Diagnostic Technical Manual

COMPACT

1 How to use this manual

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This manual is to help dealers and technicians in the installation, servicing and repair of machine equipment. It is important to follow the instructions correctly and to use the special tools to do the procedures in the specified the repair time.

1.1. CONTENTS

Refer to the table of contents at the start of each chapter for a list of the sections of the chapter.

1.2. SERVICE TOOLS

Where it is necessary to use a service tool to do an operation, the instruction refers to the related tool. To enable the technician to make the service tools, the measurements and illustrations for each tool are at the end of the applicable sections.

1.3. REPAIRS AND THE REPLACEMENT OF PARTS

During replacement operations, it is very important to use approved original parts. The warranty does not apply to the machine after the installation aftermarket parts. The installation of the incorrect parts can have a dangerous effect on the safety of the machine.
All tractors parts have a manufacturer guarantee. It is mandatory for dealers, agents and technicians to supply the approved parts.
Always obey these points during the repair and installation of replacement parts and accessories:

- The local regulations in some countries prevent the installation of parts that do not obey the specifications of the machine manufacturer.
- Always obey the torque values in the service manual.
- Use a locking device when it is specified. Always replace a locking device that has damage.

2 Safety

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2.1. REPAIR SAFETY

Always bear safety in mind when repairing or servicing the tractor.

2.1.1. Procedure

- Use tools and lifting devices in the correct way.
- Make sure that every tractor part is supported firmly, when removing components or splitting the tractor. While supporting the tractor, always check the center of gravity of the frame part. For example, the wedges must always be fitted between the front axle and engine to prevent axle oscillation when splitting the front frame of the tractor.
- Wear suitable protection when handling harmful chemicals.

WARNING: Take all necessary safety precautions when handling toxic or harmful chemicals (such as fuel, oil, grease or fluids).

- Be careful while handling pressurized circuits in the tractor.

WARNING: Opening pressurised circuits can be dangerous if the pressure is not released carefully.

2.2. SAFETY INSTRUCTIONS – ENGINE

2.2.1. General

- The warnings cannot show all the dangerous situations that can occur.
- Make sure that you tell the applicable personnel if a dangerous situation occurs.
- Use only the approved equipment for the specified and general procedures.
- Examine tools for damage and that they are in correct work condition.
- Before you move loads, make sure that you know the:
  - Weight
  - Size
  - Path has no blockages.
- Make sure that you use only approved lift equipment. And that the supports are applicable for the size and dimensions.
- All the supports show the maximum capacity they are specified for.
- Only approved personnel are to use such tools.
- Stay at a safe distance from the load and do not do work below it.
- In the remove and install operations, always obey the specified instructions. Make sure that all the removed components do not accidentally hit other personnel.
- With procedures that 2 or more personnel are necessary. To prevent accidents make sure that the work area is free of objects that can cause injury to the personnel. And do not do any procedure that can cause injury to the personnel.
- No none approved personnel in the work area.
- Know the necessary data of the operation and safety of the machine before you do work on it.
- Obey all safety warnings.
- Make sure that personnel are not away from components that are in movement.
- When work on an assembly off the ground, make sure that you use the applicable supports. Engage the manual and automatic safety devices of the hydraulic lift.
- Obey all local regulations when you work with flammable materials, example natural gas.
- Remove the expansion tank cap only when the engine is cold and do it gradually to release the pressure in the system.
- Refuel the machine outdoors. Make sure that the area does not have source of ignition and do not smoke.
- Obey all local regulations when you stow dangerous materials. Example flammable or fluids that cause corrosion.
- Use applicable containers to stow dangerous materials.
- Do not change (drill or burn) pressurized containers and make sure that they are in correct working condition and replace if necessary. Discard all cloths soaked in dangerous materials in applicable containers.
- Only use manufacturer approved components.
- A clean work area is a safer work area, make sure that you clean all spills immediately.
- Make sure that all electrical equipment is in correct work condition and obey all local regulations.

2.2.2. Personnel

- When necessary put on your Personnel Protection Equipment (PPE).
- Make sure that all loose clothes do not catch on parts that move.

- Remove all jewelry before you do maintenance or repairs.
- The work area must have applicable airflow when you engage the engine. For example, an extractor fan.
- Do not breathe in the fumes from paint (welding), they are dangerous. Do the operation outdoors or in areas of sufficient airflow.
- When necessary put on applicable breather equipment. For example, if there is paint dust.
- Hot water or steam from the engine and radiator can cause burns.
- Do not touch the fluids that are in the machine systems.

2.2.3. Machine

- When you install components, make sure that they are clean and in correct work condition.
- Make sure that you use applicable containers for components that you remove. For example, bolts or nuts.
- Only use fasteners that are in correct work condition.
- Replace all removed parts that are nylon material.
- Do not let rubber components touch corrosive materials such as diesel fuel or petrol.
- To prevent damage to the electrical components. Make sure that you put a cover on all connectors and control units before you pressure wash the machine.
- Make sure that you tighten all fasteners to the specified torque. Speak to your approved dealer if necessary.
- Before you weld:
- Disconnect all electronic control units, the power cable from the battery positive terminal and all connectors.
- Remove paint with approved agents and clean applicable surfaces with soap and water.
- Use applicable fire-resistant materials to prevent damage to components in which fluids or other flammable materials flow when welding.
- Remove ECUs when temperatures are more than 80o C. For example, if the machine is put in a dryer oven.

2.2.4. Environment

- Obey all local regulations when you discard fluids.

2.3. SAFETY INSTRUCTIONS – FRONT AXLE AND TRANSMISSION

2.3.1. General

- Obey all safety instructions, how to prevent an accident, instructions and all local regulations at all times.
- Risks to different parts and components will decrease and the work condition for the personnel will also be safer.
- Do not use flammable material to clean parts when the parts are at an increased temperature, it can cause fire.
- Deep impacts can cause failure to the mechanical and electromagnetic components.
- Manufacturers approval is necessary to change the safety signs and decals.
- Always operate in a clean and dry environment.
- Keep a safe distance from the machine when applicable, for example during a test operation.

2.3.2. Maintenance

- Before you start maintenance or repair work. Make sure that all tools and equipment are in correct work condition.
- Only approved personnel are to do the maintenance and repair operations.
- In the condition of an component failure, replace the damaged components.
- During the lubrication operations, use the specified maintenance times.
- During the torque operations use the specified torques.
- Clean carefully the work environment and the machine before you do the maintenance operations.
- The work area must have sufficient illumination to do the procedures safely.
- Do not smoke when you do maintenance procedures on the machine.

2.3.3. Personal

- Be careful not to breathe chemical material in dangerous concentrations. Only use sprays and solvents in an area with sufficient airflow.
- Put on the correct protection when necessary.
- Use applicable ear protection to prevent injury to your ears.
- Use the correct clothes when you do work on the machine. Make sure that long hair is also safely tied up.
- Make sure that applicable first aid equipment is available to use at all times.
- Keep all emergency telephone numbers near to your telephone. If an incident occurs it can be important to get medical aid quickly.
- Keep your hands, feet and clothes away from parts that move.
- Do all maintenance operations when the machine is stopped.

- The work environment must always have good air flow.
- Do not breathe in poisonous material used during the machine maintenance. Always use the correct personal protective equipment.

2.3.4. Fire

- Always be prepared for fires:
- - Make sure that you keep the fire extinguisher near you.
- - Before you start the maintenance operation, identify the fire extinguisher nearest to you.
- Before you weld or heat a part, remove the paint from area to be welded or heated.
- Do not use sprays or other flammable materials near the welding area or near heat sources.
- When you use flammable material, you must remove them with soap and water before you weld.
- Remove all containers of flammable material from the work area.

2.3.5. Environment

- The work environment must always have good air flow:
  - If vents are not available, open the doors and the windows in the work area.
  - Only use work areas that have the correct dust and fume air filtration systems in position.
- Pollution by dangerous materials:
  - Lubricant and the cleaning/painting operations are special waste.
  - Make sure that you use the correct container to collect liquid and solid waste.
  - Discard all liquid and solid waste in the specified procedure.
  - Obey all local regulations.

2.4. SAFETY INSTRUCTIONS – ELECTRONICS

2.4.1. General

- When you have to do maintenance on the electrical/electronic circuit, disconnect the batteries from the circuit. Disconnect the chassis ground cable first from the negative terminal of the battery.
- Before you connect the batteries to the system, make sure that you sufficiently insulate the system.
- Disconnect all external recharging equipment from the electrical socket before you remove the recharging equipment from the battery terminals.
- Do not cause sparks to see if voltage is in a circuit.
- Do not use a test lamp to measure circuit continuity. Use the correct control equipment only.
- Make sure that the wiring of electronic devices (length, type of cable, location, straps, connection of screen braiding, grounding, etc.) are to the correct standard for the system.
- Make sure that you carefully restore the system after repair or maintenance work.
- When you measure ECUs, on plug connectors and electrical connections, use the correct test lines only. Only use special plugs and plug-type bushes.
- Do not use not approved equipment such as bare metal wires, screwdrivers, pins or equivalent. This can cause a short circuit and can cause damage to plug-type connections. This can then cause contact problems.

2.4.2. Machine

- Do not use fast chargers to start up the engine. Startup must only be done with more batteries or
- applicable equipment.
- Incorrect polarization of voltage supply to the electronic control units (for example, incorrect polarization of batteries) can cause damage the control unit.
- Disconnect the batteries from the system before you charge them with an external unit. When you connect them to the system, only tighten the connectors (temperature sensors, pressure sensors, etc.) to the specified torque.
- Isolate the circuit before you disconnect the junction connector from an electronic control unit.
- Do not directly supply electrical current to components controlled by an electronic control unit with usual machine voltage.
- Make sure that the cable routing is such that they are not tight and as near to the chassis/body as they can be.
- When you complete maintenance on the electrical circuit, install the electrical connectors and wires to the correct position.
- Electromagnetic disturbances can cause interference when you programme keys.
- When you programme a key:
  - Make sure that there are no sources of electromagnetic disturbance near the keys or in the cab.
  - Keys not in the programming panel must be a minimum of 1 m away from the machine.

2.5. SAFETY INSTRUCTIONS – HYDRAULICS

2.5.1. General

- If the high-pressure hydraulic oil touches the skin, this will cause dangerous injuries. Get medical aid immediately if the hydraulic oil goes into your skin.
- Stop the machine and let it cool before you examine the hydraulic fluids. Use caution when you remove the pressure taps.
- Do not open hydraulic pipe connections while the machine operates. Release the hydraulic pressure before you do maintenance or repairs.
- Tighten all connections before you pressurize the system.
- Examine for leaks with a piece of wood or cardboard. This will prevent injury to the hands and the body.
- High pressure hydraulic fluid can cut the skin, cause bad burns or injury to the eyes.
- If hydraulic fluid causes injury to personnel, get medical aid quickly.
- If fuel goes into the skin you must remove it quickly or dangerous injury will result. Get medical aid immediately.

2.5.2. Welding

- Do not apply heat by welding, soldering or use a flame near pressurized fluid lines or other flammable materials.
- You can accidentally cut pressurized lines when heat goes in to more than the local flame area.
- You can make flammable spray when you put heat near pressurized fluid lines, this can cause burns to personnel.

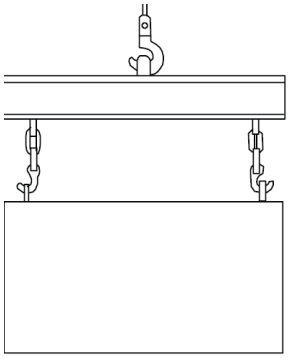
2.6. HANDLING HEAVY COMPONENTS

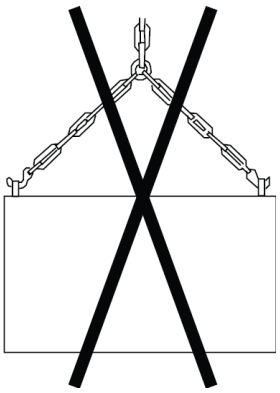
2.6.1. Before starting the procedure

Unless instructions tell differently, we recommend that you use an adjustable lifting equipment in as many lifting operations as possible.

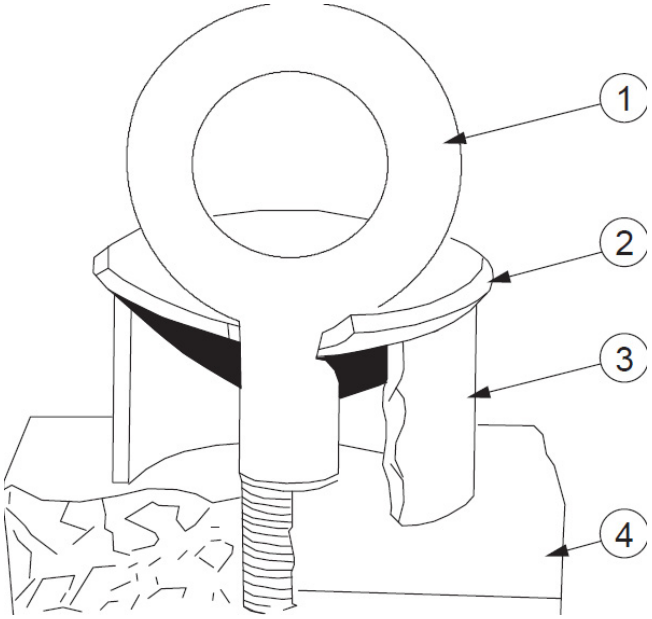
2.6.2. Procedure

- Make sure that the supporting slings are parallel to each other.
- Make sure that the supporting slings are as vertical as possible in relation to the lifted object.
- Use a triangular lifting configuration only when the capacity of the slings is much bigger than the weight of the lifting load.





- Note that the eyebolt capacity is decreased when you lift a component at an angle less than 90°. This is the angle between the lifting slings and the removed or lifted object.



1. Eyebolt
2. Eyebolt support
3. Sleeve
4. Load

- When necessary, you can use an eyebolt support for the forged eyebolt. You can weld the sleeve to the plate, but it is not mandatory.

WARNING: If a part resists removal, check that all nuts and bolts have been removed and that there is no interference from adjacent parts.

- Do not do repair work on the lifted object when it is still attached to the lifting slings.

2.7. CLEANING COMPONENTS

To ensure long life of a machine, it is important to keep dirt and foreign material out of its vital working components. Enclosed compartments, seals and filters have been provided to keep the supply of air, fuel and lubricant clean. These protective devices must not be removed.
Cleaning and covering precautions should be taken while disconnecting hydraulics, fuel, lubricating oil or lines and while removing access covers or inspection plates.

2.7.1. Procedure

- Clean the point of disconnection and the surrounding area.
- Cap, plug or tape the line or opening to prevent the ingress of foreign material.
- Clean and inspect all parts.
- Make sure that all passages and holes are clear.
- Cover all parts to keep them clean.
- Make sure parts are clean when they are reassembled.
- Keep new parts in their wrapping until they are actually needed.

2.8. ASSEMBLING COMPONENTS

2.8.1. Before starting the procedure

NOTE: Before fitting new parts, remove rust-preventive compound from all machined surfaces.
NOTE: Do not fit any components other than those originally intended for a particular purpose. The use of other than original AGCO Parts replacement parts invalidates the responsibility of AGCO Power Inc. for meeting the emission requirements.

2.8.2. Procedure

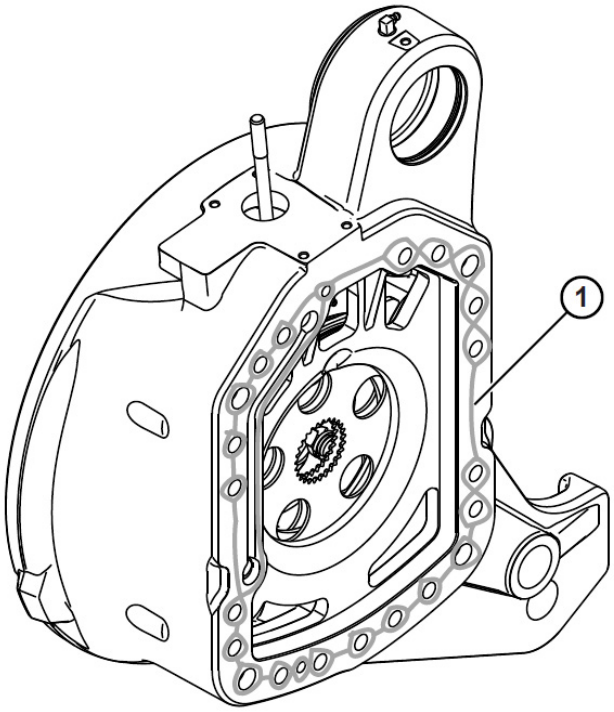
- Complete each step-in sequence when reassembling a machine.
- Never partially assemble one part then start to assemble another.
- Make all recommended adjustments.
- Make sure that nothing has been overlooked.
- Always check the job on completion.

- Recheck the various adjustments before putting the machine back into service.

2.9. APPLYING SEALANTS

2.9.1. Procedure

- Clean the surface from old sealant and grease.
- Apply a continuous bead of sealant on one counterpart surface.



1. Sealant

- Encircle all holes in the surface. Make sure that you do not plug oil lines and drillings with the sealant.
- Fit the parts as soon as possible.

2.10. ASSEMBLING ROTATING PISTON RINGS

IMPORTANT: It is recommended to replace rotating piston rings with new ones every time they are removed.

2.10.1. Procedure

- Make sure there are no dents in the piston ring.
- Make sure that the walls of the groove are undamaged and straight.

2.11. ASSEMBLING SHIMS

2.11.1. Procedure

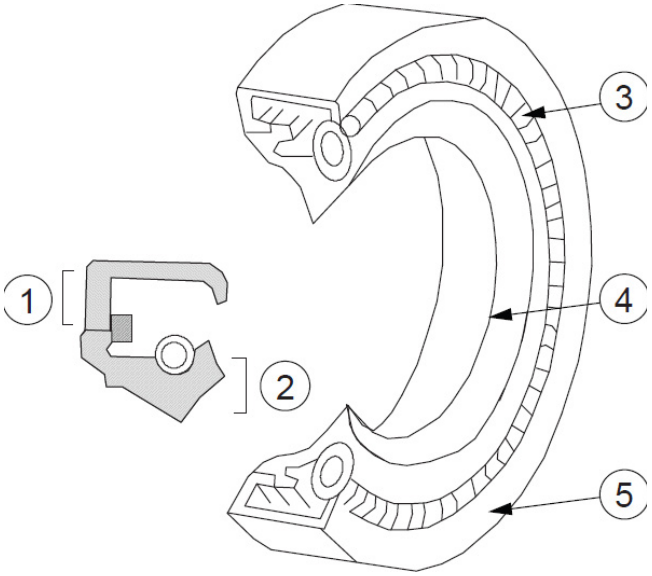
- Tie the shims together.
- Mark the locations of the shims before removal.
- Keep the shims clean.
- Do not bend the shims.

2.12. ASSEMBLING GASKETS

2.12.1. Procedure

- Make sure that the holes in gaskets are lined up with lubricating oil passages in the mating parts.

2.13. ASSEMBLING LIP TYPE RUBBER SEALS



1. Heel
2. Toe
3. Case
4. Sealing element
5. Ring spring

2.13.1. Procedure

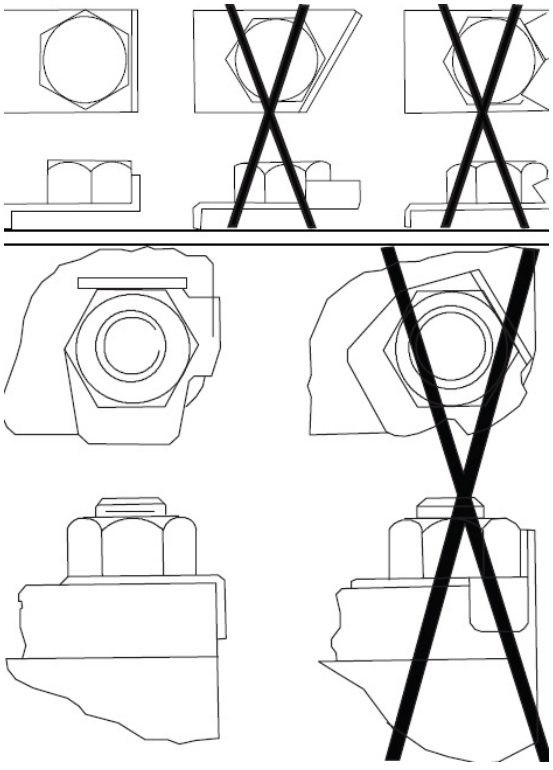
- Lubricate the lips of lip type rubber seals with oil before fitting.
- Do not use grease on seals, except for grease seals.

2.14. ASSEMBLING CABLES AND WIRES

2.14.1. Procedure

- Label each cable or wire when removing or disconnecting a group of cables or wires to ensure correct assembly.

2.15. ASSEMBLING LOCKING DEVICES

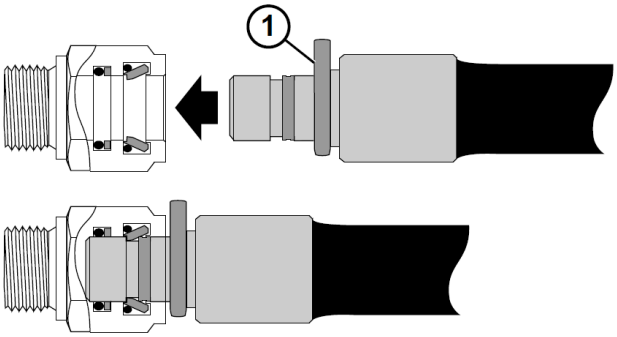


2.15.1. Procedure

- Prevent slackening of nuts and bolts.
- Slackening can be prevented by mechanical means such as lock washers, tab washers and cotter pins, or by Loctite type locking agents.
- Install flat retainers properly.
- Bend one end of the retainer against the edge of the part.
- Bend the other end against one of the nut or bolt head.
- Fit new retainers in compartments which house moving parts.
- Place a flat washer between the lock washer and the aluminium housing.

NOTE: Never fit a lock washer under a nut or screw to which a specified torque has to be applied.
NOTE: Always thoroughly degrease components before applying locking agents.

2.16. CONNECTING AND DISCONNECTING WEO CONNECTORS



1. Assembly stop

2.16.1. Procedure

To connect:

- Fit the assembly stop on the male part.
- Push the male part until the assembly stop reaches the female part.
- Pull back to verify the connection.

To disconnect:

- Remove the assembly stop.
- Push the male part completely into the female part and pull out.
- Fit the assembly stop.

2.17. STARTING THE ENGINE AFTER MAJOR MAINTENANCE

2.17.1. Before starting the procedure

Some parts in the exhaust system can be damaged easily by the increased amount of oil and impurities after maintenance work. The system can have excess oil after a major engine overhaul, for example when the pistons are lubricated during the assembly.

IMPORTANT: Excessive oil can damage the catalysts.

2.17.2. Procedure

Do not connect the exhaust system to the engine.
Run the engine for 1-2 minutes on high idle, that is, at full engine speed without load. Running the engine burns the extra oil and impurities from the engine.

CAUTION: Make sure the room is ventilated. Use hearing protectors.

2.17.2.1 Connect the exhaust system to the engine.

2.18. SAFETY PRECAUTIONS FOR THE ELECTRICAL SYSTEM

Follow the safety precautions for the electrical system.

IMPORTANT: Make sure that the main power is turned off before disconnecting or reconnecting the battery.
IMPORTANT: Disconnect the negative lead of the battery first and connect it last.
IMPORTANT: Always connect the battery with the correct polarity.
IMPORTANT: Disconnect the negative battery lead before removing the alternator.
IMPORTANT: Never open the charging circuit while the engine is running.
IMPORTANT: Ensure good ventilation when charging.
IMPORTANT: Do not connect any additional electrical equipment, as this may damage components of the existing electrical system.
IMPORTANT: All electronic equipment is sensitive to electrostatic discharge (ESD). Take all necessary measures to minimize or eliminate the risk of equipment being damaged by ESD.

3 Identification

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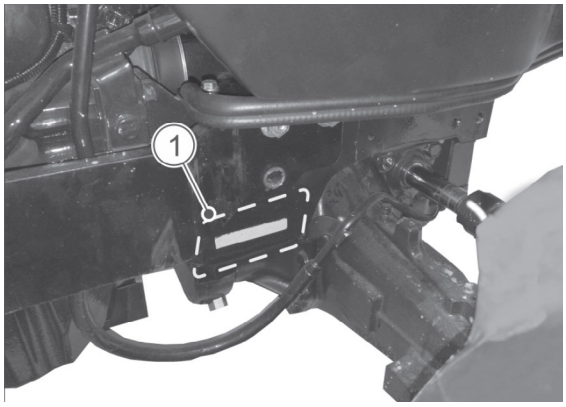
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3.1. IDENTIFICATION PLATE / SERIAL NUMBER PLATE LOCATIONS

Each machine has the identification plates recorded in this section. The identification number on the plates is a numeric or alphanumeric ID that identifies the component or assembly in an issuing database. These serial numbers are necessary for warranty claims, when you order components or to identify a tractor or component. In addition, they are necessary for law enforcement to find your machine if stolen. Make sure that you keep the data on the identification plates clean and replace an identification plate with damage. Accurately record the serial number in the text boxes supplied.

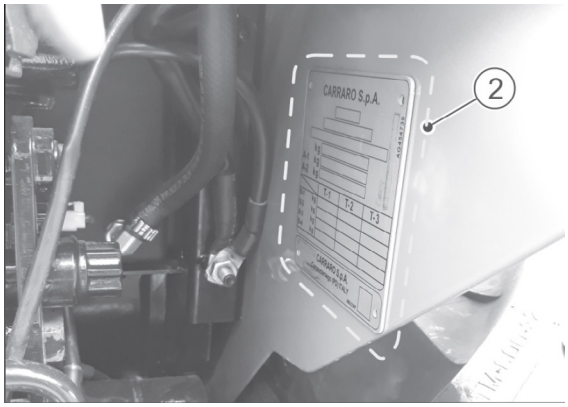
3.1.1. Vehicle identification number

The vehicle identification number (1) is marked on front axle support on rear side.



3.1.2. Product identification number

Nameplate (2) bearing the tractor identification number is at the front end of the vehicle. Identification plate location and dimensions can vary according to the various regulations applicable in some countries.



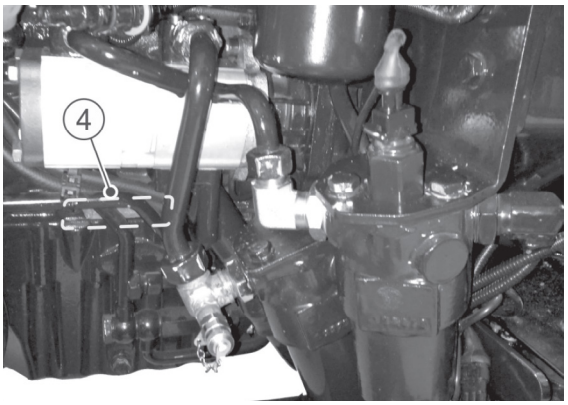
3.1.3. Safety structure plates

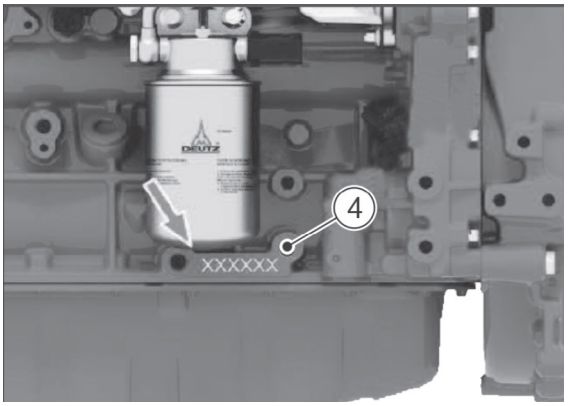
Nameplate (3) bearing the protection structure identification number is at the front end of the vehicle. Identification plate location and dimensions can vary according to the various regulations applicable in some countries.



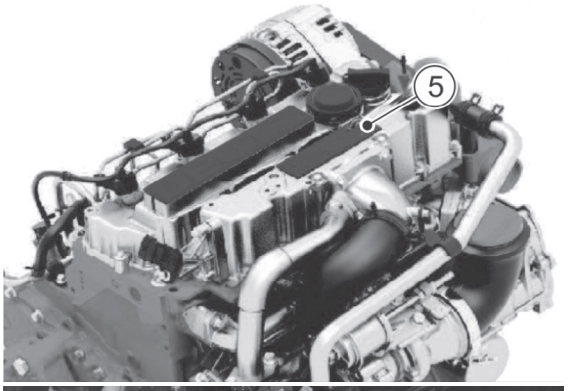
3.1.4. Engine

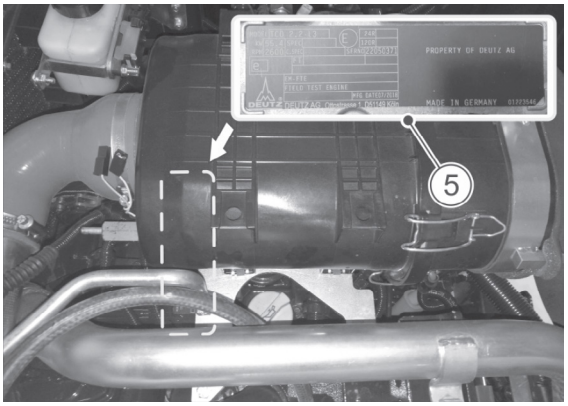
Nameplate (4) bearing the engine serial number is on the engine LH side.





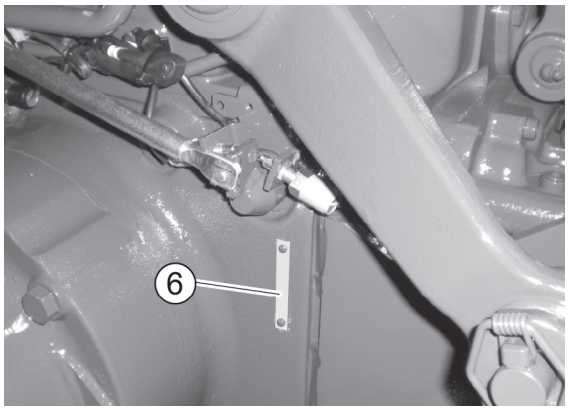
Engine serial number is also on Rating plate (5) on the top RH side of engine.





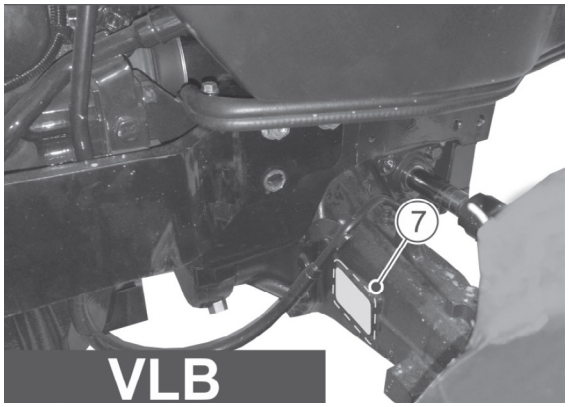
3.1.5. Transmission

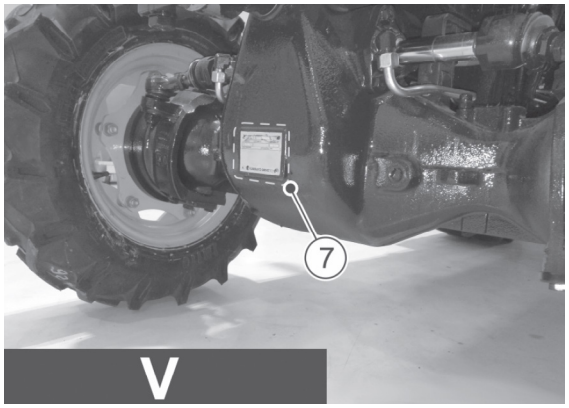
Nameplate (6) bearing the transmission serial number is at the back of the machine, in the top LH corner of the gearbox.



3.1.6. Front axle

Nameplate (7) bearing front driving axle serial number is located, depending on the model, on the front axle as shown in the figure.





4 Electrical system

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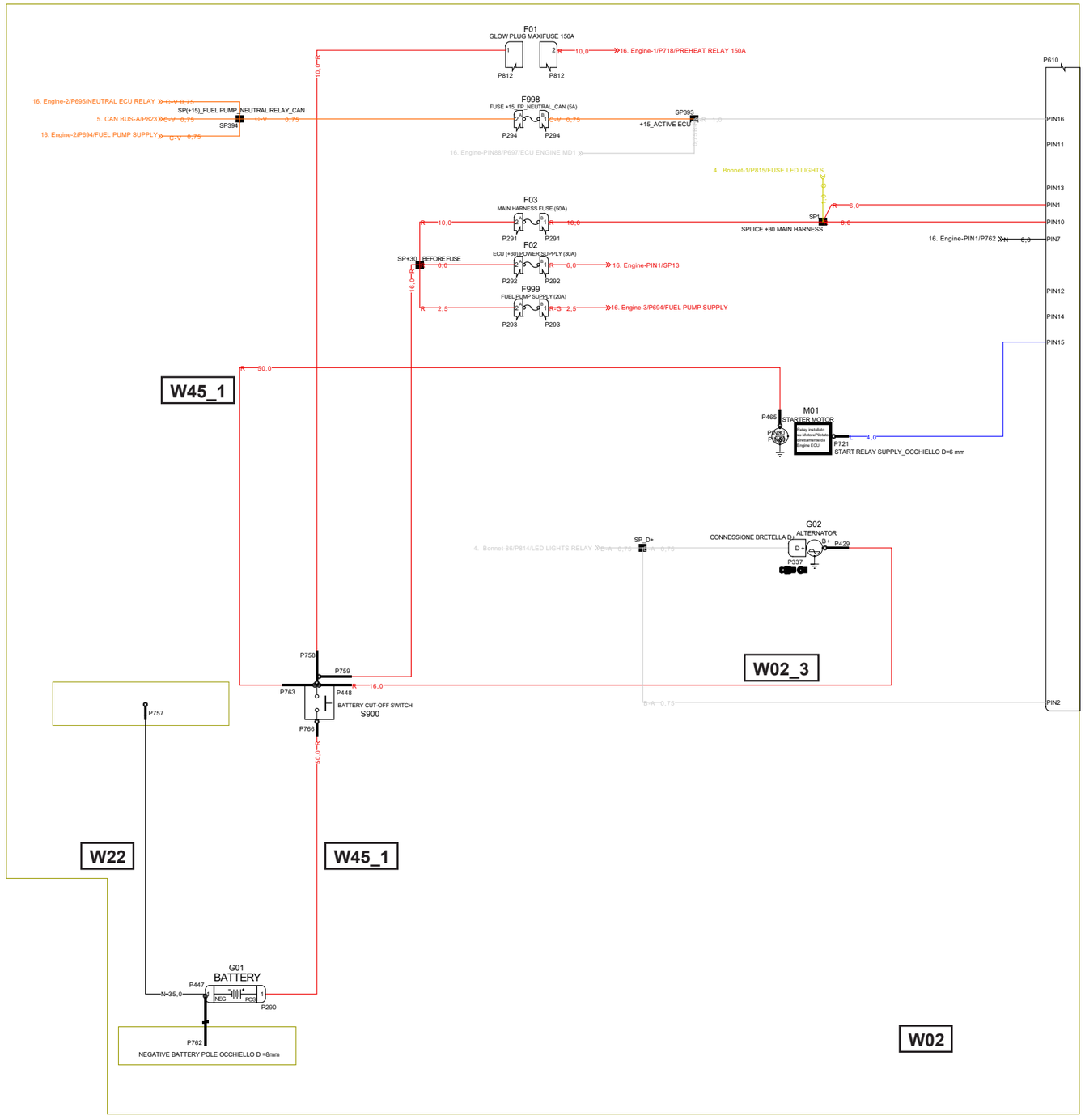
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4.1. FUNCTIONAL SCHEMATICS

4.1.1. Mechanical version

Harness name	Harness description
W01	MAIN - MECHANICAL
W02	DEUTZ ENGINE
W02_1	ALTERNATOR EXTENSION D+
W02_4	FUEL PRESS SENSOR EXTENSION
W05	BONNET
W05_2	LED LIGHT POWER SUPPLY
W06	TRAILER BRAKE VALVE - ITA
W06	TRAILER BRAKE VALVE - MR
W11_1	ELCTRONIC REAR HITCH ACTUATORS
W14	LICENSE PLATE
W17	BEACON LIGHT EXTENSION
W21	BATTERY POSITIVE CABLE + CUT-OFF
W21_1	BATTERY CHARGE
W22	BATTERY NEGATIVE CABLE
W29_1	BRAKE PEDAL SWITCHES (LH+RH) EXTENSION
W38C	ENGINE
W38C	ENGINE
W38D	GLOW PLUG
W38E	STARTER MOTOR
W44	DIAGNOSTIC SOCKET
W45_4	GROUND CABLE

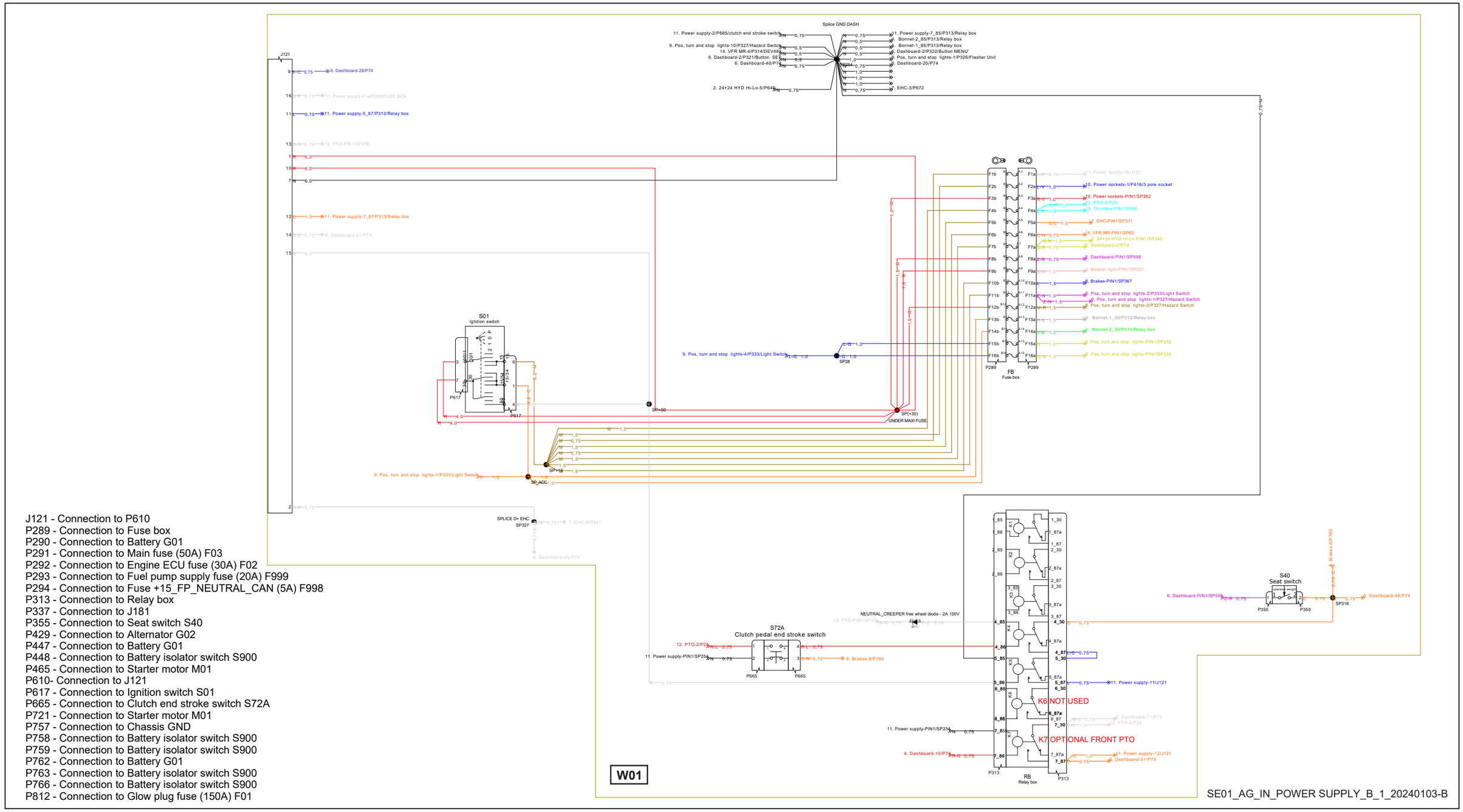
4.1.1.1 Schematic 1



J121 - Connection to P610
P289 - Connection to Fuse box
P290 - Connection to Battery G01
P291 - Connection to Main fuse (50A) F03
P292 - Connection to Engine ECU fuse (30A) F02
P293 - Connection to Fuel pump supply fuse (20A) F999
P294 - Connection to Fuse +15_FP_NEUTRAL_CAN (5A) F998
P313 - Connection to Relay box
P337 - Connection to J181
P355 - Connection to Seat switch S40
P429 - Connection to Alternator G02
P447 - Connection to Battery G01
P448 - Connection to Battery isolator switch S900
P465 - Connection to Starter motor M01
P610- Connection to J121
P617 - Connection to Ignition switch S01
P665 - Connection to Clutch end stroke switch S72A
P721 - Connection to Starter motor M01
P757 - Connection to Chassis GND
P758 - Connection to Battery isolator switch S900
P759 - Connection to Battery isolator switch S900
P762 - Connection to Battery G01
P763 - Connection to Battery isolator switch S900
P766 - Connection to Battery isolator switch S900
P812 - Connection to Glow plug fuse (150A) F01

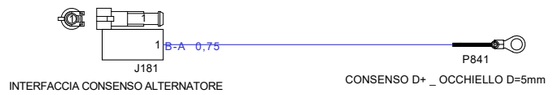
SE01_AG_IN_POWER SUPPLY_

4.1.1.2 Schematic 2



J121 - Connection to P610
P289 - Connection to Fuse box
P290 - Connection to Battery G01
P291 - Connection to Main fuse (50A) F03
P292 - Connection to Engine ECU fuse (30A) F02
P293 - Connection to Fuel pump supply fuse (20A) F999
P294 - Connection to Fuse +15_FP_NEUTRAL_CAN (5A) F998
P313 - Connection to Relay box
P337 - Connection to J181
P355 - Connection to Seat switch S40
P429 - Connection to Alternator G02
P447 - Connection to Battery G01
P448 - Connection to Battery isolator switch S900
P465 - Connection to Starter motor M01
P610- Connection to J121
P617 - Connection to Ignition switch S01
P665 - Connection to Clutch end stroke switch S72A
P721 - Connection to Starter motor M01
P757 - Connection to Chassis GND
P758 - Connection to Battery isolator switch S900
P759 - Connection to Battery isolator switch S900
P762 - Connection to Battery G01
P763 - Connection to Battery isolator switch S900
P766 - Connection to Battery isolator switch S900
P812 - Connection to Glow plug fuse (150A) F01

4.1.1.3 Schematic 3



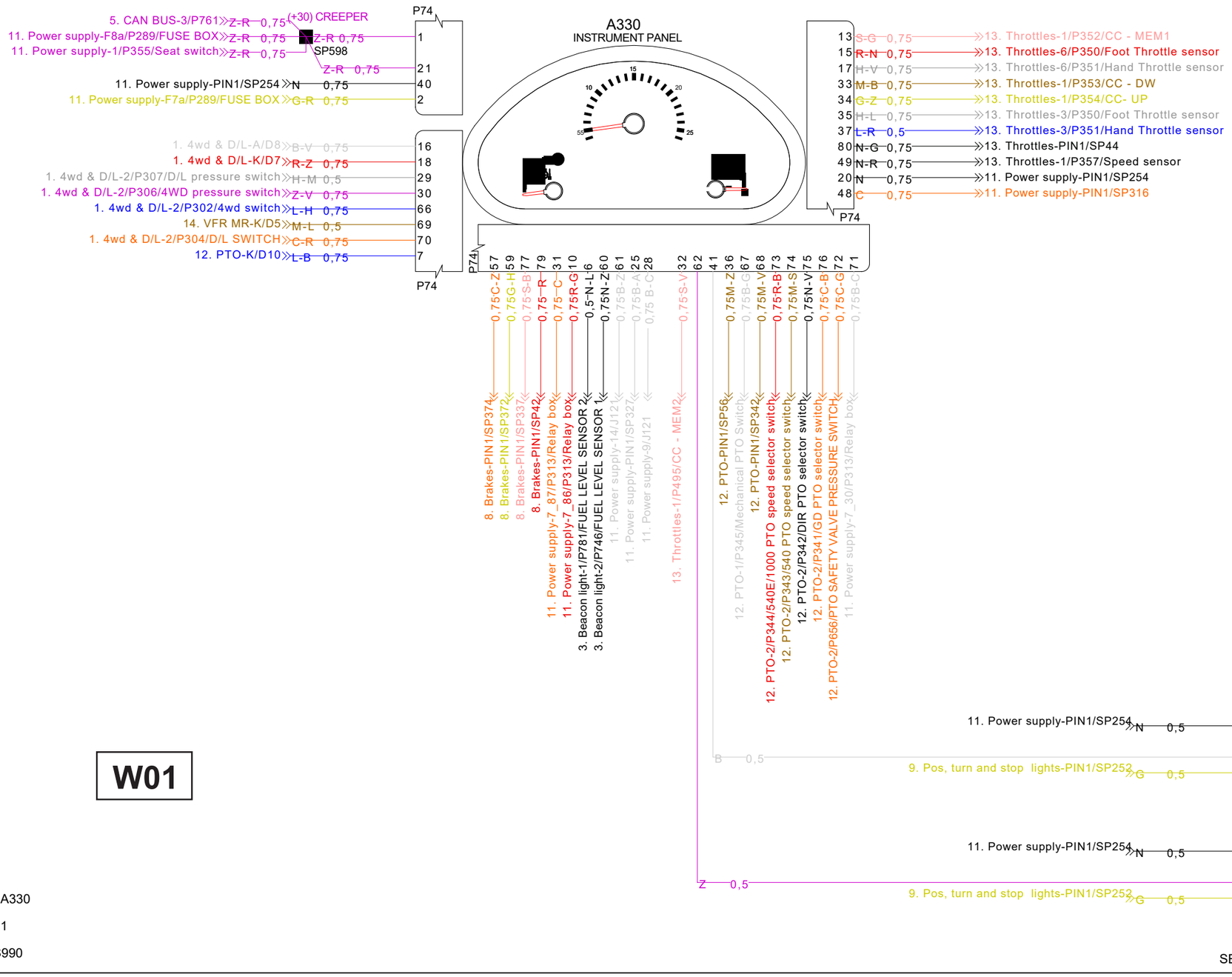
W02_1

J181 - Connection to P337

P841 - Connection to Alternator G02

SE01.1_AG_IN_ALTERNATOR CABLE_B_1_20191017

4.1.1.4 Schematic 4



W01

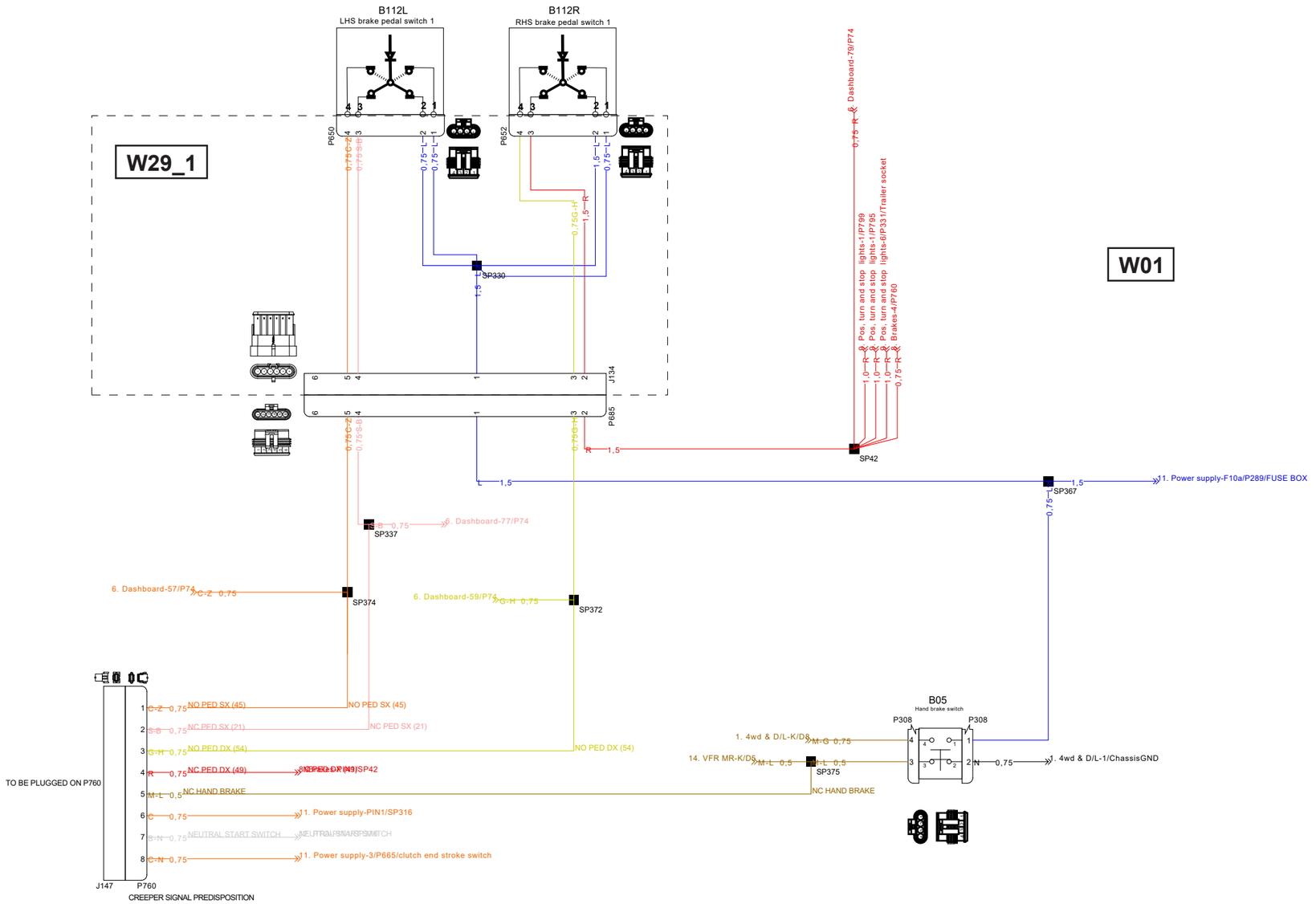
P74 - Connection to Instrument panel A330

P321 - Connection to Button SET S991

P322 - Connection to Button MENU' S990

SE02_AG_IN_INSTRUMENT PANEL_B_1_20240103

4.1.1.5 Schematic 5



J134 - Connection to P685

J147 - Connection to Creeper signal predisposition P760

P308 - Connection to Hand brake switch B05

P652 - Connection to RHS brake pedal switch B112R

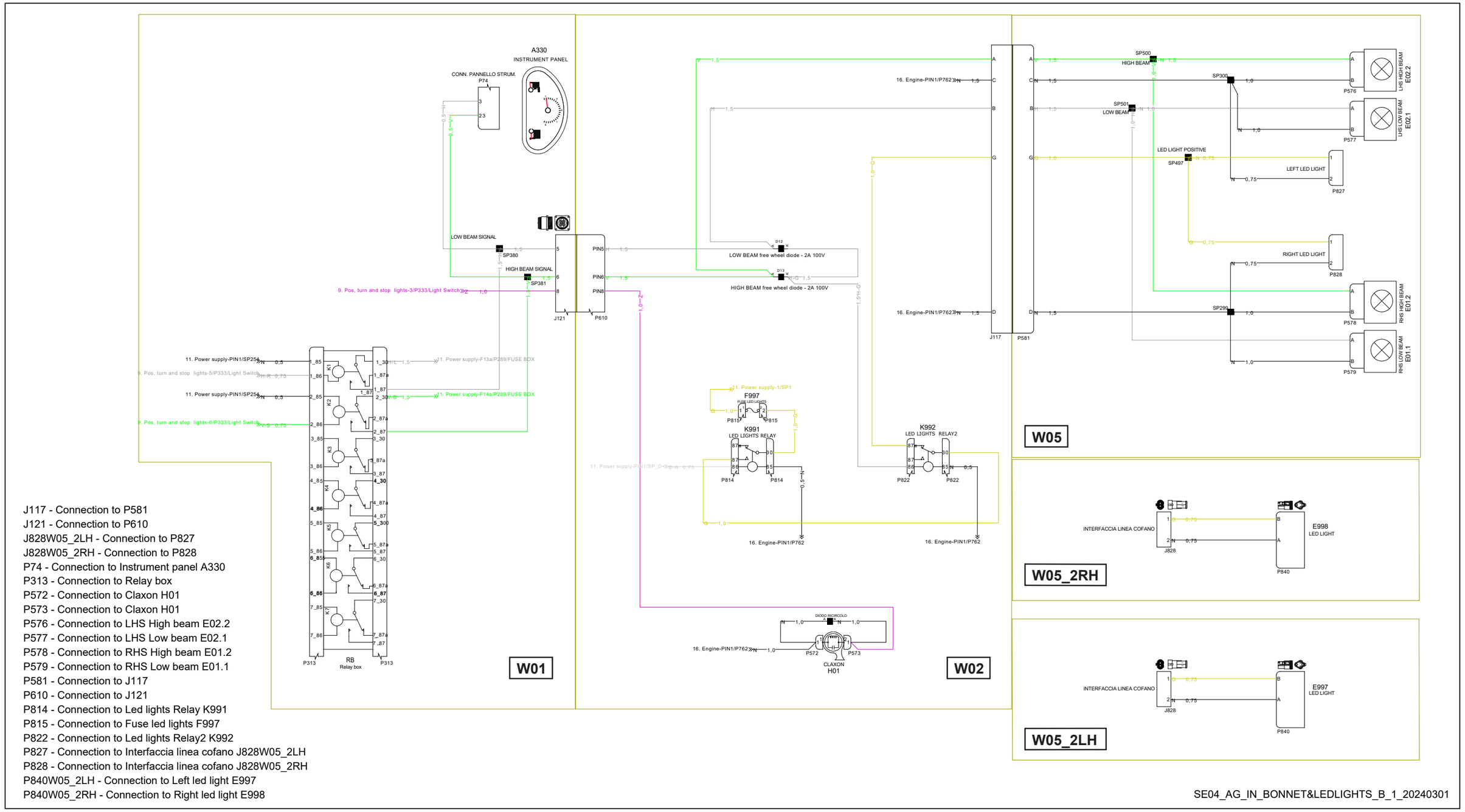
P650 - Connection to LHS brake pedal switch B112L

P685 - Connection to J134

P760 - Connection to J147

SE02_1_AG_IN_BRAKES_B_1_20191010

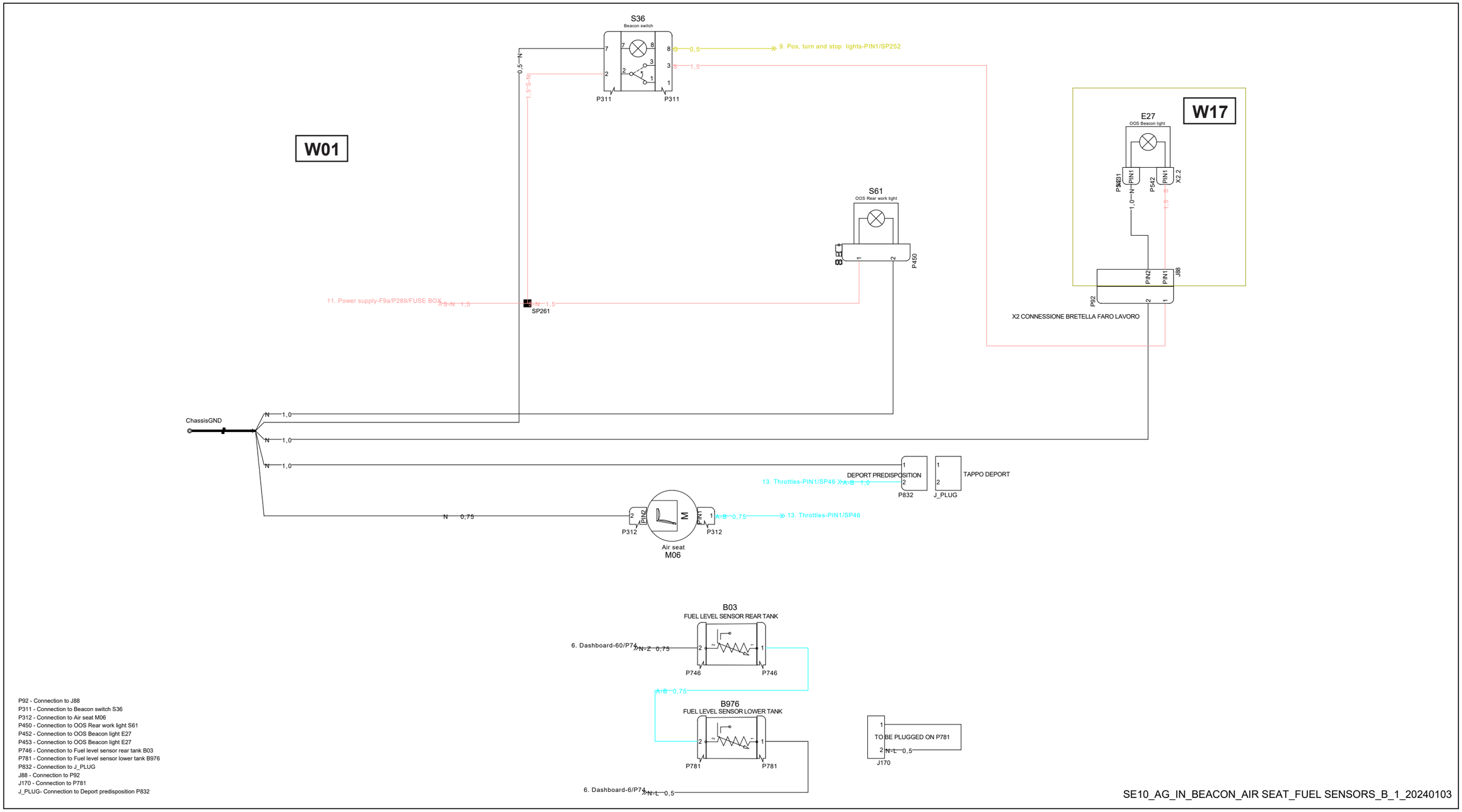
4.1.1.6 Schematic 6



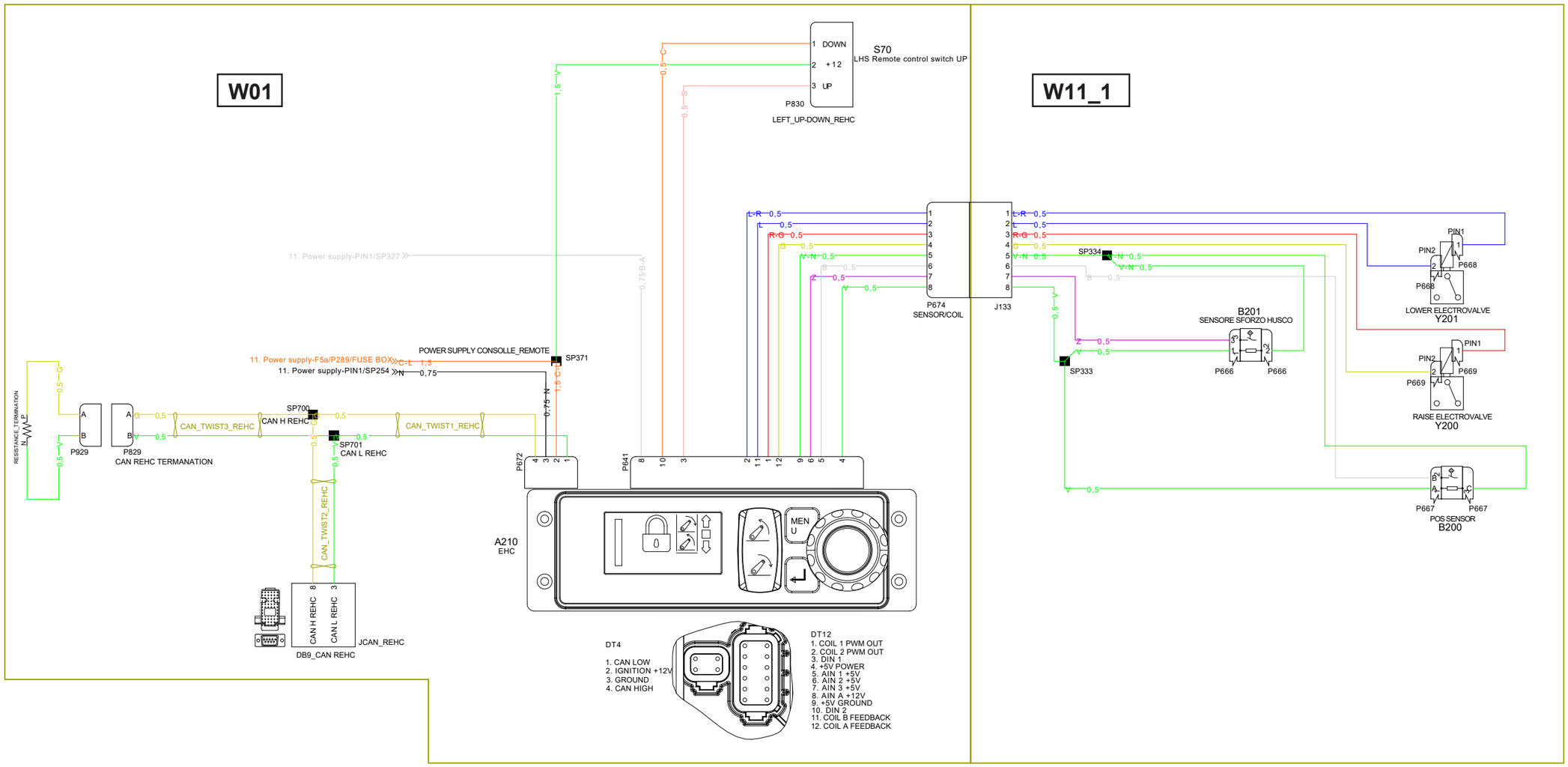
J117 - Connection to P581
J121 - Connection to P610
J828W05_2LH - Connection to P827
J828W05_2RH - Connection to P828
P74 - Connection to Instrument panel A330
P313 - Connection to Relay box
P572 - Connection to Claxon H01
P573 - Connection to Claxon H01
P576 - Connection to LHS High beam E02.2
P577 - Connection to LHS Low beam E02.1
P578 - Connection to RHS High beam E01.2
P579 - Connection to RHS Low beam E01.1
P581 - Connection to J117
P610 - Connection to J121
P814 - Connection to Led lights Relay K991
P815 - Connection to Fuse led lights F997
P822 - Connection to Led lights Relay2 K992
P827 - Connection to Interfaccia linea cofano J828W05_2LH
P828 - Connection to Interfaccia linea cofano J828W05_2RH
P840W05_2LH - Connection to Left led light E997
P840W05_2RH - Connection to Right led light E998

SE04_AG_IN_BONNET&LEDLIGHTS_B_1_20240301

4.1.1.7 Schematic 7



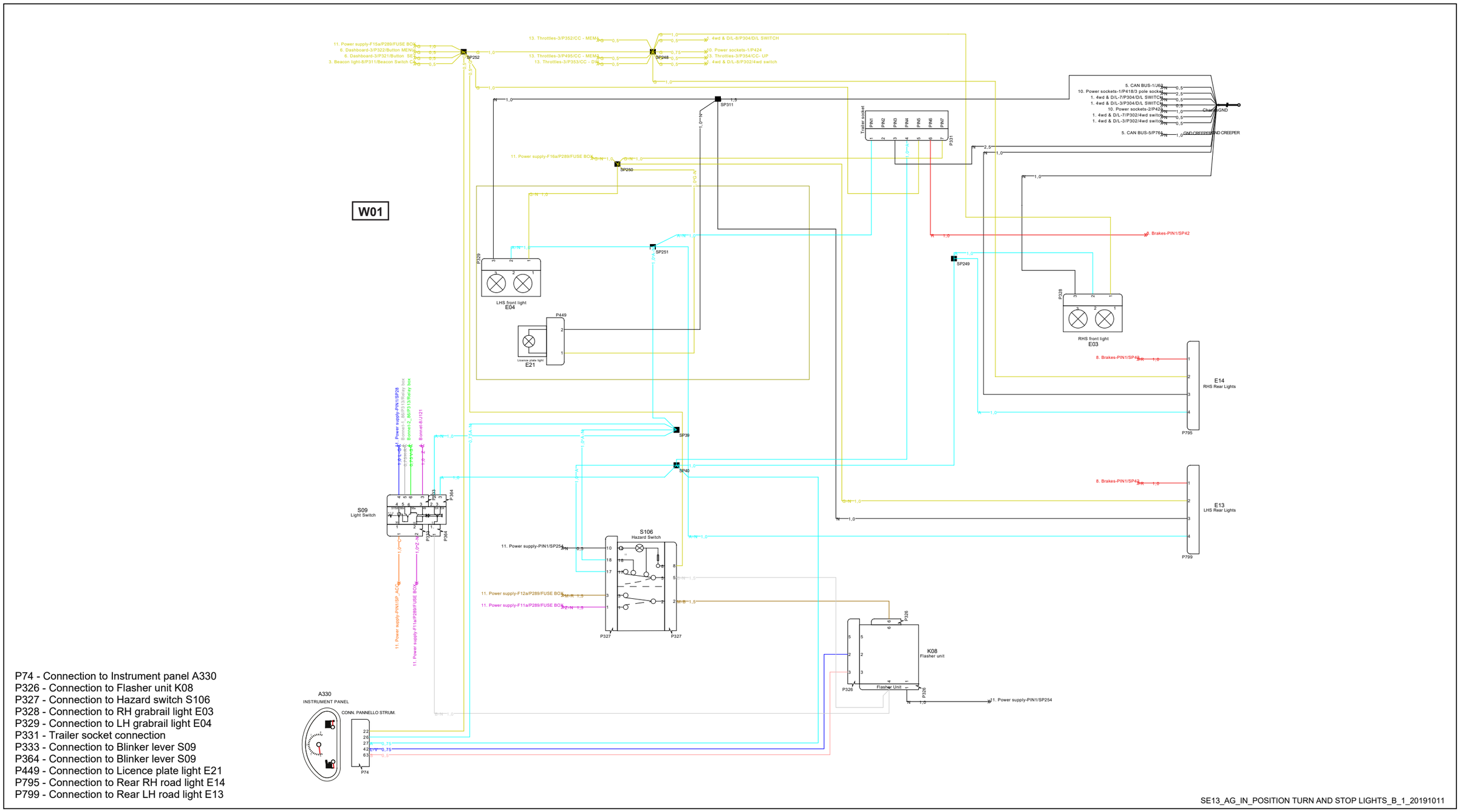
4.1.1.8 Schematic 8



J133 - Connection to P674
J830 - Connection to Predisposizione CAN RECH P829
P666 - Connection to Electronic hitch draft sensor B201
P667 - Connection to Electronic hitch position sensor B200
P668 - Connection to Electronic hitch solenoid valve DOWN Y201
P669 - Connection to Electronic hitch solenoid valve UP Y200
P641 - Connection to Electronic hitch control unit A210
P672 - Connection to Electronic hitch control unit A210
P674 - Connection to J133
P829 - Connection to predisposizione can REHC J830
P830 - Connection to LHS Remote control switch UP S70
P829 - Connection to Resistance termination P929

SE12_AG_IN_EHC_B_1_20

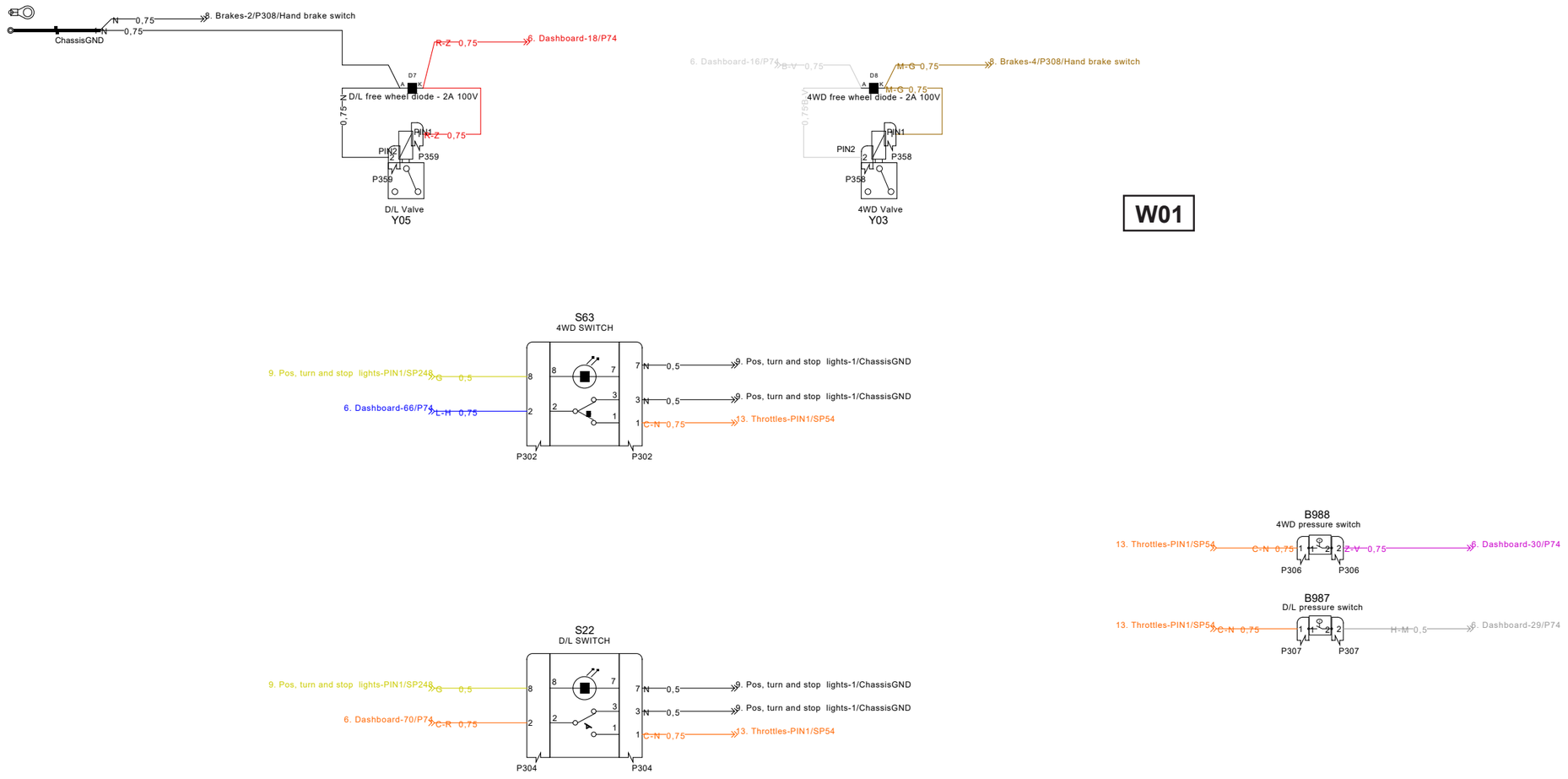
4.1.1.9 Schematic 9



P74 - Connection to Instrument panel A330
P326 - Connection to Flasher unit K08
P327 - Connection to Hazard switch S106
P328 - Connection to RH grabrail light E03
P329 - Connection to LH grabrail light E04
P331 - Trailer socket connection
P333 - Connection to Blinker lever S09
P364 - Connection to Blinker lever S09
P449 - Connection to Licence plate light E21
P795 - Connection to Rear RH road light E14
P799 - Connection to Rear LH road light E13

SE13_AG_IN_POSITION TURN AND STOP LIGHTS_B_1_20191011

4.1.1.10 Schematic 10



P302 - Connection to 4WD switch S63

P304 - Connection to Diff-lock switch S22

P306 - Connection to 4WD pressure switch B988

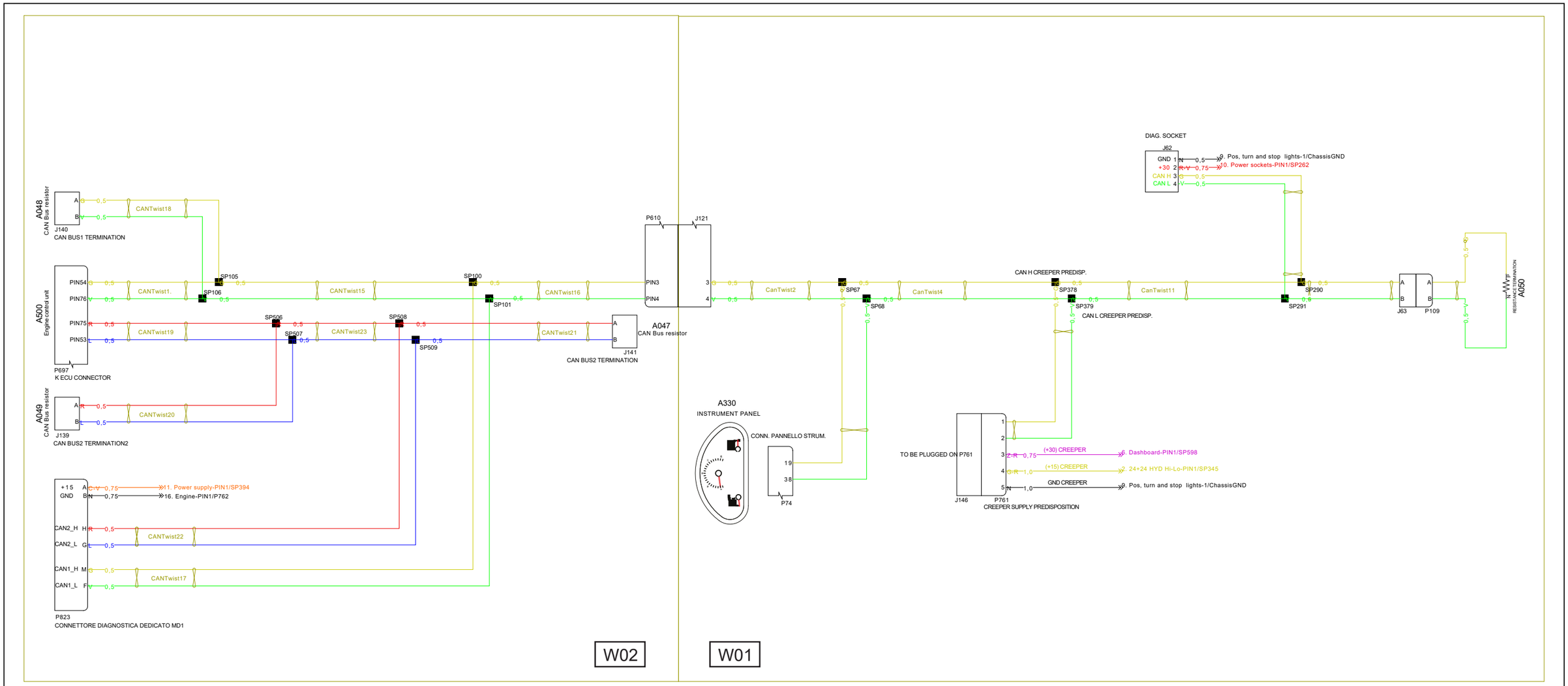
P307 - Connection to Diff-lock pressure switch B987

