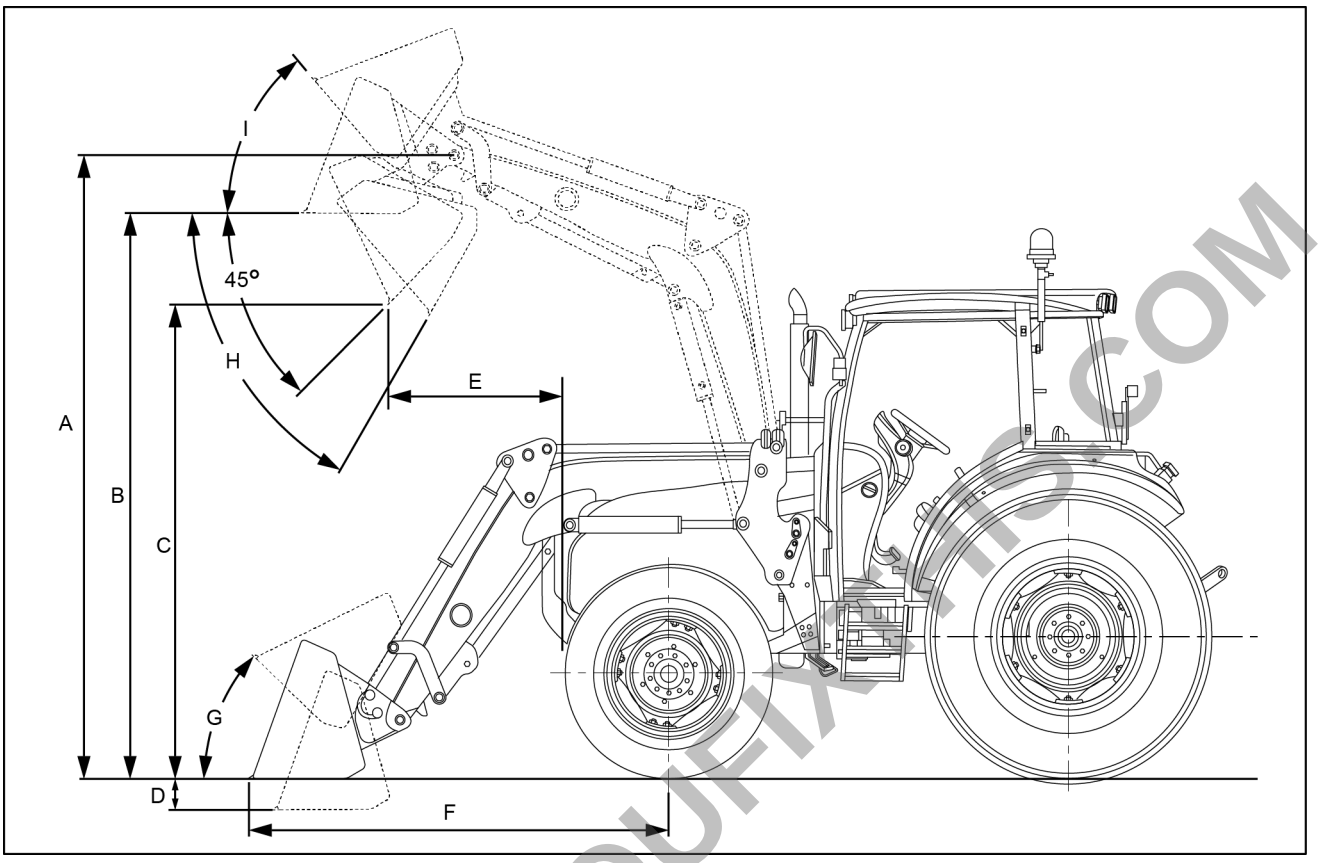
General specification Front loader and bucket



MOIL13TR02923FA 1

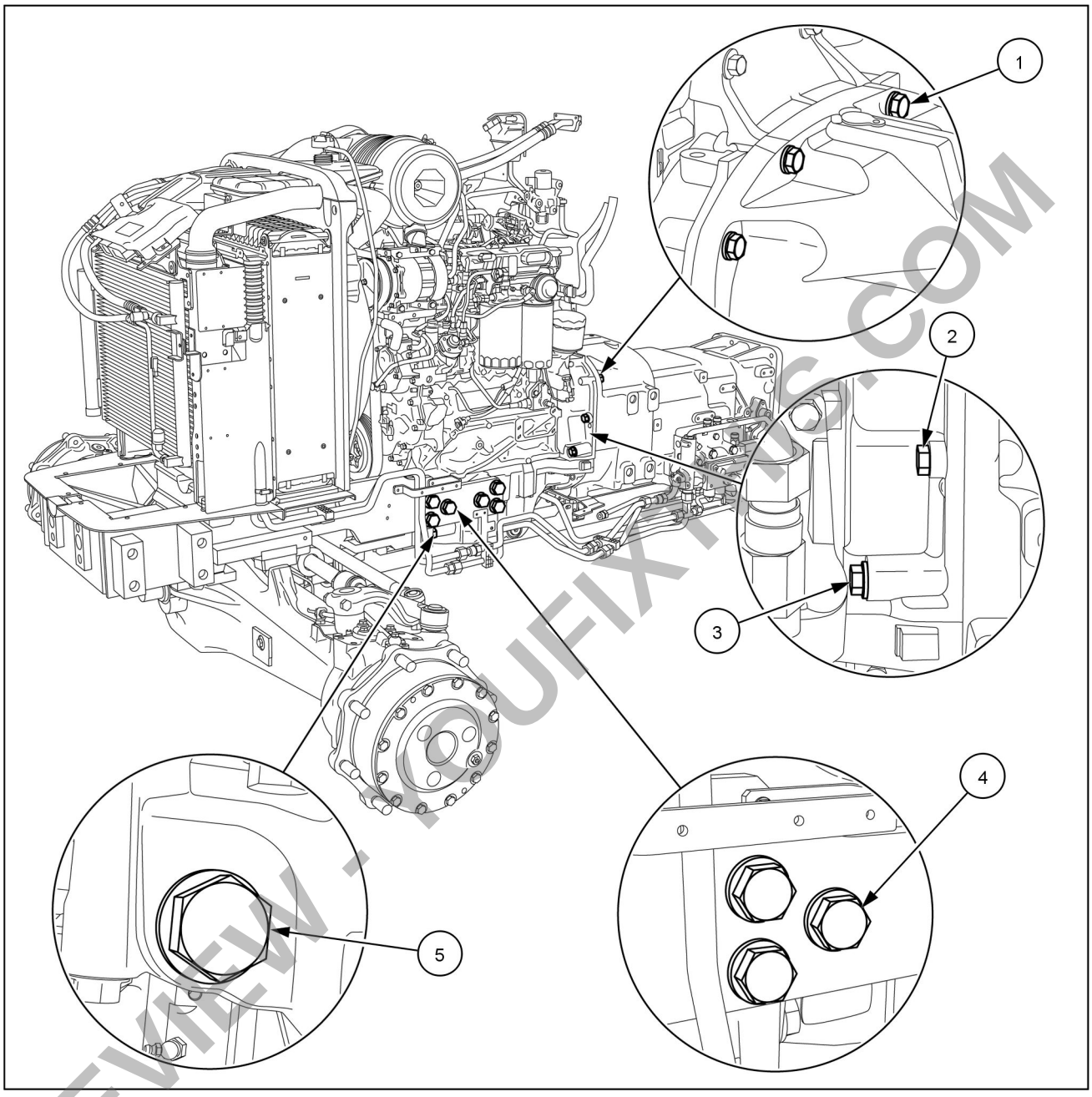
Dimensions with front tires 11.2 R 24 and rear tires 16.9 R 30.

		Model			
		655 TL		665 TL	
		No self leveling	Mechanical self leveling	No self leveling	Mechanical self leveling
	Max rear admissible tires	18.4 R 30		18.4 R 34	
A	Max lift height at pivot pins	3209 mm (126.3 in)	3199 mm (125.9 in)	3405 mm (134.1 in)	3430 mm (135.0 in)
B	Max lift height under bucket in horizontal position	2910 mm (114.6 in)	2913 mm (114.7 in)	3131 mm (123.3 in)	3149 mm (124.0 in)
C	Dumping distance at **45°**	2377 mm (93.6 in)	2364 mm (93.1 in)	2576 mm (101.4 in)	2597 mm (102.2 in)
C	Dumping distance at **60°**	2292 mm (90.2 in)	2285 mm (90.0 in)	2490 mm (98.0 in)	2513 mm (98.9 in)
D	Dig depth	210 mm (8.3 in)	205 mm (8.1 in)	179 mm (7.0 in)	162 mm (6.4 in)
E	Reach at maximum lift at **45°**	1004 mm (39.5 in)	1003 mm (39.5 in)	1097 mm (43.2 in)	1106 mm (43.5 in)
E	Reach at maximum lift at **60°**	850 mm (33.5 in)	825 mm (32.5 in)	857 mm (33.7 in)	—
F	Reach at ground level	2304 mm (90.7 in)	2300 mm (90.6 in)	2314 mm (91.1 in)	2361 mm (93.0 in)
G	Bucket rollback angle	45°	40°	44°	40°
H	Bucket dump angle	60°	60°	60°	60°
I	Bucket rollback at max height		44°		44°
	Lift capacity at max height at pivot pins	1572 kg (3466 lb)	1621 kg (3574 lb)	1746 kg (3849.3 lb)	1907 kg (4204.2 lb)

