

APPENDIX

to the operation manual for “Kirovets” K-743

№ V2384

Your tractor has the following differences from mass-produced tractors:

Six-cylinder in-line **ENGINE** OM470LA (Mercedes).



CAUTION!

1. In order to ensure a long-term and reliable operation of the engine, use only certified diesel fuel grades. Avoid the ingress of water and foreign matter into the fuel.
2. In case of welding operations at the tractors with Mercedes engines, it is necessary to disconnect the power wires “+” and “-” from storage batteries (wires 3, 3.1 and 7, see the wiring diagram). Connect wire terminals between each other by means of M10 bolt with nut.

Non-fulfilment of this requirement can lead to a failure of the engine electronic control system. When connecting storage battery to the tractor electric circuit, first connect “+”, then “-”.

Engine start-up is performed by electrical starter.

Oil and cooling fluid shall be chosen in accordance with the Operation Manual for the engine and with the appendix (“Specification for operating materials”).

Fuel strainer is located behind the cabin on the left at the hydraulic tank face and is equipped with a boosting pump and heating (24 V). A fuel sediment drain valve is located at the lower part of the filter bowl;

AIR CLEANING SYSTEM is dry, double-stage, combined, with dust suction into the exhaust pipe. Air cleaner manufactured by Donaldson is used on the tractor.

COOLING SYSTEM of the engine is closed, with compensating circuit, with forced circulation of the cooling fluid. In order to maintain the best possible heat conditions, the engines are provided with an automatic fan control system.

FUEL SYSTEM consists of the fuel tank, fuel lines, fuel strainer with in-built fuel priming pump, low pressure fuel pump, fine mesh filter, fuel cooler, high pressure pumps, fuel rail, nozzles.

EXHAUST SYSTEM is equipped with catalyst where exhaust gases are split under a chemical impact (ADblue) for reduction of their toxicity.

PNEUMATIC SYSTEM - combined, with possibility of connecting single- and double-line trailer system.

2 air receivers for 40 l each are installed instead of 3 receivers for 20 l each.

Three two-way protection valves are installed instead of one three-way protection valve.

Pneumatic diagram of the braking system is given in fig.1

HYDRAULIC SYSTEM

1 Hydraulic tank of 250 l/min capacity.

2 To prevent oil drainage from the hydraulic tank upon hydraulic system repair, valves are installed at suction lines of the pumps.

3 Steering control system has additionally installed emergency pump NSh-10 at the rear part of GB and priority valve at the cabin base. With a supply from the main pump of the steering control system (installed at the engine), pump NSh-10 supplies oil to the radiator and further to the hydraulic tank. With no oil supply from the main pump, priority valve guides the supply from pump NSh-10 to the flow amplifier in order to perform a turn; in doing so, the force at steering wheel increases.

4 Two-section pump of the working equipment hydraulic system is installed at the front gearbox part. Pump maximum capacity is 280 l/min.

5 Hydraulic distributor of the working equipment system is five-section, one of the sections (EHR) controls the linkage. Linkage "LIFTING - LOWERING" handle is located at the front part of the control panel (armrest), controllers and handles for linkage lowering speed limitation, lifting height limitation, soil cultivation depth setting and adjustment type selection are located under the armrest cover. Four remaining sections with electric and hydraulic control are connected to four pairs of quick-lock coupling outputs with flow passage of 3/4 inch. Section control handles (with 1, 2, 3 and 4 symbols) are also located at the control unit, along with flow controller handles for these four sections. Flow controller allows to set the flow rate through section in the range of 0...140 l/min. The timer allows to control the time of operation actuation from 2 seconds, until a permanent activation.

6 For a free (bypassing the hydraulic distributor) drainage to the tank from implement hydraulic motor, two slots are provided for at T-pieces of drain filters (M30x2 fitting is closed with plug).

7 Two fittings M18x1.5 (closed with plugs) are provided for at the upper part of hydraulic tank to guide the drain line from implement hydraulic motor to the tank.

The hydraulic system diagram is given in Fig. 2.

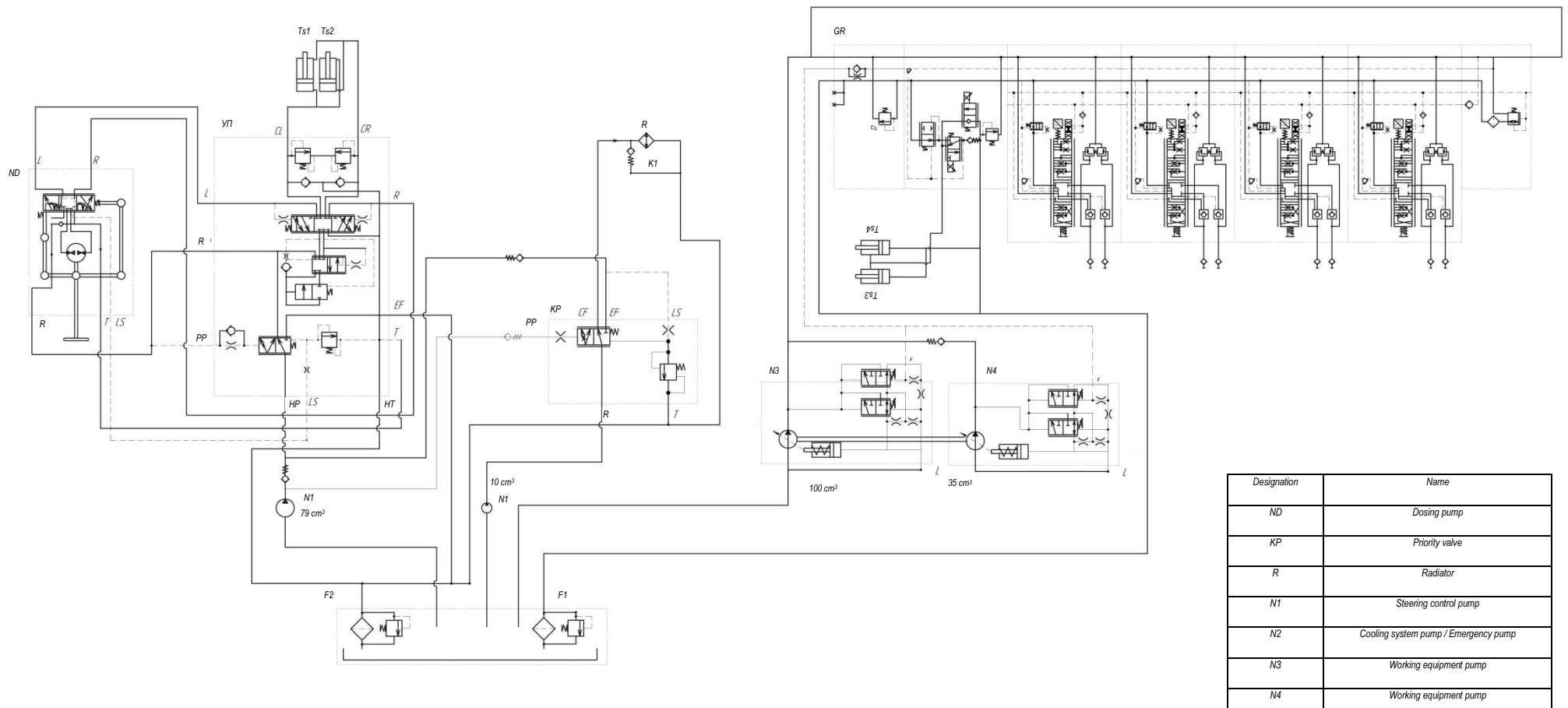


Fig. 2 Hydraulic system diagram

Designation	Name
ND	Dosing pump
KP	Priority valve
R	Radiator
N1	Steering control pump
N2	Cooling system pump / Emergency pump
N3	Working equipment pump
N4	Working equipment pump

REAR LINKAGE CONTROL (EHR)

The system is designed for control over operating parts of mobile machines, including rear linkage of the tractor.

The system provides for operation with mounted implements in the following modes: manual control with external buttons, positional, power and combined control, floating, transportation, transportation with vibration dampening.

Composition of the system:

- controller designed for assurance of stabilized power supply for force cells and position sensors, processing of output signals from these sensors and generation of control actions for electric and hydraulic distributor, and for system diagnostics;

- force cells - 2 pcs, designed to measure the force at hinge pivots of tractor linkage lower links in the course of soil cultivation operations;

- position sensor designed for noncontact measurement of the coordinate of linkage position;

- cam located at turning shaft of the tractor, operating jointly with position sensor and ensuring a linear dependence of the position sensor output signal on the turning angle of the linkage turning shaft;

- control panel designed to assign modes of control over the tractor linkage;

- electric and hydraulic distributor (not included in the scope of delivery) with two control channels with proportional solenoids fed by 12 V, that implements such functions as linkage retaining at a given position, linkage lifting, linkage lowering by gravity.

Design and operation

Logic diagram of tractor plowing unit with automated control of linkages is given in Fig. 3.

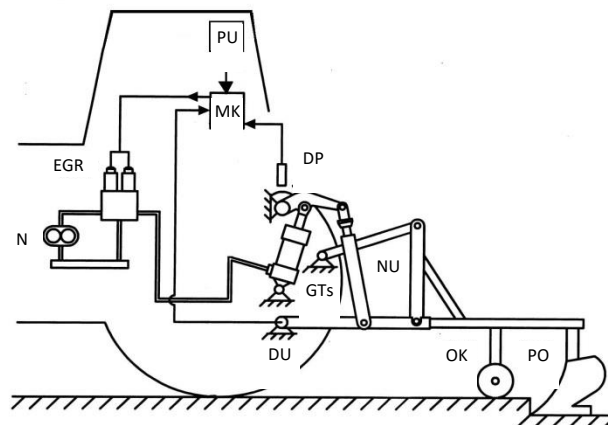


Fig. 3 Logic diagram of tractor plowing unit

Tractor plowing unit contains a soil-tilling implement PO that is kinematically connected with linkage NU and power hydraulic cylinders GTs.

The plowing unit also includes two force cells DU, noncontact position sensor DP, hydraulic fluid feed pump N for the control of hydraulic cylinders GTs via electric and hydraulic distributor EGR, as well as microprocessor controller MK implementing the control and adjustment algorithm, and control panel PU to set control modes in the course of operation.

Depending on the control type selected by operator, the system in the automatic control mode allows maintaining the given position of soil-tilling implement PO against the tractor, stabilize the drawbar resistance force in the draft links of linkage NU mechanism.

Electric signals from position sensor DP (with positional adjustment) or composite signal of position sensor DP and two force cells DU (with combined control) come into controller MK where they are compared with the signal set by operator at control panel PU. In case of a mismatch of these signals, controller MK generates a control action for solenoids of electric and hydraulic distributor EGR that performs a corrective movement of soil-tilling implement PO up or down via power hydraulic cylinders GTs, and so the set parameter (position, force) gets stabilized.

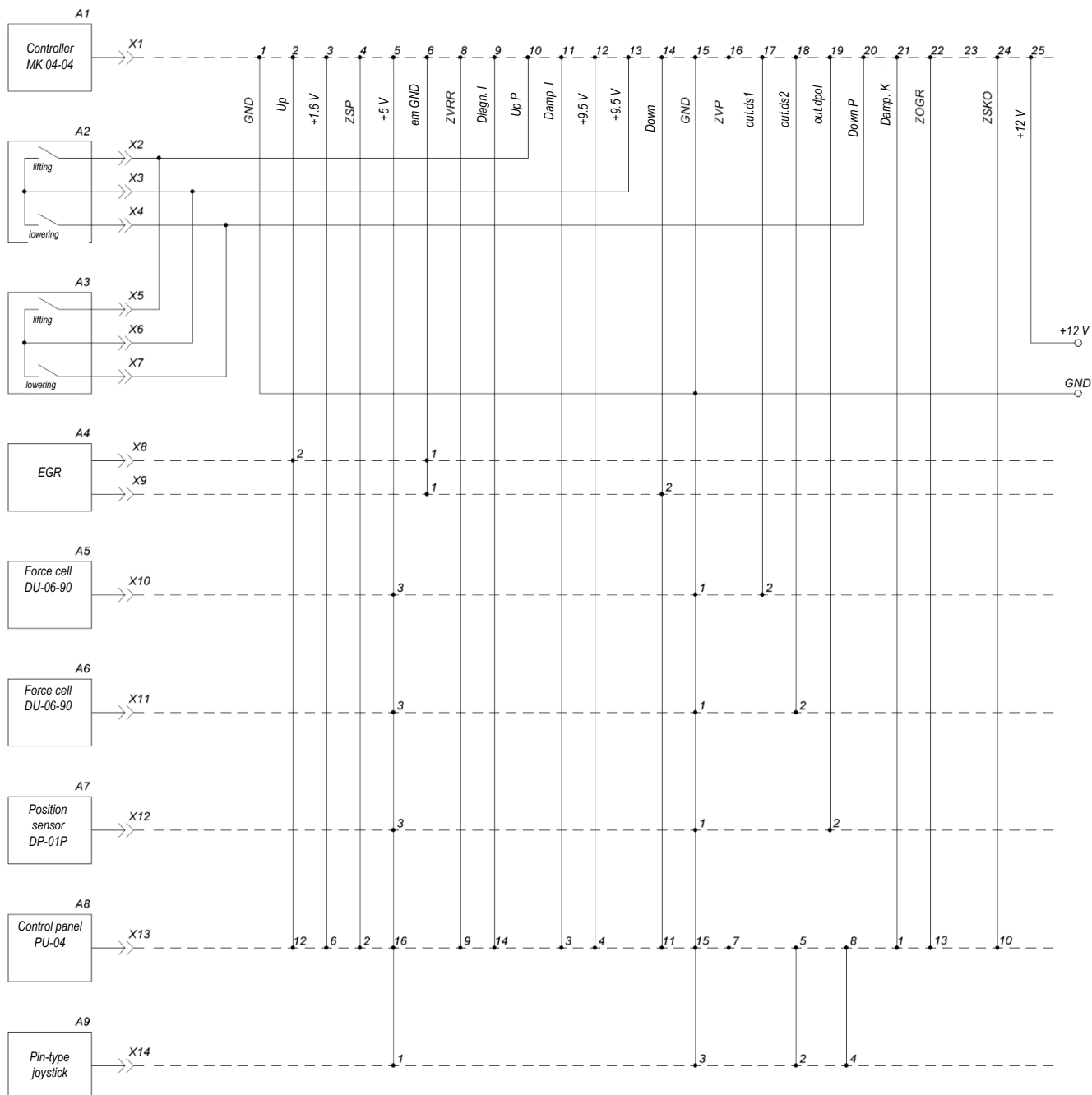


Figure 4 – Diagram for connection of system components



operation mode selection handle

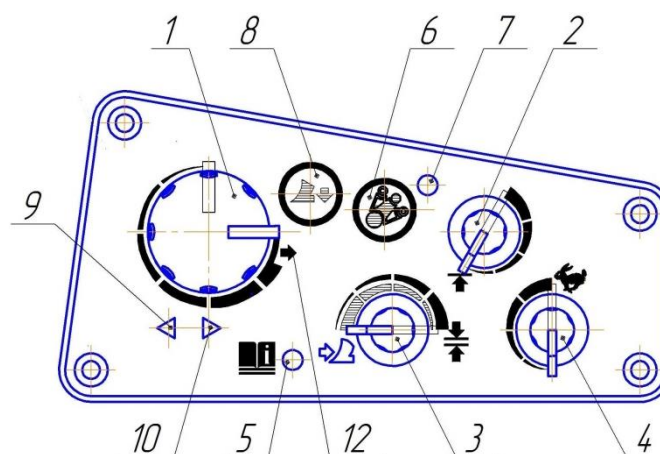


Fig. 5 Appearance of control panel PU-04

- 1 – soil cultivation depth control handle;
- 2 – lifting height limitation control handle;
- 3 – control method selection handle: extreme left position – power control mode, extreme right position – positional control mode, between them – combined control mode;
- 4 – lowering speed control handle;
- 5 – indicator DIAGNOSTICS (red light);
- 6 – button DAMPING;
- 5 – indicator DAMPING (green light);
- 8 – mode button FLOATING (without locking);
- 9 – indicator LIFTING (red color);
- 9 – indicator LOWERING (green color)

When the power supply system receives 12 V, indicators DIAGNOSTICS and DAMPING shall light up, then indicator DAMPING shall go out.

System operation modes

System operation modes are given in Table 1.

Table 1

Operation mode	Position of controls and indication of mode
STOP	In case of system configuration with control panel PU-04, operation mode selection functions are provided for by the pin-type handle (mounted outside panel PU-04) and button FLOATING (located at panel PU-04). Mode STOP shall be set at mid-position of the mode selection handle, mode TRANSPORTATION – at upper position of the handle, mode AUTOMATIC CONTROL – at lower position of the handle.
TRANSPORTATION (linkage lifting)	Set the mode selection handle of the control handle to position TRANSPORTATION (mid-position of the handle). Adjust linkage lifting height with the lifting height limitation handle. Indicator LIFTING illuminates at the control panel upon linkage lifting. If needed, press button DAMPING to activate the mode of damping mechanical vibrations in the course of transportation.
FLOATING (linkage lowering)	Adjust linkage lowering speed with the lowering speed adjustment handle. Set position FLOATING with the respective button on panel PU-04. Indicator LOWERING illuminates at the control panel upon linkage lowering. Extreme left position of the lowering speed adjustment handle is lowering prohibition.
AUTOMATIC CONTROL	Shift the mode selection handle to position AUTOMATIC CONTROL (lower position of the handle). Set control method with the control method selection handle - positional, power or combined. Set required cultivation depth with the soil cultivation depth adjustment handle. In the course of operation, indicators LIFTING and LOWERING light up and go out by turns. Extinction of both indicators LIFTING and LOWERING means that the minimum mismatch between set and measured parameters is achieved in the system and the system is in the dead zone.

System diagnostics and troubleshooting

System controller provides for diagnostics of operability of system components and, in case of a fault, blocks the system operation in automatic mode from the main control panel and returns a fault code.

System diagnostics is not performed in mode STOP (system operation is blocked).

The fault code lights up at indicator DIAGNOSTICS as per diagram given in fig. 6.

Fault code "24" is given as an example.

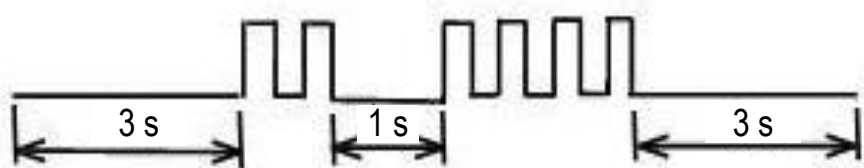


Fig. 6 Diagram of fault code "24"

Fault codes are given in Table 2.

