Specifications

Item	Measurement	Specification
Engine Slow Idle Speed	Rotation	825 ± 25
Engine Fast Idle Speed	Rotation	2625 ± 25

OUO1082,0000190 –19–26MAR01–1/1

Operational Checkout Procedure Information

The procedures covered in this group are used to give a quick checkout of all the systems and components on the unit. These checkouts should be run to ensure proper operation after any extended storage, when the unit comes in for service, and after repairs have been made on the unit. They can also be helpful in determining the value of the unit at trade-in time. The unit should be placed on a level surface to run the checkouts. All the checkouts should be done and all of the steps of each checkout should be followed.

Each checkout lists:

- Conditions—How the unit should be set up for the checkout.
- Procedure—The specific action to be done.
- Normal—What should happen or be heard or be seen.
- If Not Normal—Where to go if other tests or adjustments are needed.

When performing the checkout, be sure to set your machine up to the test conditions listed and follow the sequence carefully. The “Normal” paragraph gives the result that should happen when performing the checkout. If the results are not normal, go to the Section and Group listed in the “If Not Normal” paragraph to determine the cause and repair the malfunction.

The photograph that accompanies each checkout procedure is included to help conduct the checkout.

MX,21010HE,1A –19–12SEP00–1/1

Component Location Information

This group contains component location drawings for the following engine system components:

- 3- and 4-Cylinder Engine External Components
  - Left-Hand Side
  - Right-Hand Side

Use the drawings when diagnosing an engine problem to help locate the components to be tested.

OUO1082,000010D –19–23FEB01–1/1

Component Location Information

This group contains component location drawings for the following fuel/air system components:

- Fuel System
  - Straddle Mount
  - Isolated Open Operator Station and Cab Tractors
- Air Intake System
  - With Turbocharger
  - Without Turbocharger

Use the drawings when diagnosing a fuel/air problem and to help locate the components to be tested.

OUO1089,00002CD –19–08MAR02–1/1

Component Location Information

This group contains component location drawings for the following electrical components:

- Engine Components
- Dash Components
- Machine Components
- Cab Control Panel

Use the drawings when troubleshooting an electrical problem to help locate the components to be tested.

AG,OUO1023,585 –19–03MAR00–1/1

Component Location Information

This group contains component location drawings for the following power train components:

- Power Train Components
- Clutch
- Transmission—CollarShift
- Transmission—SyncShuttle™
- Transmission—PowrReverser™
- Final Drive
- Rear PTO

Use the drawings when diagnosing a power train problem and to help locate the components to be tested.

OUO1089,0000353 –19–22MAY01–1/1

Component Location Information

This group contains component location drawings for the following steering and brake system components:

- Steering System
  - 5220—5320 Straddle Mount
  - 5420—5520 Straddle Mount
  - 5220—5320 Isolated Open Operator Station
  - 5420—5520 Isolated Open Operator Station and All Cab Tractors
- Brake System

Use the drawings when troubleshooting steering and brake problems to help locate the components to be tested.

OUO1089,0000271 –19–12FEB01–1/1

Component Location Information

This group contains component location drawings for the following hydraulic components:

- Hydraulic System
- Selective Control Valve Components

Use the drawings when diagnosing a hydraulic problem and to help locate the components to be tested.

OUO1085,000023C –19–09OCT00–1/1

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Operational Checkout Procedures

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A full pressure system lubricates engine parts with clean oil.

MAJOR COMPONENTS:

- Cylinder Head
- Engine Block
- Gear Case
- Rocker Arms
- Rocker Arm Shaft
- Crankshaft Main Bearings
- Camshaft Bearings
- Idler Gear Bushings
- Oil Pump
- Intake Screen
- Oil Bypass Valve
- Oil Cooler
- Oil Filter
- Pressure Regulating Valve
- Oil Pressure Switch

THEORY OF OPERATION:

The pressure lubrication system consists of a positive displacement gear-driven pump (A), filter strainer in the suction pipe, full flow oil filter (D), oil cooler (E), oil pressure regulating valve (C), oil bypass valve (B) and an electrical pressure warning switch (M). In addition, the oil cooler and oil filter have their own bypass valve.

The pump draws lubrication oil from the crankcase through a strainer and a suction line. The oil is then pumped through an oil line to the oil cooler, oil filter and through the main oil gallery (F) of the cylinder block.

From the oil gallery, oil is forwarded under pressure to the main bearings (L) and spray jets (I) to cool the pistons. Drilled cross-passages in the crankshaft distribute oil from the main bearings to connecting rod bearings (N).

Lube oil holes in numbers 1, 3, and 4 main bearing oil grooves direct oil to the camshaft bearings (G).