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Engine - Torque



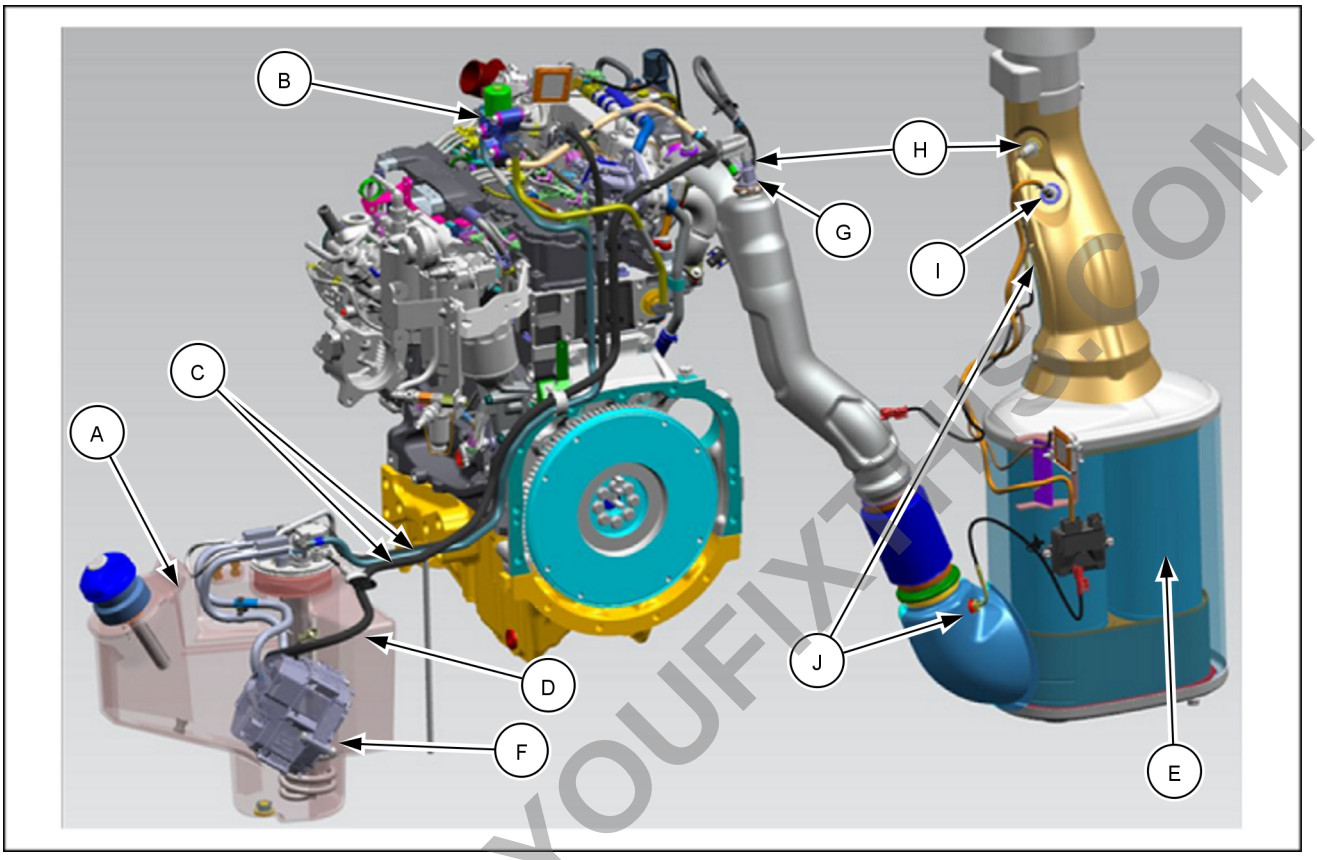
MOIL17TR02997GA 1

Part to tighten	Thread	Tighten torque
Bolt **(5)** securing the front axle to the engine block	M20 x 1.5 x 130	**587 N·m** (**432.95 lb ft**)
Bolt **(4)** securing the engine block to the front axle	M20 x 1.5 x 110	**587 N·m** (**432.95 lb ft**)
Bolt **(1)** securing the gearbox to the engine block	M12 x 1.25 x 50	**121 N·m** (**89.25 lb ft**)
Bolt **(2)** securing the engine block to the gearbox	M12 x 1.25 x 50	**121 N·m** (**89.25 lb ft**)
Bolt **(3)** securing the engine block to the gearbox	M12 x 1.25 x 90	**121 N·m** (**89.25 lb ft**)

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Selective Catalytic Reduction (SCR) exhaust treatment - Overview
After treatment system

The After Treatment System use the SCR technology, enabling to reduce NOX emissions thanks to AdBlue fluid.



MOIL17TR01344FA 1

The After Treatment System mainly include:

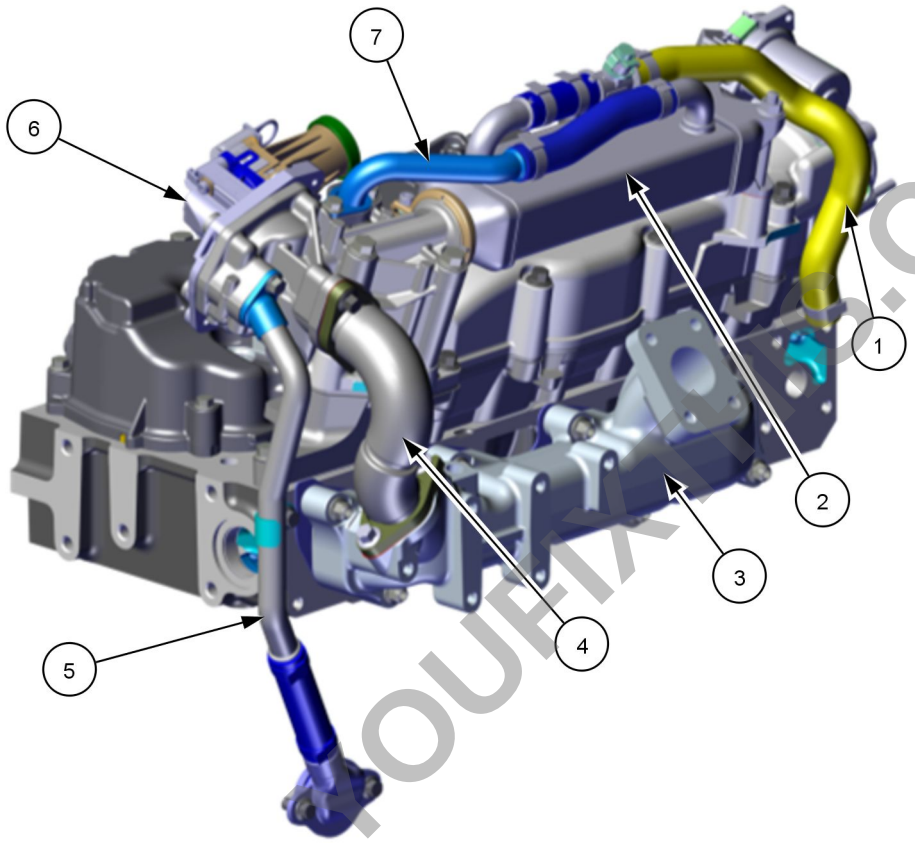
A	Diesel Exhaust Fluid (DEF)/ Adblue tank : storage of Adblue fluid, responsible for Nox reduction once injected in the exhaust pipe. Linked to the tank, the Sender Unit include a temperature, a quality and a level sensor.	**Diesel Exhaust Fluid (DEF)/AdBlue®/ARLA tank - Component localization (10.500)**
B	Coolant control valve : allow defrosting and heating the AdBlue tank with low temperature conditions.	**Coolant control valve - Dynamic description (10.500)** **Coolant control valve - Technical Data (10.500)**
C	Diesel Exhaust Fluid (DEF)/AdBlue lines : Adblue is carried from the tank to the supply module and the dosing injector. These pipes are heated (electrical resistance) to avoid Adblue freezing.	**Selective Catalytic Reduction (SCR) exhaust treatment coolant lines - Static description (10.500)**
D	A heater control unit manage the heating activation.	**Diesel Exhaust Fluid (DEF)/AdBlue®/ARLA heater control unit - Static description (55.988)** **Diesel Exhaust Fluid (DEF)/AdBlue®/ARLA heater control unit - Technical Data (55.988)**
E	Selective Catalytic Reduction (SCR) muffler and catalyst : is the chamber where the Adblue reacts with the exhaust gazes in order to reduce Nox emissions. Include the SCR chamber (for Nox reduction) and the Clean Up Catalyst (for NH3 reduction)	**Selective Catalytic Reduction (SCR) muffler and catalyst - Component identification (10.500)**

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Exhaust Gas Recirculation (EGR) valve - Component localization

The exhaust gas can be partially recycled to cylinders to reduce maximum temperature values of combustion that produce nitrogen oxides (NOx).
The exhaust gas recycle system (EGR) reduces combustion temperature and therefore is an efficient NOx emission control system.



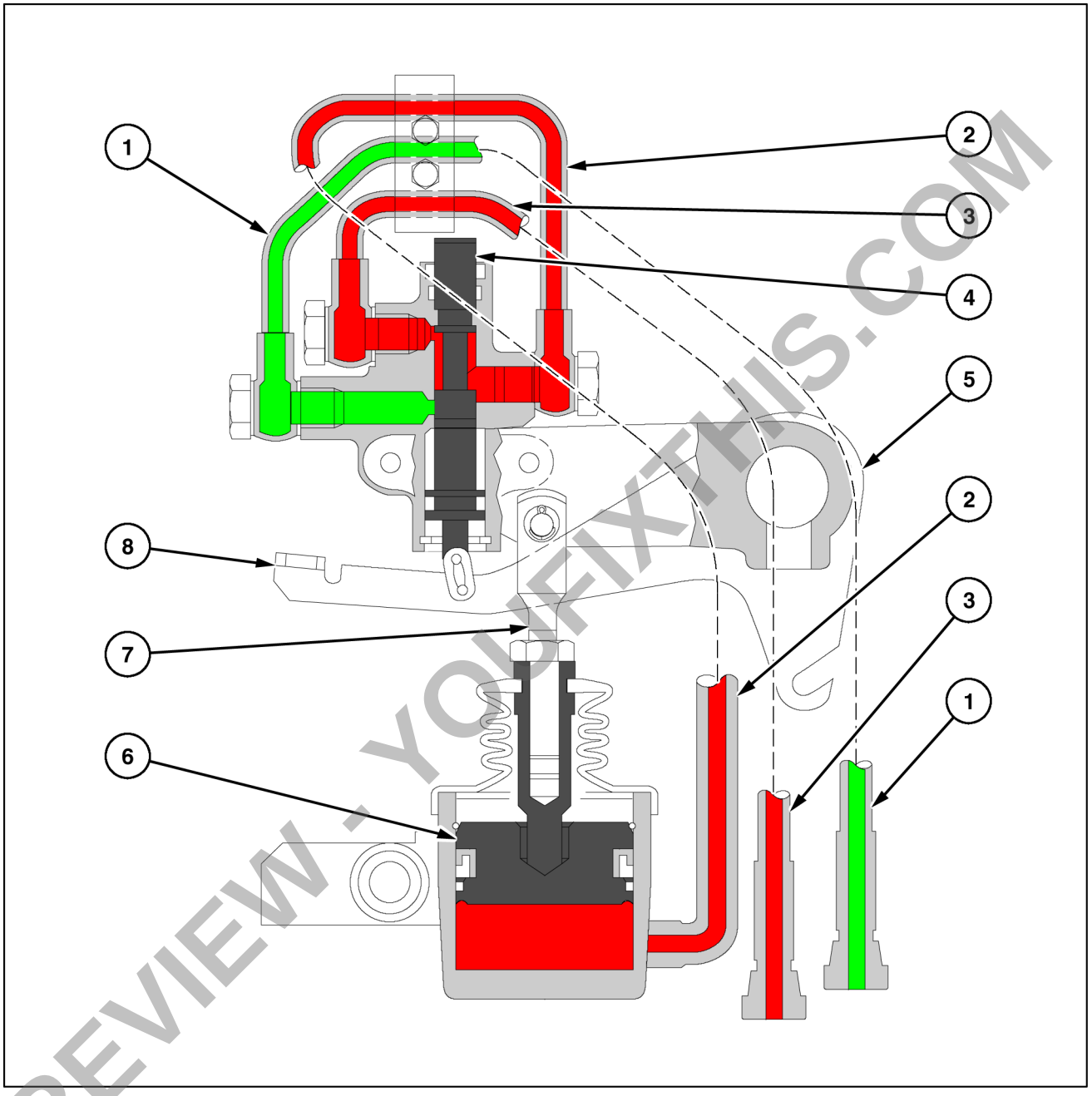
MOIL17TR01829FA 1

1	Water outlet pipe
2	Heat exchanger – EGR cooler
3	Exhaust manifold
4	EGR pipe from exhaust manifold
5	Water pipe from crankcase
6	EGR valve **Exhaust Gas Recirculation (EGR) valve - Dynamic description (10.501)** **Exhaust Gas Recirculation (EGR) valve actuator - Technical Data (55.989)**
7	Water return pipe from heat exchanger

