marked AUTO will activate the automatic differential locks mode. Switching the differential locks on is signaled by the on-screen symbol on the switch and the symbol on the dashboard display.

Applies to both manual and automatic differential locks mode:

The differential locks can not be switched on if the front drive axle drive is not engaged. When both brake pedals are depressed, the locks remain closed. When a drive speed of more than 20 kph is reached for 5 seconds, the differential locks automatically switch off.

This state is signaled by blinking the button symbol for 5 seconds before switching off the differential locks.

If the differential locks have been switched off due to a travel speed higher than 20 kph, the differential locks will not be automatically switched on when the drive speed drops below and must be switched on by pressing the button.

To deactivate the differential locks, press the button again or depress one of the brake pedals. Switching from manual to automatic mode can be done by pressing the automatic mode button.

#### Automatic axle lock control of rear and front axle

To activate the differential lock in automatic mode press the button in its part with **AUTO** symbol, the button then returns to its original position after releasing. To deactivate the differential lock, press the button again. Switching on the differential lock in automatic mode is signaled by the on-screen symbol on the switch and the **AUTO** symbol on the instrument panel display.



F18N030

#### Automatic mode of differential lock control

The automatic differential lock control mode is to disconnect the differential lock if one of the following situations occurs:

1 - the angle of the front wheels is greater than 15°, if the angle of rotation of the front wheels changes to less than 15°, the differential locks automatically switches on.

2 - the arms of the rear three-point hitch are raised to the position where the PTO clutch is automatically disconnected (more in the TRANSPORTER MACHINE chapter), when lowering the arms of the rear three-point hitch, the differential locks automatically switches on.

3. The travel speed is higher than 15 km / h, the differential lock do nto turns automatically when the travel speed is lowered and must be switched on by pressing the button

Switching from automatic to manual mode can be done by pressing the manual mode button. To deactivate the differential lock, press the AUTO button again or depress one of the brake pedals.

#### Driving up the slope



Shift from higher to lower gear in time when driving up the slope not to have a drop in engine revolutions under 800 revolutions per minute, do not allow a drive leading to the engine stop due to overload.



C18N082

Driving down the slope

Driving down the slope without engaged gear speed is forbidden. If you travel from a longer slope, shift the lower gear speed the steeper the slope is. Shift the lower gear speed before the slope, if possible.

*Note:* The gear speed with which you easily overcome an ascent, you will also successfully manage descent.



C18N083

#### Foot brakes

Foot operated brakes are disc wet-type. The rear wheel brakes of the tractor are controlled by compressed air from the tractor's air pressure system, the front wheel brakes of the tractor are hydraulically controlled by the oil from the tank located on the right side of the engine. Caution: If the air pressure in the tractor's air pressure system is less than 10 bar, the rear wheels of the tractor are braked irrespective of the hand brake lever position and the tractor can not be started until the air pressure in the tractor's air pressure system reaches at least 10 bar. When attempting to start the tractor at low air pressure in the tractor's air pressure system, there is a risk of damage to the clutch system.

#### When driving on the road, both pedals must be locked together for safety reasons.

start of descending.

Braking with one brake pedal



FHD14N086

#### Note: When driving from a steep slope with a trailer or a semi-trailer equipped with air or hydraulic brakes, it is necessary to brake with the foot operated brake from the



FHD18N028

One brake pedal braking is used to brake one rear wheel for easier turning of the tractor. When the tractor is stationary while the engine is running:

A - By pressing the button turn on the one pedal braking system

B - Release the brake pedals by pulling the latch in the direction of the arrow

C - When the left brake pedal is depressed, only the left rear wheel brakes; when the right brake pedal is depressed, only the right rear wheel brakes; front and rear brakes for trailers or semi-trailers are not active in this mode.

Disconnecting the pedals for braking the right or left rear wheel of the tractor use specially off the road, only when working in the field or ground.

#### Turning on the one pedal braking system

The one pedal brake system is switched on by pressing the button (1) on the panel on the right rear fender at a tractor speed below 13 km / h.

This system is indicated by the illuminated symbol on the button (1).

To deactivate the system, press the button (1) again. The system automatically switches off at a tractor speed exceeding 15 km / h.

If the travel speed drops below 13 km / h, the system will not be switched on automatically. If necessary, turn the system back on by pressing the (1) button.



FHD18N0027

#### Warning signalization of air pressured drop

If the air pressure in the tractor's air intake drops below 10 bar, a warning is displayed and an audible beep will sound, and the air low-pressure light and the brake fault indicator will light up at the same time.

Stop working and wait until the air pressure in the tractor's air pressure system rises.



FHD18N029

#### **Emergency braking**

If the air pressure in the tractor's air system drops below 10 bar while driving and the tractor's operation brakes stop working, use the handbrake for emergency braking of the tractor. If the air pressure in the hand brake circuit drops, the tractor automatically brakes regardless of the hand brake lever position.

As long as the air pressure in the tractor's air system does not raise to more than 10 bar, the tractor remains braked.

#### Unblocking the tractor brakes when the air pressure drops



FHD18N032

If the tractor has been braked due to the air pressure drop in the tractor's air pressure system and the tractor has to be towed off, the tractor brakes can be unlocked for the time required for tractor towing.

## **M** Only use the tow rod to tow the tractor off. <u>Tractor with unlocked brakes does not brake!</u>

The tractor brakes can be unlocked by loosing the screws located on the two brake cylinders that are located on the rear side of the rear half axle (a).

On both cylinders, loosen one screw indicated by arrow (b).



Caution: The screws can not be completely dismantled, loosen the screws until the resistance to the loosening increases to 35 Nm, the loosen screws remain in the working cylinders (c). After the towing, immediately tighten the screws in both work cylinders to their original state by a torque of max 70 Nm.

#### Hand brake



FHD18N031

The handbrake lever is located on the panel to the left of the driver's seat. To brake the tractor, move the handbrake lever from the front (a) to the rear (b) in which the lever is automatically locked. The locked handbrake lever is indicated by the light on the dashboard. To release the tractor, pull the handbrake lever in position (b) slightly up and then move to the position (a). The indicator light on the instrument panel goes out and the tractor is released.

## **Caution:** If the air pressure in the tractor's air pressure system is less than 10 bar, the rear wheels of the tractor are braked irrespective of the handbrake lever position.

#### Manual brake - signalization

If the tractor is not braked by a manual brake, a warning is displayed on a display (a letter **P** in a circle) and at the same time there is a sound signal. This situation occurs in two cases a - a tractor unbraked by a manual brake with engine running and a driver leaves its seat b - a tractor unbraked by a manual brake standing with

b - a tractor unbraked by a manual brake standing with engine off and the key is shifted in '0' position.





FHD18N004

#### Brakes of trailers and semi-trailers

When driving with a trailer or semi-trailer connected, the footbrake pedals must be connected and secured by a latch!

#### Connection of the ABS system of the trailer or semi-trailer

If the trailer or semi-trailer is equipped with the ABS system, insert the control cable of this system into the socket located in the rear part of the tractor, near outlets of the outer hydraulic circuit.



F18N032

#### Button to temporarily deactivate the trailer or semi-trailer hydraulic brakes



C18N084

# Prior to using the button for temporary deactivation of brakes of the trailer or semi-trailer, it is always necessary to provide sufficient space in front of the tractor and behind the connected trailer or semi-trailer where no obstacles or persons will be present for the case that the effect of the parking braking will not be sufficient and the combination of vehicles moves.

The button for temporary deactivation of brakes of the trailer or semi-trailer can be used by the operator of the tractor with the connected trailer or semi-trailer to make sure that the effect of the parking braking system of the tractor with the connected trailer or semi-trailer when the tractor is braked with the hand brake is sufficient.

If there is a tractor with the connected trailer or semi-trailer which is braked with the hand brake and the key in the switch box is in the position (I), and we press the button for temporary deactivation of brakes of the trailer or semi-trailer, the trailer or semi-trailer is deactivated for the time when the button is pressed (the trailer or semi-trailer does not brake). When the button for temporary deactivation of brakes of the trailer or semi-trailer is released, the brakes of the trailer or semi-trailer are activated (the trailer or semi-trailer brakes).

The temporary deactivation button for the trailer or semi-trailer brakes only deactivates the trailer or semi-trailer hydraulic brakes.

Temporary deactivation of the trailer or semi-trailer air brakes using the handbrake lever

Before using the temporary deactivation of the brakes of a trailer or semi-trailer with a handbrake lever, there must always be sufficient free space in front of the tractor and behind a trailer or semi-trailer in which there are no obstructions or any persons in case the parking braking effect is not sufficient and the set moves.

Temporary deactivation of the brakes of a trailer or semitrailer by a handbrake lever serves to ensure that the trailer with a trailer or semi-trailer can be assured that the effect of parking braking on the trailer with the trailer or trailer is sufficient when the tractor brakes with the hand brake.

If, when the tractor is stationary and has sufficient air pressure in the tractor's air pressure system (min. 10 bar), with attached trailer or semi-trailer and braked by handbrake, push the handbrake lever in the direction of the arrow (downwards) and move the lever back to the rear to stop, the brakes of the trailer or semi-trailer are deactivated while the handbrake lever is in the rear position (the trailer or the semi-trailer does not brake). After releasing the handbrake lever, the handbrake lever automatically returns to the braked position, and the trailer or trailer brakes are activated (trailer or trailer brakes).



FHG18N034

Temporary deactivation of the trailer or semi-trailer brakes by the handbrake lever deactivates the trailer or semi-trailer air brakes only.

#### Air brakes of trailers and articulated trailers

Control of the brakes of the trailers or semi-trailers and control of the tractor brakes is made so that the braking effect of both vehicles is synchronized.



C18N096

#### One-hose and two-hose brakes

1. clutch head of one-hose brakes

2. clutch heads of two-hose brakes

Clutch heads after disconnection or without a connected trailer, articulated trailer must be closed by a valve.



F18N034

#### **One-hose brakes**

Valve is marked with a black colour. Operating pressure is adjusted with the control valve at  $600 \pm 20$  kPa.

When connecting the trailer (articulated trailer) with a maximum allowed weight approved for the type of tractor at stake is a maximum allowed speed of the set of 30 km per hour! Maximum allowed speed of the set is defined by maximum allowed speed of the slower vehicle of the set.



F18N035

#### Two-hose brakes

Operating pressure is adjusted with the control valve at  $750 \pm 20$  kPa. Capacity of air tank is 12 l.

The valve of the left head is labelled in yellow (braking branch), the valve of the right head is labelled in red (filling branch).

When connecting the trailer (articulated trailer) with a maximum permitted speed approved for the type of tractor, the maximum permitted speed of set is 40 km per hour!

Maximum permitted speed of set is given by maximum permitted speed of the slower vehicle of the set.



F18N036

## Hydraulic brakes of trailers

**Connect the hydraulic brakes of the trailer or semitrailer into the quick coupling marked with an arrow.** The control of the hydraulic brakes of the trailer or semitrailer and the brake control of the tractor is performed so that the braking effect of both vehicles is synchronized. The working pressure is derived from the oil supplied by the non-displaceable hydraulic gear pump.

The trailer brake valve is controlled by the brake fluid pressure from the main brake cylinders in response to the brake pedal force. At maximum brake pedal depression, the clutch head pressure must be 12 to 15 MPa. The trailer brake valve favors the function of the brakes before the hydraulic function.

If there are a shocks in the hydraulic circuit piping when the foot brake pedals are depressed, it is necessary to vent the hose from the brake valve to the quick coupler.



F18N037

#### Connecting and disconnecting quick couplings of trailer hydraulic brakes



When connecting and disconnecting quick couplings, take increased care with regard for remaining oil which remains in the socket or in the plug of quick coupling. For ecological reasons, it is necessary to remove this remaining oil after every disconnection of quick couplings with any textile material.

#### The socket for connection of the electrical installation of the trailer or semi-trailer

The outlet for the trailer or semi-trailer wiring is located at the rear of the tractor.

Behind the outlet bracket there is a wire allowing for controlling handbrake for trailers or semi-trailers with a hydraulic braking system.

There is a three-pin socket on outlet bracket for powering trailer or semi-trailer attachments.



C18N085

#### Stopping the tractor - manual brake

Stop the tractor slowly under standard conditions. Shortly before stopping:

- 1. Depress the clutch pedal.
- 2. Shift the main gear shifting lever to neutral position.
- 3. With every stopping, secure the tractor against

spontaneous dead start by manual brake.



C18N085

#### Stopping the engine

After the work of tractor when the engine was fully loaded, it is necessary to secure its cooling.

1. Before stopping the engine, lower the revolutions to 800 - 1000 revolutions per minute and allow it to run for the time of approximately 5 minutes.

2. Shift the lever of manual throttle to STOP position.

3. The engine stops after turning the key from 'l' position to '0' position.



C18N086

Attention! When the engine is switched off, the engine control unit remains active for about 2 minutes because of storage of operation data. During this time the supply of current from the accumulator must not be interrupted. Do not disconnect the accumulator before this time expires.

#### Leaving the tractor

Before leaving the tractor with a safety cabin, do not forget to remove the key from the switch box in '0' position (in position 'I' and 'II' the key cannot be pulled out).

*Tractor must be secured against spontaneous start: 1. Engine off* 

- 2. Braked by manual brake
- 3. Wheels based by wedges.

Engaging a speed gear does not secure the tractor from start (clutch is switched off). Lock the cabin.



C18N087

Warning signalization of hydrostatic steering failure Hydrostatic steering pump failure is with oil pressure drop under 120 kPa behind a pump signalized on a dashboard by an applicable symbol.

*Note:* When starting the tractor or with low engine revolutions, the control may blink, if it switches off after starting or increasing the revolutions, it is not a failure.



P18N069

#### Important warnings

In case that indicator of lubrication, battery recharge or a fault of the hydrostatic steering is on during normal operation of the tractor, stop the tractor immediately, stop the engine and contact a specialised repair shop. This prevents a serious damage or breakdown of the tractor.



C18N088

Limiting travel speed

With the threat of exceeding the travel speed of 40 km/h, the maximum engine revolutions are automatically reduced. This function cannot be switched off.



FHD14N068

## **RUNNING IN THE TRACTOR**

#### General principles of new tractor run-in in first 100 hours of operation

#### During first 100 hours of operation:

- · Load tractor in a normal way, avoid operation with low or maximum engine revolutions
- Avoid operation under partial loading of the engine
- Avoid excessive idle run operation
- Check oil levels in engine often (during this time increased oil consumption is normal)
- Check screw joints in particular in supporting parts of tractor
- Learned insufficiencies to be removed immediately, you will thus prevent subsequent damage or endangered operation
- Keep the same procedure also after tractor complete overhaul

#### In first 10 hours of operation

- perform run-in in traffic
- tighten fastening nuts of front and rear wheels including connectionbead / rim with prescribed torque



C18N089

#### From 100 hours of operation

After drive in completion you can work with tractor without limitations.

## NOTES

Before you start, make sure that the technical condition of the tractor corresponds to requirements for safe operation. When a trailer or implement is attached, check its connection and proper fixation of the load. Never leave the tractor while it is moving to connect the trailer by yourself. Also take care of your assistant's safety.

Front hook



F18N019

Depending on the tractor equipment, the front hitch is available in various versions.

For fixing the tow bar or tow rope to the front hitch always use the original pin which must be secured against extrusion with original lock.

Used only for towing tractor without connected trailer or a different connected machinery.

Use a drawbar or a cable for releasing tractor. Never use chains! The possibility of fatal injury if a chain pulls apart!

It is forbidden to use tractor axles (individual travelling wheels) such as reeling jack when rescuing a sunken tractor.

#### CBM stage quick-adjusting hitch

It is designed for attachment of double-axle trailers or lighter single-axle semi-trailers. The guiding mouth is height adjustable. During work with various implements it may be necessary to adjust the height of the hitch or to disassemble the entire hitch.





Height adjustment and disassembly of the CBM stage hitch

By moving the control lever in the arrow direction to position (1) you will release the lever and by moving it subsequently to position (2) you will retract the locking pins (3). Now, the stage hitch is released and you can adjust its height or disassemble it. When you release the lever from position (2), the locking pins (3) will extend and the lever will automatically return to the initial position.