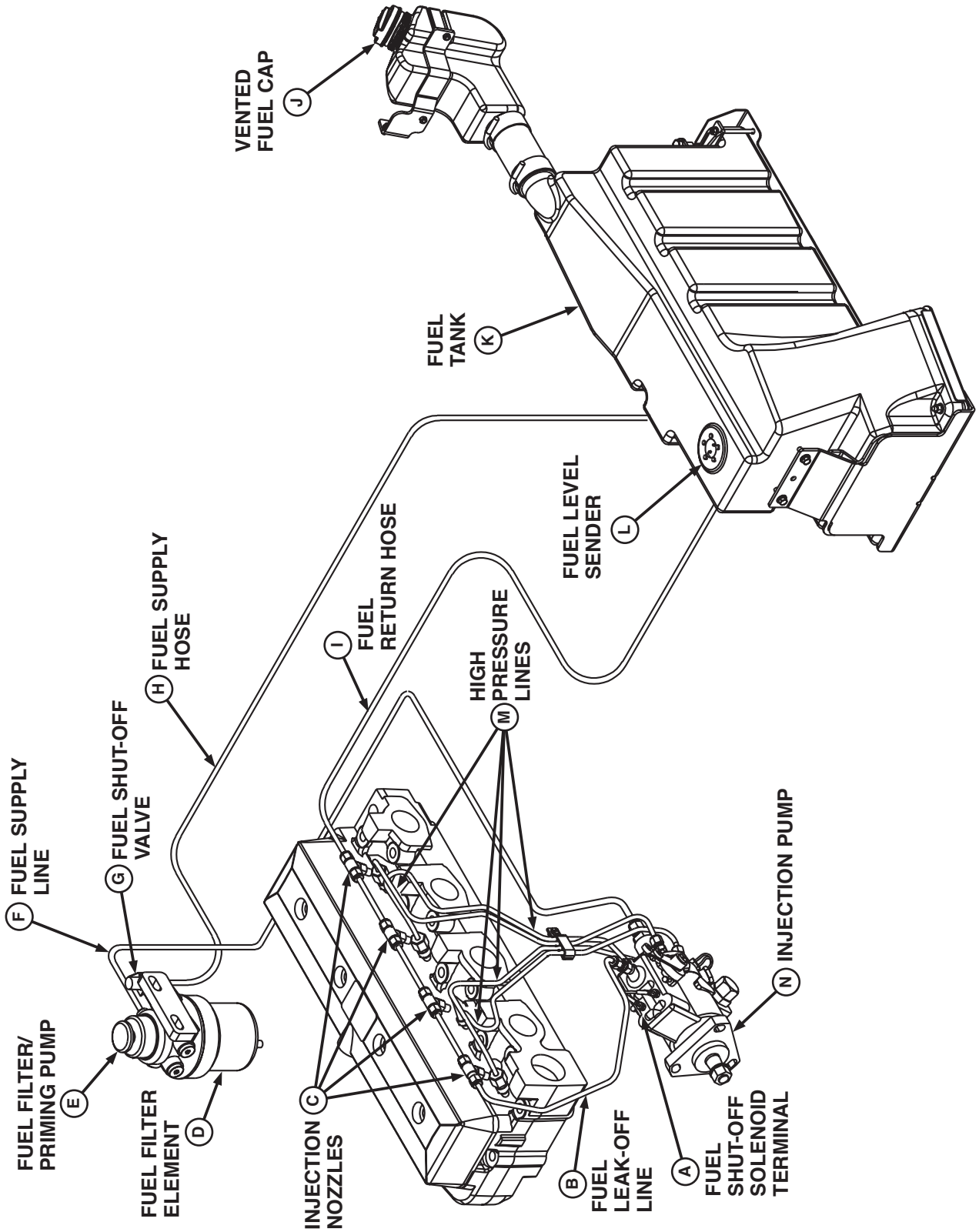
A drilled passage goes from the rear camshaft bearing through the cylinder block and cylinder head to supply lubricating oil to the rocker arm shaft.

5320 and 5520: Oil passes directly from the main oil gallery through an external line to provide lubricating oil to the shaft of the turbocharger.

Oil pressure switch (M) activates an indicator light to alert the operator to shut down the engine if oil pressure drops below 100 kPa (1.0 bar) (15 psi).

