Foreword

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

⚠ CAUTION:

This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

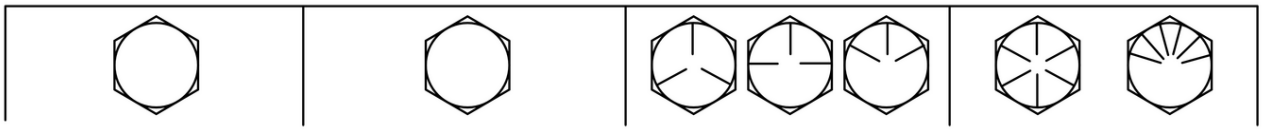
Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

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Unified Inch Bolt and Screw Torque Values



Unified Inch Bolt and Screw

Bolt or Screw Size	SAE Grade 1				SAE Grade 2 [Grade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.]				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
	Lubricated ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		Dry ["Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B, F13E or F13H zinc flake coating.]		Lubricated ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		Dry ["Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B, F13E or F13H zinc flake coating.]		Lubricated ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		Dry ["Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B, F13E or F13H zinc flake coating.]		Lubricated ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		Dry ["Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B, F13E or F13H zinc flake coating.]	
	N˙m	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**
1/4	3.7	33	4.7	42	6	53	7.5	66	9.5	84	12	106	13.5	120	17	150
													N˙m	**lb.-ft.**	**N˙m**	**lb.-ft.**
5/16	7.7	68	9.8	86	12	106	15.5	137	19.5	172	25	221	28	20.5	35	26
									N˙m	**lb.-ft.**	**N˙m**	**lb.-ft.**				
3/8	13.5	120	17.5	155	22	194	27	240	35	26	44	32.5	49	36	63	46
			N˙m	**lb.-ft.**	**N˙m**	**lb.-ft.**	**N˙m**	**lb.-ft.**								
7/16	22	194	28	20.5	35	26	44	32.5	56	41	70	52	80	59	100	74
	N˙m	**lb.-ft.**														
1/2	34	25	42	31	53	39	67	49	85	63	110	80	120	88	155	115
9/16	48	35.5	60	45	76	56	95	70	125	92	155	115	175	130	220	165
5/8	67	49	85	63	105	77	135	100	170	125	215	160	240	175	305	225
3/4	120	88	150	110	190	140	240	175	300	220	380	280	425	315	540	400
7/8	190	140	240	175	190	140	240	175	490	360	615	455	690	510	870	640
1	285	210	360	265	285	210	360	265	730	540	920	680	1030	760	1300	960
1-1/8	400	300	510	375	400	300	510	375	910	670	1150	850	1450	1075	1850	1350
1-1/4	570	420	725	535	570	420	725	535	1280	945	1630	1200	2050	1500	2600	1920
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2140	1580	2700	2000	3400	2500
1-1/2	990	730	1250	930	990	730	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

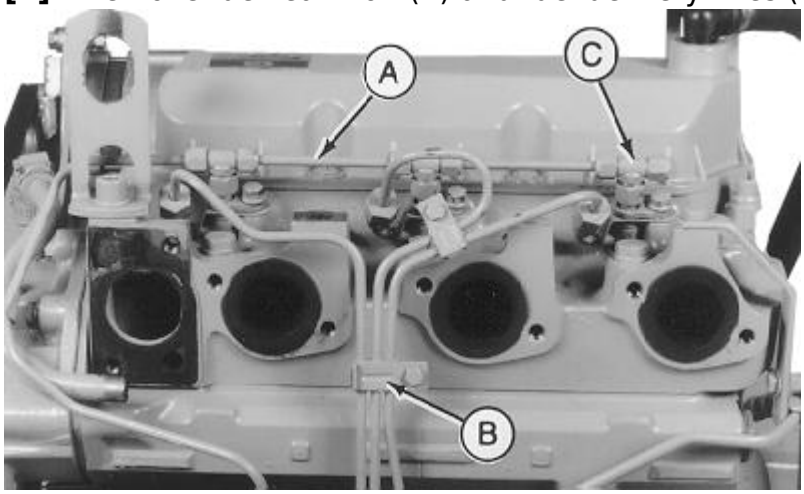
Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For plastic insert or crimped steel type lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application. Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Replace fasteners with the same or higher grade. If higher grade fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

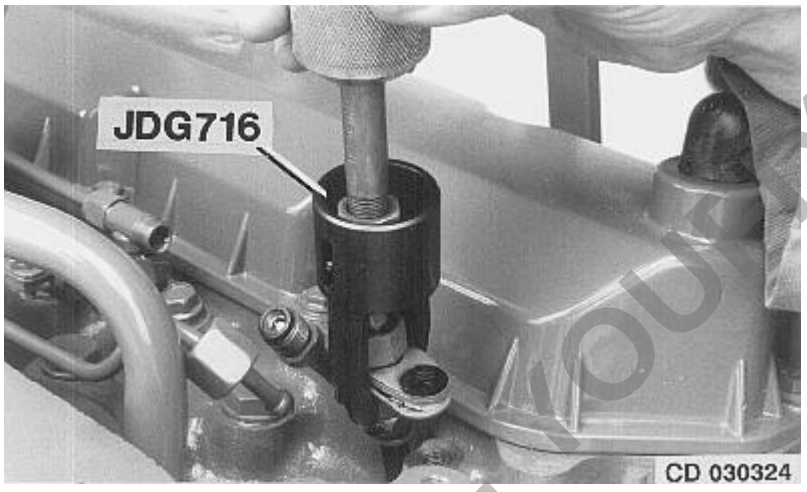
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[4] - Remove fuel leak - off (A) and fuel delivery lines (B) as assemblies.



.



Caption Needed

LEGEND:

A	Fuel Return Line
B	Fuel Delivery Lines
C	Fuel Injection Nozzle

[5] - Using special puller JDG716, remove the fuel injection nozzles.