P358 - Connection to Diff-lock solenoid valve Y05

P359 - Connection to 4WD valve Y03

SE15_AG_IN_4WD&DL_B_1_20191009

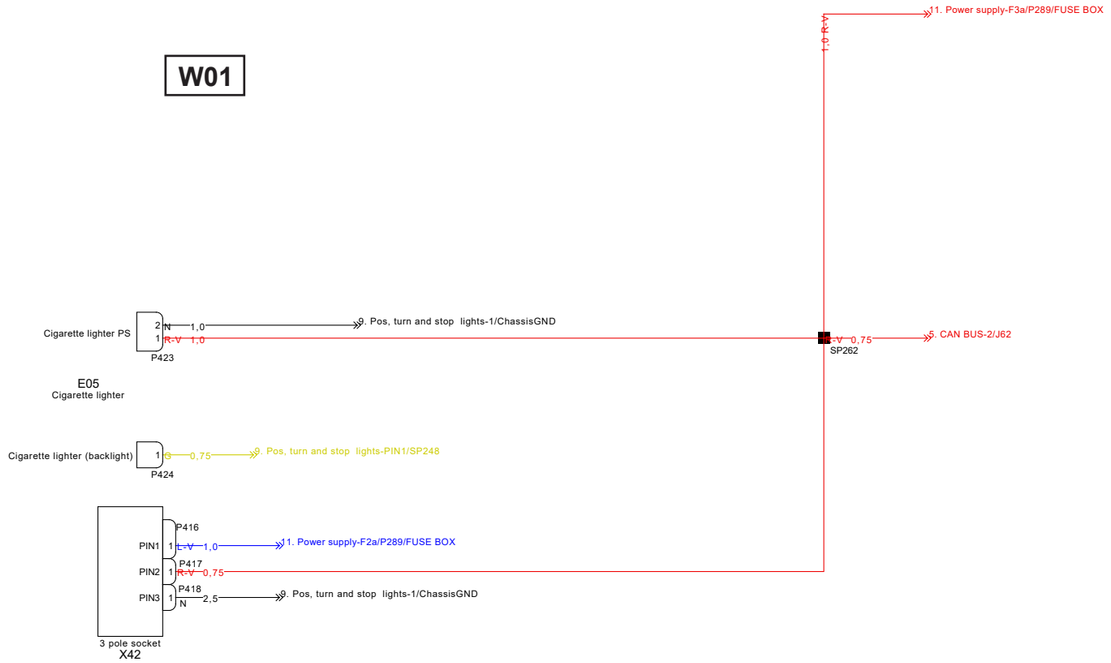
4.1.1.11 Schematic 11



J62 - Connection to diagnostic socket
J63 - Connection to P109
J121 - Connection to P610
J139 - Connection to CAN Bus resistor A049
J140 - Connection to CAN Bus resistor A048
J141 - Connection to CAN Bus resistor A047
J146 - Connection to Creeper supply predisposition P761
P74 - Connection to Instrument panel A330
P109 - Connection to CAN Bus resistor A050
P610 - Connection to J121
P697 - Connection to Engine control unit A500
P761 - Connection to J146
P823 - Connection to diagnostic MD1

SE19_AG_IN_CANBUS_B_1_20240103

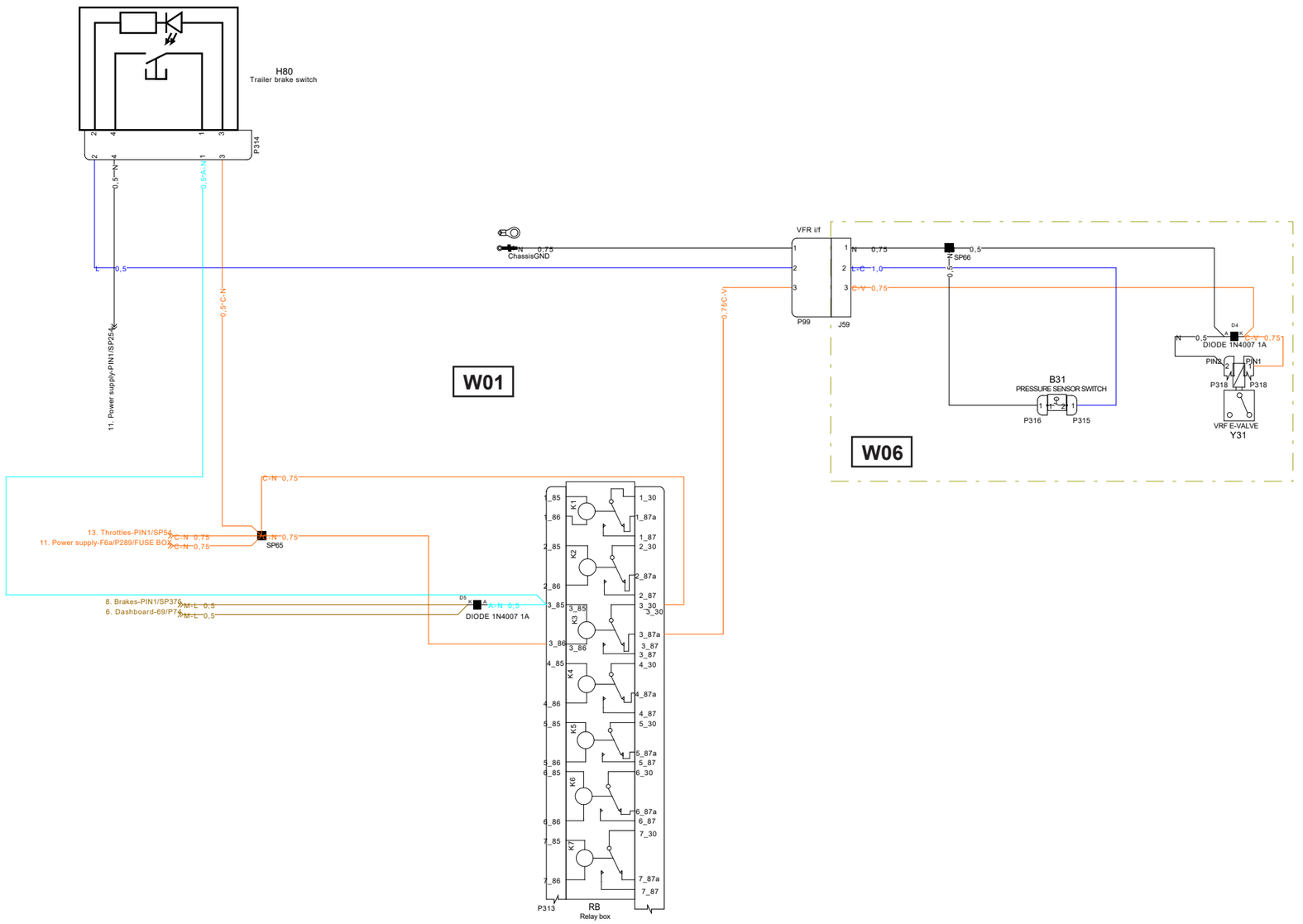
4.1.1.12 Schematic 12



P416 - Connection to 3 pole socket X42
P417 - Connection to 3 pole socket X42
P418 - Connection to 3 pole socket X42
P423 - Connection to Cigarette lighter (PS) E05
P424 - Connection to Cigarette lighter (Backlight) E05

SE23_AG_IN_POWERSOCKETS_B_1_20191011

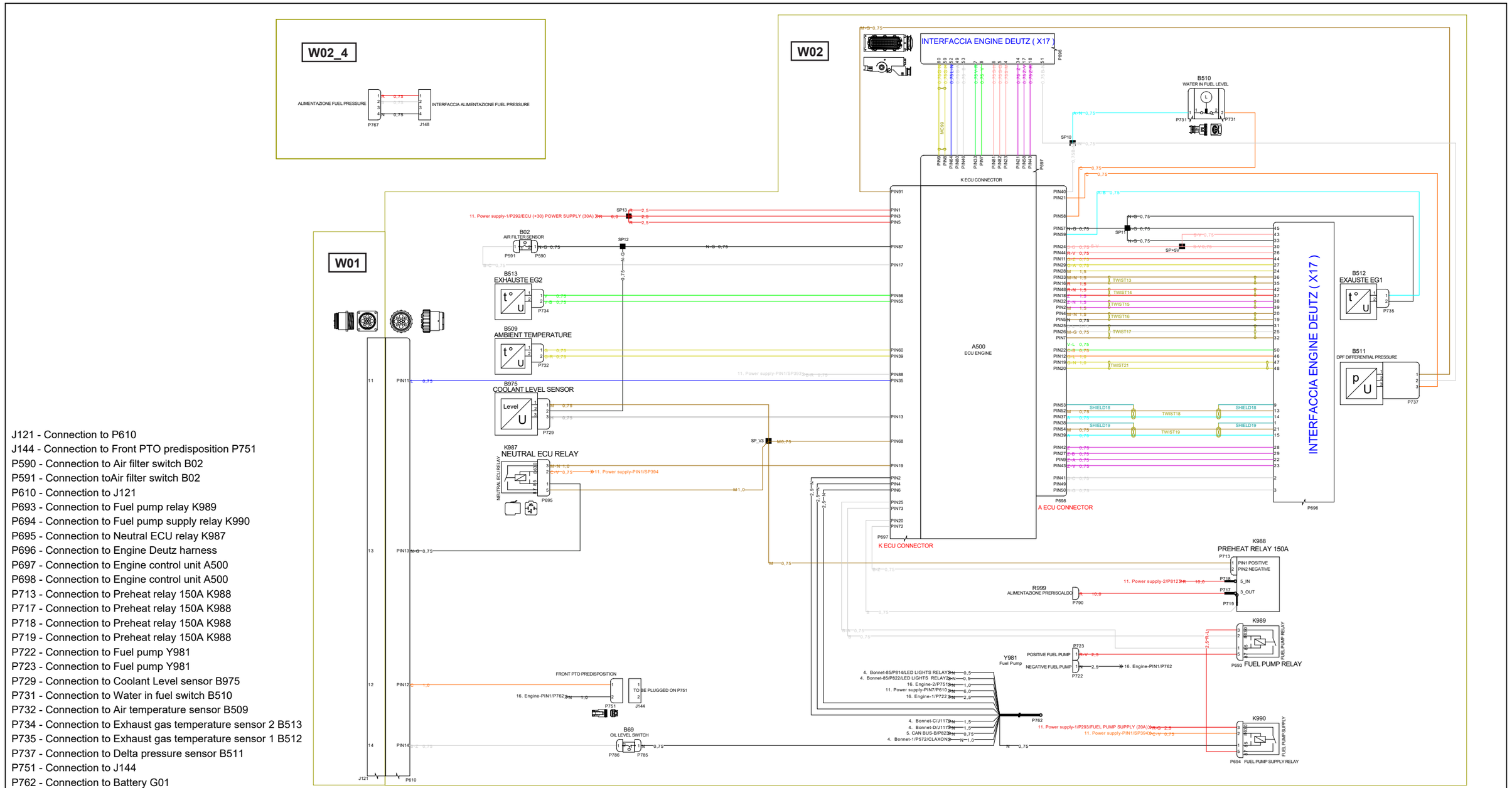
4.1.1.13 Schematic 13



J59 - Connection to P99
P99 - Connection to J59
P313 - Connection to Relay box
P314 - Connection to Trailer brake switch H80
P315 - Connection to Trailer brake pressure sensor B31
P316 - Connection to Trailer brake pressure sensor B31
P318 - Connection to Trailer brake solenoid valve Y31

SE26_AG_IN_TBVMR_B_1_20240301

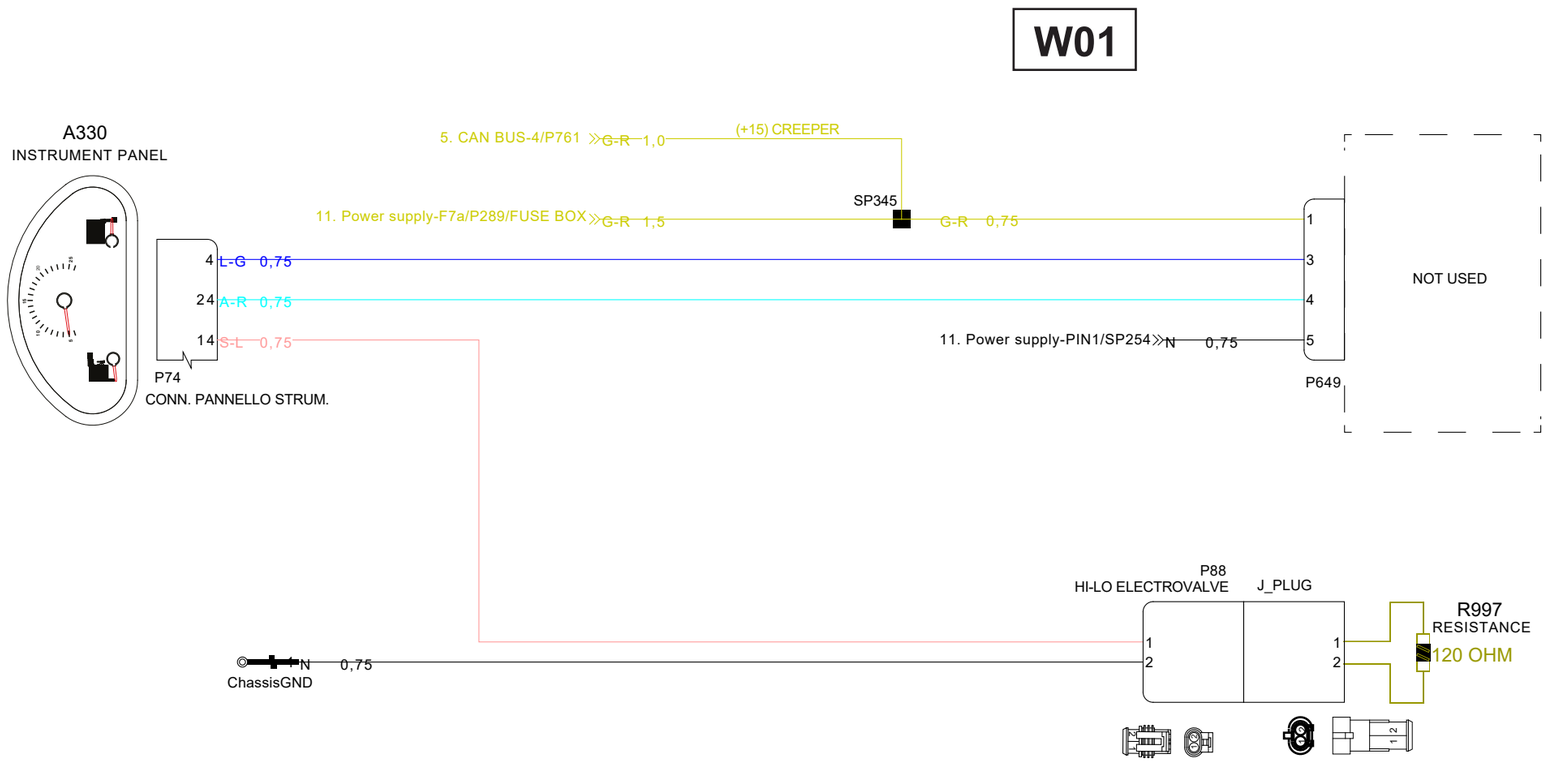
4.1.1.14 Schematic 14



J121 - Connection to P610
J144 - Connection to Front PTO predisposition P751
P590 - Connection to Air filter switch B02
P591 - Connection toAir filter switch B02
P610 - Connection to J121
P693 - Connection to Fuel pump relay K989
P694 - Connection to Fuel pump supply relay K990
P695 - Connection to Neutral ECU relay K987
P696 - Connection to Engine Deutz harness
P697 - Connection to Engine control unit A500
P698 - Connection to Engine control unit A500
P713 - Connection to Preheat relay 150A K988
P717 - Connection to Preheat relay 150A K988
P718 - Connection to Preheat relay 150A K988
P719 - Connection to Preheat relay 150A K988
P722 - Connection to Fuel pump Y981
P723 - Connection to Fuel pump Y981
P729 - Connection to Coolant Level sensor B975
P731 - Connection to Water in fuel switch B510
P732 - Connection to Air temperature sensor B509
P734 - Connection to Exhaust gas temperature sensor 2 B513
P735 - Connection to Exhaust gas temperature sensor 1 B512
P737 - Connection to Delta pressure sensor B511
P751 - Connection to J144
P762 - Connection to Battery G01
P785 - Connection to Brakes oil level switch B69
P786 - Connection to Brakes oil level switch B69
P790 - Connection to Alimentazione preriscaldo R999

SE91_AG_IN_ENGINE_B_1_20191015

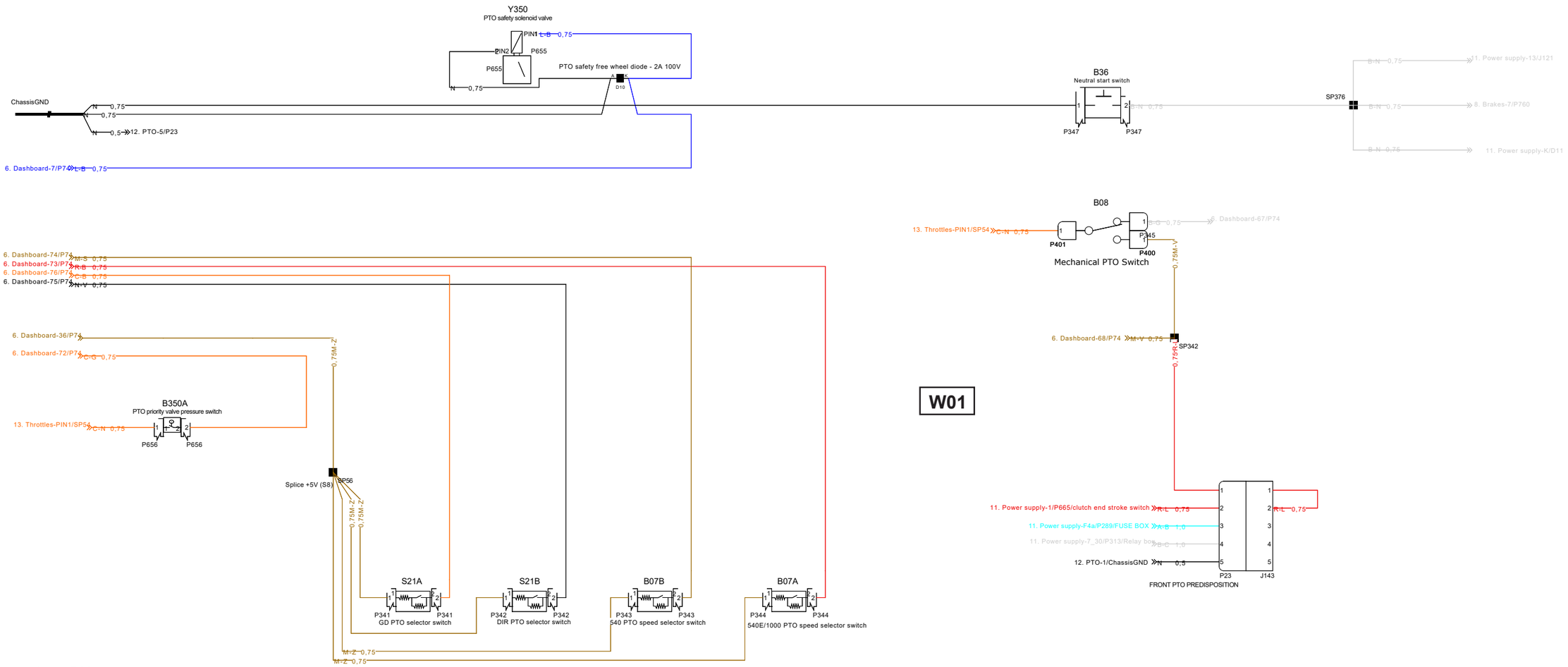
4.1.1.15 Schematic 15



P74 - Connection to Instrument panel A330
P88 - Connection to Resistance 120 Ohms R997
P649 - NOT USED

SE92_AG_IN_HI-LO_B_1_20191009

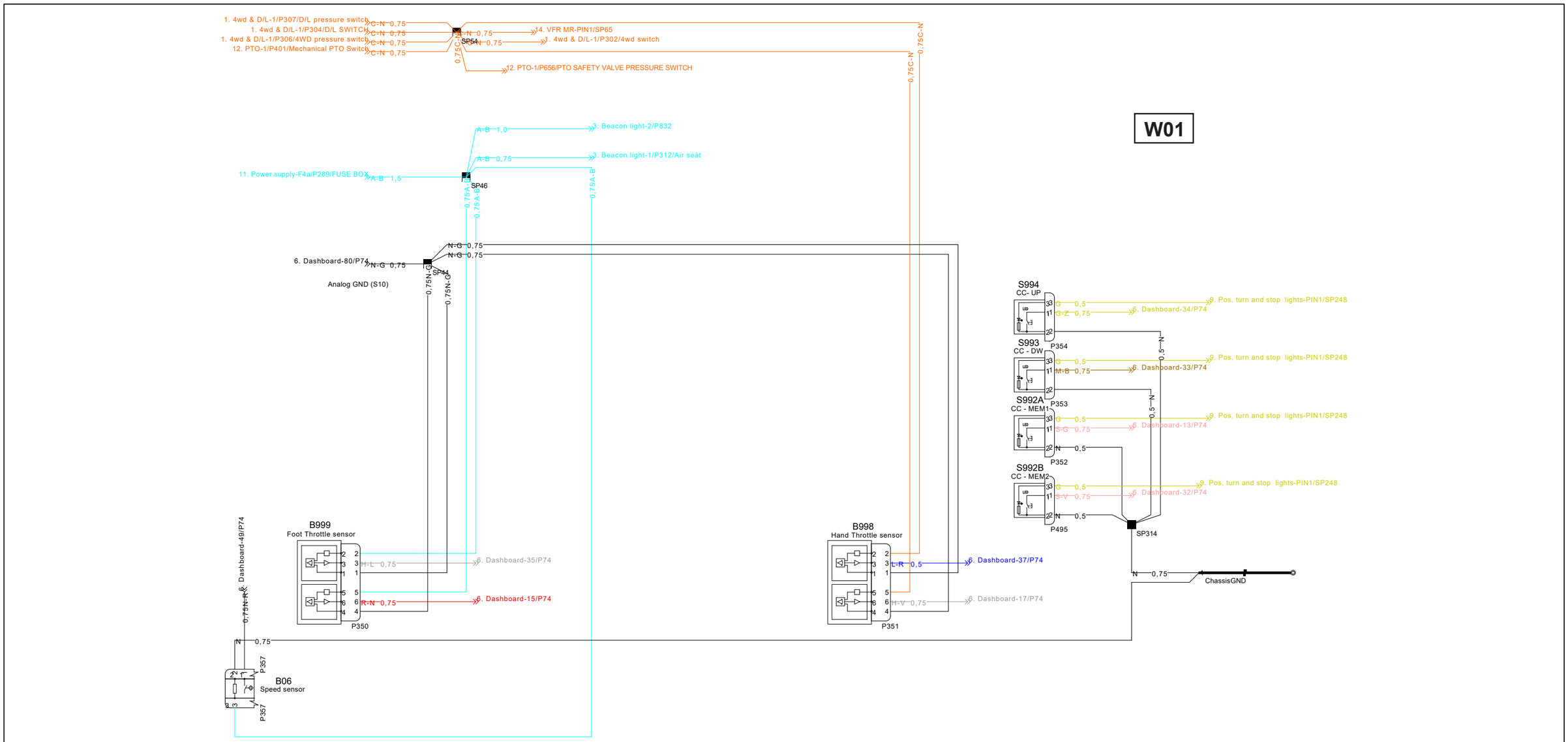
4.1.1.16 Schematic 16



J143 - Connection to P23
J168 - Connection to Front PTO predisposition P751
P23 - Connection to J143
P341 - Connection to GD PTO selector S21A
P342 - Connection to DIR PTO selector S21B
P343 - Connection to 540 PTO selector B07B
P344 - Connection to 540E/1000 PTO selector B07A
P345 - Connection to Mechanical PTO switch B08
P347 - Connection to Neutral start switch B36
P400 - Connection to Mechanical PTO switch B08
P401 - Connection to Mechanical PTO switch B08
P655- Connection to PTO priority solenoid valve Y350
P656 - Connection to PTO priority valve pressure switch B350
P678 - Connection to Front PTO switch S999
P780 - Connection to Front PTO solenoid valve Y999

SE94_AG_IN_PTO_B_1_20240103

4.1.1.17 Schematic 17



P350 - Connection to Foot throttle sensor B999
P351 - Connection to Hand throttle sensor B998
P352 - Connection to CC-MEM1 S992A
P353 - Connection to CC-DW S993
P354 - Connection to CC-UP S994
P357 - Connection to Speed Sensor B06
P495 - Connection to CC-MEM2 S992B

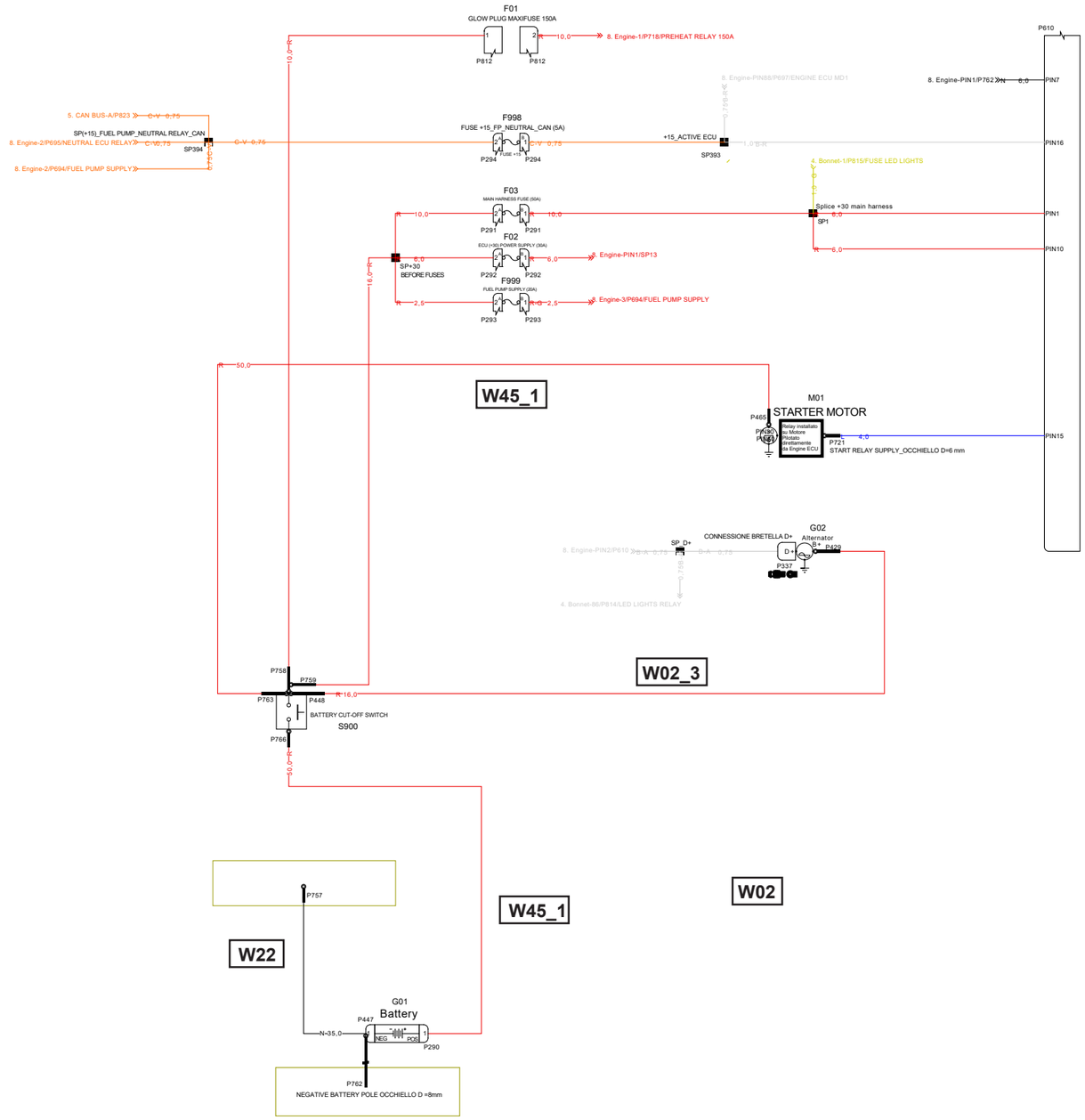
SE98_AG_IN_THROTTLES_B_1_20191014

4.2.

4.2.1. Electro-hydraulic version

Harness name	Harness description
W01	MAIN -POWER REVERSER
W01_1	ADAPTER PARKER/HUSCO
W02	DEUTZ ENGINE
W02_1	ALTERNATOR EXTENSION D+
W02_4	FUEL PRESS SENSOR EXTENSION
W05	BONNET
W05_2	LED LIGHT POWER SUPPLY
W06	TRAILER BRAKE VALVE - ITA
W06	TRAILER BRAKE VALVE - MR
W11_1	ELCTRONIC REAR HITCH ACTUATORS
W14	LICENSE PLATE
W17	BEACON LIGHT EXTENSION
W21	BATTERY POSITIVE CABLE + CUT-OFF
W21_1	BATTERY CHARGE
W22	BATTERY NEGATIVE CABLE
W25	GEAR LEVER EXTENSION
W29_1	BRAKE PEDAL SWITCHES (LH+RH) EXTENSION
W34	PTO MAIN SOLENOID VALVE
W38C	ENGINE
W38C	ENGINE
W38D	GLOW PLUG
W38E	STARTER MOTOR
W44	DIAGNOSTIC SOCKET
W45_4	GROUND CABLE

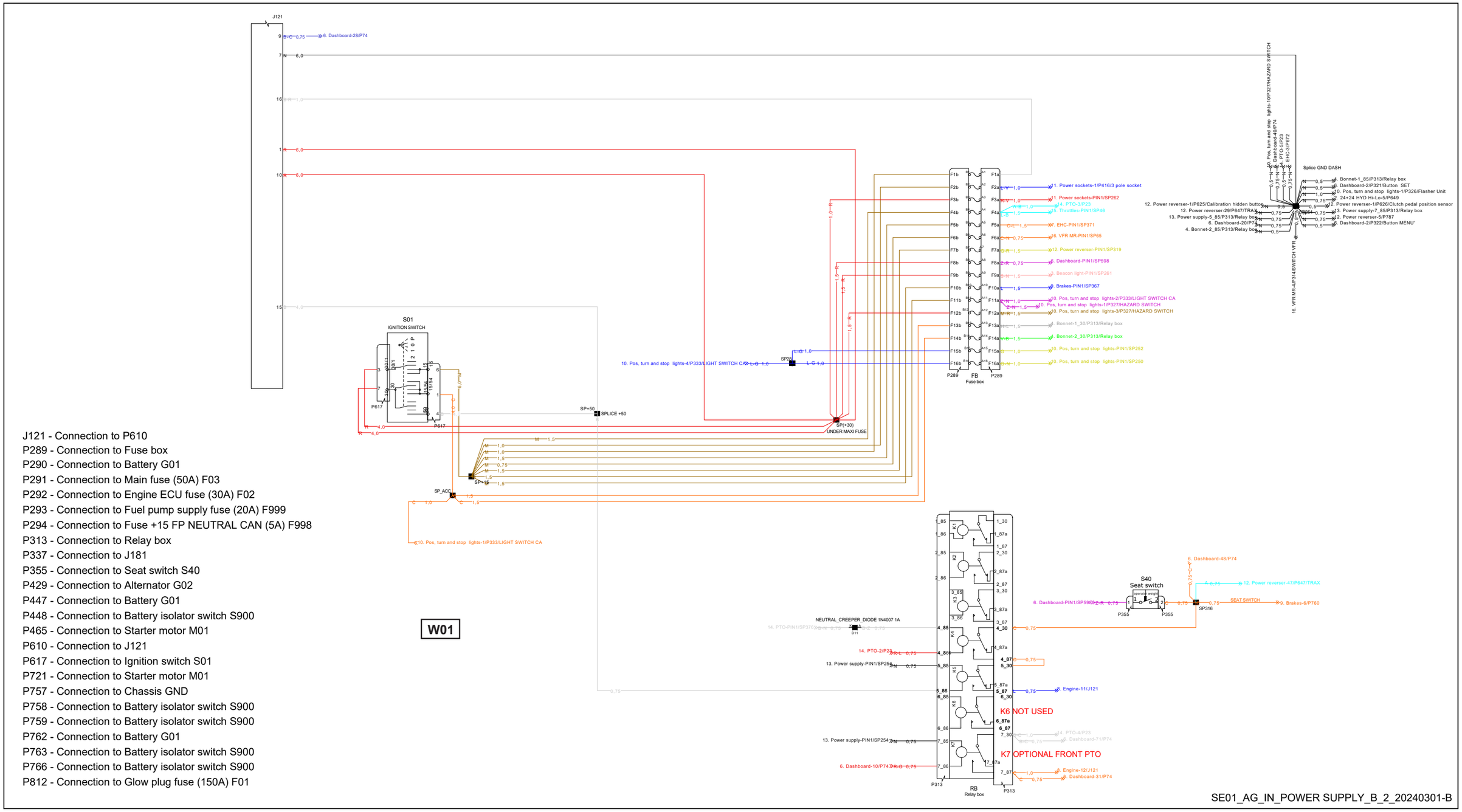
4.2.1.1 Schematic 1



J121 - Connection to P610
P289 - Connection to Fuse box
P290 - Connection to Battery G01
P291 - Connection to Main fuse (50A) F03
P292 - Connection to Engine ECU fuse (30A) F02
P293 - Connection to Fuel pump supply fuse (20A) F999
P294 - Connection to Fuse +15 FP NEUTRAL CAN (5A) F998
P313 - Connection to Relay box
P337 - Connection to J181
P355 - Connection to Seat switch S40
P429 - Connection to Alternator G02
P447 - Connection to Battery G01
P448 - Connection to Battery isolator switch S900
P465 - Connection to Starter motor M01
P610 - Connection to J121
P617 - Connection to Ignition switch S01
P721 - Connection to Starter motor M01
P757 - Connection to Chassis GND
P758 - Connection to Battery isolator switch S900
P759 - Connection to Battery isolator switch S900
P762 - Connection to Battery G01
P763 - Connection to Battery isolator switch S900
P766 - Connection to Battery isolator switch S900
P812 - Connection to Glow plug fuse (150A) F01

SE01_AG_IN_POWER SUPPLY_B_2_20240301-A

4.2.1.2 Schematic 2



W01

J121 - Connection to P610
P289 - Connection to Fuse box
P290 - Connection to Battery G01
P291 - Connection to Main fuse (50A) F03
P292 - Connection to Engine ECU fuse (30A) F02
P293 - Connection to Fuel pump supply fuse (20A) F999
P294 - Connection to Fuse +15 FP NEUTRAL CAN (5A) F998
P313 - Connection to Relay box
P337 - Connection to J181
P355 - Connection to Seat switch S40
P429 - Connection to Alternator G02
P447 - Connection to Battery G01
P448 - Connection to Battery isolator switch S900
P465 - Connection to Starter motor M01
P610 - Connection to J121
P617 - Connection to Ignition switch S01
P721 - Connection to Starter motor M01
P757 - Connection to Chassis GND
P758 - Connection to Battery isolator switch S900
P759 - Connection to Battery isolator switch S900
P762 - Connection to Battery G01
P763 - Connection to Battery isolator switch S900
P766 - Connection to Battery isolator switch S900
P812 - Connection to Glow plug fuse (150A) F01

SE01_AG_IN_POWER SUPPLY_B_2_20240301-B

4.2.1.3 Schematic 3

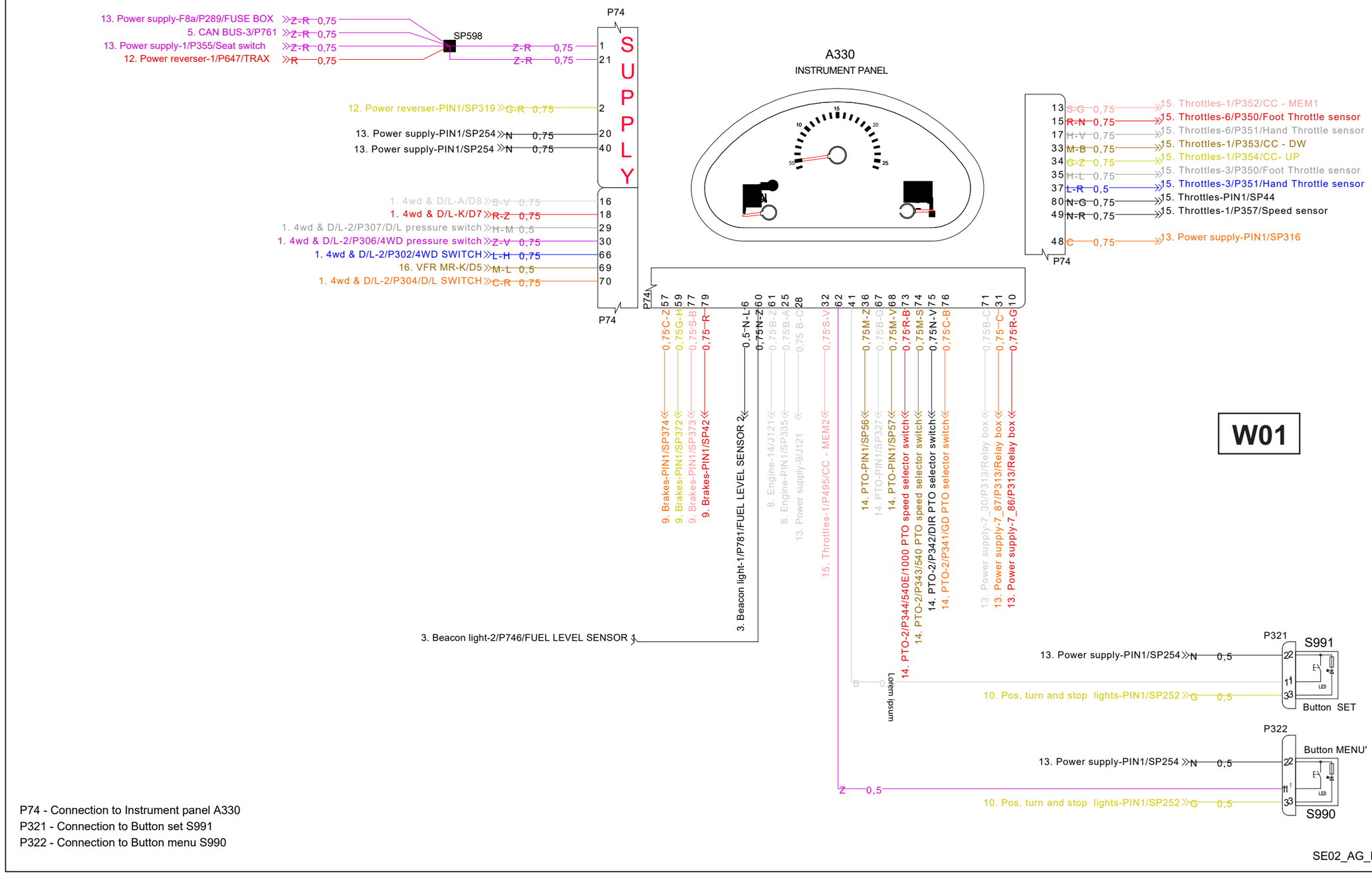


W02_1

J181 - Connection to P337
P841 - Connection to Alternator G02

SE01_1_AG_IN_ALTERNATOR CABLE_B_2_20191016

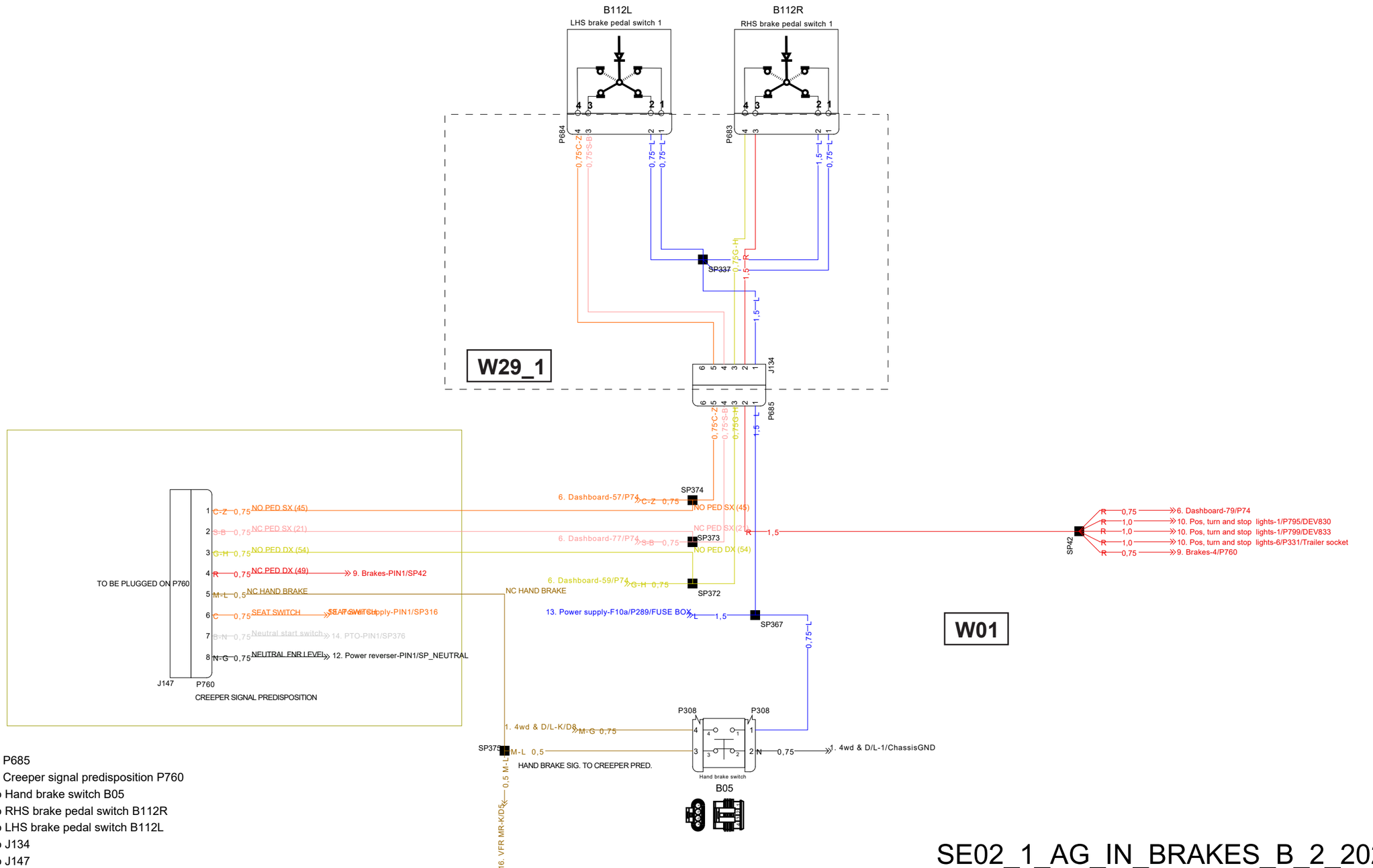
4.2.1.4 Schematic 4



P74 - Connection to Instrument panel A330
P321 - Connection to Button set S991
P322 - Connection to Button menu S990

SE02_AG_IN_INSTRUMENT PANEL_B_2_20240301

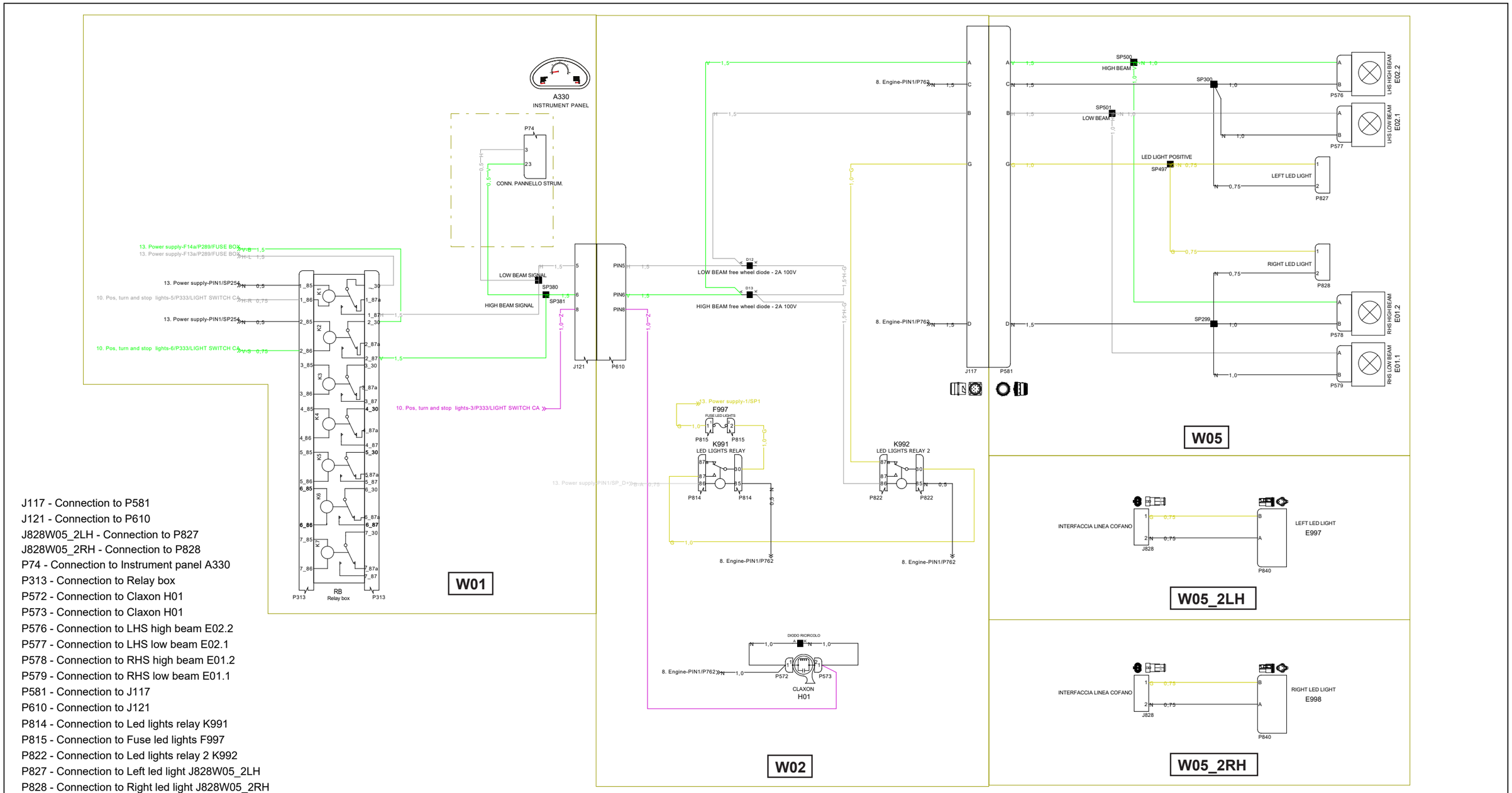
4.2.1.5 Schematic 5



J134 - Connection to P685
J147 - Connection to Creeper signal predisposition P760
P308 - Connection to Hand brake switch B05
P683 - Connection to RHS brake pedal switch B112R
P684 - Connection to LHS brake pedal switch B112L
P685 - Connection to J134
P760 - Connection to J147

SE02_1_AG_IN_BRAKES_B_2_20240301

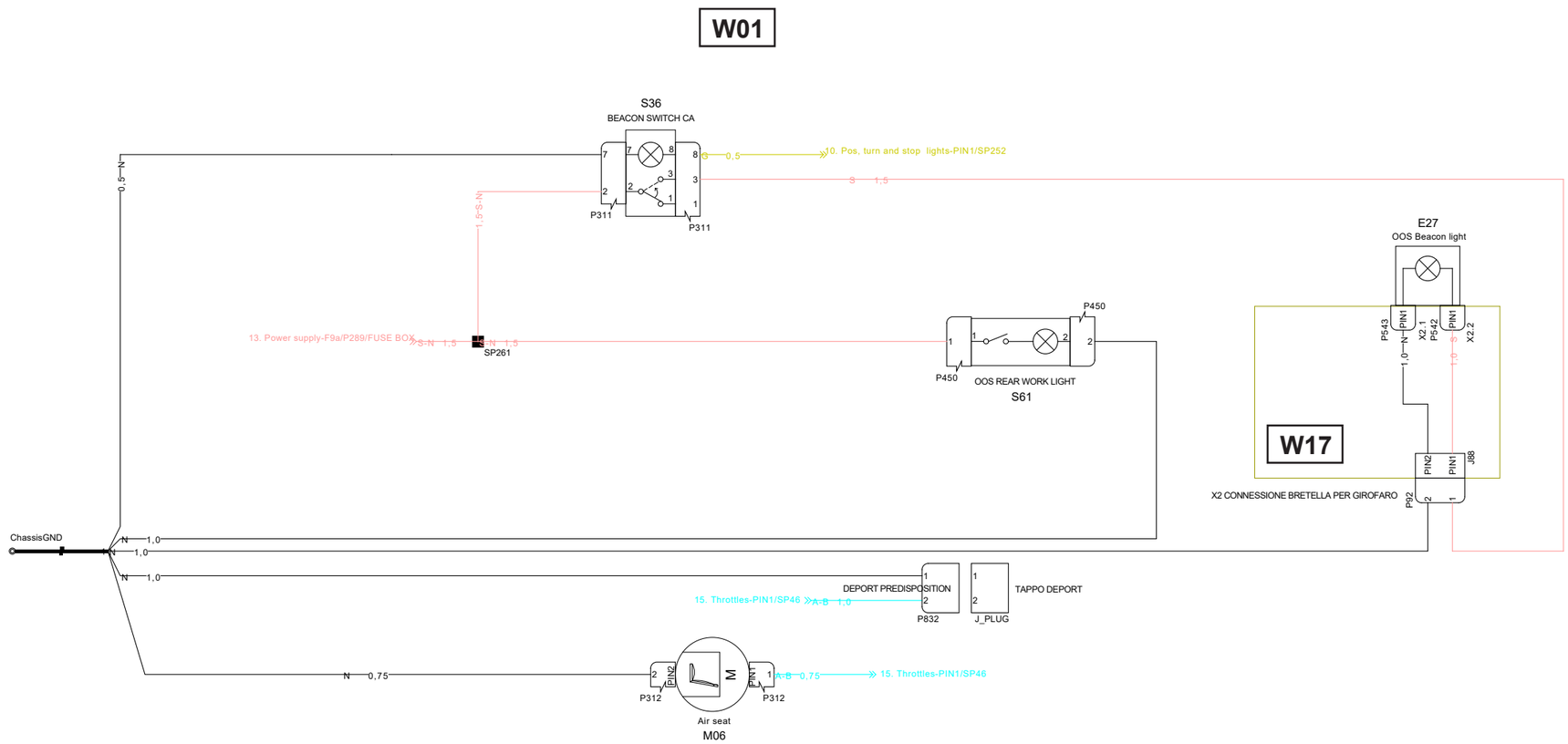
4.2.1.6 Schematic 6



J117 - Connection to P581
J121 - Connection to P610
J828W05_2LH - Connection to P827
J828W05_2RH - Connection to P828
P74 - Connection to Instrument panel A330
P313 - Connection to Relay box
P572 - Connection to Claxon H01
P573 - Connection to Claxon H01
P576 - Connection to LHS high beam E02.2
P577 - Connection to LHS low beam E02.1
P578 - Connection to RHS high beam E01.2
P579 - Connection to RHS low beam E01.1
P581 - Connection to J117
P610 - Connection to J121
P814 - Connection to Led lights relay K991
P815 - Connection to Fuse led lights F997
P822 - Connection to Led lights relay 2 K992
P827 - Connection to Left led light J828W05_2LH
P828 - Connection to Right led light J828W05_2RH
P840W05_2LH - Connection to Left led light E997
P840W05_2RH - Connection to Right led light E998

SE04_AG_IN_BONNET&LIGHTS_B_2_ 20240301

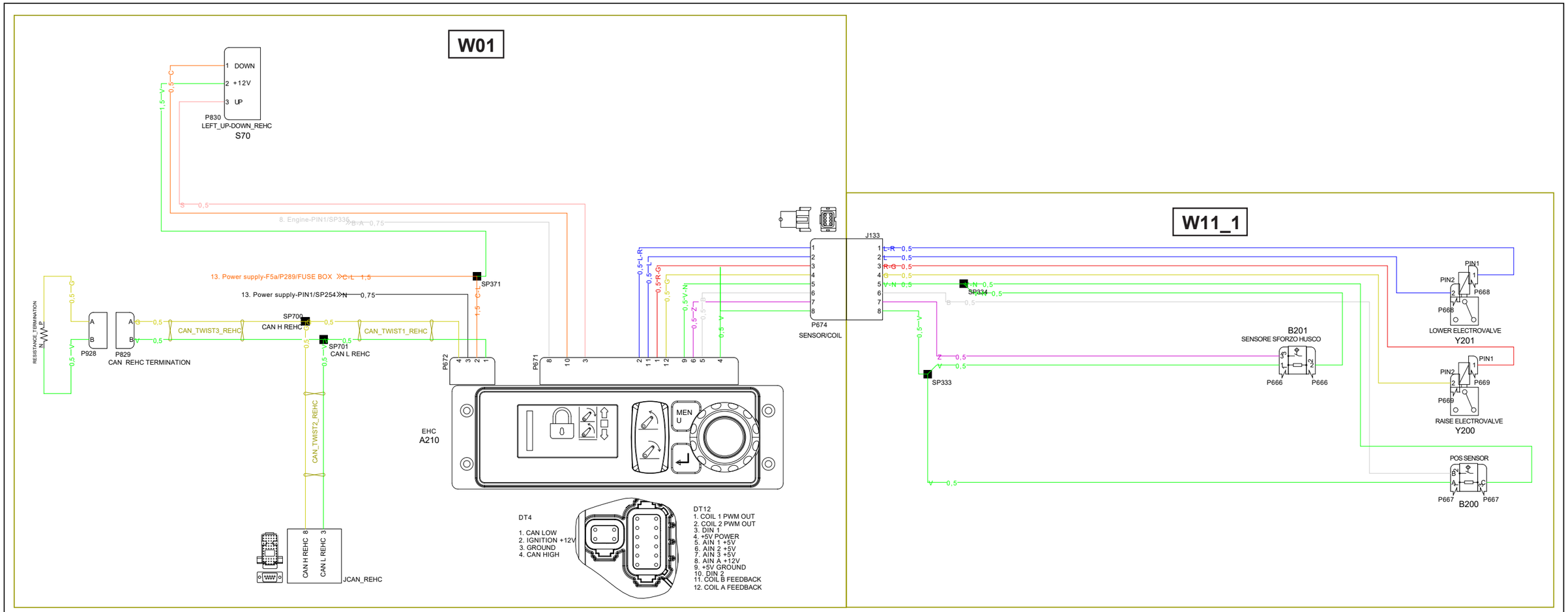
4.2.1.7 Schematic 7



J88 - Connection to P92
J170 - Connection to P781
J_PLUG - Connection to Deport predisposition P832
P92 - Connection to J88
P311 - Connection to Beacon switch S36
P312 - Connection to Air seat M06
P450 - Connection to Rear work light S61
P542 - Connection to Beacon light E27
P543 - Connection to Beacon light E27
P746 - Connection to Fuel level sensor rear tank B03
P781 - Connection to J170
P781 - Connection to Fuel level sensor lower tank B976 (option)
P832 - Connection to J_PLUG

SE10_AG_IN_BEACON_AIR SEAT_FUEL SENSOR_B_2_20240301

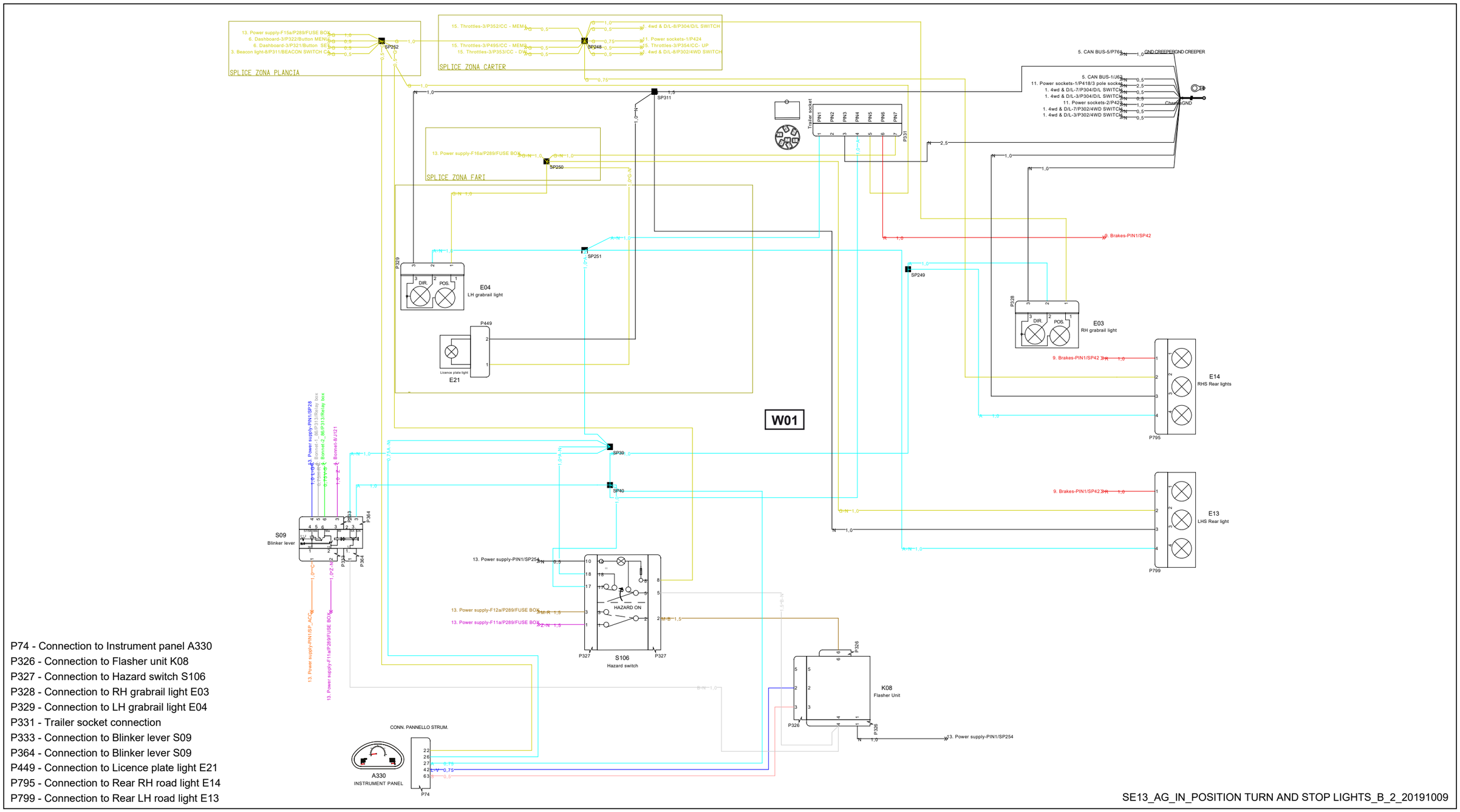
4.2.1.8 Schematic 8



J133 - Connection to P674
J830 - Connection to Predisposizione CAN REHC P829
P666 - Connection to Electronic hitch draft sensor B201
P667 - Connection to Electronic hitch position sensor B200
P668 - Connection to Electronic hitch solenoid valve DOWN Y201
P669 - Connection to Electronic hitch solenoid valve UP Y200
P671 - Connection to Electronic hitch control unit A210
P672 - Connection to Electronic hitch control unit A210
P674 - Connection to J133
P829 - Connection to J830
P830 - Connection to LHS Remote control switch UP S70
P829 - Connection to Resistance termination P929

SE12_AG_IN_EHC_B_2_20240301

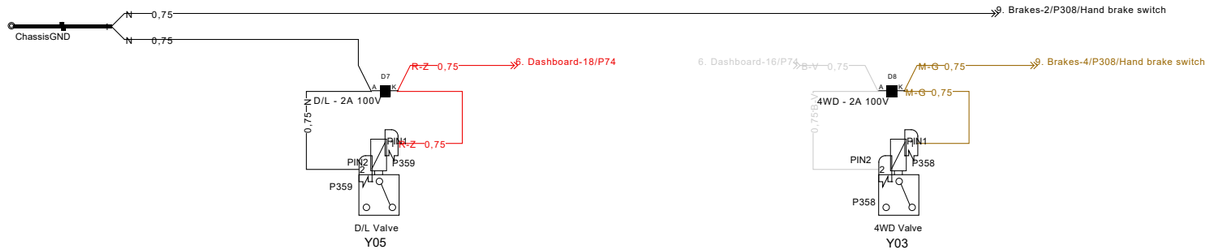
4.2.1.9 Schematic 9

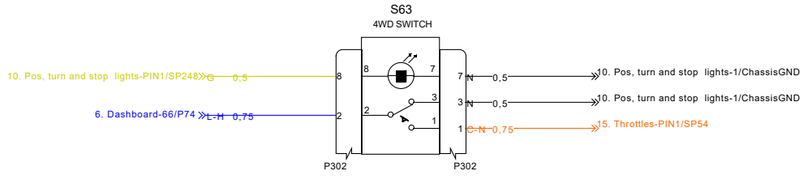


P74 - Connection to Instrument panel A330
P326 - Connection to Flasher unit K08
P327 - Connection to Hazard switch S106
P328 - Connection to RH grabrail light E03
P329 - Connection to LH grabrail light E04
P331 - Trailer socket connection
P333 - Connection to Blinker lever S09
P364 - Connection to Blinker lever S09
P449 - Connection to Licence plate light E21
P795 - Connection to Rear RH road light E14
P799 - Connection to Rear LH road light E13

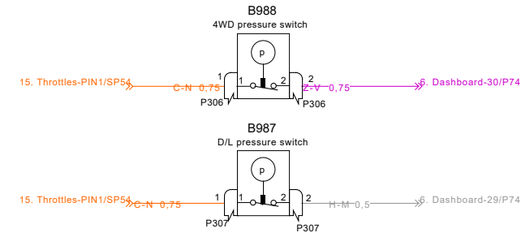
SE13_AG_IN_POSITION TURN AND STOP LIGHTS_B_2_20191009

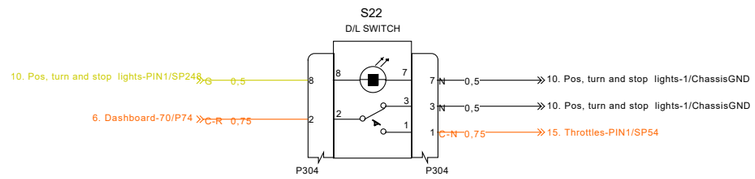
4.2.1.10 Schematic 10





W01

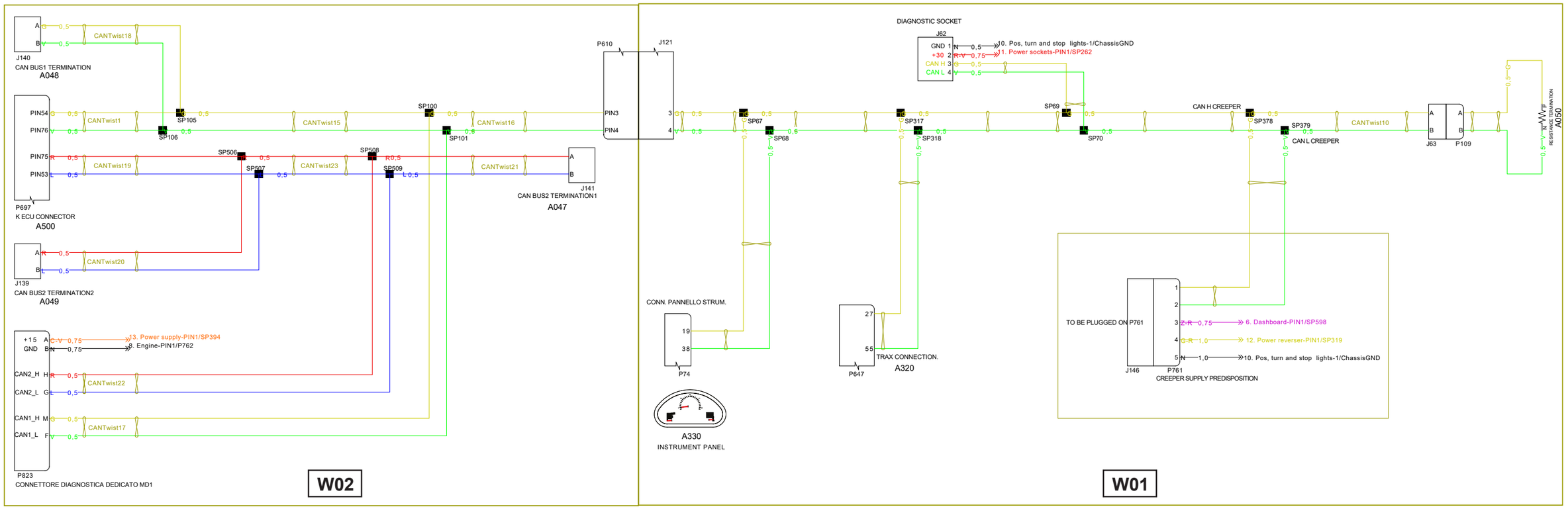




P302 - Connection to 4WD switch S63
P304 - Connection to Diff-lock switch S22
P306 - Connection to 4WD pressure switch B988
P307 - Connection to Diff-lock pressure switch B987
P358 - Connection to 4WD solenoid valve Y03
P359 - Connection to Diff-lock solenoid valve Y05

SE15_AG_IN_4WD&DL_B_2_20191008

4.2.1.11 Schematic 11



J62 - Diagnostic socket connection
J63 - Connection to P109
J121 - Connection to P610
J139 - Connection to CAN Bus2 termination2 A049
J140 - Connection to CAN Bus1 termination A048
J141 - Connection to CAN Bus2 termination1 A047
J146 - Connection to Creeper supply predisposition P761
P74 - Connection to Instrument panel A330
P109 - Connection to CAN Bus resistor A050
P610 - Connection to J121
P647 - Connection to Transmission control unit A320
P697 - Connection to Engine control unit A500
P761 - Connection to J146
P823 - Diagnostic MD1 connection

SE19_AG_IN_CANBUS_B_2_20240301

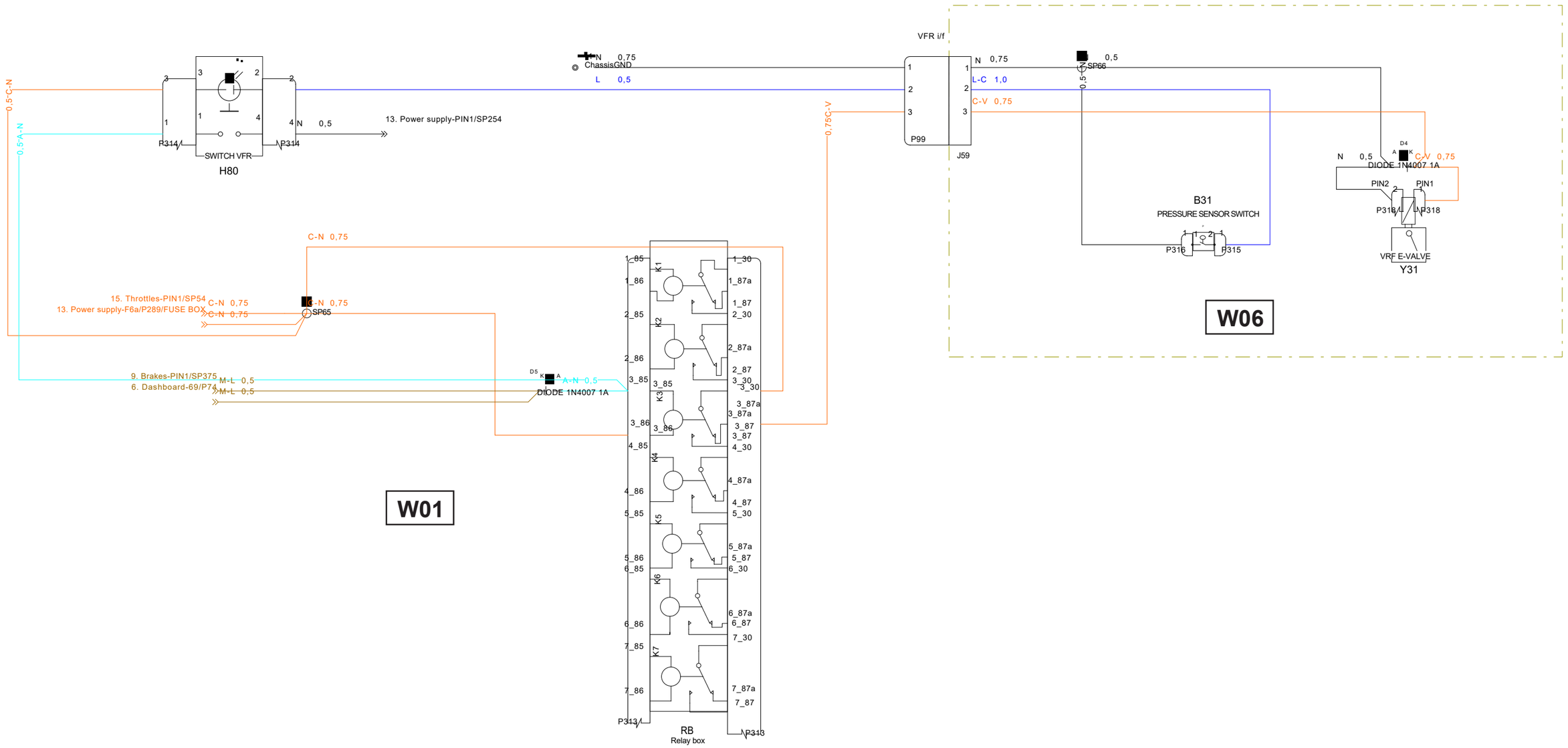
4.2.1.12 Schematic 12



P416 - Connection to 3 pole socket X42
P417 - Connection to 3 pole socket X42
P418 - Connection to 3 pole socket X42
P423 - Connection to Cigarette lighter E05
P424 - Connection to Cigarette lighter E05

