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P0003 - SHORT CIRCUIT TO GROUND OF METERING UNIT OUTPUT

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.

**Possible Causes**

- Pump metering unit short circuit to ground
- Wiring harness problem

DTC Information**DTC Reaction**

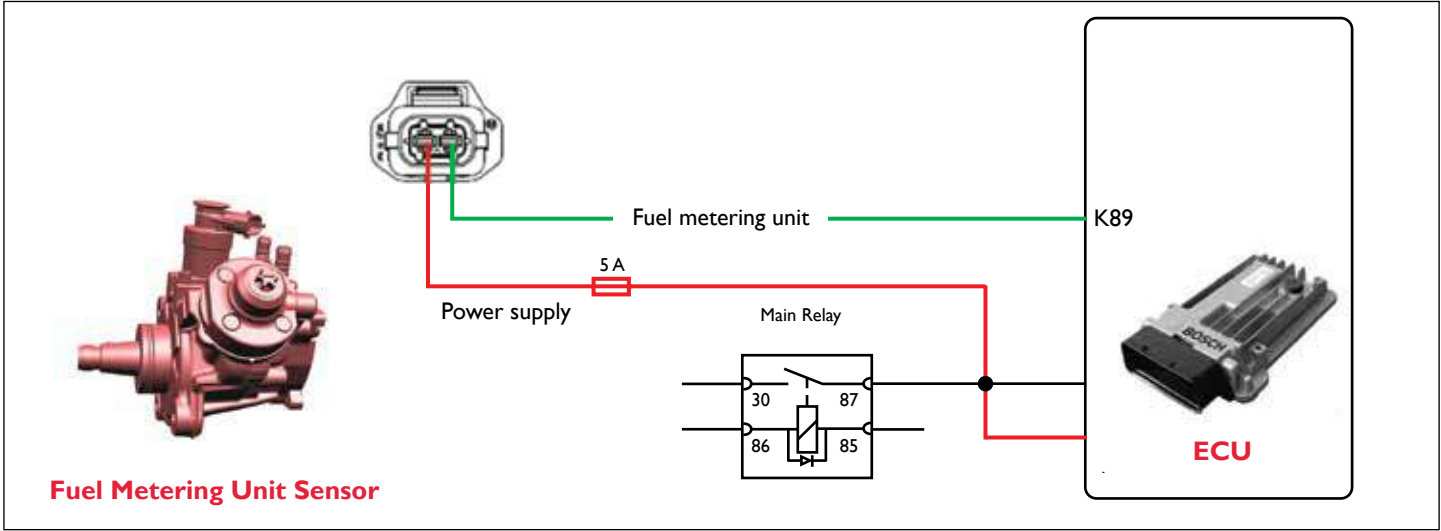
- The rail pressure line get damaged with warning light in cluster.

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Metering Unit Location

Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the metering unit fuse is blown.	<ul style="list-style-type: none">Replace the blown fuse.	Go to Step 2
2	<p>Turn OFF the ignition switch.</p> <p>Disconnect the ECU connector and pump metering unit connector.</p> <p>Check continuity between the following:</p> <ul style="list-style-type: none">ECU connector pin K89 to metering unit connector pin 1.Metering unit fuse to metering unit connector pin 2. <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none">Replace the wiring harness.
3	<p>Check whether the metering unit connector pins are shorted with ground.</p> <p>Acceptance Criteria</p> <p>No short circuit to ground.</p>	<ul style="list-style-type: none">Clear the DTC and verify.If the error repeats, replace the ECU with a new one.	<ul style="list-style-type: none">Replace the wiring harness.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



P0004 - SHORT CIRCUIT TO BATTERY OF METERING UNIT OUTPUT

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.



Possible Causes

- Pump metering unit short circuit to battery/ground for long time.
- Wiring harness problem

DTC Information

DTC Reaction

- The rail pressure line get damaged with warning light in cluster.

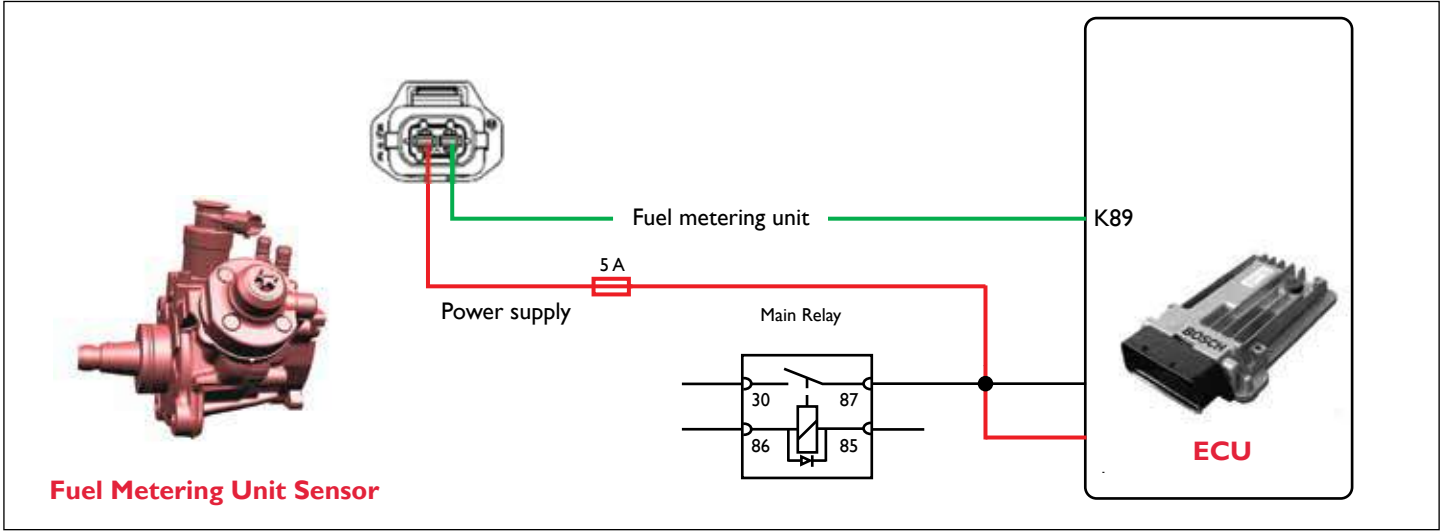
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Metering Unit Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the metering unit fuse is blown.	<ul style="list-style-type: none">Replace the blown fuse.	Go to Step 2
2	<p>Turn OFF the ignition switch.</p> <p>Disconnect the ECU connector and pump metering unit connector.</p> <p>Check continuity between the following:</p> <ul style="list-style-type: none">ECU connector pin K89 to metering unit connector pin 1.Metering unit fuse to metering unit connector pin 2. <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none">Replace the wiring harness.
3	<p>Check whether the metering unit connector pins are shorted with battery.</p> <p>Acceptance Criteria</p> <p>No short circuit to battery.</p>	<ul style="list-style-type: none">Clear the DTC and verify.If the error repeats, replace the ECU with a new one.	<ul style="list-style-type: none">Replace the wiring harness.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



P0016 - DEVIATION BETWEEN CRANKSHAFT AND CAMSHAFT

Camshaft Position Sensor

The Camshaft position sensor senses the Top dead center (TDC) point of the first cylinder in the compression stroke. This allows the ECU to determine when to start the injection.

Sensor records the rate at which the camshaft is spinning and this information is used by the ECU to control ignition and fuel injection.



Crankshaft Speed Sensor

The crankshaft speed sensor (also known as the crank position sensor) is an electronic device used in an engine to record the rate at which the crankshaft is spinning. This information is used by the ECU to control ignition and fuel injection.

The sensor system consists of a rotating part, typically a disc, as well as a static part, the actual sensor. When the engine is running, the high and low parts of the teeth cause a change in gap with the sensor. The changing gap causes a change in the magnetic field near the sensor. The change in the magnetic field causes a change in the voltage from the sensor.



Possible Causes

- Cam gear with incorrect projection angles
- Incorrect position of cam sensor

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**5Volts Pulse width modulation (PWM) Waveform**) from the camshaft position sensor.

DTC Information**DTC Detecting Condition**

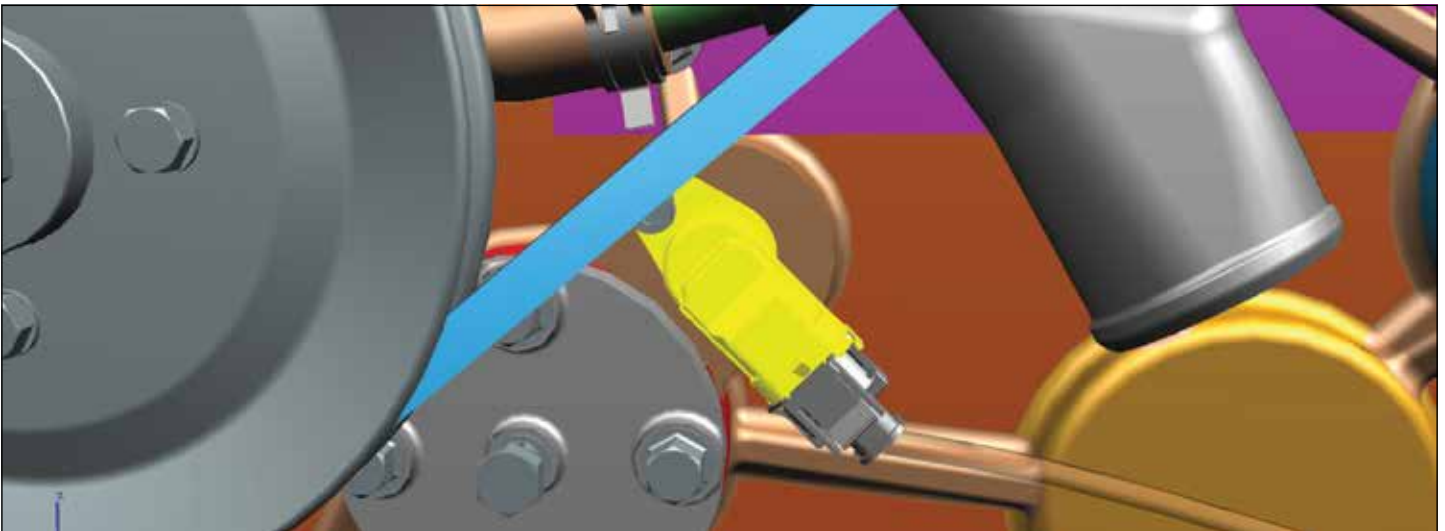
Abnormal waveform from camshaft and crankshaft sensors.

DTC Reaction

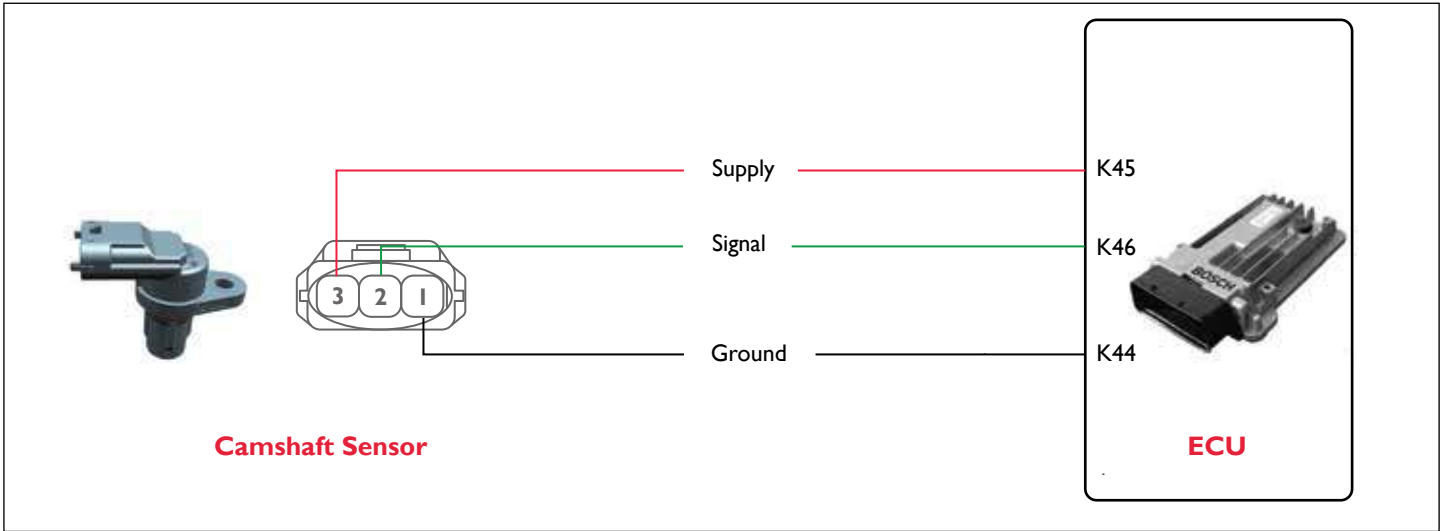
- Delayed engine start.
- Engine speed limitations.
- Engine may stall while driving.

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster glows.

Sensor Location

Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of the camshaft position sensor and its connector.	Go to Step 2	<ul style="list-style-type: none">• Ensure proper fitment.
2	<p>Turn OFF the ignition switch.</p> <p>Disconnect the sensor wiring harness connector and ECU connector.</p> <p>Check continuity for the following:</p> <ul style="list-style-type: none">• ECU connector pin K44 to Sensor connector pin 1• ECU connector pin K46 to Sensor connector pin 2• ECU connector pin K45 to Sensor connector pin 3 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none">• Replace the wiring harness.

Step	Test Procedure	Yes	No
3	<p>Check for any short circuit between sensor connector pins 2 and 3 with battery positive/ground.</p> <p>Check for any short circuit between sensor connector pin 1 with battery positive.</p> <p>Acceptance Criteria</p> <p>No short circuit between ground / battery positive.</p>	<ul style="list-style-type: none"> Replace the wiring harness. 	Go to Step 4
4	<p>Connect the ECU connector.</p> <p>Turn ON the ignition switch.</p> <p>Check the voltage between sensor connector pin 1 and 3.</p> <p>Acceptance Criteria</p> <p>Voltage = 5V (+/- 0.25)</p>	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.
5	<p>Check if the gap between the cam sensor tip and cam gear sensing surface.</p> <p>Acceptance Criteria</p> <p>0.1 to 2.8 mm</p>	Go to Step 6	<ul style="list-style-type: none"> Ensure proper gap is maintained between sensor tip and cam gear.
6	<p>If the problem persists,</p> <p>Replace the sensor with a new one.</p>	<p>Clear the DTC and verify.</p> <p>If still error repeats,</p> <p>Replace the ECU with a new one.</p>	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



P0087 - RAIL PRESSURE POSITIVE GOVERNOR DEVIATION - ACTUAL RAIL PRESSURE IS LESS THAN THE DESIRED VALUE

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.



Possible Causes

- Low/no fuel in the fuel tank
- Choked fuel filter
- Fuel leakage in the high pressure circuit and low pressure circuit.
- Restriction in fuel suction line
- Fuel leaking through PLV
- Rail pressure sensor failure (rail pressure unit failure)
- Internal leakage in the high pressure pump
- Pump could not deliver high pressure fuel
- Injector wear is high
- Injector nozzle plunger is stuck in open position.

DTC Information

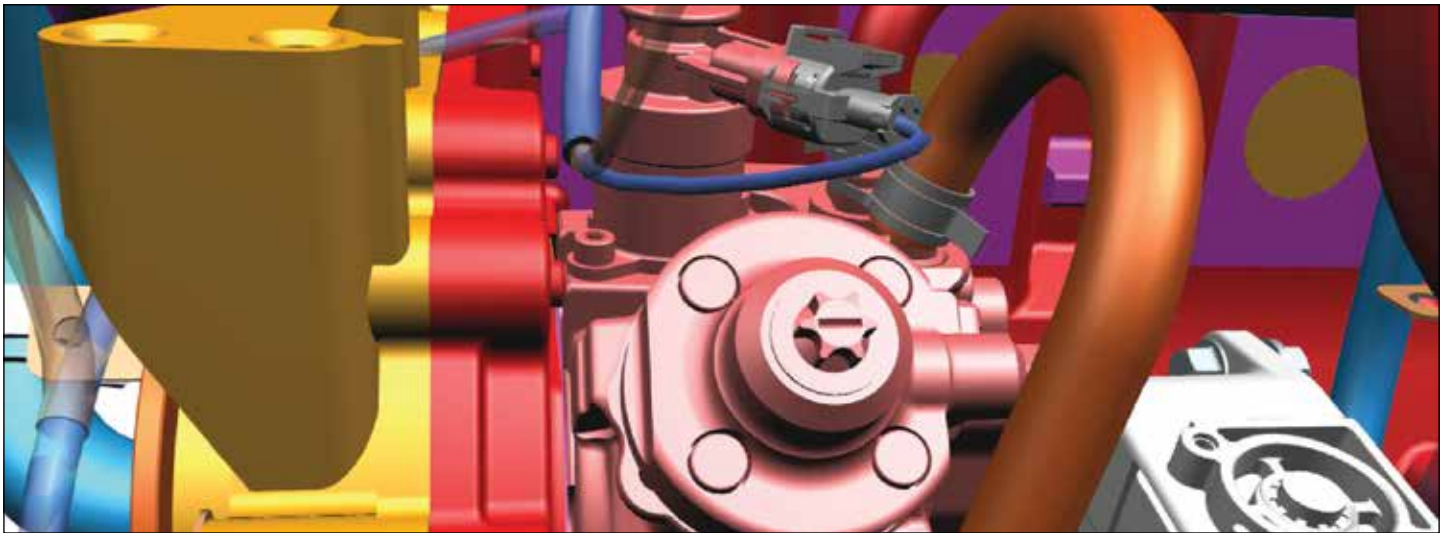
DTC Reaction

- The rail pressure line get damaged with warning light in cluster.

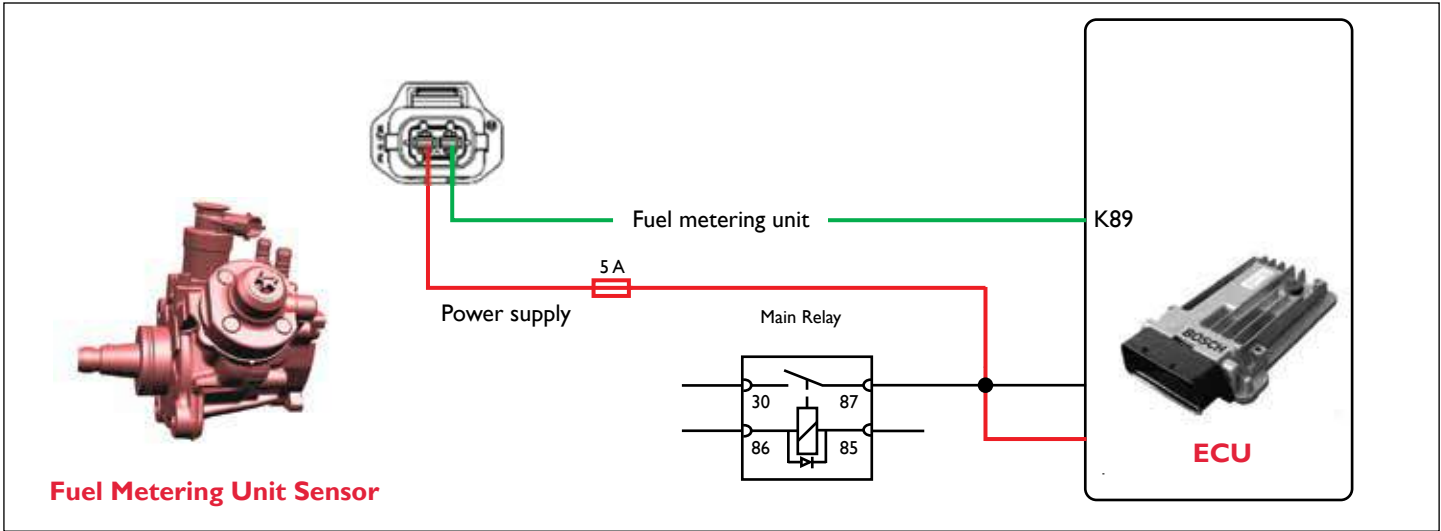
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster glows continuously.

Metering Unit Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Ensure sufficient fuel is available in the fuel tank.	Go to Step 2	<ul style="list-style-type: none"> Top-up the fuel in the fuel tank.
2	Check whether the fuel filter is choked.	<ul style="list-style-type: none"> Replaced the choked fuel filter. 	Go to Step 3
3	Check for fuel leakage in high pressure circuit and low pressure circuit.	<ul style="list-style-type: none"> Ensure proper connections. 	Go to Step 4
4	Check for the bends/crimps in the fuel suction line.	<ul style="list-style-type: none"> Change the fuel suction line. 	Go to Step 5
5	Check for any error related to Rail Pressure Sensor, PRV, Metering unit.	<ul style="list-style-type: none"> Rectify corresponding error and clear and verify DTC again Replace the rail, If error repeats 	Go to Step 6
6	Internal leakage in the high pressure pump. Pump could not deliver high pressure fuel.	<ul style="list-style-type: none"> Remove the pump. Get it checked by the authorized dealer. Clear the DTC and verify. 	
7	Injector wear is high. Injector nozzle plunger is stuck in open position.	<ul style="list-style-type: none"> Remove the injector. Get it checked by the authorized dealer. Clear the DTC and verify. 	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0117 - SIGNAL RANGE CHECK LOW - COOLANT TEMPERATURE SENSOR

The coolant temperature sensor (CTS) is used to detect the engine coolant temperature. CTS is a variable resistor located in the engine block. It changes resistance with change in temperature of the coolant that it's in contact with.

When the coolant temperature is low, the sensor resistance is high and when the coolant temperature is high, the sensor resistance is low. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

The sensor modifies a voltage signal from the electronic control unit (ECU).

The modified signal returns to the ECU as the engine coolant temperature input. The ECU checks CTS voltage and uses the information to help smoothen the engine operation.



Possible Causes

- Loose connections
- Wiring harness problem
- Faulty coolant temperature sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the measured output voltage value of the coolant temperature sensor is between **0.1 to 3.3V**.

DTC Information

DTC Detecting Condition

Output voltage of the coolant temperature sensor is less than **0.1 V**.

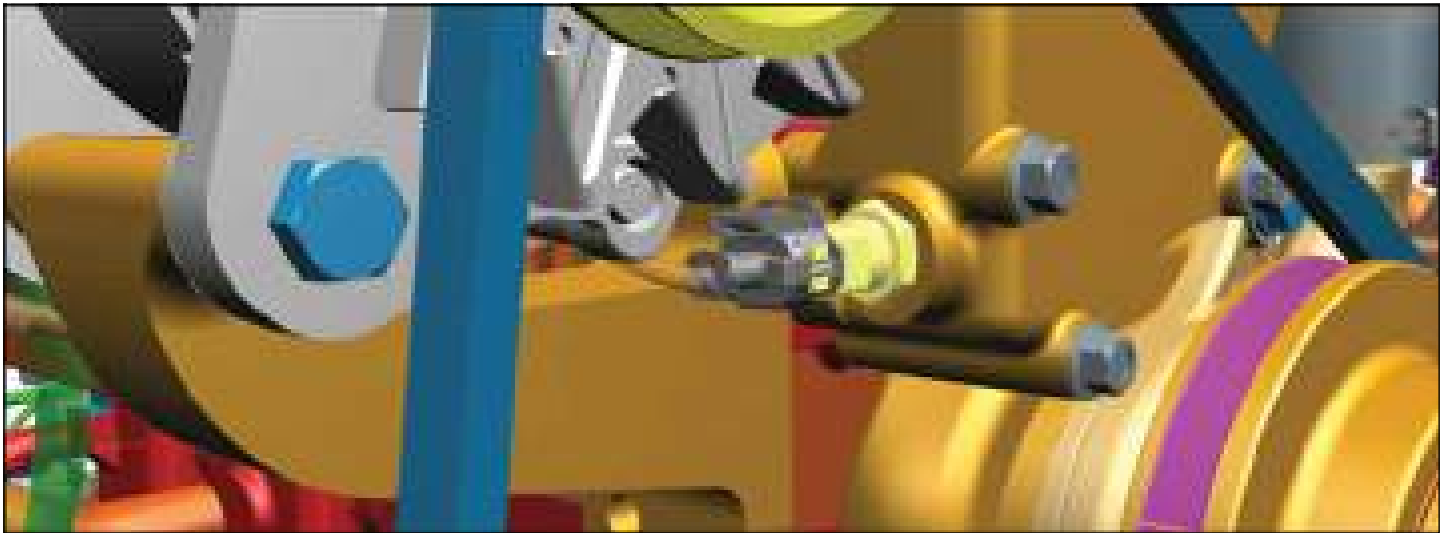
DTC Reaction

- ECU monitors and substitutes default temperature value.
- Torque deration
- Malfunctioning of temperature gauge

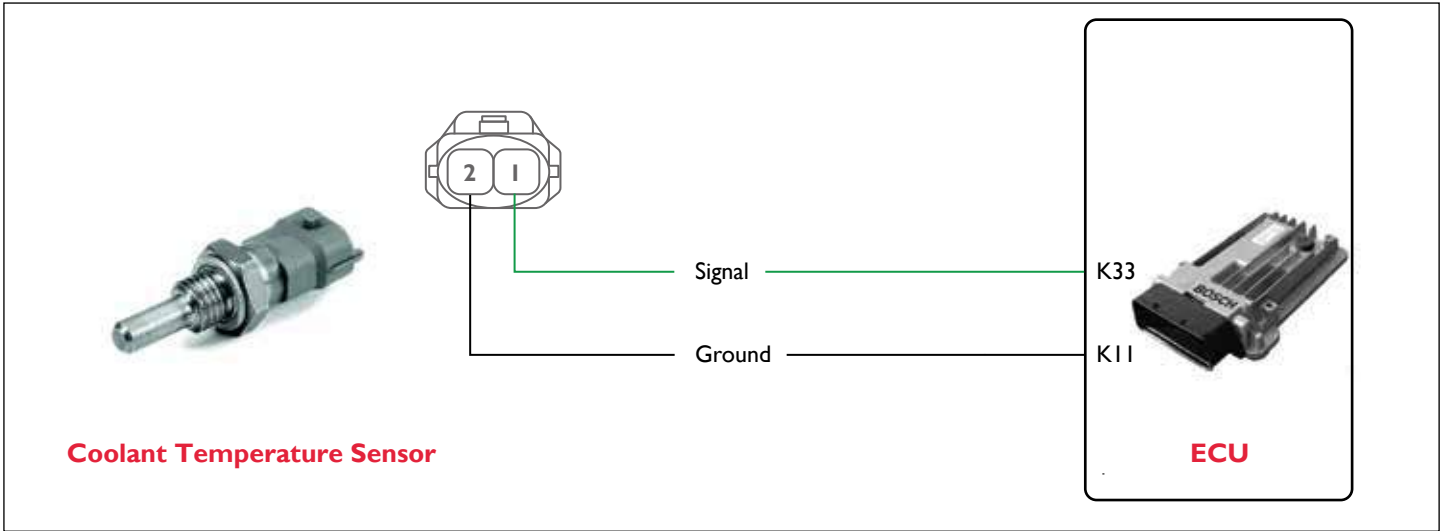
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the Coolant temperature sensor is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Connect the sensor and Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the Coolant temperature sensor connector. Without removing the coolant temperature sensor which is mounted on engine block, Check the internal resistance of it. Acceptance Criteria Resistance should be between 200 ohms to 25 K ohms based on coolant temp. during the service time. Generally 2.5 K ohms at 25 deg C.	Go to Step 3	<ul style="list-style-type: none"> Replace the Sensor with a new one.
3	Disconnect the ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K33 to Sensor connector pin 1 ECU connector pin K11 to Sensor connector pin 2 Acceptance Criteria Ensure proper continuity.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	a. Check the sensor connector pin 1 is short circuited to battery positive / ground. b. Check the sensor connector pin 1 and 2 is short with each other. Acceptance Criteria a. No short circuit to pin 1 and battery positive /ground. b. No short circuit between pin 1 and 2 of sensor connector	Go to Step 5	<ul style="list-style-type: none"> Replace the wiring harness.



Step	Test Procedure	Yes	No
5	Turn ON the ignition with ECU connector connected. a. Check the sensor connector pin 1 is short circuited to battery positive / ground. b. Check the sensor connector pin 1 and 2 is short with each other. c. Check the voltage between sensor connector pin 1 and 2. Acceptance Criteria a. No short circuit to pin 1 and battery positive / ground. b. No short circuit between pin 1 and 2 of sensor connector c. Voltage = $5 \pm 0.2V$	<ul style="list-style-type: none"> Replace the sensor. 	<ul style="list-style-type: none"> Replace the ECU with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0118 - SIGNAL RANGE CHECK HIGH - COOLANT TEMPERATURE SENSOR

The coolant temperature sensor (CTS) is used to detect the engine coolant temperature. CTS is a variable resistor located in the engine block. It changes resistance with change in temperature of the coolant that it's in contact with.

When the coolant temperature is low, the sensor resistance is high and when the coolant temperature is high, the sensor resistance is low. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

The sensor modifies a voltage signal from the electronic control unit (ECU).

The modified signal returns to the ECU as the engine coolant temperature input. The ECU checks CTS voltage and uses the information to help smoothen the engine operation.



Possible Causes

- Loose connections
- Wiring harness problem
- Faulty coolant temperature sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the measured output voltage value of the coolant temperature sensor is between **0.1 to 3.3V**.

DTC Information

DTC Detecting Condition

Output voltage of the coolant temperature sensor is more than **3.3V**.

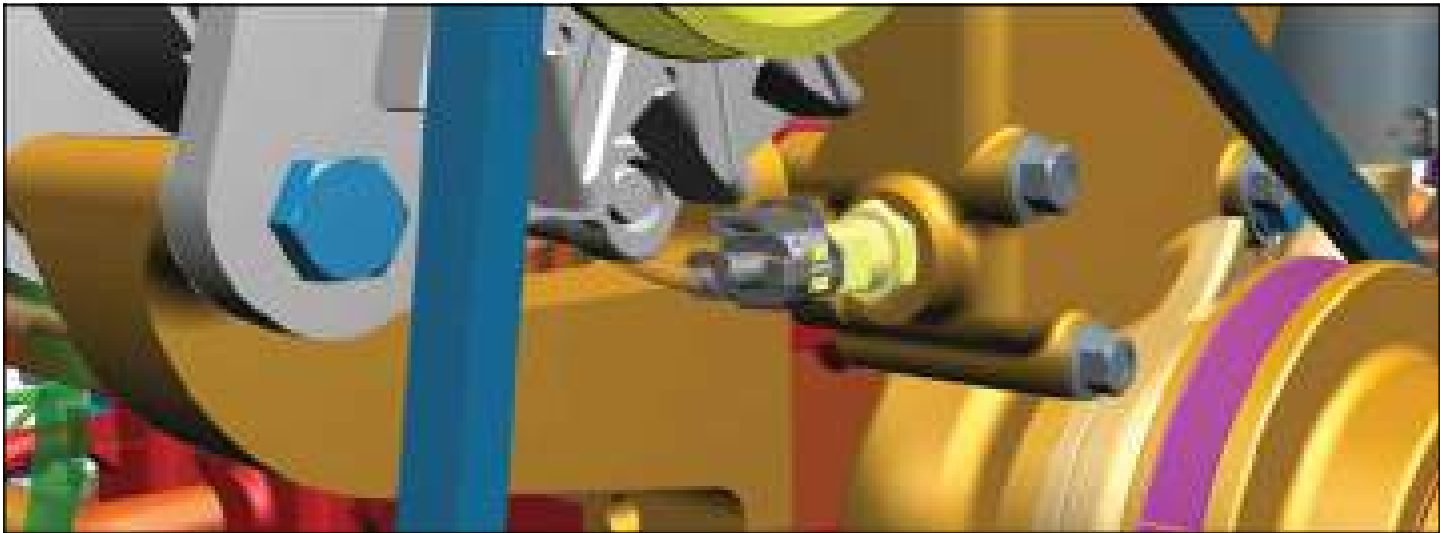
DTC Reaction

- ECU monitors and substitutes default temperature value
- Torque deration
- Malfunctioning of temperature gauge

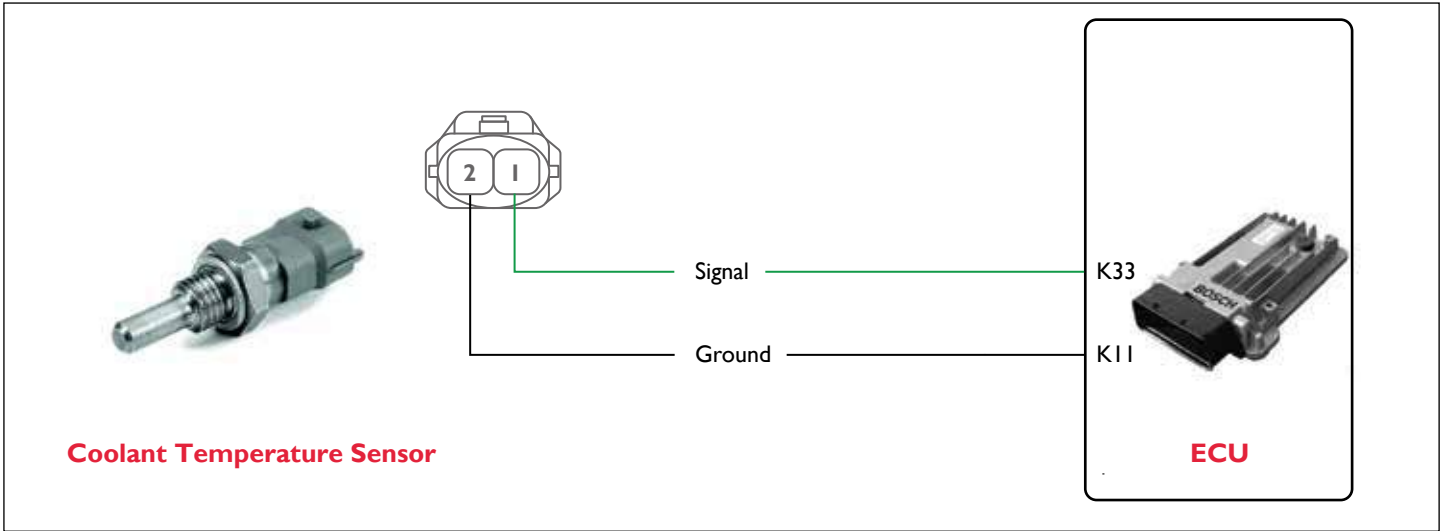
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the Coolant temperature sensor is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Connect the sensor and Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the Coolant temperature sensor connector. Without removing the coolant temperature sensor which is mounted on engine block, Check the internal resistance of it. Acceptance Criteria Resistance should be between 200 ohms to 25 K ohms based on coolant temp. during the service time. Generally 2.5 K ohms at 25 deg C.	Go to Step 3	<ul style="list-style-type: none"> Replace the Sensor with a new one.
3	Disconnect the ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K33 to Sensor connector pin 1 ECU connector pin K11 to Sensor connector pin 2 Acceptance Criteria Ensure proper continuity.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	a. Check the sensor connector pin 1 is short circuited to battery positive / ground. b. Check the sensor connector pin 1 and 2 is short with each other. Acceptance Criteria a. No short circuit to pin 1 and battery positive /ground. b. No short circuit between pin 1 and 2 of sensor connector	Go to Step 5	<ul style="list-style-type: none"> Replace the wiring harness.

Step	Test Procedure	Yes	No
5	Turn ON the ignition with ECU connector connected. a. Check the sensor connector pin 1 is short circuited to battery positive / ground. b. Check the sensor connector pin 1 and 2 is short with each other. c. Check the voltage between sensor connector pin 1 and 2. Acceptance Criteria a. No short circuit to pin 1 and battery positive / ground. b. No short circuit between pin 1 and 2 of sensor connector c. Voltage = $5 \pm 0.2V$	<ul style="list-style-type: none"> Replace the sensor. 	<ul style="list-style-type: none"> Replace the ECU with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0122 - SIGNAL RANGE CHECK LOW - PRIMARY ACCELERATOR PEDAL

Accelerator pedal module (APM) consists of two sensors (Primary and Secondary) which act as a potentiometer and its output voltage changes according to the pedal position.

The ECU applies a reference voltage to the APM sensor and then measures the voltage that is present on the APM sensor signal circuit. The ECU uses the APM sensor signal for further calculation of fuelling and other engine operational parameters.



Possible Causes

- Loose connections
- Wiring harness problem
- Faulty accelerator pedal sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**350 mV to 2.4V**) from the accelerator pedal module (Primary Sensor).

DTC Information

DTC Detecting Condition

The output voltage signal received from the accelerator pedal module is below **350 mV**.

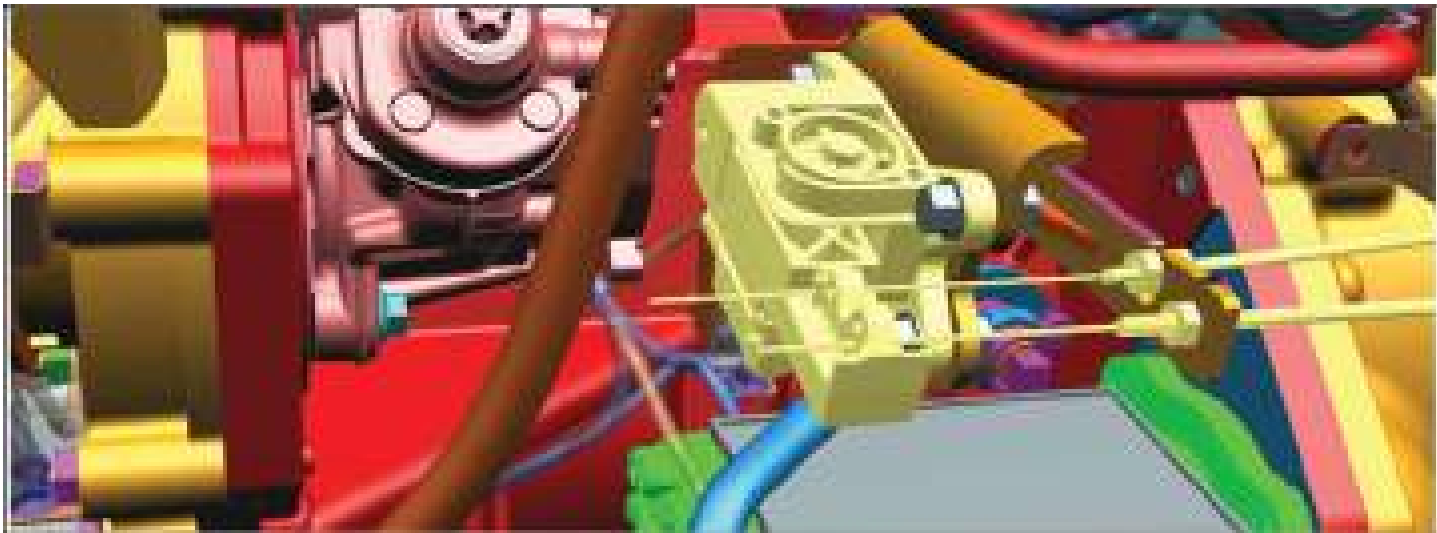
DTC Reaction

- Torque / Engine speed limitations
- No response from the accelerator pedal module

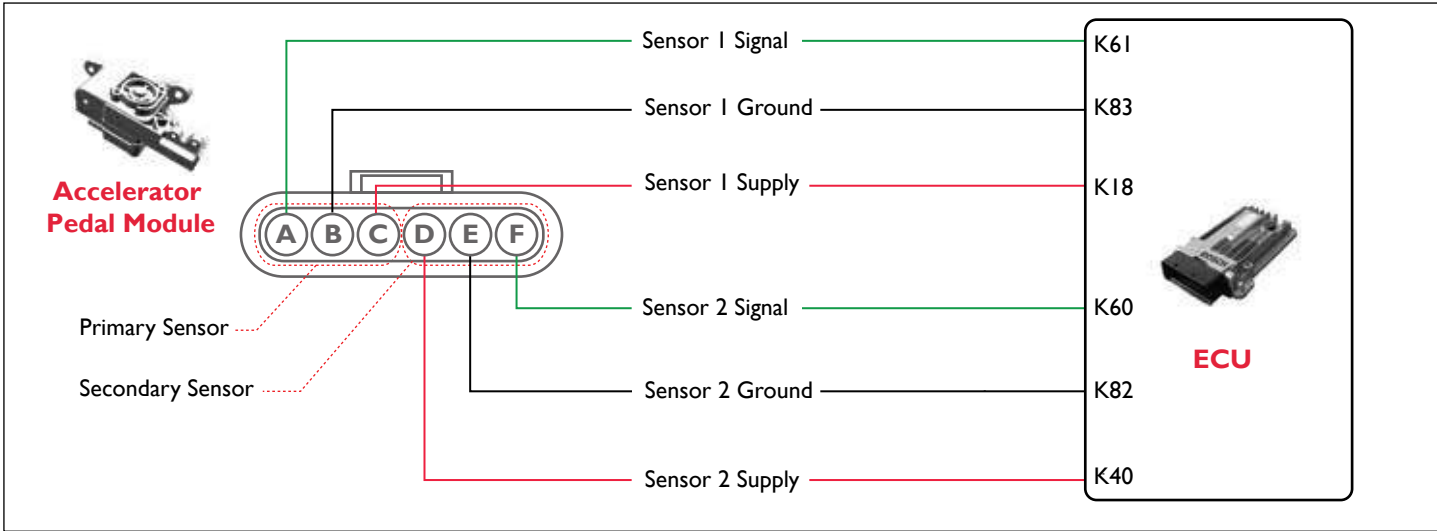
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of accelerator pedal sensor and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the ECU connector and sensor wiring harness connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K61 to Sensor connector pin A ECU connector pin K83 to Sensor connector pin B ECU connector pin K18 to Sensor connector pin C ECU connector pin K40 to Sensor connector pin D ECU connector pin K82 to Sensor connector pin E ECU connector pin K60 to Sensor connector pin F <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Turn ON the ignition with ECU connector connected. Check the sensor connector pins B and E is shorted to battery. And also check the sensor connector pins A, C, D and F is shorted to ground. <p>Acceptance Criteria</p> <p>No short circuit to ground / battery.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.