Table 2

Code	Short description of fault	Troubleshooting method
11	Open circuit of upper solenoid	Check wires connected to the solenoid. If they are not faulty check the solenoid. Replace it in case of fault.
12	Open circuit of lower solenoid	Check wires connected to the solenoid. If they are not faulty check the solenoid. Replace it in case of fault.
13	Short circuit (SC) in solenoid circuits	Check the system solenoid circuits for SC.
14	SC of button LIFTING of the remote panel	Check the button for SC.
15	SC of button LOWERING of the remote panel	Check the button for SC.
16	Voltage at power supply source +9.5 V (for controllers MK-03-03 and MK-04-04) below 9.25 V or above 9.75 V. Voltage at power supply source +5 V (for controller MK-04-04) below 4.7 V or above 5.2 V	Check supply circuits for a short circuit to in-vehicle network, frame. Eliminate SC, if found.
19	System power supply value is below 10.7 V or above 16 V	Check electric equipment of the tractor (storage battery, relay controller). Check voltage at the storage battery. If needed, recharge or replace it. Fault code triggering is also possible at a long-term starter operation (low voltage for more than 6 seconds). If this is the case, switch over the operation mode selection potentiometer after a successful engine start-up to position 'transport', 'automatic control', 'stop' several times before the fault code goes out.
22	Position sensor failed	Check that there is a supply voltage at the sensor connector pins. When it is there and there are no visible damage to the cable, adjust the sensor position as per method of its installation (section METHOD OF CAM AND POSITION SENSOR INSTALLATION). If that doesn't help, replace the sensor.
23	Soil cultivation depth control potentiometer failed	Replace the control panel
24	Height limitation control potentiometer failed	Replace the control panel
28	Operation mode selection potentiometer failed	Replace the control panel
31, 32	Force cell 1, force cell 2 failed, respectively	Check that there is a supply voltage at the sensor connector pins. When it is there and there are no visible damage to the cable replace the cell

Code	Short description of fault	Troubleshooting method
34	Lowering speed control potentiometer failed	Replace the control panel
36	Control method selection potentiometer failed	Replace the control pan
97	No solenoid current via channel LOWERING in the absence of solenoid open circuit and SC between controller contacts 14, 6 (earth of solenoids)	Check contacts 14, 1 for SC When there is a short circuit (resistance below 1.5 Ohm), eliminate it or otherwise replace the controller
98	No solenoid current via channel LIFTING in the absence of solenoid open circuit and SC between controller contacts 2, 6 (earth of solenoids)	Check contacts 2, 1 for SC When there is a short circuit (resistance below 1.5 Ohm), eliminate it or otherwise replace the controller
99	Current drain via one or two channels LIFTING, LOWERING.	Replace the controller
-	No lowering or lifting of the linkage when controlled from the main control panel. No indication of fault.	Check EGR. If it's not faulty, replace the controller.

After mode DIAGNOSTICS, the system shall be returned to operating condition as follows:

- option a) switch off power supply and in 3-4 s switch it back on.

When the power supply system receives 12 V, indicators DIAGNOSTICS and DAMPING shall light up, then indicator DAMPING shall go out;

- option b) shift the mode selection handle to mode STOP and then to the required mode.

Maintenance

The system is to be regularly maintained.

Once per month, service personnel must carry out:

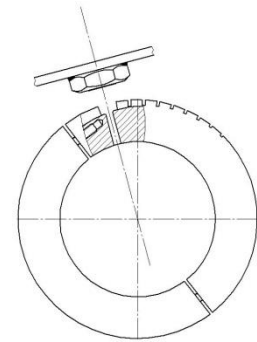
- system cleaning from dust and dirt;
- control of indication elements.

Method of cam and position sensor installation

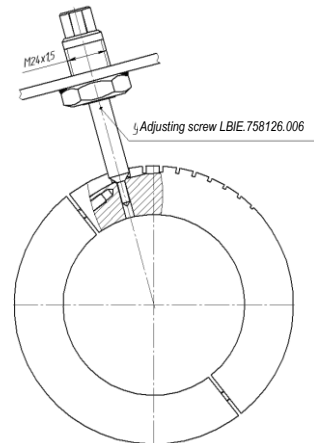
For a correct installation of cam and position sensor, do the following:

1. Using remote buttons, lift the linkage for the maximum height (pump operation for safety reduction valves is not allowed at the point of maximum lifting).

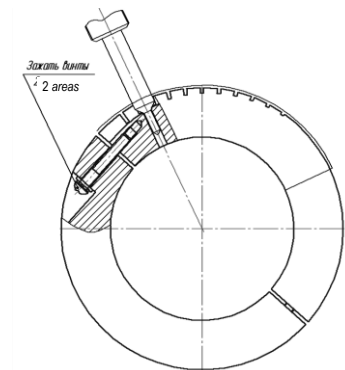
2. Mount the cam on the turning shaft roughly, with a partial tightening of cam fastening screws, so as to have the bracket threaded part hole on the same axis with the hole for cam adjusting screw



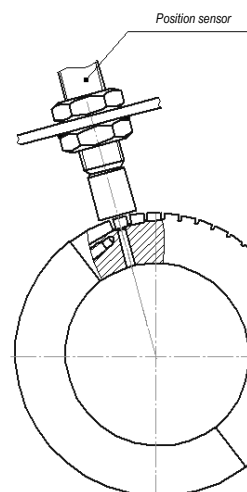
3. While turning the cam, screw in the adjusting so that it would enter the cam hole



4. Press the cam screws



5. Screw out the adjusting screw and screw in the position sensor instead all the way in the cam, then screw out the position sensor by 1.5 turns back to provide for a clearance between the sensor and cam.



6. Start up the tractor, shift the lifting height limitation programmer at the control panel to the maximum lifting height position.

7. Switch on the linkage control system, shift the operation mode selection handle to position TRANSPORTATION. In case of a non-stopping correction for height (seen by indicator LIFTING at the linkage control panel), lower the linkage and screw out the position sensor a little bit (appr. by 30°). Repeat such screwing out of the sensor until a successful completion of the correction for height (indicator 'lifting' shall go out at the upper position of the linkage). At the same time, output signal of the sensor should not exceed the limits followed by diagnostics of its improper mounting or malfunction (fault code "22").

8. Fix the position sensor with lock nut.

Note.

1. After correct installation of the sensor its output signal at the uppermost position of the linkage shall be about 4.5 V.

2. In case fault code "22" appears in the course of system operation with non-faulty position sensor, this may mean that output signal of the sensor at extreme positions exceeds the threshold limits set in the system. In case it happens at the lower position of the linkage (output signal of the sensor exceeds the lower threshold limit – 0.5 V), the position sensor must be screwed out a little bit, and if fault code "22" appears at the uppermost position (output signal of the sensor exceeds the upper threshold limit – 4.5 V), the position sensor must be screwed in a bit.

3. Said adjustments of the position sensor are based on the fact that its output signal depends on the value of clearance between its face end and operating surface of cam KR-01. The closer the operating surface of cam is to the sensor face end the lower is the sensor output signal, and vice versa.

4. Position sensor of type DP-01 measures the linkage lifting height by a noncontact method, while interacting with the operating surface of cam. Rotation of KR-01 type cam from 0° to 87° corresponds to cam operating surface movement against a sensitive face end surface of the position sensor within the range from 1.8 mm to 7.5 mm. At the same time, change of position sensor output signal for DP-01P sensor is 0.5 – 4.5 V and for DP- 01 sensor it is 2.3 – 7.1 V.

Criterion for a correct installation of the position sensor is the maximum usage of the entire range of linkage movements from the lowermost to the uppermost position without overloading hydraulic pump at the end of lifting and without bringing the linkage to a safety stop. At the same time, corrections for linkage lifting and lowering shall be time-restricted.

5. In case of inoperable condition or improper mounting of DP-01 type position sensor (fault code "22" appears), linkage lifting and lowering can be controlled by remote buttons. When a remote button is pressed, linkage movement will not be continuous unlike the case when position sensor channel is properly adjusted but discrete with a duration of about 3 s.

ELECTRONIC SYSTEM FOR HYDRAULIC DISTRIBUTOR SECTION CONTROL (EHS)

General

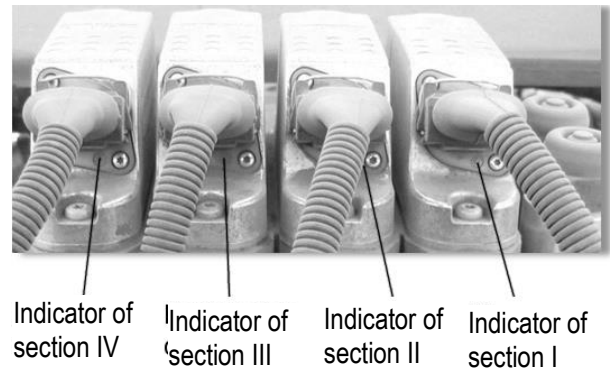
EHS system installed in the tractor serves to control sections of hydraulic distributor SB33LS EHS EHR installed at the tractor fuel tank. When control unit SRC4-5 receives power the electronic system performs self-diagnostics of control elements. When finding faults, the system indicates them with light codes of faults.

Each hydraulic distributor section has the fault code code indicator located at its upper part, in the area of electric connector.

When there is a fault in sections the indicator provides a code information about fault in the section. Fault code consists of two digits (see Table 1).

The code shall be read out by counting the number of indicator flashes: number of flashes with a short pause in between – first digit – long pause – number of flashes with a short pause in between – second digit.

For example, the system would indicate fault code “23” by activating the indicator as follows: two flashes – pause – three flashes. In the absence of faults in the distributing section the indicator shall be off.



Besides, the faults of EHS electronic control systems are indicated by the fault code indicator (EHS symbol at the system activation switch). The rules for read-out of diagnostic light codes (see Table 2) are the same as the rules for read-out of diagnostic light codes from distributor sections.

Diagnostic codes from the switch and from distributor sections are not redundant and display different faults even if the codes are the same.

For example:

- fault code “21” at the switch – resistance of the oil feed limitation controller for the valve of section No.2 out of the permissible range, or open circuit fault;
- fault code “21” at distributor section – unacceptably low level of supply voltage (from 8V to 11V) at distributing section.

Hydraulic distributor section control EHS

Hydraulic distributor section control EHS includes the following elements:

– electronic control unit of system EHS SRC4-5;

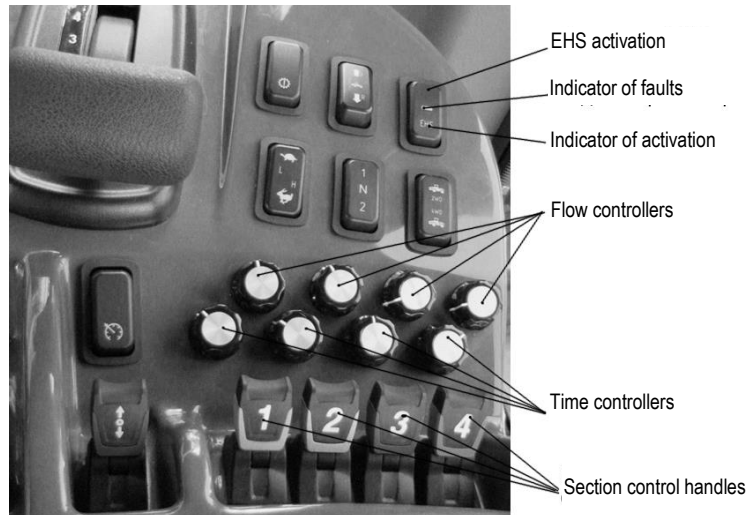
– EHR system activation switch;

– 4 flow controllers of each section (I / II / III / IV) of the hydraulic distributor;

– 4 controllers of operation actuation time upon activation of a section (I / II / III / IV) of the hydraulic distributor;

– 4 control handles of I, II, III, IV hydraulic distributor sections;

– connection wire harnesses.



Section control handles have 5 activation positions

1. Central position – neutral.
2. Unlocked forward position (towards the engine) – implement lowering.
3. Unlocked reverse position (towards the load semi-frame) – implement lifting.
4. Locked forward position (towards the engine) – activation of floating section mode.
5. Unlocked reverse position (towards the load semi-frame) – activation of constant oil flow through the section. This position of the handle allows to set up the required oil flow using the flow controller and the operation activation time using the time controller.

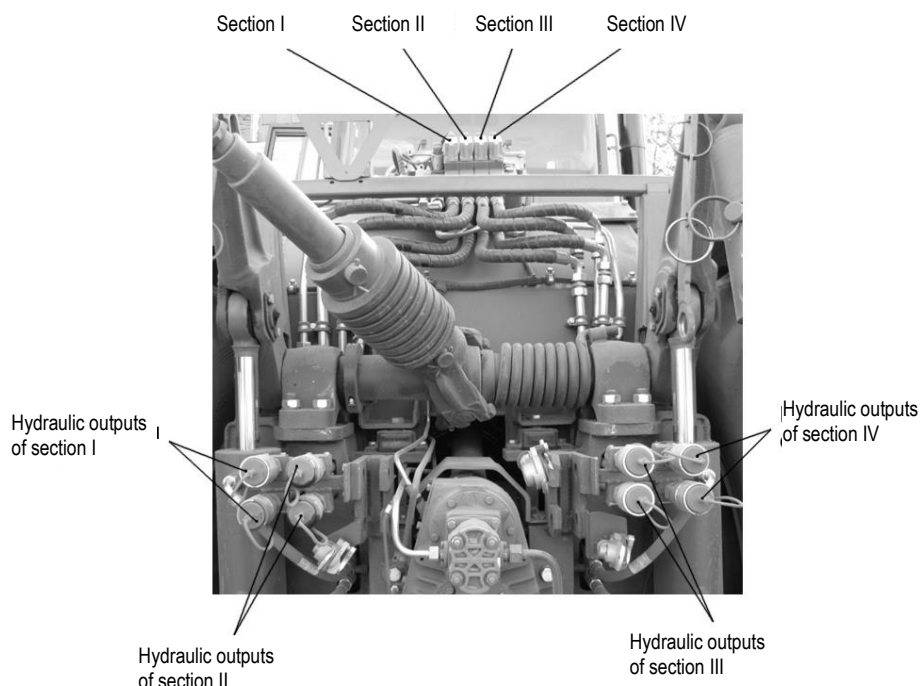
Flow controller operation ranges are 0...92 l/min:

- the flow reduces with controller handle turning clockwise;
- the flow increases with controller handle turning counter-clockwise

Ranges of time controller operation at unlocked positions are 2...60 s:

- the operation actuation time increases with controller handle turning counter-clockwise;
- the operation actuation time reduces with controller handle turning clockwise.

Hydraulic outputs shall be connected to external consumers as per the drawing.



Fault codes of EHS distributor and electronic system for hydraulic distributor section control through diagnostic light code of the fault code indicator at EHS hydraulic distributor section

Table 1

Fault code	Possible cause and nature of malfunction
11 12 13 14 15	No control signal at CAN-bus. Central gate valves of distributing section inadvertently returns to "neutral" position. CAN-protocol doesn't conform with the required one.
16	Memory fault discovered at activation of hydraulic distributor section. Central gate valve of distributing sections remains at "neutral" position.
17	Control signal doesn't conform with "neutral" position at system start-up
23	Clogging of fine mesh filter or ceramic metal strainer is extreme, or no voltage at the closing electromagnet of the reducing valve, or clogging of the reducing valve of the section for hydraulic distributor signal preparation. At the same time, distributor section gate valve doesn't move when controlled from the handles or moves slowly and not to the full extent. Code is indicated at all sections the control signal is supplied to. With no control signal or cease of its supply, code indication stops.
24	Movement of distributing section gate valve exceeds the established limits, or the gate valve doesn't return to "neutral" position under the spring force.

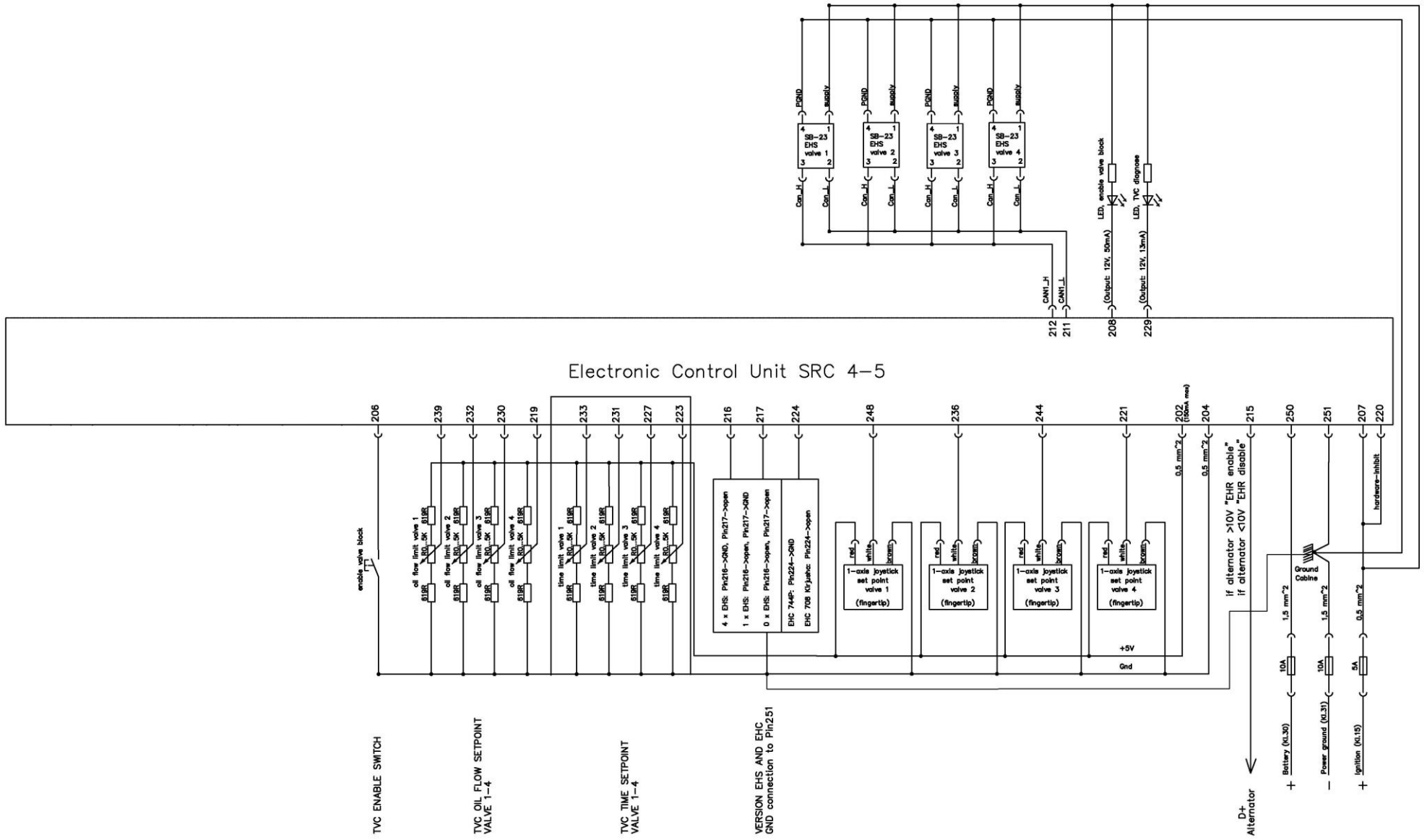
Fault code	Possible cause and nature of malfunction
25	“Floating” position doesn’t activate over a certain period of time due to mechanical seizure of the central gate valve or fault of the control valve, low control pressure. In case of code “25” indication at all distributing sections, see code “23”. Central gate valve of the distributor inadvertently returns to “neutral” position. Operation of distributing section from joysticks is blocked into position “lowering”, “floating”. Code is indicated only at faulty section, both with the control signal on and after its removal before the appearance of the control signal for “lifting”
26	Section gate valve was engaged in position “lowering” or “floating” due to control valve seizure in position “lowering” or “floating”, respectively. In case the control valve seizes in the position corresponding to oil supply for gate valve shifting to position “lifting”, the section gate valve will move to position “lifting” after the tractor start-up.
31	Unacceptably low level of supply voltage (below 8V)
32	Unacceptably high level of supply voltage (over 18V)
41	Supply voltage exceeds limiting level (over 45V). At the same time, central gate valve of distributor section inadvertently returns to “neutral” position. Control from handles is not possible. Fault code is indicated at all sections regardless of presence (absence) of the control signal
42	Value of current at the control valve is out of the permissible or expected range. At the same time, section gate valve is always at “neutral” position. Control from handles is not possible. A code is indicated at faulty sections with the control signal on
43	Fault of gate valve position inductive sensor. Fault code is indicated only at faulty section of the distributor immediately after the energization
44	Control valve is open at the system start-up. At the same time, central gate valve moves to the open channel position
81	Gate valve of distributing section moves back to neutral position. At the same time, the control from handles is not possible. Central gate valve is stuck at “lifting”, “lowering” or “floating” position. With the faults above, code “24” is indicated one time and then code “81” shows permanently
82	Central gate valve of distributing section is not at “neutral” position from the beginning, or a false signal comes from the sensor. At the same time, the control from joysticks is not possible. Fault code is indicated only at faulty distributing section immediately after the energization The code is indicated only if the gate valve is at “lifting” or “lowering” position from the beginning
83	Logic error in the section memory

