Personal safety

Carefully read this Manual before proceeding with maintenance, repairs, refuelling or other machine operations.

Repairs have to be carried out only by authorized and instructed staff; specific precautions have to be taken when grinding, welding or when using mallets or heavy hammers.

Not authorized persons are not allowed to repair or carry out maintenance on this machine. Do not carry out any work on the equipment without prior authorization.

Ask your employer about the safety instructions in force and safety equipment.

Nobody is allowed to seat on the operator's place during machine maintenance unless he is a qualified operator helping with the maintenance work.

If it is necessary to move the equipment to carry out repairs or maintenance, do not lift or lower the equipment from any other position than the operator's seat.

Never carry out any operation on the machine when the engine is running, except when specifically indicated.

Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.

All repair and maintenance operations should be carried out with the greatest care and attention.

Service stairs and platforms used in a workshop or in the field should be built in compliance with the safety rules in force.

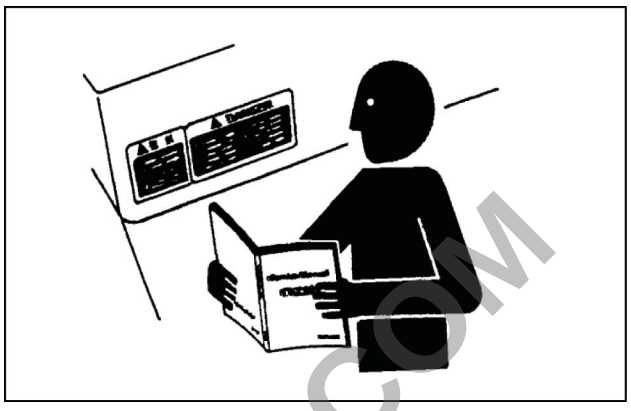
Any functional disorders, especially those affecting the safety of the machine, should therefore be rectified immediately.

⚠ DANGER

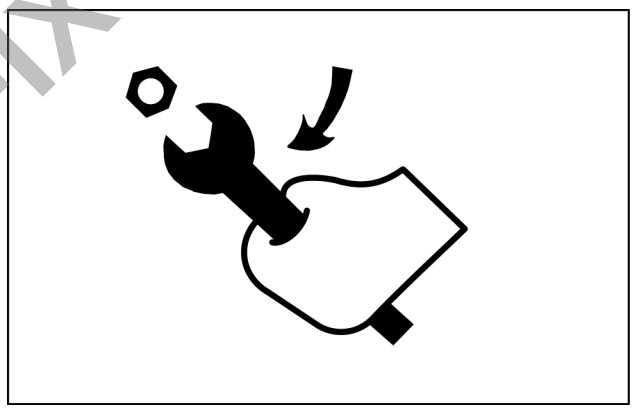
Unexpected movement!
Make sure parking brake is applied. Secure machine with wheel chocks.
Failure to comply will result in death or serious injury.

D0013A

Before performing any work on the machine, attach a maintenance in progress tag. This tag can be applied on the left-hand control lever, safety lever or cab door.



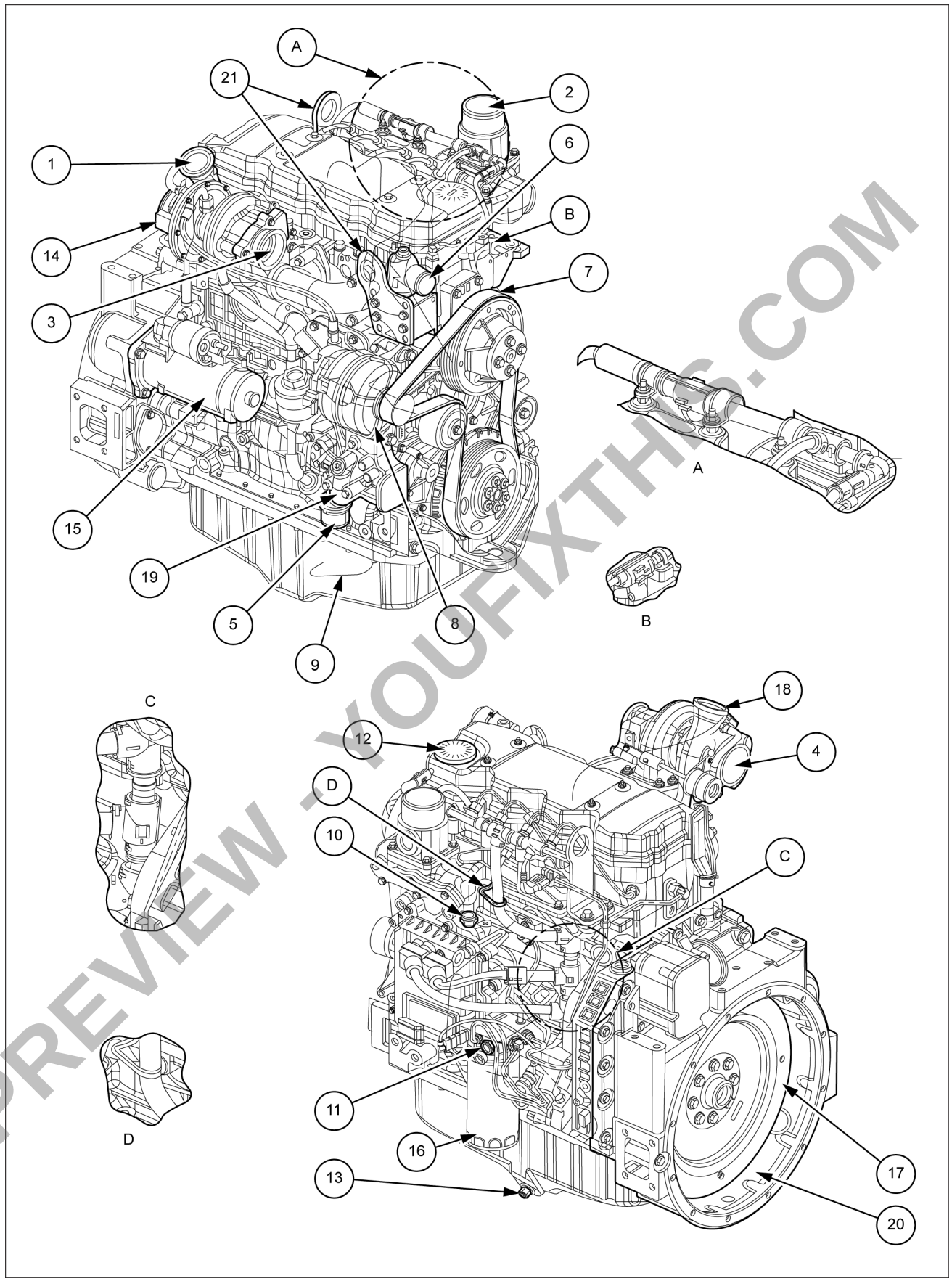
TULI12WEX2004AA 1



TULI12WEX2005AA 2

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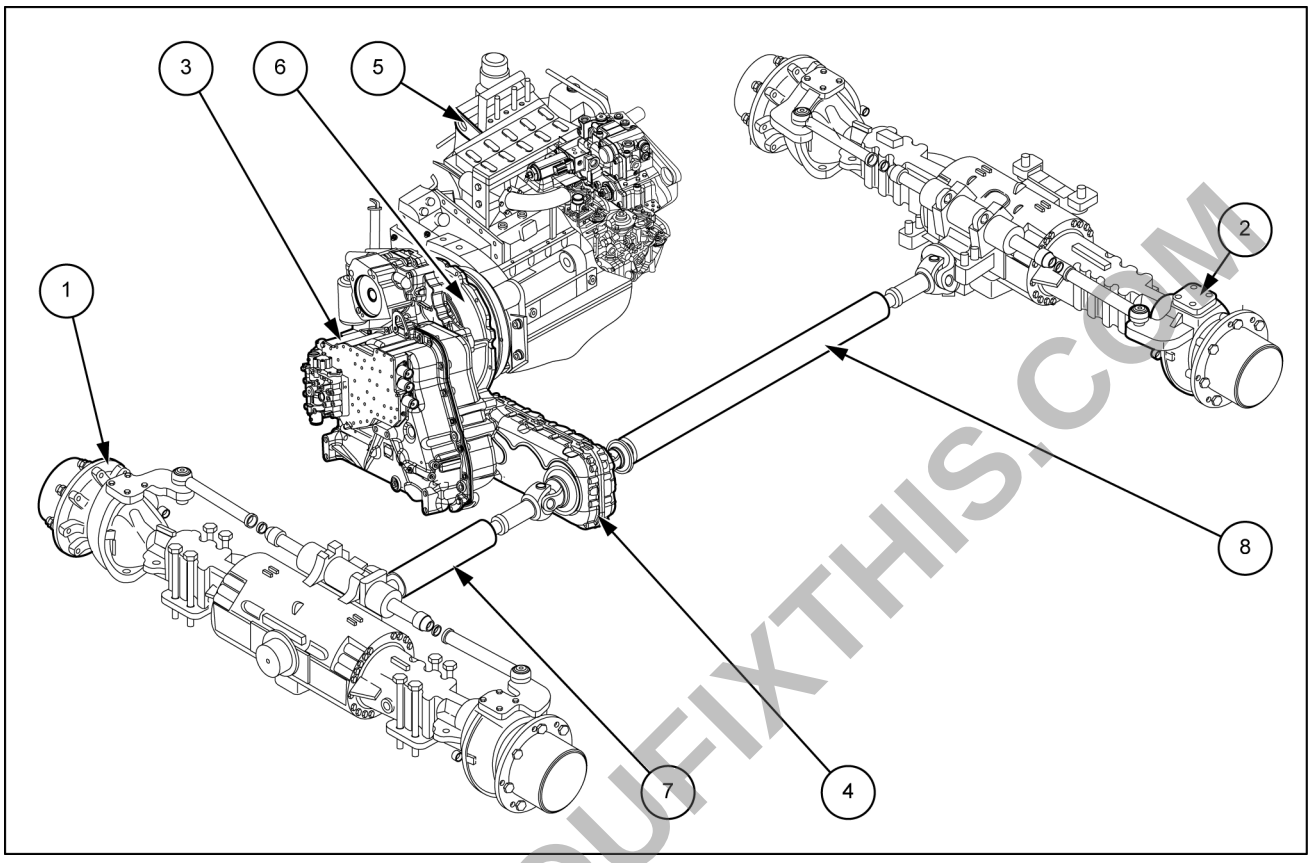


LEIL14TLH1060H 1

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Powershift transmission - General specification



LEIL13TLH1068FB 1

1. Front axle
2. Rear axle
3. Transmission
4. Transfer box
5. Engine
6. Torque converter
7. Front cardan shaft
8. Rear cardan shaft

For LM6.32, LM7.35 and LM9.35 models

The powershift transmission is controlled by electro-hydraulic solenoid valves and it is provided with 4 forward gears and 3 reverse gears.
The powershift transmission is managed by the TCU (Transmission Control Unit) Torque Converter.
The 4WD is always active (there are a front cardan shaft and a rear cardan shaft connected between the transmission and the axles).
The maximum travel speed is **38 km/h** (**24 mph**).

