

Group 40K - (SE19—SE20) Windshield Wiper and Washer
Group 40L - (SE22—SE23) Dome Light, Door Switch, Air Seat, and Radio
Group 40M - (SE24) Instrument Control Cluster (ICC)
Group 40N - (SE25—SE28) MFWD, Brakes, PTO, and Speed Sensor
Group 40P - (SE29) Transmission Control Unit (TCU)
Group 40Q - (SE30) Engine Control Unit (ECU)
Group 40S - (SE32) Controller Area Network
Group 40T - Fuses and Relays
Group 40U - Ground Points
Group 40V - Interconnects

Section 240D - ELECTRICAL TESTS AND ADJUSTMENTS

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Group 50 - Tests and Adjustments

Section 245 - ELECTRONIC CONTROL UNITS

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Group 20 - Theory of Operation
Group 40 - Component and Connector Information
Group 50 - Test and Adjustments
Group ICC - Instrument Cluster Control (ICC)
Group ECU - Engine Control Unit (ECU)
Group PTH - Power Train Hydrostatic (PTH)
Group PTR - Power Train Reverser (PTR)

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Group 40A - Component and Connector Information—PTH
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Group 50A - Tests and Adjustments—PTH
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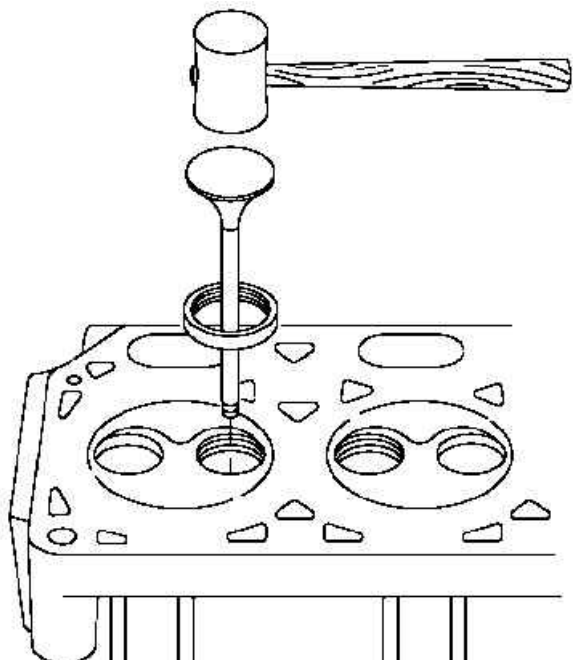
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Section 270 - HYDRAULICS OPERATION, TEST, AND ADJUSTMENTS

**Install Seat**

Put the valve seat in a container which contains alcohol with dry ice to cool it sufficiently.

[2] - Heat the cylinder head around the area for valve seat insertion to 80—100 °C (176—212 °F).

[3] - With the new intake/exhaust valve, securely insert the cooled valve seat into the cylinder head by tapping on the head of the intake/exhaust valve.

[4] - Set aside the cylinder head until the entire cylinder head is cooled to normal temperature.

Group 10 - Air Intake

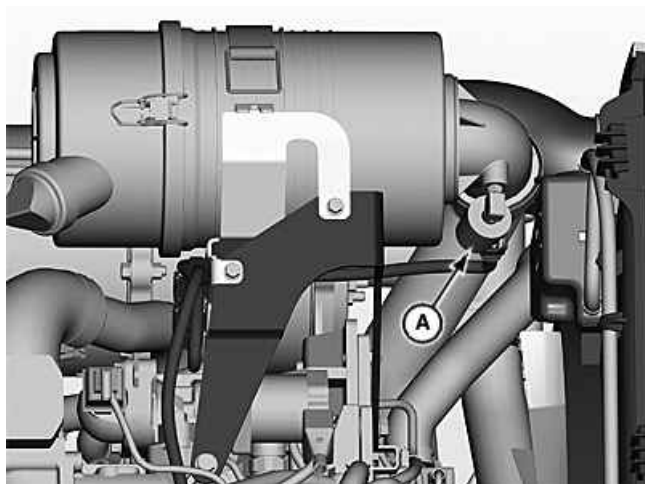
Air Filter Restriction Indicator Removal and Installation

Removal

[1] - Park machine safely.

[2] - Raise hood. Remove side panels if needed.

[3] -



LEGEND:

A Air Restriction Indicator

Air Restriction Indicator

Remove air restriction indicator (A).

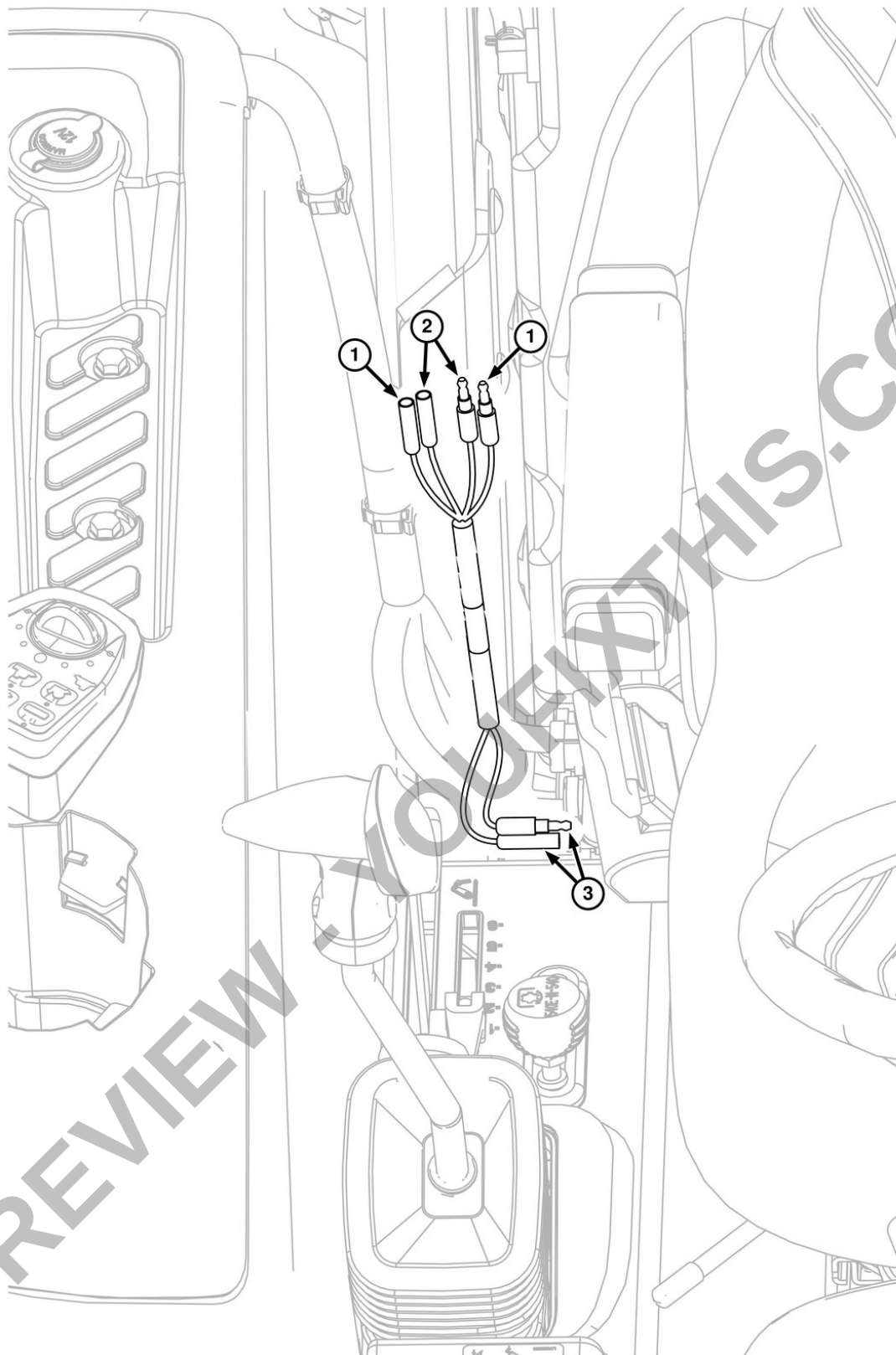
[4] - Inspect housing for cracks or other damage. Replace as needed.

