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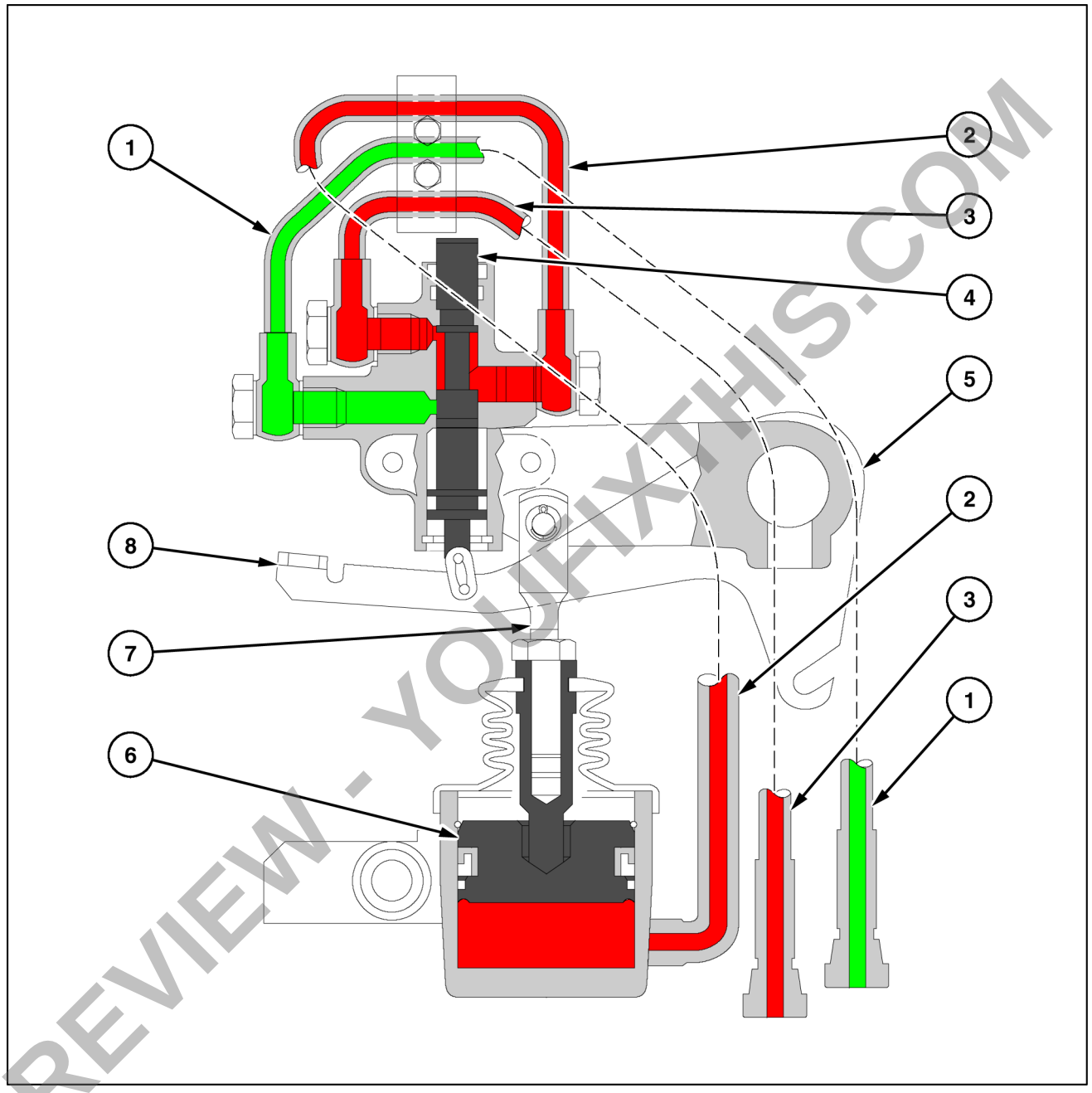
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Engage and release control tie rod - Dynamic description

T4.55 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx]	Mechanical
T4.65 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx]	Mechanical
T4.75 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx]	Mechanical



MOLI11U0067GA 1

Pressurised oil Discharge oil

Description and operation

Engaging the 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 consists of a hydraulic control valve and piston.