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Power Take-Off (PTO) clutch engagement cylinder - Dynamic description



MOLI11U0067GA 1

Pressurised oil Discharge oil

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Description and operation

Engaging the Power Take-Off (PTO) control clutch

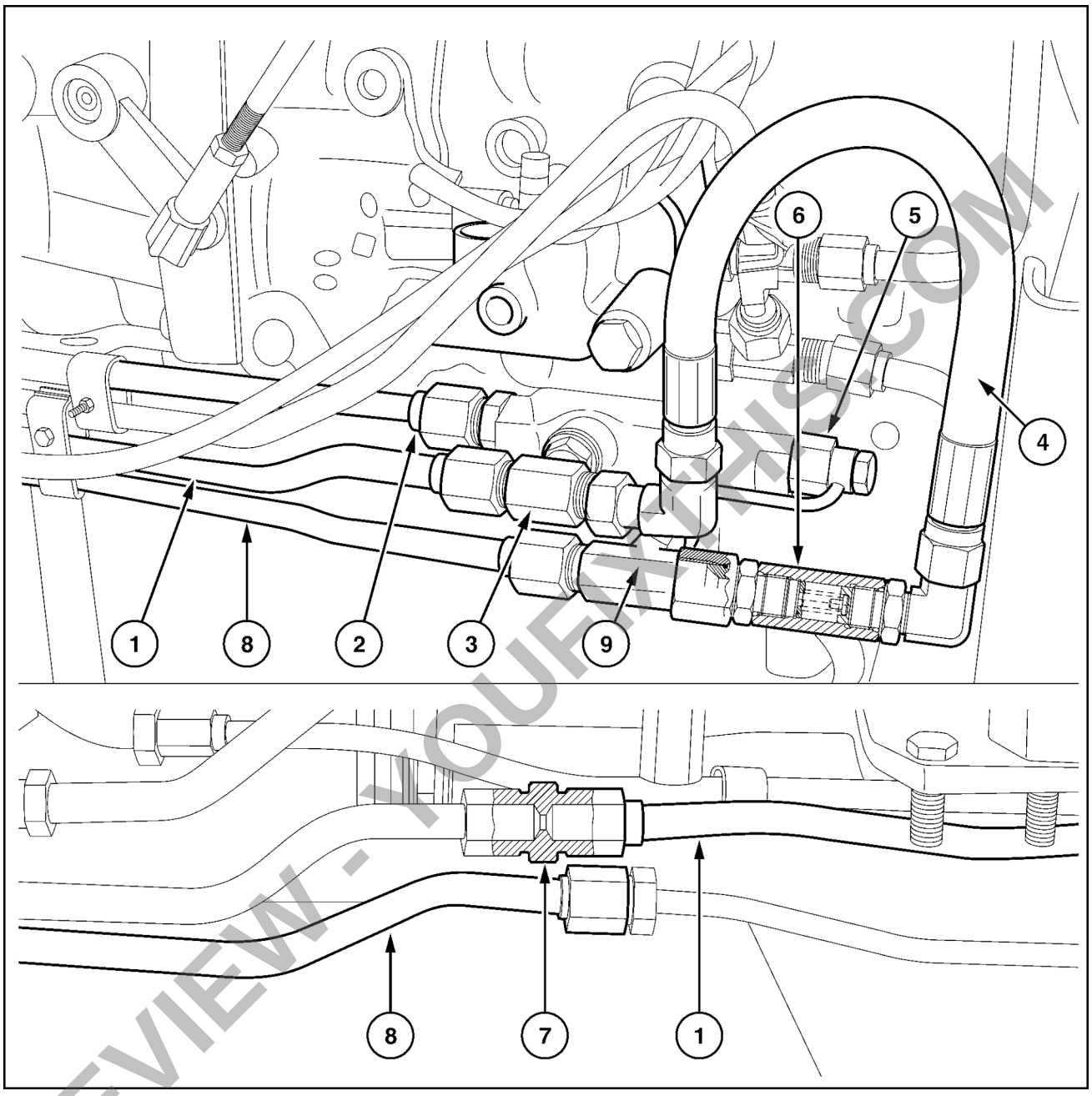
The PTO clutch control system consists of a control lever (in the cab) and a cable connecting the lever to the servo control unit.

The servo control unit comprises a hydraulic control valve and piston.

When the PTO clutch is engaged via the control lever in the cab, the connecting cable acts on the lever **(8)** which, as it moves, pushes up the control valve activation pin **(4)**.

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Mechanical transmission hydraulic components - External view



SEZ31CAP1G-1 1

(1). Pipe from the outlet of the services control valve **(3)** to the heat exchanger used by oil at high temperatures.

(2). Services control valve supply line.

(3). Excess oil discharge to the pressure relief valve; discharge to the services control valve.

(4). Line from the services control valve outlet **(3)** to the inlet hole into the transmission housing; used by oil at low temperatures.

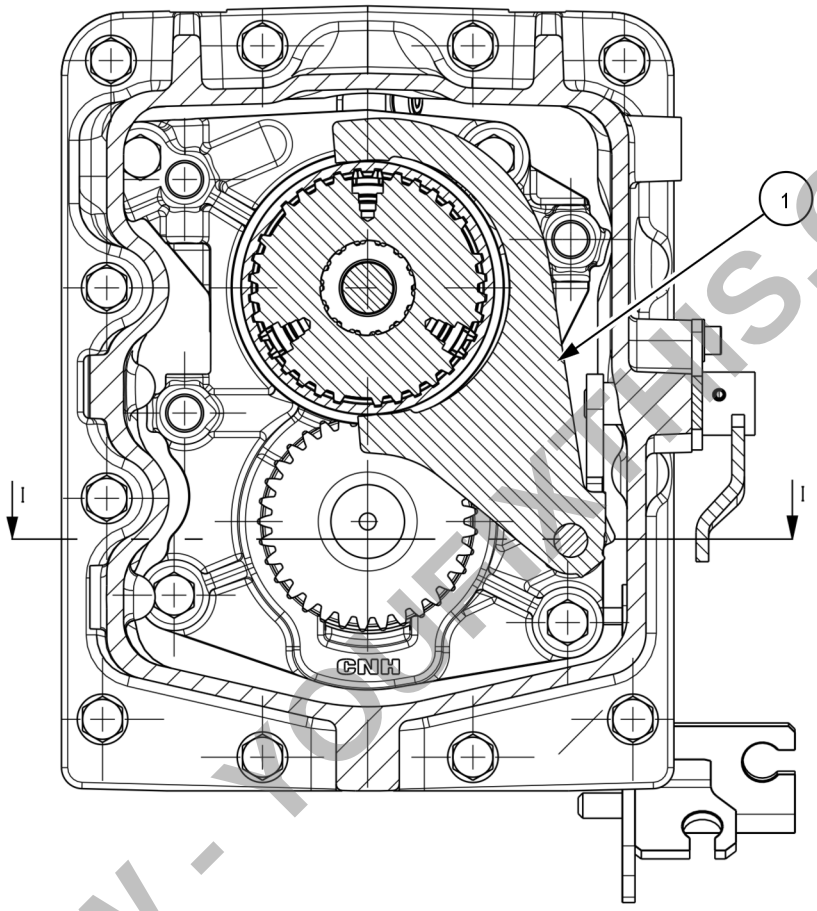
(5). Pressure relief valve compartment plug with oil drain line in the valve head.

(6). Bypass valve.

(7). Restrictor.

(8). Return line from the heat exchanger, connected to the T-fitting **(9)** introducing oil into the transmission housing; used by excess oil to lubricate the power take-off clutch that has been cooled by the exchanger.

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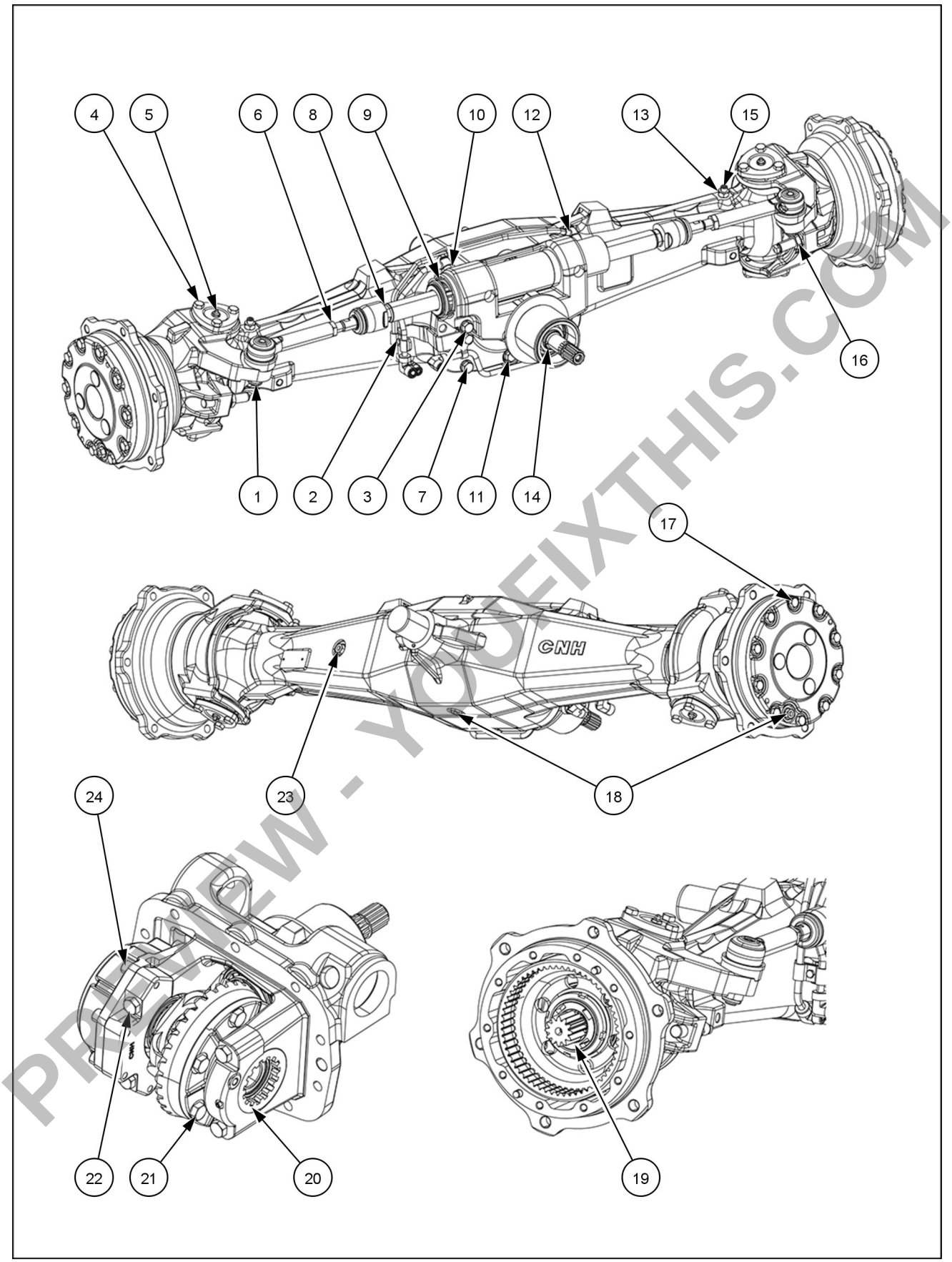
MOIL14TR00169GA 2

