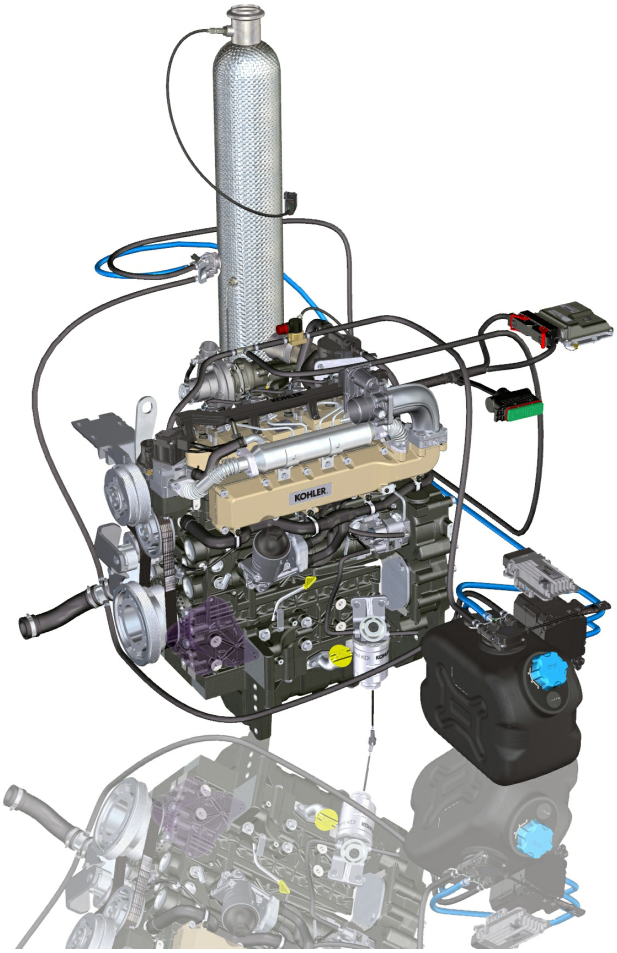
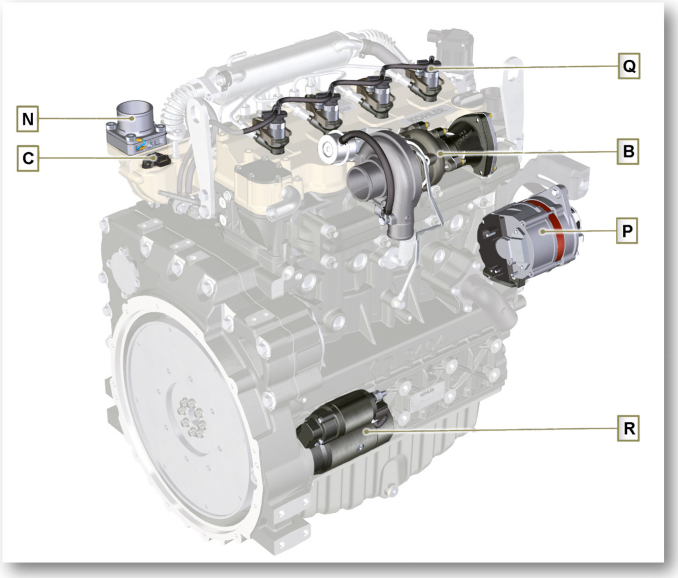
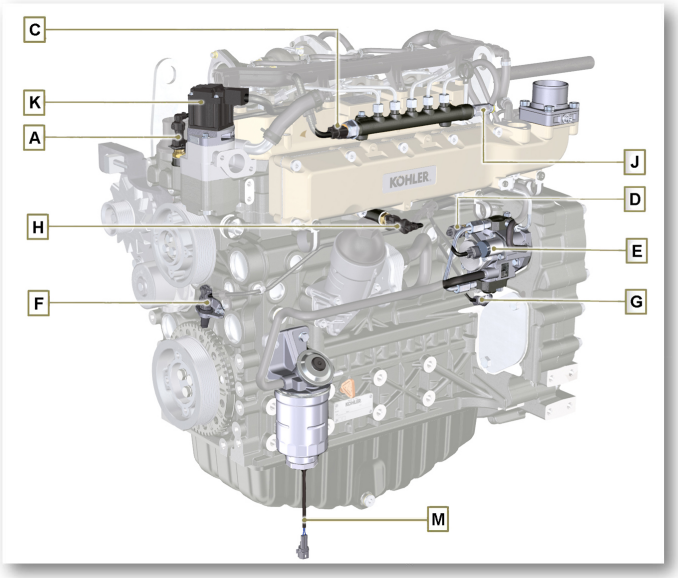
KOHLER



KOHLER help file KDI Engines 3404





A	Coolant Temperature Sensor
B	Turbocharger Waste Gate Valve
C	Intake Temperature and Manifold Absolute Pressure T-MAP Sensor
D	Fuel Temperature Sensor

P2229	Atmosphere Pressure Sensor too High	108	3
P2269	Water in fuel filter failure.	97	2
P2280	Air filter clogging error	107	2
P2293	Common Rail System Pressure - Exceeds High Upper Limit 2	157	16
P2425	Exhaust Gas Recirculation Valve: Temperature failure	2791	31
P268B	Pump Learning Uncompleted	1349	2
U0073	CAN 1 Node Error	1083	19
U0101	CAN BUS Line Open from General Unit	1083	31
U0107	TSC1 Time Out Error	3349	9
U0408	TSC1CS Checksum Test	3349	2
U0408	TSC1 RC Rolling Count Test	3349	10
U0411	EGR Valve Transmission and or received signal failure (for CAN)	2791	2
U1001	Can2 Node Error	1084	19

1.2.1 Failure Type Byte (FTB) Numbers

KOHLER. IN POWER. SINCE 1920.

Failure Type Byte (FTB) Numbers

00	No sub type information
01	General Electrical Failure
02	General signal failure
04	System internal failure (ECU)

This fault code indicates the ECU has detected a fault on the T-MAP Sensor.

This fault code activates the Engine Derating Mode.

Service Procedures :

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures.

1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
2	Check for any debris or water inside the connector terminals. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.
3	Check the harness engine and machine, is not damaged and is routed correctly (to the machine harness refere to the machine workshop manual).
4	Complete the T-MAP testing procedure described in the help page **Intake Temperature and Manifold Absolute Pressure (T-MAP) Sensor.**

FTB Related Faults :

16	Circuit voltage below threshold

1.2.11 P0113

P0113	**Fault Information**	KOHLER. IN POWER. SINCE 1920.

Intake Air Temperature Sensor Signal too High

This fault code indicates the ECU has detected a fault on the intake Temperature and Manifold absolute Pressure T-MAP Sensor.

This fault code activates the Engine Derating Mode.

Service Procedures :

	Common Rail Fuel Pressure Sensor.

FTB Related Faults :

17	Circuit voltage above threshold

1.2.22 P0201

P0201	Fault Information	KOHLER. IN POWER. SINCE 1920.

Injector Circuit/Open - Injector firing order 1

This fault code indicates the ECU has detected an open circuit on the Cylinder 1 Fuel Injector.

First cylinder flywheel side end.

This fault code activates the Engine Derating Mode.

Service Procedures :

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures.

1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
2	Check for any debris or water inside the connector terminals. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.
3	Check the harness engine and machine, is not damaged and is routed correctly (to the machine harness refere to the machine workshop manual).
4	Complete the Injector testing procedure described in the help page. Fuel Injector.
5	If fault persists complete the checks described in the help page Fuel Injector Drive System to solve the problem.

FTB Related Faults :

	Throttle Pedal Sensor

FTB Related Faults :

17	Circuit voltage above threshold

1.2.33 P0231

P0231	Fault Information	KOHLER. IN POWER. SINCE 1920.

Electric Lift Pump; Relay or Circuit Short to Ground

This fault code indicates the ECU has detected a fault on the Fuel lift pump control circuit.

Service Procedures :

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures.

1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
2	Check for any debris or water inside the connector terminals. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing see Fuel lift pump relay help page for information.
3	Check the harness engine and machine, is not damaged and is routed correctly (to the machine harness refere to the machine workshop manual).
4	Complete the Fuel lift pump control circuit testing procedure described in the help page Fuel lift pump test.

FTB Related Faults :

11	Short Circuit To Ground (SC2G)

1.2.44 P0385

P0385	Fault Information	KOHLER. IN POWER. SINCE 1920.

Crankshaft Position Sensor - Camshaft Position Sensor NO PULSE

This fault code indicates the ECU has detected a signal fault on the Camshaft Position Sensor and/or Crankshaft Position Sensor .

This fault code activates the Engine Derating Mode.

Service Procedures :

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures.

1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
2	Erase the fault code with the Kohler Diagnostic Tool and restart the engine. If the fault code are still present proceed with the step **3**.
3	Check for any debris or water inside the connector terminals. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.
4	Check the harness engine and machine, is not damaged and is routed correctly (to the machine harness refere to the machine workshop manual).
5	Complete the Camshaft Position sensor testing and Crankshaft Position Sensor procedure described in the help page **Camshaft Sensor** and/or **Crankshaft Sensor**.

FTB Related Faults :

31	No signal (lost/missing)

	This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.
3	Check the harness is not damaged, disconnected or grounded, and is routed correctly (to the machine harness refere to the machine workshop manual).
4	Complete the speed sensor testing procedure described in the machine workshop manual.
5	If the problem persist replace the vehicle Speed Sensor

FTB Related Faults :

37	Signal frequency too high

1.2.55 P0524

P0524	Fault Information	KOHLER IN POWER. SINCE 1920.

Engine Oil Pressure Low

This fault code indicates the ECU has detected a problem on the circuit used to control the low oil pressure light.

This fault code activates the Engine Derating Mode.

Service Procedures :

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures.

1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
2	Check for any debris or water inside the connector terminals. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.

3	Check the harness engine and machine, is not damaged and is routed correctly (to the machine harness refere to the machine workshop manual).
4	Complete the testing procedure described in the help page Engine Starter Switch

FTB Related Faults :

15	Circuit Short To Battery or Open

1.2.66 P0616

P0616 **Fault Information**

KOHLER. IN POWER. SINCE 1920.

Starter Relay short to Ground.

This fault code indicates the ECU has detected a fault on the Starter Motor Control Relay

Service Procedures :

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures.

1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
4	Check for any debris or water inside the connector terminals. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.
5	Check the harness engine and machine, is not damaged and is routed correctly (to the machine harness refere to the machine workshop manual).
6	Complete the testing procedure described in the help page Starter Motor Relay

FTB Related Faults :

11	Short Circuit To Ground (SC2G)

	- **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
2	Check for any debris or water inside the connector terminals. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.
3	Check the harness engine and machine, is not damaged and is routed correctly, and there are no short to Battery of the terminal (to the machine harness refere to the machine workshop manual).
4	Complete the ECU testing procedure described in the help page **ECU Electrical Schematics**
5	If fault persists, check /replace the Low Speed Fan Relay

FTB Related Faults :

15	Circuit Short To Battery or Open

1.2.78 P0704

P0704	**Fault Information**	KOHLER. IN POWER. SINCE 1920.

Clutch switch circuit malfunction (manual transmission only).

This indicate malfunction on clucth sensor.

Service Procedures :

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures.

1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
2	Check for any debris or water inside the connector terminals.

Stop the engine and let it cool before you start work. Do not start the engine during the service procedures.	
1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
2	Check for any debris or water inside the connector terminals. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.
3	Check the harness engine and machine, is not damaged and is routed correctly (to the machine harness refere to the machine workshop manual).
4	Complete the testing procedure described in the help page Intake Throttle Valve

FTB Related Faults :

29	Signal invalid

1.2.89 P2118

P2118	Fault Information	KOHLER. IN POWER. SINCE 1920.

Intake Throttle Motor Current Fault

This fault code indicates the ECU has detected a fault on the intake throttle motor or connectors.

This fault code activates the Engine Derating Mode.

Service Procedures :

IMPORTANT ! Stop the engine and let it cool before you start work. Do not start the engine during the service procedures.	
1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**

2	Check for any debris or water inside the connector terminals. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.
3	Check the harness engine and machine, is not damaged and is routed correctly, and there are no short to Ground or disconnection of the terminal (to the machine harness refere to the machine workshop manual).
4	If fault persists, replace the Air Filter Cartridge

FTB Related Faults :

2F	Signal erratic
16	Circuit voltage below threshold
17	Circuit voltage above threshold

1.2.100 P2293

P2293	Fault Information	KOHLER. IN POWER. SINCE 1920.

Common Rail System Pressure - Exceeds High Upper Limit 2

This fault code indicates the ECU has detected the fuel system pressure is too high

This fault code activates the Engine Derating Mode.

Service Procedures :

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures.

1	Check if other fault codes detected are found: - **Yes**: Refer also to the other fault codes before going to step **2** - **NO**: Proceed to Step **2**
2	Check for any debris or water inside the connector terminals.