C18N098

#### Automatic mouth of the CBM stage hitch

When the lever (1) is moved in the direction of the arrow (a), the pin (2) is retracted to the upper position, which is signalled by the extended indicator (3), see fig. (A). When the mouth gets onto the shaft lug, the pin will automatically slide into the lug of the connected trailer. You can lower the hitch pin (2) manually by moving the lever (1) in the arrow (b) direction. The insertion of the pin is signalled by the retracted indicator (3), see fig. (B).

After the attachment of the trailer you must always check whether the indicator (3) is retracted in accordance with fig. (B).



C18N099

C18N100

#### Swing drawbar

The draw rod can transversely be set to five positions. You fix it in a given position using a clip.

#### **Modular system of hitches for trailers and semi-trailers** Module types:

Fig. (B) - Swinging draw-bar console

- Fig. (C) Swinging draw-bar console with a fixed pin
- Fig. (D) Console with a ø 80 ball

Disassembly, fig. (A):

- 1 Remove the locking screw (1).
- 2 Secure the module against sinking, release and disassemble the pins (2).
- 3 Slide the module out of the console downwards.

Do the assembly in the reverse order.



C18N101

#### Swinging draw-bar console module

The swinging draw-bar console module is located in the stage hitch console.

#### Swinging draw-bar

Disassembly:

- 1 Release and remove the pins (1).
- 2 Slide the swinging draw-bar out in the arrow direction.

Do the assembly in the reverse order.



C18N102

#### Swinging draw-bar console with a fixed pin module

Perform the assembly and disassembly of the swinging draw-bar in accordance with the 'Swinging draw-bar' chapter.

Connecting the shaft lug to the fixed pin (3):

- 1 Release and remove the pin (1).
- 2 Lift the locking wedge (2) in the arrow direction.
- 3 Connect the shaft lug to the fixed pin (3):

4 - Return the locking wedge (2) to the original position and secure it with the pin (1).



C18N103

#### Console with a ø 80 ball module

# The console with a Ø 80 ball is only used to connect semi-trailers with a hitching device designed for a Ø 80 ball.

Releasing the hitch, fig. (A):

By moving the lever (1) in the arrow direction you will remove the locking wedge (2).

Locking the hitch, fig. (B):

By moving the lever (1) in the arrow direction you will retract the locking wedge (2).

#### Hitch for a single-axle CBM semi-trailer

The hitch for a single-axle semi-trailer may be equipped with a hook (A) or with a swinging draw-bar (B).

Replacing the hook with the swinging draw-bar (C):

- 1 Lower the hitch.
- 2 Release and remove the pin (1).
- 3 Remove the hook in the arrow direction.

Install the swinging draw-bar in the reverse order.



C18N104



C18N105

#### Uncoupling of a single-axle trailer

Lift up the arms of the rear three-point hinge to the upper position when the maximum position regulation is set. Move the lever of the hinge control for one-axle trailer from the position (a) to the position (b) (the lever is located on right side of the drivers seat).

Lower the arms of the rear three-point hinge. This way the hinge for the one-axle trailer is lowered as well and the drawbar eye of the trailer can be disconnected from the hitch hook.

When released, the lever of the hinge control for one-axle trailer is returned from the position (a) to the position (b) automatically.



FHD18N040

#### Coupling of a single-axle trailer

When the drawbar eye of the trailer is installed on the hitch hook, it is hydraulically lifted together with the trailer eye to the position where the bearing hooks snap under the pins of the hitch carrier. The hydraulic lifting arms must then be lowered so that the carrier pins can make contact with the bearing hooks - the telescopic pull rods must not be stretched.

Maximum permissible vertical static load of hitches for trailers and semi-trailers					
Hinge type	Permissible vertical static load	ØHinge pin	Hige type	Permissible vertical static load	Ø Hinge pin
	2 000 kg	31 mm		2 000 kg	38 mm
CBM GTF30015			CBM GTF30014		
	2 000 kg	43 mm		2 500 kg	50 mm
CBM Y314SL			CBM Z314SL		
	736 kg	31 mm		2 000 kg	80 mm
CBM GTB30003			CBM GTS80001		
		47 mm			32 mm
CBM GTU001	3 000 kg		CBM GTB30030	1 800 kg	
DROMONE ZC-H	3 000 kg		DROMONE ZC-D	1 100 kg	
	Fixed pin 2 000 kg	44,5 mm		2 000 kg	80 mm
CBM GTP001			CBM GTS80003		

The maximum weight of the aggregate braked trailer or semi-trailer shall not exceed the value stated on the tractor's production plate and the information stated in the vehicle's vehicle identification document. The maximum set speed is given by the maximum allowed speed of the slower vehicle of the set.

GTB30003 hitch max. trailer weight 13,400 kg Y314SL hitch max. trailer weight 14,000 kg. Hinge GTP001 max. trailer weight 20,000 kg DROMONE ZC-H hitch max. trailer weight 18,000kg Z314SL hitch max. trailer weight 20,000kg DROMONE ZC-D suspension max. trailer weight 23,000kg Závěs DROMONE ZC-D max. hmot. přívěsu 23 000kg

## NOTES

Work with PTO shaft

Before attaching of an implement, driven by means of the tractor PTO shaft, check the speed compatibility of both, it means tractor PTO shaft and implement driven shaft (540 rpm or 1,000 rpm). Different PTO speed values may cause serious damages and injuries.

Within any repair or modification on the implement powered by PTO or within any operation on terrain in its working range the tractor engine ought to be switched off (ignition key in position 0).

1. When working with PTO shaft mind that all the covers are duly fixed.

2. After completing the work, always mount the cover of PTO shaft back.

3. Any repairs or cleaning of aggregated machines parts driven by PTO shaft to be done only with the engine at halt and PTO clutch disengaged.

4. Before starting an aggregated machine driven by PTO shaft, make sure that there are no unauthorized personnel near, there is a risk of injury.

#### **Display of revolutions of PTO shafts**

When the PTO shaft is switched on, the PTO shaft speed is displayed on the instrument panel display.

- 1 RPM of the front PTO shaft
- 2 RPM of the rear PTO shaft



FHSX18N003

#### Replaceable end points of rear PTO shaft

The tractor is equipped with six or twenty-one splined replaceable end point of rear PTO shaft. Replacement procedure:

1. Use safety ring pliers to demount a safety ring (1)

- 2. Remove replaceable end point by pulling in the
- direction of an arrow (2)

3. Mount the end point in an opposite way, pay increased attention to the mounting of the safety ring (1)

## **A** Replacement of the terminal shall be performed when the engine is stopped.

Rpm of the output shaft and terminal type shall be chosen depending on the prescribed rpm of the coupled mechanism.

Shifting 540, 1,000, 1,000E or 540E min<sup>-1</sup> is possible regardless to the number of splines of the installed terminal.

### **Control elements of PTO shafts**

#### The buttons for activation of PTO shafts

Turning the PTO shaft on (at min. 1500 rpm) and off is done by the buttons located on the panel on the right rear fender.

1 - switch for turning on and of the rear PTO shaft2 - switch for turning on and of the front PTO shaft

If the engine is switched off while the rear or front PTO is switched on, the PTO is switched off after the engine has been restarted.





fhd18n041

#### Selection switch of rear PTO clutch revolutions (P.T.O.)



FHD18N042

The rear PTO shaft speed is set by the button located on the panel on the right rear fender. The default value is 540 rpm of the rear PTO shaft.

By pressing the bottom of the button with the symbol the speed of 1000 rpm of the PTO shaft is shifted, the button returns to its original position after release. At 1000 rpm, the symbol on the rear PTO shaft shift button lights up.

Another keystroke at the bottom of the button shifts the PTO shaft to 540 rpm, and the button returns to its original position after release. At 540 rpm, the symbol on the rear PTO shaft shift button is not illuminated. The selected number of revolutions of the rear PTO shaft is displayed on the dashboard display. After restarting the engine, the PTO shaft revolutions speed returns to the mode in which it was before the

engine was switched off.

## Change PTO speed between 540 and 1000 min <sup>-1</sup> only when the PTO is stopped! Ensure that the correct PTO shaft speed is set relative to the tool attached!

#### Rear PTO shaft revolutions preselection lever



FHD18N043

The tractor can be equipped with one of two PTO shaft speed selection systems. The system used for the specific tractor is marked on the sticker located at the rear PTO shaft speed lever.

1. Standard and economical independent rear PTO shaft Speed - Label (1)

2. Dependent and independent rear PTO shaft speed - sticker (2)

The rear PTO shaft speed lever (3) is located on the right side of the driver's seat.

The center (neutral) position of the rear PTO shaft speed selector lever is indicated by the **N** (4) symbol on the dashboard display.

Independent rear PTO shaft speed - revolutions speed is dependent on engine revolutions.

Dependent rear PTO shaft speed - the number and the meaning of the revolutions speed is dependent on the gear and the position of the reversing lever.

Shift the rear PTO shaft gear shift only when the rear PTO shaft is stopped and the clutch pedal is depressed.

#### Standard and economical independent revolutions of rear PTO shaft



FHD18N044

The system used for the specific tractor is marked on the sticker located at the rear PTO shaft speed lever. This system only has independent rear PTO shaft revolutions speed.

- A Standard PTO shaft speeds are shifted
- N Neutral position (Rear PTO shaft terminal can be rotated freely.)
- **B** Economic PTO shaft speeds are shifted

When the standard PTO shaft speed is selected (A), the rear PTO shaft speed selector can be set to 540 or 1,000 revolutions of the rear PTO shaft.

When the economic PTO shaft speed (B) is selected, the rear PTO shaft speed selector can be set to 540E or 1,000E revolutions of the rear PTO shaft.

The lever is located on the right side of the driver's seat. Raise the ring in the direction of the arrow (C) to move the lever.

The selected economic PTO shaft speed is indicated by the **E** symbol displaying behind the selected PTO shaft speed in the dashboard display.

#### Dependent and independent rear PTO shaft revolutions



FHD18N045

The system used for the specific tractor is marked on the sticker located at the rear PTO shaft speed lever. This system only has 540 or 1,000 rpm rear PTO shaft speed.

- A Dependent PTO shaft speeds shifted (PTO SYNCHRO)
- N Neutral position (rear PTO shaft terminal can be rotated freely.)
- B Independent PTO shaft speeds shifted

When dependent (A) or independent (B) PTO shaft speed is shifted, the rear PTO shaft speed selector can be set to 540 or 1,000 revolutions of the rear PTO shaft.

The lever is located on the right side of the driver's seat. Raise the ring in the direction of the arrow (C) to move the lever.

Dependent PTO shaft speeds shifted are indicated on the dashboard display by not displaying the selected PTO shaft speed. Real rear PTO shaft speed is displayed.

#### Automatic disengagement of PTO clutch



FHD18N046

The function of automatic deactivation of the clutch of PTO shaft means that when the PTO shaft is activated and the arms of the rear three-point hinge are lifted, the clutch of the rear PTO shaft is automatically deactivated and the shaft is stopped; when the arms of the rear three-point hinge are lowered again, the clutch of the rear PTO shaft is automatically activated and the shaft starts rotating provided that the driving direction is engaged with the return lever and the travelling speed of the tractor is 0.3 km/h at least.

A - When the clutch of the rear PTO shaft is activated, automatic deactivation of the clutch of PTO shaft is performed by pressing the button (1) for at least one second. When the button (1) is released, it returns into its original position. Further pressing of the button (1) causes deactivation of this function. B - Enabling the function of automatic deactivation of the clutch of PTO shaft is indicated by the symbol **A** before the selected revolutions of the rear PTO shaft appear on the display of the instrument panel.

## *It is prohibited to use the function of automatic deactivation of the clutch of PTO shaft at stationary mode of work with the rear PTO shaft.*

#### Setting automatic disengagement of PTO shaft clutch - display description



PHS18N021

Gradually press the buttons (C) and (D) to display the screen of automatic switching off of the PTO shaft on the instrument panel.

The following values are displayed on the screen:

**OFF-LIMIT** (1) - position of arms of the rear three-point hinge where the clutch of PTO shaft is deactivated **ON** (2) - the current position of arms of the rear three-point hinge

**ON-LIMIT** (3) - position of arms of the rear three-point hinge where the clutch of PTO shaft is activated The values of individual items are percents from the total stroke of hydraulic arms, the maximum stroke is 100%.

#### Automatic disengagement of PTO shaft clutch - return to basic setting

The main values set by the manufacturer are as follows: **OFF LIMIT** - 55 **ON LIMIT** - 45

If the screen is displayed, the main values are set by pressing the button (A) on the instrument panel.

#### Work with automatic disengagement of PTO shaft clutch



FHD18N047

Switch on automatic deactivation of the clutch of PTO shaft using the button (A) when the tractor is going or standing with the engine running. The activation of the function of automatic deactivation of the clutch of PTO shaft is indicated by the symbol **A** (1) on the display of the instrument panel (B). After activation of the function with the switch (A), the rear PTO shaft is standing which is indicated by the fact that revolutions of the PTO shaft (C) are not shown on the display of the instrument panel and the value (3) is higher than the value **OFF LIMIT** (2).

#### Starting of the rear PTO shaft

The rear PTO shaft starts to rotate if the arms of the rear three-point hinge are in a position lower than the set value of **ON LIMIT** (the value (3) is lower than the value **ON LIMIT** (4)) and the tractor travels with a speed higher than 0.3 km/h. When the rear PTO shaft starts to rotate, the number of revolutions of the rear PTO shaft (D) is shown on the instrument panel display.

#### Stopping of the rear PTO shaft

The rear PTO shaft is stopped if the arms of the rear three-point hinge are in a position higher than the set value of **OFF LIMIT** (the value (3) is higher than the value **OFF LIMIT** (2)). When the rear PTO shaft is stopped, it is indicated by the fact that revolutions of the PTO shaft (C) are not shown on the display of the instrument panel.

#### Restarting of the rear PTO shaft

For subsequent rotation of the rear PTO shaft you must proceed in accordance with **Starting of the rear PTO shaft**.

If the tractor is stopped during **Stopping of the rear PTO shaft** and the tractor stands for more than three minutes, automatic switching off of the rear PTO shaft is deactivated and simultaneously the rear PTO shaft drive is switched off. The symbol **A** and/or the icon of the rear PTO shaft are not shown on the display of the instrument panel (E) and the rear PTO shaft does not start to rotate even if the conditions for **Starting of the rear PTO** shaft are met.

If this situation occurs, the rear PTO shaft must be activated in accordance with **Activation of the rear PTO shaft - independent revolutions - common working mode** and automatic deactivation of the clutch of PTO shaft must be reactivated by the button (A).

#### Facilitating connection of joint shaft of an aggregated machine to the tractor



C18N106

The button (1) located on the rear mudguards can be used to facilitate connection of the transmission shaft of the aggregated machine to the tractor.

When the engine is running and the switch of the rear PTO shaft is deactivated, the rear PTO shaft starts to rotate when you press the button (1). When the button is released, the rear PTO shaft stops rotating. **Caution:** The revolutions preselection lever of the rear PTO shaft must not be in the position (N) or in the position of dependent revolutions of the rear PTO shaft.

If the conditions for activation of the rear PTO shaft in the stationary mode are met and the button (1) was pressed for more than 3 seconds, the rear PTO shaft will rotate even when the button (1) is released. You must shortly press the button (1) again to stop rotation of the rear PTO shaft.

## When handling the PTO shaft using buttons (1), the operator must stand outside the area of the connected tools in order not to be caught or injured by the tool.

#### Working modes of PTO shafts

The tractor is equipped with two working modes of PTO shafts. The selected mode is indicated on the display of the instrument panel.

A - common working mode with the PTO shaft the PTO shaft is rotated regardless the tractor is going or not; the operator must sit on the driver's seat B - the stationary working mode with the PTO shaft - it is used when the tractor is used as a stationary drive unit, e.g. for the drive of chippers, etc.

the PTO shaft is rotated if the tractor is not going and it is braked with the hand brake; the operator must not sit on the driver's seat



FHSX18N009

#### Activation of the rear PTO shaft - independent revolutions - common working mode



FHD18N048

PTO shaft revolutions speed is dependent on engine revolutions.

With the engine running while the rear PTO shaft clutch disengaged:

A - Select the appropriate operating mode by the PTO shaft speed selector lever.

B - Select the appropriate speed using the rear PTO shaft speed selector button.

C - Pressing the rear PTO shaft switch button for at least one second puts the rear PTO shaft into operation.