vertical section of the front transmission housing

1. Splitter shift fork

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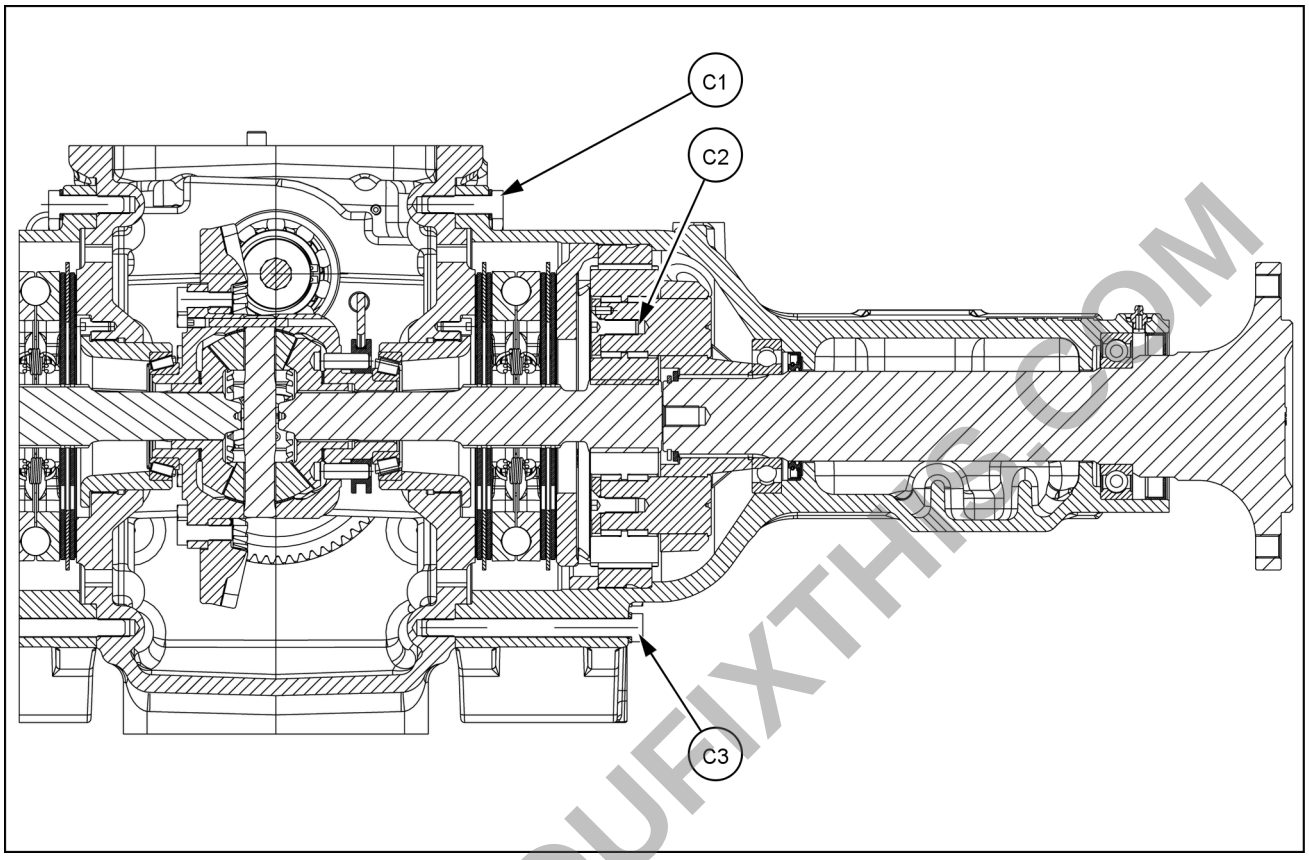


MOIL16TR01680HA 2

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Powered rear axle - Torque



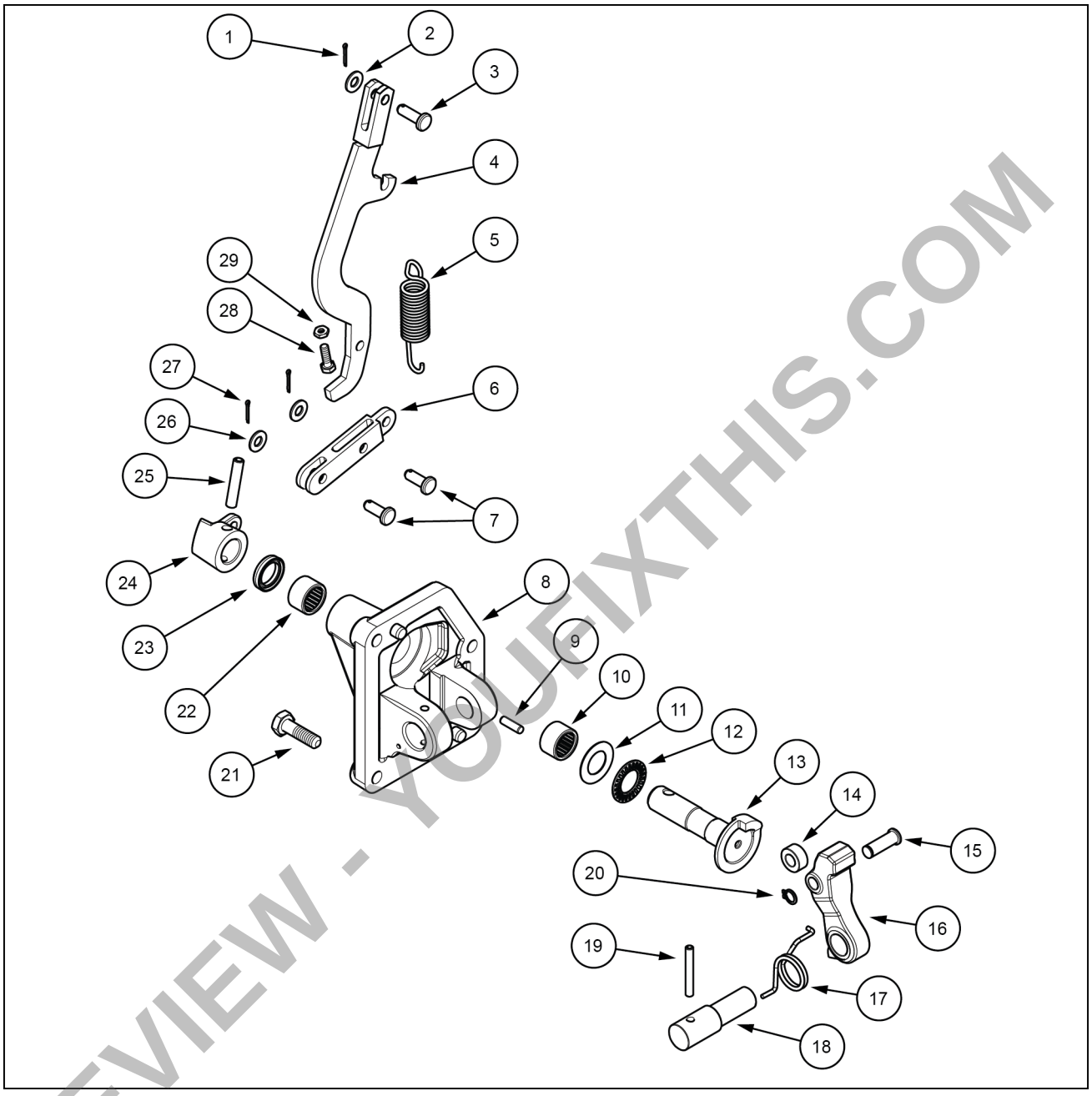
MOIL15TR00254FA 1

Parts to be torqued	Thread	Tighten Torque
Short screws **(C1)** for fixing the final drives to the transmission housing	M14 x 1.5	**137 – 152 N·m** (**101.05 – 112.11 lb ft**)
Screws **(C2)** for fixing the satellite gears	M12 x 1.25	**90 N·m** (**66.38 lb ft**)
Long screws **(C3)** for fixing the final drives to the transmission housing	M14 x 1.5	**137 – 152 N·m** (**101.05 – 112.11 lb ft**)

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Parking brake or parking lock - Exploded view