For LM6.35 and LM7.42 models

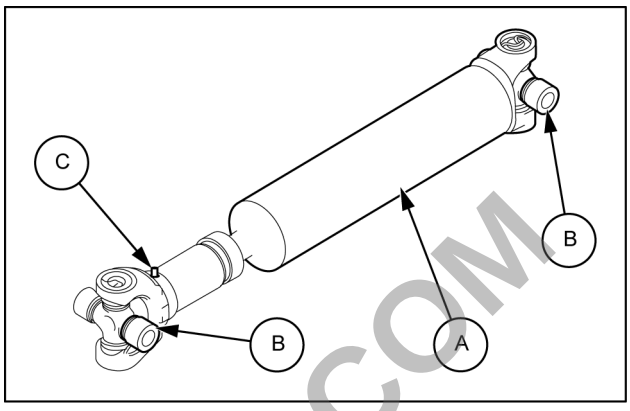
The powershift transmission is controlled by electro-hydraulic solenoid valves and it is provided with 6 forwards gears and 3 reverse gears.
The powershift transmission is managed by the TCU (Transmission Control Unit) Torque Converter.
The 4WD is always active (there are a front cardan shaft and a rear cardan shaft connected between the transmission and the axles).
The maximum travel speed is **40 km/h** (**25 mph**).

- Cardan shafts:
  The cardan shafts are installed between front axle and transmission and between transmission and rear axle.

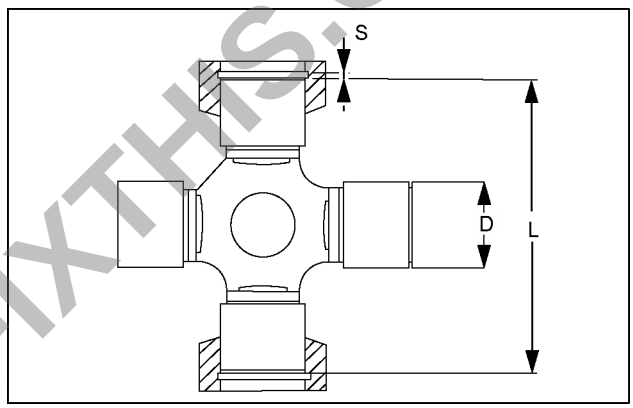
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Front drive shaft - Component identification

A. Front drive shaft
B. Spider
C. Greasing point for sleeve shaft spline



LEIL14TLH1141AB 1



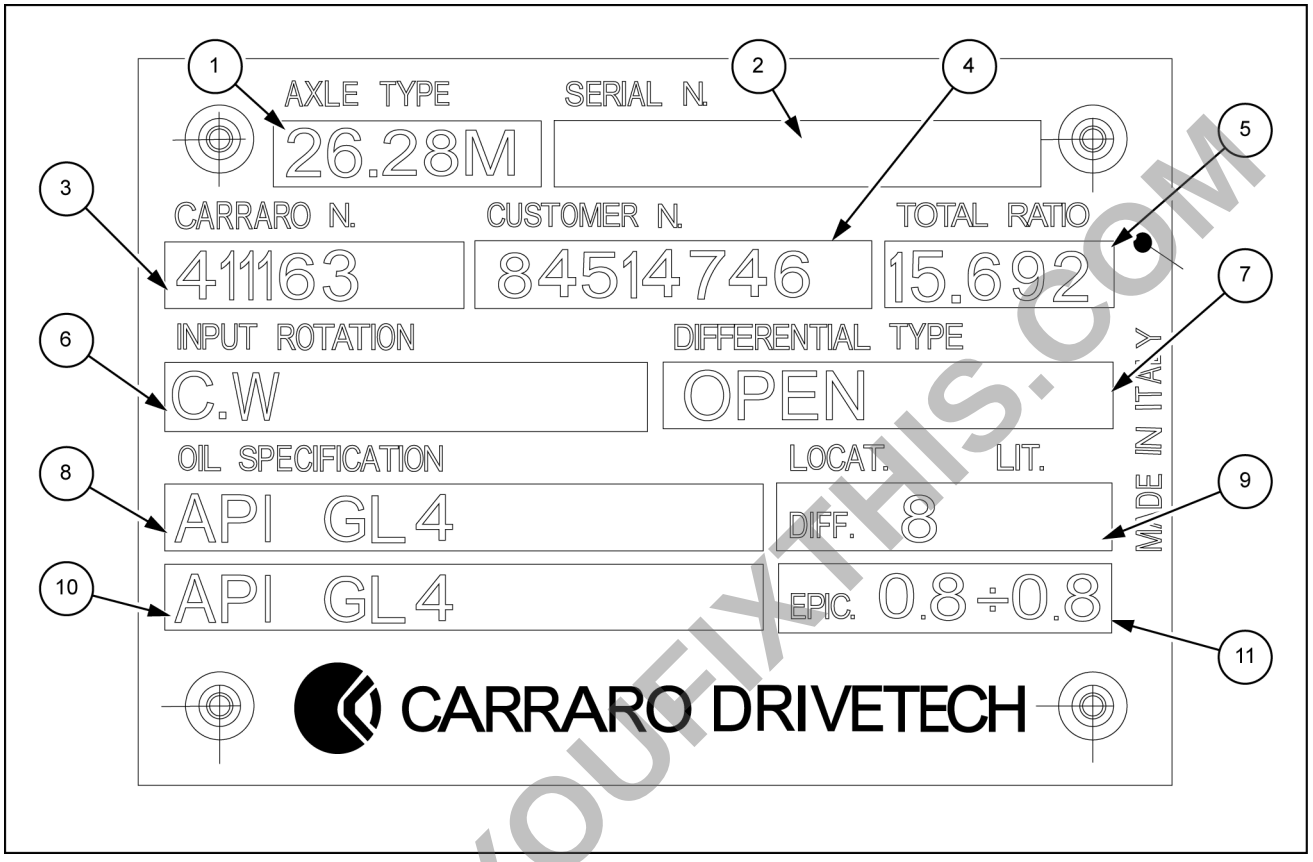
LEIL14TLH1146AA 2

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Powered rear axle - General specification

Axle identification - with open differential (LM6.32 - LM7.35 and LM9.35 models)

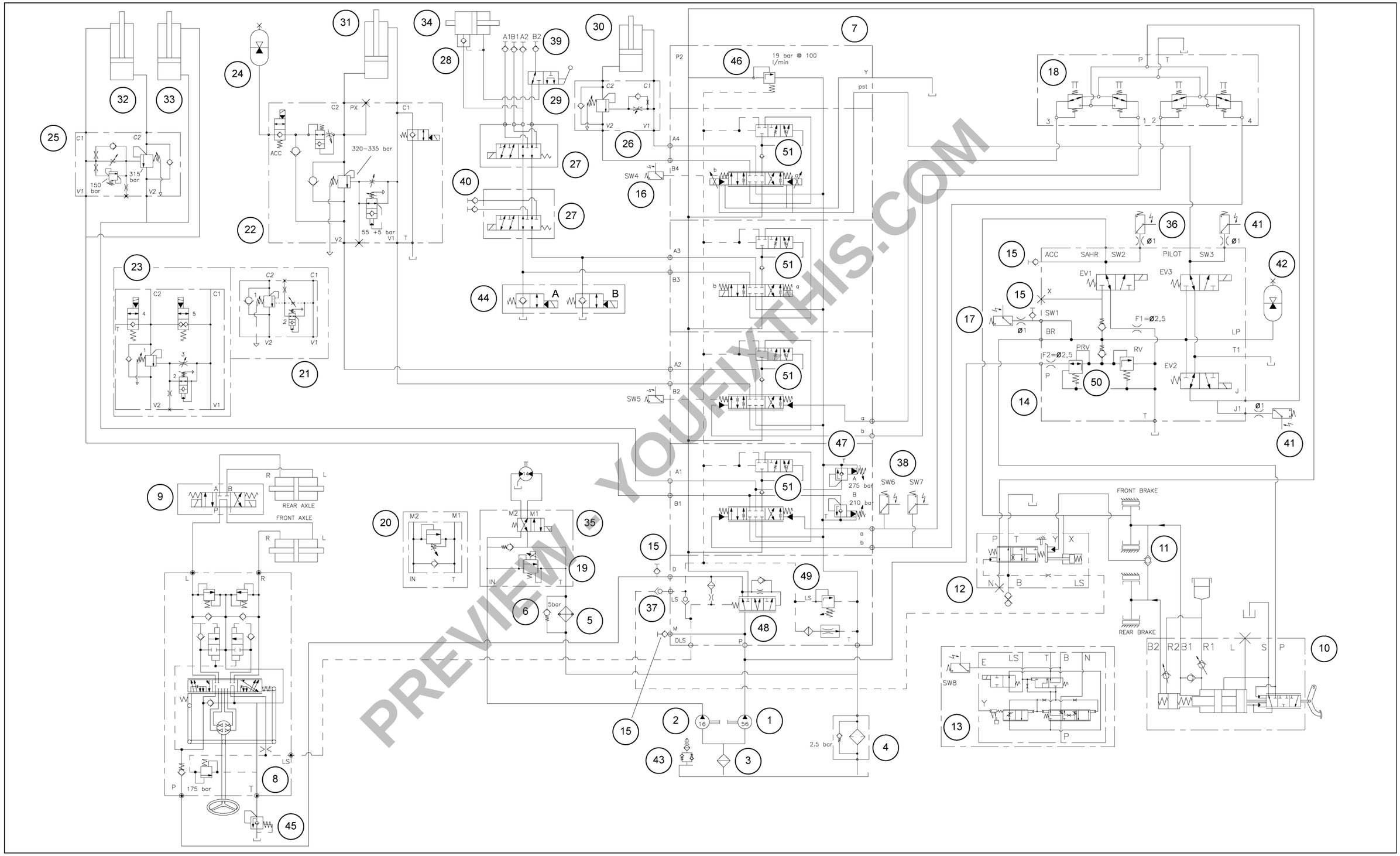


LEIL13TLH0923FB 1

1. Axle type
2. CARRARO Serial Number (S/N)
3. CARRARO reference number
4. CNH reference number
5. Total transmission ratio
6. Input rotation
7. Differential type
8. Differential oil type
9. Differential oil capacity
10. Reduction gear oil type
11. Reduction gear oil capacity