Step	Test Procedure	Yes	No
4	Check the supply voltage between the following: <ul style="list-style-type: none"> • Sensor connector pins C and B • Sensor connector pins D and E <p>Acceptance Criteria</p> <p>Voltage = 5V (+/- 0.25)</p>	Go to Step 5	<ul style="list-style-type: none"> • Replace the ECU.
5	Turn ON the ignition with sensor wiring harness connector connected. <p>Press the accelerator pedal and check for any response.</p> <p>Acceptance Criteria</p> <p>RPM varies from low idle to high idle.</p>	Clear the DTC and verify.	<ul style="list-style-type: none"> • Replace the sensor with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0123 - SIGNAL RANGE CHECK HIGH - PRIMARY ACCELERATOR PEDAL

Accelerator pedal module (APM) consists of two sensors (Primary and Secondary) which act as a potentiometer and its output voltage changes according to the pedal position.

The ECU applies a reference voltage to the APM sensor and then measures the voltage that is present on the APM sensor signal circuit. The ECU uses the APM sensor signal for further calculation of fuelling and other engine operational parameters.



Possible Causes

- Loose connections
- Wiring harness problem
- Faulty accelerator pedal sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**350 mV to 2.4V**) from the accelerator pedal module (Primary Sensor).

DTC Information

DTC Detecting Condition

The output voltage signal received from the accelerator pedal module is above **2.4V**.

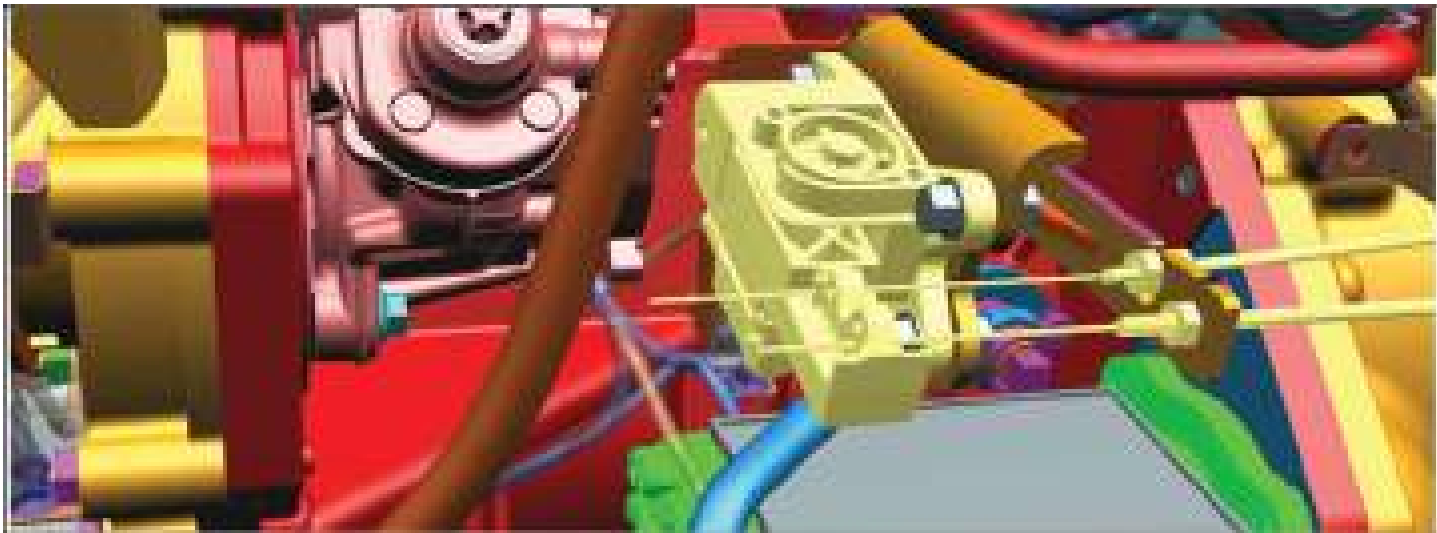
DTC Reaction

- Torque / Engine speed limitations
- No response from the accelerator pedal module

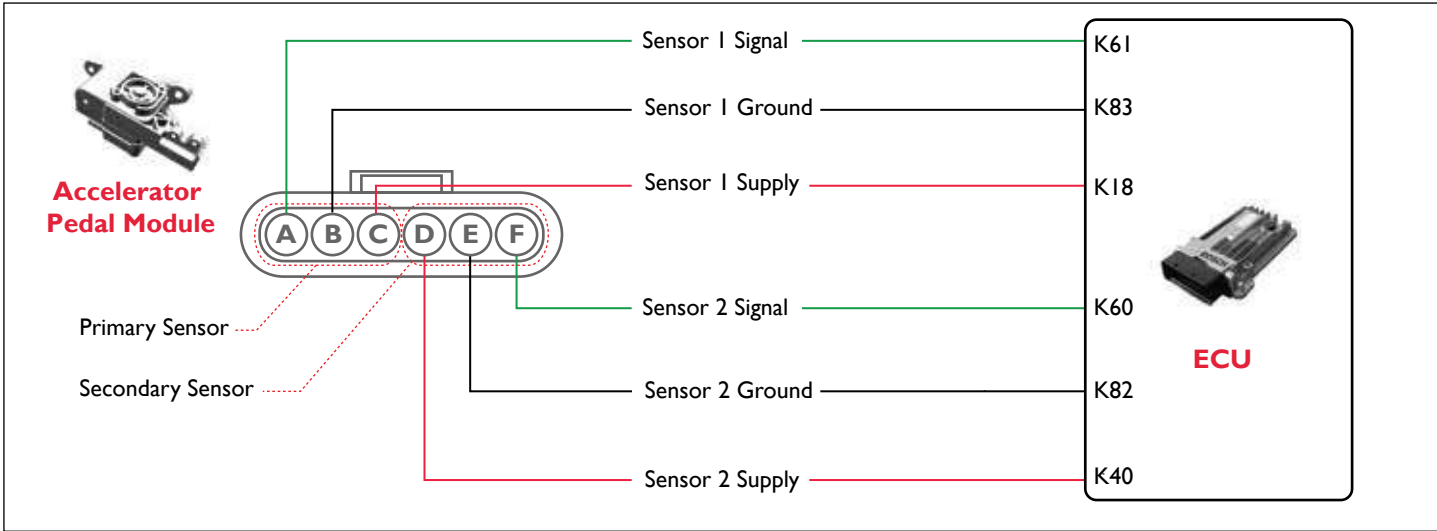
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of accelerator pedal sensor and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the ECU connector and sensor wiring harness connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K61 to Sensor connector pin A ECU connector pin K83 to Sensor connector pin B ECU connector pin K18 to Sensor connector pin C ECU connector pin K40 to Sensor connector pin D ECU connector pin K82 to Sensor connector pin E ECU connector pin K60 to Sensor connector pin F <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Turn ON the ignition with ECU connector connected. Check the sensor connector pins B and E is shorted to battery. And also check the sensor connector pins A, C, D and F is shorted to ground. <p>Acceptance Criteria</p> <p>No short circuit to ground / battery.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.

Step	Test Procedure	Yes	No
4	Check the supply voltage between the following: <ul style="list-style-type: none"> • Sensor connector pins C and B • Sensor connector pins D and E <p>Acceptance Criteria</p> <p>Voltage = 5V (+/- 0.25)</p>	Go to Step 5	<ul style="list-style-type: none"> • Replace the ECU.
5	Turn ON the ignition with sensor wiring harness connector connected. <p>Press the accelerator pedal and check for any response.</p> <p>Acceptance Criteria</p> <p>RPM varies from low idle to high idle.</p>	Clear the DTC and verify.	<ul style="list-style-type: none"> • Replace the sensor with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0192 - RAIL PRESSURE SENSOR VOLTAGE BELOW LOWER LIMIT

The rail pressure sensor (RPS) is a strain gauge device used to measure the pressure of the fuel near the fuel injectors. The electrical resistance of a strain gauge increases as pressure increases, and vice versa. The varying resistance affects the voltage drop across the sensor terminals and provides electrical signal corresponding to pressure to the electronic control unit (ECU).

The ECU compares the rail pressure monitored through the RPS against the expected pressure generated due to high pressure pump (HPP).



Possible Causes

- Loose connections
- Wiring harness problem
- Short circuit to ground
- Faulty rail pressure sensor
- Faulty ECU

Normal Operation

- At normal vehicle condition, the ECU receives an output voltage signal (**250mV to 4.8 V**) from the sensor.
- ECU reads the rail pressure in terms of voltage and the engine starts by the pressure build-up in rail.
- Sensor converts the pressure into a voltage signal and sends the signal to ECU.
- ECU corrects the fuel injection quantity in response to the voltage signal.

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

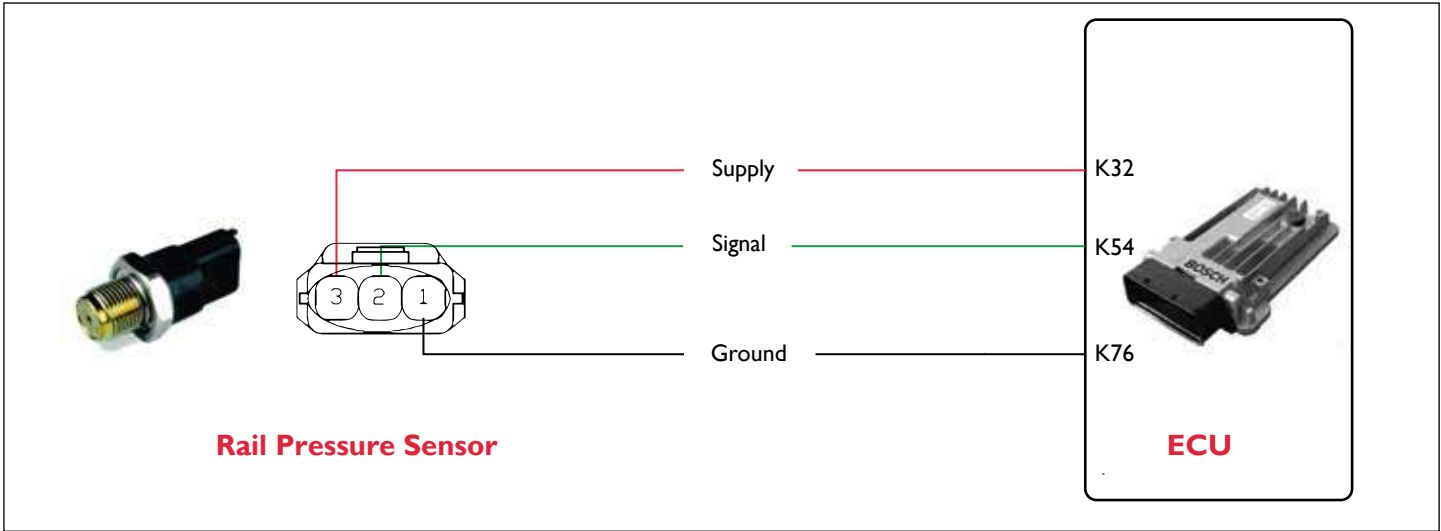
DTC Reaction

Torque deration

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the rail pressure sensor connector is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper connections.
2	Turn OFF the ignition switch. Disconnect the rail pressure sensor connector and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K76 to Sensor connector pin 1 ECU connector pin K54 to Sensor connector pin 2 ECU connector pin K32 to Sensor connector pin 3 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the pins K32 and K54 is shorted to ground. <p>Acceptance Criteria</p> <p>No short circuit to ground.</p>	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, Replace the rail with a new one. 	<ul style="list-style-type: none"> Replace the wiring harness.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0193 - RAIL PRESSURE SENSOR VOLTAGE ABOVE UPPER LIMIT

The rail pressure sensor (RPS) is a strain gauge device used to measure the pressure of the fuel near the fuel injectors. The electrical resistance of a strain gauge increases as pressure increases, and vice versa. The varying resistance affects the voltage drop across the sensor terminals and provides electrical signal corresponding to pressure to the electronic control unit (ECU).

The ECU compares the rail pressure monitored through the RPS against the expected pressure generated due to high pressure pump (HPP).



Possible Causes

- Loose connections
- Wiring harness problem
- Short circuit to ground
- Faulty rail pressure sensor
- Faulty ECU

Normal Operation

- At normal vehicle condition, the ECU receives an output voltage signal (**250mV to 4.8 V**) from the sensor.
- ECU reads the rail pressure in terms of voltage and the engine starts by the pressure build-up in rail.
- Sensor converts the pressure into a voltage signal and sends the signal to ECU.
- ECU corrects the fuel injection quantity in response to the voltage signal.

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

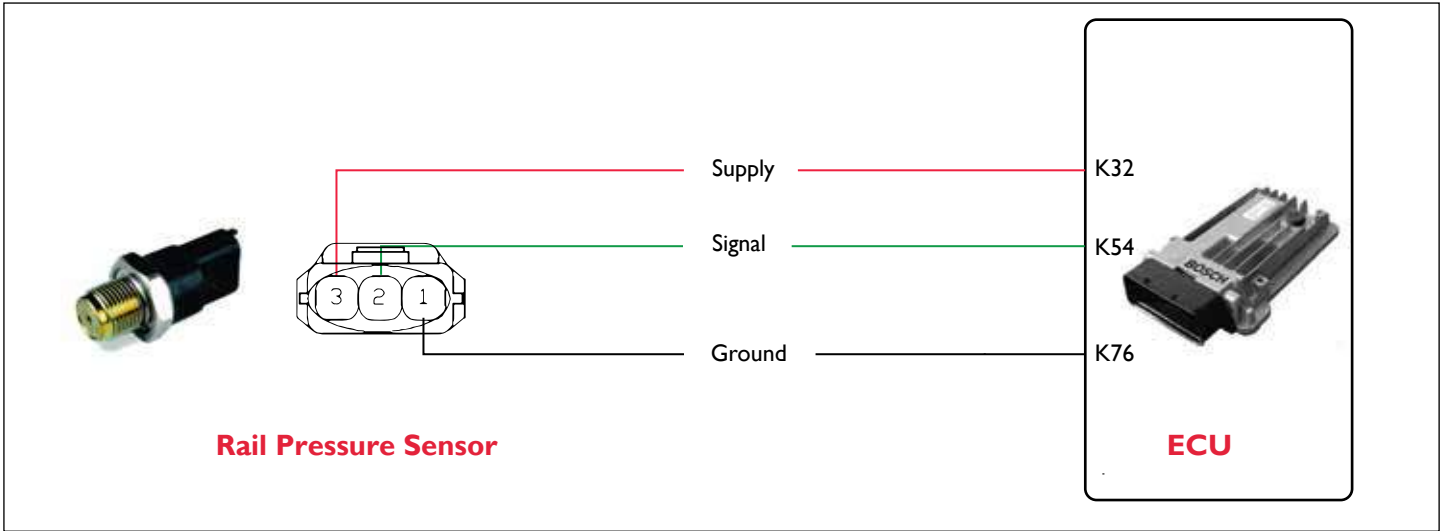
DTC Reaction

Torque deration

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the rail pressure sensor connector is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper connections.
2	Turn OFF the ignition switch. Disconnect the rail pressure sensor connector and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K76 to Sensor connector pin 1 ECU connector pin K54 to Sensor connector pin 2 ECU connector pin K32 to Sensor connector pin 3 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the pins K32 and K54 is shorted to battery. <p>Acceptance Criteria</p> <p>No short circuit to battery.</p>	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, Replace the rail with a new one. 	<ul style="list-style-type: none"> Replace the wiring harness.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0201 - OPEN LOAD ERROR - 1st CYLINDER INJECTOR

The injectors are solenoid actuated and controlled by ECU. The ECU measures the voltage drop through fixed resistors and controls it.

**Possible Causes**

- 1st Injector connector not connected
- Wiring harness connector
- Faulty injector
- Faulty ECU

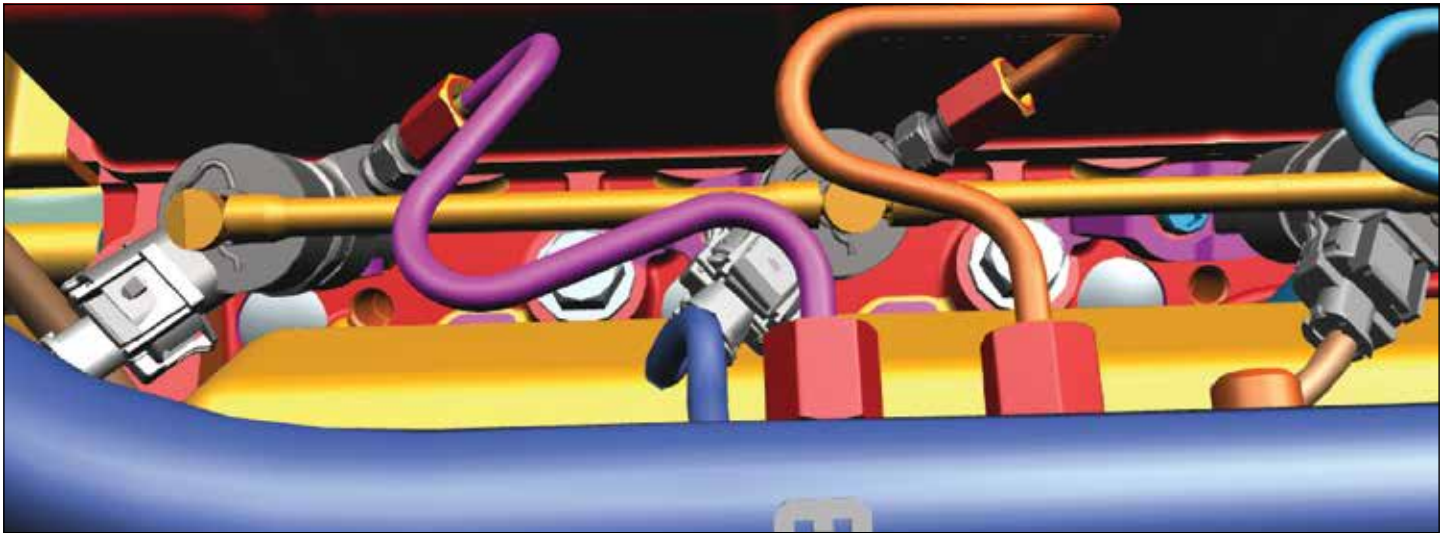
DTC Information**DTC Reaction**

- Engine is limited to 1700 RPM and torque limitation

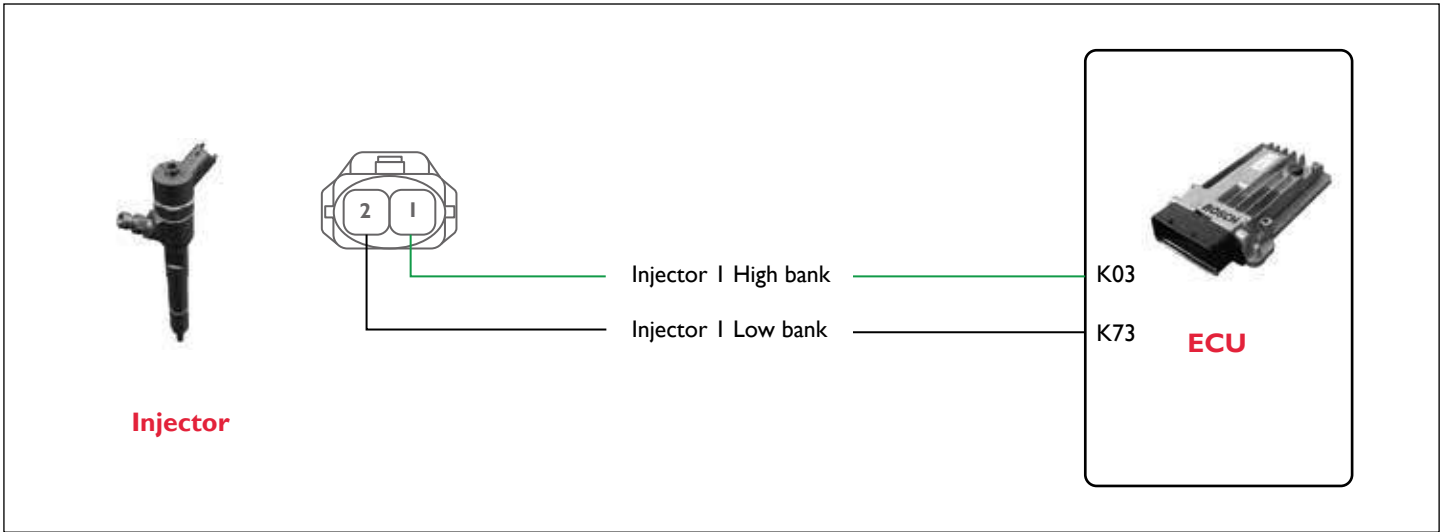
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the 1st Injector connector is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the 1st injector connector and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pins K03 to Injector connector pin 1 ECU connector pins K73 to Injector connector pin 2 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Remove the 1st injector connector. With the injector mounted on engine, Check the resistance between pin 1 and 2. <p>Acceptance Criteria</p> <p>Normally less than 100 milli ohms.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the injector with a new one.

Step	Test Procedure	Yes	No
4	Connect the ECU connector. Turn ON the ignition switch. Check the supply voltage between the first pin of 1st injector connector with respect to ground. Acceptance Criteria 12 volts for 1st injector	<ul style="list-style-type: none"> • Clear the DTC and verify. • If the error repeats, replace the injector with a new one. 	<ul style="list-style-type: none"> • Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0202 - OPEN LOAD ERROR - 2nd CYLINDER INJECTOR

The injectors are solenoid actuated and controlled by ECU. The ECU measures the voltage drop through fixed resistors and controls it.



Possible Causes

- 2nd Injector connector not connected
- Wiring harness connector
- Faulty injector
- Faulty ECU

DTC Information

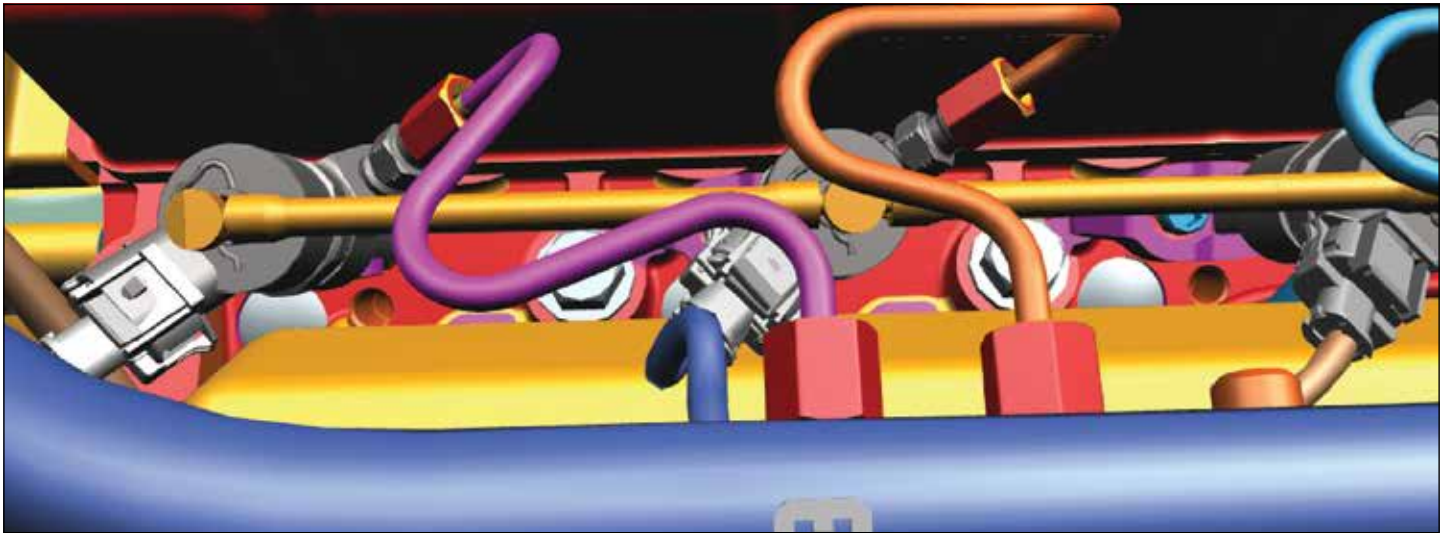
DTC Reaction

- Engine is limited to 1700 RPM and torque limitation

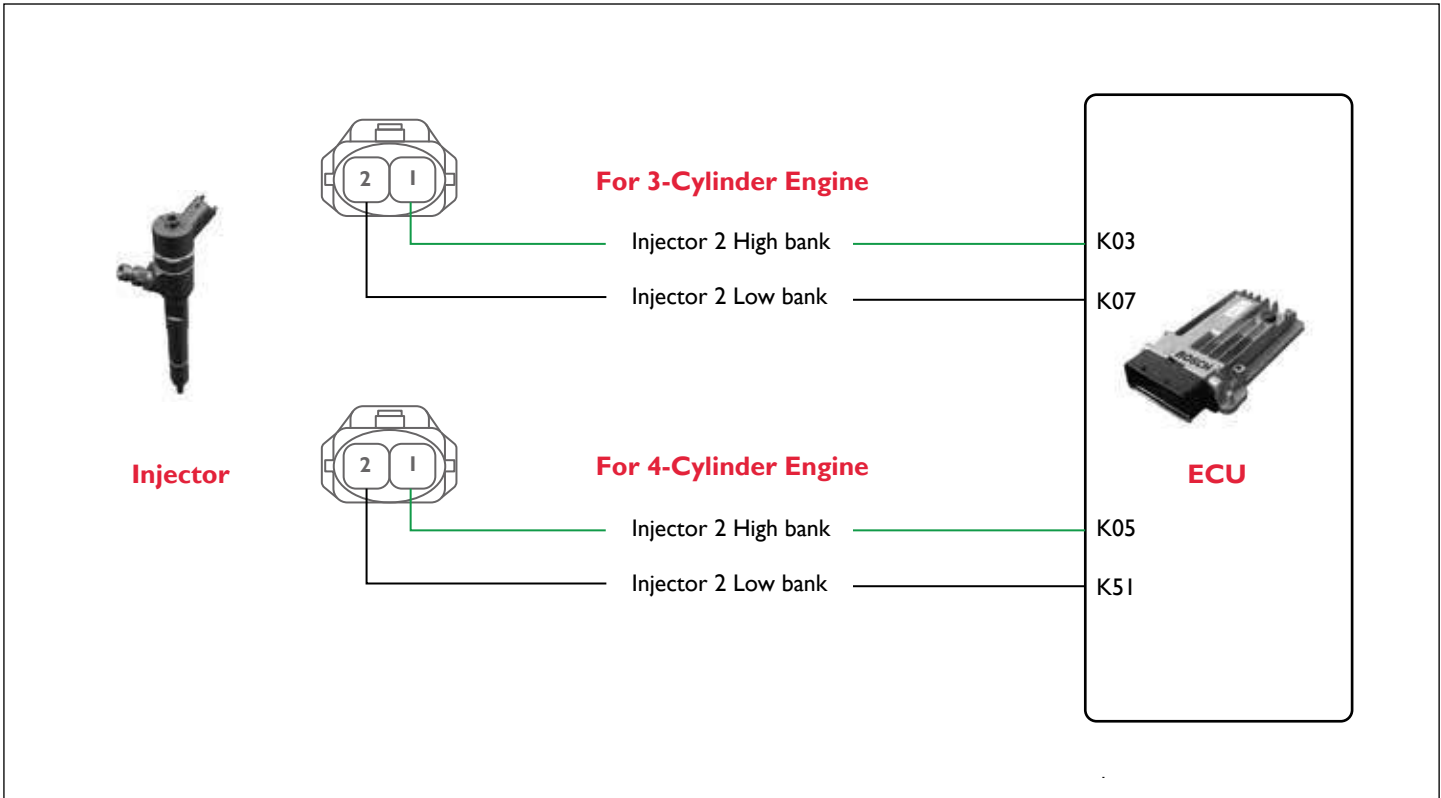
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the 2nd Injector connector is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the 2nd injector connector and ECU connector. Check continuity for the following: For 3-Cylinder Engine <ul style="list-style-type: none"> ECU connector pins K03 to Injector connector pin 1 ECU connector pins K07 to Injector connector pin 2 For 4-Cylinder Engine <ul style="list-style-type: none"> ECU connector pins K05 to Injector connector pin 1 ECU connector pins K51 to Injector connector pin 2 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Remove the 2nd injector connector. With the injector mounted on engine, Check the resistance between pin 1 and 2. Acceptance Criteria Normally less than 100 milli ohms.	Go to Step 4	<ul style="list-style-type: none"> Replace the injector with a new one.

Step	Test Procedure	Yes	No
4	Connect the ECU connector. Turn ON the ignition switch. Check the supply voltage between the first pin of 2nd injector connector with respect to ground. Acceptance Criteria 12 volts for 2nd injector	<ul style="list-style-type: none"> • Clear the DTC and verify. • If the error repeats, replace the injector with a new one. 	<ul style="list-style-type: none"> • Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0203 - OPEN LOAD ERROR - 3rd CYLINDER INJECTOR

The injectors are solenoid actuated and controlled by ECU. The ECU measures the voltage drop through fixed resistors and controls it.

**Possible Causes**

- 3rd Injector connector not connected
- Wiring harness connector
- Faulty injector
- Faulty ECU

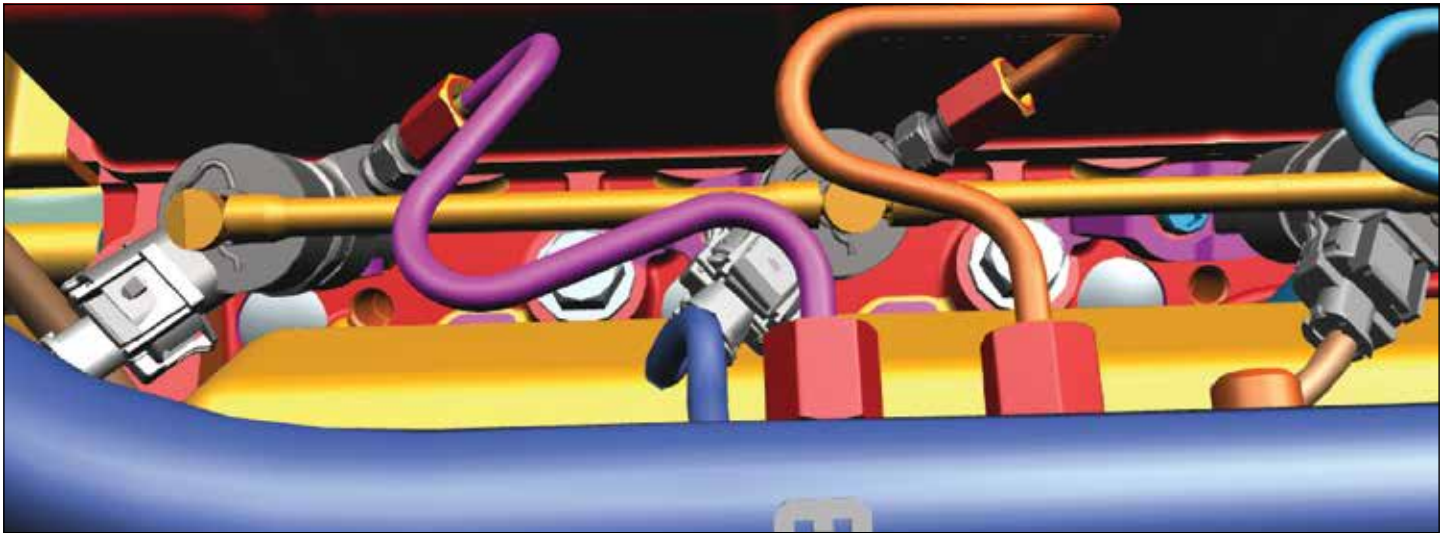
DTC Information**DTC Reaction**

- Engine is limited to 1700 RPM and torque limitation

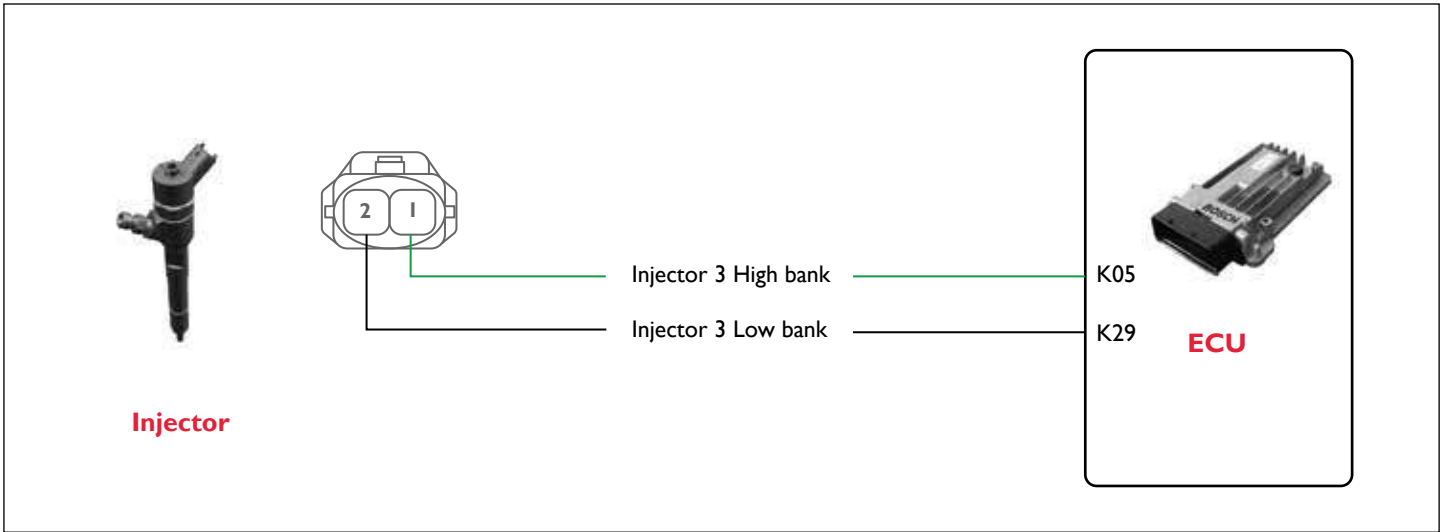
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the 3rd Injector connector is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the 3rd injector connector and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pins K03 to Injector connector pin 1 ECU connector pins K73 to Injector connector pin 2 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Remove the 3rd injector connector. With the injector mounted on engine, Check the resistance between pin 1 and 2. <p>Acceptance Criteria</p> <p>Normally less than 100 milli ohms.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the injector with a new one.



Step	Test Procedure	Yes	No
4	Connect the ECU connector. Turn ON the ignition switch. Check the supply voltage between the first pin of 3rd injector connector with respect to ground. Acceptance Criteria 12 volts for 3rd injector	<ul style="list-style-type: none"> • Clear the DTC and verify. • If the error repeats, replace the injector with a new one. 	<ul style="list-style-type: none"> • Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0219 - ENGINE OVERSPEED DETECTED

Description

Over-speed detection in component engine protection.

Possible Causes

- Detection of engine over speed

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

DTC Reaction

The engine may get damaged.

Diagnostic Procedure

1. Do not downshift the gear by higher shift (e.g. from 5th gear to 2nd gear).
2. Use the exhaust brake when descending from hills.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



P0222 - SIGNAL RANGE CHECK LOW - SECONDARY ACCELERATOR PEDAL

Accelerator pedal module (APM) consists of two sensors (Primary and Secondary) which act as a potentiometer and its output voltage changes according to the pedal position.

The ECU applies a reference voltage to the APM sensor and then measures the voltage that is present on the APM sensor signal circuit. The ECU uses the APM sensor signal for further calculation of fuelling and other engine operational parameters.



Possible Causes

- Loose connections
- Wiring harness problem
- Faulty accelerator pedal sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**850 mV to 4.8V**) from the accelerator pedal module (Secondary Sensor).

DTC Information

DTC Detecting Condition

The output voltage signal received from the accelerator pedal module is below **850 mV**.

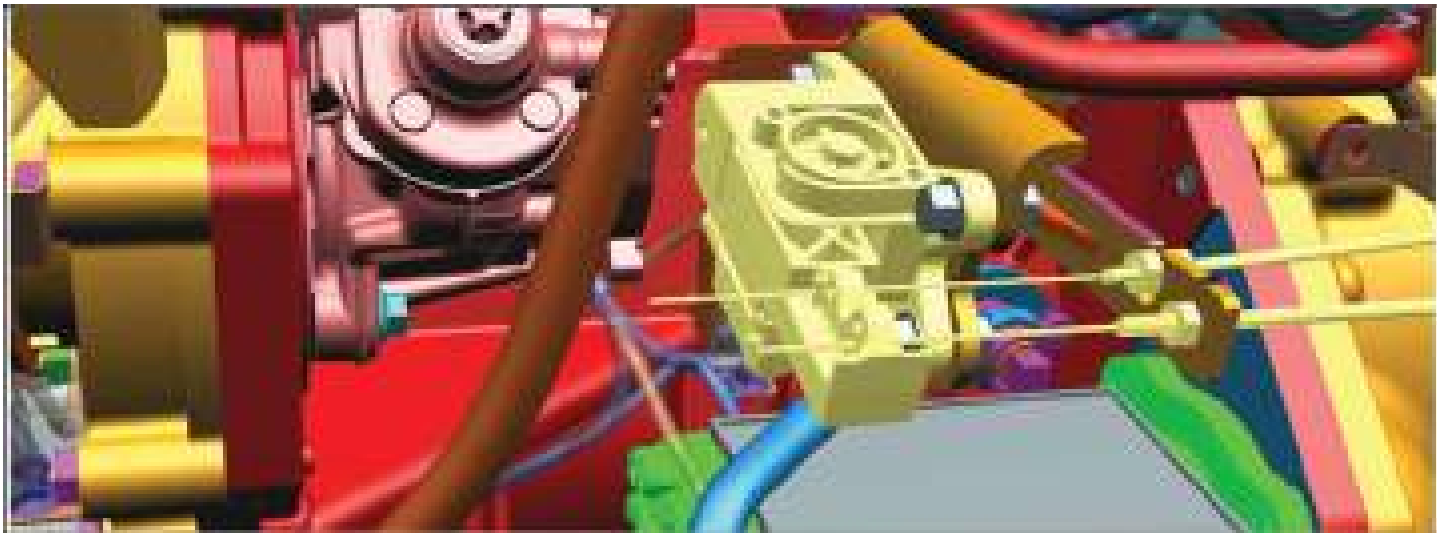
DTC Reaction

- Torque / Engine speed limitations
- No response from the accelerator pedal module

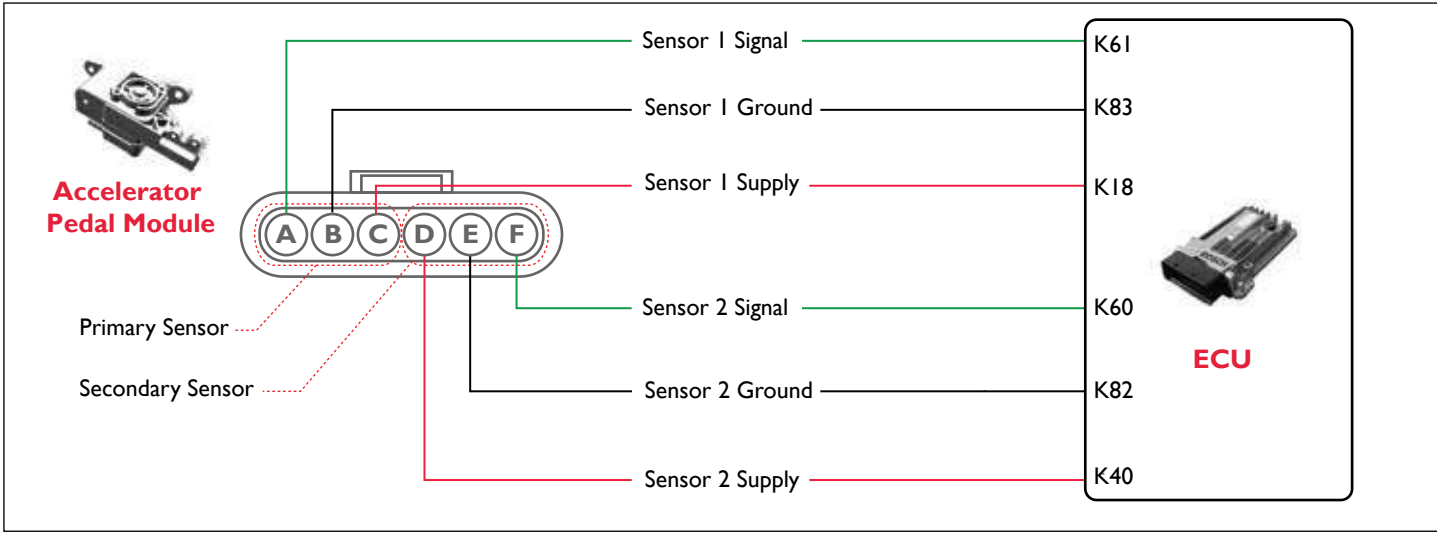
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of accelerator pedal sensor and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the ECU connector and sensor wiring harness connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K61 to Sensor connector pin A ECU connector pin K83 to Sensor connector pin B ECU connector pin K18 to Sensor connector pin C ECU connector pin K40 to Sensor connector pin D ECU connector pin K82 to Sensor connector pin E ECU connector pin K60 to Sensor connector pin F <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Turn ON the ignition with ECU connector connected. Check the sensor connector pins B and E is shorted to battery. And also check the sensor connector pins A, C, D and F is shorted to ground. <p>Acceptance Criteria</p> <p>No short circuit to ground / battery.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.



Step	Test Procedure	Yes	No
4	Check the supply voltage between the following: <ul style="list-style-type: none"> • Sensor connector pins C and B • Sensor connector pins D and E <p>Acceptance Criteria</p> <p>Voltage = 5V (+/- 0.25)</p>	Go to Step 5	<ul style="list-style-type: none"> • Replace the ECU.
5	Turn ON the ignition with sensor wiring harness connector connected. <p>Press the accelerator pedal and check for any response.</p> <p>Acceptance Criteria</p> <p>RPM varies from low idle to high idle.</p>	Clear the DTC and verify.	<ul style="list-style-type: none"> • Replace the sensor with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0223 - SIGNAL RANGE CHECK HIGH - SECONDARY ACCELERATOR PEDAL

Accelerator pedal module (APM) consists of two sensors (Primary and Secondary) which act as a potentiometer and its output voltage changes according to the pedal position.