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Mechanical transmission internal components - 140

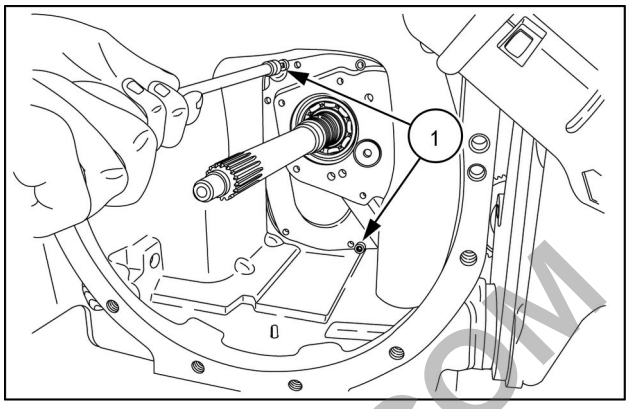
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(*) See content for specific models

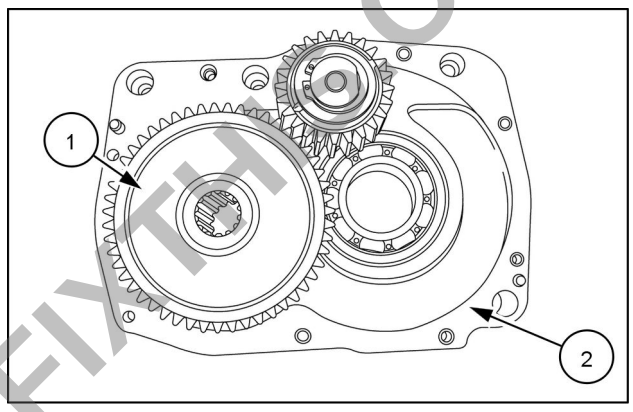
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8. Install two screws into the forcing screw holes **(1)** and remove cover.



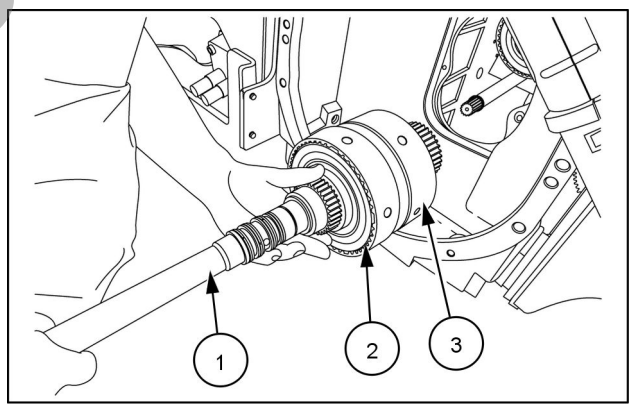
NHIL12TR00646AA 8

9. Remove the reverse gear **(1)** from the driven shaft and position in cover **(2)**.



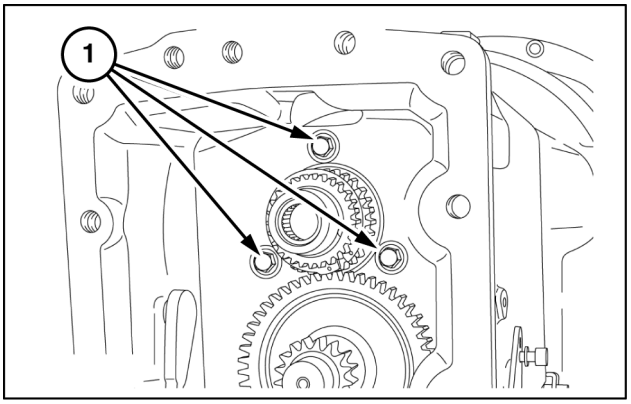
NHIL12TR00643AA 9

10. Remove the drive shaft **(1)** together with the reverse **(2)** and Power Take-Off (PTO) **(3)** clutches.



NHIL12TR00635AA 10

11. Unscrew the screws **(1)** fixing the inside manifold of the Power-Shuttle.



MOLI11U0123AB 11

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SERVICE MANUAL

Power Take-Off (PTO)

T4.55 Powerstar™ without cab, Tier 4B (Final) [ZxAHxxxxx], T4.55 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx], T4.65 Powerstar™ without cab, Tier 4B (Final) [ZxAHxxxxx], T4.65 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx], T4.75 Powerstar™ without cab, Tier 4B (Final) [ZxAHxxxxx], T4.75 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx]

