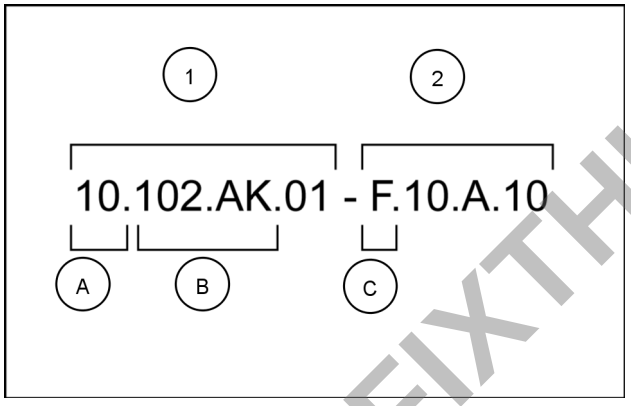
## Information units and information search

Each chapter is composed of information units. Each information unit has the SAP code shown in parentheses. This indicates the function and type of information in that information unit. Each information unit has a page reference within that Chapter. The information units provide a quick and easy way to find just the right piece of technical information you are looking for.

| | | | | | | |
|---|---|---|---|---|---|---|
| Example information unit | Engine block cover - Front – Remove (10.102.AP.01 - F.10.A.10) | | | | | |
| Information Unit SAP code | 10 | 102 | AK | 01 | F | 10.A.10 |
| SAP code classification | Engine | Pan and covers | Engine block cover | Front | Service data | Remove |




NHIL12GEN0070A 1

Navigate to the correct information unit you are searching for by identifying the function and information type from the SAP code.

- **(1)** Location and **(2)** Information type.
- **(A)** corresponds to the sections of the service manual.
  **(B)** corresponds to the chapters of the service manual. After **(B)** there may be some additional information. In this case it shows ".01", which represents the "Front" block cover. These options may be front/rear, left/right, hydraulic/mechanical etc.
  **(C)** corresponds to the type of information listed in the chapter contents: Technical Data, Functional Data, Diagnostic, or Service.
  **(A)** and **(B)** are also shown in the page numbering on the page footer.
  THE REST OF THE CODING IS NOT LISTED IN ALPHANUMERIC ORDER IN THIS MANUAL.
- You will find a table of contents at the beginning and end of each section and chapter.
  You will find an alphabetical index at the end of each chapter.
- By referring to **(A)**, **(B)** and **(C)** of the coding, you can follow the contents or index (page numbers) and quickly find the information you are looking for.

## Page header and footer

The page header will contain the following references:

- Section and Chapter description

The page footer will contain the following references:

- Publication number for that Manual.
- Version reference for that publication.
- Publication date
- Section, chapter, and page reference e.g. 10.102 / 9


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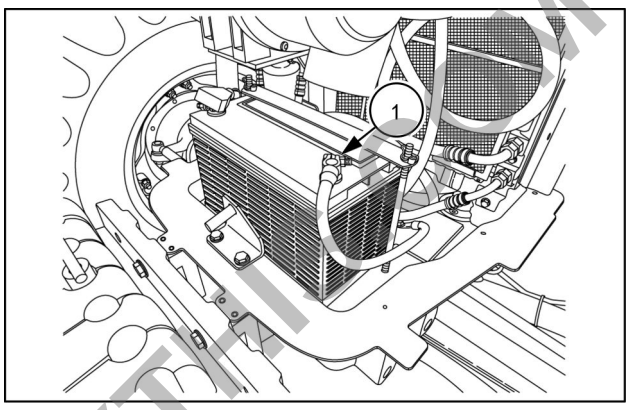
# Engine - Remove

**⚠ DANGER**

**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 will result in death or serious injury.**

**D0076A**

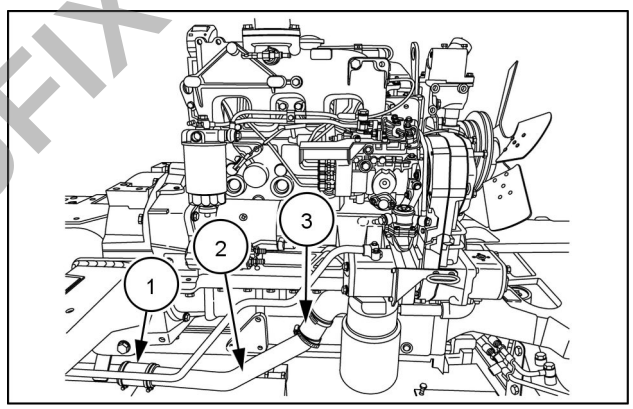
1. Disconnect the negative cable **(1)** from the battery.




CUIL13TRO0194AA 1

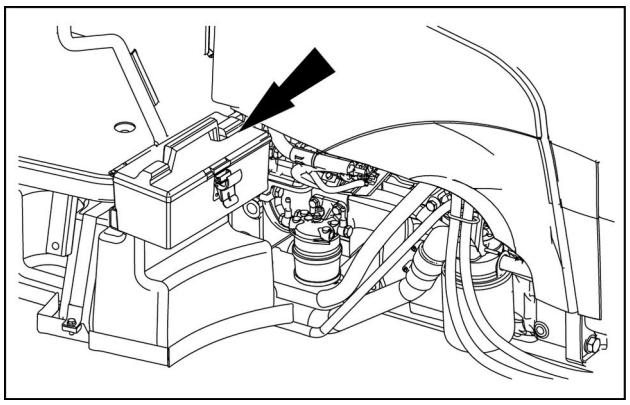
2. Loosen the clamps and the hose **(3)** and lift the tube **(2)** so that the oil does not drain out. The hose **(1)** allows this movement.

***NOTICE:*** *Protect the end of the hose **(1)** against the entry of impurities.*




CUIL13TR00802AA 2

3. Remove the tool box and the respective support.
4. Remove the front ballasts. Consult the procedures in **Front ballast - Remove (39.140)**.
5. Remove the engine side shield. Consult the procedures in **Side shield - Remove (90.102)**.
6. Remove the engine hood. Consult the procedures in **Hood - Remove (90.100)**.



CUIL14TR01405AA 3

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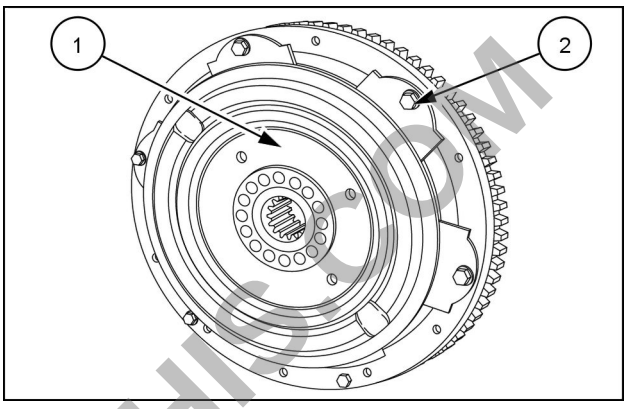

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# Slip clutch or flywheel damper - Install

| TL5 TIER 3 and STAGE III | LA (Transmission = Power Shuttle) |
|---|---|

**Prior operation:**
**Engine flywheel - Install (10.103)**

1. Assemble the flywheel damper **(1)** on the flywheel. Tighten the fixing bolts **(2)** with the lock washers.
2. Torque the fixing bolts to **24.5 – 33.0 N·m** (**18.1 – 24.3 lb ft**).