→NOTE:

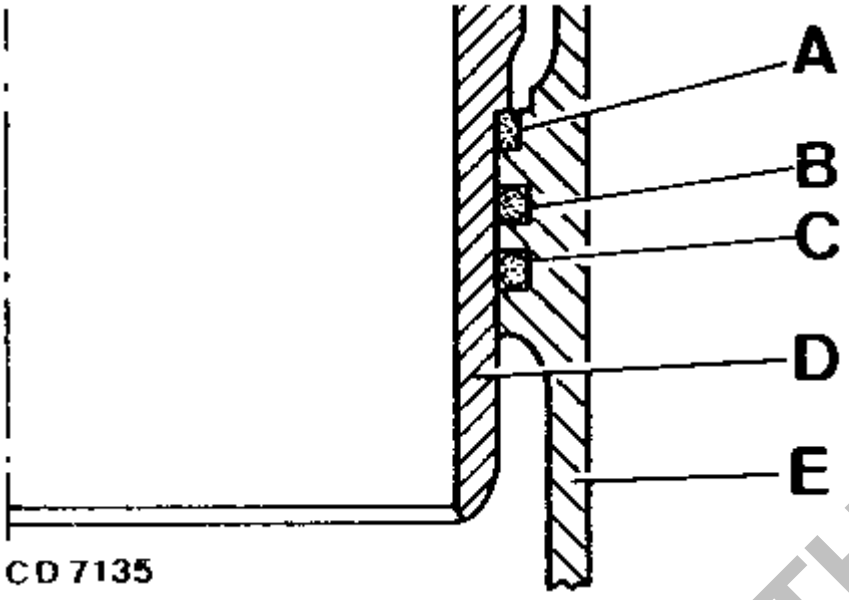
Removal of fuel injection nozzles is necessary to prevent them being damaged when cylinder head is removed.

Before removal, mark all parts so that they can be reinstalled in their original positions.

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Liner O-Ring Installation



Liner O-Ring Installation

LEGEND:

A	Rectangular Section Packing
B	Red or White O-Ring
C	Black O-Ring
D	Cylinder Liner
E	Cylinder Block

Apply lubricating soap to new O-rings. Install O-rings in respective grooves.

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Group 25 - Camshaft and Timing Gear Train

Special or Essential Tools

→NOTE:

Order tools according to information given in the U.S. SERVICEGARD™ Catalog or in the European Microfiche Tool Catalog (MTC).

→NOTE:

Use JDE83 on engines with a 142 tooth flywheel ring gear and a flywheel housing tool guide bore of 26.5 mm (1.04 in.) diameter.

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→NOTE:

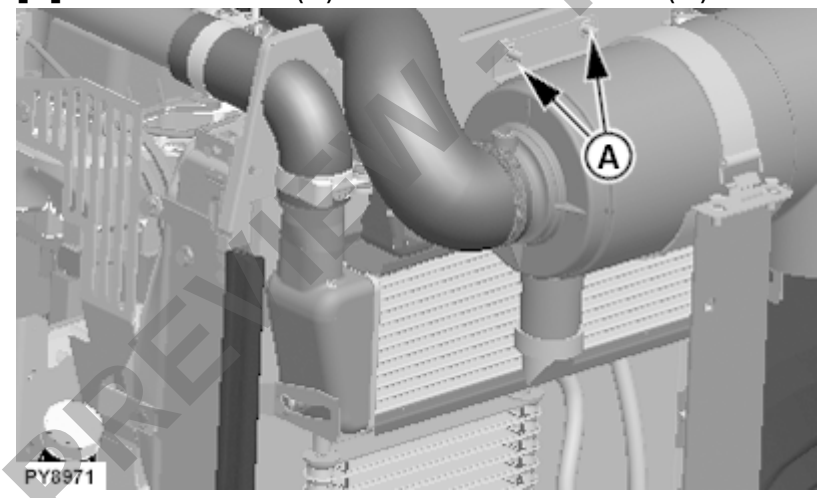
Cooling system capacity is approximately 9.5 L (10 qt).



Safety

[4] - Drain coolant.

[5] - Remove nuts (A) to remove air cleaner (D).

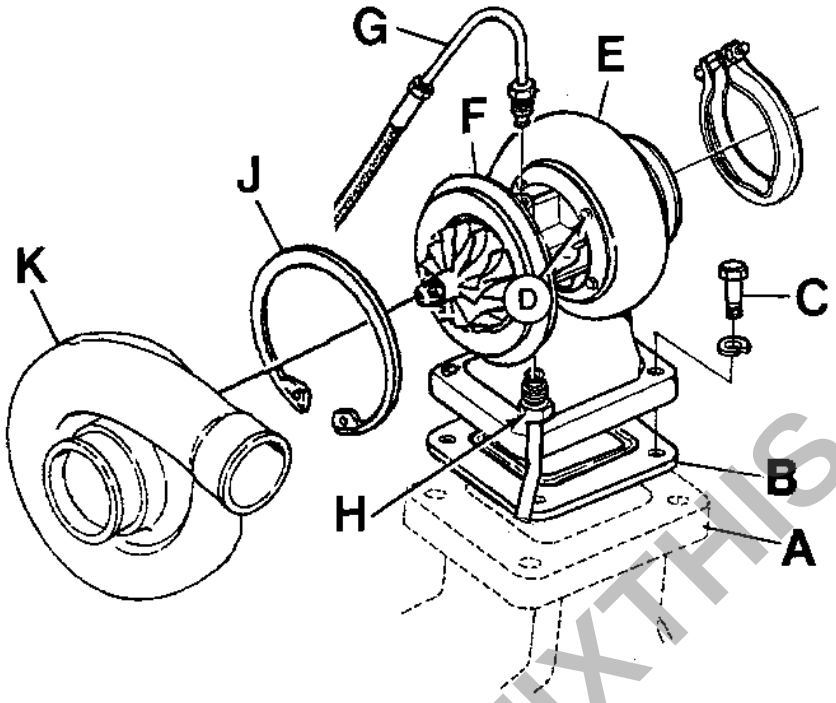


Top Side of Radiator (With CAC)

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Install Turbocharger--If Equipped



Install Turbocharger

LEGEND:

A	Exhaust Manifold
B	Gasket
C	Cap Screw
D	Cap Screw
E	Turbine Housing
F	Center Housing
G	Oil inlet Line
H	Oil Return Tube
J	Circlip
K	Compressor Cover

[1] - Install turbocharger on exhaust manifold (A) with a new gasket (B). Tighten cap screws (C) to specification.