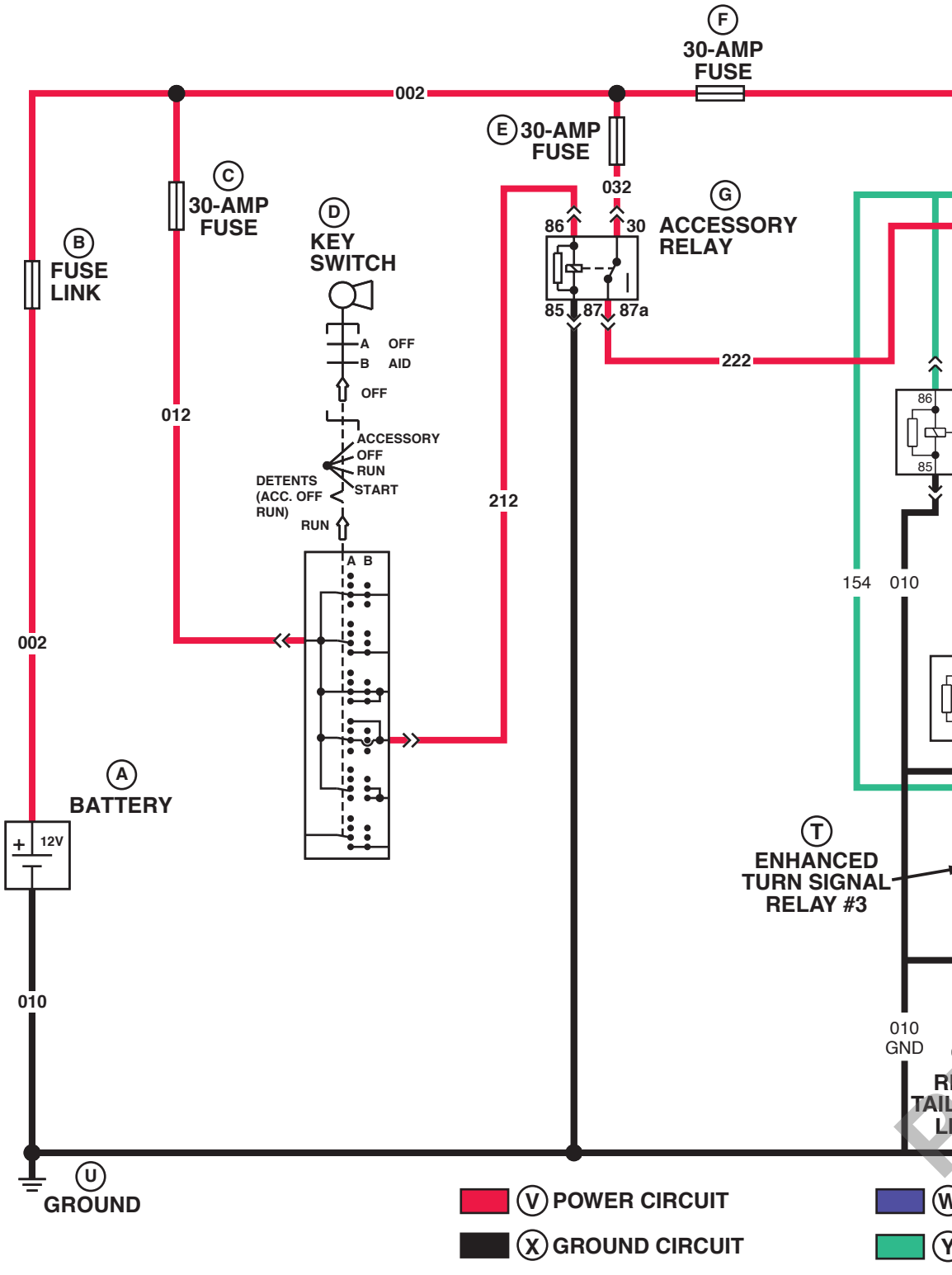
OUO1082,00000E2 –19–28OCT01–2/2

Fuel System Components—Isolated Open Operator Station and Cab Tractors



Continued on next page

OUO1089,00002D0 –19–08MAR02–1/2



LVC6338

**LIGHTING SYSTEM OPERATION — TURN SIGI
TAIL LIGHTS (STRADDLE MO**

A—Battery
B—Fuse Link
C—30-Amp Fuse
D—Key Switch
E—30-Amp Fuse
F—30-Amp Fuse
G—HVAC Relay
H—Blower Switch
I—Blower Motor Resistors
J—Blower Motor Relay #1
K—Blower Motor Relay #2
L—Right Blower Motor
M—Left Blower Motor
N—Ground
O—Power Circuit
P—Low Speed Circuit
Q—High Speed Circuit
R—Ground Circuit
S—Medium Speed Circuit
T—Purge Speed Circuit
U—Blower Motor Circuit

FUNCTION:

The blower motors are located in the evaporator/heater core housing mounted in the cab roof. They force cooled or heated air from the evaporator/heater core housing through the vents in the cab headliner to heat or cool the cab.

MAJOR COMPONENTS:

- Key Switch
- HVAC Relay
- Blower Switch
- Blower Motor Resistors
- Blower Relays
- Blower Motors

THEORY OF OPERATION:

When key switch (D) is in RUN position, current flows from battery (A) through fuse link (B), 30-amp fuse (C), and across key switch contacts to circuit 972. Current then flows through circuit 972 to energize the coil windings of HVAC relay (G).

When HVAC relay is energized, the relay blade contacts terminal 87 and current from battery flows through circuit 002, through 30-amp fuse (E) and circuit 282 to terminal B of blower switch (H).

The blower switch provides four operating speeds for the blower motors: low, medium, high, and purge.

When low, medium, or high speeds are selected, current flows through circuit 227, 221, or 225 to blower motor resistors (I); through circuit 216 to terminal 87A of the blower motor relays (J and K); and through the relays to the blower motors (L and M).

The speed of the blower motors is affected by the number of resistors in the circuit. Current from circuit 227 flows through four resistors; the current to the blower motors is low and the blower speed is low. Current from circuit 225 flows through only two resistors, thus the current drop is less and the blower speed is higher.

When PURGE speed is selected, current flows through circuit 223 and energizes the coil windings of the blower motor relays. When the relays are energized, the relay blade shifts to terminal 87 and current flows from circuits 042 and 052 to the blower motors. The current is not affected by the blower motor resistor, thus the blower motors turn at their highest speed.

30-amp fuses (E and F) protect the blower motor circuits from overload.

OUO1089,0000240 –19–13DEC00–2/2

Test Location	Normal	If Not Normal
1. Battery positive post.	Minimum 11.8 VDC.	Test battery and charge if good. Replace bad battery.
2. Starter battery terminal.	Battery voltage.	Check for corroded connection or break in wire between battery and starter.
3. Left post of fuse link junction block.	Battery voltage.	Check for corroded terminal or break in wire between starter and fuse link junction block.
4. Right post of fuse link junction block.	Battery voltage.	Check for loose or corroded terminal or replace fuse link.
5. Top terminal of fuse, F5.	Battery voltage.	Check for corroded connection or break in splice or wire between fuse link junction block and fuse, F5.
6. Bottom terminal of fuse, F6.	Battery voltage.	Check for failed fuse, F6. If fuse is good, check for corroded or loose terminals.
7. Batt terminal of key switch.	Battery voltage.	Check for corroded connection or break in wire between fuse block and key switch.
8. Acc terminal of key switch.	Battery voltage.	Check that key switch is in the run position. If key switch is in run position, test key switch.
9. Terminal 85 of accessory relay (late model isolated open operator platform and cab tractors).	Battery voltage.	Check for corroded connection or break in wire between accessory relay and key switch.
9A. Terminal 86 of accessory relay (early model isolated open operator platform and cab tractors).	Battery voltage.	Check for corroded connection or break in wire between accessory relay and key switch.
10. Terminal 86 of accessory relay (late model isolated open operator platform and cab tractors).	Less than 0.2 volt.	Check for continuity of black wires Nos. 010C, 010B and 010A through 010S to ground.
10A. Terminal 85 of accessory relay (early model isolated open operator platform and cab tractors).	Less than 0.2 volt.	Check for continuity of black wires Nos. 010C, 010B and 010A through 010S to ground.
11. Bottom terminal of fuse, F8.	Battery voltage.	Check for failed fuse, F8. If fuse is good, check for corroded or loose terminals.
12. Terminal 30 of accessory relay.	Battery voltage.	Check for corroded connection or break in wire between accessory relay and fuse block.
13. Terminal 87 of accessory relay.	Battery voltage.	Check for corroded connection. Test accessory relay.
14. Top terminal of fuse, F9.	Battery voltage.	Check for corroded connection or break in wire between accessory relay and fuse block.
15. Terminal 1 of diode pack.	Battery voltage.	Check for corroded connection or break in wire between fuse block and diode block.
16. Terminal 49a of turn signal switch.	Battery voltage.	Check for corroded connection or break in splice or wire between turn signal switch and diode block.

Test Location	Normal	If Not Normal
39. Terminal 85 of left-side trailer warn/turn relay.	Battery voltage (pulsing).	Check for corroded connection or break in wire between left-side trailer warn/turn relay and left warn/turn relay.
40. Terminal B of female side of 10-pin connector to cab roof harness.	Battery voltage (pulsing).	Check for corroded connection or break in wire between 10-pin connector and left-side trailer warn/turn relay.
41. Terminal B of male side of 10-pin connector to cab roof harness.	Battery voltage (pulsing).	Make sure connector is firmly pressed together. Check for corroded or loose terminals. Repair or replace connector.