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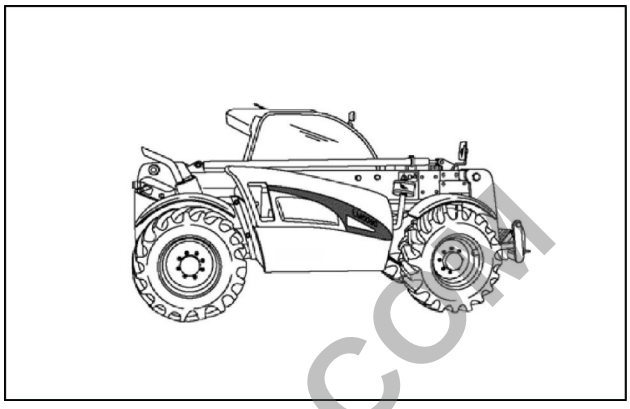
LEIL16TLH0001JB 1

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Hydraulic lift cylinder - Remove

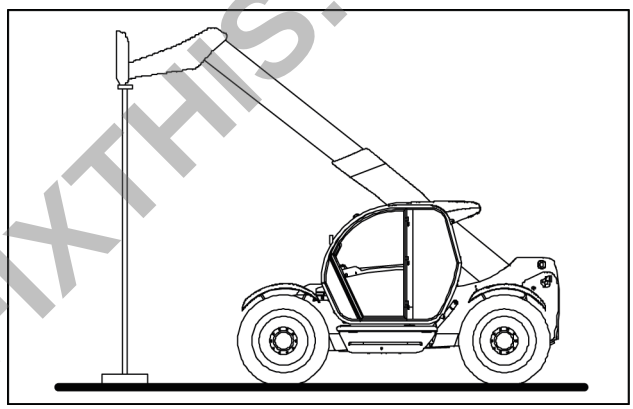
Position the Telehandler on a solid flat surface. Lift the boom arm fully and apply the handbrake.

NOTICE: *never work under or near the equipment or a component of the machine which has not been properly supported and secured.*



LELI12LM50517AA 1

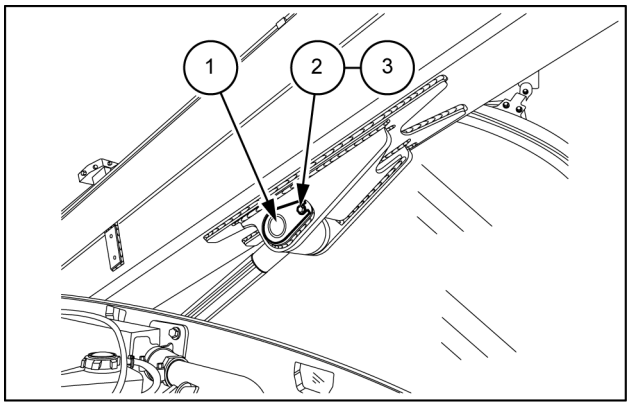
Position a safety support under the boom arm, as indicated in the figure, to prevent it from falling.
Turn-off the engine and remove the key from the ignition switch.



LELI12LM50518AA 2

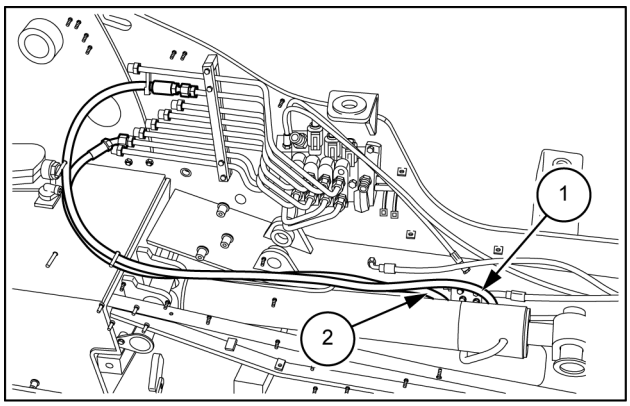
Use a lifting device to support the lift cylinder. Attach the sling to the bottom of the cylinder.
Remove the screw **(2)** and the washer **(3)** to remove pin **(1)** from the lifting cylinder and boom.
Use a striker to extract the pin **(1)**.
Remove the pin **(1)** from the rod end of the lift cylinder.

NOTICE: *handle all parts with care. Never place your hands or fingers between parts. Wear approved clothing such as goggles, gloves and safety footwear.*



LEIL13TLH1519AB 3

Before detaching, mark the hoses **(1)** and **(2)** on the check valve to avoid mistakes when fitting the new cylinder. Disconnect the hoses **(1)** and **(2)** from the two fittings fixed to the lock valve. Seal the hoses **(1)** and **(2)** to avoid any foreign material getting inside.



LEIL13TLH1576AB 4

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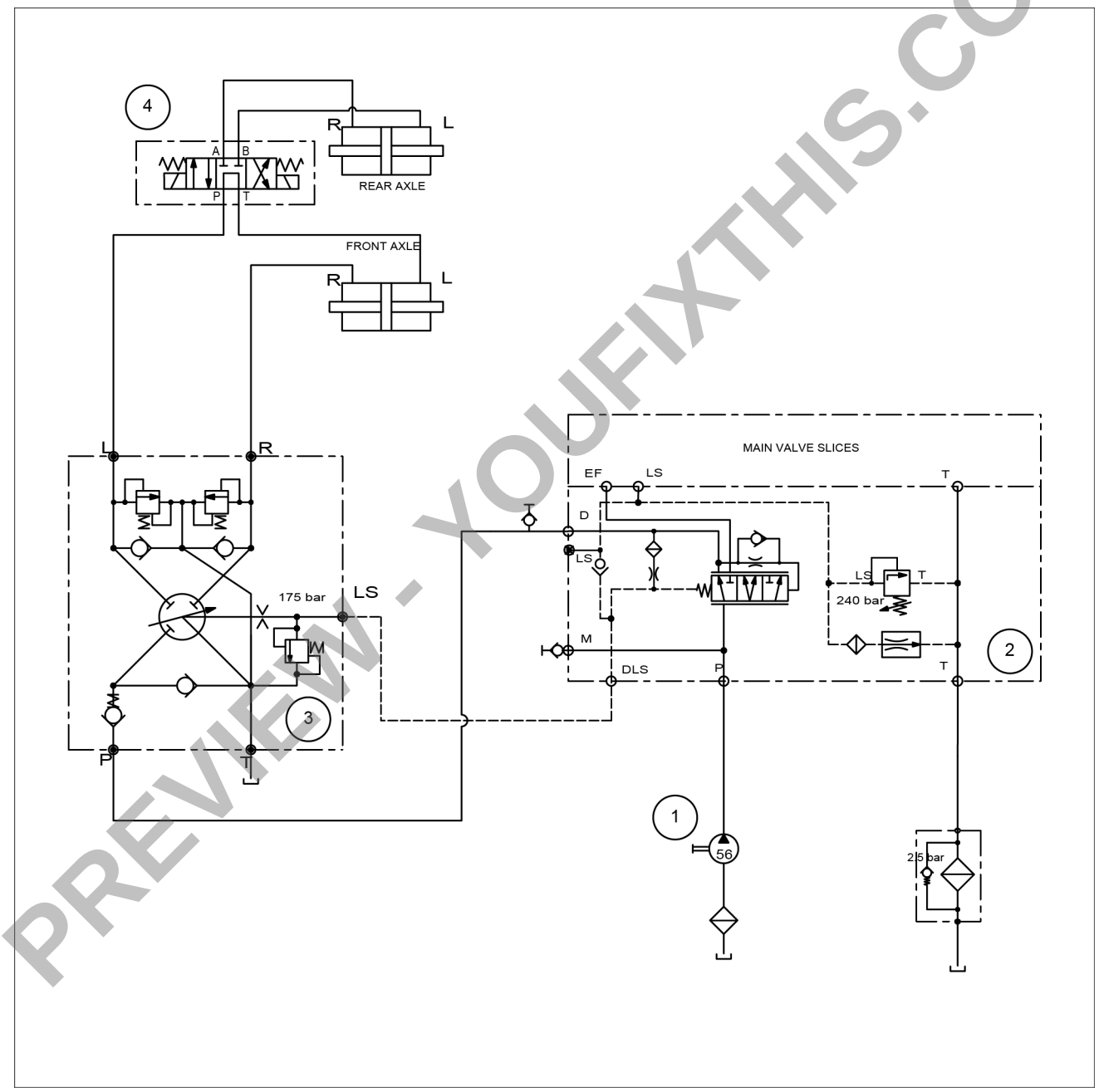
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Steering control - Hydraulic schema

Steering Hydraulic Schematic

1. Implement pump
2. Steering priority valve
3. Power steering control valve
4. Steering mode valve

Steering hydraulic schema – LM6.32 - LM7.35 - LM9.35 models



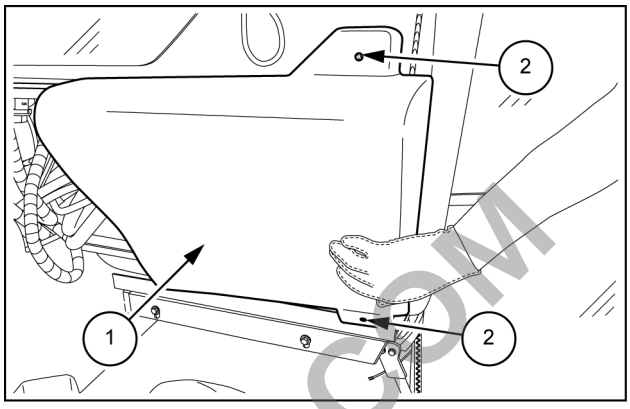
LEIL14TLH1032GB 1

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Air filter - Replace

To access the cab air filter **(3)**, remove the panel **(1)** fastened to the front side of the cab by means of the two retaining screws **(2)**.
Clean the housing with a damp cloth and re-install the filter element with the seal facing the inside of the cover.