Function: Determines operated accelerator position.

Location: There is a possibility to use two Accelerator Pedal Sensor in the engine (Main and Secondary).

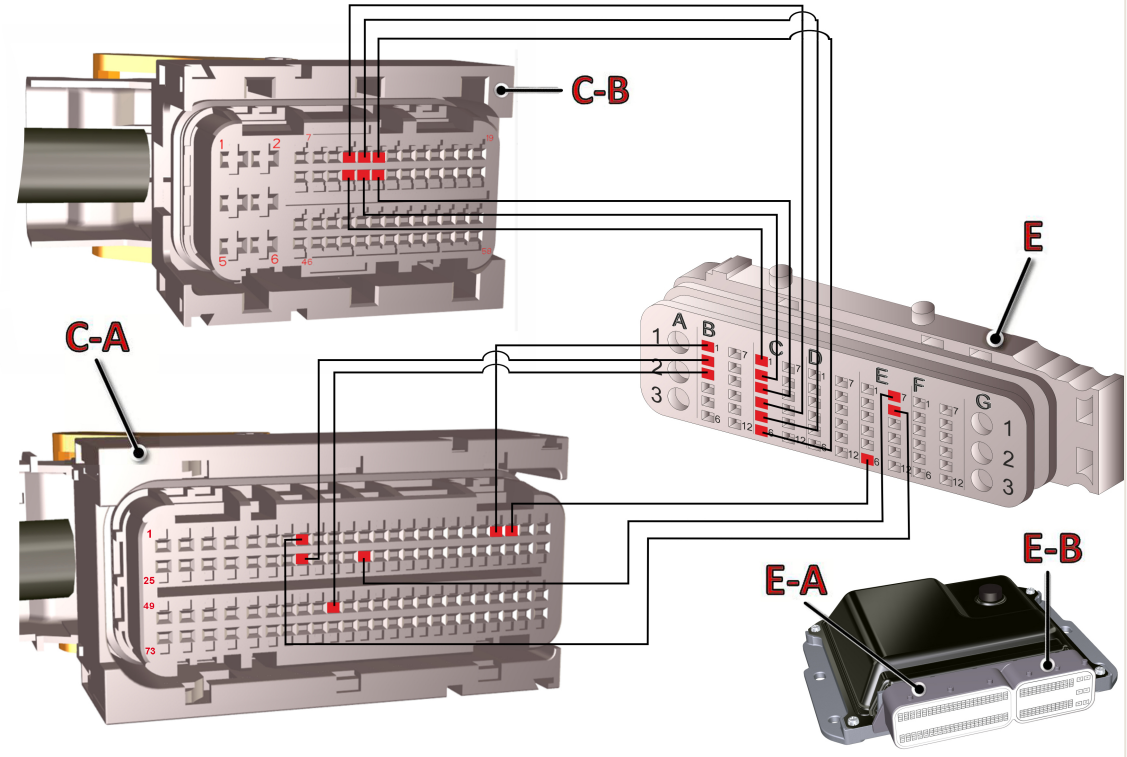
The main usually is a foot pedal and is vehicle mounted, normally on the right hand side of the cab adjacent too drivers foot.

The secondary usually is a hand control.

Refer to specific Machine Service document to identify the Accelerator Pedal Sensor position.

Signal: Analogue Voltage between 0 volts and 5 Volts. Voltage output proportional to throttle lever position. Two throttle tracks in each Accelerator Pedal Sensor are used to ensure safety of the operator in the case of throttle malfunction.

Wires and Connectors :



E-B	ECU - Connector **B**		**PIN**		**PIN**	
E-A	ECU - Connector **A**	**C-B**	**Accelerator Pedal Sensor (Main) Track 1**			**E**
C-B	Connector **B**		**B23**	Sensor power supply	**C1**	

C-A	Connector **A**	C-A	39	Sensor signal +	1	G
G	Coolant Temperature Sensor		7	Sensor ground -	2	

STOP!

Before proceeding check all the relevant wires and connectors for integrity.
Click here for a guide to procedures

Removal and Replacement Guide:

IMPORTANT !

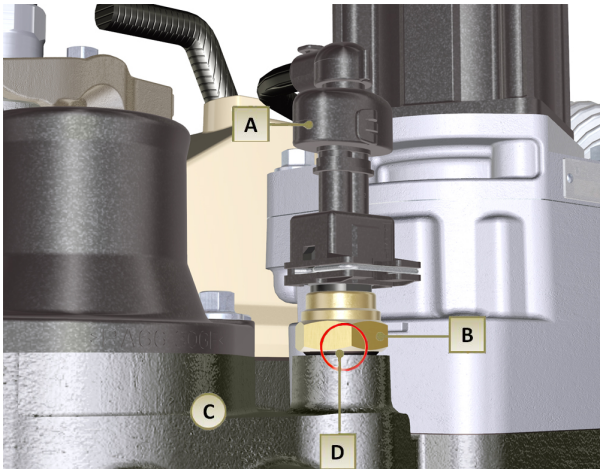
The following information must be used in conjunction with the procedures given in the Service Manuals applicable to both the engine and its installation (the vehicle or machine).
DO NOT work on any part of the engine until you have read and understood all the relevant service information.

Removal:

When the coolant sensor is removed engine coolant will be lost.
Depending on the installation the engine coolant may need to be drained before removing the coolant sensor. See the relevant installation service procedures for the correct procedures.

1	Stop the engine and allow it to cool.
2	Uncouple the electrical connector **A.**
3	Unscrew the sensor **B** from the cylinder head **C.**

Replacement:
Replacement is the reversal of



1	Crankshaft Sensor	A 46
1	Accelerator Pedal (Main) track 1	B 23
1	Accelerator PTO (Secondary) track 1	A 21
1	Common Rail Fuel Pressure Sensor	A 45
1	Fuel Inlet Pressure Sensor	A 47
2	Camshaft Sensor	A 24
2	Accelerator Pedal (main) track 2	B 10
2	Accelerator PTO (secondary) track 2	A 22
2	Intake Temperature and Manifold Absolute Pressure (TMAP) Sensor	A 23
2	Air Filter Clogged Sensor	B 9

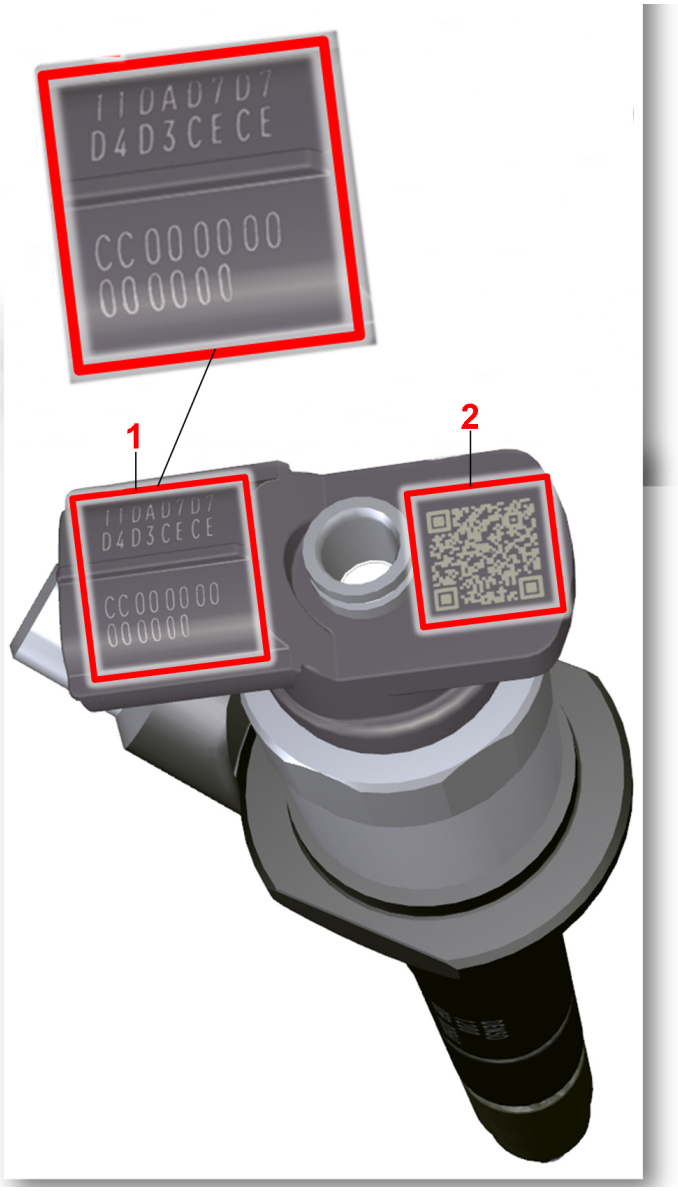
See engine ECU Electrical Schematics for further detail

STOP!

Before proceeding check all the relevant wires and connectors for integrity.
Click here for a guide to procedures

Related Fault Code Descriptions:

P0642	Battery 5V reference 1 circuit low (5V power supply for sensor)
P0643	Battery 5V reference 1 circuit high (5V power supply for sensor)
P0652	Battery 5V reference 2 circuit low (5V power supply for sensor)
P0653	Battery 5V reference 2 circuit high (5V power supply for sensor)



Wires and Connectors:

Testing the Device:

IMPORTANT!

Use the multi-meter on the harness connector pins.
DO NOT use the meter on the ECU pins.

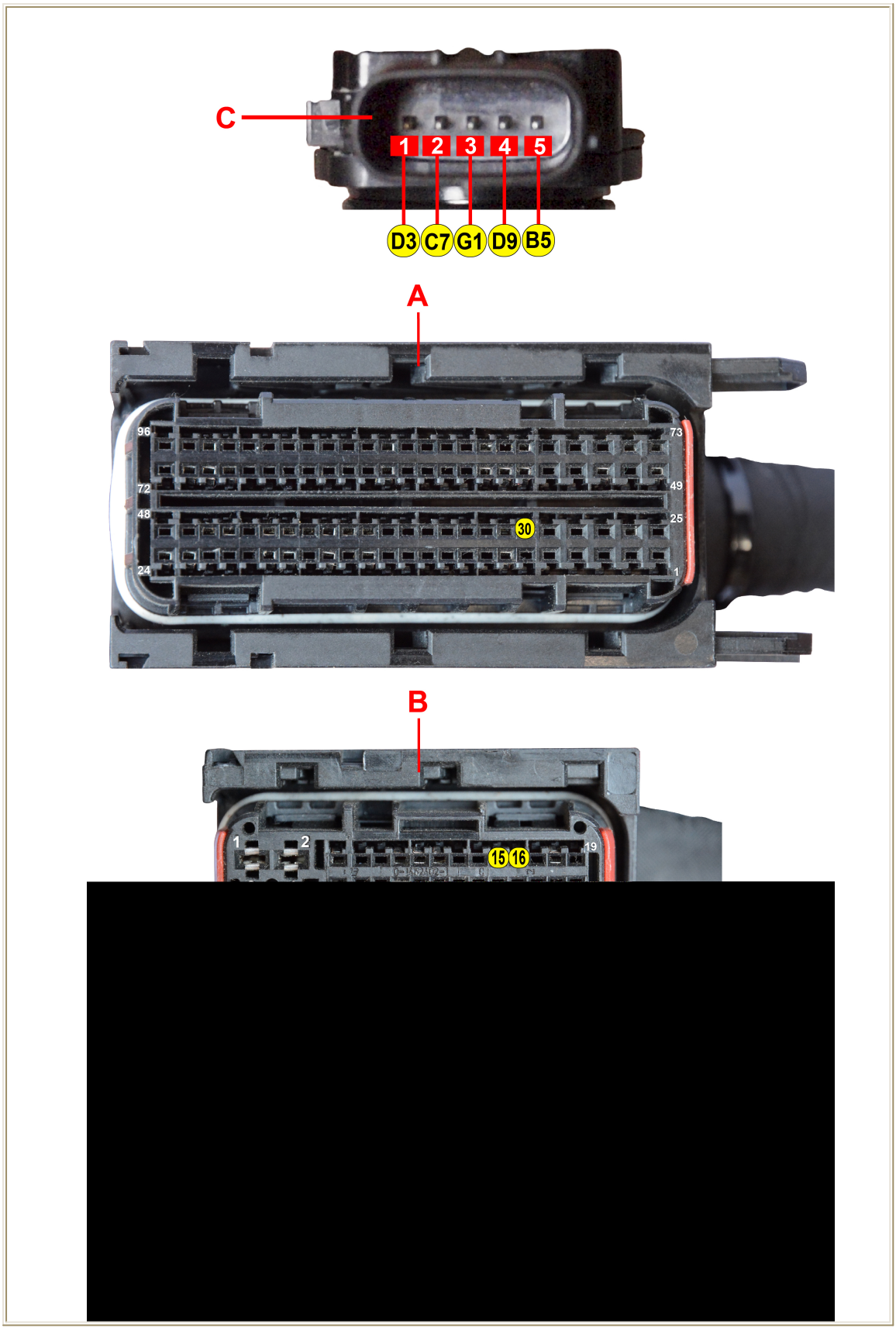
1	Disconnect the harness from the fuel temperature sensor
2	Switch the ignition on
3	Measure voltage on harness pins (5V). If voltage is not correct check harness continuity, ground connections and ECU pins for signs of damage or contamination.
4	Switch the ignition off
5	Measure the resistance across the sensor, see table below for resistance values
6	If no fault can be found with the harness or sensor, replace the ECU

Fuel Temperature Sensor

Resistance Values

Temperature degrees °C	Resistance (KOhms)
- 30	25,400
- 20	15,040
20	2,450
80	0,318
110	0,142
120	0,110

Related Fault Code Descriptions:



Testing the Device:

See **Suction Control Valve (SCV) - Troubleshooting**

Related Fault Code Descriptions:

IMPORTANT!