The ECU applies a reference voltage to the APM sensor and then measures the voltage that is present on the APM sensor signal circuit. The ECU uses the APM sensor signal for further calculation of fuelling and other engine operational parameters.



Possible Causes

- Loose connections
- Wiring harness problem
- Faulty accelerator pedal sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**850 mV to 4.8V**) from the accelerator pedal module (Secondary Sensor).

DTC Information

DTC Detecting Condition

The output voltage signal received from the accelerator pedal module is above **4.8V**.

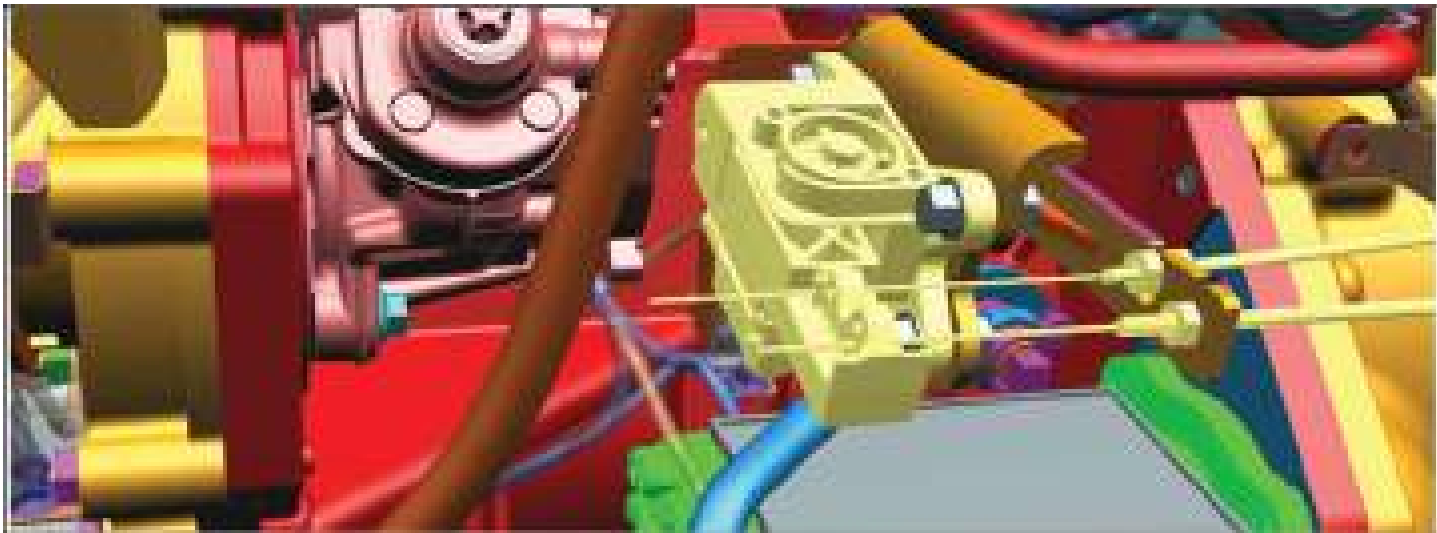
DTC Reaction

- Torque / Engine speed limitations
- No response from the accelerator pedal module

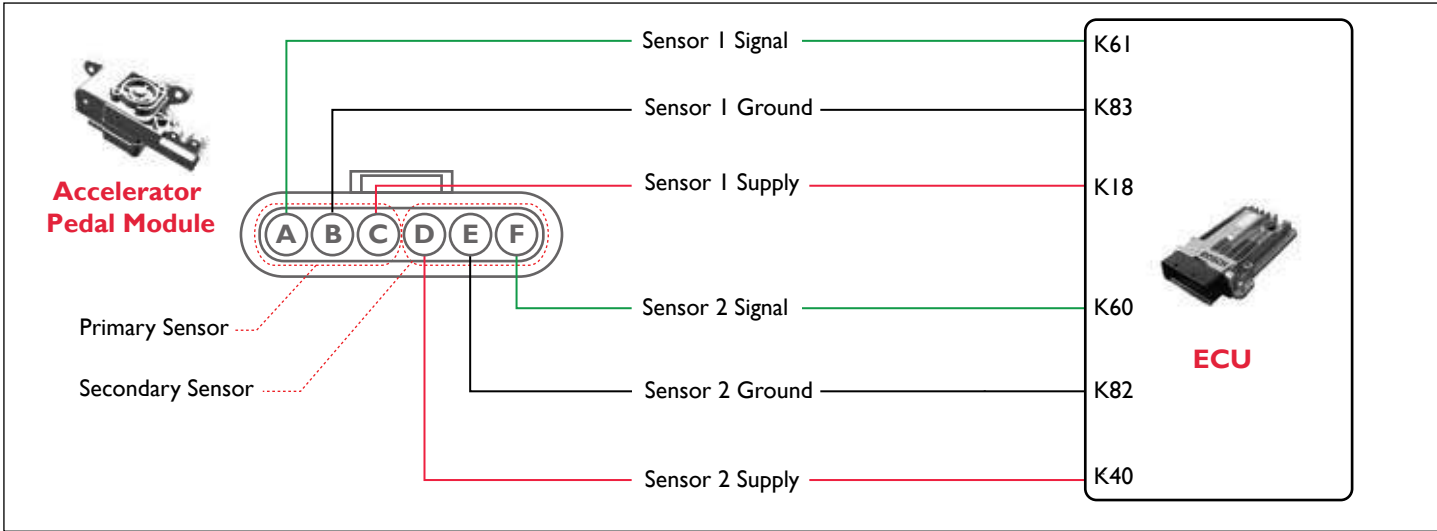
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of accelerator pedal sensor and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the ECU connector and sensor wiring harness connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K61 to Sensor connector pin A ECU connector pin K83 to Sensor connector pin B ECU connector pin K18 to Sensor connector pin C ECU connector pin K40 to Sensor connector pin D ECU connector pin K82 to Sensor connector pin E ECU connector pin K60 to Sensor connector pin F <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Turn ON the ignition with ECU connector connected. Check the sensor connector pins B and E is shorted to battery. And also check the sensor connector pins A, C, D and F is shorted to ground. <p>Acceptance Criteria</p> <p>No short circuit to ground / battery.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.



Step	Test Procedure	Yes	No
4	Check the supply voltage between the following: <ul style="list-style-type: none"> • Sensor connector pins C and B • Sensor connector pins D and E <p>Acceptance Criteria</p> <p>Voltage = 5V (+/- 0.25)</p>	Go to Step 5	<ul style="list-style-type: none"> • Replace the ECU.
5	Turn ON the ignition with sensor wiring harness connector connected. <p>Press the accelerator pedal and check for any response.</p> <p>Acceptance Criteria</p> <p>RPM varies from low idle to high idle.</p>	Clear the DTC and verify.	<ul style="list-style-type: none"> • Replace the sensor with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0262 - GENERAL SHORT CIRCUIT - CYLINDER I

The injectors are solenoid actuated and controlled by ECU. The ECU measures the voltage drop through fixed resistors and controls it.



Possible Causes

- Injector I short circuit to ground

DTC Information

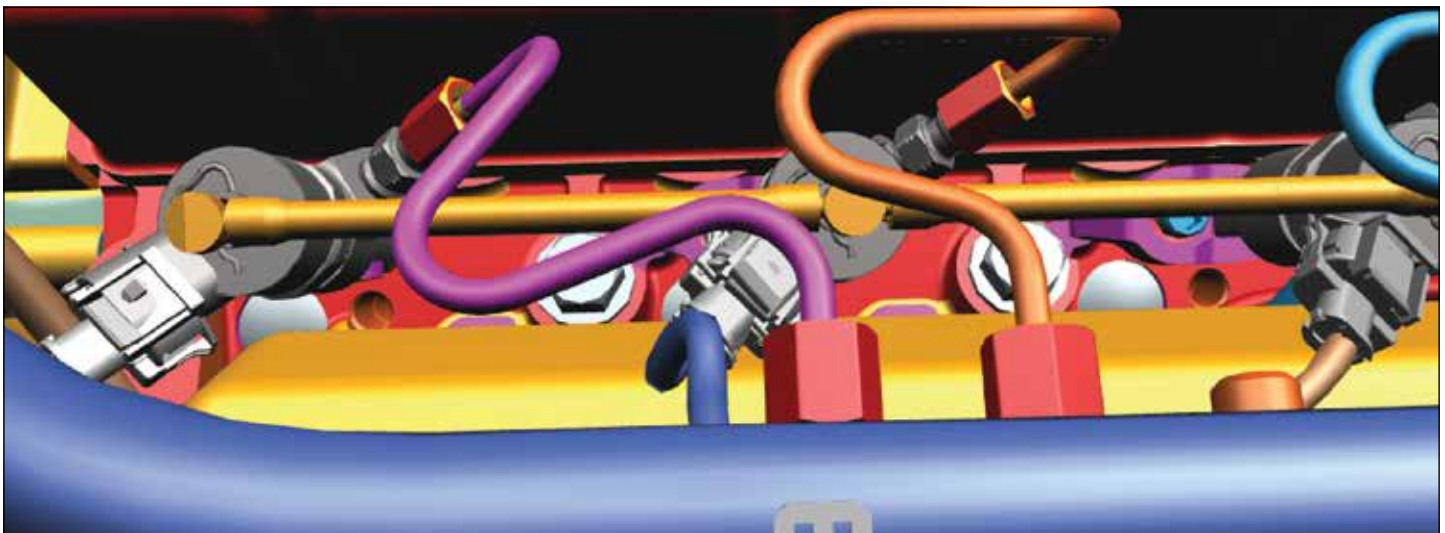
DTC Reaction

- Engine is limited to 1700 RPM and torque limitation

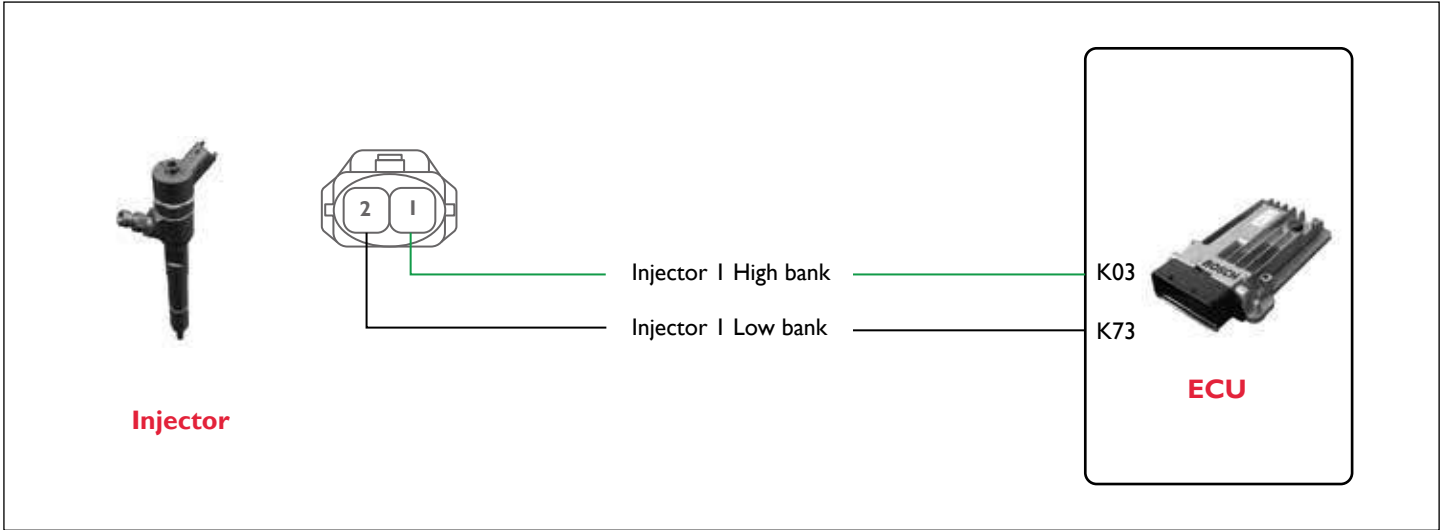
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the 1st Injector connector is connected properly.	Go to Step 2	<ul style="list-style-type: none">• Ensure better connections.
2	<p>Turn OFF the ignition switch.</p> <p>Disconnect the 1st injector connector and ECU connector.</p> <p>Check continuity for the following:</p> <ul style="list-style-type: none">• ECU connector pins K03 to Injector connector pin 1• ECU connector pins K73 to Injector connector pin 2 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none">• Replace the wiring harness.

Step	Test Procedure	Yes	No
3	<p>Check that the injector connector pins are not short with battery / ground.</p> <p>Also check that the injector connector pins are not short with each other and with injector body.</p> <p>Acceptance Criteria</p> <p>No short circuit between battery positive/injector body.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	<p>Remove the 1st injector connector.</p> <p>With the injector mounted on engine, Check the resistance between pin 1 and 2.</p> <p>Acceptance Criteria</p> <p>Normally less than 100 milli ohms.</p>	Go to Step 5	<ul style="list-style-type: none"> Replace the injector with a new one.
5	<p>Connect the ECU connector.</p> <p>Turn ON the ignition switch.</p> <p>Check the supply voltage between the first pin of 1st injector connector with respect to ground.</p> <p>Acceptance Criteria</p> <p>12 volts for 1st injector</p>	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the injector with a new one. 	<ul style="list-style-type: none"> Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0265 - GENERAL SHORT CIRCUIT - CYLINDER 2

The injectors are solenoid actuated and controlled by ECU. The ECU measures the voltage drop through fixed resistors and controls it.



Possible Causes

- Injector 2 short circuit to ground

DTC Information

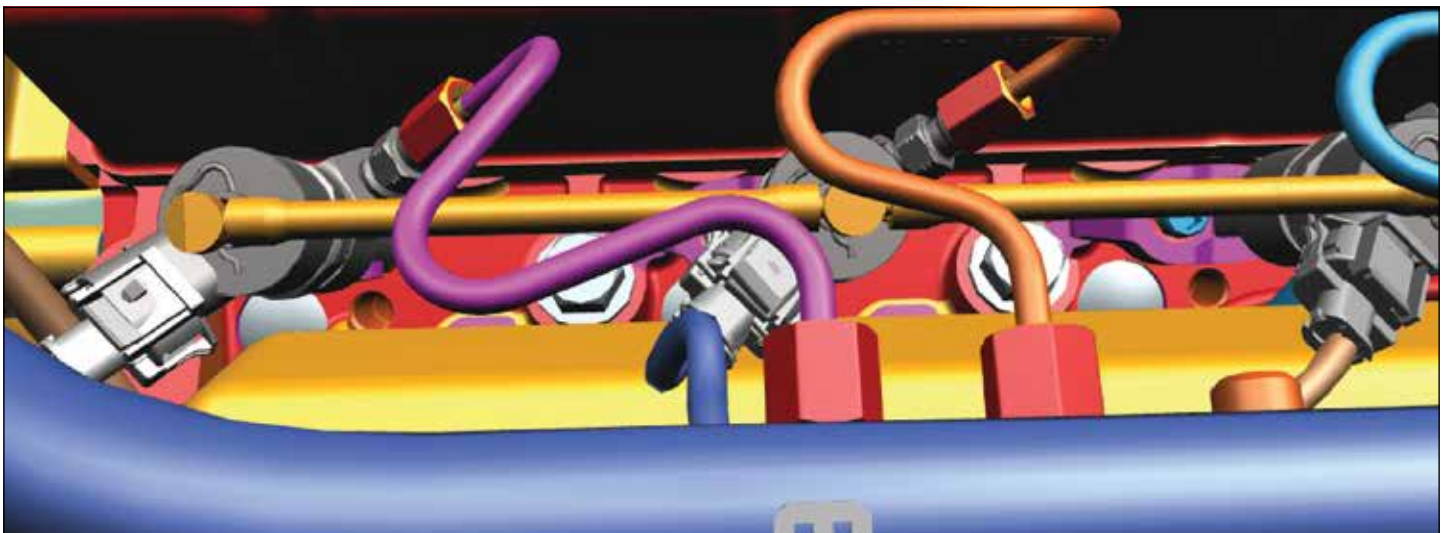
DTC Reaction

- Engine is limited to 1700 RPM and torque limitation

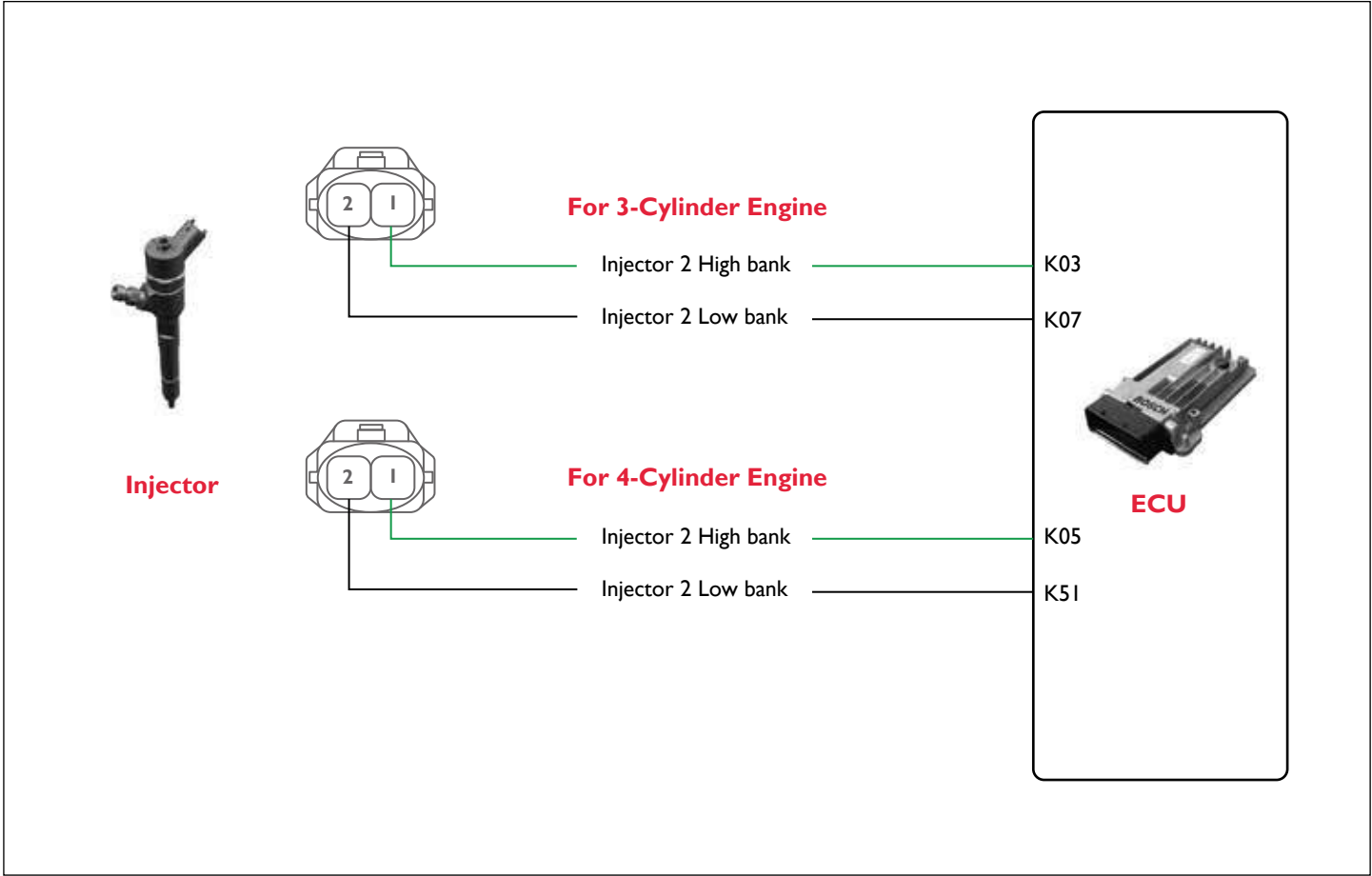
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
I	Check whether the 2nd Injector connector is connect- ed properly.	Go to Step 2	<ul style="list-style-type: none">• Ensure better connec- tions.

Diagnostic Procedure

Step	Test Procedure	Yes	No
2	<p>Turn OFF the ignition switch.</p> <p>Disconnect the 2nd Injector connector and ECU connector.</p> <p>Check continuity for the following:</p> <p>For 3-Cylinder Engine</p> <ul style="list-style-type: none"> • ECU connector pins K03 to Injector connector pin 1 • ECU connector pins K07 to Injector connector pin 2 <p>For 4-Cylinder Engine</p> <ul style="list-style-type: none"> • ECU connector pins K05 to Injector connector pin 1 • ECU connector pins K51 to Injector connector pin 2 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.
3	<p>Check that the injector connector pins are not short with battery / ground.</p> <p>Also check that the injector connector pins are not short with each other and with injector body.</p> <p>Acceptance Criteria</p> <p>No short circuit between battery positive/injector body.</p>	Go to Step 4	<ul style="list-style-type: none"> • Replace the wiring harness.

Step	Test Procedure	Yes	No
4	Remove the 2nd injector connector. With the injector mounted on engine, Check the resistance between pin 1 and 2. Acceptance Criteria Normally less than 100 milli ohms.	Go to Step 5	<ul style="list-style-type: none"> Replace the injector with a new one.
5	Connect the ECU connector. Turn ON the ignition switch. Check the supply voltage between the first pin of 2nd injector connector with respect to ground. Acceptance Criteria 12 volts for 2nd injector	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the injector with a new one. 	<ul style="list-style-type: none"> Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0268 - GENERAL SHORT CIRCUIT - CYLINDER 3

The injectors are solenoid actuated and controlled by ECU. The ECU measures the voltage drop through fixed resistors and controls it.



Possible Causes

- Injector 3 short circuit to ground

DTC Information

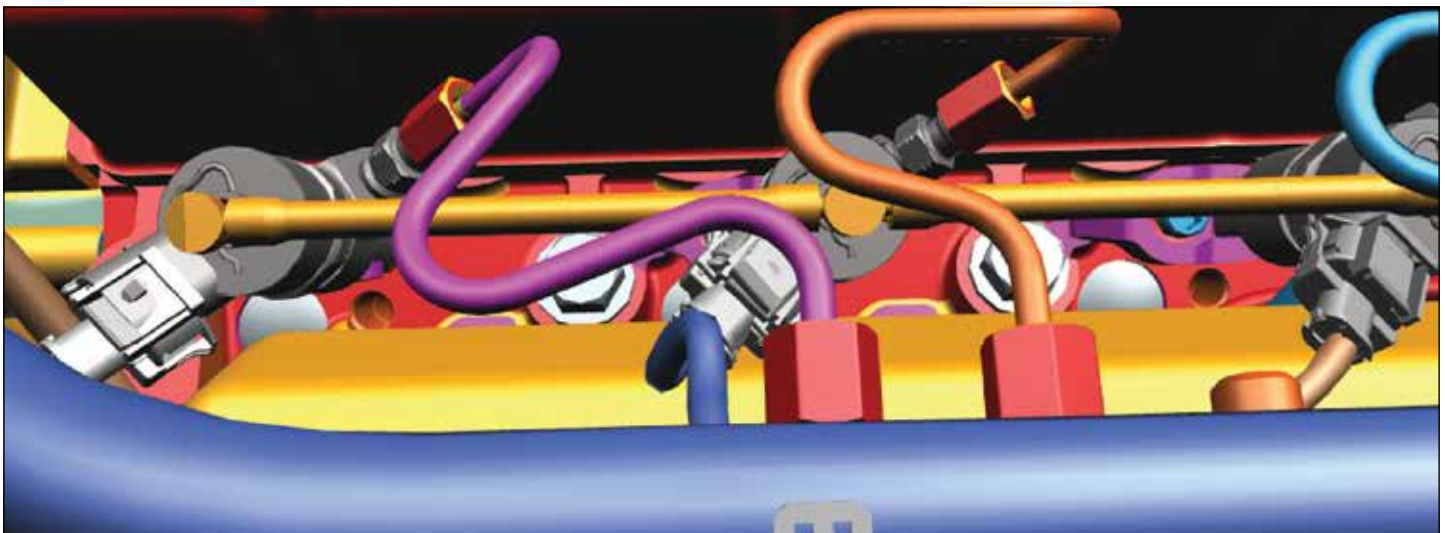
DTC Reaction

- Engine is limited to 1700 RPM and torque limitation

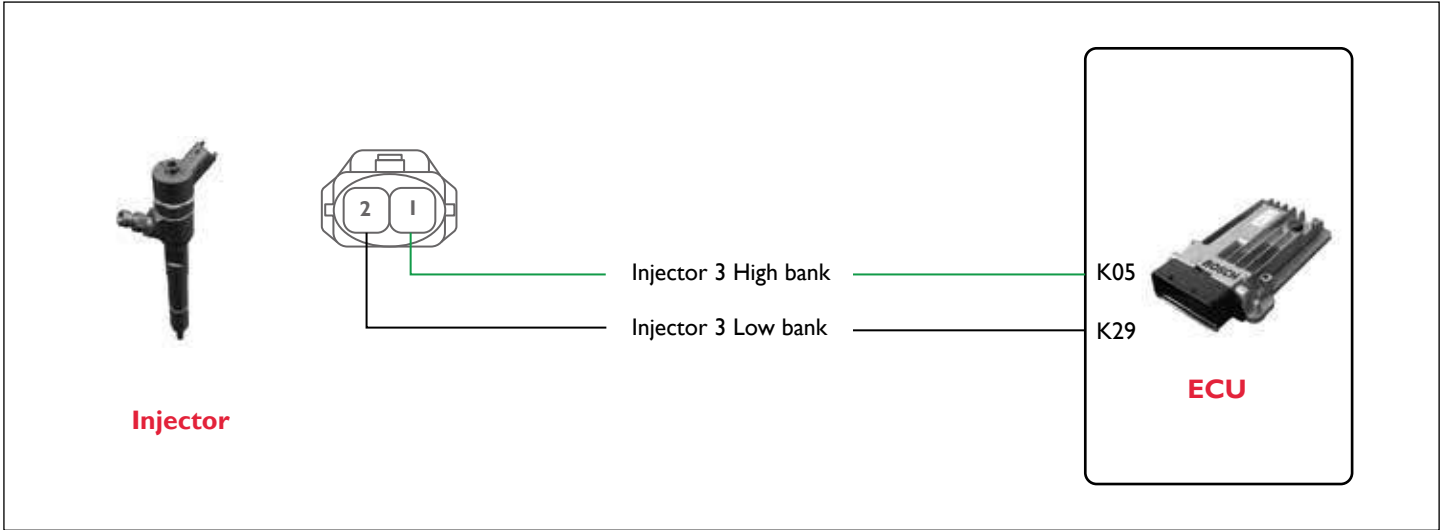
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the 3rd Injector connector is connected properly.	Go to Step 2	<ul style="list-style-type: none">Ensure better connections.
2	<p>Turn OFF the ignition switch.</p> <p>Disconnect the 3rd injector connector and ECU connector.</p> <p>Check continuity for the following:</p> <ul style="list-style-type: none">ECU connector pins K05 to Injector connector pin 1ECU connector pins K29 to Injector connector pin 2 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none">Replace the wiring harness.

Step	Test Procedure	Yes	No
3	<p>Check that the injector connector pins are not short with battery / ground.</p> <p>Also check that the injector connector pins are not short with each other and with injector body.</p> <p>Acceptance Criteria</p> <p>No short circuit between battery positive/injector body.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	<p>Remove the 3rd injector connector.</p> <p>With the injector mounted on engine, Check the resistance between pin 1 and 2.</p> <p>Acceptance Criteria</p> <p>Normally less than 100 milli ohms.</p>	Go to Step 5	<ul style="list-style-type: none"> Replace the injector with a new one.
5	<p>Connect the ECU connector.</p> <p>Turn ON the ignition switch.</p> <p>Check the supply voltage between the first pin of 3rd injector connector with respect to ground.</p> <p>Acceptance Criteria</p> <p>12 volts for 3rd injector</p>	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the injector with a new one. 	<ul style="list-style-type: none"> Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0335 - CRANKSHAFT NO SIGNAL

The crankshaft speed sensor (also known as the crank position sensor) is an electronic device used in an engine to record the rate at which the crankshaft is spinning. This information is used by the ECU to control fuel injection.

The sensor system consists of a rotating part, typically a disc, as well as a static part, the actual sensor. When the engine is running, the high and low parts of the teeth cause a change in gap with the sensor. The changing gap causes a change in the magnetic field near the sensor. The change in the magnetic field causes a change in the voltage from the sensor.



Possible Causes

- Loose connections
- Wiring harness problem
- Excess/inadequate gap between sensor and flywheel
- Faulty crankshaft speed sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**0 to 140 V**) from the crankshaft speed sensor.

DTC Information

DTC Detecting Condition

Normal signal pattern has not been input for cylinder identification from the crankshaft speed sensor signal for 4 sec. (Engine should be cranked to check this error).

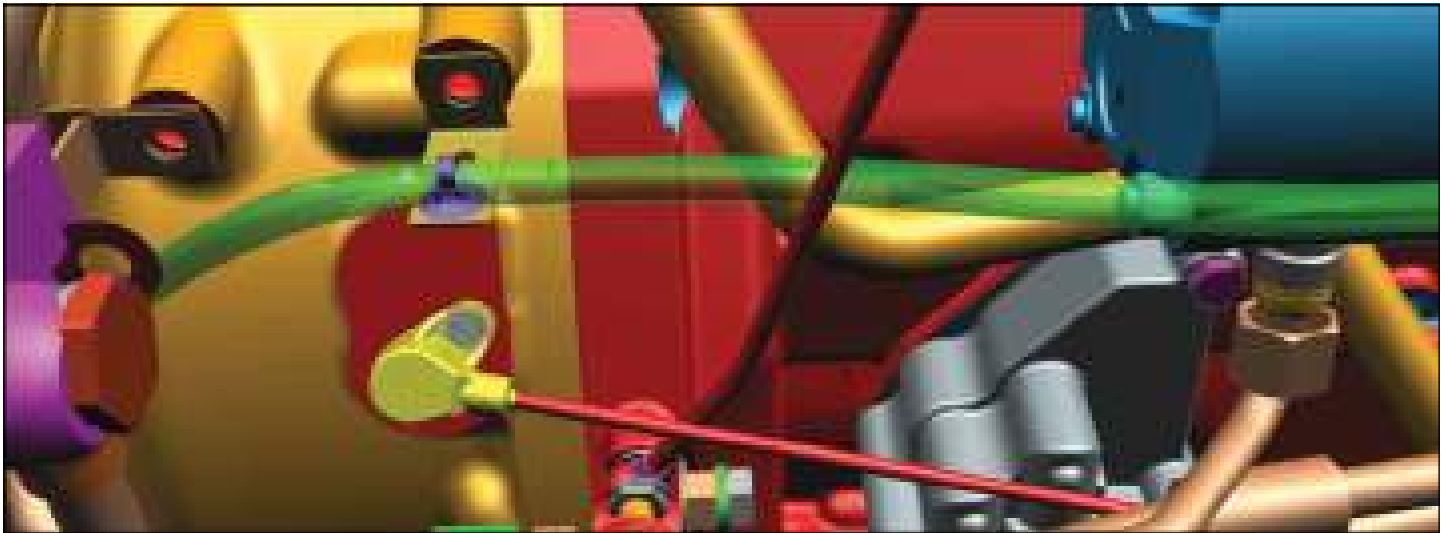
DTC Reaction

- The engine will not start.
- If this failure occurs when the engine is running, then engine shuts off.

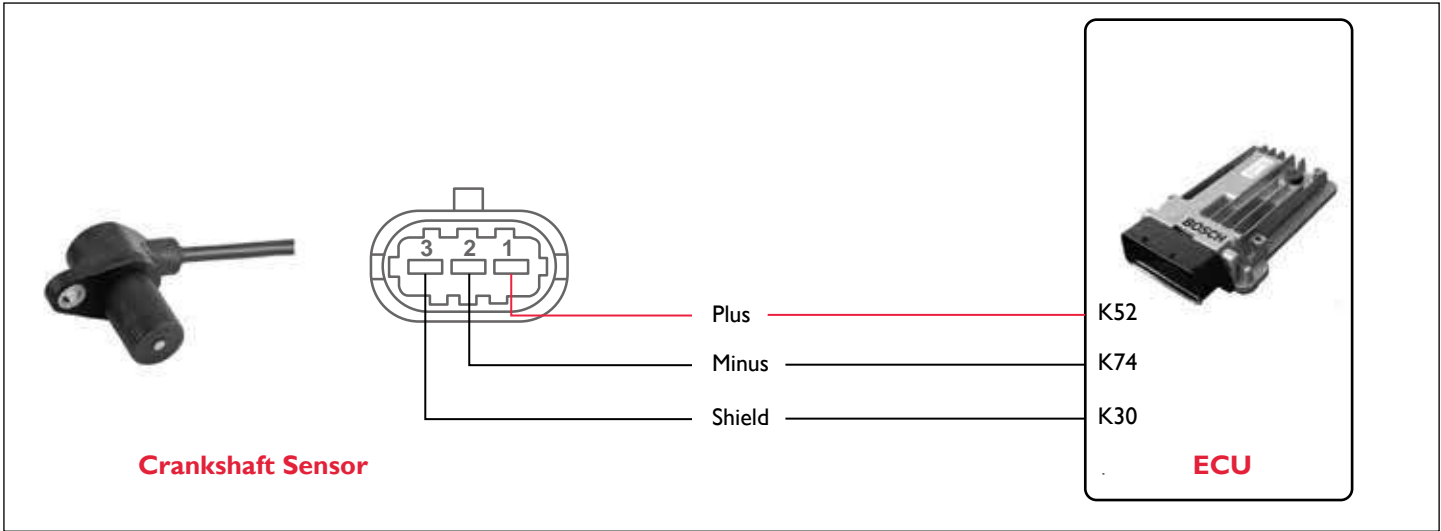
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of the crankshaft position sensor and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the sensor wiring harness connector and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K52 to Sensor connector pin 1 ECU connector pin K74 to Sensor connector pin 2 ECU connector pin K30 to Sensor connector pin 3 <p>Acceptance Criteria</p> <p>Ensure proper continuity</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Turn ON the ignition with ECU connector connected. Check for any short circuit for sensor connector pin 1 and 2 with ground/battery. Check for any short circuit between sensor connector pin 1 and 2. <p>Acceptance Criteria</p> <p>Ensure no short circuits.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Check the gap between the crank sensor tip and flywheel sensing surface. <p>Acceptance Criteria</p> <p>0.95 to 1.55 mm</p>	Go to Step 5	<ul style="list-style-type: none"> Ensure proper gap is maintained.



Step	Test Procedure	Yes	No
5	Physically check for any sensor damage. Acceptance Criteria No damage to sensor.	<ul style="list-style-type: none"> Replace the ECU with a new one. Clear the DTC and verify. If the error repeats, replace the sensor. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the sensor with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



P0339 - CRANKSHAFT ERROR SIGNAL

The crankshaft speed sensor (also known as the crank position sensor) is an electronic device used in an engine to record the rate at which the crankshaft is spinning. This information is used by the ECU to control fuel injection.

The sensor system consists of a rotating part, typically a disc, as well as a static part, the actual sensor. When the engine is running, the high and low parts of the teeth cause a change in gap with the sensor. The changing gap causes a change in the magnetic field near the sensor. The change in the magnetic field causes a change in the voltage from the sensor.



Possible Causes

- Loose connections
- Wiring harness problem
- Excess/inadequate gap between sensor and flywheel
- Faulty crankshaft speed sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**0 to 140 V**) from the crankshaft speed sensor.

DTC Information

DTC Detecting Condition

Normal signal pattern has not been input for cylinder identification from the crankshaft speed sensor signal for 4 sec.

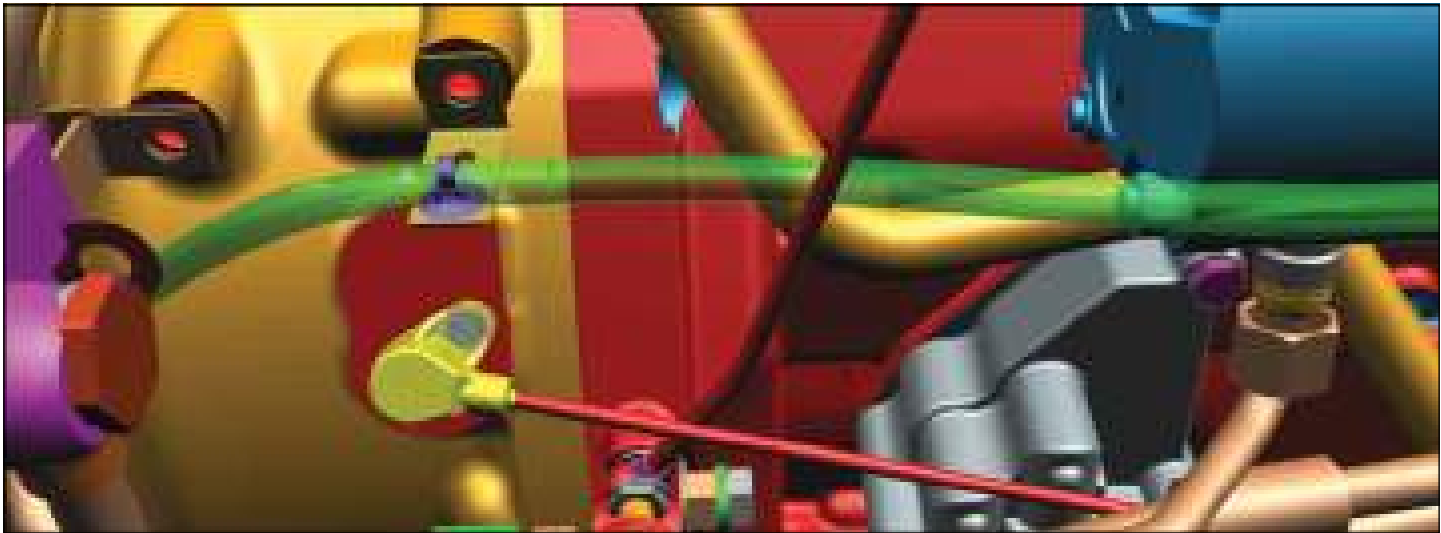
DTC Reaction

- The engine will not start.
- If this failure occurs when the engine is running, then engine shuts off.

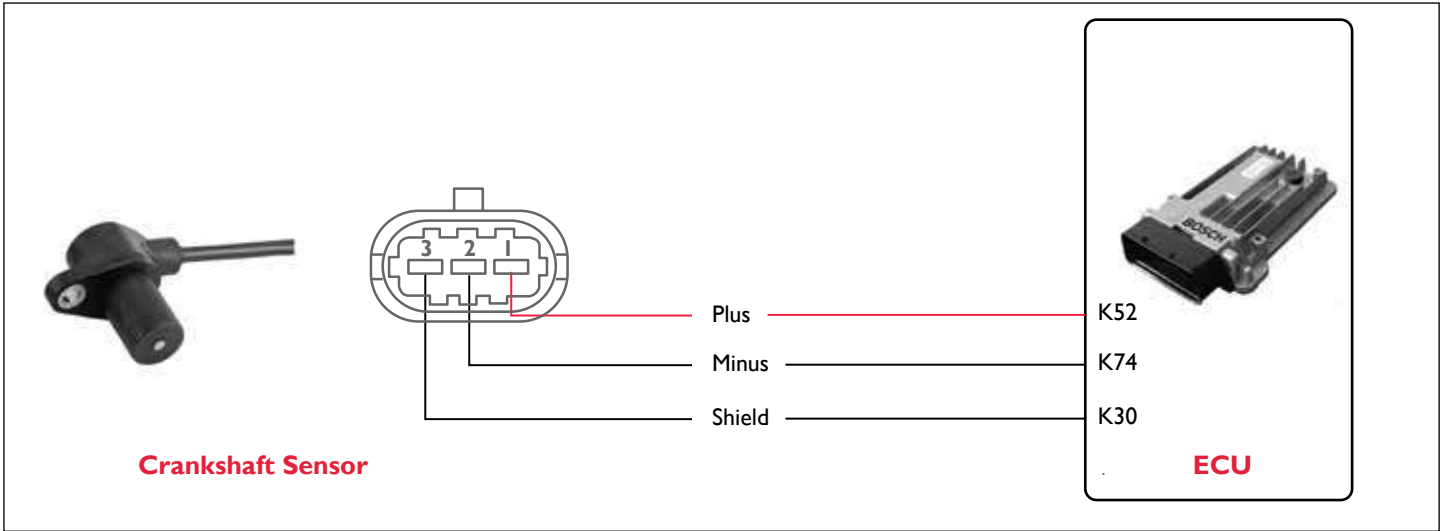
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of the crankshaft position sensor and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the sensor wiring harness connector and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K52 to Sensor connector pin 1 ECU connector pin K74 to Sensor connector pin 2 ECU connector pin K30 to Sensor connector pin 3 <p>Acceptance Criteria</p> <p>Ensure proper continuity</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Turn ON the ignition with ECU connector connected. Check for any short circuit for sensor connector pin 1 and 2 with ground/battery. Check for any short circuit between sensor connector pin 1 and 2. <p>Acceptance Criteria</p> <p>Ensure no short circuits.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Check the gap between the crank sensor tip and flywheel sensing surface. <p>Acceptance Criteria</p> <p>0.95 to 1.55 mm</p>	Go to Step 5	<ul style="list-style-type: none"> Ensure proper gap is maintained.



Step	Test Procedure	Yes	No
5	Physically check for any sensor damage. Acceptance Criteria No damage to sensor.	<ul style="list-style-type: none"> Replace the ECU with a new one. Clear the DTC and verify. If the error repeats, replace the sensor. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the sensor with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



P0340 - CAMSHAFT NO SIGNAL

The Camshaft position sensor senses the Top dead center (TDC) point of the first cylinder in the compression stroke. This allows the ECU to determine when to start the injection.

Sensor records the rate at which the camshaft is spinning and this information is used by the ECU to control ignition and fuel injection.



Possible Causes

- Loose connections
- Incorrect fitment of camshaft position sensor
- Wiring harness problem
- Excess gap between sensor and cam gear
- Faulty camshaft position sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**5Volts PWM Waveform**) from the camshaft position sensor.

DTC Information

DTC Detecting Condition

Normal waveform pattern has not been input for cylinder identification from the camshaft position sensor signal for 4 sec. (Engine should be cranked to check this error).

