Group 05 - Safety

Recognize Safety Information



Safety-alert symbol

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

Follow recommended precautions and safe operating practices.

Understand Signal Words



Signal Words

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Group 05 - Engine

Service Equipment and Tools

→NOTE:

Order tools according to information given in the service manual.

Lifting Bracket

Install to engine for removal.

Specifications

Item	Measurement	Specification
Engine to Front Support Top Cap Screws	Torque	290 N˙m
Engine to Front Support Nut	Torque	165 N˙m
Engine to Front Support Top Cap Screws	Torque	290 N˙m
Center Control Console Cap Screws	Torque	70 N˙m

John Deere Engine Repair—Use CTM8



Component Technical Manual

For complete repair information the component technical manual (CTM) is also required. Use the component technical manual in conjunction with this machine manual.

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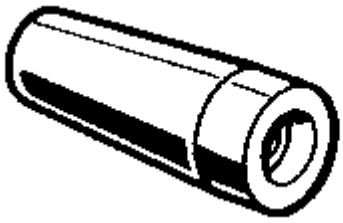
Group 05 - Fuel System

Special or Essential Tools

→NOTE:

Order tools according to information given in the service manual.

Seal Installing Tool

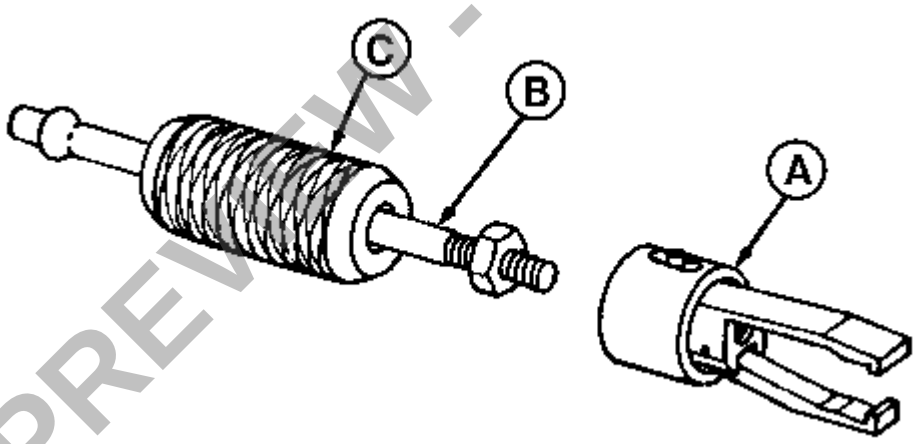


Seal Installing Tool

JD258

To install carbon stop seal on nozzle.

Injection Nozzle Puller



Injection nozzle puller

LEGEND:

A Adapter
B Shank
C Hammer

JdG38B

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Group 05 - Battery, Starter and Alternator

Starter Repair—Use CTM77



Component Technical Manual

For complete repair information the component technical manual (CTM) is also required. Use the component technical manual in conjunction with this machine manual.

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Group 05 - Clutch Housing

Service Equipment and Tools

Lifting Brackets

Remove and install engine.

Flywheel Turning Tool

JDE83

Rotates flywheel.

Bushing, Bearing, and Seal Driver Set

Used to install bushings in clutch pedal.

Other Material

Number	Name	Use
	Moly High Temperature EP Grease	Apply to PTO and traction clutch shafts

Specifications

Item	Measurement	Specification
Engine-to-Clutch Housing Cap Screw	Torque	290 N•m (214 lb-ft)
Engine-to-Clutch Housing Nut	Torque	290 N•m (214 lb-ft)

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Group 05 - Steering Repair

Other Material

Number	Name	Use
	Moly High Temperature Ep Grease.	Apply to 2WD axle tie rod sleeve.