The fault codes do not necessarily indicate a fault with the Suction control valve itself. The codes are generated as a result of the required Suction control valve signal being abnormal for the engine operating parameters.
Check to see if other fault codes have been generated that may be connected with incorrect fuel pressure.

P0627	SCV(+) output open load/short to GND; SCV(-) output open load/short to GND; SCV coil open/short
P0629	SCV(+) output short to BATT; SCV(-) output short to BATT

1.3.24 Turbocharger Waste Gate Valve

KOHLER. IN POWER. SINCE 1920.

Turbocharger Waste Gate Valve

Function: The Turbocharger with Waste Gate valve delivers air to the engine for optimum performance and drivability, permitting to control emissions to exact standards..

Location: The Turbocharger with Waste Gate valve is mounted on top of the exhaust manifold.

3	Wiring fault	Check the harness continuity, and machine and earth contacts. Repair/replace as necessary. If no fault is found, proceed to Step **4**.
4	ECU fault	Disconnect the harness from the ECU and inspect. Check seals are in place, check for signs of corrosion and pin damage. If harness is damaged repair/replace as necessary. If ECU pins are damaged, replace ECU and reflash, see section on ECU flashing. If no fault is found, proceed to Step **5**.
5	Sensor Target Wheel Fault	Check the crankshaft sensor target wheel for damage and alignment, if damaged replace target wheel. If no fault is found, raise a Kohler Helpdesk Call.

1.4.4 Electrical Network (CANBUS) - Troubleshooting

KOHLER. IN POWER. SINCE 1920.

Troubleshooting

Electrical Network (CANBUS)

IMPORTANT!

Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

Step	Fault description	Action
1	Wiring fault	Check the harness continuity, and machine and earth contacts. Repair/replace as necessary If no fault is found, proceed to Step **2**.

		If no fault is found, proceed to Step **5**.
5	Wiring fault	Check the harness continuity, and machine and earth contacts. Repair/replace as necessary If no fault is found, proceed to Step **6**.
6	ECU fault	Disconnect the harness from the ECU and inspect. Check seals are in place, check for signs of corrosion and pin damage. If harness is damaged repair/replace as necessary. If ECU pins are damaged, replace ECU and re-flash the appropriate calibration and injector calibration codes whit the procedure described in the help page Re-flashing an ECU. If no fault is found, raise a Kohler Helpdesk.

1.4.12 Water in Fuel Filter Sensor Troubleshooting

KOHLER. IN POWER. SINCE 1920.

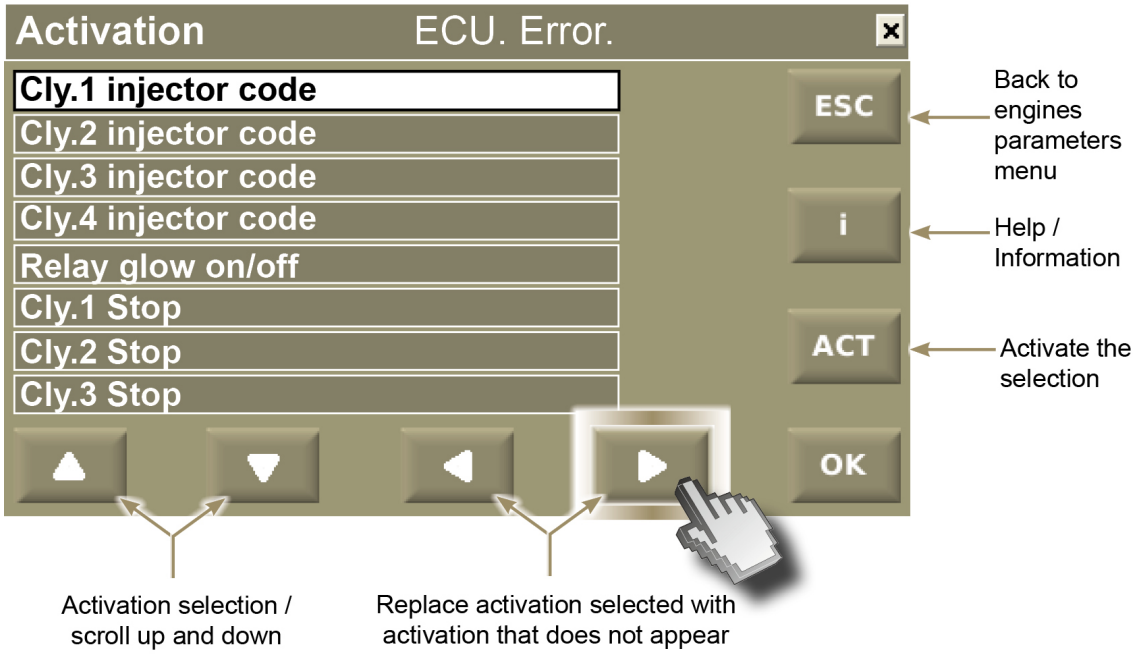
Troubleshooting

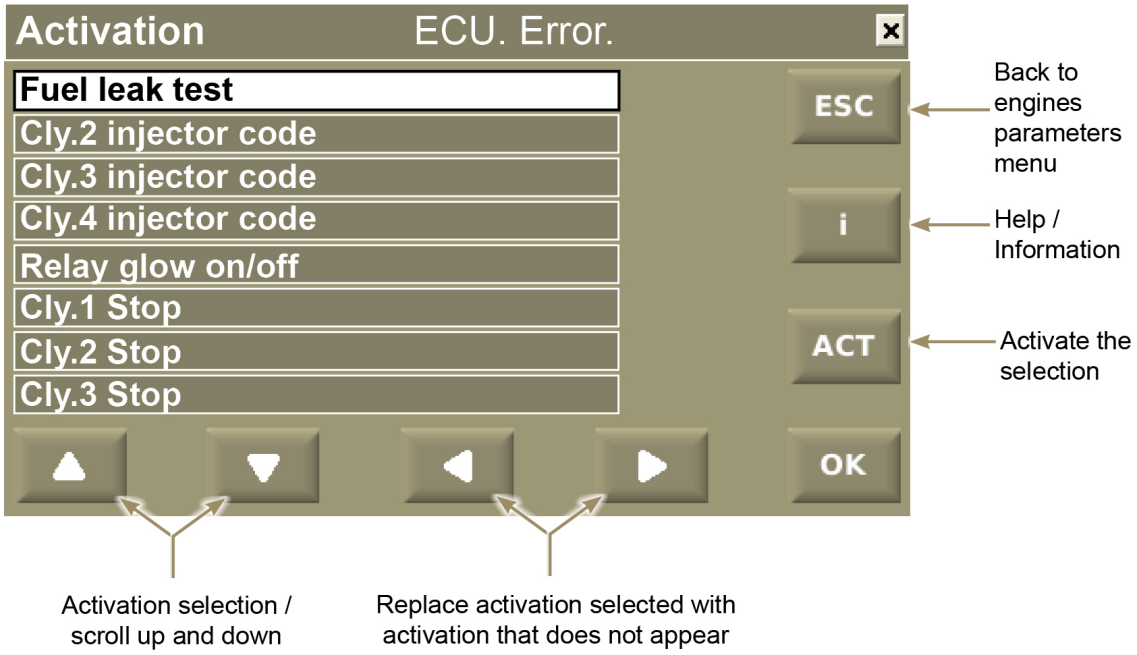
Water in Fuel Filter Sensor

IMPORTANT!

Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

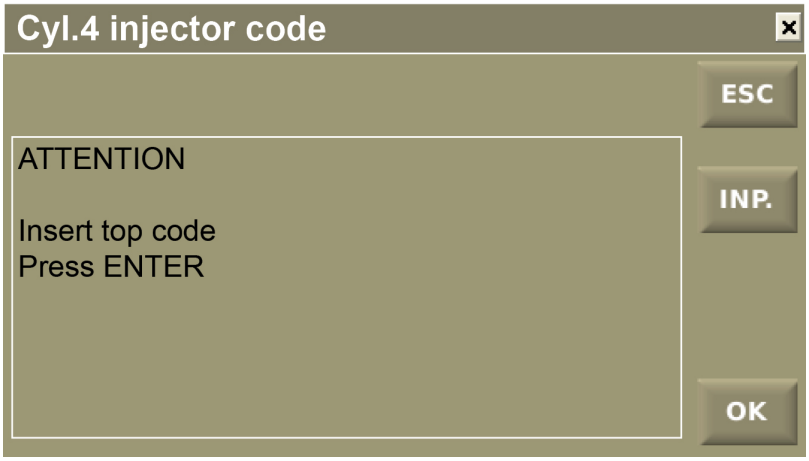
Step	Fault description	Action
1	Sensor supply voltage fault	Check the presence of electrical supply on water sensor. If sensor supply voltage is OK, proceed to Step **2**
2	Sensor connection faulty	Check condition of sensor to harness connection, make sure the seals are in place. Check for signs of corrosion or contamination.



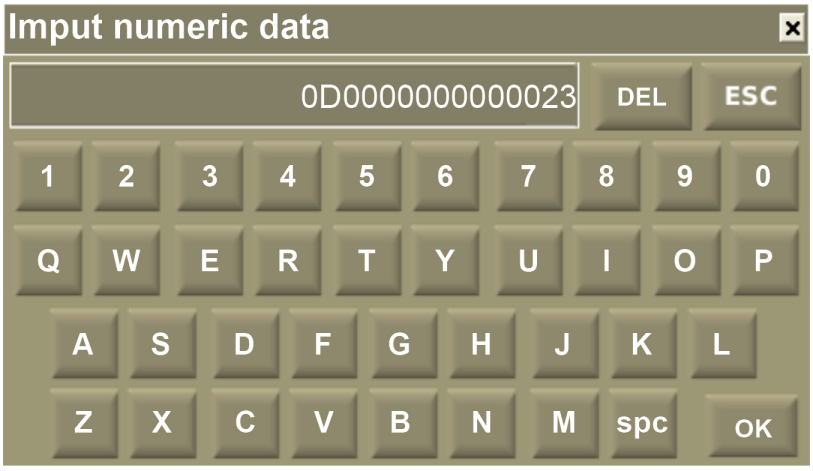


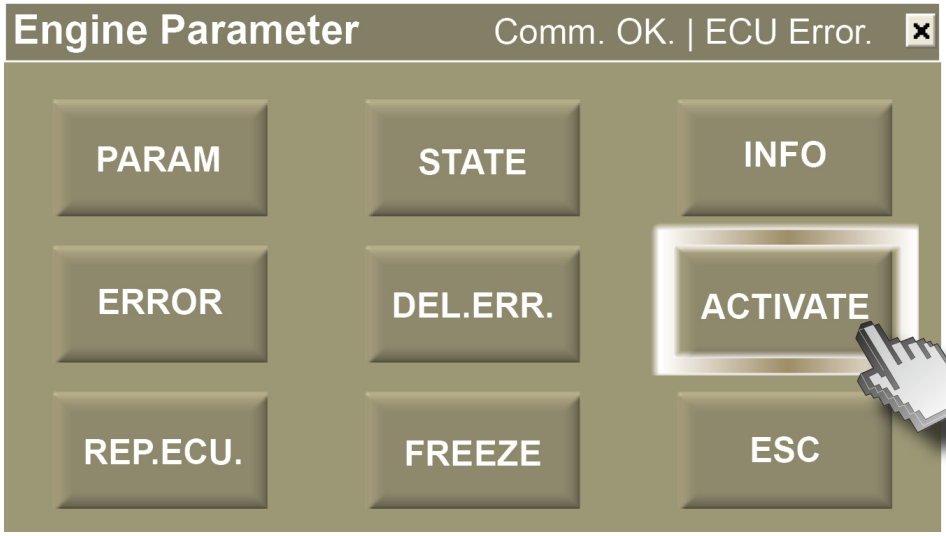
Press the "i" push button to access the "Fuel leak test" display screen.