Fault codes of EHS distributor, electronic system for electric-hydraulic distributor EHS section control through diagnostic light code of the code indicator located at “EHS Activation” switch

Table 2

Fault code	Possible cause and nature of malfunction
11	Resistance of the oil feed limitation controller for the valve of section No.1 out of the permissible range, or open circuit fault
12	Non-compliance or absence of the signal from handle to controller via section No.1
14	No communication with section No.1. The following light codes may appear at the indicator of section fault codes: 26, 31, 32, 41, 42, 81, 82
21	Resistance of the oil feed limitation controller for the valve of section No.2 out of the permissible range, or open circuit fault
22	Non-compliance or absence of the signal from handle to controller via section No.2
24	No communication with section No.2. The following light codes may appear at the indicator of section fault codes: 26, 31, 32, 41, 42, 81, 82
31	Resistance of the oil feed limitation controller for the valve of section No.3 out of the permissible range, or open circuit fault
32	Non-compliance or absence of the signal from handle to controller via section No.3
34	No communication with section No.3. The following light codes may appear at the indicator of section fault codes: 26, 31, 32, 41, 42, 81, 82
41	Resistance of the oil feed limitation controller for the valve of section No.4 out of the permissible range, or open circuit fault
42	Non-compliance or absence of the signal from joystick to controller via section No.4
44	No communication with section No.4. The following light codes may appear at the indicator of section fault codes: 26, 31, 32, 41, 42, 81, 82
72	Supply voltage out of the permissible range (7□Un□18) V. The system gets blocked
77	Temperature of oil passing through integral unit section exceeds 100 °C

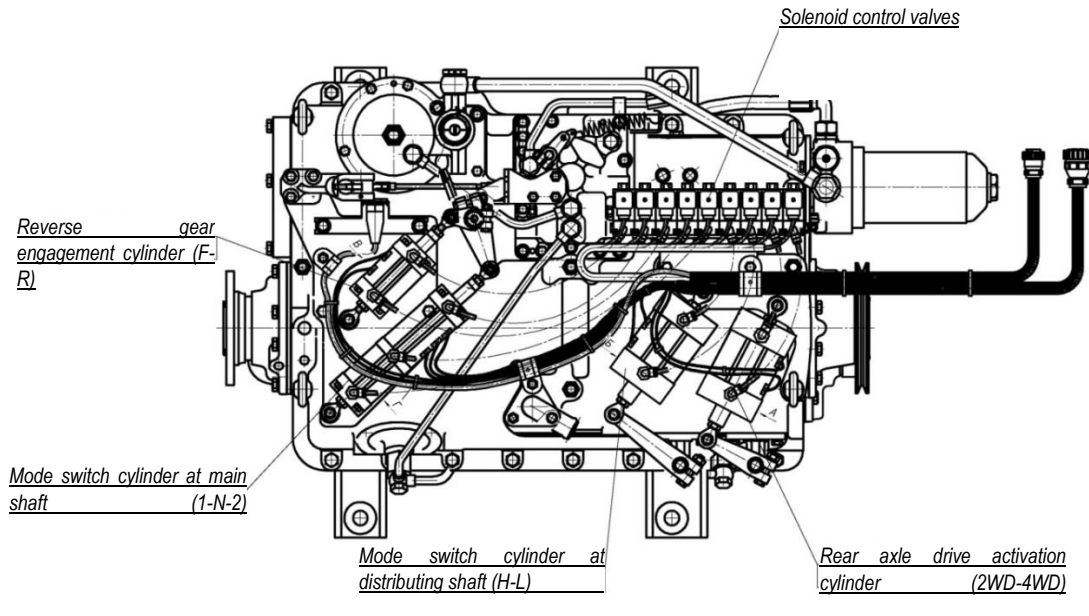
Wiring diagram of hydraulic distributor section control system (EHS)



GB PNEUMATIC CHANGEOVER

PNEUMATIC CHANGEOVER STRUCTURE

GB operation modes shall be changed over with the help of 4 air-actuated cylinders installed at upper section of the case (see the figure). Pneumatic cylinders F-R - 1-N-2 can be controlled only when the gear change lever is in "T" position (synchronizing brakes are on).



OPERATING PRINCIPLE

Controls

- (1), (2), (3), (4) – mode switches;
- (5) – shifter lever;
- (6) – abnormal engine startup switch;
- (7) – fixation button



Gears are changed by the lever via cable drive. Lever (5) shall be shifted to position "T" (synchronizing brakes are on) only with retainer 7 pressed.

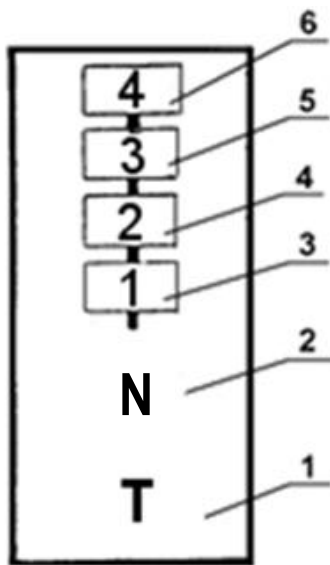
To switch to 1st gear from position NEUTRAL GEAR, depress the drain pedal. Switching from 1st to 4th gear and from 4th to 1st is done with the drain pedal lowered.

Switching from first gear to NEUTRAL GEAR is possible only with drain pedal depressed.

If the drain pedal is pressed while at 2nd, 3rd and 4th gear, the pedal will get blocked in pressed state and can return to the initial position only with 1st gear or NEUTRAL engaged.

Modes are changed over by application of electric signal from the controls to corresponding solenoid-operated pneumatic valves which, in turn, are channeling air inside pneumatic cylinders cavities, setting into motion their stems linked to GB mode switching levers.

Engaged condition is displayed at indication module as a result of triggering of magnetic contacts for pneumatic cylinder stems positioning.



Layout of gear change lever positions

- (1) – Synchronizing brakes are on, "T" position
- (2) – neutral "N"; (3) – 1st gear; (4) – 2nd gear; (5) – 3rd gear; (6) – 4th gear

INTERLOCKS

Unless synchronizing brakes are on (lever (5) is not engaged at "T" position (see the Diagram of gear change lever positions)), it is impossible to switch on any modes except 2WD, 4WD.

Reverse movement ("R") can be switched on only from NEUTRAL GEAR ("N") at main shaft.

With reverse movement on, it is impossible to switch to the first and second modes at main shaft ("1" and "2").

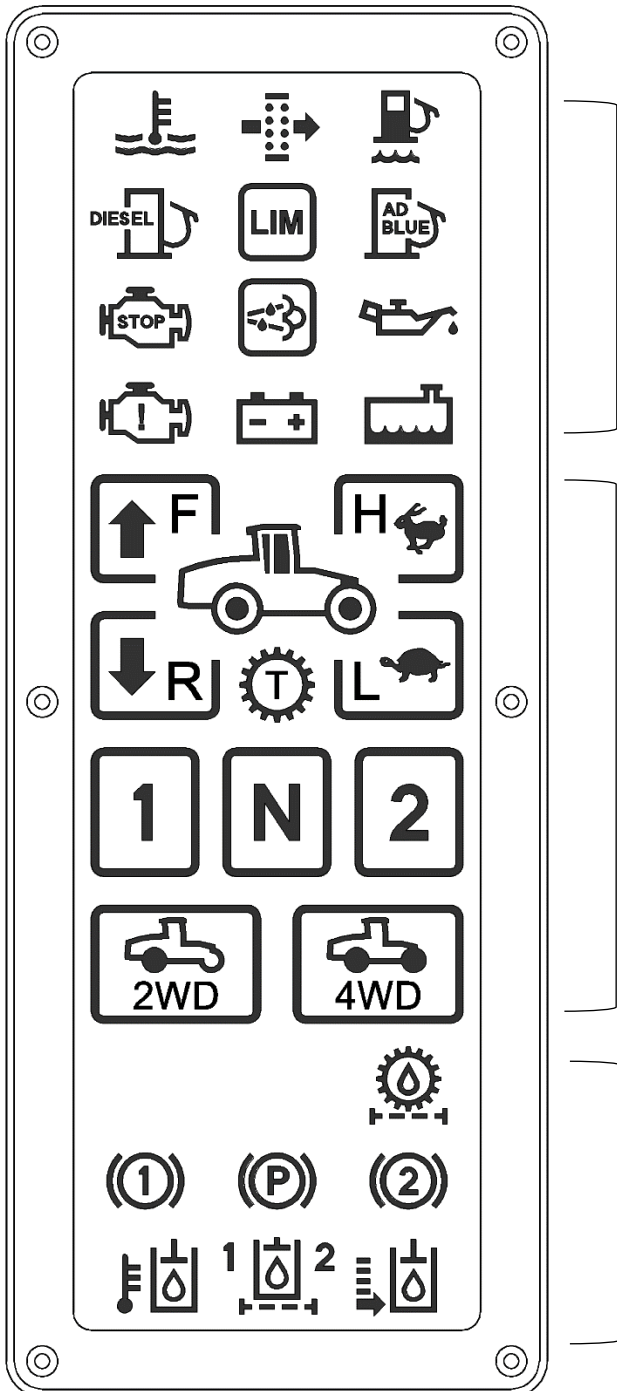
Engine start is possible only at NEUTRAL GEAR of modes ("N") and at mode "F" (forward).

INDICATION PANEL

An electronic display located at right pillar casing in the cabin is to indicate the engagement of couplings of GB operation modes and controlled states of other tractor systems.

The tractor indication panel is divided into 3 zones:

- **Zone 1** – indication of emergency engine parameters
- **Zone 2** – indication of control over pneumatic changeover of GB modes
- **Zone 3** – indication of operating and emergency parameters of pneumatic and hydraulic systems



Zone 1

Indication of emergency engine parameters

Zone 2

Indication of control over pneumatic changeover of GB modes

Zone 3

Indication of operating and emergency parameters of pneumatic and hydraulic systems

Zone 1 Indication of emergency engine parameters

<u>Symbols for indication of emergency engine parameters</u>	
	<u>engine parameters</u>
	1. Critical temperature of cooling fluid (red)
	2. Engine air filter is clogged (yellow)
	3. Water in fuel (yellow)
	4. Low fuel level (yellow)
	5. Limitation of engine speed (yellow)
	6. Low carbamide level (blue)
	7. Engine must be shut down (red)
	8. Carbamide injection (yellow)
	9. Critical engine oil pressure (red)
	10. Parameters of engine systems must be checked (yellow)
	11. Battery charge (red)
	12. Low cooling fluid level (yellow)

Zone 2 Indication of control over pneumatic changeover of GB modes

<u>Symbols for indication of control over pneumatic changeover of GB modes</u>	
	<u>Symbols for indication of control over pneumatic changeover of GB modes</u>
	1. Forward running ("F") (green)
	2. High mode ("H") (green)
	3. Reverse running ("R") (green)
	4. Synchronizing brakes are on ("T") (yellow)
	5. Low mode ("L") (green)
	6. Mode 1 ("1") (green)
	7. Neutral of modes ("N") (green)
	8. Mode 2 ("2") (green)
	9. Forward drive engaged ("2WD") (green)
	10. Four-wheel drive engaged ("4WD") (green)

Zone 3 (indication of operating and emergency parameters of pneumatic and hydraulic systems)

	<u>Symbols for indication of operating and emergency parameters of pneumatic and hydraulic systems</u> 1. GB filter is clogged (red) 2. Emergency pressure in 1st circuit of the pneumatic system (red) 3. Parking brake is pulled up (red) 4. Emergency pressure in 2nd circuit of the pneumatic system (red) 5. Critical temperature of oil in the hydraulic system (red) 6. Drain filter of the working equipment hydraulic system is clogged (red) 7. Drain filter of the steering control hydraulic system is clogged (red) 8. Critical oil level in the hydraulic system (red)
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ENGINE START-UP

Make sure that the controls are in the initial condition:

- switch (1) – at “N” (NEUTRAL) position; mid-position;
- switch (3) – at “F” position (forward);
- lever (5) – at “H” position (NEUTRAL);
- switches (2) and (4) can be at any position, e.g., switch (2) - at “L” position (low mode), switch (4) - “2WD” position (rear axle is disengaged).



CAUTION!

Make sure that there are no obstacles in the direction of planned driving.

Push horn, turn the ignition key to position STARTER and start the engine. Let the engine work on idle for engine lubrication system to fill and engine to warm up to the operating temperature.

1 Forward running

Make sure there are no obstacles along the way.

Push horn.

Move lever (5) to “T” position. The lever can be moved to “T” position only with shifter button 7 pressed in advance. The lever can be returned without pressing fixation button 7.

Activate the required mode by moving switch (1) to position "1" or "2". When the mode is activated the corresponding symbol will be illuminated at the indication panel.

If mode switching is hindered, turn the steering wheel to the right and left at a small angle.

Move lever (5) from "T" position to "H" position.

Depress the drain pedal and get into the 1st gear by moving lever (5) to position "1".

Disengage the parking brake.

Smoothly release the drain pedal and perform tractor take-off.

Further gear switching shall be performed sequentially forward as per the diagram of gear change lever positions.

The speed shall be controlled with gas pedal.

2 Stoppage

Smoothly brake the tractor before its stoppage.

Move lever (5) to the 1st gear position, depress the drain pedal, move lever (5) to "H" position, release the drain pedal.

By braking the tractor with service brakes, get it to a full stop.

Move lever (5) to "T" position (**ONLY AFTER COMPLETE STOP OF THE TRACTOR!**). In case of emergent stop of the tractor it is allowed to simultaneously push the brake and drain pedals, followed by moving lever (5) to "T" position with both pedals pushed and tractor at full stop.

Release the drain pedal.

Move switch (1) to "N" position (mid-position). "N" symbol will be illuminated at the indication module. Move lever (5) to "H" position.

Pull up the parking brake.

3 Forward running at other modes

Forward moving as per i. 1 can be done at higher speed by shifting switch (1) to position "2" or switch (2) to position "H".

4 Reverse running

Stop the tractor as per i. 2. Move lever (5) to "T" position (**ONLY AFTER COMPLETE STOP OF THE TRACTOR!**).

Shift switch (3) to "R" position. When the mode is activated the "R" symbol will be illuminated at the indication module.

Push the horn and make sure there are no obstacles for reverse running.

Press the drain pedal. Move lever (5) to the 1st gear position, disengage parking brake and smoothly release the pedal and start moving in reverse.

NOTE. You can increase the reverse running speed by moving lever (5) to position "2", "3" or "4", or shifting switch (2) to position "H".

5 Stoppage after reverse running

Stop the tractor as per i. 2.

Depress the drain pedal, move the gear change lever to end back position "T". "T" symbol will be illuminated at the indication module and buzzer will be activated.

Shift switch 3 to "F" position (when this mode is activated "R" symbol will fade and "F" symbol will light up).

Move lever (5) to "H" position.

Pull up the parking brake.



CAUTION! Use the "T" position of the gear change lever (synchronizing brakes are on) only when changing over the modes. Long-term parking of the tractor braked by small brakes with engine in operation is forbidden. A sound signal will go off after 10 s of "small brakes" position activation with engine in operation.

6 Rear axle engagement

Rear axle shall be engaged by pressing and holding switch (4) in "4WD" position until "4WD" symbol lights up at the indication module.

Rear axle shall be disengaged by pressing the switch to "2WD" position.

NOTE. Contrary to other modes, the rear axle can be engaged and disengaged when the tractor travels.

7 Engine shutdown

Engine can be shut down after the tractor stoppage (see i.2).

To this end:

- **for tractors with Mercedes engine**, turn the ignition key to position OFF;
- **for tractors with YaMZ and TMZ engines**, pull the engine shutdown handle ALL THE WAY IN.

If the engine was operating at a high speed, before the shutdown it shall work at idle for 2 or 3 minutes to allow turbocharger decelerating to the minimum speed and engine temperature stabilizing. This measure will increase the service life of turbocharger.

8 Engine startup in abnormal situation

If the tractor engine shuts down at a mode engaged and there is no (or insufficient) air pressure in receiver cylinders, an abnormal situation occurs when it becomes impossible to start up the engine (no NEUTRAL of modes at main shaft). When this is the case, start up the engine as follows:

- shift gear change lever (5) to position "T";

- push horn;
- press switch (6) and, with the switch pressed, turn the ignition key to position STARTER;
- after engine start-up and when air pressure of at least 6 bar is established, shift switch (1) to "N" position (mid-position) and gear change lever (5) - to "H" position.



CAUTION! Modes 1 – N – 2, F – R, L – H shall be changed over only when the tractor is standing still and the gear change lever is in "T" position.



CAUTION! For the avoidance of GB breakdown, **IT IS PROHIBITED** to transfer the gear change lever into position ENGAGEMENT OF SYNCHRONIZING BRAKES when tractor is driving.



CAUTION! In case of oil pressure jump or fall in GB, **IMMEDIATELY** stop operation of the tractor and check the pressure using a mechanical instrument (pressure gauge).

List of electric equipment elements and diagram of electric equipment for GB pneumatic changeover system see below.

IMPORTANT: Turn the steering wheel to the right and left at a small angle for facilitation of mode switchover as well as for rear axle engagement with the tractor stopped.