Specifications

Item	Measurement	Specification
Steering Column-to-Center Control Console Cap Screws	Torque	70 N˙m (52 lb-ft)
Steering Wheel Nut	Torque	68 N˙m (50 lb-ft)
Steering Valve Cover Cap Screw	Torque	30 N˙m (22 lb-ft)
2WD Tie Rod Clamp Cap Screw and Nut	Torque	90 N˙m (66 lb-ft)
2WD Tie Rod-to-Spindle Arm Lock Nuts	Torque	165 N˙m (122 lb-ft)
Tie Rod-to-Swivel Housing Lock Nuts	Torque	165 N˙m (122 lb-ft)
Hydraulic Lines-to-Steering Valve	Torque	50 N˙m (37 lb-ft)
2WD Steering Cylinder Mounting Bolt and Nut	Torque	290 N˙m (214 lb-ft)

Service Parts Kits

The following kits are available through your parts catalog.

- Steering Valve Seal Kit.
- Steering Cylinder Seal Kit.

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Group 05 - Hydraulic Pump and Filter

Essential Tools



.

Hydraulic Suction Filter Removal Tool

Used to remove & fit hydraulic suction filter with correct torque.

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Group 05 - Front Axle

Specifications

Item	Measurement	Specification
2WD Axle	End Play	8 mm (0.30 in.) Max.
2WD Axle Retainer Cap Screws	Torque	125 N˙m (92 lb-ft)
Wheel Cap Screws	Torque	175 N˙m (135 lb-ft)
Spindle Nut and Cap Screw	Torque	55 N˙m (40 lb-ft)
Tie Rod End Nut	Torque	165 N˙m (122 lb-ft)
Hydraulic Hose to Cylinder	Torque	39 N˙m (29 lb-ft)
Hydraulic Hose to Hydraulic Lines	Torque	46 N˙m (34 lb-ft)

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Group 05 - Seat and Support

Specifications

Item	Measurement	Specification
Deluxe Seat Mounting Cap Screws	Torque	90 N˙m (66 lb-ft)
Deluxe Seat Bracket Cap Screws	Toruqe	90 N˙m (66 lb-ft)

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Group 10 - Operational Checkout Procedures

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 insure 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.

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Group 05 - Component Location

Component Location Information

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

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.

Engine External Components—Left-Hand Side (Naturally Aspirated)

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Group 05 - Component Location