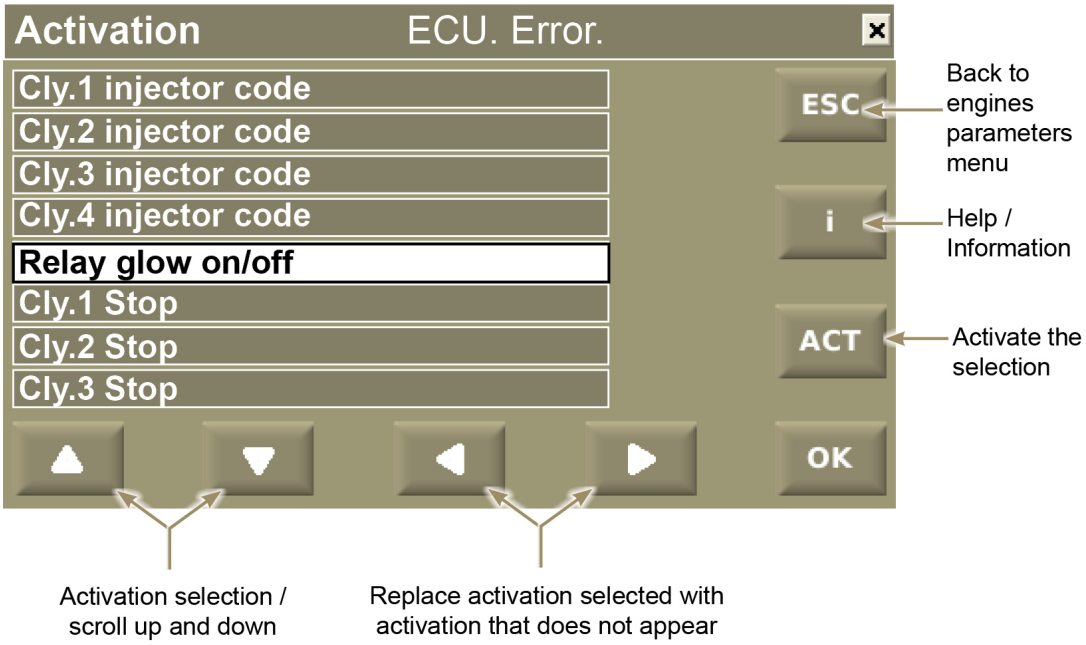
Wait for confirmation to insert the second 15 characters of the injector code and press "OK"



Insert the second 15 characters of the code and press "OK"



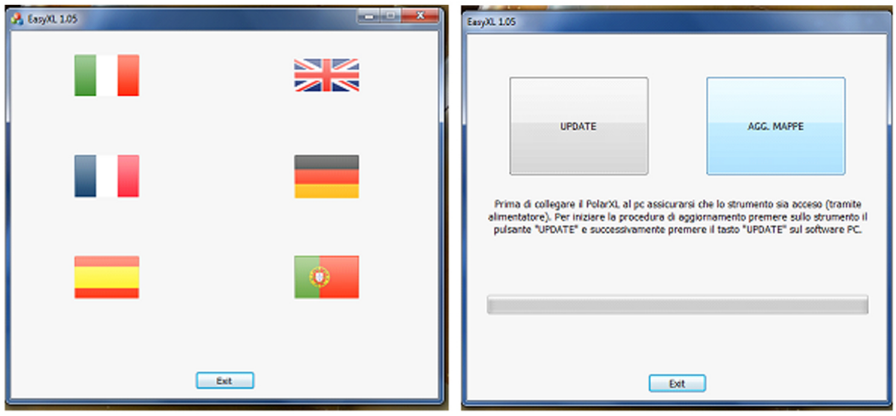




Push the button “ACT” to activate the Relay glow on/off.

Start the software "**EASYXL**" and choose the desired language and then connect the PC Diagnostic Tool.

- Connect the USB cable to the USB port of the PC
- Switch on the tool with the power adapter supplied
- At the first screen of the Tool connect the USB cable to the USB port on the Diagnostic Tool
- Click on the button "**UPDATE**" in the Diagnostic Tool
- Click " **ADD. MAPS** "of the PC interface to load the new map on the diagnostic tool.

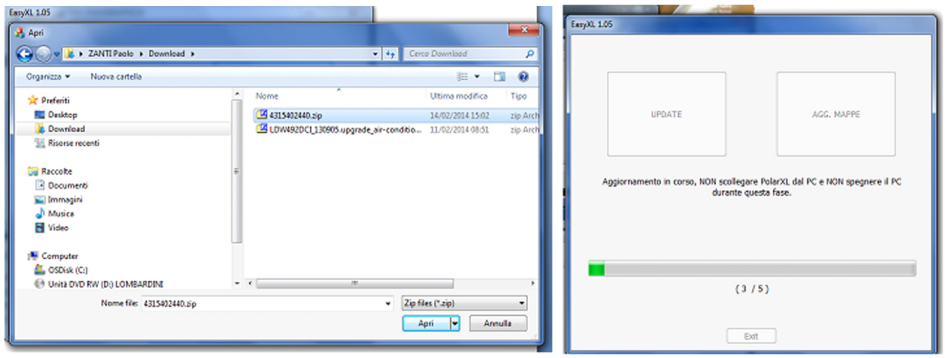


Double-click on the file "**XXXXXXXXXX.zip**" which is the engine serial number, and automatically start the transfer from the PC to the diagnostic tool.

The time it takes to transfer the file on the diagnostic tool, is about 20 minutes.

At the end of the file transfer, the tool and the PC interface will warn the end of the transfer with the message "Update finished successfully"

At this point the tool is ready to perform the remapping of the engine



- Work in inspection pits and under floor pits should only be performed by trained personnel.
- Non-slip steps should be used for the entrance of the inspection pits and under floor pits.
- When inspection pits and under floor pits must be secured with cover when not used. Make sure no falling into the opening.
- For repairing purposes, engines should only be raised and supported by suitable lifting equipment approved for this purpose. Refer to safety instructions on <Raising engines for repair purposes.

Certain gases are heavier than air and may accumulate at the bottom of inspection and under floor pits.

This may lead to an increased danger of asphyxiation and/or fire. It is essential to compliance with the appropriate safety precautions.

6. Exhaust gases

Exhaust gases from internal combustion engines and auxiliary units, such as independent heaters (auxiliary heaters), contain toxic component which can lead to serious health hazard and even death in extreme cases.

In enclosed areas, internal combustion engines and independent heaters are therefore only to be operated in conjunction with a suitable, fully functional exhaust gas extractor approved for such purposes.

The extractor must be properly connected and switched on before starting up the engine.

7. Rotating parts

There is a danger of being trapped or injured on contact with rotating parts during troubleshooting or engine assembly work.

Hazards may result from the automatic start-up of auxiliary components (e.g. radiator fan).

When working in the engine compartment, suitable action must be taken to reliably guard against start-up of the engine and its components.

8. Hot parts

The skin may be burned if contacting with the surface of hot components during troubleshooting or engine work.


AUTO OFF
POWER
ON
OFF
M890C+
hFE
MAX 10SEC
EACH 15MIN
20A
UNFUSED
20A MAX
FUSED
500mA MAX
MAX
600V
750V

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P221A	NOx Sensor 1/2 Correlation Bank 1	3256	13
P2221	NOx Sensor Heater Control Circuit Range/Performance Bank 1 Sensor 2	5045	2
P2222	NOx Sensor Heater Control Circuit Range/Performance Bank 1 Sensor 2	5045	12
P2263	Turbocharger/Supercharger Boost System Performance	102	2
P229E	NOx Sensor Circuit Range/Performance Bank 1 Sensor 1	5720	5
P22FF	SCR NOx Catalyst Inlet Temperature Too Low	3241	1
P2413	EGR System Performance	3236	2
P2502	Charging System Voltage	1683	2
P2670	Actuator Supply Voltage "B" Circuit Low	5491	4
P2671	Actuator Supply Voltage "B" Circuit High	5491	3
P2685	Actuator Supply Voltage "C" Circuit Low	7069	4
P2686	Actuator Supply Voltage "C" Circuit High	7069	3
P26E8	Actuator Supply Voltage "D" Circuit Low	7540	4
P26E9	Actuator Supply Voltage "D" Circuit High	7540	3
P2BA9	NOx Exceedance - Root Cause Unknown (Engine problem - refer to Fault codes TCR)	516218	0
P2BAA	NOx Exceedance - Root Cause Unknown (Engine problem - refer to Fault codes TCR)	516218	1
P3011	Manufacturer Controlled DTC	5461	31
P3012	Manufacturer Controlled DTC	5461	31
U0028	Vehicle Communication Bus A Performance	516104	12
U0029	Vehicle Communication Bus A Performance	51610	12

P00B7	Engine Coolant Flow Low/Performance This fault code indicates: DFC SAE J1939 error for Coolant Temperature. See Error code of CAN-Bus	110	2

2.2.8 P0114

P0114	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P0114	Intake Air Temperature Sensor 1 Circuit Range/Performance Bank 1 This fault code indicates: DFC for SAE J1939 Error for Engine Intake Manifold Temperature message. See Intake Temperature and Manifold Absolute Pressure (TMAP) Sensor	105	2

2.2.9 P0129

P0129	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding

P06F1	Reductant Control Module Internal Temperature Sensor Range/ Performance This fault code indicates: Diagnostic fault check for the maximum temperature plausibility check. See Error code of tank temperature sensor	3515	16

2.2.24 P1003

P1003	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P1003	Manufacturer Controlled DTC This fault code indicates: Power stage diagnosis could be disabled due to high Battery voltage. See Battery voltage	168	16

2.2.25 P1004

P1004	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P1059	Internal Control Module Main Processor Performance This fault code indicates: Visibility of Software Resets in DSM See Error code of DCU	516242	14

2.2.40 P105A

P105A	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P105A	Internal Control Module Main Processor Performance This fault code indicates: Visibility of Software Resets in DSM. See Error code of DCU	516243	14

2.2.41 P105E

P105E	Fault Information	KOHLER. IN POWER. SINCE 1920.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P106E	Reductant Metering Unit Temperature Sensor Circuit Range/ Performance This fault code indicates: Error urea supply module temperature sensor cold start plausibility. See Error code of reduction agent (DEF) pump temperature	516236	2

2.2.56 P106F

P106F	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P106F	Reductant Metering Unit Temperature Sensor Circuit Range/ Performance This fault code indicates: Diagnostic Fault Check for Supply Module Temperature Duty cycle in failure range. See Error code of supply pump	516256	0

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P1081	Reductant Level Sensor "A" Circuit Range/Performance This fault code indicates: Diagnostic Fault Check for Signal invalid failure mode identifier error from CAN. See Error code for tank sensor module	3031	2

2.2.72 P1082

P1082	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P1082	Reductant Pressure Sensor Circuit Low This fault code indicates: SRC low for Urea Pump Module Pressure Sensor. See Error code of supply module pressure sensor	4374	4

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P1092	Reductant Pump "A" Control Circuit/Open This fault code indicates: Diagnostic Fault Check for Supply Module Temperature Duty cycle in failure range. See Error code of supply pump	4440	2

2.2.88 P1093

P1093	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P1093	Reductant Pump "A" Control Performance/Stuck Off This fault code indicates: Pump Motor Speed Deviation. See Error code of supply pump	4440	16

P10A1	Reductant Tank Temperature/Fuel Temperature Correlation This fault code indicates: Error Tank temperature sensor plausibility min threshold. See Error code of tank temperature and environmental temperature plausibility	3031	18

2.2.103 P201A

P201A	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P201A	Reductant Injection Valve Circuit Range/Performance Bank 1 Unit 1 This fault code indicates: Dosing Valve is blocked. See Error code of dosing module	3361	7

2.2.104 P202A

P202A	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

P204C	Reductant Pressure Sensor Circuit Low This fault code indicates: Physical Range Check low for Urea Pump Module Pressure Sensor. See Error code of supply module pressure sensor	6876	1

2.2.119 P204D

P204D	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P204D	Reductant Pressure Sensor Circuit High This fault code indicates: SRC high for Urea Pump Module Pressure Sensor. See Error code of supply module pressure sensor	4374	3

2.2.120 P204E

P204E	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

P20A1	Reductant Purge Control Valve "A" Performance This fault code indicates: Over temperature error on low power stage for Urea back flow pump. See Error code of backflow pump	516246	12

2.2.135 P20A2

P20A2	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P20A2	Reductant Purge Control Valve "A" Circuit Low This fault code indicates: Short circuit to ground error on low power stage for Urea back flow pump. See Error code of backflow pump	516246	4

2.2.136 P20B5

P20B5	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

P20C5	Reductant Heater "D" Control Circuit/Open This fault code indicates: No load error. See Error code of line heater power relay	516245	5

2.2.151 P20C6

P20C6	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P20C6	Reductant Heater "D" Control Circuit Performance This fault code indicates: Over temperature error on power stage for Heater Power Relay See Error code of line heater power relay	516245	12