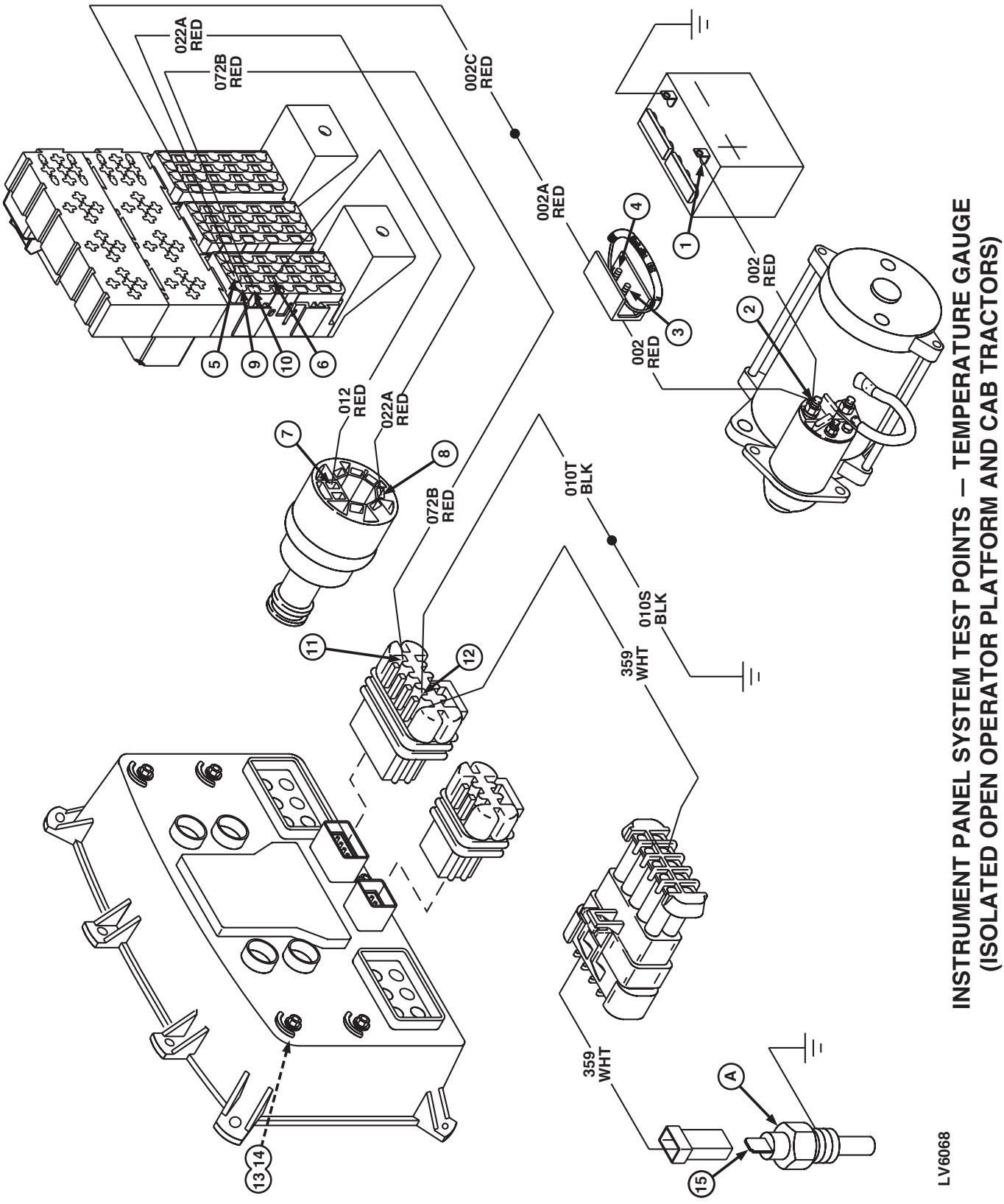
NOTE: Repeat steps 29—33 for left warning lights.

If test points are all normal, replace left warning light bulb(s).

