SERVICE MANUAL

W130D / W170D
Stage IV
Wheel Loader

Part number 51428248
English
November 2017

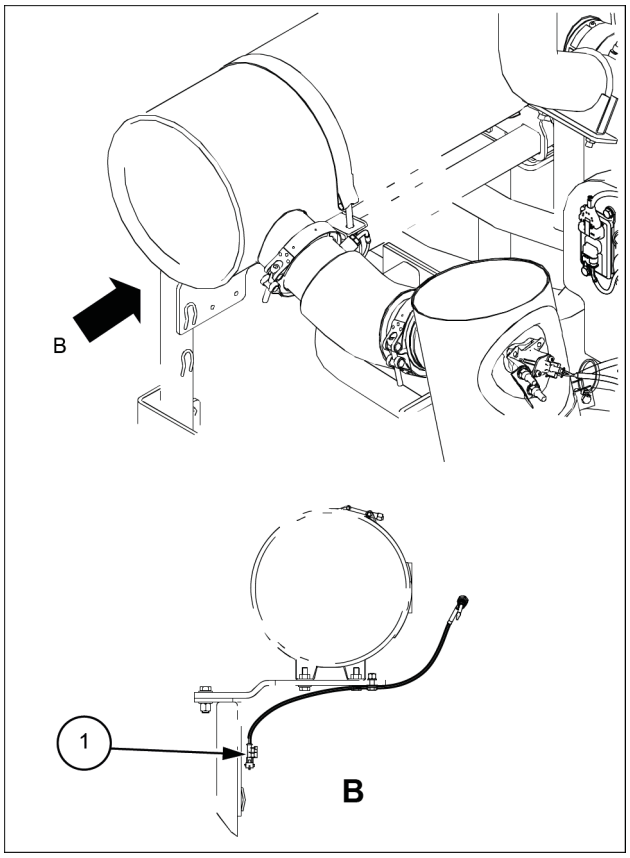
NEW HOLLAND CONSTRUCTION

Engine - 10

Engine and crankcase - 001

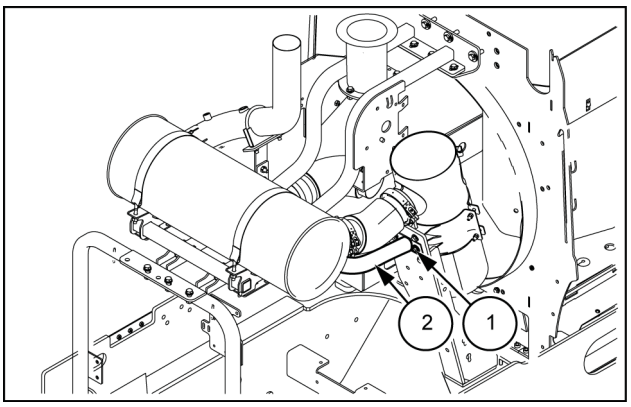
W130 D WHEEL LOADER XR, NEW CAB TIER4B
W130 D WHEEL LOADER ZBAR NEW CAB TIER4B
W170 D WHEEL LOADER XR NEW CAB TIER4B
W170 D WHEEL LOADER ZBAR, NEW CAB TIER4B

26. Connect the wire harness to the temperature sensor **(1)** to the SCR muffler and fix the connector wire with the clamps.



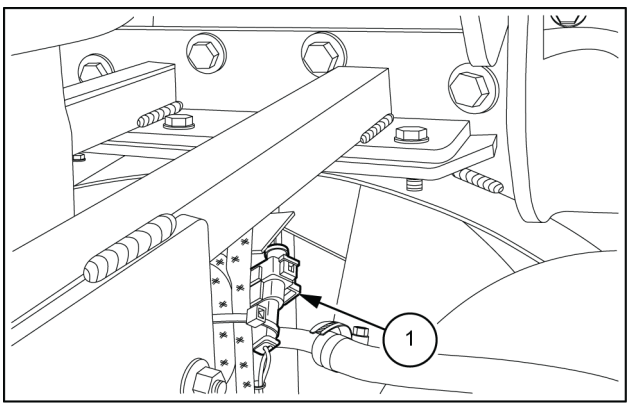
LEIL14WHL0411BB 27

27. Install the bar **(2)** and tighten the four screws **(1)**.



LEIL14WHL0408AB 28

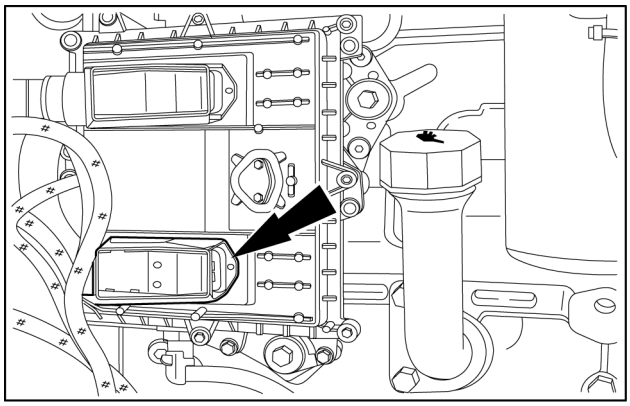
28. Connect the wire harness **(1)** and remove the tag.



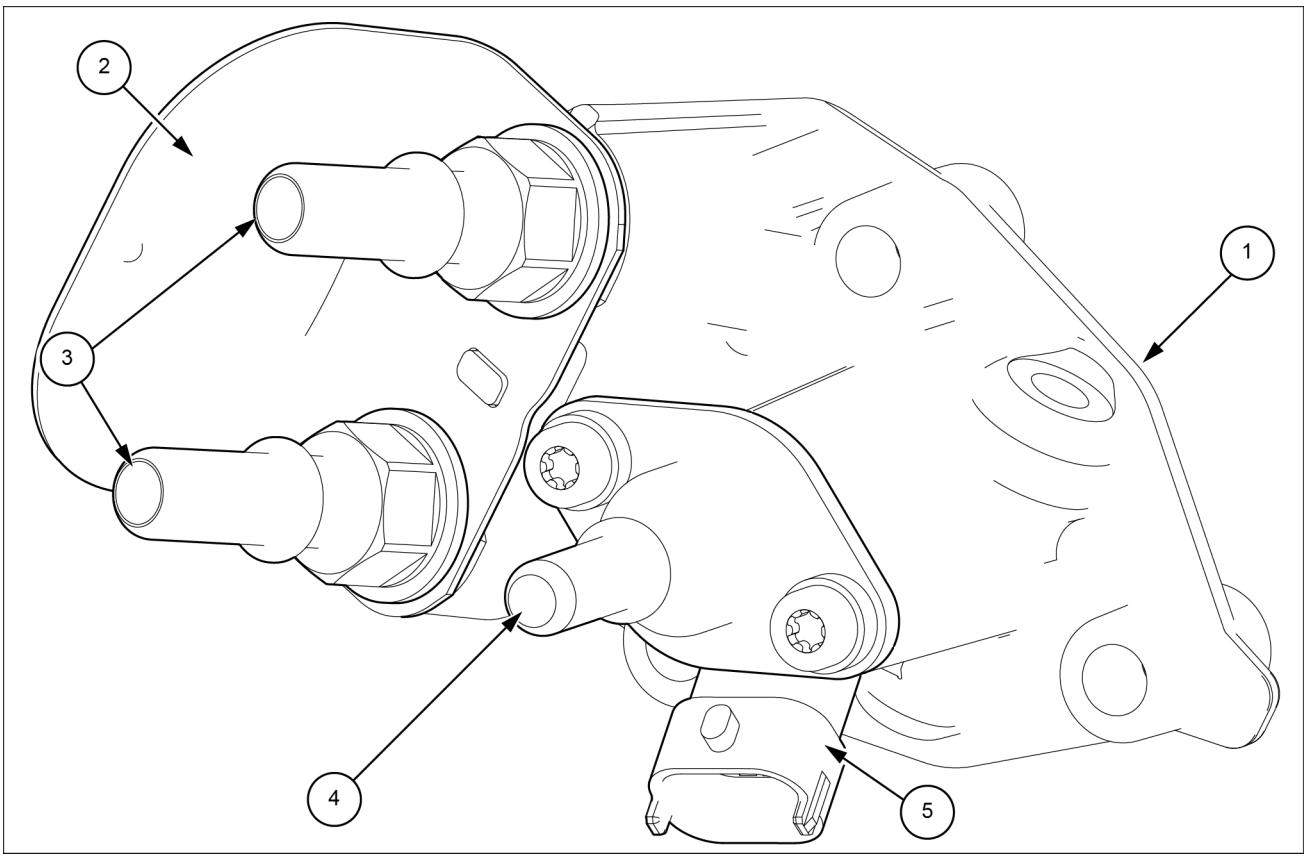
LEIL13WHL0167AB 29

13. Connect wiring harness to ECU controller.

NOTE: *start the connector on the ECU with lever straight out from ECU. Use lever to pull connector into position.*



LEIL13WHL0175AB 13



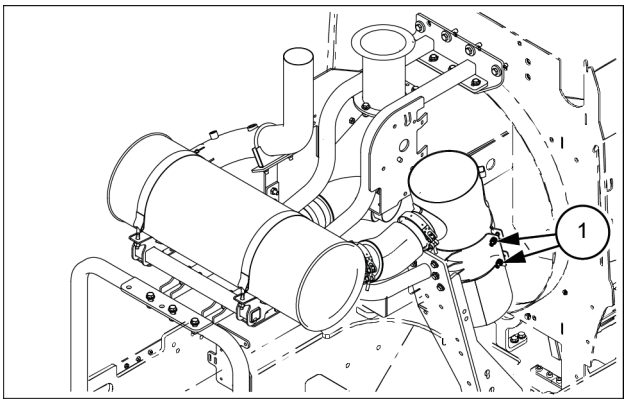
LEIL14WHL0420FB 7

W170D

1. Gasket (replace the gasket when Dosing Module is removed)
2. Heat shield
3. Coolant connector
4. Valve keeper of the **DEF/ADBLUE®** connector
5. Electrical connector

NOTE: *in the figure for the W170D model the gasket* ***(1)*** *is hidden.*

8. Remove the jam nuts from the threaded end of the hexagonal bolts **(1)**. Remove the hexagonal bolts **(1)** and remove the retaining straps from the mounting bracket saddle. Lift the Diesel Oxidation Catalyst (DOC) from machine.

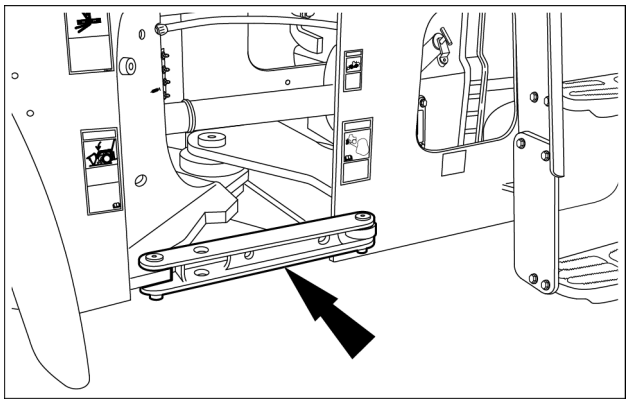


LEIL15WHL0028AB 8

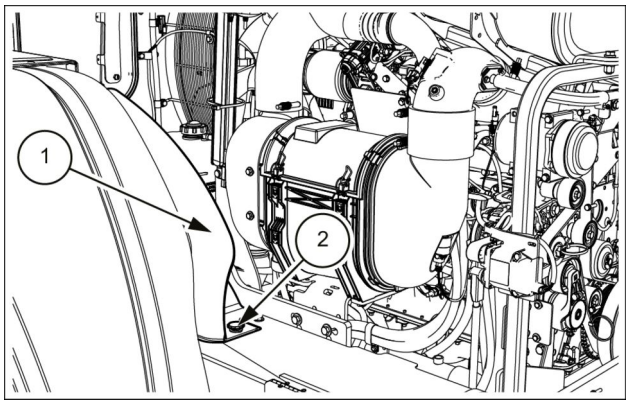
Reverse fan control system - Remove

W170 D WHEEL LOADER XR NEW CAB TIER4B	WE
W170 D WHEEL LOADER ZBAR, NEW CAB TIER4B	WE

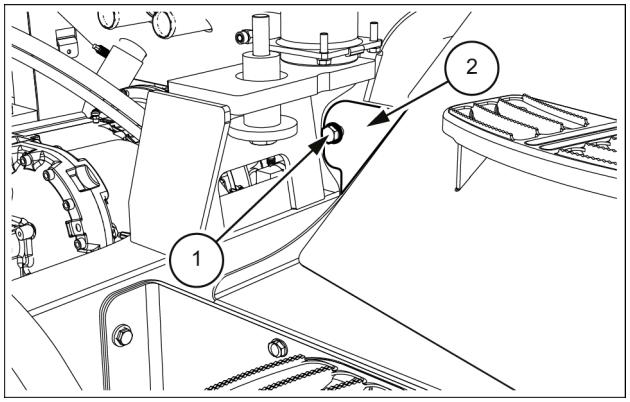
1. Park the machine on a level surface and lower the bucket to the ground. Put the articulation lock in LOCKED position and stop the engine.
2. With the engine NOT running, pump the brake repeatedly to be sure the brake accumulators have no hydraulic pressure, then move the loader control lever back and forth several times to release any hydraulic pressure in the pilot control circuit.
3. Slowly loosen the filler cap on the hydraulic reservoir to release the air pressure in the reservoir. Connect a vacuum pump to the hydraulic reservoir, turn on the pump.
4. Raise the hood. Lift the left-hand hood panel.
5. Remove the fluted knob **(2)** with related hexagonal bolt and washer to separate the left-hand inner fender panel **(1)** from the rear chassis.
6. Remove the bolt **(1)** with related washer. Remove the left-hand inner fender panel **(2)** from the machine.



LEIL16WHL0048AB 1



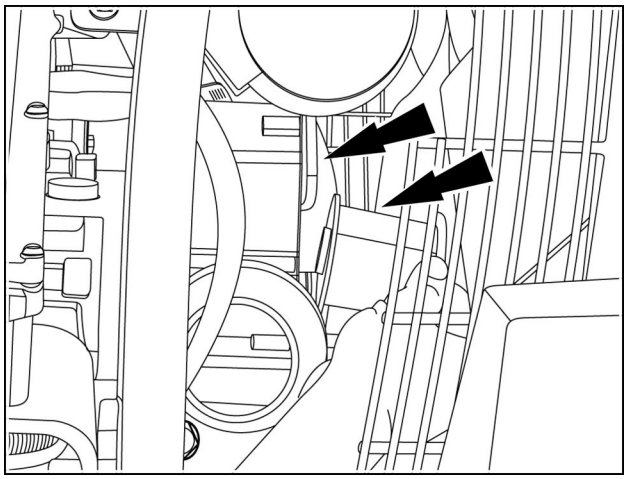
LEIL16WHL0820AB 2



LEIL16WHL0823AB 3

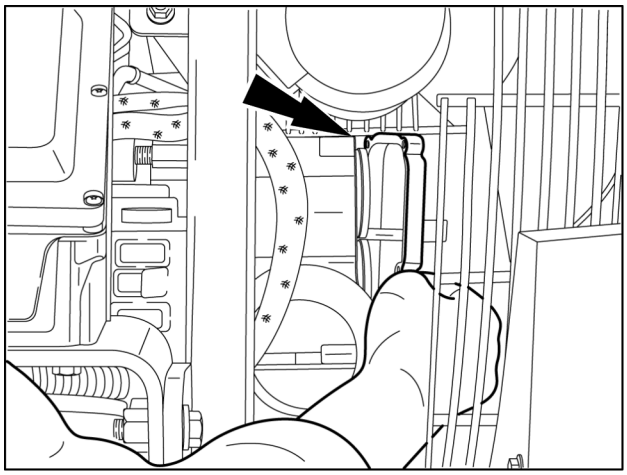
Crankcase ventilation system - Install

1. Install the new filter elements into the filter housing. Take care to fit the filter elements correctly.



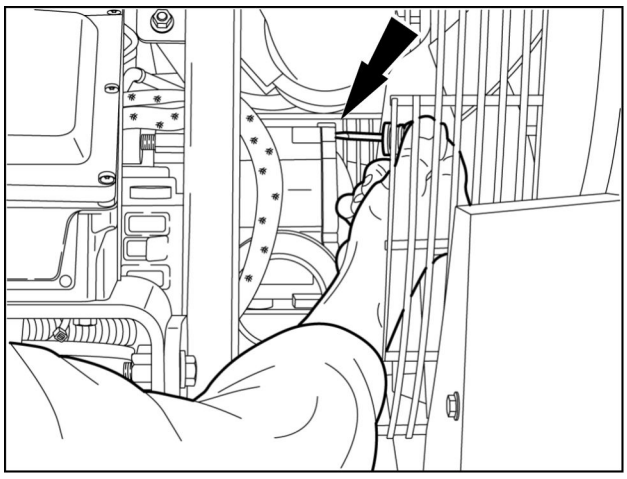
RCPH10WHL467AAH 1

2. Install the filter housing cover plate.



RAPH12WEL0090AA 2

3. Secure the filter housing cover plate with screws. It may be necessary to use an off-set screwdriver.

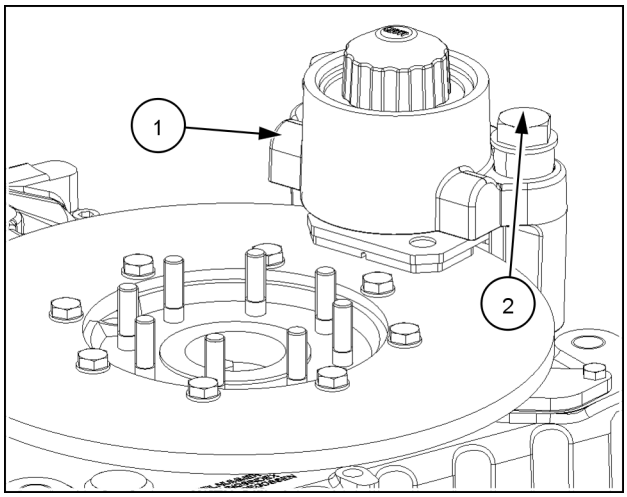


RAPH12WEL0089AA 3

10. Display

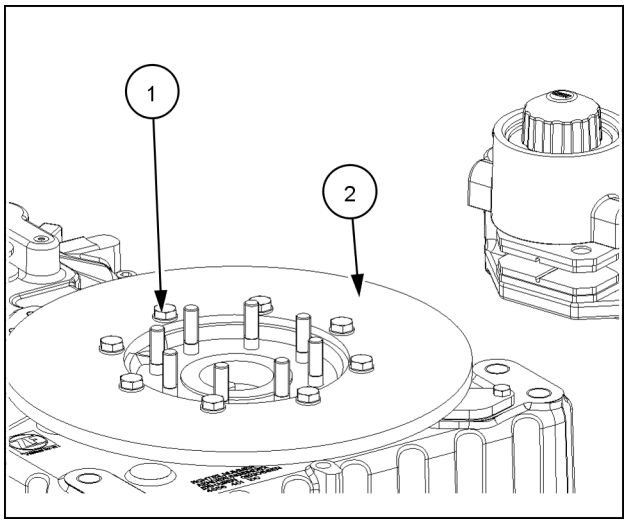
LEIL17WHL0859A 2

37. Remove the hexagon bolts **(2)** and the parking brake **(1)**.



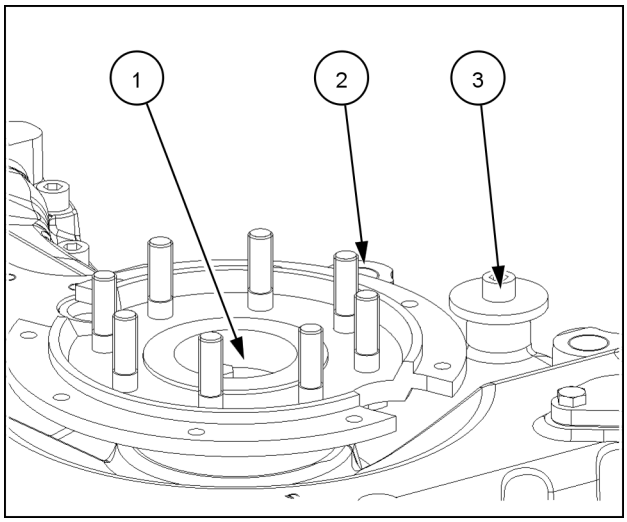
RCPH11WHL183BBU 33

38. Remove the hexagon bolts **(1)** on the bolted brake disk/output flange connection and remove the brake disk **(2)**.



RCPH11WHL184BBU 34

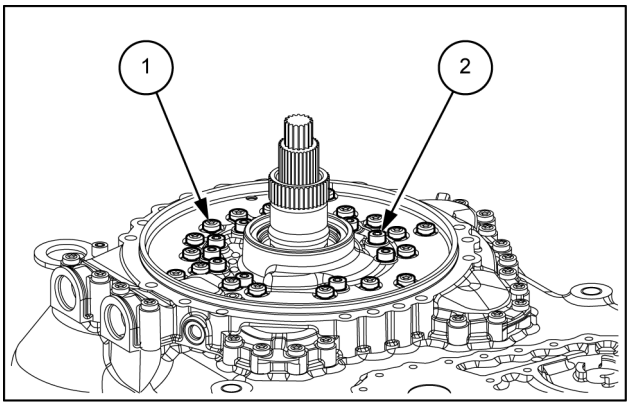
39. Remove the hexagon bolts **(1)**, washer and O ring.
40. Pull-off output flange **(2)** and remove shaft seal.
41. Remove cylinder bolt with washer **(3)**.



RCPH11WHL165BBU 35

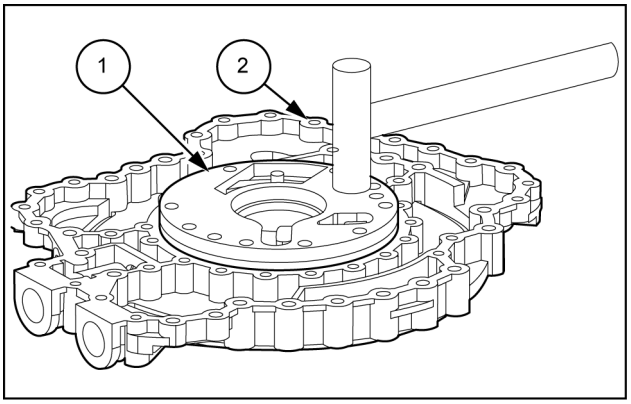
23. Remove the Torx bolts **(1)** from the oil feed housing and the front transmission housing.
24. Remove the cylindrical bolts **(2)** from the oil pressure pump and front transmission housing.

NOTE: *separate oil feed housing together with oil pressure pump from front transmission housing.*



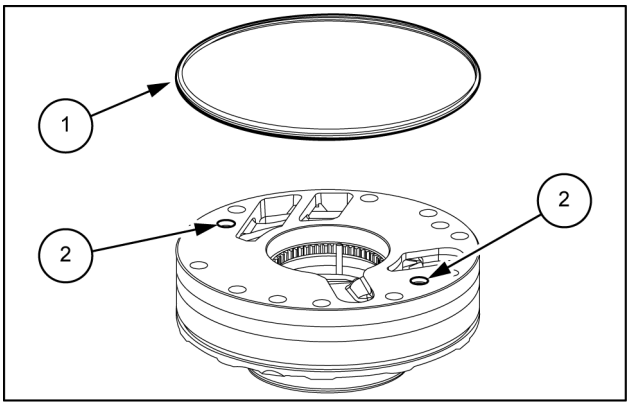
LEIL13WHL0803AB 21

25. Separate the oil pressure pump **(1)** from oil feed housing **(2)**.



LEIL13WHL0804AB 22

26. Remove the O-ring **(1)** and the cylindrical bolts **(2)**.

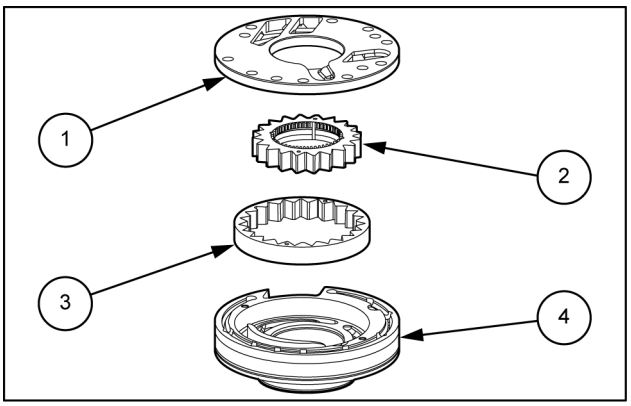


LEIL13WHL0805AB 23

27. Check oil gear pump for wear. In case of wear marks on the pump housing, cover, inner rotor, or outer rotor; replace the oil pressure pump.