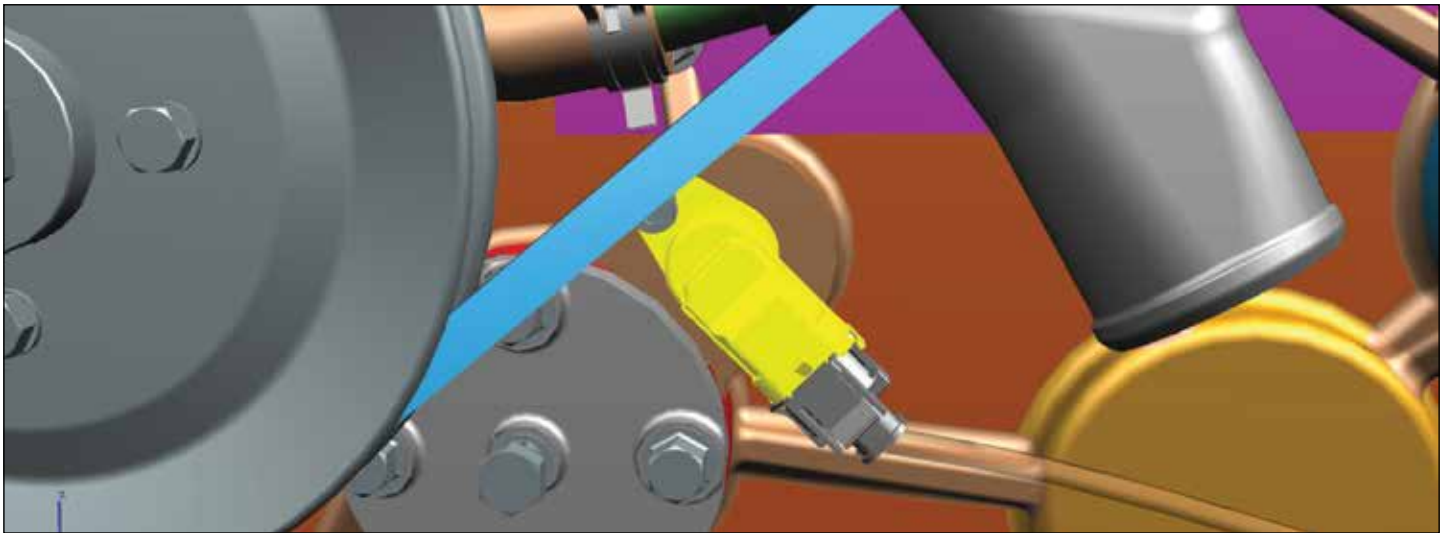
DTC Reaction

- Delayed engine start.
- Engine speed limitations.
- Engine may stall while driving.

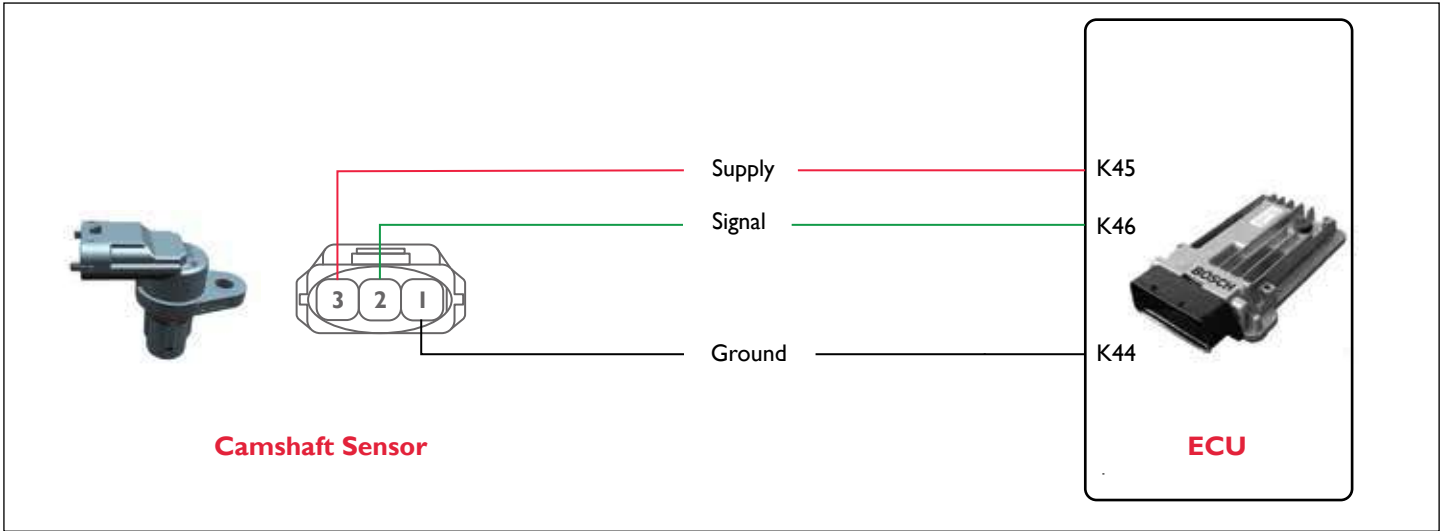
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster glows.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of the camshaft position sensor and its connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the sensor wiring harness connector and ECU connector. a. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K44 to Sensor connector pin 1 ECU connector pin K46 to Sensor connector pin 2 ECU connector pin K45 to Sensor connector pin 3 b. Check for any short circuit between Sensor connector pins 2 and 3 with battery positive/ground. c. Check for any short circuit between Sensor connector pin 1 with battery positive. Acceptance Criteria a - Ensure proper continuity. b and c - No short circuit between the pins	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Remove the sensor. Check whether the sensor is damaged. Also check whether the sensor mounting area is clean and smooth. Acceptance Criteria Ensure the sensor is not damaged and sensor mounting area is clean and smooth.	Go to Step 4	<ul style="list-style-type: none"> Replace the sensor with a new one and ensure the smooth sensor mounting area.



Step	Test Procedure	Yes	No
4	Check if the gap between the cam sensor tip and cam gear sensing surface. Acceptance Criteria 0.1 to 2.8 mm	Go to Step 5	<ul style="list-style-type: none"> Ensure proper gap is maintained between sensor tip and cam gear.
5	If the problem persist, Replace the sensor with a new one.	Clear the DTC and verify. If still error repeats, Replace the ECU with a new one.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0341 - CAMSHAFT ERROR SIGNAL

The Camshaft position sensor senses the Top dead center (TDC) point of the first cylinder in the compression stroke. This allows the ECU to determine when to start the injection.

Sensor records the rate at which the camshaft is spinning and this information is used by the ECU to control ignition and fuel injection.



Possible Causes

- Loose connections
- Incorrect fitment of camshaft position sensor
- Wiring harness problem
- Excess gap between sensor and cam gear
- Faulty camshaft position sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**5Volts PWM Waveform**) from the camshaft position sensor.

DTC Information

DTC Detecting Condition

Error signal pattern from camshaft position sensor. (Engine should not be cranked to check this error)

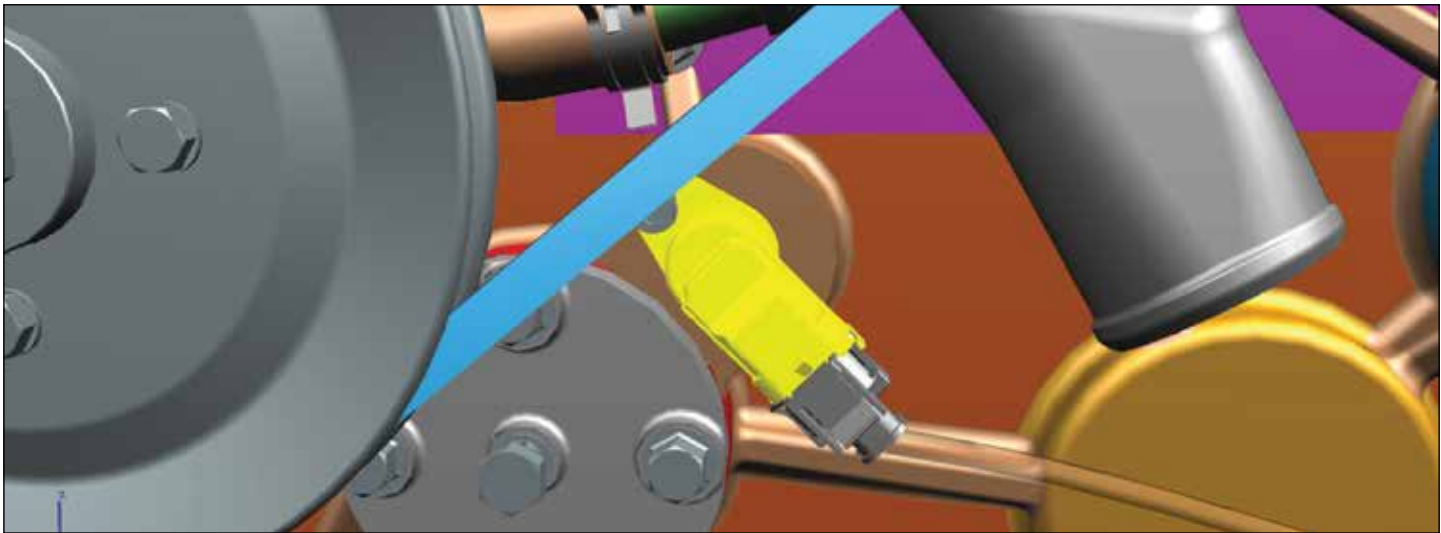
DTC Reaction

- Delayed engine start.
- Engine speed limitations.
- Engine may stall while driving.

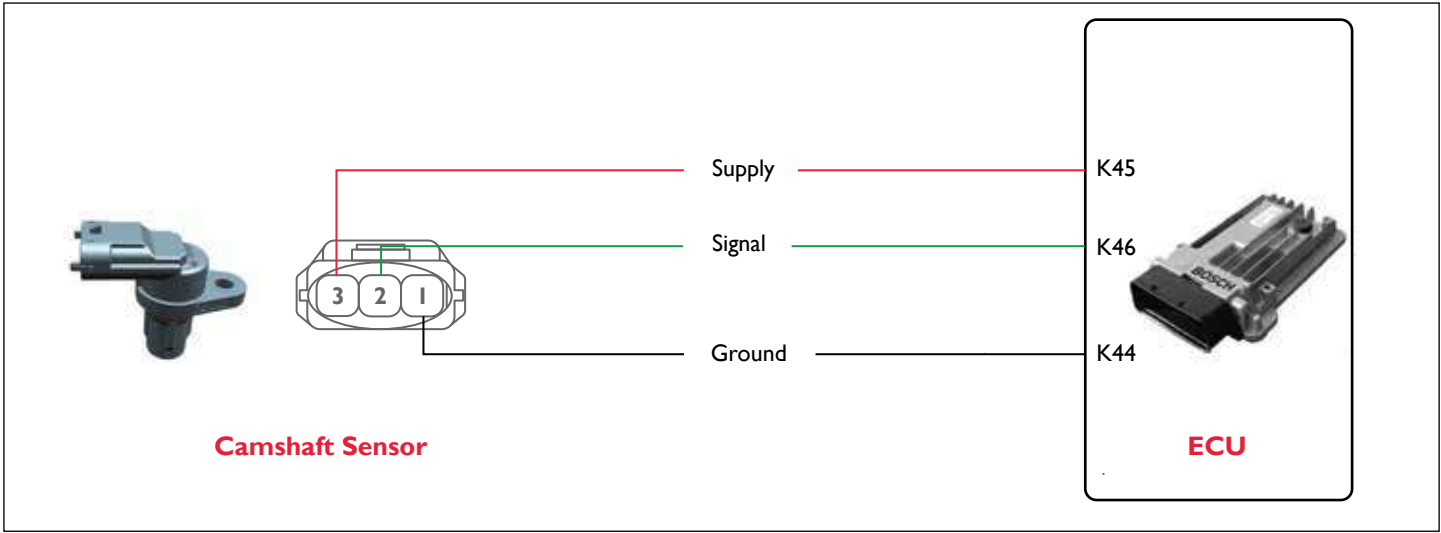
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster glows.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of the camshaft position sensor and its connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the sensor wiring harness connector and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K44 to Sensor connector pin 1 ECU connector pin K46 to Sensor connector pin 2 ECU connector pin K45 to Sensor connector pin 3 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check for any short circuit between sensor connector pins 2 and 3 with battery positive/ground. Check for any short circuit between sensor connector pin 1 with battery positive. <p>Acceptance Criteria</p> <p>No short circuit between ground / battery positive.</p>	<ul style="list-style-type: none"> Replace the wiring harness. 	Go to Step 4
4	Connect the ECU connector. Turn ON the ignition switch. Check the voltage between sensor connector pin 1 and 3. <p>Acceptance Criteria</p> <p>Voltage = 5V (+/- 0.25)</p>	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.

Step	Test Procedure	Yes	No
5	Check if the gap between the cam sensor tip and cam gear sensing surface. Acceptance Criteria 0.1 to 2.8 mm	Go to Step 6	<ul style="list-style-type: none"> Ensure proper gap is maintained between sensor tip and cam gear.
6	If the problem persist, Replace the sensor with a new one.	Clear the DTC and verify. If still error repeats, Replace the ECU with a new one.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0405 - SIGNAL RANGE CHECK LOW - SENSOR VOLTAGE FOR EGR VALVE POSITION SENSOR

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NO_x) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- Wiring harness problem
- Short circuit to ground
- Faulty EGR valve
- Faulty ECU

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

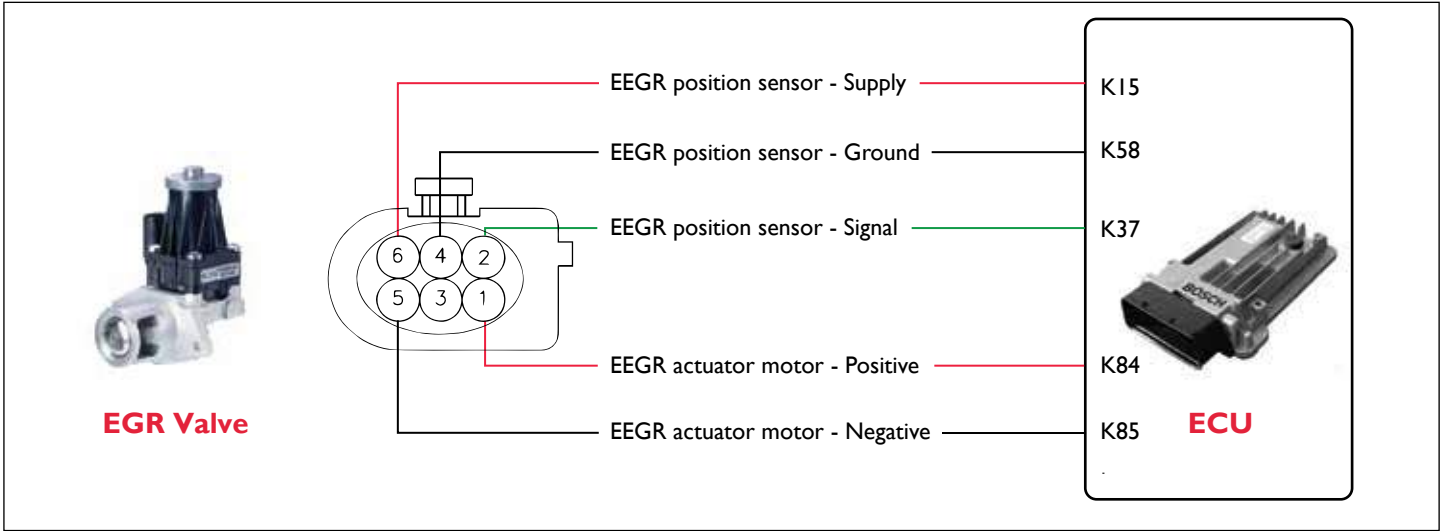
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no.5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.



Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0406 - SIGNAL RANGE CHECK HIGH - SENSOR VOLTAGE FOR EGR VALVE POSITION SENSOR

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- Wiring harness problem
- Short circuit to ground
- Faulty EGR valve
- Faulty ECU

DTC Information

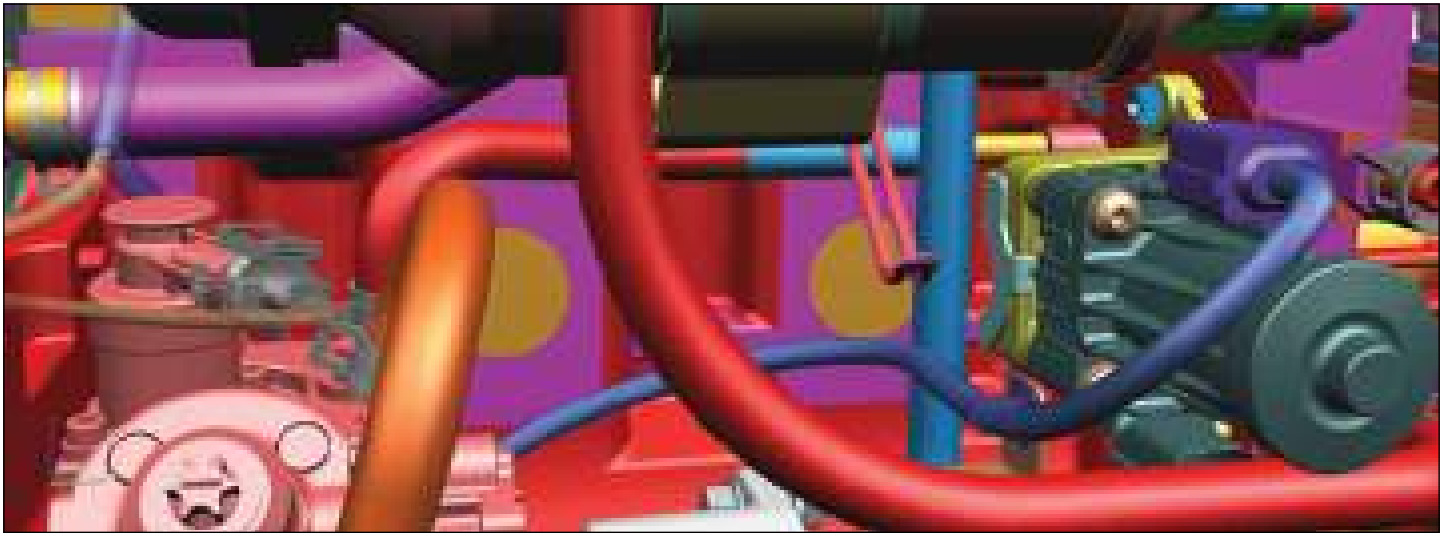
DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

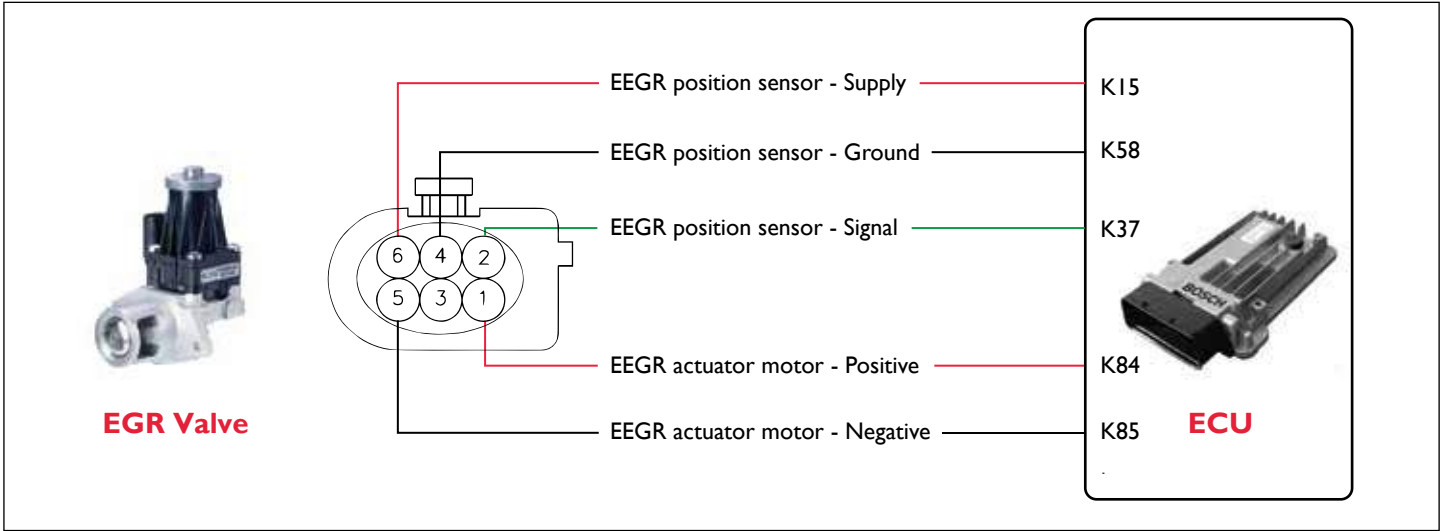
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no.5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.



Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0562 - SIGNAL RANGE CHECK LOW - BATTERY VOLTAGE SENSOR

The battery supplies electricity to the ECU even when the ignition switch is OFF. This electricity allows the ECU to store data such as DTC history, freeze frame data and other data. If the battery voltage falls below a minimum level, the ECU will conclude that there is a fault in the power supply circuit. The next time the engine starts, a DTC will be set.

The ignition voltage of the tractor is controlled by the engine control unit (ECU). If there is a voltage fluctuation and the voltage dips below the calibrated level a system voltage diagnostic trouble code (DTC) will be automatically set.

Possible Causes

- Loose or missing alternator drive belt
- Indicator bulb in instrument cluster faulty or fuse is blown OFF
- Improper battery for the application
- Faulty alternator regulator/ alternator
- Faulty ECU

Normal Operation

ECU receives **8 to 16V** supply when the ignition is ON.

DTC Information

DTC Detecting Condition

Permanent supply voltage to ECU is less than **8V**.

DTC Reaction

Torque limitation

Lamp Status

No Lamp activation

Symptoms

- Slow engine start
- Low battery power

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the alternator drive belt is loose or damaged.	<ul style="list-style-type: none"> Replace the belt or adjust the belt tension. 	Go to Step 2
2	Check whether the main charging fuse (battery charging 150 Amps) is blown OFF.	<ul style="list-style-type: none"> Replace the blown fuse. 	Go to Step 3
3	Check whether the charge indicator bulb or fuse is blown OFF.	<ul style="list-style-type: none"> Replace the blown fuse. If problem repeats, replace the Instrument cluster. 	Go to Step 4
4	Check the battery voltage. Acceptance Criteria Voltage should be 8 to 16 V.	Go to Step 5	<ul style="list-style-type: none"> Recharge or replace the battery as required.
5	Run the engine at high idle speed and measure the voltage between Positive terminal and Negative or Ground terminal. Acceptance Criteria Voltage should be more than 12 V.	<ul style="list-style-type: none"> Clear the DTC and verify. If problem persists, replace the ECU with a new one. 	<ul style="list-style-type: none"> Replace the alternator.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0563 - SIGNAL RANGE CHECK HIGH - BATTERY VOLTAGE SENSOR

The battery supplies electricity to the ECU even when the ignition switch is OFF. This electricity allows the ECU to store data such as DTC history, freeze frame data and other data. If the battery voltage falls below a minimum level, the ECU will conclude that there is a fault in the power supply circuit. The next time the engine starts, a DTC will be set.

The ignition voltage of the tractor is controlled by the engine control unit (ECU). If there is a voltage fluctuation and the voltage dips below the calibrated level a system voltage diagnostic trouble code (DTC) will be automatically set.

Possible Causes

- Faulty alternator regulator/ alternator
- Malfunctioning ECU

Normal Operation

ECU receives **8 to 16V** supply when the ignition is ON.

DTC Information

DTC Detecting Condition

The supply voltage to ECU is more than **16V**.

DTC Reaction

Torque limitation

Lamp Status

No Lamp activation

Symptoms

- Slow engine start



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the alternator drive belt is loose or damaged.	<ul style="list-style-type: none"> Replace the belt or adjust the belt tension. 	Go to Step 2
2	Check whether the main charging fuse (battery charging 150 Amps) is blown OFF.	<ul style="list-style-type: none"> Replace the blown fuse. 	Go to Step 3
3	Check whether the charge indicator bulb or fuse is blown OFF.	<ul style="list-style-type: none"> Replace the blown fuse. If problem repeats, replace the Instrument cluster. 	Go to Step 4
4	Check the battery voltage. Acceptance Criteria Voltage should be 8 to 16 V.	Go to Step 5	<ul style="list-style-type: none"> Recharge or replace the battery as required.
5	Run the engine at high idle speed and measure the voltage between Positive terminal and Negative or Ground terminal. Acceptance Criteria Voltage should be more than 12 V.	<ul style="list-style-type: none"> Clear the DTC and verify. If problem persists, replace the ECU with a new one. 	<ul style="list-style-type: none"> Replace the alternator.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P0658 - BATTERY VOLTAGE LOW

Possible Causes

- Low battery voltage

DTC Information
Lamp Status No Lamp activation
Vehicle Behaviour EGR switches OFF

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the alternator drive belt is loose or damaged.	<ul style="list-style-type: none"> • Replace the belt or adjust the belt tension. 	Go to Step 2
2	Check whether the main charging fuse (battery charging 150 Amps) is blown OFF.	<ul style="list-style-type: none"> • Replace the blown fuse. 	Go to Step 3
3	Check whether the charge indicator bulb or fuse is blown OFF.	<ul style="list-style-type: none"> • Replace the blown fuse. If problem repeats, replace the Instrument cluster. 	Go to Step 4
4	Check the battery voltage. Acceptance Criteria Voltage should be 8 to 16 V.	Go to Step 5	<ul style="list-style-type: none"> • Recharge or replace the battery as required.
5	Run the engine at high idle speed and measure the voltage between Positive terminal and Negative or Ground terminal. Acceptance Criteria Voltage should be more than 12 V.	<ul style="list-style-type: none"> • Clear the DTC and verify. • If problem persists, replace the ECU with a new one. 	<ul style="list-style-type: none"> • Replace the alternator.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



P0659 - BATTERY VOLTAGE HIGH

Possible Causes

- High battery voltage

DTC Information
Lamp Status No Lamp activation
Vehicle Behaviour EGR switches OFF

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the alternator drive belt is loose or damaged.	<ul style="list-style-type: none"> • Replace the belt or adjust the belt tension. 	Go to Step 2
2	Check whether the main charging fuse (battery charging 150 Amps) is blown OFF.	<ul style="list-style-type: none"> • Replace the blown fuse. 	Go to Step 3
3	Check whether the charge indicator bulb or fuse is blown OFF.	<ul style="list-style-type: none"> • Replace the blown fuse. If problem repeats, replace the Instrument cluster. 	Go to Step 4
4	Check the battery voltage. Acceptance Criteria Voltage should be 8 to 16 V.	Go to Step 5	<ul style="list-style-type: none"> • Recharge or replace the battery as required.
5	Run the engine at high idle speed and measure the voltage between Positive terminal and Negative or Ground terminal. Acceptance Criteria Voltage should be more than 12 V.	<ul style="list-style-type: none"> • Clear the DTC and verify. • If problem persists, replace the ECU with a new one. 	<ul style="list-style-type: none"> • Replace the alternator.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI001 - PUMP METERING UNIT OPEN LOAD ERROR

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.



Possible Causes

- Loose connections
- Wiring harness problem
- Pump metering unit failure

DTC Information

DTC Reaction

- The rail pressure line get damaged with warning light in cluster.

Lamp Status

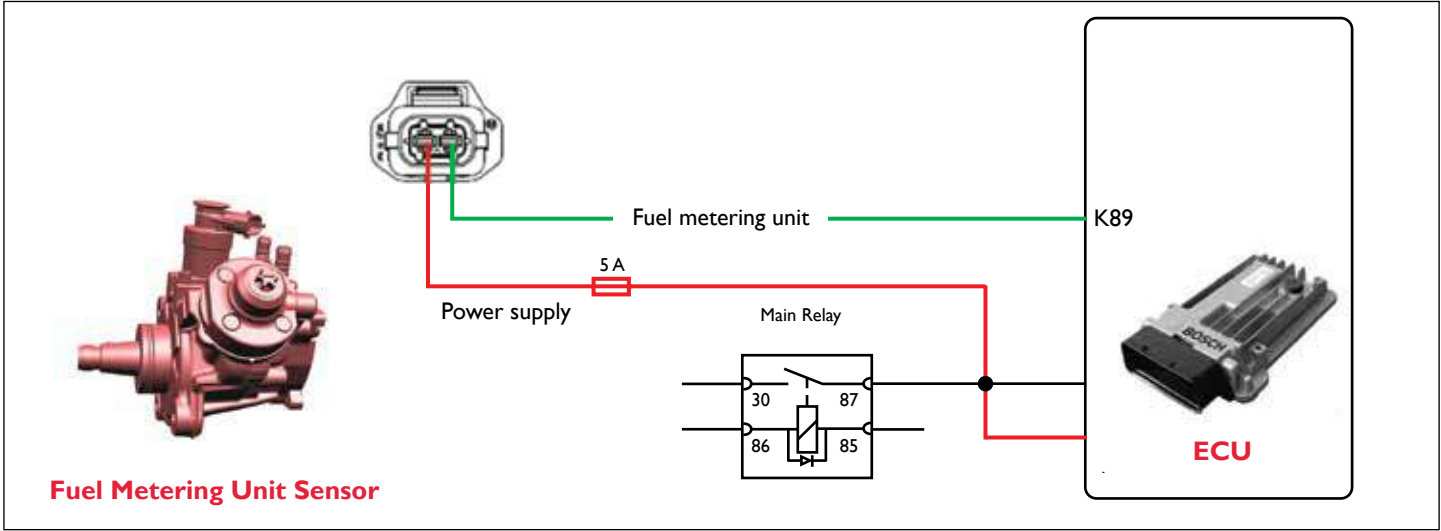
The check engine (CHK ENG) lamp in the instrument cluster blinks.

Metering Unit Location



G171

Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the metering unit fuse is blown.	<ul style="list-style-type: none">Replace the blown fuse.	Go to Step 2
2	<p>Turn OFF the ignition switch.</p> <p>Disconnect the ECU connector and pump metering unit connector.</p> <p>Check continuity between the following:</p> <ul style="list-style-type: none">ECU connector pin K89 to metering unit connector pin 1.Metering unit fuse to metering unit connector pin 2. <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none">Replace the wiring harness.
3	<p>Check whether the metering unit connector pins are shorted with battery.</p> <p>Acceptance Criteria</p> <p>No short circuit to battery.</p>	<ul style="list-style-type: none">Clear the DTC and verify.If the error repeats, replace the ECU with a new one.	<ul style="list-style-type: none">Replace the wiring harness.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI 106 - OVER CURRENT ERROR FOR EGR VALVE H-BRIDGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- High current flow to ECU H-bridge and EGR valve failure/jammed

DTC Information

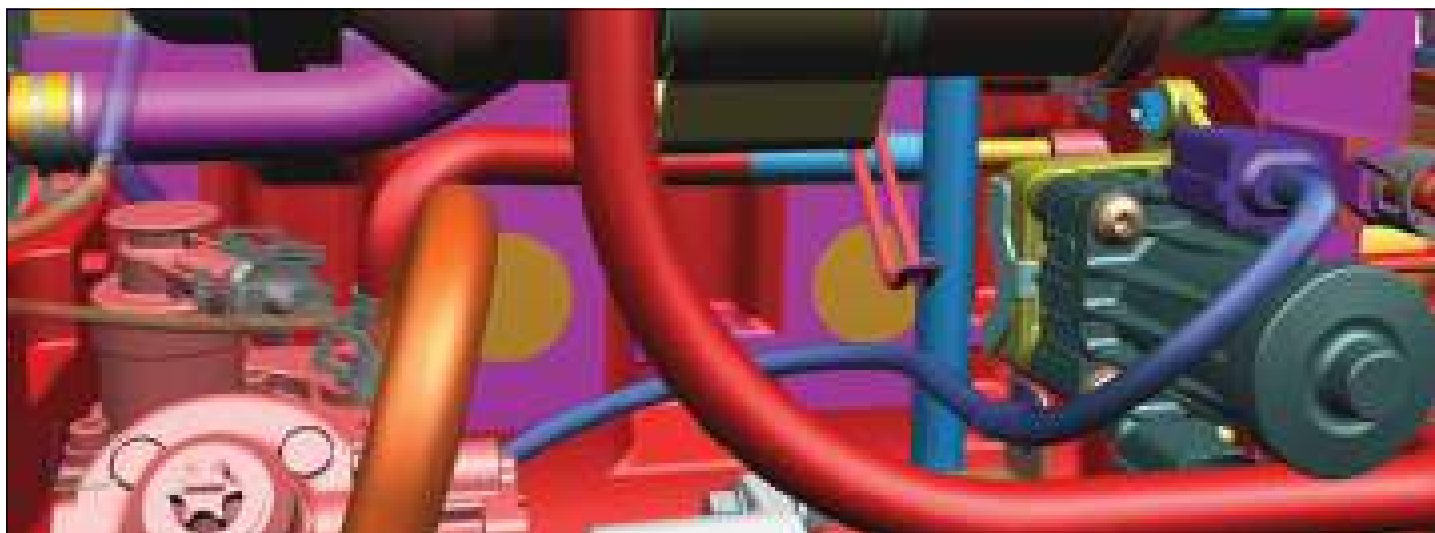
DTC Reaction

Emission failure, EGR switches off and 30% torque deration

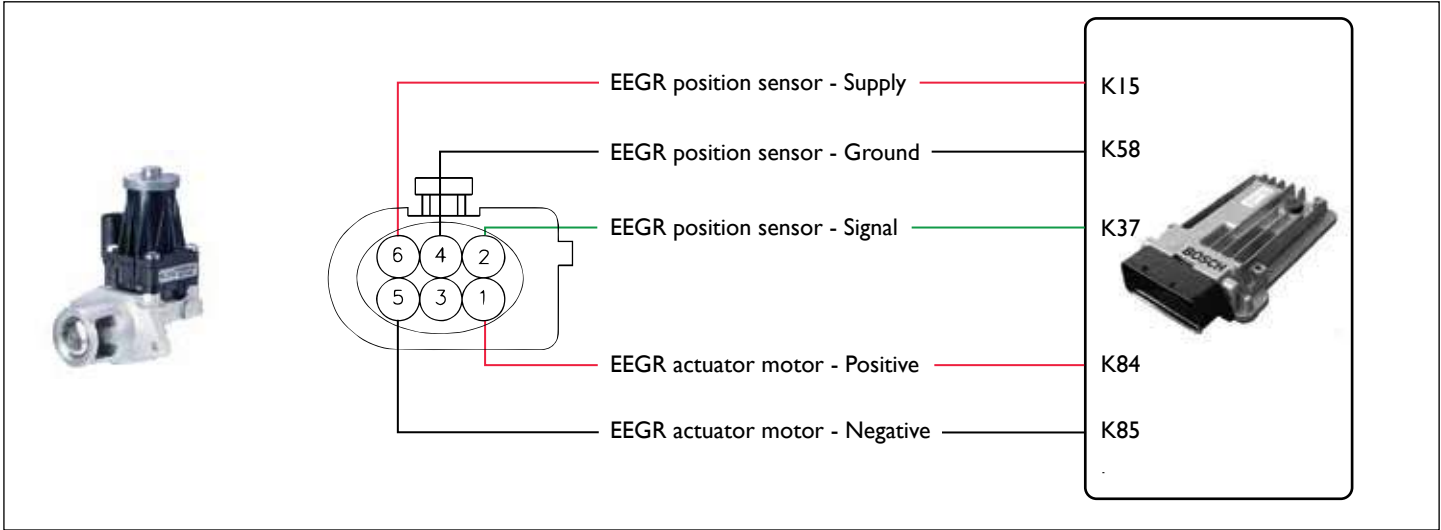
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Turn OFF the ignition switch. Remove the dust protection cap in the EEGR valve and check whether the EEGR valve operates freely.	Go to Step 2	<ul style="list-style-type: none">Change the EEGR valve.Clear the DTC and verify.
2	Turn ON the ignition switch. Activate the EGR through FES diagnostic tool actuator service. If positive response comes, clear the DTC and run the tractor at 2100 RPM for 15min.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI107 - OVER TEMPERATURE ERROR FOR EGR VALVE H-BRIDGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- DC motor +ve or -ve connection, short to battery for longer time
- High current flow to ECU H-bridge
- EGR valve failure/jammed

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

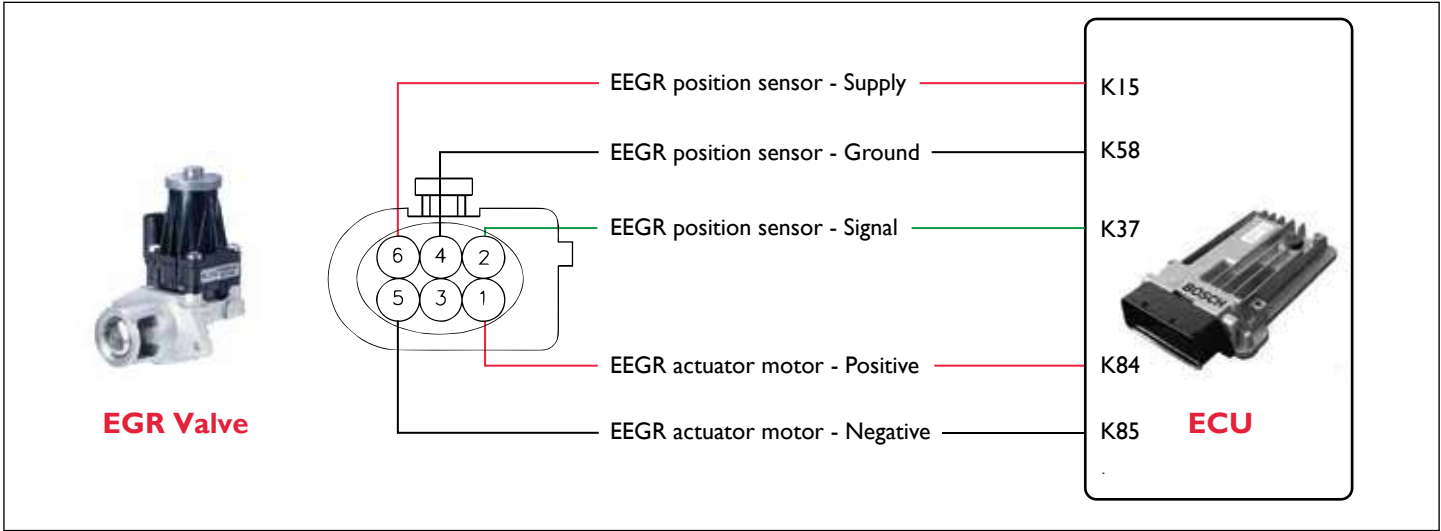
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	<p>Turn OFF the ignition switch.</p> <p>Disconnect the EGR and ECU connector.</p> <p>Check continuity for the following:</p> <ul style="list-style-type: none">• ECU connector pin K84 to EGR connector pin 1• ECU connector pin K37 to EGR connector pin 2• ECU connector pin K58 to EGR connector pin 4• ECU connector pin K85 to EGR connector pin 5• ECU connector pin K15 to EGR connector pin 6 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 2	<ul style="list-style-type: none">• Replace the wiring harness.
2	<p>Check for the sensor connector pin 1 and pin 5 for short circuit to battery.</p> <p>Acceptance Criteria</p> <p>No short circuit to battery.</p>	Go to Step 3	<ul style="list-style-type: none">• Replace the wiring harness.
3	<p>Remove the dust protection cap in the EEGR valve and check whether the EEGR valve operates freely.</p>	Go to Step 4	<ul style="list-style-type: none">• Change the EEGR valve.• Clear the DTC and verify.
4	<p>Connect the EGR and ECU connector. Turn ON the ignition switch.</p> <p>Activate the EGR through FES diagnostic tool actuator service.</p> <p>If positive response comes, clear the DTC and run the tractor at 2100 RPM for 15min.</p>	Go to Step 5	
5	<p>If still error repeats,</p> <p>Replace the ECU with a new one.</p>	Clear the DTC and verify.	



Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI 108 - SHORT CIRCUIT TO BATTERY ON OUT I ERROR FOR EGR VALVE H-BRIDGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- DC motor +ve short circuit to battery

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

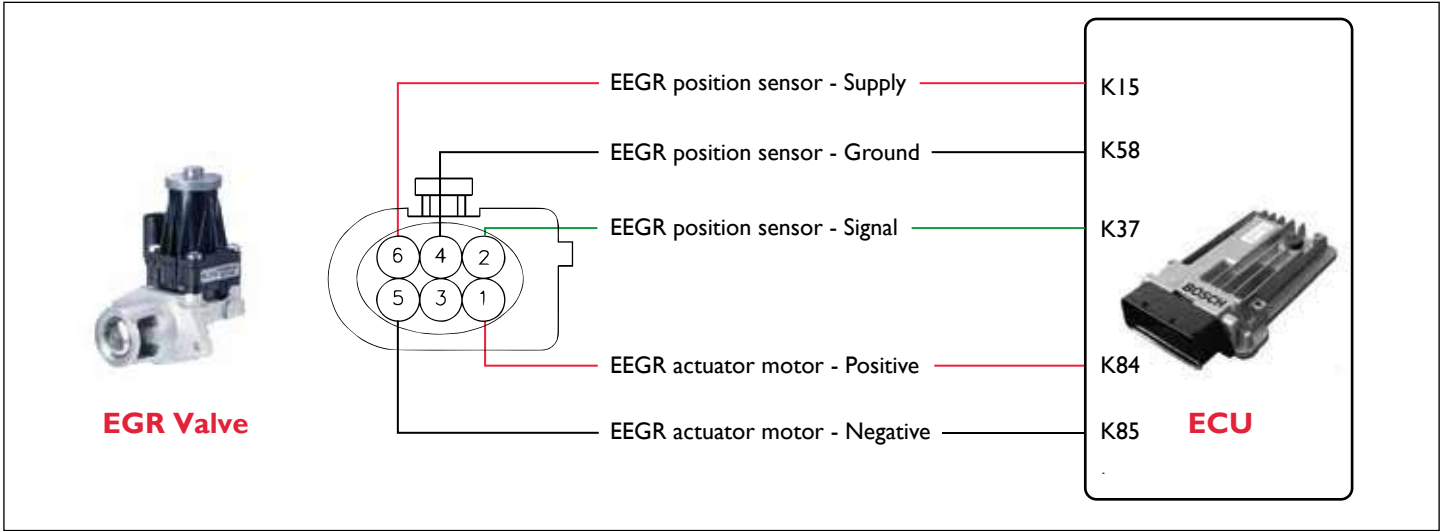
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no. 5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.



Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI 109 - SHORT CIRCUIT TO BATTERY ON OUT2 ERROR FOR EGR VALVE H-BRIDGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- DC motor -ve short circuit to battery

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

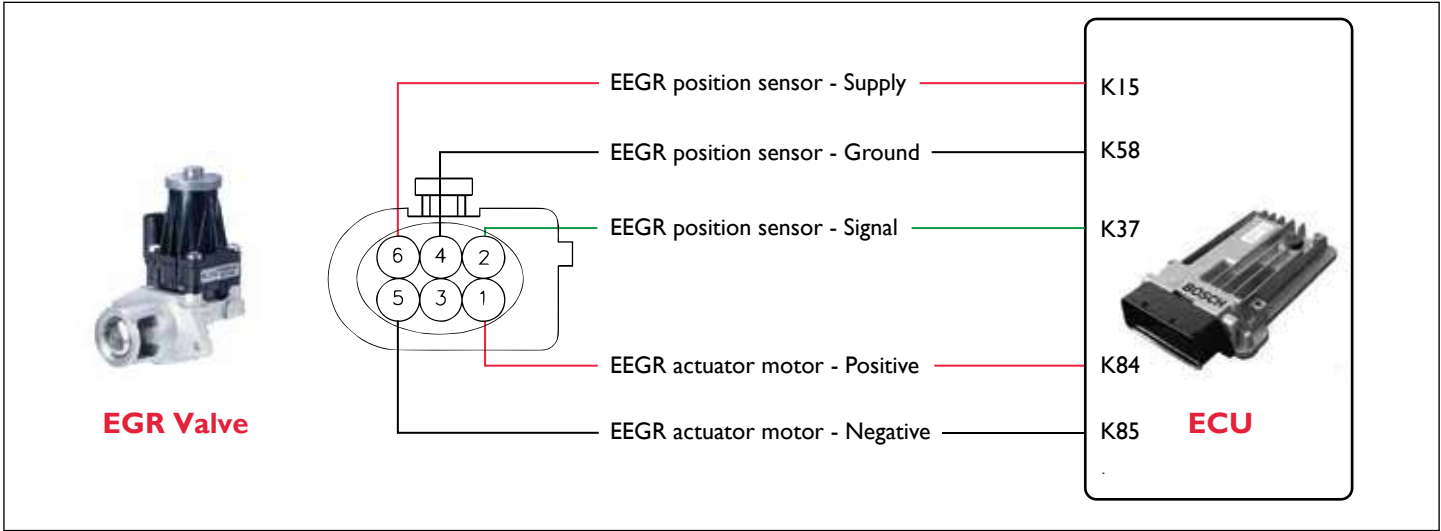
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no.5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.



Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI110 - SHORT CIRCUIT TO GROUND ON OUT1 ERROR FOR EGR VALVE H-BRIDGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- DC motor +ve short circuit to ground

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

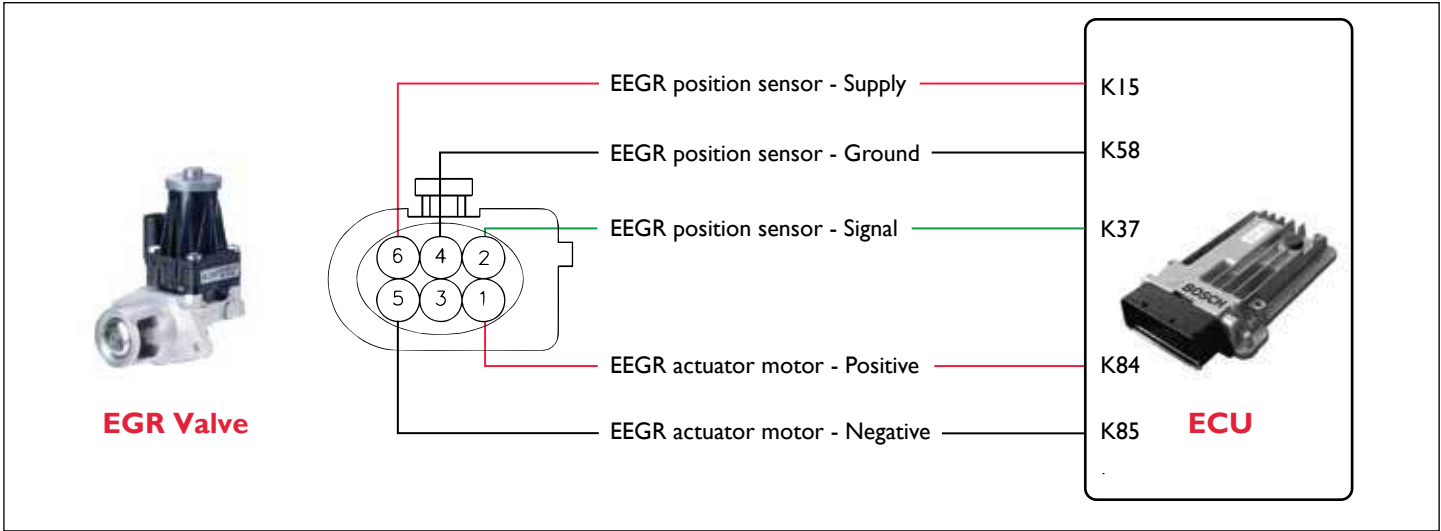
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no.5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.

Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PIIII - ENGINE SPEED TO CLUSTER - OPEN WIRE

Description

No load error on the engine speed output

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

Lamp Status

No Lamp activation

DTC Reaction

The instrument cluster does not show RPM.

Instrument Cluster Connector Pin Details

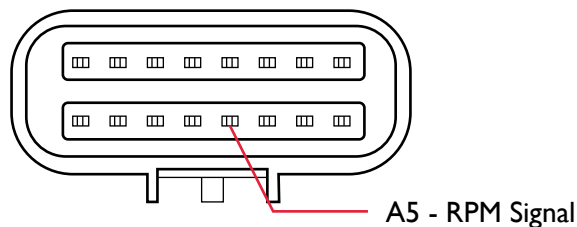


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K27 and cluster connector pin for RPM gauge A5. Acceptance Criteria Ensure proper continuity.	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one. 	<ul style="list-style-type: none"> Replace the wiring harness.
3	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P1112 - ENGINE SPEED TO CLUSTER POWERSTAGE - OVERTEMPERATURE**Description**

Over temperature error on the engine speed output

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information**Lamp Status**

No Lamp activation

DTC Reaction

The instrument cluster does not show RPM.

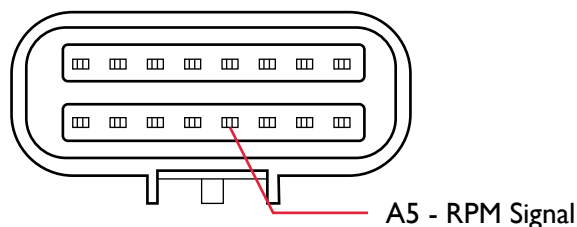
Instrument Cluster Connector Pin Details

Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K27 and cluster connector pin for RPM gauge A5. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin A5 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI113 - ENGINE SPEED TO CLUSTER - WIRE SHORTED TO BATTERY

Description

Short circuit to battery error on the engine speed output.

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

Lamp Status

No Lamp activation

DTC Reaction

The instrument cluster does not show RPM.

Instrument Cluster Connector Pin Details

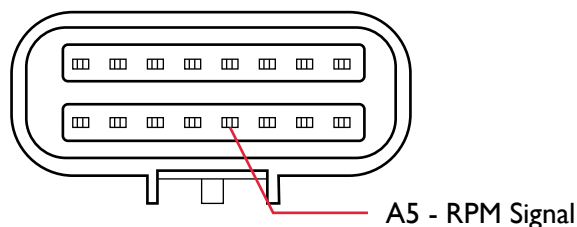


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU onnector pin K27 and cluster connector pin for RPM gauge A5. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin A5 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PII14 - ENGINE SPEED TO CLUSTER - WIRE SHORTED TO GROUND

Description

Short circuit to ground error on the engine speed output.

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information
<p>Lamp Status</p> <p>No Lamp activation</p> <p>DTC Reaction</p> <p>The instrument cluster does not show RPM.</p>

Instrument Cluster Connector Pin Details

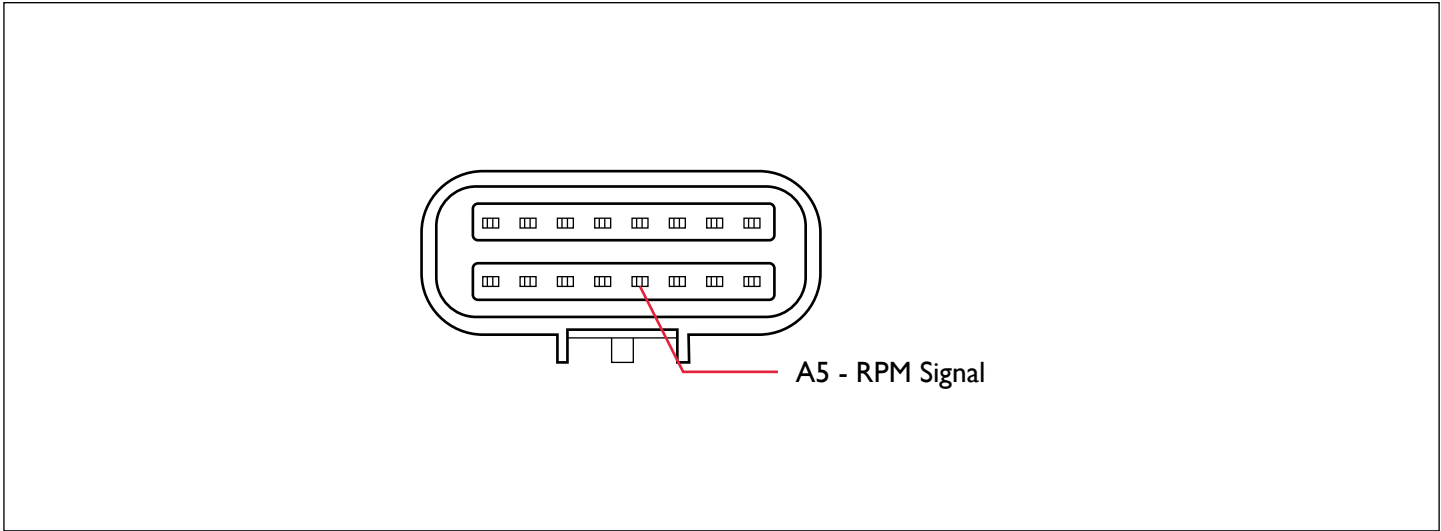


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K27 and cluster connector pin for RPM gauge A5. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin A5 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI131 - SHORT CIRCUIT TO GROUND ON OUT2 ERROR FOR EGR VALVE H-BRIDGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- DC motor -ve short circuit to ground

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

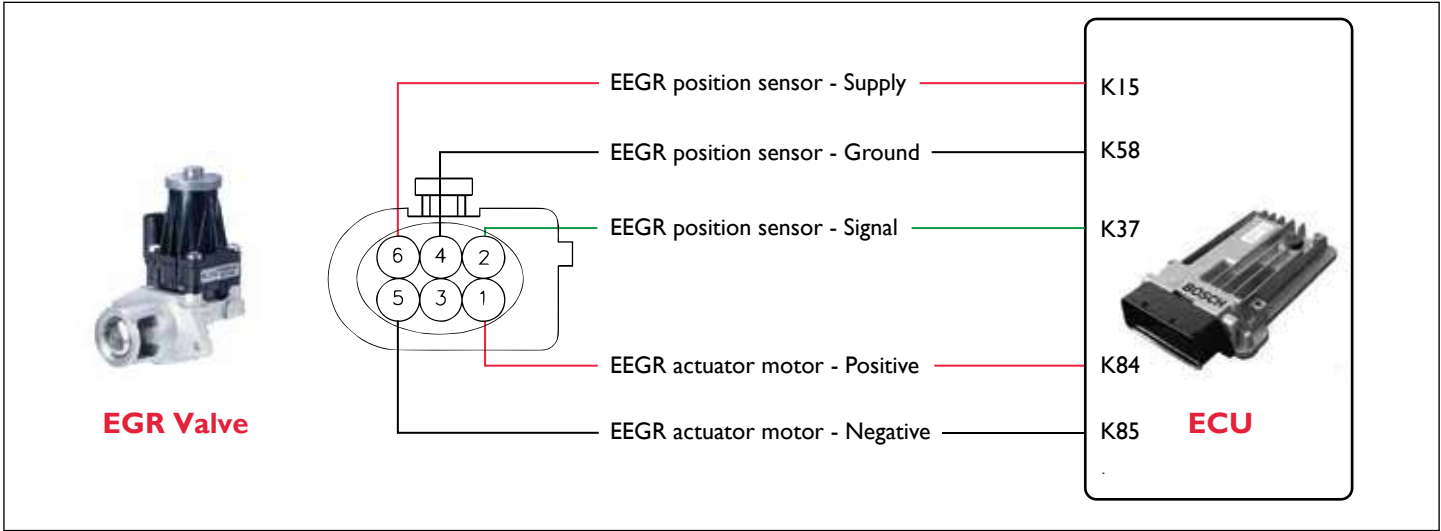
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no. 5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.

Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI 132 - SHORT CIRCUIT OVER LOAD ERROR FOR EGR VALVE H-BRIDGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- Over load on H-bridge hardware because of short circuit

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

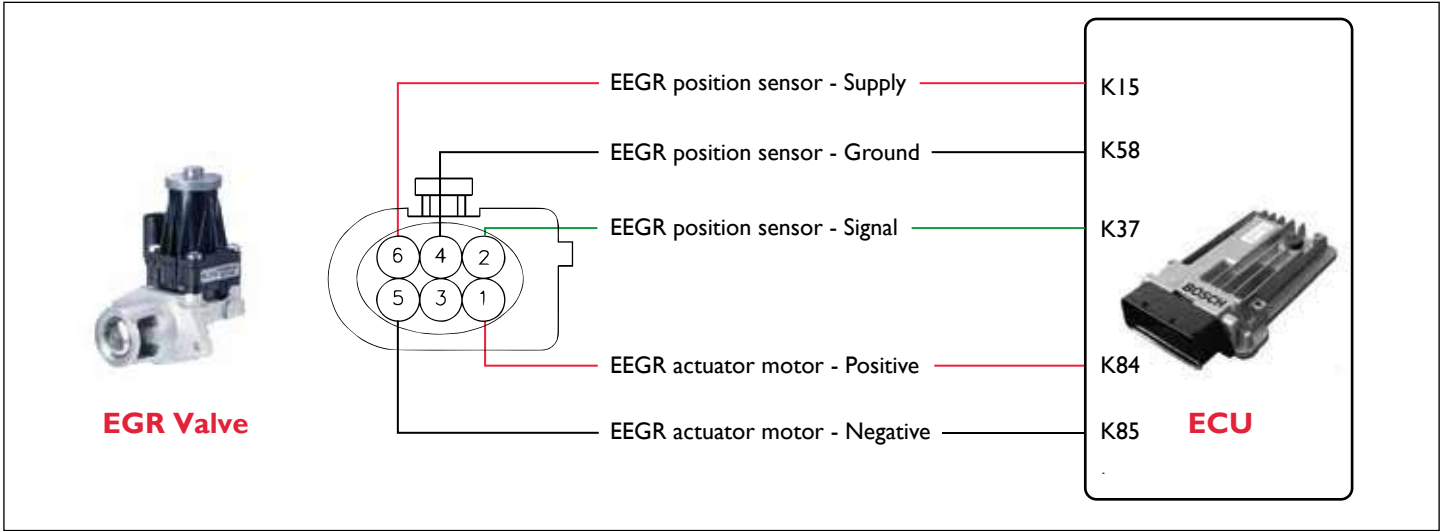
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no.5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.



Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI133 - TEMPERATURE DEPENDENT OVER CURRENT ERROR FOR EGR VALVE H-BRIDGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- Over current flow to H-bridge HW due to temperature change

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

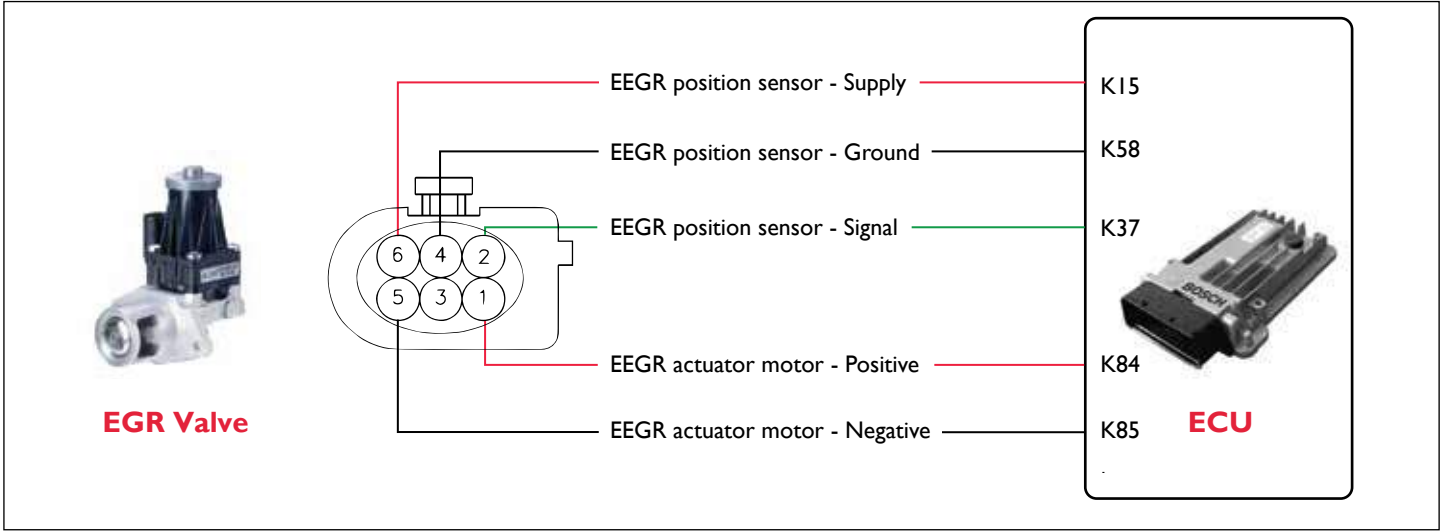
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no. 5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.



Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI I34 - UNDER VOLTAGE ERROR FOR EGR VALVE H-BRIDGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- H-bridge hardware voltage supply failure

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

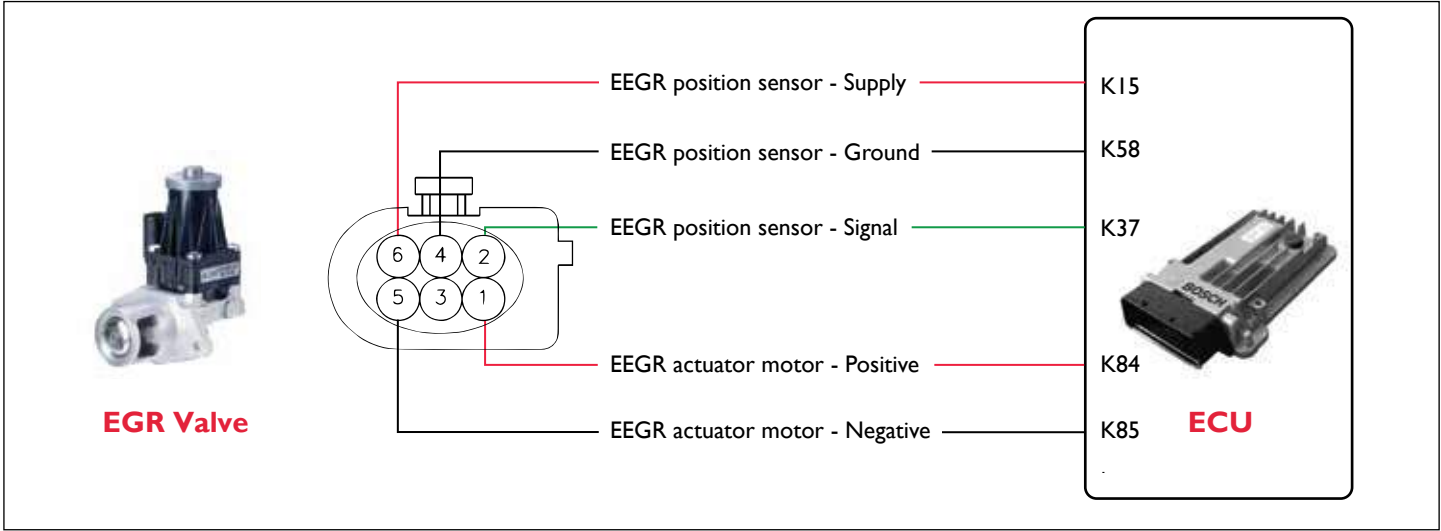
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no. 5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.



Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI I35 - OPEN LOAD ERROR FOR EGR VALVE POWERSTAGE

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- Wiring harness problem
- Short circuit to ground
- Faulty EGR Valve

DTC Information

DTC Reaction

- Emission failure
- EGR switches off, 30% torque deration

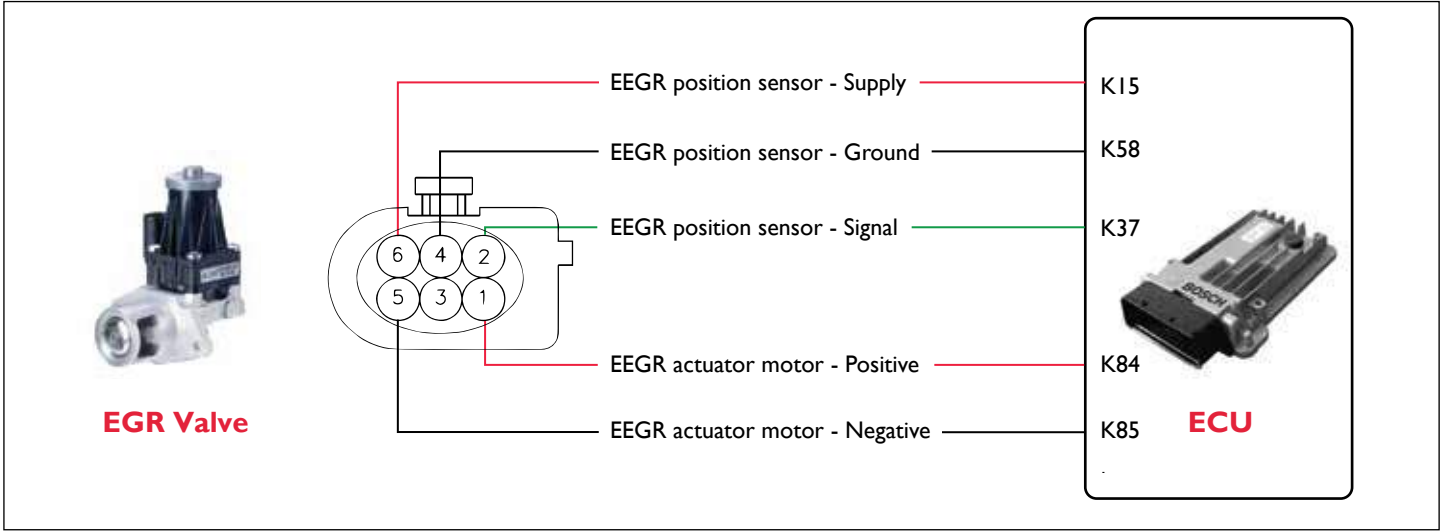
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1), EGR motor -ve (pin no.5) and EGR position sensor (pin no. 2) is short circuited to ground/battery positive. Acceptance Criteria No short circuit to ground/battery positive.	Go to Step 4	<ul style="list-style-type: none"> Replace the wiring harness.
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = $5 \pm 0.2V$	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.

Step	Test Procedure	Further Action
5	If still error repeats, Replace the EGR with a new one.	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI200 - NUMBER OF INJECTIONS LIMITED BY CHARGE BALANCE

Possible Causes

- Number of injections requested is more than allowed injections for current battery voltage and engine speed.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Check for battery voltage / replace the battery.
2. If still error persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI201 - NUMBER OF INJECTIONS LIMITED BY SYSTEM

Possible Causes

- Number of injections requested is more than allowed injections for current battery voltage and engine speed.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Check for battery voltage / replace the battery.
2. If still error persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI202 - NUMBER OF INJECTIONS LIMITED BY RUNTIME

Possible Causes

- Number of injections requested is more than allowed injections for current battery voltage and engine speed.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Check for battery voltage / replace the battery.
2. If still error persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI203 - MINIMUM RAIL PRESSURE CHECK FAILED DUE TO LESS RAIL PRESSURE

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.



Possible Causes

- Low/no fuel in the fuel tank
- Choked fuel filter
- Fuel leakage in the high pressure circuit and low pressure circuit.
- Restriction in fuel suction line
- Fuel leaking through PLV

DTC Information

DTC Reaction

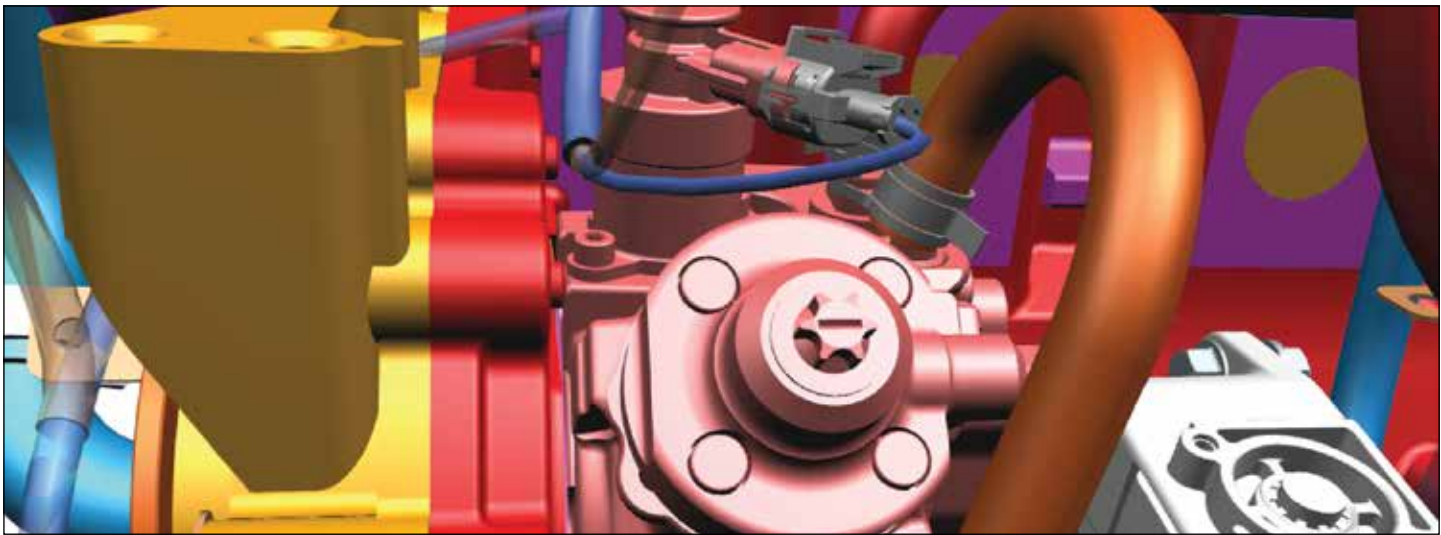
- The rail pressure line get damaged with warning light in cluster.

Lamp Status

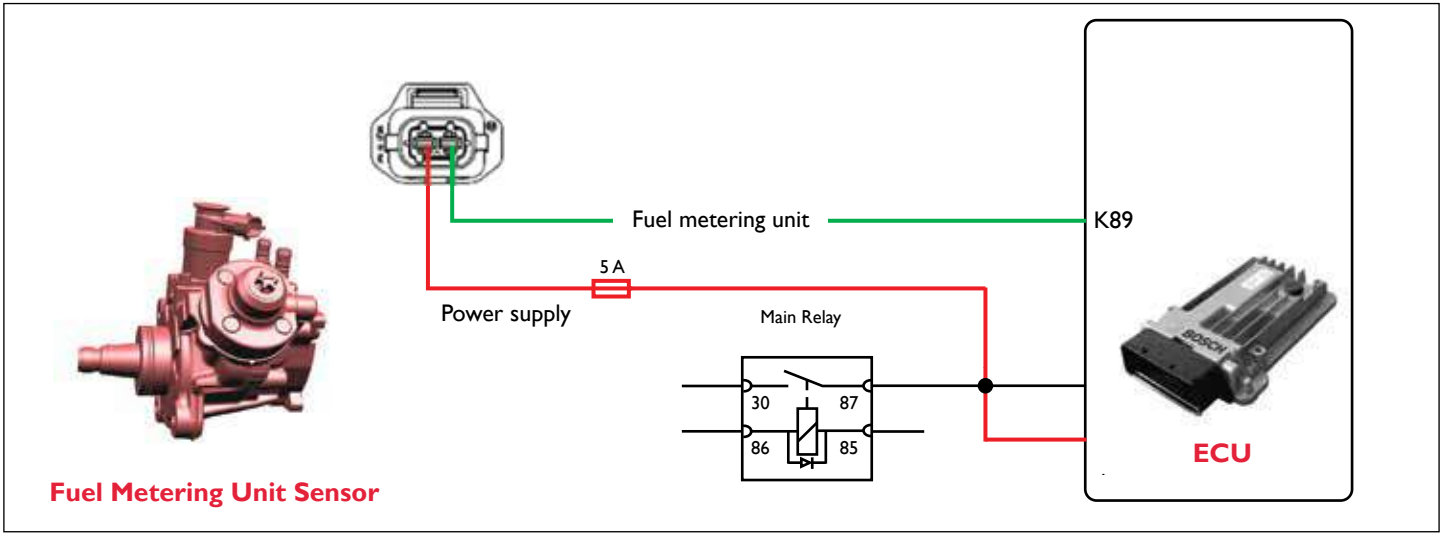
The check engine (CHK ENG) lamp in the instrument cluster blinks.



Metering Unit Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Ensure sufficient fuel is available in the fuel tank.	Go to Step 2	<ul style="list-style-type: none"> Top-up the fuel in the fuel tank.
2	Check whether the fuel filter is choked.	<ul style="list-style-type: none"> Replaced the choked fuel filter. 	Go to Step 3
3	Check for fuel leakage in high pressure circuit and low pressure circuit.	<ul style="list-style-type: none"> Ensure proper connections. 	Go to Step 4
4	Check for the bends/crimps in the fuel suction line.	<ul style="list-style-type: none"> Change the fuel suction line. 	Go to Step 5
5	Check for any error related to Rail Pressure Sensor, PRV, Metering unit.	<ul style="list-style-type: none"> Rectify corresponding error and clear and verify DTC again Replace the rail, If error repeats 	Clear the DTC and verify.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI204 - INJECTOR BANK - SHORT CIRCUIT

The injectors are solenoid actuated and controlled by ECU. The ECU measures the voltage drop through fixed resistors and controls it.



Possible Causes

- Injector bank is short circuit to battery or ground

DTC Information

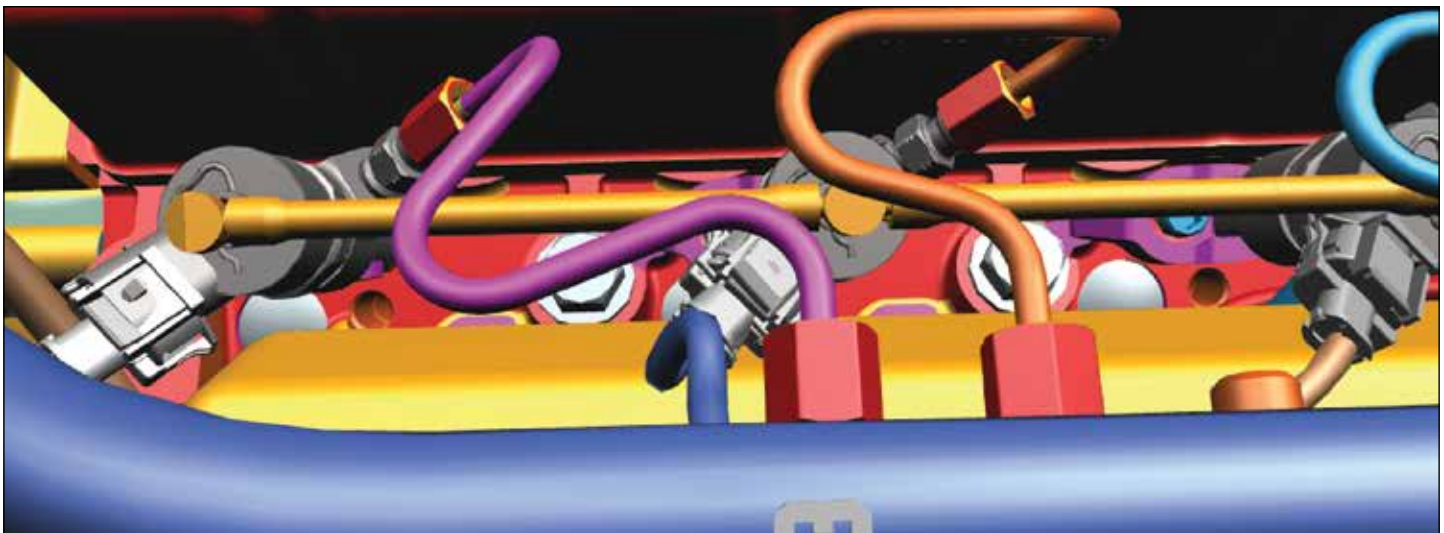
DTC Reaction

- Engine is limited to 1700 RPM and torque limitation

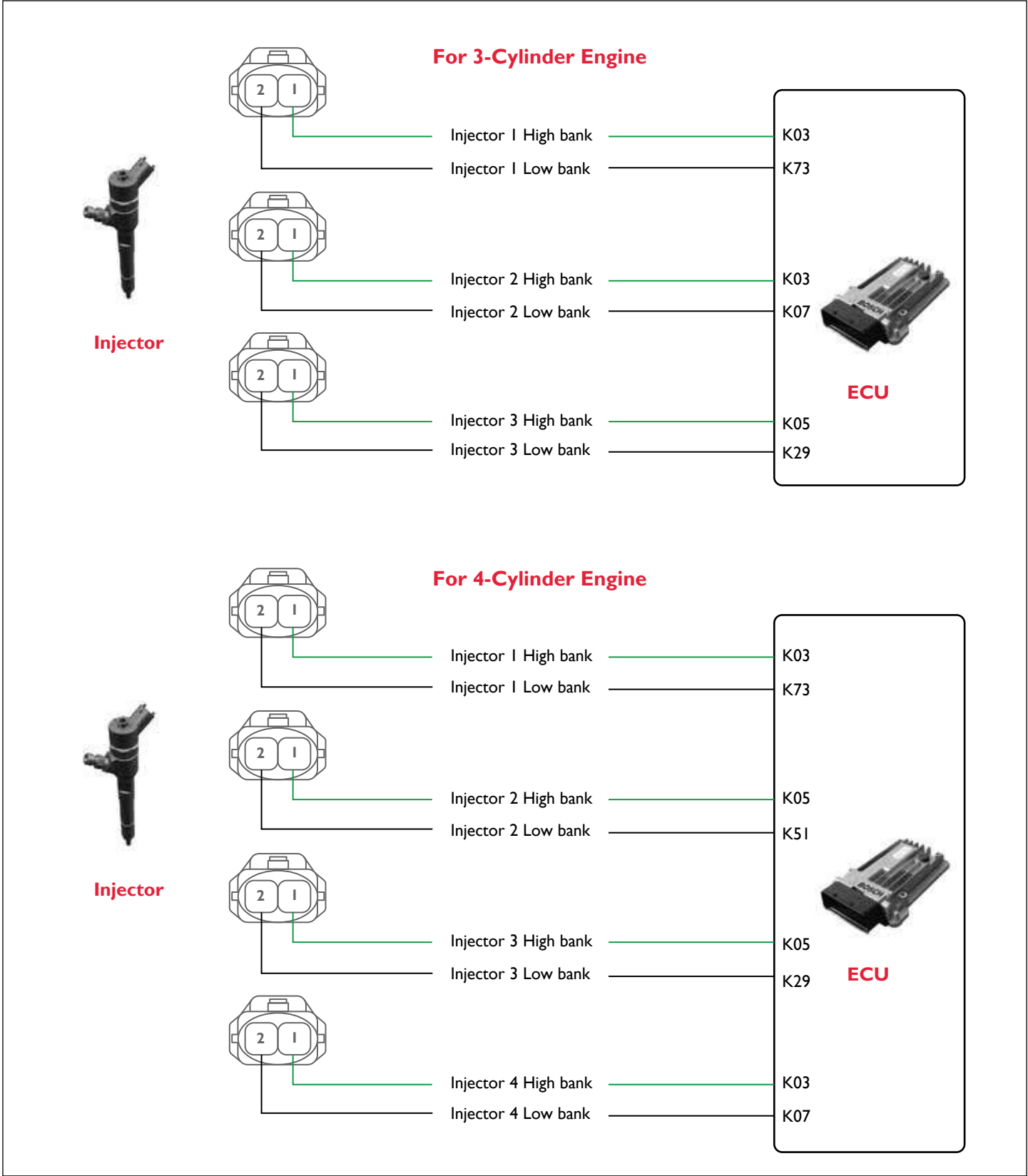
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
I	<p>Turn OFF the ignition switch.</p> <p>Disconnect the injector connector and ECU connector.</p> <p>Check continuity for the following:</p> <p>For 4-Cylinder Engine</p> <ul style="list-style-type: none"> • ECU connector pins K03 and 1st injector connector pin 1 • ECU connector pins K73 and 1st injector connector pin 2 • ECU connector pins K03 and 2nd injector connector pin 1 • ECU connector pins K07 and 2nd injector connector pin 2 • ECU connector pins K05 and 3rd injector connector pin 1 • ECU connector pins K51 and 3rd injector connector pin 2 • ECU connector pins K05 and 4th injector connector pin 1 • ECU connector pins K29 and 4th injector connector pin 2 <p>For 3-Cylinder Engine</p> <ul style="list-style-type: none"> • ECU connector pins K03 and 1st injector connector pin 1 • ECU connector pins K73 and 1st injector connector pin 2 • ECU connector pins K03 and 2nd injector connector pin 1 • ECU connector pins K07 and 2nd injector connector pin 2 • ECU connector pins K05 and 3rd injector connector pin 1 • ECU connector pins K29 and 3rd injector connector pin 2 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 2	<ul style="list-style-type: none"> • Replace the wiring harness.

Step	Test Procedure	Yes	No
2	<p>Check that the injector connector pins are not short with battery / ground.</p> <p>Also check that the injector connector pins are not short with each other and with injector body.</p> <p>Acceptance Criteria</p> <p>No short circuit between battery positive/injector body.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	<p>Remove the injectors.</p> <p>Check the resistance between pin no. 1 and 2 of injectors.</p> <p>Acceptance Criteria</p> <p>Normally less than 100 milli ohms.</p>	Go to Step 4	<ul style="list-style-type: none"> Replace the injector with a new one.
4	<p>Connect the ECU connector.</p> <p>Turn ON the ignition switch.</p> <p>Check the supply voltage between the first pin of injector connectors with respect to ground.</p> <p>Acceptance Criteria</p> <p>12 volts for 1st injector</p>	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the injector with a new one. 	<ul style="list-style-type: none"> Replace the ECU.



Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI206 - INJECTOR CHIP ERROR

Possible Causes

- CY33x chip is defective.
- CY33x chip is damaged.

DTC Information

DTC Reaction

Engine shut-off

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster glows continuously.

Diagnostic Procedure

1. Switch ON and OFF the ignition key (with complete after run).
2. Clear the error.
3. Try the above step once again.
4. Still error is present, Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI221 - CHECK OF MISSING INJECTOR ADJUSTMENT VALUE PROGRAMMING

Possible Causes

- The checksum of the injector I adjustment code words is not correct/not flashed during end of line station.
- The basic correction quantity in at least one injector checkpoint has exceeded the admissible limits
- No injector adjustment values could be read due to faulty EEPROM access.

DTC Information

DTC Reaction

- Injector misses the functioning of IQA

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Diagnostic Procedure

1. Connect the FES diagnostic tool.
2. Click on the **Write** data tab.
3. Check for Injector numbers.
4. Note the injector numbers from engine and write it through the diagnostic tester tool, If the numbers are missing.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI222 - CHECK OF MISSING INJECTOR ADJUSTMENT VALUE PROGRAMMING

Possible Causes

- The checksum of the injector 3 adjustment code words is not correct/not flashed during end of line station.
- The basic correction quantity in at least one injector checkpoint has exceeded the admissible limits
- No injector adjustment values could be read due to faulty EEPROM access.

DTC Information

DTC Reaction

- Injector misses the functioning of IQA

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Diagnostic Procedure

1. Connect the FES diagnostic tool.
2. Click on the **Write** data tab.
3. Check for Injector numbers.
4. Note the injector numbers from engine and write it through the diagnostic tester tool, If the numbers are missing.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI223 - CHECK OF MISSING INJECTOR ADJUSTMENT VALUE PROGRAMMING

Possible Causes

- The checksum of the injector 4 adjustment code words is not correct/not flashed during end of line station.
- The basic correction quantity in at least one injector checkpoint has exceeded the admissible limits
- No injector adjustment values could be read due to faulty EEPROM access.