240
15
79

OUO1089,000040E –19–28FEB02–6/6

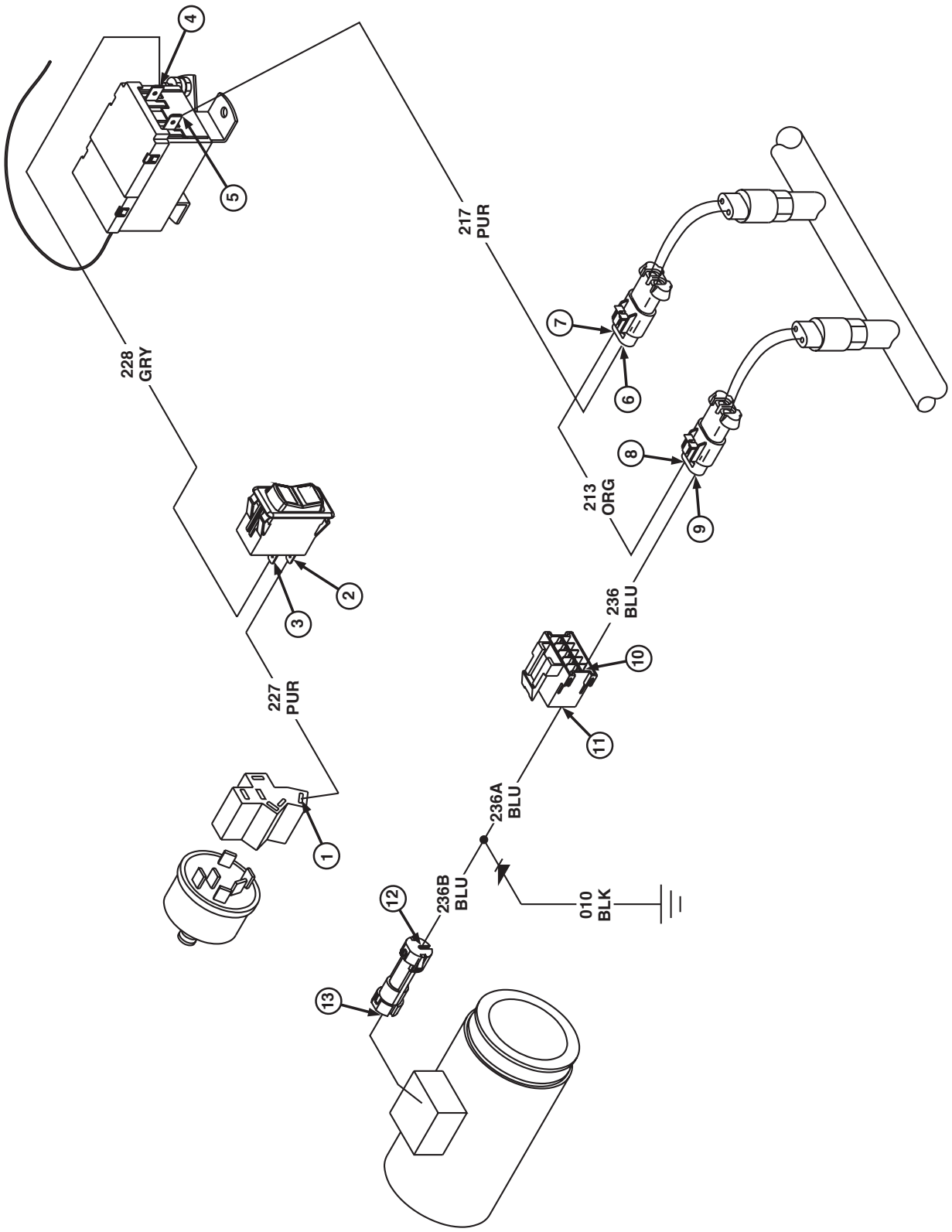
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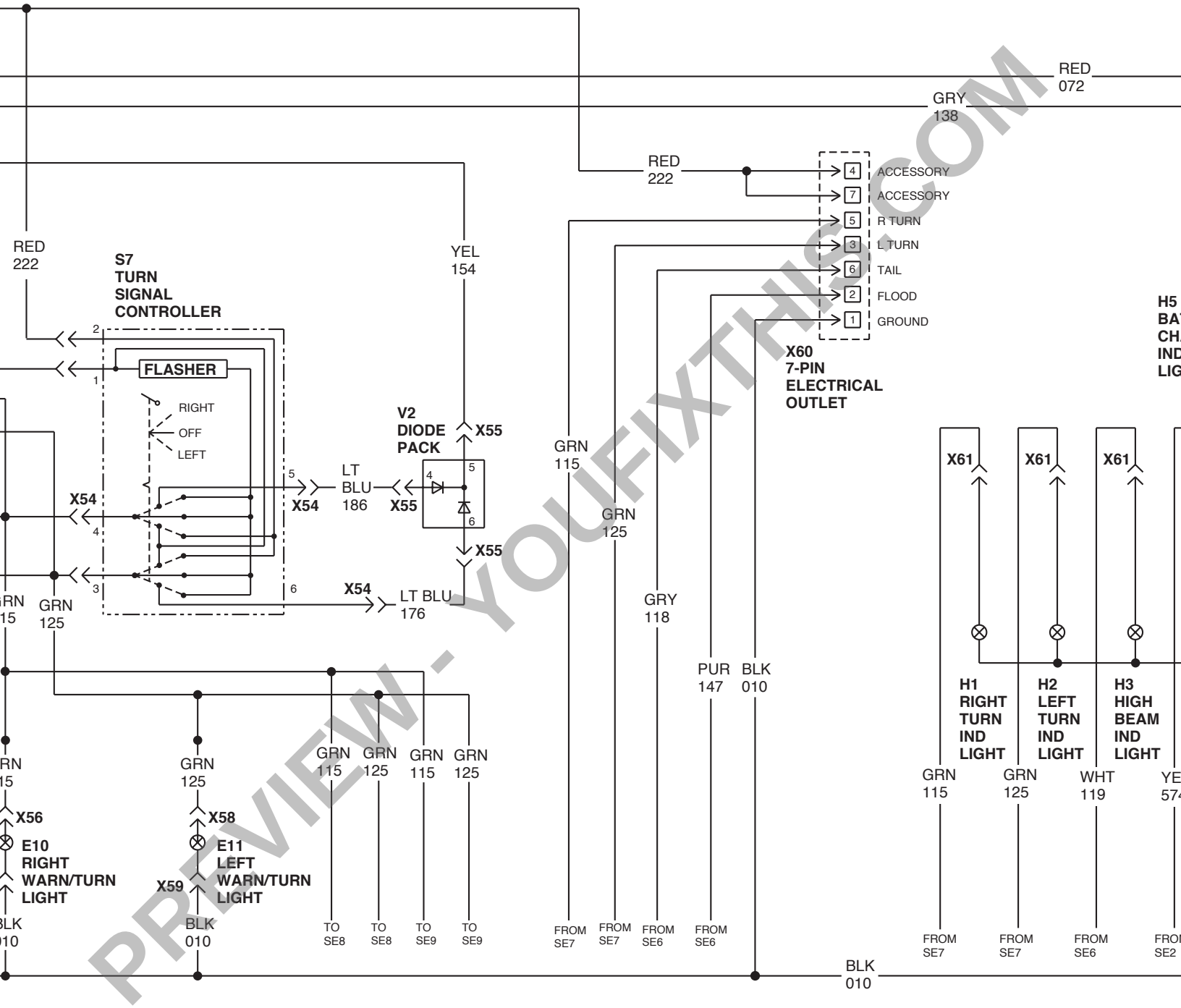
OUO1089,0000259 –19–19APR01–1/3

A/C Compressor Clutch Coil Test Points (Cab Tractors)