MOIL15TR01836GA 1

Component view of parking lock on the transmission

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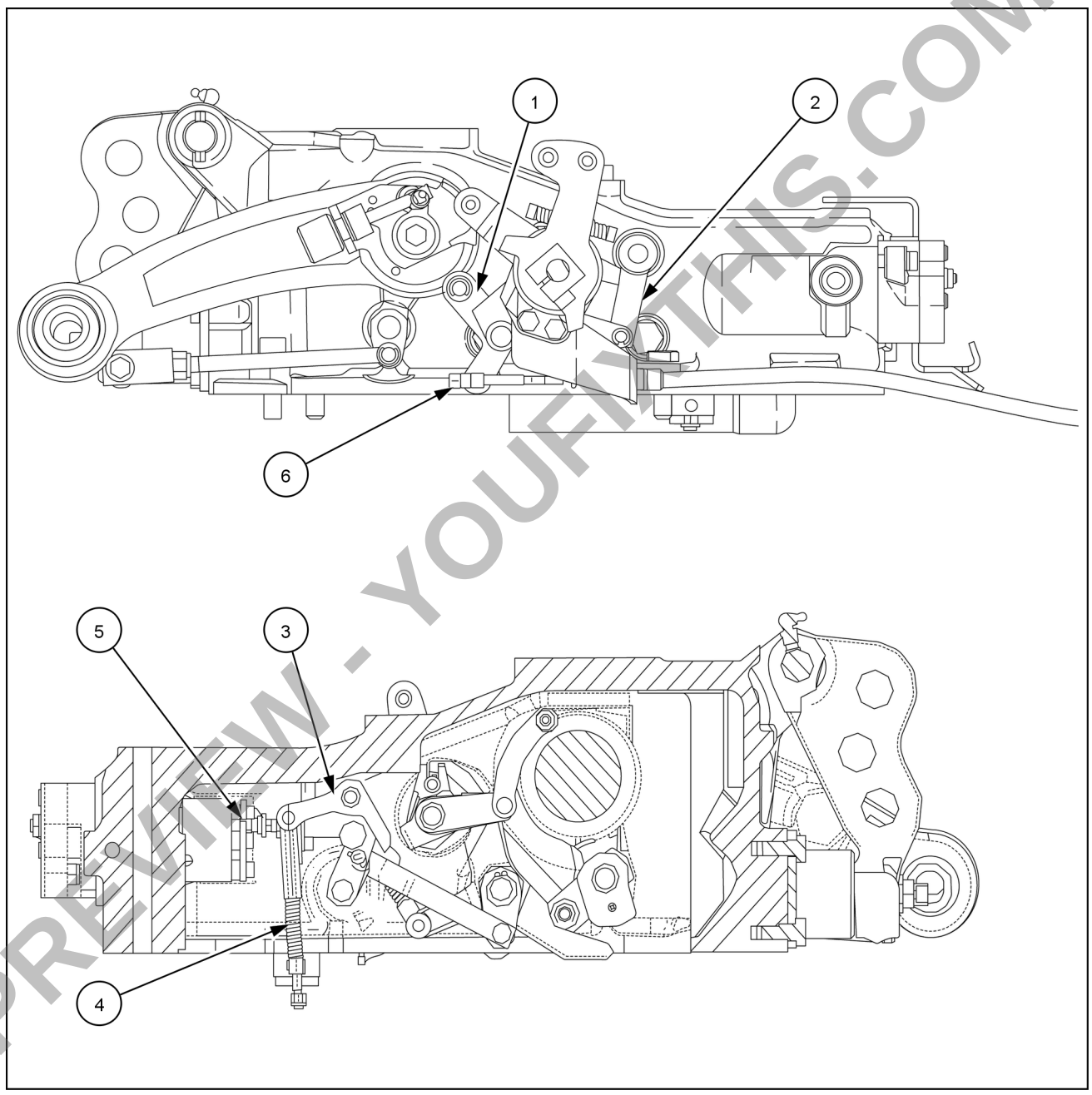
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Lift-O-Matic® control - Static description

⚠ WARNING

Avoid injury!
Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.
Failure to comply could result in death or serious injury.

W0208A



MOIL15TR00223GA 1

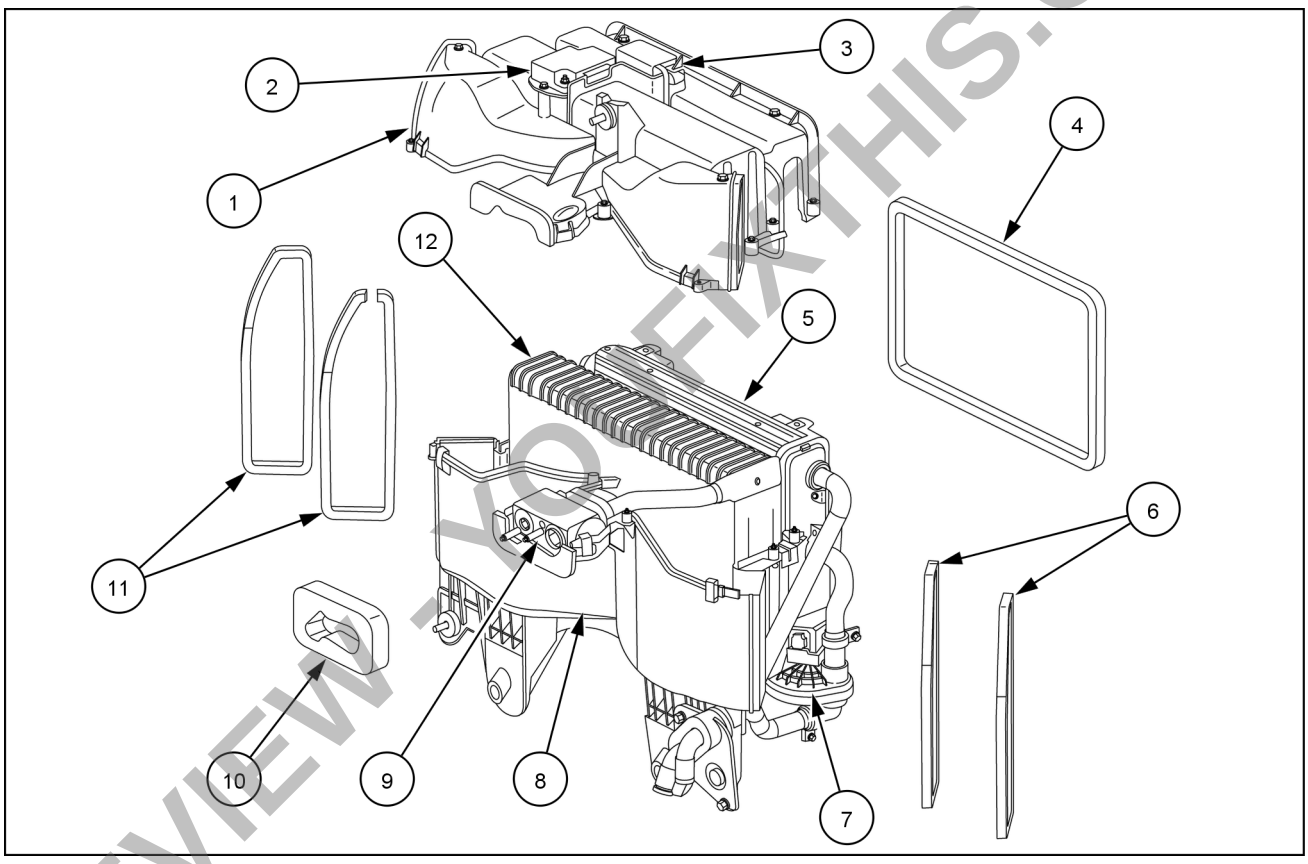
The **Lift-O-Matic™** function is used to quickly raise and lower the rear hydraulic lift arms keeping the positions set by the lift control levers unchanged.

To ensure that the **Lift-O-Matic™** raises the lift arms, the control cable **(6)** must set the linkage **(1)** moving clockwise. In this case the lever **(2)**, integral with the lever **(1)**, sets the internal lever **(3)** in motion. The lever **(3)** tensions the spring **(4)**, which makes it possible to operate the spool **(5)** of the control valve; in this way, the oil under pressure enters the cylinder and starts raising the arms.

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Heating, Ventilation, and Air-Conditioning (HVAC) unit - Component identification

PowerStar™ 100 With cab, with Mechanical transmission	
PowerStar™ 100 With cab, with Power Shuttle transmission [ELRT5100AJLE50003 -]	
PowerStar™ 110 With cab, with Mechanical transmission [ELRT5110JJLE50318 -]	
PowerStar™ 110 With cab, with Power Shuttle transmission [ELRT5110LJLE50008 -]	
PowerStar™ 120 With cab, with Mechanical transmission [ELRT5120TJLE50403 -]	
PowerStar™ 120 With cab, with Power Shuttle transmission [ELRT5120CJLE50013 -]	
PowerStar™ 90 With cab, with Power Shuttle transmission [ELRT5090VJLE50022 -]	
PowerStar™ 90 With cab, with Mechanical transmission [ELRT5090PJLE50015 -]	

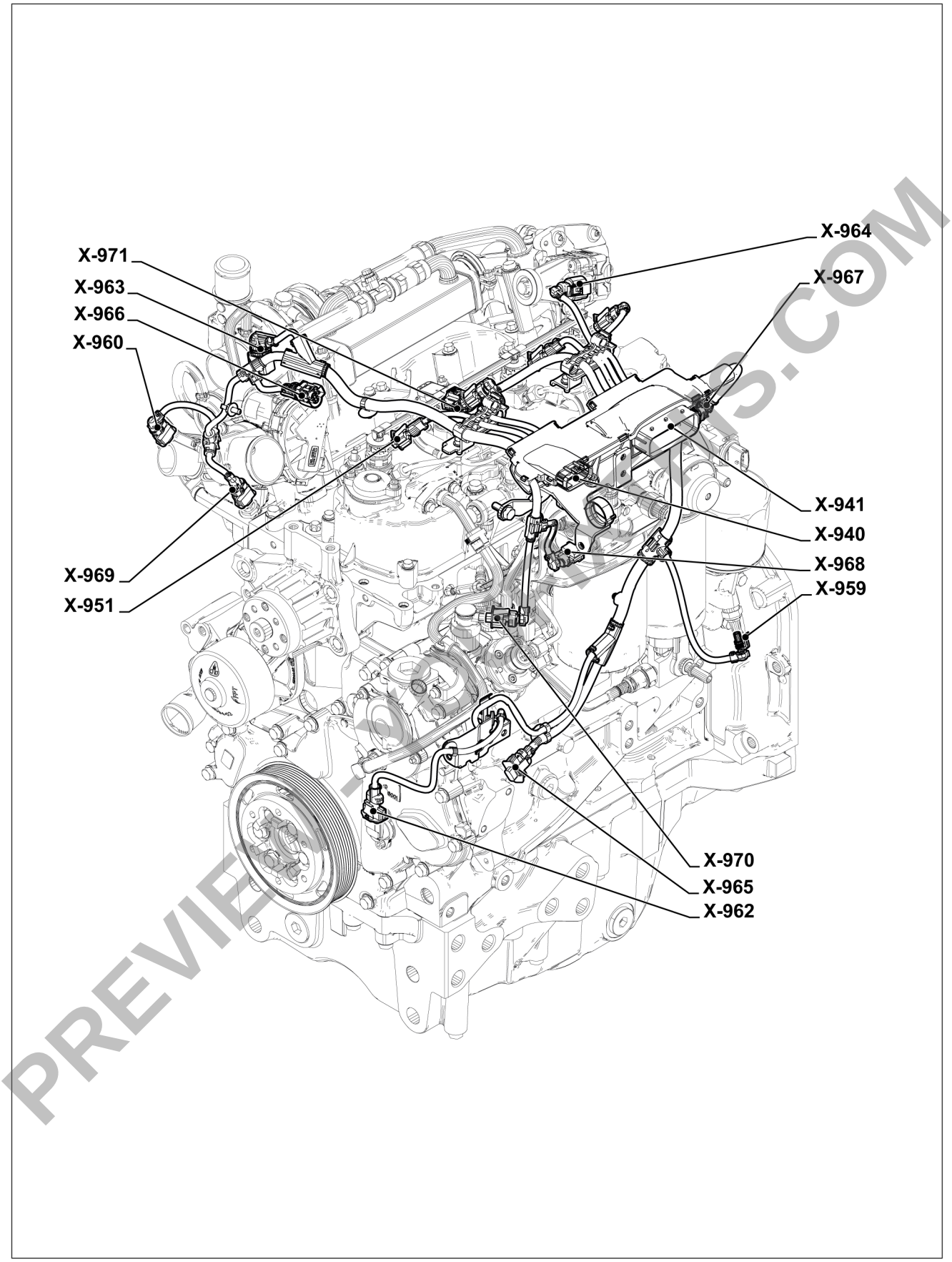


MOIL16TR02162FA 1

1. Unit housing cover
2. Heater control valve electronic module: **Air-conditioning system control unit - Static description (55.050)**
3. Thermostatic switch: **Temperature sensor - Static description (55.050)**
4. Front seal
5. Heater core
6. Lateral seal
7. Heater control valve: **Heater control valve - Static description (50.100)**
8. Unit housing
9. Thermostatic expansion valve: **Air-conditioning evaporator - Static description - Thermostatic expansion valve (50.200)**
10. Valve seal
11. Lateral seal
12. Air-conditioning evaporator: **Air-conditioning evaporator - Static description (50.200)**