Legend

1. Cover
2. Inner rotor
3. Outer rotor
4. Pump housing



LEIL13WHL0806AB 24

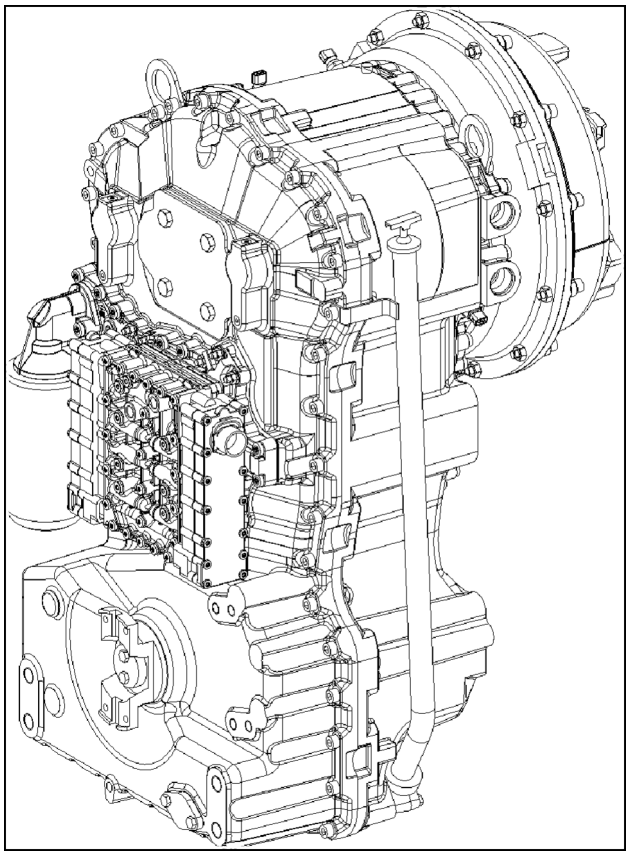
Transmission control valve - Disassemble - 4 speed

W130 D WHEEL LOADER XR, NEW CAB TIER4B	WE
W130 D WHEEL LOADER ZBAR NEW CAB TIER4B	WE

Electro-hydraulic control and fine filter (replaceable filter)

1. Attach transmission to an assembly truck stand.

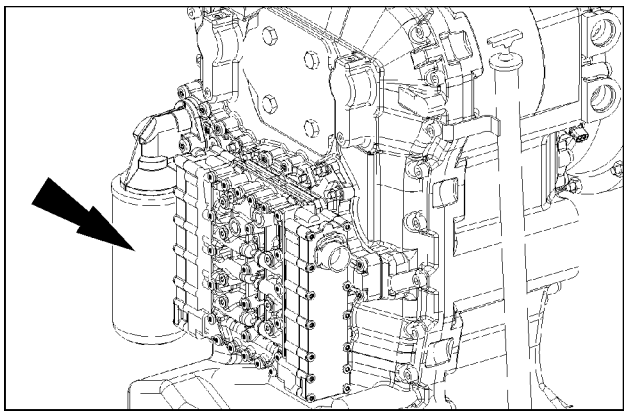
NOTE: *drain oil prior to starting transmission disassembly. Dispose of oil according to legal requirements.*



RCPH11WHL765BAU 1

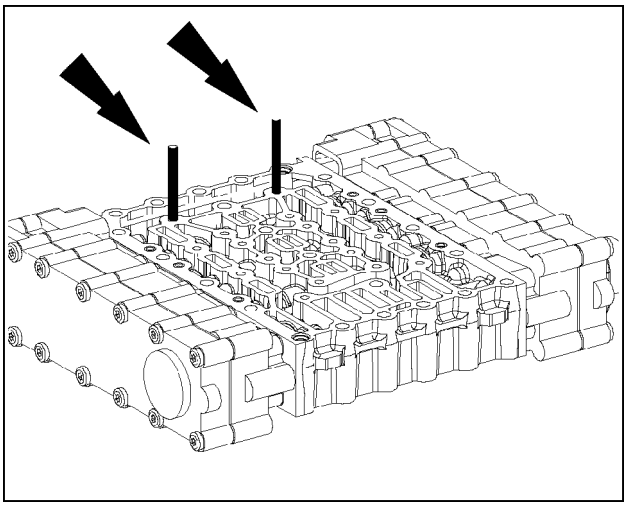
Removal of filter

2. Remove fine filter from the filter head with appropriate filter wrench. Properly dispose of filter.



RCPH11WHL766BAU 2

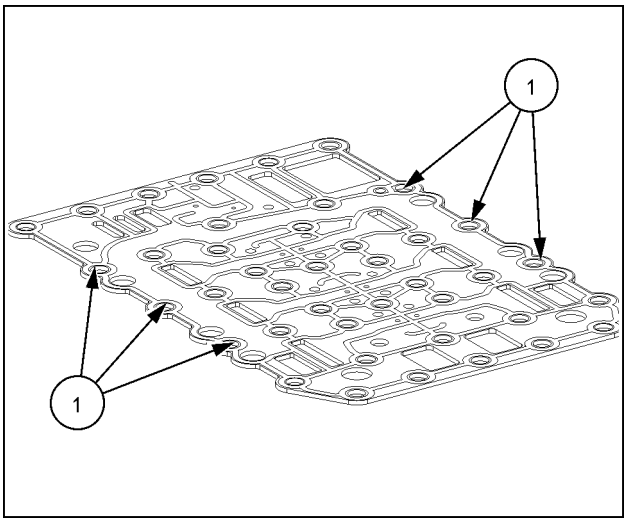
29. Install two adjusting screws 380001558.



RCPH11WHL204BBU 24

30. Flush-mount screens **(1)** into the holes of the sealing plate.

NOTE: *pay attention to the installation position. Screen faces UPWARD, toward the duct plate.*

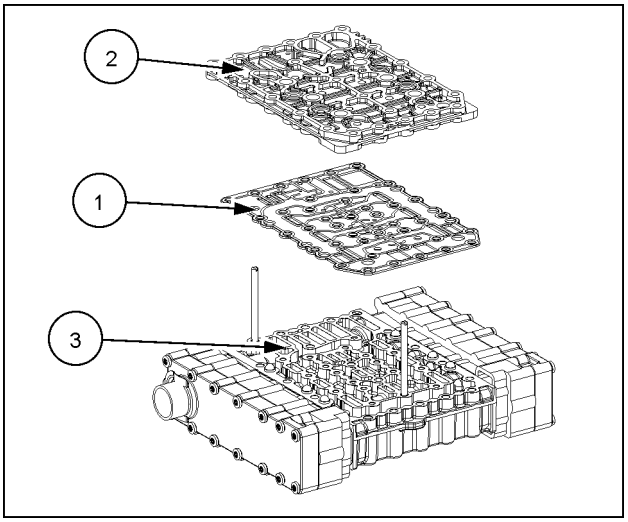


RCPH11WHL205BBU 25

31. Attach the sealing plate with the screens **(1)**, and duct plate **(2)** to the electro–hydraulic control **(3)**.

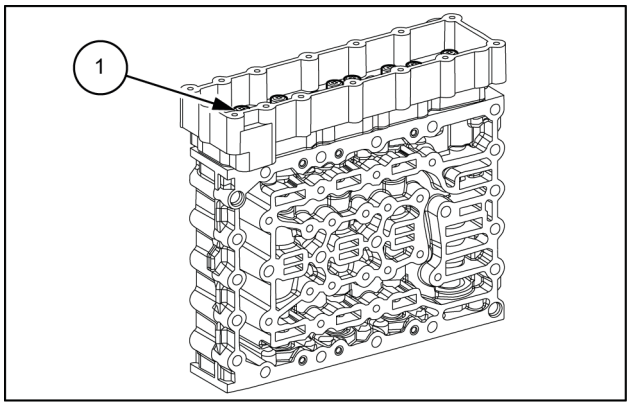
NOTE: *verify that the screen is facing upward.*

NOTE: *do not re-assemble the seal plate after opening the threaded joint shift unit/duct plate. In case of repair it is always necessary to mount a new seal plate.*



RCPH11WHL206BBU 26

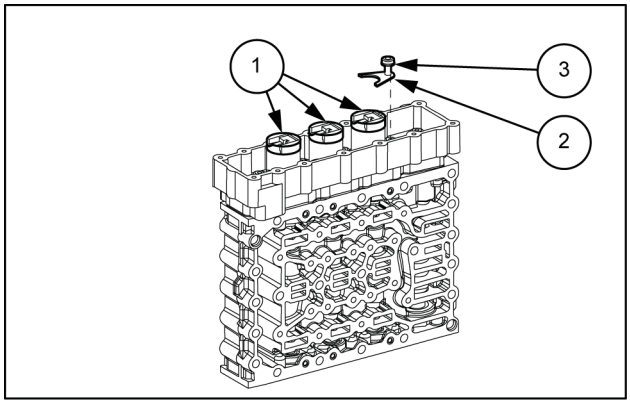
11. Seat housing using the Torx bolts **(1)**. Torque to **5.5 N·m** (**49 lb in**).



LEIL13WHL1037AB 11

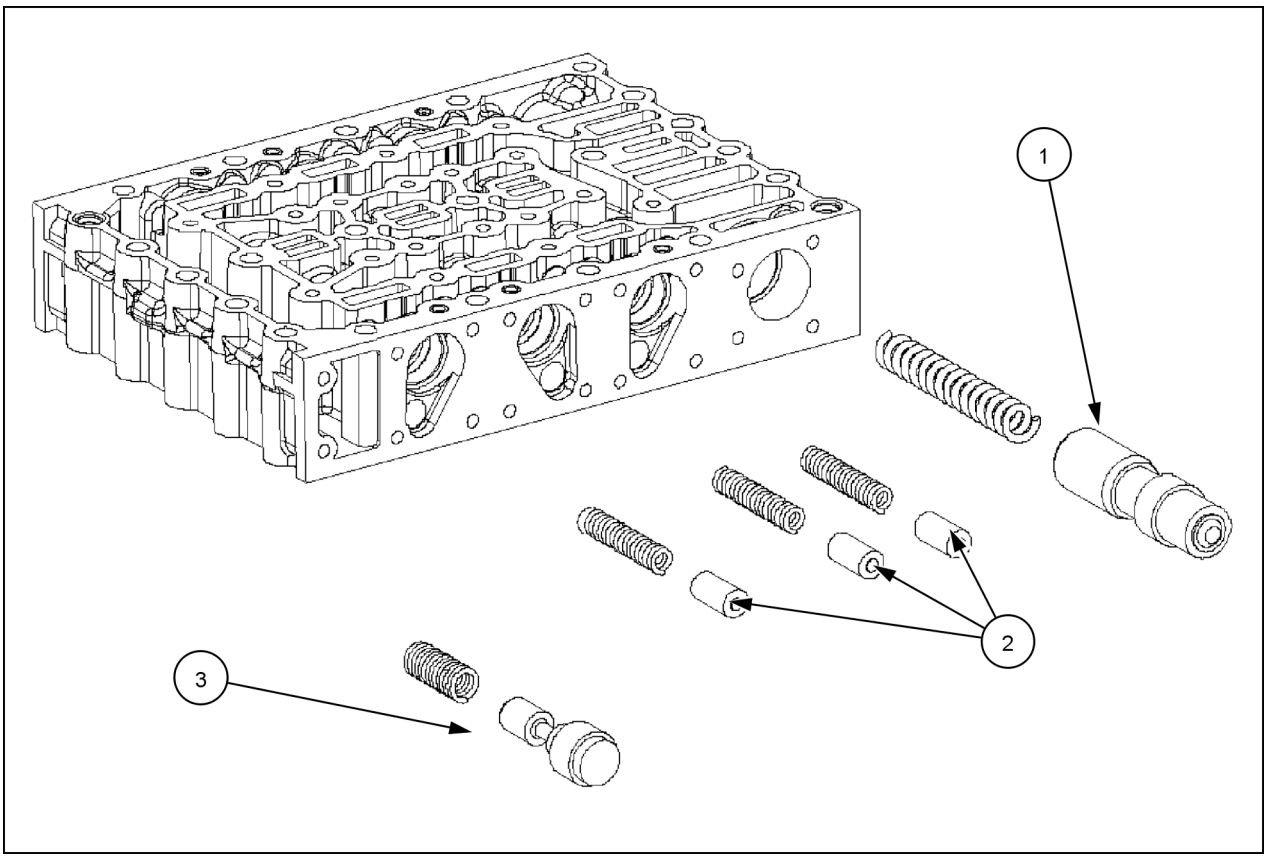
12. Mount pressure controllers with O-ring **(1)** and secure in place using securing plates **(2)** and Torx bolts **(3)**. Torque bolts to **5.5 N·m** (**49 lb in**).

NOTE: *install securing plate with the claw side facing downward. Pay attention to the radial installation position of pressure controllers.*



LEIL13WHL1038AB 12

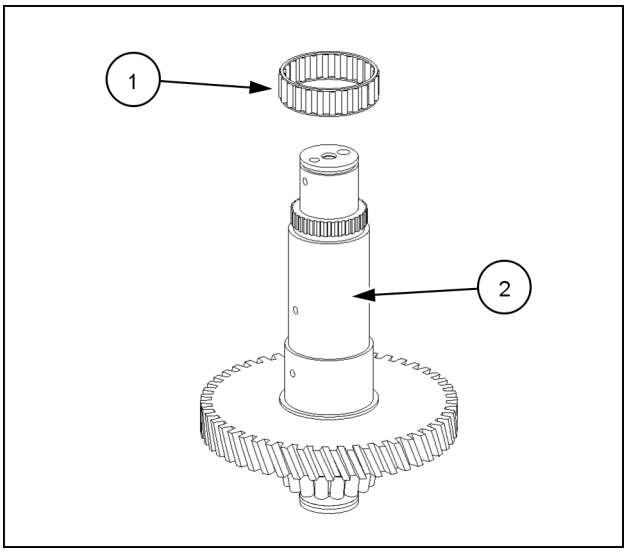
Preassemble the opposite side of electric control



RCPH11WHL209FBU 13

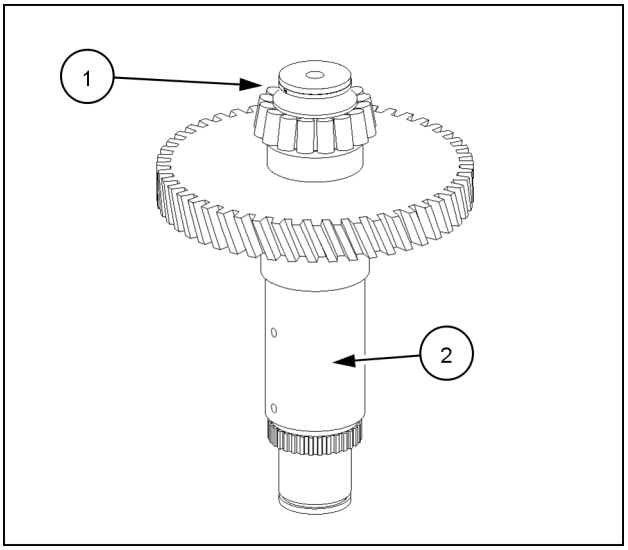
Electric control

7. Remove needle cage **(1)** from the shaft **(2)**.



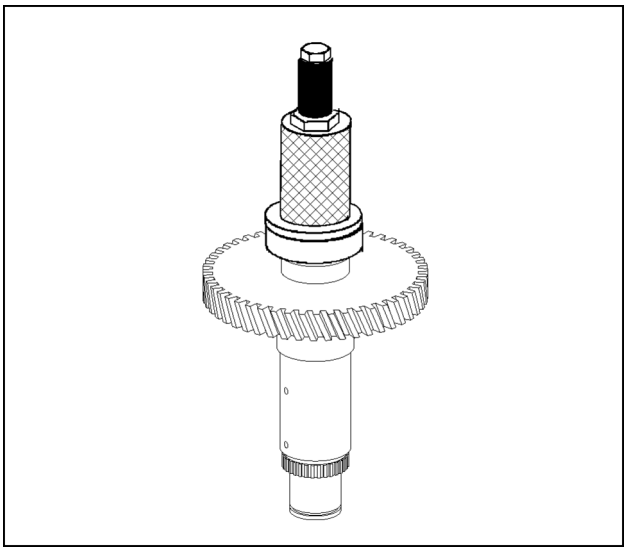
RCPH11WHL091BBU 8

8. Turn shaft **(2)** by **180°** and snap out piston ring **(1)**.



RCPH11WHL092BBU 9

9. Pull tapered roller bearing (inner ring) off the shaft.



RCPH11WHL093BBU 10

Clutch - Assemble - Third gear clutch K3 - 4 speed / 5 speed

W130 D WHEEL LOADER XR, NEW CAB TIER4B	WE
W130 D WHEEL LOADER ZBAR NEW CAB TIER4B	WE

⚠ CAUTION

Eye injury hazard!
Wear protective goggles when using compressed air.
Failure to comply could result in minor or moderate injury.

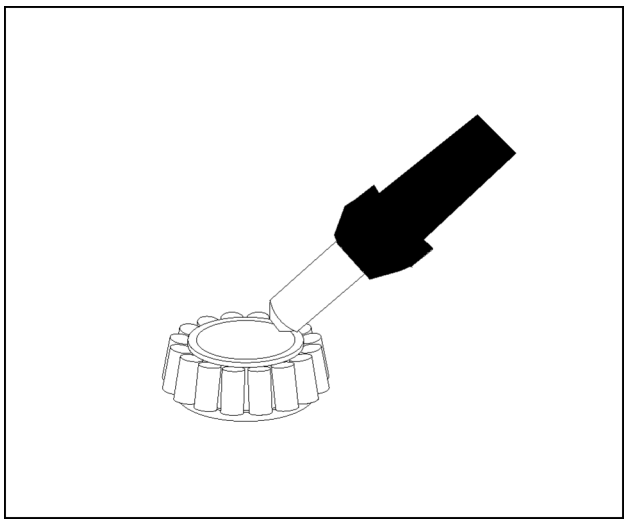
C0035A

⚠ CAUTION

Hot area!
Use care when working near hot components. Wear protective gloves.
Failure to comply could result in minor or moderate injury.

C0034A

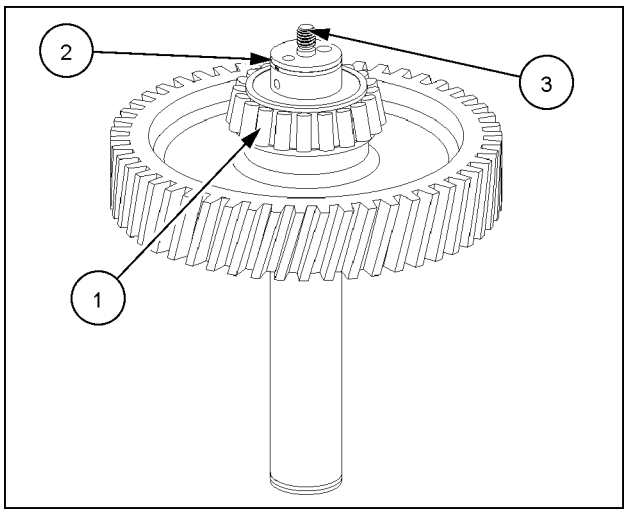
1. Heat up bearing inner ring to approximately **49 °C** (**120 °F**).



RCPH11WHL131BBU 1

2. Mount bearing inner ring **(1)** until contact is made.
3. Secure rectangular ring **(2)**.
4. Mount stud bolt **(3)**. Tighten torque to **17 N·m** (**150 lb in**)
5. Adjust bearing inner ring after cooling-down.

NOTE: *wear protective gloves.*



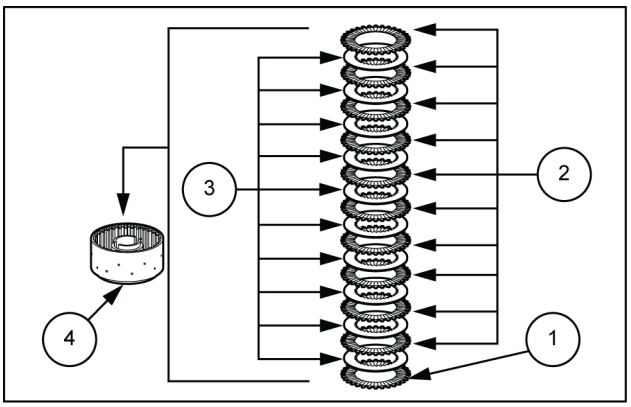
RCPH11WHL057BBU 2

12. Install outer and inner discs into the disc carrier **(4)**.
    1. Friction disc - coated on one side (1 pcs)
    2. Outer discs (10 pcs)
    3. Inner discs (10 pcs)

NOTE: *make sure that the uncoated (blank) side of the friction disc **(1)** is showing towards the piston. Number of friction surfaces is 18.*

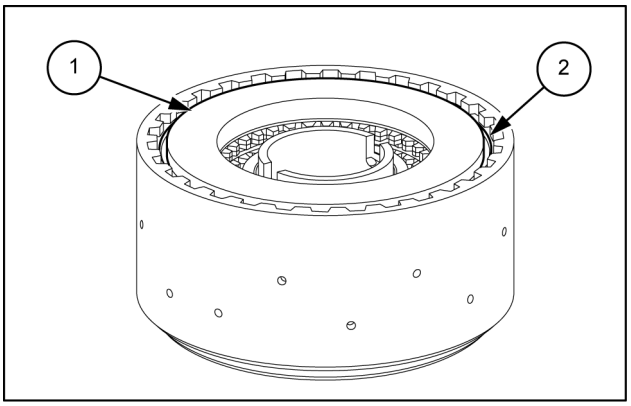
NOTE: *different clutch disc arrangements with relevant disc clearance can be installed depending on the parts list version.*

NOTE: *the actual installed clutch and disc arrangement must be taken from the corresponding spare parts list. The spare parts list is binding.*



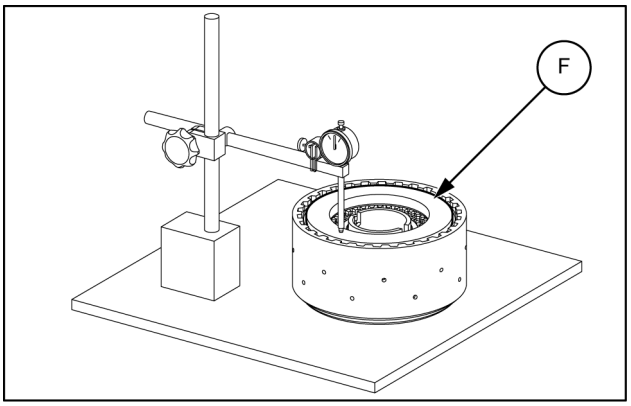
LEIL13WHL0897AB 12

13. Mount end plate **(1)** and secure disc package using snap ring **(2)** e.g. thickness = **2.65 mm** (**0.104 in**)/ recommended value.



LEIL13WHL0898AB 13

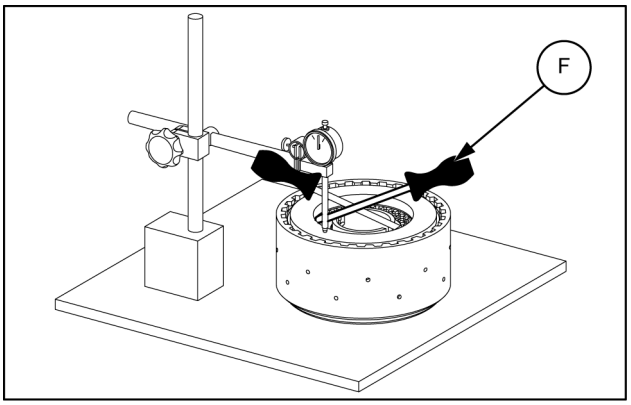
14. Press on end plate with F (approximately **100 N** (**22 lb**)) and set dial indicator to “zero”.



LEIL13WHL0899AB 14

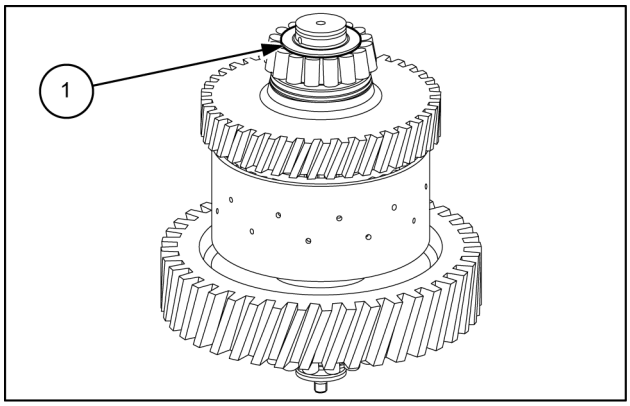
15. Press end plate against the snap ring (upwards) and read disc clearance. Disc clearance should be: **2.65 – 2.95 mm** (**0.104 – 0.116 in**)).

NOTE: *in cases of deviation, the disc clearance must be corrected with the appropriate snap ring. Optional thicknesses range from **2.1 – 4.2 mm** (**0.083 – 0.165 in**).*



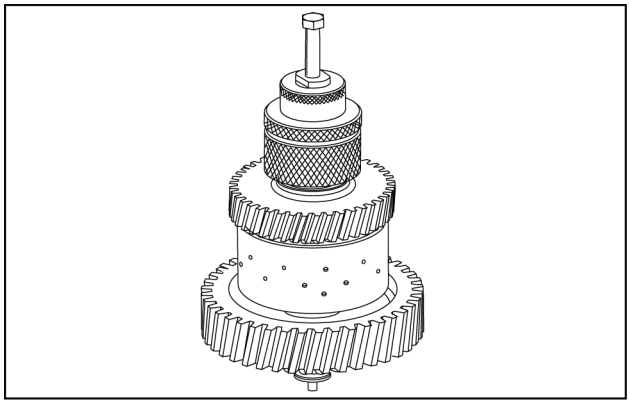
LEIL13WHL0900AB 15

1. Snap out piston ring **(1)**.



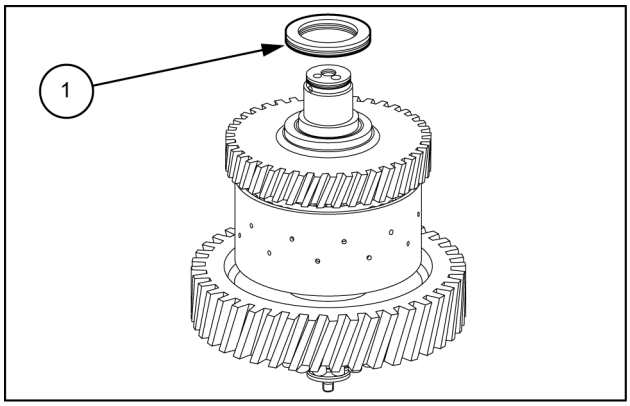
LEIL13WHL0867AB 2

2. Pull tapered roller bearing off the shaft with special tool **CAS2798**.



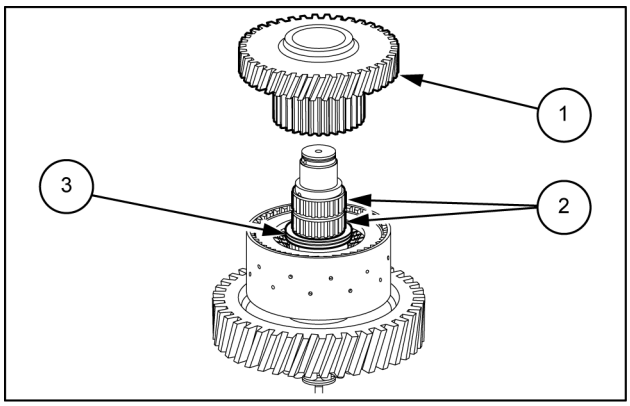
LEIL13WHL0868AA 3

3. Remove the axial bearing assembly **(1)**.



LEIL13WHL0869AB 4

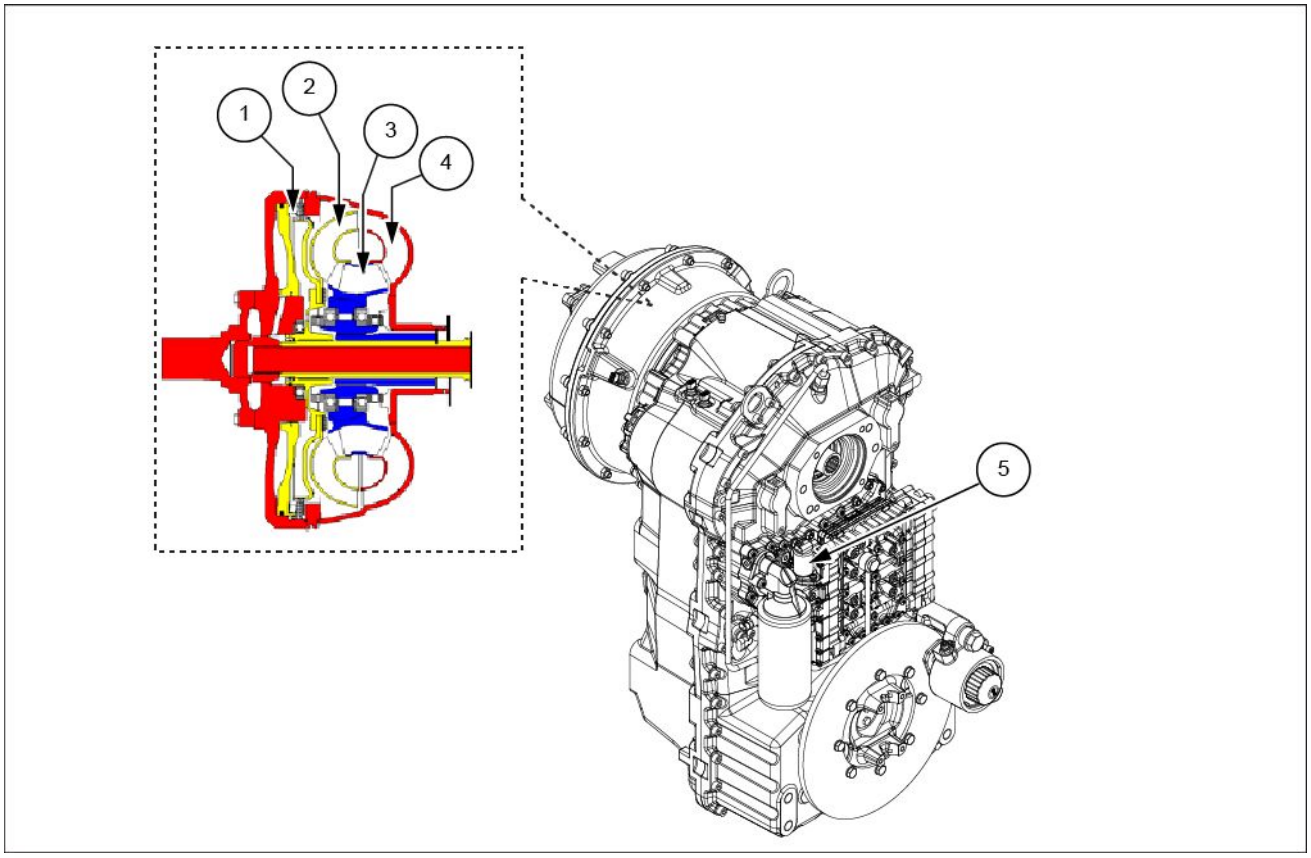
4. Take off the idler gear **(1)**, remove the needle cage **(2)** and the axial bearing assembly **(3)**.