CUIL15TR00168AA 1

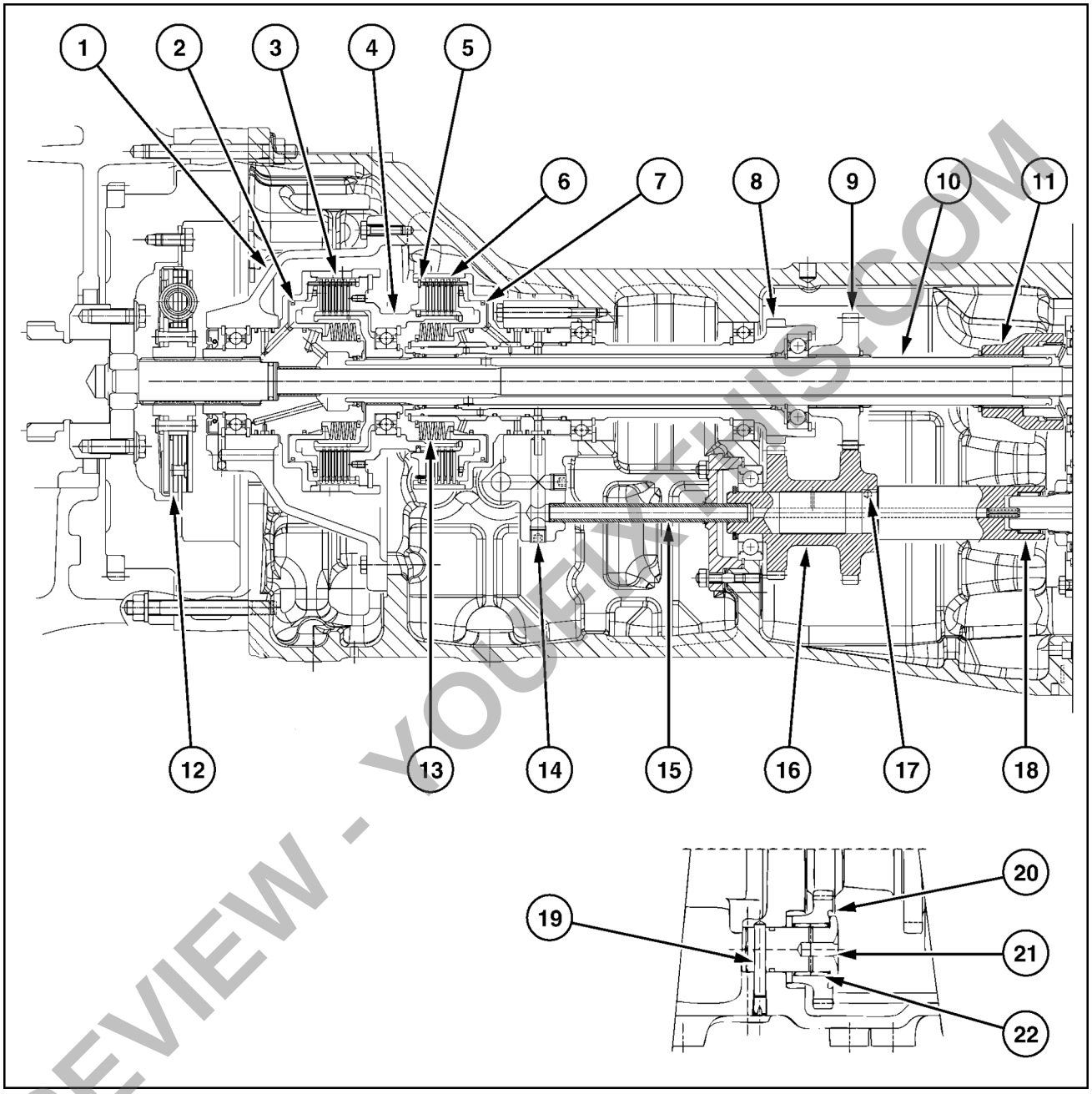
**Next operation:**
**Engine flywheel - Install - Flywheel counterweight (10.103)**

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# Power shuttle transmission - Sectional view

| | |
|---|---|
| TL5 TIER 3 and STAGE III | LA (Transmission = Power Shuttle) |



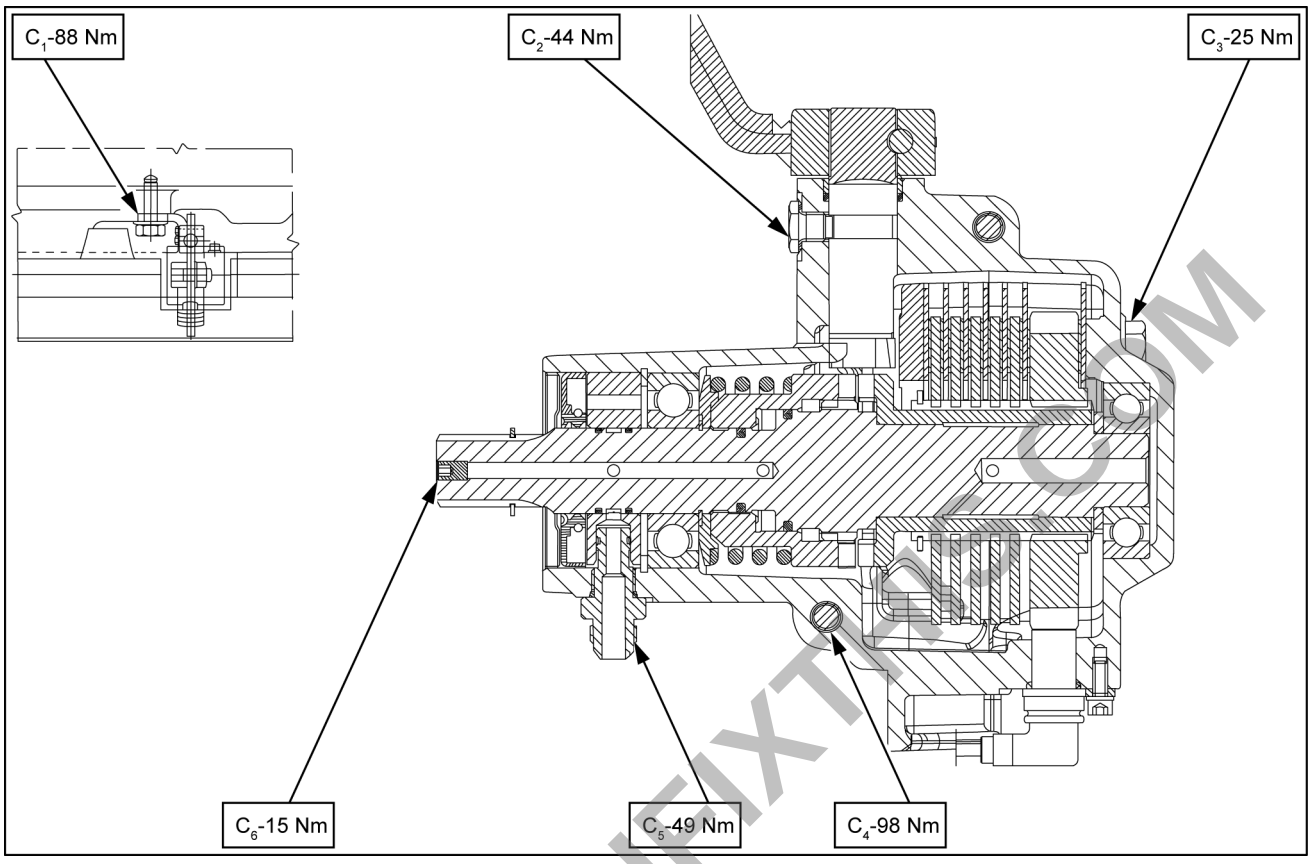

MOIL13TR01507FA 1

1. Forward gear clutch bell housing A
2. Clutch A piston
3. Clutch A
4. Clutch A bottom / clutch B driving gear
5. Clutch B bottom
6. Reverse gear clutch B
7. Clutch B piston
8. Reverse driving gear / shaft
9. Reverse driving gear
10. Forward gear drive shaft
11. Gearbox main shaft driving gear
12. Flexible coupling
13. Piston return springs in the neutral phase
14. Lubrication manifold
15. Transmission shaft lubrication line
16. Reverse intermediate gears
17. Keying ball
18. Clutch casing transmission shaft
19. Reverse idler gear shaft retaining pin
20. Reverse idler gear
21. Reverse idler gear shaft
22. Bearing