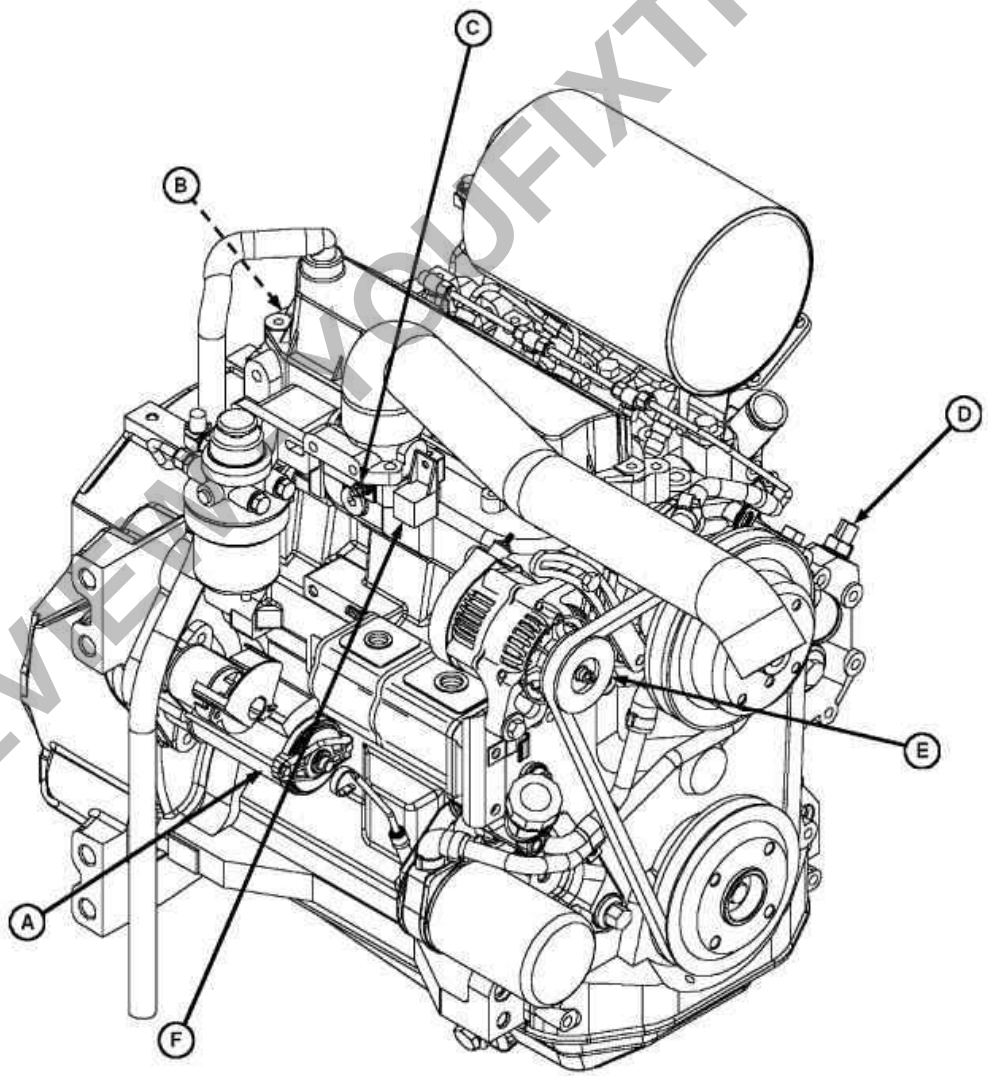
Component Location Information

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

- Engine Components
- Dash Components
- Machine Components

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

Engine Electrical Components—Right Hand Side



PY6312

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Group 05 - Component Location

Component Location Information

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

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

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

Power Train Components (OOS Tractors)

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Group 05 - Component Location

Component Location Information

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

- Steering System
- Brake System

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

Steering System Components – 5610, 5410, 5310S India and 5003 South Africa and Turkey Tractors

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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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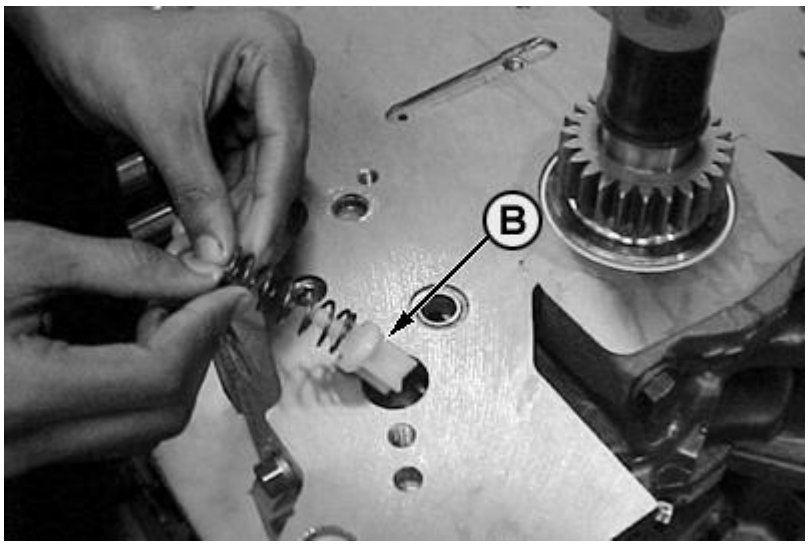
Torques for Hardware

Torque

ITEM	TORQUE
Rocker arm shaft clamp	47 N·m (35 lb-ft)
Cylinder head cap screws:	
Step 1	100 N·m (75 lb-ft)
Step 2	150 N·m (110 lb-ft)
Step 3	Wait 5 minutes and verify 150 N·m (110 lb-ft)
Step 4	Tighten additional 60° ± 10°
Fuel injection nozzles to cylinder head	40 N·m (30 lb-ft)
Intake manifold to cylinder head	47 N·m (35 lb-ft)
Exhaust manifold to cylinder head	47 N·m (35 lb-ft)
Rocker arm cover to cylinder head	11 N·m (9 lb-ft)