SE23_AG_IN_POWERSOCKETS_B_2_20191010

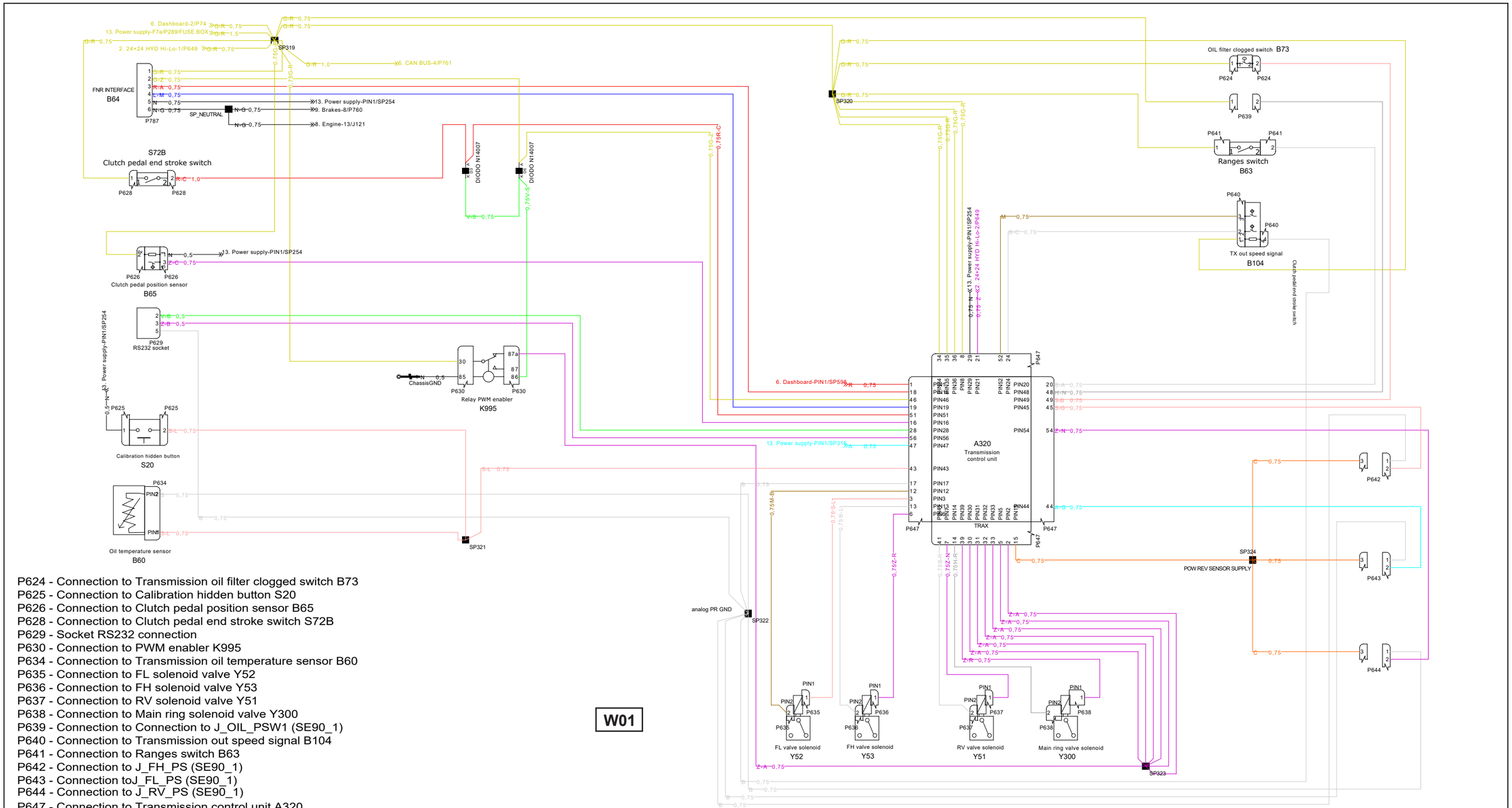
4.2.1.13 Schematic 13



J59 - Connection to P99
P99 - Connection to J59
P313 - Connection to Relay box
P314 - Connection to Trailer brake switch H80
P315 - Connection to Trailer brake pressure sensor B31
P316 - Connection to Trailer brake pressure sensor B31
P318 - Connection to Trailer brake solenoid valve Y31

SE26_AG_IN_TBVMR_B_2_20240301

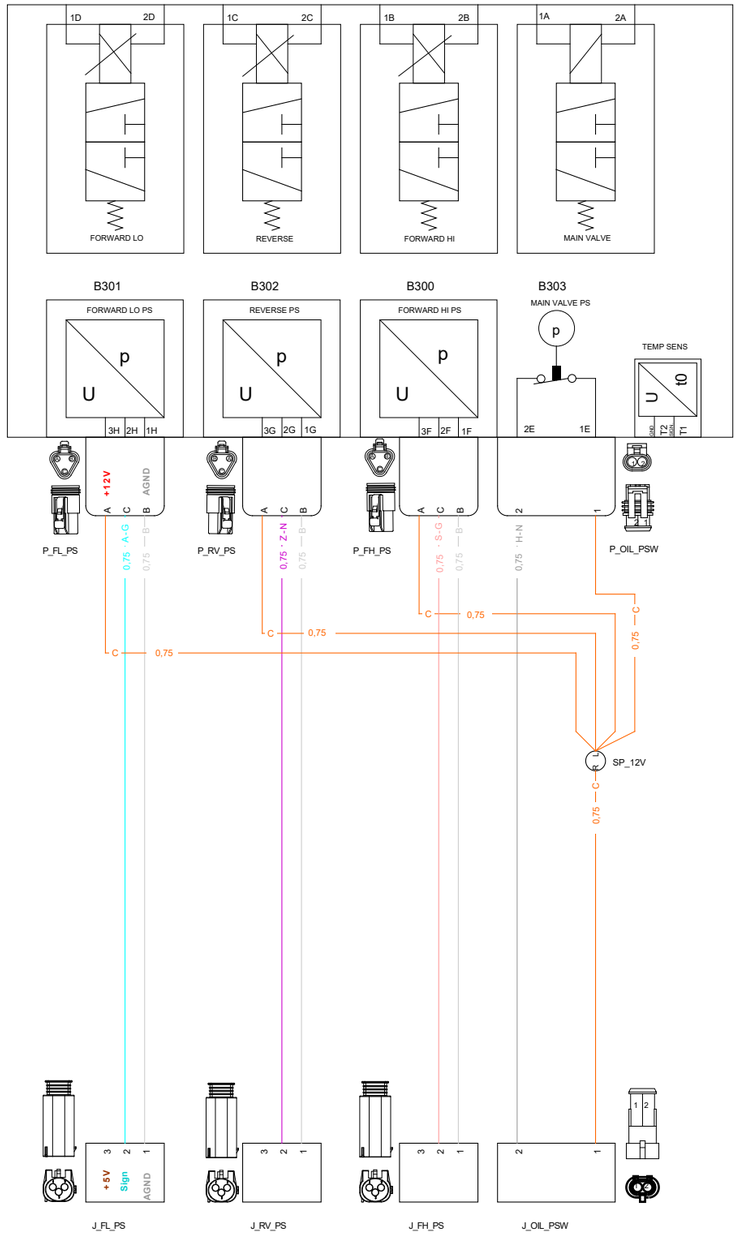
4.2.1.14 Schematic 14



P624 - Connection to Transmission oil filter clogged switch B73
P625 - Connection to Calibration hidden button S20
P626 - Connection to Clutch pedal position sensor B65
P628 - Connection to Clutch pedal end stroke switch S72B
P629 - Socket RS232 connection
P630 - Connection to PWM enabler K995
P634 - Connection to Transmission oil temperature sensor B60
P635 - Connection to FL solenoid valve Y52
P636 - Connection to FH solenoid valve Y53
P637 - Connection to RV solenoid valve Y51
P638 - Connection to Main ring solenoid valve Y300
P639 - Connection to Connection to J_OIL_PSW1 (SE90_1)
P640 - Connection to Transmission out speed signal B104
P641 - Connection to Ranges switch B63
P642 - Connection to J_FH_PS (SE90_1)
P643 - Connection toJ_FL_PS (SE90_1)
P644 - Connection to J_RV_PS (SE90_1)
P647 - Connection to Transmission control unit A320
P787 - Connection to FNR lever B64

SE90_AG_IN_POWER REVERSER_B_2_20240301

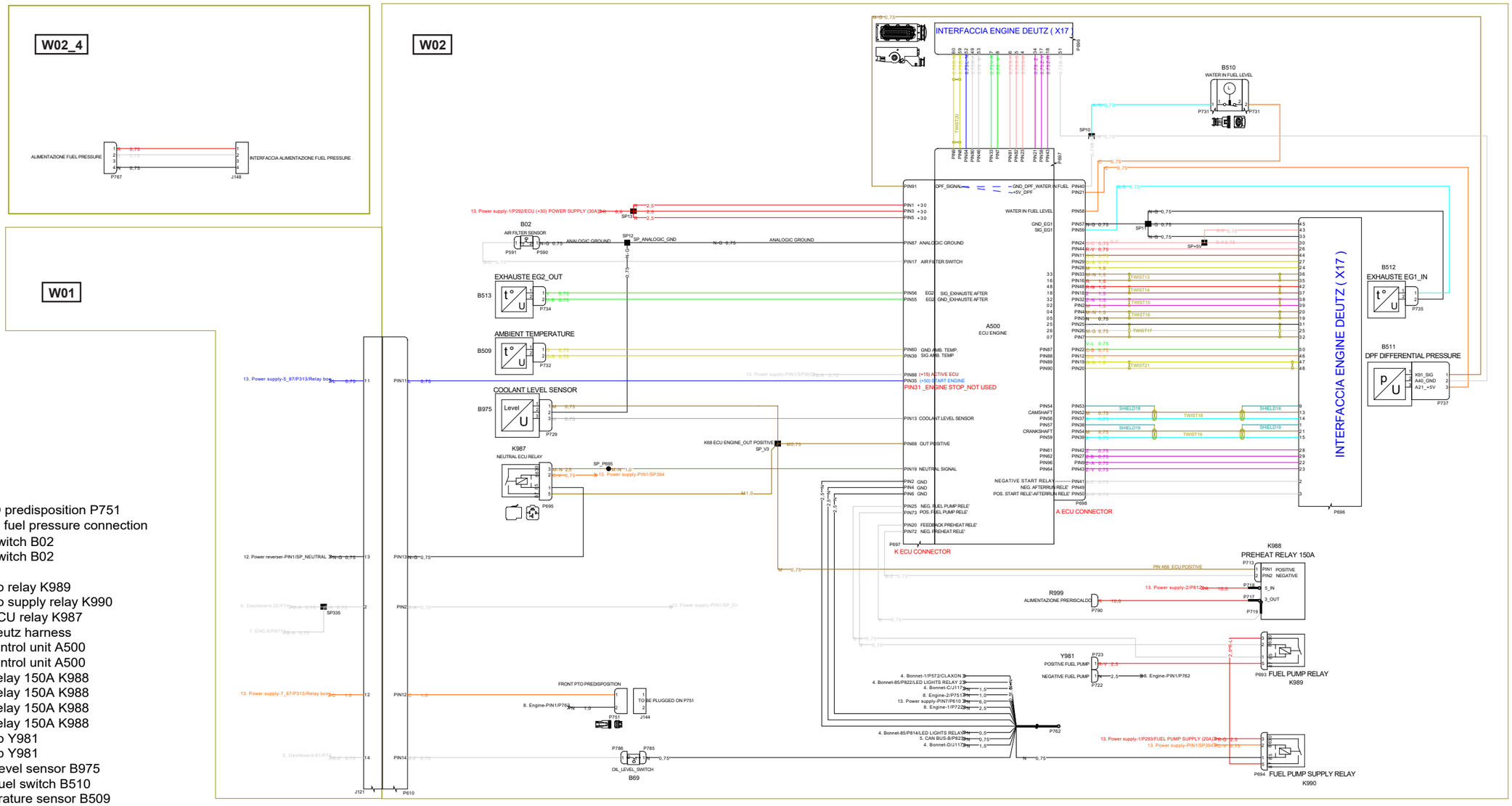
4.2.1.15 Schematic 15



P_FH_PS - Connection to B300
P_FL_PS - Connection to B301
P_RV_PS - Connection to B302
P_OIL_PSW - Connection to B303
J_FH_PS- Connection to P642 (SE90)
J_FL_PS- Connection to P643 (SE90)
J_OIL_PSW - Connection to P639 (SE90)
J_RV_PS- Connection to P644 (SE90)

SE90_1_AG_IN_BRETELLA PARKER-HUSCO_B_2_20240301

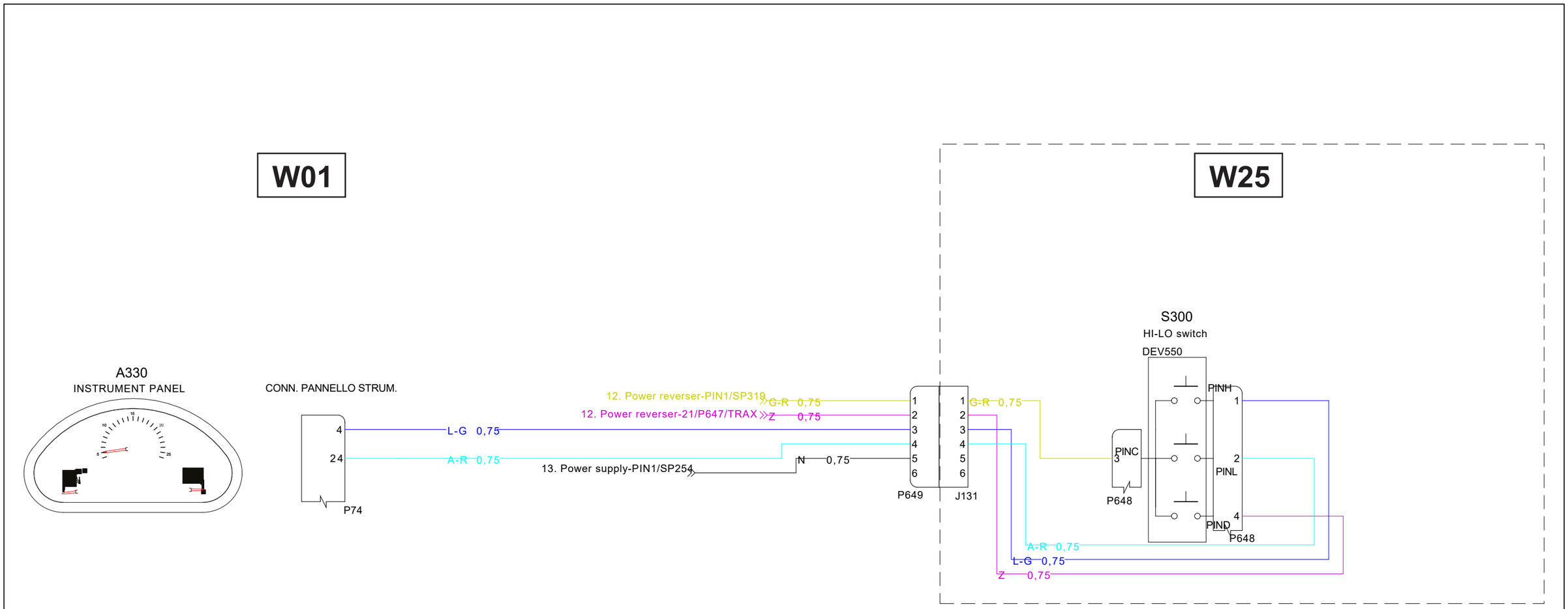
4.2.1.16 Schematic 16



J121 - Connection to P610
J144 - Connection to Front PTO predisposition P751
J148 - Interfaccia alimentazione fuel pressure connection
P590 - Connection to Air filter switch B02
P591 - Connection to Air filter switch B02
P610 - Connection to J121
P693 - Connection to Fuel pump relay K989
P694 - Connection to Fuel pump supply relay K990
P695 - Connection to Neutral ECU relay K987
P696 - Connection to Engine Deutz harness
P697 - Connection to Engine control unit A500
P698 - Connection to Engine control unit A500
P713 - Connection to Preheat relay 150A K988
P717 - Connection to Preheat relay 150A K988
P718 - Connection to Preheat relay 150A K988
P719 - Connection to Preheat relay 150A K988
P722 - Connection to Fuel pump Y981
P723 - Connection to Fuel pump Y981
P729 - Connection to Coolant Level sensor B975
P731 - Connection to Water in fuel switch B510
P732 - Connection to Air temperature sensor B509
P734 - Connection to Exhaust gas temperature sensor 2 B513
P735 - Connection to Exhaust gas temperature sensor 1 B512
P737 - Connection to Delta pressure sensor B511
P751 - Connection to J144
P762 - Connection to Battery G01
P767 - Alimentazione fuel pressure connection
P785 - Connection to Brakes oil level switch B69
P786 - Connection to Brakes oil level switch B69
P790 - Connection to Alimentazione preriscaldo R999

SE91_AG_IN_ENGINE_B_2_20240301

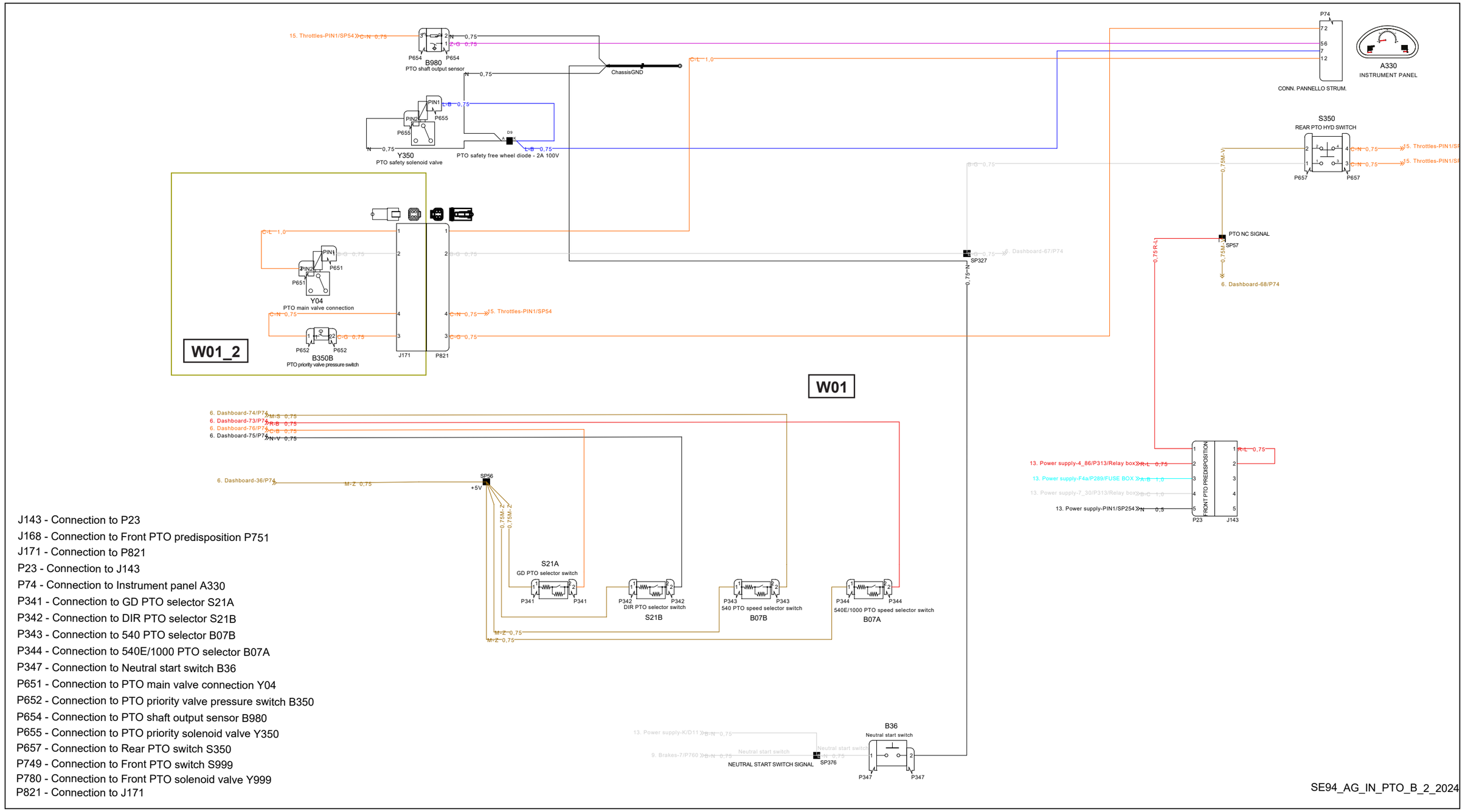
4.2.1.17 Schematic 17



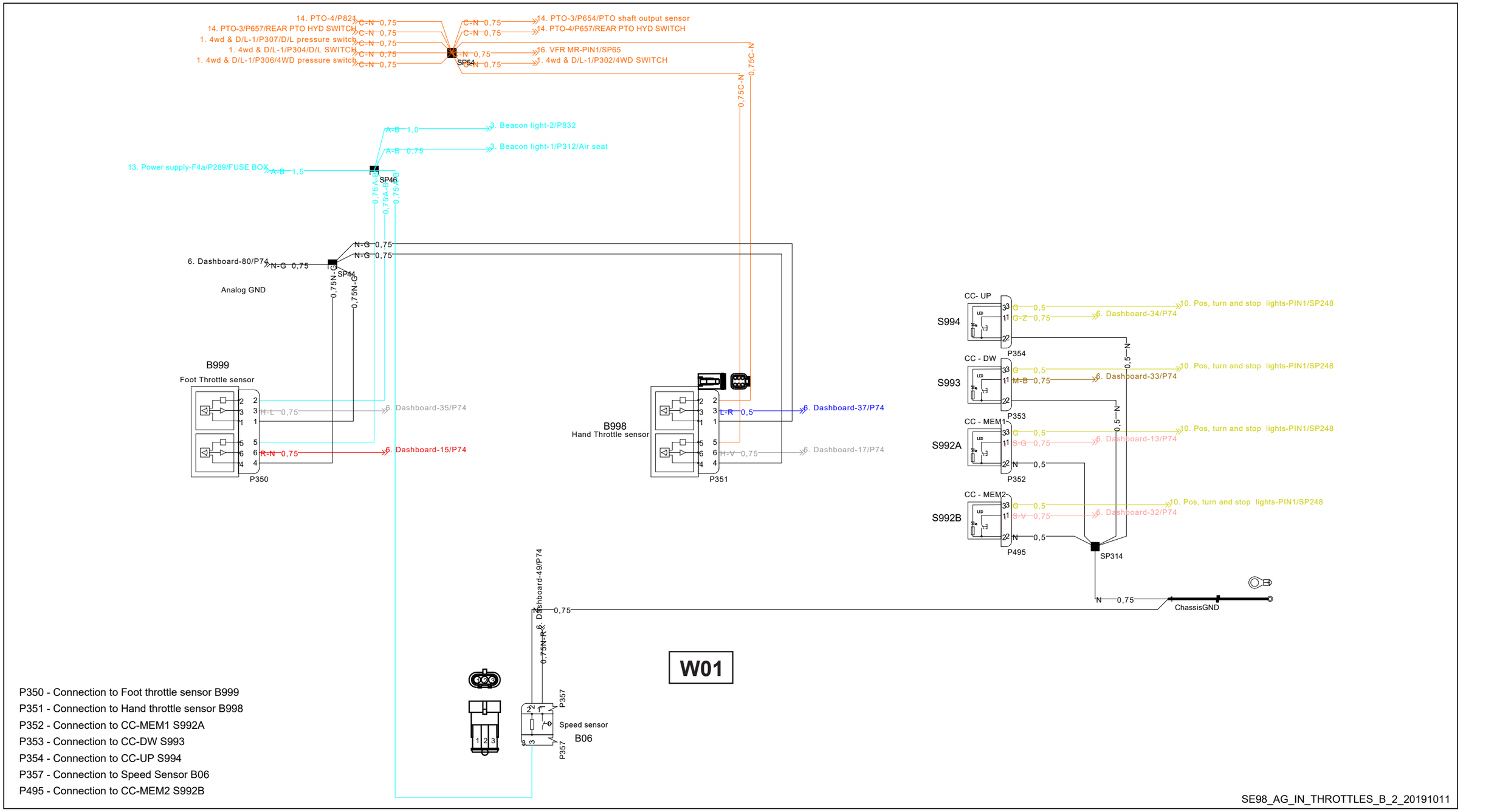
J131- Connection to P649
P74 - Connection to Instrument panel A330
P648 - Connection to HI-LO switch S300
P649 - Connection to J131

SE92_AG_IN_HI-LO_B_2_ 20191008

4.2.1.18 Schematic 18



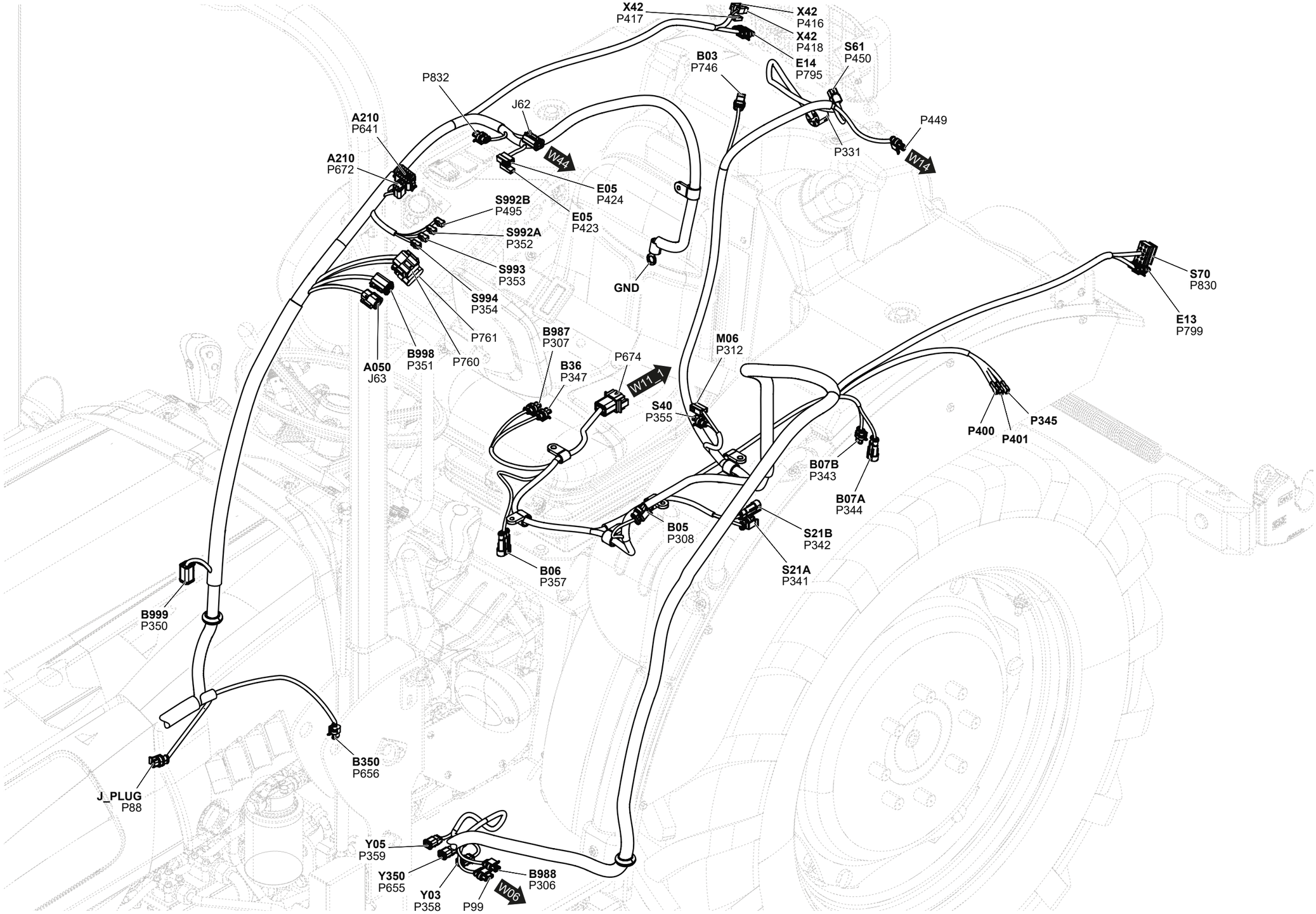
4.2.1.19 Schematic 19



4.2.2.

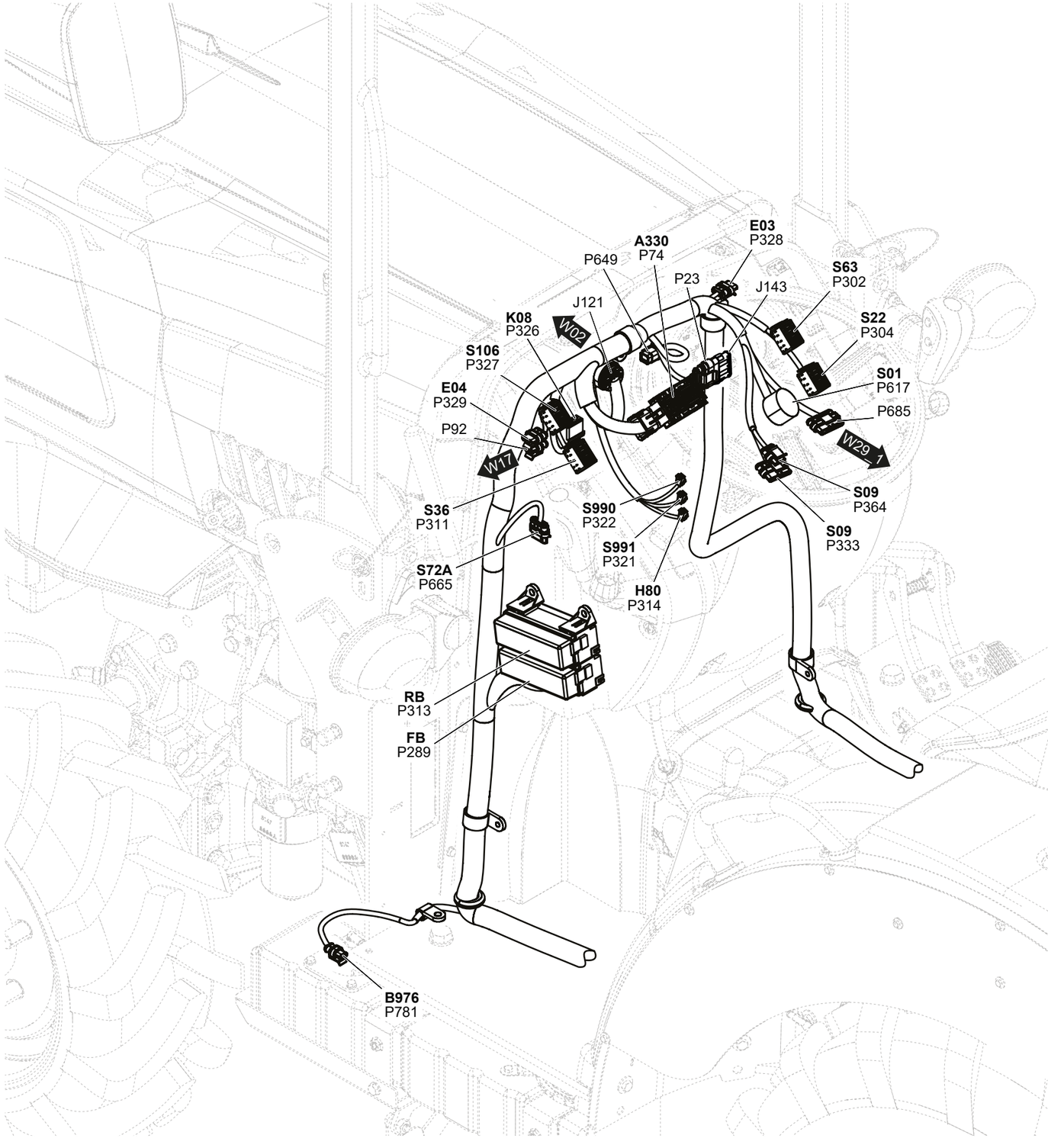
4.3. 3D ROUTINGS

4.3.1. W01 - MAIN - MECHANICAL LH

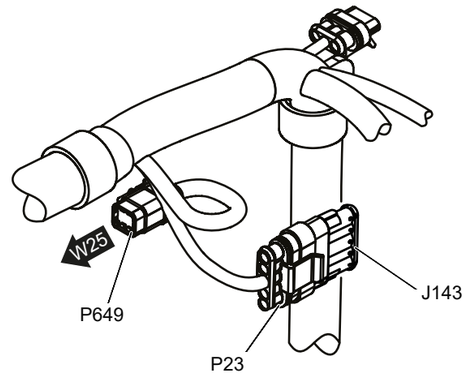


W01_AG_OUT_551954-02_B_1_FRONTLH_20240301

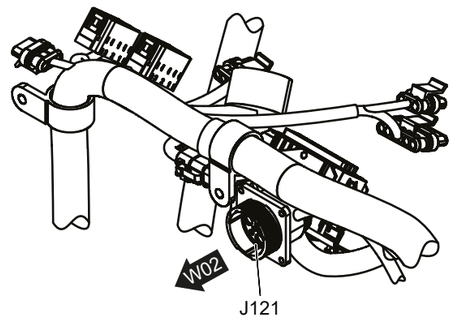
4.3.2. W01 - MAIN - MECHANICAL RH



REAR LH VIEW

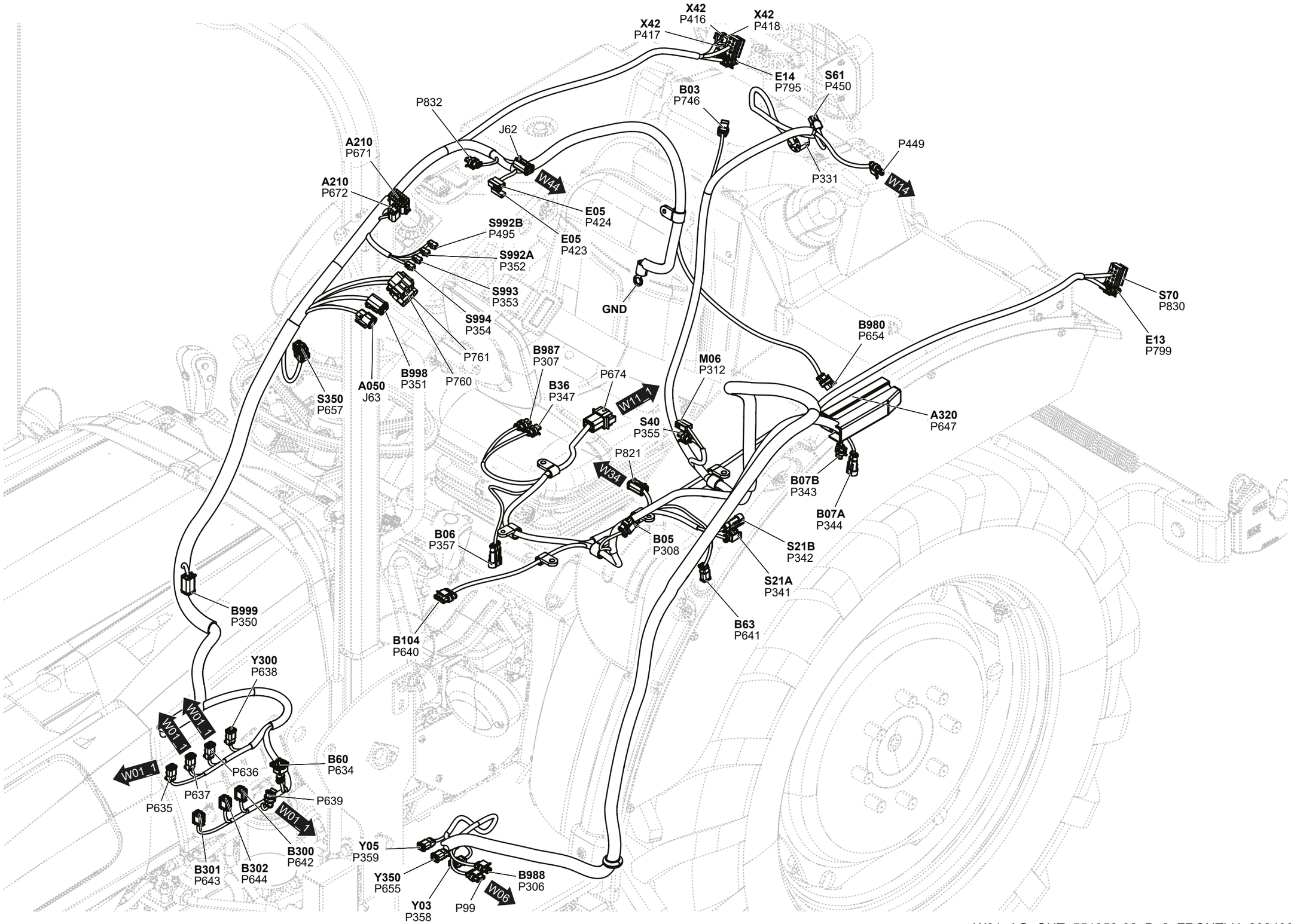


FRONT LH VIEW



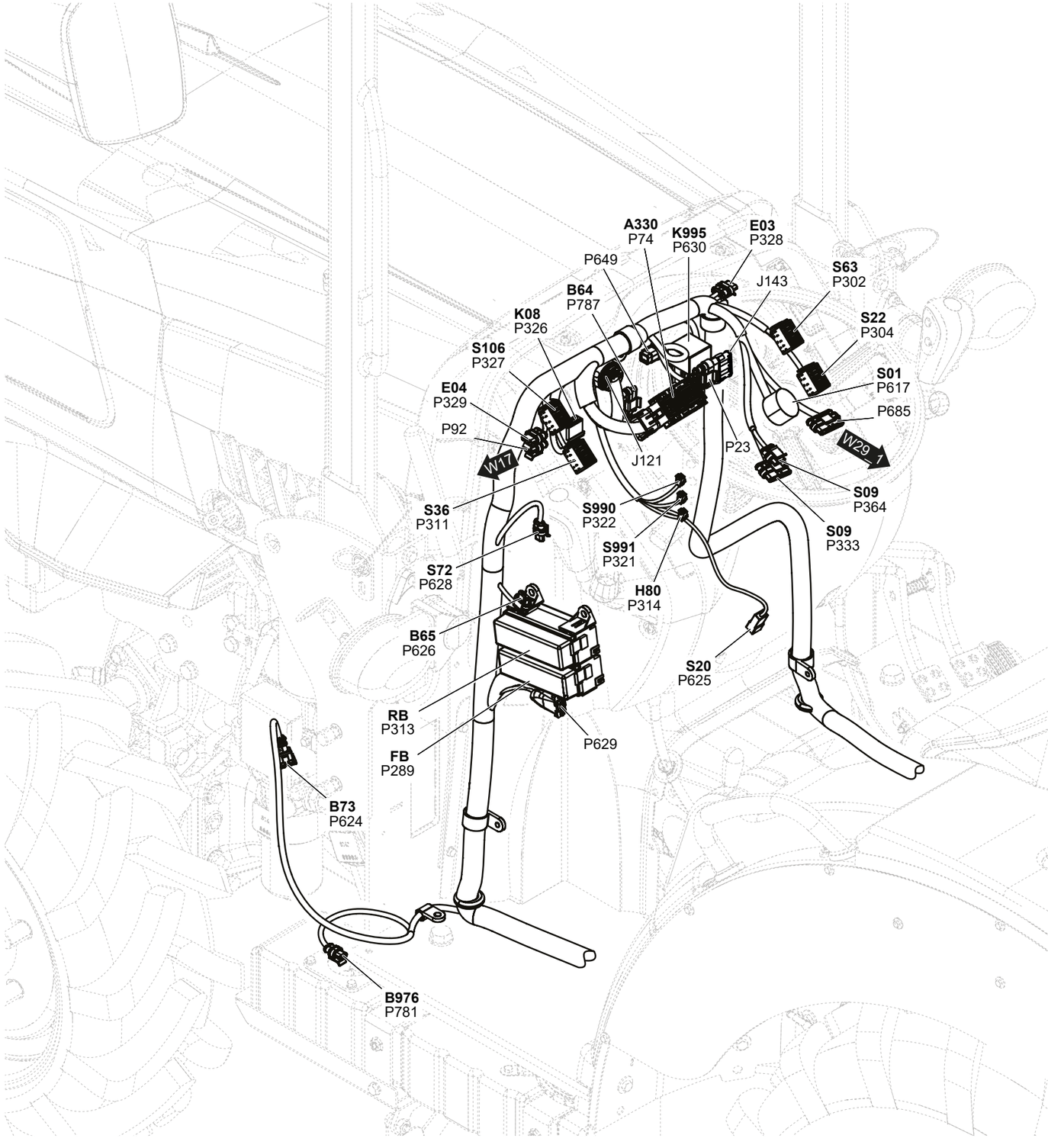
W01_AG_OUT_551954-02_B_1_REARLH_20240301

4.3.3. W01 - MAIN -POWER REVERSER LH

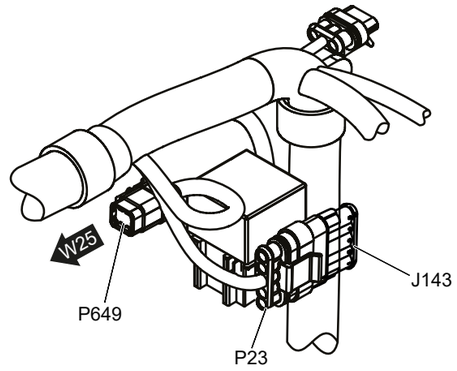


W01_AG_OUT_551953-02_B_2_FRONTLH_20240301

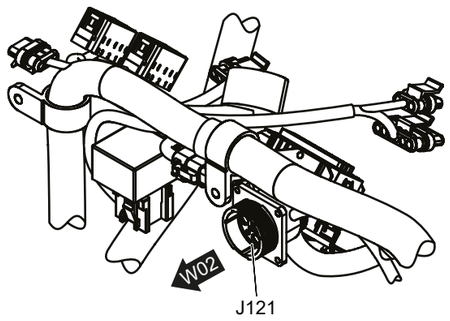
4.3.4. W01 - MAIN -POWER REVERSER RH



REAR LH VIEW

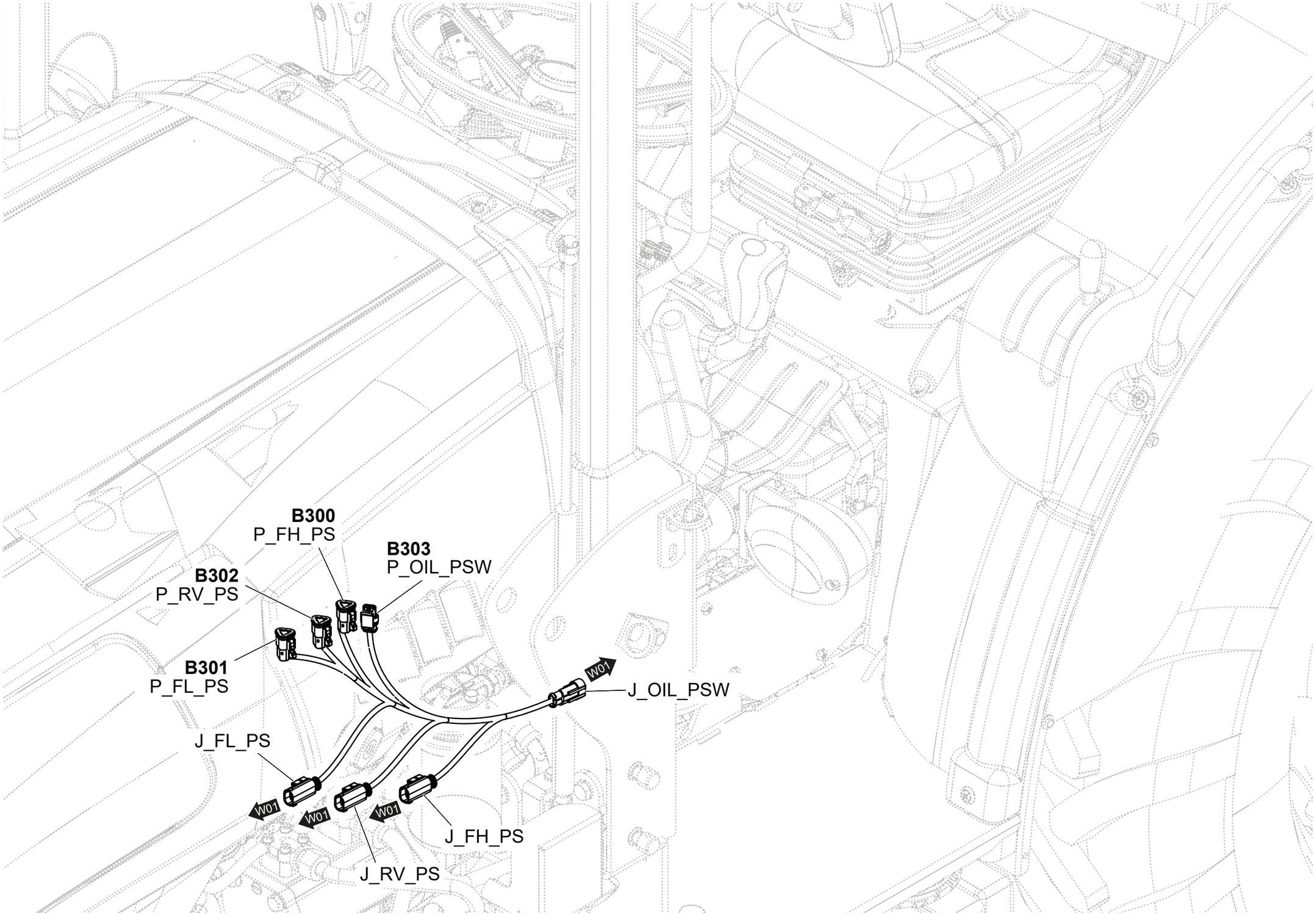


FRONT LH VIEW



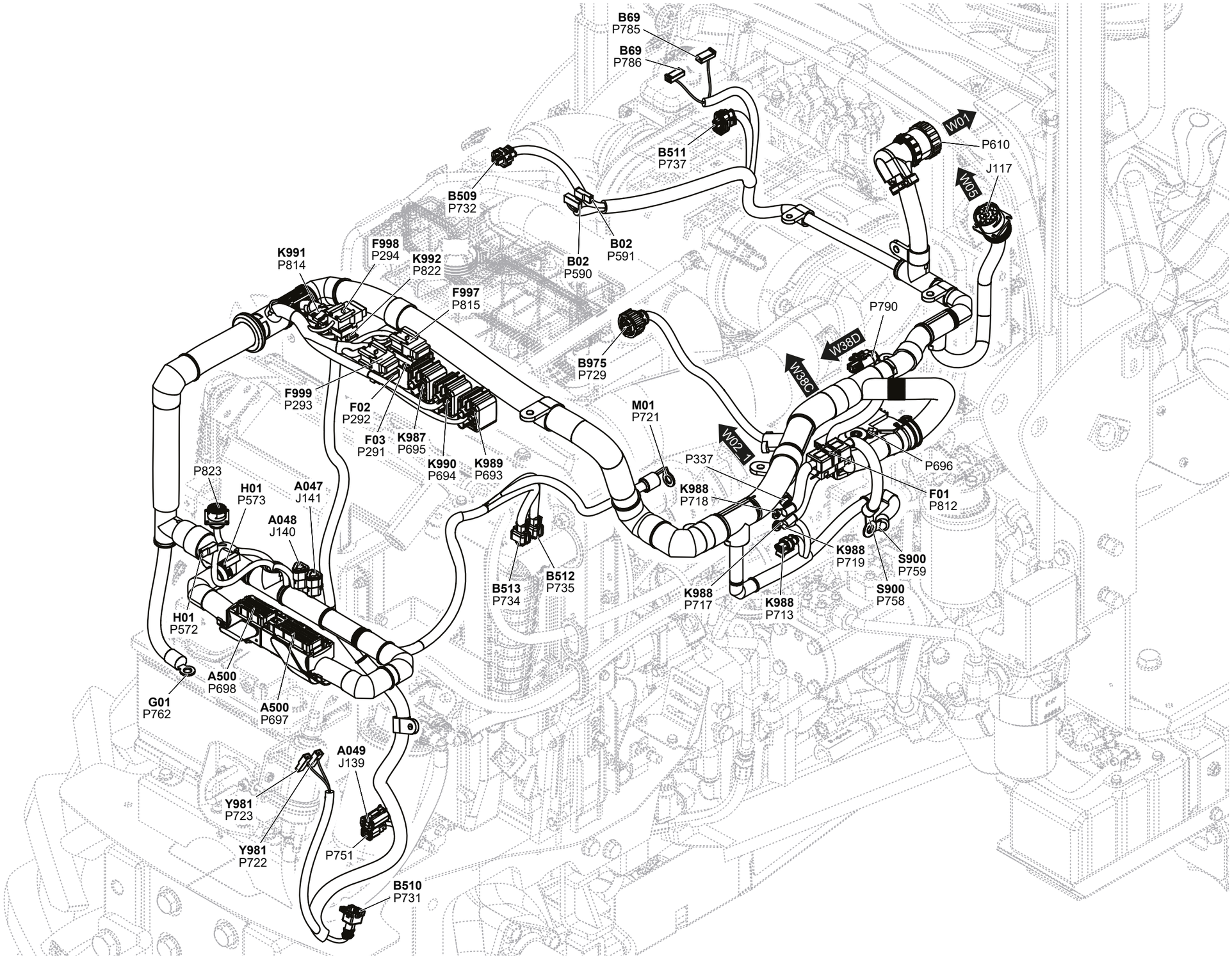
W01_AG_OUT_551953-02_B_2_REARLH_20240301