Installation

Installation is done in the reverse order of removal.

Install the air restriction indicator onto the adapter until snug.

W35 Right Work Light Split Harness (OOS)



W35 Right Work Light Split Harness (OOS)

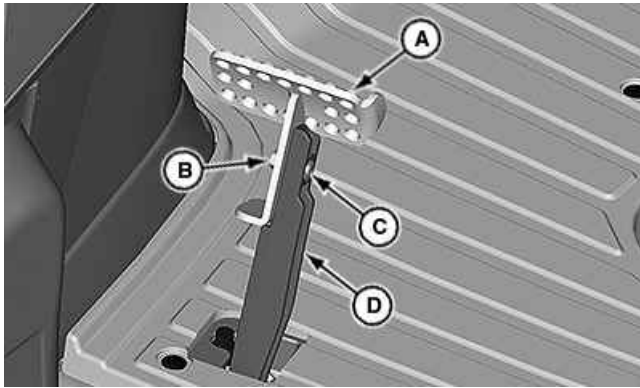
LEGEND:

- 1 X47 Right Work Light Split Harness to Right Front Work Light Harness
- 2 Not Used
- 3 X45 OOS Chassis Harness to Right Work Light Split Harness

Clutch Pedal (Open Station)—Removal and Installation

Removal

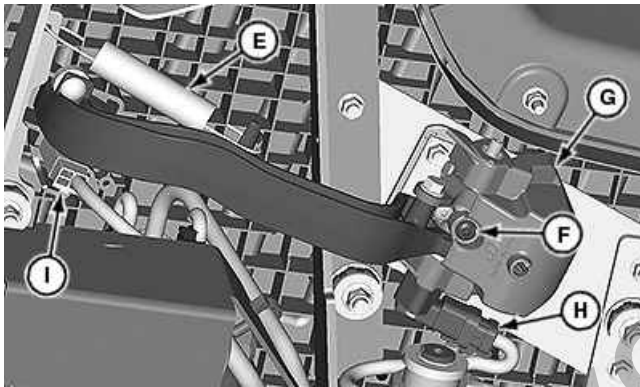
[1] -



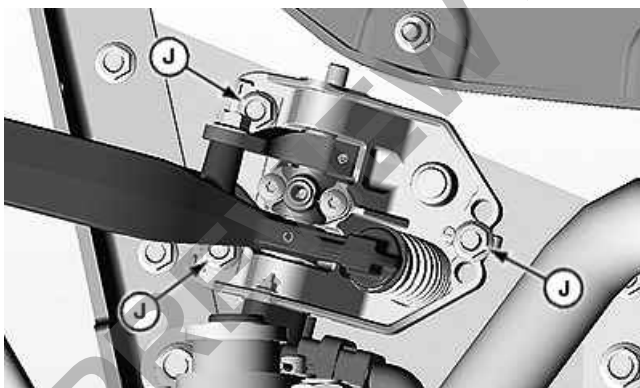
LEGEND:

A	Clutch Pedal
B	Cap Screw
C	Nut
D	Clutch Arm
E	Spring
F	TORX® Screw
G	Cover
H	Harness Connector
I	Harness Connector
J	Nut (3 used)
K	Cap Screw (3 used)

Clutch Pedal (OOS)—PowrReverser™ Transmission



Clutch Spring and Cover (OOS)—PowrReverser™ Transmission



Clutch Assembly Mounting Nuts (OOS)—PowrReverser™ Transmission

**LEGEND:**

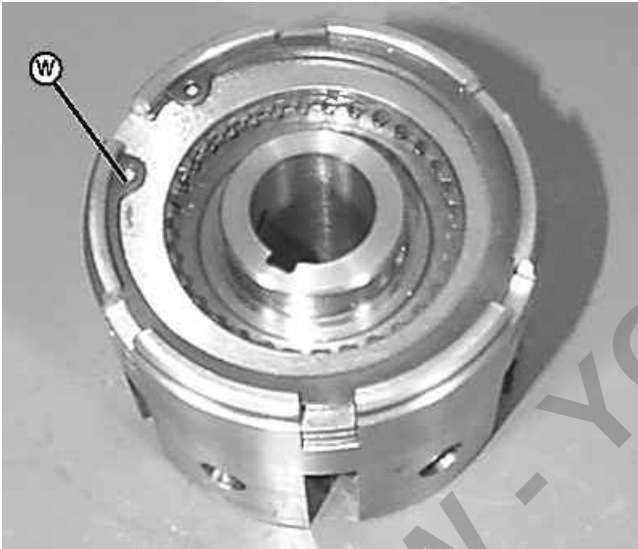
V

Brake Pack

Brake Pack

Assemble brake pack (V) starting with a plate, followed by a disk, followed by a plate, disk, plate. Install into clutch cylinder.