#### When pressing the button the operator must sit on the driver's seat.

D - Rotation of the rear PTO shaft is indicated by the number of revolutions on the dashboard.

lacksquare To interrupt the torque transmitted by the rear PTO shaft, press the button again.

If the rear PTO shaft is active and the operator leaves the driver's seat for more than five seconds, an audio signal is generated and the rear PTO shaft is deactivated. Reactivation is performed when the operator sits on the driver's seat by pressing the button on the right column of the cabin.

#### Activation of the rear PTO shaft - independent revolutions - stationary working mode



FHD18N049

PTO shaft revolutions speed is dependent on engine revolutions. With the engine running while the rear PTO shaft clutch disengaged:

- A Select the appropriate operating mode by the PTO shaft speed selector lever.
- B Select the appropriate speed using the rear PTO shaft speed selector button.
- C Move the reverse gear lever to neutral (N).
- D Move the main gear lever to neutral (N).
- E We brake the tractor by a handbrake.
- F We leave the driver's seat.

G - Press the button on the panel on right fender for at least one second or the button on the rear fender of the tractor for at least three seconds to bring the rear PTO shaft into operation.

## When pressing the button the operator must not sit on the driver's seat.

H - Rear PTO shaft rotation and selected rear PTO shaft mode are indicated by the number of revolutions of the rear PTO shaft and the pictogram of working mode on the dashboard..

## To interrupt the torque transmitted by the rear PTO shaft, press the button on the panel on right fender or the button on the rear fender of the tractor.

If the operator sits in the driver's seat during work with the rear PTO shaft in stationary mode, the mode automatically switches to normal mode, indicated by a change in the pictogram on the dashboard.

If the operator unblocks the handbrake of the tractor while working with the rear PTO shaft in stationary mode, the audible signal sounds and the rear PTO shaft switches off.



FHSX18N012

#### Deactivation of the rear PTO shaft - independent revolutions



FHD18N050

A - By pressing the button on the panel on right fender or the button on the rear fender of the tractor the rear PTO shaft turns off.

*B* - This status is signaled by not showing the number of revolutions of the rear PTO on the dashboard display.

C - Move the PTO shaft speed lever to neutral position (n).

*D* - This status is signaled by displaying the N symbol instead of the number of selected rear PTO speeds on the dashboard display.

#### Rear PTO shaft switch - dependent speed - ordinary mode of operation



FHD18N051

The number and the meaning of the speed is dependent on the gear and the position of the reversing lever. The reduction lever position does not affect the number of revolutions of the rear PTO shaft in dependent mode - normal mode.

With the tractor stopped while the engine is running:

A - The operator must sit on the driver's seat.

B - PTO shaft speed selector lever selects the dependent speed of the PTO shaft.

C - Dependent PTO shaft speeds are indicated on the dashboard display by not displaying the selected PTO shaft speed.

## The PTO shaft switch button is not functioning in this mode.

D - Select the appropriate speed using the rear PTO shaft speed selector.

E - Depress the clutch pedal and shift the gears with the main shift lever and the travel direction with the reversing lever.

F - Release the clutch pedal, the rear PTO shaft starts rotating as the tractor is starting, this is signaled by the number of revolutions of the rear PTO shaft.

## When starting the tractor the operator must sit on the driver's seat.



The PTO clutch automatic off switch is not functioning in this mode.

Use the clutch pedal for short-term interruption of torque transmission from the rear PTO shaft. The switch of the rear PTO shaft is not functional in this mode.

For long term discontinuing the torque transmitted by the rear PTO shaft, move the PTO gear lever to the neutral position after depressing the clutch pedal and stopping the tractor.

If the operator in this mode of operation of the rear PTO shaft leaves the driver's seat while the tractor is stationary, the <u>engine switches off</u>.

If the operator in this mode of work of the rear PTO shaft leaves the driver's seat, the engine is shut down.

#### Front PTO shaft

Front PTO shaft is equipped with a solid six or twenty-one splined end point and it comes only in design of 1,000 revolutions.

Tractor may be equipped with front PTO shaft with varied direction of spinning:

a -	In compliance with the direction of engine revolutions (standard)
b -	Against the direction of engine revolutions (*on request)

#### Activation of the front PTO shaft - common working mode

PTO revolutions speed is dependent on engine revolutions.

With the tractor stopped while the engine is running: ' A - Pressing the button on the right pillar of the cab for at least one second puts the front PTO shaft into operation.

## When pressing the button the operator must sit on the driver's seat.

B - Rotation of the front PTO is indicated by the number of revolutions on the dashboard. The mode of operation is indicated by a pictogram on the dashboard display.



C18N107



FHD18N052

If the front PTO shaft is active, the tractor is not going and the operator leaves the driver's seat, an audio signal is generated and after five seconds the rear PTO shaft is automatically deactivated. Reactivation is performed when the operator sits on the driver's seat by pressing the button on the right column of the cabin.>

If the front PTO shaft is active, the tractor is going and the operator leaves the driver's seat, an audio signal is generated.

#### Activation of the front PTO shaft - stationary working mode



FHD18N053

PTO shaft revolutions speed is dependent on engine revolutions.

With the tractor stopped while the engine is running:

- A We brake the tractor by a handbrake.
- B Reverse gearshift lever must be shifted to neutral position.
- C Main gearshift lever must be shifted to neutral position.
- D We leave the driver's seat.
- E Pressing the button on the right fender for at least one second puts the front PTO shaft into operation.

## igta M When pressing the button the operator must not sit on the driver's seat.

F - Rotation of the front PTO is indicated by the number of revolutions on the dashboard. The mode of operation is indicated by a pictogram on the dashboard display.

If the operator sits in the driver's seat during work with the front PTO in stationary mode, the mode automatically switches to normal mode, indicated by a change in the pictogram on the dashboard.

If the operator unblocks the handbrake of the tractor while working with the front PTO shaft in stationary mode, the audible signal sounds and the front PTO shaft switches off.



P18N023

#### Deactivation of the front PTO shaft

Pressing the button on the right fender will switch off the front PTO shaft. This status is signaled by not showing the number of revolutions of the front PTO on the dashboard display.



F18N054
# DRIVE OF AGRICULTURAL MACHINERY

# Maximum transferred output

PTO shaft	Transferred output
Front	
1000 per minute	90 kW
Rear	
1000 per minute	full engine output
540 per minute	full engine output
1000E per minute	60 kW
540E per minute	60 kW

**Drive of machines with greater inertia masses.** (crushers, rotary harrows, reaping machines, etc.) Cardan shaft for drive of these machines must be equipped with the so called freewheel clutch which ensures disconnection of torque transfer with retroaction from the machine on the tractor.



F\_02\_46



troj

# Hydraulic system

The system consists of the inner and outer circuit. The source of pressurized oil is a gear pump. Oil is drawn from the common filling of the gearbox and final drive housing.

# Indication of low oil temperature



FHD18N062

# If the temperature of the gear oil is lower than 20°C, it is not recommended to use the outer circuits of hydraulics.

When handling the controllers of the outer hydraulic circuits at the temperature of the gear oil lower than 20° C, the operational protection signal lamp on the instrument panel is activated and an error message is displayed in the display

(1) - defect code **520267** 

(2) - defect specification FMI 31

Should this be the case, interrupt handling the controllers of the outer hydraulic circuits. After several seconds the display is switched to the preset main screen. Do not use the outer hydraulic circuits until the temperature of the gear oil increases above 20°C.

# Hydraulic pump

The hydraulic pump is not switchable off. If the engine is running, the pump is in operation.

Pump type	Delivery
GHD0P 32/17	85 l/min

**Standard design of the tractor**- the pressure exerted in the hydraulic system by the hydraulic pump is limited by the safety valve to 20.5 MPa.

**Tractor with auxiliary switch for front hydraulic circuits** - The pressure exerted in the hydraulic system by the hydraulic pump is limited by a safety valve to 23.5 MPa.



C18N108

# **Control elements placement**

- Control panel is placed on the right rear mudguard.
- 1. Electrohydraulics control
- 2. External hydraulic circuit control



FHD18N063

# Outer hydraulic circuit

It delivers pressure oil for hydraulic appliances connected to the hydraulic outlets terminated by quick couplings.

Both the rear and front coupling sockets are 12.5 mm (1/2 ') in size, only the socket 0 marked on the rear panel of the quick release couplings has a 20 mm (3/4') width - a waste bin. All quick couplings comply with international ISO standards.

# Connecting and disconnecting quick-couplers



When connecting and disconnecting the quick-couplers pay increased attention with regard to the residual oil that remains in the socket or on the plug of the quick-coupler. For environmental reasons after every disconnection of quick-couplers this residual oil must be removed with any textile material.

# Quick-couplings with drip collection

On request, dripping system for holding leakage oil can be installed. Regularly check whether the tank is not full; dispose of the oil in an environment-friendly way.



FHD18N064

# Amount of oil taken from outer hydraulic drives

If the amount of oil in transmission decreases after disconnecting the tool due to its permanent outflow out of the tractor into the machine's hydraulic circuit, refill the oil missing.

# If the amount taken exceeds the limit, hydraulic pump can absorb air and can get damaged.

For maximum amount of oil taken see the following table.

Type of work: On level ground Max. oil consumption: 12 litres Gearbox filling: standard

*Type of work:* On a slope *Max. oil consumption:* 12 litres *Gearbox filling:* transmission oil filling increased by 7 litres

*Type of work:* On level ground *Max. oil consumption:* 27 litres *Gearbox filling:* transmission oil filling increased by 15 litres, maximum permissible oil quantity in the gearbox

*Type of work:* On a slope *Max. oil consumption:* 20 litres *Gearbox filling:* transmission oil filling increased by 15 litres, maximum permissible oil quantity in the gearbox

*Type of work:* On level ground *Max. oil consumption:* 8 litres *Gearbox filling:* minimumpermissible oil quantity in the gearbox

# External hydraulic circuit controls

- 1. system activation button
- 2. joystick activation or front outlets switch button
- 3. joystick
- 4. applicable hydraulic circuit controls
- 5. system status controls
- 6. pivoting selectors for setting the disengagement of
- applicable hydraulic circuit depending on time

7. pivoting selectors for setting the flow of oil of an applicable hydraulic circuit



FHD18N065

# Controls of external hydraulic circuit description



FHD18N067

The controller (I) controls the quick couplings (1) and (2) The controller (II) controls the quick couplings (3) and (4)

The controller (III) controls the quick couplings (5) and (6)

The controller (IV) controls the quick couplings (7) and (8)

The quick coupling (0) is directly connected to the distributor compartment and is intended for return oil from external hydraulic appliances (especially rotary hydraulic motors).

If the tractor is fitted with front outlets (quick couplings) these are controlled by the controller (III) and the quick couplings (5) and (6) are not assembled.

If the tractor is fitted with an additional front-circuit distributor, the front outlets and front three-point hitch are controlled by a joystick and the rear quick couplings (5) and (6) are mounted.

# External hydraulic circuit controls activation

External hydraulic circuit control gets activated with the engine running by a longer press of a button (1) (approximately 3 seconds).

Control activation is signalized by a lit symbol on the button.

Activated control can be deactivated by another press of the button (1); symbol on the button will go off. When turning the engine off, the control is deactivated automatically.



FHD18N068

# External hydraulic circuit controls function



FHD18N083

(N) - Neutral position. Outlets to quick coupler (2) and (1) are closed and oil in the connected hydraulic device is blocked. Control (I) is locked in this position.

By moving the control from position (N) to the front, there is a gradual growth in the flow of pressurized oil to a quick coupler (2), quick coupler (1) is connected with the waste. With maximum flow, the movement of control faces increased resistance. After overcoming the increased resistance you can move the control to (a) position, where the control is locked.

(a) - Floating position. Both quick couplers (2) and (1) are connected with waste and oil can flow freely in both directions. Moving the control to (a) position is signalized by a lit control .By moving the control from (N) position in backward position, there is a gradual increase in the flow of pressurized oil to the quick coupler (1), quick coupler (2) is connected with the waste. With maximum flow, the movement of control faces an increased resistance. After overcoming the increased resistance, the control can be shifted to (b) position in which the control is locked.

(b) - a position where there is a stable flow of oil in a quick coupler (1) with an adjustable flow capacity of 10% to 100% of pressurized oil flow and the possibility of the pressurized oil flow time limit (0.5s to unlimited).

Controls (II), (III) and (IV) have the same functions.

# Setting oil flow through quick couplers



If the control (I) is in (b) position (the position where there is stable flow of oil in the quick coupler (1) revolving control can be used to:

(A) set a time interval, after it elapses, the flow of pressurized oil to a quick coupler (1) is closed. By control (1), time interval can be set from 0.5s (backstop of control anticlockwise) to 1 min, at the place of backstop of control clockwise is a stable, time unlimited flow.

(B) set flow capacity of 10 per cent (backstop control anticlockwise) to 100% (backstop control clockwise) of pressurized oil flow.

Controls (II), (III) and (IV) have the same functions.

# External hydraulic circuits control by means of a joystick



FHD18N069

External hydraulic circuits control, controlled by controls (**III**) and (**VI**) can be switched to external hydraulic circuits control mode by means of a joystick (**1**). The switch is done by switching the switch (**2**), which is equipped with a lock against undesired pressing.

# Switch switching (2) is not signalized. Buttons on the upper part of joystick (1) are not functional

In external hydraulic circuits control mode by means of the joystick(1), the controls (III) and (IV) are not functional, their function is taken over by the joystick (1) including floating positions and stable oil flows with adjustable flow capacity and also setting the time limit with controls (3) in individual sections of external hydraulic circuits.

# If the tractor is equipped with an auxiliary switchboard for external hydraulic circuits, the front outlets and front three-point hitch are controlled with the joystick (1), which cannot be used for control of external hydraulic circuits controlled with controls (III) and (IV).

# External hydraulic circuit front outlets and front three-point hitch



FHD18N082

The front outlets of the outer circuit are located on the front panel of the tractor (A). Quick couplings (1) and (2) are pressure coupling, quick coupling (0) is directly connected to the transmission housing and is intended for return oil from external hydraulic appliances.

# Standard tractor design:

If the tractor is fitted with a front three-point hitch it is controlled by the controller (IV).

If the tractor is fitted with front outlets (quick couplings), these are controlled by the controller (III) and the quick coupling (5) and (6) of the section (III) on the rear panel are not mounted (B).

Tractor in version with auxiliary switch for front hydraulic circuits:

The front outlets of the external hydraulic circuit and the front three-point hitch (more in the HITCHES section) are controlled by a joystick, the rear panel has a full number of quick couplers (C).

# In this case, the (III) and (IV) controllers can not be switched to the joystick control mode.

# Front outlets of external hydraulic circuit - standard version of the tractor



FHD18N070

The front outlets of the outer circuit are located on the front panel of the tractor. Quick couplings (5) and (6) are pressure coupling, quick coupling (0) is directly connected to the transmission housing and is intended for return oil from external hydraulic appliances.

The front outlets of the external hydraulic circuit are controlled by the controller (III).

By moving the controller from the (N) position to the front, the pressure oil flow is gradually increased to the quick coupling (6), the quick coupling (5) is connected to the waste.

By moving the controller from the (N) position to the rear, the pressure oil flow is gradually increased to the quick coupling (5), the quick coupling (6) is connected to the waste.

The floating position function, constant oil flow with adjustable flow capacity, as well as the timing settings and the ability to switch to external hydraulic circuits using the joystick are preserved.

# Front outlets of external hydraulic circuit - tractor with auxiliary switchboard for front hydraulic circuits



FHD18N071

The front outlets of the external hydraulic circuit are controlled by a joystick (a), the rear panel has a full number of quick couplers.

# In this case, the (III) and (IV) controllers can not be switched to the joystick control mode.

Turning on the auxiliary distributor for the front hydraulic circuits is done by turning the switch (b), which is equipped with a mechanism against accidental pressing.

**Turning the switch (b) is not signaled. Buttons at the top of the joystick (a) are not operating.** By moving the joystick to the (6) position, the pressure oil flow is gradually increased to the quick coupling (6), the quick coupling (5) is connected to the waste. By moving the joystick to the (5) position, the pressure oil flow is gradually increased to the quick coupling (5), the quick coupling (6) is connected to the waste. The function of the floating position and constant oil flow in the locked positions is preserved.

# Connecting machines and tools to external hydraulic circuit

### Connecting rotation hydro engine

If rotation engine is connected to the external hydraulic circuit, it is necessary to always connect the returning branch to the quick-coupler '0'.