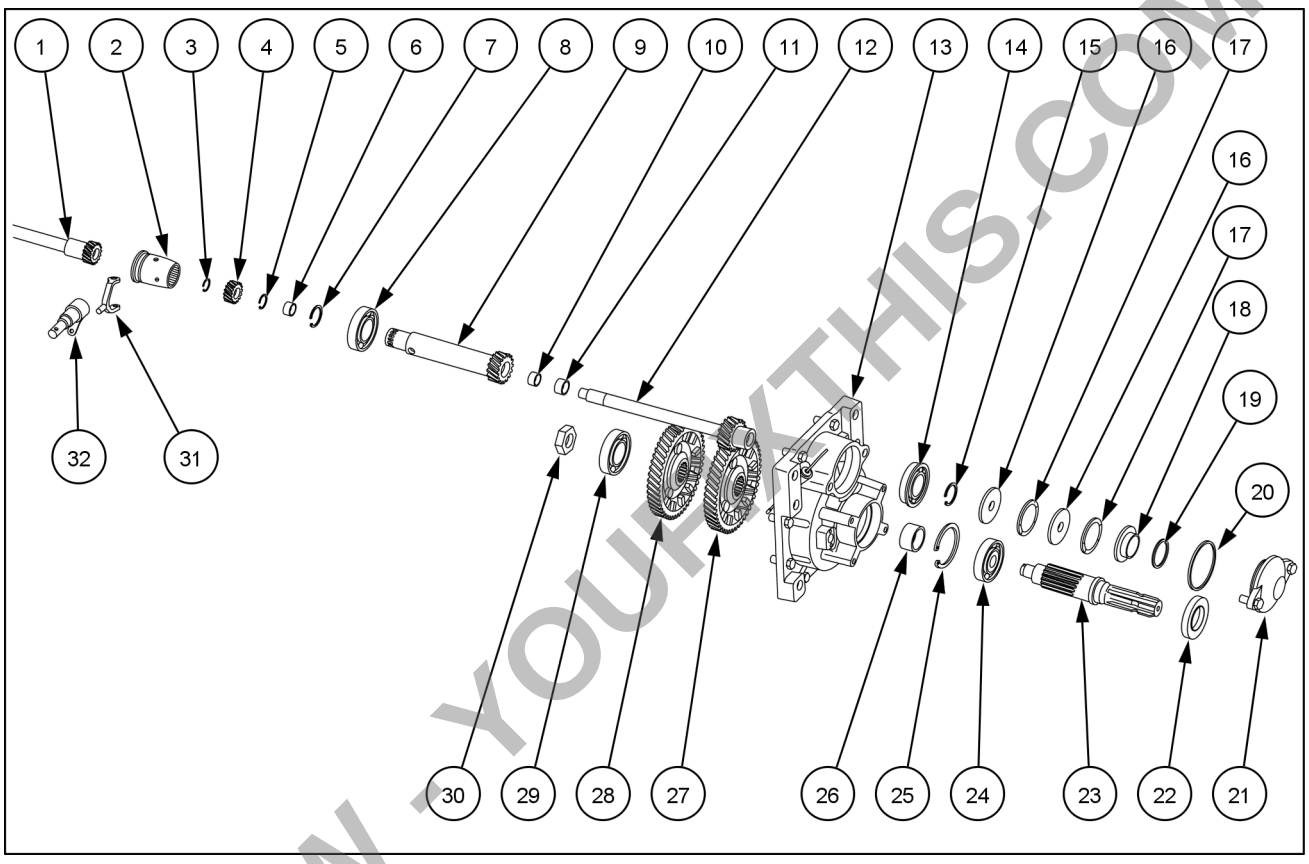
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Two-speed rear Power Take-Off (PTO) - Exploded view

T4.55 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx]	Power Shuttle
T4.55 Powerstar™ without cab, Tier 4B (Final) [ZxAHxxxxx]	Power Shuttle
T4.65 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx]	Power Shuttle
T4.65 Powerstar™ without cab, Tier 4B (Final) [ZxAHxxxxx]	Power Shuttle
T4.75 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx]	Power Shuttle
T4.75 Powerstar™ without cab, Tier 4B (Final) [ZxAHxxxxx]	Power Shuttle

540/540E rpm Hydraulic



MOIL13UTL0071FA 1

Exploded view of the 540/540E rpm hydraulic PTO

1. 540/540E rpm power take-off drive shaft
2. Coupling sleeve
3. Snap ring
4. Coupling gear
5. Snap ring
6. Spacer
7. Retainer ring D40
8. Ball bearing D40 X 80 X 18
9. Intermediate shaft
10. Needle bearing
11. Spacer
12. 540/540E rpm power take-off driven shaft
13. Cover
14. Ball bearing
15. Snap ring
16. Brake disc
17. Brake disc
18. Piston
19. Seal
20. Ring seal
21. Cover
22. Seal Ring
23. Splined output shaft
24. Ball bearing
25. Snap ring
26. Spacer
27. 540E power take-off driven gear
28. 540 power take-off driven gear
29. Ball bearing
30. Retaining nut of the splined output shaft
31. Engagement lever
32. Control lever