2.2.152 P20C7

P20C7	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P2214	NOx Sensor Circuit Range/Performance Bank 2 This fault code indicates: DFC of detection of not correctly mounted NOx sensor. See Error code for NOx sensor	3275	13

2.2.167 P221A

P221A	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE

P2BA9	NOx Exceedance - Root Cause Unknown (Engine problem - refer to Fault codes TCR) Refer too ECU PCode	516218	0

2.2.182 P2BAA

P2BAA	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
P2BAA	NOx Exceedance - Root Cause Unknown (Engine problem - refer to Fault codes TCR) Refer too ECU PCode	516218	1

2.2.183 P3011

P3011	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler

U030E	Invalid Data Received From NOx Sensor "B" This fault code indicates: AT1O1Rx Frame DLC error. See Error code of CAN-Bus	516101	12

2.2.198 U05A3

U05A3	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
U05A3	Lost Communication With ECM/PCM "A" See Error code of CAN-Bus	516260	9

2.2.199 U05A5

U05A5	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
U1022	Invalid Data Received From NOx Sensor "A" This fault code indicates: DFC SAE J1939 error NOx sensor ATI1 Self Diagnosis Status message. See Error code for NOx sensor	5714	2

2.2.214 U1023

U1023	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
U1023	Invalid Data Received From NOx Sensor "A" This fault code indicates: SAE J1939 error for Actual Oxidation factor message. See Error code for NOx sensor	3217	2

2.2.215 U1024

U1024	Fault Information	KOHLER. IN POWER. SINCE 1920.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
U103F	Lost Communication With ECM/PCM "A" This fault code indicates: Time out Packet to packet. See Error code of CAN-Bus	516117	9

2.2.230 U1040

U1040	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
U1040	Lost Communication With ECM/PCM "A" This fault code indicates: Time out for DM1ECU BAM or single message. See Error code of CAN-Bus	516123	9

2.2.231 U1041

U1041	Fault Information	KOHLER. IN POWER. SINCE 1920.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
U1059	Invalid Data Received From ECM/PCM "A" This fault code indicates: DFC for DLC Error of CAN-Receive-Frame EOI. See Error code of CAN-Bus	516133	12

2.2.246 U105B

U105B	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
U105B	Invalid Data Received From ECM/PCM "A" This fault code indicates: DFC for DLC error for Engine Temperature 1 frame. See Error code of CAN-Bus	516137	12

2.2.247 U105C

U105C	Fault Information	KOHLER. IN POWER. SINCE 1920.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
U1075	Ambient Air Temperature Sensor Circuit "A" This fault code indicates: DFC for DLC Error of CAN-Receive-Frame AMB. See Error code of CAN-Bus	516096	12

2.2.262 U1076

U1076	Fault Information	KOHLER. IN POWER. SINCE 1920.

Click on the fault code to link to device specific information and fault finding procedure

DTC codes regard malfunctions registered in the DCU and visible through the Kohler diagnostic tool.

SPN and **FMI** codes are shown only on the machine dashboard, if conveniently adapted.

DTC CODE	Malfunction code description	SPN CODE	FMI CODE
U1076	Ambient Air Temperature Sensor Circuit "A" This fault code indicates: DFC for Timeout Error of CAN-Receive-Frame AMB. See Error code of CAN-Bus	516096	9

1	Disconnect the DEF pressure hose from the dosing metering module. Install a cap the dosing metering module to prevent dirt ingress.
2	Connect the extension tube from the JCB after treatment test kit to the DEF pressure hose.
3	Insert the end of the DEF extension hose into a clean containing Plant wash solution Plant wash solution Plant wash solution should be made to the ratio of 1L of Plant wash for every 5L of clean water Connect ServiceMaster and perform the DEF Emptying Routine. This will draw Plant wash solution from the container through the DEF return hose and into the contaminated DEF tank. Make sure that the Plant wash solution in the container remains above the end of the extension pipe at all times
4	Repeat this process 3 times
5	Drain the DEF tank
6	Install the DEF tank drain plug. Tighten to the correct torque value.
7	Add the required amount of JCB Plant wash into the tank through the filler cap to the ratio of 1L of Plant wash for every 5L of clean water.
8	Fill the DEF tank with clean water from an open ended low-pressure hose pipe
9	Leave the solution to stand for 20 minutes
10	Where possible, agitate the solution to make sure all internal surfaces of the tank are cleaned
11	Clean the DEF filler cap with water and Plant wash solution. Rinse thoroughly afterwards with clean water.
12	Drain the DEF tank
13	With the DEF tank drain plug removed, thoroughly rinse the DEF tank through the filler cap with clean water from an open ended low-pressure hose pipe
14	Install the DEF tank drain plug. Tighten to the correct torque value
15	Fill the DEF tank with clean water from an open ended low-pressure hose pipe
16	Drain the DEF tank

removal and replacement procedures etc.

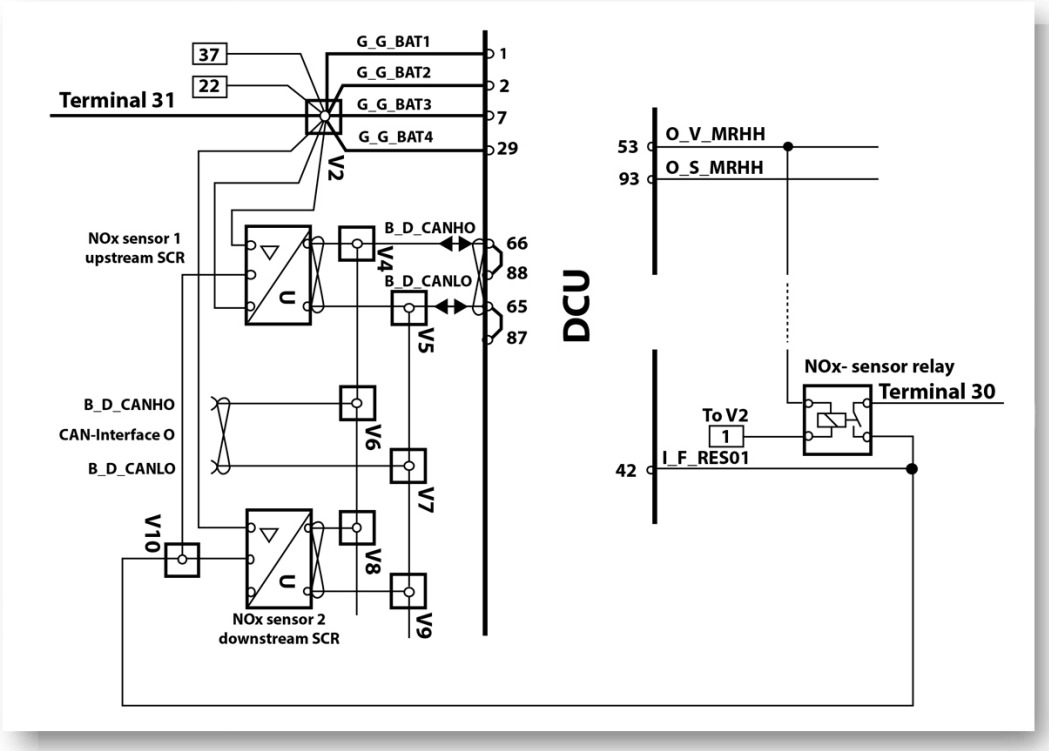
Function: The NOx sensors measures the amount of O2 (oxygen) and NOx (nitrogen oxide) in the exhaust emissions and allows the after-treatment ECU to control the DEF injection to reduce the NOx emissions from the engine. The NOx sensors will only be used when they reach a specified temperature to make sure they are measuring accurately and to prevent cracking the delicate ceramic components within them. The after-treatment system will operate based on a model programmed into the ECU and will dose under open loop control until the NOx sensors are at operating temperature. The Kohler Diagnostic Tool screen will display "0.0" in the NOx value box.

When the sensor reaches operating temperature, the system will switch to closed loop control and use the NOx sensors to measure the NOx before and after the SCR catalyst and adjust the dosing accordingly. The Kohler Diagnostic Tool screen will display the NOx reading from the sensor in the NOx value box.

The NOx sensors are active for diagnostics and CAN communication even when not being used to monitor NOx conversion.

The upstream sensor measures the 'dirty' exhaust flow before NOx conversion over the SCR catalyst. It is critical for emission control.

Location: The Upstream NOx Sensor is fitted before (Upstream) the SCR Catalyst and the non-detachable SCU (Sensor Control Unit) is machine mounted.).



Component pictures:

1) NOx control electronic plug and corresponding DCU plug

		5	Purging pump power supply	77		
		6	Purging pump ground	78		
		7	Not used	-		
		8	Pressure sensor ground	40		
		9	Pressure sensor signal	39		
		10	Pressure sensor power supply	17		
		11	Heater power supply	4		
		12	Heater ground	3		

Removal and Install:

IMPORTANT!

Stop the engine and let it cool before you start work. Do not start the engine during the service procedures. (SN0001)

The following information must be used in conjunction with the procedures given in the Service Manuals applicable to both the engine and its installation (the vehicle or machine). DO NOT work on any part of the engine until you have read and understood all the relevant service information

Install:

Installation is the reversal of removal but note the following.

1	Make sure the tank unit is seated so it is not touching the sides and is correctly sealed.
2	Make sure that any spillages of residual coolant or DEF fluid are cleaned up immediately.
3	Flash the head unit with the correct and latest software using Kohler diagnostic tool.

Testing the Device:

All conditions of the head unit are reported by the fault codes

IMPORTANT!

If electrical connections to this component are disturbed whilst the ignition is switched on, the machine will store fault codes and go in to derate. Repeat offence will also be registered.

Use the multi-meter on the harness connector pins. DO NOT use the meter on the ECU pins.

2.3.9 Tank Heating Valve

KOHLER. IN POWER. SINCE 1920.

Tank Heating Valve

Related Fault Code Descriptions:

P202A	No load error
P202B	Short circuit to ground error
P202C	Short circuit to battery error
P209F	Over temperature error

	3. Connectors/plugs OK. No loose contact or corrosion.
Offboard Tools	**1.** Multi-meter **2.** Adapter plug (Y-cable) **3.** Kohler Diagnostic Tool

IMPORTANT!

Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

Circuit/Connection diagram: Actuator relay wiring diagram

		to vehicle ground No **Possible root cause:** - Wiring harness has short circuit to battery - Plugs damaged (visual check) OK **End of test**

2.4.4 Error code for NOx sensor

KOHLER. IN POWER. SINCE 1920.

Troubleshooting

Error code for NOx sensor

Related defect Fault Code :

P103D	DFC of Nox signal maximum physical range diagnosis
P104C	DFC of all short circuit errors of Nox sensor
P104D	DFC of sensor signal readiness diagnosis of NOx sensor
P104E	DFC of wire diagnosis of Nox sensor
P1050	DFC of all short circuit errors of Nox sensor
P1051	DFC of sensor signal readiness diagnosis of NOx sensor
P2200	DFC of all open circuit errors of Nox sensor

Related defect Fault Code :

P203F	Status of tank level

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures

ATTENTION !

Check if other fault codes detected are found, if present, refer also to the other fault codes before to proceed.

Possible Symptom	**1.** System lamp and/or MIL on **2.** Reduced power
Preparation	**1.** Battery voltage is sufficient. **2.** Component related fuses are OK. **3.** Connectors/plugs OK. No loose contact or corrosion.
Offboard Tools	**1.** Multi-meter **2.** Adapter plug (Y-cable) **3.** Kohler Diagnostic Tool

IMPORTANT!

Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

Step	Description	Action
1	**DEF tank visually check**	**1.** Visually check if tank empty or any leakage exists. Refill DEF tank if tank is empty, and replace DEF tank if tank damaged and leakage exists.

IMPORTANT!

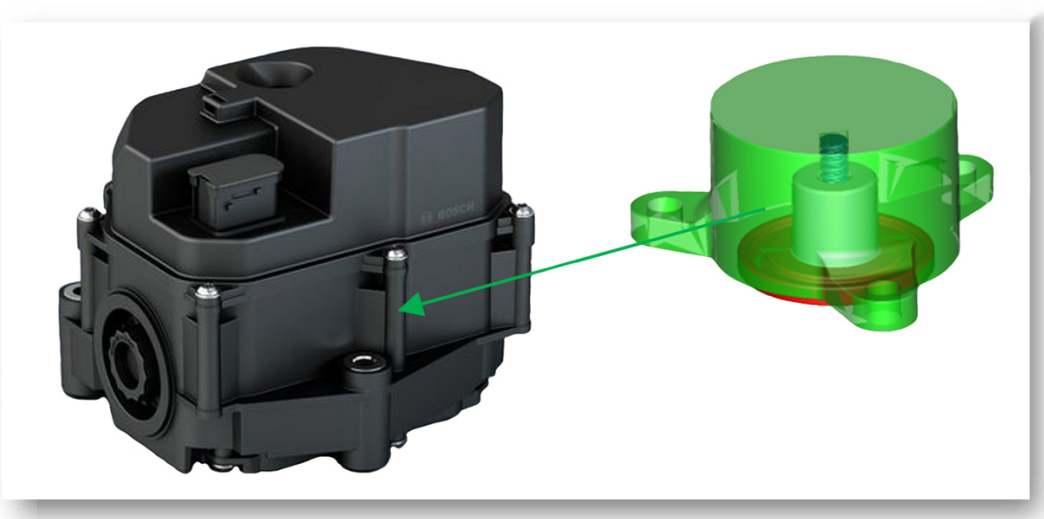
Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

Circuit/Connection diagram: Reduction agent (DEF) suction line heater

Note: The reduction agent (DEF) suction line heater is integrated in the reduction agent (DEF) suction line.