### Connecting reversing hydro engine

Reversing rotation hydro engine needs to be connected to quick couplers of one section for its function. In this case, however, it is necessary that securing vents are included in both of the branches which reliably limit the pressure peaks with the machine trailing throttle. The waste from these vents is connected to the quick-coupler '0'.

Auxiliary machines using oil filling of external hydraulic circuit must be filled with the same kind of oil, which is recommended for gear system of the tractor! Quick-couplers sockets of an auxiliary machine need to be properly cleaned before connecting.

# **Control element functions**



C18N109

- 1. Lifting switch
- a Transport, lifting
- b STOP
- c Regularity of lowering (working)
- d Free position, fast sinking- automatic return of lever to (c) position by a spring
- 2. Blocking (in transport position)
- 3. Lowering speed
- 4. Setting the position of lifting device
- 5. Upper position restriction
- 6. Smooth setting of manual control
- automatic control
- 7. LED diagnostic
- 8. LED lifting
- 9. LED lowering
- 10. Engaging compensator (softening vibrations)
- 11. LED softening vibrations engaged

# **Equipment 'OFF'**

Electric installation deactivated with the key of the switching box. The electronic system is off, the lifting device is blocked.



C18N110

# **Blocking cancellation**

When you switch on the electric installation with the key of the switching box (I), the lifting device remains blocked electronically - the lifting and lowering function is deactivated; on the EHR-B control panel the diagnostic LED (7) and the vibration dampening LED (11) shortly light up - the system self-test is in progress. The lifting LED (8) and the lowering LED (9) are off. After a short time permanent illumination of the diagnostic LED (7) indicates the state of EHR-B blocking.

If the diagnostic LED (7) is permanently illuminated, the control circuits are disconnected.



The EHR-B electro-hydraulic system is only active when the engine is started.

Activation of the EHR-B system is only possible when the lubrication indicator has gone off.

The blocking can only be cancelled (system activated) with the engine running by moving the lifting lever (1) to position (a) - short-time switching is sufficient.

By moving the lever (1) to position (c) you will bring the three-point hitch to the position corresponding to the element setting, i.e. the current position of controls (4), (5), (6).



After the activation of the system EHR-B first for safety reasons limits the lifting speed of the hydraulic arms. When the hydraulic arms first reach the selected position, this safety limitation is cancelled and then the lifting speed of the hydraulic arms is normal.

# **Quick sinking**

Lever (1) in position (d) - free position. You must hold the lever in this position; after releasing the lever will return to position (c) - the system works in accordance with the setting of controls (3), (4), (5) and (6).



C18N111



C18N112



C18N113

# **Transport of implements**

Shift the lifting lever (1) to position 'a' and block it with the moving latch (2). Blocking the lifting lever (1) by the moving latch (2) in position (a): A - Lever movement blocked

B - Lever movement not blocked

When the tractor with an attached implement is stopped, the implement must be lowered onto the ground (it must not be left in the lifted position).

# Stop position

By moving the lever (1) to position (b) - STOP position you will immediately stop the movement of the three-point hitch.



C18N114



C18N115

# Vibration compensator (damper)



C18N116

It is used during transport of a heavy implement attached to the rear three-point hitch. After activation of the vibration compensator (10) the arms of the rear three-point hitch sink by approx. 4%, which allows oscillation of the arms in the range of approx. 8% of the lift. The upward oscillation is always limited by the position of the upper position limiter (5).

Advantages of active dampening of vibrations during transport of a heavy implement attached to the rear three-point hitch.

- 1. Increased operation safety (the steering axle is not unloaded so much
- 2. Stabilization of the transported implement
- 3. Reduced dynamic stress of the hydraulic system and the rear three-point hitch

# **During the adjustment of the hitch for a single-axle semi-trailer the vibration compensator** *must be off.*

# Limitation of the upper position of the three-point hitch

It is activated with the control (5). The limitation can be implemented in the upper half of the three-point hitch lift.



C18N117

# Lowering speed

The lowering speed of the three-point hitch is set with the control (3).

Symbol of the maximum lowering speed	4
Symbol of the minimum lowering speed	¢

# In the vibration dampening mode and during the use of the rear control buttons the lowering speed setting is out of function.



C18N117

# Free position

For permanent work with free hydraulic system, e.g. during work with a plough with a support wheel the position of the control (4) under the indication (A) and the position of the control (6) at the positional control symbol is used.



C18N118

# Setting the control of three-point hitch

Electrohydraulics enables two ways of three-point hitch control.

A. Manual control setting - control (6) is set in the range see arrow

B. Automatic control - control (6) is set in HitchTronic (AHC) position see arrow

Automatic control can be at any time exchanged for manual and the other way round by a control (6).



C18N119

# Manual setting of control of three-point hitch



C18N120

Perform according to 'Cancel blocking' part and set the required position of elements with regard for the nature of performed works. To reach the depth of working tools, there is a control (4). For setting the kind of control and its mixing, use a control (6).

Power control symbol	<u> 第</u> 2
Position control symbol	해영

The activity of control (lifting and lowering) can be monitored by means of indication diodes (8) and (9). Na shift the lever (1) (a) position, after turning, set again to (c) position. Control system takes the previous working position (memory of ploughing). For setting the required speed of starting, there is a control (3).

# Automatic control of three-point hitch



C18N120

Do the step according to 'Cancel blocking' part. Set the control (6) to hitchtronic (AHC) position. By control (4), set the working depth of tools attached to rear three-point hitch.

When the implement attached in the rear three-point hitch reaches the depth set by the control (4), control system measures the soil resistance and this value is used as default for further control.

The activity of controls (lifting and lowering) can be monitored by means of indicated on diodes (8) and (9). At dead end, shift the lever (1) to (a) position, after turning set the (c) position again.

For setting the required speed of lowering, there is a control (3).

After reaching the depth set by the control (4) control system again measures the soil resistance and this value is used as default for further regulation.

# Using the rear control

The rear control is used to connect and disconnect implements. The lifting switching lever (1) on the EHR-B electro-hydraulic control panel must be in position (b) or (c). The designation symbols of buttons on both the tractor fenders correspond to the movement direction of the three-point hitch after their pressing. The movement only lasts as long as the button is held.

Every use of the rear control causes blocking of the control system and the 'Blocking cancellation' must be repeated.





# External control buttons of the electro-hydraulic system

1. Lifting

2. Lowering

The movement only lasts as long as the buttons are held.

External hydraulic control buttons are functional also without previous activation of electrohydraulics even in case of electrohydraulics blockage for the reason of possible failure. Control the arms of the rear three-point hitch by external electrohydraulics buttons only at the lower half of arms lift.



When handling the three-point hitch with the external control buttons the operator must stand out of reach of the connected implement to avoid being caught or injured by the implement.



F\_02\_65

# Indication of EHR-B errors

The electronic part of the electro-hydraulic system continuously checks proper functioning of the system. Possible errors are indicated by repeated flashing combinations of the diagnostic LED (7).

After the remedy of the error the diagnostic LED (7) goes off.

Permanent illumination of the diagnostic LED (7) indicates the state of blocking of the electro-hydraulic system.



C18N123

# Description of signals of EHR-B electro-hydraulic system errors

Flashing combination of the diagnostic LED (7).		Error category	Error description			
Long pause	No. of flashes	Short pause	No. of flashes	, ,		
	1x		1x			
	1x		2x			
	1x		3x	Serious error	electro-hydraulic system - the electro- hydraulic system is out of operation - the work with the tractor must be stopped	
	1x		4x			
	1x		5x			
	1x		6x			
	2x		2x			
	2x		3x	Moderately	Error with internal safety shutdown of the	
	2x		4x	serious error	hydraulic system is out of operation	
	2x		8x			
	3x		1x			
	3x		2x	Minor error	The electro-hydraulic system works with	
	3x		4x		a limitation resulting from the error type	
	3x		6x			

A Have EHR-B errors repaired by a specialized workshop.

# Description of minor errors of the EHR-B electro-hydraulic system



F_02_17	74
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Flashing combination of the diagnostic LED (7).					
Long pause	No. of flashes	Short pause	No. of flashes	Error location	Possible cause of the error
	3x		1x	Right dynamometric pin (A)	Faulty dynamometric pin
	3x		2x	Left dynamometric pin (A)	Faulty contact or interrupted conductor of the dynamometric pin
					Short-circuit of the dynamometric pin conductor
					Possible overloading of the dynamometric pin
	3x		4x	Lowering speed control	Faulty potentiometer of the control (3)
				(3)	Faulty contact or interrupted conductor of the control
	3x		6x	Control setting switch (6)	Faulty potentiometer of the switch (6)
					Faulty contact or interrupted conductor of the switch

**Rear three-point hitch** It is intended for attaching carried or semi-carried agricultural machines and implements with hitching points of ISO category III.

Category III.	
Hitch axis length	1010 mm
Ø of openings of connecting balls of the lower draw-bars according to ISO	37 mm
Ø of the upper draw-bar opening	32 mm

Upper draw-bar
Left lifting draw-bar
Right lifting draw-bars
Limiting draw-bars
Lower draw-bars



C18N124

# HITCHES

Safety principles of working with the three-point hitch

Persons that are not authorized to work with the attached implement must not stand between the tractor and the hitched machine (implement) - (A). Do not park the tractor with an attached implement in the lifted position (B). During a drive without an implement the lower draw-bars (5) must be connected with springs and the upper draw-bar (1) must be inserted into the spring suspension! During transport of implements the limiting draw-bars (4) of the lower draw-bars must be adjusted in such a way to avoid unwanted lateral movement of the implement!

Height adjustment of the lifting draw-bars

the adjustment by turning the capstan.

Extend the capstan (1) in the arrow direction and make



F11N032



C18N125

# Fixed and free position of the lower hydraulic draw-bars

Fixed position of the lower hydraulic draw-bars (A): The pin head (1) and washer (2) are installed horizontally.

Free position of the lower hydraulic draw-bars (B): The pin head (1) and washer (2) are installed vertically.

The free position enables free connection of the tractor and implement. In this case both the draw-bar ends may move freely against each other as regards their height.



# Limiting draw-bars

The limiting draw-bars - stabilizers (1) limit or completely prevent lateral swinging of the lower draw-bars. The adjustment of the left and right limiting draw-bar is performed by turning of the draw-bar pipe, see arrow.

# Both the limiting draw-bars must always be installed on the tractor.



E454

C18N126

# **HITCHES**

# Automatic limiting draw-bars



FHD14N087

# Both limiting drawbars must be mounted to the tractor at all times.

The length adjustment of the left and right limiting drawbar is done by turning the tube of the drawbar (2) after heaving the securing block (1) in the direction of an arrow (A). Floating position of limiting drawbars (B).

If the tools connected in the rear three-point hitch require floating position, set the applicable length of chain (**3**). Securing block (**1**) remains hanging on the chain (**3**) in lifted position when you lower the arms of rear three-point hitch and limiting drawbars enable side swing of tools connected in the rear three-point hitch. After lifting the arms of the rear three-point hitch, securing block returns to initial position and blocks the side swing of arms of the rear three-point hitch.

# \*Lower draw bar with CBM hooks

Both lower (3) and upper (4) draw bars of linkage are equipped with CBM hooks.

The tools must be first equipped with hanging CBM balls (1) and with limiting draw bars set the distance between lower draw bars of linkage (3).

When reversing and subsequently lifting a three-point linkage, its lower draw bars (3) are connected to tools and then upper draw bar (4) of three-point linkage is connected by the driver from cab.

When disconnecting tools, unlock the hooks, by control cable (2) heave upper draw bar (4) and by lowering three-point linkage disconnect lower draw bar (3).



# Securing lower draw bars with CBM hooks

For extremely demanding working conditions (aggregation with heavy machinery on slopes or with aggregation side faced machines) we recommend safely locking the hook of lower draw bar by inserting a M8 screw to (S) hole and locking the screw with a pad.







C18N127

# Upper draw-bar

The upper draw-bar (1) has adjustable length. It is attached to the tractor to the console openings.

When extending the upper draw-bar you must make sure that both the joints are unscrewed from the draw-bar pipe to the same length.



FHD14N084

# \*Front three-point hitch

It is designed for attachment of frontally carried agricultural machines and implements in accordance with ISO 8759-2.

During transport of a carried implement the hitch must always be hydraulically locked in the lifted position with valves that are installed on the left side of the tractor over the front axle.

This hydraulic lock is recommended even in case no machine is attached to the three-point hitch.



C18N128

When using the front three-point hitch, no devices must be connected to the quick couplings (7) and (8) on the rear panel.

If the tractor is equipped with a front three-point hitch, the controller (IV) is used to control it. The quick couplings (7) and (8) must not be connected at the time of using the front three-point hitch because they are pressurized together with the front three-point hitch!

After finishing the work with the front three-point hitch, for further use of the quick coupling (7) and (8) sections, raise the front three-point hitch arms to the transport position and the hydraulic lever valve lever to the front three-point hinge to the closed position.

# **HITCHES**

# Front three-point hitch - standard version of the tractor



FHD18N038

The front three-point hitch is controlled by the control (IV). In position (N), the front three-point hitch is blocked against the drop.

# Due to the leakage of the distributor, the front three-point hitch may fall.

Move the control (IV) from the (N) position towards the rear to raise the arms of the front three-point hitch. Do not use the locked position at the end of the controller runway (B). Moving the control knob from the (N) position towards the front triggers the front three-point hitch arms. After exceeding the increased resistance, you can move the controller to the floating position (A) in which the actuator is locked.

The control of the front three-point hitch can be switched to the front three-point hitch control mode via the joystick. Switching is done by switching on the switch (a), which is equipped with a lock against accidental pressing.

Switching on the switch (a) is signaled by the backlight on the switch. Buttons at the top of the joystick are not operating. In the mode of controlling the front three-point hitch with the joystick, the controller (IV) is inoperative.

# HITCHES

# Controlling front three-point hitch mode - tractor version with auxiliary switchboard for front hydraulic circuits



FHD18N039

Front three-point hitch is controlled only by a joystick. Turning on the control of the front three-point hitch is done by switching a switch (a), which is equipped with a latch against undesired pressing.

# Switching the switch (a) is not signalized. The buttons on the upper part of the joystick are not functional.

By moving the joystick from ( N ) position backward, there is the lift of arms of front three-point hitch. Do not use the locked position at the end of the control track ( B ).

By moving the joystick from (N) position to the front, there is lowering the arms of front three-point hitch. After overcoming the increased resistance, the control can be shifted to floating position (A), in which the control is locked.

The front three-point hitch is controlled by the joystick only. Switching on the front three-point hitch is triggered by switching on the switch (a), which is equipped with a lock against accidental pressing. Switching on the switch (a) is signaled by the backlit symbol on the switch. Buttons at the top of the joystick are not operating.

Move the joystick from the (N) position to the rear to raise the arms of the front three-point hitch. Do not use the locked position at the end of the controller runway (B). Move the joystick from the (N) position to the front to lower the front three-point hitch arms. After exceeding the increased resistance, you can move the controller to the floating position (A) in which the actuator is locked.

# Adjusting the lowering rate of the front three-point hitch

Before the start of work with an implement attached to the front three-point hitch it is recommended to adjust the time necessary to lower the implement from the highest to the lowest position to 1 - 1.5 s by setting the throttle valve. By turning the valve body to the left (in the arrow direction) you will increase the lowering speed. During the adjustment the valve levers of the front hitch must be directed horizontally.



C18N129

# Hydraulic lock of the front three-point hitch

Hydraulic locking of the front three-point hitch is performed in any position of the hydraulic cylinders with the ball valve in the front part of the tractor (2).

Α	Free position Valve levers are in the horizontal position - The hitch can be controlled from the cabin
В	Locked position Valve levers are in the vertical position - The hitch is locked



C18N130

# Working and transport position of the front three-point hitch

Α	Working position of the front three-point hitch
В	Transport position of the front three-point hitch

Changing the position of the draw-bars of the front threepoint hitch:

1. Release and remove the pin (1) from the opening.

2. Lift the arm from position (A) to position (B).

3. Lock the arm by inserting the pin (2) in the opening (2) and secure the pin.



Driving with agricultural machines attached to the front three-point hitch

The maximum permissible speed of the tractor with agricultural machines attached to the front threepoint hitch is 15 km.h<sup>-1</sup>. If no implement or weight is attached to the front three-point hitch, we recommend you to lift the lower lifting draw-bars to the transport position.