[2] -

→NOTE:

Turbocharger for service are designed for a specific application. In case where engine connections are not in line with turbocharger connections, follow the procedure described in step 2. Otherwise go directly to step 3.

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Install WEATHER PACK ™ Contact



WEATHER PACK Contact

→NOTE:

Cable seals are color coded for three sizes of wire:

- **Green - 18 to 20 gauge wire**
- **Gray - 14 to 16 gauge wire**
- **Blue - 10 to 12 gauge wire**

[1] - Slip correct size cable seal on wire.

[2] - Strip insulation from wire to expose 6 mm (1/4 in.) and align cable seal with edge of insulation.

[3] -

→NOTE:

Contacts have numbered identification for two sizes of wire:

- **#15 for 14 to 16 gauge wire**
- **#19 for 18 to 20 gauge wire**

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Assemble Clutch Assembly

[1] -



Support Plate

LEGEND:

A	Adjustable Socket Head Screw (3 used)
B	Clutch Support Plate
C	Machined Surface

Install support plate (B) flush with machined surface (C) on clutch.

[2] - Make sure adjustable socket head screws (A) all have equal lengths.

[3] - Place support plate and clutch on flat work area.

[4] -

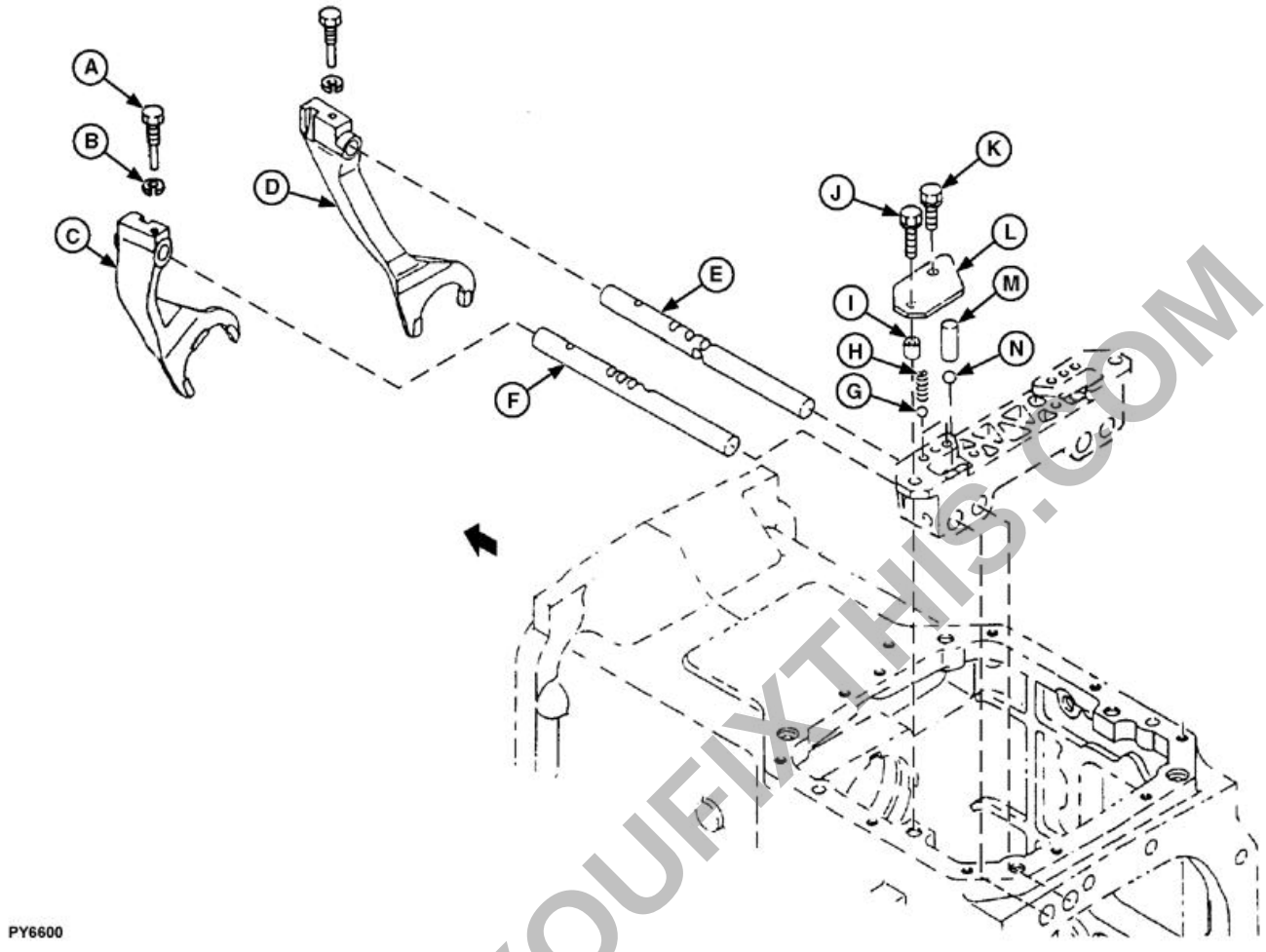
→NOTE:

Make sure raised hub side of traction clutch disk is facing downward.

Traction clutch disk (A) will align with threaded hub in center of support plate from Clutch Repair Fixture no JDG1337.

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Range-Shift Shaft Assembly

LEGEND:

A	Cap Screw (2 used)
B	Lock Washer (2 used)
C	B and C Range Shift Fork
D	A Range Shift Fork
E	A Range Shift Shaft
F	B and C Range Shift Shaft
G	Ball (2 used)
H	Spring (2 used)
I	Bushing
J	Cap Screw
K	Cap Screw
L	Plate
M	Pin
N	Ball

Remove cap screw (J), if installed.

[4] - Install A range shift fork (D).