			5	Purging pump power supply	77	
			6	Purging pump ground	78	
			7	Not used	-	
			8	Pressure sensor ground	40	
			9	Pressure sensor signal	39	
			10	Pressure sensor power supply	17	
			11	Heater power supply	4	
			12	Heater ground	3	

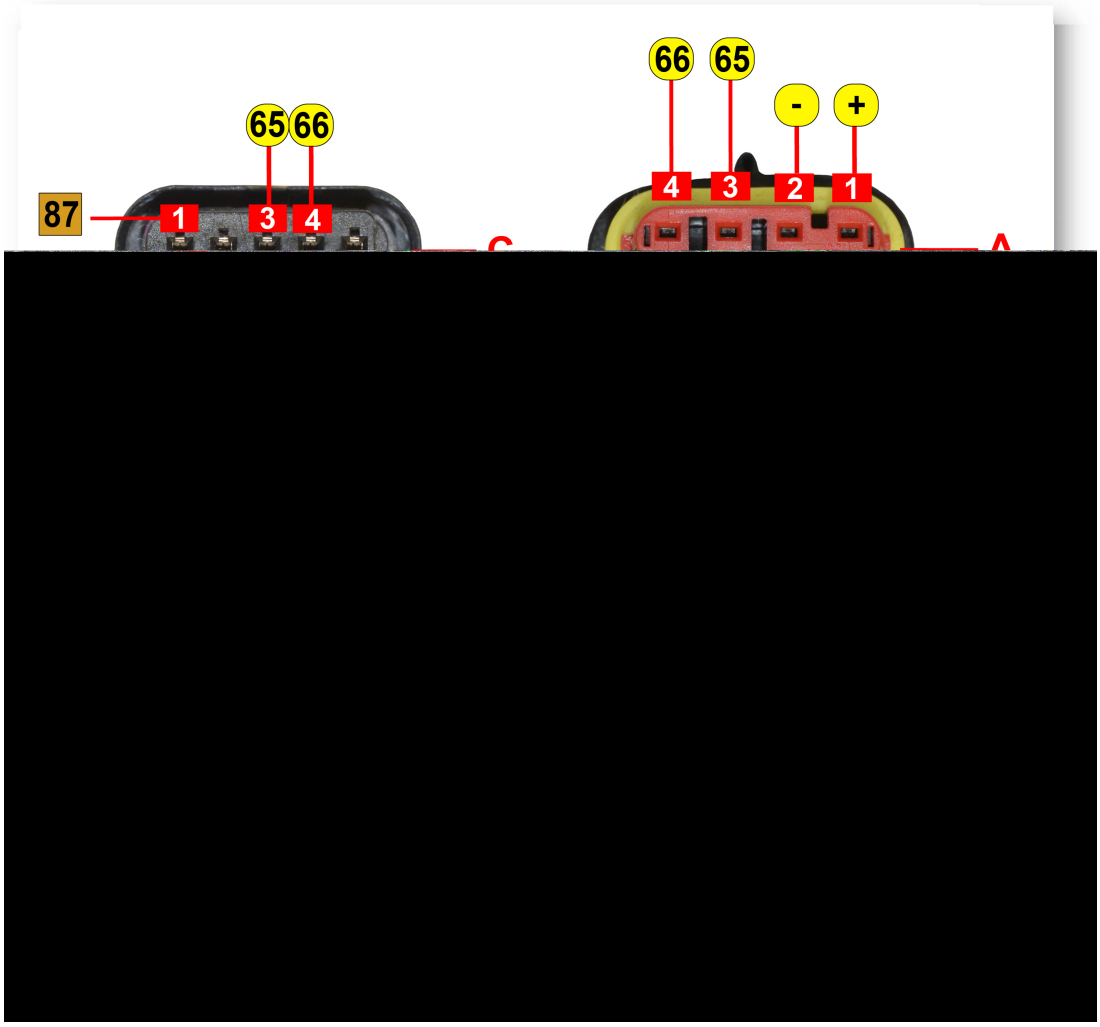
2) Supply module with backflow pump



Step	Description	Action
1	**Check power supply**	**1.** Turn the key to position OFF **(<u>Please wait at least 2 minutes in position OFF if it is from ON to avoid live working</u>)**.

Component pictures:

1) NOx-sensor (left) and Tank-sensor plug (right)



Pin definition

A	Tank sensor module connector		**PIN**		**PIN**	
B	DCU plug connector	**A**	**1**	Tank sensor power supply	**+**	
C	NOx-sensor module connector		**2**	Tank sensor ground	**-**	

temperature sensor pin 1 and pin 2 in the connector.

Typical value: 199 ~ 203 ? / @ 0°C

Typical value: 218 ~ 222 ? / @ 25°C

Typical value: 237 ~ 241 ? / @ 50°C

No

Possible root cause:

- Catalyst upstream temperature sensor broken. Refer to **Error code of catalyst upstream temperature sensor**

OK

Signal voltage check

4. Turn the key to position OFF **(Please wait at least 2 minutes in position OFF if it is from ON to avoid live working)**.

5. Plug the plug with catalyst upstream temperature sensor.

6. Plug the DCU plug with DCU.

7. Read out actual values from diagnosis tester: catalyst upstream temperature.

Note:

If the actual values from diagnosis tester are not available, use the breakout box to measure the signal voltage from the catalyst upstream temperature sensor.

Typical value:

Catalyst upstream temperature, catalyst upstream temperature signal voltage (Tester or pin 83 to ground)

		7. Read out actual values from diagnosis tester: catalyst upstream temperature. **Typical value:** Catalyst upstream temperature, catalyst upstream temperature signal voltage (Tester or pin 83 to ground) **Typical value:** ~ 0.83V @ 0°C **Typical value:** ~ 0.90V @ 25°C **Typical value:** ~ 0.96V @ 50°C No **Possible root cause:** - Catalyst upstream temperature sensor failure OK **End of test**

2.4.12 Error code of DCU

KOHLER. IN POWER. SINCE 1920.

Troubleshooting

Error code of DCU

Related defect Fault Code:

P0605	EEP Read Error based on the error in reading blocks from memory media
P0606	Report Peripheral Monitoring errors

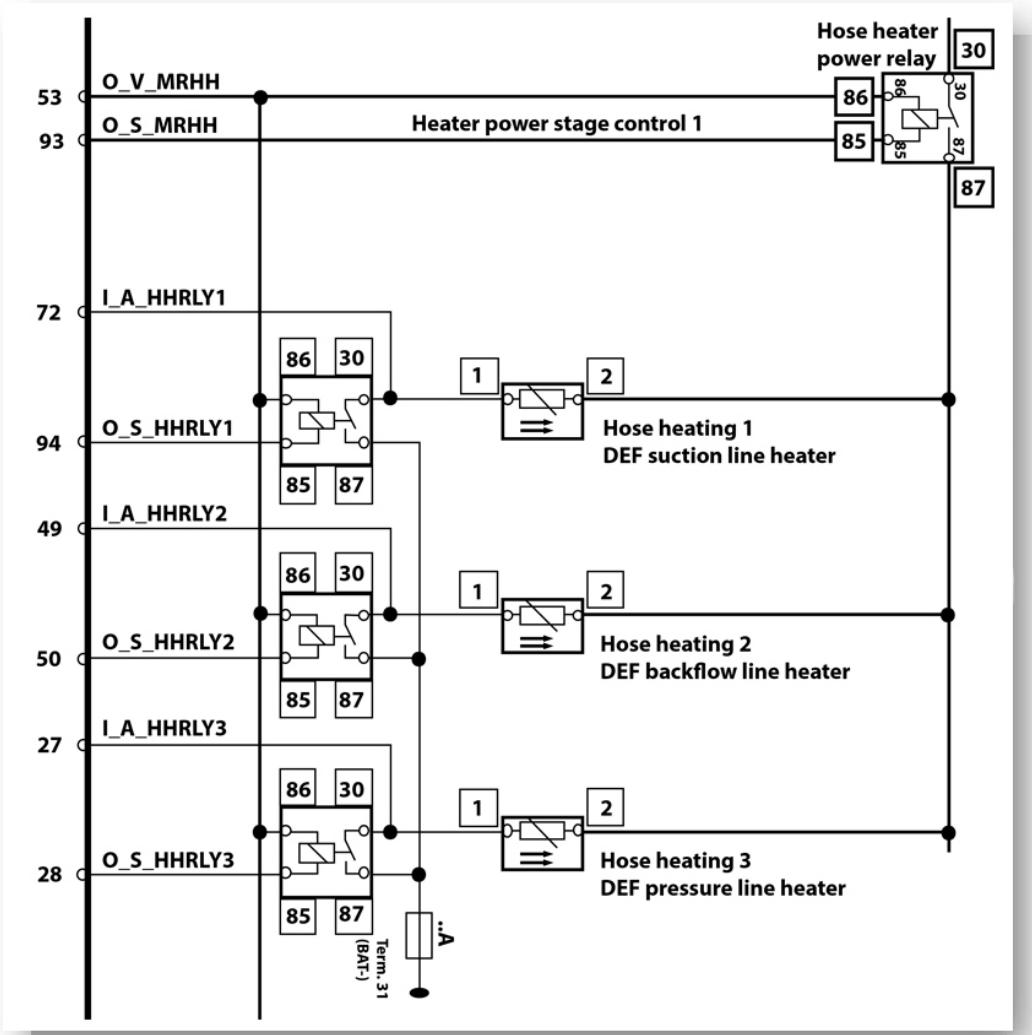
		11. Unplug the plug from the dosing module. **12.** Measure the resistance between dosing module plug pin 1 and pin 2 in the plug. **Typical value:** ≥ 1MΩ No **Possible root cause:** **-** Wiring harness is internally short circuit - Plugs damaged (visual check) OK **Check component**
3	**Check component**	**Resistance check** **1.** Turn the key to position OFF **(Please wait at least 2 minutes in position OFF if it is from ON to avoid live working)**. **2.** Unplug the plug from the dosing module. **3.** Measure the resistance directly between dosing module pin 1 and pin 2 in dosing module connector. **Typical value:** 11.4~ 12.6? / (at 20C ambient temperature) No **Possible root cause:** **-** Dosing module broken OK

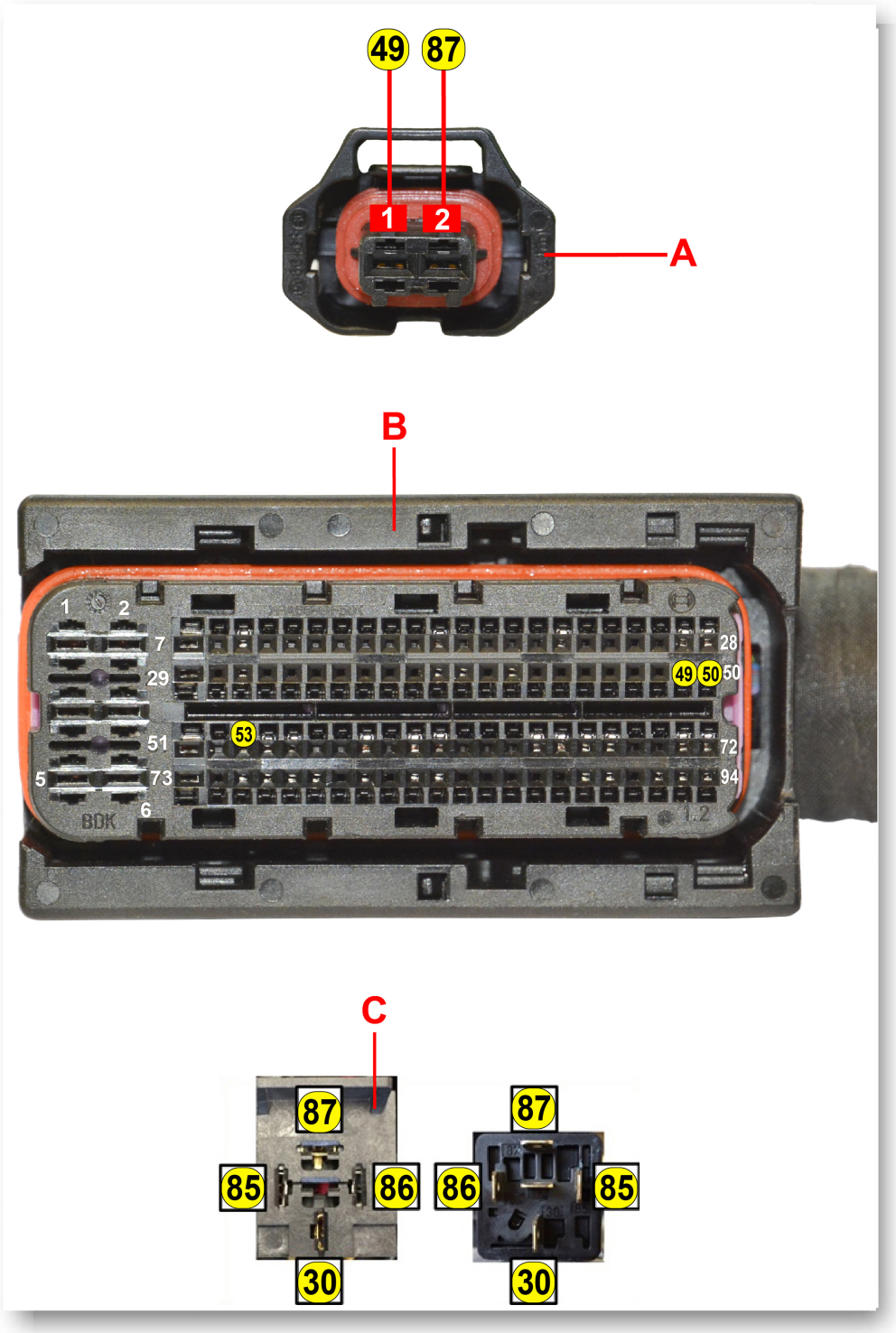
IMPORTANT!

Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

Circuit/Connection diagram: Line heater power relay

Note: The reduction agent (DEF) pressure line heater is integrated in the reduction agent (DEF) pressure line.

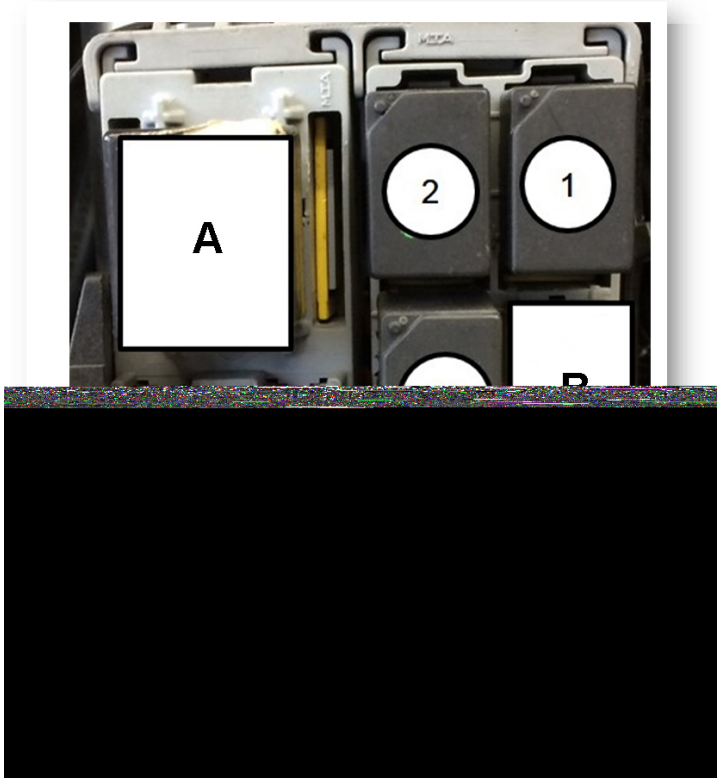




Line heater power relay pin assignment (Left: Relay, Right: Relay socket).

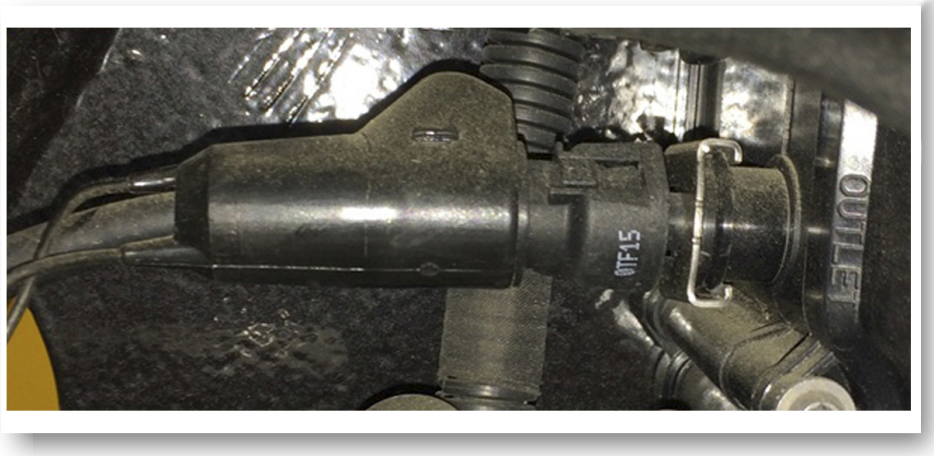
		30	Relay feedback	49	

2) Example: Reduction agent (DEF) line heater relay location.

A - Grid heater **B** - AC relay **C** - Main relay **D** - Starter relay	

Note: Relay location, type, pin-assignment, labelling and line heater resistance may vary from vehicle type to vehicle type!

Step	Description	Action
1	**Check power supply**	**1.** Turn the key to position OFF **(<u>Please wait at least 2 minutes in position OFF if it is from ON to avoid live working</u>)**. **2.** Unplug the reduction agent (DEF) backflow line heater relay.



Note: Relay location, type, pin-assignment, labelling and line heater resistance may vary from vehicle type to vehicle type!

Step	Description	Action
1	**Check power supply**	**1.** Turn the key to position OFF **(<u>Please wait at least 2 minutes in position OFF if it is from ON to avoid live working</u>)**. **2.** Unplug the plug from reduction agent (DEF) pressure line heater. **3.** Turn the key to position ON. **4.** Measure the voltage from reduction agent (DEF) pressure line heater plug pin 2 to vehicle ground (when the line heater power relay is working). **Typical value:** ~12V **Note:** Power supply (12V) is available for ~3 sec. after key on (20°C). After ~3 sec. voltage changes to ~3,5V. No **Possible root cause:** **-** Wiring harness issue

pin 27

No

Possible root cause:

- Wiring harness is interrupted

- Plugs damaged (visual check)

OK

Short circuit to ground check

5. Turn the key to position OFF **(Please wait at least 2 minutes in position OFF if it is from ON to avoid live working)**.

6. Unplug the DCU plug from DCU

7. Unplug the plug from reduction agent (DEF) pressure line heater relay.

8. Measure the resistance from reduction agent (DEF) pressure line heater relay socket pins to vehicle ground.

Typical value: ≥ 1MΩ / relay socket pin 30 to vehicle ground

Typical value: ~ 0? / relay socket pin 87 to vehicle ground

Typical value: ≥ 1MΩ / relay socket pin 85 to vehicle ground

Typical value: ≥ 1MΩ / relay socket pin 86 to vehicle ground

No

Possible root cause:

- Wiring harness is short circuit to ground

Check if other fault codes detected are found, if present, refer also to the other fault codes before to proceed.

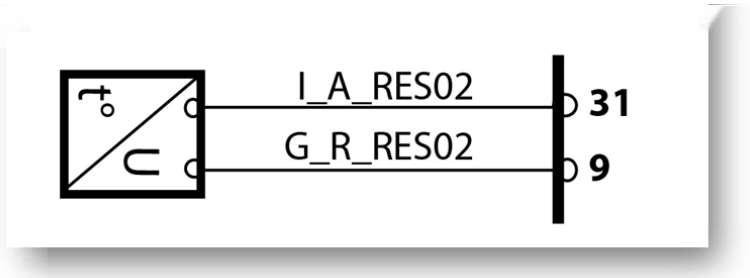
Possible Symptom	**1.** System lamp and/or MIL on
Preparation	**1.** Battery voltage is sufficient. **2.** Component related fuses are OK. **3.** Connectors/plugs OK. No loose contact or corrosion.
Offboard Tools	**1.** Multi-meter **2.** Adapter plug (Y-cable) **3.** Kohler Diagnostic Tool

IMPORTANT!

Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

Circuit/Connection diagram:

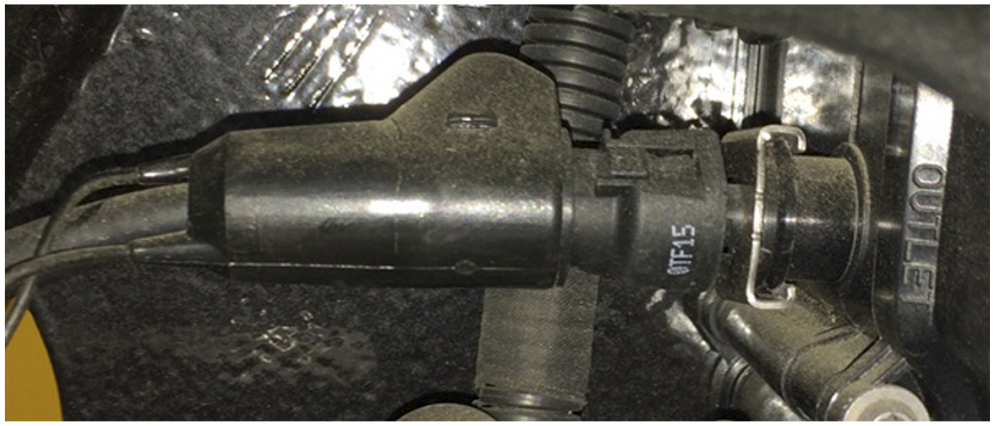
1) Environmental temperature sensor wiring diagram



Note: Supply module heater sensor allocated inside of supply module

Component pictures:

1) Environmental temperature sensor plug and corresponding DCU plug.



Note: Relay location, type, pin-assignment, labelling and line heater resistance may vary from vehicle type to vehicle type!

Step	Description	Action
1	**Check power supply**	**1.** Turn the key to position OFF **(Please wait at least 2 minutes in position OFF if it is from ON to avoid live working)**. **2.** Unplug the plug from reduction agent (DEF) suction line heater. **3.** Turn the key to position ON. **4.** Measure the voltage from reduction agent (DEF) suction line heater pin 2 to vehicle ground (when the line heater power relay is working). **Typical value:** ~12V **Note:** Power supply (12V) is available for ~3 sec. after key on (20°C). After ~3 sec. voltage changes to ~3,5V. No **Possible root cause:**

No

Possible root cause:

- Wiring harness is interrupted

- Plugs damaged (visual check)

OK

Short circuit to ground check

6. Turn the key to position OFF **(Please wait at least 2 minutes in position OFF if it is from ON to avoid live working)**.

7. Unplug the DCU plug from DCU

8. Unplug the plug from reduction agent (DEF) suction line heater relay.

9. Measure the resistance from reduction agent (DEF) suction line heater relay socket pins to vehicle ground.

Typical value: ≥ 1MΩ / relay socket pin 30 to vehicle ground

Typical value: ~ 0? / relay socket pin 87 to vehicle ground

Typical value: ≥ 1MΩ / relay socket pin 86 to vehicle ground

Typical value: ≥ 1MΩ / relay socket pin 85 to vehicle ground

No

Possible root cause:

- Wiring harness is short circuit to ground

- Plugs damaged (visual

2.4.25 Error code of supply module main filter

KOHLER. IN POWER. SINCE 1920.

Troubleshooting

Error code of supply module main filter

Related defect Fault Code :

P204F	DFC used to evaluate filter clog

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures

ATTENTION !

Check if other fault codes detected are found, if present, refer also to the other fault codes before to proceed.

Possible Symptom	**1.** System lamp and/or MIL on

IMPORTANT!

Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

Component pictures:

1) Supply module with main filter location. Refer to workshop manual for main filter replacement procedure

IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures

ATTENTION !

Check if other fault codes detected are found, if present, refer also to the other fault codes before to proceed.

Possible Symptom	**1.** System lamp and/or MIL on
Preparation	**1.** Battery voltage is sufficient. **2.** Component related fuses are OK. **3.** Connectors/plugs OK. No loose contact or corrosion.
Offboard Tools	**1.** Multi-meter **2.** Adapter plug (Y-cable) **3.** Kohler Diagnostic Tool

IMPORTANT!