[2] -

**LEGEND:**

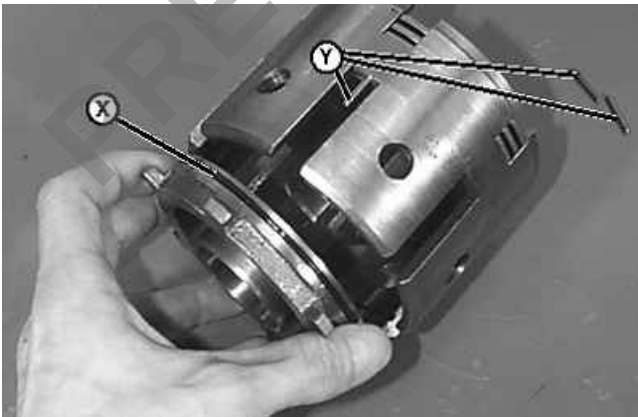
W

Snap Ring

Snap Ring Installation

Install snap ring (W) to retain brake pack.

[3] -

**LEGEND:**

X

O-Ring

Y

Interlock Pins (3 used)

Clutch Installation

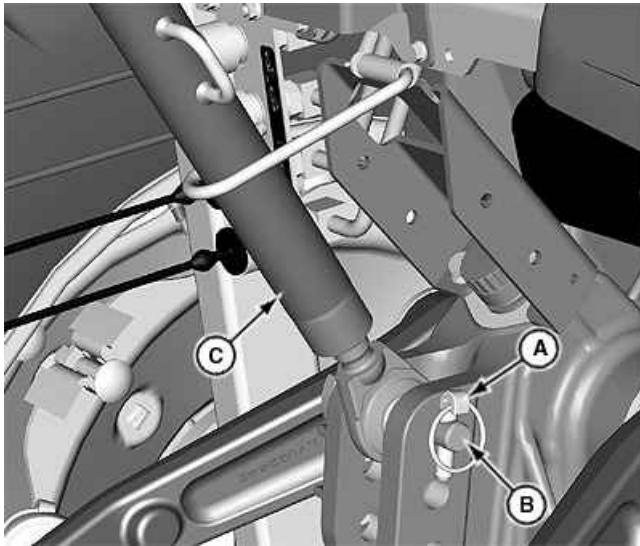
If not already done, replace O-ring (X) on clutch piston, and install into clutch cylinder.

Three Point Hitch Removal and Installation

Center Lift Link

Removal

[1] -



LEGEND:

A	Retaining Pin
B	Hitch Pin
C	Center Lift Link

Center Lift Link

Disconnect center lift link (C) from storage hook.

[2] - Remove retaining pin (A) from hitch pin (B).

[3] - Support center lift link and remove hitch pin. Remove center lift link.

Installation

Installation is done in the reverse order of removal.

Draft Arm and Adjustable Sway Bar

Removal:

[1] -

Group 40 - Heating System

Heater Core Removal and Installation

Removal

[1] - Remove cab outer roof.

[2] -



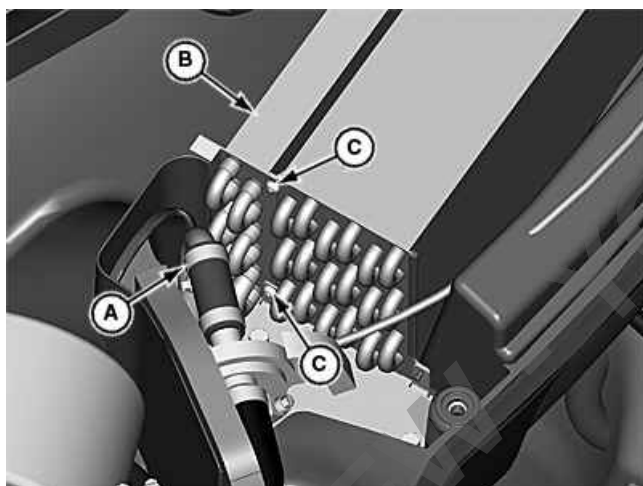
CAUTION:

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Remove radiator filler cap only when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing cap completely.

Drain approximately 7.6 L (2 gal.) coolant from radiator.

[3] -



LEGEND:

- A Hose
- B Heater Core
- C Screw (2 used)

Left Plumbing

Disconnect hose (A) from heater core (B).

→NOTE:

Close all openings with caps and plugs.

[4] - Remove two screws (C).

[5] -

ICC 000677.05- Engine Starter Motor Relay Current Below Normal or Open Circuit

378

Code Cause: Starter output is shorted to battery or open circuit.

Controller Response - None

ICC 000677.05

Check and Operate	Results
1. ICC 035—Starter Coil Current Diagnostic Addresses—Instrument Cluster Control (ICC)	OK: Code does not return. Diagnosis complete. NOT OK: Code returns. GO TO 2.
2. Engage starter for 3 seconds.	OK: Code does not return. Diagnosis complete. NOT OK: Code returns. Test K01 Starter Relay . NOT OK: Code returns. Starter relay tests good. Perform ICC—Instrument Cluster Control Unit Test .
Control Unit Addresses—Access Recall, Record, and Clear Codes	

PTH 524069.15- Machine Drive Valve Reverse Data Valid but Above Normal Operating Range - Least Severe Level

462

Code Cause: The reverse valve solenoid current is above the normal operating range.

Control Unit Response - Defaults to Neutral

PTH 524069.15

Check and Operate	Results
1. PTH 049—Reverse eHydro Valve Crack Threshold Diagnostic Addresses—Power Train Hydrostatic (PTH)	OK: Code does not return. Diagnosis complete. NOT OK: Code returns. GO TO 2.
2. Key switch ON. Engage reverse pedal through full range of motion.	OK: Code does not return. Diagnosis complete. NOT OK: Code returns. Perform Power Train Hydrostatic (PTH) Control Unit—System Calibration . NOT OK: Code returns after calibration or calibration fails. Test Y12 Reverse Proportional Solenoid and Y06 Reverse Proportional Solenoid . NOT OK: Code returns. Solenoids test good. Perform PTH—Power Train Hydrostatic Control Unit Test .
Control Unit Addresses—Access Recall, Record, and Clear Codes	

Group 50 - Tests and Adjustments

Valve Clearance Adjustment

Reason

To obtain correct rocker arm-to-valve stem clearance, to ensure proper opening and closing of the intake and exhaust valves.