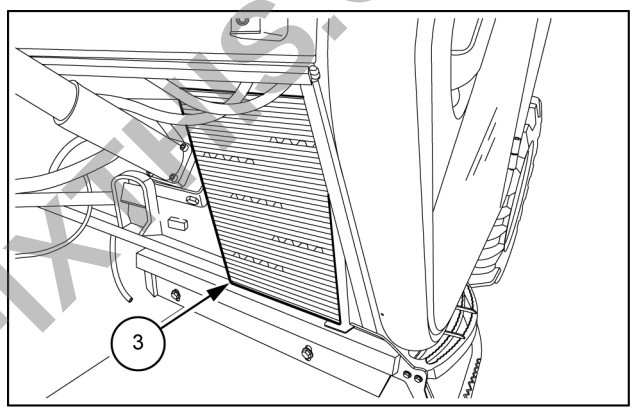


LEIL13TLH0387AB 1

NOTE: *the filter should be cleaned more frequently when operating in extremely dusty conditions.*

When filter service becomes necessary, replacing filter is always recommended over cleaning due to risk of damaging the filter. If cleaning cannot be avoided, two approaches are possible, but must be done very carefully:

1. Blow out the filter element with compressed air (maximum **5 bar**) from the clean air side to the dirty side until no more dust blown out.
2. Shake gently the filter with the dirty side directed downward until no more dust falls down. Never wash, the filter element as this will damage it.



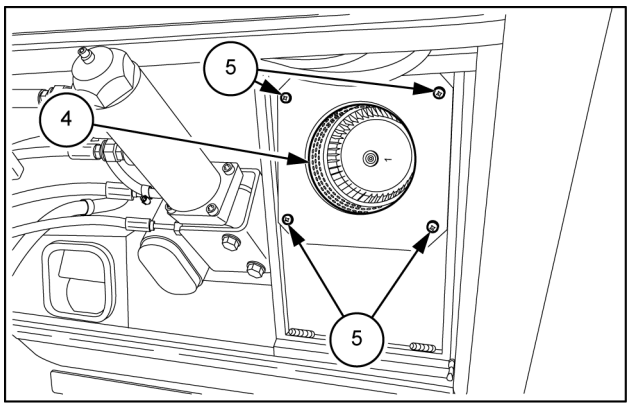
LEIL13TLH0388AB 2

NOTE: *a cleaned element will never match service life and performance of a new element. After servicing filter element, carefully wipe out the inside of the housing and the seal contact surface with a moist cloth. Take care that no dust accesses the clean air side of the air cleaner. When fitting the filter element take care that it is correctly positioned in the housing so that the function of the seal is not impaired.*

Replace the filter at least once per year. Best if filter used within 3 years after manufacturing date.

Air recirculation filter

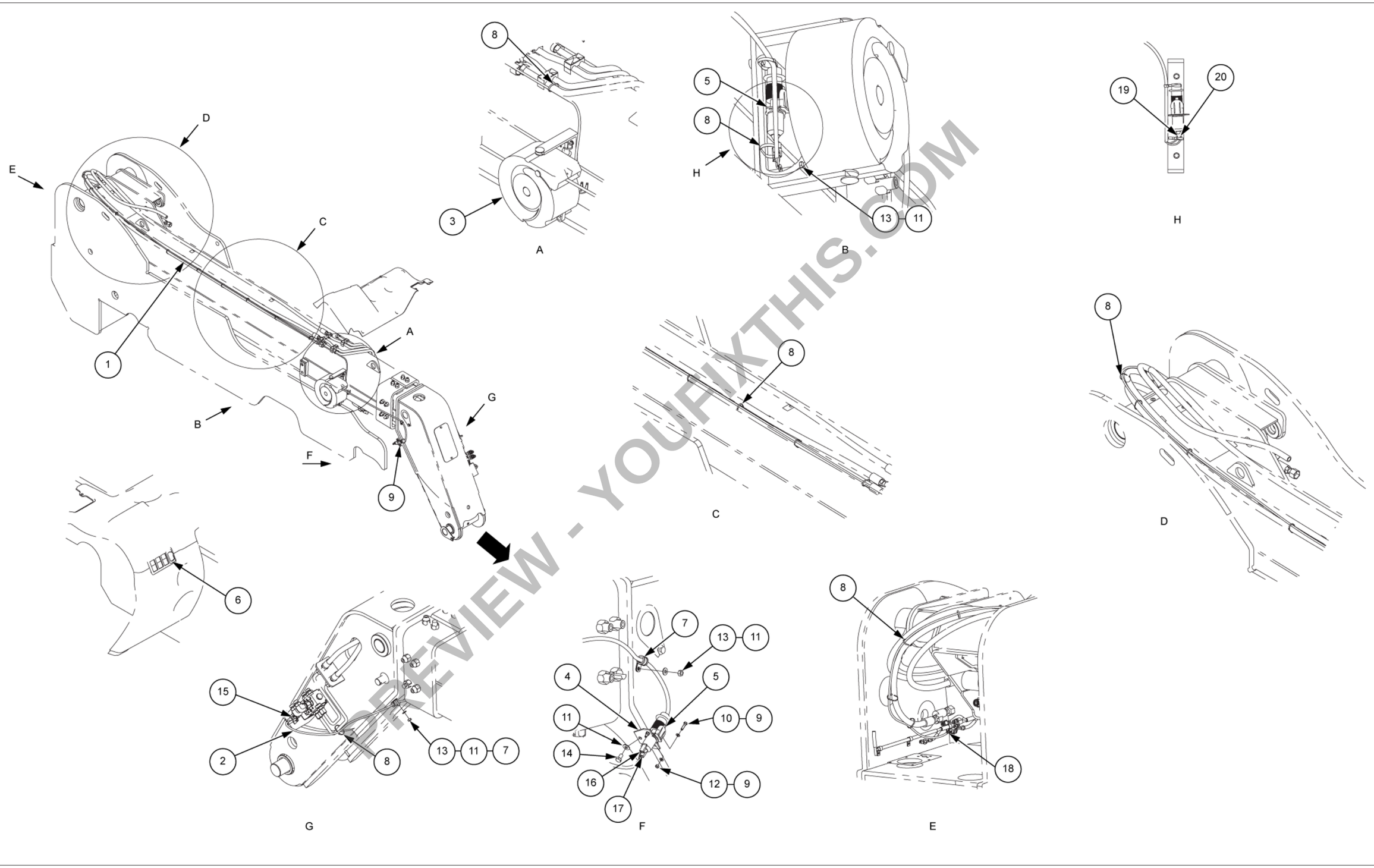
The air recirculation filter **(4)** is located behind the cab air filter.
To access the air recirculation filter, remove the fixing screws **(5)**.
Clean the inside of the filter chamber with a damp lint-free cloth and install the new filter element.



LEIL13TLH1037AB 3

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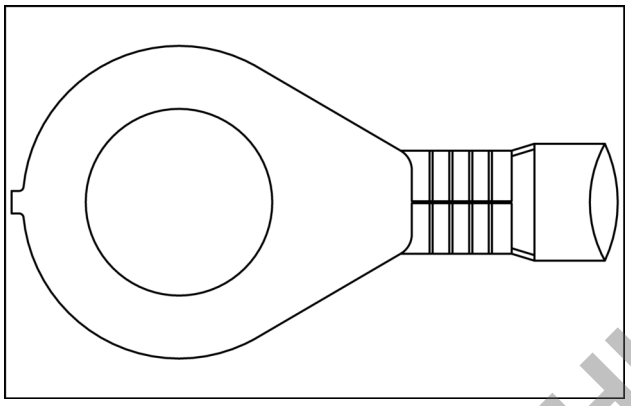
LEIL17TLH0646JB 1

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Wire connectors - Component diagram 00

LM6.32	WE
LM7.35	WE
LM9.35	WE

X-001 - UCM AND HYDR. CONTR. FRAMES-CAB (84163398) (Plug)

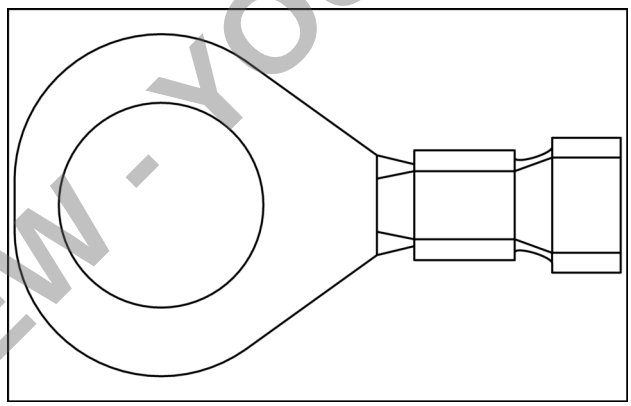


84163398 1

84163398

Pin	From	Wire	Description	Color-Size	Frame
1	**X-007 (Plug) pin 1** UCM FRAME GND	GB-1701A	GND-UCM FRAME	BK - 2.5	**SHEET 15**
1	**X-006 (Plug) pin 1** HYDRAULIC CONTROLLER FRAME GND	GB-1701	GND HYD. CONTROLL. FRAME	BK - 2.5	