LEIL13WHL0870AB 5

Torque converter - Dynamic description - Lock-up clutch (only 5 speed transmission)

W130 D WHEEL LOADER XR, NEW CAB TIER4B	WE
W130 D WHEEL LOADER ZBAR NEW CAB TIER4B	WE



LEIL17WHL0630FB 1

(1) Lock-up clutch	**(4)** Pump wheel
(2) Turbine wheel	**(5)** Lock-up proportional solenoid
(3) Stator	

The lock-up clutch **(1)** connects the torque converter pump (input) with the turbine (output) providing a direct connection between the engine and transmission. It provides faster acceleration and higher achievable vehicle speeds.

The lock-up clutch is automatically engaged/disengaged by the Transmission Control Unit (TCU).
See electrical schema **Wiring harnesses - Electrical schematic sheet 25 SH25 - GEAR CONTROL UNIT 1 (55.100)**.

The TCU performs the pressure modulation on the lock-up clutch by activating the lock-up solenoid **(5)**. The lock-up clutch remains locked up 2nd gear through 5th gear range.
See hydraulic schema **Powershift transmission - Hydraulic schema (21.113)**.

The torque converter lock-up function is operator selectable ON/OFF by way of the related button on the multifunction keypad.

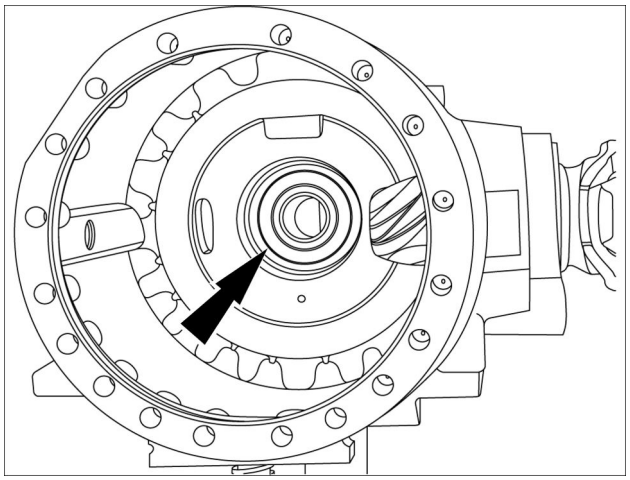
Index

Four-Wheel Drive (4WD) system - 23

Drive shaft - 314

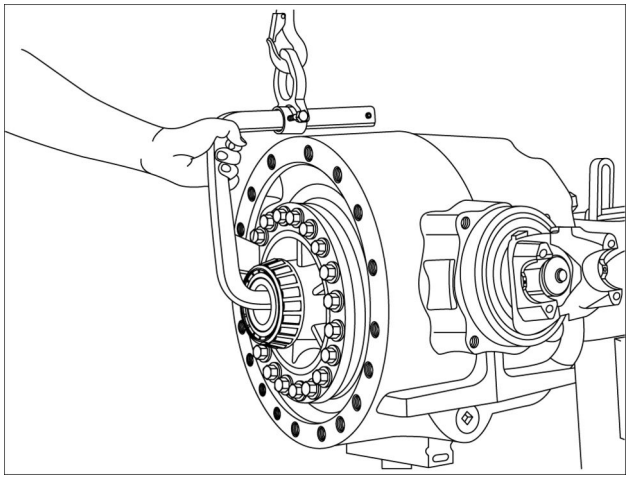
(*) See content for specific models

17. Insert selected shim e.g. s = **0.9 mm** (**0.035 in**) into hole of axle housing and adjust bearing outer ring (arrow) until contact is obtained.



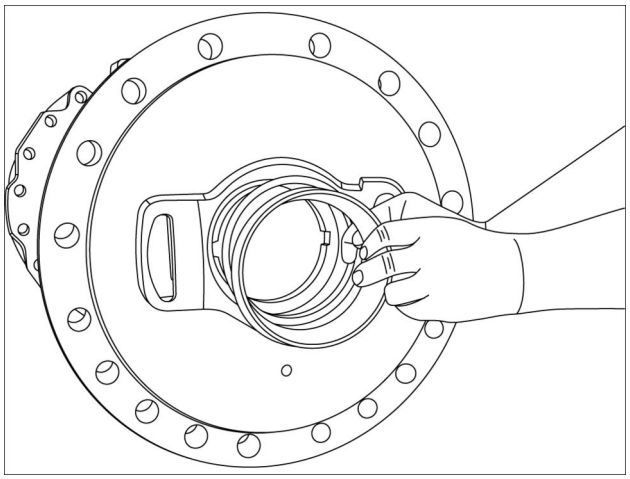
RAIL11WEL0365BA 17

18. Cover some drive and coast flanks of crown wheel with marking ink. Insert pre-mounted differential into axle drive housing.



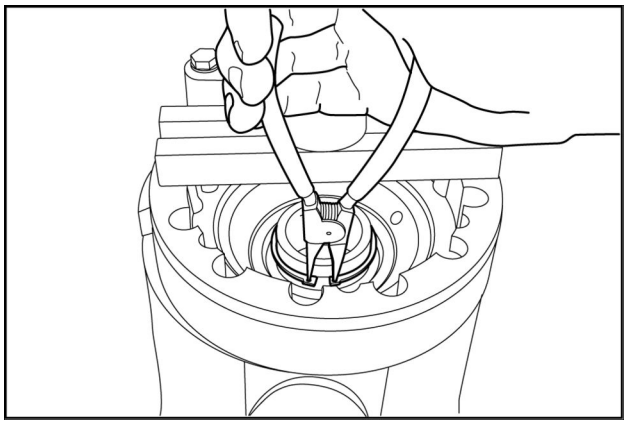
RAIL11WEL0366BA 18

19. Insert selected shim e.g. s = **1.1 mm** (**0.043 in**) into hole of axle housing and adjust bearing outer ring until contact is made.



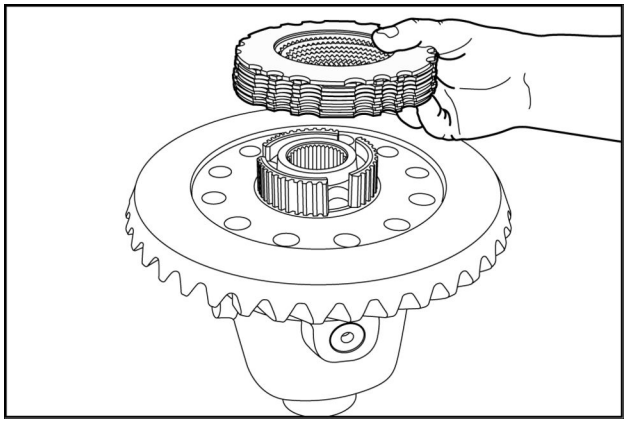
RAIL11WEL0367BA 19

4. Preload the housing cover/compression spring using the press and disengage the retaining ring. Then remove the sliding sleeve and compression spring from the housing cover.



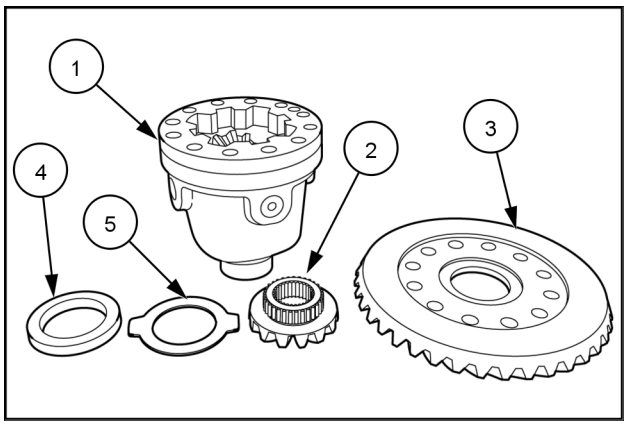
RAIL11WEL0039BA 4

5. Remove the disc package and the disc carrier.



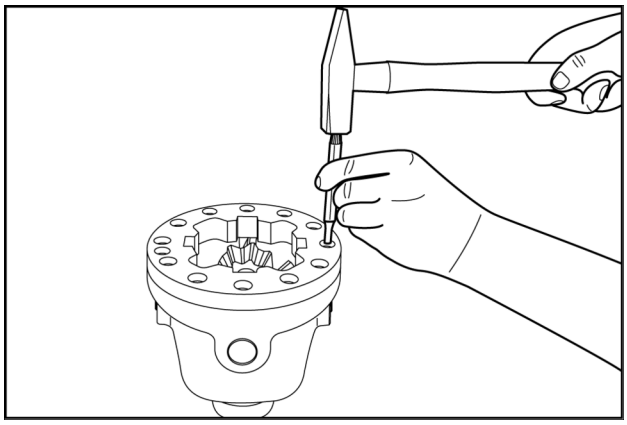
RAIL11WEL0040BA 5

6. Remove the crown wheel, axle bevel gear, thrust washer and constant spacer.
   1. Differential carrier
   2. Axle bevel gear
   3. Crown wheel
   4. Thrust washer
   5. Constant spacer



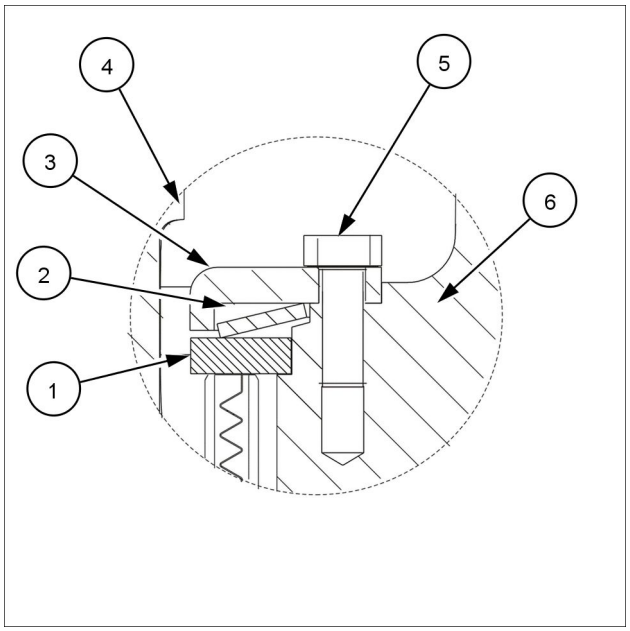
RAIL11WEL0041BA 6

7. Force slotted pins out of both spider shaft halves (split version). Then remove both spider shaft halves in arrow direction and take components out of the differential carrier.



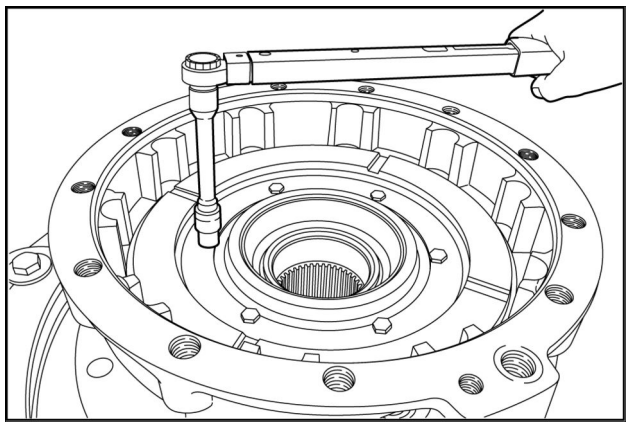
RAIL11WEL0042BA 7

13. Confirm installation position of components.
    1. Disc
    2. Cup spring
    3. Cover
    4. Piston
    5. Hex bolt
    6. Brake housing



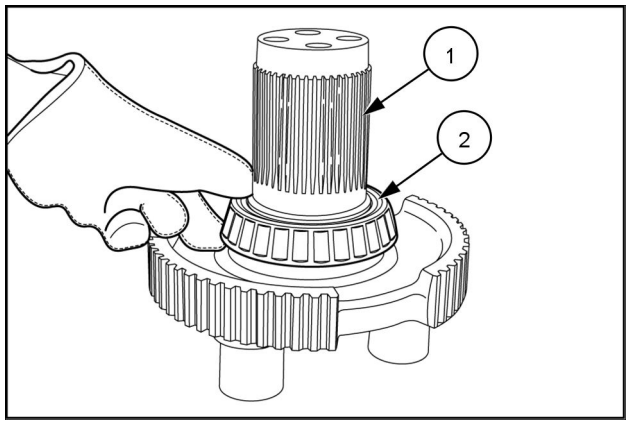
RAIL11WEL0589BA 13

14. Secure cover with hex bolts. Torque bolts to **34 N·m** (**25 lb ft**).



RAIL11WEL0545BA 14

15. Heat tapered roller bearing and install it in the planetary carrier. Then wet the profile **(1)** and front face (contact face of output shaft) **(2)** with anticorrosive agent.

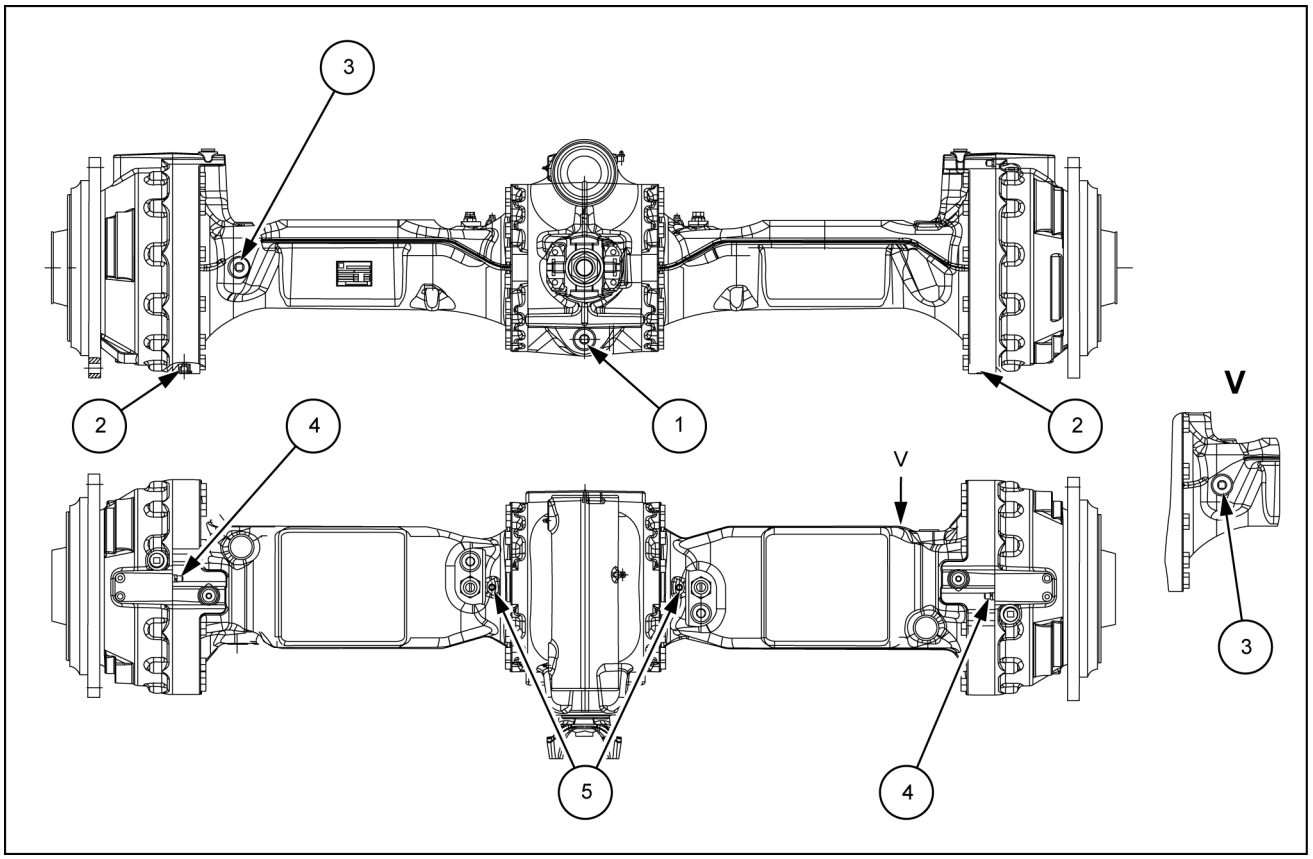


RAIL11WEL0546BA 15

W170D

Rear Axle Model MT-L3075II - Limited Slip Differential

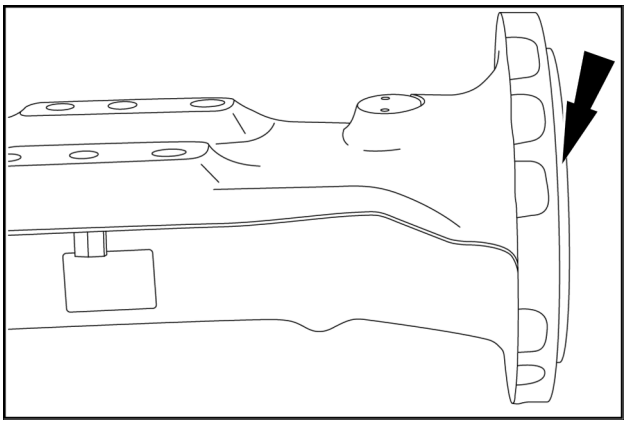
Rear Axle Model MT-L3085II - Open Differential



LEIL14WHL0424FB 2

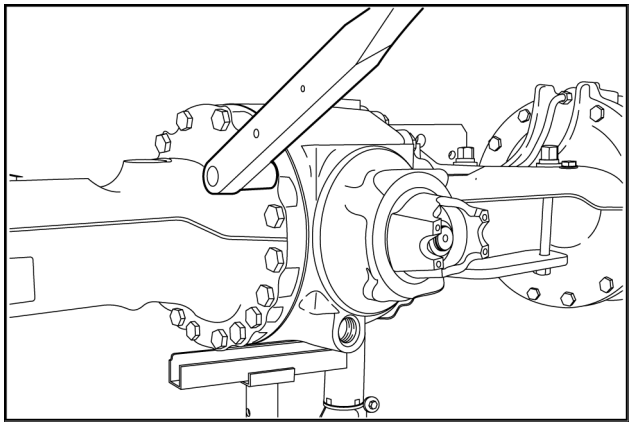
1. Oil drain hole (axle casing)
2. Oil drain hole (outputs)
3. Oil filler and check hole
4. Brake bleeder
5. Bleeder

8. Grease O-ring (see arrow) and insert it into the axle housing.



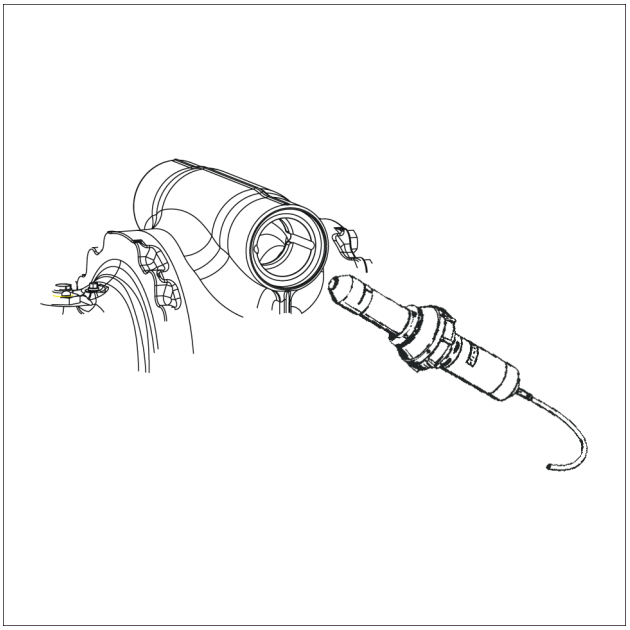
RAIL11WEL0532BA 8

9. Using a suitable lifting device, attach axle housing to axle drive housing and secure with hex nuts. Torque hex nuts to **390 N·m** (**288 lb ft**).



RAIL11WEL0533BA 9

10. Heat the hose in the axle drive housing with a hot air blower.



RAIL12WEL0596BA 10

Limited slip differential - Assemble - DL-2400

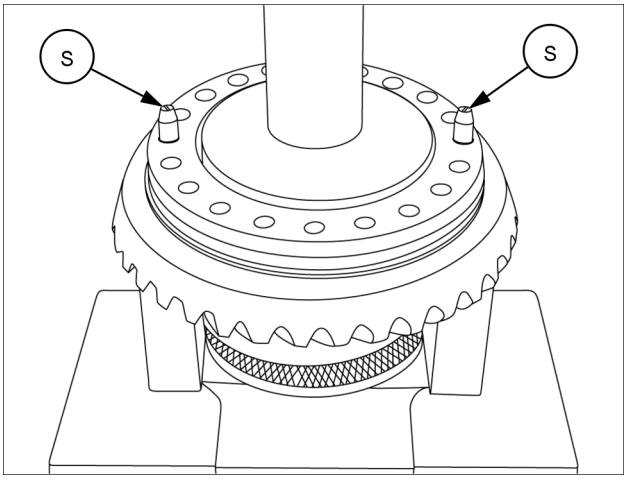
W170 D WHEEL LOADER XR NEW CAB TIER4B	WE
W170 D WHEEL LOADER ZBAR, NEW CAB TIER4B	WE

⚠ CAUTION

Burn hazard!
Always wear heat-resistant protective gloves when handling heated parts.
Failure to comply could result in minor or moderate injury.

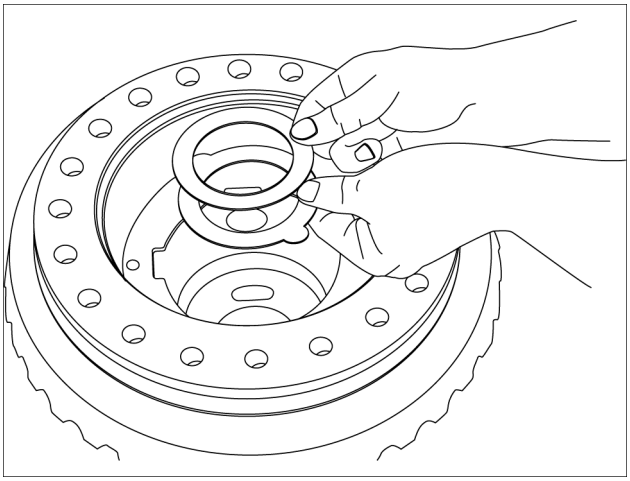
C0047A

1. Mount two M16 x 1.5 locating pins **(S)** and press heated crown wheel onto differential housing until contact is made.



RAIL11WEL0270BA 1

2. Insert thrust washer into differential housing.

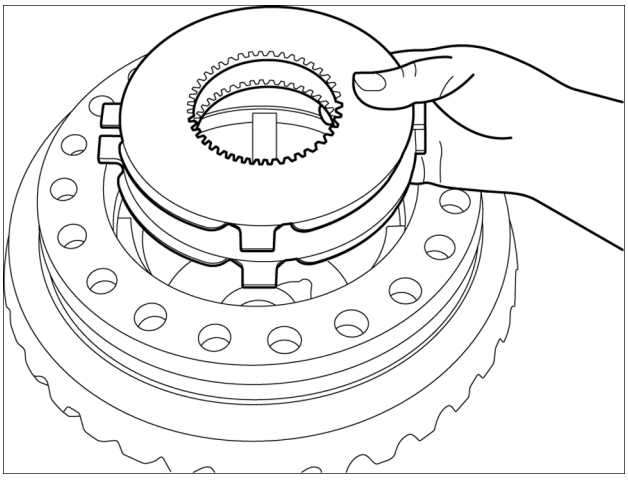


RAIL11WEL0271BA 2

3. Mount outer and inner discs in alternating order starting with an outer disk.

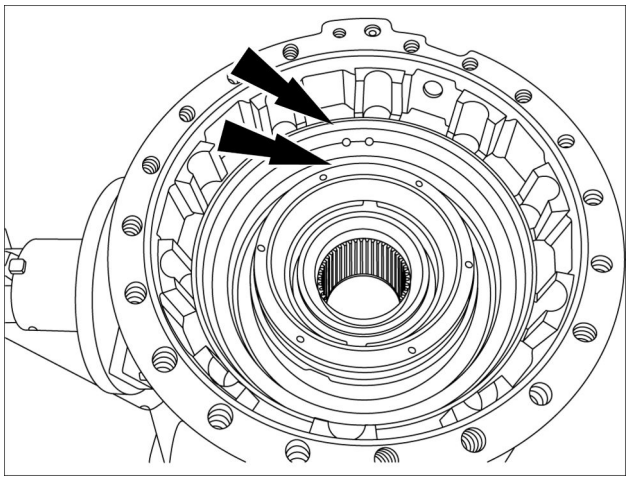
NOTE: *the installation clearance of internal parts is corrected by mounting outer discs of different thicknesses.*

NOTE: *the difference in thickness between the left and right disc package must be less than* ***0.1 mm*** *(****0.004 in****).*



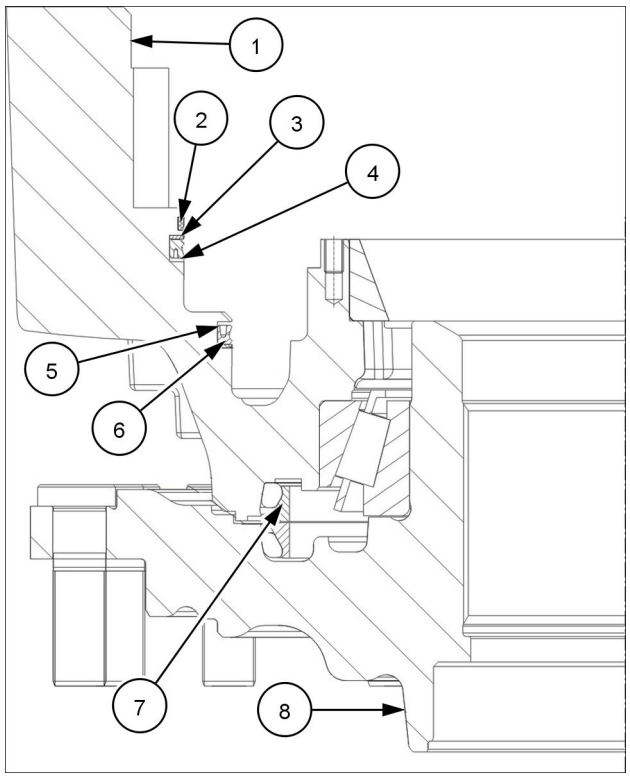
RAIL11WEL0302BA 3

13. If necessary, remove guide ring, back-up rings and grooved rings from annular grooves of brake housing (arrows).



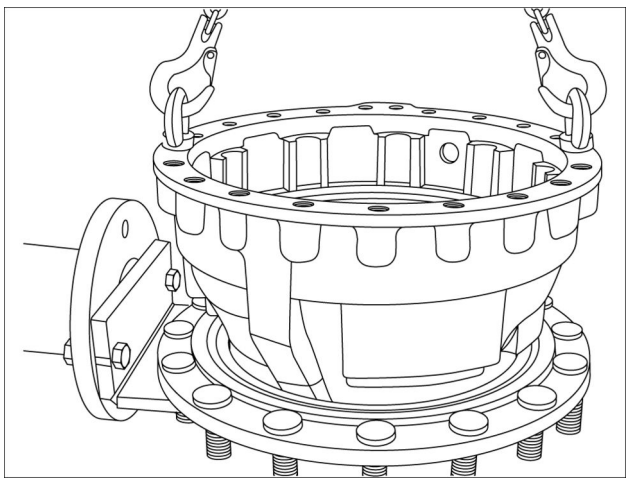
RAIL11WEL0196BA 13

14. Note the installation position of the individual parts.
    1. Brake housing
    2. Guide ring
    3. Back-up ring
    4. Piston seal
    5. Piston seal
    6. Back-up ring
    7. Slide ring seal (Metal face seal - HD option only or combi seal standard version)
    8. Output shaft



RAIL11WEL0197BA 14

15. Use a suitable lifting device. Lift brake housing from output shaft.



RAIL11WEL0198BA 15

pressure. Once the accumulators **(2)** are charged equally, the accumulator isolation check valve **(53e)** separates the pressurized oil stored in either accumulator. Only one check valve of the accumulator isolation check valve **(53e)** can be seated at one time and it is the highest pressure side. This will always assure that the lowest accumulator pressure is ported to the accumulator charging valve. If a failure occurred in either the front or rear brake circuits, the check valve in the good circuit would close to continue to provide service braking with at least one circuit.