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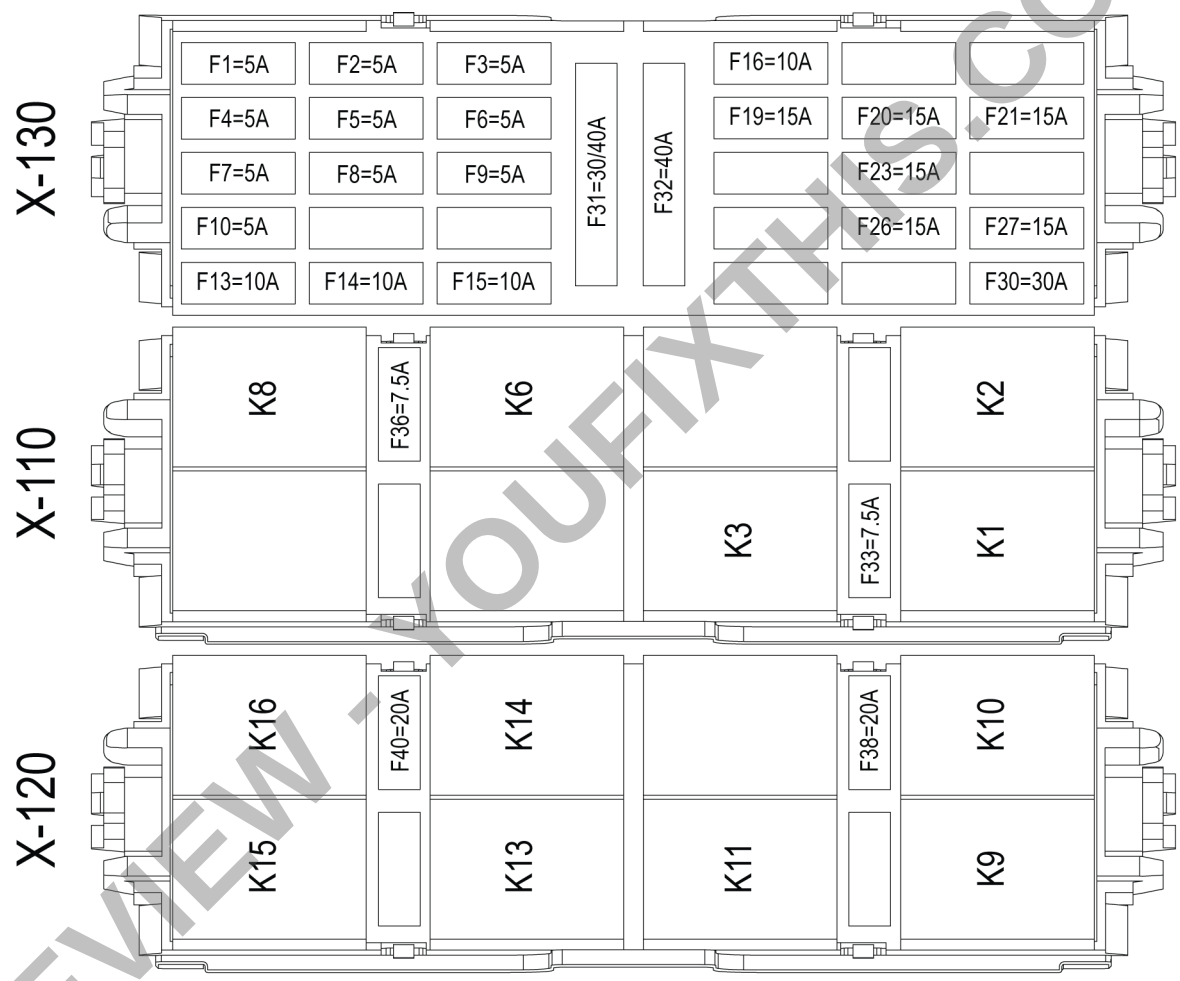


MOIL17TR01879HA 1

Drawing 01 — engine wiring harness 1, LH side view

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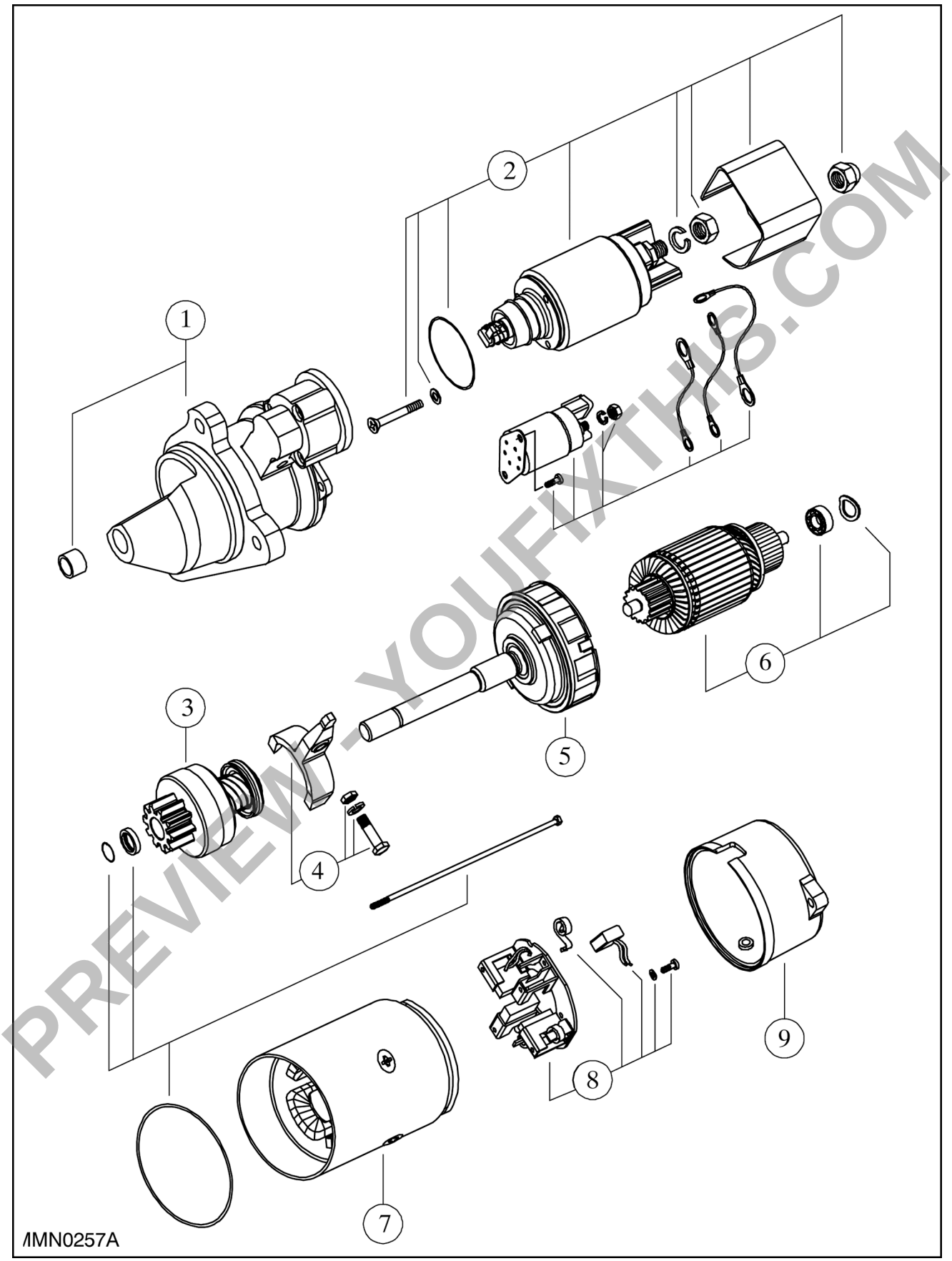


MOIL17TR02103HC 1

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Engine starter - Exploded view



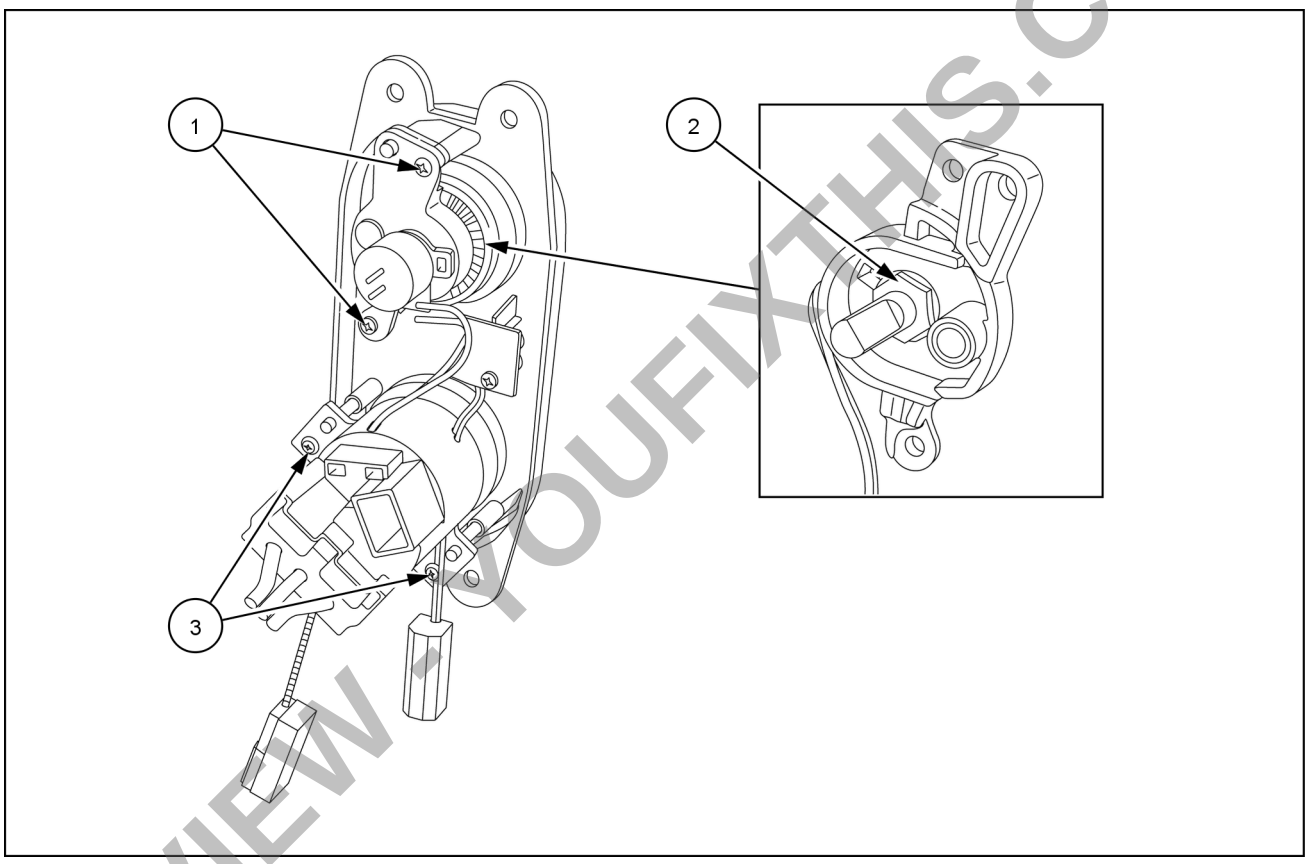
SEZ55CAP3H-2 1

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Air-conditioning switch panel - Torque