4.3.5. W01_1 - ADAPTER PARKER/HUSCO



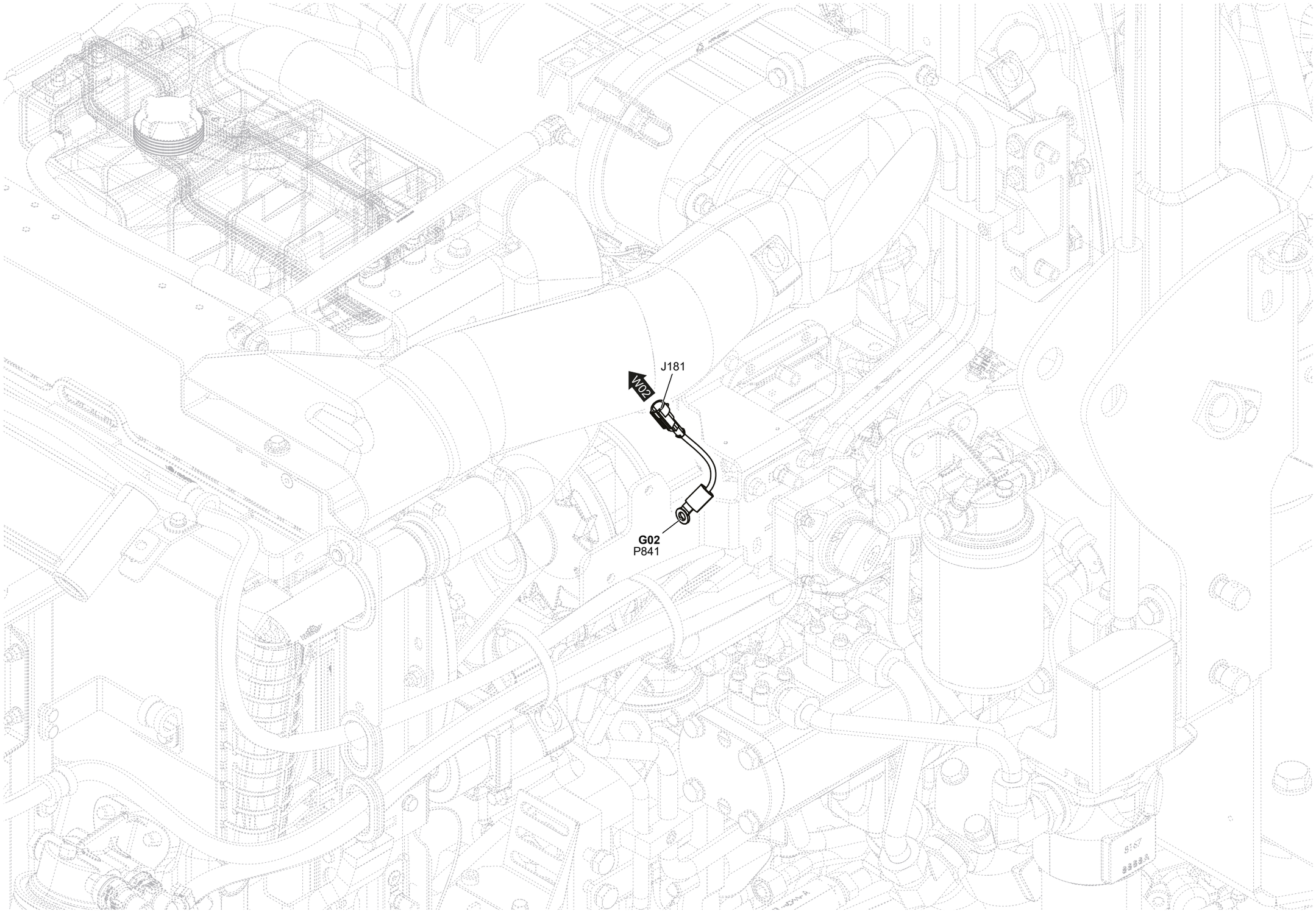
W01_1_AG_OUT_607755-01_B_2__20240301

4.3.6. W02 - DEUTZ ENGINE



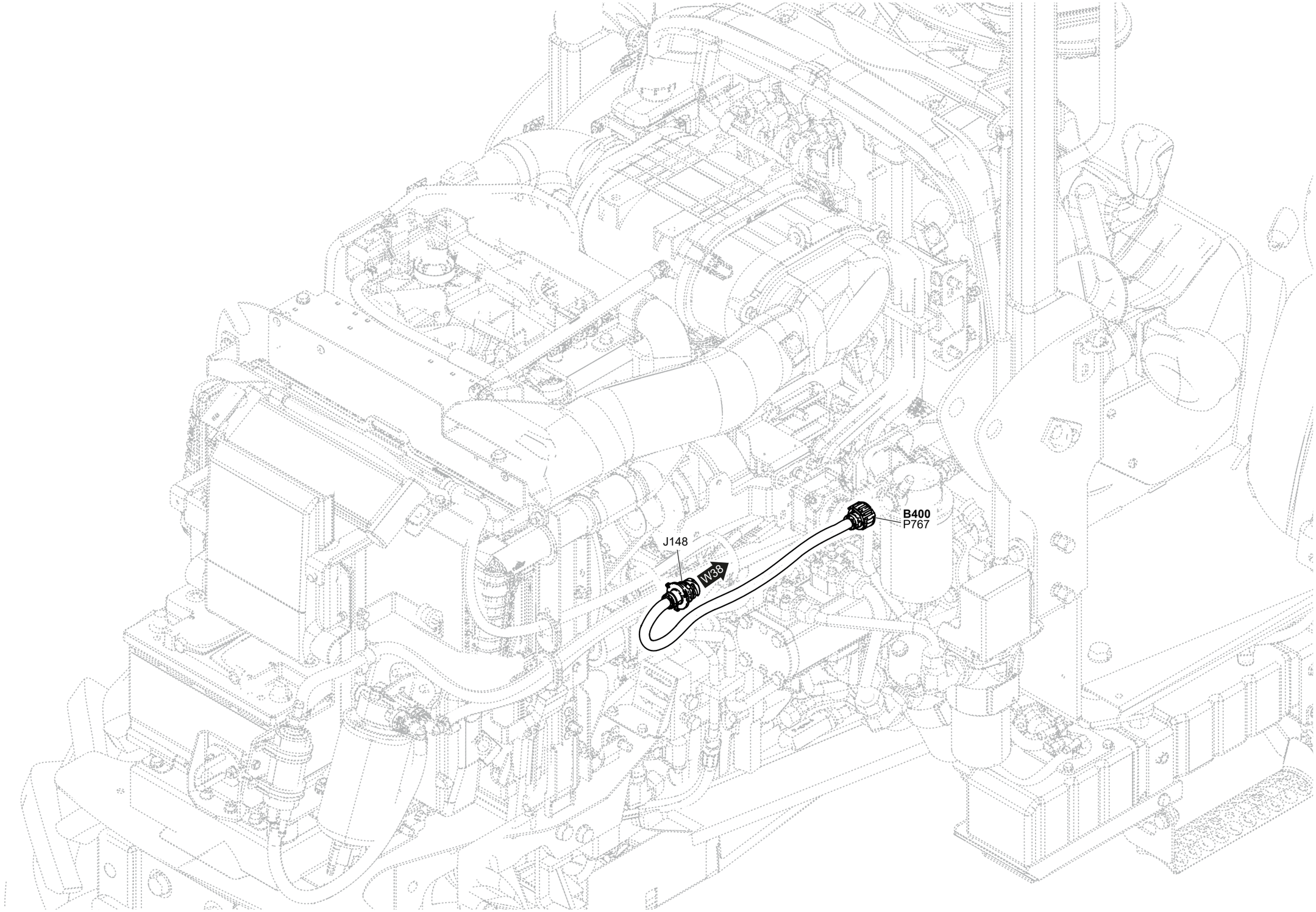
W02_AG_OUT_550585_B_0_20240301

4.3.7. W02_1 - ALTERNATOR EXTENSION D+



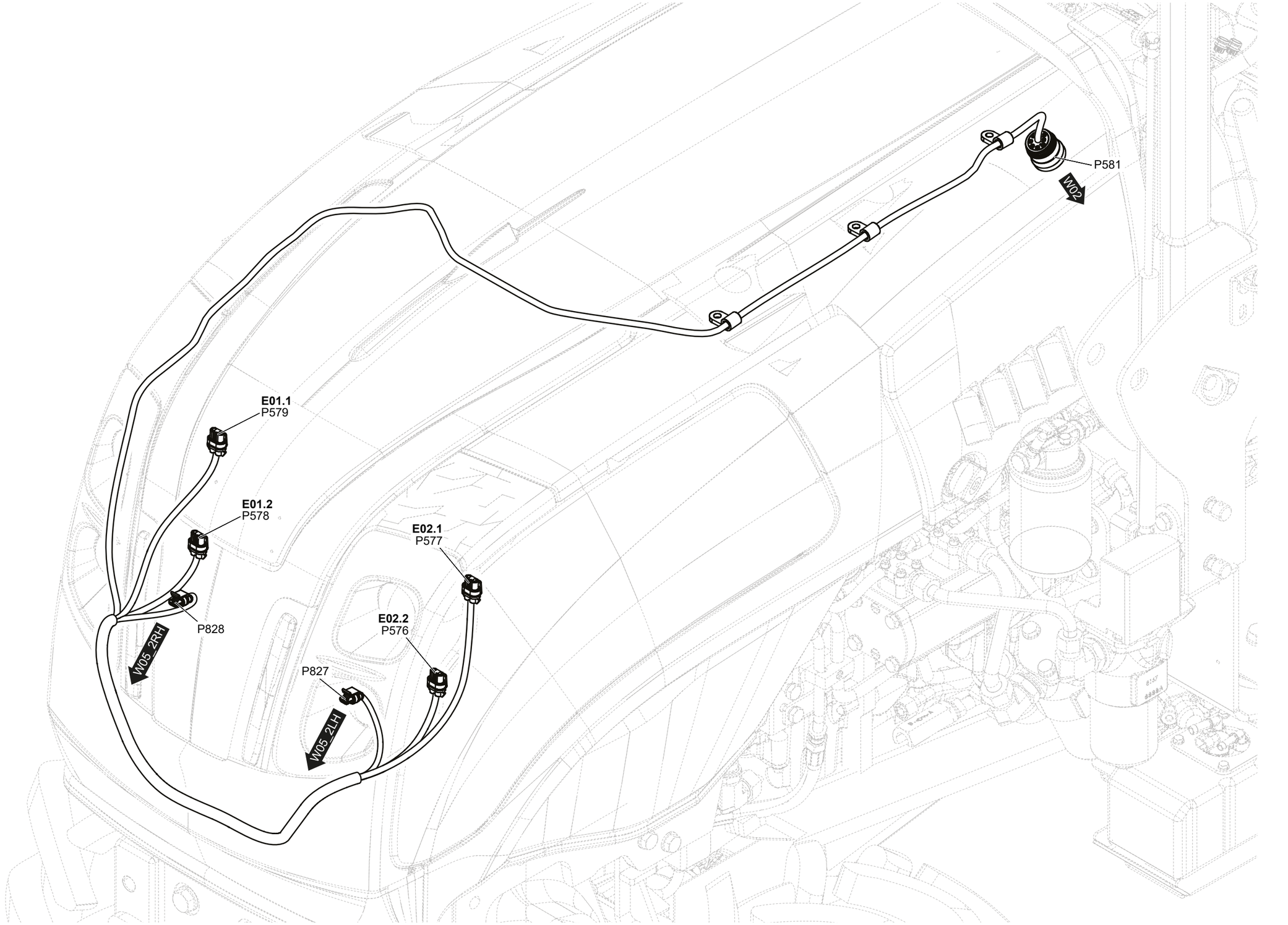
W02_1_AG_OUT_532739_B_0_20191127

4.3.8. W02_4 - FUEL PRESS SENSOR EXTENSION



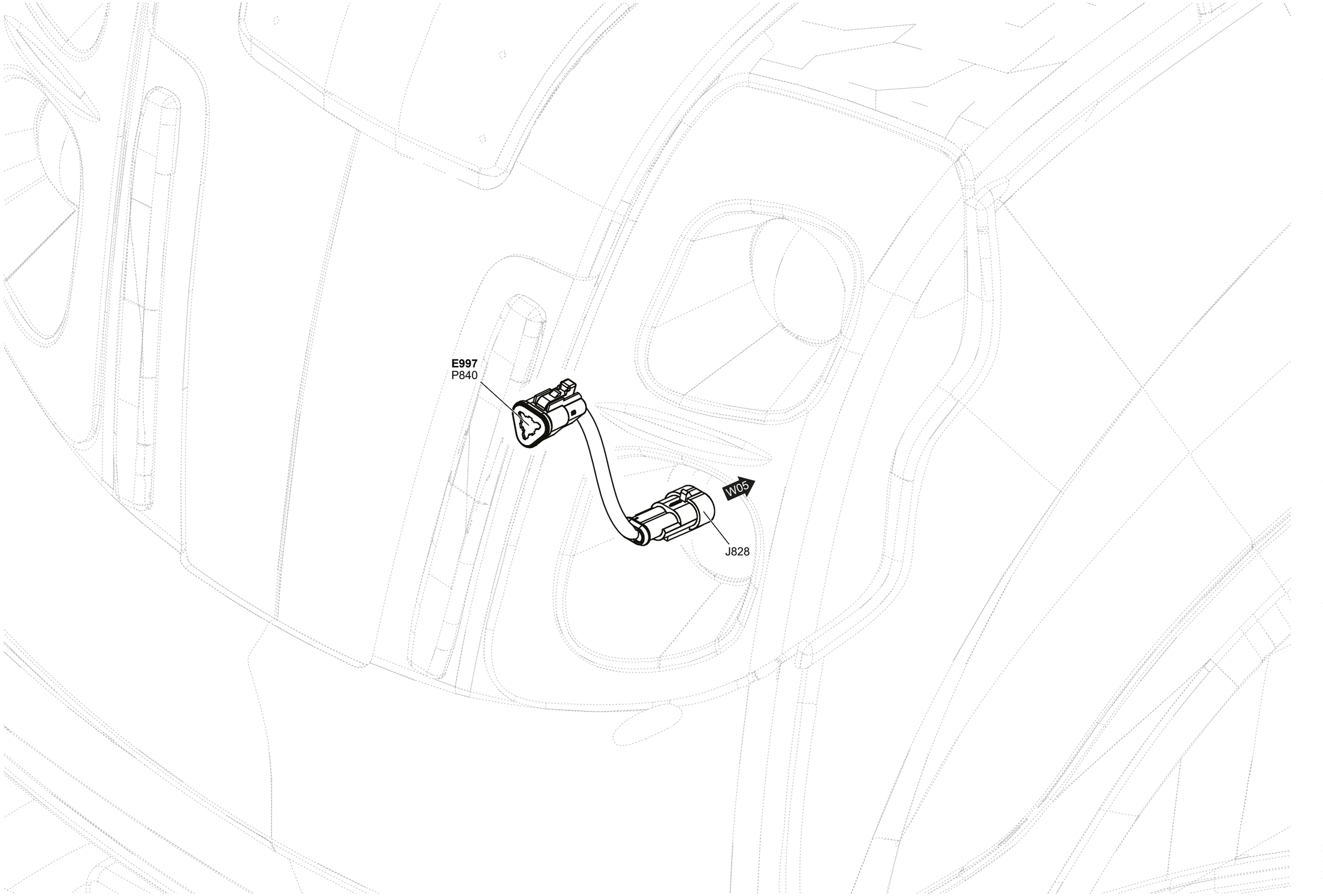
W02_4_AG_OUT_550580-2_B_0_20240301

4.3.9. W05 - BONNET



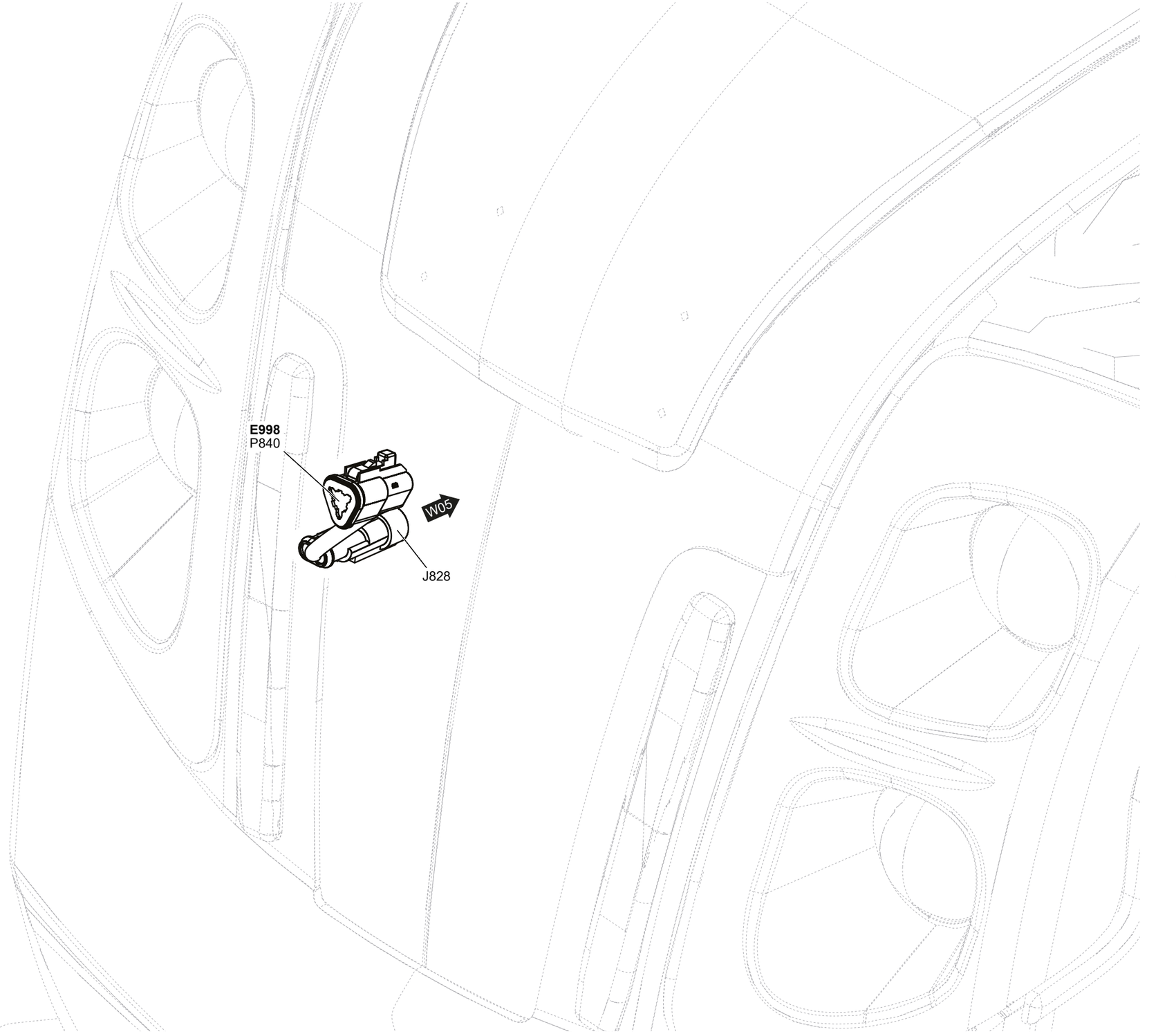
W05_AG_OUT_523213_B_0_20191128

4.3.10. W05_2 - LED LIGHT POWER SUPPLY LH



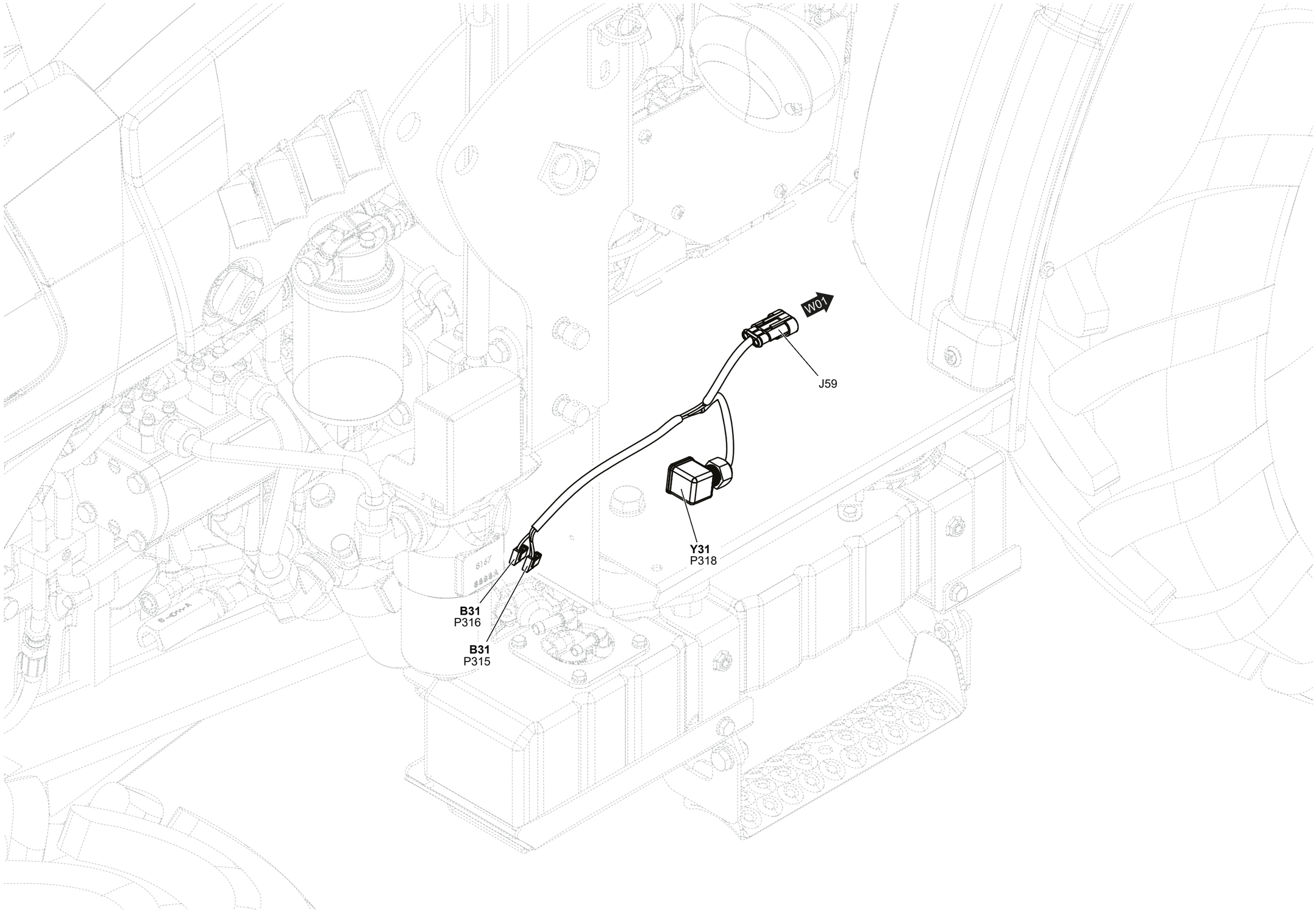
W05_2LH_AG_OUT_526301_B_0_20191128

4.3.11. W05_2 - LED LIGHT POWER SUPPLY RH



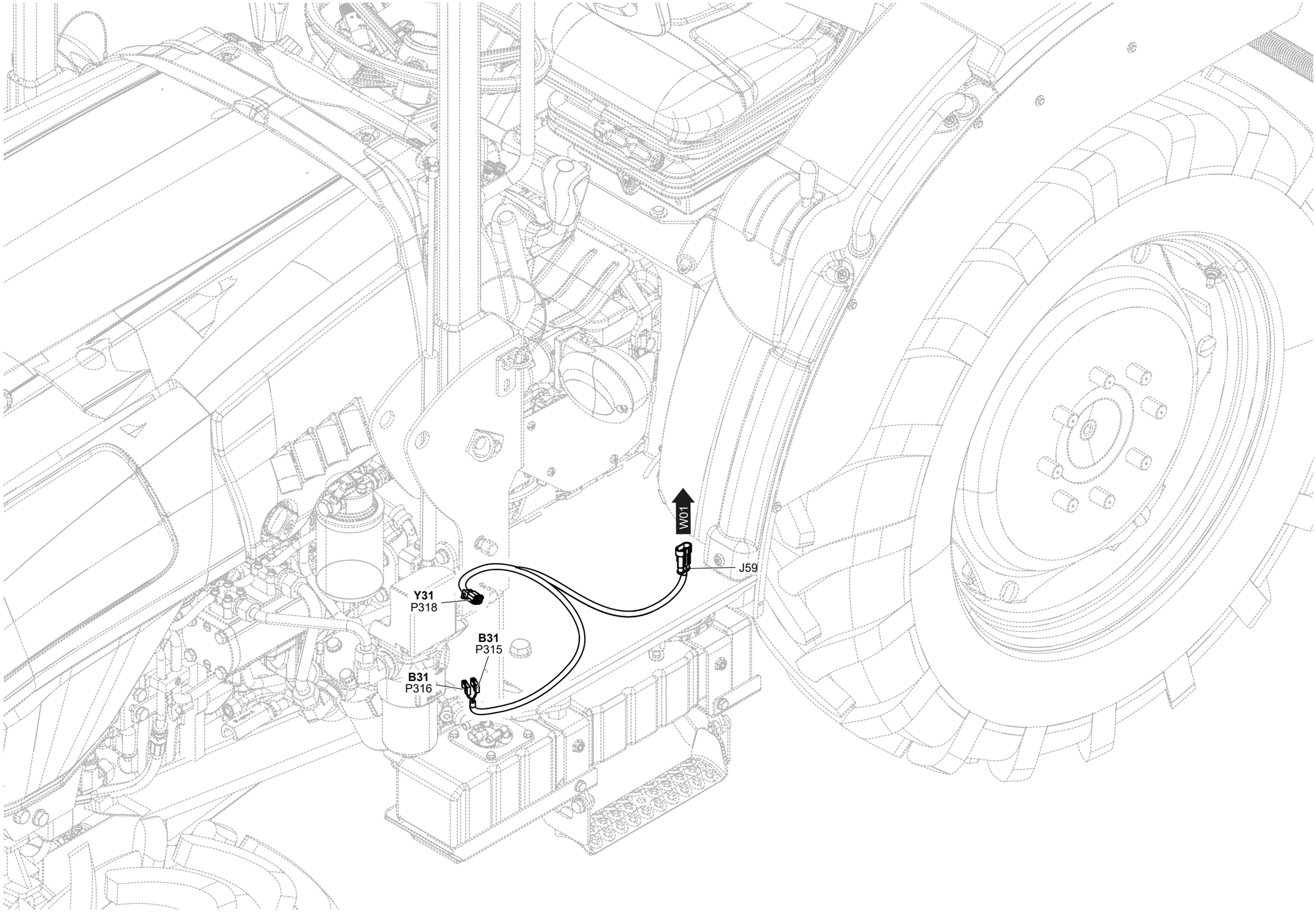
W05_2RH_AG_OUT_526301_B_0_20191128

4.3.12. W06 - TRAILER BRAKE VALVE - ITA



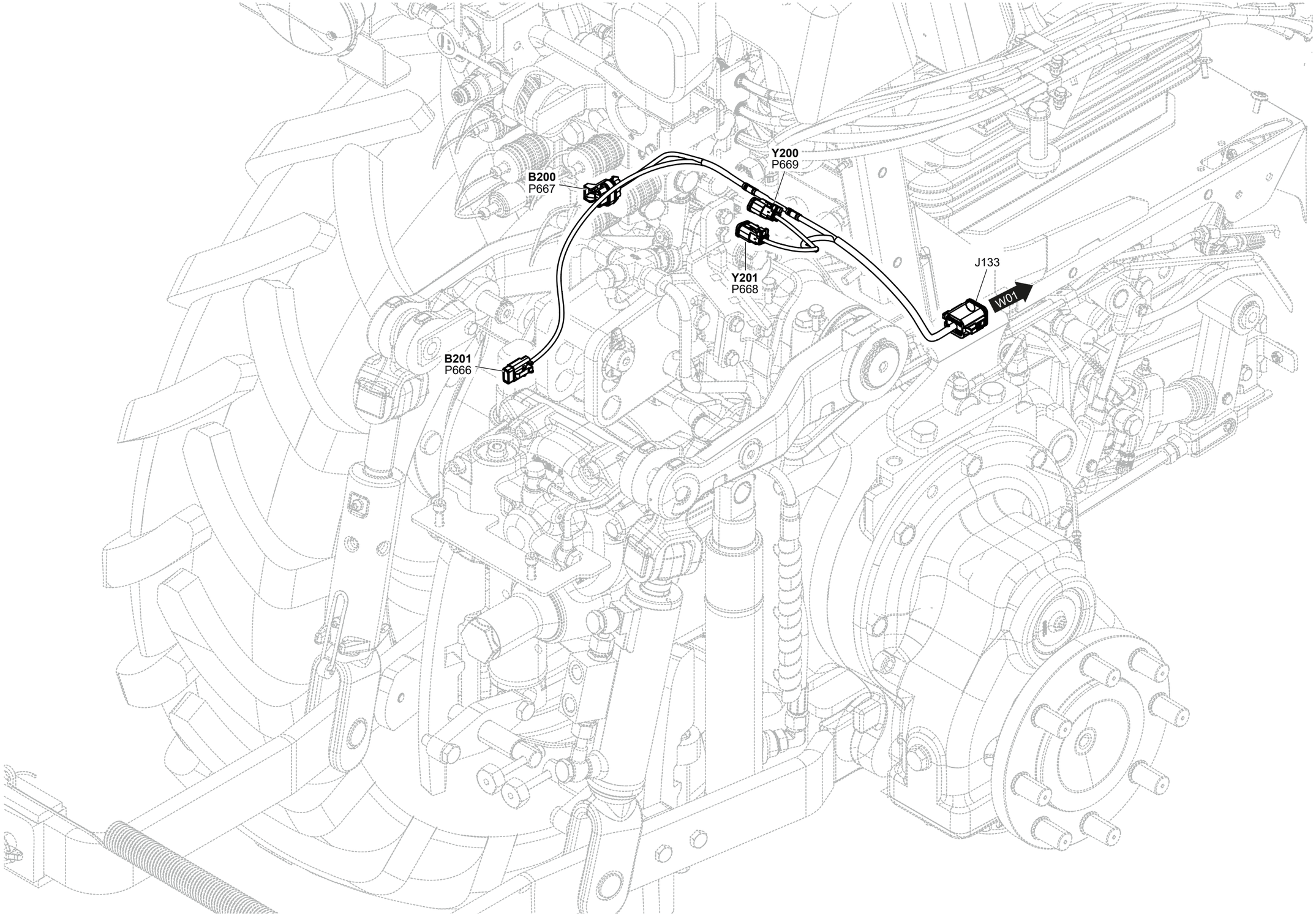
W06_AG_OUT_374177_B_0_ITA_20191127

4.3.13. W06 - TRAILER BRAKE VALVE - MR



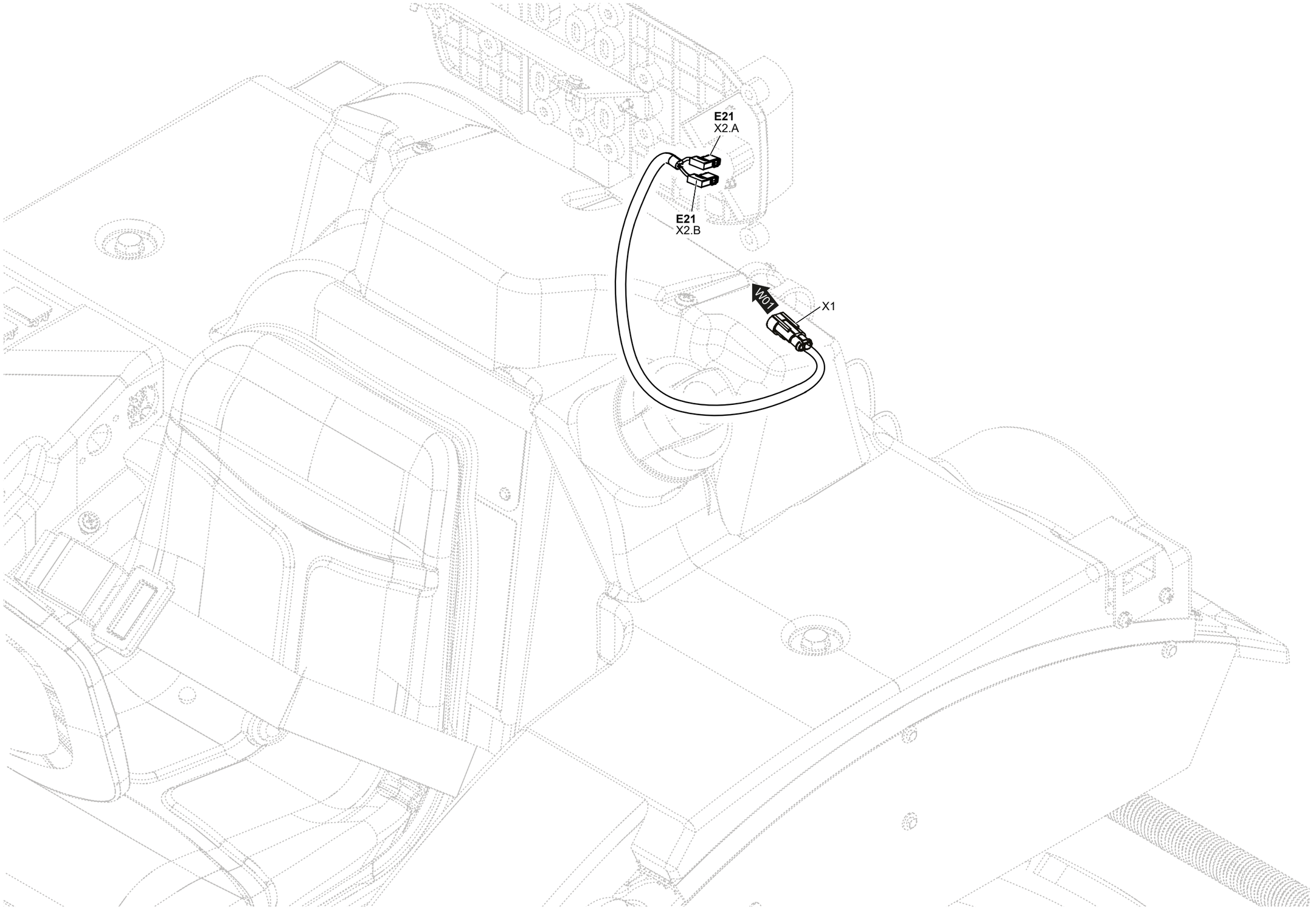
W06_AG_OUT_460148_B_0_MR_20191122

4.3.14. W11_1 - ELCTRONIC REAR HITCH ACTUATORS



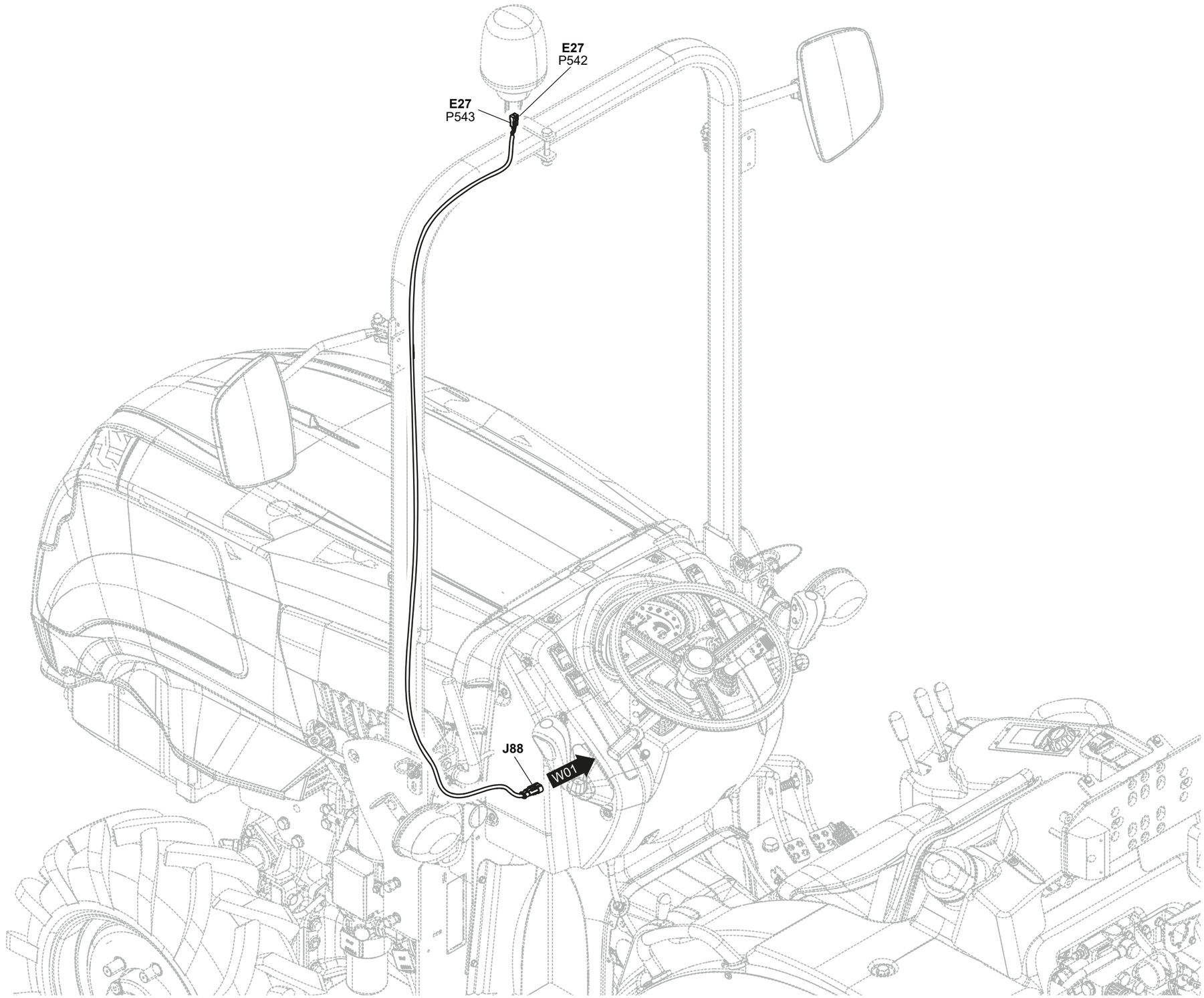
W11_1_AG_OUT_482180_B_0_20191122

4.3.15. W14 - LICENSE PLATE



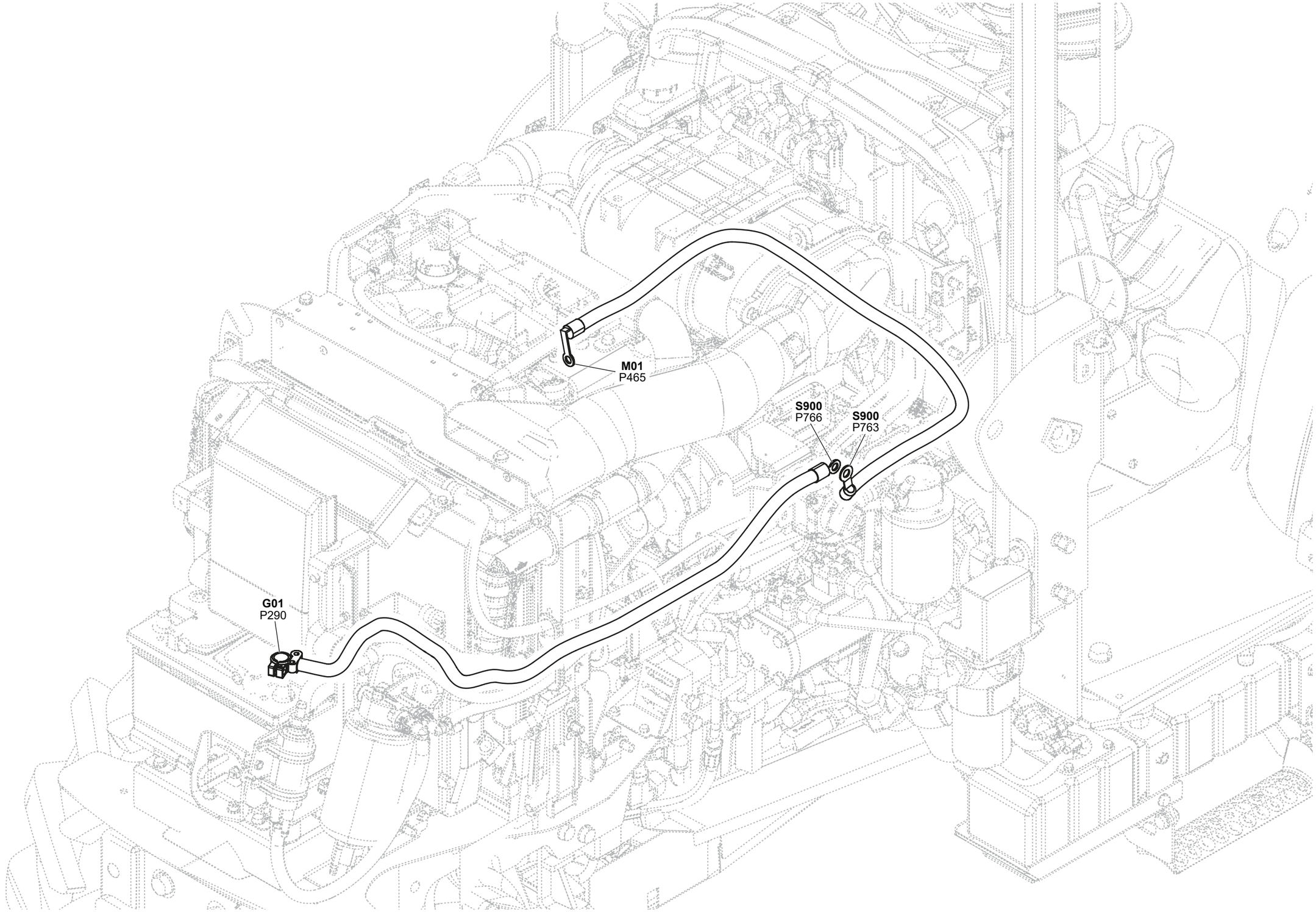
W14_AG_OUT_389908-01_B_0_20240301

4.3.16. W17 - BEACON LIGHT EXTENSION



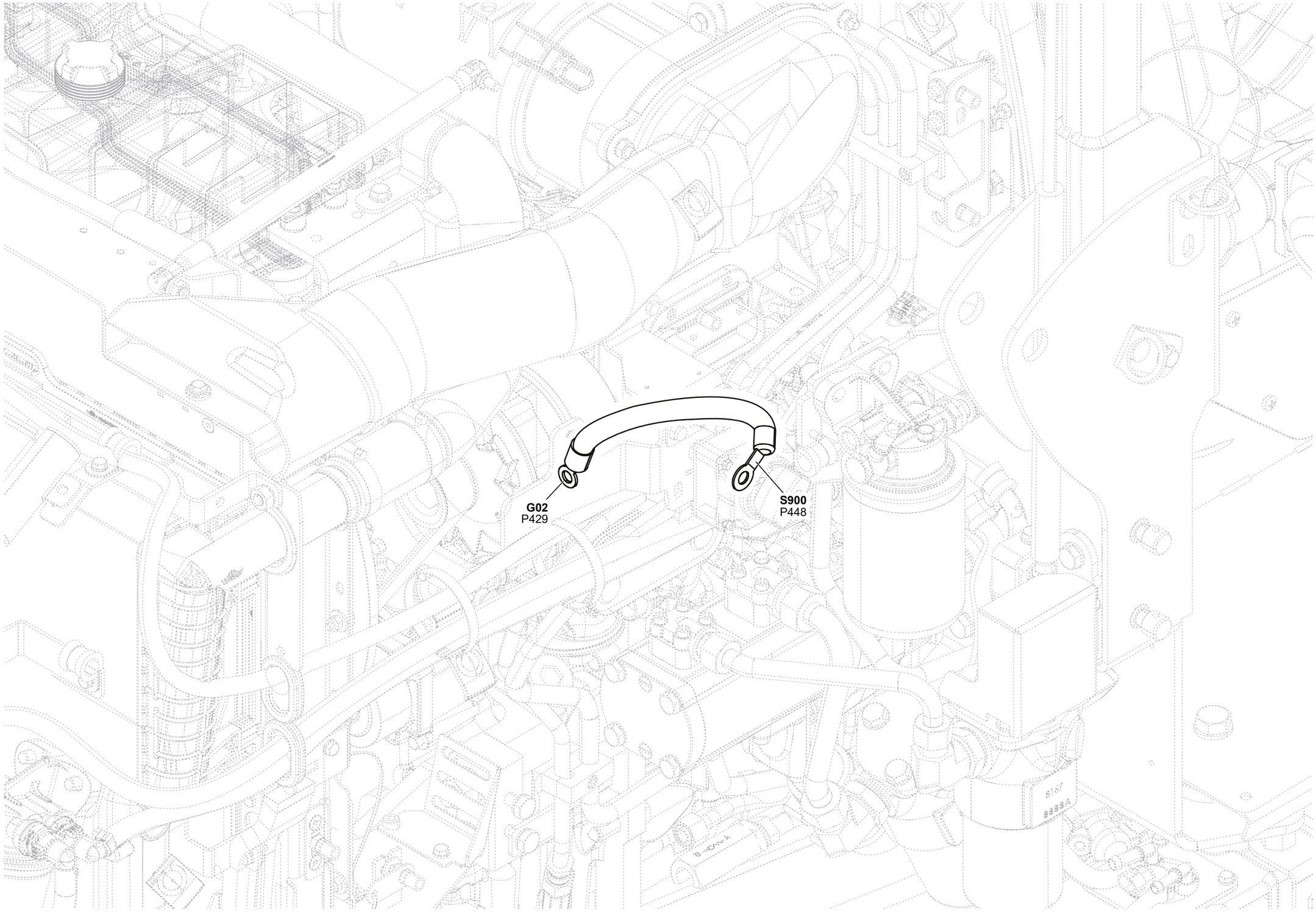
W17_AG_380037_B_0_20191118

4.3.17. W21 - BATTERY POSITIVE CABLE + CUT-OFF



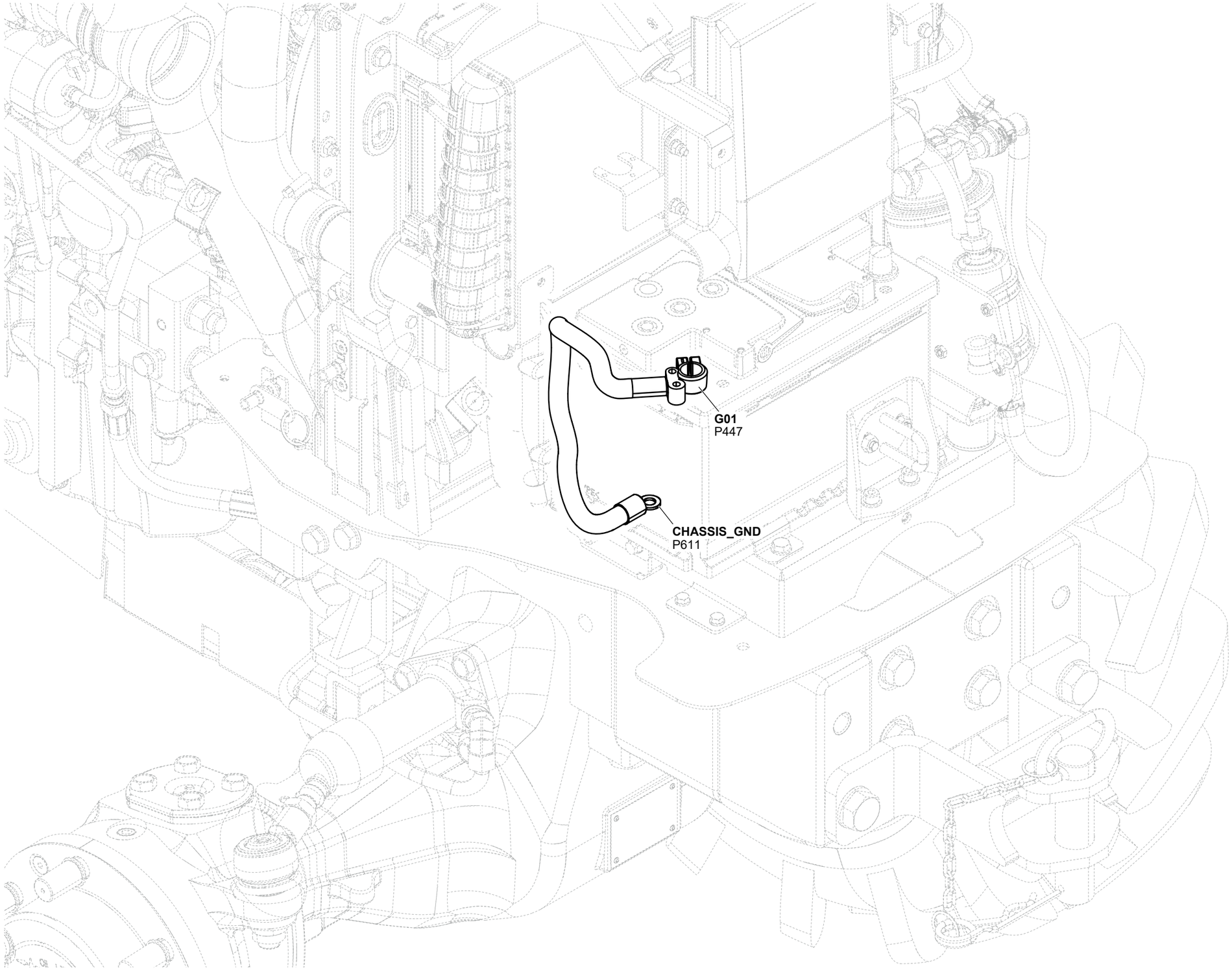
W21_AG_OUT_496677-03_B_0_20240301

4.3.18. W21_1 - BATTERY CHARGE



W21_1_AG_OUT_550579-01_B_0_20191127

4.3.19. W22 - BATTERY NEGATIVE CABLE



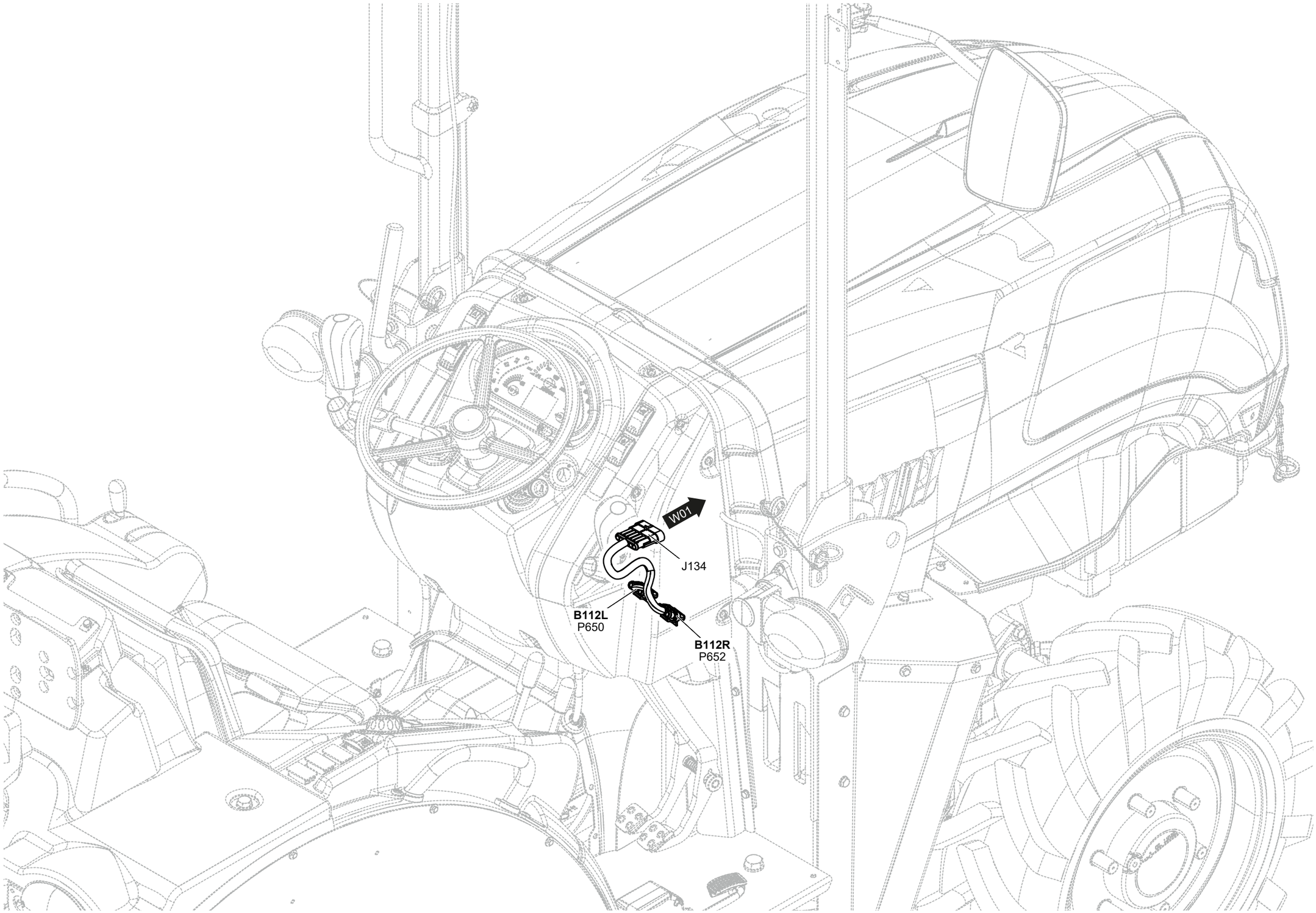
W22_AG_OUT_496676-03_B_0_20240301

4.3.20. W25 - GEAR LEVER EXTENSION



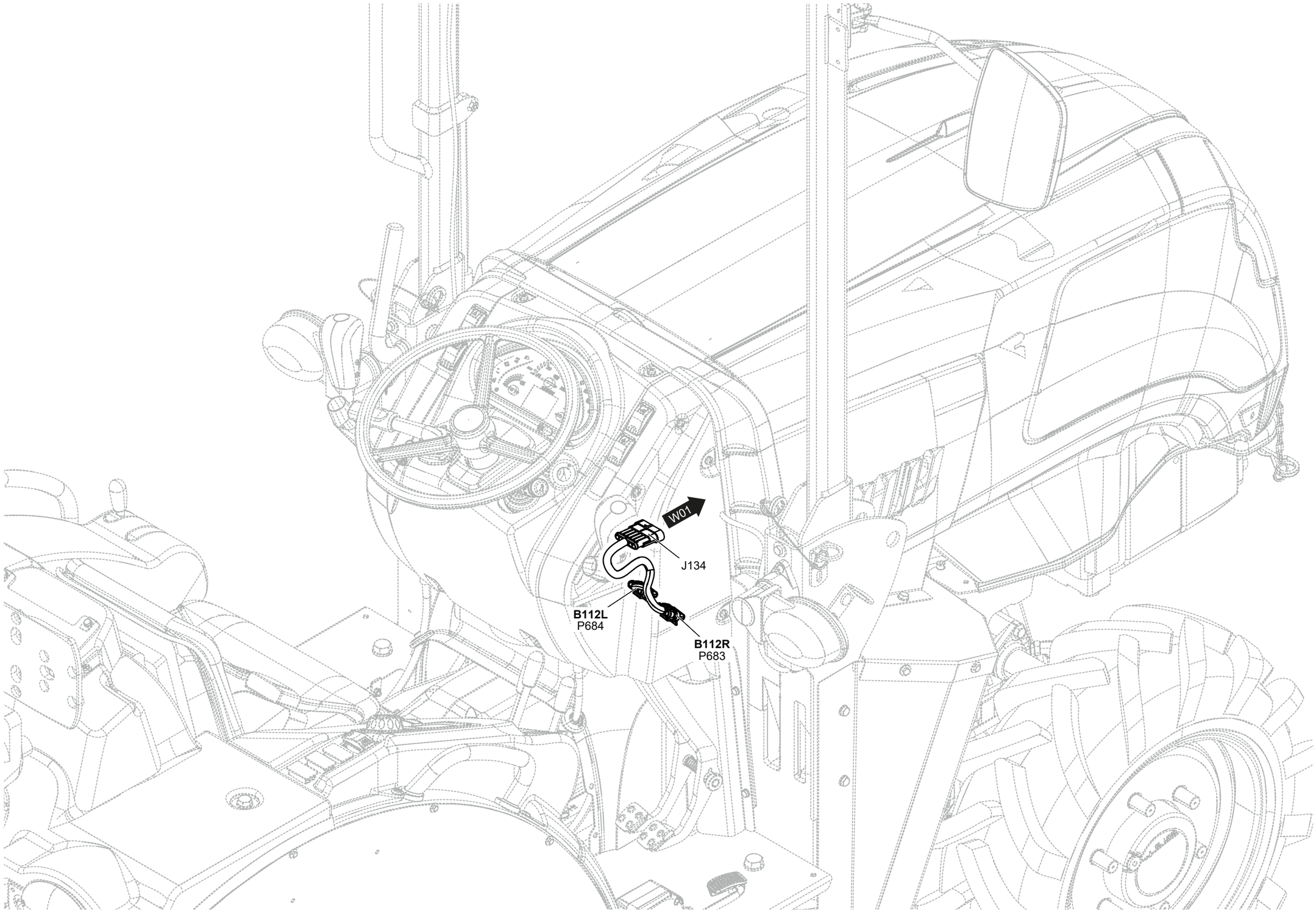
W25_AG_OUT_473558-02_B_2_20240301

4.3.21. W29_1 - BRAKE PEDAL SWITCHES (LH+RH) EXTENSION (Mechanical version)



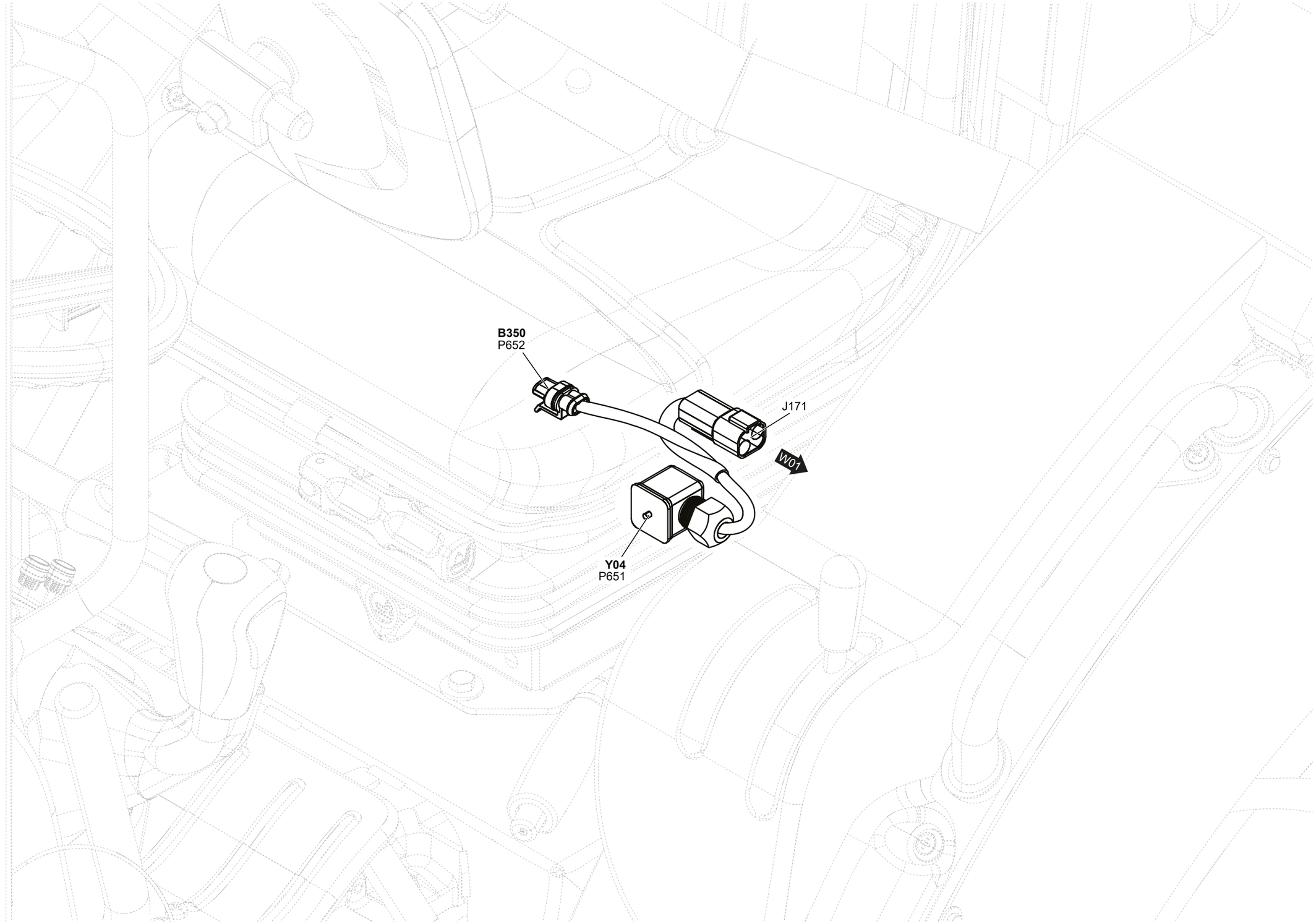
W29_1_AG_OUT_464658_B_1_20191119

4.3.22. W29_1 - BRAKE PEDAL SWITCHES (LH+RH) EXTENSION (Power reverser version)



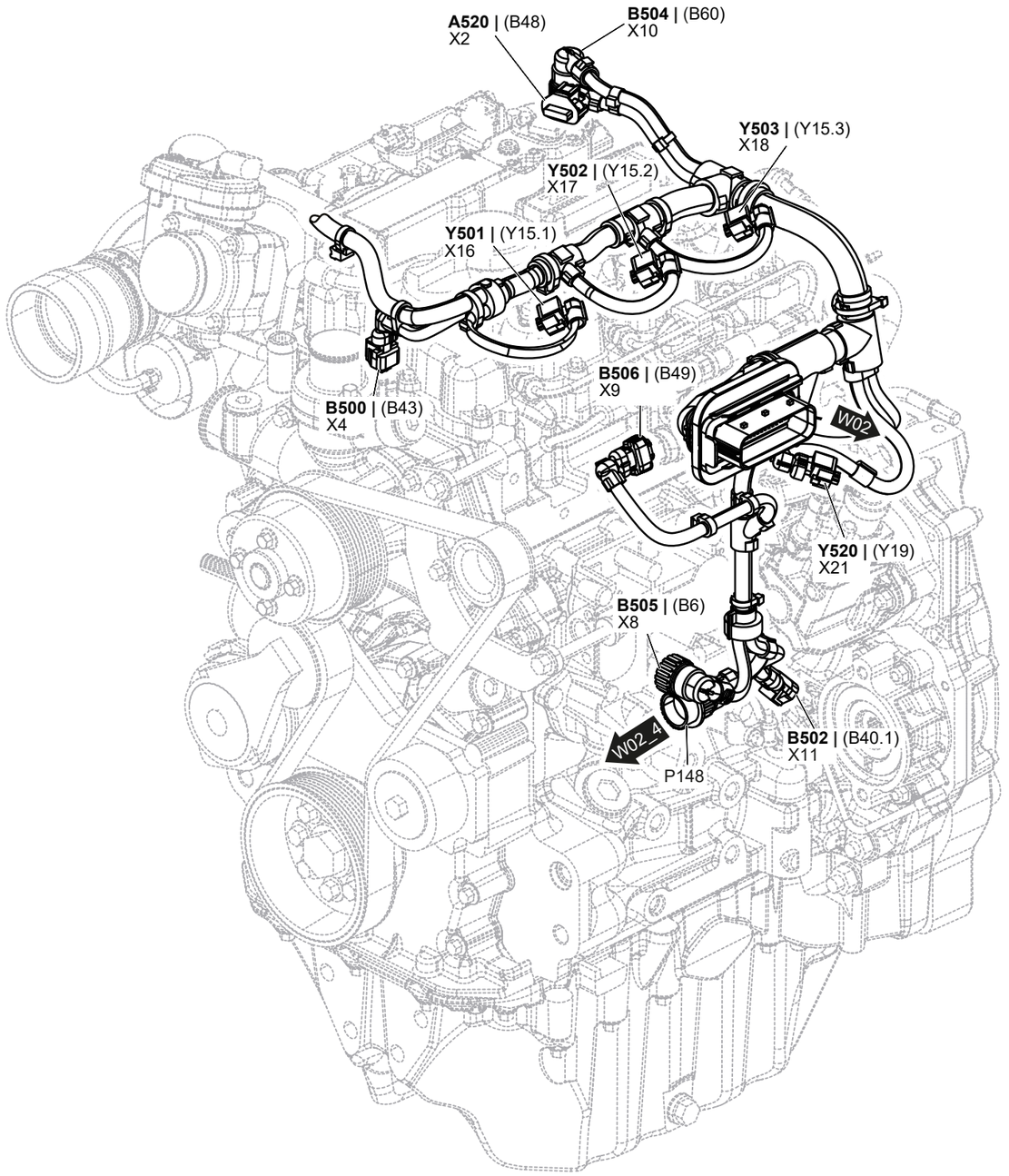
W29_1_AG_OUT_464658_B_2_20191119

4.3.23. W34 - PTO MAIN SOLENOID VALVE



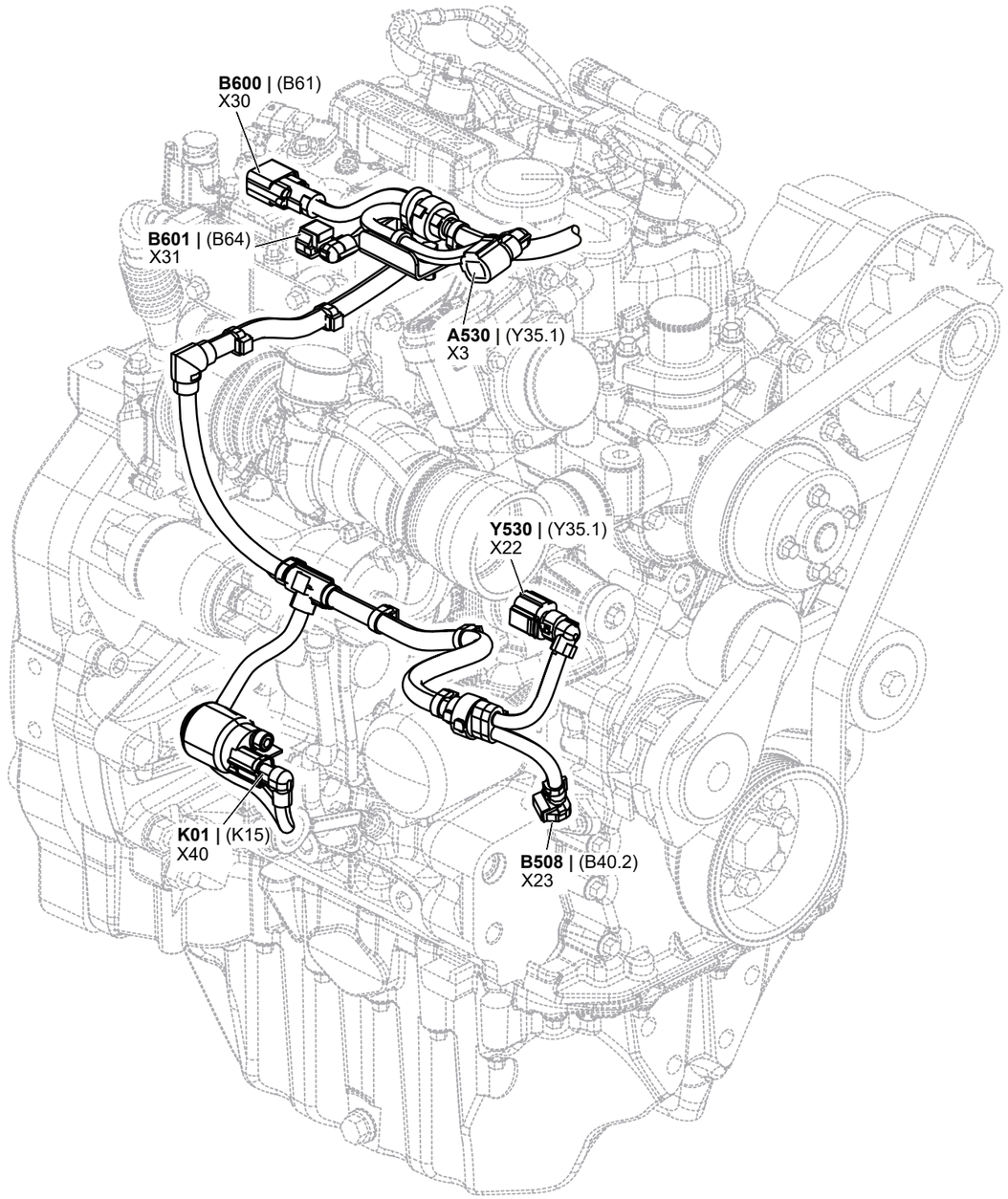
W34_AG_OUT_523139_B_2_20191128

4.3.24. W38C - ENGINE LH



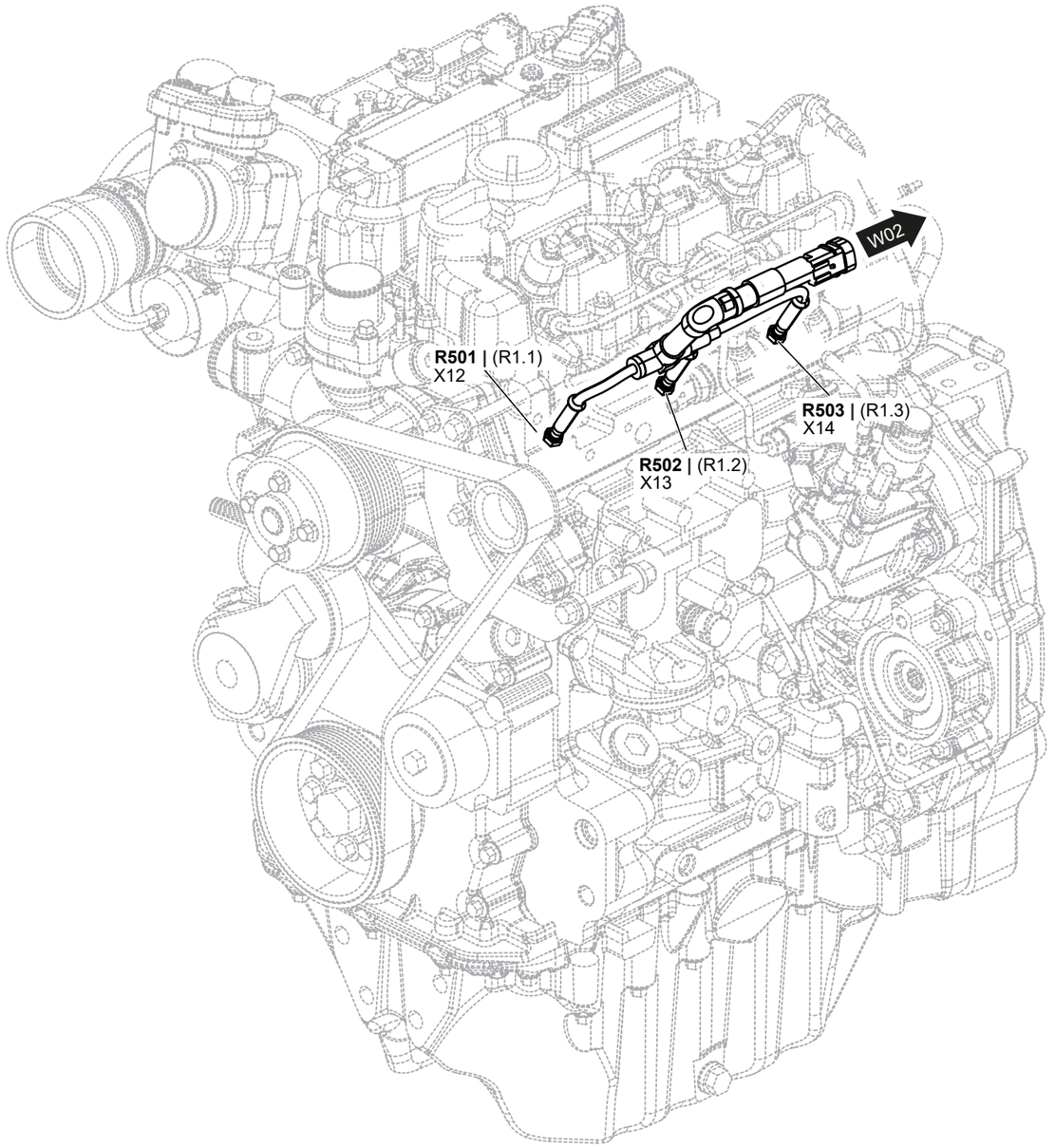
W38C_AG_OUT_474351_B_0_FRONTLH_20240301

4.3.25. W38C - ENGINE RH



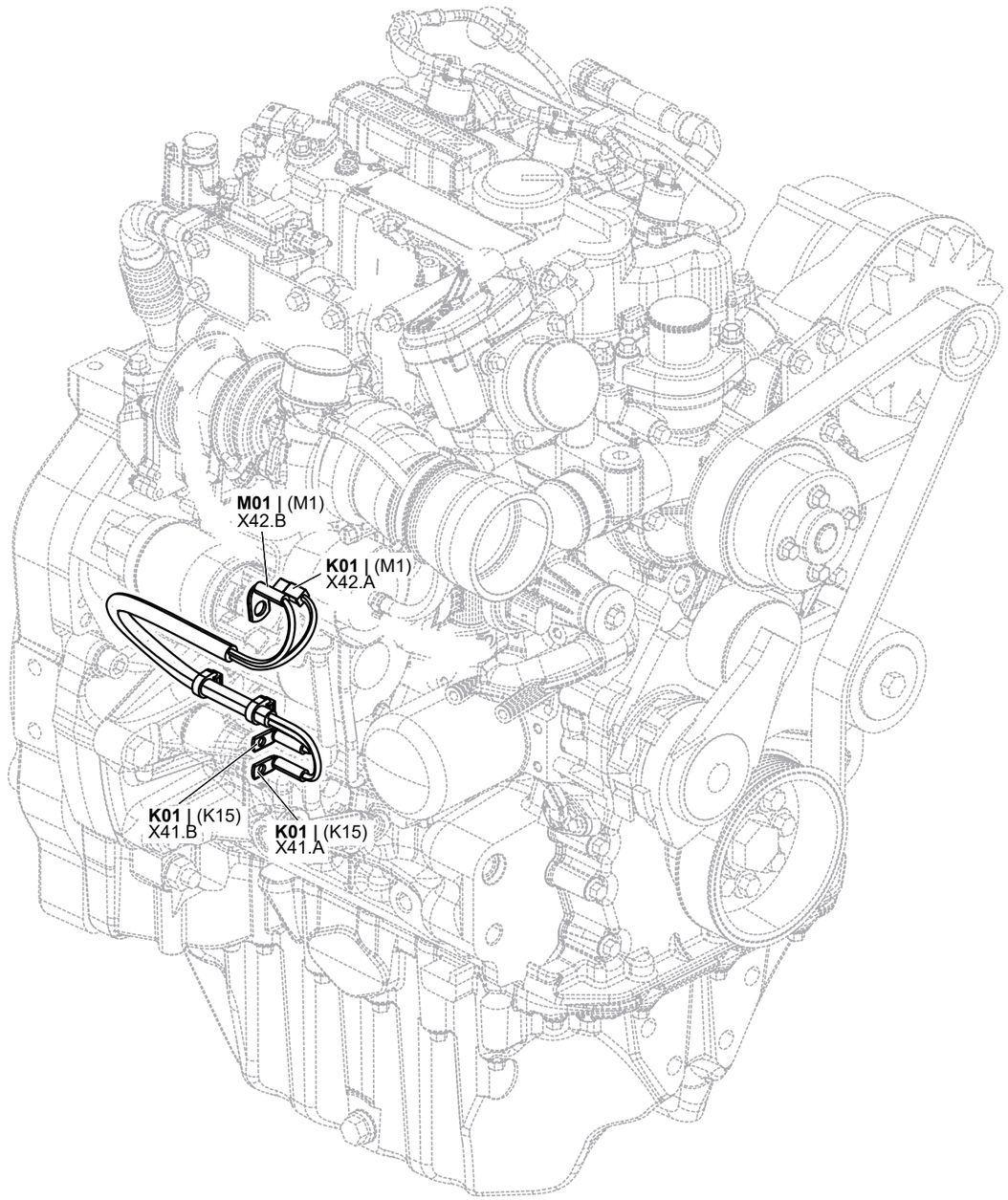
W38C_AG_OUT_474351_B_0_FRONTRH_20240301

4.3.26. W38D - GLOW PLUG



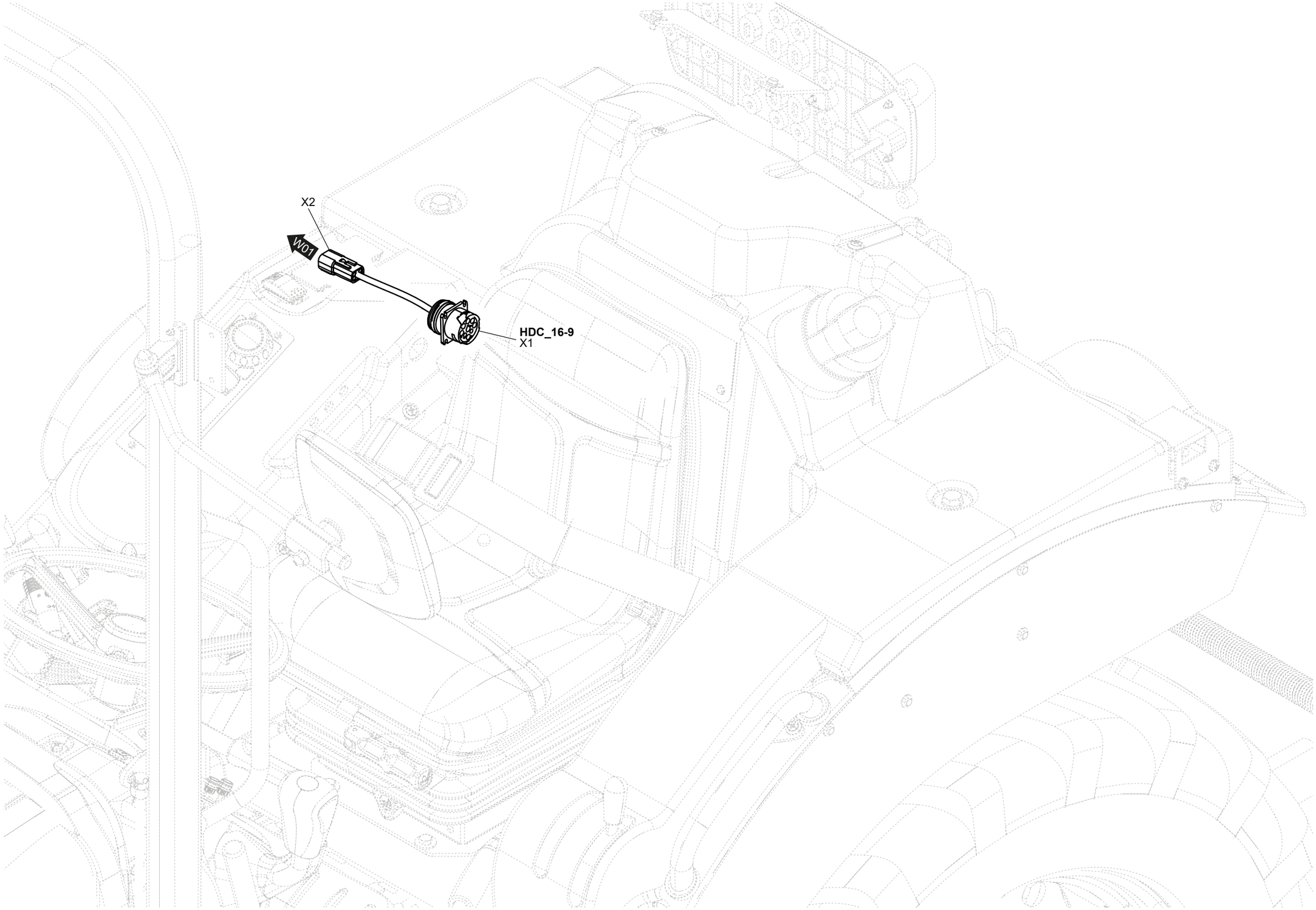
W38D_AG_OUT_474351_B_0_FRONTLH_20240301

4.3.27. W38E - STARTER MOTOR



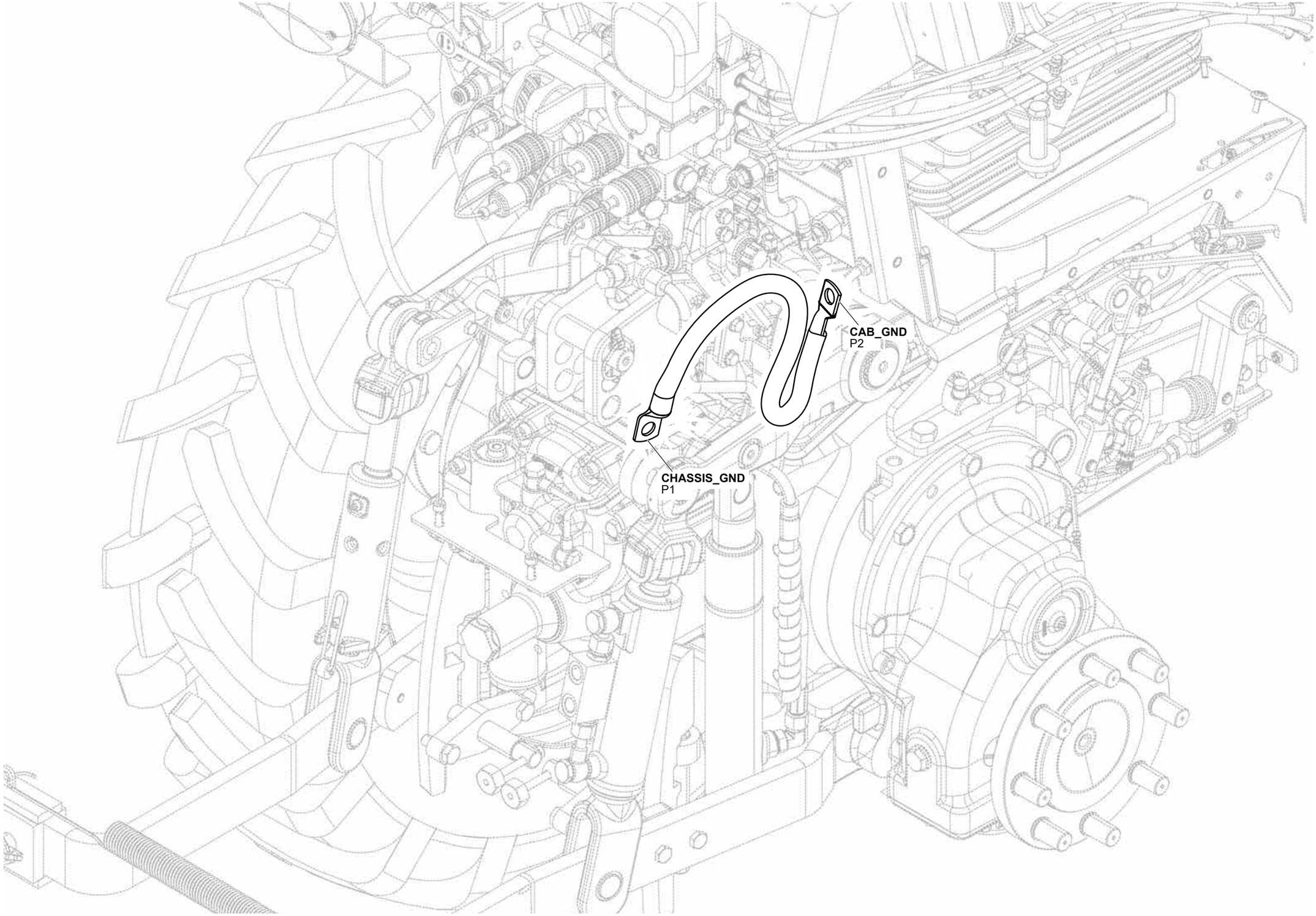
W38E_AG_OUT_474351_B_0_FRONTRH_20240301

4.3.28. W44 - DIAGNOSTIC SOCKET



W44_0_AG_OUT_438322-02_B_0_20240301

4.3.29. W45_4 - GROUND CABLE

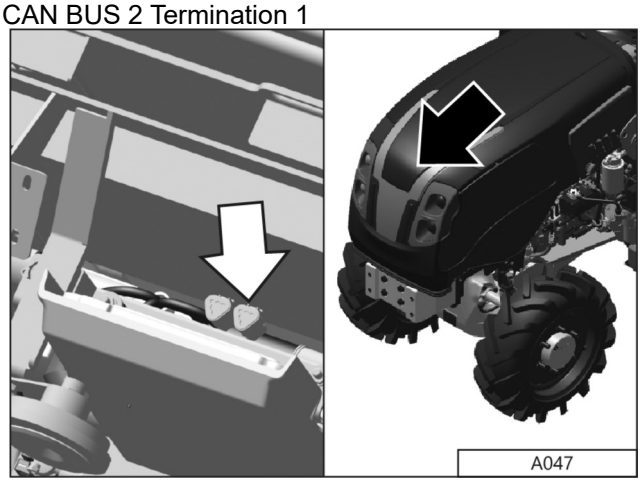


W45_4_AG_OUT_191994_B_0_20240301

4.4. COMPONENT LOCATIONS

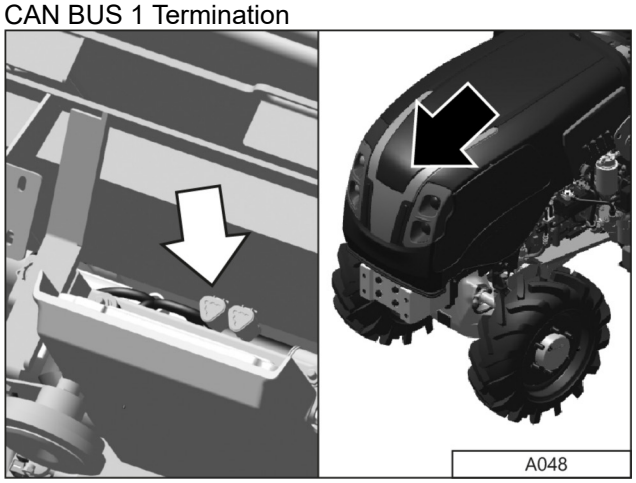
4.4.1. A047

Terminatore 1, CAN BUS 2
CAN BUS 2 Termination 1



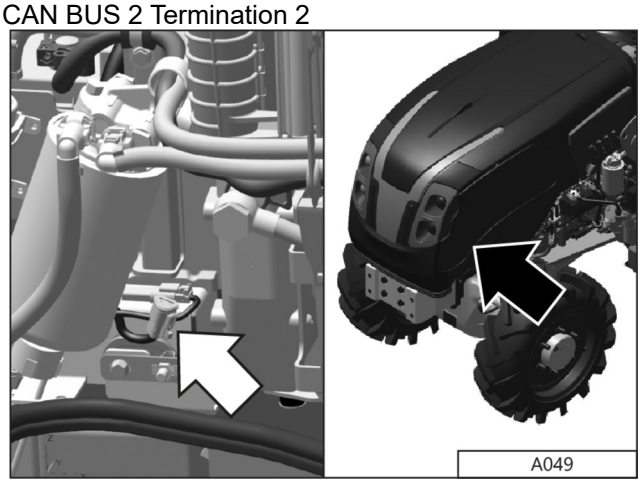
4.4.2. A048

Terminatore CAN BUS 1
CAN BUS 1 Termination



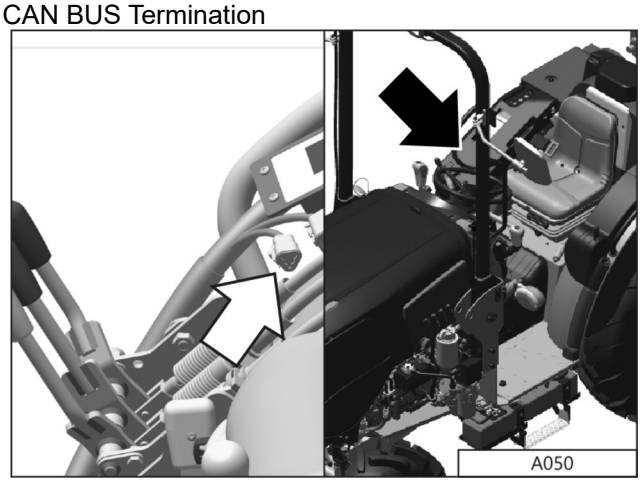
4.4.3. A049

Terminatore 2, CAN BUS 2
CAN BUS 2 Termination 2



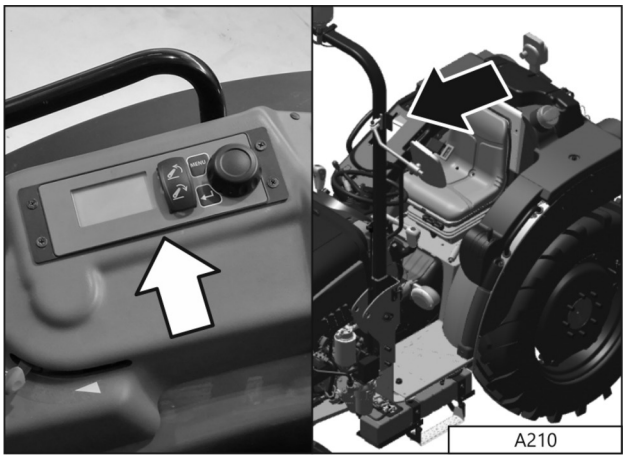
4.4.4. A050

Terminatore CAN
CAN BUS Termination



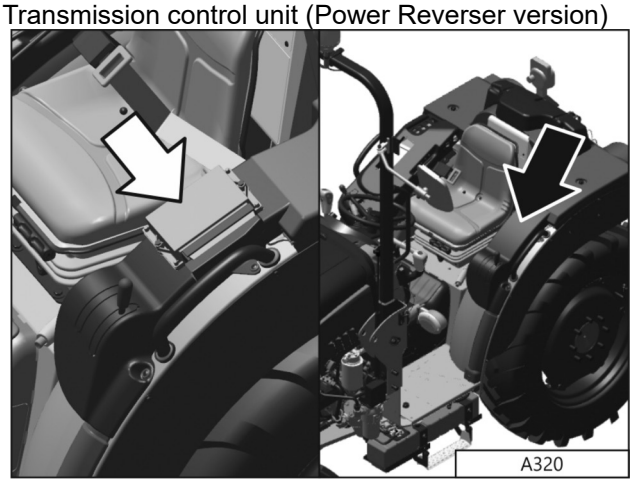
4.4.5. A210

Centralina sollevatore elettronico
Electronic hitch control unit



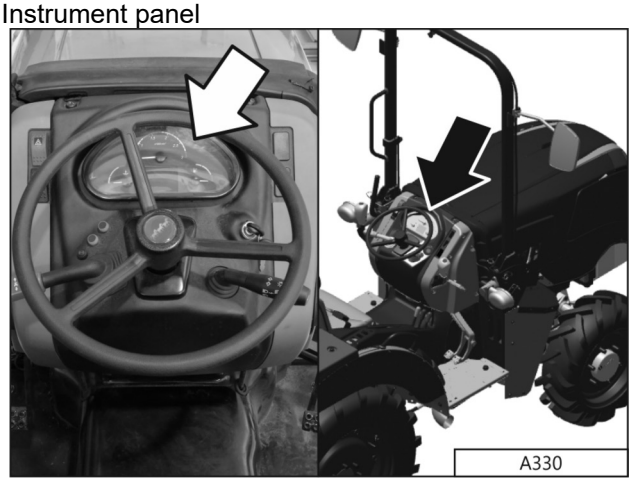
4.4.6. A320

Centralina trasmissione (Versione Elettroidraulica)
Transmission control unit (Power Reverser version)



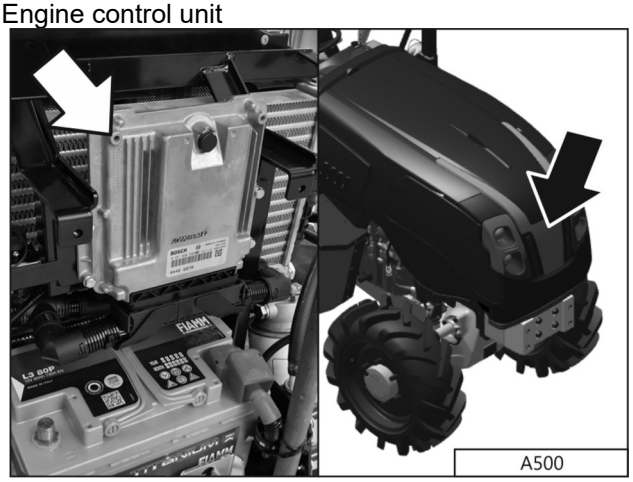
4.4.7. A330

Quadro strumenti
Instrument panel



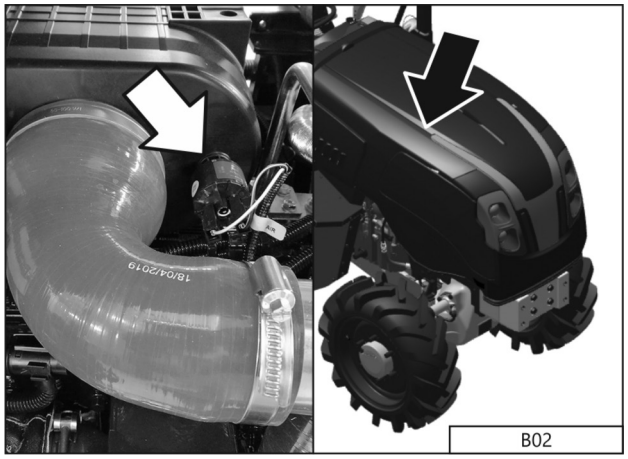
4.4.8. A500

Centralina motore
Engine control unit



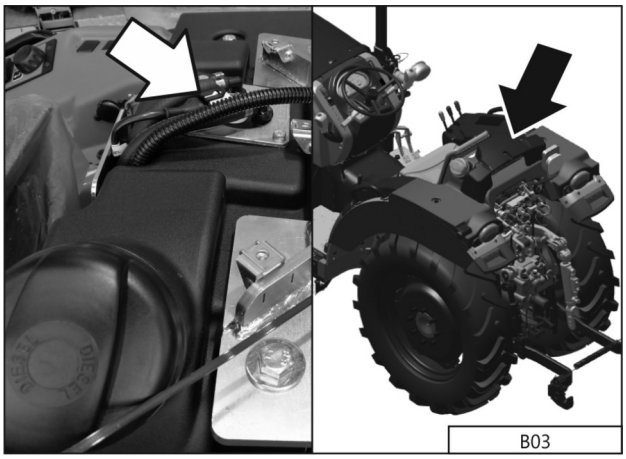
4.4.9. B02

Pressostato intasamento filtro aria
Air filter switch



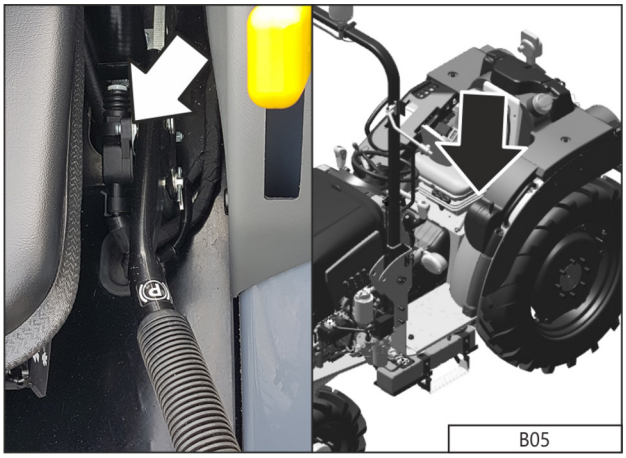
4.4.10. B03

Sensore livello carburante serbatoio posteriore
Rear tank fuel level sensor



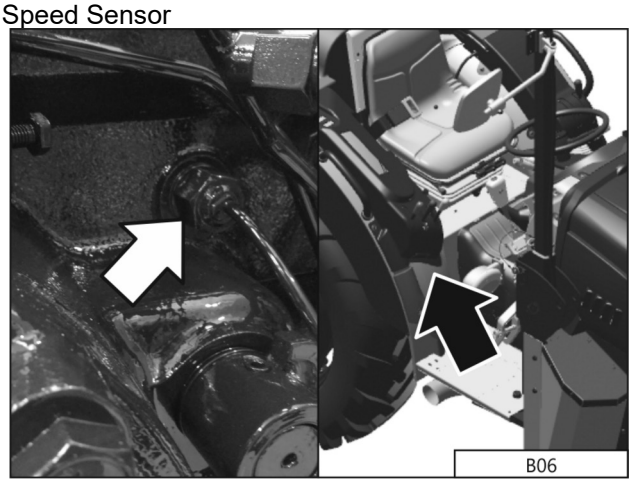
4.4.11. B05

Interruttore freno a mano
Hand brake switch



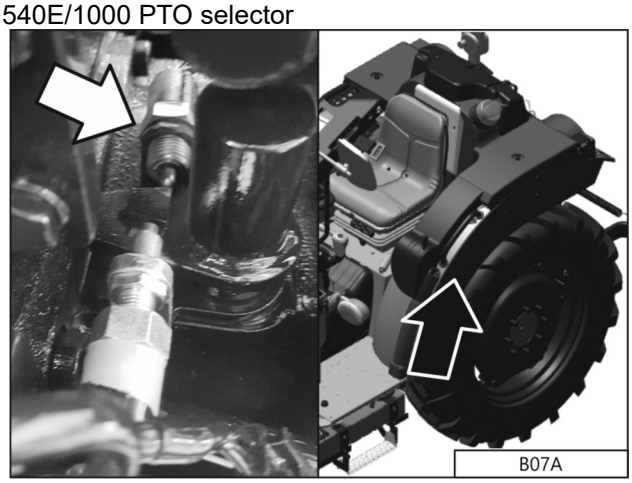
4.4.12. B06

Sensore velocità veicolo
Speed Sensor



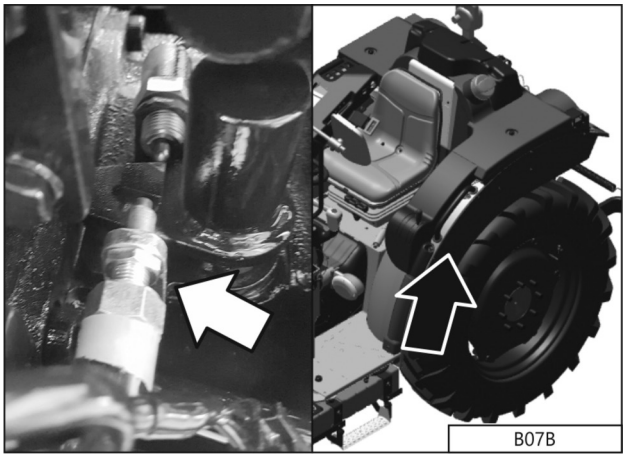
4.4.13. B07A

Interruttore velocità PTO 540E/1000
540E/1000 PTO selector



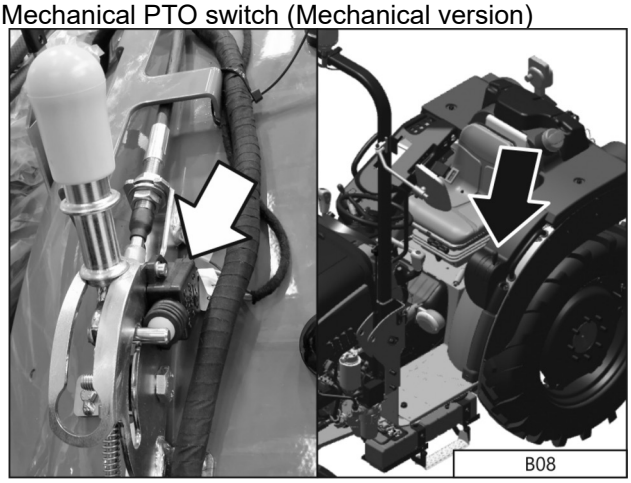
4.4.14. B07B

Interruttore velocità PTO 540
540 PTO selector



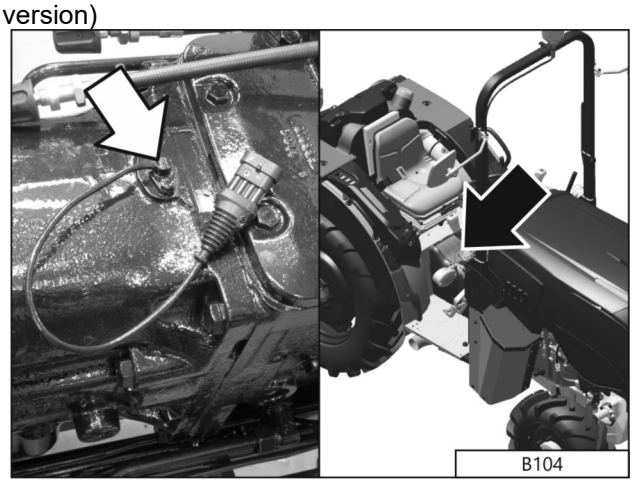
4.4.15. B08

Interruttore PTO meccanica innestata (Versione Meccanica)
Mechanical PTO switch (Mechanical version)