DTC Information

DTC Reaction

- Injector misses the functioning of IQA

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Diagnostic Procedure

1. Connect the FES diagnostic tool.
2. Click on the **Write** data tab.
3. Check for Injector numbers.
4. Note the injector numbers from engine and write it through the diagnostic tester tool, If the numbers are missing.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI300 - CHECK ENGINE (CHK) LAMP OPEN LOAD

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information
<p>Lamp Status</p> <p>No Lamp activation</p> <p>DTC Reaction</p> <p>No check (CHK) signal in the instrument cluster.</p>

Instrument Cluster Connector Pin Details

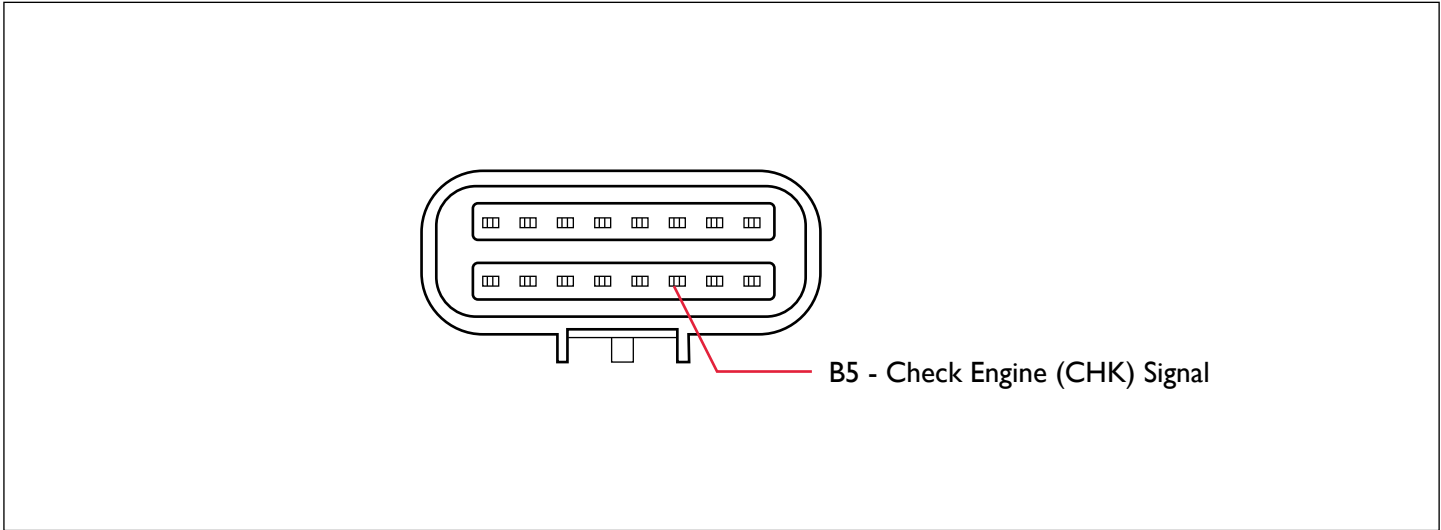


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K93 and instrument cluster connector pin B5. Acceptance Criteria Ensure proper continuity.	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one. 	<ul style="list-style-type: none"> Replace the wiring harness.
3	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI30I - OVER TEMPERATURE ERROR - CHK LAMP

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

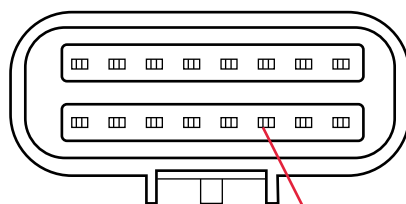
Lamp Status

No Lamp activation

DTC Reaction

No check (CHK) signal in the instrument cluster.

Instrument Cluster Connector Pin Details



B5 - Check Engine (CHK) Signal

Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K93 and instrument cluster connector pin B5. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin B5 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI302 - SHORT CIRCUIT TO BATTERY - CHK LAMP

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

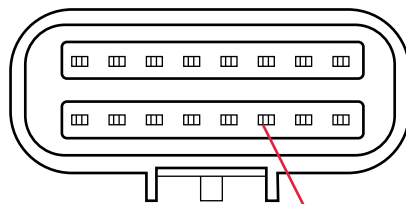
Lamp Status

No Lamp activation

DTC Reaction

No check (CHK) signal in the instrument cluster.

Instrument Cluster Connector Pin Details



B5 - Check Engine (CHK) Signal

Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K93 and instrument cluster connector pin B5. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin B5 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI303 - SHORT CIRCUIT TO BATTERY - CHK LAMP

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

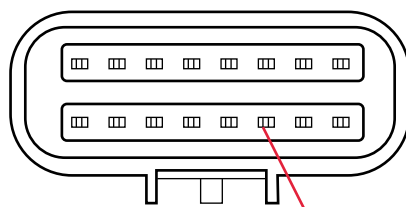
Lamp Status

No Lamp activation

DTC Reaction

No check (CHK) signal in the instrument cluster.

Instrument Cluster Connector Pin Details



B5 - Check Engine (CHK) Signal

Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K93 and instrument cluster connector pin B5. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin B5 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI 404 - EGR VALVE JAMMED AT CLOSED POSITION

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- EGR valve is stuck in closed position

DTC Information

DTC Reaction

Emission failure, EGR switches off and 30% torque deration

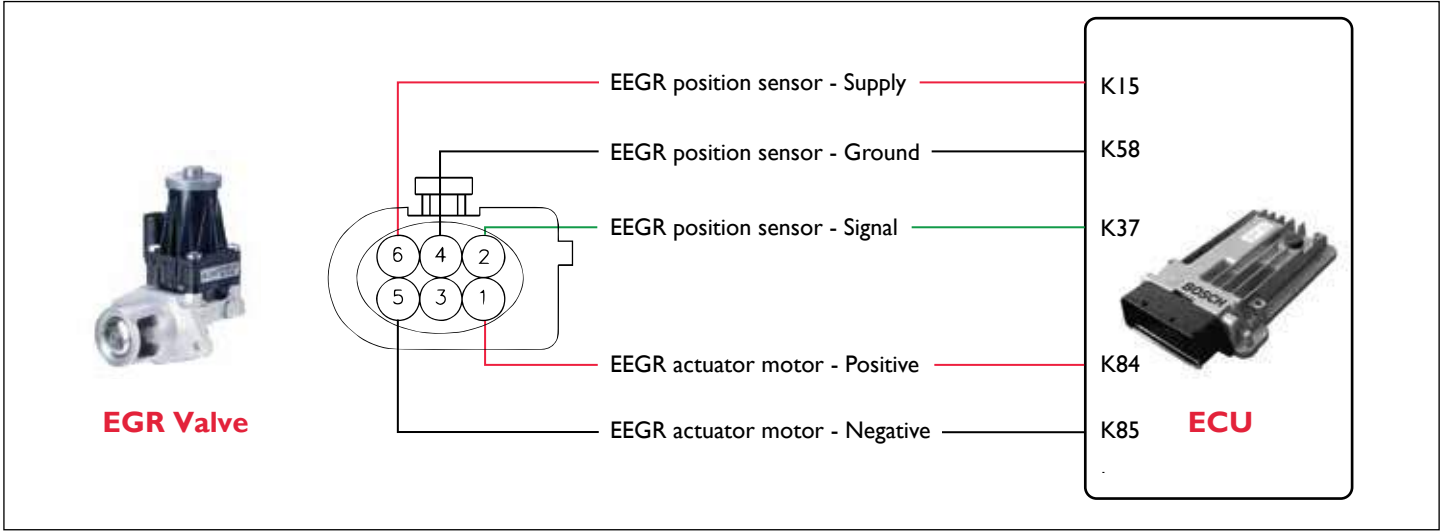
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

1. Activate the EGR through FES diagnostic tool actuator service.
2. If positive response comes, clear the DTC and run the tractor at 2100 RPM for 15min.
3. If error repeats, replace the EGR valve.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI413 - EGR VALVE JAMMED AT OPEN POSITION

Electric Exhaust Gas Recirculation (EEGR) is a Nitrogen oxide (NOx) emissions reduction technique used in engines. The EEGR Position sensor detects the movement and position of the EEGR valve pintle. The EEGR Pressure sensor detects exhaust gas flow through the EEGR passage.

EEGR valve position sensors are mounted on the top of the EEGR valve. EEGR pressure sensors will be located close to the EEGR valve as the exhaust gas hose must be connected to the sensor as well as the valve. The EEGR monitor is designed to detect insufficient or excessive EEGR flow and component performance. When the EEGR valve is open, the ECU confirms that exhaust gas is flowing. When the EEGR valve is shut off, the ECU confirms exhaust gas flow has stopped. The sensors are also monitored for open, shorts, and performance.



Possible Causes

- EGR valve is stuck in open position

DTC Information

DTC Reaction

Emission failure, EGR switches off and 30% torque deration

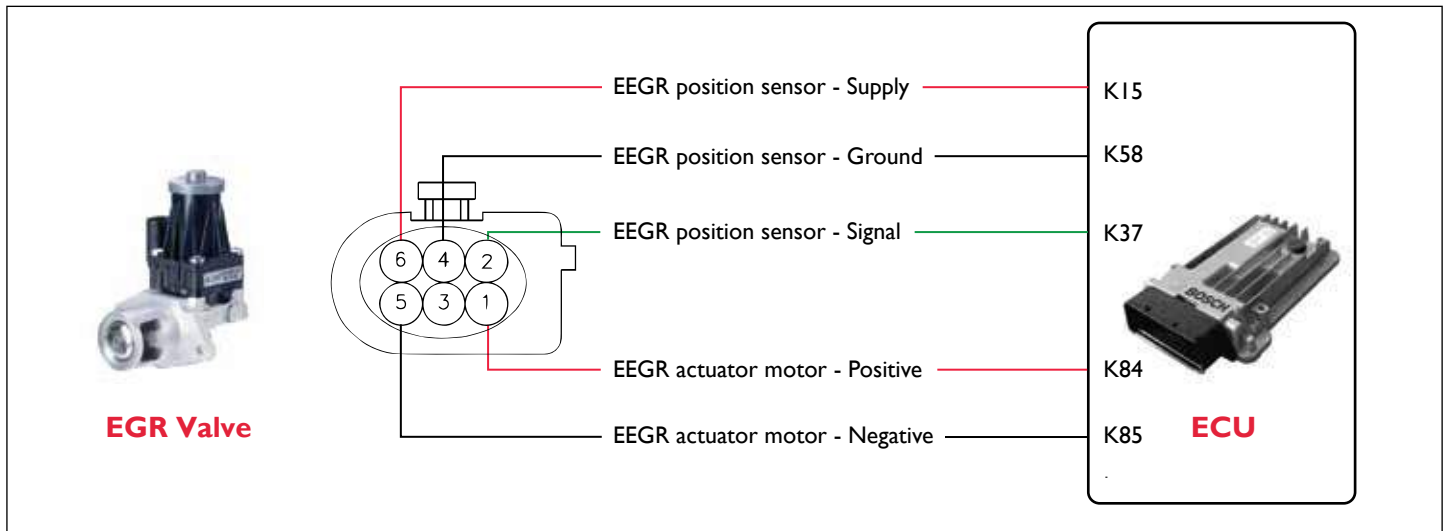
Lamp Status

Malfunction Indicator Lamp (MIL) in the instrument cluster glows continuously.

Sensor Location



Connector Pin Details



Diagnostic Procedure

1. Activate the EGR through FES diagnostic tool actuator service.
2. If positive response comes, clear the DTC and run the tractor at 2100 RPM for 15min.
3. If error repeats, replace the EGR valve.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI416 - LOOSE CONTACT BETWEEN METERING UNIT AND ECU

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.



Possible Causes

- Loose connections
- Wiring harness problem

DTC Information

DTC Reaction

- The rail pressure line get damaged with warning light in cluster.

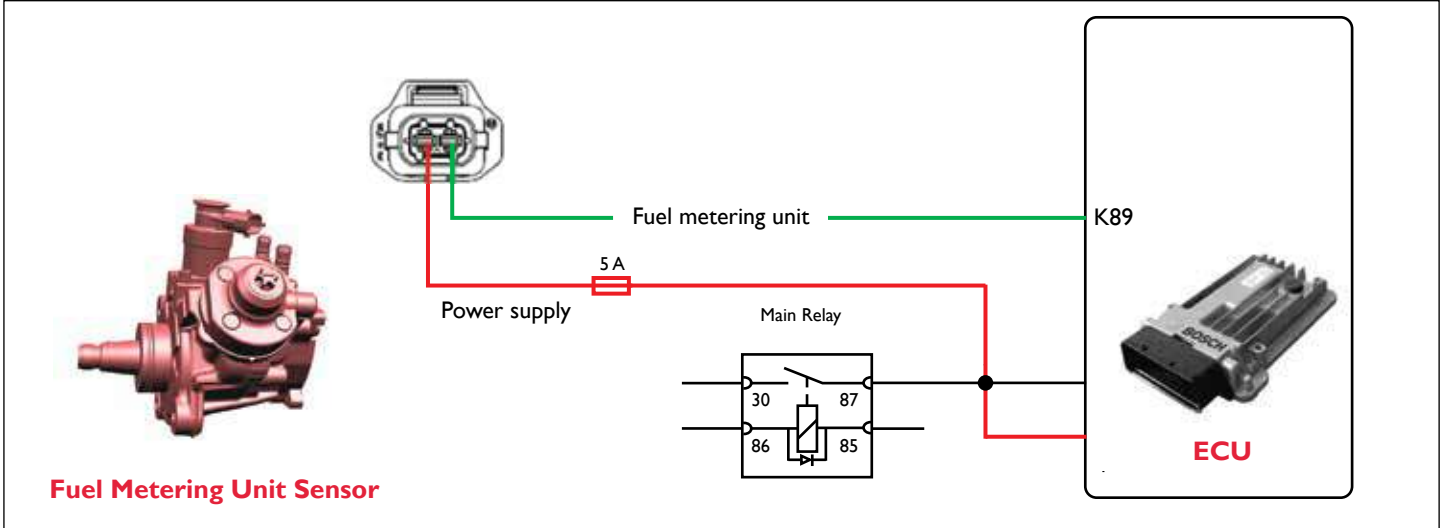
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Metering Unit Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the metering unit fuse is blown.	<ul style="list-style-type: none">Replace the blown fuse.	Go to Step 2
2	Turn OFF the ignition switch. Disconnect the ECU connector and pump metering unit connector. Check continuity between the following: <ul style="list-style-type: none">ECU connector pin K89 to metering unit connector pin 1.Metering unit fuse to metering unit connector pin 2. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none">Replace the wiring harness.
3	Check whether the metering unit connector pins are shorted with battery. Acceptance Criteria No short circuit to battery.	<ul style="list-style-type: none">Clear the DTC and verify.If the error repeats, replace the ECU with a new one.	<ul style="list-style-type: none">Replace the wiring harness.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI417 - OVER TEMPERATURE OF DEVICE DRIVER OF METERING UNIT

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.

**Possible Causes**

- Pump metering unit short circuit to battery/ground for long time.
- Wiring harness problem

DTC Information**DTC Reaction**

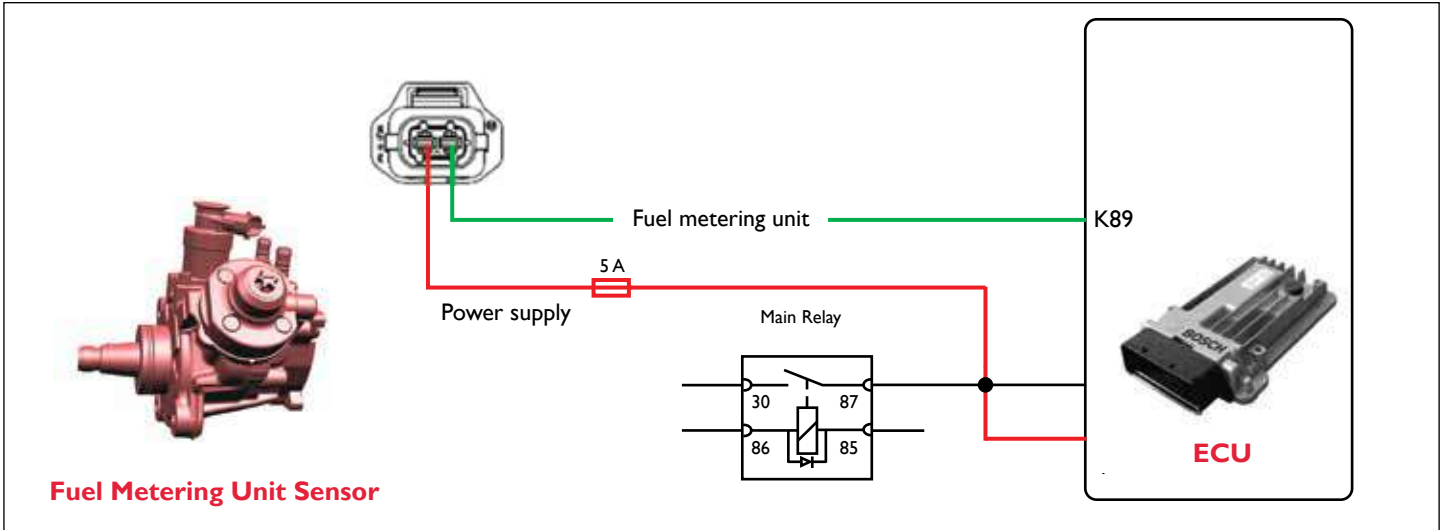
- The rail pressure line get damaged with warning light in cluster.

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Metering Unit Location

Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the metering unit fuse is blown.	<ul style="list-style-type: none">Replace the blown fuse.	Go to Step 2
2	<p>Turn OFF the ignition switch.</p> <p>Disconnect the ECU connector and pump metering unit connector.</p> <p>Check continuity between the following:</p> <ul style="list-style-type: none">ECU connector pin K89 to metering unit connector pin 1.Metering unit fuse to metering unit connector pin 2. <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none">Replace the wiring harness.
3	<p>Check whether the metering unit connector pins are shorted with battery.</p> <p>Acceptance Criteria</p> <p>No short circuit to battery.</p>	<ul style="list-style-type: none">Clear the DTC and verify.If the error repeats, replace the ECU with a new one.	<ul style="list-style-type: none">Replace the wiring harness.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI418 - OPEN LOAD ERROR - MIL LAMP

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

Lamp Status

No Lamp activation

DTC Reaction

The malfunction indication lamp (MIL) warning light in the instrument cluster does not glow.

Instrument Cluster Connector Pin Details

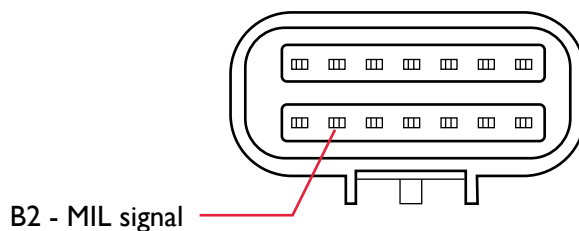


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K26 and instrument cluster connector pin B2. Acceptance Criteria Ensure proper continuity.	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one. 	<ul style="list-style-type: none"> Replace the wiring harness.
3	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI419 - SHORT CIRCUIT TO BATTERY - MIL LAMP

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

Lamp Status

No Lamp activation

DTC Reaction

The malfunction indication lamp (MIL) warning light in the instrument cluster does not glow.

Instrument Cluster Connector Pin Details

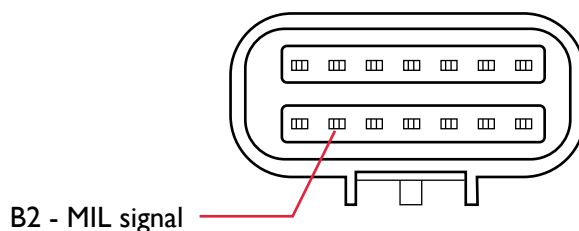


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K26 and instrument cluster connector pin B2. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin B2 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI 420 - SHORT CIRCUIT TO GROUND - MIL LAMP

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information
<p>Lamp Status</p> <p>No Lamp activation</p> <p>DTC Reaction</p> <p>The malfunction indication lamp (MIL) warning light in the instrument cluster does not glow.</p>

Instrument Cluster Connector Pin Details

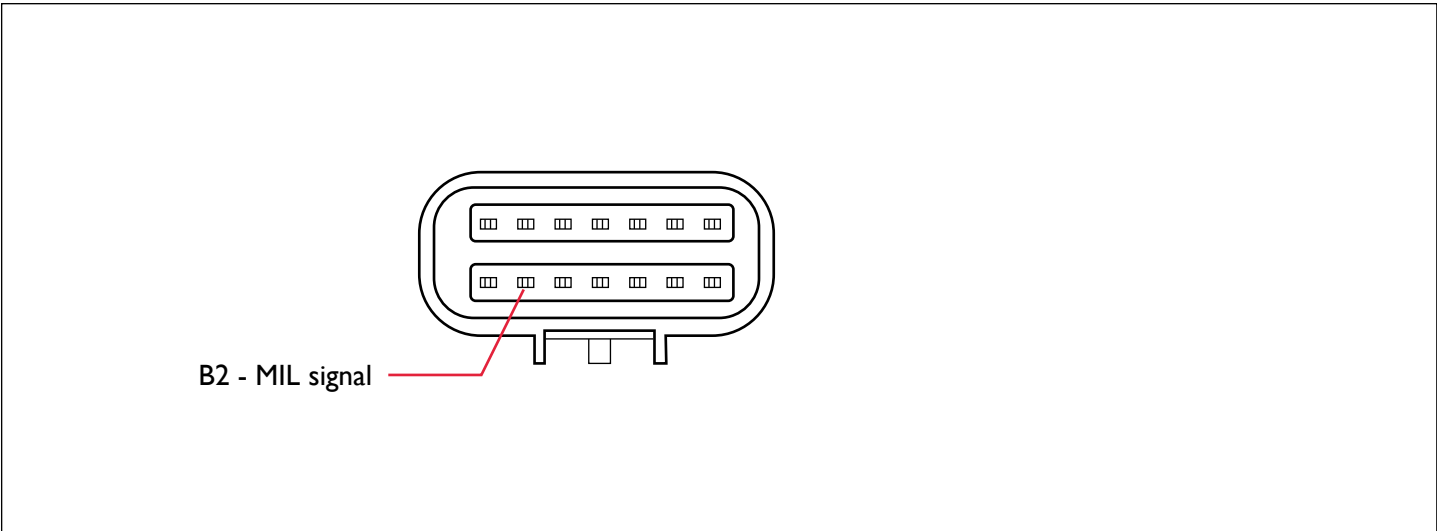


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K26 and instrument cluster connector pin B2. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin B2 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI 423 - MAXIMUM RAIL PRESSURE LIMIT EXCEEDED

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.

**Possible Causes**

- Loose connections
- Incorrect/small diameter fuel return lines
- Chocked fuel return lines
- Accumulator failure
- Rail pressure sensor failure
- Pump metering unit failure
- Pump metering unit is stuck in partial open position.

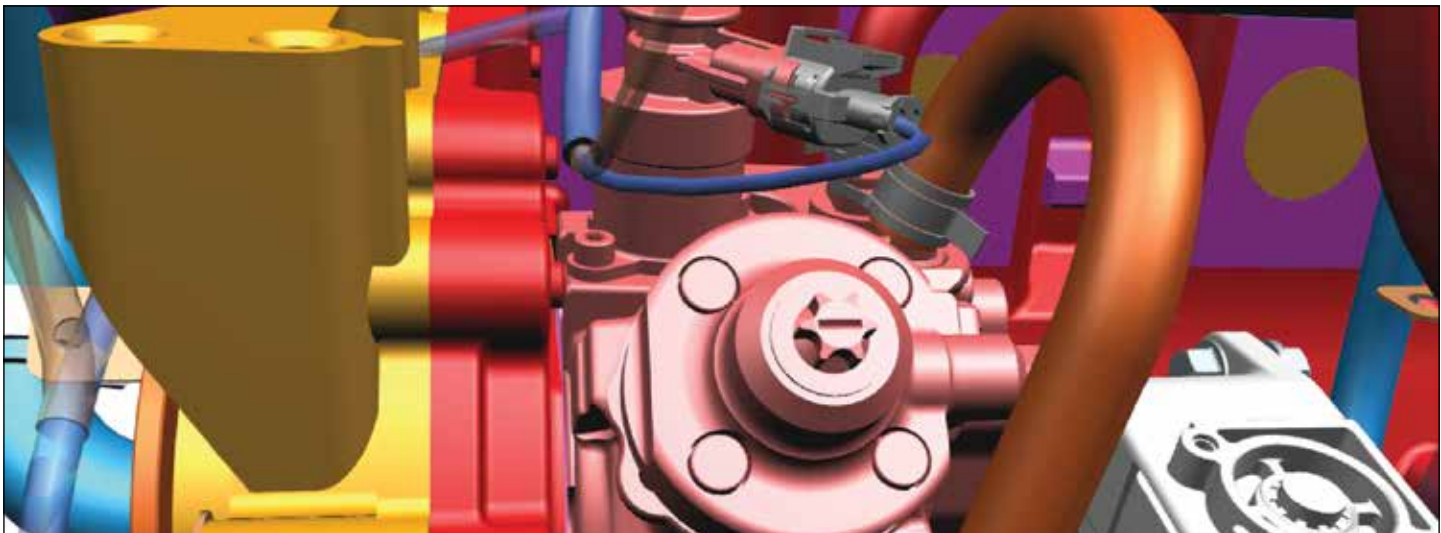
DTC Information**DTC Reaction**

- The rail pressure line get damaged with warning light in cluster.

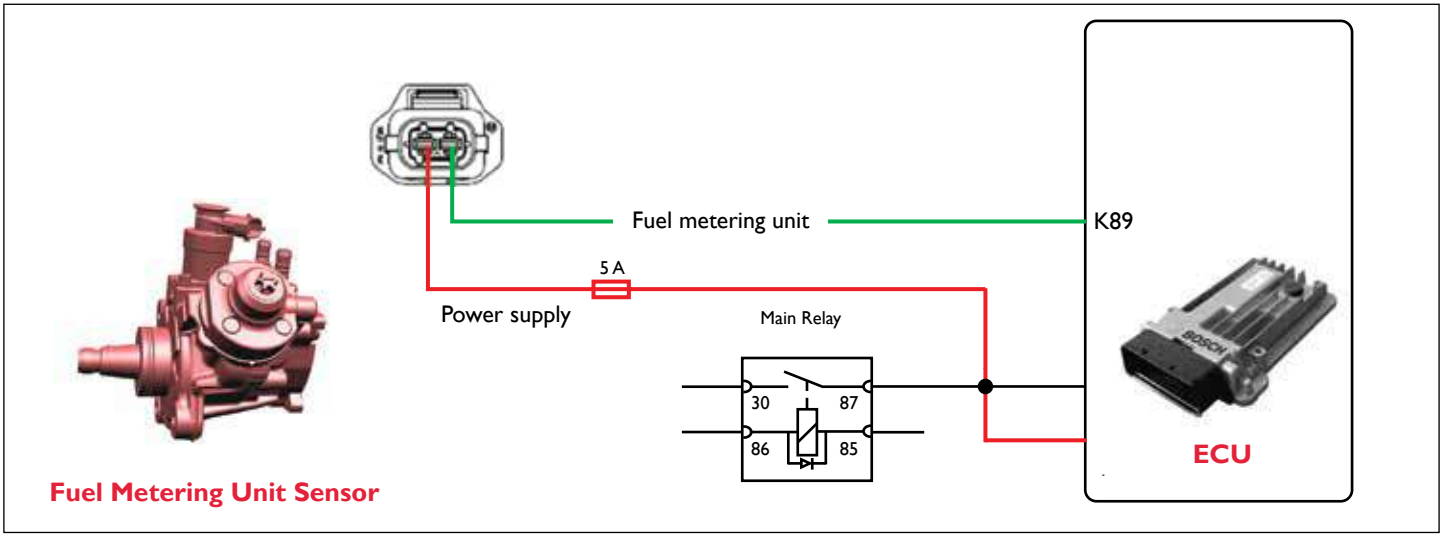
Lamp Status

The CHK ENG lamp in the instrument cluster blinks.

Metering Unit Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the rail pressure sensor connector is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper connections.
2	Check whether the pump metering unit connection is loosened / not connected.	Go to Step 3	<ul style="list-style-type: none"> Ensure proper connections.
3	Check for incorrect/small diameter fuel return lines.	<ul style="list-style-type: none"> Replace the pipe line of correct diameter. 	Go to Step 4
4	Check for the bends/crimps in the fuel suction line.	<ul style="list-style-type: none"> Change the fuel suction line. 	Go to Step 5
5	Check whether the fuel filter is choked.	<ul style="list-style-type: none"> Replaced the choked fuel filter. 	Go to Step 6
6	Check for the failure of fuel accumulator.	<ul style="list-style-type: none"> Replace the fuel accumulator. 	Go to Step 7
7	Check for any error related to Rail Pressure Sensor, PRV, Metering unit.	<ul style="list-style-type: none"> Rectify corresponding error and clear and verify DTC again Replace the rail, If error repeats 	Go to Step 8
8	Pump metering unit failure. Pump metering unit is stuck in partial open position.	<ul style="list-style-type: none"> Remove the pump. Get it checked by the authorized dealer. Clear the DTC and verify. 	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI 424 - MAXIMUM RAIL PRESSURE LIMIT EXCEEDED (2ND STAGE)

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.

**Possible Causes**

- PLV not fully open
- Pump metering unit is stuck in partial open position.

DTC Information**DTC Reaction**

- The rail pressure line get damaged with warning light in cluster.

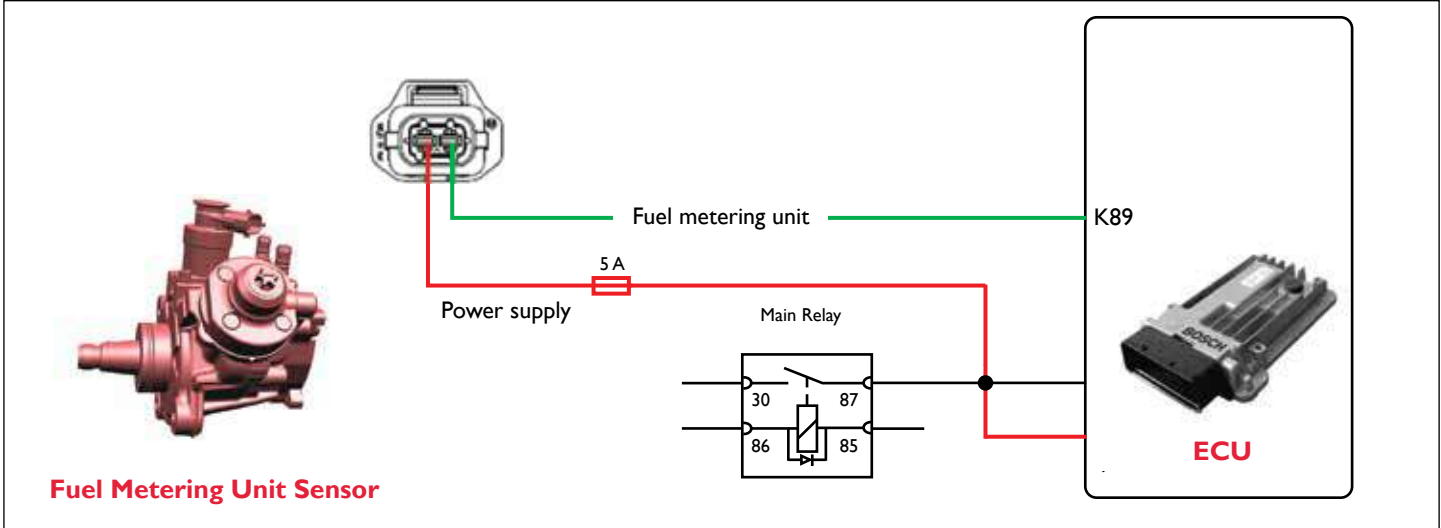
Lamp Status

The CHK ENG lamp in the instrument cluster blinks.

Metering Unit Location

G263

Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Perform the actuator test on the pump metering unit through the diagnostic tester. Check for the proper functioning of the pump metering unit.	<ul style="list-style-type: none">Replace the rail.	Go to Step 2
2	Pump metering unit failure. Pump metering unit is stuck in partial open position.	<ul style="list-style-type: none">Remove the pump. Get it checked by the authorized dealer.Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI 602 - RAIL PRESSURE NEGATIVE GOVERNOR DEVIATION - ACTUAL RAIL PRESSURE IS MORE THAN THE DESIRED VALUE

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.



Possible Causes

- Loose connections
- Incorrect/small diameter fuel return lines
- Chocked fuel return lines
- Accumulator failure
- Fuel leaking through PLV
- Rail pressure sensor failure (rail pressure unit failure)
- Pump metering unit is stuck in partial open position
- Pump metering unit failure
- Pump metering unit is stuck in open position

DTC Information

DTC Reaction

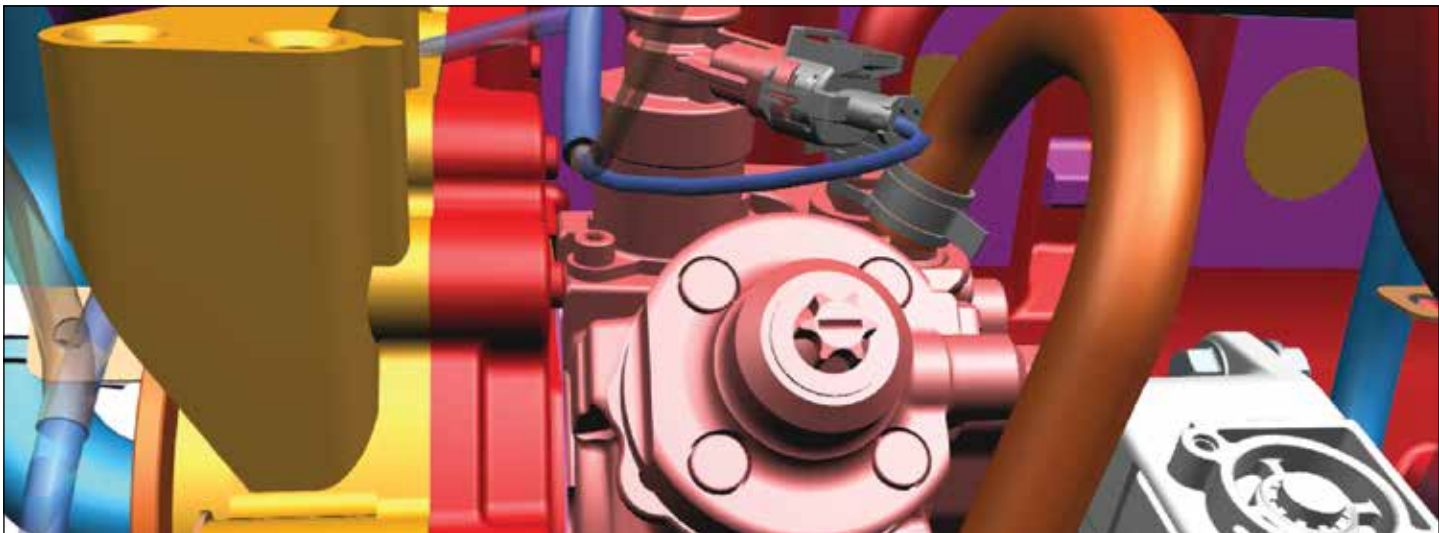
- The rail pressure line get damaged with warning light in cluster.

Lamp Status

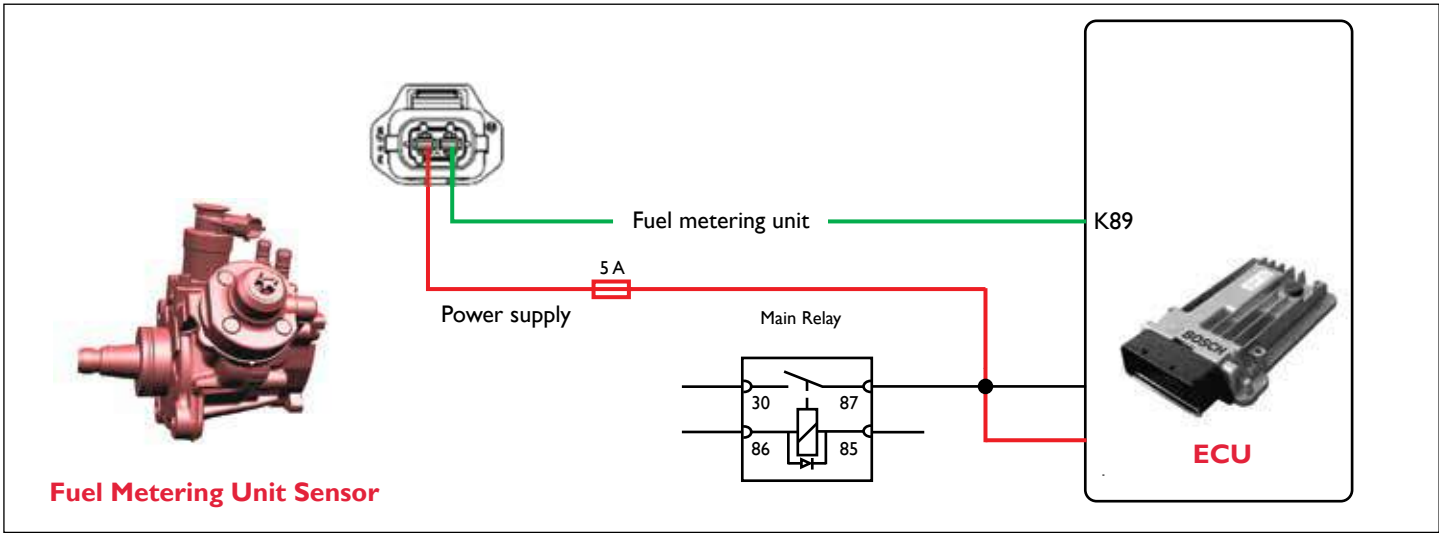
The check engine (CHK ENG) lamp in the instrument cluster glows continuously.



Metering Unit Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the rail pressure sensor connector is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper connections.
2	Check whether the pump metering unit connection is loosened / not connected.	Go to Step 3	<ul style="list-style-type: none"> Ensure proper connections.
3	Check for incorrect/small diameter fuel return lines.	<ul style="list-style-type: none"> Replace the pipe line of correct diameter. 	Go to Step 4
4	Check for the bends/crimps in the fuel suction line.	<ul style="list-style-type: none"> Change the fuel suction line. 	Go to Step 5
5	Check whether the fuel filter is choked.	<ul style="list-style-type: none"> Replaced the choked fuel filter. 	Go to Step 6
6	Check for the failure of fuel accumulator.	<ul style="list-style-type: none"> Replace the fuel accumulator. 	Go to Step 7
7	Check for any error related to Rail Pressure Sensor, PRV, Metering unit.	<ul style="list-style-type: none"> Rectify corresponding error and clear and verify DTC again Replace the rail, If error repeats 	Go to Step 8
8	Pump metering unit is stuck in partial open position. Pump metering unit failure. Pump metering unit is stuck in open position.	<ul style="list-style-type: none"> Remove the pump. Get it checked by the authorized dealer. Clear the DTC and verify. 	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI 606 - PUMP METERING UNIT PLAUSIBILITY ERROR AT IDLING

The metering unit is used for compressing the fuel at high pressure and sending it at pressurized stage towards the rail, which is controlled by ECU.



Possible Causes

- Fuel leaking through PLV
- Rail pressure sensor failure (rail pressure unit failure)
- Pump metering unit failure
- Internal leakage in the high pressure pump
- Injector wear is high
- Injector nozzle plunger is stuck in open position.

DTC Information

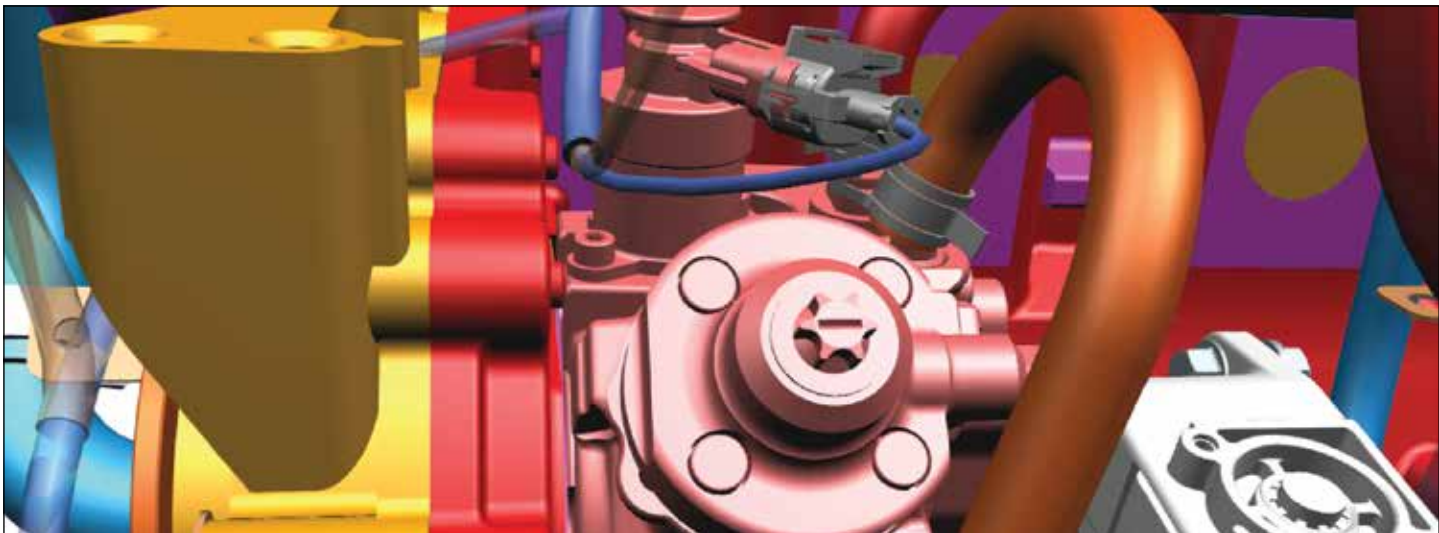
DTC Reaction

- The rail pressure line get damaged with warning light in cluster.