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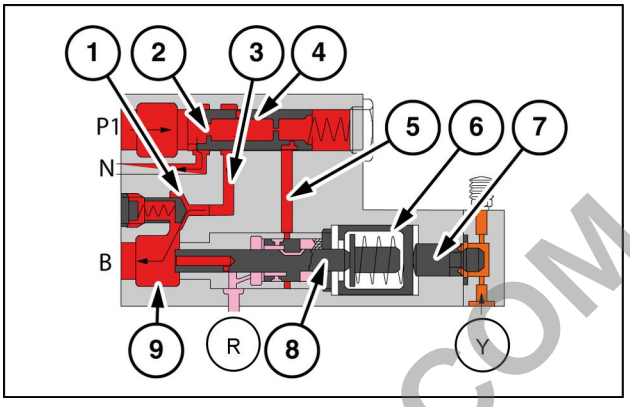
Start of braking

On operating the tractor brake pedals, the pressurized oil of the hydrostatic circuit enters the "Y" connection and shifts the piston **(7)** to the left. The pressure limiter **(6)** and the spool **(8)**, which in turn closes the passage between the "R" oil return connection, the "B" trailer brake connection, and the line **(5)**.

The oil inside the flow control valve **(4)** is maintained at a uniform pressure and so the valve element, under the action of the spring, shifts to the left to assume the position indicated in Fig. **3**.

The oil from the hydraulic pump in the "P_1" connection partly flows to the auxiliary control valves through the "N" connection, while the remainder flows to the trailer braking device via the diaphragm **(2)**, the line **(3)**, the check valve **(1)**, and the "B" connection.

As the pressure of the oil in the trailer brake connection "B" increases, it acts on the active surface **(9)** of the spool **(8)**, resisting the pressure applied on the piston **(7)** by the oil in the hydrostatic circuit of the tractor brake.



MOLI11U0333AB 3

Start of braking

B. To the trailer brakes
No. To auxiliary control valves
P_1. From the hydraulic pump to the lifting circuit
S. To the return line in the lift
Y. From the tractor brakes

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Rear hitch internal controls - Assemble

⚠ WARNING

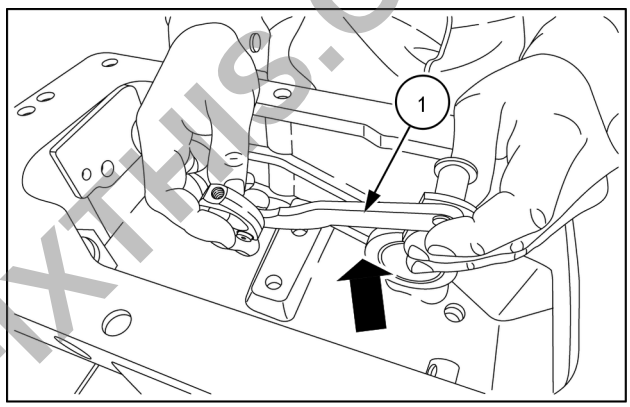
Avoid injury!
Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.
Failure to comply could result in death or serious injury.

W0208A

Prior operation:
See **Rear hitch internal controls - Disassemble (37.110)**.

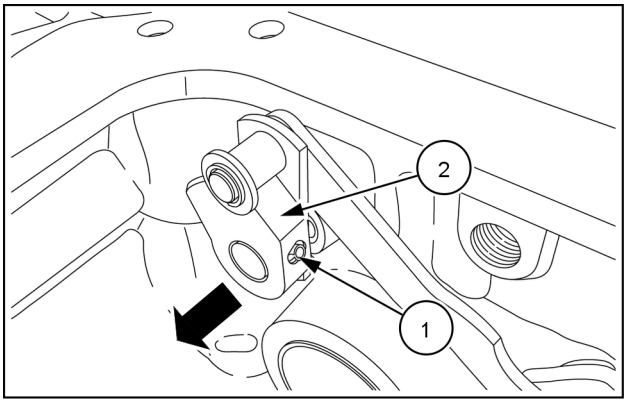
Proceed as follows:

1. Insert the draft control lever **(1)**.



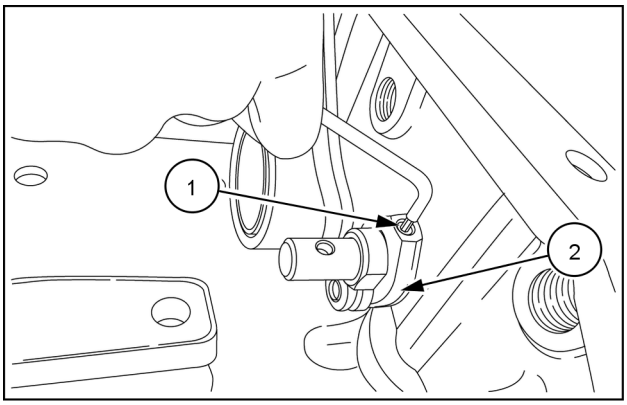
MOIL14UTL0022AA 1

2. Position the draft cam **(2)**.
3. Using a hammer and a suitable drift, insert the roll pin **(1)**.



MOIL14UTL0021AA 2

4. Screw in the fixing dowel **(1)** of the draft handle **(2)**.



MOIL14UTL0020AA 3

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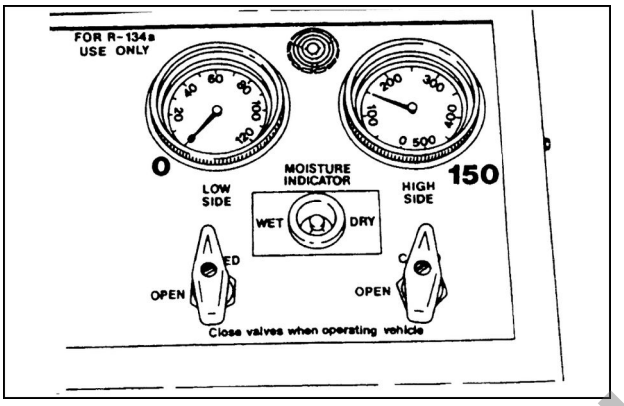
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Air conditioning - Pressure test - Example 9

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T4.65 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx]	
T4.75 Powerstar™ with cab, Tier 4B (Final) [ZxAHxxxxx]	



20105958N 1

SYMPTOMS

1. Evaporator air is cool, but not sufficiently cold.
2. Low side pressure is too low (0 or vacuum). The gauge should read **21 - 207 kPa** (**3 - 30 psi**).
3. High side pressure is low. See the pressure-temperature chart for the correct gauge readings.
4. The surface of the evaporator valve inlet pipe shows considerable moisture or frost.

DIAGNOSIS: Expansion valve is not permitting a sufficient flow of refrigerant. Possible causes include a valve stuck in restricted or closed position, or too little refrigerant in temperature sensing bulb.

CORRECTIVE PROCEDURES

1. Place a finger on the expansion valve inlet. If the inlet is too cold to keep your finger on it, proceed as follows:
   1. Operate the system at maximum cooling.
   2. Check the low side gauge. The pressure should drop slowly.
2. If the expansion valve inlet surface shows frost or heavy moisture, proceed as follows:
   1. Extract the refrigerant from the system.
   2. Clear blockage at inlet line to expansion valve.
3. If the corrective procedure outlined in Step 1 shows that the expansion valve is defective, proceed as follows:
   1. Evacuate the system.
   2. Charge the system.
   3. Performance test the system.

NOTE: *Test procedure based upon ambient temperature of* ***35 °C*** *(****95 °F****). For proper high side gauge reading for other ambient temperatures, refer to the pressure-temperature chart.*

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Wiring harnesses - Electrical schematic sheet 10 REVERSE GEAR SYSTEM

T4.55 Powerstar™ without cab, Tier 4B (Final) [ZxAHxxxxx]	
T4.65 Powerstar™ without cab, Tier 4B (Final) [ZxAHxxxxx]	
T4.75 Powerstar™ without cab, Tier 4B (Final) [ZxAHxxxxx]	

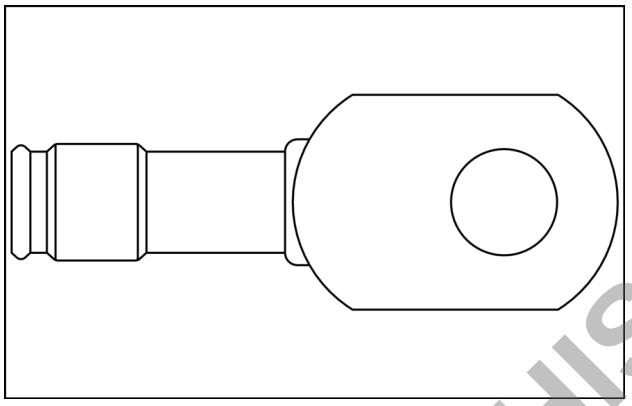
COMPONENT NAME	SIZE OF THE FUSE	DESCRIPTION
A-003		Platform fuse and relay box
F-036	**7,5 A**	Diverter power supply [+ **12 V** 15/54 key]
GND-000		Generic ground
GND-003		Platform fuse and relay box ground
K-022		Diverter relay
S-021		Brake pedal switch left hand
S-022		Brake pedal switch right hand
S-023		Diverter switch
X-087		Main harness - diverter intermediate connection
Y-008		Diverter solenoid valve

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CONNECTOR X-013 - Alternator

CONNECTOR X-013 - Alternator		
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**
1	822 (R)	X-304STARTER MOTOR X-013Alternator