X-002 - CAB GROUND 2 [SH26: A-6] (47663140) (Plug)



47663140 2

47663140

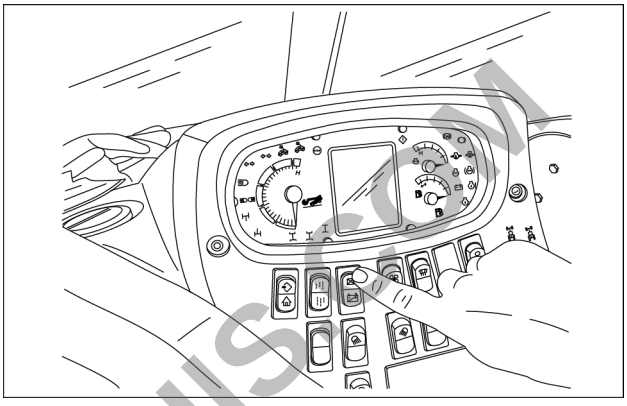
Pin	From	Wire	Description	Color-Size	Frame
1	**X-091 pin C8** FLASHER UNIT	CA-1541	GND-FLASHER UNIT	BK - 1.0	**SHEET 09**
1	**X-091 pin C7** FLASHER UNIT	CA-1540	GND-FLASHER UNIT	BK - 1.0	

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Engine starter - Remove

1. Park the machine on a firm level ground and lower the boom arm to the floor.
2. Apply the parking brake.
3. Press the upper part of the battery isolator switch to disconnect the battery. Stop the engine.
4. Move the joystick in all directions to release the hydraulic pressure.

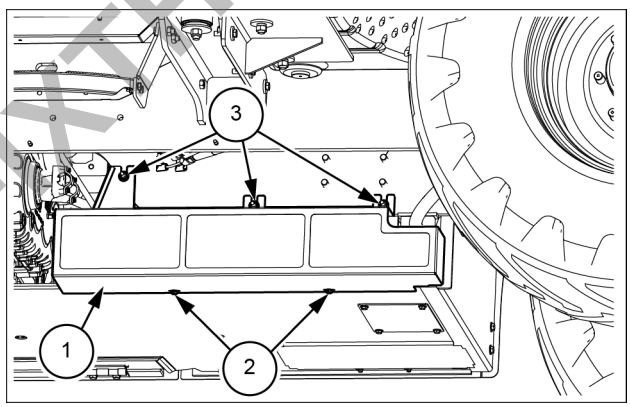


LEIL17TLH0764AA 1

5. Remove the retaining bolts **(2)** and the nuts **(3)** that fix the cover **(1)** to the frame lower side and to the engine compartment.
6. Remove the cover **(1)** from the bottom side of the machine.

NOTE: *steps **5** and **6** are necessary to gain accessibility to the engine starter from the bottom side of the machine.*

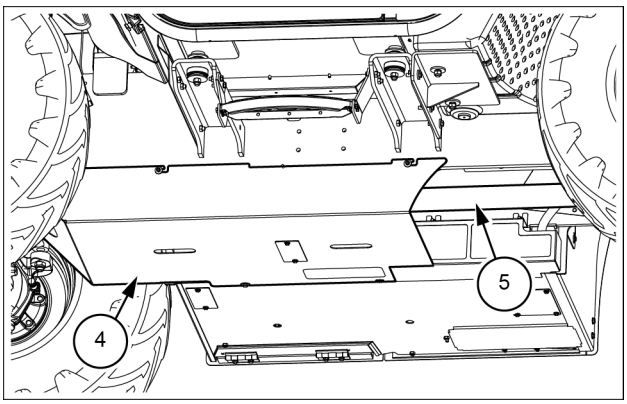
NOTE: *for clarity, the drive shaft is not shown in figure **2**.*



LEIL17TLH1178AB 2

NOTE: *if equipped, remove the drive shaft cover guard **(4)** to gain accessibility to the cover **(1)**.*

NOTE: *if necessary, remove the drive shaft **(5)**, as well.*



LEIL17TLH1179AB 3

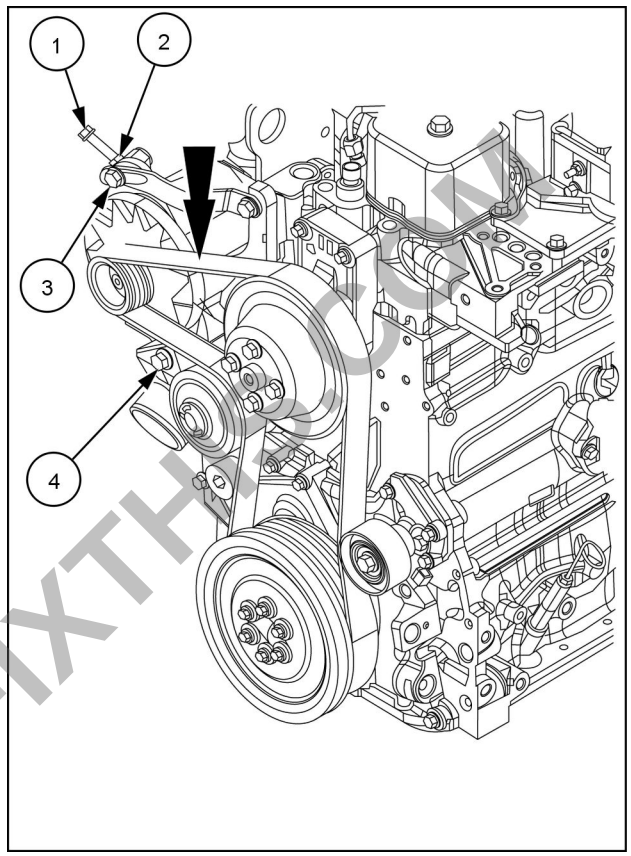
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Alternator drive system Belt - Tension adjust

Alternator belt tensioning procedure

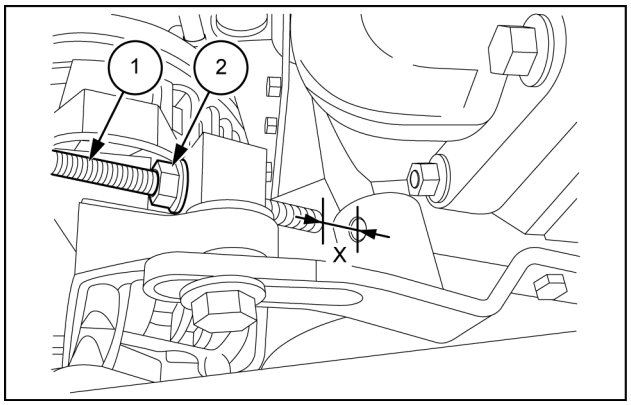
1. Loosen the screw **(3)** and **(4)** to release the belt tensioning.
2. To perform the belt tensioning act on the adjustment screw **(1)**. Tighten the adjustment screw **(1)** until the adjustment screw **(1)** is in contact with the engine block.
3. The correct belt tensioning is given when the belt deflection is about **5 mm** (**0.2 in**) once a force of **5.5 kg** (**12.1 lb**) is applied in the point indicated by the arrow in the figure.
4. Once the belt tensioning is correct, tighten the screw **(3)** and the nut of the screw **(4)** to **43 N·m** (**31.7 lb ft**)



LEIL15TLH0330BA 1

5. Loosen the adjustment screw **(1)** in order to avoid the contact with the engine block.
   Leave a gap “x” of **10 mm** (**0.4 in**) between the adjustment screw **(1)** and the engine block. Then tighten the nut **(2)**.

   x = **10 mm** (**0.4 in**)



LEIL15TLH0331AB 2

6. Start the engine and run for at least 5 minutes. After that stop the engine and allow the belt to reach the ambient temperature.
7. Start again the engine and visually check if there are belt “flap” and or noise or some belt material (ribs) in the pulley groves.
8. After the alternator belt tensioning procedure, unscrew the adjustment screw **(1)** up to leave a gap “x” of about **10 mm** (**0.4 in**) and the lock nut **(2)** placed on the screw.

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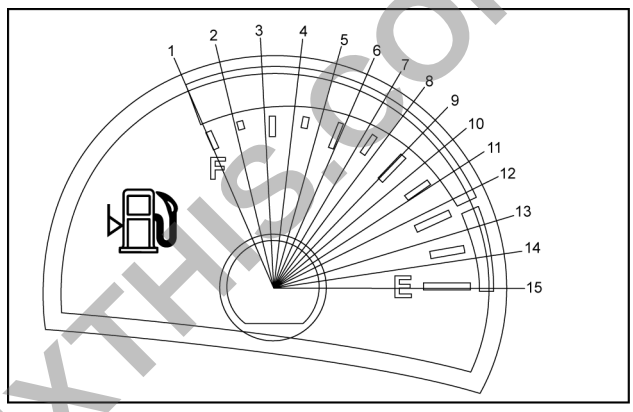
Fuel level sensor - Detailed view

The ADIC shall move the gauge to its minimum (park position) value whenever a fault of the sensor is detected.

The low fuel level lamp shall be lit whenever a fault of the sensor is detected.

SENSOR RESISTANCE (ohm)			
OPEN	Empty	Full	SHORT C.
> 900	250	20.5	< 5

The level of the fuel visualized on the gauge shall be calculated through the following table:



LEIL14TLH0034AA 1

Step #	Sensor Resistance [Ohm]	Angle [°]	Lamp Status
1	20.50	114	OFF
2	47.75	103.6	OFF
3	74.75	92.6	OFF
4	84.75	81.7	OFF
5	95.00	73.5	OFF
6	109.75	66	OFF
7	120.00	59	OFF
8	130.00	52.2	OFF
9	140.25	46	OFF
10	150.25	39	OFF
11	160.00	31.8	OFF
12	175.25	24.5	OFF/ON
13	190.25	16.6	OFF/ON
14	217.25	8.4	ON
15	250.25	0	ON

Table - Steps and Angles to consider for Fuel Level Gauge

Lamp is lit when the sensed fuel level becomes equal to step 13.