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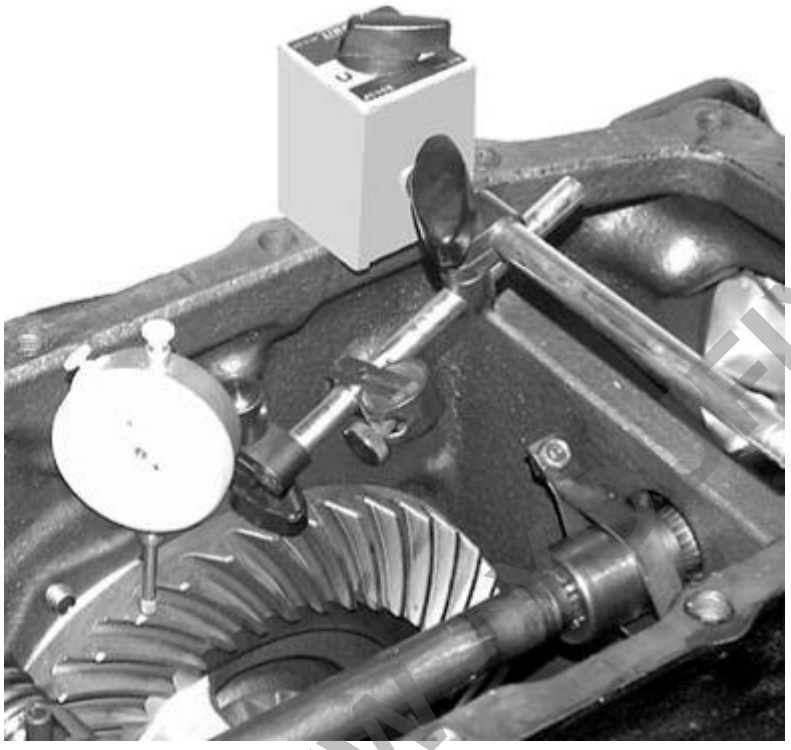
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Differential Backlash Adjustment

IMPORTANT:

Always check and adjust backlash after cone point adjustment has been made.

[1] -



Differential Backlash Adjustment

While slowly rotating differential carrier, lightly tap carrier with a soft-faced mallet to make sure bearing on other side of ring gear is seated.

[2] - Attach a dial indicator to housing, as shown, with contact point positioned on ring gear splines.

[3] -

→NOTE:

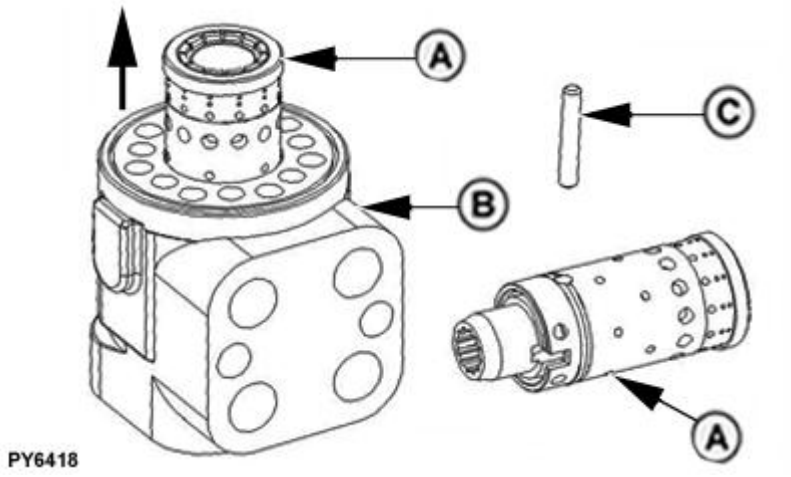
Ring gear carrier is not preloaded and will have normal side-to-side movement.

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[4] - Remove drive shaft (H) and O-ring (A).

[5] -



.

LEGEND:

A	Spool-Sleeve Assembly
B	Valve Housing
C	Pin

Carefully remove the spool-sleeve assembly (A) from housing (B) in upright position.

IMPORTANT:

Do not bind spool-sleeve assembly in housing. Rotate spool-sleeve assembly slowly when removing it from housing .

IMPORTANT:

If spool and sleeve assembly must be removed from valve body for cleaning, handle parts with care. Tolerances on these parts are very close. When replacement is necessary, spool, sleeve, and valve body must be replaced as a set.

Use care so not to drop or lose parts when removing sleeve and spool assembly. Keep cross pin in assembly horizontal.

[6] - Push pin (C) from spool-sleeve assembly (A).