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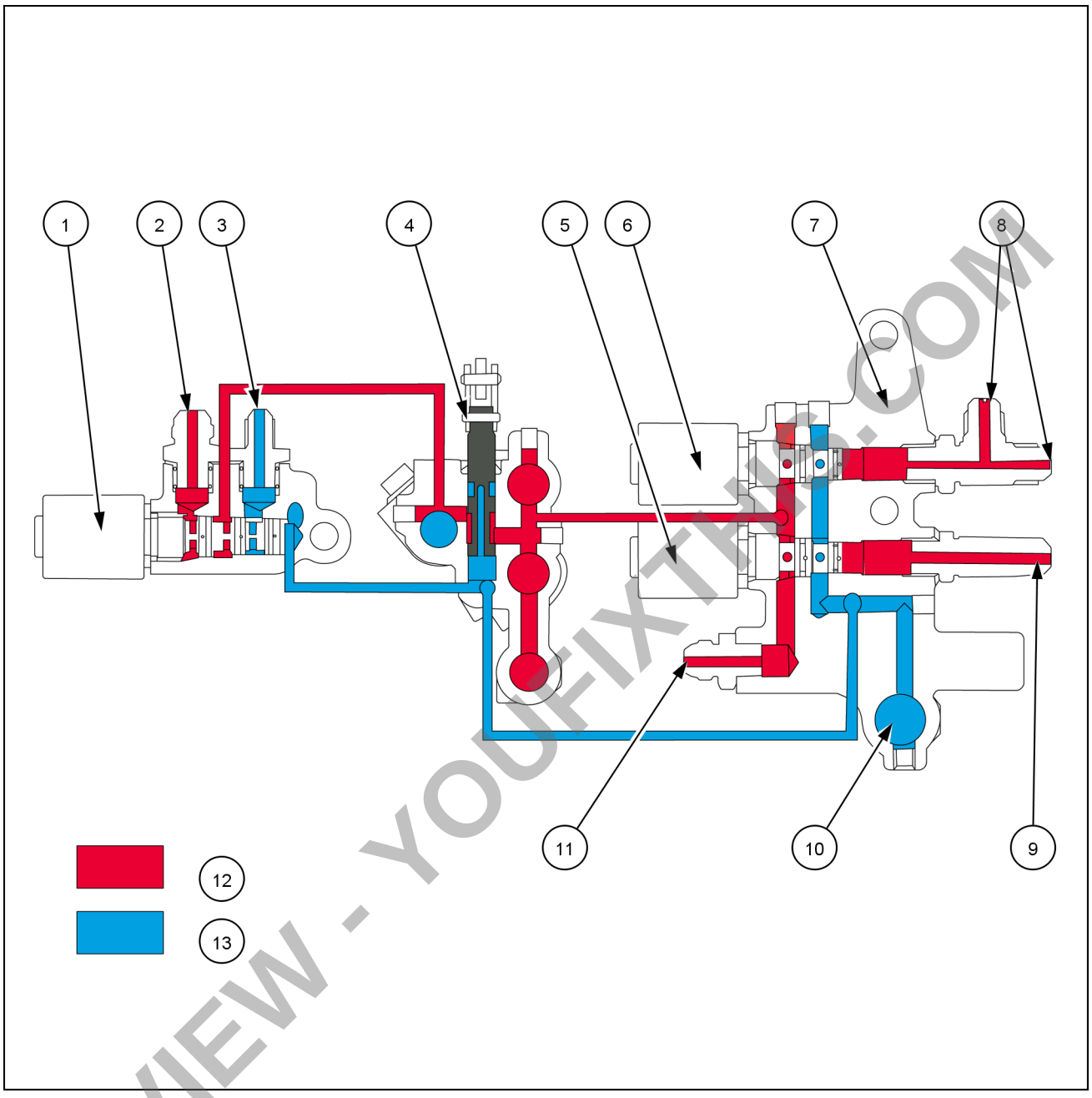

MOIL12TR00588FA 1

| Reference | Toque |
|---|---|
| **(C1)** | **88.0 N·m (65 lb ft)** |
| **(C2)** | **44.0 N·m (32.0 lb ft)** |
| **(C3)** | **25.0 N·m (18.0 lb ft)** |
| **(C4)** | **98.0 N·m (72.0 lb ft)** |
| **(C5)** | **49.0 N·m (36.0 lb ft)** |
| **(C6)** | **15.0 N·m (11.0 lb ft)** |

* The plug requires a coating of **LOCTITE® 270** prior to installation.

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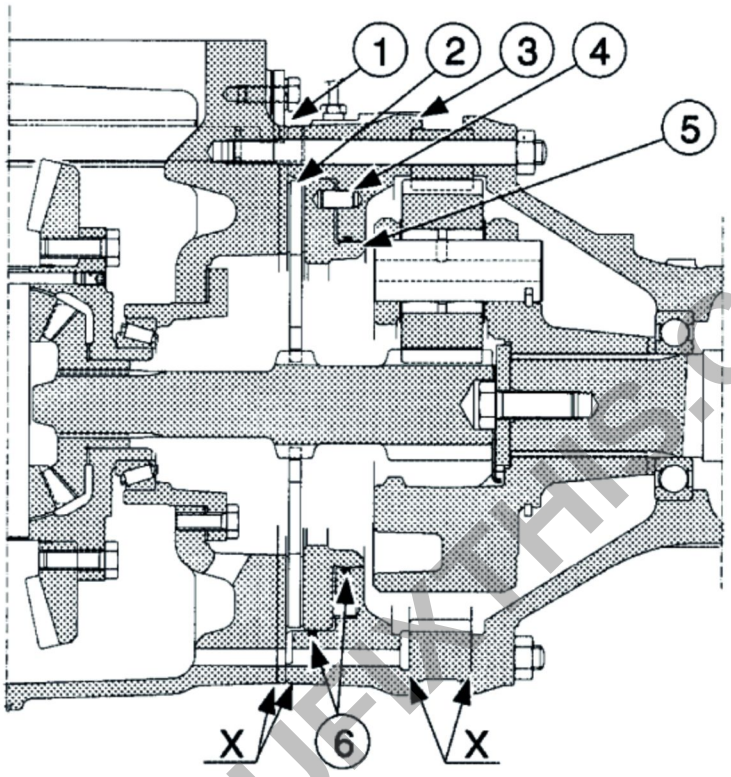

CUIL15TR00110GA 1

1. Solenoid that controls the oil supply to the PTO clutch or to the clutch brake (energized).
2. Supply line (pressurized) to PTO clutch engagement cylinder.
3. Supply line (discharge) to clutch brake.
4. Position assumed by the rod when the PTO selector lever is in neutral.
5. Solenoid that controls the disengagement of the front wheel drive.
6. Solenoid that controls the engagement of the rear differential lock.
7. Control valve block.
8. Pressurized supply line (rear differential lock engaged).
9. Pressurized supply line (front wheel drive disengaged).
10. Return line to transmission box.
11. Supply line from the pump to the hydraulic operation control valve **(7)**.
12. Oil under pressure.
13. Discharge oil.

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# Hydraulic service brakes - Sectional view




CUIL13TR00622AA 1

| Reference | Component | Reference | Component |
|---|---|---|---|
| **(1)** | Brake wear plate | **(4)** | Locating pin |
| **(2)** | Service brake valve | **(5)** | Piston of the brake control |
| **(3)** | Side end drive casing cylinder | **(6)** | Sealants |

***NOTE:*** *During assembly, apply sealant* ***LOCTITE® 515™*** *to the surfaces* ***(X)****.*

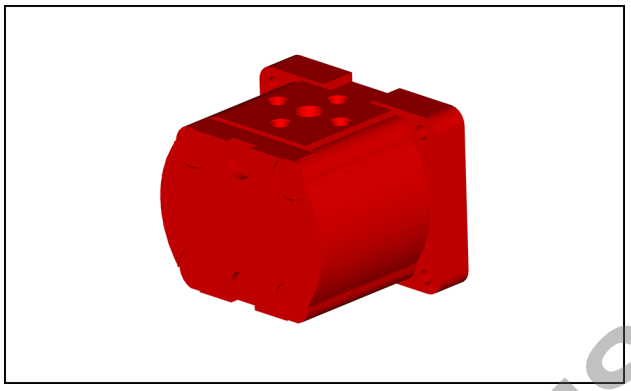
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# Hydraulic systems - Pump

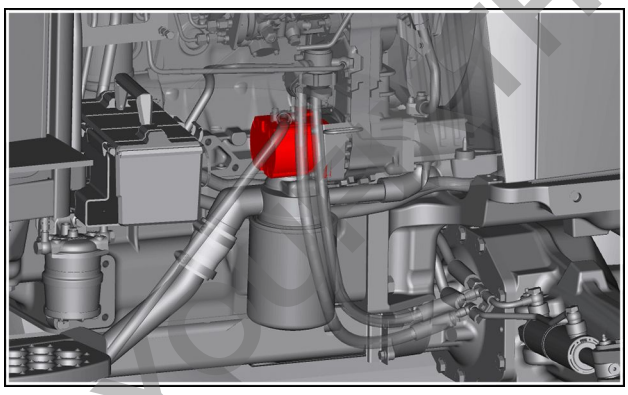
| | |
|---|---|
| TL5 TIER 3 and STAGE III | LA (Transmission = Power Shuttle) |