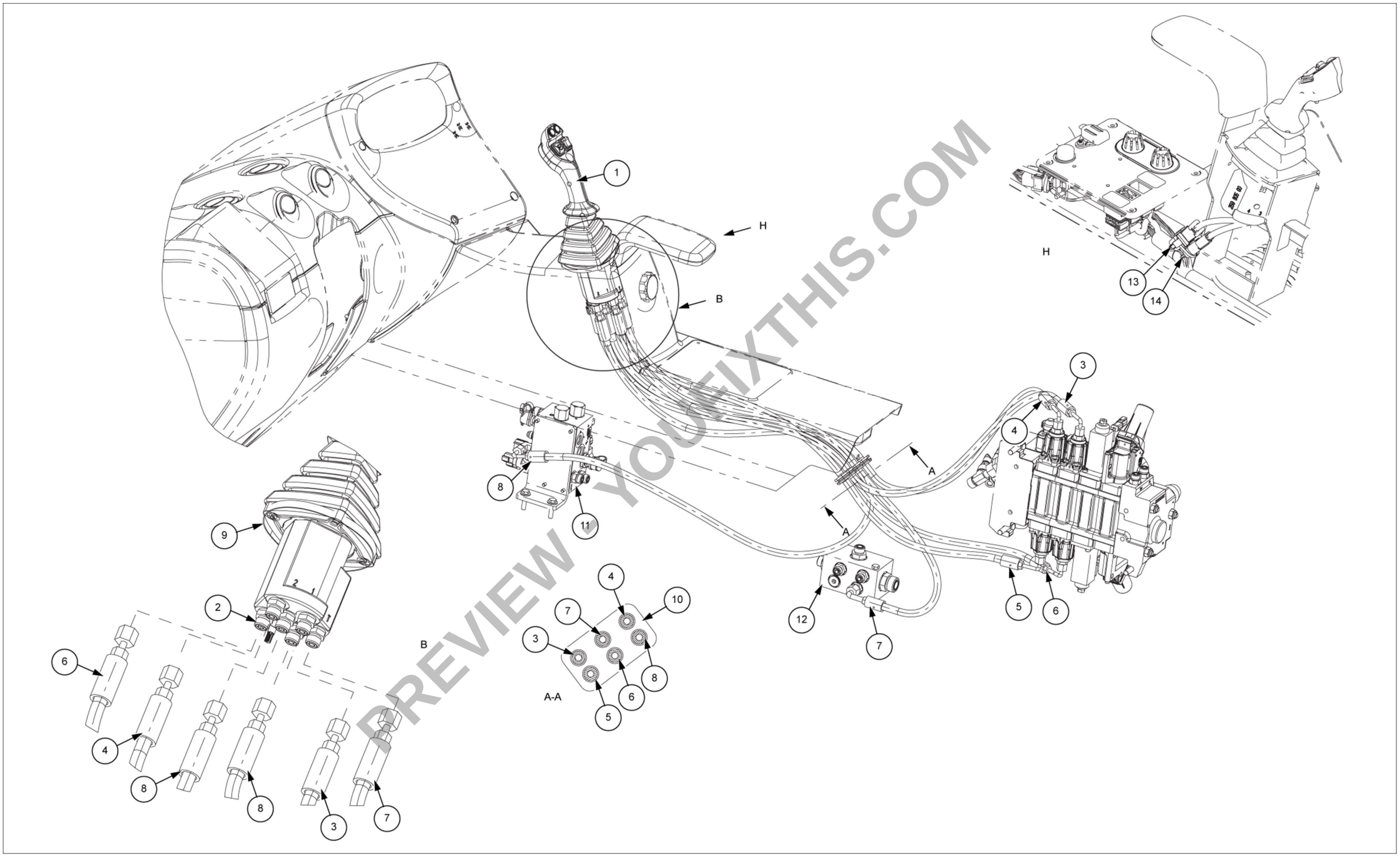
Lamp is turned off when sensed fuel level raises up to step 12.

In case the sensor resistance value is > 900 (open circuit), the gauge will be put in the empty position.

In case the sensor resistance value is < 5 (short circuit), the gauge will be put in the empty position.

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LEIL17TLH0645JB 1

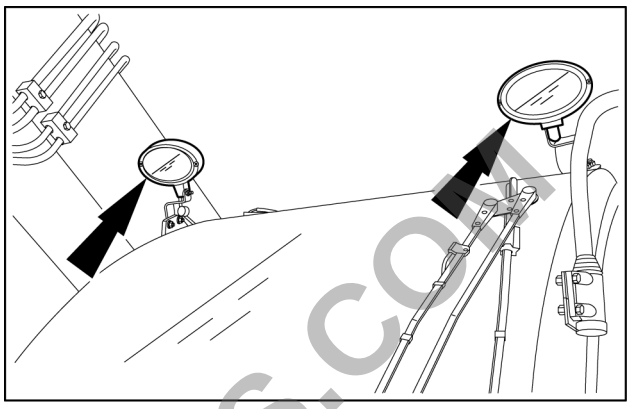
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External lighting - Replace

Front work light (12 V- 4 W; 12 V- 21 W; 12 V- 60/55 W)

To gain access to the bulb, remove the securing screws, gently remove the lens cover and remove the bulb.
Replacement of the bulb follows the removal procedure in reverse.

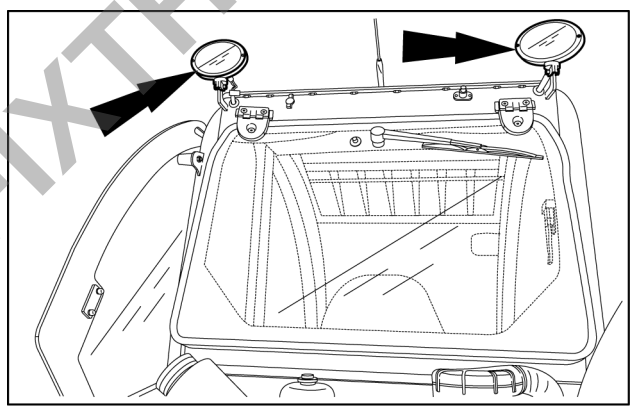
NOTE: *modern headlights and work lamps tend to have halogen bulbs fitted. Never touch a halogen bulb with the fingers. Natural moisture in the skin will cause the bulb to burn out when the lamp is switched on. Always use a clean cloth or tissue when handling halogen bulbs.*



LEIL13TLH0454AB 1

Rear work lamp (12 V - 55 W)

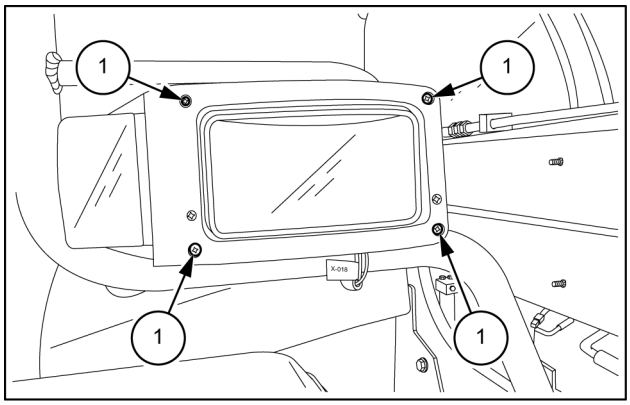
The bulb is accessible after the moulded plastic lens assembly screws have been removed.



LEIL13TLH0450AB 2

Headlight (12 V- 4 W; 12 V- 4 W; 12 V- 60/55 W)

To gain access to the headlight bulbs, extract the four securing screws **(1)**. Gently remove the lens cover and remove the plug from the rear of the bulb, release the retaining spring and extract the bulb.
The sidelight bulb is removed by pulling the bulb carrier out of the reflector assembly.
Replacement of the bulbs follows the removal procedure in reverse.
The indicator bulb can be accessed by removal of the lens cover retaining screw.



LEIL13TLH0477AB 3

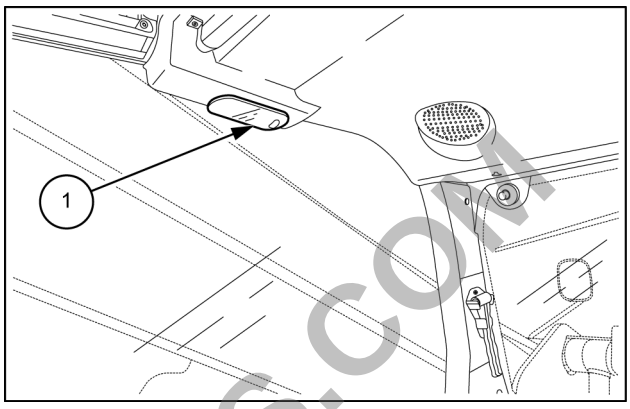
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Cab interior light - Replace

Interior lamp (12 V- 5 W)

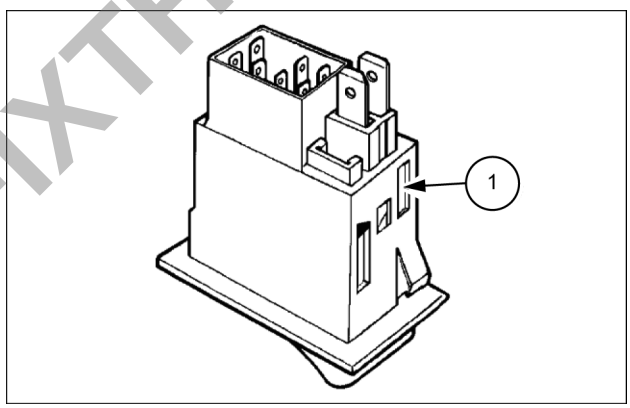
The interior lamp bulb is accessible after removal of the moulded plastic lens cover **(1)**. The bulb may be removed by exerting outward pressure on one of the retaining tangs and sliding the opposite end of the bulb from its retaining tang.
Installation of the bulb and lens cover follows the removal procedure in reverse.