C18N131



C18N132

# NOTES

Front wheels track of front drive axle in tractors equipped with non-removable discs

	Front wheels track		
Tyre dimensions			
	mm	mm	
16,9-24	2090	1840	
420/85R24	2010	1960	
480/70R24	1980	-	
540/65R24	2014	1890	
14,9-28	2090	1840	
16,9-28	2090	1840	
380/85R28	2090	1840	
420/70R28	2014	1890	
420/85R28	2014	1890	
480/65R28	2014	1890	
480/70R28	1914	1890	
540/65R28	1914	1890	

# Secure the tractor against motion first, heave the axle by a heaver and support. Tighten the nut of front wheels at a torque of 300 - 350 Nm.

The change of wheel tracks is done by turning the wheel and mounting with rim offset to the inside, while the wheels are interchanged to keep the right direction of the tyre pattern with arrow to the front.

- Demount front wheels.

- Interchange the front wheels and mount with rim offset to the inside.

- Nuts tightening front wheels to be tightened at a torque of 300 - 350 Nm.

- After travelling the distance of 100 m with an unloaded tractor, tighten the nuts tightening the front wheels again to the prescribed torque.

- After loading the tractor, tighten the nuts tightening the front wheels after 3 Mh.

- After 10 Mh, retest the tightening of nuts fixing the front wheels.

# Toe-in of the wheels of the front driving axle

The correct front wheel toe-in or toe-out of the tractor with the front drive axle is measured on the rims of the wheels.

Toe-in or toe-out is determined by the difference in measured values.

# Tractors with suspended front axle

The S-value varies with the height setting of the front of the tractor (see the section 'RUNNING OPERATION').

The front of the tractor in the highest position b = a - 3,3 to 4,2 mmThe front of the tractor in the middle position b = a + 0,3 mmThe front of the tractor in the lowest position b = a + 2,2 to 2,8 mm



C18N134

# Adjustment of toe-in of the wheels of the front driving axle



C18N135

Note: Tractors are in standard equipped with hydrostatic device.

- Set the wheel symmetrically with longitudinal axis of a tractor.
- Measure the distance between rims in the front on horizontal level of wheel axis. Mark the place of measurement.
- Travel forward with a tractor so that the marked places would be on horizontal level of rear wheel axis (turn by 180°) and remeasure the distance between marked places.
- Release locking nuts of ball joint heads (2) of connecting rods of devices in hydraulic cylinder.
- Adjust toe-in by turning the pin of ball joint (3). Do the adjusting symmetrically with both joints to keep the same lock of wheels to both sides (do the measurement on the sides of rims).
- Locking nuts of heads of ball joints (2), tighten with a torque of 122 136 N. Upper surfaces of heads must be (1) parallel.

# Front drive axle fenders

The front drive axle fenders are designed with rotating brackets, for which the axis of rotation only partially corresponds to the axis of rotation of the front wheel. This design makes allows setting of greater turning of front wheels.

The fenders are hanged on the brackets adjustable (by moving the bolts (a) into other holes) depending on the type of tires used.



C18N037

# Setting wheel stops with front drive axle

Set the stops always with any wheel track change or tire replacement with front drive axle.

Wheel stops with front drive axle must be set so that there would be a distance of at least 50 mm between front drive axle tires and tractor with full lock and full axle swing around central pin.

# Setting wheel stops with front drive axle check

1. Set full lock to one side and check that the distance between a tire and the nearest solid point on the tractor is at least 50 mm. Check both front tires.

2. Turn the steering to full lock to the other side and check according to point 1.

3. Heave one side of the front axle to the maximum swing (front axle leans against the bracket) and check according to point 1 and 2.

4. Hoist the other side of front axle to the maximum swing (front axle leans against the bracket) and check according to point 1 and 2.

The setting of stops (A) changes after the release of a nut (2) and unscrewing or screwing in a screw (1).

After the change in setting wheel stops with front drive axle, it is always necessary to check their setting according to points 1 to 4.



F13BN033

# The gauges of the tractor rear wheels equipped with solid discs

	Rear wheels track	
Tyre dimensions		
	mm	mm
18,4-38	2040	1660
460/85R38	2040	1660
520/70R38	2030	1670
520/85R38	2000	1690
580/70R38	1980	1720
600/65R38	1960	1640
650/65R38	1920	1770

# **BALLAST WEIGHTS**

Ballast weights are necessary to additionally load the tractor axles and to ensure manoeuvrability and stability of the tractor.

Note: The weight of all ballast may vary by up to 5%.

Combination of weights (pcs)	Mass of weights (kg)	
2+6	<b>2</b> x25 + <b>6</b> x30	230
2+10	<b>2</b> x25 + <b>10</b> x30	350
2+14	<b>2</b> x25 + <b>14</b> x30	470

# \*Rear wheel weights

# C18N133

\*Front weights

Front weights			
Combination of weights (pcs)	Mass of weights (kg)		
3+3	6x50	300	
5+5	10x50	500	
7+7	14x50	700	
9+9	18x50	900	

The front weights of the can type are suspended in the tool carrier. They are protected from lateral movement with a pin inserted between the central weights. The other weights are attached to the central ones with two clamps. *Note:* After the insertion of the pin the front weights and the weight carrier can be used as the front hook for emergency towing of a sunken tractor.



C18N136

# **BALLAST WEIGHTS**

# \*Weight of the front three-point hitch

Material	Weight of ballast (kg)
Cast iron	460



C18N136



C18N003

When using a ballast of 1200 kg in the front three-point hitch, a rear three-point hitch must carry the implement or a counterweight of min. weight of 450 kg.

# Valve for filling tyre tubes with liquid

All the tubes of the rear wheels are equipped with a valve that makes it possible to fill the tubes with liquid with the use of an adapter.

Weight of ballast

(kg) 800

1200

# Filling the tubes of the front tyres and double mounting of the rear wheels with liquid is not permitted.



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Wher	า usi	ng a	ı bal	la

Material

Concrete

Concrete

# **BALLAST WEIGHTS**

# Procedure of filling the tyres with liquid



F226

- 1. Unload the tyre by lifting the tractor and turn it with the valve upwards (A).
- 2. Deflate the tyre and unscrew the valve insert.
- 3. Screw the adapter for water filling on and attach the liquid supply hose to it.
- 4. Fill the tyre with the prescribed quantity of liquid.
- 5. For the filling you can use a gravity tank (B) or you can fill the tyre under pressure (C).
- 6. Remove the hose and unscrew the adapter for water filling.
- 7. Screw on the valve insert and inflate the tyre to the prescribed pressure.
- 8. After inflating screw the protective cap on the valve.
- 9. Fill the other tyre in the same way.

**M** Water must not freeze in a tyre!

# Procedure of draining liquid from the tyres



F227

- 1. Unload the tyre by lifting the tractor and turn it with the valve upwards (A).
- 2. Deflate the tyre and unscrew the valve insert; turn the wheel with the valve downwards.

# During draining of liquid vacuum may occur in the tyre. Therefore, turn the wheel time after time to get the valve to the upper position (B).

3. Remove the rest of the liquid after screwing on the adapter for water filling by supplying pressurized air (C).

- 4. Blow out the liquid until it stops running through the tube of the air adapter.
- 5. Unscrew the adapter for water filling
- 6. Screw the air part of the valve back on and inflate the tyre to the prescribed pressure.
- 7. Screw the protective cap on the valve.
- 8. Drain the liquid from the other tyre in the same way.

# Wedging the front wheels

Before lifting the rear wheels do not forget to secure the tractor against moving by wedging the front wheels.



C18N091

# An antifreeze solution may only be used for filling tyres if you have purchases additional tubes! Caution, the tractor is equipped with tubeless tyres by the manufacturer!

Water for solution preparation	Calcium chloride CaCl <sub>2</sub>	Hydrated lime	Solution density at 20° C	Freezing point approx.	Total volume	Added weight
(I)	(kg)	(kg)		(°C)	(I)	(kg)
45	11.8	0.21	1.13	-18	50	57
45	13.9	0.23	1.18	-25	50	59
45	15.4	0.25	1.21	-30	50	61

# Antifreeze solution for tyre filling

# Solution preparation:

# 1. Dry calcium chloride CaCl<sub>2</sub> is added to water, never the other way round!

2. The solution is not dangerous, but it is necessary to work carefully with it. Remove spilt drops with clean water.

3. Before filling leave the solution to cool down. Observe the prescribed quantity of hydrated lime.

4. The solution must not get in contact with metal parts and the electric installation! The solution is not harmful for the tube valve.

5. The antifreeze solution with the above mentioned composition must not be used in the cooling system!

6. After draining dispose of the antifreeze liquid as special waste!

# **ELECTRIC INSTALLATION**

No additional interventions may be carried out on electric installation of the tractor (connection of other electric consumers) due to its possible overloading! With repairs of electric installation pay special attention in particular to manipulation with the battery to avoid any contact of electrolyte with skin or clothing.

### **Basic service information**

The rechargeable battery must always be wired to the ground and the 'plus' pole connected to the alternator. Reversely connected rechargeable battery will destroy the entire semiconductor device of the alternator. When using an auxiliary rechargeable battery to start the tractor, be sure to connect the leads to 'plus' to 'plus' and 'minus' to 'minus'. If the replacement of some charging circuit components is performed, disconnect the battery from the tractor ground (-) using the battery disconnect switch. This eliminates random short circuits on the terminals.

With any manipulation or repair of the starter, it is necessary to disconnect the battery pole minus the gearshift lever, including the gearshift lever, to the neutral so that the lifetime of the repair agent can not be compromised.



# It is forbidden to start by shorting the starter terminals. Only start the tractor from the driver's seat.

### Accumulator battery

The accumulator battery is installed under the cover on the left side of the tractor under the cab step. The battery is accessible after folding up of the cab step.

# During folding up of the cab step the cab door must be closed.

- 1 Remove the screw (1)
- 2 Lift the step in the arrow direction
- 3 Secure the lifted step with a screw inserted to the opening (2) in the step
- 4 Remove the safety pin (3)
- 5 Grasp the bottom edge of the cover and remove it



FHD18N099



FHD18N098

# **ELECTRIC INSTALLATION**

# **Battery disconnector**



C18N138

The battery disconnector is located on the left side of the tractor behind the driver's stairs.

- A Battery connected
- B Battery disconnected

C - Disconnector plate is located on the cover of the accumulator battery



When the tractor is switched off, disconnect the battery using the battery disconnector. If the tractor is parked for a longer period, it is necessary to recharge the battery at least once a month for self-discharge.

Attention! When the engine is switched off, the control unit of the engine and of the exhaust system remains active for about 2 minutes because of storage of the engine operation data and drawing of urea back into the tank. During this time the supply of current from the accumulator must not be interrupted. Do not disconnect the accumulator before this time expires.

After connecting the battery using the battery disconnecting switch, wait at least 30 seconds before turning on the ignition key.

# **ELECTRIC INSTALLATION**

### Accumulator battery maintenance



F298

Keep the accumulator battery clean and properly fixed to the vehicle. However, the fixing device must not deform the battery case. In the case of polypropylene batteries the electrolyte level must not be below the minimum mark indicated on the case.

# Conly add distilled water to the battery!

1. When working with the battery first read the attached manual.

2. During work with the battery protect your eyes with goggles or a safety shield!

3. The electrolyte is a caustic substance; therefore, handle it with proper care. If your skin or clothes get stained by electrolyte, wash the skin or clothes with water and neutralize them with soap. 4. During charging hydrogen is released from the electrolyte on the electrodes. Hydrogen mixed with the air forms an explosive mixture. Therefore, it is prohibited to handle open fire near the battery during charging.

5. An explosion may also be caused by a spark created on the disconnection or release of a terminal when the charging circuit is on.

6. Keep the battery out of reach of children!

7. A discarded battery is dangerous waste for the environment - when buying a new battery hand the old one over to the dealer, who will dispose of it free of charge.

# Alternator

Charging is indicated by the red signal lamp on the united board instrument which must be deactivated after the start.

If the engine is running and the red signal lamp is activated, it is a charging error. If this situation occurs, stop the tractor and contact the service centre.



P18N004

When repairing tractor by electric welding, all the conductors must be disconnected alternator. Protect conductor '+B' against short circuit.
#### Alternator maintenance

When washing and cleaning the tractor protect the alternator from penetration of water or diesel fuel! During operation the alternator must not be disconnected from the battery! The alternator must never be put in operation without load, i.e. with the conductor disconnected from the '+B' terminal and the '+D' terminal connected. Such a condition may induce an extremely high voltage when the engine speed is increased, which would destroy the semiconductors! Never short-circuit any alternator terminal during operation! The alternator must not be additionally excited. Such an intervention would damage the semiconductors. Ensure perfect electric connection of the alternator terminals and proper grounding of the alternator! Poles of the alternator may not be re-versed even for a short time!

#### Electric installation overload

Is signalized by the selected display changing to a display with a symbol of a battery. It is a condition when electric installation of the tractor has such take-off, that the alternator performance is not sufficient to accumulator charging. If this state occurs, turn off a device or increase engine revolutions, load of electric installation drops and originally selected display is displayed.

The operation of tractor in the electric installation overload mode can lead to accumulator depletion.



P18N005

#### Fuse panels



C18N139

There are three fuse panels located on the tractor: The fuse panel (A) is located on the left side of the tractor behind the driver's stairs, not far from the battery disconnector and it is accessible from the outside of the tractor.

The fuse panel (B) is accessible after disassembly of the left side cover of the control bracket and it is accessible from the tractor cabin.

The fuse panel (C) is accessible after disassembly of the right side cover of the control bracket and it is accessible from the tractor cabin.

# During replacement of fuses it is necessary to adhere to the prescribed value of the fuse. If interrupted repeatedly, search the nearest service.

Fuse panel (A)

Note	Fuse size	Secured system
F56	175A	Cabin electric circuits
F55	175A	Alternator
F57	30A	Brake system



FHD18N074

Fuse panel (B)



C18N004

Position:	Fuse dimensioning	Protected system		
F1	15A	brake lights, warning lights breaker		
F2	15A	horn, beacon		
F3	15A	Appliances powered when the key is turned on to position I		
F4	15A	High beam with indicator light		
F5	10A	left-hand side lights, instrument panel lighting, license plate illumination		
F6	10A	right side lights		
F7	15A	dimmed lights right, fog lamp with indicator light		
F8	7.5A	dimmed lights left		
F9	15A	Front work lights in the hood		
F10	3A	Front PTO		
F11	15A	front and rear wiper, washer		
F12	15A	radio, ceiling light		
F13	15A	Lighter, two-pin socket		
F14	7.5A	A/C		
F15	15A	mirrors heating		
F16	15A	rear defogger		
F17	15A	driver's seat compressor		
F18	25A	three-pin DIN9680 socket in the cab		
F19	15A	working lights under the roof		
F20	15A	working lights under the roof		
F24	15A	transmission control unit power supply		
F25	7.5A	EHR		
F26	7.5A	EHR		
F27	15A	EHR		
F28	5A	suspended front axle		
F29	10A	turn signal light breaker		
F31	15A	NOX exhaust system sensors		
F32	10A	EGR valve		
F33	25A	three-pin DIN9680 socket on the rear of the tractor		
F34	15A	Two pin cabin socket		
F35	15A	rear working lights on the cab		
F36	10A	diagnostic socket, dashboard		
F37	15A	three-pin DIN9680 socket on the rear of the tractor		
F38	7.5A	front loader		
F51	30A	heating system		
F52	30A	engine control unit		
F53	30A	urea heating and pump		
TRACTO	R DIAG.	Tractor diagnostic socket		
ENGINE DIAG.		Engine diagnostic socket		

Fuse Panel (C)

Position:	Fuse dimensioning	Protected system
F40	5A	Cabin outlet
F41	5A	urea quality sensor
F42	7.5A	front loader
F43	10A	Driver's seat heating
F44	5A	lighting
F45	15A	brakes control unit
F46	7.5A	Cabin outlet
F47	15A	drying of moisture in the braking system
F48	10A	trailer braking system
F49	10A	Engine diagnostic socket
F62	10A	trailer braking system (EBS)
F61	10A	electronic part of the braking system



C18N005

#### Checking the adjustment of the front grill headlights





During a check on a test wall the tractor must stand on a level surface and the tyres must be inflated to the prescribed pressure. The basic vertical setting is 3.5% at the shipping weight of the tractor. In the horizontal direction the light beams must be parallel with the longitudinal axis of symmetry of the tractor.