→NOTE:

Measure and adjust while the engine is cold.

Notes:

- The No. 1 piston is on the flywheel end of the engine, opposite the radiator. The firing order is 1-3-4-2 for 4-cylinder engines.
- 4-cylinder engines fire every 180° of crankshaft rotation.
- Valve clearance of both the intake and exhaust valves can be checked with the piston for that cylinder at top dead center (TDC) of the compression stroke. When a piston is at TDC of the compression stroke, both rocker arms will be loose and the cylinder TDC mark on the flywheel will be visible in the timing port of the flywheel housing.
- If there is no valve clearance, and the cylinder is at TDC of the compression stroke, extreme wear or damage to the cylinder head or valves may be possible.
- If adjusting each cylinder individually, the cylinder to be adjusted first does not have to be the No. 1 cylinder. Select and adjust the cylinder where the piston is nearest to the TDC after turning. Make adjustment for the remaining cylinders in the order of firing by turning the crankshaft each time.
- To decrease the number of rotations required to check all cylinders, other cylinders can also be checked as indicated in the chart.

Valve Adjustment Order

4TNV84T Engines								
Cylinder No.	1		2		3		4	
Valve	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust
No. 1 Cylinder at TDC Compression	•	•	•			•		
No. 4 Cylinder at TDC Compression				•	•		•	•

Valve Adjustment 4-Valve Cylinder Head

→NOTE:

The 4-valve cylinder head operates two valves with a single rocker arm by employing a valve bridge.

Action:

1. Remove terminals from the connector to inspect for corrosion, deformation, or loose wires. These terminals can short to another pin or not make a good connection to the terminal.
2. Inspect the terminals on the component for corrosion and deformation

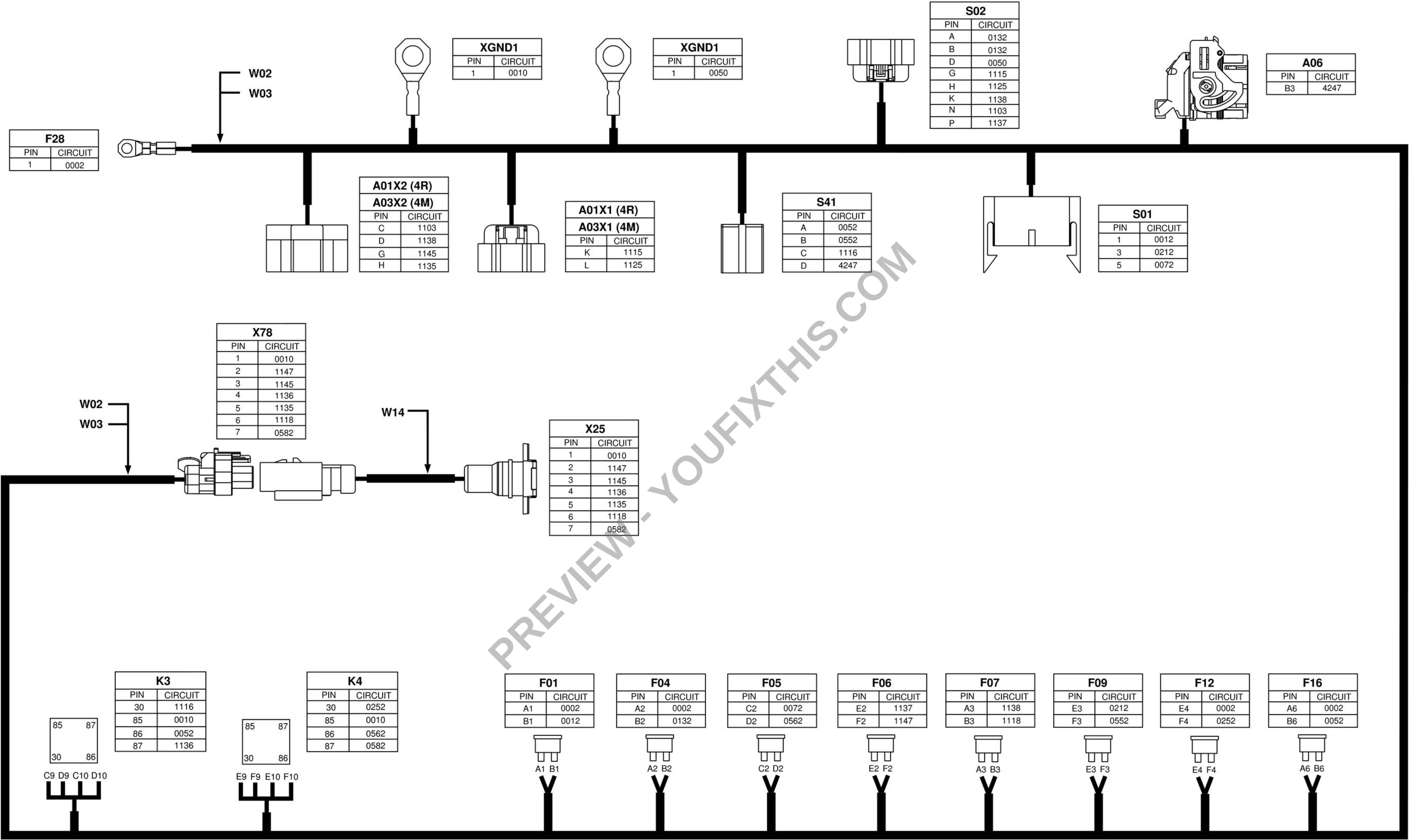
Result:

YES:GO TO 1.