Continued on next page

OUO1089,0000263 –19–01MAR02–1/3



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TURN SIGNAL AND WARNING SWITCH	SE8 – TRAILER LIGHTING OUTLET	

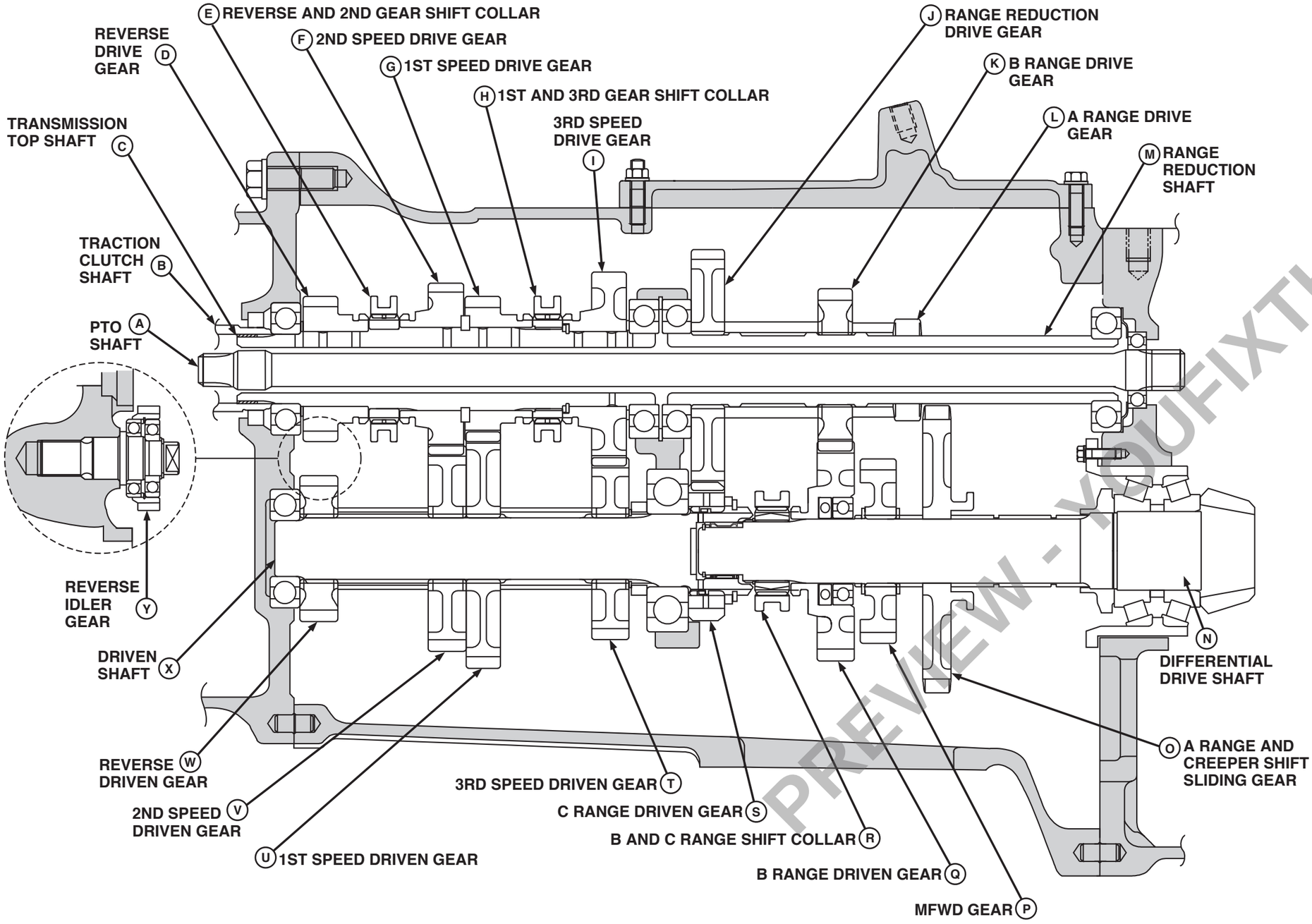
5220—5520 STRADDLE MOUNT ELECTRICAL SCHEMATIC — SHEET 2 OF 2

B1 — H

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Transmission Components—CollarShift

LVC6115 –19–24MAY01



LVC6115

TRANSMISSION COMPONENTS — COLLARSHIFT

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Differential Power Flow

FUNCTION:

The differential transmits power from the differential drive shaft to the final drive pinion shafts. It allows each wheel to rotate at varying speeds and still pull its own load.

MAJOR COMPONENTS:

- Differential Drive Shaft
- Differential Ring Gear
- Differential Carrier Assembly
- Final Drive Pinion Shafts
- Final Drive Ring Gear
- Planetary Carrier Assembly
- Axle Shaft

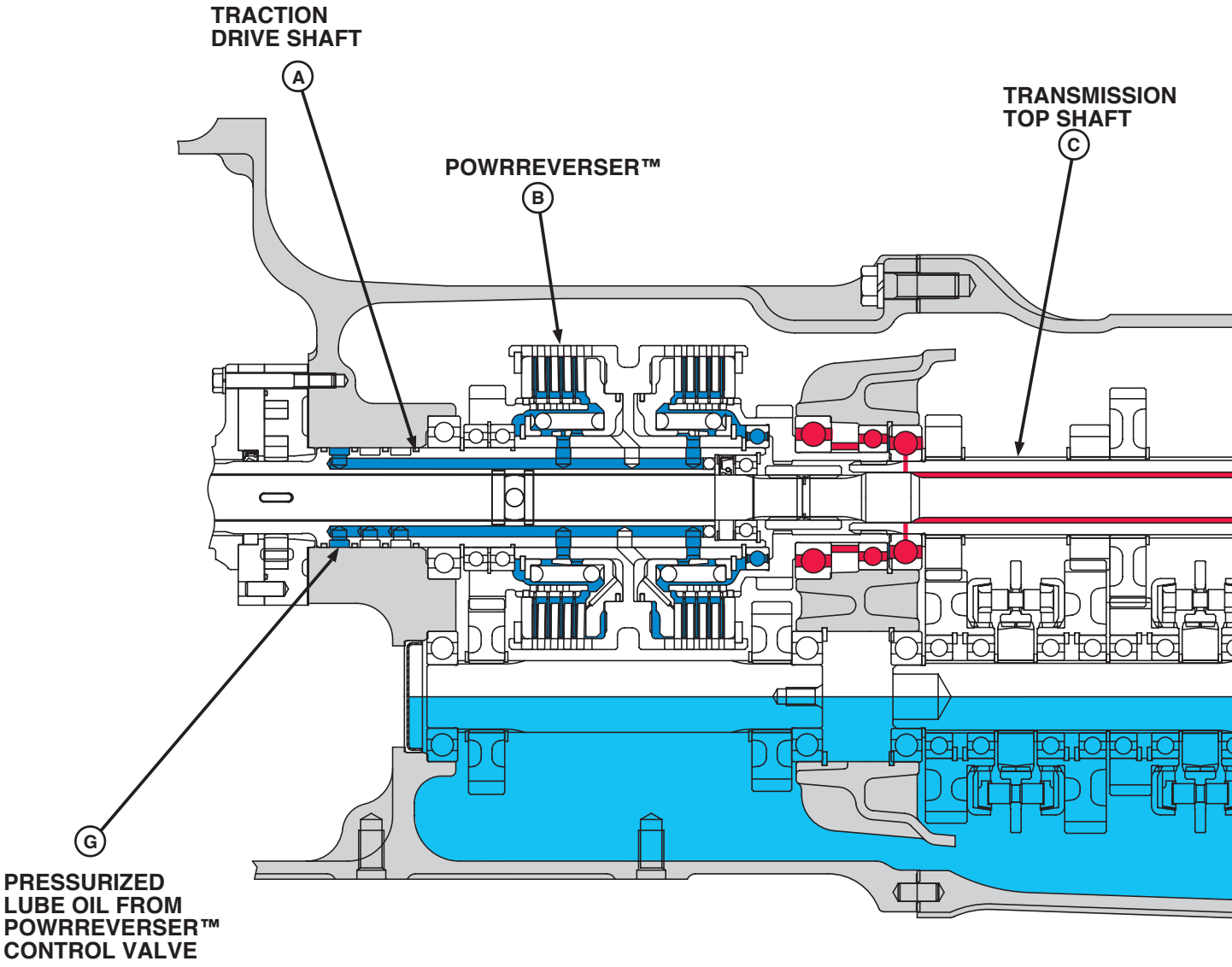
THEORY OF OPERATION:

Power from the differential drive shaft (A) is transmitted through the differential assembly to the final drive pinion shaft (F). The final drive pinion shaft is in mesh with the three small gears on the planetary carrier assembly (D). These small gears walk around the inside of final drive ring gear (G). The result is rotation of the axle shaft (E).

The differential assembly is a ring gear (C) bolted to the carrier (I). Inside the carrier are two bevel gears (H) and four bevel pinions (B).

When the tractor turns sharply, one axle is held stationary. The result is that the bevel pinions rotate on their own axis and walk around the stationary bevel gears. The turning ring gear transmits power through the pinion to the opposite bevel gear.

OUO1023,00002EB –19–16JAN01–1/1



E PRESSURIZED RETURN OIL FROM STEERING VALVE

H

G PRESSURIZED LUBRICATION OIL FROM POWRREVERSER™ CONTROL VALVE

LVC6122

POWRREVERSER™ TRANSMISS

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Steering and Brake Operation, Test & Adjust

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Group 10—Theory of Operation

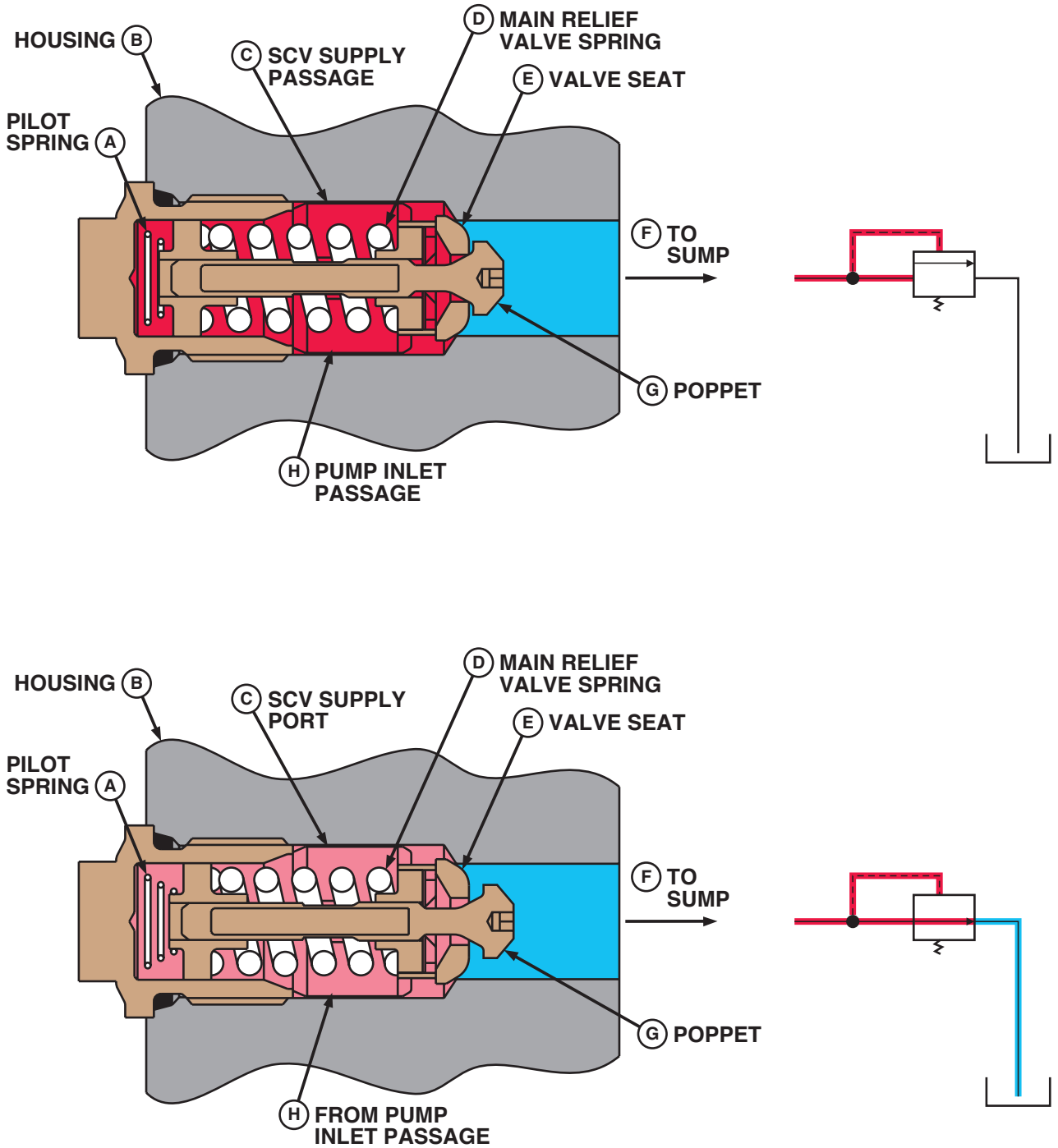
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Main Relief Valve Operation—Isolated Open Operator Station and Cab Tractors



LVC7382

RELIEF VALVE OPERATION—ISOLATED OPEN OPERATOR PLATFORM AND CAB TRACTORS

LVC7382 –19–31JUL01

270
10
30

Continued on next page

OUO1089,0000416 –19–20JUL01–1/2

1—Rear Coupler **3—Rear Outlet** **4—Rockshaft** **5—Rockshaft**
2—Rear Outlet

NOTE: For hydraulic system tests on tractors without SCV, see Hydraulic System Tests—Without SCV (Straddle Mount Tractors) in Group 16.