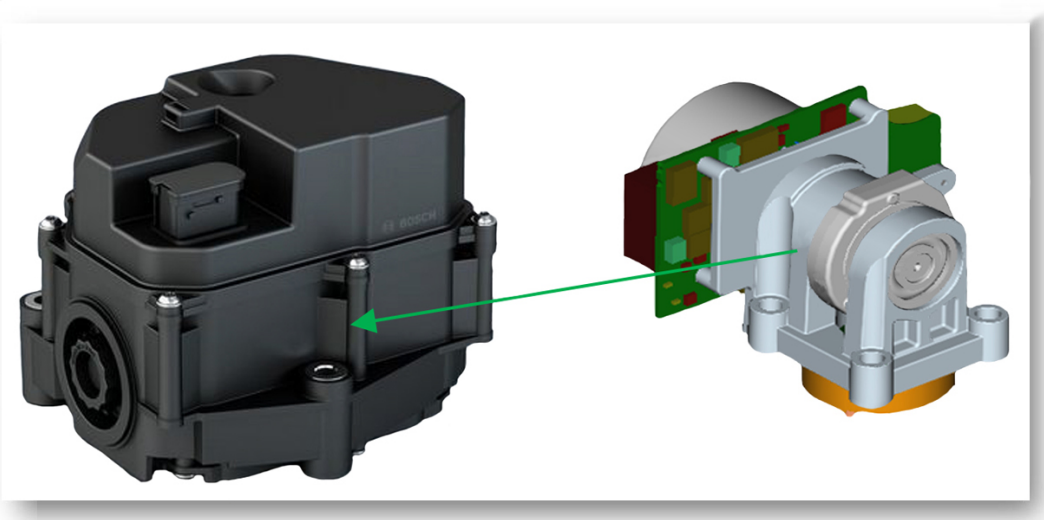
Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

Circuit/Connection diagram: Temperature sensor wiring diagram. Reduction agent pump motor

Note: The supply module temperature sensor is integrated in the supply module. And the temperature sensor pins are the same as supply pump pins.

		3	Pump motor supply	55		
		4	Pump motor ground	54		
		5	Purging pump power supply	77		
		6	Purging pump ground	78		
		7	Not used	-		
		8	Pressure sensor ground	40		
		9	Pressure sensor signal	39		
		10	Pressure sensor power supply	17		
		11	Heater power supply	4		
		12	Heater ground	3		

2) Example: Supply module with supply pump



Short circuit to ground check

7. Turn the key to position OFF **(Please wait at least 2 minutes in position OFF if it is from ON to avoid live working)**.

8. Switch off the main switch for power. If there is no main switch (depending on vehicle), remove the power connection from the positive terminal of the battery.

9. Unplug the DCU plug from DCU.

9. Unplug the plug from ignition switch.

10. Measure the resistance from ignition switch Terminal 15 and Terminal 30 to vehicle ground.

Typical value: ≥ 1MΩ / Terminal 15 to vehicle ground

Typical value: ≥ 1MΩ / Terminal 30 to vehicle ground

No

Possible root cause:

- Wiring harness is short circuit to ground

- Plugs damaged (visual check)

OK

Pin to pin short circuit check

11. Turn the key to position OFF **(Please wait at least 2 minutes in position OFF if it is from ON to avoid live working)**.

12. Unplug the DCU plug from DCU.

14. Unplug the plug from ignition switch.

		8. Measure the voltage from tank heating valve plug pin 1 to vehicle ground. **Typical value:** 3.0V~4.0V No **Possible root cause:** - Connection between DCU plug and DCU connector is not good - DCU broken OK **End of test**

2.4.32 Error code of tank level sensor

KOHLER IN POWER. SINCE 1920.

Troubleshooting

Error code of tank level sensor

Related defect Fault Code:

P1080	Diagnostic Fault Check for Signal timeout error from CAN
P109E	Diagnostic Fault Check for Signal short circuit to battery or open load error from CAN
P109F	Diagnostic Fault Check for Signal short circuit to ground error from CAN
P203C	SRC low for Urea level sensor from CAN
P203D	SRC high for Urea level sensor from CAN

2) Example: Environmental temperature sensor

Note: The tank temperature sensor is integrated in the DEF tank module and connected via CAN.

Step	Description	Action
1	**Check component: environmental temperature sensor**	**Resistance Check** **1.** Turn the key to position OFF **(Please wait at least 2 minutes in position OFF if it is from ON to avoid live working)**. **2.** Unplug the plug from environmental temperature sensor. **3.** Measure the resistance directly between environmental temperature sensor pin 1 and pin 2 in the connector. **Typical value:** 5465 ? ~ 6324 ? / @ 0°C

2.5 Machine Device SCR

2.5.1 Battery_Voltage_Troubleshooting_

KOHLER

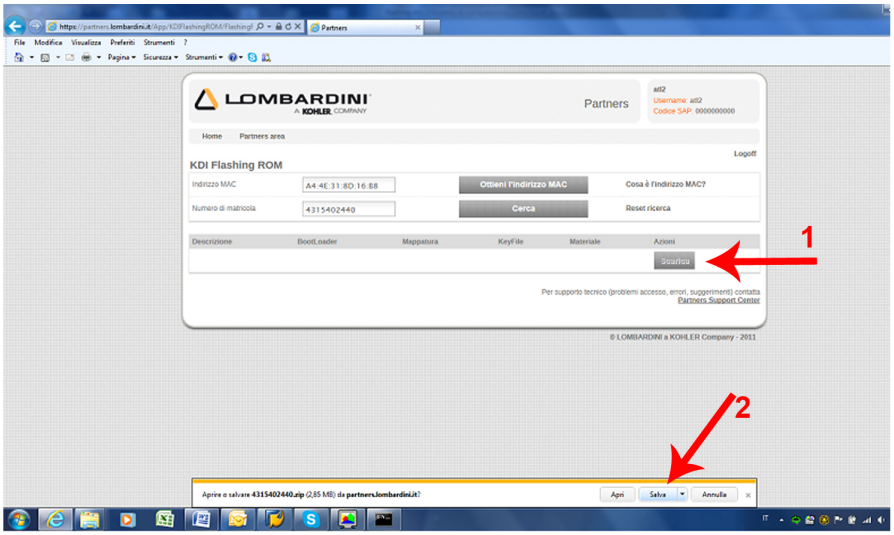
Troubleshooting

Battery Voltage

IMPORTANT!

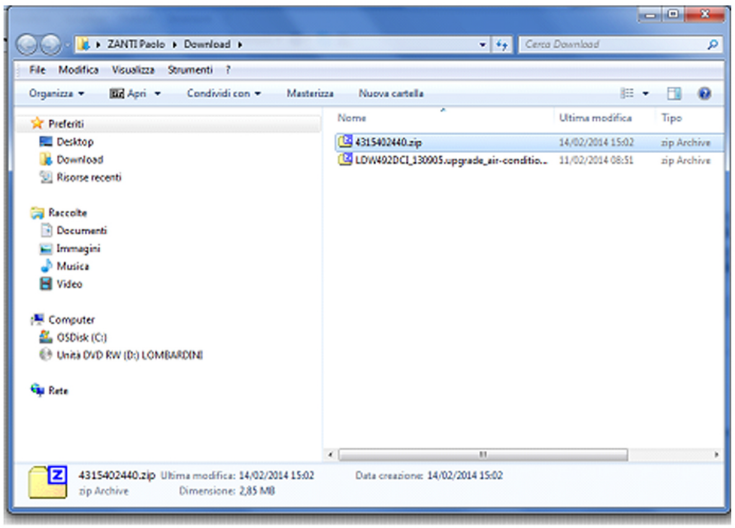
Use the multi-meter on the harness connector pins.
DO NOT use the multi-meter on the ECU pins.

Step	Fault description	Action
1	Battery fault	Test Battery voltage and power hold relay voltage at DCU. Compare this to the battery voltage. 14.4V max when running. If there is a wiring connection problem or an alternator fault this code will be generated. The battery voltage limit is set between 8 and 16 volts. If no fault is found, proceed to Step **2**
2	Battery connection fault	Check the electrical connectors from the battery for signs of damage/corrosion, clean the terminals and apply a suitable electrically conductive grease to the connections. Repair/replace battery or connectors as necessary. If no fault is found, proceed to Step **3**.
3	Battery charging circuit	Check the battery charge circuit (see engine service manual for alternator diagnosis and repair). Repair/replace as necessary. If no fault is found, proceed to Step **4**
4	DCU fault	Disconnect the harness from the DCU and inspect.



13) The time required to download the file depends on the internet connection in the area (the average time with a good connection is 3 minutes)

When the download in the "Downloads" folder or the one you specified, you will have the file you just downloaded. Zip format identified by the engine serial number



MAPPING FILE TRANSFER FROM PC TO DIAGNOSTIC TOOL

		No cause: **Conclusion/possible route** If any dosing quantity is out of range check pressure lines for blockage. If pressure lines are OK exchange Dosing module. OK **End of test**

2.6.4 Leakage test

KOHLER. IN POWER. SINCE 1920.

Leakage test

Functional description:

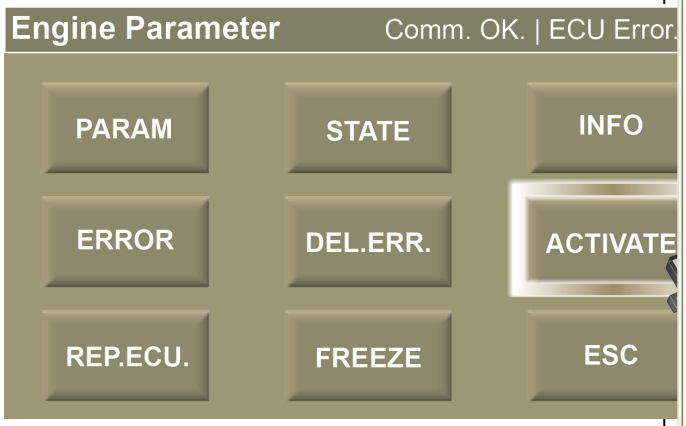
This engine test is started by diagnostic tester to perform leakage test for visual inspection.
Turn the key to position ignition ON. Start the leakage test. Then the pressure will be built up. After pressure is present, the pressure will be held for approximately 120 seconds, so that the hydraulic system can be checked for leakages by visual inspection.

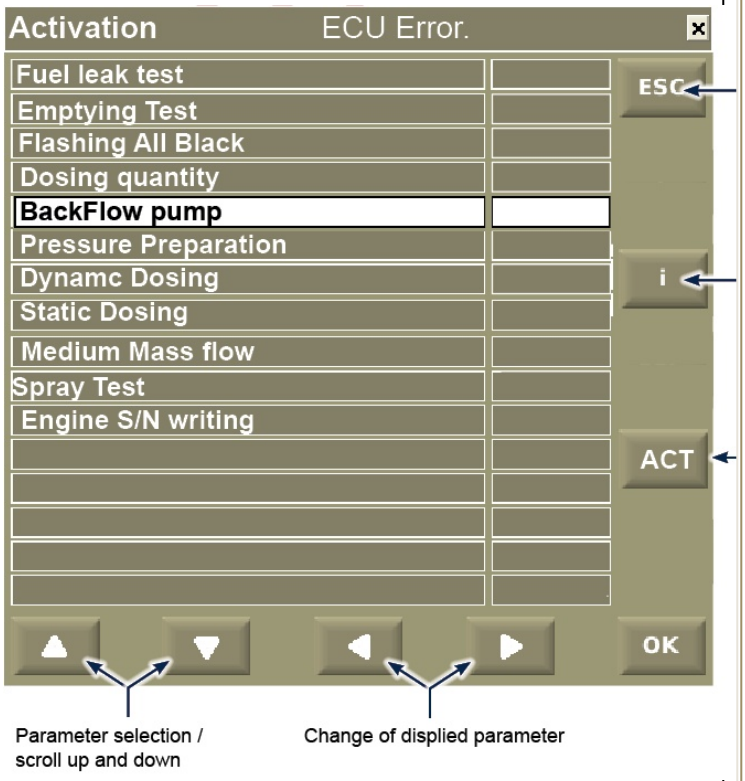
IMPORTANT !

Stop the engine and let it cool before you start work.
Do not start the engine during the service procedures

ATTENTION !

Check if other fault codes detected are found, if present, refer also to the other fault codes before to proceed.





2. After the system emptying, remove the pressure line of the su

3. Integrate a Y-adapter on the outlet of the supply module. Mou gauge and the pressure line on the Y-adapter.

4. Start the backflow pump test.

		No **cause:** **Conclusion/possible route** **1)** DEF quality value too low/ too high (refractometer): DEF is diluted with water/ oil or aged, replace with normal DEF **2)** Oil test strip shows colour change: DEF contains oil, replace with clean DEF and clean the hydraulic SCR system. OK **Fault P1071 (absolute quality error) is active: Check Urea quality**
2	**Fault P1071 (absolute quality error) is active: Check Urea quality**	**1.** Check DEF tank level and ensure tank level is moderate **2.** Use suitable tool to take out some DEF from tank. Be sure the tool is clean and prevent DEF from being polluted. **3.** Follow the instruction of refractometer to measure DEF quality. **Data - Typical values**

Values	Min	Max	Remark
DEF quality	30,5%	34,5%	DEF quality specification