LIST OF COMPONENTS
of the electric equipment for GB pneumatic changeover system

<i>Zone</i>	<i>Pos. designation</i>	<i>Name</i>	<i>Q- ty</i>	<i>Note</i>
	<i>D1...D4</i>	<i>Diode KD243B UZh3.362.036TU</i>	<i>4</i>	
	<i>HG1</i>	<i>Indication panel 7Kh3PU-3-3799 150</i>	<i>1</i>	
	<i>K16...</i>	<i>Relay 753.3777-01 TU 37.003.14 18-94</i>		
	<i>K26</i>		<i>11</i>	
	<i>SA9</i>	<i>Switch F5.3709.011-418</i>	<i>1</i>	<i>Plant Kopir</i>
	<i>SA10</i>	<i>Switch F5.3709.011-416</i>	<i>1</i>	<i>Plant Kopir</i>
	<i>SA 11</i>	<i>Switch F5.3709.011-X 17</i>	<i>1</i>	<i>Plant Kopir</i>
	<i>SA 12</i>	<i>Switch F5.3709.011-419</i>	<i>1</i>	<i>Plant Kopir</i>
	<i>3B1</i>	<i>Push-button switch 28223710</i>		
		<i>TU 37.003.911-79</i>	<i>1</i>	
	<i>SQO...</i>	<i>Position sensor SUA 70-1303-24 14</i>		
	<i>SQ8</i>		<i>9</i>	
	<i>SQ9</i>	<i>Inductive sensor ISN F2A-31N-4-L</i>	<i>1</i>	
	<i>V1</i>	<i>Diode assembly 702MB-37 99 650-4</i>	<i>1</i>	
	<i>V2</i>	<i>Diode assembly 744P-37 17 640-3</i>	<i>1</i>	
	<i>V3</i>	<i>Diode assembly 744P-37 17 650-3</i>	<i>1</i>	
		<i>Pin contact blocks OST 37.003.032-78</i>		
	<i>XP20, XP27</i>	<i>502601</i>	<i>2</i>	

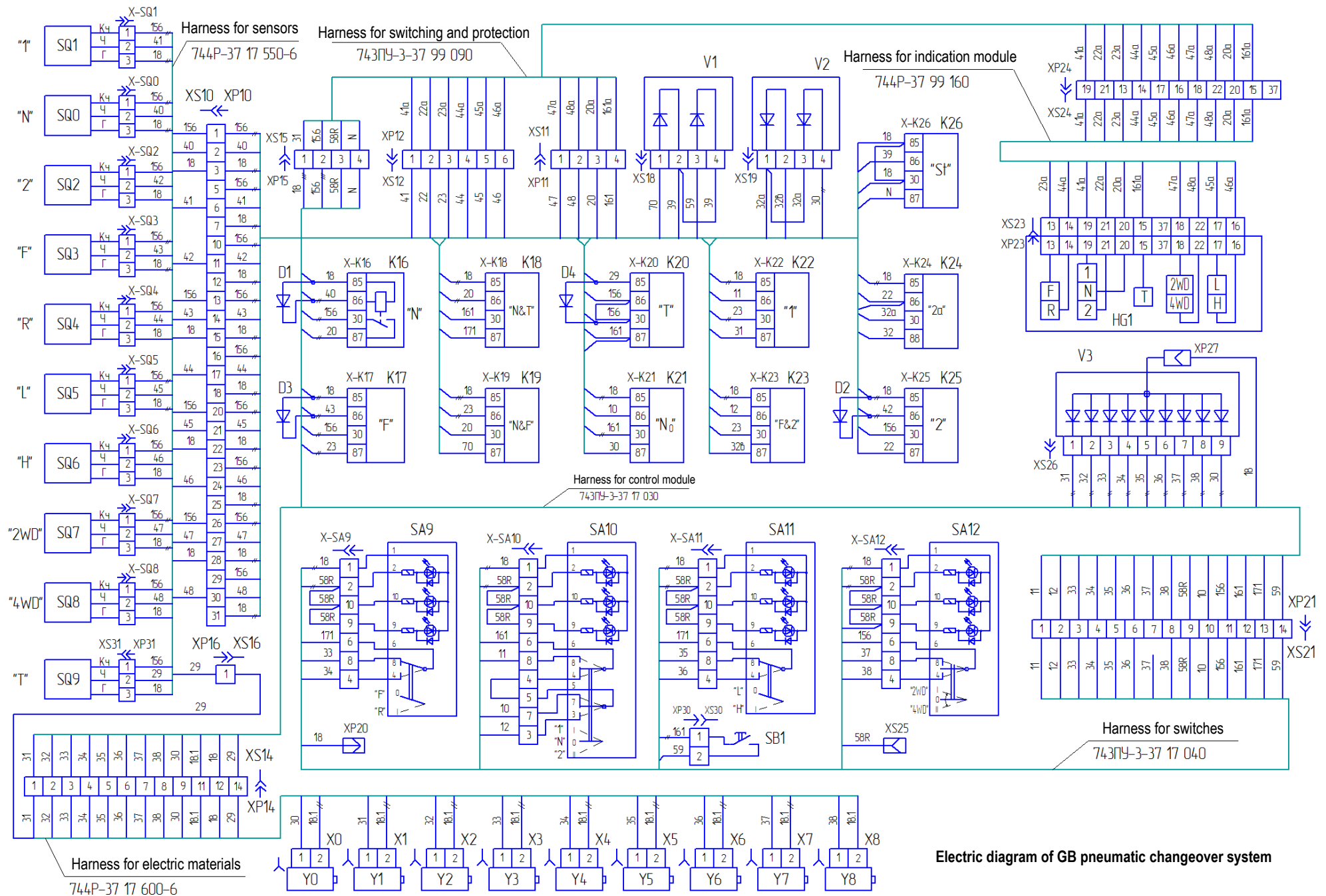
<i>Zone</i>	<i>Pos. designation</i>	<i>Name</i>	<i>Q- ty</i>	<i>Note</i>
	<i>XP30</i>	<i>502602</i>	<i>1</i>	
	<i>XP11</i>	<i>50260X</i>	<i>3</i>	
	<i>XP18, XP19</i>			

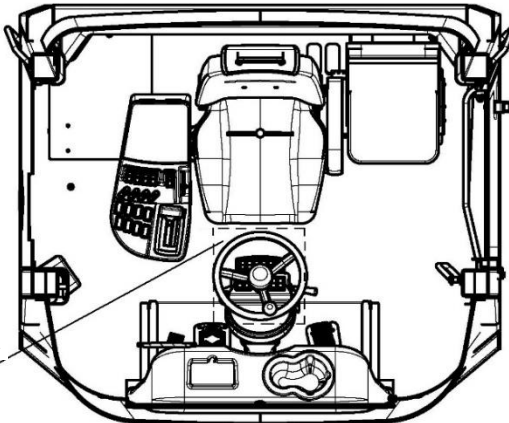
<i>Zone</i>	<i>Pos. designation</i>	<i>Name</i>	<i>Q- ty</i>	<i>Note</i>
		<i>Pin contact blocks AMR</i>		
	<i>XP10</i>	<i>206151-1</i>	<i>1</i>	
	<i>XP14, XP21</i>	<i>206044-1</i>	<i>2</i>	
	<i>XP15</i>	<i>182651-1</i>	<i>1</i>	
	<i>XP16</i>	<i>282105-1</i>	<i>1</i>	
	<i>XP26</i>	<i>1-480586-0</i>	<i>1</i>	
	<i>XP31</i>	<i>282 105-1</i>	<i>1</i>	<i>Super seal</i>
		<i>Receptacles OST 37.003.032-78</i>		
	<i>XS25,</i>	<i>602601</i>		
	<i>XS27</i>			
	<i>XS30</i>	<i>602602</i>	<i>1</i>	
	<i>XS18,</i>	<i>602604</i>	<i>2</i>	
	<i>XS19</i>			
	<i>XS12</i>	<i>602606</i>	<i>1</i>	
	<i>X-K16...</i>	<i>617605</i>	<i>11</i>	
	<i>X-K26</i>			

<i>Zone</i>	<i>Pos. designation</i>	<i>Name</i>	<i>Q- ty</i>	<i>Note</i>
		<i>Receptacles AMP</i>		
	<i>XS10</i>	<i>206150-1</i>	<i>1</i>	
	<i>XP14, XS21</i>	<i>206043-1</i>	<i>2</i>	

[illegible]

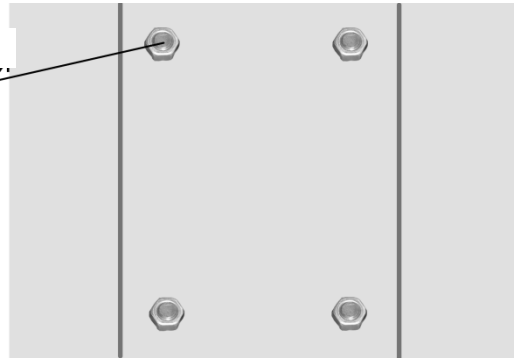
<i>Zone</i>	<i>Pos. designation</i>	<i>Name</i>	<i>Q- ty</i>	<i>Note</i>



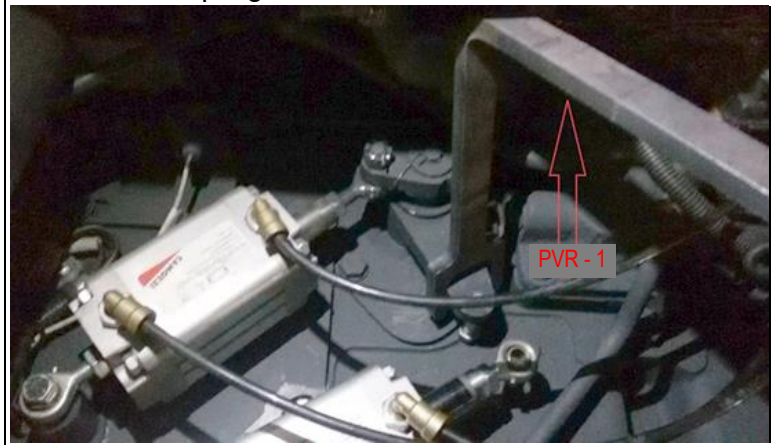
Possible faults of GB pneumatic changeover system	
Fault, failure indications	Reason, troubleshooting
Modes can't be switched, "T" letter is not lit at synchronizing brakes activation mode.	SMALL BRAKES NEUTRAL position sensor failed. Adjust the sensor or change it with a new one.
Fail to switch GB to neutral "N" from "2" mode. Flashing of sectors at number "2".	"2" SQ2 mode sensor failure Bring magnet close to the sensor. If there is no reaction (LED lamp is not lit), change it with a sensor from the SPTA kit.
Fail to switch GB to neutral "N" from "2" mode. All three LED lamps at cylinder 1-N-2 are lit. □30 Ohm between "frame" and negative wire.	Poor contact at power socket, contact oxidation. Clean up the contacts at 4-pin power socket.
When attempting to switch from "1" mode to neutral "N" mode, GB switches to "2" and vice versa, from "2" mode to "1" (no "neutral" mode). Letter "N" doesn't light up.	No voltage supply to "NEUTRAL OF MODES" solenoid due to poor connection at solenoid connector. Press and screw the solenoid connector under the cabin all the way in.
Failure of the tractor stopped for engagement of another mode with the forward running mode on.	1. Set the implement to the transport position. 2. Keep moving to the parking area with the forward running mode engaged.
Failure of the tractor stopped for engagement of the forward running mode with the reverse running mode on.	1. Stop the engine. 2. Cut out a part of the carpet on the cabin floor, which is marked by intermittent incisions.  The diagram shows a top-down view of the tractor's cabin interior. A dashed rectangular line on the floor indicates the 'Carpet cutout area'. The area is located in the front-left corner of the cabin, near the driver's seat and the control panel. The label 'Carpet cutout area' is positioned to the left of the dashed line, with a leader line pointing to it.

3. Take off the cut out part, undo 4 bolts and take off the hatch cover to provide the access to the pneumatic cylinders for forward and reverse running activation.

Hatch cover bolts



4. Disconnect stems of the pneumatic cylinders for forward and reverse running activation from levers B and A of the main shaft couplings control drive.



5. Disengage the reverse running with the use of PVR-1 key by turning lever A counter-clockwise to a fixed position.



6. Pull up the parking brake.

7. To check the neutral of modes, start up the engine and make sure of the stoppage by engaging the first gear.

8. Shift lever 5 (fig. 4) to position "T".



9. Engage a low mode with the use of PVR-1 key by turning lever B counter-clockwise to the fixed position III.



10. Do not switch modes at distributing shaft.

11. Close the hatch and start driving.

When it's impossible to disengage reverse running with the engine stopped the engine shall be started up as follows:

Move lever 5 to position "T" (NEUTRAL MODE WITH SMALL BRAKES), press button 6 (located on the right side surface of the control rack - fig. 4 of the Appendix to Manual) and turn the ignition switch to position STARTER with the button pressed.



Having started up the engine, disengage the reverse running with the use of PVR-1 key by turning lever A counter-clockwise to a fixed position.

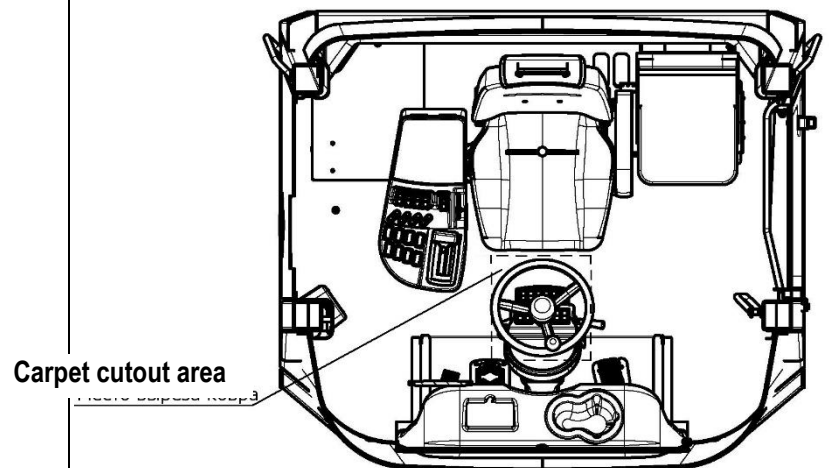


Then proceed as per items 7...11.

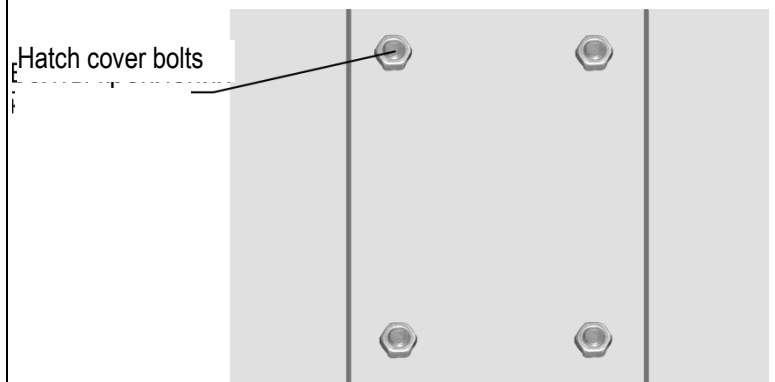
Failure of the tractor stopped for engagement of the forward or reverse running mode with the neutral of modes on.

1. Stop the engine.

2. Cut out a part of the carpet on the cabin floor, which is marked by intermittent incisions.



3. Take off the cut out part, undo 4 bolts and take off the hatch cover to provide the access to the pneumatic cylinders for forward and reverse running activation.



4. Disconnect stems of the pneumatic cylinders for engagement of the main shaft couplings control drive, the one in front of lever B.



5. Pull up the parking brake.

6. Start the engine.

7. Move lever 5 (fig. 4) to "T" position.

8. Engage a low mode with the use of PVR-1 key by turning lever B counter-clockwise to the fixed position III.



9. Do not switch modes at distributing shaft.

10. Close the hatch and start driving.

OM470LA ENGINE ELECTRONIC CONTROL SYSTEM. ERROR CODES

Color	Description
	relevant for vehicles with Daimler Transmission (Tier4 Powerpack) only
	relevant for EU6 vehicles only

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
70	2	460002	Park Brake Status Not Plausible (Vehicle Moving)	Check J1939 link connection to Park Brake Switch Check Parameter 13/28 (Park Brake Switch Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
70	13	46000D	J1939 Park Brake Switch Signal from Source CCVS1, CCVS2 or CCVS3 is missing or not available = SNA (signal not available)	Check J1939 link connection to Park Brake Switch Check Parameter 13/28 (Park Brake Switch Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	ON	OFF	OFF	
70	19	460013	J1939 Park Brake Switch Signal from Source CCVS1, CCVS2 or CCVS3 is erratic = undefined value but not SNA	Check J1939 link connection to Park Brake Switch Check Parameter 13/28 (Park Brake Switch Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	ON	OFF	OFF	
84	0	540000	Vehicle Speed above programmable Threshold #1. This is not a system failure/fault.	This is an information-only fault. It indicates the vehicle is above a programmable threshold. Check Parameter 08/23 (vss driving diagnostic limit).	ON	OFF	OFF	
84	2	540002	Vehicle Speed Signal lost	Unexpected Loss of hard-wired Vehicle Speed signal. Check wiring of associated pin and cables.	OFF	OFF	OFF	Pin 3/13
84	3	540003	Vehicle Speed Sensor Circuit shorted to Ubat	Check wiring of associated pin	ON	OFF	OFF	Pin 3/13
84	4	540004	Vehicle Speed Sensor Circuit shorted to GND	Check wiring of associated pin	ON	OFF	OFF	Pin 3/13
84	5	540005	Vehicle Speed Sensor open Circuit (broken wire, terminal floating)	Check wiring of associated pins	ON	OFF	OFF	Pin 3/13 (Supply) Pin 3/02 (GND)
84	6	540006	Vehicle Speed Sensor Anti-Tamper Detection via ABS Vehicle Speed Comparison (ABS speed and Vehicle Speed Sensor are not consistent)	Check wiring of ABS Module and VSS (Pin 3/13). Check max. Parameter 40/01(ABS Diff Thresh Veh Speed).	ON	OFF	OFF	Pin 3/13
84	7	540007	Hall effect Vehicle Speed Sensor wiring mismatch, rationality fault	Check wiring of hall effect Vehicle Speed Sensor	ON	OFF	OFF	
84	11	54000B	Vehicle Speed above programmable Threshold #2. This is not a system failure/fault.	This is an information-only fault. It indicates the vehicle is above a programmable threshold. Check Parameter 08/15 (vss absolute diagnostic limit).	ON	OFF	OFF	
84	13	54000D	J1939 Wheel-Based Vehicle Speed Signal from Source CCVS1, CCVS2 or CCVS3 is missing or not available = SNA (signal not available)	Check J1939 link connection to Wheel-Based Vehicle Speed Sensor Check Parameter 08/13 (Vehicle Speed Sensor) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
84	14	54000E	Hall effect Vehicle Speed Sensor supply voltage out of range	Check wiring of hall effect Vehicle Speed Sensor	ON	OFF	OFF	
84	19	540013	J1939 Wheel-Based Vehicle Speed Signal from Source CCVS1, CCVS2 or CCVS3 is erratic = undefined value but not SNA	Check J1939 link connection to Wheel-Based Vehicle Speed Sensor Check Parameter 08/13 (Vehicle Speed Sensor) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
84	20	540014	Vehicle Speed Sensor Drifted High Error (VSS signal not plausible)	Check wiring of associated pin	ON	OFF	OFF	Pin 3/13
84	21	540015	Vehicle Speed failure (VSS Signal Not Plausible)	Check wiring of associated pin	ON	OFF	OFF	Pin 3/13