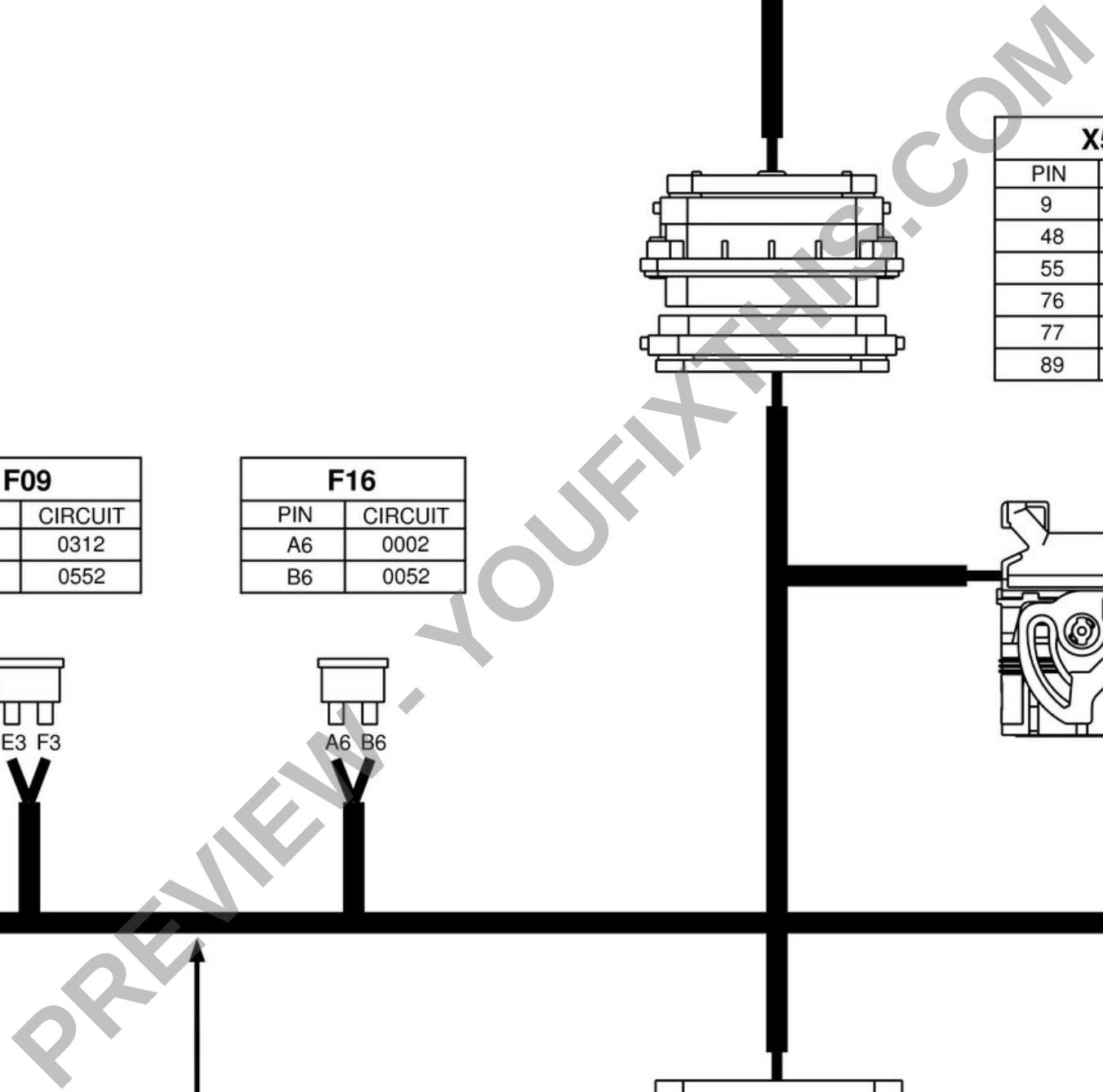
NO:Repair or replace terminals.GO TO 1.

KE11	KE11 Diverter Downforce Relay
S27	S27 Diverter/Rockshaft Downforce Switch
V2	V2 Diverter Diode
Y02	Y02 Diverter/Rockshaft Downforce Solenoid

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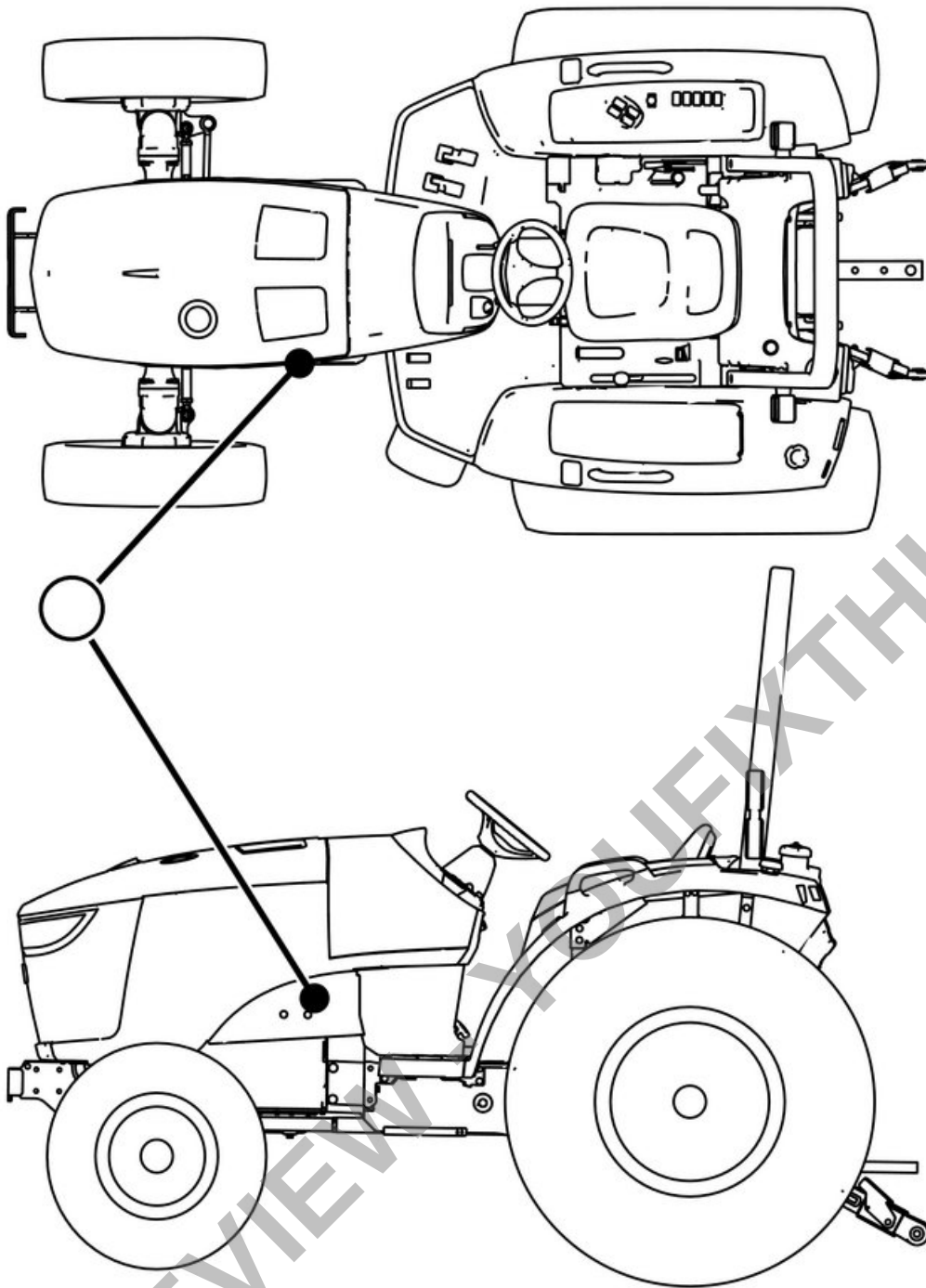