PowerStar™ 100 With cab, with Mechanical transmission	
PowerStar™ 100 With cab, with Power Shuttle transmission [ELRT5100AJLE50003 -]	
PowerStar™ 110 With cab, with Mechanical transmission [ELRT5110JJLE50318 -]	
PowerStar™ 110 With cab, with Power Shuttle transmission [ELRT5110LJLE50008 -]	
PowerStar™ 120 With cab, with Mechanical transmission [ELRT5120TJLE50403 -]	
PowerStar™ 120 With cab, with Power Shuttle transmission [ELRT5120CJLE50013 -]	
PowerStar™ 90 With cab, with Power Shuttle transmission [ELRT5090VJLE50022 -]	
PowerStar™ 90 With cab, with Mechanical transmission [ELRT5090PJLE50015 -]	



MOIL16TR02348FA 1

Part to tighten	Thread	Tightening torque
Retaining screws **(1)** of the potentiometer support to the air-conditioning system control panel	M3 x 10	**1.2 – 1.8 N·m** (**0.89 – 1.33 lb ft**)
Retaining nuts **(2)** of the potentiometer to the support	-	**1.8 – 2.2 N·m** (**1.33 – 1.62 lb ft**)
Retaining screws **(3)** of the switch to the air-conditioning system control panel	M3 x 10	**1.2 – 1.8 N·m** (**0.89 – 1.33 lb ft**)

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Electrical systems - 55

FAULT CODES - DTC

PowerStar™ 100 With cab, with Mechanical transmission, PowerStar™ 100 With cab, with Power Shuttle transmission [ELRT5100AJLE50003 -], PowerStar™ 100 Without cab, with Mechanical transmission [ELRT5100LJLE50088 -], PowerStar™ 100 Without cab, with Power Shuttle transmission [ELRT5100PJLE50079 -], PowerStar™ 110 With cab, with Mechanical transmission [ELRT5110JJLE50318 -], PowerStar™ 110 With cab, with Power Shuttle transmission [ELRT5110LJLE50008 -], PowerStar™ 110 Without cab, with Mechanical transmission, PowerStar™ 110 Without cab, with Power Shuttle transmission, PowerStar™ 120 With cab, with Mechanical transmission [ELRT5120TJLE50403 -], PowerStar™ 120 With cab, with Power Shuttle transmission [ELRT5120CJLE50013 -], PowerStar™ 120 Without cab, with Mechanical transmission, PowerStar™ 120 Without cab, with Power Shuttle transmission [ELRT5120TJLE50028 -], PowerStar™ 90 With cab, with Power Shuttle transmission [ELRT5090VJLE50022 -], PowerStar™ 90 With cab, with Mechanical transmission [ELRT5090PJLE50015 -], PowerStar™ 90 Without cab, with Power Shuttle transmission

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3001 (DTC 3AB1) - Diagnostic fault check of synchronism for double potentiometer and Low Idle Switch (LIS)

Control Module: ECU

NOTE: *When the cause of the error code has been rectified, clear the error code and test the system for normal operation.*

Cause:

Possible failure modes:

1. Faulty connector
2. Faulty foot throttle
3. Faulty wiring.
4. Controller Failure.

Solution:

1. Check the foot throttle pedal potentiometer in H9 Channel 8.
   A. Operate the foot throttle pedal. If the values displayed do not change continuously between **250 – 4500 mV**, go to step **2**
   B. If the values displayed are okay, while in H9 Channel 8, wiggle the harness, the foot throttle connector **X-321** and the controller connectors **X-450** and **X-460** to check for an intermittent circuit. Channel 8 values will change if an intermittent circuit is detected, repair or replace as required.
2. Check the foot throttle connector **X-321** and the controller connectors **X-450** and **X-460**.
   A. Ensure the connectors are connected, not damaged, the pins are in the correct position and that the fit is tight Repair or replace, as required.
   B. If the connectors are okay, continue to step **3**
3. Check for **5 Volts**.
   A. Disconnect the connector **X-321**. Turn the ignition key switch ON. Measure the voltage between the connectors:
   X-321 pin 4, wire MC-2201 (PK) and ground
   X-321 pin 3, wire MC-5696E (OR) and ground
   If the voltage indicated is not approximately **5 Volts**, repair or replace the harness as required.
   B. If the voltage indicated is approximately **5 Volts**, continue to step **4**
4. Check for an open circuit ground circuit.
   A. Turn the ignition key to OFF. Check between connectors:
   X-321 pin 7, wire MC-2300A (BL) and ground
   X-321 pin 8, wire MC-2300B (BL) and ground
   If an open circuit is indicated, repair or replace the harness as required
   B. If an open circuit is not indicated, continue to step **5**
5. Check for an open condition.
   A. Disconnect the controller connectors **X-450** and **X-460**. Check between connectors
   X-321 pin 2, wire MC-0194 (YE) and **X-450** pin 5, wire MC-0194 (YE)
   X-321 pin 6, wire MC-0195 (YE) and **X-450** pin 7, wire MC-0195 (YE)
   If an open circuit is indicated, repair or replace the harness as required
   B. If an open circuit is not indicated, continue to step **6**

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5003 - Rear PTO brake output - open circuit or short circuit to ground

Control Module: CCU

NOTE: *When the cause of the error code has been rectified, clear the error code and test the system for normal operation.*

Context:
Power Take-Off (PTO) disabled.

Possible failure modes:

1. Faulty connector
2. Faulty PTO brake solenoid
3. Faulty wire harness
4. Faulty controller

Solution:

1. Check the rear PTO brake solenoid connector **X-345**. Ensure the connectors are connected, not damaged, the pins are in the correct position and that the fit is tight.
   A. If a fault is indicated, repair or replace as required.
   B. If the connectors are okay, continue to Step **2**.
2. Check the PTO brake solenoid.
   Disconnect connector **X-345**. Check between the solenoid terminals pins 1 and 2.
   A. If the resistance indicated is not between approximately **7 – 8 Ω**, remove and replace the solenoid.
   B. If the solenoid is okay, continue to Step **3**.
3. Check for an open circuit ground circuit.
   Check between connector **X-345 (Receptacle) pin 2** and ground.
   A. If an open circuit is indicated, repair or replace the wire harness as required.
   B. If an open circuit is not indicated, continue to Step **4**.
4. Check for an open circuit.
   Disconnect the controller connector **X-240**. Check between connector **X-240 (Receptacle) pin 16** and connector **X-345 (Receptacle) pin 1**.
   A. If an open circuit is indicated, repair or replace the wire harness as required.
   B. If an open circuit is not indicated, continue to Step **5**.
5. Check for a short to ground.
   Check between connector **X-240 (Receptacle) pin 16** and ground.
   A. If a short to ground is indicated, repair or replace the wire harness as required.
   B. If the wire harness is okay, download the correct level of software. If the fault recurs, remove and replace the controller.

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17195 (DTC 921B) - CAN B Bus off passive failure

Control Module: ECU

Context:
The Engine Control Unit (ECU) **A-010** is capable of connecting to and communicating on two separate Controller Area Networks (CAN). Proper configuration and monitoring of the two twisted pair configured networks is also a function of the ECU **A-010**. CAN Node B Bus is the engine devices communications bus. The ECU **A-010** provides a CAN termination resistor for the CAN Node B Bus, internal to the ECU **A-010**. If the ECU **A-010** senses that CAN Node B Bus is not functioning properly, this fault will occur.

Cause:
ECU **A-010** has sensed a “Bus Off” state to be present at the CAN Node B.

Possible failure modes:

1. Faulty supply voltage or ground, missing.
2. Faulty CAN circuit wiring, open circuit, short to ground, or short circuit.
3. Faulty ECU **A-010**, termination resistor or software.

Solution:

1. Verify 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 other engine Selective Catalytic Reduction (SCR) device CAN faults.

   Use the EST to determine if SCR device CAN faults exist.

   A. If other SCR device CAN faults do exist, resolve the SCR device CAN faults, then check to see that **DTC 921B – CAN B Bus off passive failure** is also resolved.

   B. If other SCR device CAN faults do not exist, continue with Step **3**.

3. Check the ECU **A-010** supply voltage.

   Disconnect the vehicle (VE) harness from the ECU **A-010** at connector **X-937**.

   To energize the Main relay **K-200**, place a jumper wire between the vehicle harness (VE) side of connector **X-937** pin 28, wire EN1-0006 (GY) and chassis ground.

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

From	To	Value
X-937 pin 1, wire EN1-0002 (OR)	chassis ground	There should be **12.0 V** .
X-937 pin 3, wire EN1-0001A (OR)	chassis ground	There should be **12.0 V** .
X-937 pin 5, wire EN1-0001 (OR)	chassis ground	There should be **12.0 V** .

   A. If the voltage is present on all of the checks, leave connector **X-937** disconnected and continue with Step **4**.

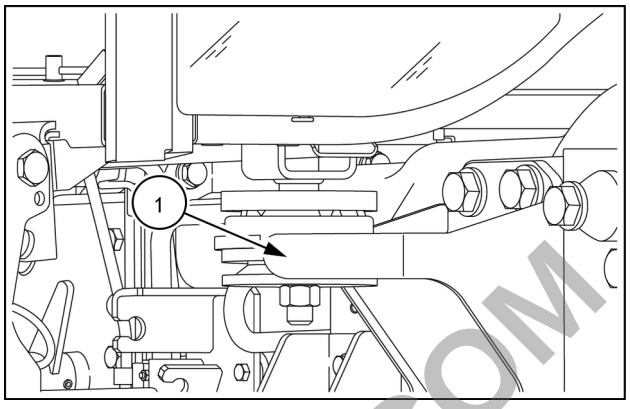
   B. If the voltage is not present for one or more of the checks, see the appropriate vehicle service manual and electrical schematics, if necessary, to locate and restore supply power to the ECU **A-010**.