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
91	0	5B0000	Accelerator Pedal Circuit shorted to Ubat	Check wiring of associated pins	ON	OFF	OFF	Pin 1/07 (Supply) Pin 1/04 (GND)
91	2	5B0002	Accelerator Pedal out of adjustment (Learn error)	Check wiring and calibration; Restart learning routine (chapter 7.4, routines 1 to 3)	ON	OFF	OFF	Pin 1/07
91	4	5B0004	Accelerator Pedal Circuit shorted to GND	Check wiring of associated pins	ON	OFF	OFF	Pin 1/07 (Supply) Pin 1/04 (GND)
91	7	5B0007	2-Channel Accelerator Pedal Idle Not Recognized (idle area not evaluated)	Check wiring of associated pins. Check Idle Position	ON	OFF	OFF	Pin 1/03 Pin 1/04 Pin 1/06 Pin 1/07
91	8	5B0008	2-Channel Accelerator Pedal Signal 1 missing	Check wiring of associated pins	ON	OFF	OFF	Pin 1/03
91	10	5B000A	Throttle pedal rationality check failed	Rationality check routine for throttle pedal position: If current throttle pedal value is above a certain calibratable value (i.e. 10%) while service brake is actuated in conjunction with a real strong vehicle deceleration, throttle pedal position is recognized as erroneous and a fault will be logged. The position furthermore is ramped down to 0%. As soon as original pedal position is back again to 0% the fault is deactivated.	OFF	OFF	OFF	
91	13	5B000D	J1939 EEC2 message is missing or not available	Check J1939 link connection and devices: Turbocharger	ON	OFF	OFF	
91	14	5B000E	2-Channel Accelerator Pedal Not Learned	Start learning routine (chapter 7.4, routines 1 to 3): – Accelerator Pedal Learning: Start – Accelerator Pedal Learning: Stop – Accelerator Pedal Learning: Request Results Status	ON	OFF	OFF	Pin 1/03 Pin 1/04 Pin 1/06 Pin 1/07
91	31	5B001F	2-Channel Accelerator Pedal Learned Range to Large	Check wiring and calibration; Restart learning routine (chapter 7.4, routines 1 to 3): – Accelerator Pedal Learning: Start – Accelerator Pedal Learning: Stop – Accelerator Pedal Learning: Request Results Status	ON	OFF	OFF	Pin 1/03 Pin 1/04 Pin 1/06 Pin 1/07
96	13	60000D	Fuel Level Sensor Missing or Not Available	Check CPC4 PT-CAN link connection. Check MCM functionality / PT-CAN link connection. Check J1939 CAN message PGN 65276 (Dash Display) and according ECU (e. g. Dashboard)	OFF	OFF	OFF	
96	19	600013	Fuel Level Sensor Received Network Data in Error	Check CPC4 PT-CAN link connection. Check MCM functionality / PT-CAN link connection. Check J1939 CAN message PGN 65276 (Dash Display) and according ECU (e. g. Dashboard)	OFF	OFF	OFF	
107	0	6B0000	Air Filter Restriction High	Check air cleaner for restriction. Perform pressure check/visual inspection of plugged inlet air filters, charge air cooler leaks or restriction, leaking or plugged intake manifold, exhaust leaks/plugging. Replace Air filter and delete fault code memory via service tool or instrument cluster if supported.	OFF	OFF	OFF	
107	2	6B0002	Air Filter Sensor plausibility error	Check wiring of associated pin Check parameter 13/11 (3 01 AI Selection) for correct configuration of input pin 3/01 Check air cleaner for restriction. Perform pressure check/visual inspection of plugged inlet air filters, charge air cooler leaks or restriction, leaking or plugged intake manifold, exhaust leaks/plugging. Replace Air filter and delete fault code memory via service tool or instrument cluster if supported.	ON	OFF	OFF	Pin 3/01
107	3	6B0003	Air Filter diff.-pressure Sensor or switch shorted to Ubat	Check wiring of associated pin Check parameter 13/11 (3 01 AI Selection) for correct configuration of input pin 3/01 Check air cleaner for restriction. Perform pressure check/visual inspection of plugged inlet air filters, charge air cooler leaks or restriction, leaking or plugged intake manifold, exhaust leaks/plugging. Replace Air filter and delete fault code memory via service tool or instrument cluster if supported.	ON	OFF	OFF	Pin 3/01

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
107	4	6B0004	Air Filter diff.-pressure Sensor or switch shorted to GND	Check wiring of associated pin Check parameter 13/11 (3 01 AI Selection) for correct configuration of input pin 3/01 Check air cleaner for restriction. Perform pressure check/visual inspection of plugged inlet air filters, charge air cooler leaks or restriction, leaking or plugged intake manifold, exhaust leaks/plugging. Replace Air filter and delete fault code memory via service tool or instrument cluster if supported.	ON	OFF	OFF	Pin 3/01
111	1	6F0001	Coolant Level below safe operating level – (SEL Condition)	Check coolant level in reservoir. If coolant level is not within limit, refill coolant to proper level. If it is within proper level, change coolant level sensor. Check coolant leak at cylinder head gasket, coolant leak at air compressor head gasket, external coolant leak at hose connections, coolant in oil, lose or faulty radiator cap, heating system for leaks.	ON	ON	OFF	
111	3	6F0003	Coolant Level Circuit shorted to Ubat	Check wiring of associated pins	ON	OFF	OFF	Pin 3/02 (GND) Pin 3/11 (Supply)
111	4	6F0004	Coolant Level Sensor Circuit Failed Low	Check wiring of associated pins	ON	OFF	OFF	Pin 3/02 (GND) Pin 3/11 (Supply)
111	6	6F0006	Coolant Level Sensor Circuit shorted to GND	Check wiring of associated pins	ON	OFF	OFF	Pin 3/02 (GND) Pin 3/11 (Supply)
111	13	6F000D	Coolant Level Sensor Data not received or Data not available (SNA)	Check coolant level sending data / device on Network	ON	OFF	OFF	
111	18	6F0012	Coolant Level below operating level (pre-warning condition)	Check coolant level in reservoir. If coolant level is not within limit, refill coolant to proper level. If it is within proper level, change coolant level sensor. Check coolant leak at cylinder head gasket, coolant leak at air compressor head gasket, external coolant leak at hose connections, coolant in oil, lose or faulty radiator cap, heating system for leaks.	ON	OFF	OFF	
111	19	6F0013	Coolant Level Sensor Received Data in Error Range	Check coolant level sending data / device on Network	ON	OFF	OFF	
120	13	78000D	J1939 Retarder Fluid Message is missing or not available (J1939 Cabin Message is missing or not available?)	Check J1939 link connection to transmission retarder	OFF	OFF	OFF	
158	2	9E0002	KL15 ignition switch status of CPC and MCM do not match.	Check KL15 wiring at Pin 2/03	ON	OFF	OFF	Pin 2/03
168	0	A80000	Battery Voltage High	Check Voltage KL15 and KL30 (Fault Condition Battery Voltage > 35V) Check wiring of associated pins	ON	OFF	OFF	Pin 2/01 Pin 2/03
168	1	A80001	Battery Voltage Very Low	Check Voltage KL15 and KI30 (Fault Condition Battery Voltage < 9.8V) Check wiring of associated pins If vehicle is equipped with a battery disconnect switch, it must be inspected	ON	OFF	OFF	Pin 2/01 Pin 2/03
168	9	A80009	Main battery connection lost	Check battery main switch and battery wiring (KL30)	ON	OFF	OFF	Pin 2/01 Pin 2/03
168	14	A8000E	ECU powerdown not completed (Main Battery Terminal Possibly Floating)	Check wiring of associated pins If vehicle is equipped with a battery disconnect switch, it must be inspected	OFF	OFF	OFF	Pin 2/01 Pin 2/03
168	18	A80012	Battery Voltage Low	Check Voltage KL15 and KL30 (Fault Condition Battery Voltage < 19.2V) Check wiring of associated pins	ON	OFF	OFF	Pin 2/01 Pin 2/03

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
171	2	AB0002	Ambient Temperature Sensor Data Erratic	Check ambient temperature sensor (wiring and associated pin) Check parameter 31/01 (Ambient Air Temp Sensor Enable) for correct configuration of Ambient Temperature Sensor	ON	OFF	OFF	Pin 3/15
171	3	AB0003	Ambient Temperature Sensor shorted to Ubat	Check ambient temperature sensor (wiring and associated pin) Check parameter 31/01 (Ambient Air Temp Sensor Enable) for correct configuration of Ambient Temperature Sensor	ON	OFF	OFF	Pin 3/15
171	4	AB0004	Ambient Temperature Sensor shorted to GND	Check ambient temperature sensor (wiring and associated pin) Check parameter 31/01 (Ambient Air Temp Sensor Enable) for correct configuration of Ambient Temperature Sensor	ON	OFF	OFF	Pin 3/15
171	19	AB0013	J1939 AMB message has not been received within it's expected time	Check ambient message sending data/ device on Network	ON	OFF	OFF	
191	8	BF0008	Transmission Output Shaft Speed Signal is missing or not available	Check Transmission wiring	OFF	OFF	OFF	
191	9	BF0009	J1939 ETC1 Message is missing or not available	Check J1939 link connection to Transmission Controller / Check if Electronic Transmission Controller is CAN capable	ON	OFF	OFF	
191	13	BF000D	J1939 Transmission Output Shaft Speed Signal is missing or not available = SNA (signal not available)	Check J1939 link connection to Transmission Controller / Check if electronic Transmission Controller is CAN capable	OFF	OFF	OFF	
191	19	BF0013	J1939 Transmission Output Shaft Speed Signal erratic = undefined value but not SNA	Check J1939 link connection to Transmission Controller	OFF	OFF	OFF	
247	0	F70000	MCM Engine Hours Data higher than expected	Check MCM.	OFF	OFF	OFF	
247	1	F70001	MCM Engine Hours Data lower than expected	CPC or MCM. The internal clocks of the CPC or MCM do not match. Check MCM.	OFF	OFF	OFF	
247	9	F70009	MCM Engine Hours Data not received or stopped arriving	Check MCM.	OFF	OFF	OFF	
247	10	F7000A	MCM Engine Hours Data increasing at an implausible rate	CPC or MCM. The internal clocks of the CPC or MCM do not match. Check MCM.	OFF	OFF	OFF	
247	14	F7000E	ACM Reported Ash Mileage is Lower than the CPC Stored Value	Use diagnostic service to clear the ash content value.	ON	OFF	OFF	
523	13	0B020D	J1939 Transmission Current Gear Signal is missing or not available	Check J1939 link connection to Transmission	ON	OFF	OFF	
523	19	0B0213	J1939 Transmission Current Gear Signal is erratic = undefined value but not SNA	Check J1939 link connection to Transmission	OFF	OFF	OFF	
524	9	0C0209	J1939 ETC2 message is missing or not available	Check J1939 link connection to Transmission Controller / Check if Electronic Transmission Controller is CAN capable	ON	OFF	OFF	
525	7	0D0207	Transmission gear selection switch reports internal error.	Check J1939 link connection to Transmission Controller / Check if Electronic Transmission Controller is CAN capable. Check LIN wiring / stalk switch.	ON	OFF	OFF	
525	9	0D0209	J1939 Powertrain Message (transfer case / PTO) is missing	Check wiring of OEM ICU and related J1939 link connection	ON	OFF	OFF	
525	19	0D0213	Transmission gear selection switch reports unplausable engine brake stage requests.	Check J1939 link connection to Transmission Controller / Check if Electronic Transmission Controller is CAN capable. Check LIN wiring / stalk switch.	ON	OFF	OFF	

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
527	9	0F0209	J1939 CCVS is missing or not available	Check J1939 link connection to Cruise Control Check Parameter 13/22 (CC ON OFF Switch Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
556	9	2C0209	J1939 RC Message from Transmission Retarder is missing	Check J1939 link connection to Transmission Retarder. Check if Transmission Retarder is enabled and correct configured, Parameter 55/01. (Trans Ret Number of Stages)	ON	OFF	OFF	
558	2	2E0202	Idle Validation Switch Inputs Reversed.	Check Idle Validation switch wiring	ON	OFF	OFF	Pin 1/03 Pin 1/06
558	3	2E0203	Idle Validation Switch 1 Circuit shorted to Ubat. The two idle switches are not synchronous (check AP)	Check wiring of associated pin Check parameters 35/01 (Selection), 35/20 (Fault Detection) and 35/38 (Configuration) for correct configuration of output pin 1/04 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 13	ON	OFF	OFF	Pin 1/04
558	4	2E0204	Idle Validation Switch 1 Circuit shorted to GND. The two idle switches are not synchronous (check AP)	Check wiring of associated pin Check parameters 35/01 (Selection), 35/20 (Fault Detection) and 35/38 (Configuration) for correct configuration of output pin 1/04 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 13	ON	OFF	OFF	Pin 1/04
558	5	2E0205	Idle Validation Switch 2 Circuit shorted to GND. The two idle switches are not synchronous (check AP)	Check wiring of associated pin Check parameters 35/01 (Selection), 35/20 (Fault Detection) and 35/38 (Configuration) for correct configuration of output pin 1/04 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 13	ON	OFF	OFF	Pin 1/04
558	6	2E0206	Idle Validation Switch 2 Circuit shorted to Ubat. The two idle switches are not synchronous (check AP)	Check wiring of associated pin Check parameters 35/01 (Selection), 35/20 (Fault Detection) and 35/38 (Configuration) for correct configuration of output pin 1/04 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 13	ON	OFF	OFF	Pin 1/04
569	9	390209	J1939 EAC1 Message is missing or not available	Check J1939 link connection to Electronic Axle Control	ON	OFF	OFF	
571	4	3B0204	Engine Brake Disable push-button shorted to Ground or pressed too long	Check wiring of associated pin Check parameters 13/19 (Selection), 13/62 (Fault Detect Ena) for correct configuration of input pin 4/18	ON	OFF	OFF	Pin 4/18
596	13	54020D	J1939 Cruise Control Enable Switch Signal from Source CCVS1, CCVS2 or CCVS3 missing or not available = SNA (signal not available)	Check J1939 link connection to Cruise Control Check Parameter 13/22 (CC ON OFF Switch Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
596	19	540213	J1939 Cruise Control Enable Switch Signal from Source CCVS1, CCVS2 or CCVS3 erratic = undefined value but not SNA	Check J1939 link connection to Cruise Control Check Parameter 13/22 (CC ON OFF Switch Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
597	13	55020D	J1939 Service Brake Switch Signal from Source CCVS1, CCVS2 or CCVS3 missing or not available = SNA (signal not available)	Check J1939 link connection to Cruise Control Check Parameter 13/29 (Service Brake Switch Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
597	19	550213	J1939 Service Brake Switch Signal from Source CCVS1, CCVS2 or CCVS3 erratic = undefined value but not SNA	Check J1939 link connection to Cruise Control Check Parameter 13/29 (Service Brake Switch Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
598	2	560202	Clutch switch status not plausible	Check wiring of Clutch Switch and Driveline Open Status	ON	OFF	OFF	
599	4	570204	Cruise Control SET and RESUME Circuits shorted to GND (SET and RESUME applied at the same time)	Check wiring of associated pins	ON	OFF	OFF	Pin 1/12 Pin 1/16
600	13	58020D	J1939 Cruise Control Coast Switch Signal from Source CCVS1, CCVS2 or CCVS3 missing or not available = SNA (signal not available)	Check J1939 link connection to Cruise Control Check Parameter 13/24 (CC Set Cst Res Accel Sw Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
600	19	580213	J1939 Cruise Control Coast Switch Signal from Source CCVS1, CCVS2 or CCVS3 erratic = undefined value but not SNA	Check J1939 link connection to Cruise Control Check Parameter 13/24 (CC Set Cst Res Accel Sw Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
602	13	5A020D	J1939 Cruise Control Accelerator Switch Signal from Source CCVS1, CCVS2 or CCVS3 = SNA (signal not available)	Check J1939 link connection to Cruise Control Check Parameter 13/24 (CC Set Cst Res Accel Sw Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
602	19	5A0213	J1939 Cruise Control Accelerator Switch from Source CCVS1, CCVS2 or CCVS3 erratic = undefined value but not SNA	Check J1939 link connection to Cruise Control Check Parameter 13/24 (CC Set Cst Res Accel Sw Config) for correct source Check Parameter 01/04 (CC1 Source Address SAE J1939), 01/05 (CC2 Source Address SAE J1939) and 01/06 (CC3 Source Address SAE J1939) for correct Source Address	OFF	OFF	OFF	
609	12	61020C	CPC electronics are defect (EEPROM, CPU...)	Try reprogramming the CPC with the new software release. Replace CPC4 and reprogram with the latest software.	OFF	OFF	OFF	
609	13	61020D	the CPC SW is corrupt (CPC Software Diagnostics)	Source address setting conflict. Messages with more than one source address (e.g. "CM1 Fan Source Addr1", "CM1 Fan Source Addr2", "AIR1 Source Address 1 SAE J1939", "AIR1 Source Address 2 SAE J1939", CC1 Source Address J1939, CC2 Source Address SAE J1939, CC3 Source Address SAE J1939, EBC1 Source Address SAE J1939, ABS Source Address SAE J1939, TSC1 Source Address SAE J1939 has to be parameterized with different addresses. Check calibration for these addresses (PGR 01 "Communication")	OFF	OFF	OFF	
609	16	610210	Internal temperature of CPC4 too high.	Check CPC4 case and cooling measurements. Turn off vehicle.	ON	OFF	OFF	
625	2	710202	PTCAN Incorrect MCM System ID received	MCM Sys ID not valid (MCM initialization not finished). Check MCM.	ON	OFF	ON	
625	8	710208	MCM PT-CAN DM1 Message Not Received or has Stopped Arriving	Check CPC4 PT-CAN link connection. Check MCM functionality / PT-CAN link connection	ON	OFF	ON	
625	9	710209	ACM PT-CAN DM1 Message Not Received or has Stopped Arriving	Check CPC4 PT-CAN link connection. Check ACM functionality / PT-CAN link connection	ON	OFF	ON	