### *P-01 – Hydraulic system pump*



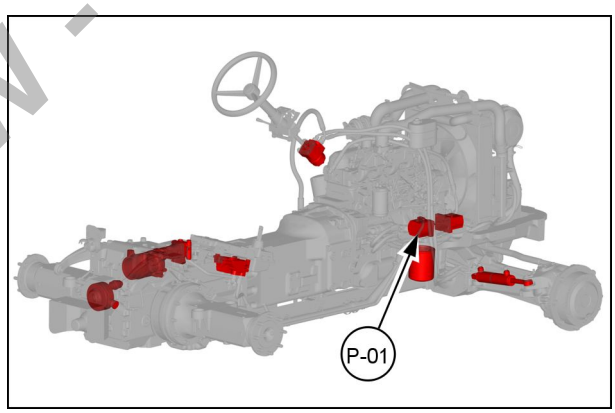
CUIL18TR00346AA 1

**Component**



CUIL18TR00316AA 2

**Location**




CUIL18TR00534FA 3

**General view**

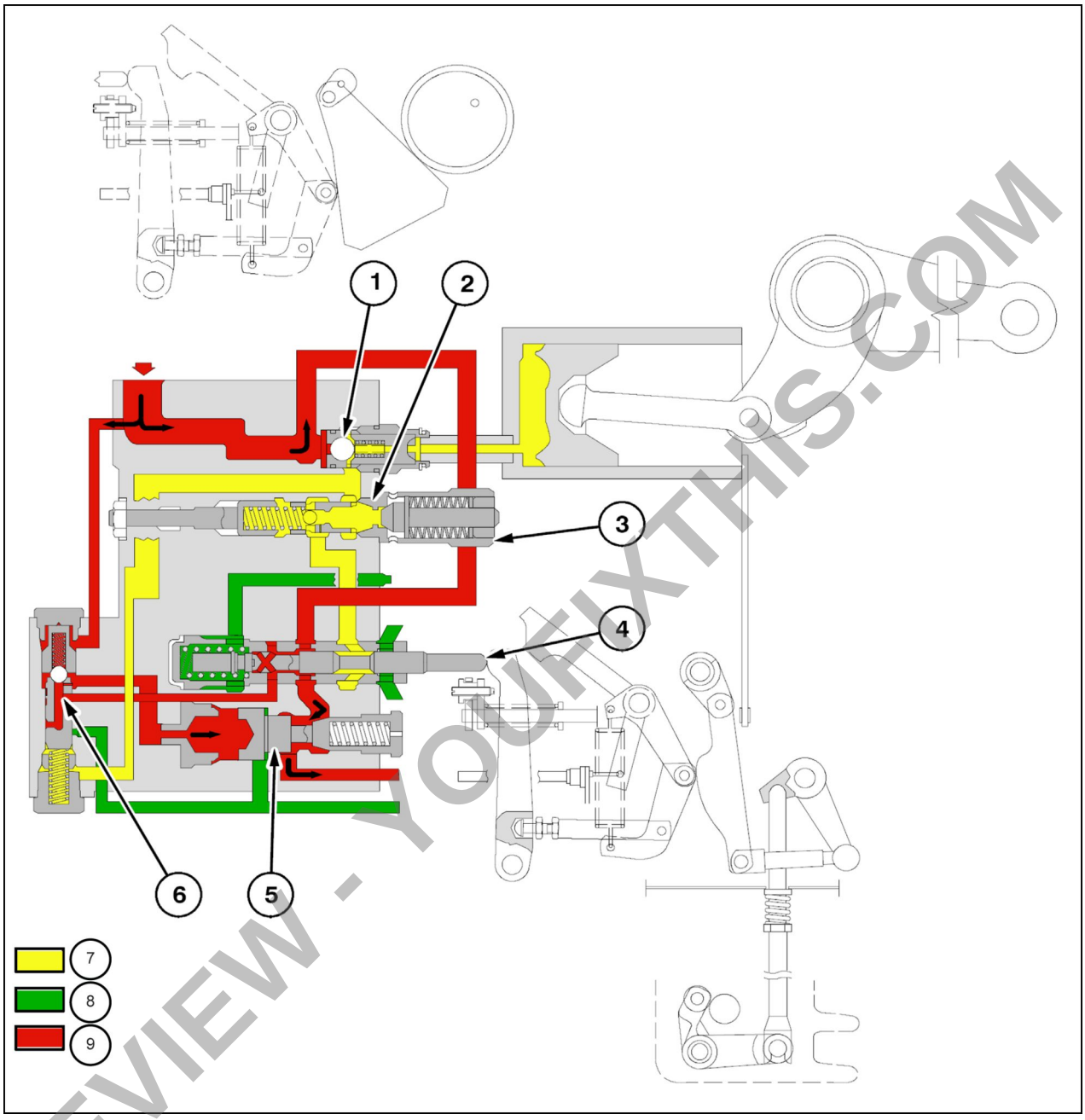
| | |
|---|---|
| Component Type | Gear pump |
| Hydraulic Schema | **Hydraulic systems - Hydraulic schema 01 - Hydraulic PTO (35.000)** |
| Service Information | **Pump - Remove (35.104)** |
| | **Pump - Install (35.104)** |

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## Neutral phase




CUIL13TR00641AA 2

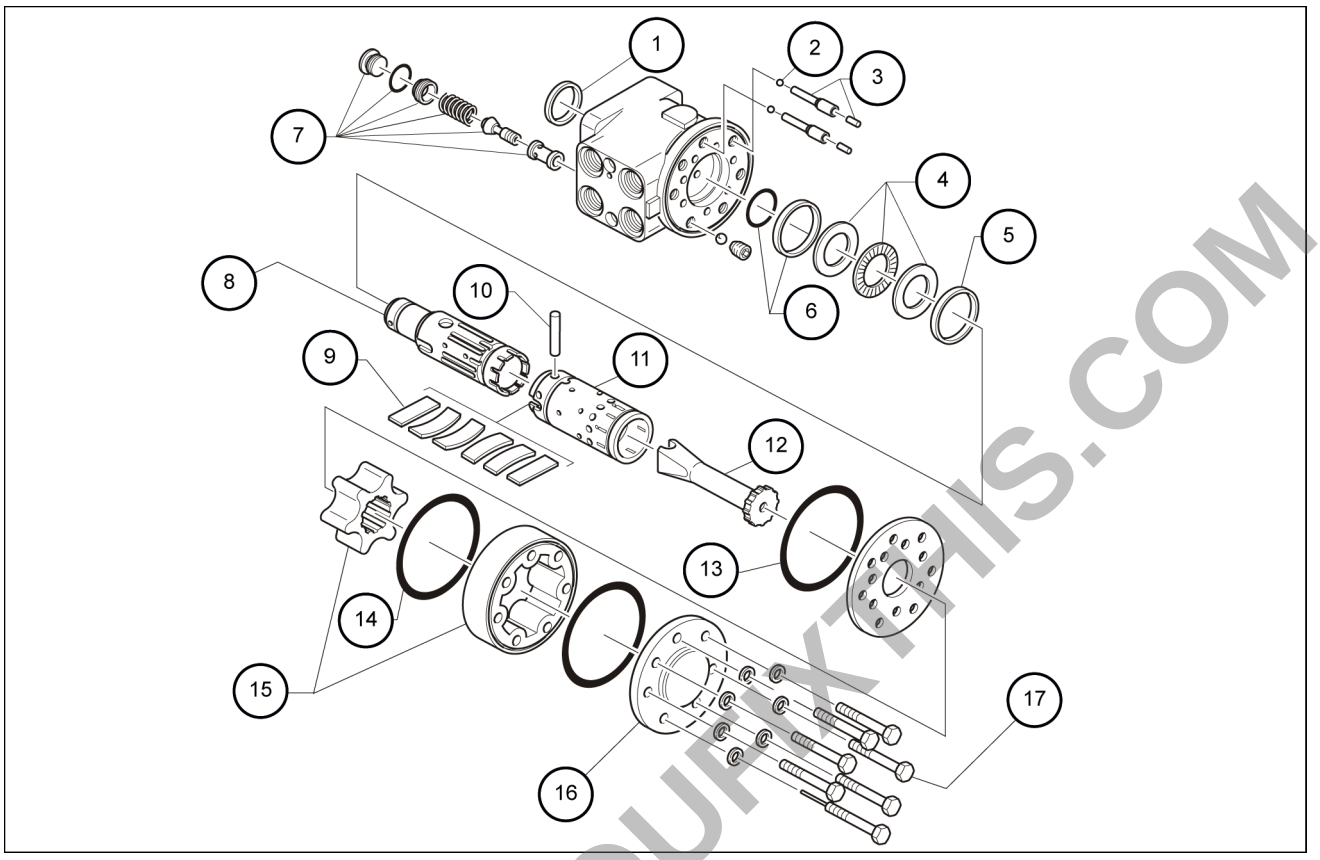
1. check valve
2. Arms lowering speed control valve
3. Cylinder saftey valve
4. Main Stack Valve
5. Piloted valve (discharge)
6. Reaction speed control valve
7. Static oil
8. Return oil
9. Oil under pressure

When the lift arms reach a certain height, the internal levers stabilize. The main control valve rod position (4) makes the oil pass through the reaction speed control valve (6) and on to the (piloted) control valve (5). **(4) (6) (5)**

The oil pressure over the piloted valve (5) overcomes the resistance of the spring and moves the valve. **(5)** That creates a discharge opening allowing the oil to flow to the transmission box (reservoir) instead of flowing to the lift cylinder.