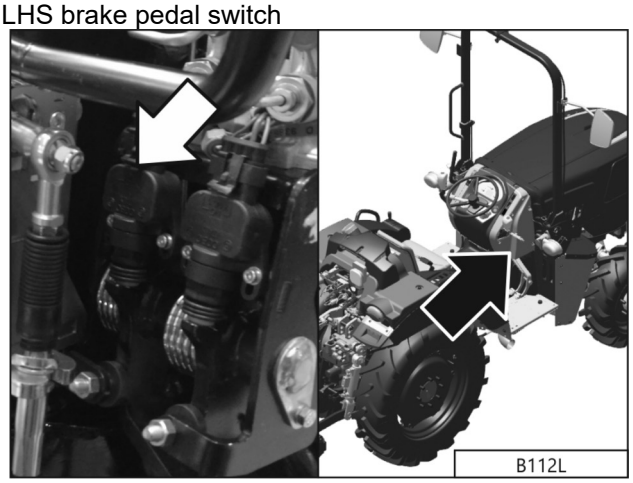
4.4.16. B104

Sensore velocità trasmissione (Versione Elettroidraulica)
Transmission out speed signal (Power Reverser version)



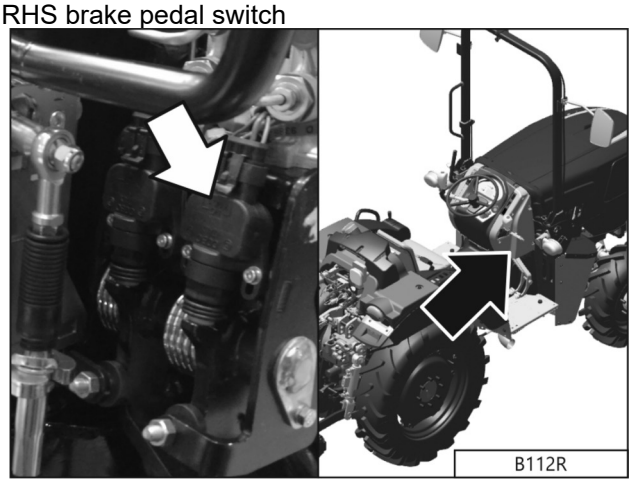
4.4.17. B112L

Interruttore pedale freno sinistro
LHS brake pedal switch



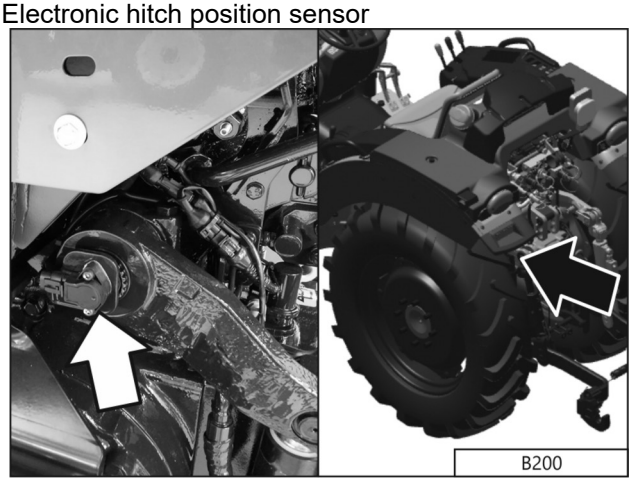
4.4.18. B112R

Interruttore pedale freno destro
RHS brake pedal switch



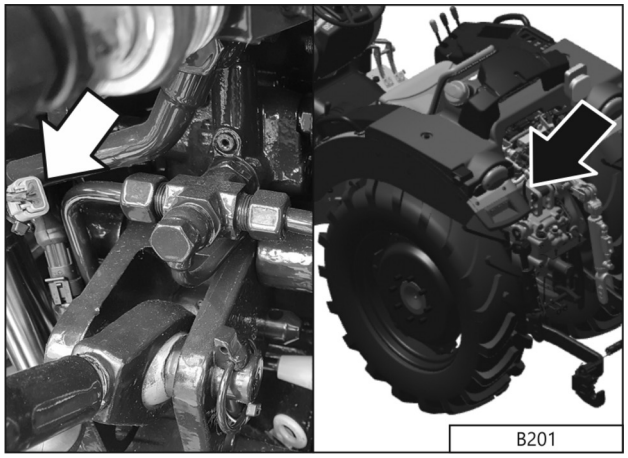
4.4.19. B200

Sensore posizione sollevatore elettronico
Electronic hitch position sensor



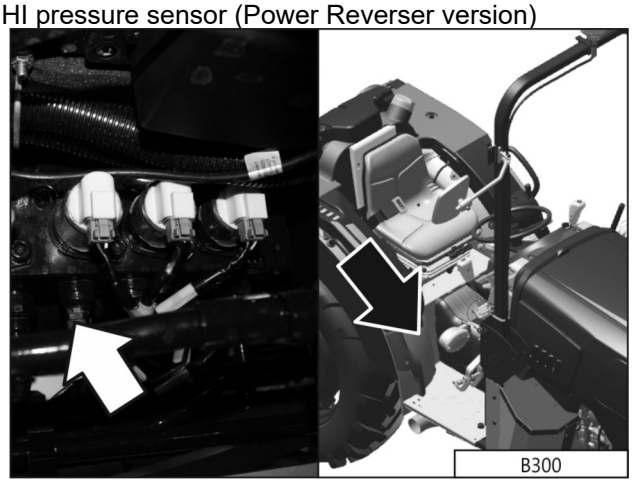
4.4.20. B201

Sensore sforzo sollevatore elettronico
Electronic hitch draft sensor



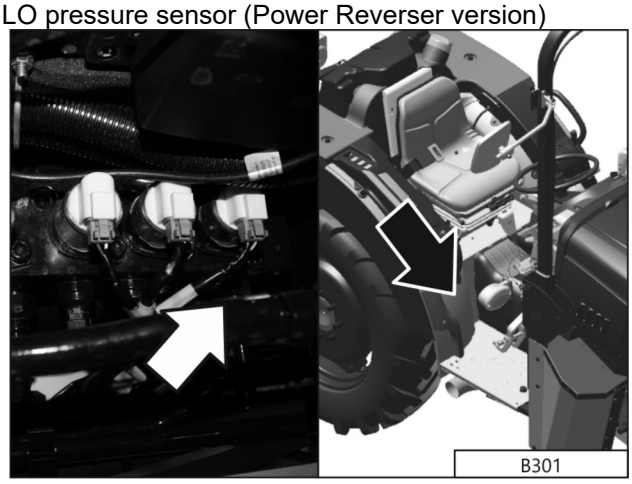
4.4.21. B300

Sensore pressione marcia alta (Versione Elettroidraulica)
HI pressure sensor (Power Reverser version)



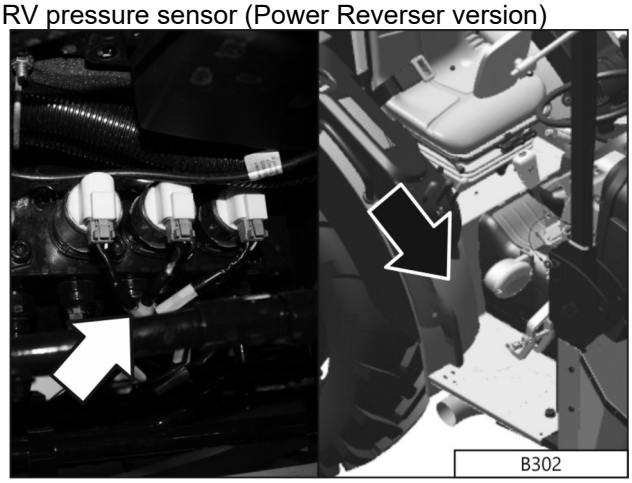
4.4.22. B301

Sensore pressione marcia bassa (Versione Elettroidraulica)
LO pressure sensor (Power Reverser version)



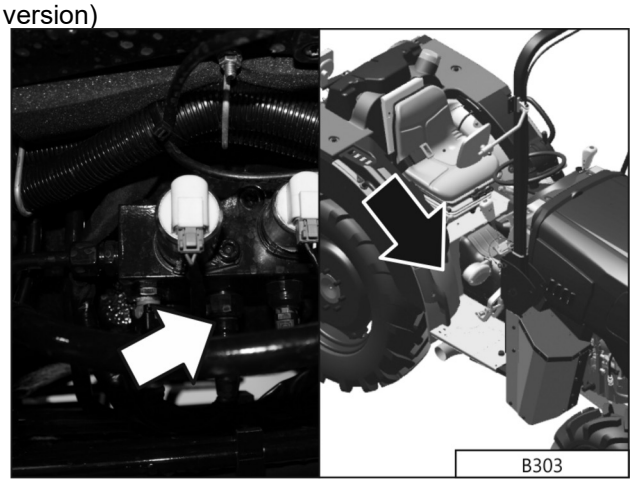
4.4.23. B302

Sensore pressione retromarcia (Versione Elettroidraulica)
RV pressure sensor (Power Reverser version)



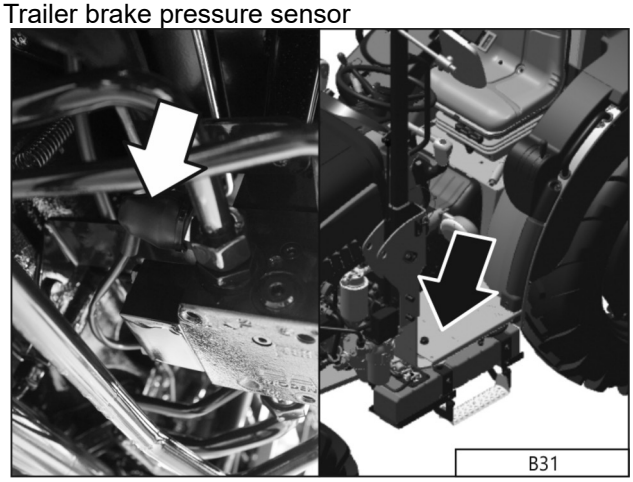
4.4.24. B303

Pressostato olio trasmissione (Versione Elettroidraulica)
Transmission oil pressure switch (Power Reverser version)



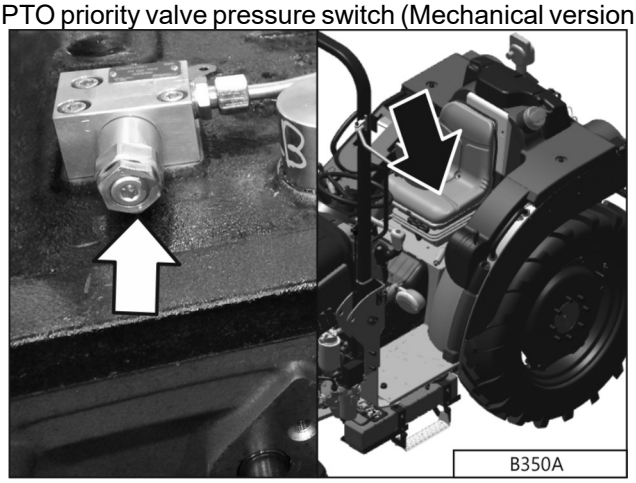
4.4.25. B31

Pressostato circuito freno rimorchio
Trailer brake pressure sensor



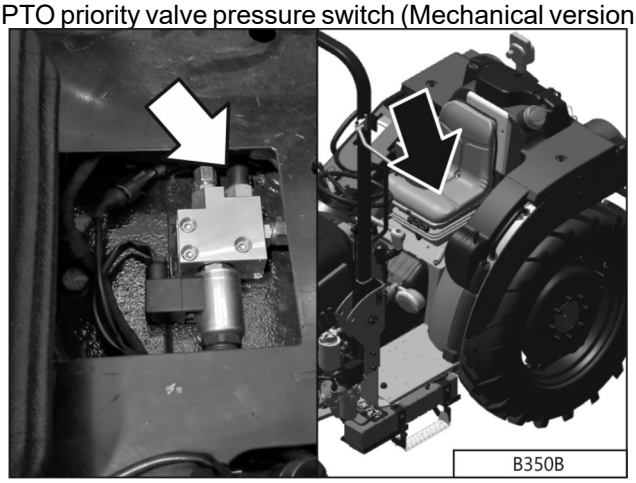
4.4.26. B350A

Pressostato circuito PTO (Versione Meccanica)
PTO priority valve pressure switch (Mechanical version)



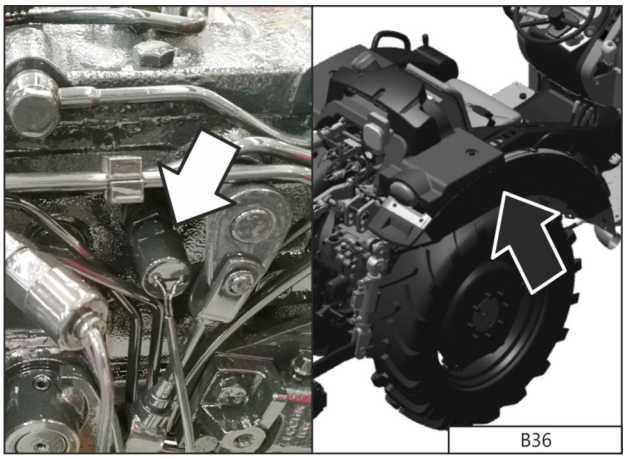
4.4.27. B350B

Pressostato circuito PTO (Versione Elettroidraulica)
PTO priority valve pressure switch (Mechanical version)



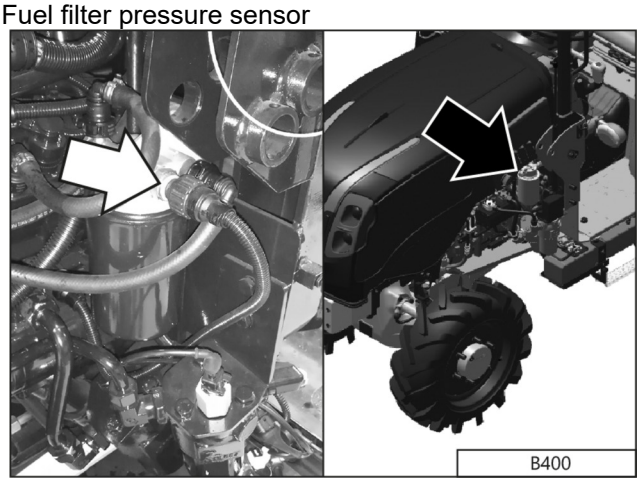
4.4.28. B36

Interruttore NEUTRO trasmissione
Neutral start switch



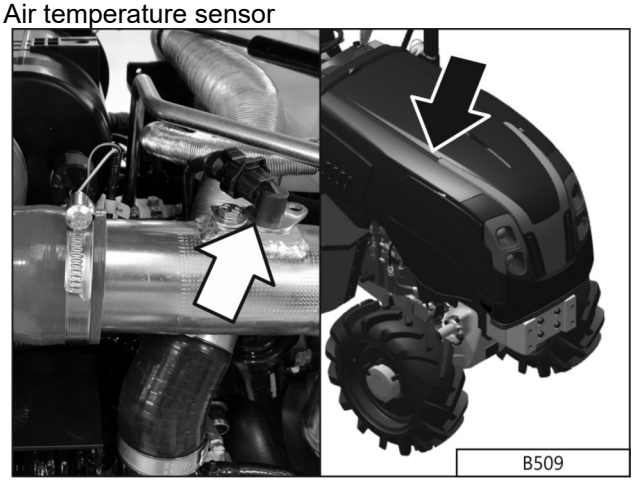
4.4.29. B400

Sensore di pressione del filtro del carburante
Fuel filter pressure sensor



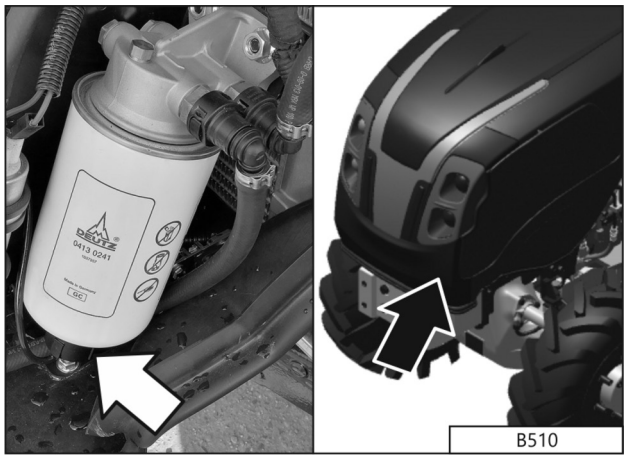
4.4.30. B509

Sensore temperatura aria
Air temperature sensor



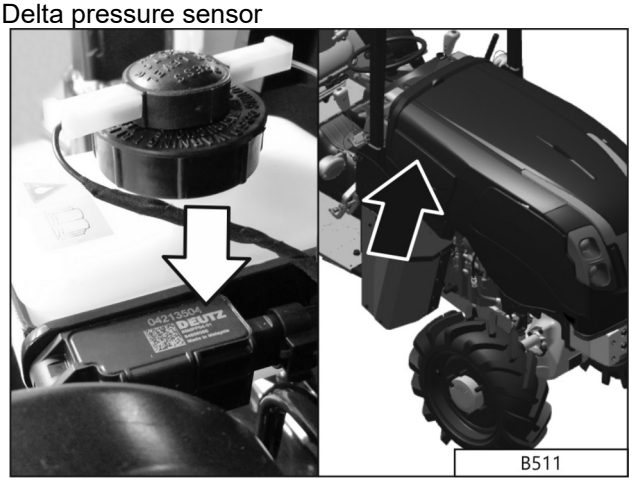
4.4.31. B510

Sensore presenza acqua nel carburante
Water in fuel switch



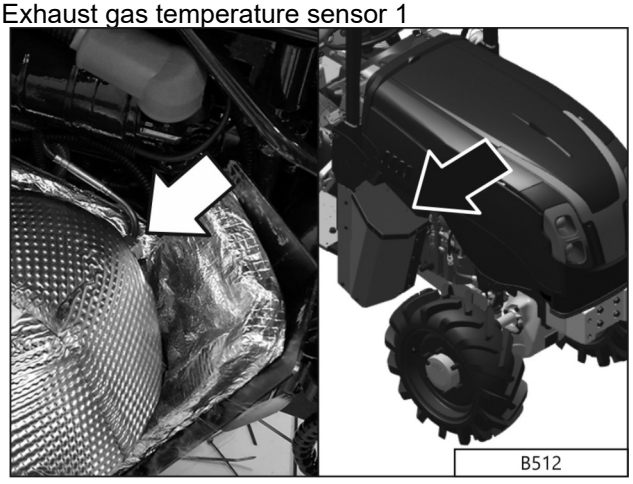
4.4.32. B511

Sensore differenziale di pressione DPF
Delta pressure sensor



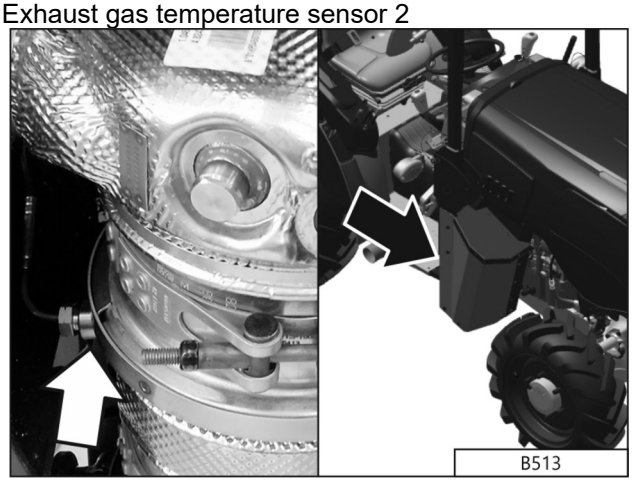
4.4.33. B512

Sensore 1 temperatura gas di scarico
Exhaust gas temperature sensor 1



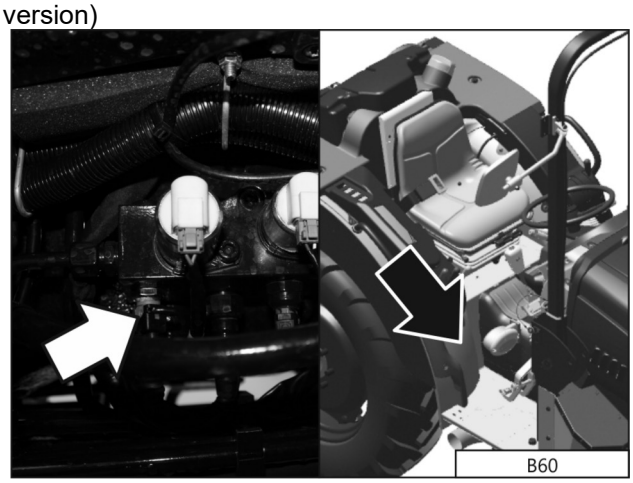
4.4.34. B513

Sensore 2 temperatura gas di scarico
Exhaust gas temperature sensor 2



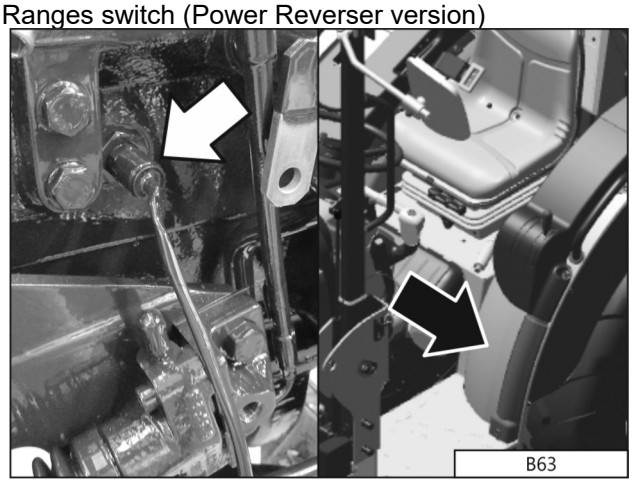
4.4.35. B60

Sensore temperatura olio trasmissione (Versione Elettroidraulica)
Transmission oil temperature sensor (Power Reverser version)



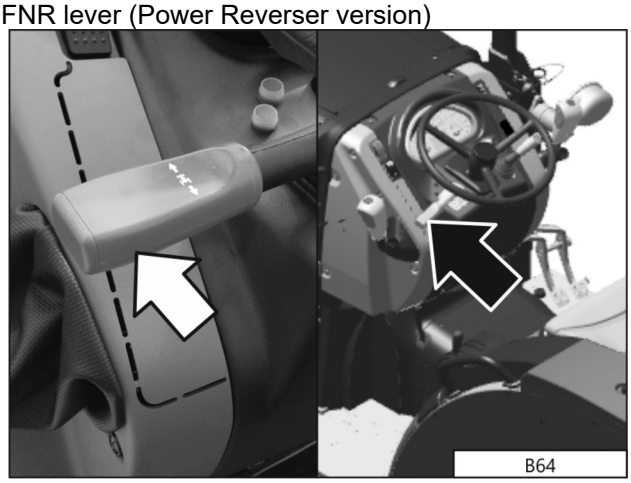
4.4.36. B63

Interruttore gamme (Versione Elettroidraulica)
Ranges switch (Power Reverser version)



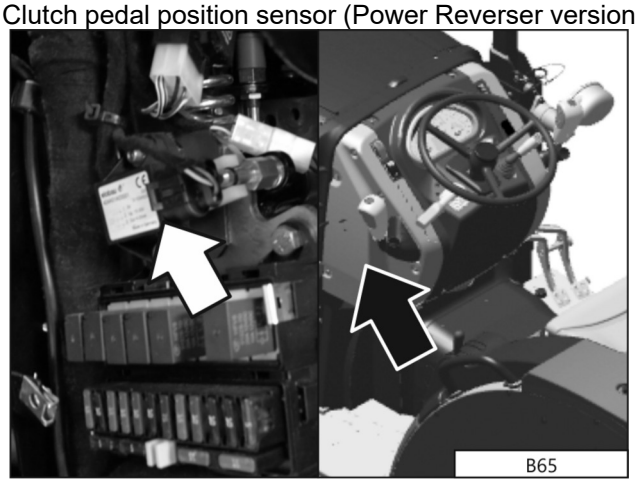
4.4.37. B64

Leva inversore (Versione Elettroidraulica)
FNR lever (Power Reverser version)



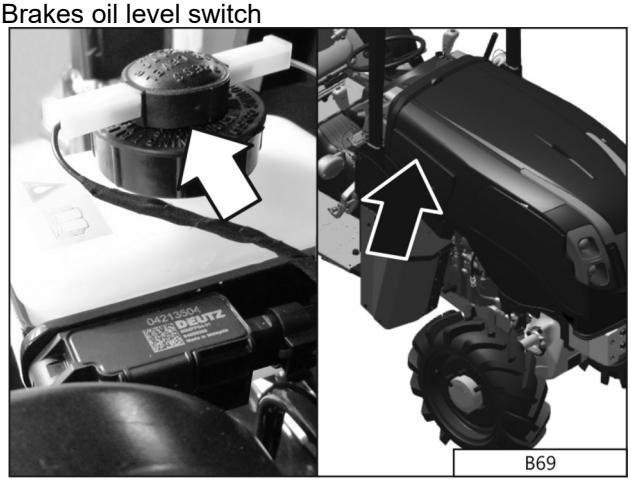
4.4.38. B65

Sensore posizione pedale frizione (Versione Elettroidraulica)
Clutch pedal position sensor (Power Reverser version)



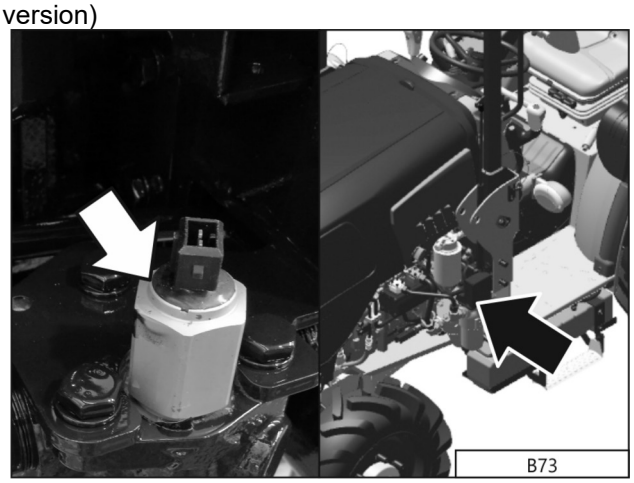
4.4.39. B69

Interruttore livello olio freni
Brakes oil level switch



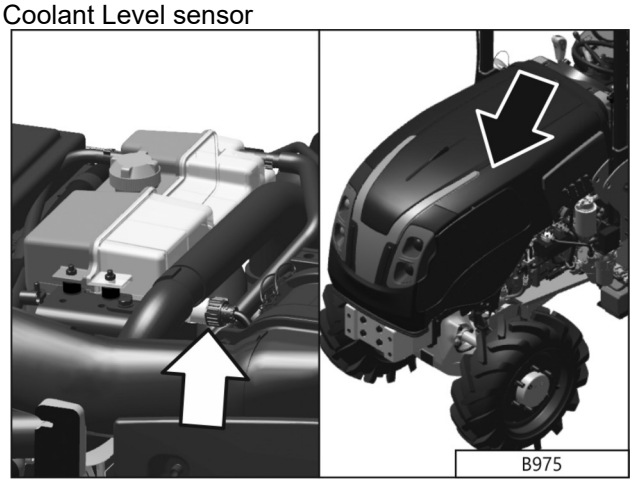
4.4.40. B73

Pressostato intasamento filtro olio trasmissione (Versione Elettroidraulica)
Transmission oil filter clogged switch (Power Reverser version)



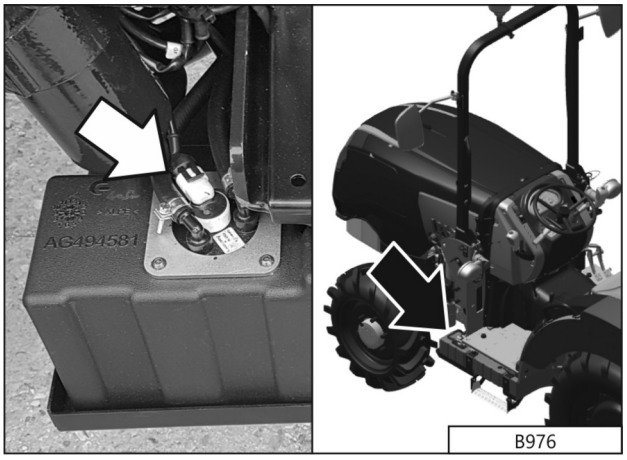
4.4.41. B975

Sensore livello liquido refrigerante
Coolant Level sensor



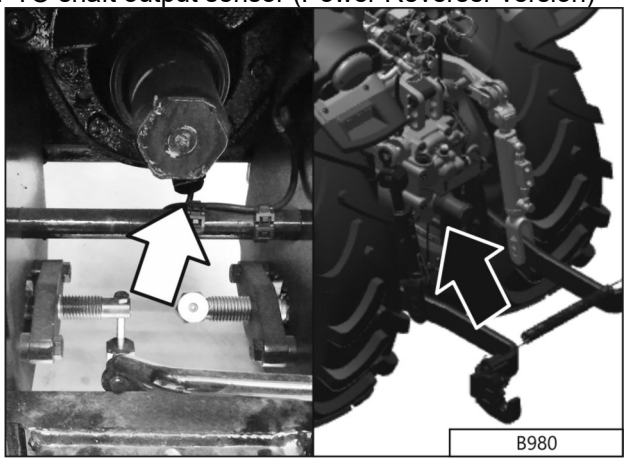
4.4.42. B976

Sensore livello carburante serbatoio inferiore
Lower tank fuel level sensor



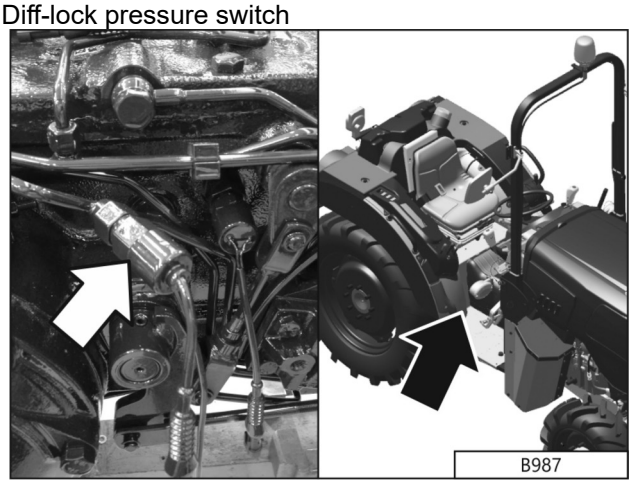
4.4.43. B980

Sensore velocità albero PTO (Versione Elettroidraulica)
PTO shaft output sensor (Power Reverser version)



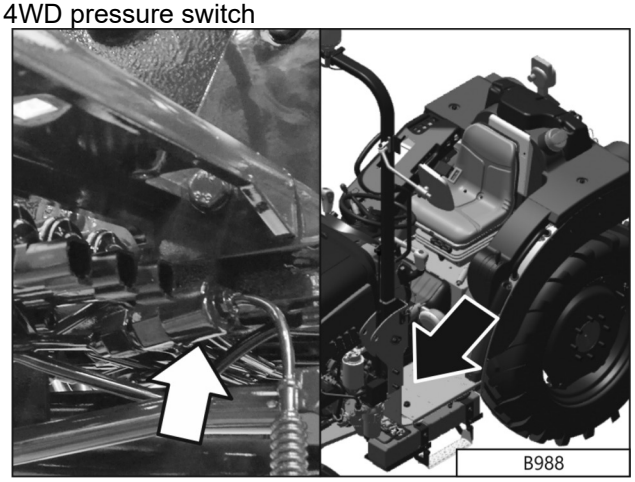
4.4.44. B987

Pressostato circuito blocco differenziale
Diff-lock pressure switch



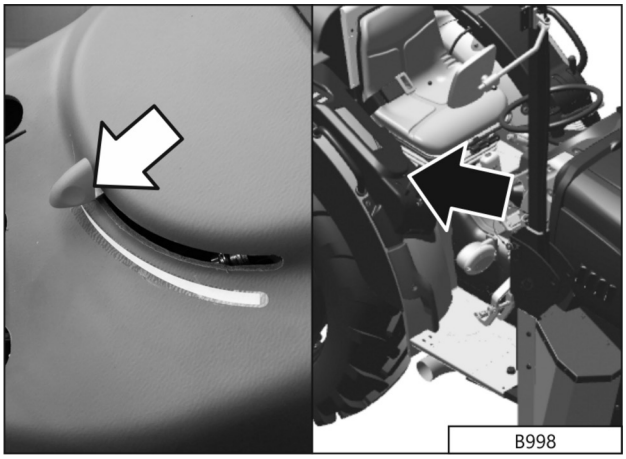
4.4.45. B988

Pressostato circuito doppia trazione
4WD pressure switch



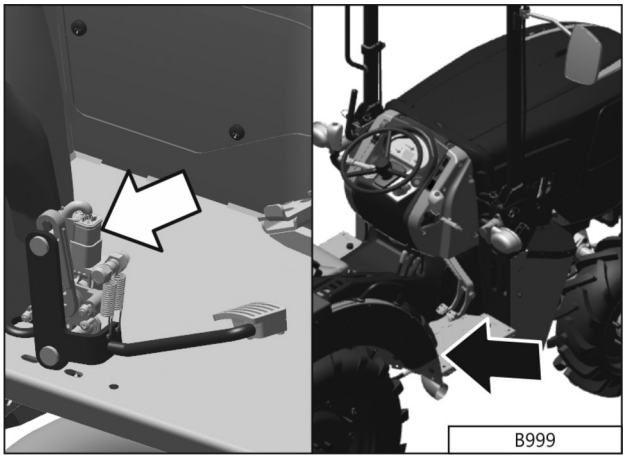
4.4.46. B998

Sensore acceleratore a mano
Hand throttle sensor



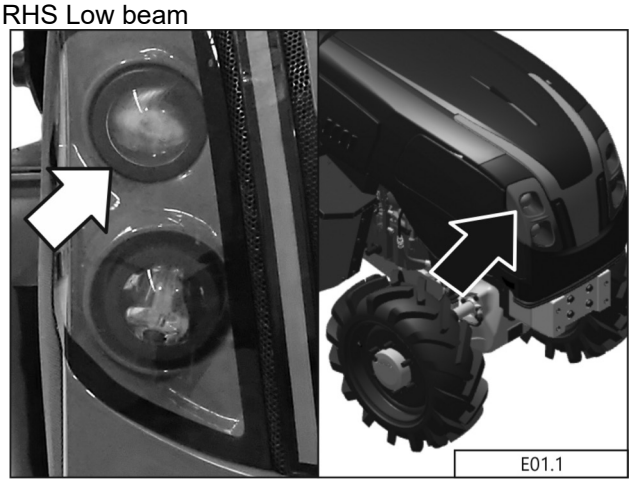
4.4.47. B999

Sensore acceleratore a pedale
Foot throttle sensor



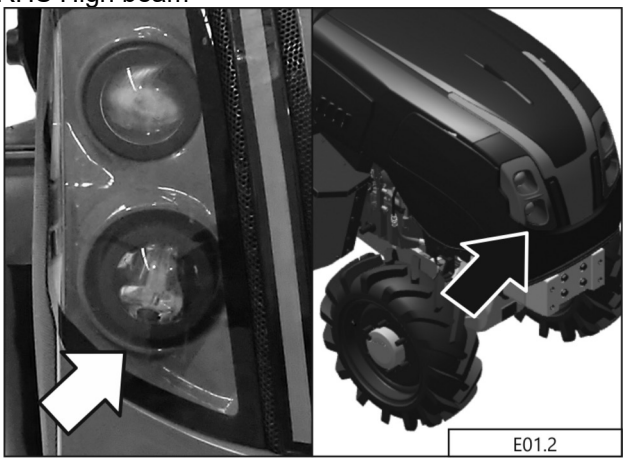
4.4.48. E01.1

Anabbagliante destro
RHS Low beam



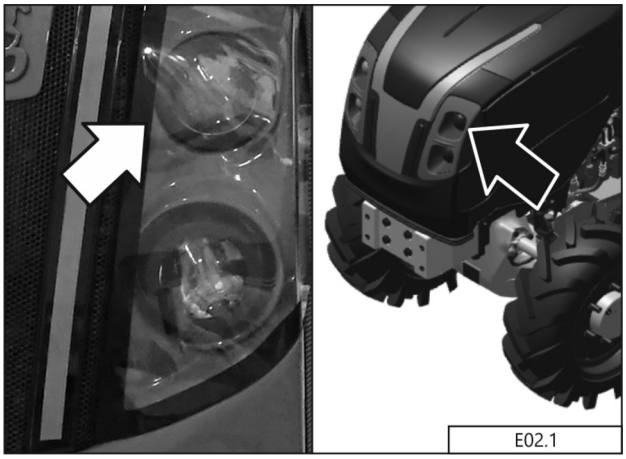
4.4.49. E01.2

Abbagliante destro
RHS High beam



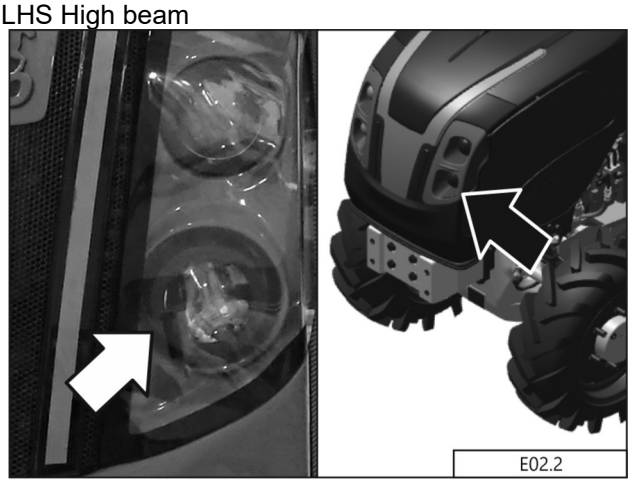
4.4.50. E02.1

Anabbagliante sinistro
LHS Low beam



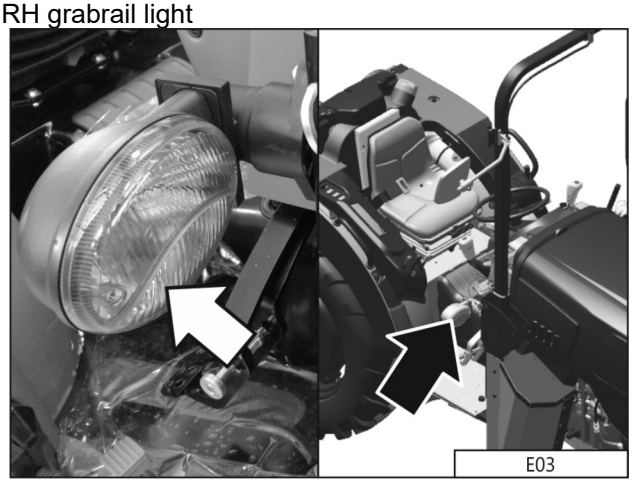
4.4.51. E02.2

Abbagliante sinistro
LHS High beam



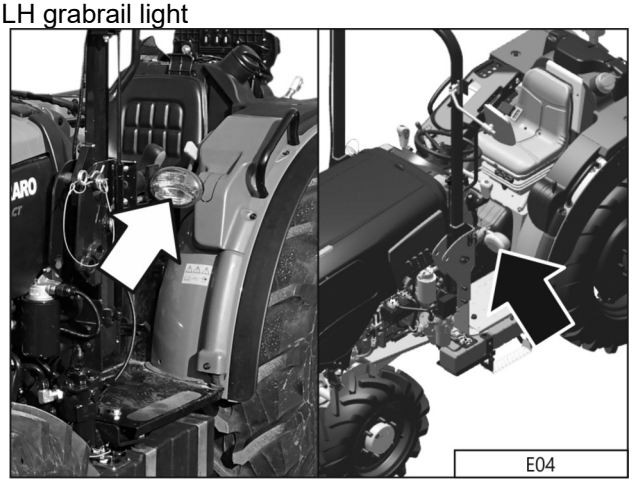
4.4.52. E03

Luce corrimano destro
RH grabrail light



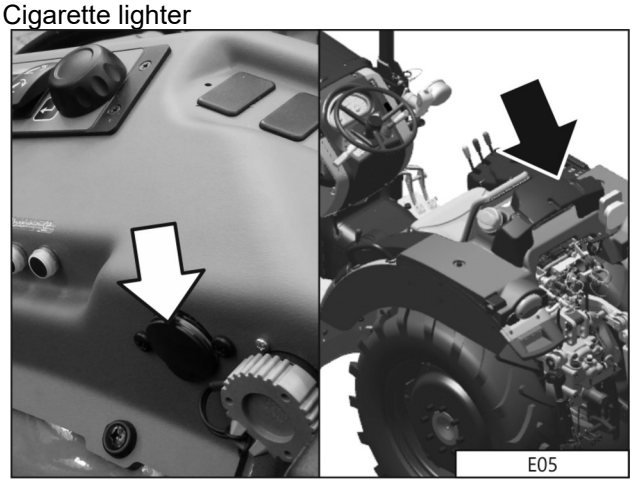
4.4.53. E04

Luce corrimano sinistro
LH grabrail light



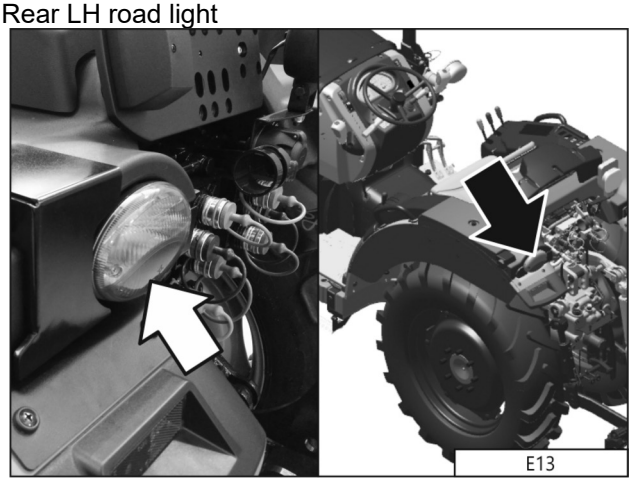
4.4.54. E05

Accendisigari
Cigarette lighter



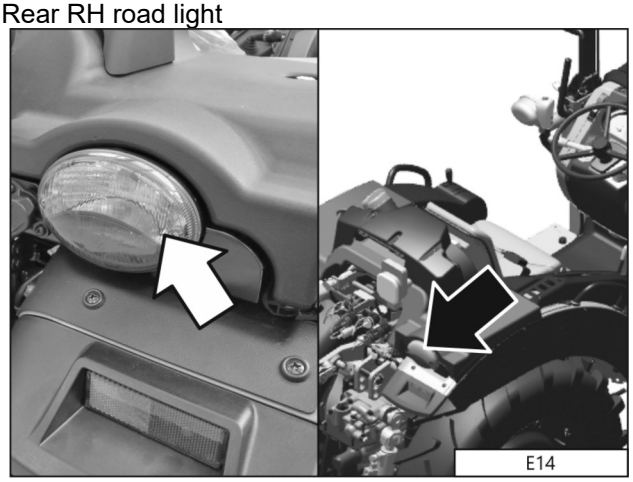
4.4.55. E13

Fanale posteriore sinistro
Rear LH road light



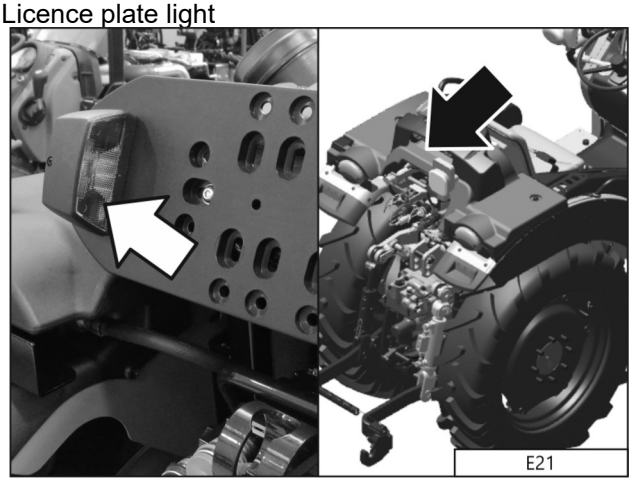
4.4.56. E14

Fanale posteriore destro
Rear RH road light



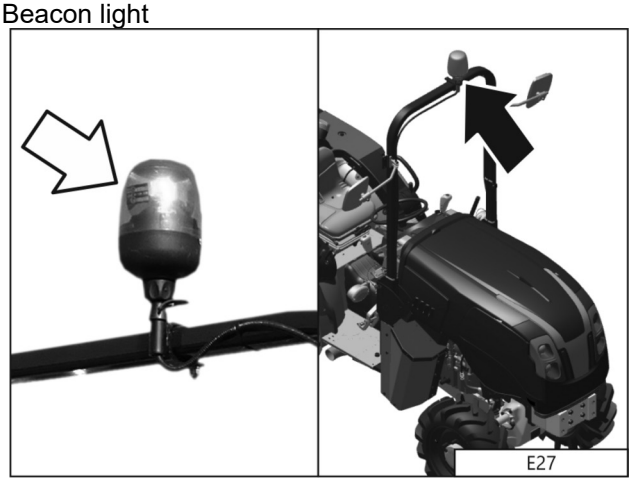
4.4.57. E21

Luce targa
Licence plate light



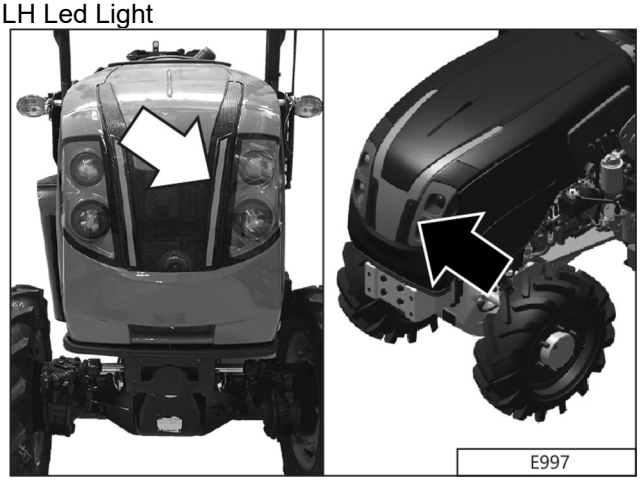
4.4.58. E27

Girofaro
Beacon light



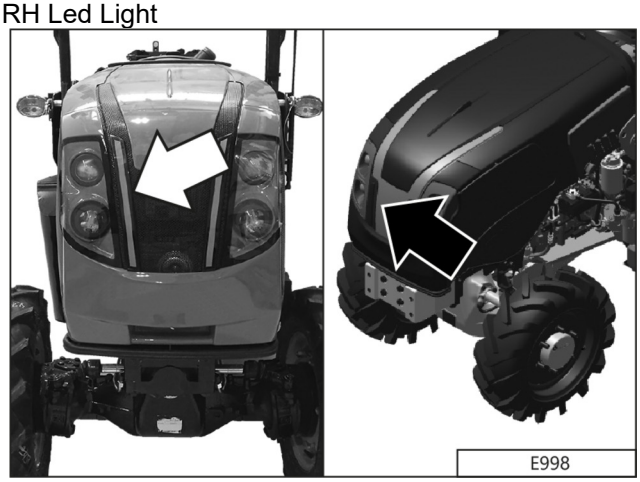
4.4.59. E997

Faro Led di sinistra
LH Led Light



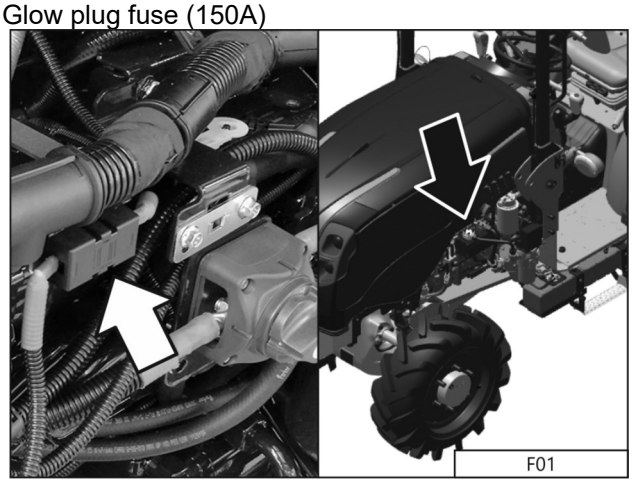
4.4.60. E998

Faro Led di destra
RH Led Light



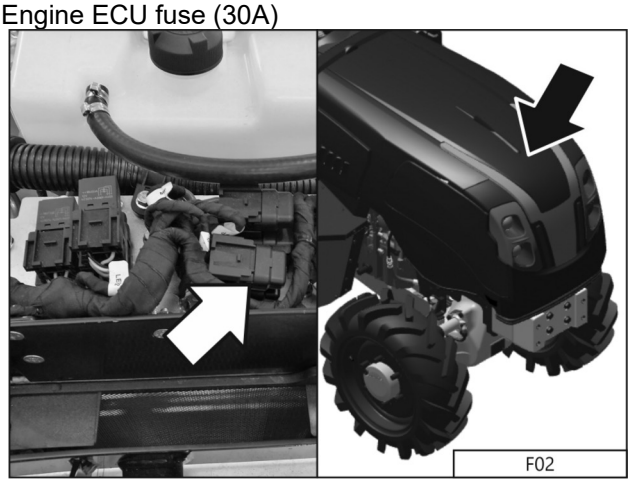
4.4.61. F01

Maxi fusibile candelette (150A)
Glow plug fuse (150A)



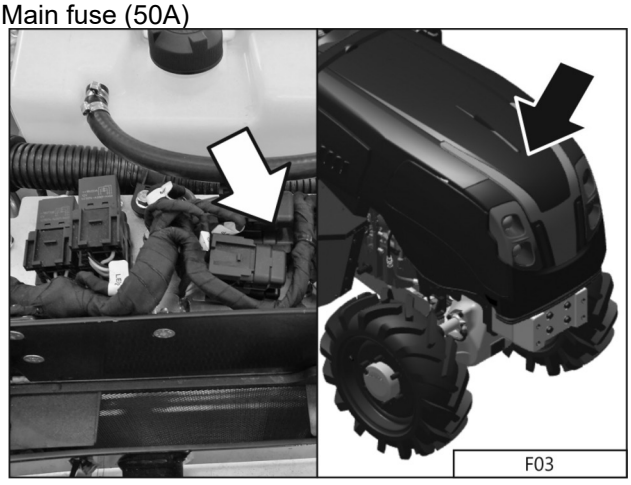
4.4.62. F02

Fusibile centralina motore (30A)
Engine ECU fuse (30A)



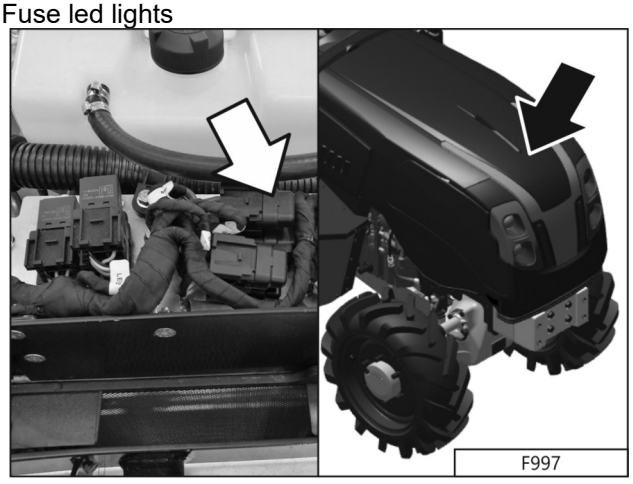
4.4.63. F03

Fusibile principale (50A)
Main fuse (50A)



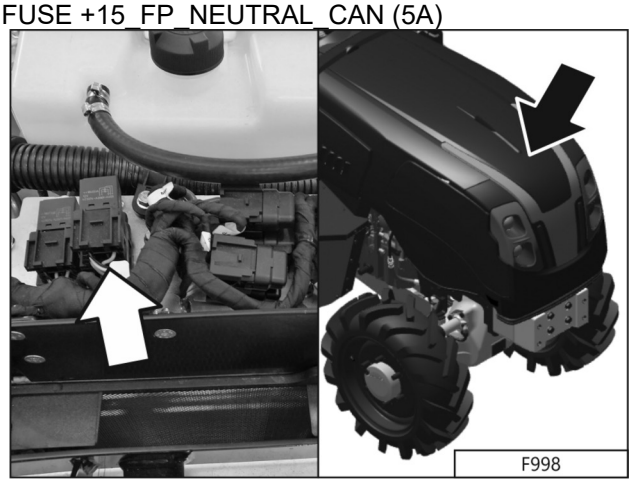
4.4.64. F997

Fusibile delle luci led
Fuse led lights



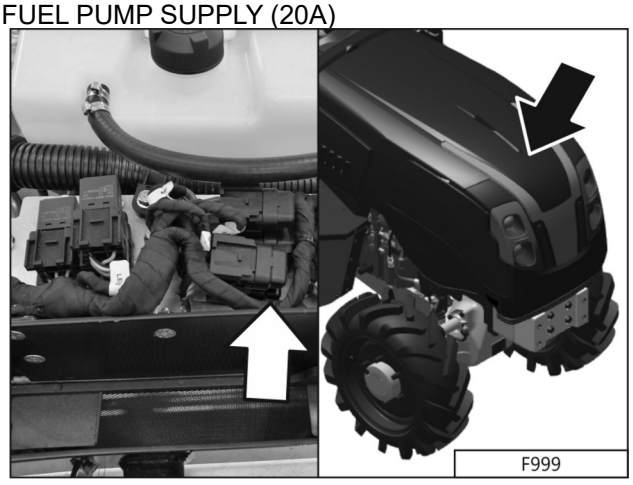
4.4.65. F998

Fusibile consenso avviamento e linea CAN (5A)
FUSE +15_FP_NEUTRAL_CAN (5A)



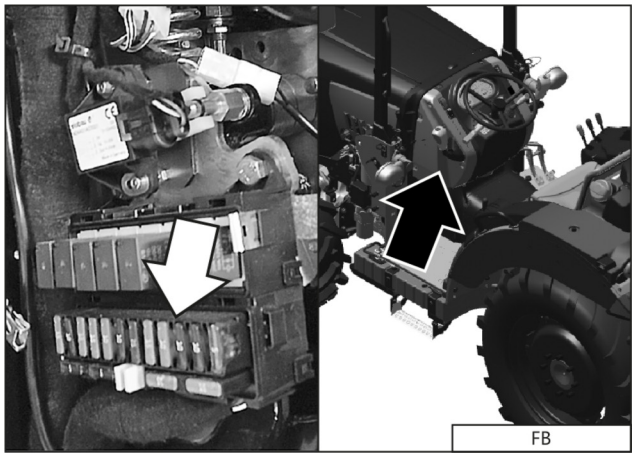
4.4.66. F999

Fusibile pompa carburante (20A)
FUEL PUMP SUPPLY (20A)



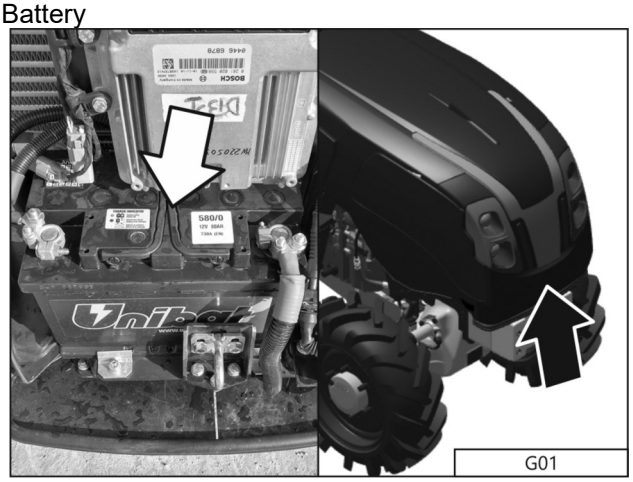
4.4.67. FB

Scatola fusibili
Fuse box



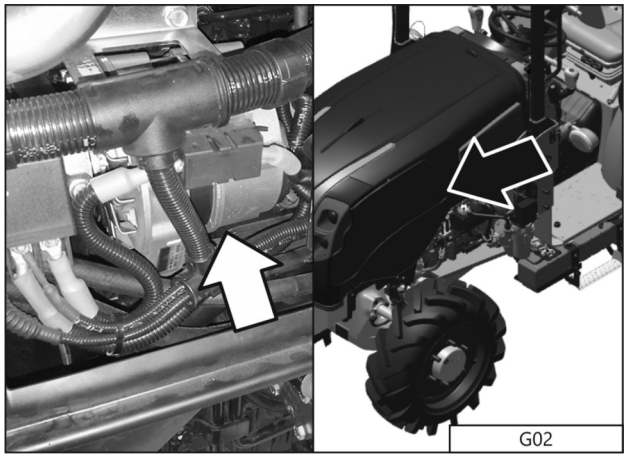
4.4.68. G01

Batteria
Battery



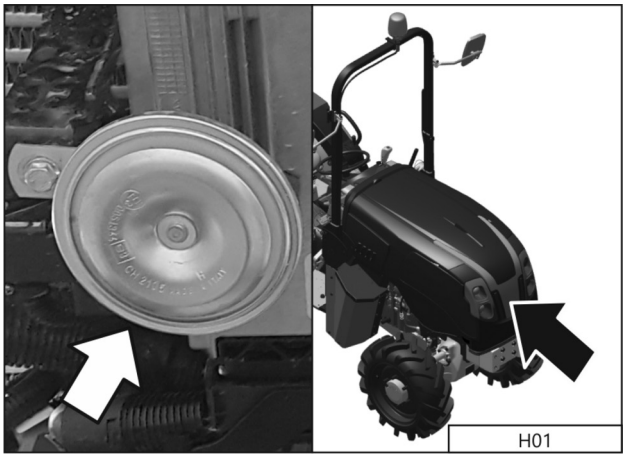
4.4.69. G02

Alternatore
Alternator



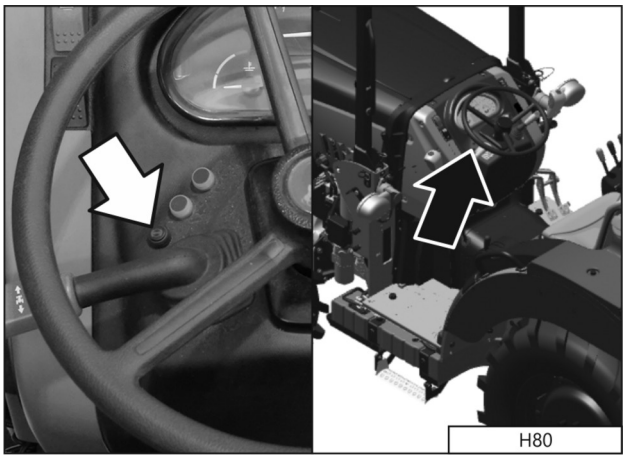
4.4.70. H01

Claxon
Claxon



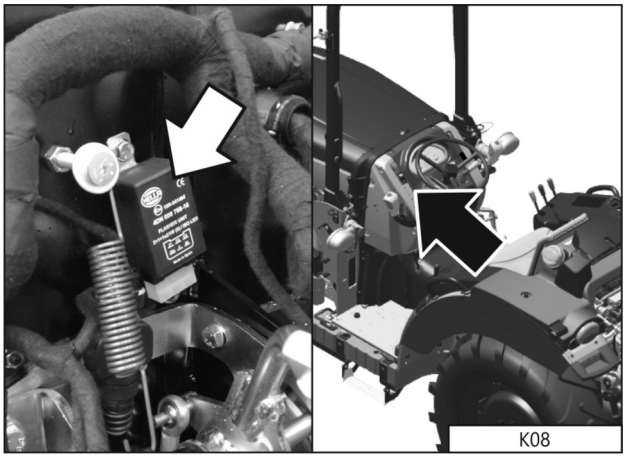
4.4.71. H80

Interruttore freno rimorchio
Trailer brake switch



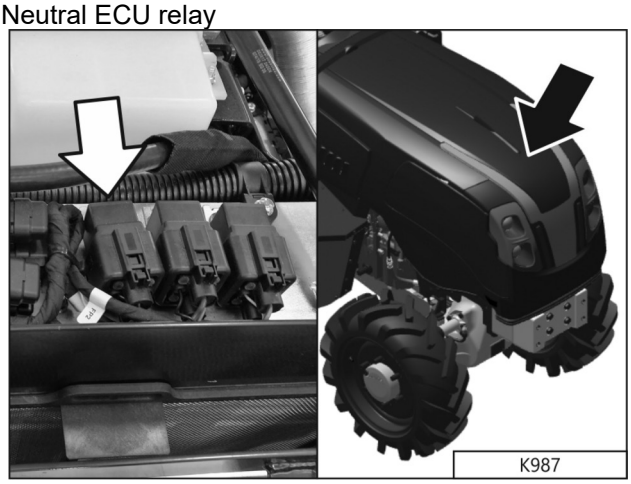
4.4.72. K08

Temporizzatore indicatori di direzione
Flasher unit



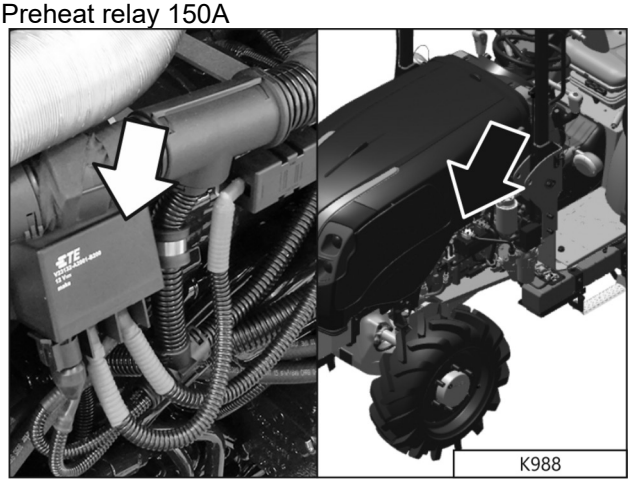
4.4.73. K987

Relè consenso avviamento
Neutral ECU relay



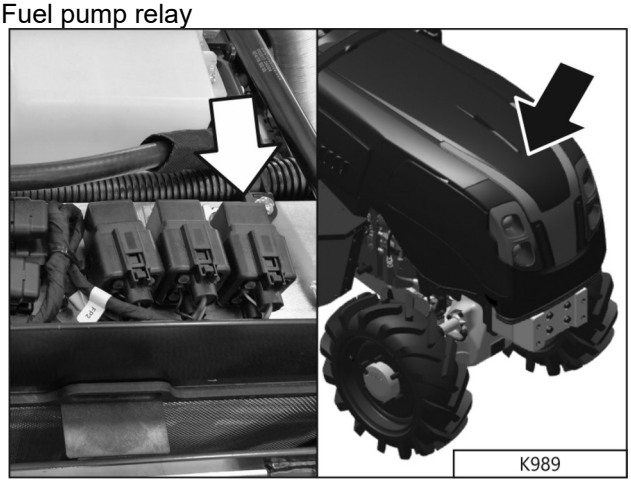
4.4.74. K988

Relè di preriscaldamento 150A
Preheat relay 150A



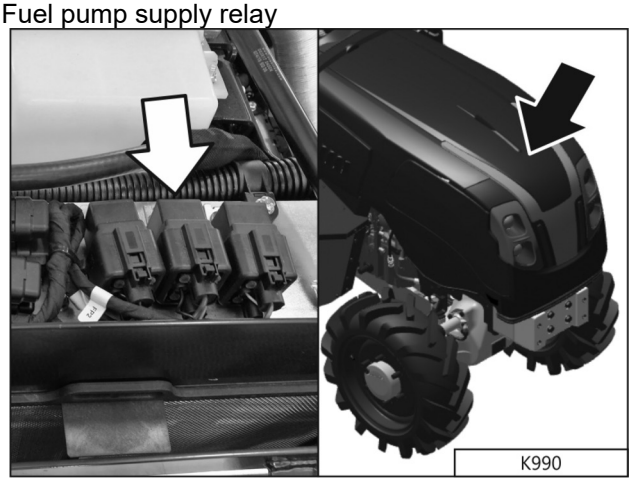
4.4.75. K989

Relè pompa carburante
Fuel pump relay



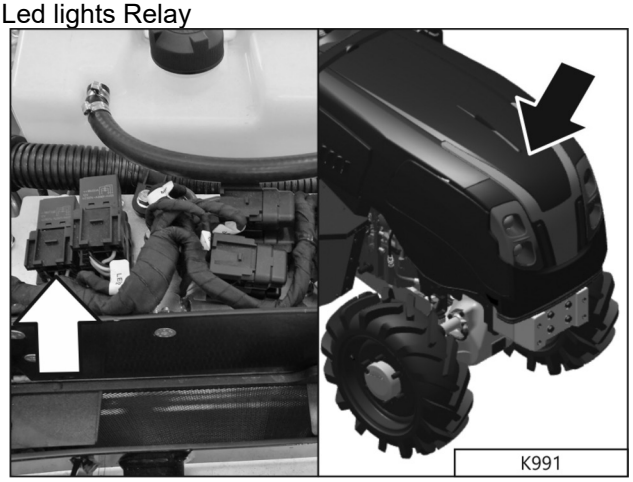
4.4.76. K990

Relè alimentazione pompa carburante
Fuel pump supply relay



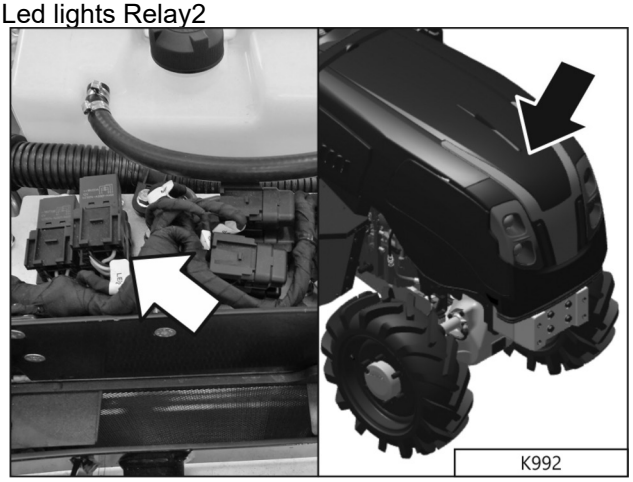
4.4.77. K991

Relè 1 luci LED cofano
Led lights Relay



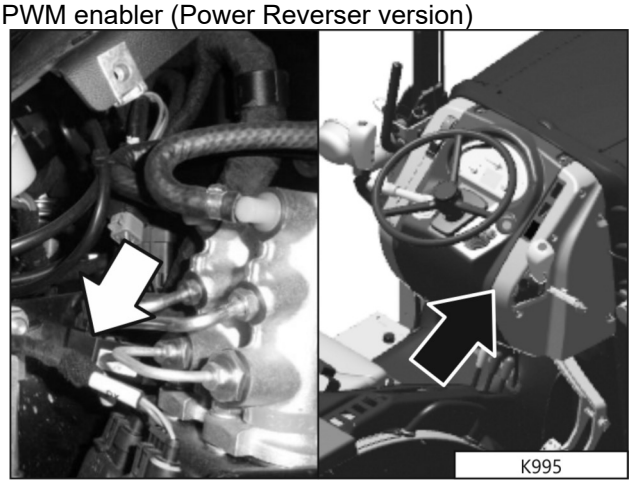
4.4.78. K992

Relè 2 luci LED cofano
Led lights Relay2



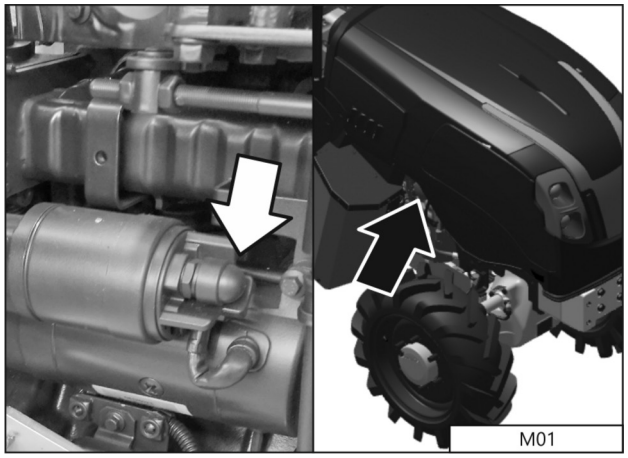
4.4.79. K995

Relè consenso PWM (Versione Elettroidraulica)
PWM enabler (Power Reverser version)