CONDITIONS:

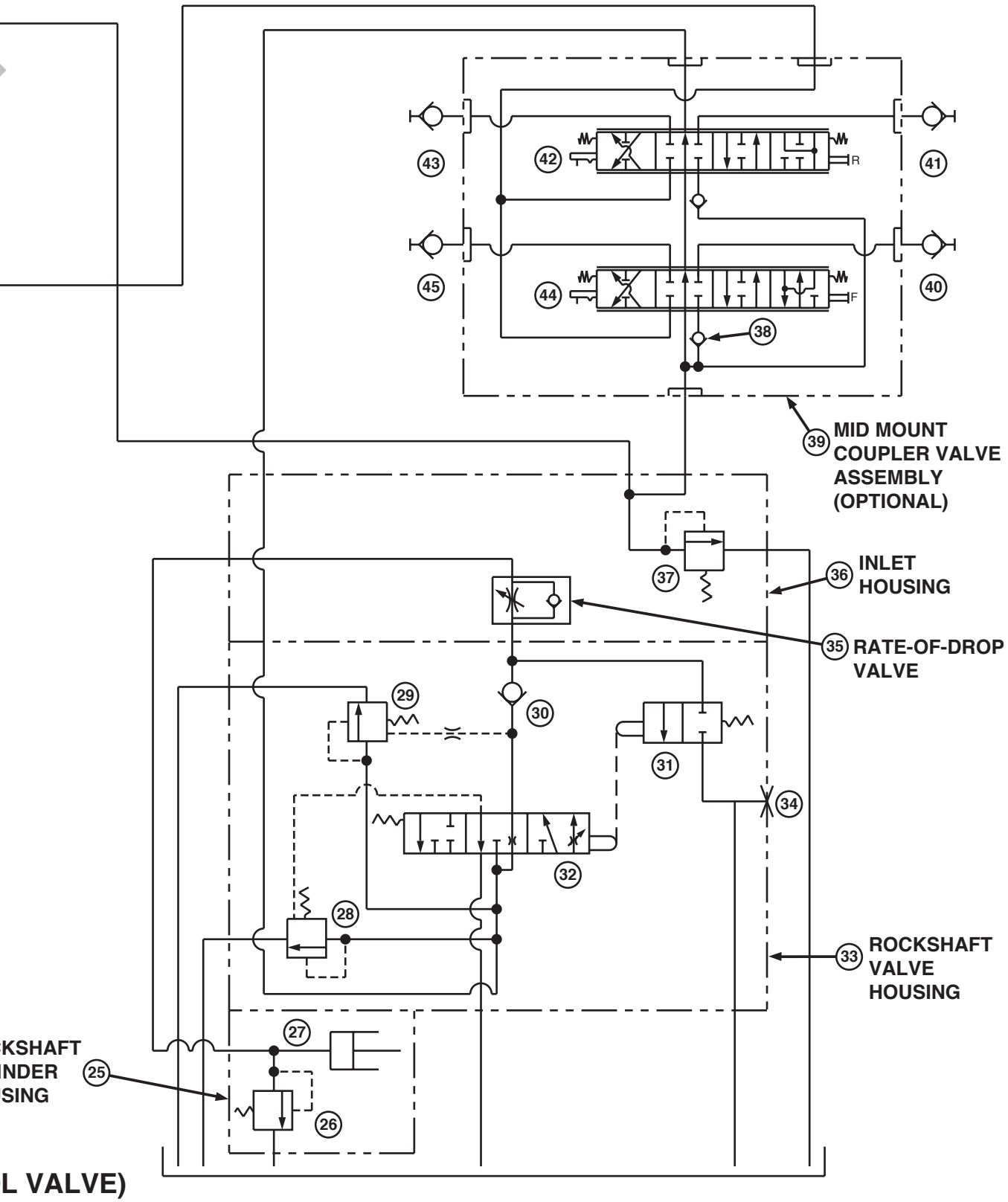
- Hydraulic oil is correct type, clean and at the proper level.
- No external hydraulic oil leaks.
- If oil filter wasn't replaced during preliminary inspection, replace it to ensure proper function.
- Rockshaft feedback linkage is properly adjusted. Refer to Rockshaft Position-Sensing Feedback Linkage Adjustment and Rockshaft Draft-Sensing Feedback Linkage Adjustment in Group 19 for procedure.
- Hydraulic oil at approximately 43°C (110°F).

Test Location	Normal	If Not Normal
1. Check pump flow (at rear couplers). Run engine at 2000 rpm and turn flowmeter restriction to 10345 kPa (103.5 bar) (1500 psi).	5220 and 5320 series tractors: 38 Lpm (10 gpm) minimum.	Perform test 2.
	5420 and 5520 series tractors: 55 Lpm (14 gpm) minimum.	
2. Check main relief pressure (at rear outlets) with engine at slow idle.	18995—19685 kPa (190—197 bar) (2755—2855 psi).	Reading low (test 1 and 2). Check main relief for leakage.
		Reading low (test 1 only). Inspect mesh filter. Inspect suction line. Inspect pump.
3. Test SCV leakage (at each rear outlet).	Pressure stays above 3448 kPa (34.5 bar) (500 psi) for at least 5 seconds.	Excessive drop at outlet 1 or 2: Repair #1 SCV spool.
		Excessive drop at outlet 3 or 4: Repair #2 SCV spool.
		Excessive drop at outlet 5 or 6: Repair #3 SCV spool.
4. Leak test rockshaft with pipe plug installed in rockshaft passage.	Rockshaft holds steady under implement load.	Inspect rockshaft in cylinder, seals, piston, or surge relief valve.
5. Leak test rockshaft without pipe plug installed in rockshaft passage.	Rockshaft holds steady under implement load.	Replace rockshaft valve or O-ring seals.

OUO1082,0000185 –19–18SEP01–2/2

Hydraulic Schematic—Isolated Open Operator Station and Cab Tractors (With Mid Mount Valve)

LV7392 –19–15AUG01



OUO1089,0000420 –19–18SEP01–1/2

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