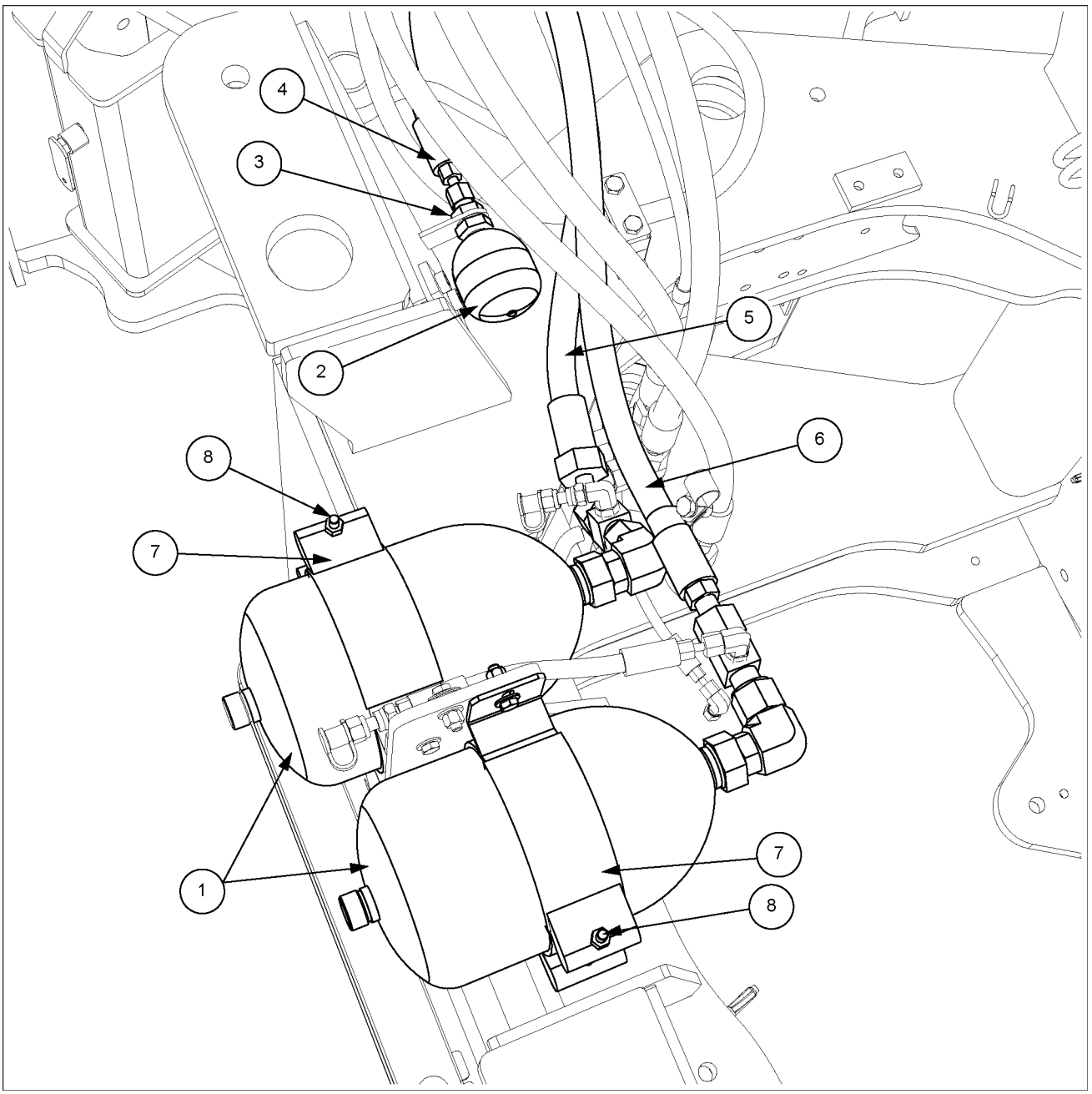
The brake accumulators **(2)** store a volume of fluid under pressure to provide a supply of brake function oil without having the brake pump operating under pressure at all times. Teed into the hydraulic line between the brake valve and each accumulators are two redundant pressure sensors (PRB1) **(53c)**, (PRB2) **(53d)**and two pressure test ports (TP6), (TP7).

The pressurized oil from the inlet of the accumulator isolation check valve is available to the parking brake solenoid **(3b)**. This solenoid is normally closed and vents the parking brake release port to tank when it is not energized. The parking brake **(3a)** is spring applied and requires hydraulic pressure to release it. Any time that the parking brake solenoid is not activated or the brake accumulator pressure is low, the parking brake automatically actuates. There is a parking brake accumulator **(3)** teed into the inlet of the parking brake solenoid valve.

There is a brake treadle valve **(53f)** connected to the brake pedal inside the cab. This valve consists of a control spool for the front brakes and another control spool for the rear brakes. These spools are interconnected with a spring so that both the front and rear brakes will see approximately the same pressure as the single pedal is depressed. Each treadle spool provides a variable pressure to its respective service brake actuator in proportion to the effort applied to the brake pedal. The service brake actuators are spring released and require an applied pressure to actuate the brakes. A small amount of brake pedal force equals low brake pressure applied to the actuator and hence light braking action. Heavier brake pedal force will result in greater braking action. The Wheel Loader brake lights are actuated by a **4.1 bar** pressure sensor (PLB-PBD) **(53g)**.

The brake pump flow not required to keep the brake accumulators charged flows to the inlet of the cooling fan drive motor. Refer to:
Standard fan control system – **Hydraulic fan drive cooling system - Overview (Standard fan control) (35.752)**;
Reverse fan control system – **Hydraulic fan drive cooling system - Overview (Reversing fan function) (35.752)**.

Accumulator - Remove



LEIL16WHL0657GB 1

1. Brake Accumulator
2. Parking Brake Accumulator
3. Mounting Nut
4. Parking Brake Accumulator Hose
5. Front Brake Accumulator Hose
6. Rear Brake Accumulator Hose
7. Accumulator Clamp
8. Clamp Stud

0.179 – 0.10 mm (**0.007 – 0.004 in**)	**0 mm** (**0.000 in**)	4474 353 115

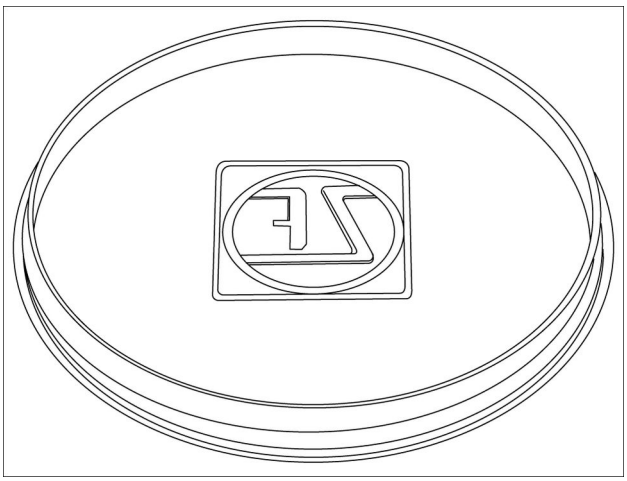
NOTE: *the cover 4474 353 172 has an offset of* ***0.07 mm*** *on one side and an offset of* ***0.13 mm*** *on the other side.*

NOTE: *the offset of* ***0.13 mm*** *is visibly marked with an annular groove.*

29. Insert the cover with the example **0.07 mm** side showing to the planetary carrier and tighten with new locking bolts. Torque the bolts successively to **200 N·m** (**148 lb ft**). Retighten the bolts successively to a torque of **500 N·m** (**369 lb ft**).

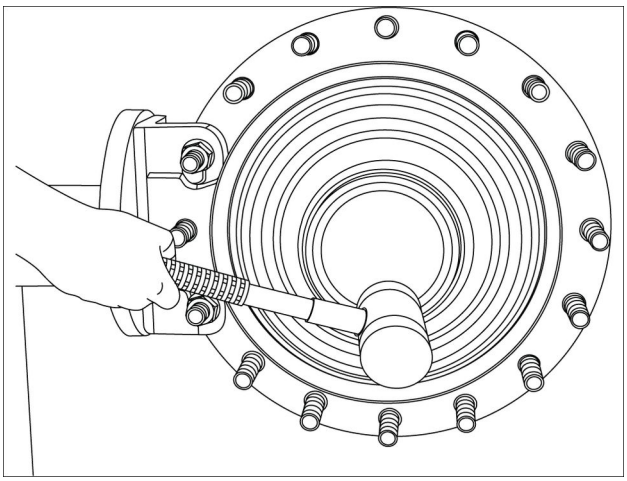
30. Install a new O-ring **(1)** on the cover and wet contact face **(2)** with **TEROSTAT® MS-9360**.

NOTE: *terostat has a curing period greater than 24 hours.*



RAIL11WEL0448BA 26

31. Install the cover onto the output shaft until fully seated.



RAIL11WEL0449BA 27

Hydraulic systems - Decontaminating

⚠ DANGER

Crushing hazard!
Always install the safety lock before working under the raised attachment.
Failure to comply will result in death or serious injury.

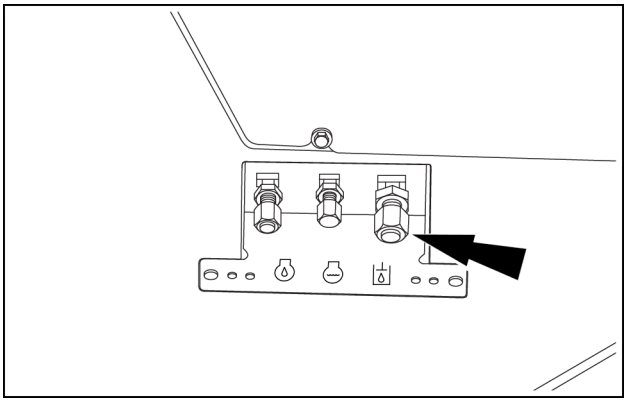
D0075A

1. Start and run the engine at **1500 rpm (r/min)**.
2. Completely retract the cylinders of all attachments on the machine. Stop the engine

NOTICE: *if retracting the cylinder rods causes the attachment to be raised, block the attachment in place before proceeding to the next step.*

NOTE: *any attachment or part of an attachment that is raised must be supported with acceptable equipment to prevent the attachment from falling.*

3. Move each control lever in both directions to release pressure in the hydraulic circuits.
4. Loosen and remove the filler cap from the reservoir.



LEIL16WHL0198AA 1

5. Drain the hydraulic oil from the reservoir.
   A. Have available acceptable equipment to drain the hydraulic oil.
   B. Remove the drain cap from the remote drain.
6. Apply brakes at least 30 times to drain oil from accumulators.
7. Remove the hydraulic filter elements from the machine.
8. Install new hydraulic filter elements on the machine.
9. Install the drain cap in the remote drain.
10. Fill the hydraulic reservoir with hydraulic fluid.
11. Disconnect the line from the OPEN end and CLOSED end of each cylinder.
12. Be sure all control levers are in the NEUTRAL position.
13. Start and run the engine at low idle.

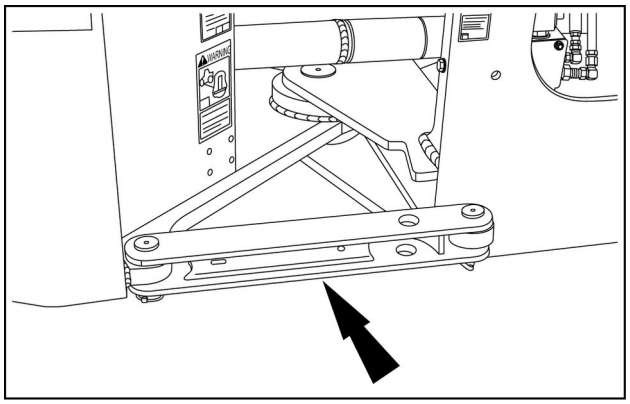
NOTICE: *check the oil level in the hydraulic reservoir frequently while doing step **13**. Have another person hold a container under the hydraulic lines while you do step **13**.*

Variable displacement pump - Service instruction - Testing and adjusting the low pressure pump differential pressure

W170 D WHEEL LOADER XR NEW CAB TIER4B	WE
W170 D WHEEL LOADER ZBAR, NEW CAB TIER4B	WE

Pressure check

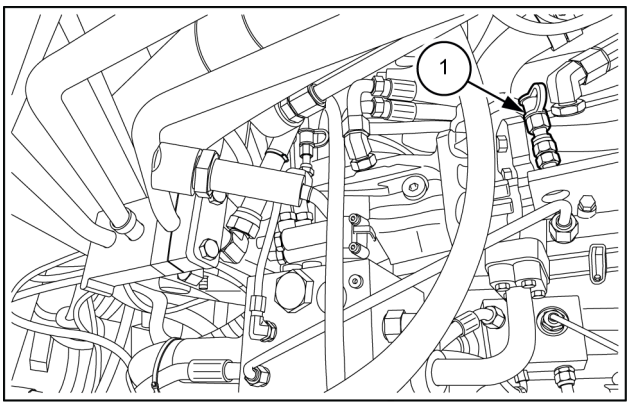
1. Install the articulation lock.



LEIL13WHL1236AA 1

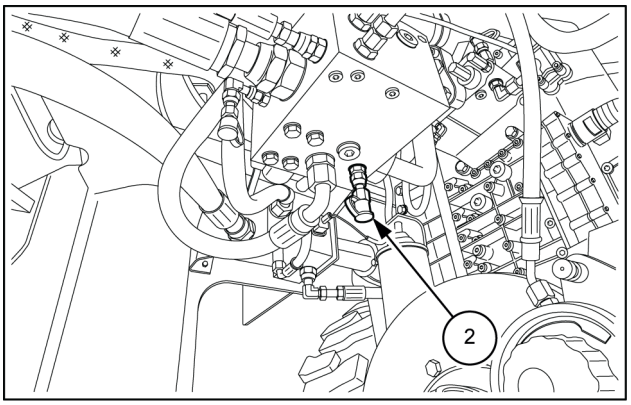
2. Make sure that the temperature of the hydraulic oil is at least **54 – 57 °C** (**129 – 135 °F**). The following is the procedure for heating the hydraulic oil.
   ● To measure the oil temperature with the instrument cluster:
   A. Press the up or down arrow key.
   B. Stop at the info screen with the temperatures that need to be monitored are on.
   ● To heat the hydraulic oil do the following:
   A. Start the engine and run at full throttle.
   B. Hold the joystick in the ROLLBACK position while raising and lowering the lift arms from ground level to full height.
   C. Continue this procedure until the temperature of the hydraulic oil is **54 – 57 °C** (**129 – 135 °F**).
   After heating oil to operating temperature, lower bucket to the ground, turn off the engine, and relieve all pressure in the hydraulic system.
3. Connect two **69 bar** (**1000 psi**) test gauges, one to the test port **(2)** located on the priority valve, and one on the pump load-sense pressure tap **(1)** (furthest from transmission).

NOTICE: *do not steer or operate loader controls while the gauges are connected, gauges could be damaged.*



LEIL13WHL1285AB 2

4. Start the engine and run at low idle.
5. Make sure all of the controls are in the neutral position and record the readings on the test ports **(1)** and **(2)**.
6. Subtract the reading of the test port **(1)** from the reading of the test port **(2)**.
7. The difference between the two readings should be **23 – 24 bar** (**334 – 348 psi**) .
8. If this reading is more or less than specified, it will be necessary to adjust the pump load-sense pressure.



LEIL13WHL1286AB 3

(24D) Priority flow divider	**(24H)** Anticavitation and circuit relief valve – **290 bar** (**4205 psi**)	

The main control valves have at least two loader control circuits, one for bucket control and one for loader lift control. Up to two optional auxiliary (Aux1/Aux2) control valve sections are available to operate attachments. The main control valve controls the loader implement of the machine, supplies regulated pressure to the pilot hand controls and also supplies priority flow to the steering circuit. The bucket, loader lift, steering priority and pilot oil supply controls are included in a single mono-block assembly. Auxiliary sections are block manifold assemblies that can be added to the end of the loader valve towards the front of the machine.

Load Sense (LS) shuttle valve (24A)

The LS shuttle valve **(24A)** is located on the end of the main control valve towards the rear of the machine. The LS shuttle valve is connected to both the steering signal pressure and the main control valve pressure. The LS shuttle valve isolates both from the other and sends the highest pressure signal pressure back to the implement piston pump.

Steering relief valve (24B)

The steering relief valve **(24B)** (**217 bar** (**3146 psi**)) is located near the inlet of the main control valve towards the right–hand side of the machine. The steering relief valve limits the maximum pressure available to the steering circuit by limiting the maximum steering signal pressure to the spring end of the steering priority spool.

Pilot hand control pressure regulator and relief valve (24C)

The pilot hand control pressure regulator and relief valve **(24C)** is located near the inlet of the loader control valve towards the rear of the machine. This regulator limits the pressure available to the pilot circuit. This valve has two functions, one to regulate the pilot pressure (**30 bar** (**435 psi**)) and one to limit the maximum pilot pressure **45 bar** (**652 psi**)) resulting from any regulator malfunction. This regulator is not adjustable and is serviced by replacement only. The pilot hand control circuit is supplied from the outlet of the implement piston pump.

Steering priority valve (24D)

The steering priority system is a part of the main control valve and includes the steering priority valve **(24D)** that ensures the closed-centered steering system receives oil before the loader control valve.

Main loader relief valve (24E)

The main loader relief valve **(24E) 227 bar** (**3292 psi**) is located near the inlet of the main control valve towards the left–hand side of the machine. The main relief valve limits the maximum pressure available to any of the loader circuits by limiting the maximum signal pressure that can be sent back from the main control valve to the flow control spool of the implement piston pump.

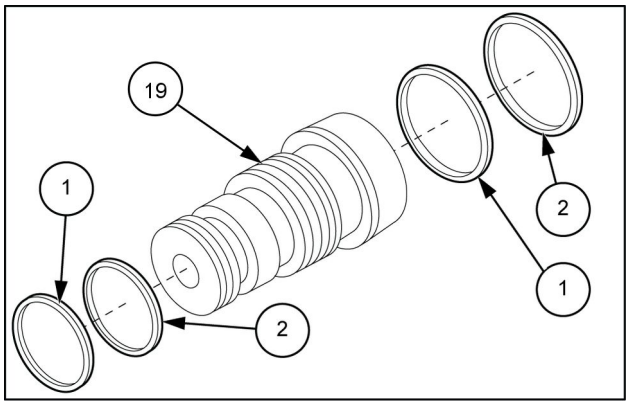
LS signal bleed down orifice (24F)

The LS signal bleed down orifice **(24F)** is located near the inlet of the main control valve towards the right–hand side of the machine. The LS signal bleed down orifice is a pressure compensated flow control orifice that continually returns approximately **0.7 L/min** (**0.18 US gpm**) from the loader valve LS signal circuit. This orifice causes the LS pressure to drop as soon as all loader control spools are returned to the neutral position.

Load check valve (24G)

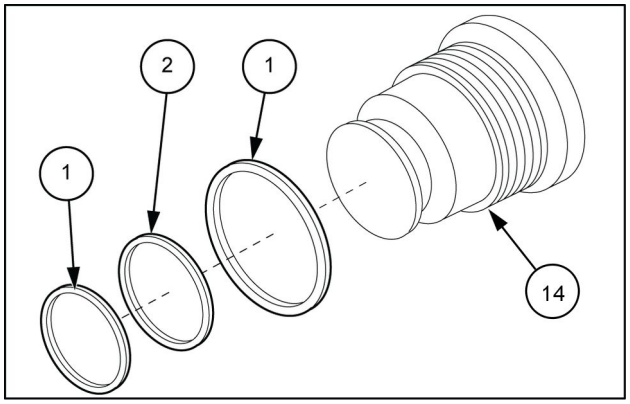
A load check valve **(24G)** is installed in each loader circuit of the main control valve. The load check valves are located under plugs on the bottom side of the main control valve. There is a load check valve in line with each control spool. The load check valves prevent the load of the circuit from falling due to gravity when the circuit is gradually engaged and the pump supply pressure happens to be less than the pressure required to hold the load raised.

17. Remove and discard O-rings **(1)** and thrust rings **(2)** from flow limit valve **(19)**.



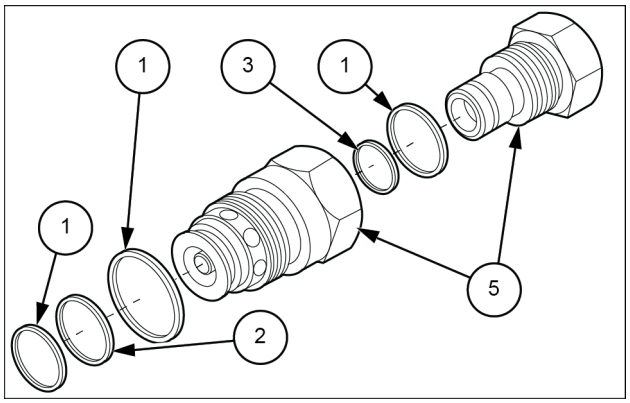
LEIL13WHL1341AB 2

18. Remove and discard O-rings **(1)** and thrust ring **(2)** from the plug **(14)**.



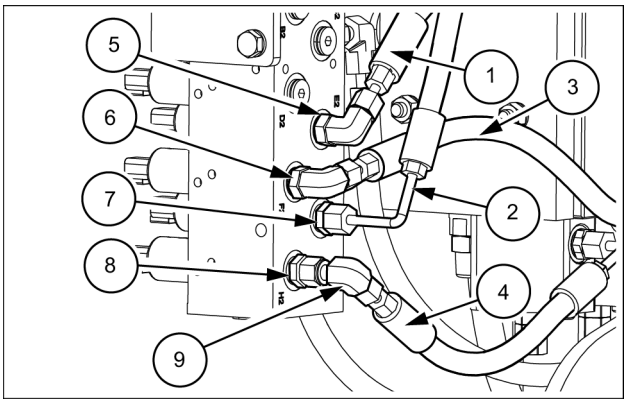
LEIL13WHL1342AB 3

19. Remove and discard the O-rings **(1)**, the thrust ring **(2)** and the spool seal **(3)** from the regeneration relief valve **(5)**.



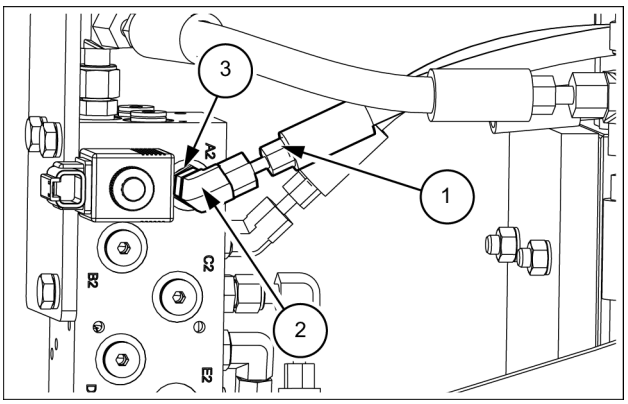
LEIL14WHL0439AB 4

14. Disconnect and plug the following hoses and remove the following elbows and fittings from the electro-hydraulic control valve:
    - 3rd spool left-hand hose **(1)** and **90°** elbow **(5)**;
    - 3rd spool hose **(3)** and **90°** elbow **(6)**;
    - pilot 4th spool left-hand hose **(2)** and fitting **(7)**;
    - pilot 4th spool right-hand hose **(4)**, **90°** elbow **(9)** and fitting **(8)**.



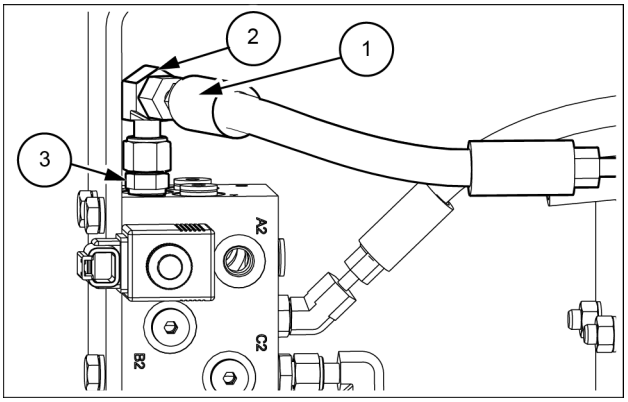
LEIL17WHL0908AB 7

15. Disconnect and plug the pilot dump hose **(1)** from the electro-hydraulic control valve.
    Remove the **90°** elbow **(2)** and the fitting **(3)** from the electro-hydraulic control valve.