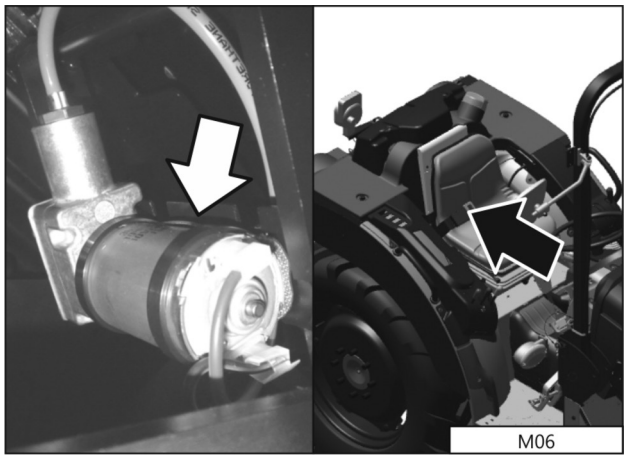
4.4.80. M01

Motorino di avviamento
Starter motor



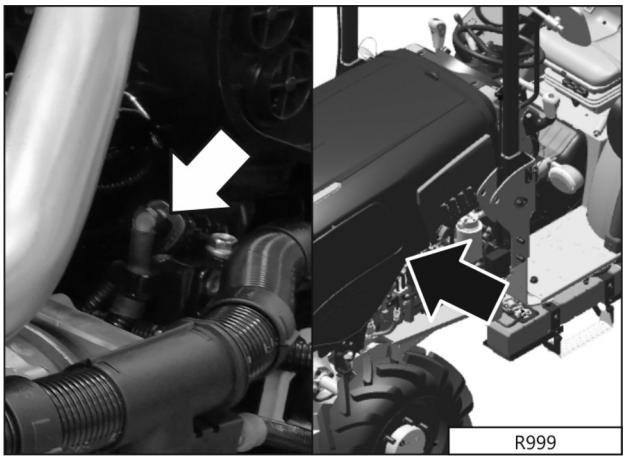
4.4.81. M06

Sedile pneumatico
Air seat



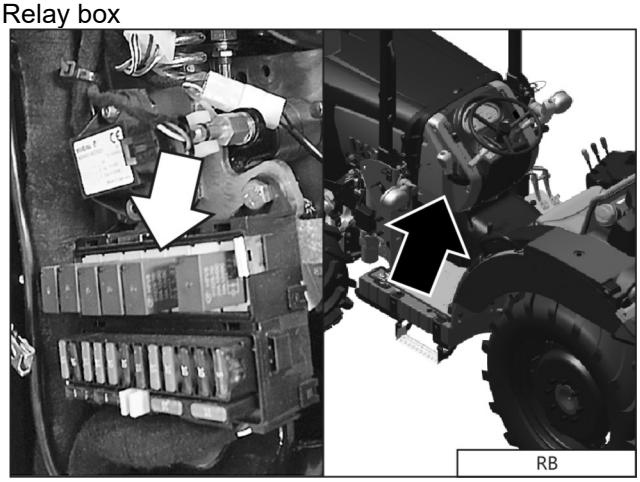
4.4.82. R999

Resistenza di preriscaldamento
Pre-heater



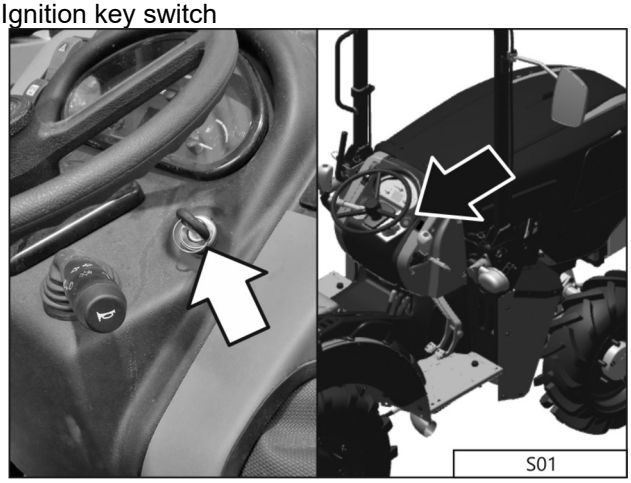
4.4.83. RB

Scatola relè
Relay box



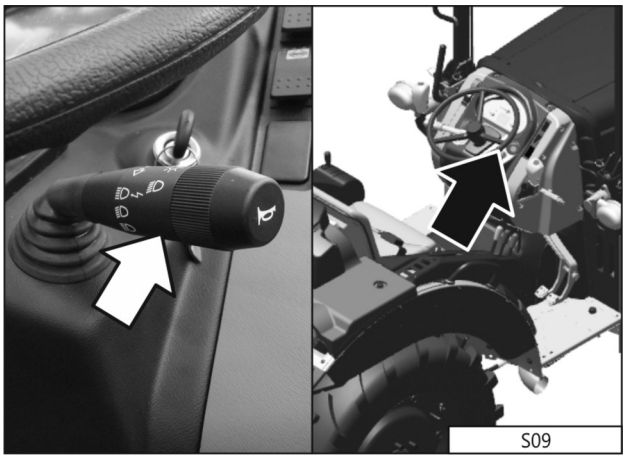
4.4.84. S01

Interruttore chiave di accensione
Ignition key switch



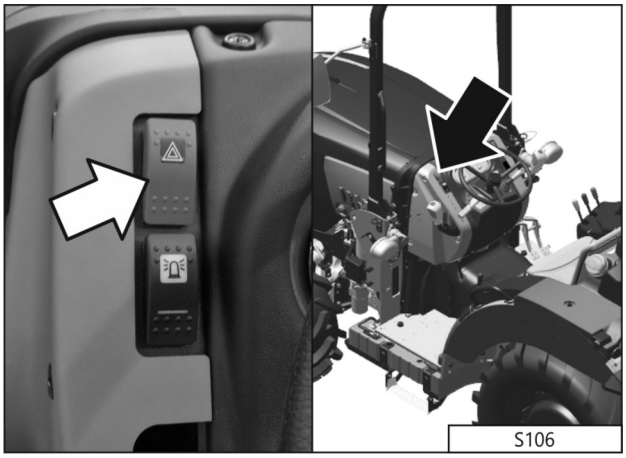
4.4.85. S09

Leva indicatori di direzione
Blinker lever



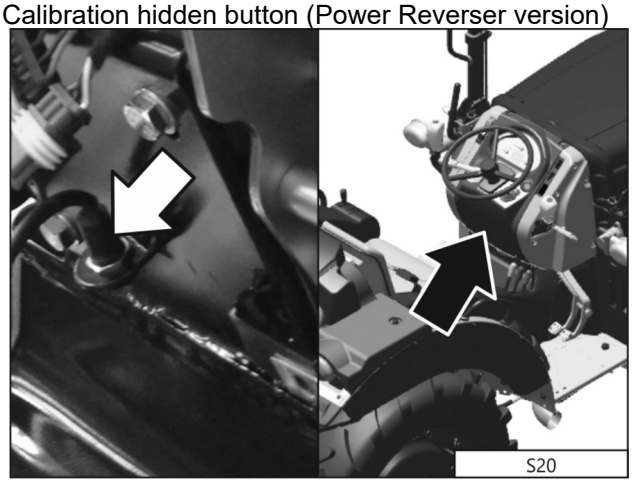
4.4.86. S106

Interruttore indicatori di emergenza
Hazard switch



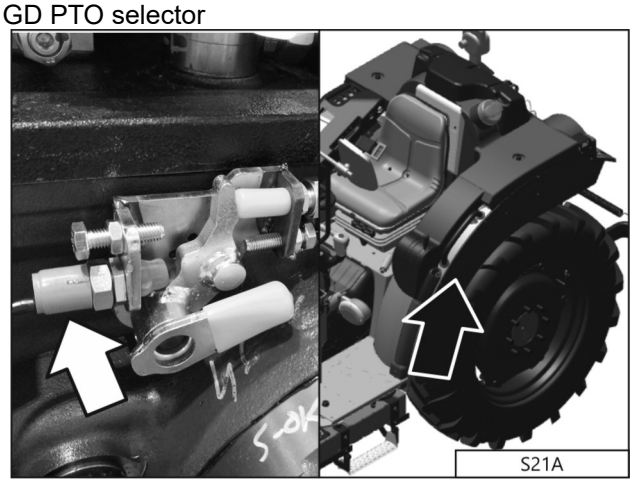
4.4.87. S20

Pulsante calibrazione trasmissione (Versione Elettroidraulica)
Calibration hidden button (Power Reverser version)



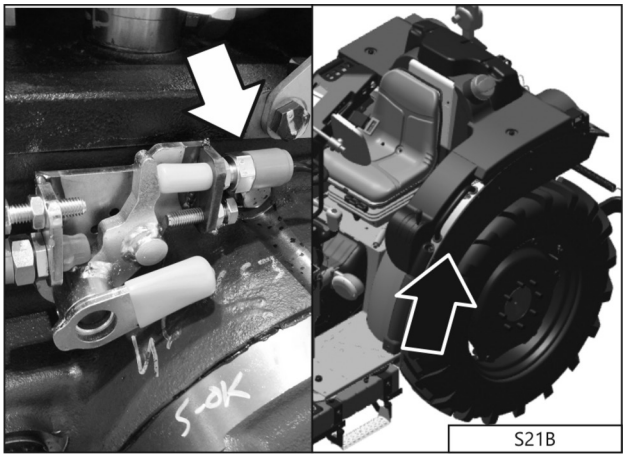
4.4.88. S21A

Interruttore PTO GROUND
GD PTO selector



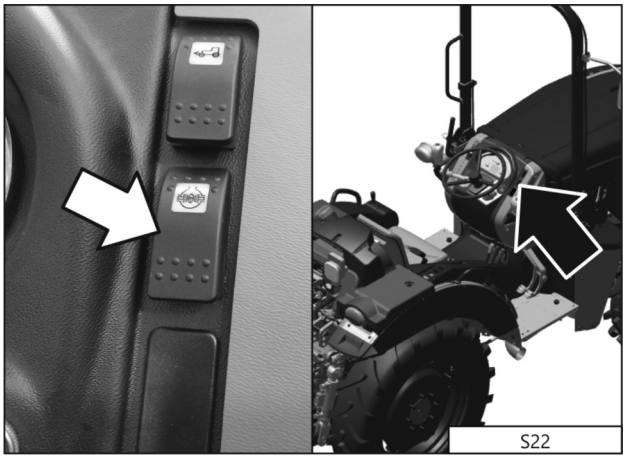
4.4.89. S21B

Interruttore PTO DIRETTA
DIR PTO selector



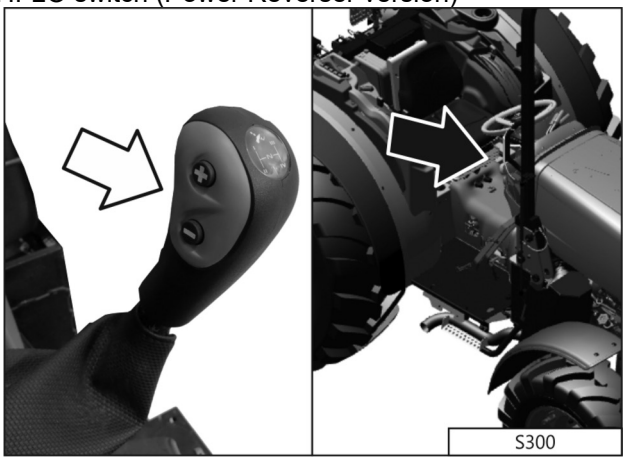
4.4.90. S22

Interruttore blocco differenziale
Diff-lock switch



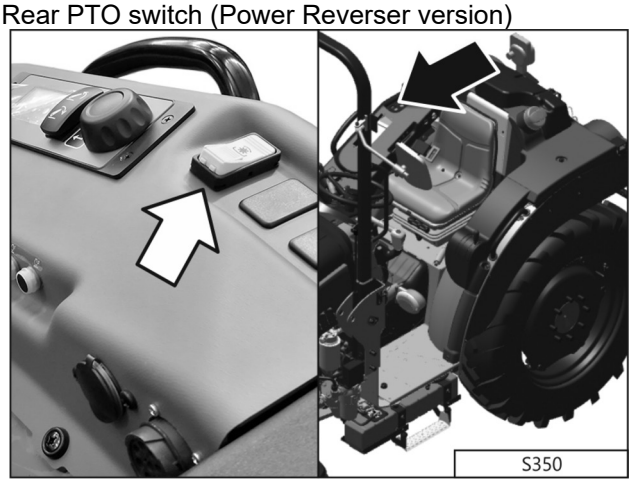
4.4.91. S300

Leva funzione HI-LO (Versione Elettroidraulica)
HI-LO switch (Power Reverser version)



4.4.92. S350

Interruttore PTO posteriore (Versione Elettroidraulica)
Rear PTO switch (Power Reverser version)



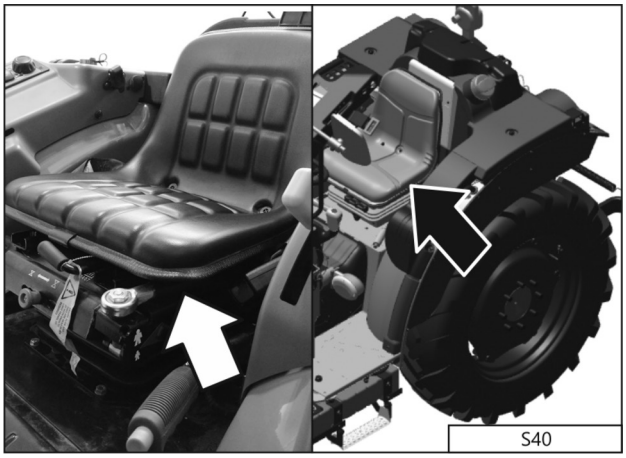
4.4.93. S36

Interruttore girofaro
Beacon switch



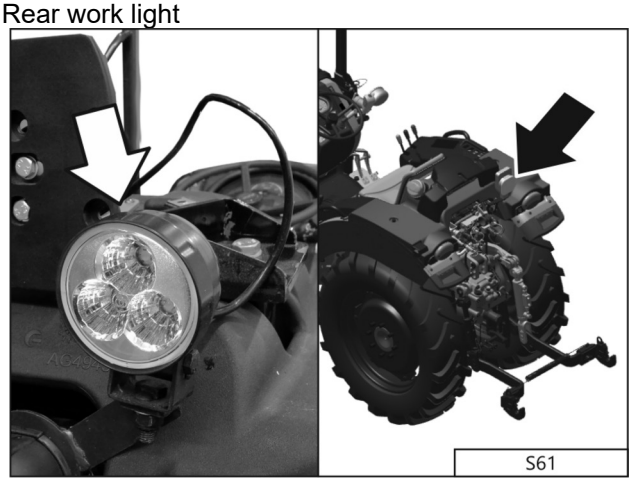
4.4.94. S40

Interruttore presenza operatore
Seat switch



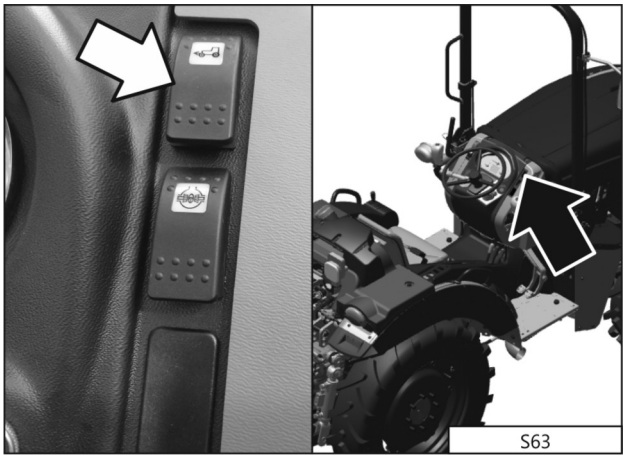
4.4.95. S61

Luce di lavoro posteriore
Rear work light



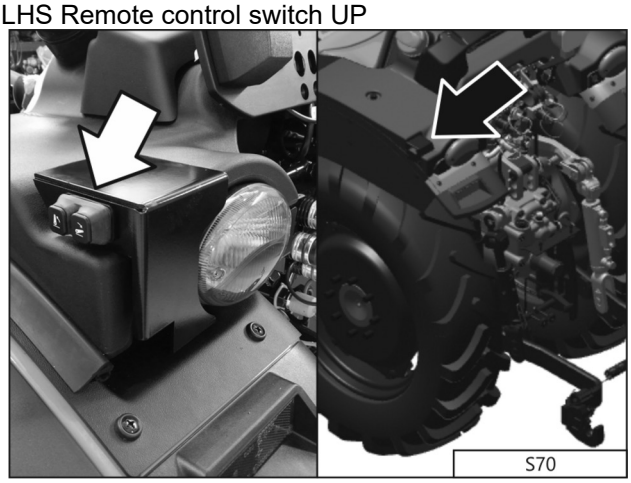
4.4.96. S63

Interruttore doppia trazione
4WD switch



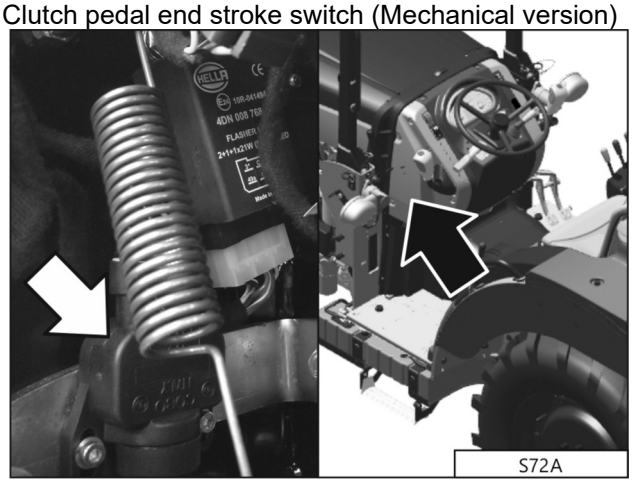
4.4.97. S70

Interruttore sollevatore elettronico su parafango sinistro
LHS Remote control switch UP



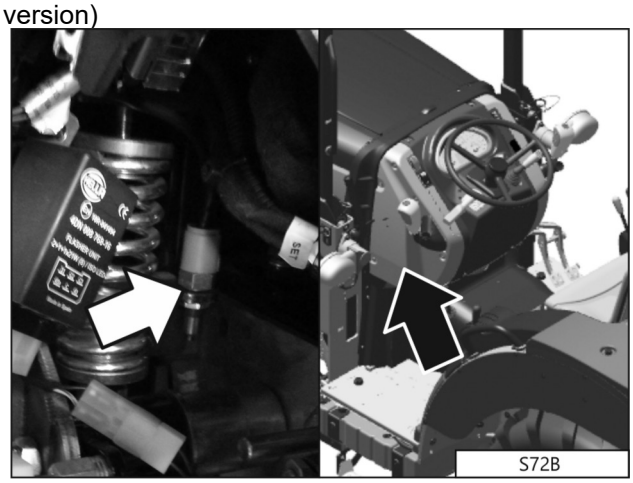
4.4.98. S72A

Interruttore fine corsa pedale frizione (Versione Meccanica)
Clutch pedal end stroke switch (Mechanical version)



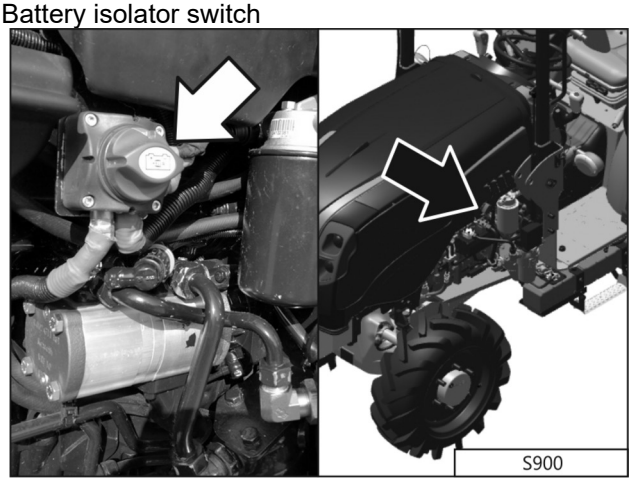
4.4.99. S72B

Interruttore fine corsa pedale frizione (Versione Elettroidraulica)
Clutch pedal end stroke switch (Power Reverser version)



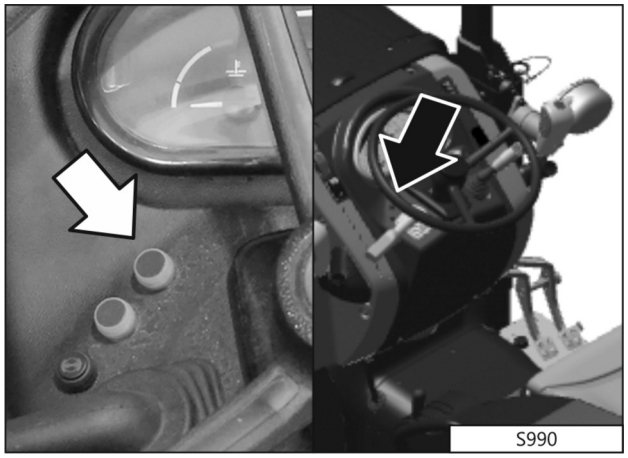
4.4.100. S900

Interruttore stacca batteria
Battery isolator switch



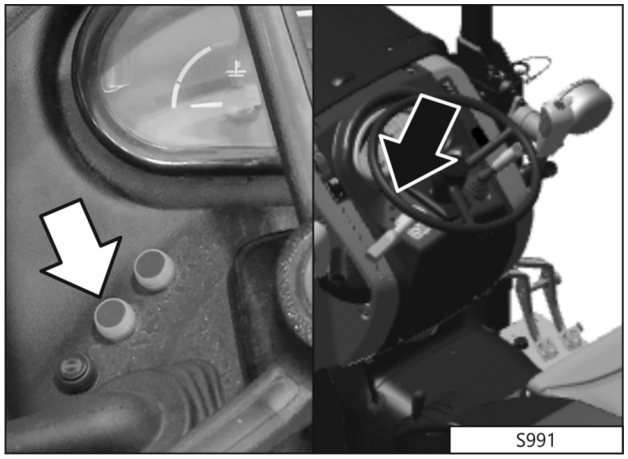
4.4.101. S990

Pulsante MENU
Button menu



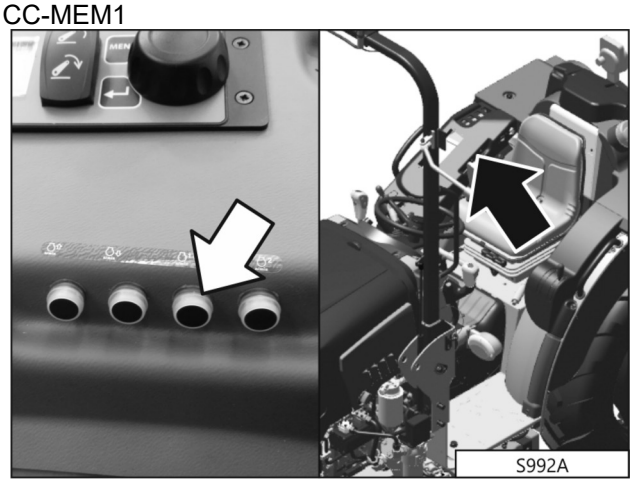
4.4.102. S991

Pulsante SELEZIONE
Button set



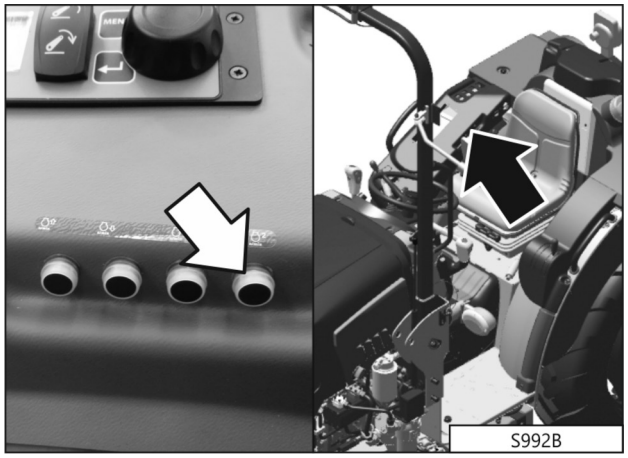
4.4.103. S992A

Pulsante Cruise Control memoria 1
CC-MEM1



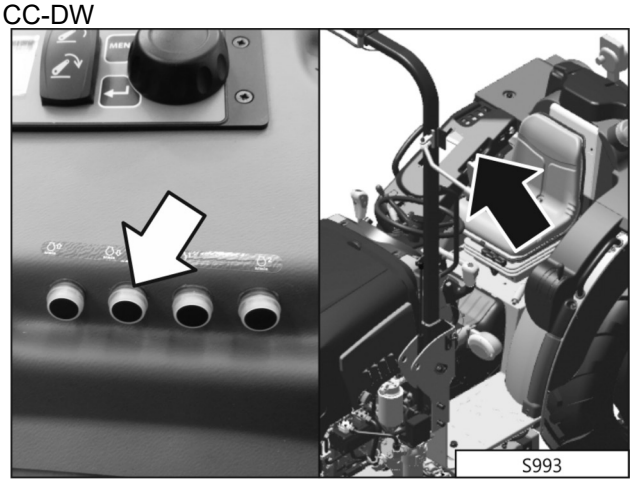
4.4.104. S992B

Pulsante Cruise Control memoria 2
CC-MEM2



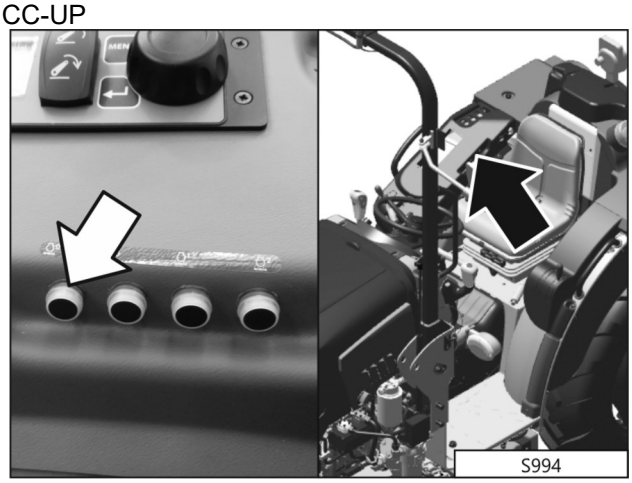
4.4.105. S993

Pulsante Cruise Control DOWN
CC-DW



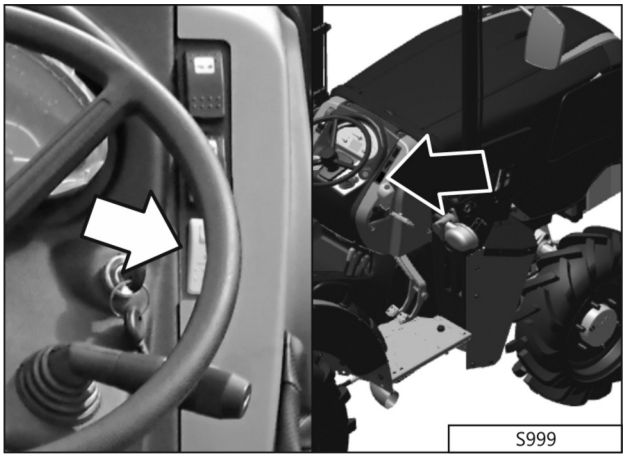
4.4.106. S994

Pulsante Cruise Control UP
CC-UP



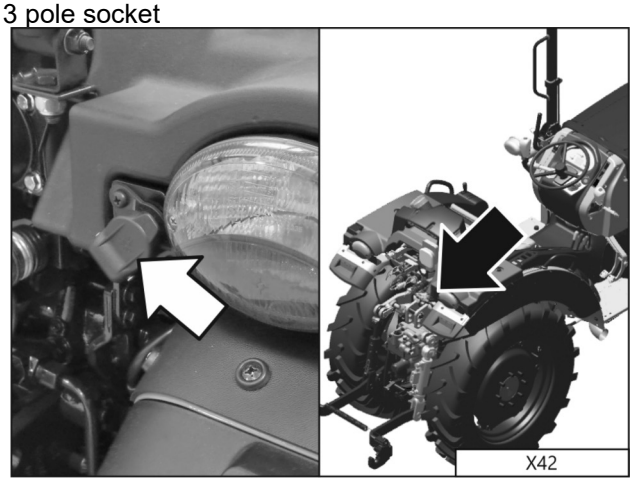
4.4.107. S999

Interruttore PTO anteriore
Front PTO switch



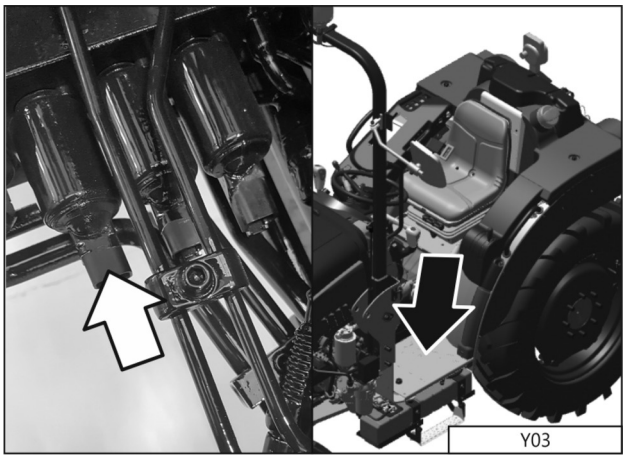
4.4.108. X42

Presa elettrica 3 poli
3 pole socket



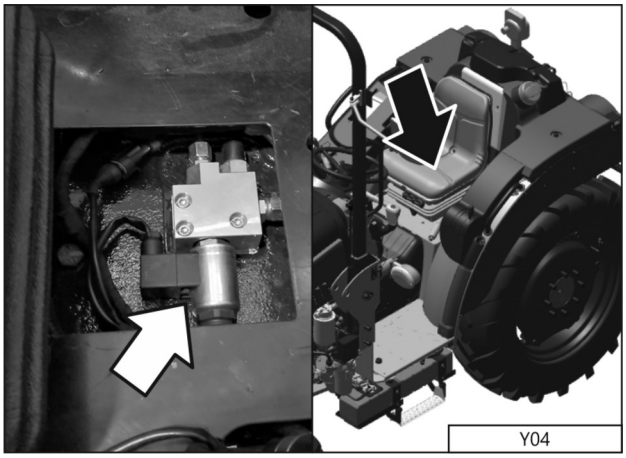
4.4.109. Y03

Elettrovalvola doppia trazione
4WD solenoid valve



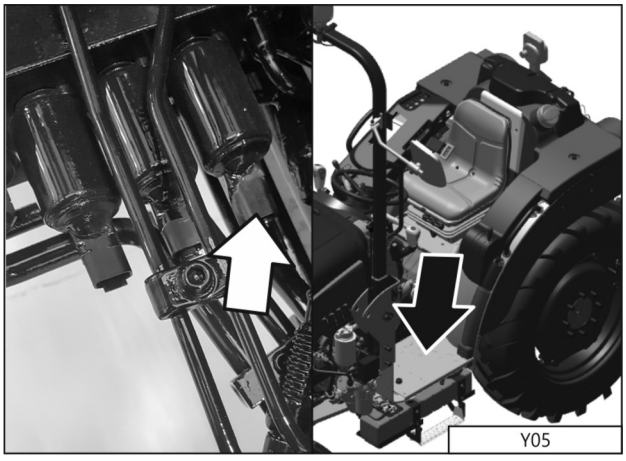
4.4.110. Y04

Elettrovalvola PTO posteriore
PTO main valve connection



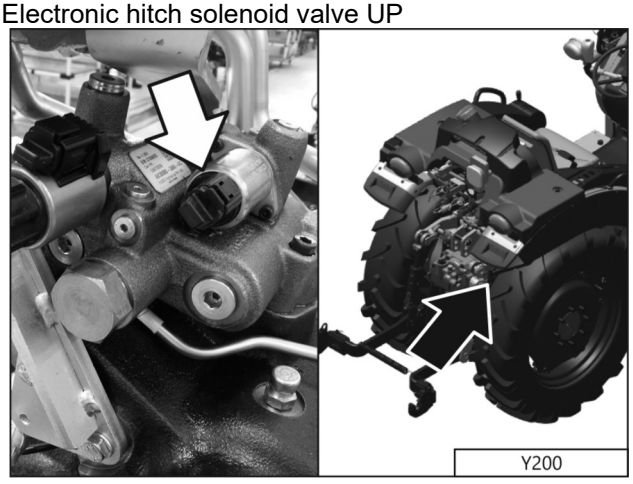
4.4.111. Y05

Elettrovalvola blocco differenziale
Diff-lock solenoid valve



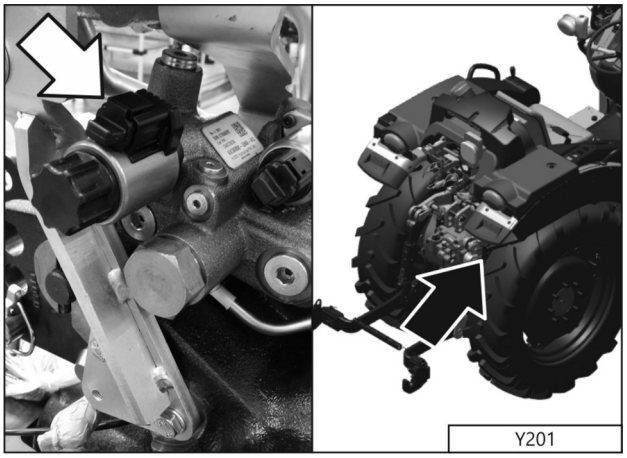
4.4.112. Y200

Elettrovalvola SOLLEVAMENTO sollevatore elettronico
Electronic hitch solenoid valve UP



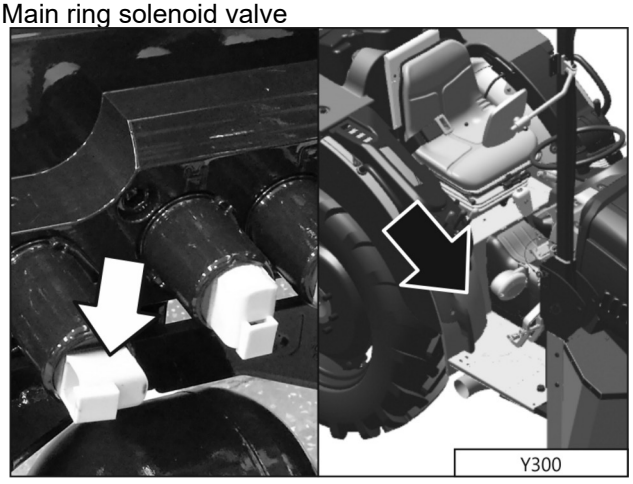
4.4.113. Y201

Elettrovalvola ABBASSAMENTO sollevatore elettronico
Electronic hitch solenoid valve DOWN



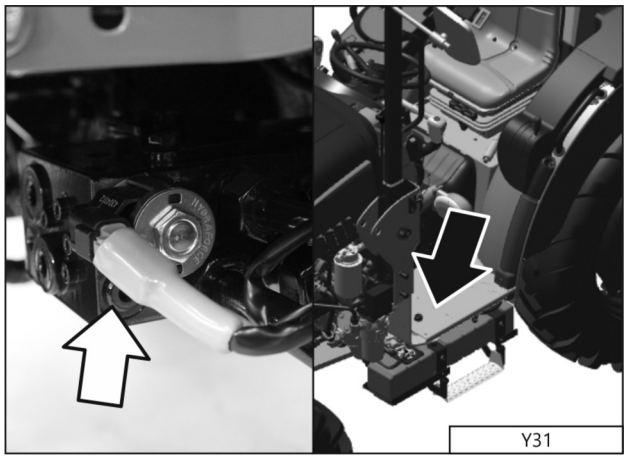
4.4.114. Y300

Elettrovalvola principale trasmissione
Main ring solenoid valve



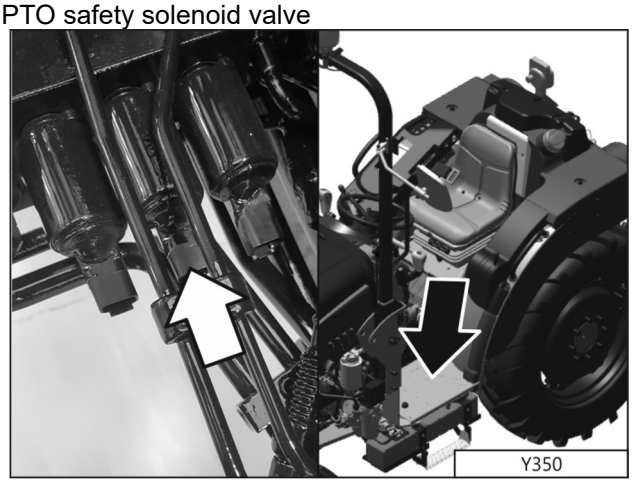
4.4.115. Y31

Elettrovalvola freno rimorchio
Trailer brake solenoid valve



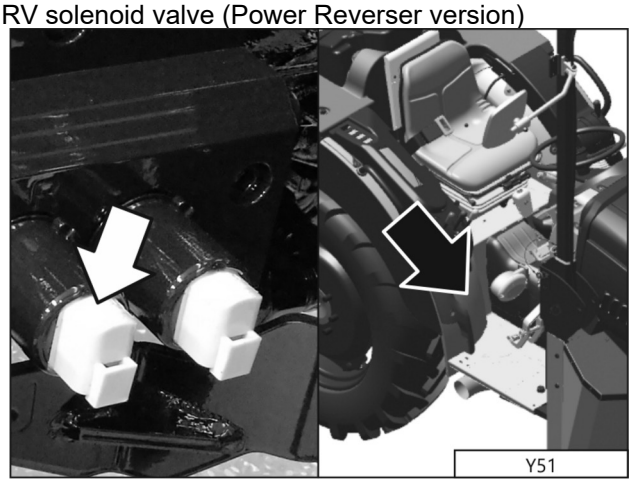
4.4.116. Y350

Elettrovalvola sicurezza PTO
PTO safety solenoid valve



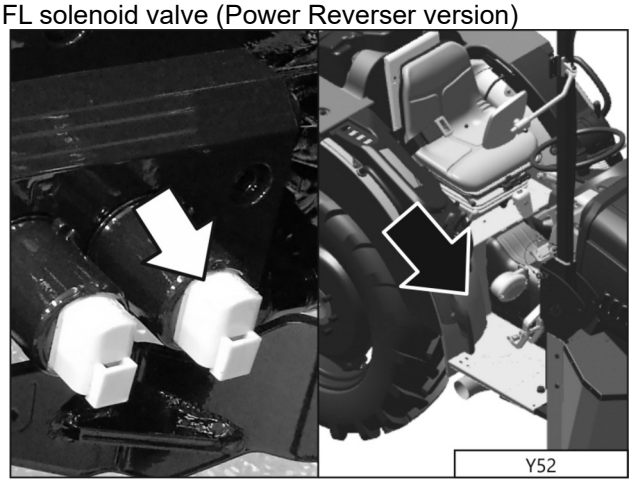
4.4.117. Y51

Elettrovalvola retromarcia (Versione Elettroidraulica)
RV solenoid valve (Power Reverser version)



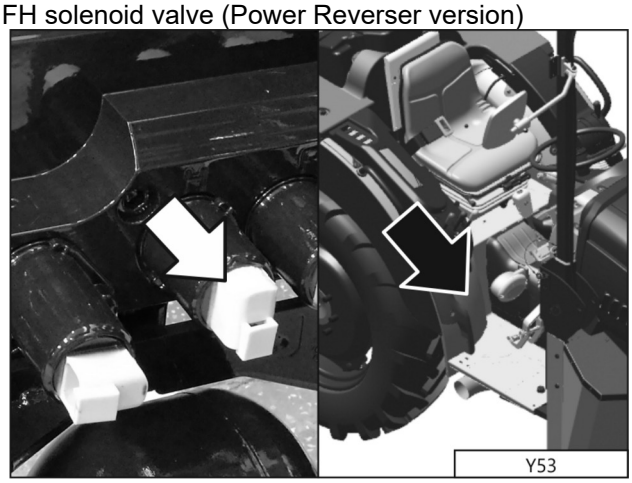
4.4.118. Y52

Elettrovalvola marcia avanti lenta (Versione Elettroidraulica)
FL solenoid valve (Power Reverser version)



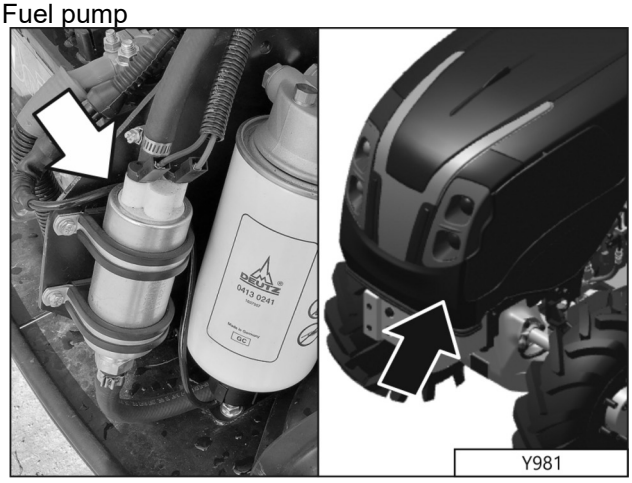
4.4.119. Y53

Elettrovalvola marcia avanti veloce (Versione Elettroidraulica)
FH solenoid valve (Power Reverser version)



4.4.120. Y981

Pompa carburante
Fuel pump



5 Electronic system

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5.1. DIAGNOSTIC TROUBLE CODES (DTC)

5.1.1. DTCs – Engine Control Unit (ECU)

KWP-Code	SPN	FMI	Blink code	Error description
1	132	11	226	Engine - Air mass - Root cause not known
9	172	2	226	Engine - Ambient air temperature sensor - Data erratic intermittent or incorrect
37	523924	3	167	Engine - Actuator relay 2 - Voltage above normal or shorted to high source
38	523925	3	731	Engine - Actuator relay 3 - Voltage above normal or shorted to high source
40	523927	3	733	Engine - Actuator relay 6 - Voltage above normal or shorted to high source
42	523924	4	167	Engine - Actuator relay 2 - Voltage below normal or shorted to low source
43	523925	4	731	Engine - Actuator relay 3 - Voltage below normal or shorted to low source
44	523926	4	732	Engine - Actuator relay 4 - Voltage below normal or shorted to low source
45	168	3	318	Machine - Battery voltage - Voltage above normal or shorted to high source
46	168	4	318	Machine - Battery voltage - Voltage below normal or shorted to low source
47	168	2	318	Machine - Battery voltage - Data erratic intermittent or incorrect
48	168	2	318	Machine - Battery voltage - Data erratic intermittent or incorrect
55	523910	14	6-9-5	Exhaust aftertreatment - Burner air pump - Special instructions
56	524013	7	8-5-6	Exhaust aftertreatment - Burner operation - Mechanical system not responding or out of adjustment
57	524020	14	8-6-3	Exhaust aftertreatment - Burner regeneration lack of oxygen - Special instructions
58	523911	0	723	Exhaust aftertreatment - Burner dosing valve - Data above normal operational range (Most severe level)
62	523911	4	723	Exhaust aftertreatment - Burner dosing valve - Voltage below normal or shorted to low source
63	523911	11	723	Exhaust aftertreatment - Burner dosing valve - Root cause not known
64	523912	2	7-2-2	Exhaust aftertreatment - Pressure sensor after burner dosing valve - Data erratic intermittent or incorrect
66	523912	0	7-2-2	Exhaust aftertreatment - Pressure sensor after burner dosing valve - Data above normal operational range (Most severe level)
69	523912	1	7-2-2	Exhaust aftertreatment - Pressure sensor after burner dosing valve - Data below normal operational range (Most severe level)
72	523912	3	722	Exhaust aftertreatment - Pressure sensor after burner dosing valve - Voltage above normal or shorted to high source
73	523912	4	722	Exhaust aftertreatment - Pressure sensor after burner dosing valve - Voltage below normal or shorted to low source
74	523913	3	721	Engine - Diagnostic cable glow plug control - Voltage above normal or shorted to high source
75	523913	4	721	Engine - Diagnostic cable glow plug control - Voltage below normal or shorted to low source
76	523914	5	721	Engine - Glow plug control - Current below normal or open circuit
77	523914	12	721	Engine - Glow plug control - Bad intelligent device or component
78	523914	3	721	Engine - Glow plug control - Voltage above normal or shorted to high source

KWP-Code	SPN	FMI	Blink code	Error description
78	523914	4	721	Engine - Glow plug control - Voltage below normal or shorted to low source
82	1235	14	271	Machine - CAN - Special instructions
84	639	14	271	Machine - CAN - Special instructions
85	1231	14	271	Machine - CAN - Special instructions
86	1235	14	271	Machine - CAN - Special instructions
89	102	2	223	Engine - Charge air pressure sensor - Data erratic intermittent or incorrect
92	110	0	225	Engine - Coolant temperature sensor - Data above normal operational range (Most severe level)
93	110	1	225	Engine - Coolant temperature sensor - Data below normal operational range (Most severe level)
96	110	3	225	Engine - Coolant temperature sensor - Voltage above normal or shorted to high source
97	110	4	225	Engine - Coolant temperature sensor - Voltage below normal or shorted to low source
98	110	0	232	Engine - Coolant temperature sensor - Data above normal operational range (Most severe level)
99	110	0	232	Engine - Coolant temperature sensor - Data above normal operational range (Most severe level)
101	111	1	235	Engine - Coolant level sensor - Data below normal operational range (Most severe level)
121	1109	2	341	Engine - Protection system requested shutdown - Data erratic intermittent or incorrect
122	523698	11	591	Engine - Shut down request from internal ECU monitoring - Root cause not known
125	523717	12	595	Engine - CAN ambient conditions - Bad intelligent device or component
126	523603	9	338	Engine - CAN ambient temperature - Abnormal update rate timeout
128	3224	9	597	Exhaust aftertreatment - NOx sensor mixing section - Abnormal update rate timeout
129	3224	2	596	Exhaust aftertreatment - NOx sensor mixing section - Data erratic intermittent or incorrect
130	3224	9	597	Exhaust aftertreatment - NOx sensor mixing section - Abnormal update rate timeout
133	523938	9	766	Exhaust aftertreatment - CAN exhaust inlet - Abnormal update rate timeout
134	523939	9	766	Exhaust aftertreatment - CAN exhaust inlet - Abnormal update rate timeout
135	523940	9	766	Exhaust aftertreatment - CAN exhaust inlet - Abnormal update rate timeout
137	3234	9	117	Exhaust aftertreatment - NOx sensor after SCR - Abnormal update rate timeout
138	3234	2	114	Exhaust aftertreatment - NOx sensor after SCR - Data erratic intermittent or incorrect
139	3234	9	117	Exhaust aftertreatment - NOx sensor after SCR - Abnormal update rate timeout
140	523941	9	767	Exhaust aftertreatment - CAN exhaust inlet - Abnormal update rate timeout
141	523942	9	767	Exhaust aftertreatment - CAN exhaust inlet - Abnormal update rate timeout
142	523943	9	767	Exhaust aftertreatment - CAN exhaust inlet - Abnormal update rate timeout
153	523992	9	7-9-3	Engine - Fan - Abnormal update rate timeout

KWP-Code	SPN	FMI	Blink code	Error description
164	523211	9	331	Engine - CAN engine brake - Abnormal update rate timeout
167	523704	12	615	Engine - Engine controller 3 - Bad intelligent device or component
168	523935	12	763	Engine - Engine controller 3 - Bad intelligent device or component
169	523936	12	764	Engine - Engine controller 3 - Bad intelligent device or component
171	523212	9	333	Engine - CAN engine protection - Abnormal update rate timeout
172	523741	14	618	Machine - CAN shut down request from engine shut down - Special instructions
179	523240	9	527	Engine - CAN Functional mode control - Abnormal update rate timeout
198	523216	9	337	Engine - CAN pre heating - Abnormal update rate timeout
202	523793	9	678	Engine - CAN AGS - Abnormal update rate timeout
203	523794	9	678	Engine - CAN AGS - Abnormal update rate timeout
212	523803	9	678	Exhaust aftertreatment - - Abnormal update rate timeout
281	523766	9	118	Machine - CAN torque rotation speed control - Abnormal update rate timeout
282	523767	9	118	Machine - CAN torque rotation speed control - Abnormal update rate timeout
283	523768	9	119	Machine - CAN torque rotation speed control - Abnormal update rate timeout
284	523769	9	119	Machine - CAN torque rotation speed control - Abnormal update rate timeout
291	523776	9	119	Machine - CAN torque rotation speed control - Abnormal update rate timeout
292	523777	9	119	Machine - CAN torque rotation speed control - Abnormal update rate timeout
293	523778	9	118	Machine - CAN torque rotation speed control - Abnormal update rate timeout
294	523779	9	118	Machine - CAN torque rotation speed control - Abnormal update rate timeout
299	523788	12	655	Engine - CAN TC - Bad intelligent device or component
300	523605	9	118	Machine - CAN torque rotation speed control - Abnormal update rate timeout
301	523606	9	119	Machine - CAN torque rotation speed control - Abnormal update rate timeout
305	898	9	118	Machine - Externally requested engine rotation speed - Abnormal update rate timeout
306	520	9	119	Machine - CAN torque rotation speed control - Abnormal update rate timeout
313	523858	12	679	Engine - CAN AGS purification - Bad intelligent device or component
322	523867	12	679	Engine - CAN AGS burner air pump - Bad intelligent device or component
360	523982	0	737	Engine - Power stage diagnostic - Data above normal operational range (Most severe level)
361	523982	1	737	Engine - Power stage diagnostic - Data below normal operational range (Most severe level)
362	523090	2	329	Machine - Pre selection switch engine brake - Data erratic intermittent or incorrect
376	630	12	281	Engine - ECU calibration memory - Bad intelligent device or component
377	630	12	281	Engine - ECU calibration memory - Bad intelligent device or component
378	630	12	281	Engine - ECU calibration memory - Bad intelligent device or component
381	411	4	693	Engine - EGR differential pressure - Voltage below normal or shorted to low source
384	2791	12	415	Engine - EGR actuator - Bad intelligent device or component

KWP-Code	SPN	FMI	Blink code	Error description
387	523612	12	555	Engine - ECU - Bad intelligent device or component
388	190	0	214	Engine - Rotation speed - Data above normal operational range (Most severe level)
390	190	11	214	Engine - Rotation speed - Root cause not known
391	190	14	214	Engine - Rotation speed - Special instructions
409	108	0	292	Engine - Rotation speed - Data above normal operational range (Most severe level)
410	108	1	292	Engine - Ambient pressure sensor - Data below normal operational range (Most severe level)
411	108	11	292	Engine - Ambient pressure sensor - Root cause not known
412	108	3	292	Engine - Ambient pressure sensor - Voltage above normal or shorted to high source
413	108	4	292	Engine - Ambient pressure sensor - Voltage below normal or shorted to low source
415	171	0	312	Engine - Ambient air temperature sensor - Data above normal operational range (Most severe level)
416	171	1	312	Engine - Ambient air temperature sensor - Data below normal operational range (Most severe level)
417	171	3	312	Engine - Ambient air temperature sensor - Voltage above normal or shorted to high source
418	171	4	312	Engine - Ambient air temperature sensor - Voltage below normal or shorted to low source
419	190	8	212	Engine - Rotation speed - Abnormal frequency or pulse width or period
420	190	12	212	Engine - Rotation speed - Bad intelligent device or component
421	190	2	213	Engine - Rotation speed - Data erratic intermittent or incorrect
422	190	8	212	Engine - Rotation speed - Abnormal frequency or pulse width or period
423	190	12	212	Engine - Rotation speed - Bad intelligent device or component
455	975	5	238	Engine - Fan - Current below normal or open circuit
457	975	3	238	Engine - Fan - Voltage above normal or shorted to high source
458	975	4	238	Engine - Fan - Voltage below normal or shorted to low source
459	1639	12	238	Engine - Fan rotation speed - Bad intelligent device or component
460	1639	0	238	Engine - Fan rotation speed - Data above normal operational range (Most severe level)
461	1639	1	238	Engine - Fan rotation speed - Data below normal operational range (Most severe level)
462	523602	0	238	Engine - Fan rotation speed - Data above normal operational range (Most severe level)
463	523602	0	238	Engine - Fan rotation speed - Data above normal operational range (Most severe level)
464	97	3	228	Engine - Water in fuel sensor - Voltage above normal or shorted to high source
465	97	4	228	Engine - Water in fuel sensor - Voltage below normal or shorted to low source
472	94	3	216	Engine - Fuel low pressure sensor - Voltage above normal or shorted to high source
473	94	4	216	Engine - Fuel low pressure sensor - Voltage below normal or shorted to low source
474	94	1	216	Engine - Fuel low pressure sensor - Data below normal operational range (Most severe level)
475	94	1	216	Engine - Fuel low pressure sensor - Data below normal operational range (Most severe level)

KWP-Code	SPN	FMI	Blink code	Error description
486	523618	3	133	Machine - Transmission oil sensor - Voltage above normal or shorted to high source
487	523618	4	133	Machine - Transmission oil sensor - Voltage below normal or shorted to low source
488	523619	2	133	Exhaust aftertreatment - Temperature before SCR Cat - Data erratic intermittent or incorrect
489	523619	2	133	Exhaust aftertreatment - Temperature before SCR Cat - Data erratic intermittent or incorrect
500	523915	0	165	Exhaust aftertreatment - Burner post injection metering valve - Data above normal operational range (Most severe level)
501	523915	12	166	Exhaust aftertreatment - Burner post injection metering valve - Bad intelligent device or component
502	523915	3	159	Exhaust aftertreatment - Burner post injection metering valve - Voltage above normal or shorted to high source
503	523915	3	164	Exhaust aftertreatment - Burner post injection metering valve - Voltage above normal or shorted to high source
504	523915	4	159	Exhaust aftertreatment - Burner post injection metering valve - Voltage below normal or shorted to low source
505	523915	11	164	Exhaust aftertreatment - Burner post injection metering valve - Root cause not known
506	523916	2	719	Exhaust aftertreatment - Fuel pressure sensor after burner post injection metering valve - Data erratic intermittent or incorrect
508	523916	0	719	Exhaust aftertreatment - Fuel pressure sensor after burner post injection metering valve - Data above normal operational range (Most severe level)
511	523916	1	719	Exhaust aftertreatment - Fuel pressure sensor after burner post injection metering valve - Data below normal operational range (Most severe level)
514	523916	3	719	Exhaust aftertreatment - Fuel pressure sensor after burner post injection metering valve - Voltage above normal or shorted to high source
515	523916	4	719	Exhaust aftertreatment - Fuel pressure sensor after burner post injection metering valve - Voltage below normal or shorted to low source
524	523917	3	718	Exhaust aftertreatment - Pressure before burner fuel valve - Voltage above normal or shorted to high source
525	523917	4	718	Exhaust aftertreatment - Pressure before burner fuel valve - Voltage below normal or shorted to low source
534	523918	3	717	Exhaust aftertreatment - Burner metering unit - Voltage above normal or shorted to high source
535	523918	4	717	Exhaust aftertreatment - Burner metering unit - Voltage below normal or shorted to low source
543	676	11	263	Engine - Glow plug relay - Root cause not known
544	676	11	263	Engine - Glow plug relay - Root cause not known
545	729	5	263	Engine - Preheating relay - Current below normal or open circuit
547	729	12	263	Engine - Preheating relay - Bad intelligent device or component
549	729	3	263	Engine - Preheating relay - Voltage below normal or shorted to low source
559	523895	13	158	Engine - Injector 1 IMA Code - Out of calibration
560	523896	13	158	Engine - Injector 2 IMA Code - Out of calibration
561	523897	13	158	Engine - Injector 3 IMA Code - Out of calibration
562	523898	13	158	Engine - Injector 4 IMA Code - Out of calibration
563	523899	13	158	Engine - Injector 5 IMA Code - Out of calibration
564	523900	13	158	Engine - Injector 6 IMA Code - Out of calibration

KWP-Code	SPN	FMI	Blink code	Error description
565	523350	4	151	Engine - Injectors bank 1 - Voltage below normal or shorted to low source
566	523352	4	152	Engine - Injectors bank 2 - Voltage below normal or shorted to low source
567	523354	12	153	Engine - Output power stage Injector - Bad intelligent device or component
568	651	5	154	Engine - Injector 1 - Current below normal or open circuit
569	652	5	155	Engine - Injector 2 - Current below normal or open circuit
570	653	5	156	Engine - Injector 3 - Current below normal or open circuit
571	654	5	161	Engine - Injector 4 - Current below normal or open circuit
572	655	5	162	Engine - Injector 5 - Current below normal or open circuit
573	656	5	163	Engine - Injector 6 - Current below normal or open circuit
580	651	3	154	Engine - Injector 1 - Voltage above normal or shorted to high source
581	652	3	155	Engine - Injector 2 - Voltage above normal or shorted to high source
582	653	3	156	Engine - Injector 3 - Voltage above normal or shorted to high source
583	654	3	161	Engine - Injector 4 - Voltage above normal or shorted to high source
584	655	3	162	Engine - Injector 5 - Voltage above normal or shorted to high source
585	656	3	163	Engine - Injector 6 - Voltage above normal or shorted to high source
592	523615	5	135	Engine - Fuel metering unit - Current below normal or open circuit
593	523615	12	135	Engine - Fuel metering unit - Bad intelligent device or component
594	523615	3	135	Engine - Fuel metering unit - Voltage above normal or shorted to high source
595	523615	4	135	Engine - Fuel metering unit - Voltage below normal or shorted to low source
596	523615	3	135	Engine - Fuel metering unit - Voltage above normal or shorted to high source
597	523615	4	135	Engine - Fuel metering unit - Voltage below normal or shorted to low source
598	523615	3	135	Engine - Fuel metering unit - Voltage above normal or shorted to high source
599	523615	4	135	Engine - Fuel metering unit - Voltage below normal or shorted to low source
604	1323	12	241	Engine - Misfire cylinder 1 - Bad intelligent device or component
605	1324	12	241	Engine - Misfire cylinder 2 - Bad intelligent device or component
606	1325	12	241	Engine - Misfire cylinder 3 - Bad intelligent device or component
607	1326	12	241	Engine - Misfire cylinder 4 - Bad intelligent device or component
608	1327	12	241	Engine - Misfire cylinder 5 - Bad intelligent device or component
609	1328	12	241	Engine - Misfire cylinder 6 - Bad intelligent device or component
610	1322	12	241	Engine - Misfire for multiple cylinders - Bad intelligent device or component
612	523612	12	555	Engine - ECU - Bad intelligent device or component
613	523612	12	555	Engine - ECU - Bad intelligent device or component
614	523612	12	555	Engine - ECU - Bad intelligent device or component
615	523612	12	555	Engine - ECU - Bad intelligent device or component
616	523612	12	555	Engine - ECU - Bad intelligent device or component
617	523612	12	555	Engine - ECU - Bad intelligent device or component
618	523612	12	555	Engine - ECU - Bad intelligent device or component
619	523612	12	555	Engine - ECU - Bad intelligent device or component
620	523612	12	555	Engine - ECU - Bad intelligent device or component
621	523612	12	555	Engine - ECU - Bad intelligent device or component

KWP-Code	SPN	FMI	Blink code	Error description
623	523612	12	555	Engine - ECU - Bad intelligent device or component
624	523612	12	555	Engine - ECU - Bad intelligent device or component
625	523612	12	555	Engine - ECU - Bad intelligent device or component
627	523612	12	555	Engine - ECU - Bad intelligent device or component
628	523612	12	555	Engine - ECU - Bad intelligent device or component
629	523612	12	555	Engine - ECU - Bad intelligent device or component
630	523612	12	555	Engine - ECU - Bad intelligent device or component
631	523612	12	555	Engine - ECU - Bad intelligent device or component
632	523612	12	555	Engine - ECU - Bad intelligent device or component
633	523612	12	555	Engine - ECU - Bad intelligent device or component
634	523612	12	555	Engine - ECU - Bad intelligent device or component
635	523612	12	555	Engine - ECU - Bad intelligent device or component
636	523612	12	555	Engine - ECU - Bad intelligent device or component
637	523612	12	555	Engine - ECU - Bad intelligent device or component
638	523612	12	555	Engine - ECU - Bad intelligent device or component
639	523612	12	555	Engine - ECU - Bad intelligent device or component
640	523612	12	555	Engine - ECU - Bad intelligent device or component
641	523612	12	555	Engine - ECU - Bad intelligent device or component
642	523612	12	555	Engine - ECU - Bad intelligent device or component
643	523612	12	555	Engine - ECU - Bad intelligent device or component
644	523612	3	555	Engine - ECU - Voltage above normal or shorted to high source
646	523612	4	555	Engine - ECU - Voltage below normal or shorted to low source
648	523008	1	424	Engine - Manipulation monitoring - Data below normal operational range (Most severe level)
649	523008	2	424	Engine - Manipulation monitoring - Data erratic intermittent or incorrect
714	523612	12	555	Engine - ECU - Bad intelligent device or component
715	523612	12	555	Engine - ECU - Bad intelligent device or component
716	523612	12	555	Engine - ECU - Bad intelligent device or component
717	523612	12	555	Engine - ECU - Bad intelligent device or component
732	100	3	224	Engine - Oil pressure sensor - Voltage above normal or shorted to high source
733	100	4	224	Engine - Oil pressure sensor - Voltage below normal or shorted to low source
734	100	0	231	Engine - Oil pressure sensor - Data above normal operational range (Most severe level)
735	100	0	231	Engine - Oil pressure sensor - Data above normal operational range (Most severe level)
736	100	1	231	Engine - Oil pressure sensor - Data below normal operational range (Most severe level)
737	100	1	231	Engine - Oil pressure sensor - Data below normal operational range (Most severe level)
743	175	3	144	Engine - Oil temperature - Voltage above normal or shorted to high source
744	175	4	144	Engine - Oil temperature - Voltage below normal or shorted to low source
745	175	0	144	Engine - Oil temperature - Data above normal operational range (Most severe level)
746	175	0	144	Engine - Oil temperature - Data above normal operational range (Most severe level)

KWP-Code	SPN	FMI	Blink code	Error description
747	1237	2	145	Engine - Shutdown override switch - Data erratic intermittent or incorrect
750	107	3	136	Engine - Air filter differential pressure sensor - Voltage above normal or shorted to high source
751	107	0	136	Engine - Air filter differential pressure sensor - Data above normal operational range (Most severe level)
752	107	0	136	Engine - Air filter differential pressure sensor - Data above normal operational range (Most severe level)
753	523919	2	6-9-4	Exhaust aftertreatment - Burner air pump pressure sensor - Data erratic intermittent or incorrect
755	523919	0	6-9-4	Exhaust aftertreatment - Burner air pump pressure sensor - Data above normal operational range (Most severe level)
758	523919	1	6-9-4	Exhaust aftertreatment - Burner air pump pressure sensor - Data below normal operational range (Most severe level)
761	523919	3	694	Exhaust aftertreatment - Burner air pump pressure sensor - Voltage above normal or shorted to high source
762	523919	4	694	Exhaust aftertreatment - Burner air pump pressure sensor - Voltage below normal or shorted to low source
763	523920	2	7-1-6	Exhaust aftertreatment - Burner exhaust back pressure sensor - Data erratic intermittent or incorrect
765	523920	0	7-1-6	Exhaust aftertreatment - Burner exhaust back pressure sensor - Data above normal operational range (Most severe level)
770	523920	3	716	Exhaust aftertreatment - Burner exhaust back pressure sensor - Voltage above normal or shorted to high source
771	523920	4	716	Exhaust aftertreatment - Burner exhaust back pressure sensor - Voltage below normal or shorted to low source
772	102	2	223	Engine - Charge air pressure sensor - Data erratic intermittent or incorrect
774	102	1	223	Engine - Charge air pressure sensor - Data below normal operational range (Most severe level)
776	102	3	223	Engine - Charge air pressure sensor - Voltage above normal or shorted to high source
777	102	4	223	Engine - Charge air pressure sensor - Voltage below normal or shorted to low source
791	411	0	693	Engine - EGR differential pressure - Data above normal operational range (Most severe level)
793	411	11	693	Engine - EGR differential pressure - Root cause not known
795	411	3	693	Engine - EGR differential pressure - Voltage above normal or shorted to high source
796	411	4	693	Engine - EGR differential pressure - Voltage below normal or shorted to low source
805	524025	14	8-4-5	Exhaust aftertreatment - Stand Still - Special instructions
807	3253	2	692	Exhaust aftertreatment - DPF differential pressure - Data erratic intermittent or incorrect
809	3251	0	692	Exhaust aftertreatment - DPF differential pressure - Data above normal operational range (Most severe level)
810	3251	0	692	Exhaust aftertreatment - DPF differential pressure - Data above normal operational range (Most severe level)
812	3251	1	692	Exhaust aftertreatment - DPF differential pressure - Data below normal operational range (Most severe level)
813	3251	1	692	Exhaust aftertreatment - DPF differential pressure - Data below normal operational range (Most severe level)

KWP-Code	SPN	FMI	Blink code	Error description
814	3253	3	692	Exhaust aftertreatment - DPF differential pressure - Voltage above normal or shorted to high source
815	3253	4	692	Exhaust aftertreatment - DPF differential pressure - Voltage below normal or shorted to low source
825	523009	9	253	Engine - Fuel pressure relief valve - Abnormal update rate timeout
826	523470	2	146	Engine - Fuel pressure relief valve - Data erratic intermittent or incorrect
827	523470	2	146	Engine - Fuel pressure relief valve - Data erratic intermittent or incorrect
828	523470	12	146	Engine - Fuel pressure relief valve - Bad intelligent device or component
829	523470	12	146	Engine - Fuel pressure relief valve - Bad intelligent device or component
830	523470	14	146	Engine - Fuel pressure relief valve - Special instructions
831	523470	11	146	Engine - Fuel pressure relief valve - Root cause not known
832	523470	11	146	Engine - Fuel pressure relief valve - Root cause not known
833	523009	10	253	Engine - Fuel pressure relief valve - Abnormal rate of change
834	523906	5	761	Engine - Fuel pre feed pump - Current below normal or open circuit
835	523906	12	761	Engine - Fuel pre feed pump - Bad intelligent device or component
836	523906	3	761	Engine - Fuel pre feed pump - Voltage above normal or shorted to high source
837	523906	4	761	Engine - Fuel pre feed pump - Voltage below normal or shorted to low source
847	1176	0	139	Engine - TC charge pressure - Data above normal operational range (Most severe level)
848	1176	1	139	Engine - TC charge pressure - Data below normal operational range (Most severe level)
849	1176	3	141	Engine - TC charge pressure - Voltage above normal or shorted to high source
850	1176	4	141	Engine - TC charge pressure - Voltage below normal or shorted to low source
856	523613	0	134	Engine - Fuel pressure - Data above normal operational range (Most severe level)
857	523613	0	134	Engine - Fuel pressure - Data above normal operational range (Most severe level)
858	523613	0	134	Engine - Fuel pressure - Data above normal operational range (Most severe level)
859	523613	0	134	Engine - Fuel pressure - Data above normal operational range (Most severe level)
861	523613	1	134	Engine - Fuel pressure - Data below normal operational range (Most severe level)
862	523613	0	134	Engine - Fuel pressure - Data above normal operational range (Most severe level)
864	523613	2	134	Engine - Fuel pressure - Data erratic intermittent or incorrect
876	523470	7	146	Engine - Fuel pressure relief valve - Mechanical system not responding or out of adjustment
877	157	3	147	Engine - Rail pressure sensor - Voltage above normal or shorted to high source
878	157	4	147	Engine - Rail pressure sensor - Voltage below normal or shorted to low source
881	523633	11	1-4-9	Exhaust aftertreatment - Efficiency SCR system - Root cause not known
882	523633	11	1-4-9	Exhaust aftertreatment - Efficiency SCR system - Root cause not known
883	523633	11	1-4-9	Exhaust aftertreatment - Efficiency SCR system - Root cause not known
887	3234	11	1-8-4	Exhaust aftertreatment - NOx sensor after SCR - Root cause not known

KWP-Code	SPN	FMI	Blink code	Error description
889	3224	1	1-8-5	Exhaust aftertreatment - NOx sensor mixing section - Data below normal operational range (Most severe level)
892	4345	11	2-3-6	Exhaust aftertreatment - Heater DEF return line - Root cause not known
893	4343	11	8-7-1	Exhaust aftertreatment - Heater DEF pressure line - Root cause not known
894	4374	13	8-7-2	Exhaust aftertreatment - DEF metering valve - Out of calibration
897	523632	16	8-7-5	Exhaust aftertreatment - DEF pressure - Data above normal operational range (Moderately severe level)
898	523632	18	8-7-6	Exhaust aftertreatment - DEF pressure - Data below normal operational range (Moderately severe level)
899	523632	0	8-7-7	Exhaust aftertreatment - DEF pressure - Data above normal operational range (Most severe level)
900	523632	1	8-7-8	Exhaust aftertreatment - DEF pressure - Data below normal operational range (Most severe level)
903	4365	0	8-8-1	Exhaust aftertreatment - DEF tank temperature - Data above normal operational range (Most severe level)
905	3241	0	8-8-3	Exhaust aftertreatment - Temperature before SCR Cat - Data above normal operational range (Most severe level)
908	3361	7	8-8-6	Exhaust aftertreatment - DEF metering unit - Mechanical system not responding or out of adjustment
914	523720	2	1-4-8	Exhaust aftertreatment - Heater DEF metering unit - Data erratic intermittent or incorrect
915	523720	2	1-4-8	Exhaust aftertreatment - Heater DEF metering unit - Data erratic intermittent or incorrect
916	523721	2	6-8-9	Exhaust aftertreatment - DEF temperature - Data erratic intermittent or incorrect
917	523721	2	6-8-9	Exhaust aftertreatment - DEF temperature - Data erratic intermittent or incorrect
918	523981	11	2-4-3	Exhaust aftertreatment - DEF tank heater - Root cause not known
919	523330	14	131	Engine - Immobilizer - Special instructions
925	523720	8	148	Exhaust aftertreatment - Heater DEF metering unit - Abnormal frequency or pulse width or period
926	523720	8	148	Exhaust aftertreatment - Heater DEF metering unit - Abnormal frequency or pulse width or period
927	523721	11	689	Exhaust aftertreatment - DEF temperature - Root cause not known
928	523722	8	691	Exhaust aftertreatment - DEF temperature - Abnormal frequency or pulse width or period
929	523722	8	691	Exhaust aftertreatment - DEF temperature - Abnormal frequency or pulse width or period
930	523721	8	689	Exhaust aftertreatment - DEF temperature - Abnormal frequency or pulse width or period
931	523721	8	689	Exhaust aftertreatment - DEF temperature - Abnormal frequency or pulse width or period
932	29	3	126	Machine - Position accelerator pedal 2 - Voltage above normal or shorted to high source
935	91	3	226	Machine - Position accelerator pedal - Voltage above normal or shorted to high source
937	29	4	126	Machine - Position accelerator pedal 2 - Voltage below normal or shorted to low source
940	91	4	226	Machine - Position accelerator pedal - Voltage below normal or shorted to low source
942	523921	3	714	Exhaust aftertreatment - Burner firing chamber temperature - Voltage above normal or shorted to high source

KWP-Code	SPN	FMI	Blink code	Error description
943	3532	3	127	Exhaust aftertreatment - DEF tank level sensor - Voltage above normal or shorted to high source
944	523921	4	714	Exhaust aftertreatment - Burner firing chamber temperature - Voltage below normal or shorted to low source
945	3532	4	127	Exhaust aftertreatment - DEF tank level sensor - Voltage below normal or shorted to low source
946	1079	13	282	Engine - Sensor supply voltage - Out of calibration
947	1080	13	282	Engine - Sensor supply voltage 2 - Out of calibration
948	523601	13	282	Engine - ECU Sensor supply voltage 3 - Out of calibration
956	677	3	512	Engine - Starter relay - Voltage above normal or shorted to high source
957	677	4	512	Engine - Starter relay - Voltage below normal or shorted to low source
958	677	5	512	Engine - Starter relay - Current below normal or open circuit
959	677	12	512	Engine - Starter relay - Bad intelligent device or component
960	677	3	512	Engine - Starter relay - Voltage above normal or shorted to high source
961	677	4	512	Engine - Starter relay - Voltage below normal or shorted to low source
965	523922	3	715	Exhaust aftertreatment - Burner metering unit shut-off valve - Voltage above normal or shorted to high source
969	624	5	513	Machine - Amber warning lamp - Current below normal or open circuit
970	624	12	513	Machine - Amber warning lamp - Bad intelligent device or component
971	624	3	513	Machine - Amber warning lamp - Voltage above normal or shorted to high source
972	624	4	513	Machine - Amber warning lamp - Voltage below normal or shorted to low source
973	523612	14	555	Engine - ECU - Special instructions
974	523612	14	555	Engine - ECU - Special instructions
975	523612	14	555	Engine - ECU - Special instructions
976	91	11	226	Machine - Position accelerator pedal - Root cause not known
978	29	2	126	Machine - Position accelerator pedal 2 - Data erratic intermittent or incorrect
980	523550	12	515	Engine - Starter switch to long active - Bad intelligent device or component
981	172	3	226	Engine - Ambient air temperature sensor - Voltage above normal or shorted to high source
982	172	4	226	Engine - Ambient air temperature sensor - Voltage below normal or shorted to low source
986	523921	0	7-1-4	Exhaust aftertreatment - Burner firing chamber temperature - Data above normal operational range (Most severe level)
989	523921	1	7-1-4	Exhaust aftertreatment - Burner firing chamber temperature - Data below normal operational range (Most severe level)
992	105	1	128	Engine - Charge air temperature sensor - Data below normal operational range (Most severe level)
994	105	3	128	Engine - Charge air temperature sensor - Voltage above normal or shorted to high source
995	105	4	128	Engine - Charge air temperature sensor - Voltage below normal or shorted to low source
996	105	0	233	Engine - Charge air temperature sensor - Data above normal operational range (Most severe level)
997	105	0	233	Engine - Charge air temperature sensor - Data above normal operational range (Most severe level)
998	105	11	128	Engine - Charge air temperature sensor - Root cause not known
1007	412	3	682	Engine - EGR temperature sensor - Voltage above normal or shorted to high source

KWP-Code	SPN	FMI	Blink code	Error description
1008	412	4	682	Engine - EGR temperature sensor - Voltage below normal or shorted to low source
1011	523960	0	771	Engine - EGR temperature after EGR cooler - Data above normal operational range (Most severe level)
1012	523960	1	771	Engine - EGR temperature after EGR cooler - Data below normal operational range (Most severe level)
1014	51	6	594	Engine - Throttle valve position - Current above normal or grounded circuit
1015	51	5	594	Engine - Throttle valve position - Current below normal or open circuit
1016	51	7	594	Engine - Throttle valve position - Mechanical system not responding or out of adjustment
1022	51	6	594	Engine - Throttle valve position - Current above normal or grounded circuit
1023	51	5	594	Engine - Throttle valve position - Current below normal or open circuit
1024	51	3	594	Engine - Throttle valve position - Voltage above normal or shorted to high source
1025	51	4	594	Engine - Throttle valve position - Voltage below normal or shorted to low source
1026	4769	2	684	Exhaust aftertreatment - Temperature sensor after DOC - Data erratic intermittent or incorrect
1029	4766	0	684	Exhaust aftertreatment - Temperature after DOC - Data above normal operational range (Most severe level)
1030	4766	0	684	Exhaust aftertreatment - Temperature after DOC - Data above normal operational range (Most severe level)
1034	4769	3	684	Exhaust aftertreatment - Temperature sensor after DOC - Voltage above normal or shorted to high source
1035	4769	4	684	Exhaust aftertreatment - Temperature sensor after DOC - Voltage below normal or shorted to low source
1036	4768	2	683	Exhaust aftertreatment - Temperature sensor before DOC - Data erratic intermittent or incorrect
1039	4765	0	683	Exhaust aftertreatment - Temperature bevor DOC - Data above normal operational range (Most severe level)
1040	4765	0	683	Exhaust aftertreatment - Temperature bevor DOC - Data above normal operational range (Most severe level)
1044	4768	3	683	Exhaust aftertreatment - Temperature sensor before DOC - Voltage above normal or shorted to high source
1045	4768	4	683	Exhaust aftertreatment - Temperature sensor before DOC - Voltage below normal or shorted to low source
1047	3248	4	685	Exhaust aftertreatment - Temperature after DPF - Voltage below normal or shorted to low source
1067	1180	3	556	Engine - TC charge temprature before tubine - Voltage above normal or shorted to high source
1069	4360	0	668	Exhaust aftertreatment - Temperature before SCR Cat - Data above normal operational range (Most severe level)
1070	4360	1	668	Exhaust aftertreatment - Temperature before SCR Cat - Data below normal operational range (Most severe level)
1072	4361	3	668	Exhaust aftertreatment - Temperature SCR Cat - Voltage above normal or shorted to high source
1073	4361	4	668	Exhaust aftertreatment - Temperature SCR Cat - Voltage below normal or shorted to low source
1074	1761	14	1-2-7	Exhaust aftertreatment - DEF tank level sensor - Special instructions
1075	3361	6	677	Exhaust aftertreatment - DEF metering unit - Current above normal or grounded circuit