Rear Trailer Connector Circuit Diagram—Hydrostatic Transmission (00S)



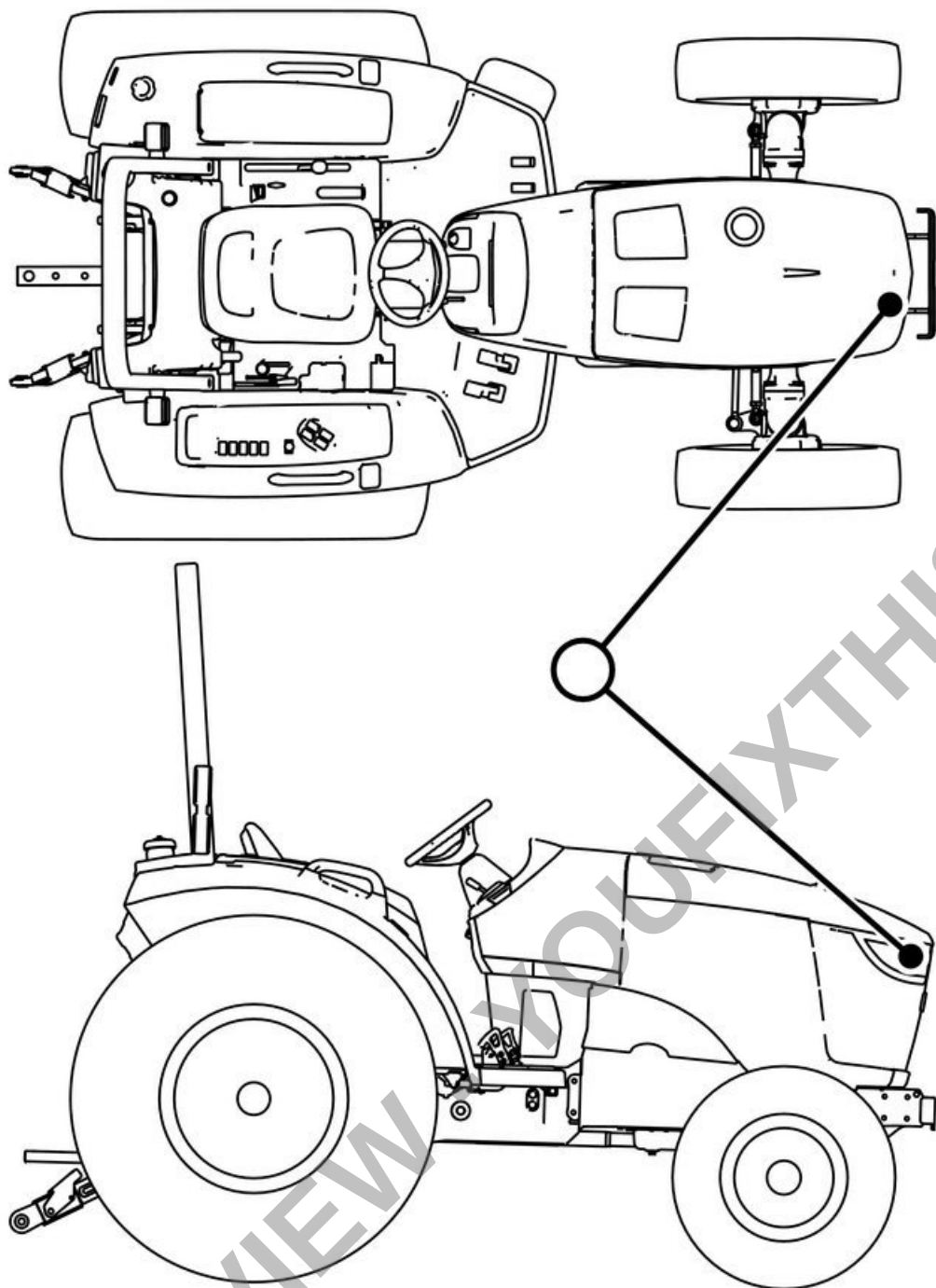
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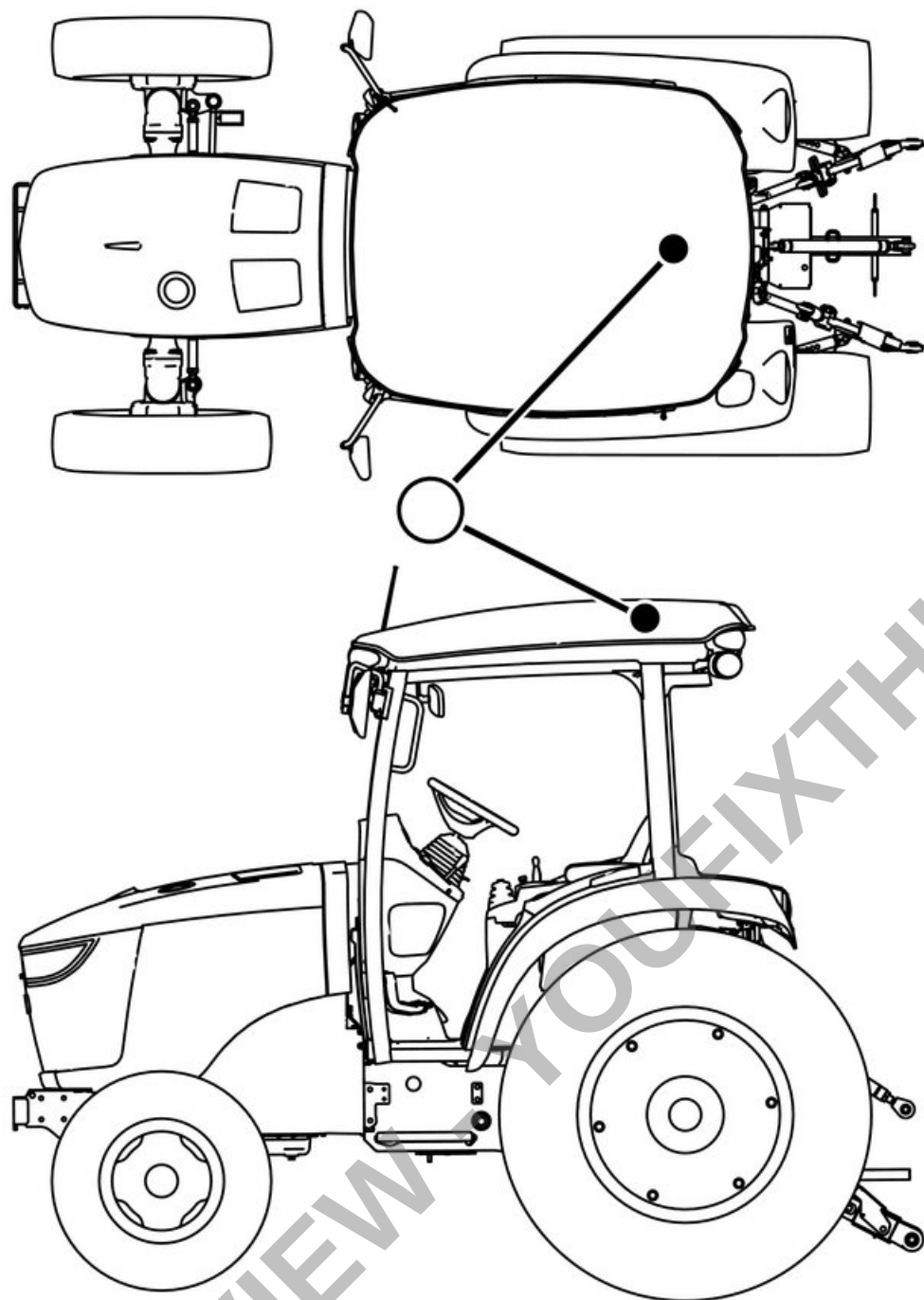
M01 Starter Motor/Solenoid