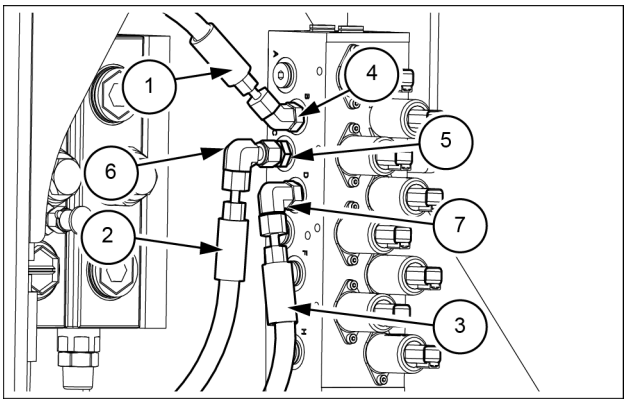
LEIL17WHL0909AB 8

16. Disconnect and plug the pilot pressure hose **(1)** from the electro-hydraulic control valve.
    Remove the **90°** elbow **(2)** and the fitting **(3)** from the electro-hydraulic control valve.



LEIL17WHL0910AB 9

17. Disconnect and plug the following hoses and remove the following elbows and fittings from the electro-hydraulic control valve:
    - pilot lower hose **(1)** and **45°** elbow **(4)**;
    - pilot rollback hose **(2)**, **90°** elbow **(6)** and fitting **(5)**;
    - pilot raise hose **(3)** and **90°** elbow **(7)**.



LEIL17WHL0911AB 10

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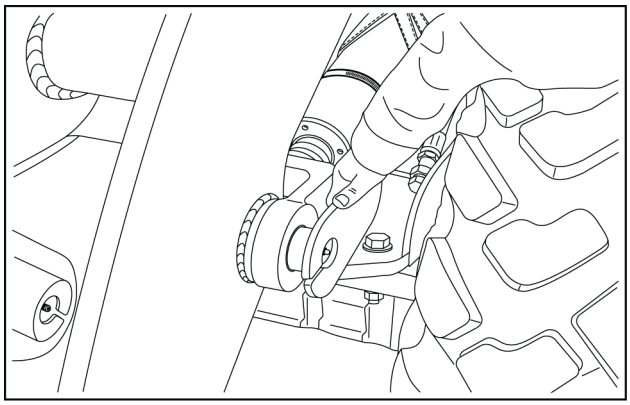
Hydraulic hand control - 355

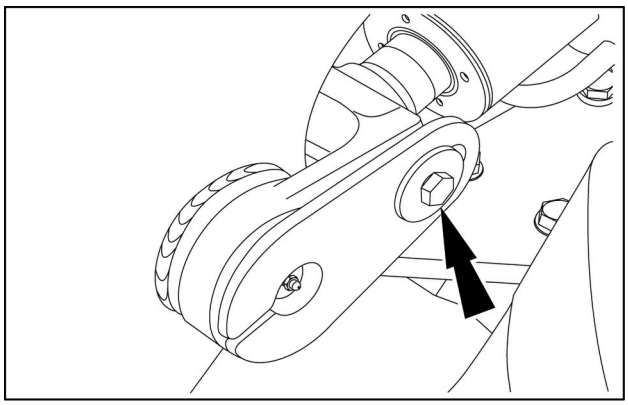
(*) See content for specific models

6. Turn off the vacuum pump **CAS10192**. Disconnect the vacuum pump **CAS10192** from the hydraulic reservoir.
7. If the yoke of the lift cylinder is not aligned with the loader frame, have another person start and run the engine at low idle and use the joystick to SLOWLY move the yoke into alignment with the loader frame.
8. Install the pivot pin for the yoke. Stop the engine.



LEIL13WHL1261AA 5

9. Align the pivot pin with the yoke and install the spacer, washer and bolt. Tighten the bolt.



LEIL13WHL1259AA 6

10. SLOWLY extend and retract the piston rod three times to remove any air from the lift cylinders.
11. Lubricate the pivot pins with molydisulfide grease.
12. Check the level of hydraulic oil in the reservoir and add as required. Tighten the filler cap on the hydraulic reservoir.

5. Connect the charging hose to the nitrogen supply tank.
6. SLOWLY turn valve A clockwise while watching the high pressure gauge. Stop turning valve A when the needle on the gauge reaches **31 bar** (**450 psi**).

NOTE: *if the needle goes over the needed pressure, quickly open and close valve D and check the pressure setting again.*

The charging kit is now ready to be installed on the accumulator.

7. Remove the valve cap from the pressure valve on the accumulator.
8. Back off the needle valve on the accumulator end of the charging hose by turning i t counterclockwise to the maximum amount. This prevents nitrogen from escaping from the accumulator when the charging hose is attached to the accumulator gas charging valve.
9. Install the charging hose fitting onto the accumulator pressure valve.
10. Tighten the needle valve by turning it clockwise. Slowly open the gauge valve D and observe the reading on the gauge. This reading is the nitrogen pressure level inside the accumulator.
11. Open the shutoff valve A on the nitrogen supply tank. While observing the pressure on the gauge, slightly open the needle valve on the accumulator charge hose. By regulating the needle valve, fill the accumulator to pressure according to temperature chart below. Close the needle valve. Close the shutoff valve A on the nitrogen supply tank.

Table 1

Temperature/Charge pressure ride control accumulator

Temperature	Charge pressure
10 °C (**50 °F**)	**1636 kPa** (**237 psi**)
13 °C (**55 °F**)	**1655 kPa** (**240 psi**)
16 °C (**61 °F**)	**1674 kPa** (**243 psi**)
18 °C (**64 °F**)	**1687 kPa** (**245 psi**)
21 °C (**70 °F**)	**1706 kPa** (**247 psi**)
24 °C (**75 °F**)	**1726 kPa** (**250 psi**)
27 °C (**81 °F**)	**1745 kPa** (**253 psi**)
29 °C (**84 °F**)	**1758 kPa** (**255 psi**)
32 °C (**90 °F**)	**1777 kPa** (**258 psi**)
35 °C (**95 °F**)	**1796 kPa** (**260 psi**)
38 °C (**100 °F**)	**1815 kPa** (**263 psi**)

12. Close valve B by turning to the right (clockwise). After a few minutes, check the accumulator for leakage.
13. Back off the needle valve on the accumulator end of the charging hose by turning it counterclockwise the maximum amount. This will prevent nitrogen from escaping from the accumulator as the hose is removed. Remove the charging hose from the accumulator pressure valve.
14. Install the valve cap onto the pressure valve on the accumulator.

Articulation frame pivot - Torque

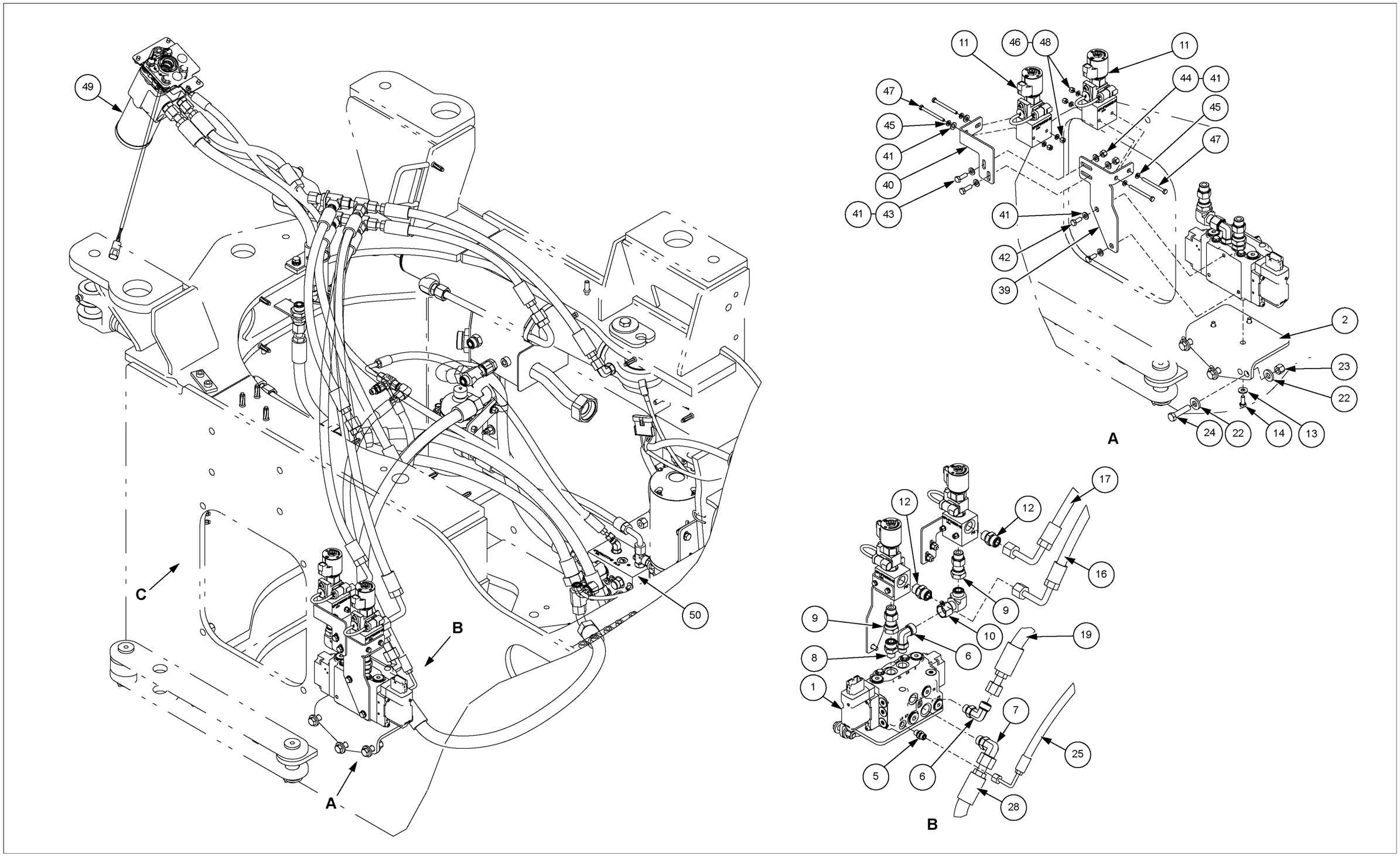
M16 bolt for upper pivot pin	**224 – 278 N·m** (**165 – 205 lb ft**)
M16 bolts for bearing retainers	**224 – 278 N·m** (**165 – 205 lb ft**)
M16 bolts for lower pin plate	**224 – 278 N·m** (**165 – 205 lb ft**)
M16 socket head bolts for lower pivot pin	**168 – 209 N·m** (**124 – 154 lb ft**)
Ferry head screws for the drive shaft	**75 – 81 N·m** (**55 – 60 lb ft**)

Articulation frame pivot - Special tools

1288730249	Hand pump (hydraulic ram)
CAS10193	Vacuum pump (**12 volt**)

HYDRAULIC COMPONENTS OF THE STEERING SYSTEM WITH AUXILIARY STEERING - Sheet 4 of 5

1. Washer, 11x24x2 mm
2. Washer, 13.5x20x2 mm
3. Auxiliary steering valve bracket
4. Bolt, M12x50
5. Auxiliary steering pump
6. Washer, 10.5x18x1.6 mm
7. Bolt, M10x30
8. Nut
9. Auxiliary steering bracket
10. Washer, 9x16x1.6 mm
11. Auxiliary steering manifold
12. Nut
13. Orbitrol valve
14. Washer, 6.6x18x1.6 mm
15. Bolt, M6x110
16. Nut
18. Connector
19. Connector
20. **90°** Elbow
21. Connector
22. Pressure hose
23. Steering load sense hose
24. **90°** Elbow
25. Pressure sensor
26. Tee
27. Diagnostic nipple
28. Cap
29. Block
30. Clamp plate
31. Bolt, M10x70
32. Clamp
33. Filter manifold hose
35. Secondary steering harness
36. Cable tie
37. Filter hydraulic tank
38. Connector
39. **90°** Elbow
40. Brass washer
41. Brass nut
42. Auxiliary steering cable B+
43. Loader valve
44. **90°** Elbow
45. Spacer
46. Relief valve
47. Washer, 6.6x12.5x2 mm
48. Battery negative cable
49. Connector
50. Fuse
51. Boot electrical
52. Clamp
53. Washer, 11x20x2 mm
54. Auxiliary suction hose
55. Bolt, M12x60
56. Auxiliary pressure hose
57. Spacer
58. Clamp
59. Spacer
60. Relay
61. Clamp
62. Bolt, M8x25
63. Steering pressure hose
64. Steering relief to filter hose
65. Load sense hose
66. Steering pump isolator
67. Rubber bushing
68. Steel bushing
69. Washer, Belleville M10x22
70. Bolt, M10x35
71. Right side rod hose
72. Right side base hose



LEIL16WHL1944JB 1

1. Place the steering relief valve **(3)** on the machine. Fix the steering relief valve **(3)** to the rear chassis by using two bolts **(6)**, washers **(7)**, spacers **(8)**, washers **(9)**, nuts **(10)**.
2. Remove the cap from the fittings of the pressure hose **(2)** and return to filter hose **(4)**. Install new O-rings onto the fittings. Connect the pressure hose **(2)** and return to filter hose **(4)** to the steering relief valve **(3)**.
3. Stop the vacuum pump. Install and tighten the reservoir filler cap.
4. Start and run the machine at low idle. Turn the steering wheel from the full left lock to full right lock, holding the steering over relief.
5. Stop the machine and check for leaks.
6. Check the fluid level in the hydraulic reservoir. Add oil as required.

Auxiliary steering pump test

For the auxiliary steering pump test via display refer to **Auxiliary steering - Check (41.910)**.

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Air conditioning - Charging

Recovery and charging station connections

1. Clean the external surfaces of the compressor and hoses. Remove the caps from the service ports on the suction and pressure hoses.

NOTICE: *Do not steam clean any air conditioning system parts while the system is charged. The heat will cause the refrigerant to rise to a pressure that could cause the system to explode.*

2. Connect the hoses from the test gauges to the service ports by turning the knurled knobs on the depressors.
3. Connect the hose from the low pressure gauge to the port on the suction hose.
4. Connect the hose from the high pressure gauge to the port on the discharge hose.

NOTICE: *always wear safety goggles when working with liquid refrigerant. Liquid refrigerant in your eyes could cause blindness.*

5. Make sure the charging station **OEM1598** manifold gauge valves are in the closed position.
6. Start the engine and run at **1500 RPM** maximum speed. Operate the air conditioner system at maximum cooling setting and blower speed for 15 minutes with the cab door open. Observe the test gauges and check the chart on page 13 against the gauge readings.

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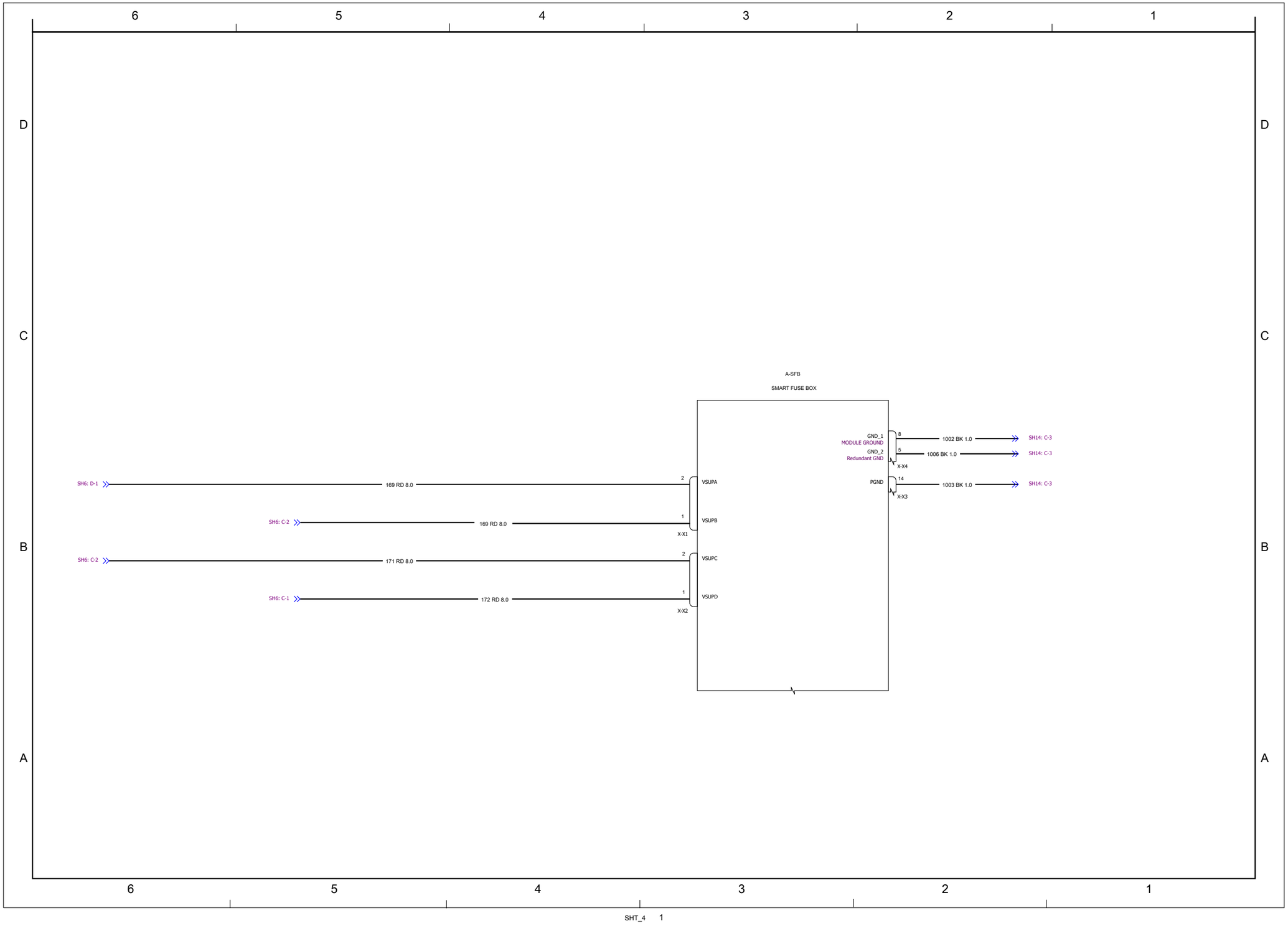
Harnesses and connectors - 100

FUNCTIONAL DATA

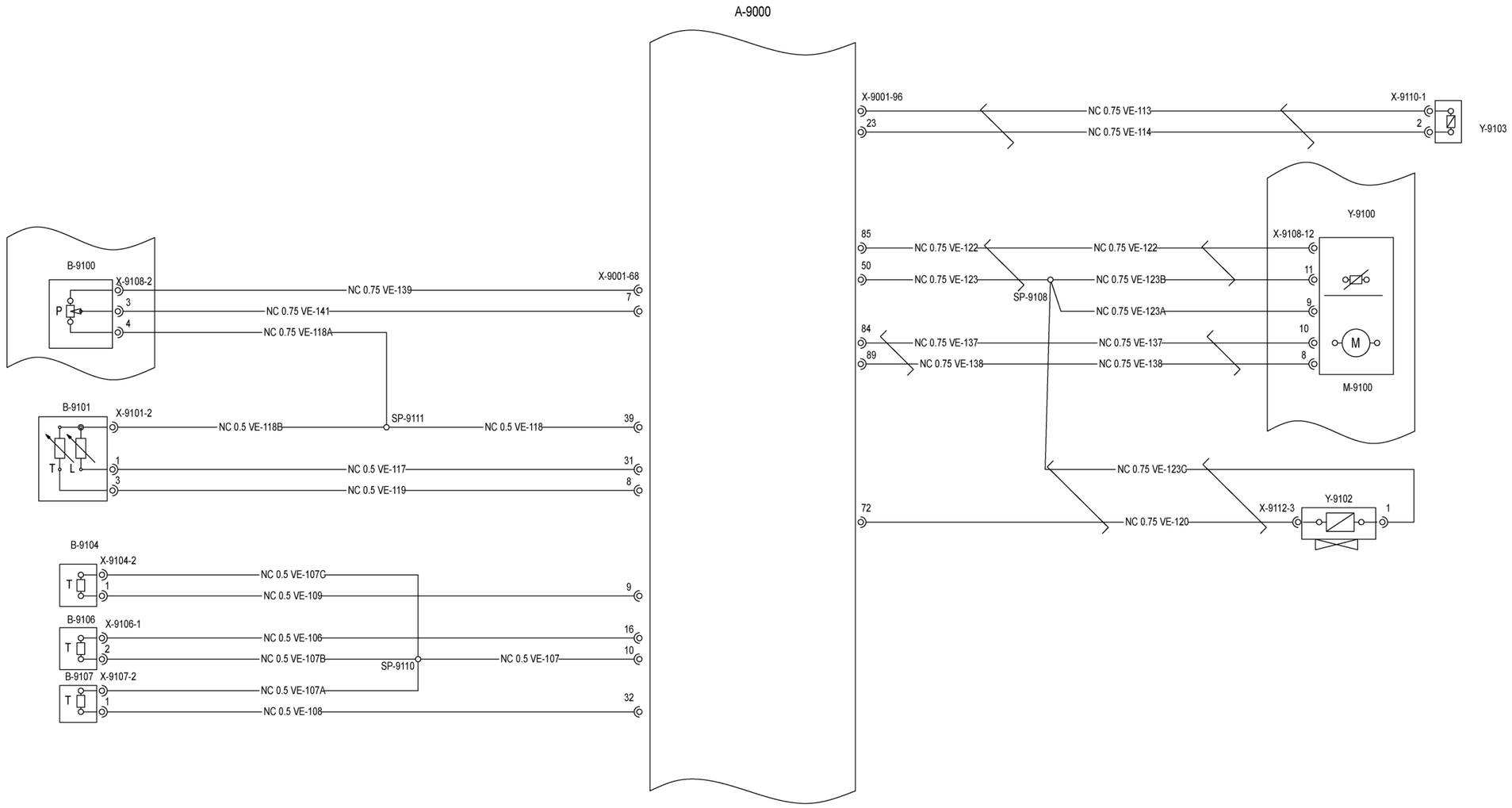
(*) See content for specific models


A-SFB
SMART FUSE BOX
SH6: D-1
169 RD 8.0
2
VSUPA
SH6: C-2
169 RD 8.0
1
VSUPB
X-X1
SH6: C-2
171 RD 8.0
2
VSUPC
SH6: C-1
172 RD 8.0
1
VSUPD
X-X2
GND_1
MODULE GROUND
8
1002 BK 1.0
SH14: C-3
GND_2
Redundant GND
5
1006 BK 1.0
SH14: C-3
X-X4
PGND
14
1003 BK 1.0
SH14: C-3
X-X3

SHT_4 1

Wiring harnesses - Electrical schematic sheet 24 SH24 - CAN STRUCTURE

Type	Component	Connector / Link	Description
ECU	**A-DIA**	**X-DIA**	DIAGNOSTIC PLUG
ECU	**A-DSP**	**X-DSP**	DISPLAY
ECU	**A-SFB**	**X-X6**	SMART FUSE BOX
ECU	**A-TERM2**	**X-TERM2**	TERMINATOR
ECU	**A-TERM3**	**X-TERM3**	TERMINATOR
Sensor	**B-ST_MTN**	**X-STW**	STEERING WHEEL MOTION
Resistor	**R-022**	**X-TERM**	TERMINATOR
Switch	**SW-PD**	**X-SW_PD**	SWITCH/KEY PAD
Switch	**SW-RH_JS**		RIGH HAND JOYSTICK or 3 lever
Switch	**SW-STALK**		STALK SWITCH
Connector	X-A_RT	**X-A_RT**	ARM REST RIGHT
Connector	X-CAB_AR	**X-CAB_AR**	CAB TO RH ARM REST
Connector	X-CAB_E	**X-CAB_E**	CAB TO ENGINE
Connector	X-CAB_JSS	**X-CAB_JSS**	CAB TO JSS FRAME HARNESS
Connector	X-CAB_P	**X-CAB_P**	CAB TO PEDESTAL
Connector	X-DIA	**X-DIA**	DIAGNOSTIC PORT
Connector	X-DSP	**X-DSP**	DISPLAY
Connector	X-ENG	**X-ENG**	ENGINE TO CAB
Connector	X-JSS_CAN	**X-JSS_CAN**	CAN
Connector	X-JSS_COM	**X-JSS_COM**	JSS FRAME TO CAB CAN
Connector	X-JSS_FR	**X-JSS_FR**	JSS FRAME HARNESS TO CAB
Connector	X-JSV	**X-JSV**	JOYSTICK STEERING VALVE
Connector	X-PED	**X-PED**	PEDESTAL TO CAB
Connector	X-SFB_XCP	**X-SFB_XCP**	DIAG
Connector	X-STLK	**X-STLK**	STALK LEVER RH
Connector	X-STW	**X-STW**	STEERING WHEEL MOTION SENSOR
Connector	X-SW_PD	**X-SW_PD**	SWITCH PAD
Connector	X-TERM	**X-TERM**	TERMINATOR
Connector	X-TERM2	**X-TERM2**	TERMINATOR CAN
Connector	X-TERM3	**X-TERM3**	TERMINATOR CAN
Connector	X-X7	**X-X7**	SFB
Connector	X-X_TEL	**X-X_TEL**	TELEMATICS
Solenoid	**Y-JSS_STRG_VLV**	**X-JSV**	JOYSTICK STEERING VALVE



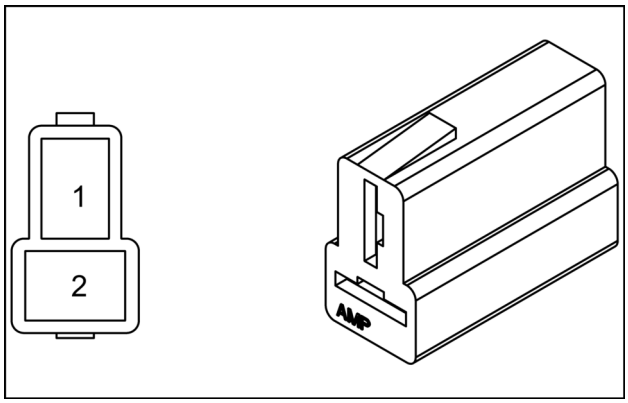
SHEET 3 - AFTER TREATMENT SYSTEM (ATS)-NON-CAN)

NHIL14ENG0034JA 1

Connector	Description
X-SCR2	Inline from SCR sensors harness
X-DSR	Urea dosing valve
X-NOXD	SCR downstream NOX sensor
X-CTS	DOC upstream temp
X-NOXS	DOC upstream NOX sensor
X-DTS	SCR downstream temp
X-NH3	NH3 sensor
X-TERM_C	Controller area network

Pin	From	Wire	Description	Color-Size	Frame
A	**X-LC4 (Receptacle) pin 85** LOADCENTER 4	954A	ACCESSORY RELAY COIL GND	BK - 0.8	**SHEET 13**
B	**X-CAB_JSS (Receptacle) pin 5** CAB TO JSS FRAME HARNESS	955X	JSS GROUND	BK - 0.8	
C	**X-SC (Plug) pin B** SEAT COMPRESSOR	955L	SEAT COMPRESSOR GND	BK - 2.0	
D	**X-CAB_P (Plug) pin 7** CAB TO PEDESTAL	954D	PEDESTAL GND	BK - 1.0	
E	**X-DSP (Receptacle) pin X** DISPLAY	954E	DISPLAY GND	BK - 0.8	
F	**X-LC3 (Receptacle) pin R1_85** LOADCENTER 3	954F	SPARE RELAY COIL GND	BK - 0.8	
G	SP-954L-P-X	954L	CAB GROUND	BK - 0.8	
H	**X-LC5 (Receptacle) pin 85** LOADCENTER 5	954H	IGNITION RELAY COIL GND	BK - 0.8	
J	**X-CAB_L (Receptacle) pin 11** CAB TO JSS L ARMREST	954J	LH JSS GND	BK - 0.8	
K	**X-CAB_AR (Plug) pin 2** CAB TO RH ARM REST	954K	RH ARMREST JOYSTICK GND	BK - 1.0	
M	SP-954S-P-X	954S	GROUND	BK - 0.8	