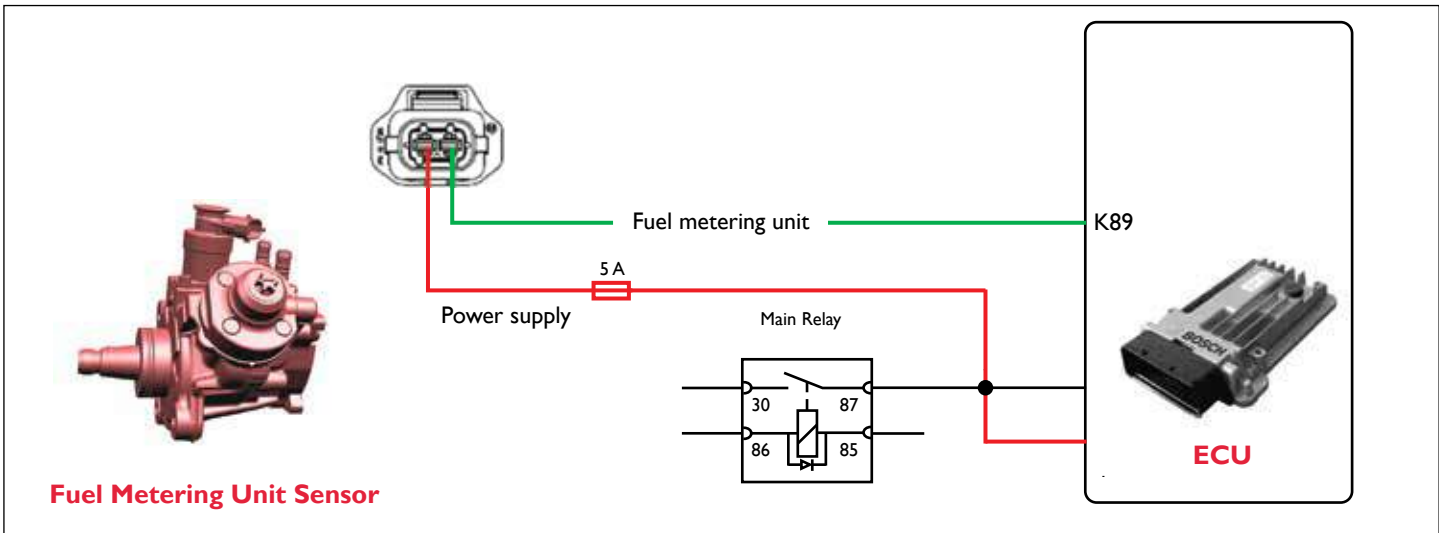
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster glows continuously.

Metering Unit Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for any error related to Rail Pressure Sensor, PRV, Metering unit.	<ul style="list-style-type: none"> Rectify corresponding error and clear and verify DTC. Replace the rail, If error repeats. 	Go to Step 2
2	Internal leakage in the high pressure pump. Pump could not deliver high pressure fuel.	<ul style="list-style-type: none"> Remove the pump. Get it checked by the authorized dealer. Clear the DTC and verify. 	
3	Injector wear is high. Injector nozzle plunger is stuck in open position.	<ul style="list-style-type: none"> Remove the injector. Get it checked by the authorized dealer. Clear the DTC and verify. 	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI611 - MAIN RELAY EARLY OPENING

Possible Causes

- Loose connections
- Wiring harness problem
- Faulty ECU Relay
- Faulty ECU

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

DTC Reaction

ECU remains ON always

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the ECU relay is connected properly.	Go to Step 2	<ul style="list-style-type: none"> • Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and ECU relay. Check the continuity between ECU connector pin K50 and ECU relay connector pin 86. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.
3	Check the ECU connector control line (pin K50) is short circuited to ground.	<ul style="list-style-type: none"> • Replace the wiring harness. 	Go to Step 4



Step	Test Procedure	Yes	No
4	Turn OFF the ignition switch. Remove the ECU relay. Check the resistance between pin 85 and 86 of relay. Acceptance Criteria Resistance should be 50-200 ohm	Go to Step 5	<ul style="list-style-type: none"> Replace the EMS Relay with a new one.
5	Check the continuity between pin 30 and 87 of ECU relay. Acceptance Criteria No continuity between the pins.	<ul style="list-style-type: none"> Clear the DTC and verify. If still error repeats, Replace the ECU with a new one. 	<ul style="list-style-type: none"> Replace the ECU relay with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI612 - MAIN RELAY STUCK

Possible Causes

- Loose connections
- Wiring harness problem
- Faulty ECU Relay
- Faulty ECU

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

DTC Reaction

ECU remains ON always

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the ECU relay is connected properly.	Go to Step 2	<ul style="list-style-type: none"> • Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and ECU relay. Check the continuity between ECU connector pin K50 and ECU relay connector pin 86. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.
3	Check the ECU connector control line (pin K50) is short circuited to ground.	<ul style="list-style-type: none"> • Replace the wiring harness. 	Go to Step 4



Step	Test Procedure	Yes	No
4	Turn OFF the ignition switch. Remove the ECU relay. Check the resistance between pin 85 and 86 of relay. Acceptance Criteria Resistance should be 50-200 ohm	Go to Step 5	<ul style="list-style-type: none"> Replace the EMS Relay with a new one.
5	Check the continuity between pin 30 and 87 of ECU relay. Acceptance Criteria No continuity between the pins.	<ul style="list-style-type: none"> Clear the DTC and verify. If still error repeats, Replace the ECU with a new one. 	<ul style="list-style-type: none"> Replace the ECU relay with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI 650 - MIL - OVER TEMPERATURE ERROR

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

Lamp Status

No Lamp activation

DTC Reaction

The malfunction indication lamp (MIL) warning light in the instrument cluster does not glow.

Instrument Cluster Connector Pin Details

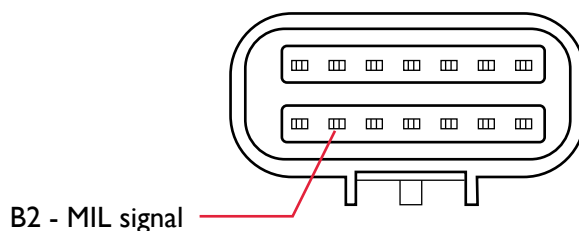


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K26 and instrument cluster connector pin B2. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin B2 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI701 - SPI/COM - ERRORS OF THE CY320

Possible Causes

- Communication errors in CY 320 chip

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI702 - EEP ERASE ERROR BASED ON THE ERROR FOR MORE BLOCKS

Possible Causes

- ECU internal error - Electrically erasable programmable read-only memory (EEPROM) erase is not possible.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Switch ON and OFF the ignition key for 1 or 2 times.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI 703 - EEP READ ERROR BASED ON THE ERROR FOR MORE BLOCKS

Possible Causes

- ECU internal error - EEPROM read is not possible.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Switch ON and OFF the ignition key for 1 or 2 times.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI704 - EEP WRITE ERROR BASED ON THE ERROR FOR ONE BLOCK

Possible Causes

- ECU internal error - EEPROM write is not possible.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Switch ON and OFF the ignition key for 1 or 2 times.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI705 - ERROR CHECK OF NO-LOAD TEST PULSE OPERATION

Possible Causes

- Error detected in the plausibility check of the ADC by no load test pulse test. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI706 - ERROR IN THE PLAUSIBILITY OF THE TEST VOLTAGE

Possible Causes

- Error detected in the plausibility check of the ADC by voltage test signal. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI707 - CHECK OF THE RATIO METRIC CORRECTION

Possible Causes

- Error detected in the plausibility check of the ADC in the voltage ratio. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI 708 - ERROR IN THE PLAUSIBILITY OF FC AND MM

Possible Causes

- Error in the plausibility of FC and MM communication. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI 709 - ERROR REPORT DUE TO AN INTERRUPTED SPI COMMUNICATION

Possible Causes

- Multiple error in complete ROM-test during post drive detected. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI710 - MULTIPLE ERROR IN COMPLETE ROM TEST DURING POST DRIVE DETECTED

Possible Causes

- Multiple error in complete ROM-test during post drive detected. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



P1711 - TOO LESS BYTES RECEIVED BY MM FROM CPU AS RESPONSE

Possible Causes

- Too less bytes received by MM from CPU as response. The ECU has an internal error.

DTC Information
Lamp Status No Lamp activation
Vehicle Behaviour The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI712 - DFC TO SET A TORQUE LIMITATION ONCE AN ERROR IS DETECTED BEFORE MOC SOP'S ERROR REACTION

Possible Causes

- Error during SOP test (defective injector or shut-off path). The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI713 - ERROR TRYING TO SET MM RESPONSE TIME

Possible Causes

- Error trying to set MM response time. The ECU has an internal error.

DTC Information
Lamp Status No Lamp activation
Vehicle Behaviour The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI714 - ERROR DETECTED IN THE SPI COMMUNICATION

Possible Causes

- Error detected in the SPI communication. The ECU has an internal error.

DTC Information
Lamp Status No Lamp activation
Vehicle Behaviour The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI715 - SHUT-OFF PATH TEST OF THE UNDER VOLTAGE DETECTION

Possible Causes

- Error in the check of the shut-off path test of the under voltage detection. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI716 - SHUT-OFF PATH OF THE MONITORING MODULE

Possible Causes

- Error in the check of the shut-off path of the monitoring module.

DTC Information
Lamp Status No Lamp activation
Vehicle Behaviour The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI717 - TIME OUT ERROR TRYING TO SET OR CANCELLING THE ALARM TASK

Possible Causes

- Time out error trying to set or cancelling the alarm task. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI718 - DIAGNOSTIC FAULT CHECK TO REPORT THAT THE POSITIVE TEST FAILED

Possible Causes

- Error during positive test. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI719 - ERROR IN TIME MONITORING OF THE SHUT-OFF PATH TEST

Possible Causes

- Error in the check of the shut-off path of the monitoring module.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI720 - ERROR IN THE CHECK OF THE SHUT-OFF PATH TEST OF THE OVER VOLTAGE DETECTION

Possible Causes

- Error in the check of the shut-off path test of the over voltage detection. The ECU has an internal error.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI726 - ERROR REPORT "WDA ACTIVE" DUE TO A DEFECT QUERY/RESPONSE COMMUNICATION

Possible Causes

- ECU Hardware - internal error

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI727 - ERROR REPORT "ABE ACTIVE" DUE TO UNDER VOLTAGE DETECTION

Possible Causes

- ECU Hardware - internal error

DTC Information
Lamp Status No Lamp activation
Vehicle Behaviour The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI 728 - ERROR REPORT "ABE ACTIVE" DUE TO OVER VOLTAGE DETECTION

Possible Causes

- ECU Hardware - internal error

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI729 - ERROR REPORT "ABE/WDA ACTIVE" DUE TO AN UNKNOWN REASON

Possible Causes

- ECU Hardware - internal error

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI730 - REPORTED MSC - ERRORS OF R2S2

Possible Causes

- Communication errors in R2S2 chip

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

DTC Reaction

No sensor supply to ECU.

Diagnostic Procedure

1. Clear the DTC and verify.
2. Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI731 - ERROR SENSOR SUPPLY I

Possible Causes

- Unavailability of 5 V supply for APP2, EGR.
- Sensor short circuit to battery or ground.

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

DTC Reaction

No sensor supply to ECU.

Diagnostic Procedure

I. Accelerator pedal module

Step	Test Procedure	Yes	No
1	Check for the proper fitment of accelerator pedal sensor and connector.	Go to Step 2	<ul style="list-style-type: none"> • Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the ECU connector and sensor wiring harness connector. Check continuity for the following: <ul style="list-style-type: none"> • ECU connector pin K61 to Sensor connector pin A • ECU connector pin K83 to Sensor connector pin B • ECU connector pin K18 to Sensor connector pin C 	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.

Step	Test Procedure	Yes	No
	<ul style="list-style-type: none"> ECU connector pin K40 to Sensor connector pin D ECU connector pin K82 to Sensor connector pin E ECU connector pin K60 to Sensor connector pin F <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	<p>Turn ON the ignition with ECU connector connected.</p> <p>Check the sensor connector pins B and E is shorted to battery.</p> <p>And also check the sensor connector pins A, C, D and F is shorted to ground.</p> <p>Acceptance Criteria</p> <p>No short circuit between ground / battery.</p>	<ul style="list-style-type: none"> Replace the wiring harness. 	Go to Step 4
4	<p>Check the supply voltage between the following:</p> <ul style="list-style-type: none"> Sensor connector pins C and B Sensor connector pins D and E <p>Acceptance Criteria</p> <p>Voltage = 5V (+/- 0.25)</p>	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.
5	<p>Turn ON the ignition with sensor wiring harness connector connected.</p> <p>Press the accelerator pedal and check for any response.</p> <p>Acceptance Criteria</p> <p>RPM varies from low idle to high idle.</p>	Clear the DTC and verify.	<ul style="list-style-type: none"> Replace the sensor with a new one.



2. EGR

Step	Test Procedure	Yes	No
1	Check for the proper fitment of EGR valve and connector.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the EGR and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K84 to EGR connector pin 1 ECU connector pin K37 to EGR connector pin 2 ECU connector pin K58 to EGR connector pin 4 ECU connector pin K85 to EGR connector pin 5 ECU connector pin K15 to EGR connector pin 6 Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the sensor supply line (pin no. 6), EGR motor +ve (pin no. 1) and EGR motor -ve (pin no.5) is short circuited to ground/battery. Acceptance Criteria No short circuit to ground/battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	Go to Step 4
4	Turn ON the ignition with ECU connector connected. Check the supply voltage between EGR Connector pin 1 and 5. Acceptance Criteria Voltage = 5V	<ul style="list-style-type: none"> Clear the DTC and verify. If error repeats, replace the EGR. 	<ul style="list-style-type: none"> Replace the ECU with a new one.



3. Rail pressure sensor

Step	Test Procedure	Yes	No
1	Check whether the rail pressure sensor connector is connected properly.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper connections.
2	Turn OFF the ignition switch. Disconnect the rail pressure sensor connector and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K76 to Sensor connector pin 1 ECU connector pin K54 to Sensor connector pin 2 ECU connector pin K32 to Sensor connector pin 3 <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Check the pins K32 and K54 is shorted to ground. <p>Acceptance Criteria</p> <p>No short circuit to ground.</p>	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, Replace the rail with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

4. Crankshaft sensor

Step	Test Procedure	Yes	No
1	Check for the proper fitment of the crankshaft position sensor.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.

Step	Test Procedure	Yes	No
2	<p>Turn OFF the ignition switch.</p> <p>Disconnect the sensor wiring harness connector and ECU connector.</p> <p>Check continuity for the following:</p> <ul style="list-style-type: none"> • ECU connector pin K52 to Sensor connector pin 1 • ECU connector pin K74 to Sensor connector pin 2 • ECU connector pin K30 to Sensor connector pin 3 <p>Acceptance Criteria</p> <p>Ensure proper continuity</p>	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.
3	<p>Turn ON the ignition with ECU connector connected.</p> <p>Check for any short circuit for sensor connector pin 1 and 2 with ground/battery.</p> <p>Check for any short circuit between sensor connector pin 1 and 2.</p> <p>Acceptance Criteria</p> <p>Ensure no short circuits.</p>	<ul style="list-style-type: none"> • Replace the wiring harness. 	Go to Step 4
4	<p>Check if the gap between the cam sensor tip and cam gear sensing surface.</p> <p>Acceptance Criteria</p> <p>0.95 to 1.55 mm</p>	Go to Step 5	<ul style="list-style-type: none"> • Replace the Sensor with a new one.



Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI732 - ERROR SENSOR SUPPLY 2

Possible Causes

- Unavailability of 5 V supply for APPI, Rail and Camshaft sensors.
- Sensor short circuit to battery or ground.

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

DTC Reaction

No sensor supply to ECU.

Diagnostic Procedure

I. Accelerator pedal module

Step	Test Procedure	Yes	No
1	Check for the proper fitment of accelerator pedal sensor and connector.	Go to Step 2	<ul style="list-style-type: none"> • Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the ECU connector and sensor wiring harness connector. Check continuity for the following: <ul style="list-style-type: none"> • ECU connector pin K6I to Sensor connector pin A • ECU connector pin K83 to Sensor connector pin B • ECU connector pin K18 to Sensor connector pin C 	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.

Step	Test Procedure	Yes	No
	<ul style="list-style-type: none"> ECU connector pin K40 to Sensor connector pin D ECU connector pin K82 to Sensor connector pin E ECU connector pin K60 to Sensor connector pin F <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	<p>Turn ON the ignition with ECU connector connected.</p> <p>Check the sensor connector pins B and E is shorted to battery.</p> <p>And also check the sensor connector pins A, C, D and F is shorted to ground.</p> <p>Acceptance Criteria</p> <p>No short circuit between ground / battery.</p>	<ul style="list-style-type: none"> Replace the wiring harness. 	Go to Step 4
4	<p>Check the supply voltage between the following:</p> <ul style="list-style-type: none"> Sensor connector pins C and B Sensor connector pins D and E <p>Acceptance Criteria</p> <p>Voltage = 5V (+/- 0.25)</p>	Go to Step 5	<ul style="list-style-type: none"> Replace the ECU.
5	<p>Turn ON the ignition with sensor wiring harness connector connected.</p> <p>Press the accelerator pedal and check for any response.</p> <p>Acceptance Criteria</p> <p>RPM varies from low idle to high idle.</p>	Clear the DTC and verify.	<ul style="list-style-type: none"> Replace the sensor with a new one.



2. Crankshaft sensor

Step	Test Procedure	Yes	No
1	Check for the proper fitment of the crankshaft position sensor.	Go to Step 2	<ul style="list-style-type: none"> Ensure proper fitment.
2	Turn OFF the ignition switch. Disconnect the sensor wiring harness connector and ECU connector. Check continuity for the following: <ul style="list-style-type: none"> ECU connector pin K52 to Sensor connector pin 1 ECU connector pin K74 to Sensor connector pin 2 ECU connector pin K30 to Sensor connector pin 3 <p>Acceptance Criteria</p> <p>Ensure proper continuity</p>	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Turn ON the ignition with ECU connector connected. Check for any short circuit for sensor connector pin 1 and 2 with ground/battery. Check for any short circuit between sensor connector pin 1 and 2. <p>Acceptance Criteria</p> <p>Ensure no short circuits.</p>	<ul style="list-style-type: none"> Replace the wiring harness. 	Go to Step 4
4	Check if the gap between the cam sensor tip and cam gear sensing surface. <p>Acceptance Criteria</p> <p>0.95 to 1.55 mm</p>	Go to Step 5	<ul style="list-style-type: none"> Replace the Sensor with a new one.

Step	Test Procedure	Yes	No
5	Check whether the sensor is damaged.	<ul style="list-style-type: none"> Replace the Sensor with a new one. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the sensor with a new one.
6	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI738 - VISIBILITY OF SOFTWARE RESETS IN DSM

Possible Causes

- Software resets

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Check for possible resets and causes.
2. If the causes are verified and still problem persists, Replace the ECU

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI74I - COMMUNICATION SPI ERRORS OF TLE6232

Possible Causes

- Communication errors in Tle6232 chip.
- Tle6232 chip is defective or damaged.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI 742 - INJECTION CUT OFF DEMAND (ICO) FOR SHUT OFF COORDINATOR

Possible Causes

- Overrun monitoring fault (DFC_MoFOvR) will trigger this error.

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster glows continuously.

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI743 - ERROR IS THE PLAUSIBILITY BETWEEN ENGINE SPEED IN LEVEL 1 AND LEVEL 2

Possible Causes

- Error in the engine speed acquisition from the crank sensor.

DTC Information

Lamp Status

No Lamp activation

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI750 - ERROR IN THE PLAUSIBILITY OF CURRENT ENERGIZING TIME WITH MAXIMUM PERMITTED ENERGIZINGTIME

Possible Causes

- Error in the plausibility of current energizing time with maximum permitted energizing time during overrun.
- The ECU has an internal error.

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster glows continuously.

Vehicle Behaviour

The engine will not start.

Diagnostic Procedure

1. Clear the error through the diagnostic tester.
2. If the problem persists, replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI75I - COOLANT TEMP DISPLAY TO CLUSTER - WIRE OPEN

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

Lamp Status

No Lamp activation

DTC Reaction

The instrument cluster does not show coolant temperature.

Instrument Cluster Connector Pin Details

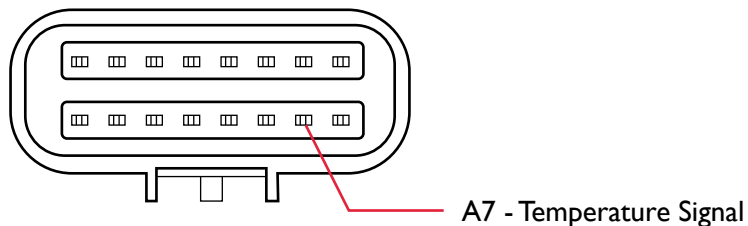


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K70 and instrument cluster connector pin A7. Acceptance Criteria Ensure proper continuity.	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one. 	<ul style="list-style-type: none"> Replace the wiring harness.
3	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI752 - COOLANT TEMP DISPLAY TO CLUSTER POWERSTAGE OVERTEMPERATURE

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

Lamp Status

No Lamp activation

DTC Reaction

The instrument cluster does not show coolant temperature.

Instrument Cluster Connector Pin Details

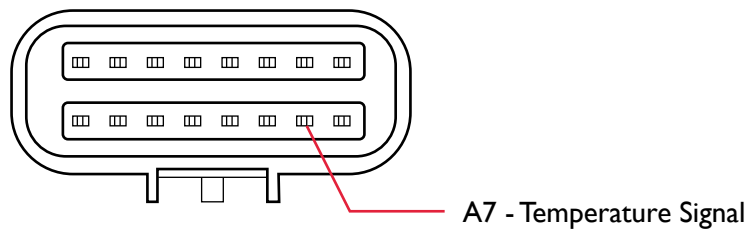


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K70 and instrument cluster connector pin A7. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin A7 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI753 - COOLANT TEMP DISPLAY TO CLUSTER - WIRE SHORTED TO BATTERY

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

Lamp Status

No Lamp activation

DTC Reaction

The instrument cluster does not show coolant temperature.

Instrument Cluster Connector Pin Details

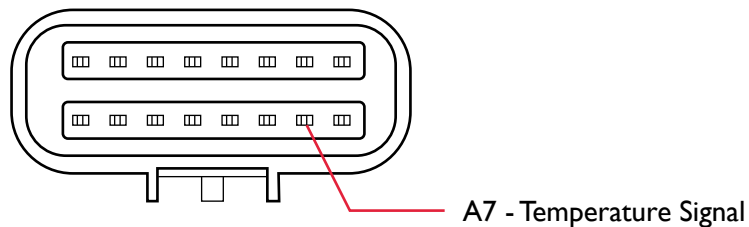


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K70 and instrument cluster connector pin A7. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin A7 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI754 - COOLANT TEMP DISPLAY TO CLUSTER - WIRE SHORTED TO GROUND

Possible Causes

- Loose Connections
- Wiring Harness Problem
- Faulty Instrument Cluster
- Faulty ECU

DTC Information

Lamp Status

No Lamp activation

DTC Reaction

The instrument cluster does not show coolant temperature.

Instrument Cluster Connector Pin Details

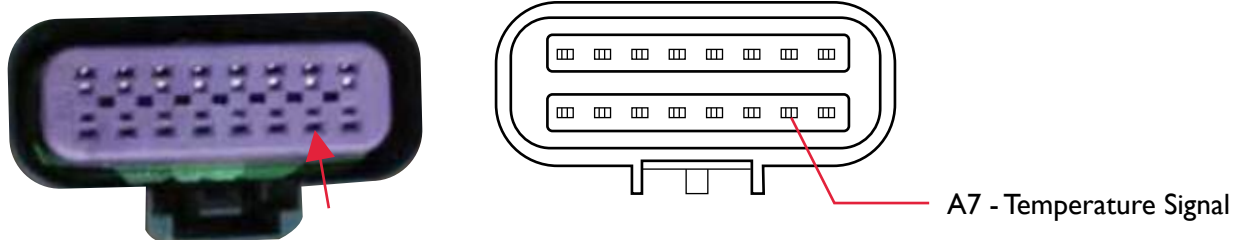


Image shown is applicable for 6000 series model and the connector pin details may vary for other models.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check whether the instrument cluster is connected to ECU.	Go to Step 2	<ul style="list-style-type: none"> Ensure better connections.
2	Turn OFF the ignition switch. Disconnect the ECU connector and instrument cluster connector. Check the continuity between ECU connector pin K70 and instrument cluster connector pin A7. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> Replace the wiring harness.
3	Connect the ECU connector. Turn ON the ignition. Check for any short circuit between instrument cluster connector pin A7 with ground / battery. Acceptance Criteria No short circuit between ground / battery.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the cluster with a new one.
4	If still error repeats, Replace the ECU with a new one.	Clear the DTC and verify.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI80I - TOTAL COUNTER FOR RAIL PRESSURE LIMITING VALVE OPEN CONDITION EXCEEDED THE LIMIT

Possible Causes

- Total counter for PRV open condition exceeds the limit.

DTC Information

Lamp Status

The Check engine (CHK ENG) lamp in the instrument cluster blinks continuously.

DTC Reaction

Rail line needs to be changed after 50 counters.

Diagnostic Procedure

1. Clear the DTC and verify.
2. Replace the rail.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI 802 - RAIL PRESSURE LIMITING VALVE FORCED OPEN

Possible Causes

- Loose connections
- Wiring harness problem
- Metering unit pump failure
- Rail pressure sensor failure

DTC Information

Lamp Status

The Check engine (CHK ENG) lamp in the instrument cluster blinks continuously.

DTC Reaction

Rail line needs to be changed after 50 counters.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for any fuel metering unit (high pressure pump) and rail pressure sensor related errors in diagnostic tester tool.	Rectify the same. Clear the DTC and verify	Go to Step 2
2	Turn OFF the ignition switch. Disconnect the ECU connector and metering unit pump connector. <ul style="list-style-type: none"> • Check the continuity between metering unit pump connector pin 1 and ECU connector pin K89. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.

Step	Test Procedure	Yes	No
3	Check whether the metering unit connector pins are shorted with battery/ground. Acceptance Criteria No short circuit to battery/ground.	<ul style="list-style-type: none"> Replace the wiring harness. 	Go to Step 4
4	Disconnect the Rail pressure sensor connector. Check the continuity between the following: <ul style="list-style-type: none"> ECU connector pin K76 and Sensor connector pin 1 ECU connector pin K54 and Sensor connector pin 2 ECU connector pin K32 and Sensor connector pin 3. Acceptance Criteria Ensure proper continuity.	Go to Step 5	<ul style="list-style-type: none"> Replace the wiring harness.
5	Check whether the rail pressure sensor connector pins are shorted with battery/ground. Acceptance Criteria No short circuit to battery/ground.	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the metering unit pump with a new one. 	<ul style="list-style-type: none"> Replace the wiring harness.
6	If still error repeats, Replace the Rail.	Clear the DTC and verify. If still error repeats, Replace the ECU.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI 803 - RAIL PRESSURE LIMITING VALVE FORCED OPEN BY PRESSURE SHOCKS

Possible Causes

- Loose connections
- Wiring harness problem
- Metering unit pump failure
- Rail pressure sensor failure

DTC Information

Lamp Status

The Check engine (CHK ENG) lamp in the instrument cluster blinks continuously.

DTC Reaction

Rail line needs to be changed after 50 counters.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for any fuel metering unit (high pressure pump) and rail pressure sensor related errors in diagnostic tester tool.	Rectify the same. Clear the DTC and verify	Go to Step 2
2	Turn OFF the ignition switch. Disconnect the ECU connector and metering unit pump connector. <ul style="list-style-type: none"> • Check the continuity between metering unit pump connector pin I and ECU connector pin K89. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.

Step	Test Procedure	Yes	No
3	Check whether the metering unit connector pins are shorted with battery/ground. Acceptance Criteria No short circuit to battery/ground.	<ul style="list-style-type: none"> Replace the wiring harness. 	Go to Step 4
4	Disconnect the Rail pressure sensor connector. Check the continuity between the following: <ul style="list-style-type: none"> ECU connector pin K76 and Sensor connector pin 1 ECU connector pin K54 and Sensor connector pin 2 ECU connector pin K32 and Sensor connector pin 3. Acceptance Criteria Ensure proper continuity.	Go to Step 5	<ul style="list-style-type: none"> Replace the wiring harness.
5	Check whether the rail pressure sensor connector pins are shorted with battery/ground. Acceptance Criteria No short circuit to battery/ground.	<ul style="list-style-type: none"> Replace the wiring harness. 	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the metering unit pump with a new one.
6	If still error repeats, Replace the Rail.	Clear the DTC and verify. If still error repeats, Replace the ECU.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI804 - RAIL PRESSURE LIMITING VALVE OPENED

Possible Causes

- Loose connections
- Wiring harness problem
- Metering unit pump failure
- Rail pressure sensor failure

DTC Information

Lamp Status

The Check engine (CHK ENG) lamp in the instrument cluster blinks continuously.

DTC Reaction

Rail line needs to be changed after 50 counters.

Diagnostic Procedure

Step	Test Procedure	Yes	No
1	Check for any fuel metering unit (high pressure pump) and rail pressure sensor related errors in diagnostic tester tool.	Rectify the same. Clear the DTC and verify	Go to Step 2
2	Turn OFF the ignition switch. Disconnect the ECU connector and metering unit pump connector. <ul style="list-style-type: none"> • Check the continuity between metering unit pump connector pin I and ECU connector pin K89. Acceptance Criteria Ensure proper continuity.	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.

Step	Test Procedure	Yes	No
3	Check whether the metering unit connector pins are shorted with battery/ground. Acceptance Criteria No short circuit to battery/ground.	<ul style="list-style-type: none"> Replace the wiring harness. 	Go to Step 4
4	Disconnect the Rail pressure sensor connector. Check the continuity between the following: <ul style="list-style-type: none"> ECU connector pin K76 and Sensor connector pin 1 ECU connector pin K54 and Sensor connector pin 2 ECU connector pin K32 and Sensor connector pin 3. Acceptance Criteria Ensure proper continuity.	Go to Step 5	<ul style="list-style-type: none"> Replace the wiring harness.
5	Check whether the rail pressure sensor connector pins are shorted with battery/ground. Acceptance Criteria No short circuit to battery/ground.	<ul style="list-style-type: none"> Clear the DTC and verify. If the error repeats, replace the metering unit pump with a new one. 	<ul style="list-style-type: none"> Replace the wiring harness.
6	If still error repeats, Replace the Rail.	Clear the DTC and verify. If still error repeats, Replace the ECU.	

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

PI805 - QUANTITY BALANCE CHECK IF A SUCCESSFULL PRV OPENING IS ENSURED

Possible Causes

- Malfunction in the pressure relief valve (PRV).

DTC Information

Lamp Status

The CHK ENG lamp in the instrument cluster glows continuously.

DTC Reaction

Rail line needs to be changed after 50 counters.

Diagnostic Procedure

1. Turn OFF the ignition switch.
2. Disconnect the rail pressure sensor connector.
3. Check whether the rail pressure sensor connector pins are shorted with battery/ground.
4. Clear the DTC and verify.
5. Replace the rail.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



PI807 - TOTAL TIME FOR RAIL PRESSURE LIMITING VALVE OPEN CONDITION EXCEEDED THE LIMIT

Possible Causes

- Total time for PLV open condition exceeded the limit.

DTC Information

Lamp Status

The Check engine (CHK ENG) lamp in the instrument cluster blinks continuously.

DTC Reaction

Rail line needs to be changed after 50 counters.

Diagnostic Procedure

1. Clear the DTC and verify.
2. Replace the rail.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P2135 - ACCELERATOR PEDAL PLAUSIBILITY ERROR BETWEEN PRIMARY AND SECONDARY SENSORS

Accelerator pedal module (APM) consists of two sensors (Primary and Secondary) which act as a potentiometer and its output voltage changes according to the pedal position.

The ECU applies a reference voltage to the APM sensor and then measures the voltage that is present on the APM sensor signal circuit. The ECU uses the APM sensor signal for further calculation of fuelling and other engine operational parameters.



Possible Causes

- Loose connections
- Wiring harness problem
- Faulty accelerator pedal sensor
- Faulty ECU

Normal Operation

At normal vehicle condition, the ECU receives an output voltage signal (**350 mV to 4.8V**) from the accelerator pedal module.

DTC Information

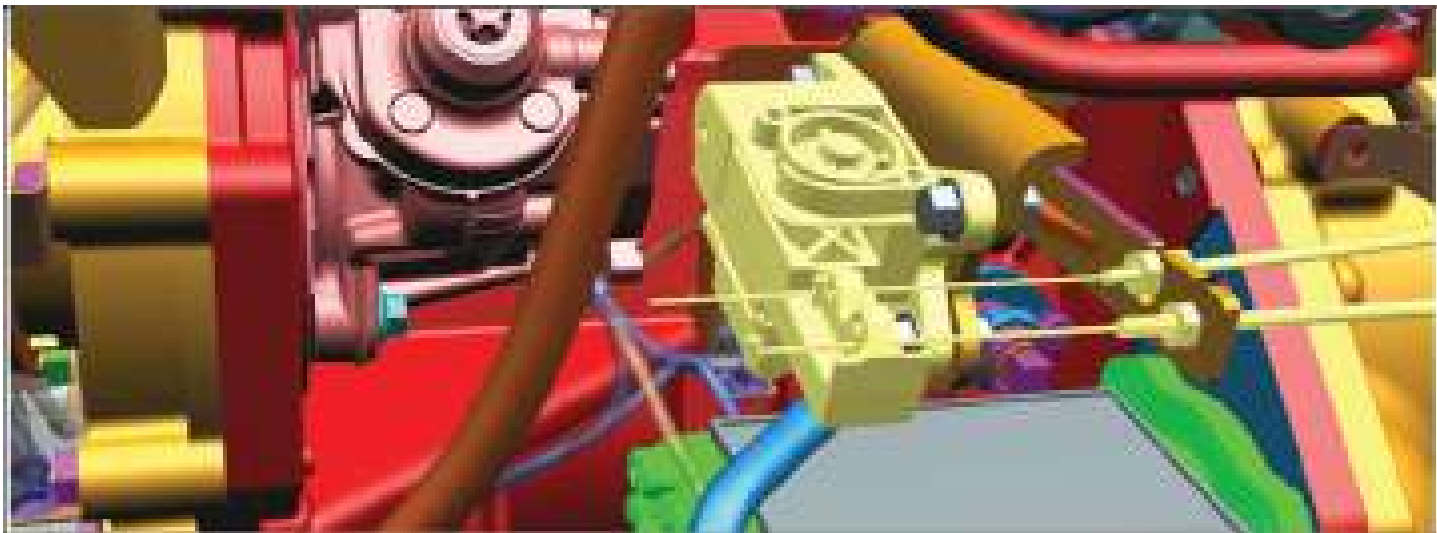
DTC Reaction

- Torque / Engine speed limitations
- No response from the accelerator pedal module

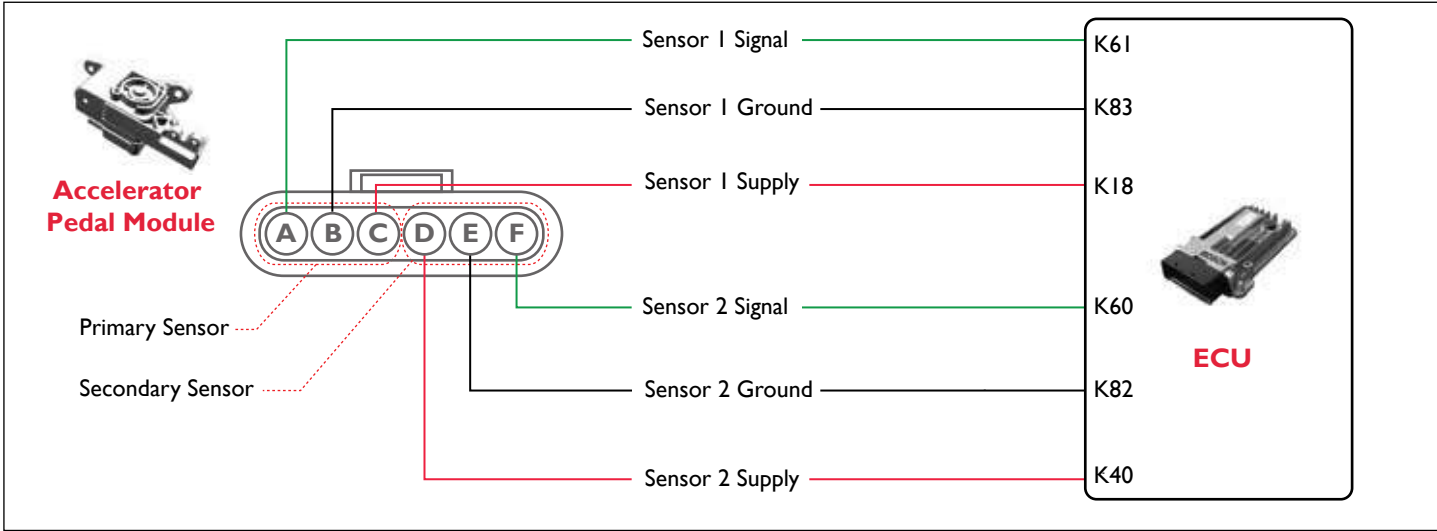
Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

Sensor Location



Connector Pin Details



Diagnostic Procedure

Step	Test Procedure	Yes	No
1	<p>Turn OFF the ignition switch.</p> <p>Disconnect the ECU connector and sensor wiring harness connector.</p> <p>Check continuity for the following:</p> <ul style="list-style-type: none"> • ECU connector pin K61 to Sensor connector pin A • ECU connector pin K83 to Sensor connector pin B • ECU connector pin K18 to Sensor connector pin C • ECU connector pin K40 to Sensor connector pin D • ECU connector pin K82 to Sensor connector pin E • ECU connector pin K60 to Sensor connector pin F <p>Acceptance Criteria</p> <p>Ensure proper continuity.</p>	Go to Step 2	<ul style="list-style-type: none"> • Replace the wiring harness.
2	<p>Turn ON the ignition with ECU connector connected.</p> <p>Check the sensor connector pins B and E is shorted to battery.</p> <p>And also check the sensor connector pins A, C, D and F is shorted to ground.</p> <p>Acceptance Criteria</p> <p>No short circuit to ground / battery.</p>	Go to Step 3	<ul style="list-style-type: none"> • Replace the wiring harness.
3	<p>Check the supply voltage between the following:</p> <ul style="list-style-type: none"> • Sensor connector pins C and B • Sensor connector pins D and E <p>Acceptance Criteria</p> <p>Voltage = 5V (+/- 0.25)</p>	Go to Step 4	<ul style="list-style-type: none"> • Replace the ECU.

Step	Test Procedure	Yes	No
4	<p>Turn ON the ignition with sensor wiring harness connector connected.</p> <p>Press the accelerator pedal and check for any response.</p> <p>Acceptance Criteria</p> <p>RPM varies from low idle to high idle.</p>	Clear the DTC and verify.	<ul style="list-style-type: none"> Replace the sensor with a new one.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.



P2228 - SIGNAL RANGE CHECK LOW - ENVIRONMENT PRESSURE SENSOR

Possible Causes

- Low environment pressure
- Sensor is not internally connected in ECU

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

DTC Reaction

Possible torque limitations

Diagnostic Procedure

- I. Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

P2229 - SIGNAL RANGE CHECK HIGH - ENVIRONMENT PRESSURE SENSOR

Possible Causes

- High environment pressure
- Sensor is not internally connected in ECU

DTC Information

Lamp Status

The check engine (CHK ENG) lamp in the instrument cluster blinks.

DTC Reaction

Possible torque limitations

Diagnostic Procedure

- I. Replace the ECU.

Healing Condition

After performing the troubleshooting for each P Code, follow the below test procedure before driving the vehicle.

- Clear the DTC and verify using the FES diagnostic tool.
- Activate the ignition for one driving cycle (ignition-OFF and ON).

Upon completion of diagnostic procedure, clear the DTC. Ensure that the problem has been rectified and the DTC does not appear again.