I	1	distance of the test wall from the headlight (5 m)
h	I	height of the headlight centre above the road surface
∆h	-	headlight inclination (-3.5 %) to the distance of the test wall = 17.5 cm
α	1	raising of the outline of an asymmetrical headlight (15%)

# Checking the dipped beam headlamps and adjusting them must only be carried out if the front suspension axle is positioned vertically in the center position. Recommended procedure:

Start the engine, switch the suspended front axle to **AUTO** mode (see the section 'RUNNING OPERATION'), wait until the front axle is set to the center position, turn off the engine.

#### Adjusting the front grill headlights

The adjustment is performed simultaneously with all the screws for the vertical and horizontal direction of the beam. In the adjusted condition all the springs of non-adjusting screws must be pre-tensioned. Each headlight is adjusted separately. The lamps are replaced by removing from the rear side of the reflector.



C18N140

# List of lamps



C18N038

Position:	Location of the bulb	Voltage	Power	Bulb type
1	Dipped beam	12V	60W	HB3
2	High beam	12V	60W	HB3
3	Working lamp	12V	65W	H9
4	Dipped beam	12V	55W	H7
5	Direction light	12V	21W	P21W
6	Side light	12V	5W	R5W
7	Side / brake light	12V	21W/5W	P21/5W
8	Illumination of license plate and interior	12V	5W	W5W

#### Service inspections

Service inspections are performed as follows:

The first service inspection at the state of the engine hour counter of 100 EH maximum, but not later than 6 months after commissioning of the tractor. The second service inspection after covering another 400 EH (at the state of the engine hour counter of 500 EH maximum) but not later than 12 months after the first service inspection. Next service inspections always after covering another 500 EH but not later than 12 months after the previous service inspection. The service inspections are a part of tractor maintenance. The services authorized by Zetor will provide professional performance of service inspections according to the manufacturer's instructions.

#### Steps performed daily before the start of work

Check that the signal lamps in the instrument panel are off and if there are no error messages.

#### Before starting the engine

Fuel system leaks check Engine oil level check Coolant volume and leakage of the cooling system connections check Amount of brake fluid in the brake fluid reservoir and the front axle fluid brake circuit check Cooler clutches check Oil level in the gearbox and the gearbox check Air pressure in all tires check Tightening of the wheels check Condition of the suspension and the connecting devices check

#### After starting the engine

Engine lubrication function check Charging function check Control function check Function and the leakage of the steering circuit check Function and effectiveness of the tractor brakes check Function and efficiency of the trailer or semi-trailer brakes check

#### Steps performed every 50 hours of work

Lubrication of the tractor according to the lubrication schedule Inspection of fouling of the cabin filter elements

#### Steps performed every 100 hours of work

Operations carried out every 50 engine hours Cleaning the radiator plates with air pressure Maintenance of the dry air cleaner (daily when using front-mounted implements) Checking the oil level in the gearbox and final drive Checking the oil level in the front PTO gearbox Checking the oil level in the reducers and the front drive axle box Clean and paint the terminals of the battery with a thin layer of lubricating grease.

#### Steps performed every 500 hours of work

Operations carried out every 100 EH

Check V-belt tension

Check clearance in the entire hydrostatic steering system

Check the front axle pin clearance

Check the foot and handbrake function

Check the function of the trailer braking system

Check the tightness and function of the air-pressure system

Check the driver's seat, lubricate the moving parts with grease

Inspection whether there is a current software in control units.

#### Steps performed outside the interval of 500 hours of work

Related to new tractor or tractor after overhaul								
EH counter status	100	500	1,000	1,500	2,000	2,500	3,000	then always after EH worked
Inspection and adjustment of valve clearance					0			2,000
A/C Compressor drive belt replacement					0			2,000
Replacing the flat belt of the accessory drive and the tensioning pulleys								4,500
Hydrostatic steering hoses replacement								every 3,500EH or every 4 years
Inspection of the front wheel toe-in					0			2,000
Calibration of clutch couplings	0	0	0	0	0	0	0	500
Brake pedal free play setting	0	0	0	0	0	0	0	500

**Monthly performed actions** If the tractor is equipped with the air conditioning system that has not been used, it is necessary at least once a month to switch for a minimum of 5 minutes at ambient temperature higher than 4°C.

# Filling and filter replacement

EH counter status	100	500	0 1,000 1500 2,000 then always after EH worked		then always after EH worked	
Engine oil replacement		0	0	0	0	500 or as per the warning on the display
Engine oil cleaner insert replacement		0	0	0	0	500 or as per the warning on the display
replacement of the urea pump filter insert		0	0	0	0	500
Fuel filter coarse insert replacement			0		0	1,000
Fuel filter fine insert replacement			0		0	1,000
Air filter insert replacement		0	0	0	0	500 or every year
Air filter safety insert replacement			0		0	1,000 EH or every 2 years
Heating filter insert replacement			0		о	every 1,000 EH or every 2 years
Coolant replacement						every 2 years
Hydraulic brakes fluid replacement			0		0	1,000
Engine and clutch oil replacement			0		0	1,000
Magnet and the suction filter screen insert in the hydraulic pump replacement	o	o	o	0	o	500
Oil cleaner insert on the hydraulic pump displacement filter replacement	0	o	0	0	0	500 or filter clogging signalization
Oil cleaner insert on the clutch switch displacement filter replacement	0	o	0	0	0	500 or filter clogging signalization
Cleaner insert in the tractor's brake air control valve replacement		o	o	0	o	500
Oil change in the front drive axle box	0		0		0	1,000
Oil change in the front drive axle reducers	0		0		0	1,000
Oil change in the front PTO shaft box and oil filter screen cleaning		0	0	0	0	500

#### Used operation liquids and filling - quantities

Usage name	volume in liters
Brake fluid	0.5
Coolant	30
Engine oil	12
Suspended front axle	
Front drive axle box oil	4
Front drive axle planetary reducers oil	2x2
Gearbox and timing oil	75
Front PTO shaft gearbox oil	2.7
Urea	32
Fuel	300
A/C coolant	0.9 kg

# The manufacturer does not take responsibility for any damages caused by the usage of service fillings that do not comply with requirements stated in this service manual.

#### ZETOR service fillings

To maintain best operational characteristics of your tractor, original operational **Zetor** fillings are recommended to be used.

#### Oil in the gearbox and final drivehousing

Oil for gearing mechanisms of tractors ZETOR EXTRA 10W30 STOU

#### Oil for the front driving axle

Oil for the front axle ZETOR LS 80W

#### Motor oils

While changing or refilling the oil fill in the engine always use an oil complying with the specification **DQC III-10 LA** 

#### Specification of the oil for the gearbox housing and the final drive housing

Viscosity Class SAE	Performance Class API
10W - 30	GL-4

#### Specification of oil for the front driving axle

Axle type	Performance class API
Suspended front axle	GL4/GL5

## Other recommended service fillings tested on Zetor tractors

### Oil to gear systems of tractors

Manufacturer	Oil designation	Viscosity class SAE	Performance class API
Paramo	MOGUL Traktol STOU	10W - 30	GL-4
Aral	Super Traktoral	10W - 30	GL-4
ÖMV	Austrotrac	10W - 30	GL-4
Fuchs	AGRIFARM STOU 10W-30 MC	10W - 30	GL-4
ORLEN OIL	Agro STOU	10W - 40	GL-4

### Front PTO oil

Manufacturer	Oil designation
Shell	Donax TX
BP	Autran DX III
	Fluid 9
Esso	ATF E 25131
Castrol	Transmax S
Elf	Elfmatic G2 Syn
	Elfmatic G3
FINA	Finamatic HP
	Finamatic S6726
Mobil	Mobil ATF
Техасо	Texamatic 7045
Valvoline	ATF Dextron II-E
Beverol	Dextron II-E
	(Fina)matic HP
JD	Hygard JDMJ 20C
Total	Fluide AT42
	Fluidematic Syn
MOL	ATF 3G

#### Oil for the front driving axle

Manufacturer	Oil designation	Viscosity class SAE	Performance class API
Shell	Spirax AX	80W - 90	GL-5
Aral	Fluid HGS	80W	GL-4
Agip	Rotra Multi THT	80W	GL-4
Esso	Torque Fluid 62	80W	GL-4
Fuchs	Titan Supergear	80W - 90	GL-4/GL-5
	Titan Hydramot 1030MC	10W - 30	GL-4
	Titan Renep 8090MC	80W - 90	GL-4/GL-5
ÖMV	Gear Oil LS	85W - 90	GL-5
MOL	Hykomol K 80W-90	80W - 90	GL-5
ORLEN OIL	Platinum Gear 80W-90	80W - 90	GL-5

Hydraulic brake liquid for the tractors Hydraulic oil TITAN ZH LHM PLUS is used as a fluid for hydraulic brakes in tractors.

**/**!` TITAN ZH LHM PLUS is not compatible with synthetic hydraulic fluids and must not be mixed with them.

TITAN ZH LHM PLUS must not ever be mixed with brake fluids of the DOT type!

Plastic lubricant for the tractor

Туре	Classification	
Shell retinax HD2	DIN 51825 KP 2 K-20	
MOGUL LA 2	ISO 6743/9 CCEB 2/3, ISO - L - XBCEA 2	
MOGUL LV 2M	ISO 6743/9 CCEB 2/3	
ÖMV signum	DIN 51825-K 2 C-30	
MOL	Liton LT 2EP	
ORLEN OIL	Liten® Premium ŁT-4 EP2	

#### A/C coolant

Coolant R134a is used as the cabin air conditioning system.

#### Liquid for the cooling system of the tractors

Coolant and demineralized water in the ratio of 1:1.5 (carry out refilling of the mixture using this ratio). While changing or refilling the cooling fill in the engine always use a coolant complying with the prescribed specifications.

Specification

Deutz TR 0199-99-01115/9 EN

Do not use water without an antifreeze for the cooling of a tractor! Carry out a renewal of the coolant after two years of operation.

Fuel

Diesel oil complying with the regulation of EN 590



Paraffin impurities or additional additives in fuel are not allowed for engines with Common-Rail injection.

#### Urea (urea solution AUS 32)

Urea a highly pure aqueous urea 32.5% solution used as a reducing agent NOx for additional treatment of exhaust gases.

The product is labelled as urea or AUS 32 (AUS: Aqueous Urea Solution). Add only solution adhering to prescribed specifications.

Specification	
DIN 70070 ISO 22241-1 ASTM D 7821	

Note:

The urea solution AUS 32 is known in USA and North America as Diesel Exhaust Fluid (DEF).



The lifetime of urea without the loss of the quality is influenced by storage conditions. It crystallizes at -11°C and over +35°C it initiates hydrolytic reaction which means that a slow decomposition to ammonia and carbon dioxide begins. It is essential to protect unprotected vessels from direct sunlight.

#### Tractor greasing scheme

#### Safety instructions for lubrication of the tractor

• The tractor maintenance may be performed only by the trained personnel thoroughly familiarized with operational and safety principles.

• During maintenance of the tractor wear appropriate (specified) personal protective equipment (occupational footwear, protective gloves, safety goggles, etc.).

• Prior to starting the work, secure the tractor against movement using manual brake.

### Lubrication must be performed only when the engine is at standstill!

#### **Transmission shaft**

Position	Name	Number of greasing points
1	Transmission shaft clutches	2



FHD14N089

# Bearing housing of the front axle drive shaft

Number of lubrication points - 1

The grease is located on the left-hand bearing housing and is accessible through the opening in the front axle drive shaft housing.



C18N031

#### Suspension front drive axle



FHD14N088

Position number	Name	Number of greasing points
1	Greasing points	25

Use grease with PTFE additives for greasing suspension front drive axle.

#### Hitch for a single-axle semi-trailer

Pos. no.	Identification	No. of lubrication points
1	Hook pin bearings	0 to 4 (by version)



C18N140

### Front three-point hitch

Pos. no.	Identification	No. of lubrication points
1	Pins of cylinders of the front three-point hitch	4



C18N137

#### **Three-point hitch**

Pos. no.	Identification	No. of lubrication points
1	Pins of auxiliary hydraulic cylinders	2
2	Lifting draw-bars	2



#### Hitch mouth for a trailer

Pos. no.	Identification	No. of lubrication points
1	Hitch mouth for a trailer	1



C18N141

**Technical maintenance of the tractors after a general overhaul of the main groups** Run in the tractor after a general overhaul in accordance with the instructions for running in a new tractor. Perform the maintenance in the same way as with a new tractor.

Most of operations of planned maintenance may be carried out by the driver or other user of the tractor. In case you do not have sufficient technical equipment, let the difficult operations carried out by a specialised repair shop.

All works, connected with cleaning, lubrication and adjustments of the tractor or coupled mechanisms may only be carried out after stopping of the engine and other movable components except checks of brakes, recharging and hydraulic system.

#### Opening the hood

Opening the hood:

Release the hood by pressing the button (1), grasp it in the places of arrows and lift it. Thanks to a gas brace the hood will open automaticallyafter that. The hood is locked in this lifted position thanks to this gas-liquid brace. Closing the hood:

Pull the hood down with the strap, grasp it in the place of arrows and press it downwards until the hood lock snaps.

**Do not use excessive force to close the front** hood as the filaments of headlight bulbs situated in thefront hood might get damaged.



C18N145

# Checking the oil level in the engine



C15N077

Perform the check daily before starting the operation when the tractor is standing horizontally and the engine is not running.

The filling hole (1) is located in the left side of the engine (A). The engine oil dipstick is a part of the lid of the filling hole (B). The oil level must always be in the range from MIN and MAX (C).

The lid (1) is released by turning to the left. Take out the dipstick, wipe it with a clean cloth without fibres and insert it back till the end. When the dipstick is taken out again check the oil level. Add the oil as necessary through the filling hole (1) to the mark MAX on the dipstick.

#### Draining oil from the engine



C15N078

Oil draining from the engine is preferably carried out when the driving is finished or when the engine is heated to the operating temperature.

Do not perform the oil draining until the tractor is standing horizontally and the engine is not running. Release the filling hole plug (2) of the engine oil during the oil draining.

- 1. Place the retaining vessel for the drained oil under the drain plug (1) in the left side of the engine
- 2. Unscrew the drain plug (1) in the left side of the engine.
- 3. Drain the oil to the retaining vessel
- 3. Clean the drain plug
- 4. Screw the drain plug (1) back

#### Filling the engine with oil

Pour the specified amount of the engine oil through the filling hole (2), start the engine and leave it running for 2 - 3 minutes when engine idling.

When the engine is stopped and the oil level is quiet, check the oil level with the dipstick and perform checking of the tightness of the filter body, drain plug and other connections.

#### Replacing full-continuous motor oil filter

The full flow oil filter is located in the right side of the engine and is accessible when the engine bonnet is open and the right bonnet sidewall is disassembled. The replacement of the filter element is performed after each oil change in the engine.

The replacement is performed when the engine is not running.



C15N080



C15N079

- 1 Cover
- 2 Sealing ring
- 3 Jacket
- 4 Guide
- 5 Filter element
- 6 Clamp

Procedure for filter element replacement

Release the cover (1) by 2 to 3 revolutions and wait ca. 30 seconds.

Unscrew the cover (1) in anticlockwise direction.

Carefully release the filter body from the guide (4) in the jacket (5) in the upward direction.Catch the leaking oil in a suitable vessel.

Slightly bend the filter element (5) in the retaining vessel to the side until the element is released from the clamp (6).

Clean the components.

Replace the sealing ring (2) and oil it slightly.

Press the new filter element (5) into the clamp (6) and carefully put them together in the guide (4).

Firmly screw the cover (1) (25 Nm) in clockwise direction.

Check the tightness when the engine is running.

#### **Fuel filtering**

The fuel filters are located on the right side of the engine.

The fuel filtration is two stage: preliminary fuel filter with desilter (1) fine fuel filter (2)



C18N094

#### Raw fuel filter clearing

You perform it while the engine is stopped and the key is in the switch box in the position 0.