X-CL - CIGAR LIGHTER [LMP-CIG_LTR] (84015523) (Receptacle)

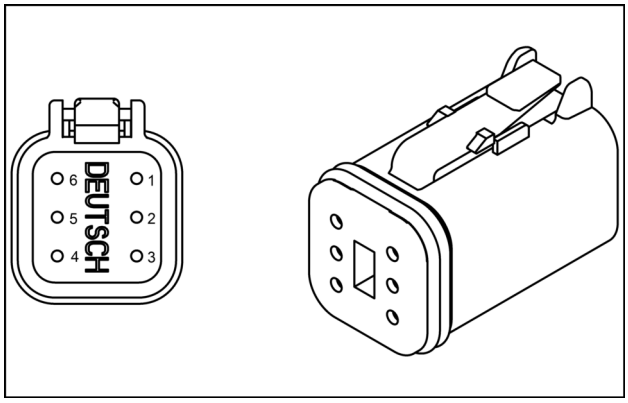


84015523 53

84015523

Pin	From	Wire	Description	Color-Size	Frame
1	**X-LC4 (Receptacle) pin 1A** LOADCENTER 4	743	24V CIGAR LIGHTER	OR - 2.0	**SHEET 35**

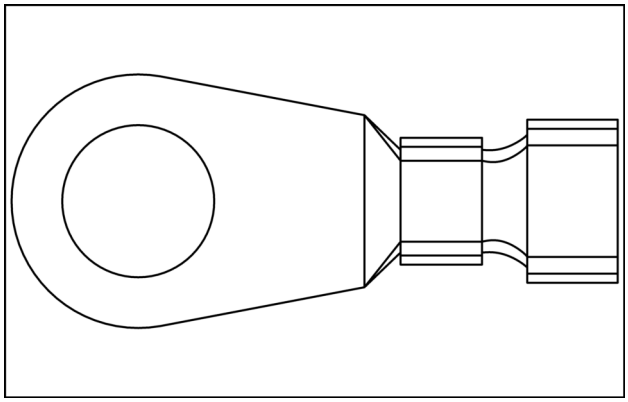
X-CNV - 24 TO 12 POWER CONVERTER [SH35: B-4] (87694112) (Receptacle)



87694112 54

87694112

X-JC2 - JUNCTION STUD OF B+ IN REAR [SH3: C-4] (84186853) (Plug)

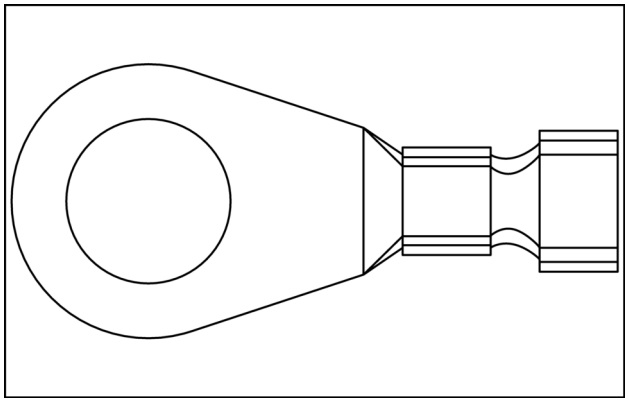


84186853 130

84186853

Pin	From	Wire	Description	Color-Size	Frame
1	**X-LC6 pin 3** LOADCENTER 6	212	B+	RD - 3.0	**SHEET 03**
1	**X-LC6 pin 30** LOADCENTER 6	212A	EVGT POWER	RD - 3.0	
1	**X-LC6 pin 9** LOADCENTER 6	416	B+	RD - 5.0	

X-JC3 - JUNCTION STUD OF B+ IN REAR (84253168) (Plug)



84253168 131

84253168

Pin	From	Wire	Description	Color-Size	Frame
1	**X-LC7 pin 3** LOAD CENTER 7	229	B+	RD - 5.0	**SHEET 03**

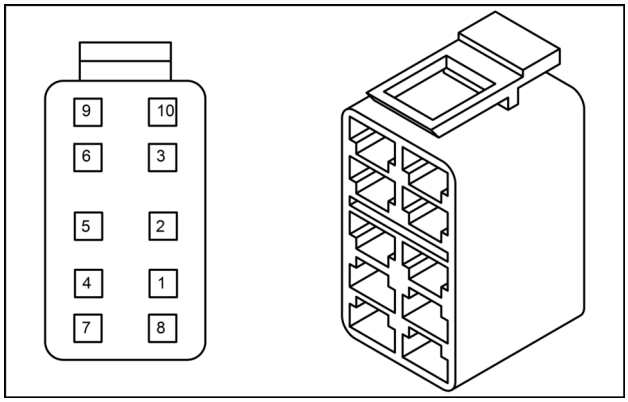
X-JS+ - JUMP START STUD POS [J-JS+] (Plug)

Pin	From	Wire	Description	Color-Size	Frame
PIN1	**X-P5320 (Plug) pin PIN1** JUMP START	CABLE09	JUMP START	RD - 32.0	**SHEET 03**

X-JS- - JUMP START STUD NEG [J-JS-] (Plug)

Pin	From	Wire	Description	Color-Size	Frame
PIN1	**X-P5321 (Plug) pin PIN1** JUMP START	CABLE08	JUMP START MINUS	BK - 32.0	**SHEET 03**

X-SRWP - SWITCH REAR WIPER [SW-WPR_SW] (87716755) (Receptacle)

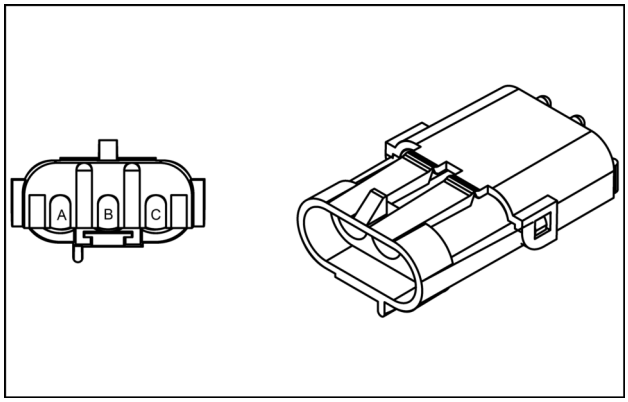


87716755 211

87716755

Pin	From	Wire	Description	Color-Size	Frame
2	**X-PG (Receptacle) pin L** PEDESTAL GROUND	955M	GROUND	BK - 0.8	**SHEET 28**
3	**X-PED_2 (Plug) pin 8** PEDESTAL TO CAB 2	728A	REAR WASHER SWITCH	YE - 0.8	
5	**X-PG (Receptacle) pin G** PEDESTAL GROUND	955W	PEDESTAL GROUND	BK - 0.8	
6	**X-PED_2 (Plug) pin 9** PEDESTAL TO CAB 2	727A	REAR WIPER SWITCH	YE - 0.8	
7	**X-PG (Receptacle) pin F** PEDESTAL GROUND	955D	REAR WIPER SW INDICATOR GND	BK - 0.8	
8	SP-981A-P-X	981C	SWITCH BACK LIGHTING	VT - 0.8	
9	**X-PG (Receptacle) pin C** PEDESTAL GROUND	955G	REAR WIPER SW GND	BK - 0.8	
10	**X-PED_2 (Plug) pin 11** PEDESTAL TO CAB 2	283A	REAR WIPER INDICATOR	VT - 0.8	

X-SSD - SS FLYBACK DIODE [D-SS DIODE] (87692858) (Plug)



87692858 212

87692858

Pin	From	Wire	Description	Color-Size	Frame
A	**X-S245 (Plug) pin 1** GROUND	180A	SEC STRG FLYBACK GRND	BK - 1.0	**SHEET 21**
B	**X-S245 (Plug) pin 1** GROUND	180	SEC STRG FLYBACK GRND	BK - 1.0	
C	**X-SSS (Plug) pin 1** SECONDARY STEERING MOTOR	441E	SEC STRG FLY BACK PWR	OR - 1.0	

Wire connectors - Component diagram 56

X-563 - BATTERY LUG [G-001] (Plug)

Pin	From	Wire	Description	Color-Size	Frame
1	**X-BAT-GND (Plug) pin 1** BATTERY GROUND	CABLE-001	CABLE BATTERY NEGATIVE	BK - 62.0	**SHEET 03**

X-564 - BATTERY LUG [G-002] (Plug)

Pin	From	Wire	Description	Color-Size	Frame
1	**X-567 (Plug) pin 1** BATTERY LUG	CABLE-002	BATTERY CABLE	RD - 62.0	**SHEET 03**

X-566 - BATTERY POSITIVE [G-002] (Plug)

Pin	From	Wire	Description	Color-Size	Frame
1	**X-D(B) (Plug) pin 1** MASTER DISCONNECT BATTERY	CABLE-003	BATTERY POWER	RD - 62.0	**SHEET 03**

X-567 - BATTERY LUG [G-001] (Plug)

Pin	From	Wire	Description	Color-Size	Frame
1	**X-564 (Plug) pin 1** BATTERY LUG	CABLE-002	BATTERY CABLE	RD - 62.0	**SHEET 03**

Connector X-9025 NEF - Exhaust flap

CONNECTOR X-9025 NEF - Exhaust flap			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
1	EN-049	Supply	**SHEET 04**
2	EN-050	Ground	
3	-	-	
4	EN-047A	CAN Low	**SHEET 04**
5	EN-048	CAN High	

Connector X-9137 - NH3 sensor controller

CONNECTOR X-9137 - NH3 sensor controller			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
1	EN-261 (PU)	Heater supply	**SHEET 04**
2	EN-262 (YE)	Trim resistor supply	
3	EN-263 (YE)	Trim resistor ground	
4	EN-264 (BK	EMF 2	
5	EN-265 (WH)	Heater ground	
6	EN-266 (GN)	Temperature signal	
7	EN-267 (BR)	Signal ground	
8	EN-268 (GY)	EMF 1	

LC1 fuses panel

Fuse	Ampere [A]	Function
F1	40	Accessory
F2	40	Ignition
F3	50	SFB-D
F4	50	SFB-C
F5	50	SFB-B
F6	50	SFB-A

LC2 fuses panel

Fuse	Ampere [A]	Function
F1	20	UCM-VP
F2	20	UCM VF2/3
F3	20	UCM VF4/6
F4	15	UCM VS1/VLP
F5	-	Spare
F6	7.5	Transmission control module
F7	10	Display
F8	5	Diagnostic plug
F9	20	Hood lift
F10	-	Spare
F11	-	Spare
F12	-	Spare
F13	-	Spare
F14	-	Spare
F15	-	Spare
F16	-	Spare
F17	-	Spare
F18	-	Spare
F19	-	Spare
F20	-	Spare

LC3 fuses and relays panel

Fuse	Ampere [A]	Function
F1	-	Spare
F2	-	Spare
F3	-	Spare
F4	-	Spare
F5	-	Spare
F6	-	Spare
F7	-	Spare
F8	-	Spare

Relay	Function
R4	Horn

LC4 fuses and relays panel

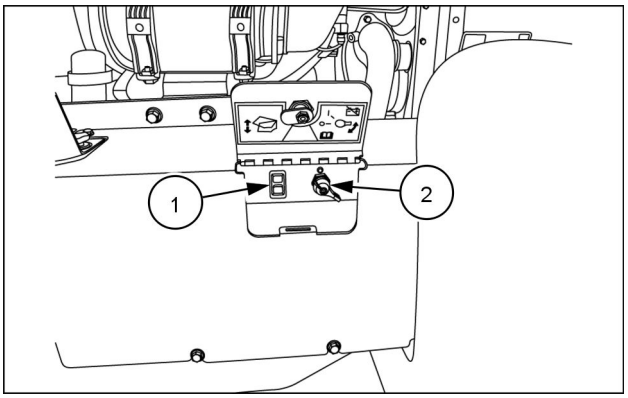
Fuse	Ampere [A]	Function
F1	15	**24 V** cigar
F2	-	Spare
F3	-	Spare
F4	-	Spare
F5	-	Spare

Engine starter - Remove

W170 D WHEEL LOADER XR NEW CAB TIER4B	WE
W170 D WHEEL LOADER ZBAR, NEW CAB TIER4B	WE

1. Park the machine on a level surface and lower bucket to ground.
2. Press the button **(1)** to raise completely the engine hood. Place the timed disconnect switch **(2)** to the OFF position.

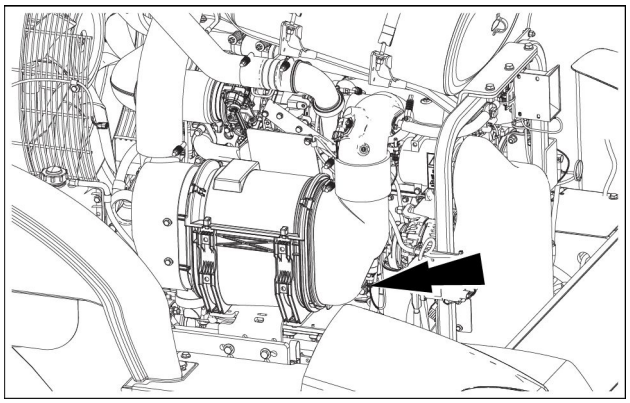
NOTE: *wait approximately* ***5 min*** *until the battery isolator opens. Alternatively remove the negative battery cable.*



RCPH10WHL106AAH 1

NOTE: *to access the engine starter, first you need to remove the air filter assembly at the left-hand side of the engine compartment.*

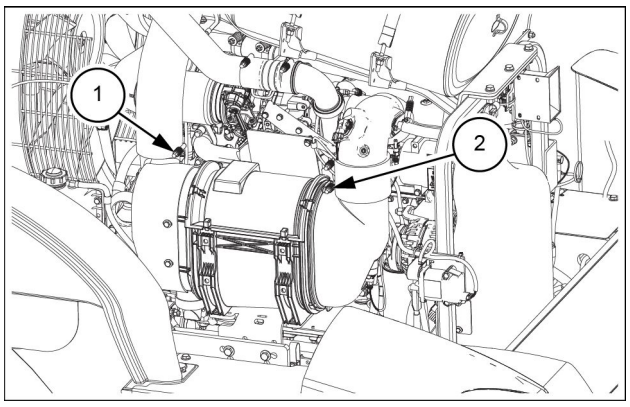
3. Tag and disconnect the connector from the air filter restriction switch.



LEIL17WHL2151A 2

4. Loosen the clamp **(1)** to unfix the air inlet tube from the air filter housing.
5. Loosen the clamp **(2)** to unfix the air intake tube from the air filter housing.

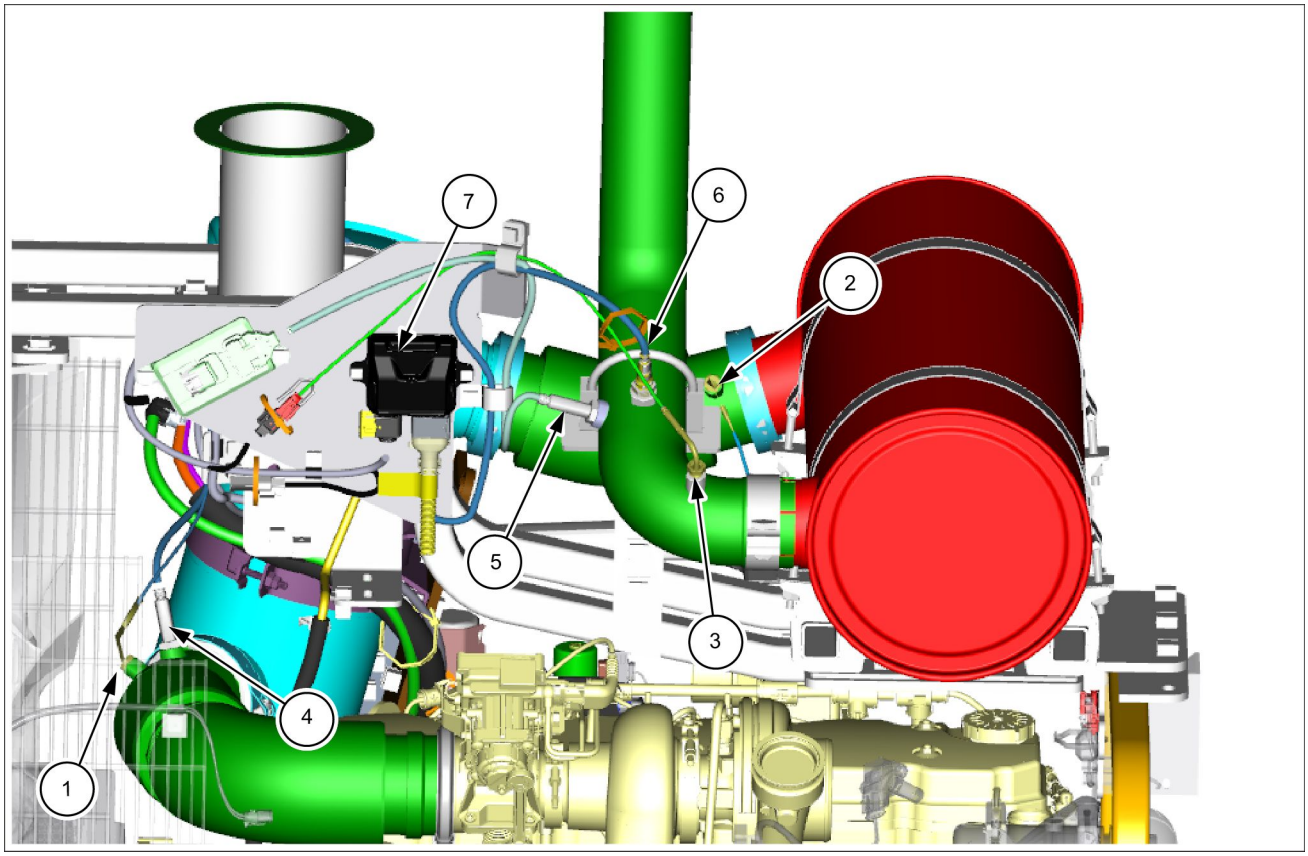
NOTE: *after air filter housing removal, cover the turbocharger inlet to prevent debris entry.*



LEIL17WHL2152A 3

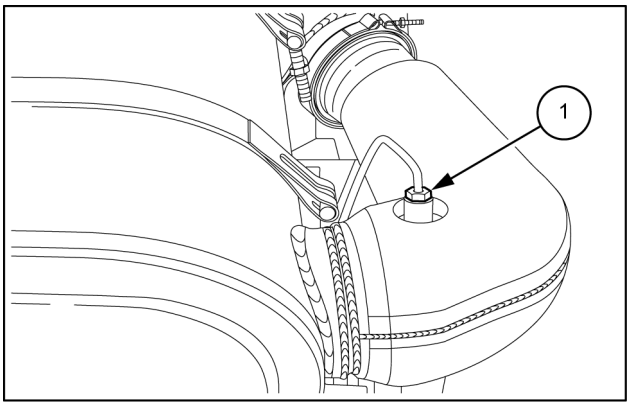
Selective Catalytic Reduction (SCR) electrical system - Overview After Treatment System (ATS) sensors

W130 D WHEEL LOADER XR, NEW CAB TIER4B	WE
W130 D WHEEL LOADER ZBAR NEW CAB TIER4B	WE



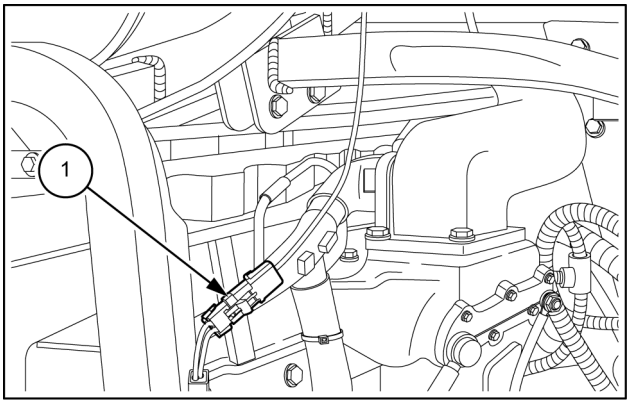
LEIL17WHL0924F 1

4. Loosen the hexagonal nut **(1)** of the catalyst inlet temperature sensor.
   Remove the sensor from the exhaust system.



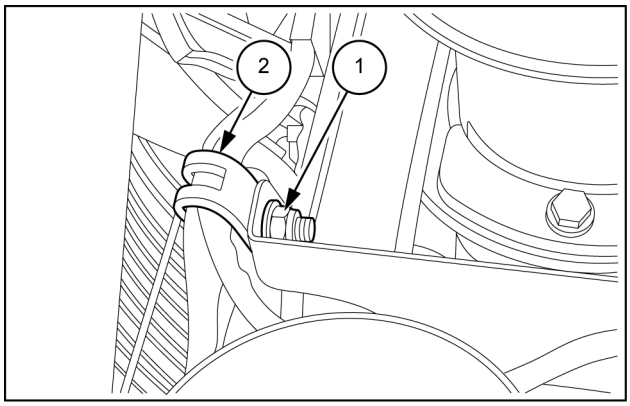
LEIL13WHL0194AB 4

5. Remove wire ties securing wire harness to support brackets. Unplug sensor from machine wiring harness **(1)** and remove it.



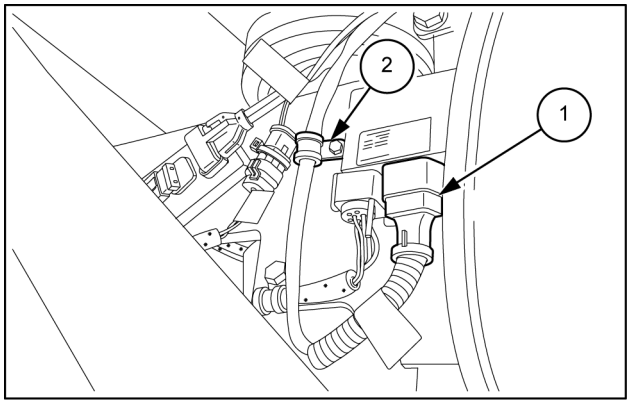
LEIL13WHL0195AB 5

4. Loosen the hexagonal nut **(1)** and remove the clamp **(2)** that secure the sensor wiring harness to the catalyst mounting support bracket.
   Remove any wire ties that secure the sensor wiring harness to the machine.



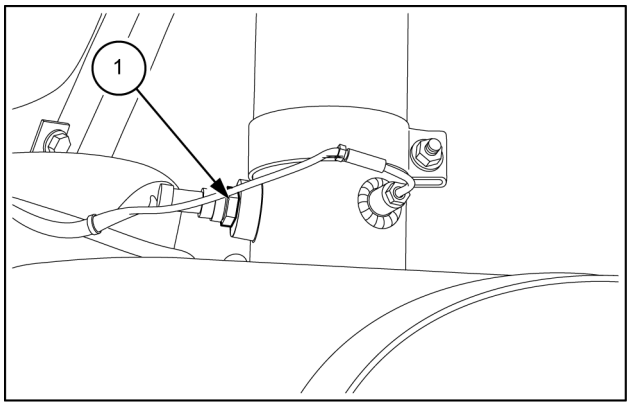
LEIL13WHL0224AB 4

5. Loosen the hexagonal nut **(2)** and remove the clamp that secure the sensor wiring harness to the catalyst mounting support bracket.
   Disconnect the sensor connector **(1)** from NH3 Electronic Control Unit.



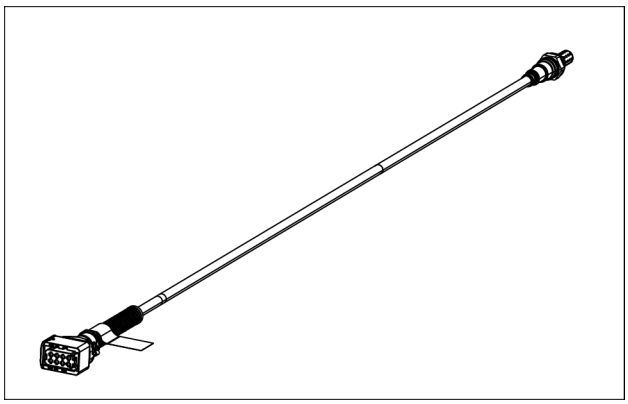
LEIL13WHL0197AB 5

6. Loosen the hexagonal nut **(1)** from the catalyst outlet ammonia (NH3) sensor **(1)**.



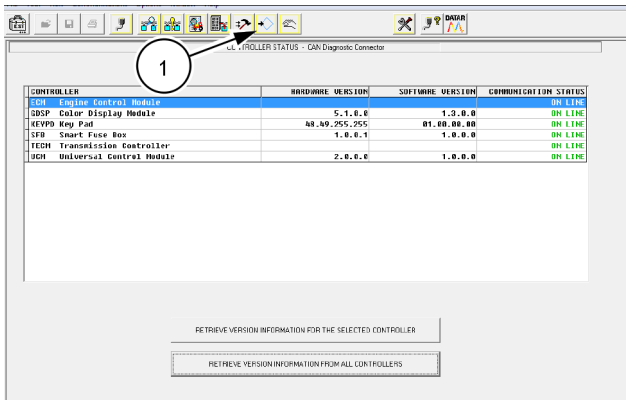
LEIL13WHL0198AB 6

7. Remove the sensor catalyst outlet ammonia (NH3) sensor and the wiring harness.



LEIL15WHL0220AA 7

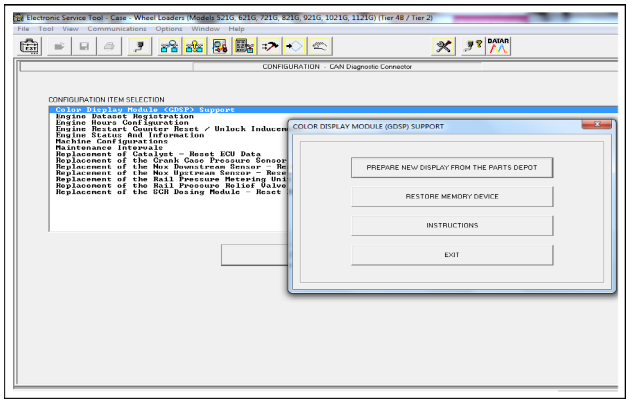
4. Click on icon **(1)** to access the “Configuration” screen.