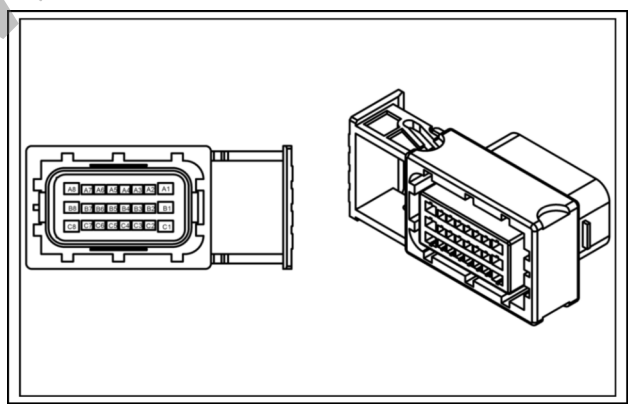
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CONNECTOR X-090 - Flasher

CONNECTOR X-090 - Flasher		
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**
A1	736 (RD)	X-090Flasher SP-065
A2	1300 (TQ)	X-090Flasher SP-051
A3	179 (TQ) 67 (TQ)	X-090Flasher X-098Main/ 7 Pole Socket Extension X-090Flasher X-098Main/ 7 Pole Socket Extension
A4	1303 (TQ/BK)	X-090Flasher SP-050
A5	177 (TQ/BK) 183 (TQ/BK) 77 (TQ/BK)	X-090Flasher X-098Main/ 7 Pole Socket Extension X-090Flasher X-098Main/ 7 Pole Socket Extension X-090Flasher X-098Main/ 7 Pole Socket Extension
A6	738 (BR/GN)	X-090Flasher X-092Hazard SW
A7	1702 (OR/WH) 1702 (WH/BK)	X-090Flasher X-450ADIC CN1 X-090Flasher X-450ADIC CN1
A8	723 (WH/BL)	X-090Flasher SP-066
B1	735 (RD)	X-090Flasher SP-065
B2	166 (TQ)	X-091Light Control SW X-090Flasher
B3	31 (TQ/BK)	X-091Light Control SW X-090Flasher
B4	739 (WH/RD)	X-092Hazard SW X-090Flasher
B5	1701 (OR/BK) 1701 (WH)	X-090Flasher X-450ADIC CN1 X-090Flasher X-450ADIC CN1
B6	165 (TQ/BK) 1700 (BL/BK)	SP-050 X-090Flasher X-090Flasher X-023LH Rear Lamp
B7	163 (TQ) 80 (BL)	SP-051 X-090Flasher X-024RH Rear Lamp X-090Flasher
B8	181 (BK)	X-090Flasher X-410Fuse Box Ground 1
C1	-	-
C2	-	-
C3	-	-
C4	-	-
C5	-	-
C6	-	-
C7	-	-
C8	-	-



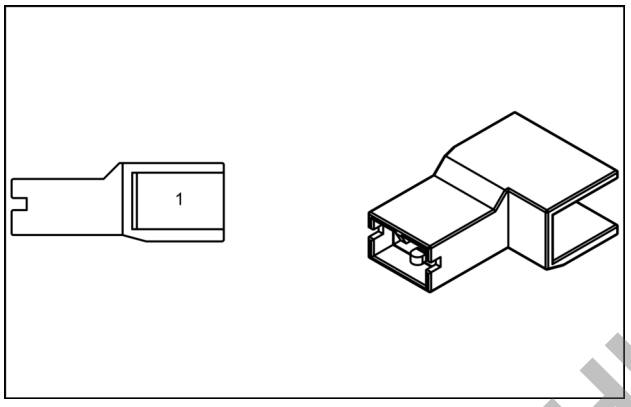
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CONNECTOR X-503 - Trailer Brake Safety switch 1

CONNECTOR X-503 - Trailer Brake Safety switch 1		
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**
1	926 (BR/WH)	X-503Trailer Brake Safety switch 1 X-381Frazionamento Trailer Brake-CAB



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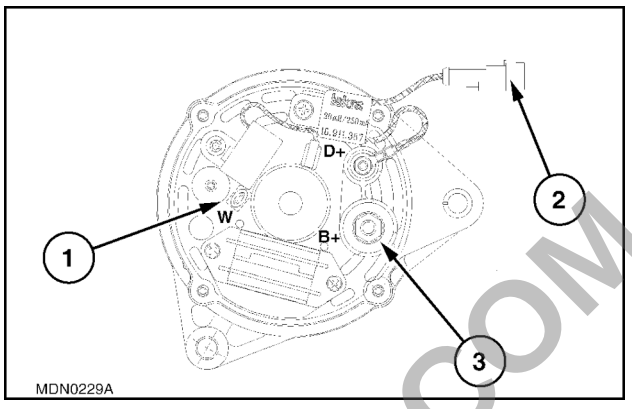
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Alternator - Static description

DESCRIPTION OF THE ALTERNATOR

An Iskra-type **120 A** external cooling fan alternator is fitted on all models. Stator winding is ventilated with an air-conducting diaphragm in the support on the rectifier bridge side and peripheral openings in the support on the control side. The alternator, installed on the right-hand side of the engine, is operated by a pulley and a driving belt. Alternators are fitted with a built-in regulator.