LEIL14TLH1053AB 1

Rocker switch

The rocker switches are internally illuminated by a bulb which can be removed from the rear of the switch assembly **(1)**.
To gain access to the switch remove the console attaching screws and rotate the console.
The bulb is of the capless type, rated at **1.2 W** and is press fitted in the retainer. After changing the bulb, push the retainer into the back of the switch.



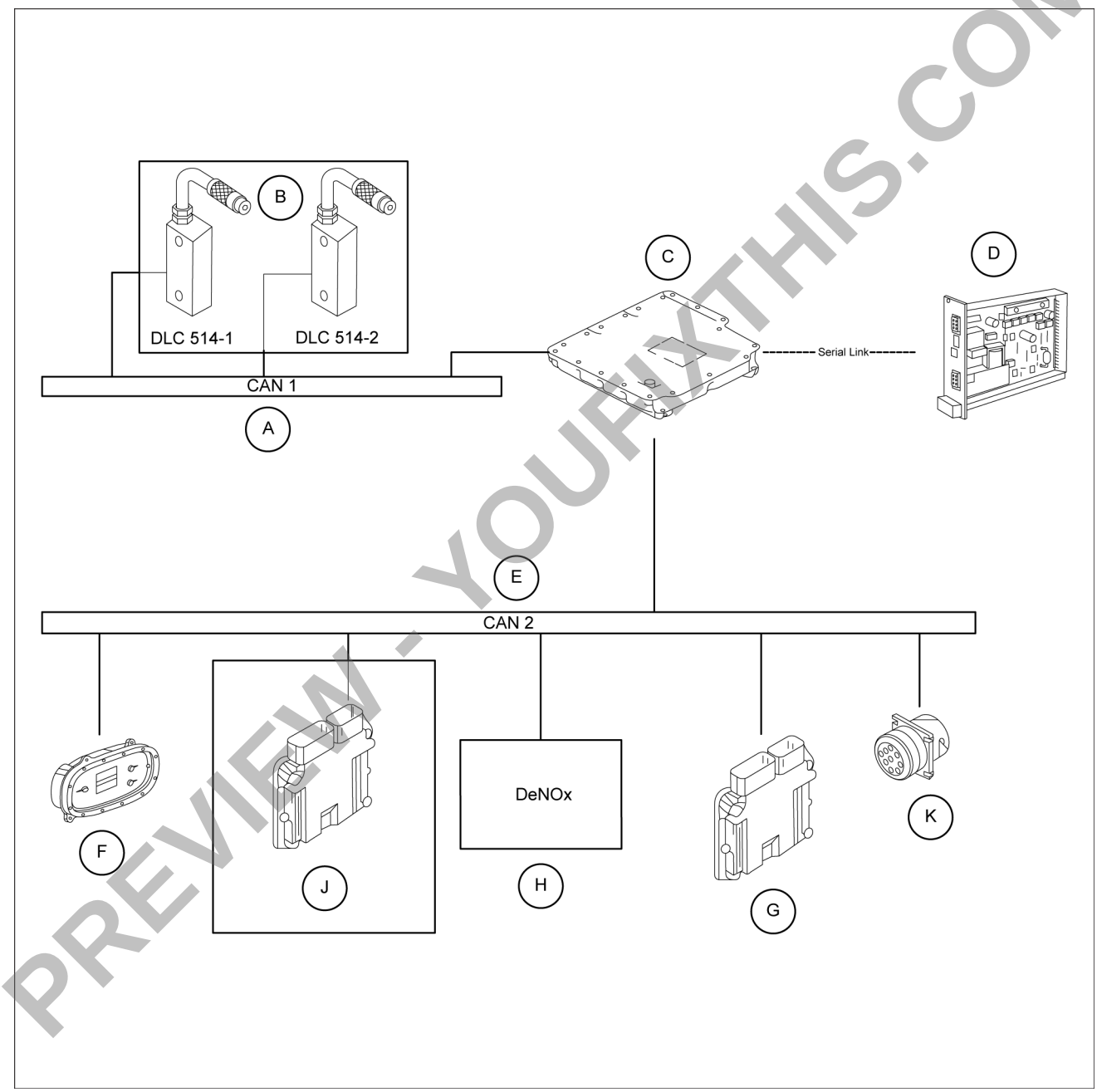
LEIL14TLH1055AB 2

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VEHICLE ARCHITECTURE

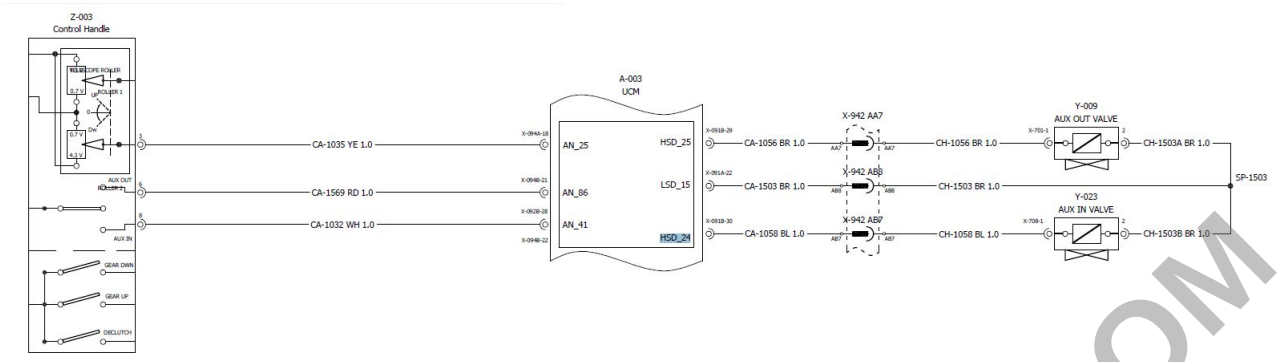
The system architecture of the Telehandler is a CAN bus architecture.
The CAN 1 network **(A)** is dedicated for communications between the Digital Load Cells **(B)** and the UCM **(C)** (which is linked to a ZF transmission unit **(D)** via a serial connection).
The CAN 2 network **(E)** is dedicated for the cluster **(F)** (ADIC LL type), for the Engine Control Unit **(G)** and for the DeNOx control unit **(H)**.
The LM6.35 and LM7.42 models offers an additional Bosch unit **(J)** for hydraulic working system.
The machine is also fitted with an ISO 11783 standard diagnostic connector **(K)**. This connector allows the EST (Electronic Service Tool) to be connected to the machine, for off-board diagnostics and failure analysis.



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LEIL17TLH0001 1

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19001 - Battery voltage sensing (electrical) - signal high / P0563 battery voltage evaluation – above upper limit

LM6.32	WE
LM7.35	WE
LM9.35	WE

Control Module: ECU

Context:
The Engine Control Unit (ECU) A-002 monitors battery voltage. If the ECU determines that battery voltage has exceeded **35.7 V**, this fault will occur.

Cause:
Battery voltage is greater than **35.7 V**.

Possible failure modes:

1. Faulty charging system.
2. Faulty ECU A-002, software.

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 and the connectors.

   Visually inspect the relevant harness and connector for damage, bent or dislocated pins, corroded terminals or broken wires. Verify that the connectors are fully installed. Flex the harness 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 continue with Step **3**.
3. Check the battery voltage.

   The engine must be running.

   Use a multimeter to perform the following voltage check:

From	To	Value
Connector **X-418 (Plug) pin 1**	Connector **X-419 (Plug) pin 1**	There should be about **12 V**

   A. If there is more than **12 V**, continue with Step **4**.

   B. If there is about **12 V**, check the ECU A-002 for the appropriate software and re-flash, if necessary.
4. Check the charging system for proper operation.

   A. If the charging system is not functioning properly, repair the charging system as necessary.

   B. If the charging system is functioning properly, check the ECU A-002 for the appropriate software and re-flash, if necessary.

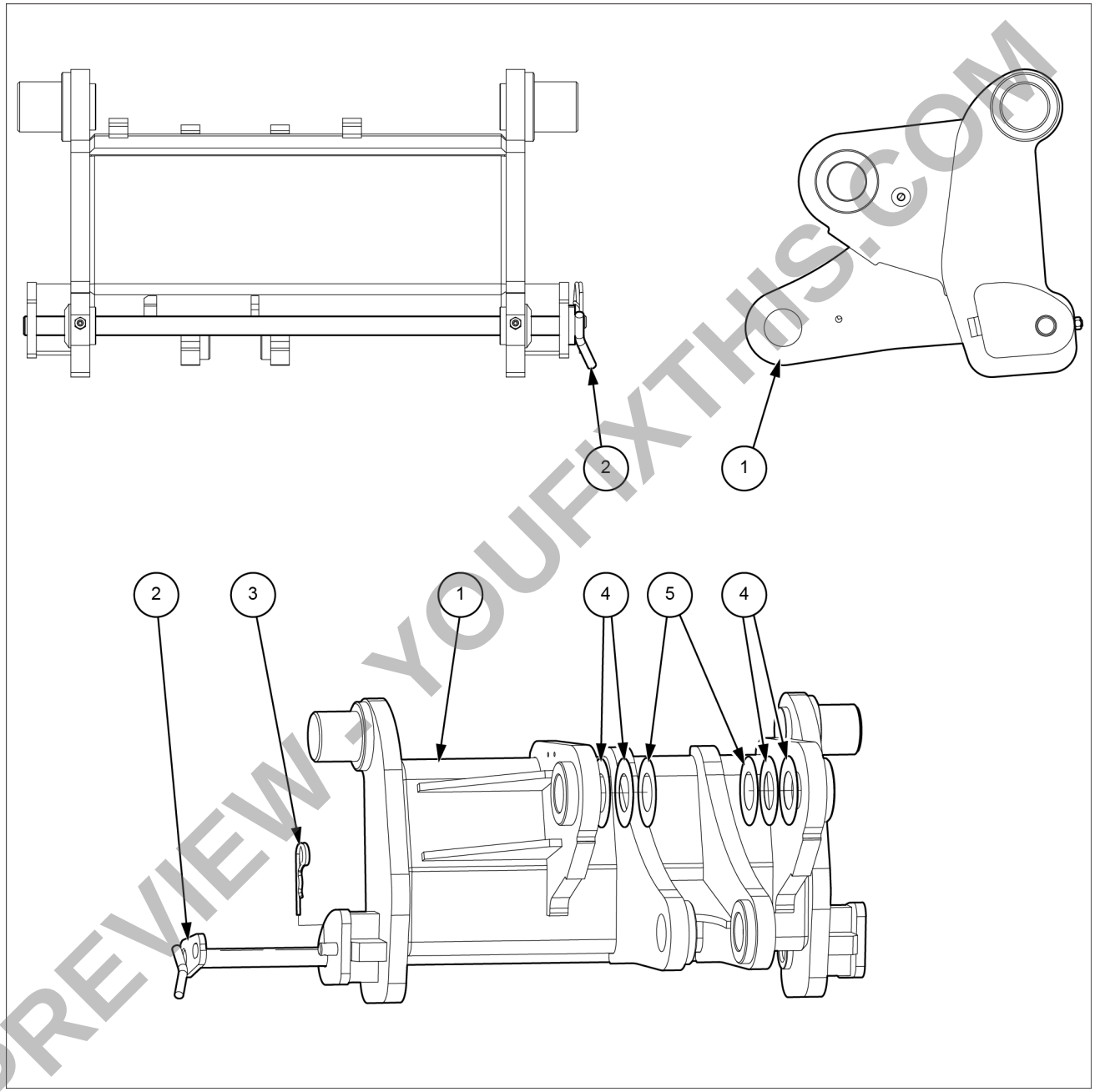
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Quick coupler - Component identification - Mechanical carrier