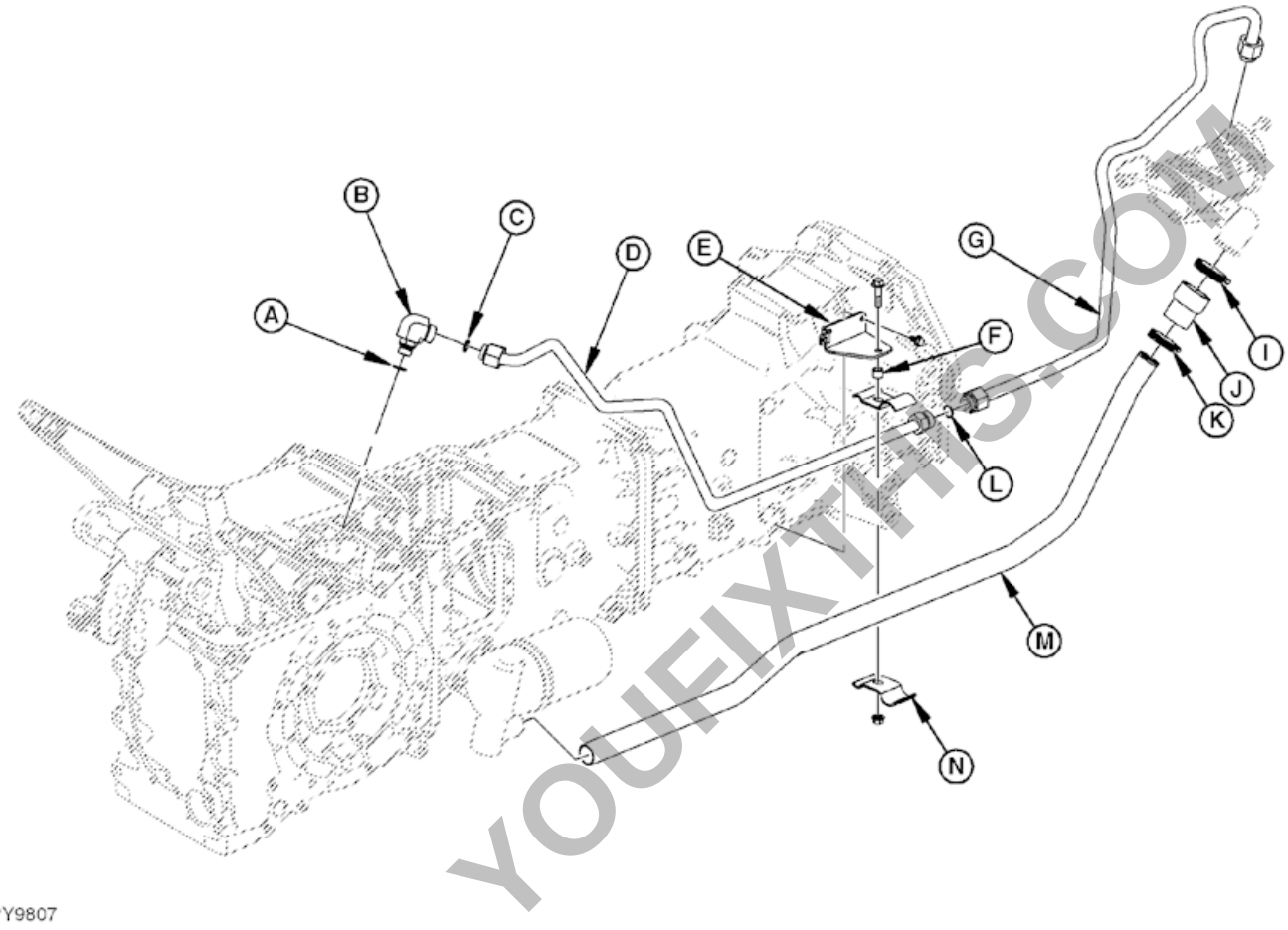
→NOTE:

Thin bearing race may remain in valve body.

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Inspect and Replace Hydraulic Supply and Suction/Return Lines



Hydraulic Supply and Return Lines

LEGEND:

A	O-Ring
B	Fitting
C	O-Ring
D	Pump to Inlet Housing Pressure Line
E	Bracket
F	Spacer
G	Pump to Inlet Housing Supply Line
I	Clamp
J	Suction Line to Pump Hose
K	Clamp
L	O-Ring
M	Filter Manifold to Pump Suction Line
N	Clamp (2 used)

[1] - Remove right rear wheel and fender. (See Remove and Install Fenders in Section 90, Group 25 and Remove and Install Front or Rear Wheels in Section 80, Group 10.)

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[18] -

IMPORTANT:

Always use new seals and O-rings. Damaged or used seals and O-rings will leak.

Apply clean hydraulic oil to all internal parts before assembly.

Install new O-rings (R and O) and backup ring (N).

[19] - Install seal plate (E).

[20] - Coat spool and bore with clean transmission/hydraulic oil.

[21] - Install spool.

[22] - Lightly coat detent assembly with multipurpose grease.

[23] - Apply Medium Strength Locking Liquid MT1247, to threads of socket head cap screws (F).

[24] - Install end cap (G) using socket head cap screws (F). Tighten screws to specification.

Item	Measurement	Specification
Spool End Cap Socket Head Cap Screw	Torque	12—15 N·m (9—11 lb-ft)

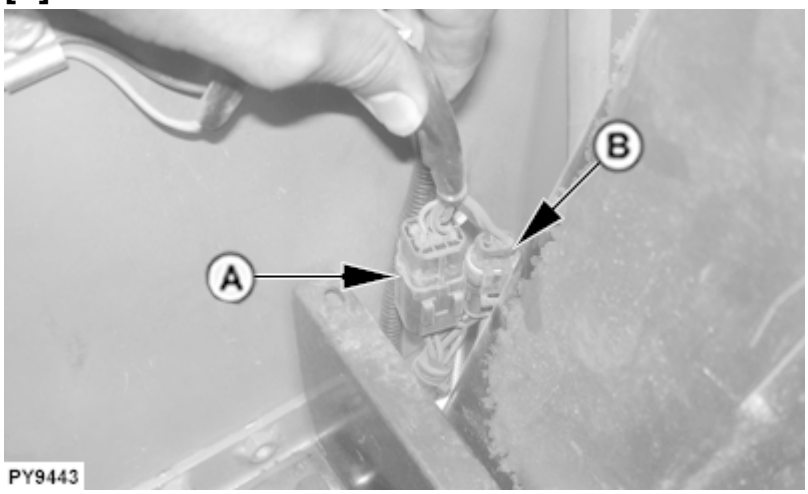
[25] - Install parts (A—D). Tighten cap (A) to specification.

Item	Measurement	Specification
Load Check Cap	Torque	34—41 N·m (25—30 lb-ft)

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[7] -



.

LEGEND:

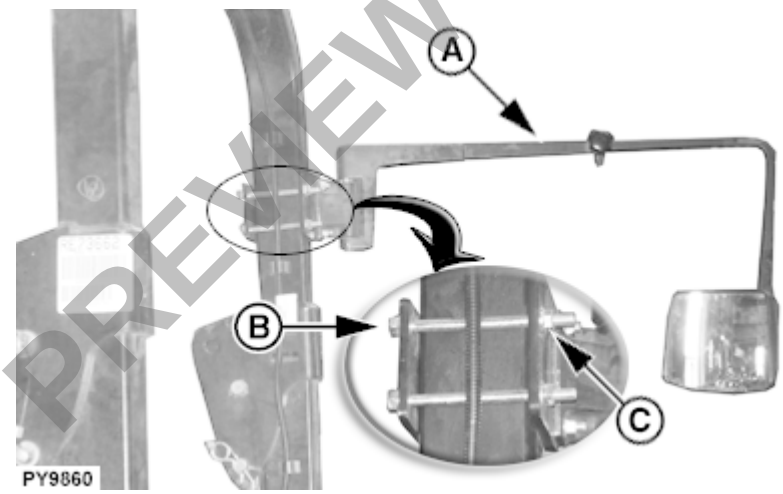
A	Connector
B	Connector

Connect connectors (A) and (B) to connect 7-pin connector to the wiring harness.