1. Alternator speed connection (terminal **(W)**) not used.
2. Alternator charge indicator connection (**(D+)** terminal).
3. Battery connection (**(B+)** terminal).



SEZ55CAP4A-2 1

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3293-Fuel Metering Unit: maximum positive deviation of rail pressure exceeded

Context:
The fuel rail pressure control is executed with 2 devices, metering unit as feeding quantity control and pressure control valve (PCV) as pressure control. The fuel rail pressure control can switch between the 3 states "only metering unit", "only PCV" and "both devices" depending on engine speed and requested fuel pressure.
If the Engine Control Unit (ECU) detects the rail pressure is lower than the desired pressure by less than the engine speed dependant threshold this error will occur. This error can be the result of a leak within the high pressure system (low efficiency of high pressure pump, internal leakage of injector, leaking pressure control valve) or too low pressure at the high pressure pump inlet (clogged filter, leaking low pressure tubes, electric pre-supply pump faulty, gear pump faulty).

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3024-Atmospheric pressure sensor - signal above range maximum

Control Module : ECU

Context:
The engine control unit (ECU) has detected a failure of the Atmospheric Pressure Sensor (APS), located inside the ECU.
The sensor signal level is above **4.88 V** for over **800 ms**. This fault will reset if the raw signal level goes below **4.88 V** for over **480 ms**. In the case of a defective APS the atmospheric pressure value is switched to a default value of **97 kPa** (**14.07 psi**). If the sensor is defective the ECU should be replaced only if required. It is not necessary to replace the ECU if never running in high altitude and if engine is without Variable Geometry Turbocharger (VGT).

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3243-ECU internal: Visibility of software resets in DSM

Control Module : ECU

Context:
The engine control unit (ECU) has detected that a software internal failure occurred which lead to a software reset. This reset caused a failure which is only visible for approved diagnostic equipment. This error can be the result of electronic disturbances, various hardware defects (ECU internal) or configuration problems. If this error occurs repeatedly, reprogram the ECU and if the error remains, replace the ECU.

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Wiring harnesses - Electrical schematic sheet 18 ENGINE COMPONENTS 1 (55.100.DP-C.20.E.18)

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3720-Lambda sensor - supply voltage too low

Control Module : ECU

Context:
The SPI chip reports a "very low battery voltage" defect (i.e. Voltage is less than **9.0 V**).

Cause:
A low voltage source has been detected.

Possible failure modes:

1. Faulty electrical wiring or connection
2. Defective Lambda probe (oxygen sensor)
3. Defective engine control unit (ECU)

Solution:

1. Verify the fault code is still present and in an active state.

   A. If the fault is no longer active or present, check for an intermittent fault.

   B. If the fault is still present and active, continue with step **2**monitor.

2. Turn the key- start switch off. Disconnect the engine harness from the lambda (oxygen) sensor at connector **X-943** . Inspect all connectors, pins, and wiring harness for broken connectors, corrosion, bent pins or wire breaks.

   A. If damage is found, Repair or replace as required.

   B. If no damage is found, leave the connector **X-943** disconnected. Continue with Step **3**monitor.

3. Check the wiring. Disconnect the engine harness from the ECU at connector **X-937** . Place ignition switch in off position. Using a multi-meter to test the wiring harness, refer to the table below for test results.

Type of test	From	To	Result
Resistance	**X-937** pin 64, wire 316 (OR)	**X-943** pin 1, wire 316 (OR)	Continuity
Resistance	**X-937** pin 85, wire 317 (GY)	**X-943** pin 2, wire 317 (GY)	Continuity
Resistance	**X-937** pin 7, wire 314 (GN)	**X-943** pin 3, wire 314 (GN)	Continuity
Resistance	**X-937** pin 86, wire 318 (YE)	**X-943** pin 5, wire 318 (YE)	Continuity
Resistance	**X-937** pin 63, wire 315 (BR)	**X-943** pin 6, wire 315 (BR)	Continuity

   A. If any of the above tests fail. Repair or replace as required.

   B. If the all the above tests are correct, replace the lambda probe.
   Use the electronic service tool (EST) to reset the ECU oxygen sensor learning values.
   Recheck fault has cleared. If fault is still present, replace the ECU.