KWP-Code	SPN	FMI	Blink code	Error description
1077	3361	3	677	Exhaust aftertreatment - DEF metering unit - Voltage above normal or shorted to high source
1078	3361	3	677	Exhaust aftertreatment - DEF metering unit - Voltage above normal or shorted to high source
1079	3361	4	677	Exhaust aftertreatment - DEF metering unit - Voltage below normal or shorted to low source
1080	3361	4	677	Exhaust aftertreatment - DEF metering unit - Voltage below normal or shorted to low source
1081	4345	5	6-7-4	Exhaust aftertreatment - Heater DEF return line - Current below normal or open circuit
1082	4366	5	7-6-2	Exhaust aftertreatment - DEF tank heating valve - Current below normal or open circuit
1083	4343	5	6-7-3	Exhaust aftertreatment - Heater DEF pressure line - Current below normal or open circuit
1084	4366	5	7-6-2	Exhaust aftertreatment - DEF tank heating valve - Current below normal or open circuit
1085	4366	5	7-6-2	Exhaust aftertreatment - DEF tank heating valve - Current below normal or open circuit
1086	4341	5	6-7-5	Exhaust aftertreatment - Heater DEF supply line - Current below normal or open circuit
1087	523719	5	6-7-2	Exhaust aftertreatment - SCR heater - Current below normal or open circuit
1088	4366	5	6-7-1	Exhaust aftertreatment - DEF tank heating valve - Current below normal or open circuit
1089	4243	11	7-8-3	Exhaust aftertreatment - SCR heater - Root cause not known
1090	4345	5	674	Exhaust aftertreatment - Heater DEF return line - Current below normal or open circuit
1092	4345	3	674	Exhaust aftertreatment - Heater DEF return line - Voltage above normal or shorted to high source
1093	4345	4	674	Exhaust aftertreatment - Heater DEF return line - Voltage below normal or shorted to low source
1094	4343	5	673	Exhaust aftertreatment - Heater DEF pressure line - Current below normal or open circuit
1096	4343	3	673	Exhaust aftertreatment - Heater DEF pressure line - Voltage above normal or shorted to high source
1097	4343	4	673	Exhaust aftertreatment - Heater DEF pressure line - Voltage below normal or shorted to low source
1098	523718	5	676	Exhaust aftertreatment - SCR system - Current below normal or open circuit
1099	523718	12	676	Exhaust aftertreatment - SCR system - Bad intelligent device or component
1100	523718	3	676	Exhaust aftertreatment - SCR system - Voltage above normal or shorted to high source
1101	523718	4	676	Exhaust aftertreatment - SCR system - Voltage below normal or shorted to low source
1102	4341	5	675	Exhaust aftertreatment - Heater DEF supply line - Current below normal or open circuit
1104	4341	3	675	Exhaust aftertreatment - Heater DEF supply line - Voltage above normal or shorted to high source
1105	4341	4	675	Exhaust aftertreatment - Heater DEF supply line - Voltage below normal or shorted to low source
1106	523719	5	672	Exhaust aftertreatment - SCR heater - Current below normal or open circuit

KWP-Code	SPN	FMI	Blink code	Error description
1108	523719	3	672	Exhaust aftertreatment - SCR heater - Voltage above normal or shorted to high source
1109	523719	4	672	Exhaust aftertreatment - SCR heater - Voltage below normal or shorted to low source
1110	4366	5	671	Exhaust aftertreatment - DEF tank heating valve - Current below normal or open circuit
1112	4366	3	671	Exhaust aftertreatment - DEF tank heating valve - Voltage above normal or shorted to high source
1113	4366	4	671	Exhaust aftertreatment - DEF tank heating valve - Voltage below normal or shorted to low source
1117	523632	11	666	Exhaust aftertreatment - DEF pressure - Root cause not known
1118	4375	5	666	Exhaust aftertreatment - DEF pump - Current below normal or open circuit
1120	4375	3	666	Exhaust aftertreatment - DEF pump - Voltage above normal or shorted to high source
1121	4375	4	666	Exhaust aftertreatment - DEF pump - Voltage below normal or shorted to low source
1122	4334	0	665	Exhaust aftertreatment - DEF pump pressure - Data above normal operational range (Most severe level)
1123	4334	1	665	Exhaust aftertreatment - DEF pump pressure - Data below normal operational range (Most severe level)
1124	4334	0	6-6-5	Exhaust aftertreatment - DEF pump pressure - Data above normal operational range (Most severe level)
1125	4334	1	6-6-5	Exhaust aftertreatment - DEF pump pressure - Data below normal operational range (Most severe level)
1127	523632	3	665	Exhaust aftertreatment - DEF pressure - Voltage above normal or shorted to high source
1128	523632	4	665	Exhaust aftertreatment - DEF pressure - Voltage below normal or shorted to low source
1129	4376	5	667	Exhaust aftertreatment - DEF reverse valve - Current below normal or open circuit
1131	4376	3	667	Exhaust aftertreatment - DEF reverse valve - Voltage above normal or shorted to high source
1132	4376	4	667	Exhaust aftertreatment - DEF reverse valve - Voltage below normal or shorted to low source
1135	3031	0	669	Exhaust aftertreatment - DEF tank temperature - Data above normal operational range (Most severe level)
1136	3031	1	669	Exhaust aftertreatment - DEF tank temperature - Data below normal operational range (Most severe level)
1137	4365	2	669	Exhaust aftertreatment - DEF tank temperature - Data erratic intermittent or incorrect
1138	4365	3	669	Exhaust aftertreatment - DEF tank temperature - Voltage above normal or shorted to high source
1139	4365	4	669	Exhaust aftertreatment - DEF tank temperature - Voltage below normal or shorted to low source
1157	97	12	228	Engine - Water in fuel sensor - Bad intelligent device or component
1158	523946	0	772	Engine - Injection Zero quantity calibration Injector 1 - Data above normal operational range (Most severe level)
1159	523947	0	772	Engine - Injection Zero quantity calibration Injector 2 - Data above normal operational range (Most severe level)
1160	523948	0	772	Engine - Injection Zero quantity calibration Injector 3 - Data above normal operational range (Most severe level)

KWP-Code	SPN	FMI	Blink code	Error description
1163	523951	0	772	Engine - Injection Zero quantity calibration Injector 6 - Data above normal operational range (Most severe level)
1164	523946	1	772	Engine - Injection Zero quantity calibration Injector 1 - Data below normal operational range (Most severe level)
1165	523947	1	772	Engine - Injection Zero quantity calibration Injector 2 - Data below normal operational range (Most severe level)
1166	523948	1	772	Engine - Injection Zero quantity calibration Injector 3 - Data below normal operational range (Most severe level)
1167	523949	1	772	Engine - Injection Zero quantity calibration Injector 4 - Data below normal operational range (Most severe level)
1168	523950	1	772	Engine - Injection Zero quantity calibration Injector 5 - Data below normal operational range (Most severe level)
1170	523612	12	555	Engine - ECU - Bad intelligent device or component
1180	168	0	318	Machine - Battery voltage - Data above normal operational range (Most severe level)
1181	168	1	318	Machine - Battery voltage - Data below normal operational range (Most severe level)
1183	172	1	226	Engine - Ambient air temperature sensor - Data below normal operational range (Most severe level)
1187	523980	14	7-8-4	Exhaust aftertreatment - DEF metering quantity - Special instructions
1193	1180	0	5-5-6	Engine - TC charge temprature before tubine - Data above normal operational range (Most severe level)
1194	1180	1	5-5-6	Engine - TC charge temprature before tubine - Data below normal operational range (Most severe level)
1219	524018	14	7-8-6	Exhaust aftertreatment - DPF regeneration request - Special instructions
1220	524022	14	7-8-6	Exhaust aftertreatment - Soot load - Special instructions
1222	190	14	212	Engine - Rotation speed - Special instructions
1223	51	5	594	Engine - Throttle valve position - Current below normal or open circuit
1224	51	6	594	Engine - Throttle valve position - Current above normal or grounded circuit
1226	51	3	594	Engine - Throttle valve position - Voltage above normal or shorted to high source
1227	51	3	594	Engine - Throttle valve position - Voltage above normal or shorted to high source
1228	51	4	594	Engine - Throttle valve position - Voltage below normal or shorted to low source
1229	51	4	594	Engine - Throttle valve position - Voltage below normal or shorted to low source
1230	51	6	594	Engine - Throttle valve position - Current above normal or grounded circuit
1231	51	11	594	Engine - Throttle valve position - Root cause not known
1232	51	4	594	Engine - Throttle valve position - Voltage below normal or shorted to low source
1239	523984	3	788	Engine - Actuator relay 7 - Voltage above normal or shorted to high source
1241	523986	4	176	Engine - Actuator relay 6 - Voltage below normal or shorted to low source
1242	523987	4	791	Engine - Actuator relay 7 - Voltage below normal or shorted to low source
1247	524019	11	8-6-2	Exhaust aftertreatment - Burner air line blocked - Root cause not known
1248	523910	9	6-9-5	Exhaust aftertreatment - Burner air pump - Abnormal update rate timeout

KWP-Code	SPN	FMI	Blink code	Error description
1249	523910	7	6-9-5	Exhaust aftertreatment - Burner air pump - Mechanical system not responding or out of adjustment
1250	523910	12	6-9-5	Exhaust aftertreatment - Burner air pump - Bad intelligent device or component
1252	523910	0	6-9-5	Exhaust aftertreatment - Burner air pump - Data above normal operational range (Most severe level)
1254	524014	1	8-5-8	Engine - Air pressure glow plug flushing line - Data below normal operational range (Most severe level)
1255	524013	7	8-5-7	Exhaust aftertreatment - Burner operation - Mechanical system not responding or out of adjustment
1257	523915	7	8-5-3	Exhaust aftertreatment - Burner post injection metering valve - Mechanical system not responding or out of adjustment
1258	524016	11	8-5-9	Exhaust aftertreatment - Burner air pump - Root cause not known
1259	524016	2	8-5-9	Exhaust aftertreatment - Burner air pump - Data erratic intermittent or incorrect
1261	523910	6	6-9-5	Exhaust aftertreatment - Burner air pump - Current above normal or grounded circuit
1262	523922	7	8-5-4	Exhaust aftertreatment - Burner metering unit shut-off valve - Mechanical system not responding or out of adjustment
1263	524021	11	8-6-4	Exhaust aftertreatment - Burner fuel line - Root cause not known
1264	523922	7	8-5-5	Exhaust aftertreatment - Burner metering unit shut-off valve - Mechanical system not responding or out of adjustment
1285	524038	9	8-2-4	Engine - CAN Main Secondary - Abnormal update rate timeout
1286	524039	9	8-2-5	Engine - CAN Main Secondary - Abnormal update rate timeout
1287	524040	9	8-2-6	Engine - CAN Main Secondary - Abnormal update rate timeout
1288	524041	9	8-2-7	Engine - CAN Main Secondary - Abnormal update rate timeout
1289	524042	9	8-2-8	Engine - CAN Main Secondary - Abnormal update rate timeout
1290	524043	9	8-2-9	Engine - CAN Main Secondary - Abnormal update rate timeout
1291	524045	9	8-3-1	Engine - CAN Main Secondary - Abnormal update rate timeout
1292	524046	9	8-3-2	Engine - CAN Main Secondary - Abnormal update rate timeout
1293	524047	9	8-3-3	Engine - CAN Main Secondary - Abnormal update rate timeout
1294	524048	9	8-3-4	Engine - CAN Main Secondary - Abnormal update rate timeout
1299	523788	0	655	Engine - CAN TC - Data above normal operational range (Most severe level)
1300	523788	0	655	Engine - CAN TC - Data above normal operational range (Most severe level)
1302	524024	11	8-6-6	Exhaust aftertreatment - DOC temperature difference - Root cause not known
1324	523995	13	7-9-5	Engine - Injector 7 IMA Code - Out of calibration
1325	523996	13	7-9-6	Engine - Injector 8 IMA Code - Out of calibration
1326	523997	4	7-9-7	Engine - Injectors bank 1 Secondary - Voltage below normal or shorted to low source
1327	523998	4	7-9-8	Engine - Injectors bank 2 Secondary - Voltage below normal or shorted to low source
1328	523999	12	7-9-9	Engine - Injector control Secondary - Bad intelligent device or component
1329	524000	5	1-7-7	Engine - Injector 7 - Current below normal or open circuit
1330	524001	5	1-7-8	Engine - Injector 8 - Current below normal or open circuit
1333	524000	3	1-7-7	Engine - Injector 7 - Voltage above normal or shorted to high source
1334	524001	3	1-7-8	Engine - Injector 8 - Voltage above normal or shorted to high source
1337	2797	4	565	Engine - Injector group - Voltage below normal or shorted to low source

KWP-Code	SPN	FMI	Blink code	Error description
1338	2798	4	566	Engine - Injector group 2 - Voltage below normal or shorted to low source
1339	2797	4	565	Engine - Injector group - Voltage below normal or shorted to low source
1340	2798	4	566	Engine - Injector group 2 - Voltage below normal or shorted to low source
1342	524036	12	5-5-5	Engine - Diagnostic injector Secondary - Bad intelligent device or component
1345	524069	9	8-9-6	Engine - CAN Main Secondary - Abnormal update rate timeout
1357	524052	11	8-3-6	Exhaust aftertreatment - Power reduction on Main ECU triggered by fault on Secondary - Root cause not known
1368	524052	11	8-3-6	Exhaust aftertreatment - Power reduction on Main ECU triggered by fault on Secondary - Root cause not known
1378	523919	2	6-9-4	Exhaust aftertreatment - Burner air pump pressure sensor - Data erratic intermittent or incorrect
1379	523920	2	7-1-6	Exhaust aftertreatment - Burner exhaust back pressure sensor - Data erratic intermittent or incorrect
1380	3253	2	6-9-2	Exhaust aftertreatment - DPF differential pressure - Data erratic intermittent or incorrect
1381	164	2	839	Engine - Rail pressure - Data erratic intermittent or incorrect
1389	523922	5	715	Exhaust aftertreatment - Burner metering unit shut-off valve - Current below normal or open circuit
1390	523922	12	715	Exhaust aftertreatment - Burner metering unit shut-off valve - Bad intelligent device or component
1392	523922	4	715	Exhaust aftertreatment - Burner metering unit shut-off valve - Voltage below normal or shorted to low source
1395	523921	2	7-1-4	Exhaust aftertreatment - Burner firing chamber temperature - Data erratic intermittent or incorrect
1398	1136	0	681	Engine - ECU temperature - Data above normal operational range (Most severe level)
1402	4769	2	6-8-4	Exhaust aftertreatment - Temperature sensor after DOC - Data erratic intermittent or incorrect
1403	4769	2	6-8-4	Exhaust aftertreatment - Temperature sensor after DOC - Data erratic intermittent or incorrect
1411	1188	11	814	Engine - TC wastegate - Root cause not known
1412	1188	11	814	Engine - TC wastegate - Root cause not known
1413	1188	13	814	Engine - TC wastegate - Out of calibration
1414	1188	2	814	Engine - TC wastegate - Data erratic intermittent or incorrect
1415	1188	7	814	Engine - TC wastegate - Mechanical system not responding or out of adjustment
1417	1188	11	814	Engine - TC wastegate - Root cause not known
1418	1188	11	814	Engine - TC wastegate - Root cause not known
1423	51	0	594	Engine - Throttle valve position - Data above normal operational range (Most severe level)
1424	51	1	594	Engine - Throttle valve position - Data below normal operational range (Most severe level)
1425	172	0	226	Engine - Ambient air temperature sensor - Data above normal operational range (Most severe level)
1432	524029	2	815	Exhaust aftertreatment - CAN return actuator - Data erratic intermittent or incorrect
1436	524034	5	816	Engine - Disc separator - Current below normal or open circuit
1437	524034	12	816	Engine - Disc separator - Bad intelligent device or component

KWP-Code	SPN	FMI	Blink code	Error description
1438	524034	3	816	Engine - Disc separator - Voltage above normal or shorted to high source
1439	524034	4	816	Engine - Disc separator - Voltage below normal or shorted to low source
1440	524030	7	815	Engine - EGR actuator - Mechanical system not responding or out of adjustment
1441	524031	13	815	Engine - EGR actuator - Out of calibration
1442	524032	2	815	Engine - EGR actuator - Data erratic intermittent or incorrect
1443	524033	7	815	Engine - EGR actuator - Mechanical system not responding or out of adjustment
1455	3711	12	711	Exhaust aftertreatment - Temperature during Stand Still - Bad intelligent device or component
1458	523960	0	7-7-1	Engine - EGR temperature after EGR cooler - Data above normal operational range (Most severe level)
1464	523668	11	1136	Exhaust aftertreatment - Hardware failure temperature sensor DEF suction unit - Root cause not known
1466	523669	11	1137	Exhaust aftertreatment - Hardware failure quality sensor DEF suction unit - Root cause not known
1467	523670	11	1138	Exhaust aftertreatment - Hardware failure level sensor DEF suction unit - Root cause not known
1468	524282	11	1139	Exhaust aftertreatment - Hardware failure temperature sensor DEF suction unit - Root cause not known
1469	524283	12	1141	Exhaust aftertreatment - Swapped hoses for differential pressure sensor DPF - Bad intelligent device or component
1470	524284	12	1142	Exhaust aftertreatment - DOC removed - Bad intelligent device or component
1471	524285	2	1143	Machine - GPS status error - Data erratic intermittent or incorrect
1472	524286	2	1144	Machine - Telemetry status error - Data erratic intermittent or incorrect
1481	524025	5	845	Exhaust aftertreatment - Stand Still - Current below normal or open circuit
1482	524044	9	1-8-8	Engine - CAN Main Secondary - Abnormal update rate timeout
1484	524068	2	8-9-5	Engine - ECU Main Secondary identical - Data erratic intermittent or incorrect
1485	524052	11	8-3-6	Exhaust aftertreatment - Power reduction on Main ECU triggered by fault on Secondary - Root cause not known
1486	523718	5	6-7-6	Exhaust aftertreatment - SCR system - Current below normal or open circuit
1488	523718	3	6-7-6	Exhaust aftertreatment - SCR system - Voltage above normal or shorted to high source
1489	523718	4	6-7-6	Exhaust aftertreatment - SCR system - Voltage below normal or shorted to low source
1490	4376	5	6-6-7	Exhaust aftertreatment - DEF reverse valve - Current below normal or open circuit
1491	4376	12	6-6-7	Exhaust aftertreatment - DEF reverse valve - Bad intelligent device or component
1493	4376	4	6-6-7	Exhaust aftertreatment - DEF reverse valve - Voltage below normal or shorted to low source
1505	524057	2	843	Engine - Fuel low pressure pump - Data erratic intermittent or incorrect
1523	2659	2	8-2-2	Engine - EGR mass flow - Data erratic intermittent or incorrect
1524	2659	0	8-2-2	Engine - EGR mass flow - Data above normal operational range (Most severe level)
1525	2659	1	8-2-2	Engine - EGR mass flow - Data below normal operational range (Most severe level)

KWP-Code	SPN	FMI	Blink code	Error description
1526	2659	12	8-2-2	Engine - EGR mass flow - Bad intelligent device or component
1527	2659	2	8-2-2	Engine - EGR mass flow - Data erratic intermittent or incorrect
1529	524070	2	897	Exhaust aftertreatment - NOx sensor before SCR Cat - Data erratic intermittent or incorrect
1530	524071	2	898	Exhaust aftertreatment - NOx sensor after SCR Cat - Data erratic intermittent or incorrect
1531	524072	2	899	Exhaust aftertreatment - NOx sensor before SCR Cat - Data erratic intermittent or incorrect
1532	524073	2	245	Exhaust aftertreatment - NOx sensor after SCR Cat - Data erratic intermittent or incorrect
1533	524074	9	246	Exhaust aftertreatment - NOx sensor after SCR Cat - Abnormal update rate timeout
1534	524075	11	247	Exhaust aftertreatment - NOx sensor after SCR Cat - Root cause not known
1535	524076	9	248	Exhaust aftertreatment - NOx sensor before SCR Cat - Abnormal update rate timeout
1536	524077	11	249	Exhaust aftertreatment - NOx sensor before SCR Cat - Root cause not known
1537	524078	9	255	Exhaust aftertreatment - NOx sensor after SCR Cat lambda - Abnormal update rate timeout
1538	524079	9	256	Exhaust aftertreatment - NOx sensor after SCR Cat lambda - Abnormal update rate timeout
1539	524080	9	257	Exhaust aftertreatment - NOx sensor before SCR Cat lambda - Abnormal update rate timeout
1540	524081	9	258	Exhaust aftertreatment - NOx sensor before SCR Cat lambda - Abnormal update rate timeout
1541	524082	9	259	Exhaust aftertreatment - NOx sensor after SCR Cat NOx - Abnormal update rate timeout
1542	524083	9	261	Exhaust aftertreatment - NOx sensor after SCR Cat NOx - Abnormal update rate timeout
1543	524084	9	911	Exhaust aftertreatment - NOx sensor before SCR Cat NOx - Abnormal update rate timeout
1544	524085	9	912	Exhaust aftertreatment - NOx sensor before SCR Cat NOx - Abnormal update rate timeout
1545	524149	2	968	Engine - TC pressure after turbine - Data erratic intermittent or incorrect
1549	1176	2	139	Engine - TC charge pressure - Data erratic intermittent or incorrect
1555	524063	5	869	Exhaust aftertreatment - DEF heater - Current below normal or open circuit
1556	524063	5	869	Exhaust aftertreatment - DEF heater - Current below normal or open circuit
1557	524063	5	869	Exhaust aftertreatment - DEF heater - Current below normal or open circuit
1558	524063	3	869	Exhaust aftertreatment - DEF heater - Voltage above normal or shorted to high source
1559	524063	4	869	Exhaust aftertreatment - DEF heater - Voltage below normal or shorted to low source
1560	524063	5	869	Exhaust aftertreatment - DEF heater - Current below normal or open circuit
1561	524063	5	869	Exhaust aftertreatment - DEF heater - Current below normal or open circuit
1562	524063	5	869	Exhaust aftertreatment - DEF heater - Current below normal or open circuit

KWP-Code	SPN	FMI	Blink code	Error description
1565	524065	0	892	Exhaust aftertreatment - Pressure sensor before SCR Cat - Data above normal operational range (Most severe level)
1566	524065	1	892	Exhaust aftertreatment - Pressure sensor before SCR Cat - Data below normal operational range (Most severe level)
1569	524065	3	892	Exhaust aftertreatment - Pressure sensor before SCR Cat - Voltage above normal or shorted to high source
1570	524065	4	892	Exhaust aftertreatment - Pressure sensor before SCR Cat - Voltage below normal or shorted to low source
1581	524067	0	894	Exhaust aftertreatment - DEF pump temperature - Data above normal operational range (Most severe level)
1582	524067	1	894	Exhaust aftertreatment - DEF pump temperature - Data below normal operational range (Most severe level)
1585	524067	0	894	Exhaust aftertreatment - DEF pump temperature - Data above normal operational range (Most severe level)
1586	524067	1	894	Exhaust aftertreatment - DEF pump temperature - Data below normal operational range (Most severe level)
1593	1761	0	129	Exhaust aftertreatment - DEF tank level sensor - Data above normal operational range (Most severe level)
1594	1761	1	129	Exhaust aftertreatment - DEF tank level sensor - Data below normal operational range (Most severe level)
1597	524149	2	968	Engine - TC pressure after turbine - Data erratic intermittent or incorrect
1598	524065	2	892	Exhaust aftertreatment - Pressure sensor before SCR Cat - Data erratic intermittent or incorrect
1617	3699	2	8-1-8	Exhaust aftertreatment - Passive regeneration - Data erratic intermittent or incorrect
1619	524087	5	884	Machine - DEF error lamp - Current below normal or open circuit
1620	524087	12	884	Machine - DEF error lamp - Bad intelligent device or component
1621	524087	3	884	Machine - DEF error lamp - Voltage above normal or shorted to high source
1622	524087	4	884	Machine - DEF error lamp - Voltage below normal or shorted to low source
1630	524132	2	955	Engine - Fuel low pressure before pump - Data erratic intermittent or incorrect
1631	524132	0	9-5-5	Engine - Fuel low pressure before pump - Data above normal operational range (Most severe level)
1632	524132	0	9-5-5	Engine - Fuel low pressure before pump - Data above normal operational range (Most severe level)
1633	524132	1	9-5-5	Engine - Fuel low pressure before pump - Data below normal operational range (Most severe level)
1634	524132	1	9-5-5	Engine - Fuel low pressure before pump - Data below normal operational range (Most severe level)
1635	3699	0	8-1-8	Exhaust aftertreatment - Passive regeneration - Data above normal operational range (Most severe level)
1639	524147	13	966	Exhaust aftertreatment - DEF pressure - Out of calibration
1646	524063	12	869	Exhaust aftertreatment - DEF heater - Bad intelligent device or component
1647	524063	12	869	Exhaust aftertreatment - DEF heater - Bad intelligent device or component
1654	1761	14	138	Exhaust aftertreatment - DEF tank level sensor - Special instructions
1655	1761	14	138	Exhaust aftertreatment - DEF tank level sensor - Special instructions
1656	1761	14	138	Exhaust aftertreatment - DEF tank level sensor - Special instructions
1658	524096	14	1-9-6	Exhaust aftertreatment - EPA counter - Special instructions

KWP-Code	SPN	FMI	Blink code	Error description
1659	524114	9	9-3-8	Exhaust aftertreatment - CAN DOC - Abnormal update rate timeout
1660	524115	9	939	Exhaust aftertreatment - CAN service - Abnormal update rate timeout
1661	524116	9	1-9-4	Exhaust aftertreatment - CAN DEF tank - Abnormal update rate timeout
1662	524117	9	9-4-1	Exhaust aftertreatment - CAN DEF heater - Abnormal update rate timeout
1663	524097	9	921	Exhaust aftertreatment - CAN Burner pump - Abnormal update rate timeout
1664	524098	9	922	Exhaust aftertreatment - CAN Burner pump - Abnormal update rate timeout
1665	524099	9	923	Exhaust aftertreatment - CAN DPF - Abnormal update rate timeout
1666	524100	9	924	Exhaust aftertreatment - CAN DPF - Abnormal update rate timeout
1667	524101	9	925	Exhaust aftertreatment - CAN DPF - Abnormal update rate timeout
1668	524105	9	929	Engine - CAN EGR actuator - Abnormal update rate timeout
1669	524108	9	932	Engine - CAN EGR actuator - Abnormal update rate timeout
1670	524110	9	934	Engine - Exhaust brake flap - Abnormal update rate timeout
1671	524112	9	936	Engine - CAN throttle valve - Abnormal update rate timeout
1672	524118	9	942	Exhaust aftertreatment - CAN DPF regeneration - Abnormal update rate timeout
1675	524103	9	927	Exhaust aftertreatment - CAN Burner air pump - Abnormal update rate timeout
1676	524104	9	928	Exhaust aftertreatment - CAN DPF - Abnormal update rate timeout
1677	524106	9	195	Engine - CAN EGR actuator - Abnormal update rate timeout
1678	524107	9	931	Engine - CAN EGR actuator - Abnormal update rate timeout
1679	524109	9	933	Engine - CAN EGR actuator - Abnormal update rate timeout
1680	524111	9	935	Engine - Exhaust brake flap - Abnormal update rate timeout
1681	524113	9	937	Engine - CAN throttle valve - Abnormal update rate timeout
1682	524120	9	9-4-4	Exhaust aftertreatment - CAN SCR heater diagnostic - Abnormal update rate timeout
1683	524121	9	945	Engine - CAN wastegate actuator - Abnormal update rate timeout
1684	524122	9	9-4-6	Exhaust aftertreatment - CAN DEF quality - Abnormal update rate timeout
1685	524123	9	9-4-7	Exhaust aftertreatment - CAN SCR heater control - Abnormal update rate timeout
1686	524124	9	9-4-8	Exhaust aftertreatment - CAN DPF - Abnormal update rate timeout
1687	524125	9	949	Engine - CAN wastegate actuator - Abnormal update rate timeout
1698	524133	2	956	Machine - Override switch - Data erratic intermittent or incorrect
1699	524134	0	957	Exhaust aftertreatment - DPF ash load - Data above normal operational range (Most severe level)
1700	524134	0	957	Exhaust aftertreatment - DPF ash load - Data above normal operational range (Most severe level)
1701	524135	0	958	Exhaust aftertreatment - DPF soot load - Data above normal operational range (Most severe level)
1702	524135	14	958	Exhaust aftertreatment - DPF soot load - Special instructions
1703	524135	0	958	Exhaust aftertreatment - DPF soot load - Data above normal operational range (Most severe level)
1705	524156	9	972	Machine - CAN wheel speed - Abnormal update rate timeout
1706	524157	9	973	Machine - CAN fan control - Abnormal update rate timeout
1708	524159	0	975	Engine - Fan - Data above normal operational range (Most severe level)
1709	524159	1	975	Engine - Fan - Data below normal operational range (Most severe level)
1710	524160	5	976	Engine - Fan control - Current below normal or open circuit

KWP-Code	SPN	FMI	Blink code	Error description
1712	524160	3	976	Engine - Fan control - Voltage above normal or shorted to high source
1713	524160	4	976	Engine - Fan control - Voltage below normal or shorted to low source
1714	524161	5	977	Engine - Fan control - Current below normal or open circuit
1716	524161	3	977	Engine - Fan control - Voltage above normal or shorted to high source
1717	524161	4	977	Engine - Fan control - Voltage below normal or shorted to low source
1718	524162	12	978	Engine - Fan control angle sensor - Bad intelligent device or component
1719	524163	12	979	Engine - Fan control - Bad intelligent device or component
1752	2791	7	415	Engine - EGR actuator - Mechanical system not responding or out of adjustment
1753	2791	2	415	Engine - EGR actuator - Data erratic intermittent or incorrect
1754	2791	13	415	Engine - EGR actuator - Out of calibration
1755	2791	12	415	Engine - EGR actuator - Bad intelligent device or componen
1756	2791	13	415	Engine - EGR actuator - Out of calibration
1757	2791	6	415	Engine - EGR actuator - Current above normal or grounded circuit
1758	2791	3	415	Engine - EGR actuator - Voltage above normal or shorted to high source
1759	2791	4	415	Engine - EGR actuator - Voltage below normal or shorted to low source
1760	2791	13	415	Engine - EGR actuator - Out of calibration
1761	2791	7	415	Engine - EGR actuator - Mechanical system not responding or out of adjustment
1762	2791	16	415	Engine - EGR actuator - Data above normal operational range (Moderately severe level)
1763	2791	0	415	Engine - EGR actuator - Data above normal operational range (Most severe level)
1788	1188	7	814	Engine - TC wastegate - Mechanical system not responding or out of adjustment
1789	1188	2	814	Engine - TC wastegate - Data erratic intermittent or incorrect
1790	1188	13	814	Engine - TC wastegate - Out of calibration
1791	1188	12	814	Engine - TC wastegate - Bad intelligent device or component
1792	1188	13	814	Engine - TC wastegate - Out of calibration
1793	1188	6	814	Engine - TC wastegate - Current above normal or grounded circuit
1794	1188	3	814	Engine - TC wastegate - Voltage above normal or shorted to high source
1795	1188	4	814	Engine - TC wastegate - Voltage below normal or shorted to low source
1796	1188	13	814	Engine - TC wastegate - Out of calibration
1797	1188	7	814	Engine - TC wastegate - Mechanical system not responding or out of adjustment
1799	1188	0	814	Engine - TC wastegate - Data above normal operational range (Most severe level)
1827	524141	7	192	Exhaust aftertreatment - DEF metering valve - Mechanical system not responding or out of adjustment
1857	523612	12	555	Engine - ECU - Bad intelligent device or component
1858	524147	7	966	Exhaust aftertreatment - DEF pressure - Mechanical system not responding or out of adjustment
1859	524175	0	993	Exhaust aftertreatment - NOx emissiones after SCR Cat - Data above normal operational range (Most severe level)
1860	524074	2	246	Exhaust aftertreatment - NOx sensor after SCR Cat - Data erratic intermittent or incorrect
1861	524076	2	248	Exhaust aftertreatment - NOx sensor before SCR Cat - Data erratic intermittent or incorrect
1863	524177	7	995	Exhaust aftertreatment - DEF pressure suction line -

KWP-Code	SPN	FMI	Blink code	Error description
1864	524178	7	996	Mechanical system not responding or out of adjustment
1864	524178	7	996	Exhaust aftertreatment - DEF pressure - Mechanical system not responding or out of adjustment
1865	4360	2	668	Exhaust aftertreatment - Temperature before SCR Cat - Data erratic intermittent or incorrect
1866	4334	2	665	Exhaust aftertreatment - DEF pump pressure - Data erratic intermittent or incorrect
1867	524067	2	894	Exhaust aftertreatment - DEF pump temperature - Data erratic intermittent or incorrect
1868	524067	2	894	Exhaust aftertreatment - DEF pump temperature - Data erratic intermittent or incorrect
1869	1761	2	129	Exhaust aftertreatment - DEF tank level sensor - Data erratic intermittent or incorrect
1874	524152	2	971	Exhaust aftertreatment - CAN DEF quality sensor - Data erratic intermittent or incorrect
1875	524153	2	997	Exhaust aftertreatment - DEF tank level and temperature - Data erratic intermittent or incorrect
1880	1761	14	138	Exhaust aftertreatment - DEF tank level sensor - Special instructions
1881	4768	2	683	Exhaust aftertreatment - Temperature sensor before DOC - Data erratic intermittent or incorrect
1882	524025	14	8-4-5	Exhaust aftertreatment - Stand Still - Special instructions
1883	524025	14	8-4-5	Exhaust aftertreatment - Stand Still - Special instructions
1884	524184	9	2-6-7	Exhaust aftertreatment - CAN SCR - Abnormal update rate timeout
1889	524189	9	2-6-9	Engine - CAN Main Secondary - Abnormal update rate timeout
1890	524192	12	274	Engine - Fan control - Bad intelligent device or component
1891	524190	14	272	Engine - Power reduction step 1 - Special instructions
1892	524191	14	273	Engine - Power reduction step 2 - Special instructions
1893	524193	8	275	Exhaust aftertreatment - Time Stand Still - Abnormal frequency or pulse width or period
1894	524194	8	276	Exhaust aftertreatment - Time Stand Still - Abnormal frequency or pulse width or period
1895	3519	12	277	Exhaust aftertreatment - DEF tank temperature - Bad intelligent device or component
1896	3520	3	278	Exhaust aftertreatment - DEF quality sensor - Voltage above normal or shorted to high source
1897	3520	4	278	Exhaust aftertreatment - DEF quality sensor - Voltage below normal or shorted to low source
1898	3519	3	277	Exhaust aftertreatment - DEF tank temperature - Voltage above normal or shorted to high source
1899	3519	4	277	Exhaust aftertreatment - DEF tank temperature - Voltage below normal or shorted to low source
1900	524195	14	279	Exhaust aftertreatment - Stand Still request - Special instructions
1901	524196	13	283	Engine - Fan - Out of calibration
1902	524196	2	283	Engine - Fan - Data erratic intermittent or incorrect
1904	3520	2	278	Exhaust aftertreatment - DEF quality sensor - Data erratic intermittent or incorrect
1905	3520	8	278	Exhaust aftertreatment - DEF quality sensor - Abnormal frequency or pulse width or period
1907	3520	13	278	Exhaust aftertreatment - DEF quality sensor - Out of calibration
1908	3519	13	277	Exhaust aftertreatment - DEF tank temperature - Out of calibration
1909	4365	12	669	Exhaust aftertreatment - DEF tank temperature - Bad intelligent device or component

KWP-Code	SPN	FMI	Blink code	Error description
1910	3532	13	129	Exhaust aftertreatment - DEF tank level sensor - Out of calibration
1911	3532	3	127	Exhaust aftertreatment - DEF tank level sensor - Voltage above normal or shorted to high source
1912	3532	4	127	Exhaust aftertreatment - DEF tank level sensor - Voltage below normal or shorted to low source
1913	4365	13	669	Exhaust aftertreatment - DEF tank temperature - Out of calibration
1914	4365	3	669	Exhaust aftertreatment - DEF tank temperature - Voltage above normal or shorted to high source
1915	4365	4	669	Exhaust aftertreatment - DEF tank temperature - Voltage below normal or shorted to low source
1917	3936	14	286	Exhaust aftertreatment - Time Stand Still - Special instructions
1918	3936	14	286	Exhaust aftertreatment - Time Stand Still - Special instructions
1924	51	3	5-9-4	Engine - Throttle valve position - Voltage above normal or shorted to high source
1925	51	3	5-9-4	Engine - Throttle valve position - Voltage above normal or shorted to high source
1926	51	4	5-9-4	Engine - Throttle valve position - Voltage below normal or shorted to low source
1931	51	7	5-9-4	Engine - Throttle valve position - Mechanical system not responding or out of adjustment
1932	51	12	5-9-4	Engine - Throttle valve position - Bad intelligent device or component
1935	51	3	5-9-4	Engine - Throttle valve position - Voltage above normal or shorted to high source
1942	524201	11	3-1-3	Exhaust aftertreatment - SCR effectiveness monitoring Secondary ECU triggered by ambient temperature sensor Main - Root cause not known
1943	524202	11	3-1-3	Exhaust aftertreatment - Collective fault on Secondary ECU triggered by SCR failure Main - Root cause not known
1944	524203	11	3-1-3	Exhaust aftertreatment - Collective fault on Secondary ECU triggered DEF tank failure Main - Root cause not known
1945	524204	11	3-1-3	Exhaust aftertreatment - Collective fault on Secondary ECU triggered by SCR failure Main - Root cause not known
1946	524205	11	3-1-3	Exhaust aftertreatment - Collective fault on Secondary ECU triggered by SCR failure Main - Root cause not known
1947	524206	11	3-1-3	Exhaust aftertreatment - Collective fault on Secondary ECU triggered by DEF dosing failure Main - Root cause not known
1971	524230	11	3-1-5	Exhaust aftertreatment - Hardware failure on Secondary ECU activates power reduction - Root cause not known
1972	524231	11	3-1-5	Exhaust aftertreatment - SCR failure on Secondary ECU activates power reduction - Root cause not known
1973	524232	11	3-1-5	Exhaust aftertreatment - SCR failure on Secondary ECU activates power reduction - Root cause not known
1974	524233	11	3-1-5	Engine - ECU EEPROM error Secondary - Root cause not known
1975	524234	11	3-1-5	Engine - Battery voltage failure on Secondary ECU triggers collective fault Main - Root cause not known
1976	524235	11	3-1-5	Engine - CAN failure on Secondary ECU triggers collective fault Main - Root cause not known
1977	524236	11	3-1-5	Engine - ECU monitoring failure on Secondary ECU triggers collective fault Main - Root cause not known
1978	524237	11	3-1-5	Engine - ECU failure on Secondary ECU triggers collective fault Main - Root cause not known
1979	524238	11	3-1-5	Engine - ECU failure on Secondary ECU triggers collective fault Main - Root cause not known

KWP-Code	SPN	FMI	Blink code	Error description
1980	524239	11	3-1-5	Exhaust aftertreatment - Collective fault on Secondary ECU triggered by SCR failure Main - Root cause not known
1983	524242	11	3-1-5	Engine - Software reset failure on Secondary ECU triggers collective fault Main - Root cause not known
1984	524243	11	3-1-5	Engine - Engine speed signal failure on Secondary ECU triggers collective fault Main - Root cause not known
1989	524248	11	3-1-5	Exhaust aftertreatment - Collective fault on Secondary ECU triggered by SCR failure Main - Root cause not known
1990	524249	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by SCR failure Secondary - Root cause not known
1992	524251	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by SCR failure Secondary - Root cause not known
1993	524252	11	3-1-5	Exhaust aftertreatment - Reverting valve failure on Secondary ECU triggered by collective fault Main - Root cause not known
1994	524253	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by DEF failure Secondary - Root cause not known
1995	524254	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by SCR failure Secondary - Root cause not known
1996	524255	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by DEF failure Secondary - Root cause not known
1997	524256	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by DEF failure Secondary - Root cause not known
1998	524257	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by SCR failure Secondary - Root cause not known
1999	524258	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by SCR failure Secondary - Root cause not known
2000	524259	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by DEF failure Secondary - Root cause not known
2001	524260	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by DEF failure Secondary - Root cause not known
2002	524261	11	3-1-5	Exhaust aftertreatment - Collective fault on Main ECU triggered by DEF failure Secondary - Root cause not known
2003	524262	8	3-1-6	Exhaust aftertreatment - CAN SCR - Abnormal frequency or pulse width or period
2007	524267	14	273	Exhaust aftertreatment - Announcement trigger power reduction step 2 - Special instructions
2008	524025	8	845	Exhaust aftertreatment - Stand Still - Abnormal frequency or pulse width or period
2011	4361	2	668	Exhaust aftertreatment - Dynamic temperature check before SCR - Data erratic intermittent or incorrect
2013	524147	13	966	Exhaust aftertreatment - DEF pressure - Out of calibration
2014	3520	1	278	Exhaust aftertreatment - DEF quality sensor - Data below normal operational range (Most severe level)
2015	524268	9	1117	Manufacturer Assignable SPN - Abnormal update rate timeout
2016	523470	13	146	Engine - Fuel pressure relief valve - Out of calibration
2025	524272	14	1119	Manufacturer Assignable SPN - Special instructions
2026	523470	13	146	Engine - Fuel pressure relief valve - Out of calibration
2032	411	2	693	Engine - EGR differential pressure - Data erratic intermittent or incorrect
2033	1176	2	139	Engine - TC charge pressure - Data erratic intermittent or incorrect
2034	524277	11	555	Engine - ECU afterun too often not waited - Root cause not known
2035	524278	11	555	Engine - ECU afterun too often consecutive not waited - Root cause not known

KWP-Code	SPN	FMI	Blink code	Error description
2036	51	12	594	Engine - Throttle valve position - Bad intelligent device or component
2038	524281	6	1124	Engine - Throttle valve dynamic current limitation - Current above normal or grounded circuit
2044	524280	8	-	Engine - CAN oil level sensor - Abnormal frequency or pulse width or period
2049	5763	6	1146	Engine - EGR valve - Current above normal or grounded circuit
2050	5763	5	1146	Engine - EGR valve - Current below normal or open circuit
2051	5763	5	1146	Engine - EGR valve - Current below normal or open circuit
2052	5763	6	1146	Engine - EGR valve - Current above normal or grounded circuit
2054	5763	3	1146	Engine - EGR valve - Voltage above normal or shorted to high source
2055	5763	3	1146	Engine - EGR valve - Voltage above normal or shorted to high source
2056	5763	4	1146	Engine - EGR valve - Voltage below normal or shorted to low source
2057	5763	4	1146	Engine - EGR valve - Voltage below normal or shorted to low source
2058	5763	6	1146	Engine - EGR valve - Current above normal or grounded circuit
2059	5763	11	1146	Engine - EGR valve - Root cause not known
2060	5763	4	1146	Engine - EGR valve - Voltage below normal or shorted to low source
2061	5763	7	1146	Engine - EGR valve - Mechanical system not responding or out of adjustment
2063	5763	6	1146	Engine - EGR valve - Current above normal or grounded circuit
2064	5763	5	1146	Engine - EGR valve - Current below normal or open circuit
2065	5763	3	1146	Engine - EGR valve - Voltage above normal or shorted to high source
2066	5763	4	1146	Engine - EGR valve - Voltage below normal or shorted to low source
2067	5763	0	1146	Engine - EGR valve - Data above normal operational range (Most severe level)
2068	5763	1	1146	Engine - EGR valve - Data below normal operational range (Most severe level)
2069	5763	6	1147	Engine - EGR valve - Current above normal or grounded circuit

5.1.2. DTCs – Vehicle Control Unit (VCU)

5.1.2.1 E001 - Foot Throttle Sensor is Out of Range (Negative characteristic)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage of B999 – Foot throttle sensor** • Disconnect the connector P350 of the foot throttle sensor. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P350 between pins: - 1 and 2 **Specification** Supply voltage of foot throttle sensor: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the foot throttle fuse (F4) is OK. • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • • Switch OFF ignition. Check for short to ground (Check the continuity between pins: 2, 3 and ground). Repair or replace if needed. • Check for short to positive (Check the continuity between pins: 1, 3 and F4). Repair or replace if needed. • Check that the component (B999) is not damaged.
2. **Check continuity between foot throttle sensor and instrument panel control module** • Switch OFF ignition. • Disconnect P74. • Check continuity between: • P350 pin 3 and P74 pin 35 ***NOTE:*** Verify that the resistance is near to 0 ohms	**OK:** Go to **3**. **NOT OK:** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace if needed.
3. **Check for correct calibration of the foot throttle sensor** • Reconnect all connectors • Remake the calibration of the foot throttle sensor, following the instructions on the **Accelerators adjustment procedure (Hand & Foot)**.	**OK:** Go to **4**. **NOT OK:** • Check for a mechanical / hydraulic issue

4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module

5.1.2.2 E001 - Foot Throttle Sensor is Out of Range (Positive characteristic)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage of B999 – Foot throttle sensor** • Disconnect the connector P350 of the foot throttle sensor. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P350 between pins: - 4 and 5 **Specification** Supply voltage of foot throttle sensor: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the foot throttle fuse (F4) is OK. • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • • Switch OFF ignition. Check for short to ground (Check the continuity between pins: 5, 6 and ground). Repair or replace if needed. • Check for short to positive (Check the continuity between pins: 4, 6 and F4). Repair or replace if needed. • Check that the component (B999) is not damaged.
2. **Check continuity between foot throttle sensor and instrument panel control module** • Switch OFF ignition. • Disconnect P74. • Check continuity between: • P350 pin 6 and P74 pin 15 ***NOTE:*** Verify that the resistance is near to 0 ohms	**OK:** Go to **3**. **NOT OK:** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace if needed.

3. **Check for correct calibration of the foot throttle sensor** • Reconnect all connectors • Remake the calibration of the foot throttle sensor, following the instructions on the **Accelerators adjustment procedure (Hand & Foot)**.	**OK:** Go to **4**. **NOT OK:** • Check for a mechanical / hydraulic issue
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module

5.1.2.3 E002 - Difference between Positive and Negative characteristic is Out of Range

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage of B999 – Foot throttle sensor** • Disconnect the connector P350 of the foot throttle sensor. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P350 between pins: - 1 and 2 - 4 and 5 **Specification** Supply voltage of foot throttle sensor: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the foot throttle fuse (F4) is OK. • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • • Switch OFF ignition. Check for short to ground (Check continuity between pins: 2, 3, 5, 6 and ground). Repair or replace if needed. • Check for short to positive (Check continuity between pins: 1, 3, 4, 6 and F4). Repair or replace if needed. • Check that the component (B999) is not damaged.

2. **Check continuity between foot throttle sensor and instrument panel control module** • Switch OFF ignition. • Disconnect P74. • Check continuity between: - P350 pin 3 and P74 pin 35 - P350 pin 6 and P74 pin 15 ***NOTE:*** Verify that the resistance is near to 0 ohms	**OK:** Go to **3**. **NOT OK:** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace if needed.
3. **Check for correct calibration of the foot throttle sensor** • Reconnect all connectors • Remake the calibration of the foot throttle sensor, following the instructions on the **Accelerators adjustment procedure (Hand & Foot)**.	**OK:** Go to **4**. **NOT OK:** • Check for a mechanical / hydraulic issue
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module

5.1.2.4 E004 - Hand Throttle Sensor is Out of Range (Negative characteristic)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage of B998 – hand throttle sensor** • Disconnect the connector P351 of the hand throttle sensor. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P351 between pins: - 1 and 2 **Specification** Supply voltage of foot throttle sensor: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the hand throttle fuse (F6) is OK. • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • • Switch OFF ignition. Check for short to ground (Check continuity between pins: 2, 3 and ground). Repair or replace if needed. • Check for short to positive (Check continuity between pins: 1, 3 and F6). Repair or replace if needed. • Check that the component (B998) is not damaged.
2. **Check continuity between hand throttle sensor and instrument panel control module** • Switch OFF ignition. • Disconnect P74. • Check continuity between: - P351 pin 3 and P74 pin 37 ***NOTE:*** Verify that the resistance is near to 0 ohms	**OK:** Go to **3**. **NOT OK:** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace if needed.
3. **Check for correct calibration of the hand throttle sensor** • Reconnect all connectors • Remake the calibration of the hand throttle sensor, following the instructions on the **Accelerators adjustment procedure (Hand & Foot)**.	**OK:** Go to **4**. **NOT OK:** • Check for a mechanical / hydraulic issue
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module

5.1.2.5 E004 - Hand Throttle Sensor is Out of Range (Positive characteristic)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage of B998 – hand throttle sensor** • Disconnect the connector P351 of the hand throttle sensor. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P351 between pins: - 4 and 5 **Specification** Supply voltage of foot throttle sensor: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the hand throttle fuse (F6) is OK. • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • • Switch OFF ignition. Check for short to ground (Check continuity between pins: 5, 6 and ground). Repair or replace if needed. • Check for short to positive (Check continuity between pins: 4, 6 and F6). Repair or replace if needed. • Check that the component (B998) is not damaged.
2. **Check continuity between hand throttle sensor and instrument panel control module** • Switch OFF ignition. • Disconnect P74. • Check continuity between: - P351 pin 6 and P74 pin 17 ***NOTE:*** Verify that the resistance is near to 0 ohms	**OK:** Go to **3**. **NOT OK:** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace if needed.
3. **Check for correct calibration of the hand throttle sensor** • Reconnect all connectors • Remake the calibration of the hand throttle sensor, following the instructions on the **Accelerators adjustment procedure (Hand & Foot)**.	**OK:** Go to **4**. **NOT OK:** • Check for a mechanical / hydraulic issue

4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module

5.1.2.6 E005 - Difference between Positive and Negative characteristic is Out of Range

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage of B998 – hand throttle sensor** • Disconnect the connector P351 of the hand throttle sensor. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P351 between pins: - 1 and 2 - 4 and 5 **Specification** Supply voltage of foot throttle sensor: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the hand throttle fuse (F6) is OK. • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • • Switch OFF ignition. Check for short to ground (Check continuity between pins: 2, 3, 5, 6 and ground). Repair or replace if needed. • Check for short to positive (Check continuity between pins: 1, 3, 4, 6 and F6). Repair or replace if needed. • Check that the component (B998) is not damaged.
2. **Check continuity between hand throttle sensor and instrument panel control module** . • Switch OFF ignition • Disconnect P74. • Check continuity between: - P351 pin 3 and P74 pin 37 - P351 pin 6 and P74 pin 17 ***NOTE:*** Verify that the resistance is near to 0 ohms	**OK:** Go to **3**. **NOT OK:** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace if needed.

3. **Check for correct calibration of the hand throttle sensor** • Reconnect all connectors • Remake the calibration of the hand throttle sensor, following the instructions on the **Accelerators adjustment procedure (Hand & Foot)**.	**OK:** Go to **4**. **NOT OK:** • Check for a mechanical / hydraulic issue
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module

5.1.2.7 E007 - Inconsistent values of Left Pedal Brake Sensor

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check supply voltage of B112L – Left hand pedal switch** • Disconnect the connector P684 • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P684 between pins: - 1 and ground - 2 and ground **Specification** Supply voltage of brake pedal switch: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the brakes line fuse (F10) is OK. • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Switch OFF ignition. Check for short to ground: Check continuity between pins: - 1 of P684 and ground - 2 of P684 and ground Repair or replace if needed. • Check that the components (B112L) is not damaged.

2. **Check continuity between brake pedal switch signal output and instrument panel control module** • Switch OFF ignition. • Disconnect connector P74. • Check continuity between: - P684 pin 3 and P74 pin 77 - P684 pin 4 and P74 pin 57 ***NOTE:*** *When a continuity check is done, v*erify that the resistance is near to 0 ohms	**OK:** Go to **3**. **NOT OK:** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Check for short to ground: check continuity between pins: - P74 pin 57 and ground - P74 pin 77 and ground • Check for short to positive: **With brakes pedals released**, check that there is continuity between pins: - P74 pin 77 and F10 Check that there is not continuity between pins: - P74 pin 57 and F10 **With brakes pedals pressed**, check that there is continuity between pins: - P74 pin 57 and F10 Check that there is not continuity between pins: - P74 pin 77 and F10 Repair or replace if needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module

5.1.2.8 E007 - Inconsistent values of Right Pedal Brake Sensor

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage of B112R – Right hand pedal switch** • Disconnect the connector P683 • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P683 between pins: - 1 and ground - 2 and ground **Specification** Supply voltage of brake pedal switch: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the brakes line fuse (F10) is OK. • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • • Switch OFF ignition. Check for short to ground: Check continuity between pins: - 1 of P683 and ground - 2 of P683 and ground Repair or replace if needed. • Check that the components (B112R) is not damaged.
2. **Check continuity between brake pedal switch signal output and instrument panel control module** • Switch OFF ignition. • Disconnect connector P74. • Check continuity between: - P683 pin 3 and P74 pin 79 - P683 pin 4 and P74 pin 59 ***NOTE:*** *When a continuity check is done, v*erify that the resistance is near to 0 ohms	**OK:** Go to **3**. **NOT OK:** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Check for short to ground: check continuity between pins: - P74 pin 59 and ground - P74 pin 79 and ground • Check for short to positive: **With brakes pedals released**, check that there is continuity between pins: - P74 pin 79 and F10 Check that there is not continuity between pins: - P74 pin 59 and F10 **With brakes pedals pressed**, check that there is continuity between pins: - P74 pin 59 and F10 Check that there is not continuity between pins: - P74 pin 79 and F10 Repair or replace if needed.

3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Change the control module

5.1.2.9 E008 - 4WD Switch short circuit to Vbatt or stuck

NOTE: This error is shown if the switch is pressed for more than 3 sec.

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check for a short circuit to positive** • Disconnect the connector P74 of the control module (A330) and P302 connector of the 4WD switch (S63). • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P302 between: - Pin 2 and ground **Specification** The voltage must be near to: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • Replace or repair as needed. • Check continuity between: - Pin 2 of P302 and pin 66 of P74 If there is not continuity, replace or repair as needed. • Check that the component (S63) is not damaged.
2. **Check control module revision level** • Switch OFF ignition. Reconnect all the connectors before disconnected • Download the correct software revision level on the control module, and verify that the system functions properly	**OK:** END of process. **NOT OK:** • Change the control module

5.1.2.10 E009 - Pressure Switch signal on 4WD pipeline not correct at engine OFF

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check supply voltage signal on the instrument panel connector P74** • Disconnect the connector P74 of the instrument panel (A330). • Switch ON ignition. • Use a multimeter to check the supply voltage at connectors P74 between: - Pin 30 and ground **Specification** Supply voltage of the pressure switch: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check that the pressure switch line fuse (F6) is OK. • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • Check for short to ground: Check continuity between: - Pin 30 of P74 and ground If there is continuity, repair or replace as needed. • Check for an open circuit. Check continuity between: - Pin 30 of P74 and F6 (pressure switch line fuse). If there is not continuity, repair or replace as needed. • Check that the component (B988) is not damaged and verify that there is continuity between pins: - 1 and 2 of B988 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for possible hydraulic / mechanical issue** • Switch OFF ignition and reconnect all connectors. • Check the correct hydraulic / mechanical operations of the B988 pressure switch (see relevant section).	**OK:** Go to **3**. **NOT OK:** • Replace the pressure switch.
3. **Check control module revision level** - Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** - Change the control module.

5.1.2.11 E010 - Pressure Switch signal on 4WD pipeline not correct at engine ON (rpm > 700)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

NOTE: *This test must be done with hand brake activated.* 1. **Check supply voltage signal on the instrument panel connector P74** • Disconnect the connector P74 of the instrument panel (A330). • Switch ON ignition. • Use a multimeter to check the supply voltage at connectors P74 between: - Pin 30 and ground **Specification** Supply voltage of the pressure switch: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the pressure switch line fuse (F6) is OK. • • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • • Switch OFF ignition. Check for short to ground: Check continuity between: - Pin 30 of P74 and ground If there is continuity, repair or replace as needed. • Check for an open circuit. Check continuity between: - Pin 30 of P74 and F6 (pressure switch line fuse). If there is not continuity, repair or replace as needed. • Check that the component (B988) is not damaged and verify that there is continuity between pins: - 1 and 2 of B988 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for possible hydraulic / mechanical issue** • Switch OFF ignition and reconnect all connectors. • Check the correct hydraulic / mechanical operations of the B988 pressure switch (see relevant section).	**OK:** Go to **3**. **NOT OK:** • Replace the pressure switch.
3. **Check control module revision level** - Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** - Change the control module.

5.1.2.12 E011 - Diff-Lock Switch short circuit to Vbatt or stuck

NOTE: This error is shown if the switch is pressed for more than 3 sec.

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check for a short circuit to positive** • Disconnect the connector P74 of the control module (A330) and P304 connector of the Differential lock switch (S22). • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P304 between: - Pin 2 and ground **Specification** The voltage must be near to: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. Replace or repair as needed. • Check continuity between: - Pin 2 of P304 and pin 70 of P74 If there is not continuity, replace or repair as needed. • Check that the component (S22) is not damaged.
2. **Check control module revision level** • Switch OFF ignition. Reconnect all the connectors before disconnected • Download the correct software revision level on the control module, and verify that the system functions properly	**OK:** END of process. **NOT OK:** - Change the control module

5.1.2.13 E012 - Pressure Switch signal on Diff-Lock pipeline not correct at engine OFF

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check supply voltage signal on the instrument panel connector P74** • Disconnect the connector P74 of the control module (A330). • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P74 between: - Pin 29 and ground **Specification** Supply voltage of the pressure switch: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check that the pressure switch line fuse (F6) is OK. • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • Check for short to ground: Check continuity between: - Pin 29 of P74 and ground If there is continuity, repair or replace as needed. • Check for an open circuit. Check continuity between: - Pin 29 of P74 and F6 (pressure switch line fuse). If there is not continuity, repair or replace as needed. • Check that the components (B987) is not damaged and verify that there is continuity between pins: - 1 and 2 of B987 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for possible hydraulic / mechanical issue** • Switch OFF ignition. Reconnect all connectors. • Check the correct hydraulic / mechanical operations of the B987 pressure switch (see relevant section).	**OK:** Go to **3**. **NOT OK:** Replace the pressure switch.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** - Change the control module.

5.1.2.14 E013 - Pressure Switch signal on Diff-Lock pipeline not correct at engine ON (rpm > 700)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

NOTE: *This test must be done with brake pedals pressed (**AFTER KEY ON**).* 1. **Check supply voltage signal on the instrument panel connector P74** • Disconnect the connector P74 of the control module (A330). • Switch ON ignition and press the brake pedals. • Use a multimeter to check the supply voltage at connector P74 between: - Pin 29 and ground **Specification** Supply voltage of the pressure switch: …12 Volt	**OK:** Go to **2.** **NOT OK:** • Check that the pressure switch line fuse (F6) is OK. • • Check the leads and connecting points for bad, • widened, slid-back, or corroded (loose) contacts. • • Switch OFF ignition. Check for short to ground: Check continuity between: - Pin 29 of P74 and ground If there is continuity, repair or replace as needed. • Check for an open circuit. Check continuity between: - Pin 29 of P74 and F6 (pressure switch line fuse). If there is not continuity, repair or replace as needed. • Check that the components (B987) is not damaged and verify that there is continuity between pins: - 1 and 2 of B987 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for possible hydraulic / mechanical issue** • Switch OFF ignition. Reconnect all connectors. • Check the correct hydraulic / mechanical operations of the B987 pressure switch (see relevant section).	**OK:** Go to **3**. **NOT OK:** Replace the pressure switch.

3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** - Change the control module.

5.1.2.15 E014 - Cruise Control SET Switch short circuit to GND or stuck

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
NOTE: *This error can also be caused by prolonged pressure of button for more than 15 seconds.* 1. **Check of the engine speed 1 storage button** • Check that the engine speed 1 storage button (S992A) is not stuck. • Disconnect the connector P352 of the push button. • Check the absence of continuity on push button between: - pin 1 and 2	**OK:** Go to **2.** **NOT OK:** • Replace the push button.
2. **Check for short to ground** • Disconnect the connector P74. • Check the absence of continuity between: - pin 1 of P352 and ground	**OK:** Go to **3.** **NOT OK:** • Check connectors, pins and wiring. Repair or replace harness as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.16 E015 - Cruise Control UP Switch short circuit to GND or stuck

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**

NOTE: *This error can also be caused by prolonged pressure of button for more than 15 seconds.* 1. **Check of the engine speed up button** • Check that the engine speed up button (S994) is not stuck. • Disconnect the connector P354 of the push button. • Check the absence of continuity on push button between: - pin 1 and 2	**OK:** Go to **2.** **NOT OK:** • Replace the push button.
2. **Check for short to ground** • Disconnect the connector P74. • Check the absence of continuity between: - pin 1 of P354 and ground	**OK:** Go to **3.** **NOT OK:** • Check connectors, pins and wiring. Repair or replace harness as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.17 E016 - Cruise Control DOWN Switch short circuit to GND or stuck

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
NOTE: *This error can also be caused by prolonged pressure of button for more than 15 seconds.* 1. **Check of the engine speed down button** • Check that the engine speed down button (S993) is not stuck. • Disconnect the connector P353 of the push button. • Check the absence of continuity on push button between: - pin 1 and 2	**OK:** Go to **2.** **NOT OK:** • Replace the push button.

2. **Check for short to ground** • Disconnect the connector P74. • Check the absence of continuity between: - pin 1 of P353 and ground	**OK:** Go to **3.** **NOT OK:** • Check connectors, pins and wiring. Repair or replace harness as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.18 E017 - The Feedback of the Hi-Lo Valve is negative

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
NOTE: *This error can also be caused by simultaneous pressure of buttons for more than 15 seconds.* 1. **Check of the gear lever switches** • Check that the "Hi-Lo" gear lever switches (S300) are not damaged. • Disconnect the connector P500. • Check the absence of continuity on the contacts of the gear lever switches between: - pin 3 and 1 (Normally Open contact) - pin 3 and 2 (Normally Open contact)	**OK:** Go to **2.** **NOT OK:** • Replace the "Hi-Lo" gear lever switches.
2. **Check for short to positive** • Disconnect the connector P74. • Switch ON ignition. • Check the voltage between: - pin 3 of P500 and ground - pin 4 of P500 and ground **Specification:** Voltage on pin 3 and 4 of P500: ……0 Volt	**OK:** Go to **3.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.

3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.19 E018 - Hi-Lo HI Switch short circuit to Vbatt or stuck

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
NOTE: *This error can also be caused by prolonged pressure of button for more than 15 seconds.* 1. **Check of the gear lever switch** • Check that the "Hi" gear lever switch is not damaged. • Disconnect the connector P500. • Check the absence of continuity on the contact of the gear lever switch between: - pin 3 and 1 (Normally Open contact)	**OK:** Go to **2.** **NOT OK:** • Replace the "Hi" gear lever switch.
2. **Check for short to positive** • Disconnect the connector P74. • Switch ON ignition. • Check the voltage between: - pin 3 of P500 and ground **Specification:** Voltage on pin 3 of P500: ……0 Volt	**OK:** Go to **3.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
3. **Check for short to ground** • Switch OFF ignition. • Check the absence of continuity between: - pin 3 of P500 and ground	**OK:** Go to **4.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.

4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.20 E019 - Hi-Lo LO Switch short circuit to Vbatt or stuck

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
NOTE: *This error can also be caused by prolonged pressure of button for more than 15 seconds.* 1. **Check of the gear lever switch** • Check that the “Lo” gear lever switch is not damaged. • Disconnect the connector P500. • Check the absence of continuity on the contact of the gear lever switch between: - pin 3 and 2 (Normally Open contact)	**OK:** Go to **2.** **NOT OK:** • Replace the “Lo” gear lever switch.
2. **Check for short to positive** • Disconnect the connector P74. • Switch ON ignition. • Check the voltage between: - pin 4 of P500 and ground **Specification:** Voltage on pin 4 of P500: ……0 Volt	**OK:** Go to **3.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
3. **Check for short to ground** • Switch OFF ignition. • Check the absence of continuity between: - pin 4 of P500 and ground	**OK:** Go to **4.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.21 E020 - The Feedback of the PTO Safety Valve is negative

1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Change the control module.

E021 - The Feedback of the PTO Main Valve is negative

1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Change the control module.

E022 - Base control function call period not correct

NOTE: *Keep machine off for 15 minutes.* 1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Change the control module.

5.1.2.22 E023 - Inconsistent values of PTO activation Switch

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. Check supply voltage signal on PTO switch • Switch OFF ignition. • Disconnect the connector P657 of the switch (S350). • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P657 between: - pin 3 and ground - pin 4 and ground **Specification** Supply voltage of the switch: ……12 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check that the line fuse (F6) is OK. • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Check continuity between: - pin 3 of P657 and fuse F6 - pin 4 of P657 and fuse F6 If there is not continuity or the wiring is damaged, repair or replace harness as needed. • Check for short to ground. • Disconnect the connector P74 and P651. • Check continuity between: - pin 1 of P657 and ground - pin 2 of P657 and ground - pin 3 of P657 and ground - pin 4 of P657 and ground - pin 1 of P651 and ground - pin 2 of P651 and ground • If there is continuity, repair or replace harness as needed. ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. Check continuity on the PTO switch • Switch OFF ignition. • Use a multimeter to check the continuity on the component S350 between: *Switch not activated:* - pin 1 and 3 (no continuity) - pin 2 and 4 (continuity) *Switch activated:* - pin 1 and 3 (continuity) - pin 2 and 4 (no continuity)	**OK:** Go to **3.** **NOT OK:** • Replace switch.

3. Check wiring harness between P657 and P74 • Disconnect the connector P74. • Use a multimeter to check the continuity between: - pin 1 of P657 and pin 67 of P74 - pin 2 of P657 and pin 68 of P74 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*	**OK:** Go to **4.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
4. Check for short to positive between P657 and P74 • Disconnect the connector P651. • Switch ON ignition. • Check voltage between: - pin 1 of P657 and ground - pin 2 of P657 and ground ***NOTE:*** *The voltage on pins must be near 0 volts.*	**OK:** Go to **5.** **NOT OK:** • Repair or replace harness as needed.
5. Check control module revision level • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.23 E024 - Gear 540 Engaged signal under threshold

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check supply voltage signal on 540 PTO switch** • Disconnect the connector P343 of the switch B07B. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P343 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%) Typical value: ……4,7 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Check continuity between: - pin 36 of P74 and pin 1 of P343 - pin 74 of P74 and pin 2 of P343 • Also check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • If there is not continuity or the wiring is damaged, repair or replace harness as needed. • • Check for a short to ground. Check continuity between: - pin 1 of P343 and ground If there is continuity, repair or replace the wiring as needed. • • ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for correct resistance value** • Use a multimeter to check the resistance between: - pin 1 and pin 2 of the switch B07B **Specification** Resistance value must be near to: …1730 Ohm (±5%) ***NOTE:*** *The switch must be in open state (not operated).*	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Replace the switch.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module.

5.1.2.24 E025 - Gear 540 Engaged signal inconsistent

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check supply voltage signal on 540 PTO switch** • Disconnect the connector P343 of the switch B07B. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P343 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Also check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace harness as needed. • Check continuity on wiring between: - pin 36 of P74 and pin 1 of P343 ***NOTE:*** *During this test twist the wiring harness to find possible intermittent contacts.* - If there is not continuity or an intermittent contact is indicated, repair or replace as needed. ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for correct resistance value** • Use a multimeter to check that the resistance between pins 1 and 2 of the switch B07B is approximately: - 1730 Ohms (Switch not operated) (±5%) - 530 Ohms (Switch operated) (±5%)	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Replace the switch.
3. **Check for continuity** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Check continuity on wiring between: - pin 74 of P74 and pin 2 of P343 ***NOTE:*** *During this test twist the wiring harness to find possible intermittent contacts.* ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*	**OK:** Go to **4**. **NOT OK:** • If there is not continuity or an intermittent contact is indicated, repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module.

5.1.2.25 E026 - Gear 540 Engaged signal over threshold

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on 540 PTO switch** • Disconnect the connector P343 of the switch B07B. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P343 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Check for a short to positive. Check the voltage between: - pin 1 of P343 and ground If supply voltage is over 5 volts, check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace harness as needed.
2. **Check for short to positive (output signal)** • Use a multimeter to check the supply voltage at connector P343 (output signal) between: - pin 2 and ground **Specification** Voltage of the switch output signal: ……0 Volt	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Repair or replace the wiring harness as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Change the control module.

5.1.2.26 E027 - Gear 2ND Engaged signal under threshold

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on 540E/1000 PTO switch** • Disconnect the connector P344 of the switch B07A. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P344 between: - pin 1 and ground Specification Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2**. **NOT OK:** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Check continuity between: - pin 36 of P74 and pin 1 of P344 - pin 73 of P74 and pin 2 of P344 • Also check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • If there is not continuity or the wiring is damaged, repair or replace harness as needed. • Check for a short to ground. Check continuity between: - pin 1 of P344 and ground If there is continuity, repair or replace the wiring as needed. • ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for correct resistance value** • Use a multimeter to check the resistance between: - pin 1 and pin 2 of the switch B07A **Specification** Resistance value must be near to: ……1730 Ohms (±5%) ***NOTE:*** *The switch must be in open state (not operated).*	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Replace the switch.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.27 E028 - Gear 2ND Engaged signal inconsistent

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check supply voltage signal on 540E/1000 PTO switch** • Disconnect the connector P344 of the switch B07A. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P344 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Also check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace harness as needed. • Check continuity on wiring between: - pin 36 of P74 and pin 1 of P344 ***NOTE:*** *During this test twist the wiring harness to find possible intermittent contacts.* - If there is not continuity or an intermittent contact is indicated, repair or replace as needed. ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for correct resistance value** • Use a multimeter to check that the resistance between pins 1 and 2 of the switch B07A is approximately: - 1730 Ohms (Switch not operated) (±5%) - 530 Ohms (Switch operated) (±5%)	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Replace the switch.
3. **Check for continuity** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330) • Check continuity on wiring between: - pin 73 of P74 and pin 2 of P344 ***NOTE:*** *During this test twist the wiring harness to find possible intermittent contacts.*	**OK:** Go to **4**. **NOT OK:** • If there is not continuity or an intermittent contact is indicated, repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.28 E029 - Gear 2ND Engaged signal over threshold

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on 540E/1000 PTO switch** • Disconnect the connector P344 of the switch B07A. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P344 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Check for a short to positive. Check the voltage between: - pin 1 of P344 and ground • If supply voltage is over 5 volts, check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace harness as needed.
2. **Check for short to positive (output signal)** • Use a multimeter to check the supply voltage at connector P344 (output signal) between: - pin 2 and ground **Specification** Voltage of the switch output signal: ……0 Volt	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Repair or replace the wiring harness as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.29 E030 - Engaged Gear Speed detection failure

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check correct resistance of the PTO speed switches selection** • Disconnect the connectors P343 and P344. • Use a multimeter to check the resistance between: - pin 1 and 2 of B07B (switch not operated) - pin 1 and 2 of B07A (switch not operated) **Specification:** Resistance (switches not operated): ……1730 Ohms (±5%) • Use a multimeter to check the resistance between: - pin 1 and 2 of B07B (switch operated) - pin 1 and 2 of B07A (switch operated) **Specification** Resistance (switches operated): ……530 Ohms (±5%)	**OK:** Go to **2.** **NOT OK:** • Replace the faulty switch.
2. **Check wiring harness, connectors and mechanical parts of the system** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Check for mechanical issues on PTO speed selection system.	**OK:** Go to **3.** **NOT OK:** • Repair or replace harness, connectors or mechanical part as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.30 E031 - Direct Mode Engaged signal under threshold

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check supply voltage signal on direct PTO selector switch** • Disconnect the connector P342 of the switch S21B. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P342 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK**: Go to **2**. **NOT OK:** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Check continuity between: - pin 36 of P74 and pin 1 of P342 - pin 75 of P74 and pin 2 of P342 • Also check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • If there is not continuity or the wiring is damaged, repair or replace harness as needed. • Check for a short to ground. Check continuity between: - pin 1 of P342 and ground If there is continuity, repair or replace the wiring as needed. ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for correct resistance value** • Use a multimeter to check the resistance between: - pin 1 and pin 2 of the switch S21B **Specification** Resistance value must be near to: ……1730 Ohms (±5%) ***NOTE:*** *The switch must be in open state (not operated).*	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Replace the switch.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.31 E032 - Direct Mode Engaged signal inconsistent

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on direct PTO selector switch** • Disconnect the connector P342 of the switch S21B. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P342 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Also check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace harness as needed. • Check continuity on wiring between: - pin 36 of P74 and pin 1 of P342 ***NOTE:*** *During this test twist the wiring harness to find possible intermittent contacts.* If there is not continuity or an intermittent contact is indicated, repair or replace as needed. ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for correct resistance value** • Use a multimeter to check that the resistance between pins 1 and 2 of the switch S21B is approximately: - 1730 Ohms (±5%) (Switch not operated) - 530 Ohms (±5%) (Switch operated)	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Replace the switch.
3. **Check for continuity** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Check continuity on wiring between: - pin 75 of P74 and pin 2 of P342 ***NOTE:*** *During this test twist the wiring harness to find possible intermittent contacts.*	**OK:** Go to **4**. **NOT OK:** • If there is not continuity or an intermittent contact is indicated, repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.32 E033 - Direct Mode Engaged signal over threshold

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on direct PTO selector switch** • Disconnect the connector P342 of the switch S21B. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P342 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Check for a short to positive. Check the voltage between: - pin 1 pf P342 and ground If supply voltage is over 5 volts, check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • • Repair or replace harness as needed.
2. **Check for short to positive (output signal)** • Use a multimeter to check the supply voltage at connector P342 (output signal) between: - pin 2 and ground **Specification** Voltage of the switch output signal: ……0 Volt	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Repair or replace the wiring harness as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.33 E034 - GD Mode Engaged signal under threshold

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on ground PTO selector switch** • Disconnect the connector P341 of the switch S21A. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P341 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2**. **NOT OK:** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Check continuity between: - pin 36 of P74 and pin 1 of P341 - pin 76 of P74 and pin 2 of P341 • Also check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • If there is not continuity or the wiring is damaged, repair or replace harness as needed. • Check for a short to ground. Check continuity between: - pin 1 of P341 and ground If there is continuity, repair or replace the wiring as needed. ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for correct resistance value** • Use a multimeter to check the resistance between: - pin 1 and pin 2 of the switch S21A **Specification** Resistance value must be near to: ……1730 Ohms (±5%) ***NOTE:*** *The switch must be in open state (not operated).*	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Replace the switch.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.34 E035 - GD Mode Engaged signal inconsistent

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check supply voltage signal on ground PTO selector switch** • Disconnect the connector P341 of the switch S21A. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P341 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330). • Also check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Repair or replace harness as needed. • Check continuity on wiring between: - pin 36 of P74 and pin 1 of P341 ***NOTE:*** *During this test twist the wiring harness to find possible intermittent contacts.* • If there is not continuity or an intermittent contact is indicated, repair or replace as needed. ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*
2. **Check for correct resistance value** • Use a multimeter to check that the resistance between pins 1 and 2 of the switch S21A is approximately: - 1730 Ohms (±5%) (Switch not operated) - 530 Ohms (±5%) (Switch operated)	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Replace the switch.
3. **Check for continuity** • Switch OFF ignition. • Disconnect connector P74 of the control module (A330) • Check continuity on wiring between: - pin 76 of P74 and pin 2 of P341 ***NOTE:*** *During this test twist the wiring harness to find possible intermittent contacts.*	**OK:** Go to **4**. **NOT OK:** • If there is not continuity or an intermittent contact is indicated, repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.35 E036 - GD Mode Engaged signal over threshold

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on ground PTO selector switch** • Disconnect the connector P341 of the switch S21A. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P341 between: - pin 1 and ground **Specification** Supply voltage of the switch: ……5 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Check for a short to positive. Check the voltage between: - pin 1 of P341 and ground • If supply voltage is over 5 volts, check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • • Repair or replace harness as needed.
2. **Check for short to positive (output signal)** • Use a multimeter to check the supply voltage at connector P341 (output signal) between: - pin 2 and ground **Specification** Voltage of the switch output signal: ……0 Volt	**OK:** Go to **3**. **NOT OK:** • Switch OFF ignition. • Repair or replace the wiring harness as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.36 E037 - Engaged Mode detection failure

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check correct resistance of the PTO switches selection** • Disconnect the connectors P341 and P342. • Use a multimeter to check the resistance between: - pin 1 and 2 of S21A (switch not operated) - pin 1 and 2 of S21B (switch not operated) **Specification:** Resistance (switches not operated): ……1730 Ohms (±5%) • Use a multimeter to check the resistance between: - pin 1 and 2 of S21A (switch operated) - pin 1 and 2 of S21B (switch operated) **Specification** Resistance (switches operated): ……530 Ohms (±5%)	**OK:** Go to **2.** **NOT OK:** • Replace the faulty switch.
2. **Check wiring harness, connectors and mechanical parts of the system** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Check for mechanical issues on PTO selection system.	**OK:** Go to **3.** **NOT OK:** • Repair or replace harness, connectors or mechanical part as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.37 E041 - PTO pressure switch open signal failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check the voltage on pressure switch B350** • Disconnect the connector P652 of the pressure switch (B350). • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P652 between: - pin 1 and ground **Specification:** Voltage on pin 1: ……12 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check the presence of the continuity between: - pin 1 and fuse (F6) • Check for short to ground. Check the absence of continuity between: - pin 1 of P652 and ground • Check connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
2. **Check pressure switch B350** • Use a multimeter to check the presence of continuity on pressure switch B350 between: - pin 1 and 2 ***NOTE:*** *Switch is normally closed.* ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **3.** **NOT OK:** • Replace the pressure switch.
3. **Check continuity between P652 and P74** • Disconnect the connector P74 of the instrument panel (A330). • Use a multimeter to check the presence of continuity between: - pin 2 of P652 and 72 of P74 • Check for short to ground. Check the absence of continuity between: - pin 2 of P652 and ground ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **4.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
4. **Check that the pressure switch is not damaged doing hydraulic and mechanical tests (see relevant section)**	**OK:** Go to **5.** **NOT OK:** • Replace the pressure switch.

5. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.38 E042 - PTO pressure switch closed signal failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check for short to positive** • Disconnect the connector P652 of the pressure switch (B350). • Switch ON ignition. • Use a multimeter to check the voltage at connector P652 between: - pin 2 and ground **Specification:** Voltage on pin 2: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
2. **Check that the pressure switch is not damaged doing hydraulic and mechanical tests (see relevant section)**	**OK:** Go to **3.** **NOT OK:** • Replace the pressure switch.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.39 E043 - PTO Safety Valve stuck open

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check supply voltage signal on Y350 PTO safety valve** • Disconnect the connector P655 of the safety valve (Y350). • Switch ON ignition. • Use a multimeter to check the voltage at connector P655 between: - pin 1 and 2 **Specification:** Voltage on the safety valve: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Disconnect the connectors P74. • Check for short to positive. • Switch ON ignition. • Check the voltage between: • pin 1 of P655 and ground **Specification:** Voltage on pin 1 of P655: ……0 Volt • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
2. **Check that the safety valve is not damaged doing hydraulic and mechanical tests (see relevant section)**	**OK:** Go to **3.** **NOT OK:** • Replace the safety valve.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.40 E044 - PTO Main Valve stuck open

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on Y04 PTO main valve** • Disconnect the connector P651 of the main valve (Y04). • Switch ON ignition. • Use a multimeter to check the voltage at connector P651 between: - pin 1 and 2 **Specification:** Voltage on the main valve: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Check that relay K7 (in main relay box) is not damaged, and check supply line of relay. • Check for short to positive. Check the voltage between: - pin 1 of P651 and ground **Specification:** Voltage on pin 1 of P651: ……0 Volt • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
2. **Check that the main valve is not damaged doing hydraulic and mechanical tests (see relevant section)**	**OK:** Go to **3.** **NOT OK:** • Replace the main valve.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.41 E045 - PTO Clutch low pressure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
NOTE: *Before starting with checks, verify the hydraulic circuit**.*** 1. **Check for short to positive** • Disconnect the connector P652 of the pressure switch (B350). • Switch ON ignition. • Use a multimeter to check the voltage at connector P652 between: - pin 2 and ground **Specification:** Voltage on pin 2: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.

2. **Check that the pressure switch is not damaged doing hydraulic and mechanical tests (see relevant section)**	**OK:** Go to **3.** **NOT OK:** • Replace the pressure switch.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.42 E046 - PTO Output Shaft Speed signal failure

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

NOTE: *Before starting with checks, verify the correct operation of the tachometer and that the clutch does not slip.* 1. **Check the supply voltage on sensor B980** • Disconnect the connector P654 of the sensor (B980). • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P654 between: - pin 3 and 2 **Specification:** Supply voltage on the sensor: ……12 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check that the line fuse (F6) is OK. • Check the presence of continuity between: • pin 3 of P654 and fuse F6 • pin 2 of P654 and ground • Check for short to ground. Check the absence of continuity between: • pin 3 of P654 and ground • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed. ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*

2. **Check wiring harness between P654 and P74** • Switch OFF ignition. • Disconnect the connector P74. • Use a multimeter to check the presence of continuity between: - pin 1 of P654 and pin 56 of P74 • Check for short to ground. Check the absence of continuity between: - pin 1 of P654 and ground • Check for short to positive. • Switch ON ignition. • Check the voltage between: - pin 1 of P654 and ground **Specification:** Voltage on pin 1 of P654: ……0 Volt ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **3.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.
3. **Check of the sensor** • Check that the sensor is not damaged. • Remove the sensor from work location. • Connect the connector P654 to the sensor. • Check the voltage between: - pin 2 and 1 of P654 **Specification:** Voltage between pin 2 and 1: ……4,7 Volt (±5%)	**OK:** Go to **4.** **NOT OK:** • Replace the sensor.
4. **Check of the mechanical component (pulse wheel)** • Verify that the pulse wheel is not damaged and that it is correctly assembled.	**OK:** Go to **5.** **NOT OK:** • Repair or replace mechanical component.
5. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.43 E047 - Cruise Control SET2 Switch short circuit to GND or stuck

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
NOTE: *This error can also be caused by prolonged pressure of button for more than 15 seconds.* 1. **Check of the engine speed 2 storage button** • Check that the engine speed 2 storage button (S992B) is not stuck. • Disconnect the connector P495 of the push button. • Check the absence of continuity on push button between: - pin 1 and 2	**OK:** Go to **2.** **NOT OK:** • Replace the push button.
2. **Check for short to ground** • Disconnect the connector P74. • Check the absence of continuity between: - pin 1 of P495 and ground	**OK:** Go to **3.** **NOT OK:** • Check connectors, pins and wiring. Repair or replace harness as needed.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.44 E141 - EEPROM corrupted

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.45 E142 - MMC to SMC communication error

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on P74 connector** • Disconnect the P74 connector from instrument panel control module A330. • Switch ON ignition. • Use a multimeter to check the supply voltage on P74 connector between: - pin 1 and 20 - pin 2 and 20 - pin 21 and 20 **Specification:** Supply voltage: ……12 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Only if voltage is low use a multimeter to check the voltage on battery between: - positive pole and negative pole **Specification:** Supply voltage: ……12 Volt (±10%) If the voltage is not as per specification: • Replace or recharge the battery as needed. • Switch OFF ignition. • Check that the line fuses F7 and F8 are OK. If any fuse is broken, check for short to ground on affected line of the circuit. • Check the presence of continuity between: - pin 1 of P74 and fuse F8 pin A - pin 21 of P74 and fuse F8 pin A - pin 2 of P74 and fuse F7 pin A - pin 20 of P74 and the negative pole of the battery ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.* • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harnesses as needed.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.46 E143 - MMC and SMC SW version are different

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.47 E144 - MMC dead or not responding

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check supply voltage signal on P74 connector** • Disconnect the P74 connector from instrument panel control module A330. • Switch ON ignition. • Use a multimeter to check the supply voltage on P74 connector between: - pin 1 and 20 - pin 2 and 20 - pin 21 and 20 **Specification:** Supply voltage: ……12 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Only if voltage is low use a multimeter to check the voltage on battery between: - positive pole and negative pole **Specification:** Supply voltage: ……12 Volt (±10%) If the voltage is not as per specification: • Replace or recharge the battery as needed. • Switch OFF ignition. • Check that the line fuses F7 and F8 are OK. If any fuse is broken, check for short to ground on affected line of the circuit. • Check the presence of continuity between: - pin 1 of P74 and fuse F8 pin A - pin 21 of P74 and fuse F8 pin A - pin 2 of P74 and fuse F7 pin A - pin 20 of P74 and the negative pole of the battery ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.* • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harnesses as needed.

2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.2.48 E145 - Error on CAN BUS

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the value of CAN bus resistance on diagnosis socket** • Switch OFF ignition. • Use a multimeter to check the value of CAN bus resistance on diagnosis socket (J62 connector) between: - pin 3 and 4 **Specification:** CAN bus resistance: ……60 Ohms (±5%)	**OK:** Go to **2.** **NOT OK:** • Disconnect the CAN bus terminator (A050) from J63 connector and use a multimeter to check the value of resistance on terminator between: - pin A and B If resistance does not respect the specific: • Replace resistance. **Specification:** CAN bus resistance: ……120 Ohms (±5%) • Disconnect the connectors P647 and P74. • Check the absence of continuity between: - pin 19 and 38 of P74 • Check the presence of continuity between: - pin 19 of P74 and any pins of the CAN-H line - pin 38 of P74 and any pins of the CAN-L line ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.* • Check for short to ground. Check the absence of continuity between: - pin 19 of P74 and ground - pin 38 of P74 and ground • Check for short to positive. • Switch ON ignition. • Check the voltage between: - pin 19 of P74 and ground - pin 38 of P74 and ground **Specification:** Voltage on pin 19 and 38: ……0 Volt • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harnesses as needed.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.49 E152 - Front PTO HSD Feedback error

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage of the front PTO relay K7 in the main relay box** • Disconnect the connector P313 of the main relay box RB. • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P313 between pins: - 7_85 and 7_86 **Specification** Supply voltage of front PTO relay: ……5 Volt	**OK:** Go to **2.** **NOT OK:** • Check the leads and connecting points for bad, widened, slid-back, or corroded (loose) contacts. • Switch OFF ignition. Check for short to ground. Check continuity between pin: - 7_86 of P313 and ground • If continuity is detected, repair or replace if needed. • Check that the component K7, front PTO relay, is not damaged.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.50 E154 - Wheel Speed Sensor Out of Range

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

NOTE: *Before starting with checks verify the correct operation of the tachometer and that the clutch does not slip.* 1. **Check the supply voltage on sensor B06** • Disconnect the connector P357 of the sensor (B06). • Switch ON ignition. • Use a multimeter to check the supply voltage at connector P357 between: - pin 2 and 3 **Specification:** Supply voltage on the sensor: ……12 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check that the line fuse (F4) is OK. • Check the presence of continuity between: • pin 3 of P357 and fuse F4 • pin 2 of P357 and ground • Check for short to ground. Check the absence of continuity between: • pin 3 of P357 and ground • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed. ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*
2. **Check wiring harness between P357 and P74** • Switch OFF ignition. • Disconnect the connector P74. • Use a multimeter to check the presence of continuity between: - pin 1 of P357 and pin 49 of P74 • Check for short to ground. Check the absence of continuity between: - pin 1 of P357 and ground • Check for short to positive. • Switch ON ignition • Check the voltage between: - pin 1 of P357 and ground **Specification:** Voltage on pin 1 of P357: …….0 Volt ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **3.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harness as needed.

3. **Check of the sensor** • Check that the sensor is not damaged. • Remove the sensor from work location. • Connect the connector P357 to the sensor. • Check the voltage between: - pin 2 and 1 of P357 **Specification:** Voltage on sensor: ……4,7 Volt (±5%)	**OK:** Go to **4.** **NOT OK:** • Replace the sensor.
4. **Check of the mechanical component (pulse wheel)** • Verify that the pulse wheel is not damaged and that it is correctly assembled.	**OK:** Go to **5.** **NOT OK:** • Repair or replace mechanical component.
5. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.2.51 Driver Seat Switch stuck

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check supply voltage of S40 – Seat switch** • Disconnect the connector P355 of the seat switch. • Switch ON ignition. • Use a multimeter to check the voltage between: – Pin 1 of (P355) and ground **Specification** Supply voltage: ……12 Volt	**OK:** Go to **2.** **NOT OK:** Check that the fuse F8 (FB) is not damaged. Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. Repair or replace if needed.

2. **Check for continuity** • Switch OFF ignition. • Disconnect the connector P74 from the A330 control unit. • Use a multimeter to check the continuity between: - Pin 1 of (P355) and pin F8a of (FB) - Pin 2 of (P355) and pin 48 of (P74) **Specification** Continuity: ……Present ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **3**. **NOT OK:** Refer to schematic. Repair or replace the circuit if needed.
3. **Check for short to positive** • Use a multimeter to check the voltage between: - Pin 48 of (P74) and ground **Specification** Supply voltage: ……0 Volt	**OK:** Go to **4**. **NOT OK:** Refer to schematic. Repair or replace the circuit if needed.
4. **Check for short to ground** • Use a multimeter to check the absence of continuity between: - Pin 1 of (P355) and ground - Pin 2 of (P355) and ground **Specification** Continuity: ……Absent	**OK:** Go to **5**. **NOT OK:** Refer to schematic. Repair or replace the circuit if needed.
5. **Check component** • Check that the component seat switch S40 is not damaged and functions properly.	**OK:** End of test. **NOT OK:** Repair or replace as needed.

5.1.3. DTCs – Transmission Control Unit (TCU)

5.1.3.1 E060 - Transmission Electronic Control Unit internal failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.2 E061 - Transmission Electronic Control Unit internal failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.3 E063 - FLASH MEMORY calibration parameters corruption

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the clutch pedal and pressure sensors** • Use the electronic tool to reset the parameters: - clutch pedal - forward high pressure sensor - forward low pressure sensor - reverse pressure sensor	If the problem is not resolved, before replacing the transmission ECU, download the correct software revision level, and verify that the system functions properly. If the system does not function properly: • Replace the control module • Remake the calibration of the parameters

5.1.3.4 E064 - FLASH MEMORY writing failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Calibration of the clutch pedal and pressure sensors** • Use the electronic tool to reset the parameters: - clutch pedal - forward high pressure sensor - forward low pressure sensor - reverse pressure sensor	If the problem is not resolved, before replacing the transmission ECU, download the correct software revision level, and verify that the system functions properly. If the system does not function properly: • Replace the control module • Remake the calibration of the parameters

5.1.3.5 E066 - Transmission Electronic Control Unit supply voltage is under 9V

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage signal on the transmission control unit** • Disconnect the connector P647 of the transmission control unit (A320). • Switch ON ignition. • Use a multimeter to check the supply voltage on P647 connector between: - pin 1 and 29 - pin 8 and 29 - pin 34 and 29 - pin 35 and 29 - pin 36 and 29 **Specification:** Supply voltage: ……12 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Only if voltage is low, use a multimeter to check the voltage on battery between: - The positive pole and the negative pole **Specification:** Supply voltage: ……12 Volt (±5%) • If the voltage is not as per specification, replace or recharge the battery as needed. • Switch OFF ignition. • Check that the line fuses F7 and F8 are OK. • If any fuse is broken, check for short to ground on affected line of the circuit. • Check the presence of continuity between: - pin 1 and fuse F8 - pin 8 and fuse F7 - pin 34 and fuse F7 - pin 35 and fuse F7 - pin 36 and fuse F7 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.* • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harnesses as needed.

2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.6 E067 - Transmission Electronic Control Unit supply voltage is over 16V

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the alternator** • Start the vehicle. • Use a multimeter to check the supply voltage on battery between: - The positive pole and the negative pole **Specification:** Supply voltage on battery: ……14 Volt (±5%)	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Repair or replace the alternator.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.7 E068 - Sensor supply voltage is under 4.5V

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check for short to ground** • Disconnect connectors P647, P644, P642 and P643. • Use a multimeter to check the absence of continuity on P647 between: - pin 15 and ground	**OK:** Go to **2.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harnesses as needed.

2. **Check supply voltage signal on pressure sensors** • Connect the transmission control unit connector P647. • Switch ON ignition. • Use a multimeter to check the voltage on connectors P644, P642 and P643 between: - pin 3 and 1 **Specification:** Voltage on the pressure sensors: ……5 Volt (±5%)	**OK:** Go to **3.** **NOT OK:** • Switch OFF ignition. • Check the pressure sensors for failure. Connect the P644 connector to its pressure sensor. • Switch ON ignition and check the voltage on connector P642 or P643 between: • pin 3 and 1 • Switch OFF ignition and disconnect connector P644 and connect P642 to its pressure sensor. • Switch ON ignition and check the voltage on connector P644 or P643 between: • pin 3 and 1 • Switch OFF ignition and disconnect connector P642 and connect P643 to its pressure sensor. • Switch ON ignition and check the voltage on connector P644 or P642 between: • pin 3 and 1 **Specification:** Voltage on the pressure sensors: ……5 Volt (±5%) If the voltage is not as per specification, replace pressure sensor damaged and do calibration of parameters.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.8 E069 - Sensor supply voltage is over 5.5V

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check for short on positive** • Disconnect connectors P647, P644, P642 and P643. • Switch ON ignition. • Use a multimeter to check the voltage on P647 connector between: - pin 15 and ground **Specification:** Voltage on pin 15: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, bent pins or line breaks. • Repair or replace harnesses as needed.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.9 E070 - Overcurrent detected on Forward Low Clutch

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check the solenoid of the forward low solenoid valve** • Disconnect connector P635 from forward low solenoid valve (Y52). • Use a multimeter to check on the forward low solenoid valve the solenoid resistance between: - pin 1 and 2 **Specification:** Solenoid resistance: ……2,2 Ohm (±5%)	**OK:** Go to **2.** **NOT OK:** • Replace forward low solenoid valve.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.10 E071 - Overcurrent detected on Forward High or Reverse clutch

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the solenoids of the forward high and reverse solenoid valves** • Disconnect connectors P636 from forward high valve (Y53) and P637 from reverse valve (Y51). • Use a multimeter to check on both valves the solenoid resistance between: - pin 1 and 2 **Specification:** Solenoid resistance: ……2,2 Ohm (±5%)	**OK:** Go to **2.** **NOT OK:** • Replace damaged solenoid valve.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.11 E072 - Overcurrent detected on main ring valve HS supply pin

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the solenoid of the main ring valve** • Disconnect the P638 connector from main ring valve (Y300). • Use a multimeter to check on the valve the solenoid resistance between: - pin 1 and 2 **Specification:** Solenoid resistance: ……8 Ohm (±5%)	**OK:** Go to **2.** **NOT OK:** • Replace main ring valve.
2. **Check for short to ground** • Disconnect the transmission control unit connector P647. • Check the absence of continuity on connector P647 between: - pin 39 and ground	**OK:** Go to **3.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harnesses as needed.

3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.12 E073 - All outputs overcurrent

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.13 E074 - FNR Lever is applying Forward and Reverse signals simultaneously to Transmission Electronic Control Unit

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check FNR lever** • Disconnect connector P787 from the FNR lever (B64). • Check FNR lever contacts. • With FNR lever in neutral position, use a multimeter to check the absence of continuity between: - pin 2 (N) and 3 (F) - pin 2 (N) and 4 (R) - pin 3 (F) and 4 (R)	**OK:** Go to **2.** **NOT OK:** • Replace FNR lever.
2. **Check continuity** • Disconnect the transmission control unit connector P647. • Check on connector P647 the absence of continuity between: - pin 18 and 19	**OK:** Go to **3.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.

3. **Check for short to positive** • Switch ON ignition. • Check the voltage on connector P647 between: - pin 18 and ground - pin 19 and ground **Specification:** Voltage on pins 18 and 19: ……0 Volt	**OK:** Go to **4.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.14 E075 - FNR Lever is applying Forward and Neutral signals simultaneously to Transmission Electronic Control Unit

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check FNR lever** • Disconnect connector P787 from the FNR lever (B64). • Check FNR lever contacts. • With FNR lever in neutral position, use a multimeter to check the absence of continuity between: - pin 2 (N) and 3 (F) - pin 2 (N) and 4 (R) - pin 3 (F) and 4 (R)	**OK:** Go to **2.** **NOT OK:** • Replace FNR lever.
2. **Check continuity** • Disconnect the transmission control unit connector P647. • Check on connector P647 the absence of continuity between: - pin 18 and 46	**OK:** Go to **3.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.

3. **Check for short to positive** • Switch ON ignition. • Check the voltage on connector P647 between: - pin 18 and ground - pin 46 and ground **Specification:** Voltage on pins 18 and 46: ……0 Volt	**OK:** Go to **4.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.15 E076 - FNR Lever is applying Neutral and Reverse signals simultaneously to Transmission Electronic Control Unit

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check FNR lever** • Disconnect connector P787 from the FNR lever (B64). • Check FNR lever contacts. • With FNR lever in neutral position, use a multimeter to check the absence of continuity between: - pin 2 (N) and 3 (F) - pin 2 (N) and 4 (R) - pin 3 (F) and 4 (R)	**OK:** Go to **2.** **NOT OK:** • Replace FNR lever.
2. **Check continuity** • Disconnect the transmission control unit connector P647. • Check on connector P647 the absence of continuity between: - pin 19 and 46	**OK:** Go to **3.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.

3. **Check for short to positive** • Switch ON ignition. • Check the voltage on connector P647 between: - pin 19 and ground - pin 46 and ground **Specification:** Voltage on pins 19 and 46: ……0 Volt	**OK:** Go to **4.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.16 E077 - FNR Lever is applying simultaneously Forward, Neutral and Reverse signals to Transmission Electronic Control Unit

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check FNR lever** • Disconnect connector P787 from the FNR lever (B64). • Check FNR lever contacts. • With FNR lever in neutral position, use a multimeter to check the absence of continuity between: - pin 2 (N) and 3 (F) - pin 2 (N) and 4 (R) - pin 3 (F) and 4 (R)	**OK:** Go to **2.** **NOT OK:** • Replace FNR lever.
2. **Check continuity** • Disconnect the transmission control unit connector P647. • Check on connector P647 the absence of continuity between: - pin 18 and 19 - pin 18 and 46 - pin 19 and 46	**OK:** Go to **3.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.

3. **Check for short to positive** • Switch ON ignition. • Check the voltage on connector P647 between: - pin 18 and ground - pin 19 and ground - pin 46 and ground **Specification:** Voltage on pins 18, 19 and 46: ……0 Volt	**OK:** Go to **4.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.17 E078 - PWM benches supplied with FNR lever in Neutral position or clutch pedal completely pressed

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check for short to positive** • Disconnect the transmission control unit connector P647. • Disconnect PWM ENABLER relay (K995). • Switch ON ignition. • Use a multimeter to check the voltage on PWM ENABLER connection side between: - pin 87A and ground **Specification:** Voltage on pin 87A of PWM ENABLER: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
2. **Check PWM ENABLER relay (K995)** • Check relay contacts: - Check the presence of continuity between pin 30 and 87A - Check the absence of continuity between pin 30 and 87 **Specification:** Contacts 30 and 87A: ……normally closed Contacts 30 and 87: ……normally open	**OK:** Go to **3.** **NOT OK:** • Replace relay.

3. **Check supply voltage on PWM ENABLER connection side** • With clutch pedal completely pressed and FNR lever in forward or reverse position, check the supply voltage of the relay between: - pin 85 and 86 • With clutch pedal not pressed and FNR lever in neutral position, check the supply voltage of the relay between: - pin 85 and 86 • Check the voltage between: - pin 85 and 30 **Specification:** Supply voltage of PWM ENABLER: ……12 Volt (±5%)	**OK:** Go to **9.** **NOT OK:** If there is not voltage with clutch pedal completely pressed, go to **4**. If there is not voltage with FNR lever in neutral position, go to **5**. If there is not voltage at all, go to **6**. If there is voltage between pins 85 and 30, go to **7**.
4. **Check clutch pedal end stroke switch** • Switch OFF ignition. • Disconnect connector P665 (MECHANICAL VERSION) / P628 (POWER REVERSER VERSION) from the clutch pedal end stroke switch (S72A / S72B). • Check clutch pedal end stroke contacts. Check the absence of continuity between: - pin 1 and 2 **Specification:** Contacts 1 and 2: ……normally open	**OK:** Go to **8.** **NOT OK:** • Replace clutch pedal end stroke.
5. **Check FNR lever** • Switch OFF ignition. • Disconnect connector P787 from the FNR lever (B64). • Check FNR lever contacts. Check the continuity between: - pin 1 (COM) and 2 (N) ***NOTE:*** *There must be continuity only if FNR lever is in neutral position.*	**OK:** Go to **8.** **NOT OK:** • Replace FNR lever.

6. **Check ground cable** • Check the presence of continuity between: - pin 85 (on PWM ENABLER connection side) and ground ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*	**OK:** Go to **7.** **NOT OK:** • Check wirings to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or line breaks. • Repair or replace as needed.
7. **Check for short to ground** • Check for short to ground. Check the absence of continuity between: - pin 86 (on PWM ENABLER connection side) and ground	**OK:** Go to **8.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or line breaks. • Repair or replace as needed.
8. **Check wiring harness** • Check the presence of continuity between: - pin 86 of PWM ENABLER and pin 2 of P665 (MECHANICAL VERSION) / P628 (POWER REVERSER VERSION) - pin 87A of PWM ENABLER and any of the pins 2, 5, 30, 31, 32 or 33 of P647 ***Attention:*** *Connect red end-piece on PWM ENABLER and black end-piece on P665 (MECHANICAL VERSION) / P628 (POWER REVERSER VERSION) and P647.* ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohms.*	**OK:** Go to **9.** **NOT OK:** • Check wirings to detect the presence of broken diodes, broken connectors, slid-back or corroded contacts, bent pins or line breaks. • Repair or replace as needed.
9. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.18 E080 - Clutch pedal angular sensor output voltage is too high

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check for short positive on the sensor output** • Disconnect the transmission control unit connector P647 and the clutch pedal position sensor connector P626. • Check for short to positive. Switch ON ignition. Use a multimeter to check the voltage on connector P626 between: - pin 3 and ground **Specification:** Voltage on pin 3 of P626: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission ECU, replace the angular sensor and clear the fault code. If the fault code reappears, replace the control module.

E081 - Clutch pedal angular sensor output voltage is too low

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check for short ground on the sensor output** • Disconnect the transmission control unit connector P647 and the clutch pedal position sensor connector P626. • Use a multimeter to check the absence of continuity on connector P626 between: - pin 3 and ground	**OK:** Go to **2.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
2. **Check the line resistance** • Check the line resistance between: - pin 3 of P626 and pin 16 of P647 **Specification:** Line resistance near to: ……0 Ohm	**OK:** Go to **3.** **NOT OK:** • Check wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.

3. **Check the supply voltage of the angular sensor** • Switch ON ignition. • Check the supply voltage on connector P626 between: - pin 1 and 2 **Specification:** Supply voltage of the position sensor: ……12 Volt (±5%)	**OK:** Go to **4.** **NOT OK:** • Check the supply cables to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission ECU, replace the angular sensor and clear the fault code. If the fault code reappears, replace the control module.

5.1.3.19 E082 - Clutch pedal angular sensor signal is under stroke minimum value (lower than 100 digit)

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the clutch pedal position sensor B65** • Use the electronic tool to reset the parameters of the clutch pedal position sensor.	If the problem is not resolved, before replacing the transmission ECU, download the correct software revision level, and verify that the system functions properly. If the system does not function properly: • Replace the control module • Remake the calibration of the parameters

5.1.3.20 E083 - Clutch pedal angular sensor signal is over stroke maximum value (higher than 990 digit)

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Calibration of the clutch pedal position sensor B65** • Use the electronic tool to reset the parameters of the clutch pedal position sensor.	If the problem is not resolved, before replacing the transmission ECU, download the correct software revision level, and verify that the system functions properly. If the system does not function properly: • Replace the control module • Remake the calibration of the parameters

5.1.3.21 E084 - Clutch pedal angular sensor and switch signals are not consistent (switch pressed signal at stroke over 20% or switch not pressed signal at 0% of stroke)

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the clutch pedal position sensor B65** • Use the electronic tool to reset the parameters of the clutch pedal position sensor.	If the problem is not resolved, before replacing the transmission ECU, download the correct software revision level, and verify that the system functions properly. If the system does not function properly: • Replace the control module • Remake the calibration of the parameters

5.1.3.22 E085 - Differential pressure presence detected without engine being on

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check that the connector P624 is connected to the oil filter clogged switch B73**	**OK:** Go to **2.** **NOT OK:** • Reconnect the connector.

2. **Check the line voltage** • Disconnect the connector P624 from oil filter clogged sensor. • Switch ON ignition. • Use a multimeter to check the voltage on connector P624 between: - pin 1 and ground **Specification:** Voltage between pin 1 and ground: …12 Volt (±5%)	**OK:** Go to **4.** **NOT OK:** If there is no voltage at all, go to **3**. If there is voltage, but it is not as per specification: • Check the wirings to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
3. **Check the fuse** • Switch OFF ignition. • Check the line fuse F7.	**OK:** Check the wirings to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. Repair or replace as needed. **NOT OK:** Before replacing the fuse F7, check for short to ground. • Check the absence of continuity between: • pin 1 of P624 and ground • pin 2 of P624 and ground • Check the wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
4. **Check the oil filter clogged sensor contacts** • Check the presence of continuity between the sensor contacts: - pin 1 and 2 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **5.** **NOT OK:** • Replace the sensor.
5. **Check the continuity** • Disconnect the transmission control unit connector P647. • Switch OFF ignition. • Check the presence of continuity between: - pin 1 of P624 and fuse F7 - pin 2 of P624 and pin 49 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **6.** **NOT OK:** • Check the wirings to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.

6. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.23 E086 - Differential pressure detected on filter with engine on and oil temperature over 20°C

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check oil filter** • Turn OFF engine. • Switch ON ignition. • Check if error code E085 is displayed.	**OK (error code E085 is displayed):** Go to **2.** **NOT OK (error code E085 is not displayed):** • Replace oil cartridge.
2. **See error code E085**	

5.1.3.24 E087 - Main ring line low pressure (less than 7 bar)

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check for short to positive** • Disconnect the transmission control unit connector P647 and the oil pressure switch connector P639. • Switch ON ignition. • Use a multimeter to check the voltage on connector P639 between: - pin 2 and ground **Specification:** Voltage on pin 2: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Check the wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.

2. **Check oil pressure switch B303** • Reconnect the connectors P647 and P639. • Turn ON engine. • Make hydraulic test using the hydraulic test kit.	**OK:** Go to **3.** **NOT OK:** • Replace the pressure switch.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.25 E088 - Clutches main ring pressure presence detected without engine being on

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check that the connector P639 is connected to the oil pressure switch B303**	**OK:** Go to **2.** **NOT OK:** • Reconnect the connector.
2. **Check the oil pressure switch B303** • Disconnect the connector P639. • Use a multimeter to check the presence of continuity on connector P639 between: - pin 1 and 2 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **3.** **NOT OK:** • Wear the protective devices and loosen the oil pressure switch to let out any residual pressure from the circuit. • Reinstall the oil pressure switch. • Reconnect the connector P639. • Turn ON engine. • Make hydraulic test using the hydraulic test kit. If the check is not OK: • Replace the oil pressure switch.

3. **Check for short to ground** • Disconnect the transmission control unit connector P647. • Check the continuity on connector P639 between: - pin 1 and ground - pin 2 and ground ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **4.** **NOT OK:** • Check the wiring harnesses to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.26 E089 - Clutches main ring pressure presence detected without valve being powered and engine on

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check that the main ring valve Y300 is not stuck open doing hydraulic and mechanical tests**	**OK:** Go to **2.** **NOT OK:** • Replace the main ring valve.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.27 E090 - Oil temperature is under –20 °C

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Warm the oil** • Keep the engine running for 10÷15 minutes. • Turn OFF engine. • Wait approximately 30 seconds. • Turn ON engine.	**OK:** END of process. **NOT OK:** Go to **2.**
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** If the system does not function properly, before replacing the transmission ECU, replace the oil temperature sensor and clear the fault code. If the fault code reappears: • Replace the control module.

5.1.3.28 E091 - Oil temperature is over 120 °C

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Cool the oil** • Keep the engine idling for 10÷15 minutes. • Turn OFF engine. • Wait approximately 30 seconds. • Turn ON engine.	**OK:** END of process. **NOT OK:** Go to **2.**
2. **Check the cooling system**	**OK:** Go to **3.** **NOT OK:** Follow the instruction in the dedicated chapter in the service manual to repair the system.
3. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** If the system does not function properly, before replacing the transmission ECU, replace the oil temperature sensor and clear the fault code. If the fault code reappears: • Replace the control module.

5.1.3.29 E092 - Oil temperature sensor signal too high

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check that the connector P634 is connected to the oil temperature sensor B60**	**OK:** Go to **2.** **NOT OK:** • Reconnect the connector.
2. **Check the resistance value of the oil temperature sensor** • Disconnect the connector P634 from the oil temperature sensor B60. • Use a multimeter to check, on sensor, the resistance value between: - pin 1 and 2 **Specification:** Nominal resistance at 20 °C: ……2,5 kΩ Measuring range: ……-30÷130 °C Accuracy: ……±1K Response time 90%: ……< 10 s	**OK:** Go to **3.** **NOT OK:** • Replace the oil temperature sensor.
3. **Check the contacts of the calibration hidden button that are not stuck** • Disconnect the connector P625 from calibration hidden button S20. • Check, on the switch S20, the absence of continuity between: - pin 1 and 2	**OK:** Go to **4.** **NOT OK:** • Replace the calibration hidden button.
4. **Check for short to ground** • Disconnect the transmission control unit connector P647. • Check the absence of continuity on connector P634 between: - pin 1 and ground	**OK:** Go to **5.** **NOT OK:** • Check the wiring to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
5. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.30 E093 - Oil temperature sensor signal too low

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the resistance value of the oil temperature sensor** • Disconnect the connector P634 from the oil temperature sensor B60. • Use a multimeter to check, on sensor, the resistance value between: - pin 1 and 2 **Specification:** Nominal resistance at 20 °C: ……2,5 kΩ Measuring range: ……-30÷130 °C Accuracy: ……±1K Response time 90%: ……< 10 s	**OK:** Go to **2.** **NOT OK:** • Replace the oil temperature sensor.
2. **Check for short to positive on the oil temperature sensor output** • Switch ON ignition. • Check the voltage on connector P634 between: - pin 1 and ground **Specification:** Voltage on pin 1: ……5 Volt (±5%)	**OK:** Go to **3.** **NOT OK:** • Switch OFF ignition. • Check the wiring to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
3. **Check the continuity on the oil temperature sensor output** • Disconnect the transmission control unit connector P647. • Check the presence of continuity between: - pin 1 of P634 and 43 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **4.** **NOT OK:** • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.31 E094 - Forward High clutch valve coil no current feedback with command

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the coil of the forward high clutch solenoid valve Y53 on another circuit** • Disconnect the connectors P636 and P637 from their solenoid valves. • Remove and reverse the coils from their solenoid valves. • Reconnect the connectors P636 and P637 to the solenoid valves of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E100 is not displayed.	**OK (error code E094 is displayed):** Go to **3.** **NOT OK (error code E100 is displayed):** Go to **2.**
2. **Check the coil of the forward high clutch solenoid valve** • Switch OFF ignition. • Restore the initial state (remove and reinvert the coils). • Use a multimeter to check on the forward high clutch solenoid valve the coil resistance between: - pin 1 and 2 **Specification:** Coil resistance: ……2,2 Ohm (±5%)	**OK:** Go to **3.** **NOT OK:** • Replace the coil of the forward high clutch solenoid valve.
3. **Check the continuity** • Switch OFF ignition. • Restore the initial state (remove and reinvert the coils). • Disconnect the transmission control unit connector P647. • Check the presence of continuity between: - pin 1 of P636 and 6 of P647 - pin 2 of P636 and 13 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **4.** **NOT OK:** • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.

4. **Check for short to ground** • Check the absence of continuity on connector P636 between: - pin 1 and ground - pin 2 and ground	**OK:** Go to **5.** **NOT OK:** • Check wiring to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
5. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.32 E095 - Forward High clutch valve coil current feedback detected when valve is not supplied

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check for short to positive** • Disconnect the connector P636 from forward high clutch solenoid valve Y53. • Switch ON ignition. • Check the voltage on connector P636 between: - pin 1 and ground - pin 2 and ground **Specification:** Voltage on pins 1 and 2: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check wiring to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.33 E096 - Forward High clutch valve coil difference between measured and reference current

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the coil of the forward high clutch solenoid valve Y53 on another circuit** • Disconnect the connectors P636 and P637 from their solenoid valves. • Remove and reverse the coils from their solenoid valves. • Reconnect the connectors P636 and P637 to the solenoid valves of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E102 is not displayed.	**OK (error code E096 is displayed):** Go to **3.** **NOT OK (error code E102 is displayed):** Go to **2.**
2. **Check the coil of the forward high clutch solenoid valve** • Switch OFF ignition. • Restore the initial state (remove and reinvert the coils). • Use a multimeter to check on the forward high clutch solenoid valve the coil resistance between: - pin 1 and 2 **Specification:** Coil resistance: ……2,2 Ohm (±5%)	**OK:** Go to **3.** **NOT OK:** • Replace the coil of the forward high clutch solenoid valve.
3. **Check the circuit** • Switch OFF ignition. • Disconnect the transmission control unit connector P647. • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Check the line resistance between: - pin 1 of P636 and 6 of P647 - pin 2 of P636 and 13 of P647 **Specification:** Line resistance near: ……0 Ohm	**OK:** Go to **4.** **NOT OK:** • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.34 E097 - Forward Low clutch valve coil no current feedback with command

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the coil of the forward low clutch solenoid valve Y52 on another circuit** • Disconnect the connectors P635 and P637 from their solenoid valves. • Remove and reverse the coils from their solenoid valves. • Reconnect the connectors P635 and P637 to the solenoid valves of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E100 is not displayed.	**OK (error code E097 is displayed):** Go to **3.** **NOT OK (error code E100 is displayed):** Go to **2.**.
2. **Check the coil of the forward low clutch solenoid valve** • Switch OFF ignition. • Restore the initial state (remove and reinvert the coils). • Use a multimeter to check on the forward low clutch solenoid valve the coil resistance between: - pin 1 and 2 **Specification:** Coil resistance: ……2,2 Ohm (±5%)	**OK:** Go to **3.** **NOT OK:** • Replace the coil of the forward low clutch solenoid valve.
3. **Check the continuity** • Switch OFF ignition. • Restore the initial state (remove and reinvert the coils). • Disconnect the transmission control unit connector P647. • Check the presence of continuity between: - pin 1 of P635 and 3 of P647 - pin 2 of P635 and 12 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **4.** **NOT OK:** • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.

4. **Check for short to ground** • Check the absence of continuity on connector P635 between: - pin 1 and ground - pin 2 and ground	**OK:** Go to **5.** **NOT OK:** • Check wiring to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
5. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.35 E098 - Forward Low clutch valve coil current feedback detected when valve is not supplied

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check for short to positive** • Disconnect the connector P635 from forward high clutch solenoid valve Y52. • Switch ON ignition. • Check the voltage on connector P635 between: - pin 1 and ground - pin 2 and ground **Specification:** Voltage on pins 1 and 2: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check wiring to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.36 E099 - Forward Low clutch valve coil difference between measured and reference current

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check the coil of the forward low clutch solenoid valve Y52 on another circuit** • Disconnect the connectors P635 and P637 from their solenoid valves. • Remove and reverse the coils from their solenoid valves. • Reconnect the connectors P635 and P637 to the solenoid valves of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E102 is not displayed.	**OK (error code E099 is displayed):** Go to **3.** **NOT OK (error code E102 is displayed):** Go to **2.**
2. **Check the coil of the forward low clutch solenoid valve** • Switch OFF ignition. • Restore the initial state (remove and reinvert the coils). • Use a multimeter to check on the forward low clutch solenoid valve the coil resistance between: - pin 1 and 2 **Specification:** Coil resistance: ……2,2 Ohm (±5%)	**OK:** Go to **3.** **NOT OK:** • Replace the coil of the forward low clutch solenoid valve.
3. **Check the circuit** • Switch OFF ignition. • Disconnect the transmission control unit connector P647. • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Check the line resistance between: - pin 1 of P635 and 3 of P647 - pin 2 of P635 and 12 of P647 **Specification:** Line resistance near: ……0 Ohm	**OK:** Go to **4.** **NOT OK:** • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.37 E100 - Reverse clutch valve coil no current feedback with command

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the coil of the reverse clutch solenoid valve Y51 on another circuit** • Disconnect the connectors P635 and P637 from their solenoid valves. • Remove and reverse the coils from their solenoid valves. • Reconnect the connectors P635 and P637 to the solenoid valves of their circuits. • Turn ON engine. • Drive the vehicle in forward low mode. • Check that the error code E097 is not displayed.	**OK (error code E100 is displayed):** Go to **3.** **NOT OK (error code E097 is displayed):** Go to **2.**
2. **Check the coil of the reverse clutch solenoid valve** • Switch OFF ignition. • Restore the initial state (remove and reinvert the coils). • Use a multimeter to check on the reverse clutch solenoid valve the coil resistance between: - pin 1 and 2 **Specification:** Coil resistance: ……2,2 Ohm (±5%)	**OK:** Go to **3.** **NOT OK:** • Replace the coil of the reverse clutch solenoid valve.
3. **Check the continuity** • Switch OFF ignition. • Restore the initial state (remove and reinvert the coils). • Disconnect the transmission control unit connector P647. • Check the presence of continuity between: - pin 1 of P637 and 7 of P647 - pin 2 of P637 and 41 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **4.** **NOT OK:** • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.

4. **Check for short to ground** • Check the absence of continuity on connector P637 between: - pin 1 and ground - pin 2 and ground	**OK:** Go to **5.** **NOT OK:** • Check wiring to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
5. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.38 E101 - Reverse clutch valve coil current feedback detected when valve is not supplied

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check for short to positive** • Disconnect the connector P637 from reverse clutch solenoid valve Y51. • Switch ON ignition. • Check the voltage on connector P637 between: - pin 1 and ground - pin 2 and ground **Specification:** Voltage on pins 1 and 2: ……0 Volt	**OK:** Go to **2.** **NOT OK:** • Switch OFF ignition. • Check wiring to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.39 E102 - Reverse clutch valve coil difference between measured and reference current

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check the coil of the reverse clutch solenoid valve Y51 on another circuit** • Disconnect the connectors P635 and P637 from their solenoid valves. • Remove and reverse the coils from their solenoid valves. • Reconnect the connectors P635 and P637 to the solenoid valves of their circuits. • Turn ON engine. • Drive the vehicle in forward low mode. • Check that the error code E099 is not displayed.	**OK (error code E102 is displayed):** Go to **3.** **NOT OK (error code E099 is displayed):** Go to **2.**
2. **Check the coil of the reverse clutch solenoid valve** • Switch OFF ignition. • Restore the initial state (remove and reinvert the coils). • Use a multimeter to check on the reverse clutch solenoid valve the coil resistance between: - pin 1 and 2 **Specification:** Coil resistance: ……2,2 Ohm (±5%)	**OK:** Go to **3.** **NOT OK:** • Replace the coil of the reverse clutch solenoid valve.
3. **Check the circuit** • Switch OFF ignition. • Disconnect the transmission control unit connector P647. • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Check the line resistance between: - pin 1 of P637 and 7 of P647 - pin 2 of P637 and 41 of P647 **Specification:** Line resistance near: ……0 Ohm	**OK:** Go to **4.** **NOT OK:** • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.40 E103 - Forward High clutch pressure sensor signal over maximum value (higher than 940 digit)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Calibration of the forward high clutch pressure sensor B300** • Use the electronic tool to reset the parameters of the forward high clutch pressure sensor B300.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the supply voltage of the forward high clutch pressure sensor B300** • Switch ON ignition. • Use a multimeter to check, on the connector P642, the supply voltage between: - pin 1 and 3 **Specification:** Supply voltage sensor: ……5 Volt	**OK:** Go to **3.** **NOT OK (supply voltage over 5 volt):** • Switch OFF ignition. • Check the supply line to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
3. **Check for short to positive on the sensor output line** • Switch OFF ignition. • Disconnect the transmission control unit connector P647. • Switch ON ignition. • Check the voltage between: - pin 2 of P642 and ground **Specification:** Voltage on pin 2 of connector P642: ……0 Volt	**OK:** Go to **4.** **NOT OK:** • Switch OFF ignition. • Check the supply line to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.

4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward high clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.41 E104 - Forward High clutch pressure sensor signal under minimum value (lower than 40 digit)

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the forward high clutch pressure sensor B300** • Use the electronic tool to reset the parameters of the forward high clutch pressure sensor B300.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the supply voltage of the forward high clutch pressure sensor B300** • Switch ON ignition. • Use a multimeter to check, on the connector P642, the supply voltage between: - pin 1 and 3 **Specification:** Supply voltage sensor: ……5 Volt	**OK:** Go to **3.** **NOT OK (supply voltage under 5 volt):** • Switch OFF ignition. • Check the supply line to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.

3. **Check sensor output line** • Switch OFF ignition. • Disconnect the transmission control unit connector P647. • Check the line resistance between: - pin 2 of P642 and 45 of P647 **Specification:** Line resistance near: ……0 Ohm • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines.	**OK:** Go to **4.** **NOT OK:** • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward high clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.42 E105 - Forward High clutch pressure lower than 0.250 bar when pressure requested

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the forward high clutch pressure sensor B300** • Use the electronic tool to reset the parameters of the forward high clutch pressure sensor B300.	**OK:** End of process. **NOT OK:** Go to **2.**

2. **Check the forward high clutch pressure sensor on reverse circuit** • Wear the protective devices. • Disconnect the connectors P642 and P644 from their sensors. • Remove and invert the sensors from their circuits. • Reconnect the connectors P642 and P644 to the sensors of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E117 is not displayed.	**OK (error code E105 is displayed):** Go to **3.** **NOT OK (error code E117 is displayed):** • Replace the forward high clutch pressure sensor B300.
3. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward high clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.43 E106 - Forward High clutch pressure over 0.9 bar when clutch is not activated

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the forward high clutch pressure sensor B300** • Use the electronic tool to reset the parameters of the forward high clutch pressure sensor B300.	**OK:** End of process. **NOT OK:** Go to **2.**

2. **Check the forward high clutch pressure sensor on reverse circuit** • Wear the protective devices. • Disconnect the connectors P642 and P644 from their sensors. • Remove and invert the sensors from their circuits. • Reconnect the connectors P642 and P644 to the sensors of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E118 is not displayed.	**OK (error code E106 is displayed):** Go to **3.** **NOT OK (error code E118 is displayed):** • Replace the forward high clutch pressure sensor B300.
3. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward high clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.44 E107 - Forward High clutch pressure reference and measure differ of 0.5 bar

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the forward high clutch pressure sensor B300** • Use the electronic tool to reset the parameters of the forward high clutch pressure sensor B300.	**OK:** End of process. **NOT OK:** Go to **2.**

2. **Check the forward high clutch pressure sensor on reverse circuit** • Wear the protective devices. • Disconnect the connectors P642 and P644 from their sensors. • Remove and invert the sensors from their circuits. • Reconnect the connectors P642 and P644 to the sensors of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E119 is not displayed.	**OK (error code E107 is displayed):** Go to **3.** **NOT OK (error code E119 is displayed):** • Replace the forward high clutch pressure sensor B300.
3. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward high clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.45 E108 - Forward High clutch proportional valve PI characteristic out of nominal ranges (150 mA)

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the forward high clutch pressure sensor B300** • Use the electronic tool to reset the parameters of the forward high clutch pressure sensor B300.	**OK:** End of process. **NOT OK:** Go to **2.**

2. **Check the forward high clutch valve on reverse circuit** • Wear the protective devices. • Disconnect the connectors P636 and P637 from their solenoid valves. • Remove and invert the valves from their circuits. • Reconnect the connectors P636 and P637 to the solenoid valves of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E120 is not displayed.	**OK (error code E108 is displayed):** Go to **3.** **NOT OK (error code E120 is displayed):** • Replace the forward high clutch valve Y53.
3. **Check the forward high clutch pressure sensor on reverse circuit** • Switch OFF ignition. • Wear the protective devices. • Disconnect the connectors P642 and P644 from their sensors. • Remove and invert the pressure sensors from their circuits. • Reconnect the connectors P642 and P644 to the pressure sensors of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E120 is not displayed.	**OK (error code E108 is displayed):** Go to **4.** **NOT OK (error code E120 is displayed):** • Replace the forward high clutch pressure sensor B300.
4. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the proportional valves and pressure sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission ECU, replace the forward high clutch proportional valve, replace the pressure sensor and clear the fault code. If the system does not function properly: • Replace the control module.

5.1.3.46 E109 - Forward Low clutch pressure sensor signal over maximum value (higher than 940 digit)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Calibration of the forward low clutch pressure sensor B301** • Use the electronic tool to reset the parameters of the forward low clutch pressure sensor B301.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the supply voltage of the forward low clutch pressure sensor B301** • Switch ON ignition. • Use a multimeter to check, on the connector P643, the supply voltage between: - pin 1 and 3 **Specification:** Supply voltage sensor: ……5 Volt	**OK:** Go to **3.** **NOT OK (supply voltage over 5 volt):** • Switch OFF ignition. • Check the supply line to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
3. **Check for short to positive on the sensor output line** • Switch OFF ignition. • Disconnect the transmission control unit connector P647. • Switch ON ignition. • Check the voltage between: - pin 2 of P643 and ground **Specification:** Voltage on pin 2 of connector P643: ……0 Volt	**OK:** Go to **4.** **NOT OK:** • Switch OFF ignition. • Check the supply line to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward low clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.47 E110 - Forward Low clutch pressure sensor signal under minimum value (lower than 40 digit)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Calibration of the forward low clutch pressure sensor B301** • Use the electronic tool to reset the parameters of the forward low clutch pressure sensor B301.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the supply voltage of the forward low clutch pressure sensor B301** • Switch ON ignition. • Use a multimeter to check, on the connector P643, the supply voltage between: - pin 1 and 3 **Specification:** Supply voltage sensor: ……5 Volt	**OK:** Go to **3.** **NOT OK (supply voltage under 5 volt):** • Switch OFF ignition. • Check the supply line to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
3. **Check sensor output line** • Switch OFF ignition. • Disconnect the transmission control unit connector P647. • Check the line resistance between: - pin 2 of P643 and 44 of P647 **Specification:** Line resistance near: ……0 Ohm • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines.	**OK:** Go to **4.** **NOT OK:** • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward low clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

E111 - Forward Low clutch pressure lower than 0.250 bar when pressure requested

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the forward low clutch pressure sensor B301** • Use the electronic tool to reset the parameters of the forward low clutch pressure sensor B301.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the forward low clutch pressure sensor on reverse circuit** • Wear the protective devices. • Disconnect the connectors P643 and P644 from their sensors. • Remove and invert the sensors from their circuits. • Reconnect the connectors P643 and P644 to the sensors of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E117 is not displayed.	**OK (error code E111 is displayed):** Go to **3.** **NOT OK (error code E117 is displayed):** • Replace the forward low clutch pressure sensor B301.
3. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward low clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.48 E112 - Forward Low clutch pressure over 0.9 bar when clutch is not activated

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Calibration of the forward low clutch pressure sensor B301** • Use the electronic tool to reset the parameters of the forward low clutch pressure sensor B301.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the forward low clutch pressure sensor on reverse circuit** • Wear the protective devices. • Disconnect the connectors P643 and P644 from their sensors. • Remove and invert the sensors from their circuits. • Reconnect the connectors P643 and P644 to the sensors of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E118 is not displayed.	**OK (error code E112 is displayed):** Go to **3.** **NOT OK (error code E118 is displayed):** • Replace the forward low clutch pressure sensor B301.
3. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward low clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.49 E113 - Forward Low clutch pressure reference and measure differ of 0.5 bar

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the forward low clutch pressure sensor B301** • Use the electronic tool to reset the parameters of the forward low clutch pressure sensor B301.	**OK:** End of process. **NOT OK:** Go to **2.**

2. **Check the forward low clutch pressure sensor on reverse circuit** • Wear the protective devices. • Disconnect the connectors P643 and P644 from their sensors. • Remove and invert the sensors from their circuits. • Reconnect the connectors P643 and P644 to the sensors of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E119 is not displayed.	**OK (error code E113 is displayed):** Go to **3.** **NOT OK (error code E119 is displayed):** • Replace the forward low clutch pressure sensor B301.
3. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the forward low clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.50 E114 - Forward Low clutch proportional valve PI characteristic out of nominal ranges (150 mA)

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the forward low clutch pressure sensor B301** • Use the electronic tool to reset the parameters of the forward low clutch pressure sensor B301.	**OK:** End of process. **NOT OK:** Go to **2.**

2. **Check the forward low clutch valve on reverse circuit** • Wear the protective devices. • Disconnect the connectors P635 and P637 from their solenoid valves. • Remove and invert the valves from their circuits. • Reconnect the connectors P635 and P637 to the solenoid valves of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E120 is not displayed.	**OK (error code E114 is displayed):** Go to **3.** **NOT OK (error code E120 is displayed):** • Replace the forward low clutch valve Y52.
3. **Check the forward low clutch pressure sensor on reverse circuit** • Switch OFF ignition. • Wear the protective devices. • Disconnect the connectors P643 and P644 from their sensors. • Remove and invert the pressure sensors from their circuits. • Reconnect the connectors P643 and P644 to the pressure sensors of their circuits. • Turn ON engine. • Drive the vehicle in reverse mode. • Check that the error code E120 is not displayed.	**OK (error code E114 is displayed):** Go to **4.** **NOT OK (error code E120 is displayed):** • Replace the forward low clutch pressure sensor B301.
4. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the proportional valves and pressure sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission ECU, replace the forward low clutch proportional valve, replace the pressure sensor and clear the fault code. If the system does not function properly: • Replace the control module.

5.1.3.51 E115 - Reverse clutch pressure sensor signal over maximum value (higher than 940 digit)

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Calibration of the reverse clutch pressure sensor B302** • Use the electronic tool to reset the parameters of the reverse clutch pressure sensor B302.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the supply voltage of the reverse clutch pressure sensor B302** • Switch ON ignition. • Use a multimeter to check, on the connector P644, the supply voltage between: - pin 1 and 3 **Specification:** Supply voltage sensor: ……5 Volt	**OK:** Go to **3.** **NOT OK (supply voltage over 5 volt):** • Switch OFF ignition. • Check the supply line to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
3. **Check for short to positive on the sensor output line** • Switch OFF ignition. • Disconnect the transmission control unit connector P647. • Switch ON ignition. • Check the voltage between: - pin 2 of P644 and ground **Specification:** Voltage on pin 2 of connector P644: ……0 Volt	**OK:** Go to **4.** **NOT OK:** • Switch OFF ignition. • Check the supply line to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the reverse clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.52 E116 - Reverse clutch pressure sensor signal under minimum value (lower than 40 digit)

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Calibration of the reverse clutch pressure sensor B302** • Use the electronic tool to reset the parameters of the reverse clutch pressure sensor B302.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the supply voltage of the reverse clutch pressure sensor B302** • Switch ON ignition. • Use a multimeter to check, on the connector P644, the supply voltage between: - pin 1 and 3 **Specification:** Supply voltage sensor: ……5 Volt	**OK:** Go to **3.** **NOT OK (supply voltage under 5 volt):** • Switch OFF ignition. • Check the supply line to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
3. **Check sensor output line** • Switch OFF ignition. • Disconnect the transmission control unit connector P647. • Check the line resistance between: - pin 2 of P644 and 54 of P647 **Specification:** Line resistance near: ……0 Ohm • Check the wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines.	**OK:** Go to **4.** **NOT OK:** • Repair or replace as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the reverse clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.53 E117 - Reverse clutch pressure lower than 0.250 bar when pressure requested

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Calibration of the reverse clutch pressure sensor B302** • Use the electronic tool to reset the parameters of the reverse clutch pressure sensor B302.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the reverse clutch pressure sensor on forward low circuit** • Wear the protective devices. • Disconnect the connectors P644 and P643 from their sensors. • Remove and invert the sensors from their circuits. • Reconnect the connectors P644 and P643 to the sensors of their circuits. • Turn ON engine. • Drive the vehicle in forward low mode. • Check that the error code E111 is not displayed.	**OK (error code E117 is displayed):** Go to **3.** **NOT OK (error code E111 is displayed):** • Replace the reverse clutch pressure sensor B302.
3. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the reverse clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.54 E118 - Reverse clutch pressure over 0.9 bar when clutch is not activated

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Calibration of the reverse clutch pressure sensor B302** • Use the electronic tool to reset the parameters of the reverse clutch pressure sensor B302.	**OK:** End of process. **NOT OK:** Go to **2.**
2. **Check the reverse clutch pressure sensor on forward low circuit** • Wear the protective devices. • Disconnect the connectors P644 and P643 from their sensors. • Remove and invert the sensors from their circuits. • Reconnect the connectors P644 and P643 to the sensors of their circuits. • Turn ON engine. • Drive the vehicle in forward low mode. • Check that the error code E112 is not displayed.	**OK (error code E118 is displayed):** Go to **3.** **NOT OK (error code E112 is displayed):** • Replace the reverse clutch pressure sensor B302.
3. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the reverse clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.55 E119 - Reverse clutch pressure reference and measure differ of 0.5 bar

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the reverse clutch pressure sensor B302** • Use the electronic tool to reset the parameters of the reverse clutch pressure sensor B302.	**OK:** End of process. **NOT OK:** Go to **2.**

2. **Check the reverse clutch pressure sensor on forward low circuit** • Wear the protective devices. • Disconnect the connectors P644 and P643 from their sensors. • Remove and invert the sensors from their circuits. • Reconnect the connectors P644 and P643 to the sensors of their circuits. • Turn ON engine. • Drive the vehicle in forward low mode. • Check that the error code E113 is not displayed.	**OK (error code E119 is displayed):** Go to **3.** **NOT OK (error code E113 is displayed):** • Replace the reverse clutch pressure sensor B302.
3. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission control unit: • Replace the reverse clutch pressure sensor. • Remake the calibration of the parameters. • Clear the fault code. If the system does not function properly: • Replace the control module. • Remake the calibration of the parameters.

5.1.3.56 E120 - Reverse clutch proportional valve PI characteristic out of nominal ranges (150 mA)

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Calibration of the reverse clutch pressure sensor B302** • Use the electronic tool to reset the parameters of the reverse clutch pressure sensor B302.	**OK:** End of process. **NOT OK:** Go to **2.**

2. **Check the reverse clutch valve on forward low circuit** • Wear the protective devices. • Disconnect the connectors P637 and P635 from their solenoid valves. • Remove and invert the valves from their circuits. • Reconnect the connectors P637 and P635 to the solenoid valves of their circuits. • Turn ON engine. • Drive the vehicle in forward low mode. • Check that the error code E114 is not displayed.	**OK (error code E120 is displayed):** Go to **3.** **NOT OK (error code E114 is displayed):** • Replace the reverse clutch valve Y51.
3. **Check the reverse clutch pressure sensor on forward low circuit** • Switch OFF ignition. • Wear the protective devices. • Disconnect the connectors P644 and P643 from their sensors. • Remove and invert the pressure sensors from their circuits. • Reconnect the connectors P644 and P643 to the pressure sensors of their circuits. • Turn ON engine. • Drive the vehicle in forward low mode. • Check that the error code E114 is not displayed.	**OK (error code E120 is displayed):** Go to **4.** **NOT OK (error code E114 is displayed):** • Replace the reverse clutch pressure sensor B302.
4. **Check control module revision level** • Switch OFF ignition. • Restore the initial state (remove and reinvert the proportional valves and pressure sensors). • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** If the system does not function properly, before replacing the transmission ECU, replace the reverse clutch proportional valve, replace the pressure sensor and clear the fault code. If the system does not function properly: • Replace the control module.

5.1.3.57 E121 - Forward High clutch unexpected slipping

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check clutches** • Start engine. • Check that other clutches do not slip: - Engage the low speed and check that no other errors are shown - Engage the reverse and check that no other errors are shown	**OK:** Go to **2.** **NOT OK:** • Disconnect connectors P640 and P647. • Use a multimeter. • Check the presence of continuity between: - pin 2 of P640 and 24 of P647 - pin 3 of P640 and 52 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.* • Check for short to ground. Check the absence of continuity between: - pin 2 of P640 and ground - pin 3 of P640 and ground • Switch ON ignition. • Check for short to positive. Check the voltage between: - pin 2 of P640 and ground - pin 3 of P640 and ground **Specification:** Voltage on pin 2 and 3: ……0 Volt • If there are anomalies repair or replace wiring harness as needed. • If there are not anomalies replace the sensor.
2. **Repair or replace forward high clutch**	• Follow the instruction in the dedicated chapter in the service manual to fix the issue.

5.1.3.58 E122 - Forward Low clutch unexpected slipping

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check clutches** • Start engine. • Check that other clutches do not slip: - Engage the high speed and check that no other errors are shown - Engage the reverse and check that no other errors are shown	**OK:** Go to **2.** **NOT OK:** • Disconnect connectors P640 and P647. • Use a multimeter. • Check the presence of continuity between: - pin 2 of P640 and 24 of P647 - pin 3 of P640 and 52 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.* • Check for short to ground. Check the absence of continuity between: - pin 2 of P640 and ground - pin 3 of P640 and ground • Switch ON ignition. • Check for short to positive. Check the voltage between: - pin 2 of P640 and ground - pin 3 of P640 and ground **Specification:** Voltage on pin 2 and 3: ……0 Volt • If there are anomalies repair or replace wiring harness as needed. • If there are not anomalies replace the sensor.
2. **Repair or replace forward low clutch**	• Follow the instruction in the dedicated chapter in the service manual to fix the issue.

5.1.3.59 E123 - Reverse clutch unexpected slipping

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check clutches** • Start engine. • Check that other clutches do not slip: - Engage the low speed and check that no other errors are shown - Engage the high speed and check that no other errors are shown	**OK:** Go to **2.** **NOT OK:** • Disconnect connectors P640 and P647. • Use a multimeter. • Check the presence of continuity between: - pin 2 of P640 and 24 of P647 - pin 3 of P640 and 52 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.* • Check for short to ground. Check the absence of continuity between: - pin 2 of P640 and ground - pin 3 of P640 and ground • Switch ON ignition. • Check for short to positive. Check the voltage between: - pin 2 of P640 and ground - pin 3 of P640 and ground **Specification:** Voltage on pin 2 and 3: ……0 Volt • If there are anomalies repair or replace wiring harness as needed. • If there are not anomalies replace the sensor.
2. **Repair or replace reverse clutch**	• Follow the instruction in the dedicated chapter in the service manual to fix the issue.

5.1.3.60 E124 - Clutches output speed sensor failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check that the connector P640 is connected to the transmission out speed sensor B104**	**OK:** Go to **2.** **NOT OK:** • Reconnect the connector.

2. **Check the supply voltage of the sensor** • Disconnect connector P640, from the transmission out speed sensor B104, and P647, from the transmission control unit A320. • Switch ON ignition. • Use a multimeter to check the voltage on connector P640 between: - pin 1 and 4 **Specification:** Supply voltage of sensor: ……12 Volt (±5%)	**OK:** Go to **5.** **NOT OK:** If there is not voltage at all, go to **3**. If there is voltage, but it is not as per specification: • Check the wirings to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Check the power line resistance between: • pin 1 of P640 and any of the pins 8, 34, 35 or 36 of P647 • pin 4 of P640 and pin 17 of P647 **Specification:** Line resistance must be near: ……0 Ohm • Repair or replace as needed.
3. **Check the fuse** • Switch OFF ignition. • Check the line protection fuse (F7) in fuse box FB.	**OK:** Check the wirings to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed. If everything is ok, go to **4**. **NOT OK:** Before replacing the fuse F7, check for short to ground. • Check the absence of continuity between: • pin 1 of P640 and ground • Check the wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
4. **Check for short to positive on ground line** • Switch ON ignition. • Check the voltage on ground line, between: - pin 4 of P640 and ground **Specification:** Voltage on pin 4: ……0 Volt	**OK:** Go to **5.** **NOT OK:** • Check the wirings to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.

5. **Check the continuity on the sensor output lines** • Switch OFF ignition. • Check the presence of continuity between: - pin 2 of P640 and pin 24 of P647 - pin 3 of P640 and pin 52 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **6.** **NOT OK:** • Check the wirings to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.
6. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** If the system is not function properly, before replacing the transmission ECU, replace the transmission out speed sensor and clear the fault code. If the fault code reappears: • Replace the control module.

5.1.3.61 E126 - Transmission Electronic Control Unit internal failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.62 E127 - Transmission Electronic Control Unit internal failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.63 E128 - Transmission Electronic Control Unit internal failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.64 E132 - Can bus physical support or communication failure

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**

1. **Check the value of CAN bus resistance on diagnosis socket** • Switch OFF ignition. • Use a multimeter to check the value of CAN bus resistance on diagnosis socket (J62 connector) between: - pin 3 and 4 **Specification:** CAN bus resistance: ……60 Ohms (±5%)	**OK:** Go to **2.** **NOT OK:** • Disconnect the CAN bus terminator (A050) from J63 connector and use a multimeter to check the value of resistance on terminator between: - pin A and B If resistance does not respect the specific: • Replace resistance. **Specification:** CAN bus resistance: ……120 Ohms (±5%) • Disconnect the connectors P647 and P74. • Check the absence of continuity between: - pin 27 and 55 of P647 • Check the presence of continuity between: - pin 27 of P647 and any pins of the CAN-H line - pin 55 of P647 and any pins of the CAN-L line ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.* • Check for short to ground. Check the absence of continuity between: - pin 27 of P647 and ground - pin 55 of P647 and ground • Check for short to positive. Switch ON ignition. Check the voltage between: - pin 27 of P647 and ground - pin 55 of P647 and ground **Specification:** Voltage on pin 27 and 55: ……0 Volt • Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. • Repair or replace harnesses as needed.
2. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.65 E133 - Overcurrent detected on main ring valve

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.
The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check the solenoid of main ring valve Y300** • Disconnect the P638 connector from main ring valve Y300. • Use a multimeter to check on the main ring valve the solenoid resistance between: - pin 1 and 2 **Specification:** Solenoid resistance: ……8 Ohm (±5%)	**OK:** Go to **2.** **NOT OK:** • Replace main ring valve Y300.
2. **Check for short to positive** • Disconnect the transmission control unit connector P647. • Switch ON ignition. • Check the voltage on connector P647 between: - pin 14 and ground - pin 39 and ground **Specification:** Voltage on pins 14 and 39: ……0 Volt	**OK:** Go to **3.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, bent pins or line breaks. • Repair or replace harnesses as needed.
3. **Check the continuity** • Switch OFF ignition. • Check the absence of continuity on connector P647 between: - pin 14 and 39	**OK:** Go to **4.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, bent pins or line breaks. • Repair or replace harnesses as needed.
4. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.66 E134 - Engine EEC1 message timeout

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **To move the vehicle perform LIMP Mode**	If the problem is not resolved, before replacing the transmission control unit A320, download the correct software revision level and verify that the system functions properly.

5.1.3.67 E135 - Vehicle ECU message CAN timeout

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check instrument panel A330 revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process. **NOT OK:** • Replace the control module.

5.1.3.68 E138 - Absence of electrical signal from FNR lever

Circuit / harness test **IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes.** **The fault memory must be cleared once the circuit / harness test has been completed.**	
1. **Check fuse** • Check line protection fuse F7 in fuse box FB.	**OK:** Go to **2.** **NOT OK:** Before replacing the fuse: • Check for short to ground. - Disconnect the connector P787 from FNR lever B64. - Check the absence of continuity between: ▪ pin 1 of P787 and ground • Check all connectors, pins and wiring to detect the presence of broken connectors, bent pins or line breaks. • Repair or replace as needed.

2. **Check supply voltage** • Disconnect the connector P787 from FNR lever B64. • Switch ON ignition. • Use a multimeter to check the supply voltage on connector P787 between: - pin 1 and ground **Specification:** Supply voltage: ……12 Volt (±5%)	**OK:** Go to **3.** **NOT OK:** • Switch OFF ignition. • Check the presence of continuity between: - pin 1 of P787 and fuse F7 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.* • Check all connectors, pins and wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or line breaks. • Repair or replace as needed.
3. **Check FNR lever B64** • Check FNR lever contacts. • FNR lever in neutral position, check the presence of continuity between: - pin 1 (COM) and 2 (N) • FNR lever in forward position, check the presence of continuity between: - pin 1 (COM) and 3 (F) • FNR lever in reverse position, check the presence of continuity between: - pin 1 (COM) and 4 (R) ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **4.** **NOT OK:** • Replace FNR lever.
4. **Check continuity** • Disconnect the transmission control unit connector P647. • Check the presence of continuity between: - pin 2 of P787 and 46 of P647 - pin 3 of P787 and 18 of P647 - pin 4 of P787 and 19 of P647 ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **5.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, slid-back or corroded contacts, bent pins or damaged lines. • Repair or replace as needed.

5. **Check for short to ground** • Check the absence of continuity on connector P647 between: - pin 18 and ground - pin 19 and ground - pin 46 and ground	**OK:** Go to **6.** **NOT OK:** • Check all connectors, pins and wiring to detect the presence of broken connectors, bent pins or damaged lines. • Repair or replace as needed.
6. **Check control module revision level** • Download the correct software revision level on the control module and verify that the system functions properly.	**OK:** END of process**.** **NOT OK:** • Replace the control module.

5.1.3.69 Driver presence seat switch not pressed

Circuit / harness test

IMPORTANT: when ignition is ON, disconnected connectors may cause additional diagnostic trouble codes. The fault memory must be cleared once the circuit / harness test has been completed.

1. **Check supply voltage of S40 – Seat switch** • Disconnect the connector P355 of the seat switch. • Switch ON ignition. • Use a multimeter to check the voltage between: – Pin 1 of (P355) and ground **Specification** Supply voltage: ……12 Volt	**OK:** Go to **2.** **NOT OK:** Check that the fuse F8 (FB) is not damaged. Check all connectors, pins and wiring to detect the presence of broken connectors, corroded contacts, bent pins or line breaks. Repair or replace if needed.
2. **Check for continuity** • Switch OFF ignition. • Disconnect the connector P74 from the A330 control unit. • Use a multimeter to check the continuity between: - Pin 1 of (P355) and pin F8a of (FB) - Pin 2 of (P355) and pin 48 of (P74) **Specification** Continuity: …… Present ***NOTE:*** *When a continuity check is done, verify that the resistance is near to 0 ohm.*	**OK:** Go to **3**. **NOT OK:** Refer to schematic. Repair or replace the circuit if needed.

3. **Check for short to positive** • Use a multimeter to check the voltage between: - Pin 48 of (P74) and ground **Specification** Supply voltage: ……0 Volt	**OK:** Go to **4**. **NOT OK:** Refer to schematic. Repair or replace the circuit if needed.
4. **Check for short to ground** • Use a multimeter to check the absence of continuity between: - Pin 1 of (P355) and ground - Pin 2 of (P355) and ground **Specification** Continuity: ……Absent	**OK:** Go to **5**. **NOT OK:** Refer to schematic. Repair or replace the circuit if needed.
5. **Check component** • Check that the component seat switch S40 is not damaged and functions properly.	**OK:** End of test. **NOT OK:** Repair or replace as needed.