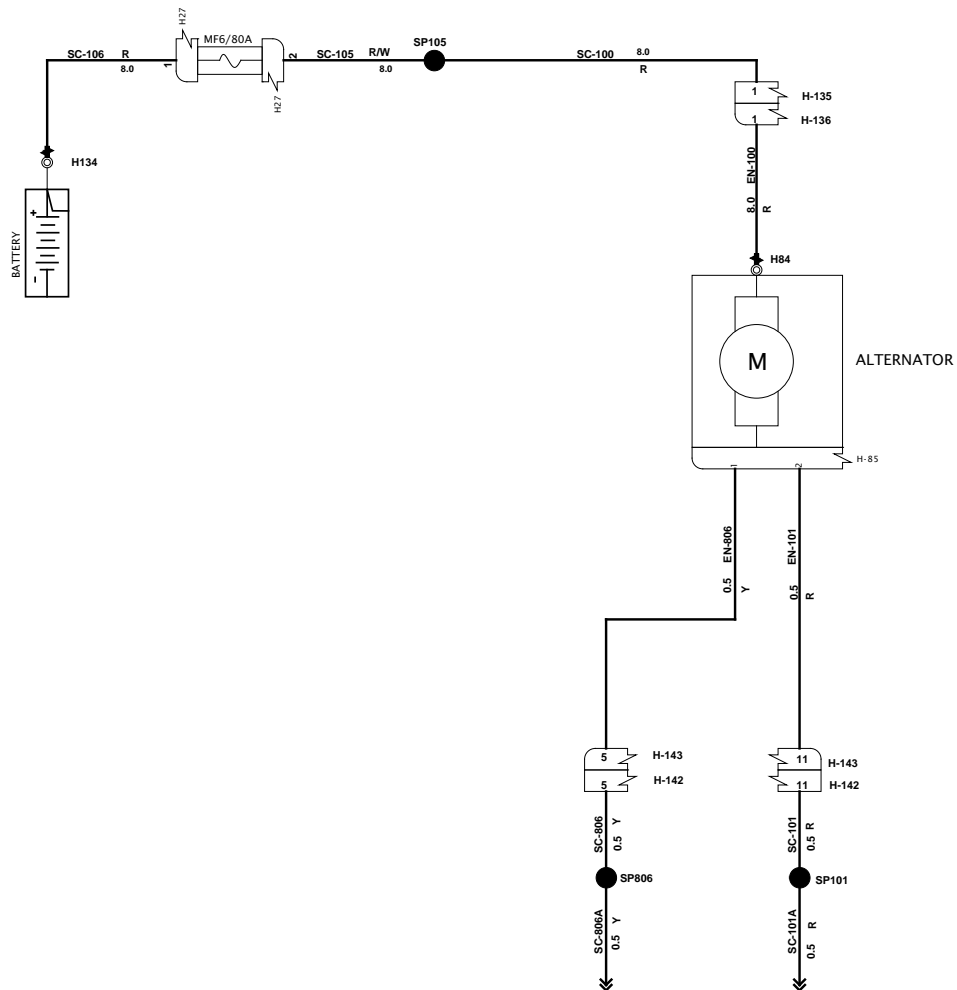


CHAPTER - H

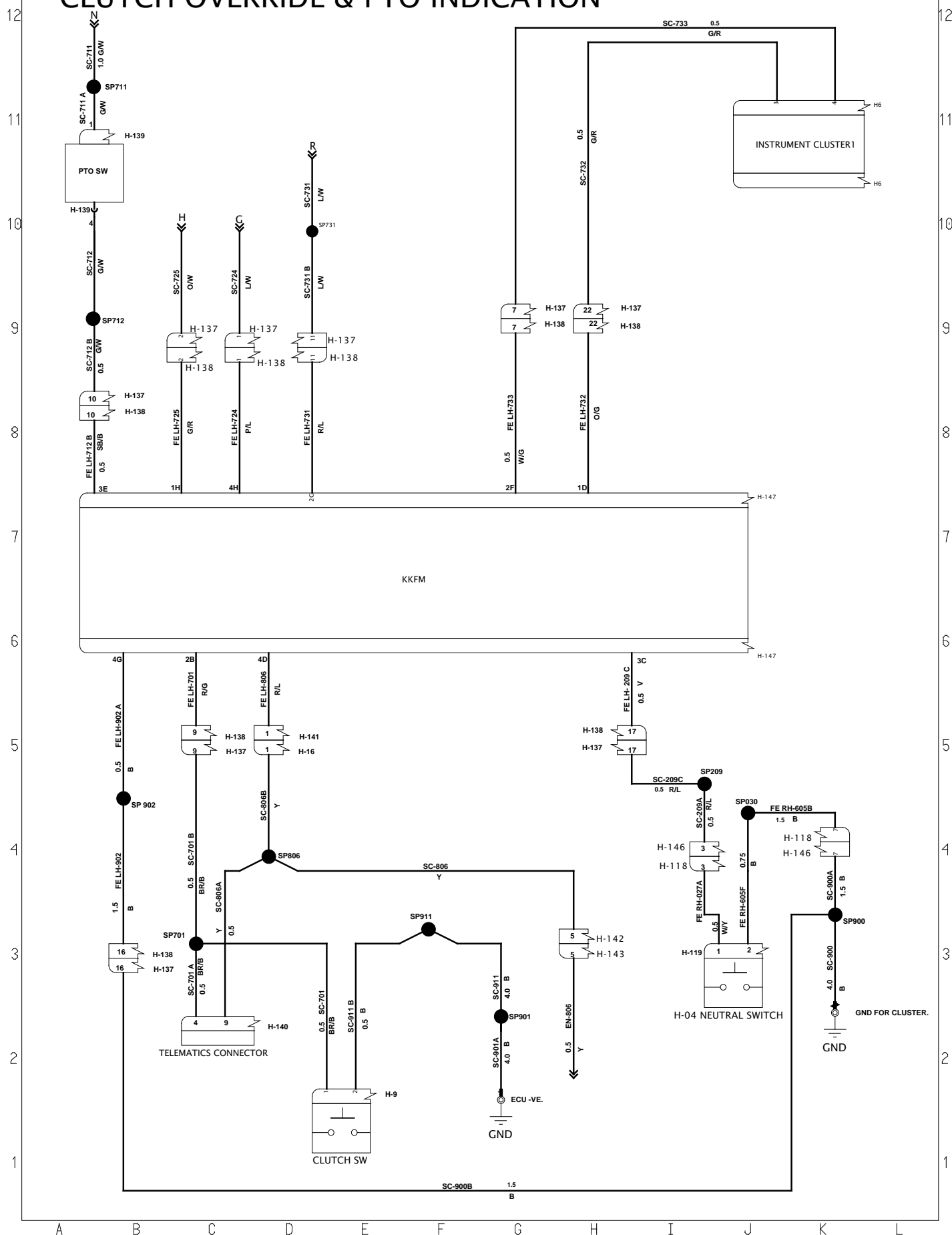
CRDe Wiring Harness (Manual)

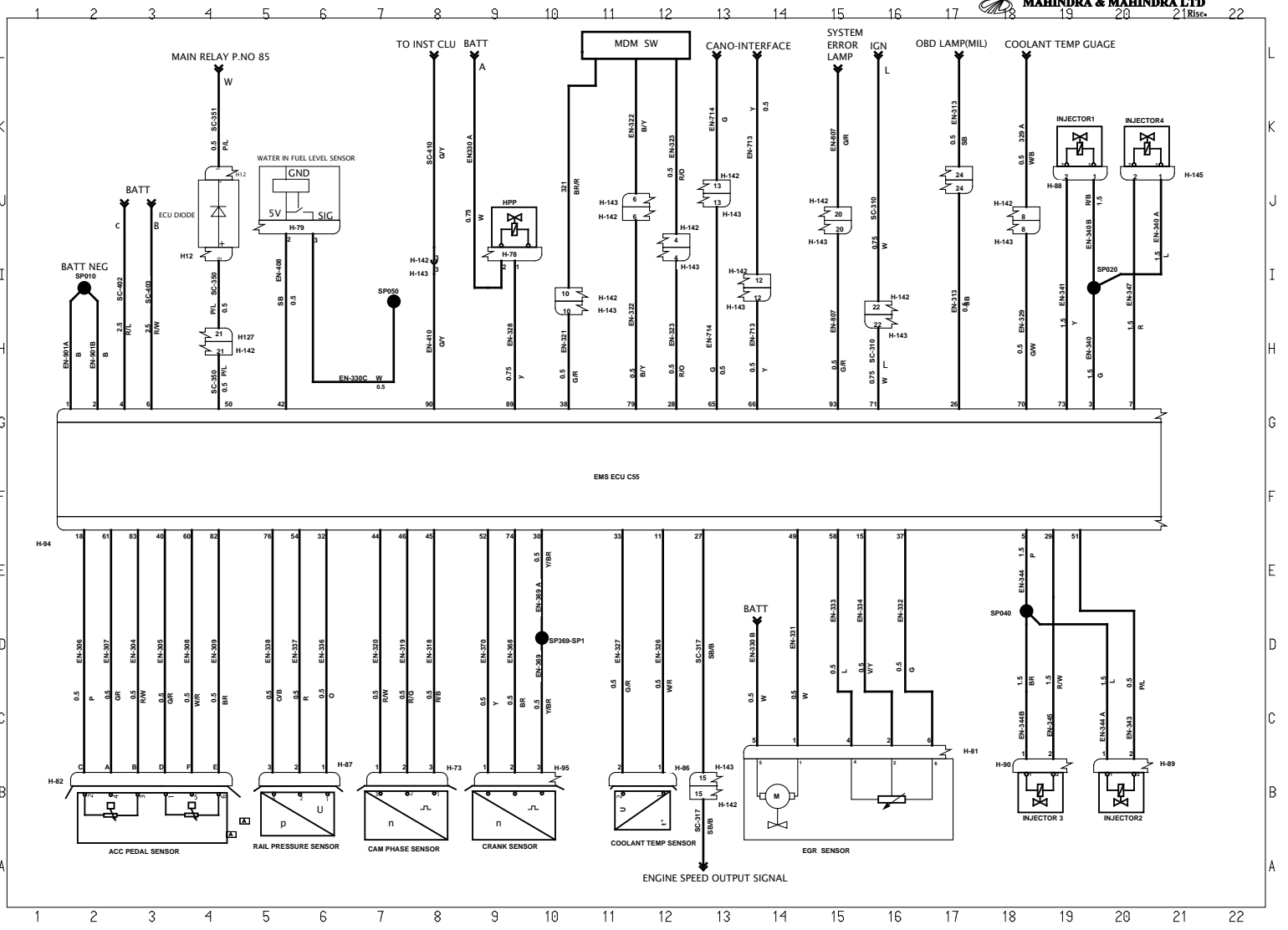


CHARGING CIRCUIT

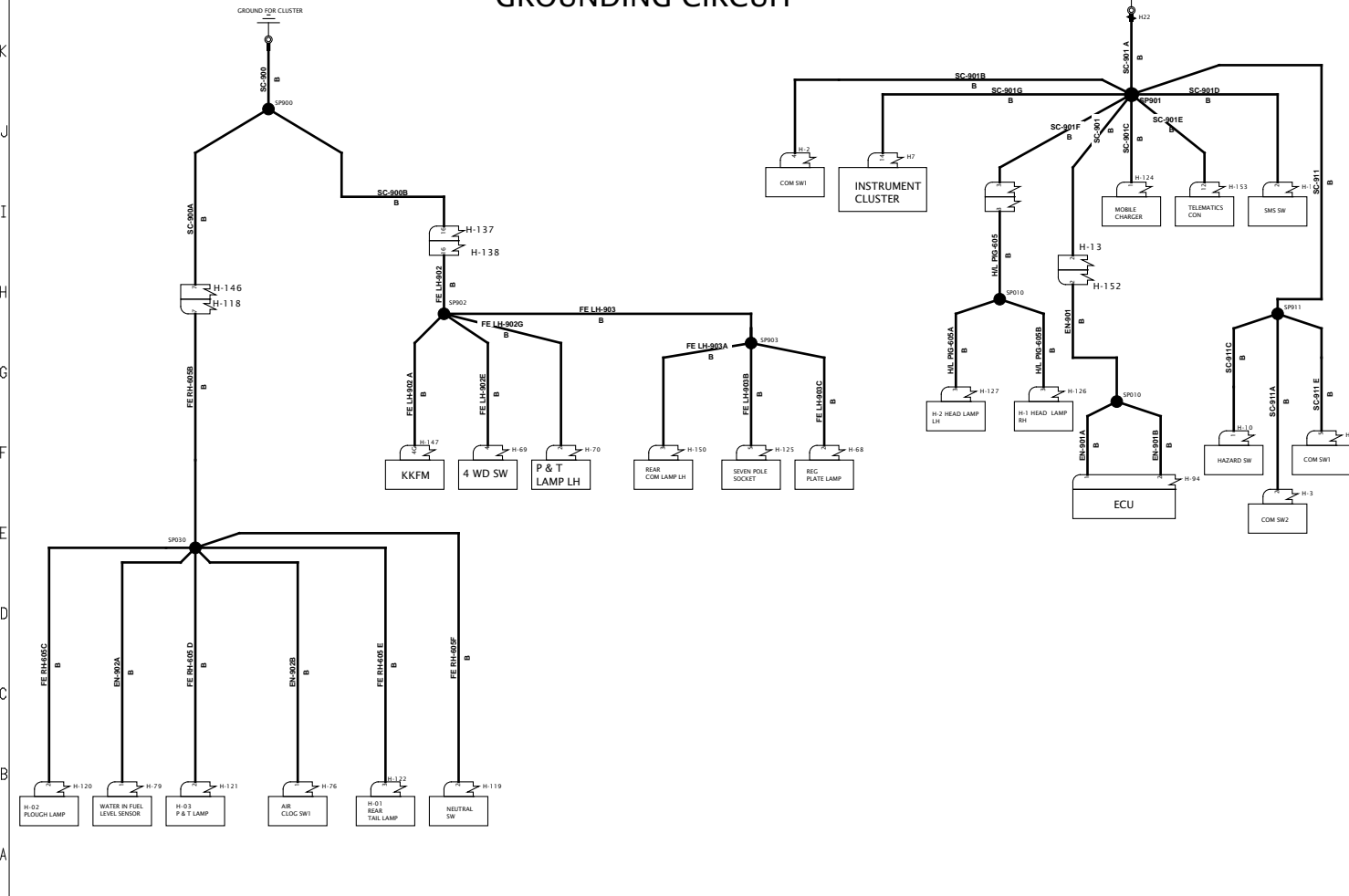


CLUTCH OVERRIDE & PTO INDICATION





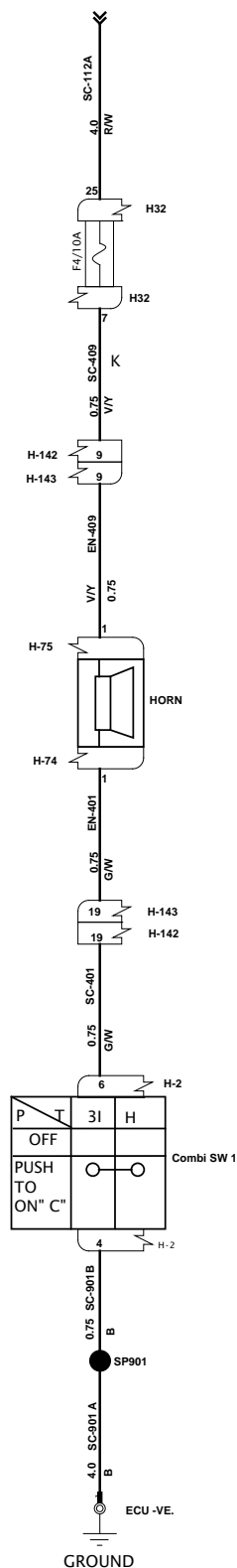
GROUNDING CIRCUIT



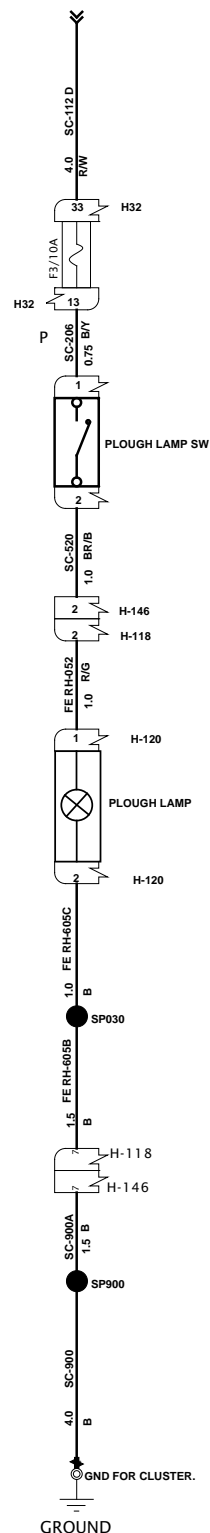
H346



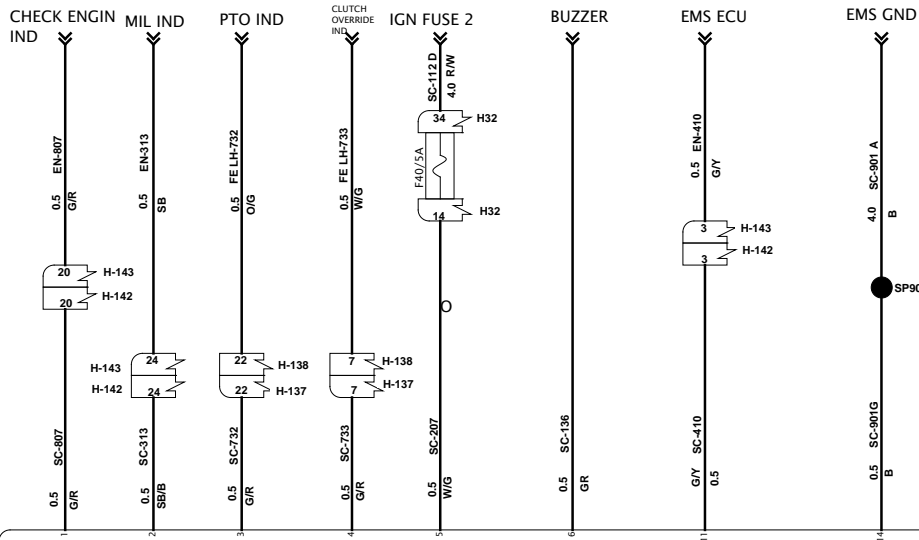
HORN CIRCUIT



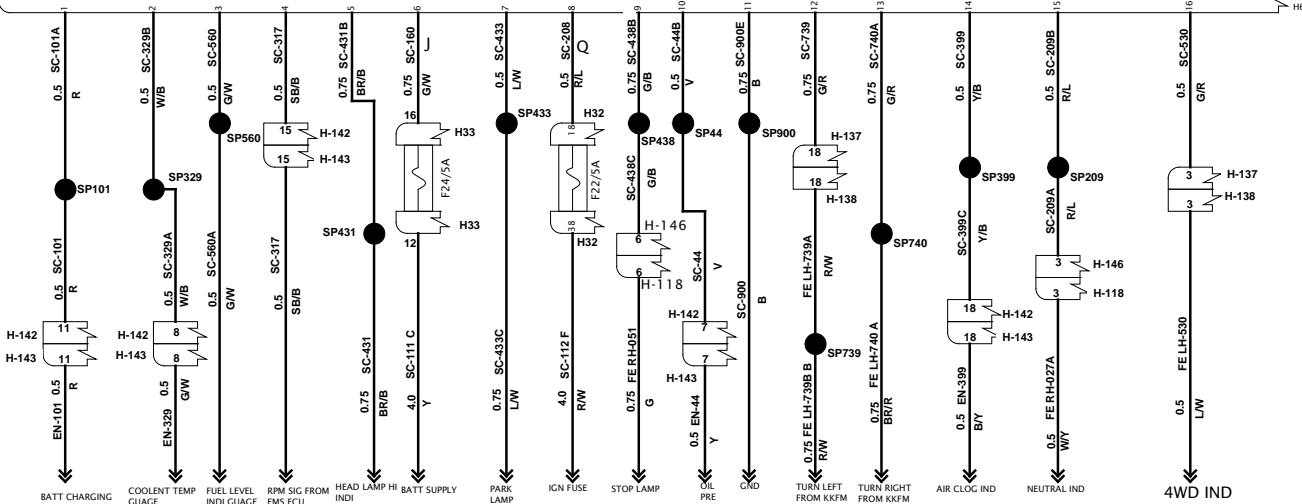
PLOUGH CIRCUIT



INSTRUMENT CLUSTER

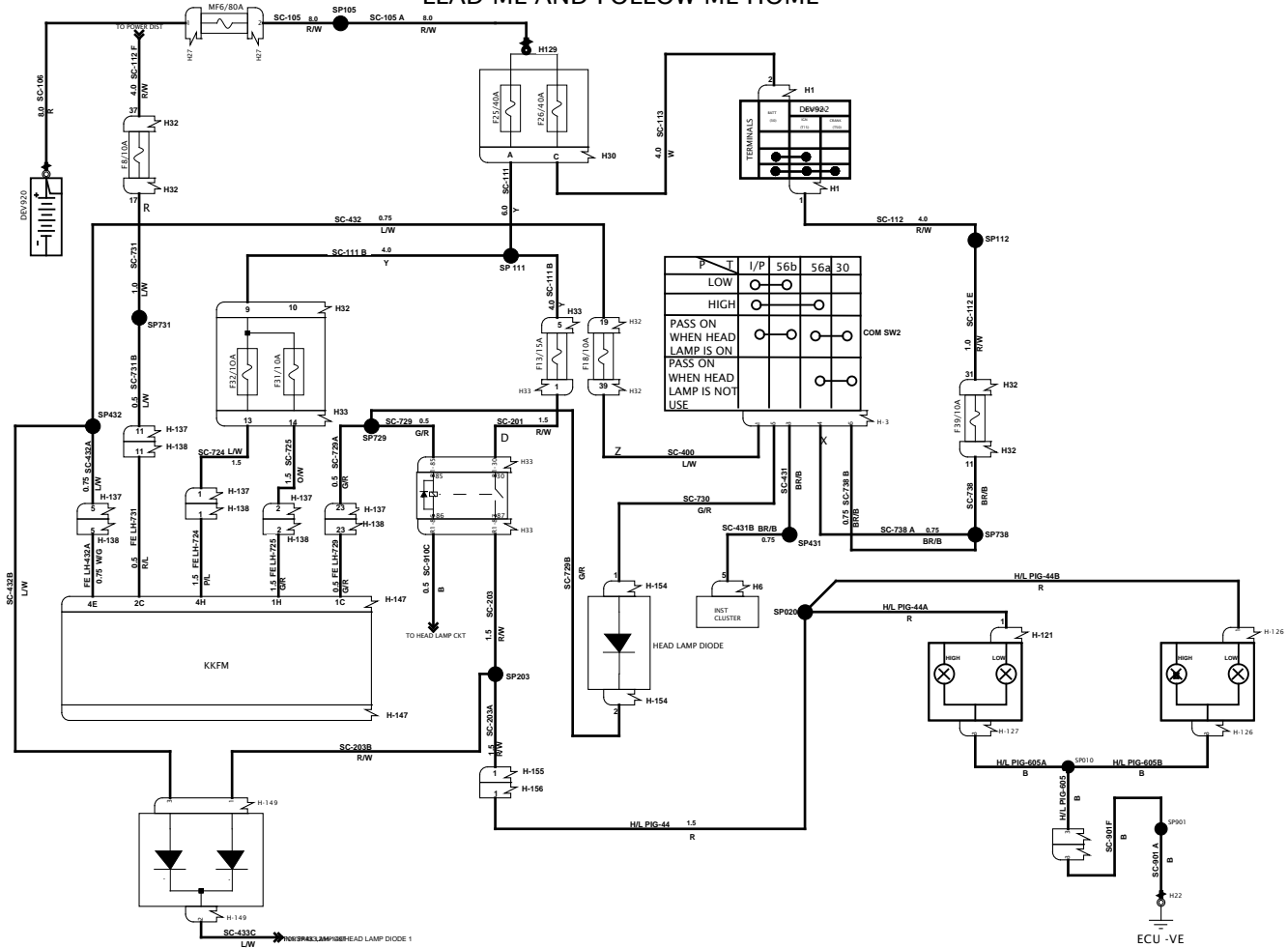


INSTRUMENT CLUSTER





LEAD ME AND FOLLOW ME HOME

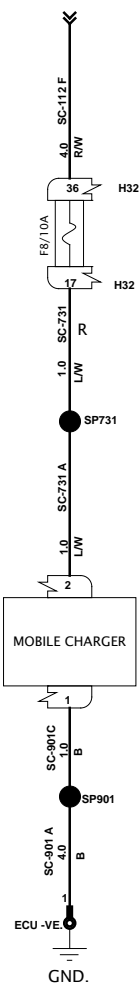


ECU -VE

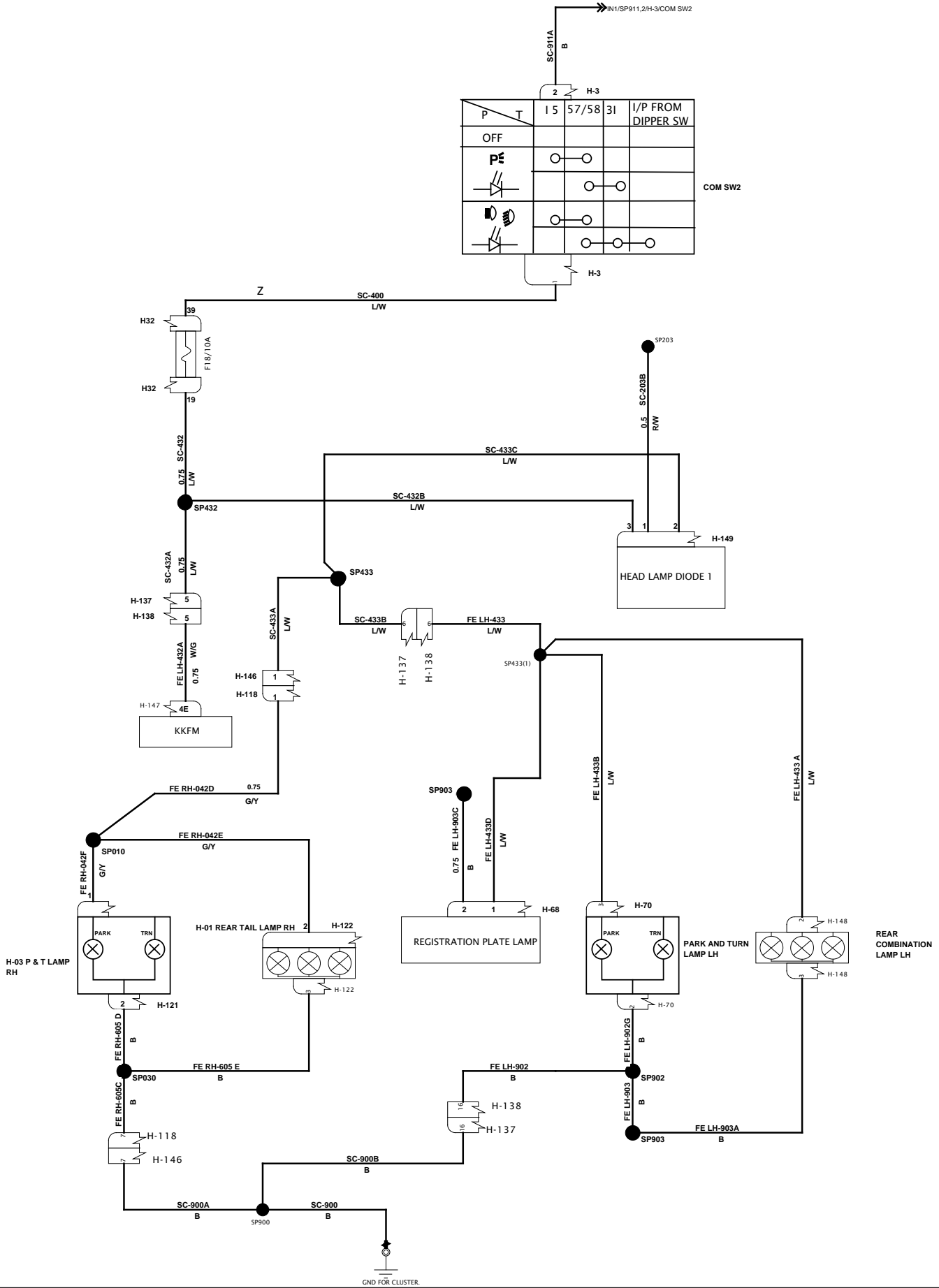
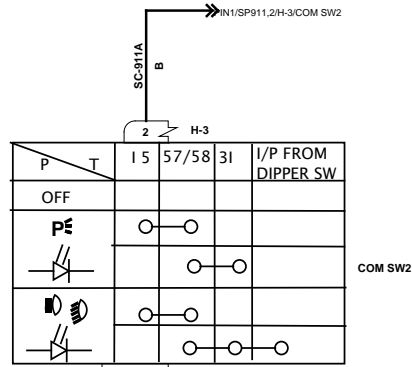
H 350



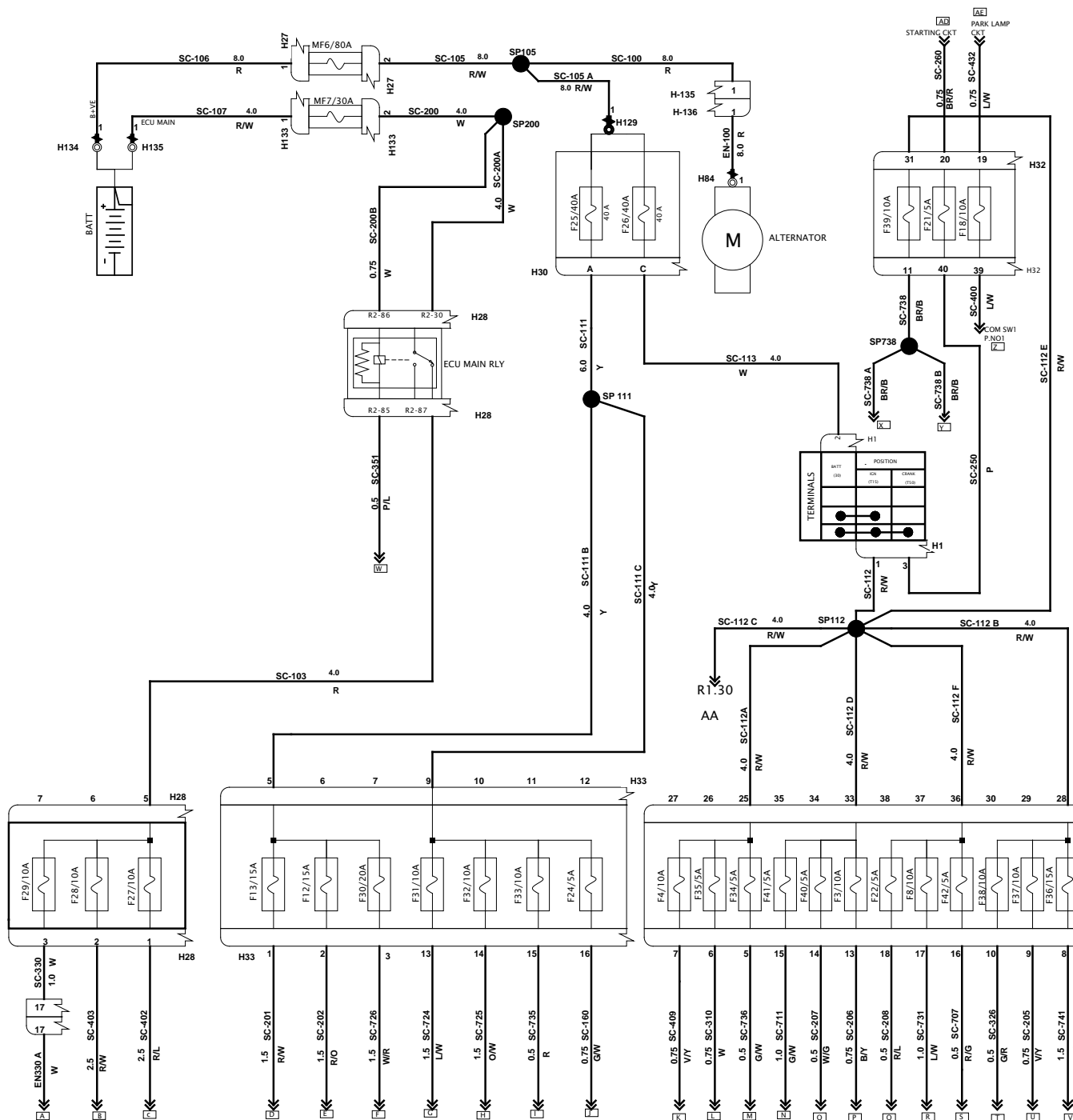
MOBILE CHARGER



PARK LAMP CIRCUIT

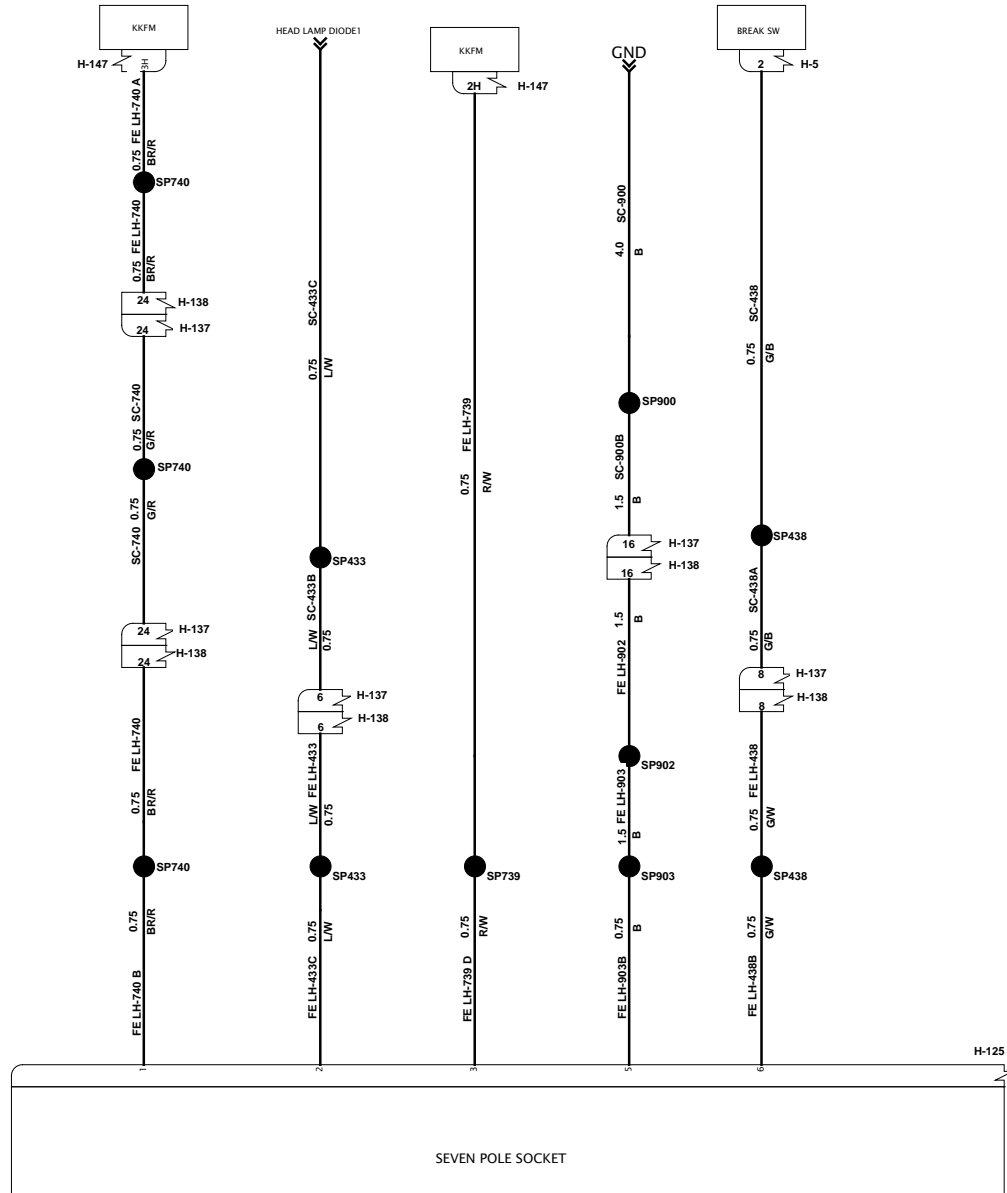


POWER DISTRIBUTION

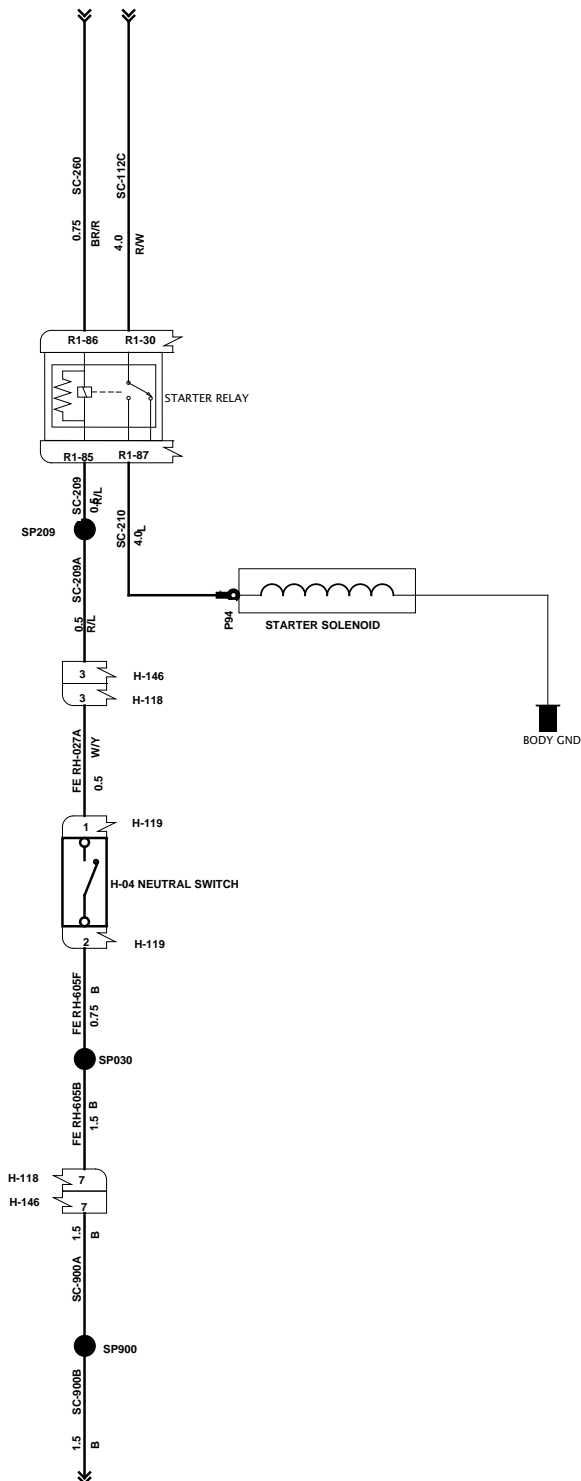


SEVEN POLE SOCKET

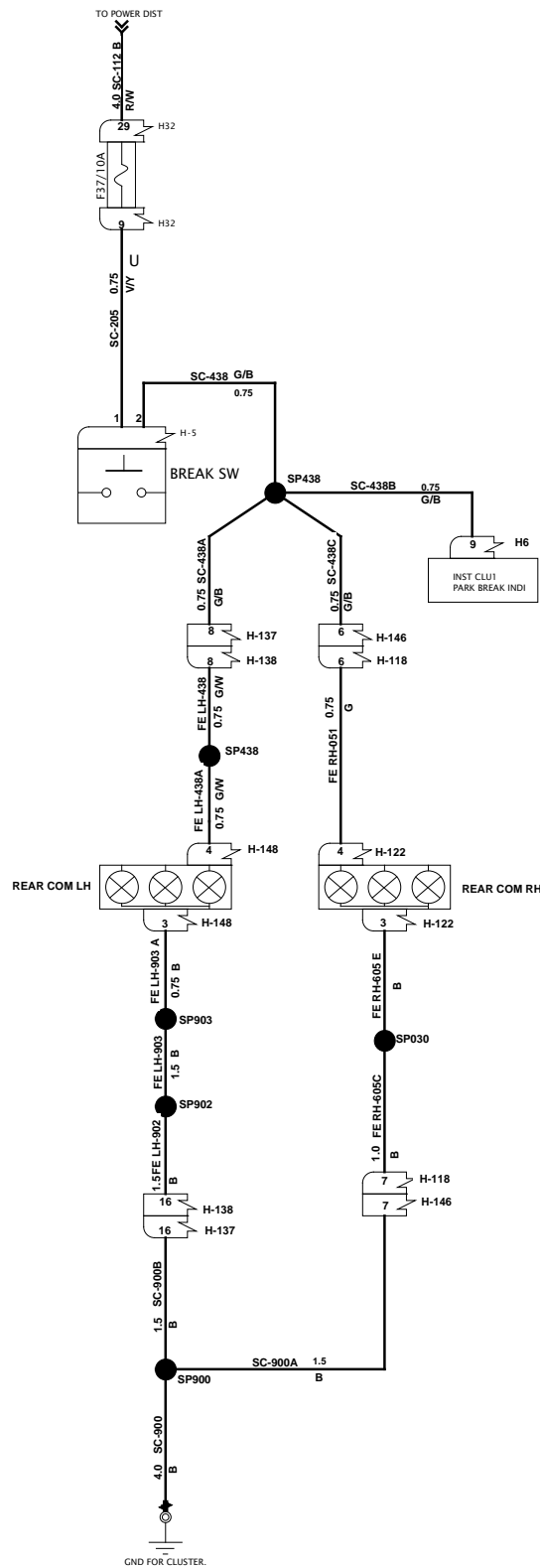
FOR CLUSTER



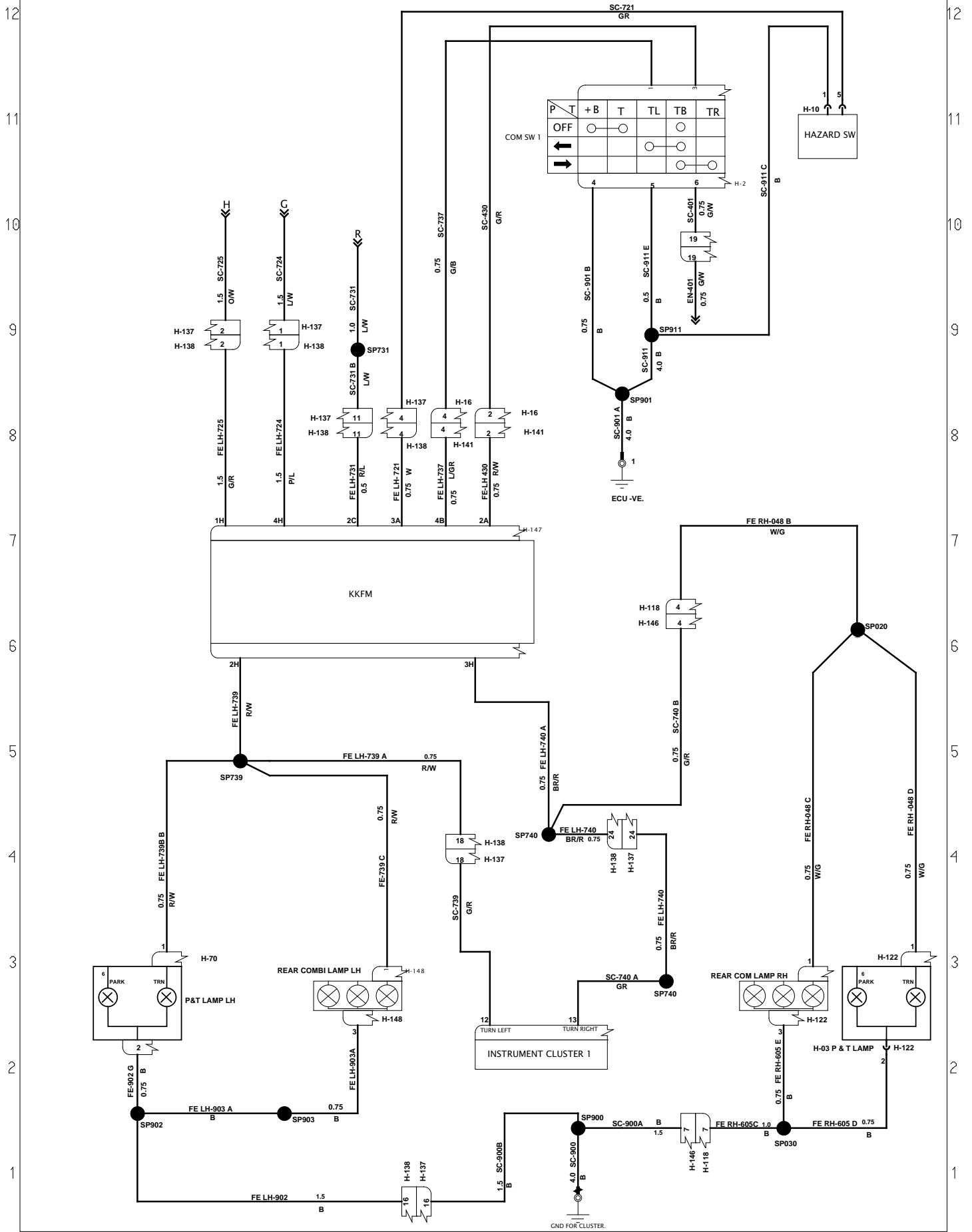
STARTING CIRCUIT



STOP LAMP CIRCUIT



TURN AND HAZARD SIGNAL



H357