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Wiring harnesses - Electrical schematic sheet 18 ENGINE COMPONENTS 1 (55.100.DP-C.20.E.18)

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3915-Pressure Relief Valve: Averaged rail pressure is outside the expected range with open PRV

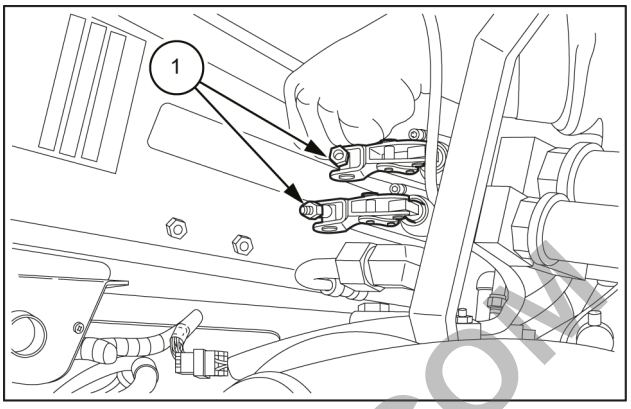
Control Module : ECU

Context:
The engine control unit (ECU) has determined that the Pressure Relief Valve (PRV) is not opening completely, there is a restriction at the PRV connections or a fault is present with the rail pressure sensor or wiring harness. Check for error codes relating to the fuel rail pressure sensor, if other rail pressure sensor errors are present, continue to those tests. If no other rail pressure sensor related error codes are present, remove the PRV valve and check for any damages. If PRV is damaged, replace the valve.

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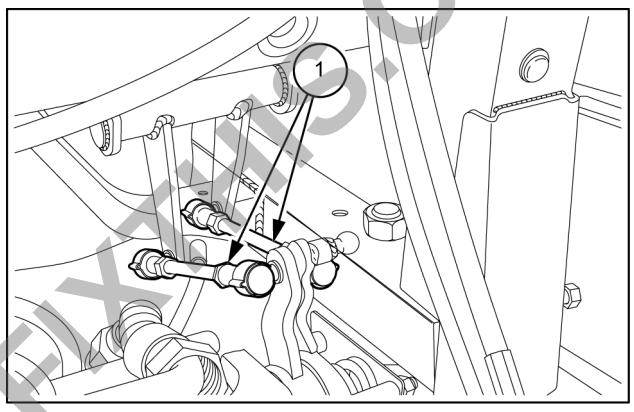
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22. Disconnect the auxiliary control valve tie rods **(1)**.



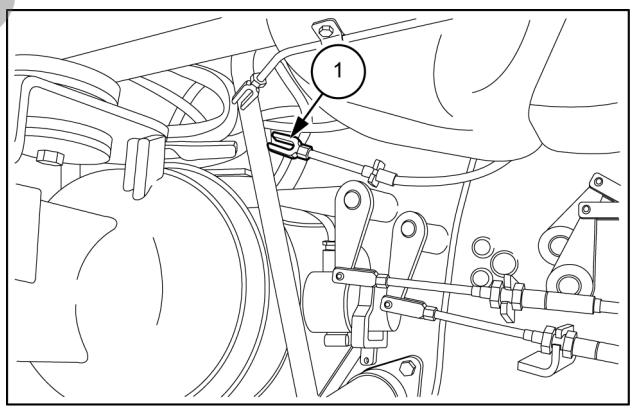
MOIL13TR01697AB 20

23. Detach the control tie rods **(1)** of the mechanically controlled hydraulic lift.



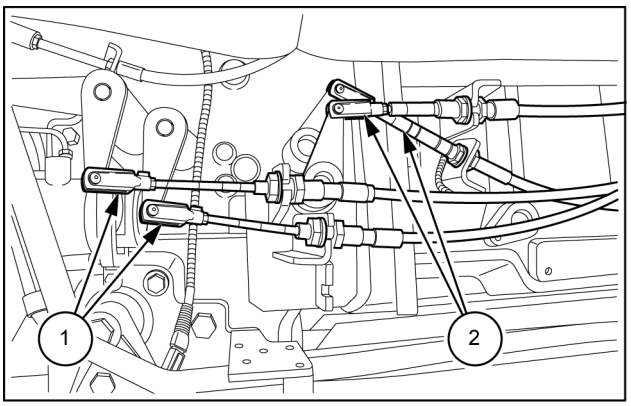
MOIL12TR00531AA 21

24. Disconnect the differential lock cable **(1)** with mechanical coupling.



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25. Label and then disconnect the control tie rods of the gearbox **(2)** and range gears **(1)**.



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