- 1. Put a catch reservoir under the raw fuel filter
- 2. Loosen the draining bolt (1)
- 3. Keep the liquid draining until a pure fuel flows out
- 4. Tighten up the draining bolt with a tightening moment of 1.3-1.9 Nm

5. After having started the engine check tightness of the raw fuel filter



C15N083

### Cartridge replacement in the raw fuel filter

1. Put a catch reservoir under the raw fuel filter

2. Unplug the cable of the condensate level sensor (3) in the raw fuel filter

3. Loosen the raw fuel filter cartridge (2) and screw it off using appropriate tools

4. Dismantle the draining bolt (4) with the condensate level sensor

5. Before screwing on a new filter cartridge clean the packing surface of the filter body (1)

6. Smear fuel on the rubber packing of the new filter cartridge (2) and screw on the filter cartridge

7. After the packing has sit down on the contact surface tighten up the filter manually

8. Attach the draining bolt (4) with the condensate level sensor

9. Plug in the cable of the condensate level sensor in the raw fuel filter (3)

10. Perform an air bleeding of the fuel system

11. After starting up the engine make a tightness check of the raw fuel filter

The filter cartridge must not be filled with fuel before you start the mounting. Contamination danger.



C15N084

#### Cartridge replacement in the fine fuel filter



C15N079

- 1 Cover
- 2 Sealing ring
- 3 Jacket
- 4 Guide
- 5 Filter element
- 6 Clamp

Procedure for filter element replacement

Release the cover (1) by 2 to 3 revolutions and wait ca. 30 seconds.

Unscrew the cover (1) in anticlockwise direction.

Carefully release the filter body from the guide (4) in the jacket (5) in the upward direction.

Catch the leaking fuel in a suitable vessel.

Slightly bend the filter element (5) in the retaining vessel to the side until the element is released from the clamp (6).

Clean the components.

Replace the sealing ring (2) and oil it slightly.

Press the new filter element (5) into the clamp (6) and carefully put them together in the guide (4).

Firmly screw the cover (1) (25 Nm) in clockwise direction.

Check the tightness when the engine is running.

#### Fuel system venting

Release the bleeder screw (2). Unlock the bayonet closure of the fuel pump (1) by simultaneous pressing and turning and in anticlockwise direction. The pump piston is now pressed out due to the force of the spring.

Pump until no air leaks from the bleeder screw.

Tighten the bleeder screw (6.5) with the tightening torque of  $6.5 \pm 1.3$  Nm.

Lock the bayonet closure of the fuel pump (1) by simultaneous pressing and turning and in clockwise direction.

C15N085

Start the engine and leave it running for ca. 5 minutes when engine idling or at low load. During this check the tightness of the fuel system.

After completing service operations that have sparked the fuel system, the engine start time may be extended.

This state is transient, is caused by the air in the fuel system. The return to the normal start time of the engine may take up to several hours depending on the engine operating mode and the degree of aeration during the service.

#### Dry air cleaner maintenance instructions

Maintenance of the dry air cleaner includes the following activities:

- 1. Inspection of suction line (joint tightness, hose damage)
- 2. Checking the main filter cartridge (clogging, damage)
- 3. Checking the securing filter cartridge



#### Replace damaged parts

#### Air cleaner disassembly

Disassemble the air cleaner according to the following

- 1. lift the front hood
- 2. release the air cleaner cover clips (indicated by arrows)
- 3. remove the cover of the cleaner (1)



C15N086

#### Recovery of the mainair cleaner element

Remove the main element of the dry cleaner (2) by pulling. If the main element is not damaged (there must not be any dust on the inner side of the element), recover it by blowing pressurized air from the inner side of the element. This way you can recover the main element 3 times at the most. The element must be replaced once a year.



NM14D015

**Replacing the safety element of the air cleaner** - remove dry filter locking element (3) with a pull

**Locking element cannot be regenerated. It must** be always replaced in these cases:

- when damaging main element
- after 5 maintenances of air filter
- at least once in two years



NM14D016

#### 1. III 2. re

#### Reassembly of the air cleaner elements

Carry out a reverse procedure in order to mount air filter cartridges back on.

While mounting the cartridges back on mind:

- The cleanness of contact surfaces

- That the cartridges must not lose their shape while being mounted and they must not vibrate after their mounting has been finished

- That after having closed the filter with the cover you must ensure a perfect tightness of the entire filter



C15N087

#### Bleeding the hydraulic circuit of the hydrostatic steering

1 - Start the engine and let it run at the idle speed for approx. 1 minute.

2 - Turn the steering wheel several times to both the sides at the idle speed of the engine.

3 - At the maximum engine speed turn the wheels with the steering wheel 3 times alternately slowly and quickly to both the sides up to the limiting stops of the wheels.

4 - Stop the engine and lower the tractor onto the front wheels.



C18N144

#### Replacing the hydrostatic steering hoses

The hoses must be replaced after four years from the production date (the date is indicated on their surface) or after 3500 hours of work of the tractor or immediately after discovering signs of their damage (hose sweating, local buckling, leaks of the working media around the end pieces and on the hose surface, abrasion of the hose surface to the metallic reinforcement, damage of the outer yarn braiding in the case of low-pressure hoses).

In case of a pump failure or after stopping of the engine the steering capability is maintained, but the required steering force gets higher. You can drive the tractor at a reduced speed to the nearest workshop. The steering wheel must not be held in the limit turning angle positions for a long time (the maximum time is 20 s); otherwise the oil in the hydrostatic steering circuit is heated up excessively.

#### **Replacing coolant**



C18N013

Follow these steps:

1 - Open the heating cock (B) and release the overpressure plug (A) on the leveling container.

2 - Drain coolant from the radiator. The drain plug (C) is accessible after the bonnet has been removed.
3 - Drain the coolant from the engine block. The drain plug (D) is located on the left side of the engine and is accessible after the bonnet has been removed.

4 - unscrew the vent plugs (E) and (F) and drain the remaining coolant from the engine block through the drain plug (D). The stopper (E) is located on the rear of the engine head and is accessible after removing the right side of the bonnet. The stopper (F) is located on the EGR valve hub behind the left side of the bonnet. 5 - Close the drain plugs (C) and (D) after draining the coolant (leave the heater cock and plugs (E) and (F) open).

6 - Start filling the coolant into the neck of the buffer tank (A) until the coolant starts to escape through the opening of the venting plug (E). When the coolant without air bubbles begins to leak through the hole, screw in and tighten the plug (E).

7 - Continue filling the coolant until the coolant starts to leak through the vent (F). When the coolant without air bubbles starts to escape through the hole, screw in and tighten the plug (F).

8 - Refill the cooling system with a coolant through the neck in the buffer container and close with an overpressure plug.

9 - Start the engine and run it for about 1 minute.

10 - Refill the coolant level in the buffer tank (A) to the MAX mark.

11 - Close the container with an overpressure plug.

# When filling the engine cooling system, always use this procedure to bleed the engine cooling system and the EGR valve via the vent plugs (E) and (F), otherwise the EGR valve may be damaged.

Always use the prescribed coolant to fill the engine cooling system. Never fill the cooling system with water. Using a different coolant may cause engine damage.

#### Check and replacement of oil in gear box

#### Draining and checking holes

- 1. drain plug of oil from clutch box
- 2. drain plug of oil from gearbox
- 3. drain plug of oil from final drive housing
- 4. drain plug of oil from final drive housing box
- 5. drain plug of oil from final house driving box

6. Pouring opening for gear oil is placed in hydraulic mechanism housing. Accessible from the rear part of the tractor



C18N143

#### Checking the oil in gearbox

The height of oil in gear box set is checked by oil level indicator which is placed at the right rear part of the gearbox behind the right hydraulic roller. A - Standard oil filling

**Carry out the check always with the engine** stopped.



FH12N016

#### After draining oil

1 - Clean the magnet (part of the lid) and the suction filter screen insert (1)

2 - Replace the hydraulic oil pump and transmission distributor filter inserts

- 3 After cleaning, screw back in all the drain screws
- 4 Fill in the oil, start the engine, let it run approx.2 minutes

5 - After stopping the engine and calming the oil level in the gear unit, check the oil level and top up the top edge of the dipstick, if necessary, increase the filling to the lower or upper dipstick gauge mark



C18N006

#### Replacement of the transmission oil cleaner element with hydraulic pump suction filter

The oil cleaner is placed on the left side of the gearbox.

# Before replacing the oil cleaner element, place a suitable vessel for dripping oil under the tractor.

- 1. Unscrew the body of the cleaner (1)
- 2. Replace the filtration element
- 3. Reassemble the body of the cleaner



C18N007

#### Insertion piece replacement of the oil cleaner with delivery filter of the gearbox switchboard

Oil cleaner is placed on the left side of the gearbox. The cleaner clogging is signalized by a control on dashboard lighting up.



Before replacing the insertion of the oil cleaner, place a suitable vessel under the tractor for catching the dripping oil.

- 1. Unscrew the body of the cleaner (1)
- 2. Replace the insertion filter
- 3. Do the back assembly of the body of the cleaner



C18N008

Cleaner insert in the tractor's brake air control valve replacement

Prior to any handling of the cleaner liner on the tractor's brake air control valve, it is necessary to shut off the engine and release the compressed air from the circuit in which the liner is located.



FHD18N078

The cleaner insert on the tractor's brake air control valve is located on the rear of the tractor (A).

# When replacing the insert, keep clean. Before replacing the insert, carefully clean the surface of the insert, valve and its immediate vicinity.

(B)

- Remove the rubber cap (1) and replace with the tire inflation hose instead. Tighten the hose to the end of the thread so that the check valve is depressed. Wait for the air to run out of the tire inflation hose.

- Remove the cover (2).
- Unscrew the liner (3) using a suitable tool.

- Replace with the new cleaner liner (3) and tighten it by hand. Once the seal has touched, tighten the insert by 3/4 to 1 and 1/4 turn.

- Mount the cover (2).
- Remove the tire inflation hose and replace the rubber cap (1).
- Start the engine and check the tightness of the new liner.

#### Replacement of filter element of urea filter



# Before replacing the urea cleaner insert, place a suitable container under the tractor to catch the dripping urea.

A - Urea cleaner is part of the urea pump unit and is accessible from the bottom of the tractor on the right side of the engine, see figure (A). For illustration purposes, the lower cover of the pump unit is not shown. The urea cleaner insert changes with the engine stopped and the ignition key removed from the ignition switch.

Remove the bottom cover of the pump unit.

- B Exchange procedure:
- 1 remove the cover (1)
- 2 remove the filter insert with the compensating body (2)
- 3 insert the new filter insert with the compensating body (2)
- 4 install the cover (1), tighten to the torque 20-25 Nm
- 5 start engine and check tightness

# Use protective gloves when handling urea contaminated components.



C18N093

#### Filling, controlling and draining hole of oil of front drive axle

1 - Transmission oil drain hole

2 - Transmission oil pouring and inspection opening (after unscrewing the check screw the oil level must reach the lower edge of the inspection hole)





#### Filling, controlling and draining hole of oil of front wheels reducers

Inspection, filling and draining oil is done by a one hole after turning reducer according to figure.

1. amount of oil inspection - hole in the horizontal axis of a reducer (after unscrewing control screw the level of oil must reach the brim of checking hole)

- 2. filling oil hole at the top
- 3. draining hole hole at the bottom



C18N142

#### Front PTO

The inspection and filling plug of oil (1) is situated on the front side of the front PTO case.

*Note:* The front PTO with the standard turning direction is equipped with a hollow bolt of the oil cooler hose instead of the inspection and filling plug. Perform the check after removing the hollow bolt.

After unscrewing of the inspection plug the oil level must reach the bottom edge of the inspection opening. During the oil replacement the oil cleaning strainer (2) must be cleaned. The cleaning strainer is accessible after the disassembly of the locking ring and removal of the cap.



C18N145

#### **Carbon filter installation instructions**

1. Remove the old filter from the air duct orifice in the place of its mounting.

2. Remove the protective package from the new filter.

3. Insert the filter into the air duct orifice in such a way to make the air flow direction correspond to the flow direction through the filter in accordance with the arrow on the filter. The entering air must first pass through the white dust filtration layer.

4. Check proper sealing of the filter.

5. Secure the filter.

#### Cleaning the heating filters

Recover the filters positioned under the covering grills over the windshield outside the cabin with regard to the degree of clogging:

- by shaking

- by blowing with compressed air

Check the filters for clogging daily. Replace heavily clogged filters.

The safety cab of the tractor is not equipped with special filters of air aspirated to the cab. It does not protect the operator from the effect of aerosols and other harmful substances! Use a filter with active carbon when working with harmful substances.

#### Air filter with active carbon

Filters with active carbon are installed instead of the standard dust filter and they are replaced in the same way as the normal filters. The filter must be inserted with the white side towards the grill.

The filter is only used during spraying of pesticides; then it must be replaced with a paper filter again as flying dust would clog the carbon filter in a very short time. During its use the recirculation control must be in the position of 'air suctioned from the outside'.

The fan control must be in the 'maximum' position.

# The filter does not provide complete protection from toxic substances:

- When handling the filter wear protective gloves
- Do not clean or blow the filter with compressed air

Replace the active carbon filter every 200 hours or 36 months (the production date is printed on the filter). If you feel the smell of pesticides in the cab, replace the filter immediately and have the cab sealing checked. Used filters must be disposed of in specialized collection centres.



C18N144



F13BN030



F13BN031

#### Air-conditioning maintenance

The most important element of the maintenance of the air-conditioning system is cleaning of the cooler (condenser) of the air conditioning (it is located in front of the engine cooler). The full condenser of the air conditioning decreases not only the efficiency of the cooling of the air-conditioning system, but also the efficiency of the engine cooling.

Lift up the engine bonnet, disassemble the locking screw (1) and release and push out the cooler in the direction of the arrow.

Blow out with compressed air or rinse out with pressure water (against the tractor travelling direction).

Then insert the cooler back and mount the locking screw (1).

Make sure that the hoses correctly guided.



C15N090

When the air-conditioning functions properly, water condenses in the roof space of the cab and the condensate is drained through hoses in the cab pillars and runs out at the bottom side of the pillar. This is why you must make sure that the condensate drain hoses will not be blocked.

#### Checking the air systems for leaks

- Fill the air tank to the maximum pressure

- with the engine stopped, the pressure drop of more than 0.15 bar must not occur in 10 minutes.

Check leakage daily before driving with a trailer or semi-trailer. If the brake system fails or the pressure drops below 10 bar, the warning light on the dashboard lights up.



P18N013

#### Maintenance and treatment of tyres



FHD18N075

Regularly inspect the outer surface of the tire and verify that it has no defects in the lateral or overloaded parts and damaged skeleton.



#### Tire inflation

Basic values of recommended inflation are listed in the table. Check the pressure regularly before driving when the tires are cold.

For inflating, use the air valve located on the rear of the tractor (A).

Remove the rubber cap indicated by the arrow (B) and instead screw on the tire inflation hose. Tighten the hose to the end of the thread so that the check valve is depressed.

After inflating the tires and removing the tire inflation hose, it is necessary to replace the rubber cap.

#### Tractor shutdown and recommended points for tractor lifting

If the tractor is to be put out of operation for a shorter period, inflate the tyres to the value required for road transport. In case of a longer period of inactivity of the tractor (storage), support the tractor and reduce the pressure in the tyres to the minimum (the wheels must not touch the ground).



E743

# ADJUSTMENT

# Almost all the following works require certain experience and more exacting service and diagnostic equipment. That's why we recommend to do the works at specialized or authorized workshops.

#### Adjusting valve clearance

Adjustment of the engine valves must be performed by an authorized service.

#### Flat belt drive tension of accessories

Flat belt drive tension of accessories (**A**) does not need to be adjusted. The belt is tensioned automatically.

#### \*Tensioning the V-belt of the AC compressor

If the V-belt (B) is properly tensioned - its deflection must be 5.5 mm when the belt is subject to the force of 50 N. Tension the V-belt to the prescribed value after releasing the fixation screws of the AC compressor.



C15N119

#### Bleeding the front drive axle brake system



C18N095

Bleed the front axle brake system with a minimum of 10 bar with the engine running and the operating air pressure in the system.

#### Perform the following steps:

1. Check the level of brake fluid in the buffer tank (A). Fill the amount of brake fluid if any missing. Check the amount of brake fluid in the reservoir for the entire duration of the bleeding of the front axle brakes and, after the bleeding is complete, top up the brake fluid to the maximum height (3/4 of the tank contents).

# Use only the Titan ZH LHM PLUS hydraulic oil as the brake fluid in the front axle brake system .

2. Remove the caps on the brake discs of the front drive axle (the screws are located on the upper surfaces of the reducers).