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# Power steering control valve - Exploded view




CUIL13TR00674AA 1

| Reference | Component | Reference | Component |
|---|---|---|---|
| **(1)** | Retainer Ring | **(10)** | Valve spool lock pin |
| **(2)** | Reflow valve balls | **(11)** | Valve sleeve |
| **(3)** | Reflow valve pins | **(12)** | Rotor drive shaft |
| **(4)** | Bearing | **(13)** | seal |
| **(5)** | Retainer Ring | **(14)** | seal |
| **(6)** | Retainer Ring | **(15)** | Rotor and fixed ring for the rotor |
| **(7)** | Relief valve | **(16)** | Rear cover |
| **(8)** | Rotary valve | **(17)** | Fixing bolt |
| **(9)** | Springs to return the sleeve to the neutral position | | |

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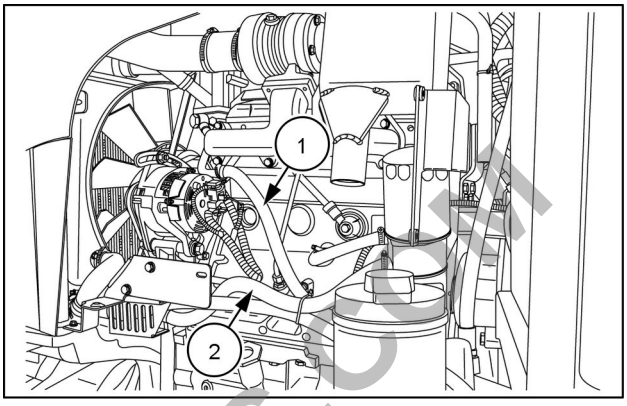

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# Heating - Dynamic description

| TL5 TIER 3 and STAGE III | LA (Platform = With cab) |
|---|---|

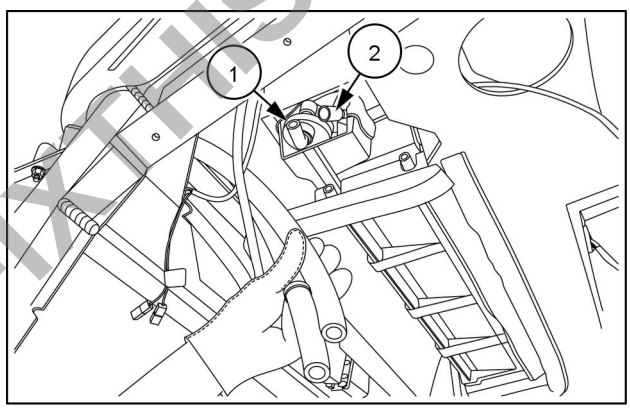
## Fluid from the engine to the heater

The fluid exits the engine, from the thermostat housing, through hose **(1)**.




CUIL13TR00787AA 1

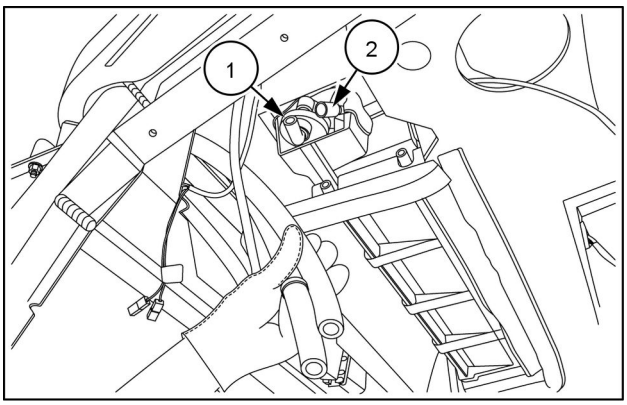
In the cab roof, on the left-hand side of the heater, the hose **(1)** , figure **(1)**, is connected to the fitting **(1)**.




CUIL13TR00740AA 2

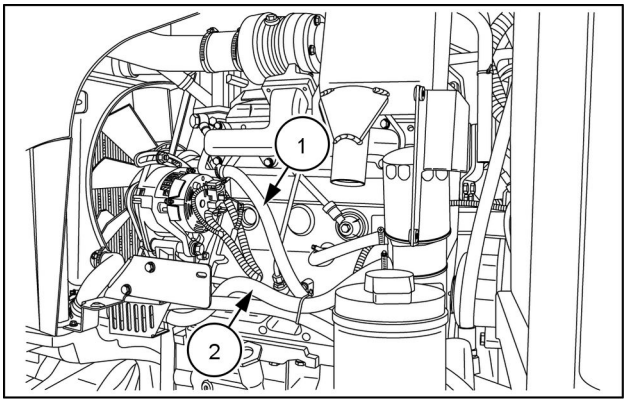
## Fluid from the heater to the engine

The hot fluid, after crossing the heater, exits through the copper fitting **(2)**.




CUIL13TR00740AA 3

The fluid returns through the upper socket in the bottom radiator pipe through the hose **(2)**.




CUIL13TR00787AA 4



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# SERVICE MANUAL

## Electrical systems

**TL5.100 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.100 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.110 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.110 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.80 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.80 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.90 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.90 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD**

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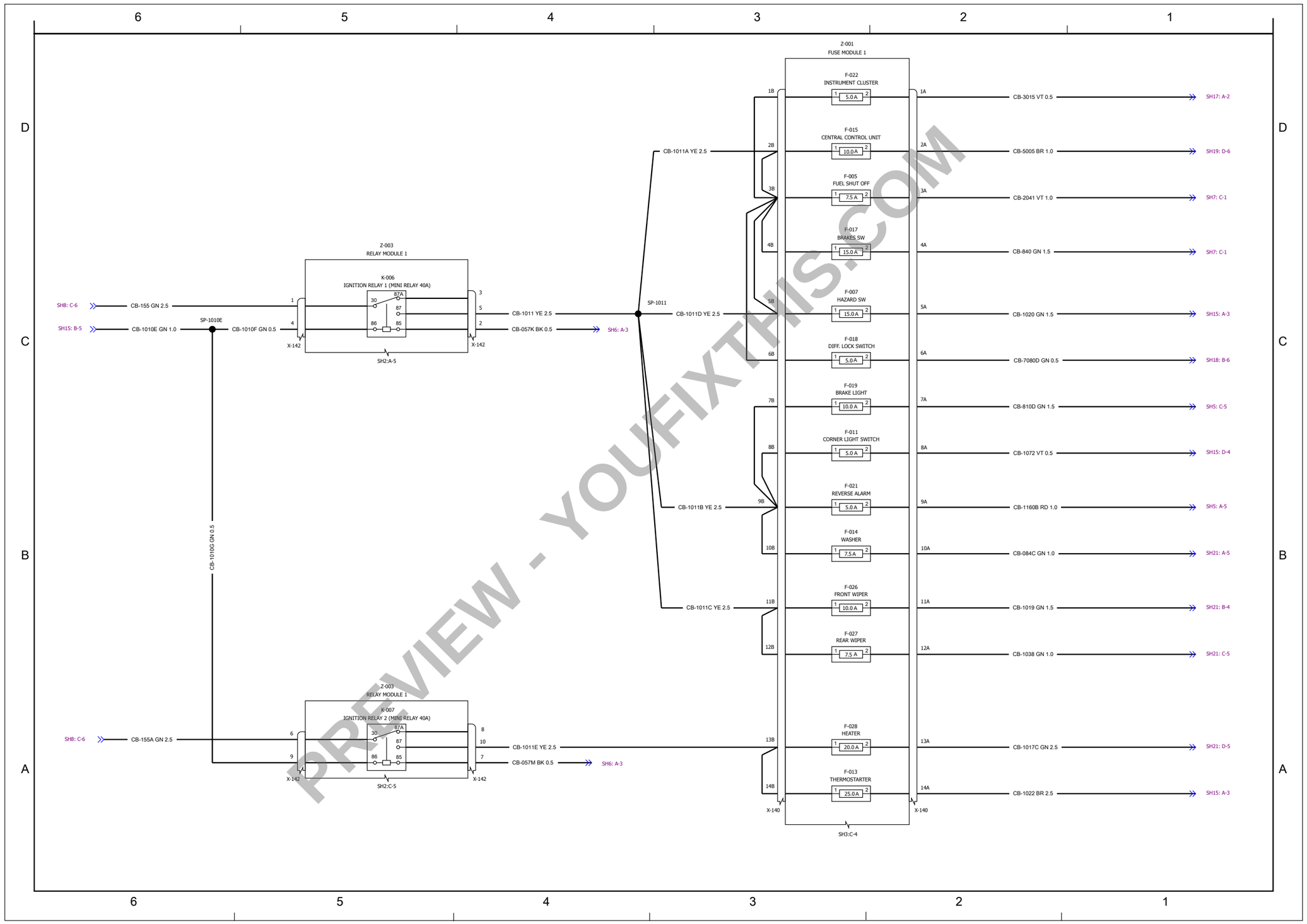
# Electrical systems - 55

## Harnesses and connectors - 100

**TL5.100 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.100 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.110 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.110 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.80 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.80 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.90 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.90 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD**

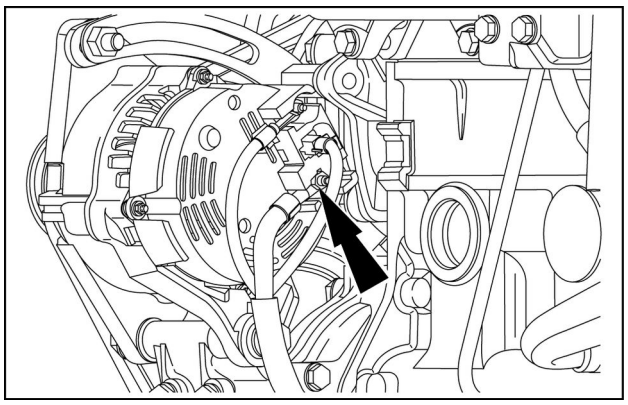
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SHT_2 1