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Oil By-Pass Valve

LEGEND:

A	Countersunk Screw
B	Oil By-Pass Valve
C	Stud Location
D	AT21191 Plug (5/16“) (6 used)
E	AT22919 Plug (3/8”) (2 used)
F	T23442 Stud (3 used)
G	R79854 Bushing
H	Gasket
J	Front Plate

[1] - Install injection pump stud (F) on front plate using Loctite 271.

[2] -

→NOTE:

Standard front plate (without auxiliary drive extension) have several injection pump stud locations. Use holes marked (C).

ON standard front plate only, install the 5/16“ plugs (D) and the 3/8” plugs (E) as shown. Bushing (G) is not required for this application.

[3] - Install oil by-pass valve (B) and spring in cylinder block.

[4] - Install gasket (H) and front plate. Place new external tooth washers onto countersunk screws (A) then tighten to specification.

Item	Measurement	Specification
Front Plate Countersunk Screws	Torque	35 N˙m (25 lb-ft)

IMPORTANT:

Cut off protruding edge of gasket only after timing gear cover has been tightened.

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Section 50 - POWER TRAIN REPAIR

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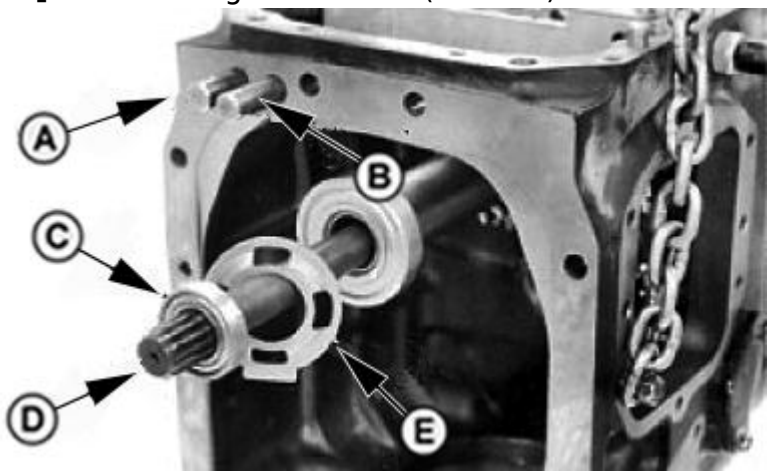
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A Bearing
B Oil Deflector

Install bearing (A) and oil deflector (B) to differential housing.

[12] - Install range shift shaft (A and B).



.

LEGEND:

A B and C Range Shift Shaft
B A Range Shift Shaft
C Bearing
D PTO Shaft
E Washer

[13] - Install PTO shaft (D), washer (E) and bearing (C).

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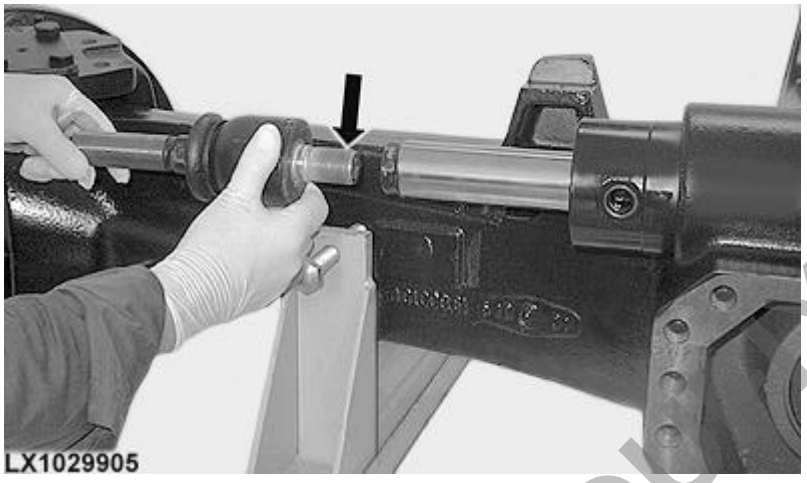
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Install Tie Rods — MFWD

⚠ CAUTION:

Follow safety and repair instructions, see reference"General Safety and Repair Information"in Group 01.