LEIL17WHL0939AA 3

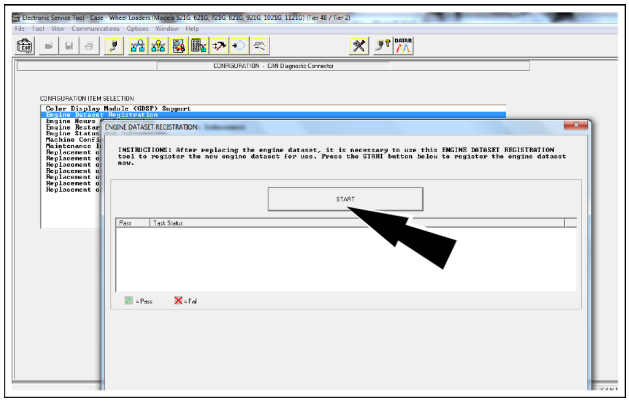
5. Select the item to be configured:

Color Display Module (GDSP) Support

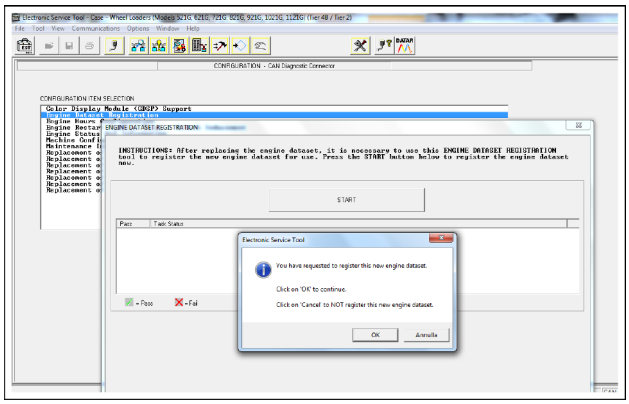


LEIL17WHL1022AA 4

Engine Dataset Registration

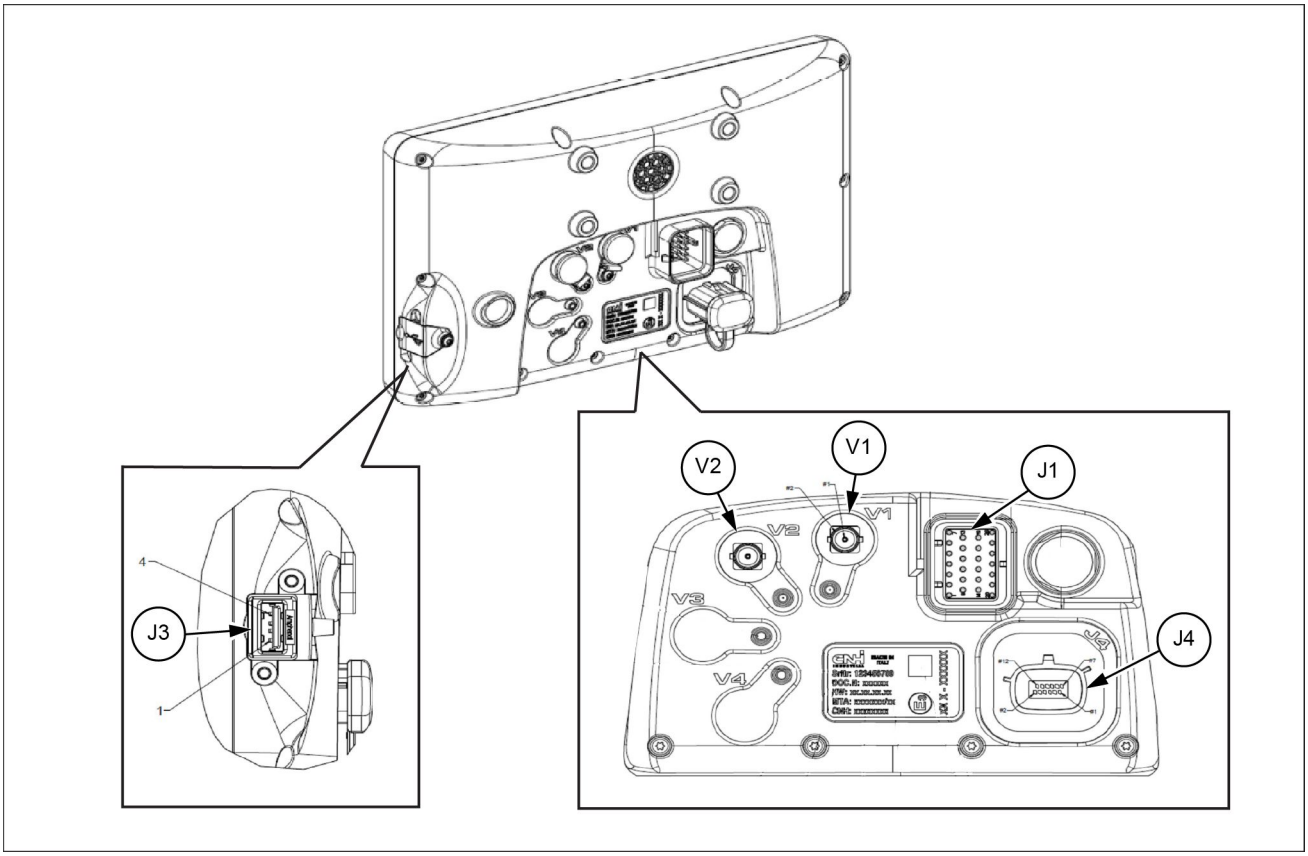


LEIL17WHL1023AA 5



LEIL17WHL1024AA 6

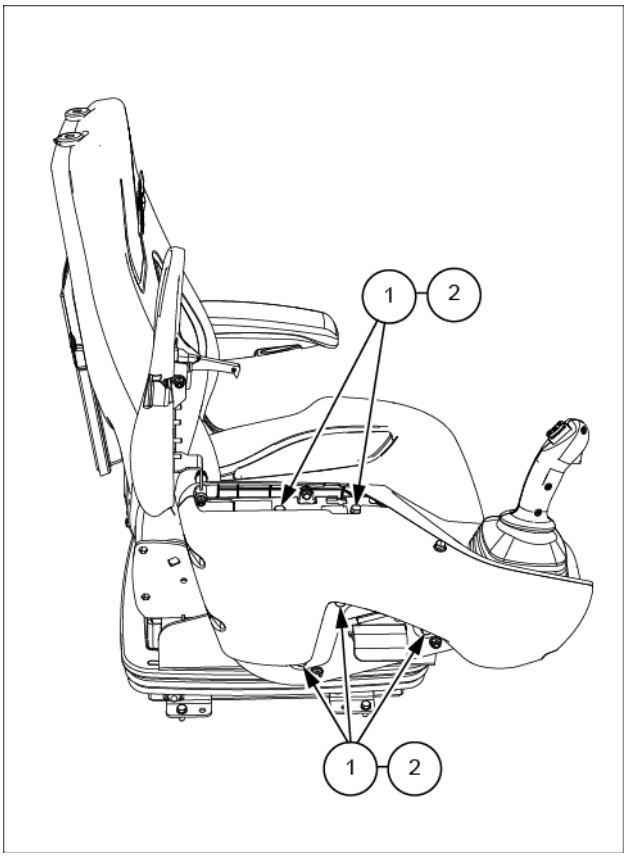
Electric connection



LEIL17WHL1293F 2

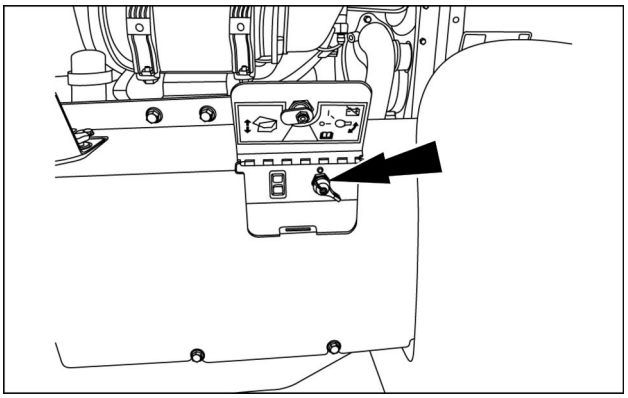
PIN-OUT **(J1)**		PIN-OUT **(V1)**	
PIN #	SIGNAL	PIN #	SIGNAL
1	CAN 1 High	1	VIDEO Input
2	CAN 1 Low	2	VIDEO Ground
3	Not populated	PIN-OUT **(V2)**	
4	Not populated	PIN #	SIGNAL
5	CAN 2High	1	VIDEO Input
6	CAN 2Low	2	VIDEO Ground
7	Not populated	PIN-OUT **(J3)**	
8	Not populated	PIN #	SIGNAL
9	Analog Input 1	1	USB-1 PWR 5V
10	Analog Input 2	2	USB-1 D-
11	Signal GND	3	USB-1 D+
12	Not populated	4	USB-1 Ground
13	Unswitched VBAT	Shell	Shield
14	Power Ground	PIN-OUT **(J4)**	
15	Key Switched VBAT	1	USB #2 ID
16	Analog Input 3	2	USB #2 Data+
17	DIG IN1 (diag mode)	3	USB #2 Data-
18	Not populated	4	No Connect
19	Not populated	5	No Connect
20	LSD1	6	No Connect
21	Not populated	7	USB 2 VBus (+5V)
22	Not populated	8	No Connect
23	Not populated	9	GND
24	Frequency Input 2	10	No Connect
25	Not populated	11	No Connect
26	Frequency Input 1	12	No Connect

6. Reinstall the two mounting bolts **(1)** and washers **(2)** located on the top side of the armrest, and then the three bolts **(1)** and washers **(2)** located on the lower side of the armrest.



LEIL16WHL0489BB 5

7. Turn the timed disconnect switch to the ON position.



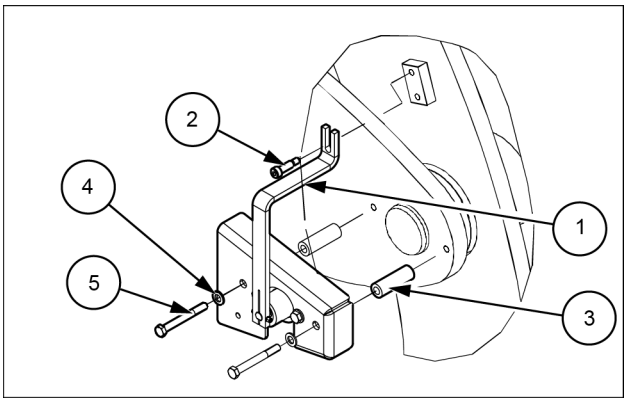
RCPH10WHL106AAH 6

Loader arm and bucket control system - Install - Electro-Hydraulic (EH) tilt sensor

1. Park the machine on a level surface and lower the bucket to the ground. Stop the engine and make sure the parking brake is applied.
2. With the engine stopped, move the joystick or control lever(s) to release any pressure in the hydraulic circuit.

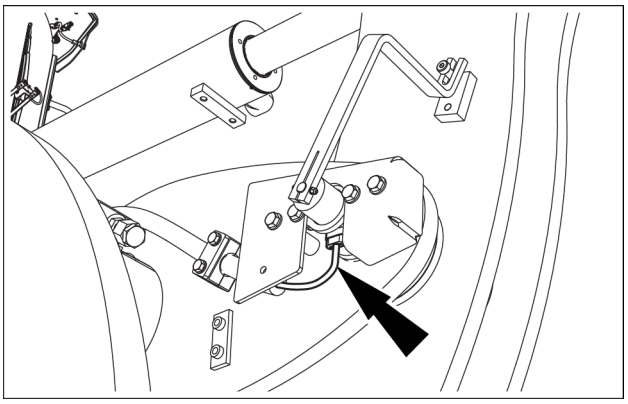
Z-bar models

3. Fix the arm fork of the Electro-Hydraulic (EH) tilt sensor assembly **(1)** to the front frame with the hexagonal socket screw **(2)**.
4. Use the two bolts **(5)**, washers **(4)**, and spacers **(3)** to install the EH tilt sensor assembly **(1)** to the front frame.



LEIL17WHL2269AB 1

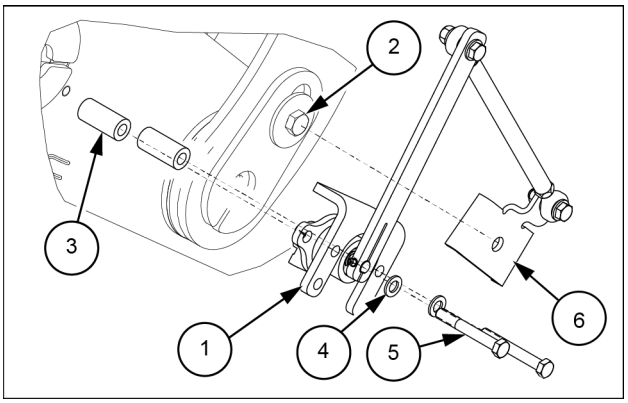
5. Connect the electrical connector **X-BUA** to the EH tilt sensor.



LEIL17WHL2267AB 2

XT models

3. Fix the arm mounting bracket **(5)** of the Electro-Hydraulic (EH) tilt sensor assembly **(1)** to the front frame with the bolt **(2)**.
4. Use the two bolts **(5)**, washers **(4)**, and spacers **(3)** to install the EH tilt sensor assembly **(1)** to the front frame.



LEIL17WHL2167FB 3

3997-03 - Electrical Accessory Power Relay - Short Circuit to B+

Control Module: SFB

Context:
Electrical Accessory Power Relay - Short Circuit to B+.

Cause:
The Smart Fuse box detects a Short Circuit to B+ from the Electrical Accessory Power Relay (**X-X3** pin 11) when the key is OFF.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The harness between Smart Fuse Box and Electrical Accessory Power Relay is damaged.
3. The **X-LC4** connector (pin 86) is damaged.
4. The Smart Fuse Box connector (**X-X3** pin 11) is damaged.
5. The harness between Electrical Accessory Power Relay and Smart Fuse Box is defective.
6. The Electrical Accessory Power Relay is defective.
7. The Smart Fuse Box is defective.

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Check the integrity of the harness between Smart Fuse Box and Electrical Accessory Power Relay.

   Visually check the integrity of the harness and check for any damage.

   A. If the harness is damaged, replace the harness.

   B. If the harness is not damaged, continue with Step **3**.
3. Check the integrity of the Electrical Accessory Power Relay connector.

   The key must be in the OFF position.

   Disconnect Electrical Accessory Power Relay (**X-LC4** pin 86) and visually check the integrity of the pin.

   A. If the pin is damaged, replace the **X-LC4** connector.

   B. If the pin is not damaged, continue with Step **4**.
4. Check the integrity of the Smart Fuse Box connector.

   The key must be in the OFF position.

   Disconnect **X-X3** connector and visually check the integrity of the pin 11.

   A. If the pin is damaged, replace the **X-X3** connector.

   B. If the pin is not damaged, continue with Step **5**.
5. Check the Electrical Accessory Power Relay signal circuit.

   The key must be in the OFF position.

5110-04 - Short circuit to ground at transmission sump temperature sensor input

Control Module: TCU

Context:
The Transmission Control Unit **A-TRANS** uses the default temperature.
There is no failure detected in the transmission system or the failure has no or slight effects on the transmission control.
The Transmission Control Unit **A-TRANS** works without or, in special cases, with little limitations.

Cause:
There is a short circuit to ground at the hydraulic oil temperature sensor **B-HOT**. The measured voltage is too low.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The harnesses or the connectors are damaged or the connectors are not installed.
3. The harness between hydraulic oil temperature sensor **B-HOT** and the ground is defective.
4. The hydraulic oil temperature sensor **B-HOT** is defective.
5. The Unit Control Module **A-UCM** is defective.

Solution:

1. Verify that fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step 2.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Check if the connector **X-HOT** is connected to the hydraulic oil temperature sensor **B-HOT**.

   Check if the connector **X-TRANS** is connected to the connector **X-CAB_TR**.

   Check if the connector **X-UCM1A** is connected to the Unit Control Module **A-UCM**.

   Check if the connector **X-UCM4A** is connected to the Unit Control Module **A-UCM**.

   A. If a problem is found, restore the connection.

   B. If there are no problems, continue with Step **3**.
3. Disconnect the connector **X-HOT** from the hydraulic oil temperature sensor **B-HOT**.

   Check the integrity of the connector **X-HOT** and visually check for any damage to the connector and to the pins.

   A. If a problem is found, replace the connector **X-HOT**.

   B. If there are no problems, connect the connector **X-HOT** to the hydraulic oil temperature sensor **B-HOT** and continue with Step **4**.
4. Disconnect the connector **X-TRANS** from the connector **X-CAB_TR**.

   Check the integrity of the connectors **X-TRANS** and **X-CAB_TR**, visually check for any damage to the connectors and to the pin 30 and 3.

   A. If a problem is found, replace the damaged connector.

   B. If there are no problems, connect the connector **X-CAB_TR** to the connector **X-TRANS** and continue with Step **5**.

A. If a problem is found, replace the output speed sensor **B-OSS**.

B. If there are no problems, replace the Transmission Control Unit **A-TRANS**.

Wiring harnesses - Electrical schematic sheet 26 (55.100)

B. If there are no problems, replace the Engine Control Unit **A-ECU**.

Wiring harnesses - Electrical schematic sheet 18 (55.100)

5530-03 - Short circuit to battery voltage at clutch Kr

Control Module: TCU

Context:
The detected failure in the system has strong limitations to transmission control. The Transmission Control Unit **A-TRANS** can engage only one gear in each direction. In some cases only one direction will be possible.
The Transmission Control Unit **A-TRANS** will shift the transmission into neutral at the first occurrence of the failure. First, the operator must shift the gear selector into neutral position.
If output speed is less than a threshold for neutral to gear and the operator shifts the gear selector into forward or reverse, the Transmission Control Unit A-TRANS will select the limp-home gear.
If output speed is less than a threshold for reversal speed and the Transmission Control Unit **A-TRANS** has changed into the limp-home gear and the operator selects a shuttle shift, the Transmission Control Unit **A-TRANS** will shift immediately into the limp-home gear of the selected direction.
If output speed is greater than the threshold, the Transmission Control Unit **A-TRANS** will shift the transmission into neutral. The operator has to slow down the vehicle and must shift the gear selector into neutral position.
If a failure at another clutch is pending, the Transmission Control Unit **A-TRANS** detects a severe failure that disables control of system. The Transmission Control Unit **A-TRANS** shuts off all solenoid valves and also both common power supplies (VPS1, VPS2). The park brake is operating, also all functions which use ADM 1 to ADM 8 are disabled.
The Transmission Control Unit **A-TRANS** shifts the transmission to neutral position.

Cause:
There is a short circuit to battery voltage at clutch Kr of the transmission controller of tranny **A-TRC**. The measured resistance value of the valve is out of limit, the voltage at Kr valve is too high.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The harnesses or the connectors are damaged or the connectors are not installed.
3. The harness between the transmission controller of tranny **A-TRC** and the Transmission Control Unit **A-TRANS** is defective.
4. The transmission controller of tranny **A-TRC** is defective.
5. The Transmission Control Unit **A-TRANS** is defective.

Solution:

1. Verify that fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Check if the connector **X-TRC** is connected to the transmission controller of tranny **A-TRC**.

   Check if the connector **X-TRANS** is connected to the connector **X-CAB_TR**.

   Check if the connector **X-TECM** is connected to the Transmission Control Unit **A-TRANS**.

   A. If a problem is found, restore the connection.

   B. f there are no problems, continue with Step 3.
3. Disconnect the connector **X-TRC** from the transmission controller of tranny **A-TRC**.

   Check the integrity of the connector **X-TRC** and visually check for any damage to the connector and to the pins.

   A. If a problem is found, replace the connector **X-TRC**.

5710-00 - Overtemp Retarder

Control Module: TCU

Context:
There is no failure detected in the transmission system or the failure has no or slight effects on the transmission control.
The Transmission Control Unit **A-TRANS** works without or, in special cases, with little limitations.

Cause:
The Transmission Control Unit **A-TRANS** measures a temperature in the retarder oil that is over the allowed threshold.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. Incorrect level of oil into the transmission.
3. The hydraulic oil temperature sensor **B-HOT** is defective.

Solution:

1. Verify that fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Cool down the machine.

   Check the oil level of the transmission.

   A. If a problem is found, restore the oil level of the transmission.

   B. If there are no problems, continue with Step **3**.
3. Check if the hydraulic oil temperature sensor **B-HOT** is defective and replace if necessary.

Wiring harnesses - Electrical schematic sheet 19 (55.100)

6245 - (DTC 1865)-Fuel rail pressure has exceeded maximum limit

NOTE: *refer to the Engine Service Manual for more details.*

Context:
For more information on the fuel injection system, see **Injection control - Dynamic description (55.010)**. The Engine Control Unit (ECU) monitors the fuel rail pressure sensor B-9004 for proper fuel pressure. If the ECU determines that fuel pressure is greater than **2000 bar** (**29000 psi**), this fault will occur.

Cause:
The ECU has detected a fuel pressure greater than **2000 bar** (**29000 psi**) for a period greater than **1 s**.

Possible failure modes:

1. Faulty Y-9000 wiring, open circuit condition.
2. Faulty Y-9000, internal failure.
3. Faulty fuel return line, damaged or clogged.
4. Faulty software of the ECU.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.
2. Check for the following possible related fault:

   21077 – (DTC 5255) - Fuel metering unit has an open load error

   A. If the fault is active, troubleshoot it first and then return to this fault.

   B. If the fault is not active, continue to Step **3**.
3. Check the Y-9000 for an internal failure.

   Disconnect connector **X-9007**.

   Use a multimeter to perform the following resistance check:

From	To	Value
X-9007 pin 1	**X-9007 pin 2**	There should be between **2.8 – 3.2 Ω**.

   A. If the value is within the specified range, continue to Step **4**.

   B. If the value is not within the specified range, the Y-9007 has failed internally. Replace the Y-9007.
4. Inspect the high pressure pump fuel return line for damage or blockage.

   A. If there is damage or blockage, repair the fuel line as necessary.

   B. If the fuel lines do not have any blockage or damage, check the ECU for the appropriate software and re-flash, if necessary.
5. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

7524 - (DTC 1D64)-Intake manifold pressure sensor voltage is higher than expected

NOTE: *refer to the Engine Service Manual for more details.*

NOTE: *because this fault causes inducement, it is necessary to perform the SCR Fault Repair Verification Test once the fault has been resolved. See* ***Selective Catalytic Reduction (SCR) exhaust treatment - Service instruction - SCR fault repair verification test (10.500)*** *if necessary.*

Context:
The Engine Control Unit (ECU) monitors the intake manifold pressure sensor B-9001 pressure signal circuit. If the ECU determines that the voltage in the pressure signal circuit is higher than expected, this fault will occur.

Cause:
The ECU has detected a voltage greater than **4.91 V** for a period greater than **500 ms** in the B-9001 pressure signal circuit.

Possible failure modes:

1. Faulty intake manifold pressure sensor , internal failure.
2. Faulty signal circuit of the intake manifold pressure sensor, open or short to high source condition.
3. Faulty software of the ECU.

Solution:

1. Verify that fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **5**.

2. Check the B-9001 pressure signal circuit for an open circuit condition.

   Disconnect connector **X-9003**.

   Disconnect connector **X-9002** from the ECU

From	To	Value
X-9002 pin 86	**X-9003 pin 4**	There should be continuity.

   A. If there is continuity, leave both connectors disconnected and continue to Step **3**.

   B. If there is no continuity, there is an open circuit condition in the B-9001 pressure signal circuit. Locate and repair the broken conductor.

3. Check the signal circuit of the intake manifold pressure sensor for a short to high source condition.

   The key must be in the OFF position.

   Use a multimeter to perform the following continuity check:

From	To	Value
X-9002 pin 86	**X-9002 pin 7**	There should be no continuity.
X-9002 pin 86	All other pins	There should be no continuity.

   A. If there is continuity, there is a short to high source condition in the B-9001 pressure signal circuit, wire EN–006. Locate and repair the shorted conductor.

   B. If there is no continuity, continue to Step **4**.

96-01 - Fuel Level Sensor Under Resistance

Control Module: UCM

Context:
The **A-UCM** detects a value of resistance of the FUEL LEVEL SENSOR (**B-RFLG**) lower than the low limit; as a consequence the fuel level is not available.

Cause:
The **A-UCM** detects on pin 11 of connector **X-UCM4A** a resistance value < **20 Ω** 20 Ω (last index is **27.5 Ω** ± **2.5 Ω**).

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The harness between **A-UCM** and the FUEL LEVEL SENSOR is damaged.
3. The FUEL LEVEL SENSOR is damaged.
4. The connectors **X-CAB_E** or **X-ENG** or **X-FL** or **X-UCM4A** are damaged.
5. The harness of FUEL LEVEL SENSOR is damaged.
6. The harness between connectors **X-ENG** and **X-FL** is damaged.
7. The harness between connectors **X-CAB_E** and **X-UCM4A** is damaged.

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Visually check the integrity of the harness between the connector **X-UCM4A** and the connector **X-FL** for any damage.

   A. If the harness is damaged, replace the harness.

   B. If the harness is not damaged, continue with Step **3**.
3. Replace the FUEL LEVEL SENSOR.

   A. If the functionality is restored, the procedure ends.

   B. If the functionality is not restored, continue with Step **4**.
4. Check the integrity of connector **X-FL**.

   Disconnect the connector **X-FL** from the FUEL LEVEL SENSOR and visually check the integrity of pins 1 and 2.

   A. If one pin is damaged, replace the harness relevant to the damaged connector.

   B. If the pins are not damaged, continue with Step **5**.
5. Check the integrity of harness of the FUEL LEVEL SENSOR.

   Disconnect the connector **X-FL** from the FUEL LEVEL SENSOR.

   Use a multimeter to perform the following check:

From	To	Value
Connector **X-FL** pin 2	Connector **X-FL** pin 1	Open circuit

   A. If the measurement is not correct, replace the harness.

11034 - (DTC 2B1A)-Upstream SCR catalyst temperature sensor voltage is lower than expected

NOTE: *refer to the Engine Service Manual for more details.*

Context:
The Engine Control Unit (ECU) monitors the SCR upstream temperature sensor circuit voltage. If the ECU detects a voltage less than **500 mV** in the SCR upstream temperature sensor signal circuit, this fault will occur.

Cause:
The ECU has detected a voltage less than **500 mV** in the SCR upstream temperature sensor signal circuit.

Possible failure modes:

1. Faulty SCR upstream temperature sensor, wiring.
2. Faulty SCR upstream temperature sensor, internal failure.
3. Faulty software of the ECU.

Solution:

1. Verify that fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **4**.
2. Check the signal circuit of the SCR upstream temperature sensor for a short to ground condition.

   Disconnect the connector **X-ECU**.

   Disconnect the connector **X-UTS**.

   The key must be in the OFF position.

   Use a multimeter to perform the following continuity check:

From	To	Value
Connector **X-ECU** pin 32	Connector **X-ECU** pin 10	There should be no continuity
Connector **X-ECU** pin 32	Chassis ground	There should be no continuity

   A. If there is continuity, there is a short to ground condition in the SCR upstream temperature sensor signal circuit. Locate and repair the shorted conductor.

   B. If there is no continuity, continue to Step **3**.
3. Replace the SCR upstream temperature sensor.

   Use the EST to verify the status of this fault code.

   A. If the fault has been resolved, use EST, see **Selective Catalytic Reduction (SCR) exhaust treatment - Configure - Engine restart counter reset (10.500)** if necessary, to perform the Engine Restart Counter Reset / Unlock Inducement configuration then return the machine to service.

   B. If the fault has not been resolved, check the ECU for the appropriate software and re-flash, if necessary.
4. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

12956 - (DTC 329C)-Exhaust flap actuator supply voltage out of range

NOTE: *refer to the Engine Service Manual for more details.*

Context:
For information regarding the functional operation of the exhaust flap A-9002 see **Exhaust flap actuator - Overview (55.014)**. The exhaust flap actuator controller sends and receives information at regular intervals to and from the Engine Control Unit (ECU) via Controller Area Network (CAN). If an electrical problem is sensed by the exhaust flap actuator controller, this fault will occur.

Cause:
The ECU has reported, via the engine sensor CAN bus, that the exhaust flap actuator controller has reported an electrical problem.