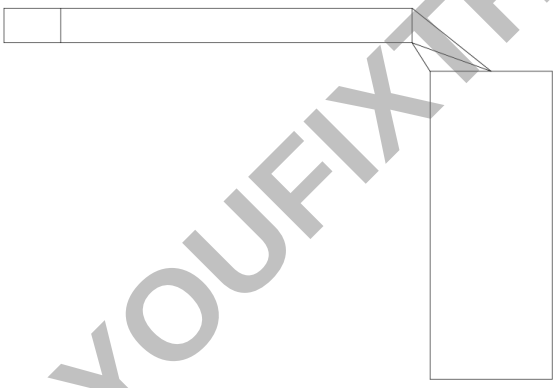

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CUIL19TR00027AA 4

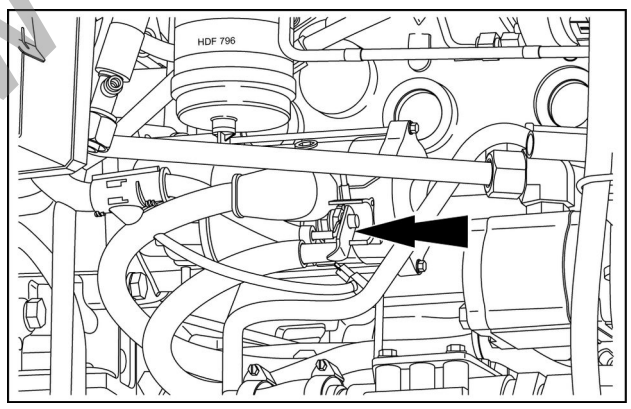
| Pin | From | Wire | Description | Color-Size | Frame |
|---|---|---|---|---|---|
| 1 | **X-003 (Plug) pin 1** - STARTER MOTOR (84417630) | EN-150 | EN-150 | BR - 16.0 | **SHEET 08 SH08 - ENGINE COMPONENTS** |

### *X-003 - STARTER MOTOR (84417630) (Plug)*



84417630 5

**84417630**




CUIL19TR00035AA 6

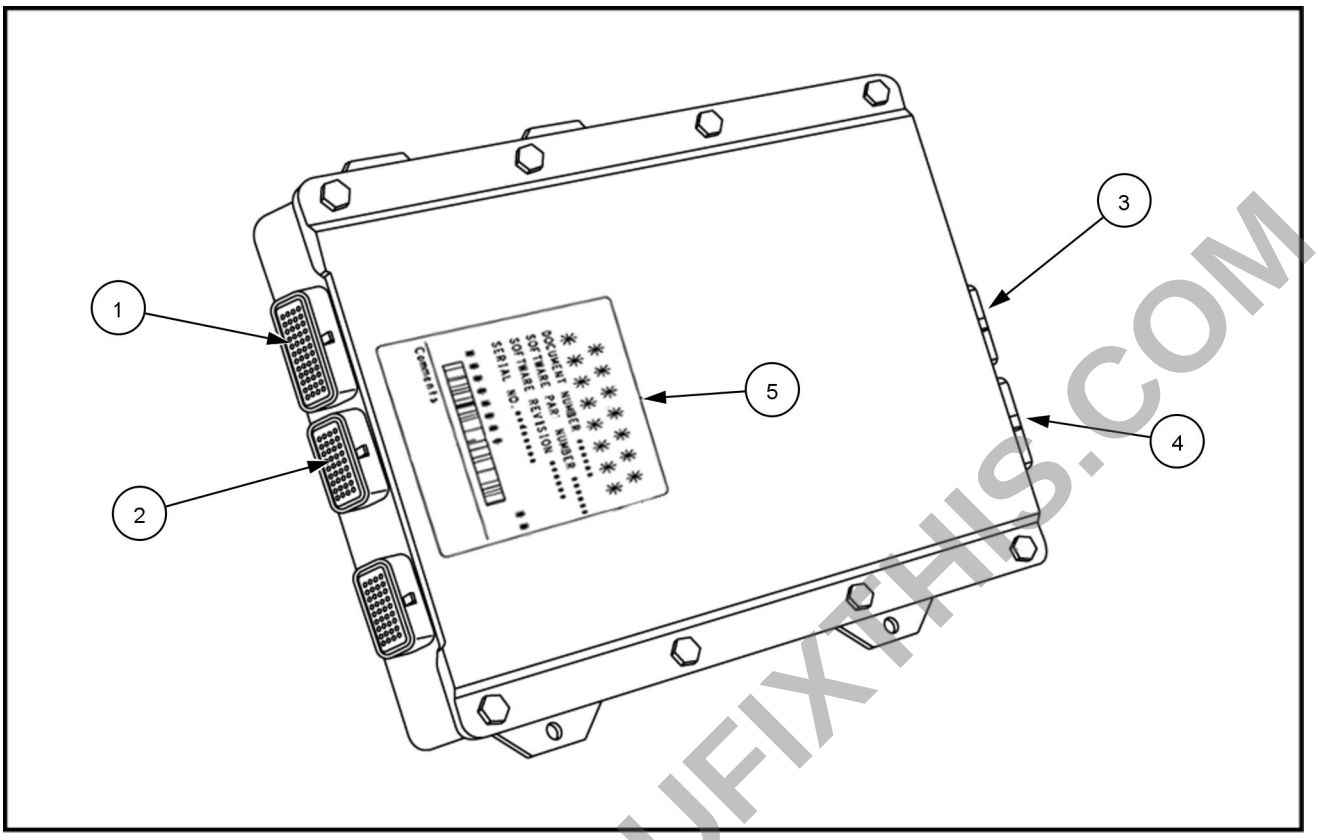
| Pin | From | Wire | Description | Color-Size | Frame |
|---|---|---|---|---|---|
| 1 | **X-002 (Plug) pin 1** - ALTERNATOR B+ [G-002] (84426136) | EN-150 | EN-150 | BR - 16.0 | **SHEET 08 SH08 - ENGINE COMPONENTS** |
| 1 | **X-008B (Plug) pin 1** - FUSE [F-020] (84382955) | EN-150A | EN-150A | BR - 16.0 | **SHEET 08 SH08 - ENGINE COMPONENTS** |

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# Electronic module - Detailed view




CUIL14TR01402AA 1

| Reference | Component | Reference | Component |
|---|---|---|---|
| **(1)** | Connector X-038 | **(4)** | Connector X-031 |
| **(2)** | Connector X-039 | **(5)** | Identification decal |
| **(3)** | Connector X-040 | | |

***NOTE:*** *For information about the connectors, see*

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# Electrical systems - 55

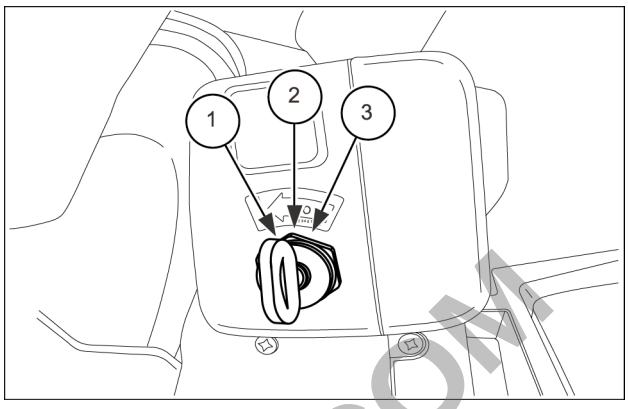
## Electronic modules - 640

**TL5.100 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.100 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.110 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.110 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.80 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.80 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.90 PIN HCCZ, Without cab, Tier 3, 12x12, Power Shuttle, 4WD, TL5.90 PIN HCCZ, With cab, Tier 3, 12x12, Power Shuttle, 4WD**

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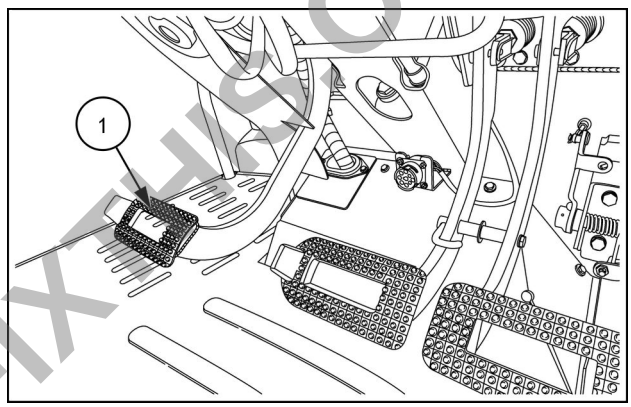

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4. Start the engine.