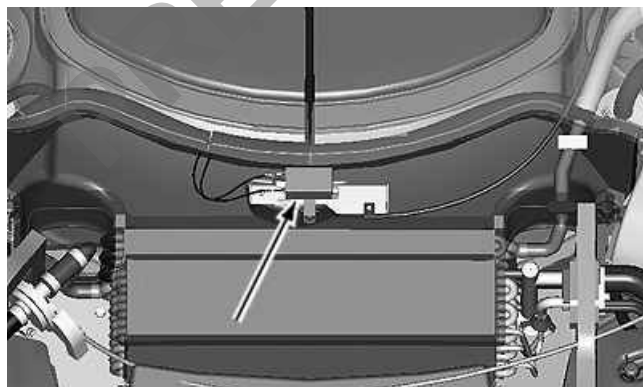
M01 Location Overview



**E42 Location Overview****E42 Location**



B07 Location Overview



B07 Location

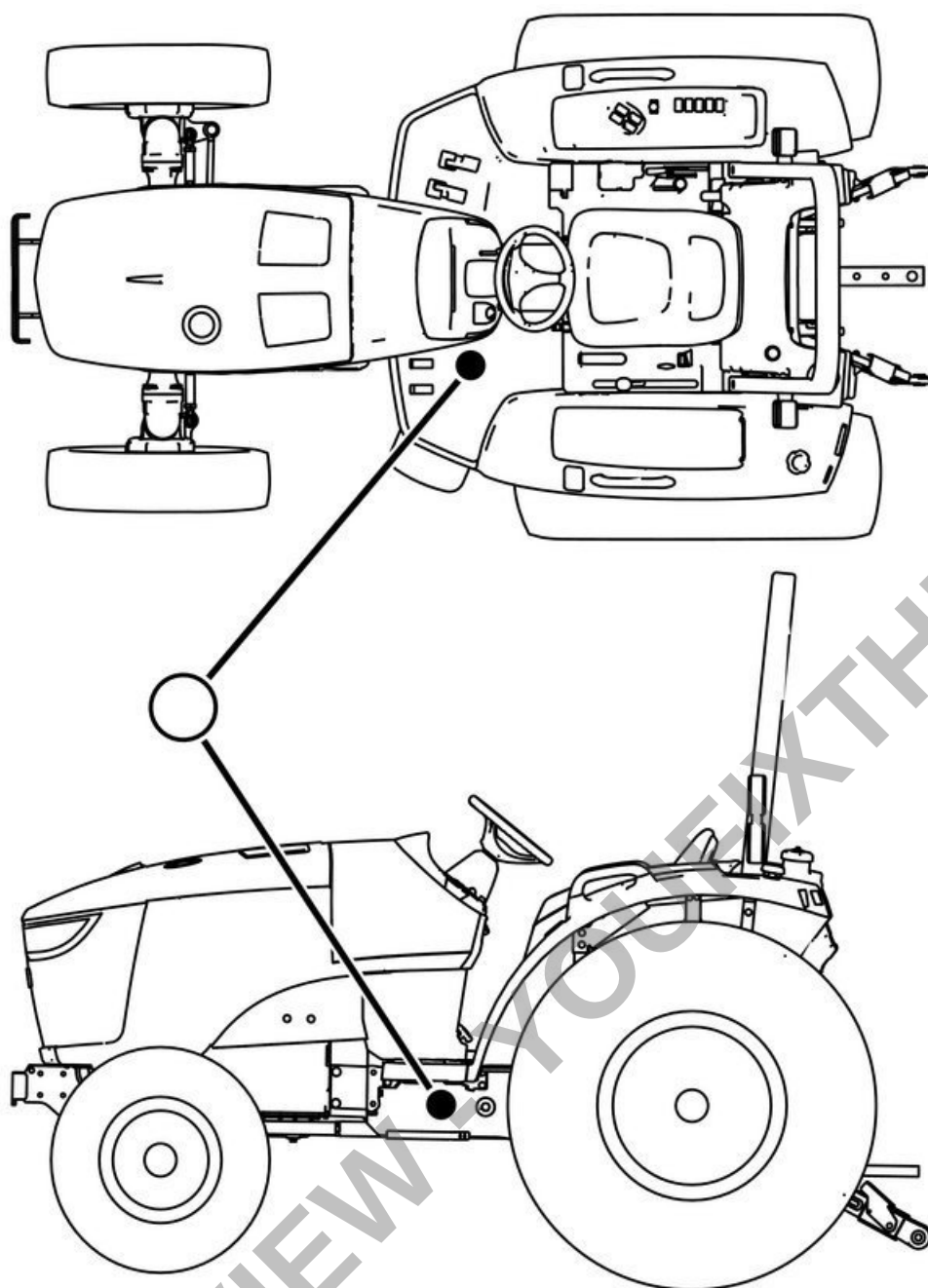


B05 Connector - SAE J928_TYPE1_90_156

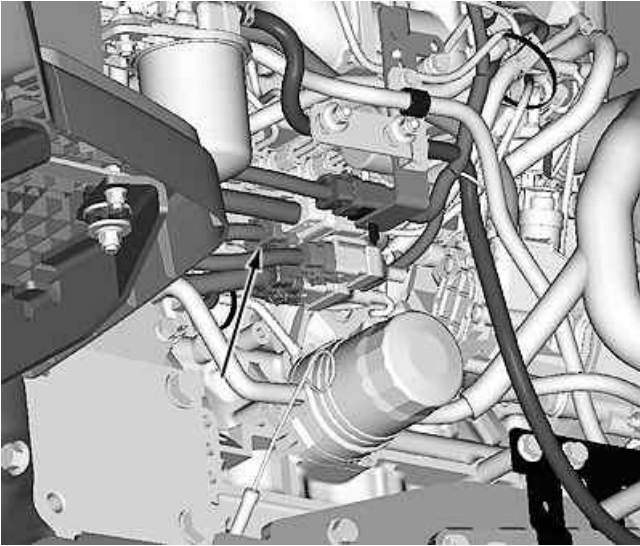
B05 Layout

B05 Engine Coolant Temperature Sensor		
Schematic Section:	Instrument Control Cluster (ICC) Schematic (SE24)	
Wiring Harnesses:	W04 Chassis Harness (4M OOS without ECU) (License and Clearance Lights) W05 Chassis Harness (4R OOS without ECU) (License and Clearance Lights) W17 Cab Chassis Harness (without ECU) (License and Clearance Lights) W47 Chassis Harness (4M OOS without ECU) (License and Clearance Lights)—PowrReverser Transmission	
Test Procedure:	Sensor Test	
Terminal	Circuit Number	Circuit Function
A	5359	5 V Input Engine Coolant Temperature Sensor (White)

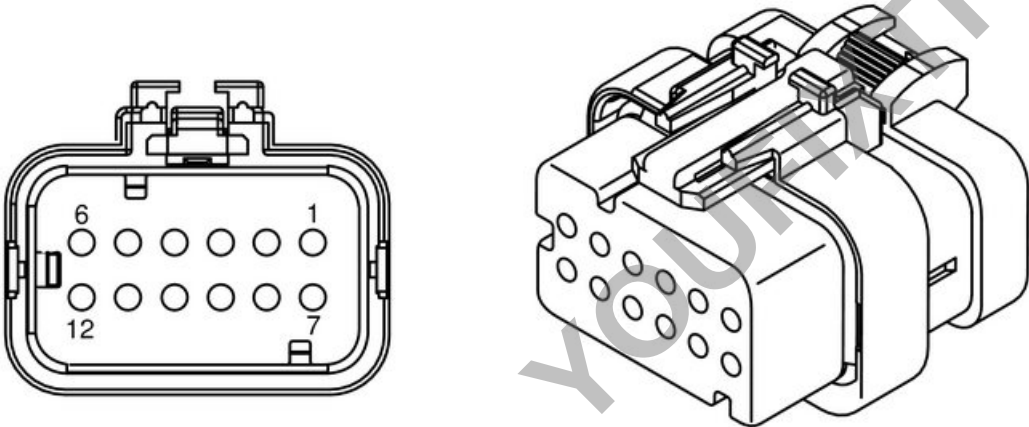
Y11 Forward Proportional Solenoid



Y11 Connector Overview



X22 Location



X22 Connector - 57M9800

X22 Layout

X22 OOS Chassis Harness to Engine Harness	
Wiring Harnesses:	W02 Chassis Harness (4M OOS with ECU) W03 Chassis Harness (4R OOS with ECU) W10 Chassis Harness (4M OOS with ECU) (License and Clearance Lights) W19 Cab Chassis Harness (with ECU)
Terminal	Circuit Number
1	5043
2	9907
3	9906
4	0050
5	5432
6	5425
7	5450
8	5414
9	5416

NO:Repair ground circuit as needed and confirm repair.Return to diagnosis.

(3) Continuity Check

Action:

Test for continuity between the solenoid harness connector and the NEXT component connector in each output circuit. Refer to the electrical schematic and circuit diagram to identify the components. See [Electrical Schematics - Summary of References](#).