Possible failure modes:

1. Faulty supply voltage, out of required range.
2. Faulty CAN wiring, open or short circuit.
3. Faulty exhaust flap actuator controller, hardware or firmware.
4. Faulty software of the ECU.

Solution:

1. Verify that fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **6**.
2. Check the exhaust flap actuator controller supply voltage.

   Disconnect the engine (EN) harness from the exhaust flap A-9001 actuator controller at connector **X-9025 NEF**.

   With the key switch in the ON position, use a multimeter to check for voltage on the engine (EN) harness side:

From	To	Value
X-9025 NEF pin 1	**X-9025 NEF pin 2**	There should be **12.0 V** .

   A. If the voltage is present, leave connector **X-9025 NEF** disconnected and continue with Step **3**.

   B. If the voltage is not present, continue with Step **4**.
3. Determine the condition of the exhaust flap actuator controller CAN circuit.

   With the key switch in the OFF position, use a multimeter to measure the resistance of the CAN connection on the engine (EN) harness side:

From	To	Value
X-9025 NEF pin 4	**X-9025 NEF pin 5**	There should be **60 Ω**.

   A. If the measured resistance is correct, continue with Step **5**.

   B. If the measured resistance is not correct, continue with Step **4**.
4. Check for other engine CAN faults.

   Use EST to determine if other CAN faults exist.

15205 - (DTC 3B65)-High pressure pump fuel delivery quantity in over run exceeds a maximum threshold

NOTE: *refer to the Engine Service Manual for more details.*

Context:
For more information on the fuel injection system see **Injection control - Dynamic description (55.010)**. The Engine Control Unit (ECU) controls fuel delivery by the fuel metering unit. The ECU monitors for high pressure leakage during over run. If high pressure fuel delivery quantity exceeds a maximum threshold in over run and desired fuel pressure can not be reached, leakage in the system is assumed and this fault will occur.

Cause:
The ECU has determined that desired fuel rail pressure is lower than expected in over run.

Possible failure modes:

1. Faulty fuel injectors, internal leakage or stuck open.
2. Leakage from pressure relief valve.
3. Faulty fuel metering unit.
4. Faulty high pressure pump.
5. Clogged fuel filter.
6. Leakage (air entrance) from low pressure fuel lines.
7. Faulty low pressure gear pump.

17998 - (DTC 464E)-DEF/AdBlue quality sensor internal failure (Internal fault)

NOTE: *refer to the Engine Service Manual for more details.*

Context:
For information regarding the functional operation of the **DEF/ADBLUE®** quality sensor see **Diesel Exhaust Fluid (DEF)/AdBlue®/ARLA quality sensor - Overview (55.988)**. The **DEF/ADBLUE®** quality sensor has internal monitoring for operating conditions and reports status along with sensed data to the Engine Control Unit (ECU). If an internal sensor system error is detected, this fault will occur.

Cause:
The **DEF/ADBLUE®** quality sensor has reported to the ECU that it has an internal sensor system error.

Possible failure modes:

1. Faulty **DEF/ADBLUE®** quality sensor, hardware or firmware.
2. Faulty software of the ECU.

Solution:

1. As there is no method for field testing, replace the **DEF/ADBLUE®** quality sensor.

   Then check to see that the fault is resolved.

   A. If the fault is resolved, return the machine to service.

   B. If the fault is not resolved, check the ECU for the appropriate software and re-flash, if necessary.

19934 - (DTC 4DDE)-NH3 sensor power supply failure

NOTE: *refer to the Engine Service Manual for more details.*

Context:
For information regarding the NH3 electronic control unit and the NH3 connector sensor refer to **Ammonia (NH3) sensor - ECU description (55.988)**. The NH3 electronic control unit is required to report information at regular intervals to the Engine Control Unit (ECU) via Controller Area Network (CAN). The required supply voltage range, for full functionality, of the NH3 electronic control unit is **11.5 – 28.0 V**. The **NH3 electronic control unit** can not achieve and/or maintain NH3 sensor temperature if the input voltage goes below **11.5 V**. If the expected voltage is deemed to be too low or out of range, this fault will occur.

Cause:
The NH3 electronic control unit has reported, via CAN, to the ECU that the expected voltage is deemed to be too low or out of range.

Possible failure modes:

1. Faulty supply voltage, sourcing circuit failure.
2. Faulty NH3 electronic control unit, hardware or firmware.
3. Faulty software of the ECU.

Solution:

1. Verify that fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **4**.
2. Check the level of the NH3 electronic control unit supply voltage.

   Disconnect the vehicle harness (VE) from the NH3 electronic control unit at the connector **X-NH3**.

   Use a multimeter to measure the voltage on the vehicle harness (VE) side:

From	To	Value
Connector **X-NH3** pin 1	Connector **X-NH3** pin 4	There should be between **11.5 – 28.0 V**

   A. If the voltage is not within the specified limits, refer to the appropriate vehicle electrical schematics to locate and resolve the issue.

   B. If the voltage is within the specified limits, continue with Step **3**.
3. As there is no method for field testing or re-flashing the NH3 electronic control unit, replace the controller.

   Then check to see that this fault is resolved.

   A. If the fault is resolved, return the machine to service.

   B. If the fault is not resolved, check the ECU for the appropriate software and re-flash, if necessary.
4. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

   A. If you find damage or the display indicates other than normal display readings, repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

A. If you find damage or the display indicates other than normal display readings, repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

B. If you do not find damage and the display indicates only normal readings, erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 11 (55.100)
Wiring harnesses - Electrical schematic sheet 16 (55.100)

26237 - (DTC 667D)-Supply UB2 short to battery failure

Context:
The Engine Control Unit (ECU), monitors the supply UB2 circuit. If the ECU detects that the UB2 supply circuit has a short to battery power condition, this fault will occur.

Cause:
The ECU has detected a short to battery power in the supply UB2 circuit.

Possible failure modes:

1. Faulty supply UB2 circuit, short to battery power condition.
2. Faulty the software of the ECU.

Solution:

1. Verify that fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **4**.
2. Check the supply UB2 circuit for a short to battery power condition.

   Disconnect the connector **X-ECU** from the ECU.

   The key must be in OFF position.

   Use a multimeter to perform the following continuity check:

From	To	Value
Connector **X-ECU** pin 74	All pins in connector **X-ECU**	There should be no continuity

   A. If there is continuity, there is a short circuit condition in the supply UB2 circuit. Locate and repair the shorted conductor.

   B. If there is no continuity, leave the connector disconnected and continue to Step **3**.
3. Check the supply UB2 circuit for a short to key battery power condition.

   The key must be in the ON position.

   Use a multimeter to perform the following voltage test:

From	To	Value
Connector **X-ECU** pin 74	Chassis ground	There should be no voltage

   A. If there is voltage, there is a short to key battery power in the supply UB2 circuit. Locate and repair the shorted conductor.

   B. If there is no voltage, check the ECU for the appropriate software and re-flash, if necessary.
4. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

   A. If you find damage or the display indicates other than normal display readings, repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

30037 - (DTC 7555)-Fuel metering unit is shorted to ground at the high side

NOTE: *refer to the Engine Service Manual for more details.*

Context:
For more information no the fuel metering unit Y-9000 refer to **Injection control - Dynamic description (55.010)**. If the Engine Control Unit (ECU) detects a short circuit to ground in the Y-9000 high side, this fault will occur.

Cause:
The A-9000 has detected a short to ground in the Y-9000 circuit, high side.

Possible failure modes:

1. Y-9000 internal short to ground condition.
2. Short to ground condition in the Y-9000 circuit, high side.
3. Faulty software of the ECU.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool (EST) to the diagnostic port.

   A. If the fault is present and active, continue to Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue to Step **4**.
2. Check the Y-9000 for an internal short to ground condition.

   Disconnect the Y-9000 connector **X-9007**.

   The key must be in the OFF position.

   Use a multimeter to perform the following resistance check:

From	To	Value
X-9007 pin 1	**X-9007 pin 2**	There should be between **2.8 – 3.2 Ω** (**2.8 – 3.2 Ω**).

   A. If the value is in the specified range, leave **X-9007** disconnected and continue to Step **3**.

   B. If the value is not in the specified range, the Y-9000 has failed internally. Replace the Y-9000 then refer to **Pressure regulating valve - Configure - Reset ECU data (10.218)** if necessary, to perform the Replacement of the Rail Pressure Metering Unit - Reset ECU Data.
3. Check for a short to ground condition in the (EN) harness at the ECU connector **X-9002**.

   Disconnect the ECU connector **X-9002**.

   The key must be at the OFF position.

   Use a multimeter to perform the following continuity check:

From	To	Value
X-9002 pin 58	Chassis ground	There should be no continuity.
X-9002 pin 58	All pins in connector **X-9002**	There should be no continuity.

   A. If there is continuity, there is a short to ground condition in the engine (EN) harness, wire EN-015. Use the appropriate service manual to locate and repair the shorted conductor.

Use a multimeter to perform the following voltage check:

From	To	Value
X-9002 pin 58	Chassis ground	There should be no voltage.
X-9002 pin 83	Chassis ground	There should be no voltage.

A. If there is voltage, there is a short to key power condition in the fuel metering unit Y-9000 wiring. Locate the repair the shorted conductor.

B. If there is no voltage, continue to Step **5**.

5. Replace the fuel metering unit Y-9000.

   Use the EST to verify the status of this fault code.

   A. If the fault has been resolved, return the machine to service.

   B. If the fault has not been resolved, check the ECU for the appropriate software and re-flash, if necessary.

6. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

   A. If you find damage or the display indicates other than normal display readings, repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 05 (55.100)

38091 - (DTC 94CB)-CAN communication failure between vehicle controller and ECU controller - TSC1_VR message (Engine brake)

Context:
The Engine Control Unit (ECU) is capable of connecting to and communicating on three separate Controller Area Networks (CAN). Proper configuration and monitoring of the three twisted pair configured networks is also a function of the ECU. CAN Node A Bus is the main vehicle interface bus. The ECU provides a CAN termination resistor for the CAN Node A Bus, internal to the ECU. The ECU receives and responds to Vehicle Retarder (VR) information at two different rates (active and passive) dependant upon change request status. If the ECU is not sensing the VR message at the passive rate, this fault will occur.

Cause:
The ECU is not properly sensing the VR message.

Possible failure modes:

1. Faulty vehicle system, related CAN fault.
2. Faulty supply voltage or ground, missing.
3. Faulty CAN circuit wiring, open circuit, short to ground, or short circuit.
4. Faulty ECU, termination resistor or software.

Solution:

1. Verify that fault is present and in active state.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step**2**.

   B. If the fault is no longer present or is in an inactive state, the fault may be intermittent and not currently active. Continue with Step **6**.
2. Check for related vehicle CAN faults.

   Use the EST to determine if vehicle CAN faults exist.

   A. If related vehicle CAN faults do exist, resolve the vehicle CAN faults, then check that this fault is also resolved.

   B. If related vehicle CAN faults do not exist, continue with Step **3**.
3. Check the ECU supply voltage.

   Disconnect the vehicle (VE) harness from the ECU at the connector **X-ECU**.

   With the key switch in the “ON” position, use a multimeter to check for voltage on the vehicle (VE) harness side:

From	To	Value
Connector **X-ECU** pin 1	Chassis ground	There should be **12.0 V**
Connector **X-ECU** pin 25	Chassis ground	There should be **12.0 V**
Connector **X-ECU** pin 26	Chassis ground	There should be **12.0 V**
Connector **X-ECU** pin 49	Chassis ground	There should be **12.0 V**
Connector **X-ECU** pin 73	Chassis ground	There should be **12.0 V**

   A. If the voltage is present on all of the checks, leave the connector **X-ECU** disconnected and continue with Step **4**.

   B. If the voltage is not present for one or more of the checks, refer to the appropriate vehicle service manual and electrical schematics to locate and restore supply power to the ECU.
4. Check the ECU grounding.

   With the key switch in the “OFF” position, use a multimeter to check for continuity on the vehicle (VE) harness side:

57709 - (DTC E16D)-There was an error during Write/Read EEPROM operation

Context:
The Engine Control Unit (ECU) has the capability of reading and writing values to flash or EEPROM. The ECU monitors the reading and writing capability of this function. If the ECU determines that calibrated parameters for baud rate cannot be read from EEPROM during this monitoring, this fault will occur.

Solution:

1. Check the ECU for the appropriate software and re-flash, if necessary.

   A. If the fault has been resolved, return the machine to service.

   B. If the fault has not been resolved, escalate an ASIST concern.

58909 - (DTC E61D)-ECU internal failure - SPI communication error

Context:
The Engine Control Unit (ECU) tests the correct functioning of the fuel injection path shut off procedure. During this test, each injection path is shortly activated during ECU initialization. If a Serial Peripheral Interface (SPI) communication error is detected during this test, this fault will occur.

Solution:

1. Check the ECU for the appropriate software and re-flash, if necessary.

   A. If the fault has been resolved, return the machine to service.

   B. If the fault has not been resolved, escalate an ASIST concern.

60381 - (DTC EBDD)-ECU 5 volt supply voltage is higher than expected

Context:
The Engine Control Unit (ECU) monitors for a voltage error of the internal **5 V** supply. If the voltage supply exceeds the internal maximal limit, this fault will occur.

Possible failure modes:

1. Faulty the supply wiring of the ECU.
2. Faulty the software of the ECU.

Solution:

1. Verify that fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with Step **4**.
2. Check the ECU supply wiring.

   Disconnect the connector **X-ECU**.

   The key must be in the ON position.

   Use a multimeter to perform the following voltage check:

From	To	Value
Connector **X-ECU** pin 73	Chassis ground	There should be approximately **12 V**
Connector **X-ECU** pin 49	Chassis ground	There should be approximately **12 V**
Connector **X-ECU** pin 25	Chassis ground	There should be approximately **12 V**
Connector **X-ECU** pin 1	Chassis ground	There should be approximately **12 V**
Connector **X-ECU** pin 26	Chassis ground	There should be approximately **12 V**

   A. If there is not approximately **12 V**, check the charging system for proper operation and repair as necessary.

   B. If there is approximately **12 V**, continue to Step **3**.
3. Check the ECU for the appropriate software and re-flash, if necessary.

   A. If the fault has been resolved, return the machine to service.

   B. If the fault has not been resolved, escalate an ASIST concern.
4. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals, or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while you monitor the display.

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Disconnect the connector **X-PED** from the connector **X-CAB_B** and visually check the integrity of pin 5 of both connectors.

A. If one pin is damaged, replace the harness relevant to the damaged connector.

B. If all pins are not damaged, continue with Step **6**.

6. Check the integrity of harness between the connector **X-PED** and the connector **X-TT**.

   Disconnect the connector **X-TT** from the TELL TALE INDICATOR.

   Use a multimeter to perform the following check:

From	To	Value
Connector **X-PED** pin 5	Connector **X-TT** pin 4	Short circuit

   A. If the measurement is not correct, replace the harness.

   B. If the measurement is correct, continue with Step **7**.

7. Check the integrity of connector **X-UCM4B**.

   Disconnect the connector **X-UCM4B** from the **A-UCM** and visually check the integrity of pin 9.

   A. If the pin is damaged, replace the harness.

   B. If the pin is not damaged, continue with Step **8**.

8. Check the integrity of harness between the connectors **X-UCM4B** and **X-CAB_P**.

   Use a multimeter to perform the following check:

From	To	Value
Connector **X-UCM4B** pin 9	Connector **X-CAB_P** pin 5	Short circuit

   A. If the measurement is not correct, replace the harness.

   B. If the measurement is correct, continue with Step **9**.

9. Replace the LED WARNING.

   A. If the functionality is restored, the procedure ends.

   B. If the functionality is not restored, replace the **A-UCM**.

Wiring harnesses - Electrical schematic sheet 20 (55.100)
Wiring harnesses - Electrical schematic sheet 28 (55.100)

62879 - (DTC F59F)-SCR Inducement: Level 3 (creep mode), triggered by DEF/AdBlue dosing interruption fault

NOTE: *refer to the Engine Service Manual for more details.*

NOTE: *since this fault is part of the inducement strategy, it may be necessary to perform the Engine Restart Counter Reset / Unlock Inducement configuration with the Electronic Service Tool (EST) before you return the machine to service, unless this was accomplished as part of the resolution of the fault causing this fault. See* ***Selective Catalytic Reduction (SCR) exhaust treatment - Configure - Engine restart counter reset (10.500)****, if necessary.*

Context:
This fault is only for informational purposes and requires no action other than the resolution of the active fault causing this fault to occur. Any one of many Selective Catalytic Reduction (SCR) **DEF/ADBLUE®** fluid injection interruption faults that remains active for more than **20 h** will cause this fault to occur.

A. If the functionality is restored, the procedure ends.

B. If the functionality is not restored, replace the **A-UCM**.

Wiring harnesses - Electrical schematic sheet 10 (55.100)
Wiring harnesses - Electrical schematic sheet 21 (55.100)

518113-02 - Low Brake Pressure

Control Module: UCM

Context:

The **A-UCM** detects a value from Brake lower than the expected one; as a consequence:

- UCM: none
- GHMI:
  - Low Brake Pressure Indicator = ON
  - Red Master Indicator = ON
  - Error Pop Up Message Displayed
  - Buzzer = ON (Consistent with other RED warnings)

Cause:

- Key Switch = ON;
- Engine Running for **4 s**;
- Brake Pressure < 12.2 for **3.0 s** continuous.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The Brake Supply Line Pressure Sensor is not functioning.
3. The Brake Supply Line is not functioning.

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. By performing the procedures **518113-03 – Short to Power at Brake Supply Line Pressure Sensor** and **518113-04 – Short to Ground at Brake Supply Line Pressure Sensor**, check the Brake Supply Line Pressure Sensor is correctly functioning.

   A. If the sensor is not functioning, replace sensor.

   B. If the sensor is functioning, continue with Step 3.
3. Replace the Brake Supply Line.

   A. If the functionality is restored, the procedure ends, replace the harness.

   B. If the functionality is not restored, replace the **A-UCM**.

Wiring harnesses - Electrical schematic sheet 19 (55.100)

A. If the functionality is restored, the procedure ends.

B. If the functionality is not restored, replace the **A-UCM**.

518136-04 - Bucket Angle Sensor Channel 2 Under Voltage

Control Module: UCM

Context:
The **A-UCM** detects a value from the Channel 2 of the BUCKET ANGLE (**B-BKT_ANG**) greater than the lower limit.

Cause:
The **A-UCM** detects, on pin 23 of connector **X-UCM1B**, a voltage < **0.25 V**; as a consequence, the advanced EH bucket features (RTD) is disabled.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The harness between the **A-UCM** and the BUCKET ANGLE is damaged.
3. The connectors **X-BUA** or **X-FRNT_EH** or **X-BTM_FEH** or **X-BTM_EH** or **X-CAB_EH** or **X-UCM1B** are damaged.
4. The BUCKET ANGLE is not correctly supplied.
5. The BUCKET ANGLE sensor is damaged.
6. The harness between the connectors **X-BUA** and **X-FRNT_EH** is damaged.
7. The harness between the connectors **X-BTM_FEH** and **X-BTM_EH** is damaged.
8. The harness between the connectors **X-CAB_EH** and **X-UCM1B** is damaged

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Check the integrity of the harness between the **A-UCM** and the BUCKET ANGLE.

   Visually check the integrity of the harness and check for any damage.

   A. If the harness is damaged, replace the harness.

   B. If the harness is not damaged, continue with Step **3**.
3. Check the integrity of the connector **X-BUA**.

   Disconnect the connector **X-BUA** from the BUCKET ANGLE.

   Visually check the integrity of pins F, E and D of the connector.

   A. If one pin is damaged, replace the relevant harness.

   B. If all pins are not damaged, continue with Step **4**.
4. Check the BUCKET ANGLE power supply.

   Use a multimeter to perform the following check:

From	To	Value
Connector **X-BUA** pin F	Connector **X-BUA** pin E	+ **5 V**

   A. If the value is not correct, check the harness between the connectors **X-BUA**, **X-FRNT_EH** and **X-FRNT**.

   B. If the value is correct, continue with Step **5**.

518142-04 - Short to Ground at AUX 2 Low Side Driver

Control Module: UCM

Context:

The **A-UCM** detects a grounding connection when drives an AUX 2 Solenoid; as a consequence:

- AUX II Function disabled
- Open AUX II LSD
- Command AUX II HSD PWMs to **0%**

Cause:
The **A-UCM** detects, on pin 21 of connector **X-UCM1A**, a short circuit to ground risen by BSP.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The harness between the **A-UCM** and the connectors **X-AUX_2_LEFT** and **X-AUX_2_RIGHT** is visually damaged.
3. The connector **X-UCM1A** is damaged.
4. The harness between **A-UCM** and the connectors **X-AUX_2_LEFT** and **X-AUX_2_RIGHT** is damaged.

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Visually check the integrity of the harness between the connectors **X-UCM1A**, **X-AUX_2_LEFT** and **X-AUX_2_RIGHT** for any damage.

   A. If the harness is damaged, replace the harness.

   B. If the harness is not damaged, continue with Step **3**.
3. Check the integrity of connector **X-UCM1A**.

   Disconnect the connector **X-UCM1A** from the **A-UCM** and visually check the integrity of pin 10.

   A. If the pin is damaged, replace the harness.

   B. If the pin is not damaged, continue with Step **4**.
4. Check the integrity of harness between the **A-UCM** and the connectors **X-AUX_2_LEFT** and **X-AUX_2_RIGHT**.

   Use a multimeter to perform the following check:

From	To	Value
Connector **X-UCM1A** pin 21	Ground	Open circuit

   A. If the measurement is correct, replace the **A-UCM**.

   B. If the measurement is not correct, check the correct functioning of the circuits relevant to:
   - the AUX 2 Left High Side Driver (see procedure **518140-04 – Short to Ground at AUX 2 Left High Side Driver**).
   - the AUX 2 Right High Side Driver (see procedure **518141-04 – Short to Ground at AUX 2 Right High Side Driver**).

From	To	Value
Connector **X-UCM2B** pin 14	Ground	There should be a short circuit

A. If there is an open circuit, replace the harness.

B. If there is not voltage, continue to Step **6**.

6. Check the Smart Fuse Box signal circuit for an open circuit.

   The key must be in the OFF position.

   Use a multimeter to perform the following voltage check:

From	To	Value
Connector **A-SFB** pin OUT_03_H	Chassis ground	There should be an open circuit

A. If there is a voltage, replace the Smart Fuse Box.

Wiring harnesses - Electrical schematic sheet 03 (55.100)
Wiring harnesses - Electrical schematic sheet 20 (55.100)

518289-31 - Error at 24VA Supply Rail

Control Module: UCM

Context:
The **A-UCM** detects the absence of the 24VA power supply; as a consequence the UCM disable all functions.

Cause:
The **A-UCM** detects, on pin 14 of connector **X-UCM1A**, a voltage < **10 V**.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The harness between **A-UCM** and the LC5 is damaged.
3. The connectors **X-LC5** or **X-UCM1A** are damaged.
4. The harness between **A-UCM** and the connector **X-LC5** is damaged.
5. The fuse UCM (**F-5F2**) is burnt.
6. The harness between the LC5 and the power supply is damaged.

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Visually check the integrity of the harness between the connectors **X-UCM1A** and **X-LC5** for any damage.

   A. If the harness is damaged, replace the harness.

   B. If the harness is not damaged, continue with Step **3**.
3. Check the integrity of connector **X-UCM1A**.

   Disconnect the connector **X-UCM1A** from the **A-UCM** and visually check the integrity of pin 14.

   A. If the pin is damaged, replace the harness.

   B. B. If the pin is not damaged, continue with Step **4**.
4. Check the integrity of harness between the **A-UCM** and the power supply.

   Use a multimeter to perform the following check:

From	To	Value
Connector **X-UCM1A** pin 14	Ground	+ **10 V**

   A. If the voltage is correct, replace the **A-UCM**.

   B. If the voltage is not correct, continue with Step **5**.
5. Check the integrity of connector **X-LC5**.

   Disconnect the connector **X-LC5** from LC5 and visually check the integrity of pins 2A and 3B.

   A. If the pin is damaged, replace the relevant harness.

   B. If the pin is not damaged, continue with Step **6**.
6. Check the integrity of harness between the connectors **X-LC5** and **X-UCM1A**.

520572-06 - 24v to 12v Converter Enable - Short Circuit to GND

Control Module: SFB

Context:
24 V to **12 V** Converter Enable (Short Circuit to GND).

Cause:
The Smart Fuse box detects a Short Circuit to GND from the DC converter Relay signal (**X-X3** pin 15) when the key is ON.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The harness between Smart Fuse Box and DC converter Relay is damaged.
3. The **X-LC3** connector (pin RI_86) is damaged.
4. The Smart Fuse Box connector (**X-X3** pin 15) is damaged.
5. The harness between DC converter Relay and Smart Fuse Box is defective.
6. The DC converter Relay is defective.
7. The Smart Fuse Box is defective.

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Check the integrity of the harness between Smart Fuse Box and DC converter Relay.

   Visually check the integrity of the harness and check for any damage.

   A. If the harness is damaged, replace the harness.

   B. If the harness is not damaged, continue with Step **3**.
3. Check the integrity of the DC converter Relay connector.

   The key must be in the OFF position.

   Disconnect DC converter Relay connector (**X-LC3** pin R1-86) and visually check the integrity of the pin.

   A. If the pin is damaged, replace the **X-LC3** connector.

   B. If the pin is not damaged, continue with Step **4**.
4. Check the integrity of the Smart Fuse Box connector.

   The key must be in the OFF position.

   Disconnect **X-X3** connector and visually check the integrity of the pin 15.

   A. If the pin is damaged, replace the **X-X3** connector.

   B. If the pin is not damaged, continue with Step **5**.
5. Check the DC converter Relay signal circuit.

   The key must be in the OFF position.

520591-03 - Backup Alarm - Short circuit to B+

Control Module: SFB

Context:
Battery voltage on Backup Alarm (Short circuit to B+).

Cause:
The Smart Fuse box measure a battery voltage on Backup Alarm signal (X4 pin 21) when the key is OFF.

Possible failure modes:

1. The fault is intermittent and not currently active.
2. The harness between Smart Fuse Box and Backup Alarm is damaged.
3. The Backup Alarm connector is damaged.
4. The **X-ENG** connector is damaged.
5. The **X-CAB_E** connector is damaged.
6. The Smart Fuse Box connector is damaged.
7. The Backup Alarm is defective.
8. The harness between Backup Alarm and **X-ENG** connector is defective.
9. The harness between Smart Fuse Box and **X-CAB_E** connector is defective.
10. The Smart Fuse Box is defective.

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is present and active, continue with Step **2**.

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active.
2. Check the integrity of the harness between Smart Fuse Box and Backup Alarm.

   Visually check the integrity of the harness and check for any damage.

   A. If the harness is damaged, replace the harness.

   B. If the harness is not damaged, continue with Step **3**.
3. Check the integrity of the Backup Alarm connector.

   The key must be in the OFF position.

   Disconnect Backup Alarm connector **X-BU2** and visually check the integrity of the pin P.

   A. If the pin P is damaged, replace the **X-BU2** connector.

   B. If the pin P is not damaged, continue with following step.
4. Disconnect Backup Alarm connector **X-BU1** and visually check the integrity of the pin N.

   A. If the pin N is damaged, replace the **X-BU1** connector.

   B. If the pin N is not damaged, continue with Step **5**.
5. Check the integrity of the **X-ENG** connector.

   The key must be in the OFF position.