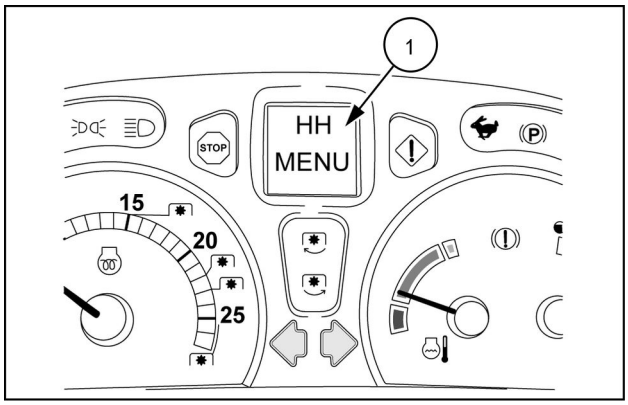

CUIL13TR00927AA 4

5. Fully release the clutch pedal **(1)**.



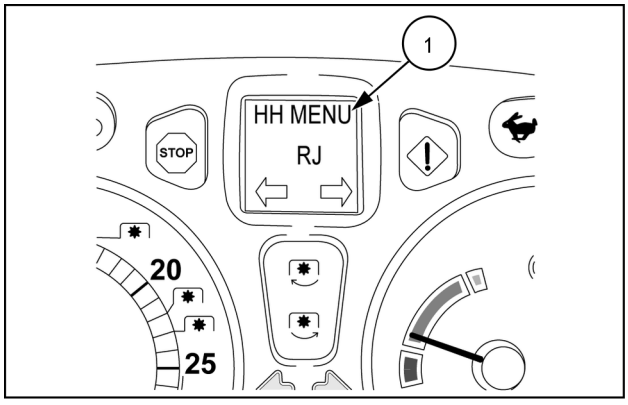

CUIL13TR01143AA 5

6. "HH Menu" will appear on the display **(1)**.




CUIL14TR01511AA 6

7. Press the "m" button until "HHMENU RJ" appears. on the display **(1)**.




CUIL14TR01510AA 7

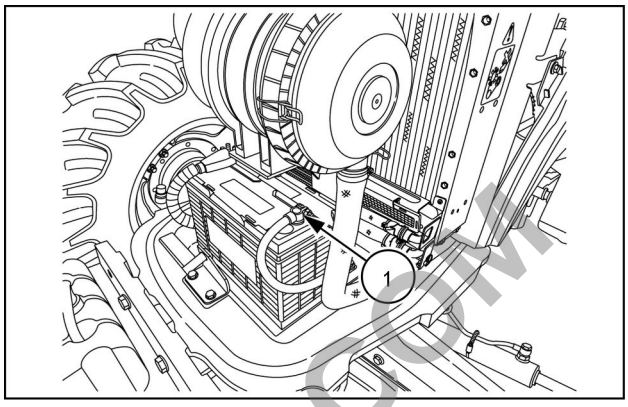
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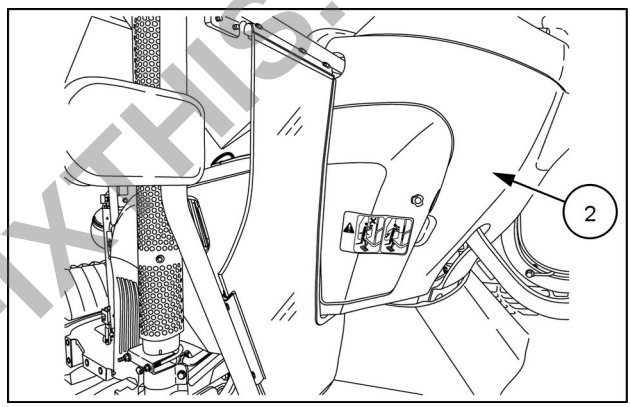
# Clutch pedal potentiometer - Replace

1. Disconnect the negative cable **(1)** from the battery.



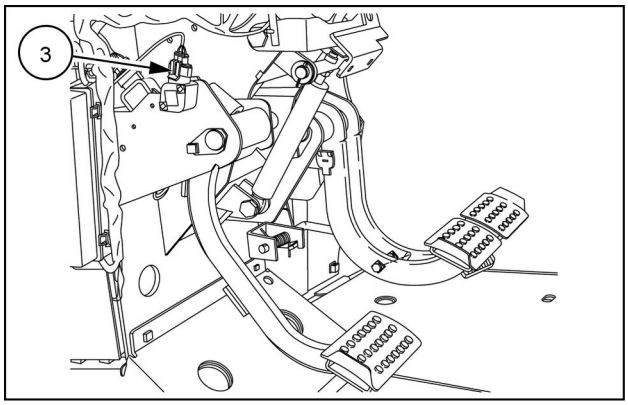

CUIL13TR01146AA 1

2. Remove the steering column cover **(2)**.



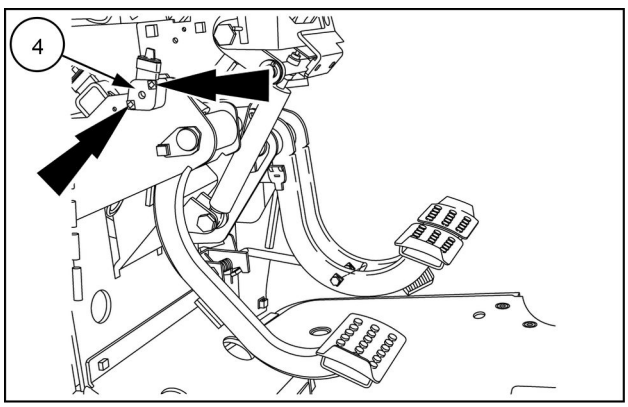

CUIL14TR01162AA 2

3. Disconnect connector **(3)**..




CUIL14TR01518AA 3

4. Remove the bolts. Remove the potentiometer **(4)**.
5. Reinstall the new potentiometer. Make sure that the alignment is correct.
6. Reconnect the battery negative cable.




CUIL14TR01517AA 4

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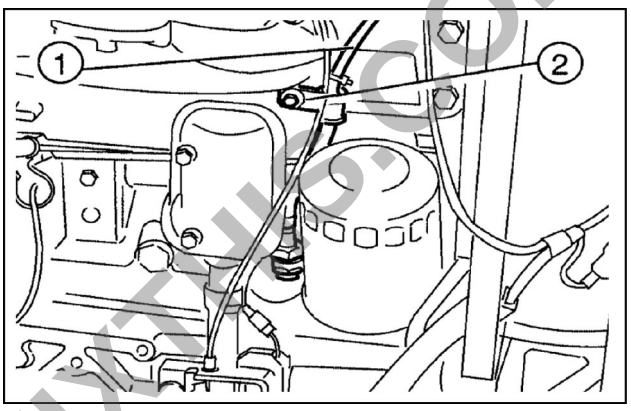
# Cab and platform - Remove

**⚠ DANGER**

**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 will result in death or serious injury.**

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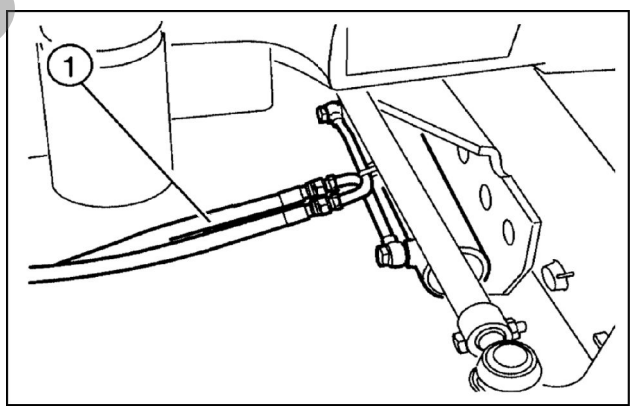
1. Remove the engine side shields. See the procedures in **Side shield - Remove (90.102)**.
2. Disconnect the engine tachometer cable **(1)** and remove the set support bolts **(2)**.




LAIL11TL0557A0A 1

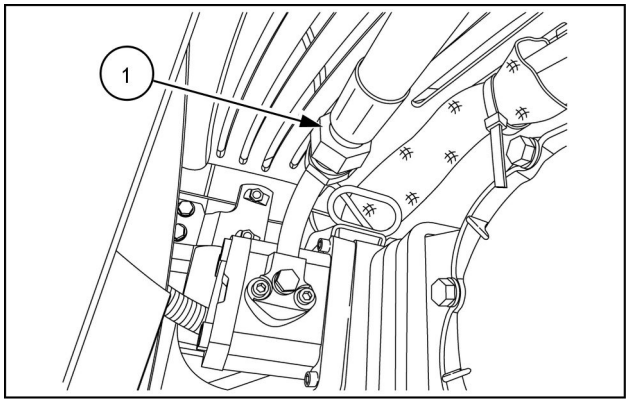
3. Remove the hood. Please see **Hood - Remove (90.100)** .
4. Disconnect the two hoses **(1)** from the steering cylinder.