4. Check the ECU **A-010** ground circuits.

   Use a multimeter to check for continuity on the vehicle (VE) harness side:

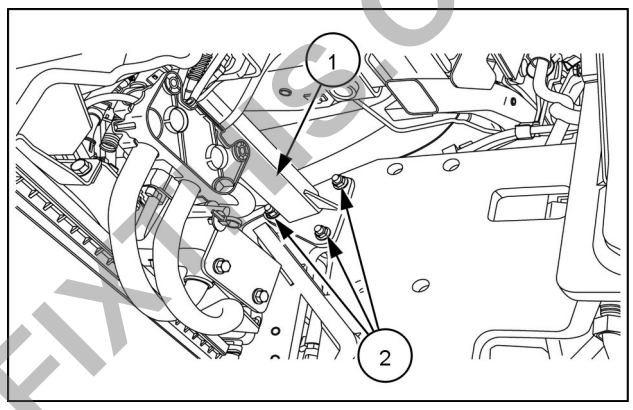
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5. Remove the front-right support **(1)** for the cab as described in **Cab front mounts - Remove (90.150)**.



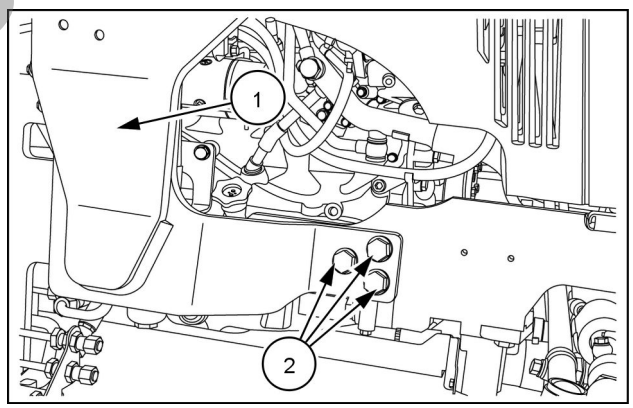
MOIL17TR00011AA 4

6. Loosen the fastening nuts **(2)** and retrieve the respective washers.
7. Remove the bracket **(1)**.



MOIL17TR03476AA 5

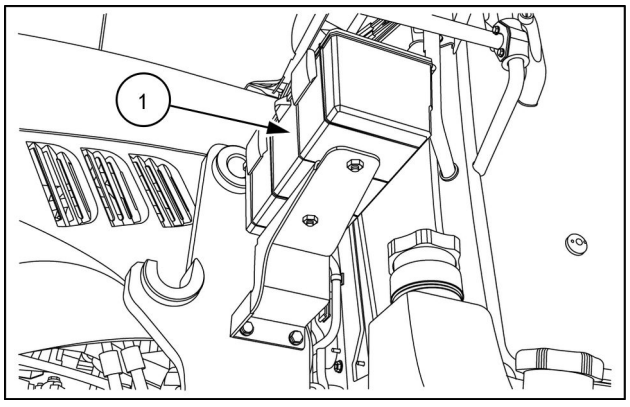
8. Loosen the fastening screws **(2)** on the right-hand longitudinal member.
9. Remove the right-hand longitudinal member **(1)**.



MOIL17TR03477AA 6

Left-hand side

1. Remove the toolbox **(1)** as described in **Tool box - Remove (88.100)**.



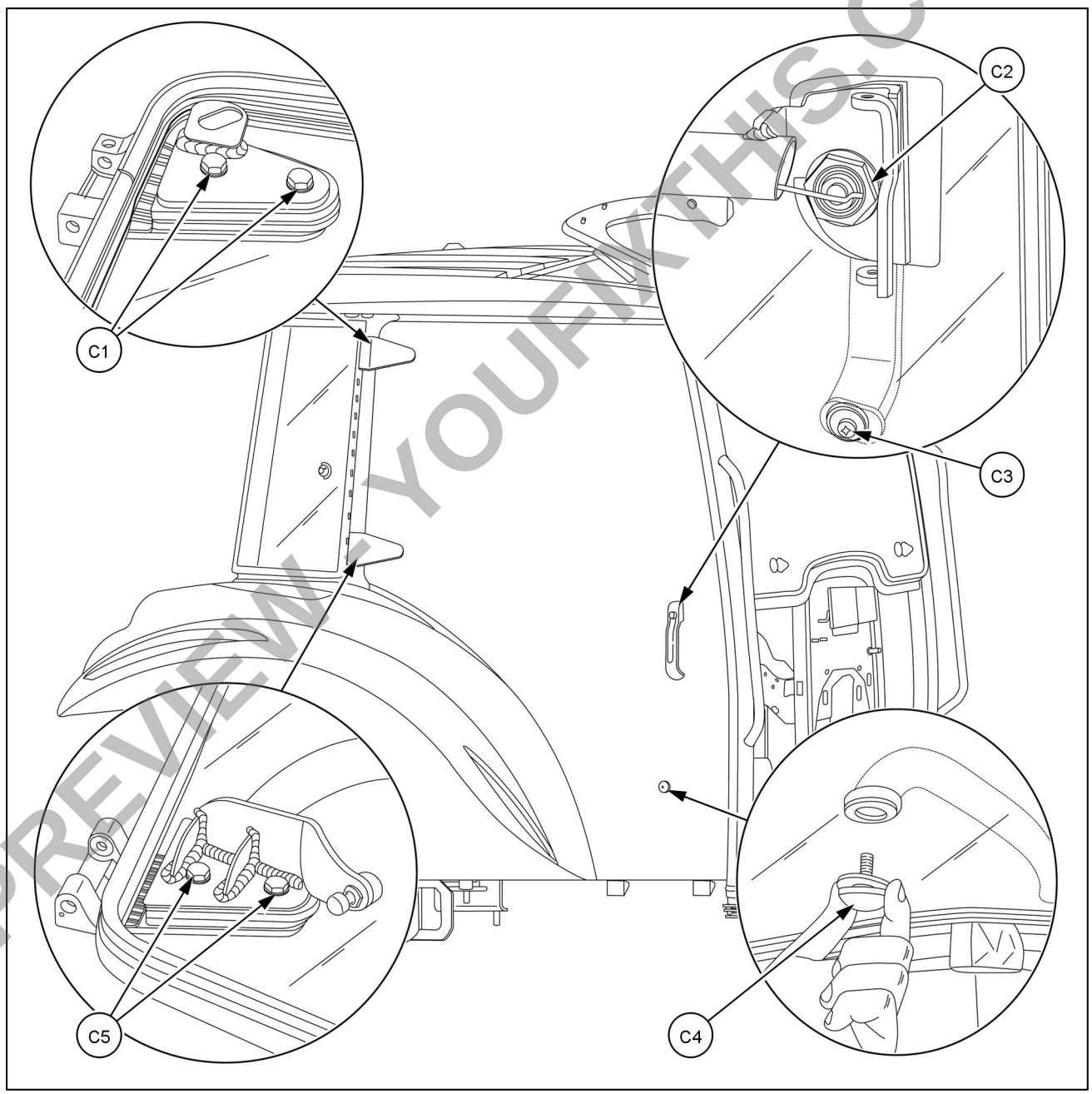
MOIL17TR03478AA 7

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Cab door window - Torque

PowerStar™ 100 With cab, with Mechanical transmission	
PowerStar™ 100 With cab, with Power Shuttle transmission [ELRT5100AJLE50003 -]	
PowerStar™ 110 With cab, with Mechanical transmission [ELRT5110JJLE50318 -]	
PowerStar™ 110 With cab, with Power Shuttle transmission [ELRT5110LJLE50008 -]	
PowerStar™ 120 With cab, with Mechanical transmission [ELRT5120TJLE50403 -]	
PowerStar™ 120 With cab, with Power Shuttle transmission [ELRT5120CJLE50013 -]	
PowerStar™ 90 With cab, with Power Shuttle transmission [ELRT5090VJLE50022 -]	
PowerStar™ 90 With cab, with Mechanical transmission [ELRT5090PJLE50015 -]	



MOIL15TR00829GA 1

Part to tighten	Thread	Rated torque
Hinge retaining bolts **(C1)**	M8 x 1.25	**6 – 8 N·m** (**4.43 – 5.90 lb ft**)
Handle retaining nut **(C2)**	-	**10 – 12 N·m** (**7.38 – 8.85 lb ft**)

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Seat suspension base or support - Remove - Seat mounting plate

⚠ WARNING

Avoid injury!
Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.
Failure to comply could result in death or serious injury.

W0208A

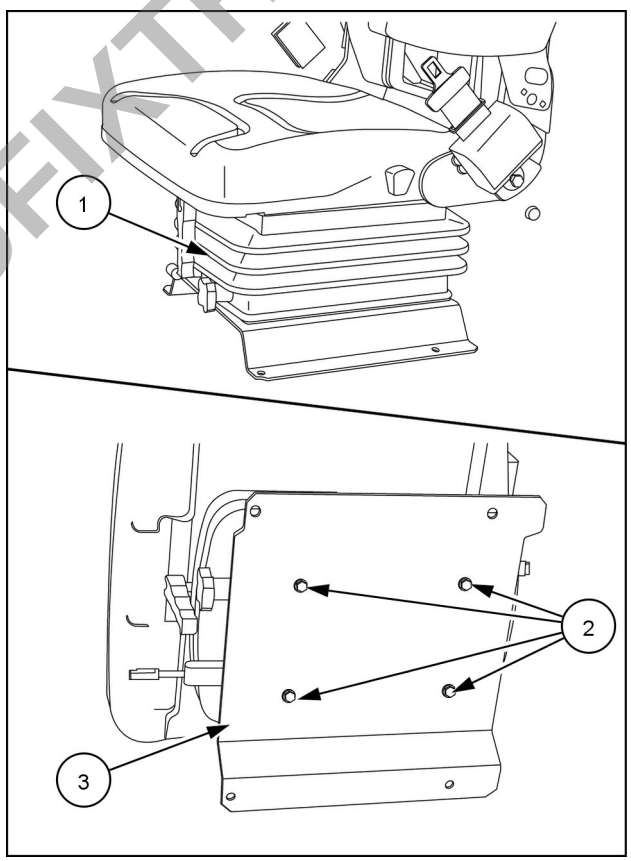
⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply could result in death or serious injury.

W0398A

Prior operation:
Operator seat - Remove - Mechanically-adjustable operator seat (90.120).

1. Position the seat **(1)** on a suitable workbench.
2. Loosen the four screws **(2)**, retrieve the related washers and separate the plate **(3)** from the seat.



MOIL16TR02637BA 1

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