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
625	13	71020D	TCM System ID Not Received or Stopped Arriving (TCM Outage -> Check Translamp)	Check CPC4 PT-CAN link connection. Check TCM functionality / PT-CAN link connection	OFF	OFF	OFF	
625	14	71020E	PTCAN: MCM System ID Not Received or Stopped Arriving (ECAN ID_596/7 not received or it has stopped arriving)	Check PT-CAN link connection. Check MCM functionality / PT-CAN link connection	ON	OFF	ON	
628	2	740202	EEPROM Checksum Failure	Try reprogramming the CPC with the new software release. Reset EEPROM values to default. Redownload CPC parameter set. Replace CPC4 and reprogram with the latest software.	ON	OFF	OFF	
628	14	74020E	XFLASH Static Fault Code Memory Page Read Write Failure (XFLASH Failure.)	Replace CPC4 box due to XFLASH failure and reprogram with the latest software.	OFF	OFF	OFF	
628	17	740211	1000ms ECU OS Task Timed out Prior to Completion. (Indication of a critical resource allocation issue. Task restructuring required.)	Try reprogramming the CPC with the new software release. Replace CPC4 and reprogram with the latest software.	OFF	OFF	OFF	
629	2	750202	CPC Hardware / Software Mismatch (Incorrect Hardware Configuration - NAFTA Vs. EUROPE)	Try reprogramming the CPC with the new software release. Reset EEPROM values to default. Redownload CPC parameter set. Replace CPC4 and reprogram with the latest software.	ON	OFF	OFF	
629	12	75020C	DDEC Data Xflash Write Error. Replace CPC. (XFLASH Failure.)	Try reprogramming the CPC with the new software release. Replace CPC4 and reprogram with the latest software.	OFF	OFF	OFF	
639	13	7F020D	HDMS Fan is configured and the J1939 message was not received or has stopped arriving.	Check J1939 link connection to the air conditioner transducer. Check if CPC4 parameters correct for the vehicle configuration.	OFF	OFF	OFF	
639	14	7F020E	J1939 Data Link Failure (CPC is no longer sending or receiving data from the J1939 link.)	Check J1939 data link connection	ON	OFF	OFF	Pin 2/16 Pin 2/17 Pin 2/18
667	3	9B0203	Starter Pin 1/18 Circuit shorted to Ubat (KL50)	Check KL50 wiring at Pin 1/18	ON	OFF	OFF	Pin 1/18
684	8	AC0208	Maneuver mode request error	Check activation timing or wiring	ON	OFF	OFF	
684	9	AC0209	Rock out mode request error	Check activation timing or wiring	ON	OFF	OFF	
701	3	BD0203	Digital Output 3/07 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/06 (Selection), 35/25 (Fault Detection) and 35/42 (Configuration) for correct configuration of output pin 3/07 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 9	ON	OFF	OFF	Pin 3/07
701	4	BD0204	Digital Output 3/07 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/06 (Selection), 35/25 (Fault Detection) and 35/42 (Configuration) for correct configuration of output pin 3/07 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 9	ON	OFF	OFF	Pin 3/07
701	5	BD0205	Digital Output 3/07 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/06 (Selection), 35/25 (Fault Detection) and 35/42 (Configuration) for correct configuration of output pin 3/07 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 9	ON	OFF	OFF	Pin 3/07

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
702	3	BE0203	Digital Output 3/08 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/07 (Selection), 35/26 (Fault Detection) and 35/43 (Configuration) for correct configuration of output pin 3/08 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 10	ON	OFF	OFF	Pin 3/08
702	4	BE0204	Digital Output 3/08 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/07 (Selection), 35/26 (Fault Detection) and 35/43 (Configuration) for correct configuration of output pin 3/08 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 10	ON	OFF	OFF	Pin 3/08
702	5	BE0205	Digital Output 3/08 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/07 (Selection), 35/26 (Fault Detection) and 35/43 (Configuration) for correct configuration of output pin 3/08 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 10	ON	OFF	OFF	Pin 3/08
703	3	BF0203	Digital Output 3/09 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/08 (Selection), 35/27 (Fault Detection) and 35/44 (Configuration) for correct configuration of output pin 3/09 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 14	ON	OFF	OFF	Pin 3/09
703	4	BF0204	Digital Output 3/09 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/08 (Selection), 35/27 (Fault Detection) and 35/44 (Configuration) for correct configuration of output pin 3/09 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 14	ON	OFF	OFF	Pin 3/09
703	5	BF0205	Digital Output 3/09 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/08 (Selection), 35/27 (Fault Detection) and 35/44 (Configuration) for correct configuration of output pin 3/09 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 14	ON	OFF	OFF	Pin 3/09
704	3	C00203	Digital Output 4/07 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/16 (Selection), 35/35 (Fault Detection) and 35/52 (Configuration) for correct configuration of output pin 4/07 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 15	ON	OFF	OFF	Pin 4/07
704	4	C00204	Digital Output 4/07 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/16 (Selection), 35/35 (Fault Detection) and 35/52 (Configuration) for correct configuration of output pin 4/07 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 15	ON	OFF	OFF	Pin 4/07
704	5	C00205	Digital Output 4/07 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/16 (Selection), 35/35 (Fault Detection) and 35/52 (Configuration) for correct configuration of output pin 4/07 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 15	ON	OFF	OFF	Pin 4/07
705	3	C10203	Digital Output 1/13 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/03 (Selection), 35/22 (Fault Detection) and 35/40 (Configuration) for correct configuration of output pin 1/13 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 1	ON	OFF	OFF	Pin 1/13

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
705	4	C10204	Digital Output 1/13 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/03 (Selection), 35/22 (Fault Detection) and 35/40 (Configuration) for correct configuration of output pin 1/13 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 1	ON	OFF	OFF	Pin 1/13
705	5	C10205	Digital Output 1/13 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/03 (Selection), 35/22 (Fault Detection) and 35/40 (Configuration) for correct configuration of output pin 1/13 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 1	ON	OFF	OFF	Pin 1/13
706	3	C20203	Digital Output 3/10 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/09 (Selection), 35/28 (Fault Detection) and 35/45 (Configuration) for correct configuration of output pin 3/10 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 2	ON	OFF	OFF	Pin 3/10
706	4	C20204	Digital Output 3/10 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/09 (Selection), 35/28 (Fault Detection) and 35/45 (Configuration) for correct configuration of output pin 3/10 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 2	ON	OFF	OFF	Pin 3/10
706	5	C20205	Digital Output 3/10 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/09 (Selection), 35/28 (Fault Detection) and 35/45 (Configuration) for correct configuration of output pin 3/10 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 2	ON	OFF	OFF	Pin 3/10
707	3	C30203	Digital Output 2/10 Circuit shorted to Ubat (CEL / AWL Lamp)	Check wiring of associated pin Check parameters 35/04 (Selection), 35/23 (Fault Detection) and 35/41 (Configuration) for correct configuration of output pin 2/10 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 3	OFF	OFF	OFF	Pin 2/10
707	4	C30204	Digital Output 2/10 Circuit shorted to GND (CEL / AWL Lamp)	Check wiring of associated pin Check parameters 35/04 (Selection), 35/23 (Fault Detection) and 35/41 (Configuration) for correct configuration of output pin 2/10 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 3	OFF	OFF	OFF	Pin 2/10
707	5	C30205	Digital Output 2/10 Open Circuit (broken wire, terminal floating / CEL / AWL Lamp)	Check wiring of associated pin Check parameters 35/04 (Selection), 35/23 (Fault Detection) and 35/41 (Configuration) for correct configuration of output pin 2/10 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 3	OFF	OFF	OFF	Pin 2/10
708	3	C40203	Digital Output 3/12 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/10 (Selection), 35/29 (Fault Detection) and 35/46 (Configuration) for correct configuration of output pin 3/12 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 4	ON	OFF	OFF	Pin 3/12
708	4	C40204	Digital Output 3/12 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/10 (Selection), 35/29 (Fault Detection) and 35/46 (Configuration) for correct configuration of output pin 3/12 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 4	ON	OFF	OFF	Pin 3/12

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
708	5	C40205	Digital Output 3/12 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/10 (Selection), 35/29 (Fault Detection) and 35/46 (Configuration) for correct configuration of output pin 3/12 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 4	ON	OFF	OFF	Pin 3/12
709	3	C50203	Digital Output 3/16 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/11 (Selection), 35/30 (Fault Detection) and 35/47 (Configuration) for correct configuration of output pin 3/16 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 5	ON	OFF	OFF	Pin 3/16
709	4	C50204	Digital Output 3/16 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/11 (Selection), 35/30 (Fault Detection) and 35/47 (Configuration) for correct configuration of output pin 3/16 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 5	ON	OFF	OFF	Pin 3/16
709	5	C50205	Digital Output 3/16 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/11 (Selection), 35/30 (Fault Detection) and 35/47 (Configuration) for correct configuration of output pin 3/16 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 5	ON	OFF	OFF	Pin 3/16
710	3	C60203	Digital Output 4/06 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/15 (Selection), 35/34 (Fault Detection) and 35/51 (Configuration) for correct configuration of output pin 4/06 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 6	ON	OFF	OFF	Pin 4/06
710	4	C60204	Digital Output 4/06 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/15 (Selection), 35/34 (Fault Detection) and 35/51 (Configuration) for correct configuration of output pin 4/06 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 6	ON	OFF	OFF	Pin 4/06
710	5	C60205	Digital Output 4/06 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/15 (Selection), 35/34 (Fault Detection) and 35/51 (Configuration) for correct configuration of output pin 4/06 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 6	ON	OFF	OFF	Pin 4/06
711	3	C70203	Digital Output 1/05 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/02 (Selection), 35/21 (Fault Detection) and 35/39 (Configuration) for correct configuration of output pin 1/05 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 12	ON	OFF	OFF	Pin 1/05
711	4	C70204	Digital Output 1/05 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/02 (Selection), 35/21 (Fault Detection) and 35/39 (Configuration) for correct configuration of output pin 1/05 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 12	ON	OFF	OFF	Pin 1/05
711	5	C70205	Digital Output 1/05 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/02 (Selection), 35/21 (Fault Detection) and 35/39 (Configuration) for correct configuration of output pin 1/05 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 12	ON	OFF	OFF	Pin 1/05

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
712	3	C80203	Digital Output 1/04 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/01 (Selection), 35/20 (Fault Detection) and 35/38 (Configuration) for correct configuration of output pin 1/04 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 13	ON	OFF	OFF	Pin 1/04
712	4	C80204	Digital Output 1/04 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/01 (Selection), 35/20 (Fault Detection) and 35/38 (Configuration) for correct configuration of output pin 1/04 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 13	ON	OFF	OFF	Pin 1/04
712	5	C80205	Digital Output 1/04 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/01 (Selection), 35/20 (Fault Detection) and 35/38 (Configuration) for correct configuration of output pin 1/04 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 13	ON	OFF	OFF	Pin 1/04
714	3	CA0203	Digital Output 4/10 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/18 (Selection), 35/37 (Fault Detection) and 35/54 (Configuration) for correct configuration of output pin 4/10 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 11	ON	OFF	OFF	Pin 4/10
714	4	CA0204	Digital Output 4/10 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/18 (Selection), 35/37 (Fault Detection) and 35/54 (Configuration) for correct configuration of output pin 4/10 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 11	ON	OFF	OFF	Pin 4/10
714	5	CA0205	Digital Output 4/10 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/18 (Selection), 35/37 (Fault Detection) and 35/54 (Configuration) for correct configuration of output pin 4/10 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 11	ON	OFF	OFF	Pin 4/10
715	3	CB0203	Frequency Output 4/12 Circuit shorted to Ubat	Check wiring of associated pin Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software: Start with Signal Parameter 1, Frequency in Hz, Width in %	ON	OFF	OFF	Pin 4/12
715	4	CB0204	Frequency Output 4/12 Circuit shorted to GND	Check wiring of associated pin Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software: Start with Signal Parameter 1, Frequency in Hz, Width in %	ON	OFF	OFF	Pin 4/12
715	5	CB0205	Frequency Output 4/12 Open Circuit (broken wire, terminal floating) (refer to chapter 3.6.6)	Check wiring of associated pin Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software: Start with Signal Parameter 1, Frequency in Hz, Width in %	OFF	OFF	OFF	Pin 4/12
716	3	CC0203	Frequency Output 1/09 Circuit shorted to Ubat	Check wiring of associated pin Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software: Start with Signal Parameter 2, Frequency in Hz, Width in %	ON	OFF	OFF	Pin 1/09
716	4	CC0204	Frequency Output 1/09 Circuit shorted to GND	Check wiring of associated pin Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software: Start with Signal Parameter 2, Frequency in Hz, Width in %	ON	OFF	OFF	Pin 1/09
716	5	CC0205	Frequency Output 1/09 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software: Start with Signal Parameter 2, Frequency in Hz, Width in %	ON	OFF	OFF	Pin 1/09
904	9	880309	J1939 EBC2 Message from ABS is missing or not available = SNA (signal not available)	Check J1939 link connection to the ABS and Devices Brake System Controller	OFF	OFF	OFF	

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
904	13	88030D	J1939 Front Axle Speed Signal is missing or not available = SNA (signal not available)	Check J1939 link connection to Front Axle Speed Sensor	OFF	OFF	OFF	
904	19	880313	J1939 Front Axle Speed Signal is erratic = undefined value but not SNA	Check J1939 link connection to Front Axle Speed Sensor	OFF	OFF	OFF	
924	3	9C0303	Digital Output 4/09 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/17 (Selection), 35/36 (Fault Detection) and 35/53 (Configuration) for correct configuration of output pin 4/09 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 7	ON	OFF	OFF	Pin 4/09
924	4	9C0304	Digital Output 4/09 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/17 (Selection), 35/36 (Fault Detection) and 35/53 (Configuration) for correct configuration of output pin 4/09 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 7	ON	OFF	OFF	Pin 4/09
924	5	9C0305	Digital Output 4/09 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/17 (Selection), 35/36 (Fault Detection) and 35/53 (Configuration) for correct configuration of output pin 4/09 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 7	ON	OFF	OFF	Pin 4/09
925	3	9D0303	Digital Output 3/17 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/12 (Selection), 35/31 (Fault Detection) and 35/48 (Configuration) for correct configuration of output pin 3/17 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 8	ON	OFF	OFF	Pin 3/17
925	4	9D0304	Digital Output 3/17 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/12 (Selection), 35/31 (Fault Detection) and 35/48 (Configuration) for correct configuration of output pin 3/17 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 8	ON	OFF	OFF	Pin 3/17
925	5	9D0305	Digital Output 3/17 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/12 (Selection), 35/31 (Fault Detection) and 35/48 (Configuration) for correct configuration of output pin 3/17 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 8	ON	OFF	OFF	Pin 3/17
926	3	9E0303	Digital Output 4/01 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/13 (Selection), 35/32 (Fault Detection) and 35/49 (Configuration) for correct configuration of output pin 4/01 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 16	ON	OFF	OFF	Pin 4/01
926	4	9E0304	Digital Output 4/01 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/13 (Selection), 35/32 (Fault Detection) and 35/49 (Configuration) for correct configuration of output pin 4/01 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 16	ON	OFF	OFF	Pin 4/01
926	5	9E0305	Digital Output 4/01 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/13 (Selection), 35/32 (Fault Detection) and 35/49 (Configuration) for correct configuration of output pin 4/01 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 16	ON	OFF	OFF	Pin 4/01

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
970	3	CA0303	Engine Aux. Shutdown Input shorted to Ubat	Check wiring of associated pin. Check parameters 13/03 (Selection) and 13/35 (Fault Detection) for correct configuration of input pin 1/01.	ON	OFF	OFF	Pin 1/10
970	4	CA0304	Engine Aux. Shutdown Input shorted to GND	Check wiring of associated pin. Check parameters 13/03 (Selection) and 13/35 (Fault Detection) for correct configuration of input pin 1/01.	ON	OFF	OFF	Pin 1/10
972	2	CC0302	Throttle inhibit switch signal not plausible due to excess vehicle speed	Check wiring of associated pin. Check parameters 13/05 (Selection) and 13/43 (Fault Detection) for correct configuration of input pin 1/17.	ON	OFF	OFF	Pin 1/17
973	2	CD0302	EvoBus 5stage retarder level position not plausible	Check wiring of associated pin. Check parameters 13/08 (Selection) and 13/49 (Fault Detection) for correct configuration of input pin 2/13.	ON	OFF	OFF	Pin 2/13
973	9	CD0309	J1939 EBC1 Message is missing or not available	Check J1939 link connection and Devices Turbocharger. Check Parameter 01/10 (EBC1 Source Address SAE J1939)	ON	OFF	OFF	
973	13	CD030D	J1939 Engine Retarder Selection Signal Missing or not available = SNA (signal not available)	Check J1939 link connection to Engine Retarder	ON	OFF	OFF	
973	19	CD0313	J1939 Engine Retarder Selection Signal erratic = undefined value but not SNA	Check J1939 link connection to Engine Retarder	ON	OFF	OFF	
974	2	CE0302	Remote Accelerator Pedal Supply Voltage Out of Range	Check wiring of associated pins	ON	OFF	OFF	Pin 3/03 Pin 3/04
974	3	CE0303	Remote Accelerator Pedal Circuit shorted to Ubat	Check wiring of associated pins	ON	OFF	OFF	Pin 3/02 Pin 3/03 Pin 3/04
974	4	CE0304	Remote Accelerator Pedal Circuit shorted to GND	Check wiring of associated pins	ON	OFF	OFF	Pin 3/02 Pin 3/03 Pin 3/04
979	9	D30309	J1939 PTO Message Not Received This Ignition Cycle	Check J1939 link connection. Check Parameter 01/52 (PTO Source Address SAE J1939) for proper configuration.	ON	OFF	OFF	
986	9	DA0309	J1939 CM1 DPF Message is missing or not available	Check J1939 link connection and Devices Cab Controller 1 and Climate Control. Check Parameter 01/07 (CM1 DPF Source Address SAE J1939) for proper configuration.	OFF	OFF	OFF	
986	13	DA030D	J1939 CM1 Fan SPN986 Signal from source address #1 or #2 is missing or not available = SNA (signal not available)	Check J1939 link connection. Check Parameter 01/08 (CM1 Fan Source Address #1 SAE J1939) and Parameter 01/09 (CM1 Fan Source Address #2 SAE J1939) for proper configuration.	OFF	OFF	OFF	
986	19	DA0313	J1939 CM1 Fan SPN986 Signal from source address #1 or #2 is erratic = undefined value but not SNA	Check J1939 link connection. Check Parameter 01/08 (CM1 Fan Source Address #1 SAE J1939) and Parameter 01/09 (CM1 Fan Source Address #2 SAE J1939) for proper configuration.	OFF	OFF	OFF	
1089	9	410409	J1939 AIR1 Message (Air Supply Pressure) is missing from first source address	Check J1939 link connection Check Parameter 01/96 (AIR1 Source Address 1 SAE J1939)	ON	OFF	OFF	
1089	13	41040D	J1939 AIR1 Message (Air Supply Pressure) is missing from second source address	Check J1939 link connection Check Parameter 01/102 (AIR1 Source Address 2 SAE J1939)	ON	OFF	OFF	
1121	2	610402	J1939 Powertrain Message (AMT – Detroit transmission) is missing	Check wiring of J2CC and related J1939 link connection	ON	OFF	OFF	
1121	13	61040D	J1939 Service Brake Switch Signal from EBC1 is missing or not available = SNA (signal not available)	Check J1939 link connection to Service Brake. Check Parameter 01/10 (EBC1 Source Address SAE J1939)	OFF	OFF	OFF	