[8] -

→NOTE:

Support mirror assembly properly during removal and installation.



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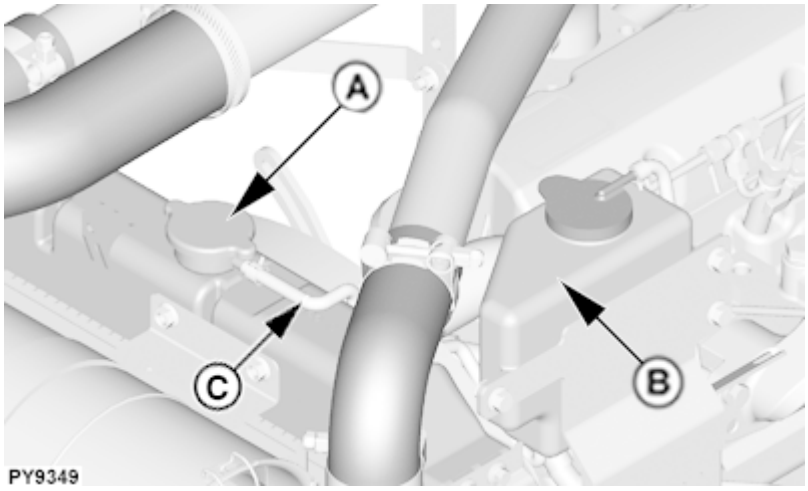
LEGEND:

A	Mirror Assembly
B	Cap Screw (4 used)
C	Nut (4 used)

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Coolant Level and Condition Check



Coolant Level and Condition Check

LEGEND:

A	Radiator Cap
B	Expansion Tank
C	Hose

CONDITIONS:

- Key switch in OFF position.
- Machine parked on level surface.

PROCEDURE:

IMPORTANT:

Perform checks when engine is cold.

- Observe level of coolant in expansion tank (B).
- Check condition of expansion tank (B) and tank-to-radiator hose (C).

NORMAL:

- Expansion tank (B) and hose (C) in good condition, no holes or cracks.
- Coolant clean, no oil, rust-like discoloration or foreign material in fluid.
- No leakages.

IF NOT NORMAL:

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[1] - With coolant at proper level and radiator cap tight, run engine to operating temperature.

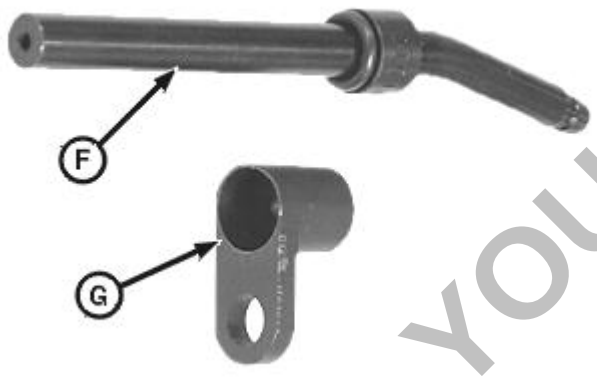
[2] - Check for coolant or steam coming from bottom of coolant vent hose (A).

[3] - Isolate source of compression leak: Turn off engine and remove one injector nozzle.

[4] - Move piston to bottom of stroke with intake and exhaust valves closed.

[5] - Assemble parts (B—E) using test kit JT01674.