3. Place the hoses (B) on the screws. Dive the other end to the bottom of the transparent bottle partially filled with brake fluid. Place the container at least 300 mm above the vent screws. The screws must still be under pressure so that air does not get through their threads

4. Bleed the left and right brakes at the same time

5. Loosen the bleed screws by a maximum of 1/4 turn

6. Depress the connected brake pedals and pull the breather screws only after pulling the venting screws release the brake pedals

7. Repeat as long as the air bubbles continue to run out of the hoses

8. After the brake system has been bled, the throttle screws tighten to 0.8 - 1.2 Nm and replace the two screws of the cap (C)

# ADJUSTMENT

#### Brake pedal free play setting

Leave adjusting the brake pedals to an authorized Zetor service department. The Zetor Diagnoser diagnostic tool is required to adjust the brake pedals.

#### Brake adjustment



FHD18N079

Brake adjustment nuts are accessible from the rear of the tractor near the brake cylinders (A).

Before adjusting the brakes, the handbrake lever must be in the released position.

First, secure the tractor against movement, lift the left rear wheel with the jack to avoid touching the ground and support the rear axle.

Let the assistant spin the left rear wheel by the hand. At the same time, tighten the adjustment nut (1) on the left brake cylinder until the left rear wheel stops spinning. Do not tighten more. Then adjust the adjustment nut (1) by 5/6 turns (5 sides of the nut) and check that it can be turned around. In the same way, adjust the right rear wheel brake with the nut (1) on the right brake cylinder.

After this basic adjustment, check the operation of the foot brakes for both wheels to have the same braking effect.

If this is not the case, then on the side having a greater braking effect, loosen the adjusting nut (1) by the required value.

#### Adjustment of the lifting draw-bars of the hitch for a single-axle semi-trailer

- Raise the hydraulic arms to the upper - transport position with the position control selected and the vibration compensator off.

- Screw the nuts on the adjustable draw-bars towards the guiding pipe without any play.

- Tighten the nuts by another 3.5 turns.

- Check whether it is possible to tilt off the supporting hooks freely.

- By lowering and repeated lifting of the hydraulic arms to the transport position check whether the engine does not tend to 'stall' at the idle speed - the relief valve of the hydraulic pump must not be in operation.

- Then, lower the arms slightly.

#### Adjusting the bowden cable

It is performed if the carrier with the towing hook is in contact with the supporting hooks. The Bowden cable must be tensioned to avoid any play of the control lever in the cab. Then, the cable is secured against loosening with a nut.



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F\_2\_132

# MAIN TECHNICAL PARAMETERS

#### Main tractor's parameters (mm)

	-	Note
Position length with the suspension device with lowered front TPL	4388-5410	without additional weights
Position length with the suspension device with front TPL	4388-4692	without additional weights
Width over rear mudguards	2117	
Height to the exhaust muzzle	3040-3045	according to the tyre dimensions
Height of the tractor to the cabin upper edge	2965-3005	according to the tyre dimensions
Clear height under the front axle beam	482-522	according to the tyre dimensions
Height of the flat mouthpiece in the highest position (centre of the mouthpiece)	1087	
Wheelbase	2850	

# Technical data of engines

Tractor type		Crystal 150	Crystal 170
Engine type		TCD6.1L6	TCD6.1L6
Engine design		straight, standing, water cooled	
Engine type		diesel, four-stroke with direct fuel injection, turbocharged with intercooler	
Injection system		Common Rail	
Additional exhaust gas treatment		Selective Catalytic Reduction (SCR) Diesel Particulate Filter (DPF)	
Number of Cylinders		6	
Cylinders displacement	cm <sup>3</sup>	6057	
Bore x Stroke	mm	101x126	
Rated speed	min <sup>-1</sup>	2100	
Idle speed	min <sup>-1</sup>	700	
Injection order		1-5-3-6-2-4	
Compression ratio		18	
Max. power / engine speed (EC R24)	kW / rpm	106.5/1800	120.1/1800
Specific fuel consumption @ 2,100 rpm	g / kW.h	233.2 226.3	
Max. torque (Mt) / engine speed	Nm / rpm	664/1500 738.9/1500	
Torque increase	%	37.67 35.08	
Minimal oil pressure at rated engine speed and oil temperature 80 ° C	MPa	0.08	
Coolant max temperature	°C	110	

ECE R24 - engine equipped with accessories - cooling ventilator
#### Permitted maximum load of front axle (kg)

Travelling speed	Wheel track (mm)
(km/h)	1 924
40	4 500

The load only refers to the entire axle; the permissible load with regard to tyres is specified in the tab. 'Loadbearing capacity of the front tyres'.

#### Permitted maximum load of rear axle (kg)

Travelling speed	Wheel track (mm)
(km/h)	<b>1 850</b>
40	6 500

The load only refers to the entire axle; the permissible load with regard to tyres is specified in the tab. 'Loadbearing capacity of the rear tyres'.

#### Permitted maximum weight of set 'tractor + mounted machine' (kg)

Travelling speed (km/h)	Maximum weight of the set
8	10 000
20	10 000
30	10 000
40	10 000

#### Allowed weight of unbraked trailers

Weight of the unbraked vehicle	Tractor weight	Kit weight: tractor + unbraked trailer
2,000 kg	10,000 kg	12,000 kg
2,500 kg	9,500 kg	12,000 kg
3,000 kg	9,000 kg	12,000 kg
3,500 kg	8,500 kg	12,000 kg

#### Manoeuvrability condition

Travelling speed (km/h)	Weight of the front axle of the tractor out of the total weight of the carrying set (%)
max. 40	min. 25
max. 15	min. 20

#### Front tires steerability

Tyre	Travelling speed		
dimensions	40 km.h <sup>-1</sup>		
	Tyreload-b capacity (k	earing g)	
	Tyre 1 pc	Axle	Inflation (kPa)
16,9-24	1650	4500	170
420/85R24	2300	4500	160
480/70R24	2575	4500	160
540/65R24	2740	4500	160
14,9-28	1500	4500	180
16,9-28	1950	4500	200
380/85R28	2060	4500	160
420/70R28	2060	4500	160
420/85R28	2430	4500	160
480/65R28	2430	4500	160
480/70R28	2500	4500	160
540/65R28	2900	4500	160

The specified inflation values are minimum valued adapted to the current tyre load so that the tyre deformation can remain in the range in which all the operation requirements are met.

## Change of the load-bearing capacity of the front tyres (%)

Travelling speed (km/h)	diagonal	radial
8	+ 40	+ 50
20	+ 20	+ 23
30	0	+ 7
0	- 20	0

#### Bearing capacity of rear tires

_	Travelling speed		
Tyre dimensions	40 km.h <sup>-1</sup>		
	Tyreload-bearing capacity (kg)		
	Tyre 1 pc	Axle	Inflation (kPa)
18,4-38	2180	6500	140
460/85R38	3250	6500	160
520/70R38	3350	6500	160
520/85R38	3875	6500	160
580/70R38	3875	6500	160
600/65R38	4000	6500	160
650/65R38	4500	6500	160

#### Note:

The specified inflation values are minimum valued adapted to the current tyre load so that the tyre deformation can remain in the range in which all the operation requirements are met.

#### Change of the load capacity of the rear tyres (%)

Travelling speed (km/h)	diagonal	radial
8	+ 40	+ 50
20	+ 20	+ 23
30	0	+ 7
40	- 20	0

#### Permitted combinations of wheels for tractors

Combination	Front wheels		Rear wheels	
Combination	dimension of tyre	equivalent	dimension of tyre	equivalent
1	16,9-24 420/85R24 480/70R24 540/65R24 14,9-28 380/85R28 420/70R28 480/65R28	16,9R24 14,9R28	18,4-38 460/85R38 520/70R38 600/65R38	18,4R38
2	16,9-28 420/85R28 480/70R28 540/65R28	16,9R28	520/85R38 580/70R38 650/65R38	20,8R38

#### Performance on rear PTO shaft

Power on PTO shaft	Tractor type	
	CRYSTAL 150	CRYSTAL 170
Pto power (kW ± 2%) - at rated engine speed and pto rated speed 1,000 rpm		
Engine run-in (after 100 EH)	93.7 kW	101.6 kW

## Lifting force of the three-point hitch

Lifting force at the end of the bottom draw-bars of the rear three-point hitch in the whole lifting range at the maximum usable pressure (kN).	76
Lifting force at the end of the lower draw- bars of the front three-point hitch in the whole lifting range at the maximum usable pressure (kN) - Zuidberg front three-point hitch	35

## Tensile force

Tractor type	Crystal 150	Crystal 170
Maximum tensile force (kN) in the swinging rod on the concrete, tractor in standby with HS ballast, up to 15% slippage	53	54

•			Forward		Reverse	
	gear	multiplier gear	460/85 R38	520/85R38	460/85 R38	520/85 R38
		Н	47.1 *)	49.1 *)	44.0 *)	45.9 *)
	5	М	40.7 *)	42.4 *)	38.0	39.6
		L	35.2	36.7	32.9	34.2
		Н	32.9	34.3	30.8	32.0
	4	М	28.5	29.6	26.6	27.7
		L	24.6	25.6	23.0	23.9
		Н	23.3	24.3	21.7	22.7
Road speeds	3	М	20.2	20.9	18.8	19.6
opoodo		L	17.4	18.1	16.3	16.9
		Н	16.4	17.0	15.2	15.9
	2	М	14.2	14.7	13.2	13.8
		L	12.2	12.7	11.4	11.9
		Н	12.0	12.5	11.2	11.8
	1	М	10.4	10.8	9.7	10.1
		L	9.1	9.4	8.4	8.7
		Н	11.4	11.8	10.6	11.1
	5	М	9.9	10.3	9.1	9.6
		L	8.5	8.8	8.0	8.3
		Н	7.9	8.3	7.5	7.8
	4	М	6.9	7.2	6.4	6.7
		L	6.0	6.2	5.6	5.8
		Н	5.9	5.9	5.3	5.5
Reduced speeds	3	М	4.8	5.1	4.5	4.7
opoodo		L	4.2	4.4	3.9	4.1
		Н	3.9	4.2	3.7	3.9
	2	М	3.4	3.5	3.2	3.4
		L	3.0	3.1	2.7	2.8
		Н	2.9	3.0	2.7	2.8
	1	Μ	2.5	2.6	2.3	2.4
		L	2.2	2.2	2.0	2.1

## Speed of tractor with engine revolutions of 2 100 rpm and parameter of rear wheels (km/h)

**Dependent PTO shaft revolutions with nominal engine revolutions** \*) With the threat of exceeding the travel speed of 40 km/h, the maximum engine revolutions are automatically reduced. This function cannot be switched off.

			Forward		Reverse	
	gear	multiplier gear	540	1,000	540	1,000
		Н	876	1,593	819	1,488
	5	М	757	1,377	708	1,285
		L	655	1,190	611	1,111
		Н	612	1,112	572	1,040
	4	М	529	961	495	898
		L	458	832	427	776
		Н	433	787	405	735
Road speeds	3	М	374	680	350	635
		L	324	588	302	549
		Н	304	553	284	517
	2	М	263	478	246	446
		L	228	413	212	386
		Н	224	407	210	380
	1	М	194	351	181	328
		L	168	304	156	284
		Н	876	1,593	819	1,488
	5	М	757	1,377	708	1,285
		L	655	1,190	611	1,111
		Н	612	1,112	572	1,040
	4	М	529	961	495	898
		L	458	832	427	776
		Н	433	787	405	735
Reduced speeds	3	М	374	680	350	635
		L	324	588	302	549
		Н	304	553	284	517
	2	М	263	478	246	446
		L	228	413	212	386
		Н	224	407	210	380
	1	Μ	194	351	181	328
		L	168	304	156	284

## Independent rear pto shaft revolutions

	PTO speed / engine speed	PTO speed / engine speed
540	540/1913	593/2100
540E	540/1595	711/2100
1000	1000/1950	1077/2100
1000E	1000/1626	1292/2100

## Speed of the Zuidberg front PTO

Turning direction	PTO speed / engine speed	PTO speed / engine speed
right (a)	1000 / 1920	1094 / 2100
*left (b)	1000 / 2000	1050 / 2100

\* - option



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## Clearance-circle and turning circle diameter

Track width	front	1,974 mm	Tire	Front 540/65R28	loft	right
	rear	1,850 mm	size	Rear 650/65R38		ngnt
Trace	without PH	vithout PHN turned on				12,530 mm
diameter with PHN turned on			13,040 mm	13,275 mm		
Contour	without PH	without PHN turned on			12,700 mm	12,930 mm
diameter	with PHN turned on				13,485 mm	13,700 mm

#### Calculation of tractor load limit

Connection of machines to the front or rear hydraulic arms must not exceed the allowed total load of the tractor, individual axles and tractor tyres. Therefore make sure before buying the aggregation that these assumptions are fulfilled using the following calculation:



The following data must be known for the calculation:

- T<sub>L</sub> (kg) instantaneous mass
- T<sub>v</sub> (kg) instantaneous front axle load
- T<sub>H</sub> (kg) instantaneous rear axle load
- G<sub>H</sub> (kg) total machine weight suspended in the rear / rear load
- $\mathbf{G_{v}}$  (kg) total machine weight suspended in the front / front load

a (m) - distance between the gravity centre of the front carried machine / front load and load through the centre of the front axle
a (m) - tractor wheelbase

c (m) - distance between the centre of the rear axle and the centre of fixing holes of lower hydraulic arms

**d** (m) - distance between the centre of fixing holes of lower hydraulic arms and the gravity centre of the machine suspended in the rear / rear load

see instructions for use of the tractor
 see instructions for use of the machine
 machine measurement



#### Rear carried machine or front and rear carried combination

## 1. Calculation of the minimum front axle load $G_{V min}$

The calculated value of the minimum front axle load should be recorded in the table.

$$G_{v_{min}} = \frac{G_H \bullet (c+d) - T_v \bullet b + 0, 2 \bullet T_L \bullet b}{a+b}$$

#### 2. Calculation of the minimum rear axle load G<sub>H min</sub>

The calculated value of the minimum rear axle load should be recorded in the table.

$$G_{v_{min}} = \frac{G_v \bullet a - T_H \bullet b + 0.45 \bullet T_L \bullet b}{b + c + d}$$

#### Front carried machine

# 3. Calculation of the real front axle load $\rm T_{v\,tat}$

If the necessary front axle load cannot be reached with the front attached machine  $(G_V)$ , the weight of the front carried machine must be increased to the minimum allowed load.

The real values and allowed values specified in the instructions for use of the tractor designed for the front axle should be recorded in the table.

$$T_{v_{tat}} = \frac{G_v \bullet (a+b) + T_v \bullet b - G_H \bullet (c+d)}{b}$$

#### 4. Calculation of the real total load G tat

If the necessary rear axle load cannot be reached with the rear attached machine (G<sub>H</sub>), the weight of the rear carried machine must be increased to the minimum allowed load.

The real values and allowed values specified in the instructions for use of the tractor designed for the total load should be recorded in the table.

$$G_{tot} = G_v + T_L + G_H$$

## 5. Calculation of the real rear axle load T $_{\rm h\ tat}$

The real values and allowed values specified in the instructions for use of the tractor valid for the rear axle load should be recorded in the table.

$$T_{H tat} = G_{tat} - T_{V tat}$$

#### 6. Load-bearing capacity of tyres

The calculation of the double value (two tyres) of the allowed tyre load (see, e.g., documents for tyre manufacturers) should be recorded in the table.

## Allowed load of the tractor and axles

Table

The real value according to the calculation must be lower or equal to the allowed value specified by the tractor manufacturer.

	Real value according to the calculation	Allowed value according to the manufacturer
Total tractor weight		10.000kg
Front axle load		4.500kg
Rear axle load		6.500kg

The driveability of the front axle must be preserved under all load conditions, i.e., min. 20% of the real tractor weight must lie on the front axle.

During aggregation with side moving machines, side ditch trimmers and similar types of aggregation, there is an unequal distribution of the load on the right and on the left side of the tractor axle. It is necessary to ensure that the load on one side of the axle does not exceed ½ of the allowed load of the rear axle of the tractor.



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 $\mathbf{G}_{\mathbf{H} \max}$  - allowed load of the rear axle

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#### Operator's manual Crystal HD 150 Crystal HD 170

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