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
1121	19	610413	J1939 Service Brake Switch Signal from EBC1 is erratic = undefined value but not SNA	Check J1939 link connection to Service Brake. Check Parameter 01/10 (EBC1 Source Address SAE J1939)	OFF	OFF	OFF	
1237	4	D50404	Stop Engine Override Switch shorted to Ground (if applied more than 5 sec this error flags)	Check wiring of associated pin. Check parameters 13/04 (Selection) and 13/41 (Fault Detect Enable) for correct configuration of input pin 1/15.	ON	OFF	OFF	Pin 1/15
1243	14	DB040E	ABS fault restricts automatic gear selection functionality.	Check ABS for proper function. Combination of ABS and ASC error. ABS error = $v > 1\text{km/h}$ and req-gear < current gear and ABS in stat "not fully operable"	OFF	OFF	OFF	
1482	9	CA0509	J1939 TC1 Message (Transmission Mode) is missing	Check J1939 link connection to Transmission Control	ON	OFF	OFF	
1484	9	CC0509	J1939 Message was lost (Message Counter Error)	Check J1939 link connection	OFF	OFF	OFF	
1484	13	CC050D	J1939 Message was lost (CRC Error)	Check J1939 link connection	OFF	OFF	OFF	
1592	9	380609	J1939 HRW Message from ABS is missing (HRW not received in case newAMT Transmission used)	Check J1939 link connection to ABS. Check correct configuration (parameter 02/09 (Transmission Type)) if newAMT Transmission is used	ON	OFF	OFF	
1592	13	38060D	J1939 HRW Wheel Speed Signal Missing (HRW received but at least one signal not available)	Check J1939 link connection to ABS. Check correct configuration (parameter 02/09 (Transmission Type)) if newAMT Transmission is used	OFF	OFF	OFF	
1592	19	380613	J1939 HRW Wheel Speed Signal Erroneous (HRW received but at least one signal erroneous)	Check J1939 link connection to ABS. Check correct configuration (parameter 02/09 (Transmission Type)) if newAMT Transmission is used	OFF	OFF	OFF	
1623	9	570609	J1939 Tachograph Output Shaft Speed Signal is erratic = undefined value but not SNA	Check wiring of associated pin	OFF	OFF	OFF	
1623	13	57060D	J1939 Tachograph Output Shaft Speed Signal is missing or not available = SNA (signal not available)	Check wiring of associated pin	OFF	OFF	OFF	
1624	9	580609	J1939 TCO1 Message is missing or not available	Check J1939 link connection to Vehicle Speed Sensor. Check Parameter 08/13 (Vehicle Speed Sensor Configuration) for proper configuration	OFF	OFF	OFF	
1624	13	58060D	J1939 Tachograph Vehicle Speed Signal is missing or not available = SNA (signal not available) + J1939 TCO1 speed sensor selected	Check J1939 link connection to Vehicle Speed Sensor. Check Parameter 08/13 (Vehicle Speed Sensor Configuration) for proper configuration	OFF	OFF	OFF	
1624	19	580613	J1939 Tachograph Vehicle Speed Signal is erratic = undefined value but not SNA + J1939 TCO1 speed sensor selected	Check J1939 link connection to Vehicle Speed Sensor. Check Parameter 08/13 (Vehicle Speed Sensor Configuration) for proper configuration	OFF	OFF	OFF	
1681	9	910609	J1939 BM Message (Battery Main Switch) is missing	Check J1939 link connection	ON	OFF	OFF	
1716	9	B40609	J1939 ERC1 Message is missing or not available	Check J1939 link connection to Retarder	OFF	OFF	OFF	
1716	13	B4060D	EvoBus 5stage retarder level calibration not plausible	Check wiring of associated pin. Check parameters 13/08 (Selection) and 13/49 (Fault Detect Enable) for correct configuration of input pin 2/13.	ON	OFF	OFF	Pin 2/13

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
1814	9	160709	J1939 VDC1 Message was not received or has stopped arriving.	Check J1939 link connection. Check Parameter 01/57 (VDC1 Source Address SAE J1939)	OFF	OFF	OFF	
1845	9	350709	J1939 TCFG2 Message is missing or not available	Check J1939 link connection to Transmission Control	OFF	OFF	OFF	
2003	9	D30709	J1939 Message is missing from source Address 3 (3dec = Transmission #1 ECU missing)	Check J1939 link connection to Cruise Control ECU	ON	OFF	OFF	
2011	9	DB0709	J1939 Message is missing from source address 11 (dec).		OFF	OFF	OFF	
2017	9	E10709	J1939 Message is missing from source address 17 (17dec = Cruise Control ECU missing)	Check J1939 link connection to Cruise Control ECU	OFF	OFF	OFF	
2023	9	E70709	J1939 Message is missing from source 23 (23dec = Instrument Cluster ECU missing)	Check J1939 link connection to Instrument Cluster ECU	OFF	OFF	OFF	
2025	9	E90709	J1939 Message is missing from source 25 (25dec = Passenger-Operator Climate Control ECU missing)	Check J1939 link connection to Passenger Operator Climate Control ECU	OFF	OFF	OFF	
2033	9	F10709	J1939 Message is missing from source 33 (33dec = Body Controller ECU missing)	Check J1939 link connection to body Controller ECU	ON	OFF	OFF	
2042	9	FA0709	J1939 Message is missing from source 42 (42dec = Headway Controller (forward-looking collision warning, collision avoidance, speed Controller, or speed matching) ECU is missing)	Check J1939 link connection to Headway Controller ECU	ON	OFF	OFF	
2049	9	010809	J1939 Message is missing from source 49 (49dec = Gab Controller - Primary ECU missing)	Check J1939 link connection to Gab Controller – Primary ECU	ON	OFF	OFF	
2596	9	240A09	J1939 CM1 Message (Maximum Vehicle Speed Limit) is Missing or Not Available	Check J1939 link connection	ON	OFF	OFF	
2623	2	3F0A02	2-Channel Accelerator Pedal "in-range" fault (AP Ch1 and Ch2 values differ to much)	Check wiring of associated pins and calibration; Restart learning routine. (chapter 7.4, routines 1 to 3); Check Accelerator Pedal for proper behavior regarding voltage of the 2 channels.	ON	OFF	OFF	
2623	8	3F0A08	2-Channel Accelerator Pedal Signal 2 Missing	Check wiring of associated pin	ON	OFF	OFF	Pin 1/06
2646	3	560A03	Digital Output 4/02 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 35/14 (Selection), 35/33 (Fault Detection) and 35/50 (Configuration) for correct configuration of output pin 4/02 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 9	ON	OFF	OFF	Pin 4/02
2646	4	560A04	Digital Output 4/02 Circuit shorted to GND	Check wiring of associated pin Check parameters 35/14 (Selection), 35/33 (Fault Detection) and 35/50 (Configuration) for correct configuration of output pin 4/02 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 9	ON	OFF	OFF	Pin 4/02

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
2646	5	560A05	Digital Output 4/02 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check parameters 35/14 (Selection), 35/33 (Fault Detection) and 35/50 (Configuration) for correct configuration of output pin 4/02 Run Service Routine (chapter 7.4, routines 15 to 17): – Digital Output Pin Under Software Control: Start Response with Signal Parameter 9	ON	OFF	OFF	Pin 4/02
2882	13	420B0D	Off-Highway Engine Configuration Selection message on J1939 was not received or has stopped arriving.	Check the J1939 link connection Check parameter 01/72 for configuration of OHECS source address Check parameter 05/06 for proper configuration	ON	OFF	OFF	
2900	9	540B09	J1939 ETC7 Message is missing or not available	Check J1939 link connection to Transmission Controller / Check if Electronic Transmission Controller is CAN capable	ON	OFF	OFF	
3187	9	730C09	Transmission Shift Console Datalink (LIN)	Check LIN wiring / stalk switch	ON	OFF	OFF	
3353	2	190D02	Generator (Charging System) D+ terminal failure	Check wiring of Generator Terminal D+ or check Generator functionality	OFF	OFF	OFF	
3460	2	840D02	PTO 2 feedback, but not activated	Check feedback switch and PTO2 mechanics	ON	OFF	OFF	
3460	7	840D07	PTO 2 feedback, but not feedback	Check PTO2 feedback wiring	ON	OFF	OFF	
3461	2	850D02	PTO 1 feedback, but not activated	Check feedback switch and PTO1 mechanics	ON	OFF	OFF	
3461	7	850D07	PTO 1 activated, but no feedback	Check PTO1 feedback wiring	ON	OFF	OFF	
3510	4	B60D04	Accelerator Pedal Supply Voltage Circuit shorted to GND	Check wiring of associated pins	ON	OFF	OFF	Pin 1/08 Pin 3/03
3510	7	B60D07	Accelerator Pedal Supply Voltage Circuit shorted to Ubat	Check wiring of associated pins	ON	OFF	OFF	Pin 1/08 Pin 3/03
3511	3	B70D03	Remote Accelerator Pedal Supply Voltage circuit shorted to Ubat	Check wiring of associated pins	ON	OFF	OFF	Pin 3/03 (Supply) Pin 3/02 (GND)
3511	4	B70D04	Remote Accelerator Pedal Supply Voltage circuit shorted to GND	Check wiring of associated pins	ON	OFF	OFF	Pin 3/03 (Supply) Pin 3/02 (GND)
3606	9	160E09	J1939 PROP04 Message is missing or not available	Check J1939 link connection to Diesel Particulate Filter	ON	OFF	OFF	
3645	9	3D0E09	J1939 TCI Message (Transfer Case Information) is missing	Check J1939 link connection	ON	OFF	OFF	
3695	9	6F0E09	J1939 DPF Regen Inhibit MUX Switch Message Stopped Arriving	Check J1939 link connection to Diesel Particulate Filter. Check Parameter 46/10 (DPF J1939 Inhibit Sw Enable) and 46/11 (DPF J1939 Regen Sw Enable).	ON	OFF	OFF	
3695	13	6F0E0D	J1939 DPF Regen Inhibit MUX Switch Message Contains SNV(SNA) Indicator	Check J1939 link connection to Diesel Particulate Filter. Check Parameter 46/10 (DPF J1939 Inhibit Sw Enable) and 46/11 (DPF J1939 Regen Sw Enable).	ON	OFF	OFF	
3695	14	6F0E0E	J1939 DPF Regen Inhibit MUX Switch Message Not Received this Ignition Cycle	Check J1939 link connection to Diesel Particulate Filter. Check Parameter 46/10 (DPF J1939 Inhibit Sw Enable) and 46/11 (DPF J1939 Regen Sw Enable).	ON	OFF	OFF	
3695	19	6F0E13	J1939 DPF Regen Inhibit MUX Switch Message Contains Data Error(erratic) Indicator	Check J1939 link connection to Diesel Particulate Filter. Check Parameter 46/10 (DPF J1939 Inhibit Sw Enable) and 46/11 (DPF J1939 Regen Sw Enable).	ON	OFF	OFF	

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
3696	4	700E04	J1939 DPF Regeneration Switch Circuit shorted to GND (if applied more than 5 sec this error flags)	Check J1939 link connection to Diesel Particulate Filter. Check Parameter 46/10 (DPF J1939 Inhibit Sw Enable) and 46/11 (DPF J1939 Regen Sw Enable).	ON	OFF	OFF	
3696	9	700E09	J1939 DPF Regen Force MUX Switch Message Stopped Arriving	Check J1939 link connection to Diesel Particulate Filter. Check Parameter 46/10 (DPF J1939 Inhibit Sw Enable) and 46/11 (DPF J1939 Regen Sw Enable).	ON	OFF	OFF	
3696	13	700E0D	J1939 DPF Regen Force MUX Switch Message Contains SNV(SNA) Indicator	Check J1939 link connection to Diesel Particulate Filter. Check Parameter 46/10 (DPF J1939 Inhibit Sw Enable) and 46/11 (DPF J1939 Regen Sw Enable).	ON	OFF	OFF	
3696	14	700E0E	J1939 DPF Regen Force MUX Switch Message Not Received this Ignition Cycle	Check J1939 link connection to Diesel Particulate Filter. Check Parameter 46/10 (DPF J1939 Inhibit Sw Enable) and 46/11 (DPF J1939 Regen Sw Enable).	ON	OFF	OFF	
3696	19	700E13	J1939 DPF Regen Force MUX Switch Message Contains Data Error(erratic) Indicator	Check J1939 link connection to Diesel Particulate Filter. Check Parameter 46/10 (DPF J1939 Inhibit Sw Enable) and 46/11 (DPF J1939 Regen Sw Enable).	ON	OFF	OFF	
3719	0	870E00	DPF Filter Soot Level is very high	Check DPF Filter.	OFF	ON	OFF	
3719	16	870E10	DPF Filter Soot Level is High	Check DPF Filter. Start manual regeneration.	ON	OFF	OFF	
3840	3	000F03	Frequency Output 4/15 Circuit shorted to Ubat	Check wiring of associated pin. Check Parameters 09/07 (Selection), 09/13 (Fault Detection) and 09/17 (Output Configuration) for correct configuration.	ON	OFF	OFF	Pin 4/15
3840	4	000F04	Frequency Output 4/15 Circuit shorted to GND	Check wiring of associated pin. Check Parameters 09/07 (Selection), 09/13 (Fault Detection) and 09/17 (Output Configuration) for correct configuration.	ON	OFF	OFF	Pin 4/15
3840	5	000F05	Frequency Output 4/15 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin. Check Parameters 09/07 (Selection), 09/13 (Fault Detection) and 09/17 (Output Configuration) for correct configuration.	ON	OFF	OFF	Pin 4/15
3841	3	010F03	Frequency Output 4/11 Circuit shorted to Ubat	Check wiring of associated pin. Check Parameters 09/07 (Selection), 09/13 (Fault Detection) and 09/17 (Output Configuration) for correct configuration.	ON	OFF	OFF	Pin 4/11
3841	4	010F04	Frequency Output 4/11 Circuit shorted to GND	Check wiring of associated pin. Check Parameters 09/07 (Selection), 09/13 (Fault Detection) and 09/17 (Output Configuration) for correct configuration.	ON	OFF	OFF	Pin 4/11
3841	5	010F05	Frequency Output 4/11 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin. Check Parameters 09/07 (Selection), 09/13 (Fault Detection) and 09/17 (Output Configuration) for correct configuration.	ON	OFF	OFF	Pin 4/11
3842	3	020F03	Analog Ground 3/02 Circuit shorted to Ubat	Check wiring of associated pin Check Parameters 35/05 (Selection) and 35/24 (Fault Detection) for correct configuration.	ON	OFF	OFF	Pin 3/02
3842	4	020F04	Analog Ground 3/02 Circuit shorted to GND	Check wiring of associated pin Check Parameters 35/05 (Selection) and 35/24 (Fault Detection) for correct configuration.	ON	OFF	OFF	Pin 3/02
3842	5	020F05	Analog Ground 3/02 Open Circuit (broken wire, terminal floating)	Check wiring of associated pin Check Parameters 35/05 (Selection) and 35/24 (Fault Detection) for correct configuration.	ON	OFF	OFF	Pin 3/02
3843	3	030F03	Digital Input 1/01 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/01 (Selection), 13/35 (Fault Detect Ena) for correct configuration of input pin 1/01	ON	OFF	OFF	Pin 1/01
3843	4	030F04	Digital Input 1/01 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/01 (Selection), 13/35 (Fault Detect Ena) for correct configuration of input pin 1/01	ON	OFF	OFF	Pin 1/01
3844	3	040F03	Digital Input 1/02 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/01 (Selection), 13/35 (Fault Detect Ena) for correct configuration of input pin 1/02	ON	OFF	OFF	Pin 1/02

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
3844	4	040F04	Digital Input 1/02 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/02 (Selection), 13/36 (Fault Detect Ena) for correct configuration of input pin 1/02	ON	OFF	OFF	Pin 1/02
3845	3	050F03	Digital Input 1/12 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/39 (Fault Detect Ena) for correct configuration of Fault Detection of pin 1/12	ON	OFF	OFF	Pin 1/12
3845	4	050F04	Digital Input 1/12 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/39 (Fault Detect Ena) for correct configuration of Fault Detection of pin 1/12	ON	OFF	OFF	Pin 1/12
3846	3	060F03	Digital Input 1/14 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/40 (Fault Detect Ena) for correct configuration of Fault Detection of pin 1/12	ON	OFF	OFF	Pin 1/14
3846	4	060F04	Digital Input 1/14 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/40 (Fault Detect Ena) for correct configuration of Fault Detection of pin 1/12	ON	OFF	OFF	Pin 1/14
3847	3	070F03	Digital Input 1/15 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/04 (Selection), 13/41 (Fault Detect Ena) for correct configuration of input pin 1/15	ON	OFF	OFF	Pin 1/15
3847	4	070F04	Digital Input 1/15 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/04 (Selection), 13/41 (Fault Detect Ena) for correct configuration of input pin 1/15	ON	OFF	OFF	Pin 1/15
3848	3	080F03	Digital Input 1/16 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/42 (Fault Detect Ena) for correct configuration of Fault Detection of pin 1/16	ON	OFF	OFF	Pin 1/16
3848	4	080F04	Digital Input 1/16 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/42 (Fault Detect Ena) for correct configuration of Fault Detection of pin 1/16	ON	OFF	OFF	Pin 1/16
3849	3	090F03	Digital Input 1/17 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/05 (Selection), 13/43 (Fault Detect Ena) for correct configuration of input pin 1/17	ON	OFF	OFF	Pin 1/17
3849	4	090F04	Digital Input 1/17 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/05 (Selection), 13/43 (Fault Detect Ena) for correct configuration of input pin 1/17	ON	OFF	OFF	Pin 1/17
3850	3	0A0F03	Digital Input 1/11 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/38 (Fault Detect Ena) for correct configuration of Fault Detection of pin 1/11	ON	OFF	OFF	Pin 1/11
3850	4	0A0F04	Digital Input 1/11 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/38 (Fault Detect Ena) for correct configuration of Fault Detection of pin 1/11	ON	OFF	OFF	Pin 1/11
3851	3	0B0F03	Digital Input 2/09 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/07 (Selection), 13/46 (Fault Detect Ena) for correct configuration of input pin 2/09	ON	OFF	OFF	Pin 2/09
3851	4	0B0F04	Digital Input 2/09 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/07 (Selection), 13/46 (Fault Detect Ena) for correct configuration of input pin 2/09	ON	OFF	OFF	Pin 2/09
3852	3	0C0F03	Digital Input 2/11 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/47 (Fault Detect Ena) for correct configuration of Fault Detection of pin 2/11	ON	OFF	OFF	Pin 2/11
3852	4	0C0F04	Digital Input 2/11 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/47 (Fault Detect Ena) for correct configuration of Fault Detection of pin 2/11	ON	OFF	OFF	Pin 2/11
3853	3	0D0F03	Digital Input 2/12 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/48 (Fault Detect Ena) for correct configuration of Fault Detection of pin 2/12	ON	OFF	OFF	Pin 2/12
3853	4	0D0F04	Digital Input 2/12 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/48 (Fault Detect Ena) for correct configuration of Fault Detection of pin 2/12	ON	OFF	OFF	Pin 2/12
3854	3	0E0F03	Digital Input 2/13 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/08 (Selection), 13/49 (Fault Detect Ena) for correct configuration of input pin 2/13	ON	OFF	OFF	Pin 2/13
3854	4	0E0F04	Digital Input 2/13 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/08 (Selection), 13/49 (Fault Detect Ena) for correct configuration of input pin 2/13	ON	OFF	OFF	Pin 2/13
3855	3	0F0F03	Digital Input 2/14 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/09 (Selection), 13/50 (Fault Detect Ena) for correct configuration of input pin 2/14	ON	OFF	OFF	Pin 2/14