[6] -



Engine Adapter and Holder

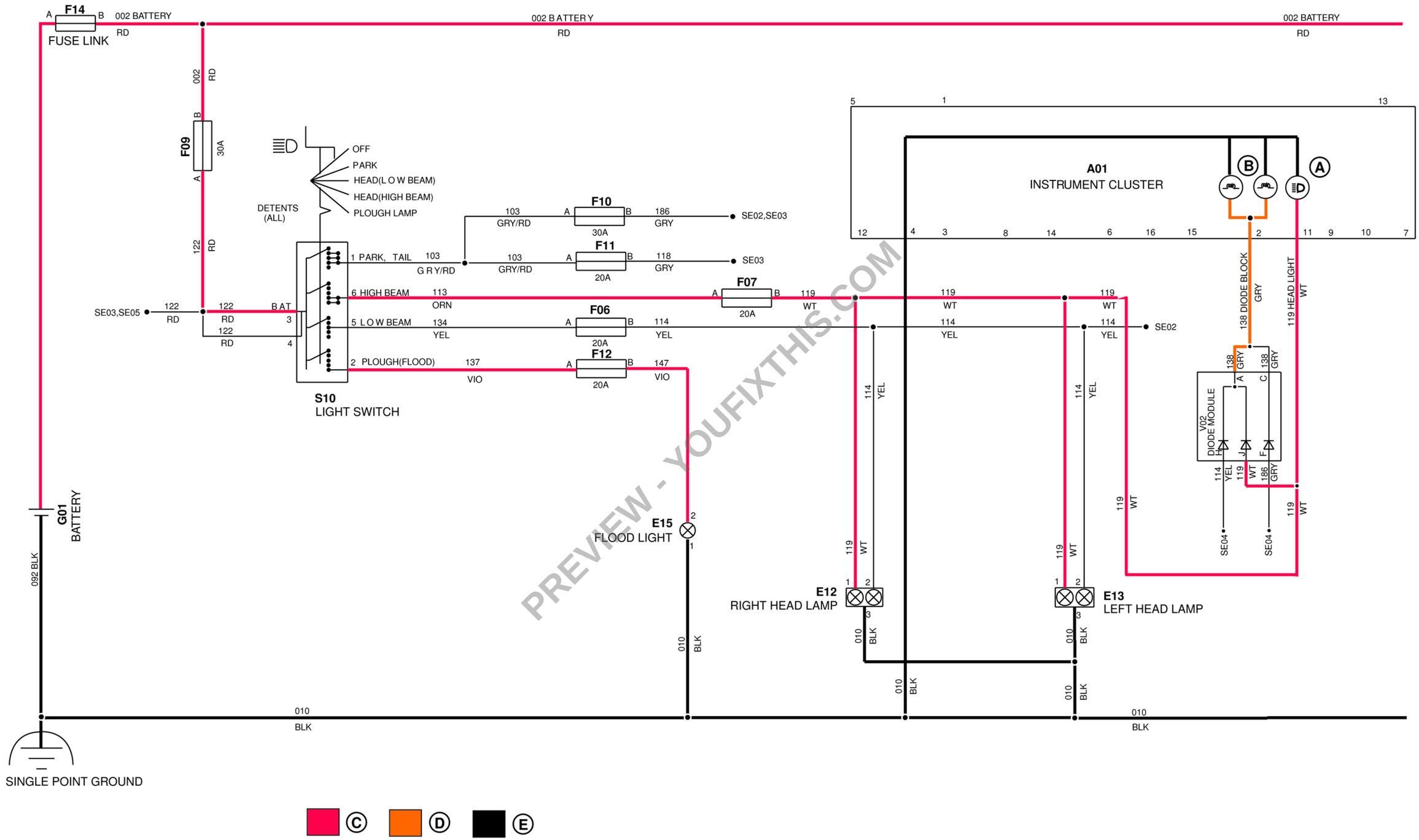
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Temperature Gauge Test Points 115
Engine Oil Pressure Indicator Test Points 118
Air Filter Restriction Indicator Test Points 121
MFWD and Differential Lock Indicator Test Points 124
Manifold Heater Test Points 127
Brake Switch Test Points 129
Fuel Pump Test Points 131
Horn Test Points 133
Accessory Relay and Trailer Connector Test Points 136
Battery Voltage and Specific Gravity Tests 139
Charge Battery 141
Battery Load Test 143
Starter Amp Draw/RPM Test 145
Starter No-Load amp Draw/RPM Test 148
Alternator/Regulator Test 150
Starter Solenoid Test 151
Starter Relay Test 153
Key Switch Test 156
Plug-In Relay Test 158
Mini Plug-In Relay 160
Diode Pack Test 162
Fuse Test 163
Neutral Start Switch Test 165
PTO Switch Test 167
Park Brake Switch Test 169
Light Switch Test 170
Turn Signal Switch Test 172
Fuel Shut-Off Solenoid Test 173
Group 20 - Wiring Schematics 175
Schematic Information 175
Component Identification Table 176
Quick Reference Table 177
Reference Tables 179
SE01—Starting Motor, Charging Circuit, Jump Start and Back EMF Protection 179
SE01A—Starting Aid (Heater Manifold and Fuel Pump) 182
SE02—Instrument Gauges, Sensors and Switches 183
SE03—Turn Signals and Hazard Switch 185
SE04—Light Switch, Left and Right Headlights, and Beacon Light 187
SE05—Horn 189
SE06—Trailer Connector 191
Group 25 - Component Information—Connectors 194
Component Location—Connectors (Summary of Information) 194
X1—6-Pin Connector for Electronic Flasher 195
X2 and X3—12-Pin Connectors for Front to Console Wiring Harness 196
X4 and X5—3-Pin Connectors for Console to Hood Wiring Harness 198
X6—2-Pin Connector for Trailer Connector 200
X7—1-Pin Connector for Junction Box 201
X8—6-Pin Connector for Trailer Connector 202
X9 and X10—12-Pin Connectors for Console to Rear Wiring Harness 203
X11 and X12—6-Pin Connectors for Console to Rear Wiring Harness 205

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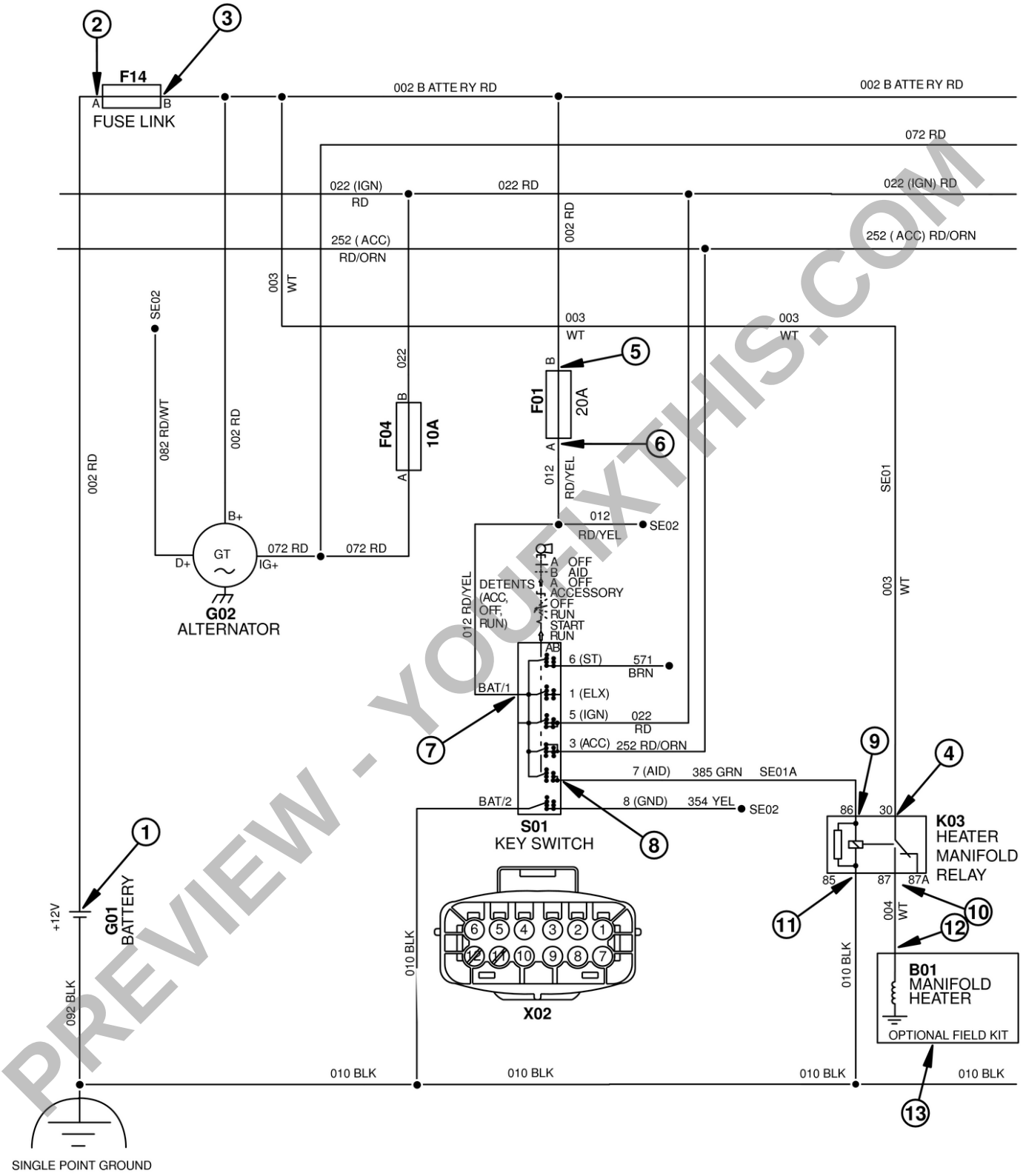