LM6.32	WE
LM7.35	WE
LM9.35	WE

CNH mechanical carrier



LEIL17TLH0648GB 1

1. Carrier
2. Pin
3. Cotter pin
4. Shim **1 mm** (quantity 4)
5. Shim **0.5 mm** (quantity 2)

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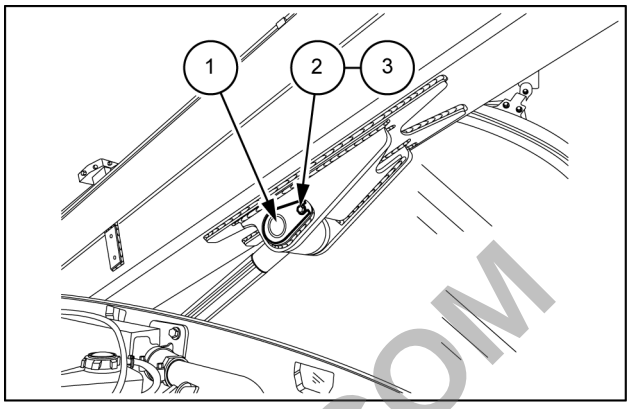
[33.220] Trailer brake hydraulic control 33.3
[33.204] Front axle brake 33.4
Hydraulic systems 35
[35.000] Hydraulic systems 35.1
[35.104] Fixed displacement pump 35.2
[35.106] Variable displacement pump 35.3
[35.359] Main control valve 35.4
[35.357] Pilot system 35.5
[35.128] Auxiliary hydraulic function control 35.6
[35.752] Hydraulic fan drive cooling system 35.7
[35.100] Main lift system 35.8
[35.701] Front loader arm hydraulic system 35.9
[35.736] Boom hydraulic system 35.10
[35.734] Tool quick coupler hydraulic system 35.11
[35.740] Telescopic arm hydraulic system 35.12
Steering 41
[41.101] Steering control 41.1
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[55.011] Fuel tank system 55.4
[55.512] Cab controls 55.5

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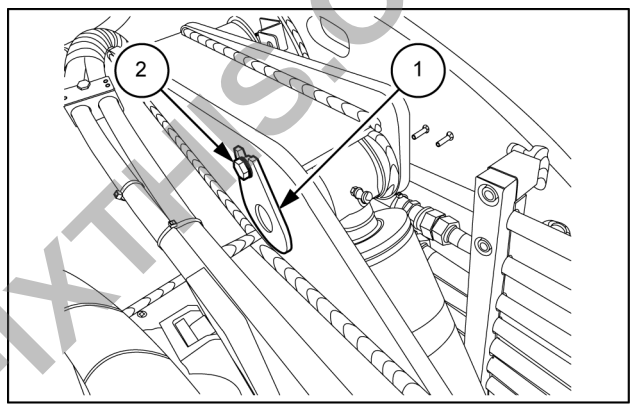
Remove the pin **(1)** which secure the lifting cylinder to the boom first section. Remove the locking screw **(2)** and the washer **(3)** to remove the pin **(1)**. Use a striker to extract the pin **(1)**.

NOTICE: *handle all parts with care. Never place hands of fingers between parts. Wear approved protective clothing such as glasses, gloves and safety shoes.*



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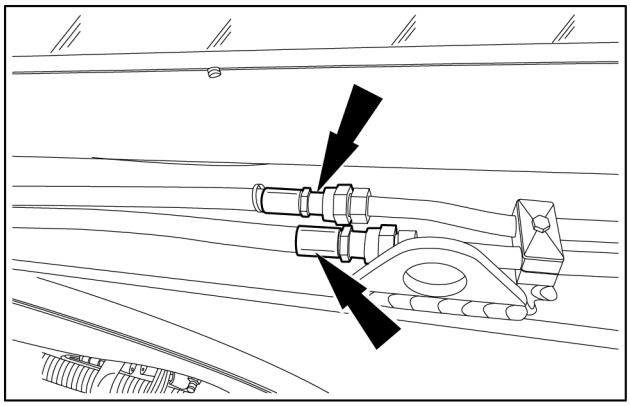
Remove the pin **(1)** which secures the compensation cylinder to the boom first section.
Remove the locking screws **(2)** and the related washer to remove the pin **(1)**. Use a striker to extract the pin **(1)**.



LEIL13TLH1524AB 39

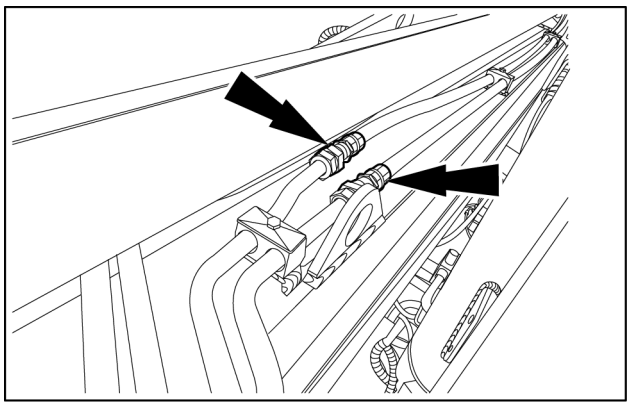
Disconnect the two auxiliary function hoses indicated. Plug all hoses in order to prevent accidental oil leakage.

NOTICE: *before removing the cap or the cover, turn them slowly to discharge internal pressure. Please refer to the Operator's Manual.*



LEIL13TLH1522AB 40

Disconnect the hydraulic hoses from the tilt cylinder on the left-hand side of the boom first section. Plug the hoses.



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Electrical components - ECU description

LM6.35 ELITE	WE
LM7.42 ELITE	WE

A-001 - DENOX CONTROLLER (ECU)

Component Type	ECU
Wiring frames	**SHEET 12** **SHEET 28**
Connectors	**X-914 (Receptacle)**

A-002 - ECU (ECU)

Component Type	ECU
Wiring frames	**SHEET 11** **SHEET 13** **SHEET 28**
Connectors	**X-911 (Plug)**

A-003 - UCM (ECU)

Component Type	ECU
Wiring frames	**SHEET 04** **SHEET 14** **SHEET 15** **SHEET 16**
Connectors	**X-091B (Receptacle)** **X-093B (Receptacle)** **X-094B (Receptacle)** **X-092A (Receptacle)** **X-094A (Receptacle)** **X-091A (Receptacle)** **X-093A (Receptacle)** **X-092B (Receptacle)**

A-004 - ADIC LOWLINE (ECU)

Component Type	ECU
Wiring frames	**SHEET 18**
Connectors	**X-060 (Receptacle)** **X-061 (Receptacle)** **X-064 (Plug)**

A-006 - HYDRAULIC CONTROLLER (ECU)

Component Type	ECU
Wiring frames	**SHEET 15** **SHEET 21** **SHEET 30**
Connectors	**X-024 (Receptacle)** **X-023 (Receptacle)**

A-007 - TRANSMISSION CONTROL UNIT (ECU)

Component Type	ECU
Wiring frames	**SHEET 17**
Connectors	**X-089 (Receptacle)**

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3309 - Rail Pressure Above Maximum Limit In Controlled Mode

LM6.35 ELITE	WE
LM7.42 ELITE	WE

Control Module: ECU

Context:
The rail pressure is monitored by various fault paths during active pressure control by the metering unit. The fault path at hand detects if the rail pressure has exceeded a maximum pressure threshold. The monitoring is only active if the high pressure governor is operating in closed loop control and the monitoring has not been inhibited by other faults.

Cause:
The rail pressure exceeds the maximum pressure **1700.00 bar**. Defect condition fulfilled continuously for more than **1000.0 ms**.

Possible failure modes:

1. Faulty fuel metering unit Y-016 wiring, open circuit condition.
2. Faulty fuel metering unit Y-016, internal failure.
3. Faulty fuel return line, damaged or clogged.
4. Faulty ECU A-002, software.

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 presence of the following related fault:

   3137 - Metering Unit – Open Load (55.640)

   A. If the listed fault is detected, resolve the fault. Then, repeat the Step **1**.

   B. If no other fuel system fault is detected, continue with Step **3**.
3. 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.

Wiring harnesses - Electrical schematic sheet 11 (55.100)

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