***NOTE:*** *Mark the hoses with their respective connections to facilitate assembly.*




LAIL11TL0558A0A 2

5. Disconnect the steering pump hose **(1)**.




CUIL13TR01268AA 3

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# Front-Wheel Drive (FWD) control valve - Install

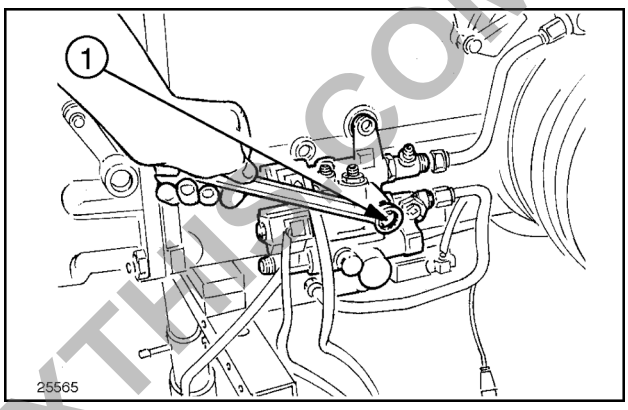
| | |
|---|---|
| TL5 TIER 3 and STAGE III | LA (Front axle = Class 2 Axle) |

**⚠ DANGER**

**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 will result in death or serious injury.**

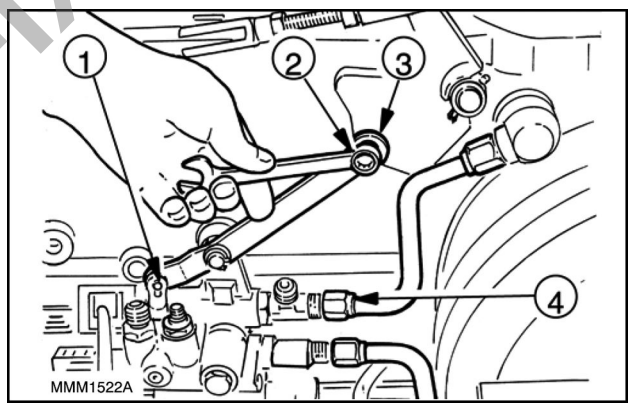
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1. Attach the control valve to the gearbox casing with the bolts **(1)**.



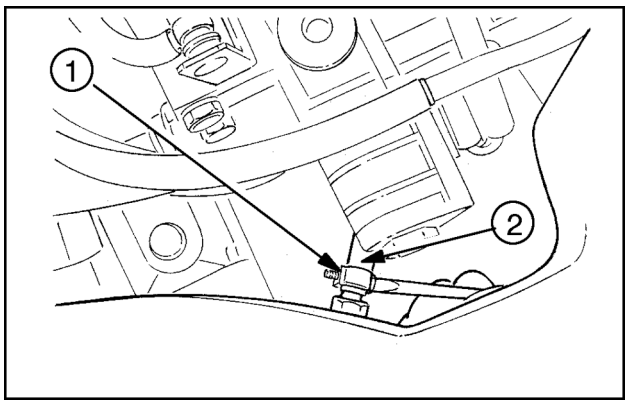

SEZ23CAP1A-34 1

2. Connect the lever ( **(2)**, **3**) governing the control valve rod **(1)** and, using the eccentric nut ( **(2)**, **2**), adjust the control valve rod ( **(1)**, **3**) so as to leave a clearance between the valve **(1)** and the grub screw **(3)** at the limit stops.




SEZ23CAP1A-9 2

3. Install the fuel tank. See **Fuel tank - Install (10.216)**.
4. Refit the injection pump fuel line **(2)**.
5. Refit the left-hand rear wheel.
6. Reconnect the battery negative lead.




SEZ23CAP1A-2 3

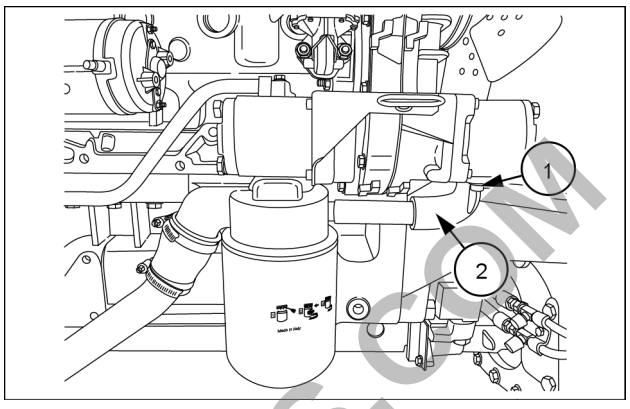
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# Power steering pump - Remove

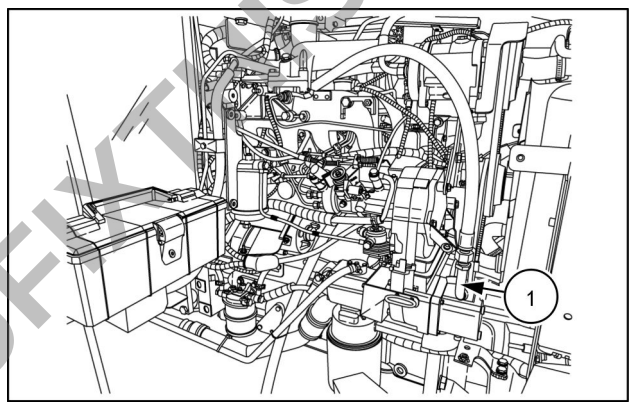
| TL5 TIER 3 and STAGE III | LA (Platform = With cab) |
|---|---|

1. Remove the bolts **(1)** and remove the suction tube **(2)** from the pump.




CUIL13TR00693AA 1

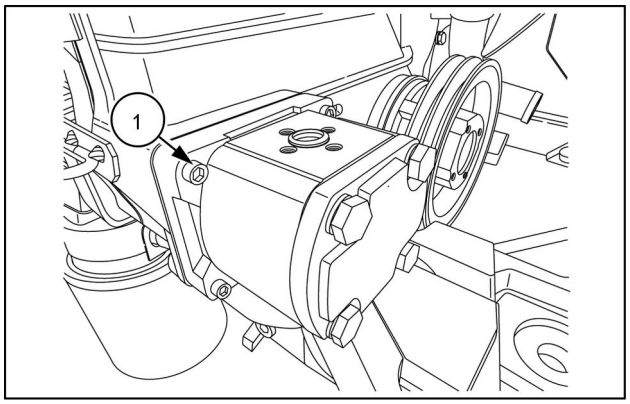
2. Remove the tube bolts **(1)** and remove the tube.




CUIL13TR00331AA 2

3. Remove the pump fixing bolts **(1)**. Remove the pump from its housing.

***NOTICE:*** *Protect the ends of the tube and the pump inlet with suitable covers.*

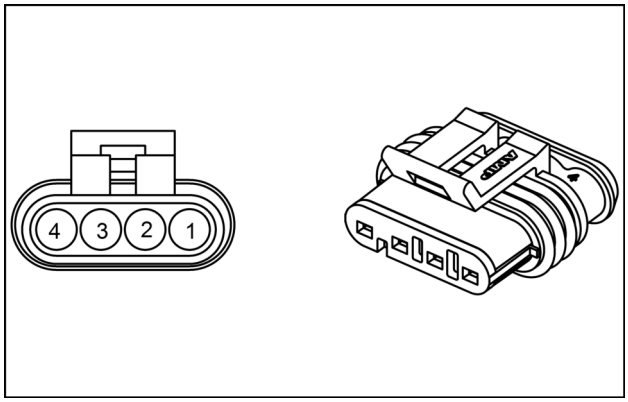



CUIL13TR00782AA 3

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### *X-129 - ENHANCED KEY PAD [ A-009] (87687242) (Plug)*




87687242 15

**87687242**

| Pin | From | Wire | Description | Color-Size | Frame |
|---|---|---|---|---|---|
| 1 | SP-1003-P-X | CB-1003F | CB-1003F | GN - 1.0 | **SHEET 15 SH15 - INSTRUMENT CLUSTER** |
| 2 | SP-5420-P-X | CB-5420C | CB-5420C | GN - 0.75 | **SHEET 15 SH15 - INSTRUMENT CLUSTER** |
| 3 | SP-5400-P-X | CB-5400C | CB-5400C | YE - 0.75 | **SHEET 15 SH15 - INSTRUMENT CLUSTER** |
| 4 | SP-057A-P-X | CB-057ABD | CB-057ABD | BK - 1.0 | **SHEET 15 SH15 - INSTRUMENT CLUSTER** |

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