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
3855	4	0F0F04	Digital Input 2/14 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/09 (Selection), 13/50 (Fault Detect Ena) for correct configuration of input pin 2/14	ON	OFF	OFF	Pin 2/14
3856	3	100F03	Digital Input 2/15 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/10 (Selection), 13/51 (Fault Detect Ena) for correct configuration of input pin 2/15	ON	OFF	OFF	Pin 2/15
3856	4	100F04	Digital Input 2/15 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/10 (Selection), 13/51 (Fault Detect Ena) for correct configuration of input pin 2/15	ON	OFF	OFF	Pin 2/15
3857	3	110F03	Digital Input 2/07 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/44 (Fault Detect Ena) for correct configuration of Fault Detection of pin 2/07	ON	OFF	OFF	Pin 2/07
3857	4	110F04	Digital Input 2/07 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/44 (Fault Detect Ena) for correct configuration of Fault Detection of pin 2/07	ON	OFF	OFF	Pin 2/07
3858	3	120F03	Digital Input 2/08 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/06 (Selection), 13/45 (Fault Detect Ena) for correct configuration of input pin 2/08	ON	OFF	OFF	Pin 2/08
3858	4	120F04	Digital Input 2/08 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/06 (Selection), 13/45 (Fault Detect Ena) for correct configuration of input pin 2/08	ON	OFF	OFF	Pin 2/08
3859	3	130F03	Digital Input 4/16 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/60 (Fault Detect Ena) for correct configuration of Fault Detection of pin 4/16	ON	OFF	OFF	Pin 4/16
3859	4	130F04	Digital Input 4/16 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/60 (Fault Detect Ena) for correct configuration of Fault Detection of pin 4/16	ON	OFF	OFF	Pin 4/16
3860	3	140F03	Digital Input 4/18 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/19 (Selection), 13/62 (Fault Detect Ena) for correct configuration of input pin 4/18	ON	OFF	OFF	Pin 4/18
3860	4	140F04	Digital Input 4/18 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/19 (Selection), 13/62 (Fault Detect Ena) for correct configuration of input pin 4/18	ON	OFF	OFF	Pin 4/18
3861	3	150F03	Digital Input 4/13 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/17 (Selection), 13/59 (Fault Detect Ena) for correct configuration of input pin 4/13	ON	OFF	OFF	Pin 4/13
3861	4	150F04	Digital Input 4/13 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/17 (Selection), 13/59 (Fault Detect Ena) for correct configuration of input pin 4/13	ON	OFF	OFF	Pin 4/13
3862	3	160F03	Digital Input 1/10 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/03 (Selection), 13/37 (Fault Detect Ena) for correct configuration of input pin 1/10	ON	OFF	OFF	Pin 1/10
3862	4	160F04	Digital Input 1/10 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/03 (Selection), 13/37 (Fault Detect Ena) for correct configuration of input pin 1/10	ON	OFF	OFF	Pin 1/10
3863	3	170F03	Digital Input 4/17 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/18 (Selection), 13/61 (Fault Detect Ena) for correct configuration of input pin 4/17	ON	OFF	OFF	Pin 4/17
3863	4	170F04	Digital Input 4/17 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/18 (Selection), 13/61 (Fault Detect Ena) for correct configuration of input pin 4/17	ON	OFF	OFF	Pin 4/17
3864	3	180F03	Digital Input 3/18 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/12 (Selection), 13/52 (Fault Detect Ena) for correct configuration of input pin 3/18	ON	OFF	OFF	Pin 3/18
3864	4	180F04	Digital Input 3/18 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/12 (Selection), 13/52 (Fault Detect Ena) for correct configuration of input pin 3/18	ON	OFF	OFF	Pin 3/18
3865	3	190F03	Digital Input 4/08 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/16 (Selection), 13/58 (Fault Detect Ena) for correct configuration of input pin 4/08	ON	OFF	OFF	Pin 4/08
3865	4	190F04	Digital Input 4/08 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/16 (Selection), 13/58 (Fault Detect Ena) for correct configuration of input pin 4/08	ON	OFF	OFF	Pin 4/08
3866	3	1A0F03	Digital Input 4/04 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/14 (Selection), 13/56 (Fault Detect Ena) for correct configuration of input pin 4/04	ON	OFF	OFF	Pin 4/04

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
3866	4	1A0F04	Digital Input 4/04 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/14 (Selection), 13/56 (Fault Detect Ena) for correct configuration of input pin 4/04	ON	OFF	OFF	Pin 4/04
3867	3	1B0F03	Digital Input 4/05 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/15 (Selection), 13/57 (Fault Detect Ena) for correct configuration of input pin 4/05	ON	OFF	OFF	Pin 4/05
3867	4	1B0F04	Digital Input 4/05 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/15 (Selection), 13/57 (Fault Detect Ena) for correct configuration of input pin 4/05	ON	OFF	OFF	Pin 4/05
3868	3	1C0F03	Digital Input 4/03 Circuit shorted to Ubat	Check wiring of associated pin Check parameters 13/13 (Selection), 13/55 (Fault Detect Ena) for correct configuration of input pin 4/03	ON	OFF	OFF	Pin 4/03
3868	4	1C0F04	Digital Input 4/03 Circuit shorted to GND	Check wiring of associated pin Check parameters 13/13 (Selection), 13/55 (Fault Detect Ena) for correct configuration of input pin 4/03	ON	OFF	OFF	Pin 4/03
3869	3	1D0F03	Digital Input 4/01 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/53 (Fault Detect Ena) for correct configuration of Fault Detection of pin 4/01	ON	OFF	OFF	Pin 4/01
3869	4	1D0F04	Digital Input 4/01 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/53 (Fault Detect Ena) for correct configuration of Fault Detection of pin 4/01	ON	OFF	OFF	Pin 4/01
3870	3	1E0F03	Digital Input 4/02 Circuit shorted to Ubat	Check wiring of associated pin Check parameter 13/54 (Fault Detect Ena) for correct configuration of Fault Detection of pin 4/02	ON	OFF	OFF	Pin 4/02
3870	4	1E0F04	Digital Input 4/02 Circuit shorted to GND	Check wiring of associated pin Check parameter 13/54 (Fault Detect Ena) for correct configuration of Fault Detection of pin 4/02	ON	OFF	OFF	Pin 4/02
3871	3	1F0F03	Transmission Speed Sensor 4/04 or 3/13 Circuit shorted to Ubat	Check wiring of associated pin	ON	OFF	OFF	Pin 4/04 or 3/13
3871	4	1F0F04	Transmission Speed Sensor 4/04 or 3/13 Circuit shorted to GND	Check wiring of associated pin	ON	OFF	OFF	Pin 4/04 or 3/13
3871	5	1F0F05	Transmission Speed Sensor Circuit Open (broken wire, terminal floating)	Check wiring of associated pin	ON	OFF	OFF	Pin 4/04 or 3/13
3872	3	200F03	Analog Output 01 shorted to Ubat	Check wiring of associated pin. Check parameters 09/03 (Selection) and 09/09 (Fault Detection) for correct configuration of output pin 3/05. Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software Control: Start with Signal Parameter 5, Frequency in Hz, Width in %	ON	OFF	OFF	Pin 3/05
3872	4	200F04	Analog Output 01 shorted to GND or Circuit Open (broken wire, terminal floating)	Check wiring of associated pin. Check parameters 09/03 (Selection) and 09/09 (Fault Detection) for correct configuration of output pin 3/05. Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software Control: Start with Signal Parameter 5, Frequency in Hz, Width in %	ON	OFF	OFF	Pin 3/05
3873	3	210F03	Analog Output 02 shorted to Ubat	Check wiring of associated pin. Check parameters 09/04 (Selection) and 09/10 (Fault Detection) for correct configuration of output pin 3/06. Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software Control: Start with Signal Parameter 6, Frequency in Hz, Width in %	ON	OFF	OFF	Pin 3/06
3873	4	210F04	Analog Output 02 shorted to GND or Circuit Open (broken wire, terminal floating)	Check wiring of associated pin. Check parameters 09/04 (Selection) and 09/10 (Fault Detection) for correct configuration of output pin 3/06. Run Service Routine (chapter 7.4, routines 8 to 10): – Analog Output Pin Under Software Control: Start with Signal Parameter 6, Frequency in Hz, Width in %	ON	OFF	OFF	Pin 3/06

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
3948	9	6C0F09	J1939 PTODE Message (PTO Drive Engagement) is missing or not available	Check J1939 link connection Check Parameter 01/108 (PTODE Source Address SAE J1939)	ON	OFF	OFF	
4041	0	C90F00	Indication of a critical software (logic) failure. (20ms ECU OS Task Locked in an Endless Loop)	Try reprogramming the CPC with the new software release. Replace CPC4 and reprogram with the latest software.	OFF	OFF	OFF	
4041	9	C90F09	Indication of a critical resource allocation issue. Task restructuring required. (20ms ECU OS Task Timed out Prior to Completion)	Try reprogramming the CPC with the new software release. Replace CPC4 and reprogram with the latest software.	OFF	OFF	OFF	
4041	16	C90F10	Indication of a critical software (logic) failure. (1000ms ECU OS Task Locked in an Endless Loop)	Try reprogramming the CPC with the new software release. Replace CPC4 and reprogram with the latest software.	OFF	OFF	OFF	
4206	2	6E1002	TSC1 Message Counter indicates lost Messages	Try reprogramming the CPC with the new software release. Replace CPC4 and reprogram with the latest software.	ON	OFF	OFF	
4207	2	6F1002	TSC1 Message Checksum wrong	Try reprogramming the CPC with the new software release. Replace CPC4 and reprogram with the latest software.	ON	OFF	OFF	
524275	19	F3FFF3	RCM Message not received or stopped arriving	Check CPC4 PT-CAN link connection. Check RCM functionality / PT-CAN link connection	OFF	OFF	OFF	
524276	13	F4FFED	MCM fuelmap to GVC emission standard calibration (02/23) mismatched	Check parameter 02/24 (GVC Emission Standard Conf) for correct setting.	ON	OFF	OFF	
524277	13	F5FFED	Super Structure Cabin Mode ENABLE-State ERROR	Check CPC4 PT-CAN link connection. Check if vehicle speed has plausible value. Check park brake state. Check if gearbox sends valid values for current and selected gear. Check if CC is deactivated.	OFF	OFF	OFF	
524277	14	F5FFEE	Driving from SuperStructure IMPLAUSIBLE Condition	Check CPC4 PT-CAN link connection. Check engine mode. Check service brake state. Check if gearbox sends valid values for current and selected gear. Check if CC is deactivated.	OFF	OFF	OFF	
524277	19	F5FFF3	Super Structure Cabin Mode DISABLE-State ERROR	Check CPC4 PT-CAN link connection. Check if vehicle speed has plausible value. Check park brake state. Check if gearbox sends valid values for current and selected gear. Check if CC is deactivated.	OFF	OFF	OFF	
524278	13	F6FFED	2-Channel RAT Accelerator Pedal Signal 1 Missing	Check wiring of associated pins. Check parameter 09/01 (1 9 FPO_02 Selection) and parameter 09/06 (4 12 FPO_01 Selection) Check parameter 09/12 (4 12 FPO_01 Fault Detection) for correct configuration of Fault Detection of pin 4/12 and parameter 09/08 (1 9 FPO_02 Fault Detection) for correct configuration of Fault Detection of pin 1/09. Check parameter 09/14 (1 9 FPO_02 Resistor Enable) for pin 1/09 resistor activation.	ON	OFF	OFF	Pin 4/12 Pin 1/09
524278	14	F6FFEE	2-Channel RAT Accelerator Pedal Signal 2 Missing	Check wiring of associated pins. Check parameter 09/01 (1 9 FPO_02 Selection) and parameter 09/06 (4 12 FPO_01 Selection) Check parameter 09/12 (4 12 FPO_01 Fault Detection) for correct configuration of Fault Detection of pin 4/12 and parameter 09/08 (1 9 FPO_02 Fault Detection) for correct configuration of Fault Detection of pin 1/09. Check parameter 09/14 (1 9 FPO_02 Resistor Enable) for pin 1/09 resistor activation.	ON	OFF	OFF	Pin 4/12 Pin 1/09
524278	15	F6FFEF	RAT Accelerator pedal "in-range" fault.	Deviation between RAT Ch1 and Ch2 too high. Check RAT AP Sensor.	ON	OFF	OFF	
524279	2	F7FFE2	Expansion tank pressure sensor data erratic	Check wiring of associated pins. Check parameter 13/63 (3 04 AI_02 Selection) and parameter 13/64 (4 14 AI_03 Selection)	ON	OFF	OFF	Pin 3/04 Pin 4/14

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
524279	3	F7FFE3	Expansion tank pressure sensor circuit shorted to Ubat	Check wiring of associated pins. Check parameter 13/63 (3 04 AI_02 Selection) and parameter 13/64 (4 14 AI_03 Selection)	ON	OFF	OFF	Pin 3/04 Pin 4/14
524279	4	F7FFE4	Expansion tank pressure sensor circuit shorted to GND	Check wiring of associated pins. Check parameter 13/63 (3 04 AI_02 Selection) and parameter 13/64 (4 14 AI_03 Selection)	ON	OFF	OFF	Pin 3/04 Pin 4/14
524279	11	F7FFEB	Expansion Pressure Tank Pressure Set Fault	Inspect Expansion Pressure Tank for leaks	OFF	OFF	OFF	
524279	18	F7FFF2	Expansion Pressure Tank Pressure Loss	Inspect Expansion Pressure Tank for leaks	OFF	OFF	OFF	
524280	2	F8FFE2	Remote Accelerator Pedal Idle Validation Switch inputs reversed	Check wiring of associated pins. Check Parameters 13/08, 13/09, 13/10 and 13/65	ON	OFF	OFF	Pin 2/11 Pin 2/14 Pin 2/13 Pin 2/15
524280	3	F8FFE3	Remote Accelerator Pedal Idle Validation Switch 1 circuit shorted to Ubat	Check wiring of associated pins. Check parameter 13/09 (2 14 DI Selection) and parameter 13/65 (2 11 DI Selection) Check parameter 13/47 (2 11 Diflex10 Fault Detect Enable) for correct configuration of Fault Detection of pin 2/11 and parameter 13/50 (2 14 Diflex13 Fault Detect Enable) for correct configuration of Fault Detection of pin 2/14	ON	OFF	OFF	Pin 2/11 or Pin 2/14
524280	4	F8FFE4	Remote Accelerator Pedal Idle Validation Switch 1 circuit shorted to GND	Check wiring of associated pins. Check parameter 13/09 (2 14 DI Selection) and parameter 13/65 (2 11 DI Selection) Check parameter 13/47 (2 11 Diflex10 Fault Detect Enable) for correct configuration of Fault Detection of pin 2/11 and parameter 13/50 (2 14 Diflex13 Fault Detect Enable) for correct configuration of Fault Detection of pin 2/14	ON	OFF	OFF	Pin 2/11 or Pin 2/14
524280	5	F8FFE5	Remote Accelerator Pedal Idle Validation Switch 2 circuit shorted to Ubat	Check wiring of associated pins. Check parameter 13/08 (2 13 DI Selection) and parameter 13/10 (2 15 DI Selection) Check parameter 13/49 (2 13 Diflex12 Fault Detect Enable) for correct configuration of Fault Detection of pin 2/13 and parameter 13/51 (2 15 Diflex14 Fault Detect Enable) for correct configuration of Fault Detection of pin 2/15	ON	OFF	OFF	Pin 2/13 or Pin 2/15
524280	6	F8FFE6	Remote Accelerator Pedal Idle Validation Switch 2 circuit shorted to GND	Check wiring of associated pins. Check parameter 13/08 (2 13 DI Selection) and parameter 13/10 (2 15 DI Selection) Check parameter 13/49 (2 13 Diflex12 Fault Detect Enable) for correct configuration of Fault Detection of pin 2/13 and parameter 13/51 (2 15 Diflex14 Fault Detect Enable) for correct configuration of Fault Detection of pin 2/15	ON	OFF	OFF	Pin 2/13 or Pin 2/15
524281	9	F9FFE9	J1939 Powertrain Message (Engine Droop Control) is missing (PropB50)	Check J1939 link connection	ON	OFF	OFF	
524283	2	FBFFE2	Generator (Charging System) terminal W – Low Voltage	Check wiring of Generator Terminal W or check Generator functionality	OFF	OFF	OFF	
524283	14	FBFFEE	Generator (Charging System) terminal W – allocation error (pulse / rev signal)	Check wiring of Generator Terminal W or check Generator functionality	ON	OFF	OFF	
524285	4	FDFFE4	CM1 DPF Regeneration Switch shorted to GND (if applied more than 5 sec this error flags)	Check parameter 01/07 (CM1 DPF Source Addr SAE J1939) for correct configuration	ON	OFF	OFF	
524286	1	FEFFE1	Automatic gear selection: automatic mode is not available (multiple causes for error: AT is in manual mode, no automatic mode possible)	Check MCM, ACM, TCM and CPC Failure (calibration wrong)	OFF	OFF	OFF	

SPN	FMI	DTC	Fault description	Recommended Action	CEL	SEL	MIL	Fault location
524286	2	FEFFE2	Automatic gear selection: incompatible or missing dataset (calibration error, wrong calibration data set for this vehicle)	Check if CAL-Dataset version fits to the software version, engine and transmission type	OFF	OFF	OFF	
524286	3	FEFFE3	Automatic gear selection: EcoRoll is not available (multiple errors, no EcoRoll available)	Check MCM, ACM, TCM and CPC Failure	OFF	OFF	OFF	
524286	4	FEFFE4	Automatic gear selection: Gear shift not plausible (multiple errors, no optimal gear shift possible)	Check MCM, ACM, TCM and CPC Failure	OFF	OFF	OFF	
524286	5	FEFFE5	Automatic gear selection: No gear shiftable.	Check TCM for proper function and fault codes. Possible gearbox error.	OFF	OFF	OFF	
524286	6	FEFFE6	ITPM error: vehicle calibration is inconsistent	Check parameterization of PTCONF (PGR 048)	OFF	OFF	OFF	
524286	7	FEFFE7	ITPM error: drivetrain speed signal is inconsistent. (One or more speed signals incorrect)	Check parameterization of PTCONF (PGR 048) Check signals as follows: - engine speed - transmission input speed - transmission output speed - TCO vehicle speed - ABS/EBS vehicle speed	OFF	OFF	OFF	
524287	1	FFFFE1	EvoBus cruise control lever position not plausible	EvoBus only. Check associated Pins.	ON	OFF	OFF	

CAUTION!

Operation Manual, Section 7.5.7 Cardan shaft maintenance shall be read as follows:

In the process of operation observe the following rules of maintenance for cardan shafts:

- a) at the end of each shift check the degree of heating of bearing assemblies using a pyrometer. The heating temperature shall not exceed 60°C. In case of overheating, take off the cardan shaft. Eliminate faults at TSS or in a workshop. In case of removal of cardan shafts from the tractor or their installation on the tractor, one cannot use tyre iron or any other items to be inserted into the joint for cardan shaft barring. This entails a damage of seals, which can lead to premature failure of cardan joints;
- b) systematically check fastening of cardan joint flanges. All nuts shall be reliably tightened.