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Manifold Heater Test Points



PY9748

Manifold Heater Test Points

Conditions:

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Horn

LEGEND:

H01	Horn
S11	Horn Switch

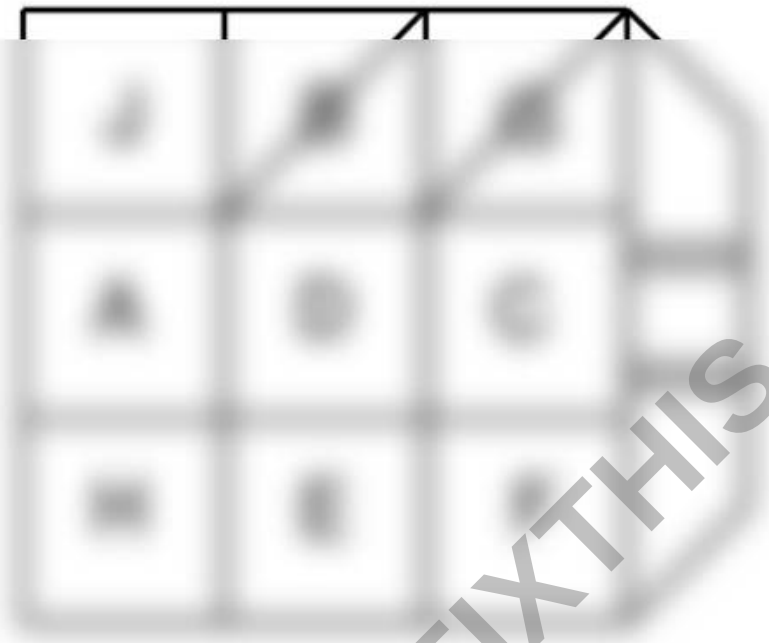
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XV01—9-Pin Connector for Diode Module



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Traction Clutch Squeaks

CONDITIONS:

Test Location	Normal	If Not Normal
1. Flywheel pilot bearing.	Lubricated sufficiently.	Lubricate.
2. Traction clutch release bearing.	Lubricated sufficiently.	Lubricate.
	Bearing spins freely. No evidence of wear or damage.	Replace bearing.

Traction Clutch Does Not Release

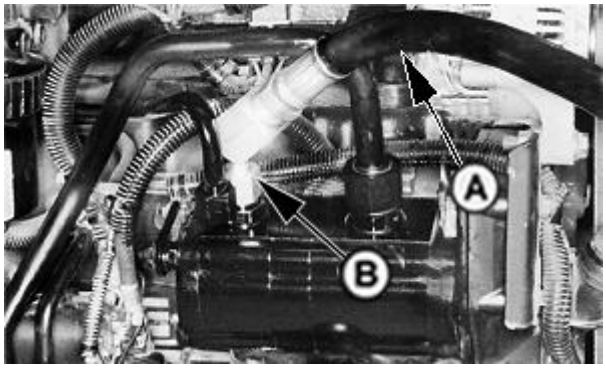
CONDITIONS:

Test Location	Normal	If Not Normal
1. Traction clutch disk and pressure plate.	Disk and pressure plate separate freely with no sticking.	Clean or replace disk and/or pressure plate. If storing tractor, block clutch pedal in disengaged position.

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Steering Pump Flow Test



Steering Pump Flow Test

LEGEND:

A	Flowmeter
B	Pump Adapter

REASON:

To determine if steering pump can provide adequate flow under pressure.

EQUIPMENT:

- Flowmeter
- Pump Adapter 3/4 FNPT x 13/16-16 FORFS 45° Elbow
- (Flowmeter with 37° flare hose) Adapter 3/4 MNPT x 3/4-16 M 37° Flare
- (Flowmeter with 3/4-16 M ORB hose) Adapter 3/4 MNPT x 1/2 FNPT and 1/2 MNPT x 3/4-16 Forb

CONNECTIONS:

[1] - Remove steering pump outlet line.

[2] - Connect flowmeter inlet hose (A) to adapter (B).

[3] - Install adapter and flowmeter assembly.

[4] - Insert flowmeter return hose into hydraulic oil fill hole.

PROCEDURE:

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C	Inlet Passages
D	Return Pressure Passage
E	Spool
F	Retract Port
G	Pressure Inlet Passage
H	Load Check Valve
I	Extend Port
J	System Pressure Oil
K	Trapped Oil
L	Return Oil
M	SCV II Extend Port (Regenerative)
N	SCV II Retract Port
O	SCV I Retract Port
P	SCV I Extend Port (Float)

The float SCV is the top spool valve of the dual mid-mount SCV. Besides the positions of neutral, extend, and retract, SCV I also has a float position.

When the spool (E) is moved fully inward, a detent engages the spool in the float position. This isolates the system pressure oil from retract port (F) and extend port (I) and connects both ports to their respective sump passages (B). With both ends of the implement cylinder connected to sump, oil can pass to sump freely, allowing implement to follow the ground contour.

→NOTE:

Detent locks spool in float position and must be released by operator.

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