→NOTE:

Test all circuits which have not been tested, unless an individual function is not working and can be determined from the schematic or circuit diagram, just that circuit needs to be checked.

Result:

YES:Replace solenoid as needed and confirm repair.Return to diagnosis.

NO:Repair circuit as needed and confirm repair.Return to diagnosis.

NO:Problem exists with downstream component. See [Electrical Components and Connectors - Summary of References](#) and diagnose suspect components.

NO:Problem still exists. Perform open circuit load test for further testing of circuits. See [Open Circuit Load Test](#). Open circuit load testing may reveal problems that are not detected by the use of a multimeter by itself.

NO:Problem still exists. See [Troubleshooting Unresolved Electrical/Electronic Problems](#) to resolve intermittent problems or other issues.

Section 250 - POWER TRAIN—TRANSMISSION OPERATION, TEST, AND ADJUSTMENTS

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Pressure Relief Valve

Install shims (B) to increase system pressure or remove shims (B) to decrease system pressure per specification.

Item	Measurement	Specification
Regulating Valve Shim	Pressure Change	50 - 75 kPa
		0.5—0.7 bar
		7.25 - 10.8 psi

[2] - Install regulating valve spring (C) and regulating valve cap (D).

Result:

YES:Pressure is within specification.Return to diagnosis

NO:Pressure not OK.Low pump flow.Oil filter blockage.Downstream restriction.

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