[1] -



Tie rod joint

Coat approx. 3 turns of the thread on the tie rod with LOCTITE ™ 243 thread lock (see arrow). Tighten tie rod joint to specified torque.

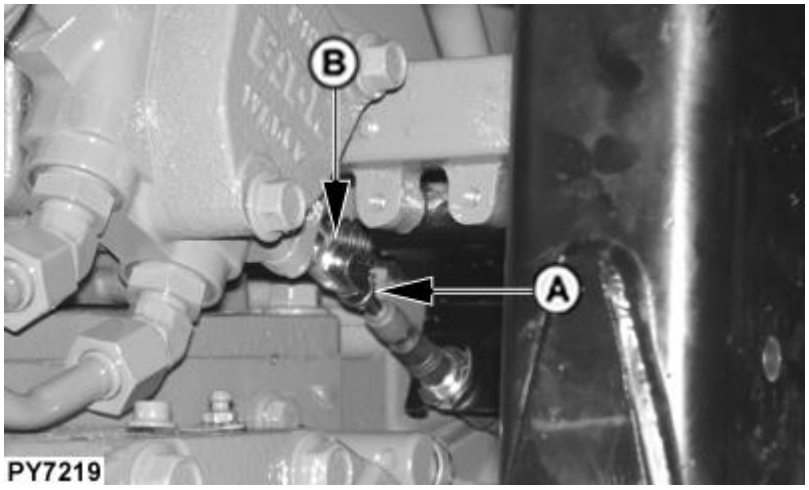
Item	Measurement	Specification
Tie rod joint to piston rod of steering cylinder (00.16 axle)	Torque	300 N˙m
		220 lb-ft

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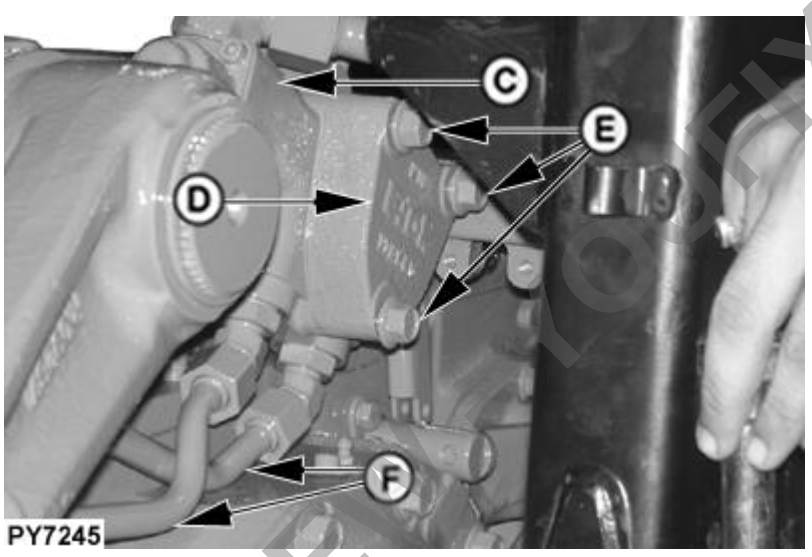
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Remove and Install EATON Selective Control Valve - Turkey (IOOS) Tractors

[1] -



SCV and SCV Cable



SCV Parts

LEGEND:

A	Locking Pin
B	Clevis
C	SCV
D	End Cap
E	Screw (3 used)
F	Hydraulic Lines

Disconnect SCV from SCV cable by removing locking pin (A) and clevis (B).

[2] - Remove screws (E) and end cap (D).

[3] - Disconnect hydraulic lines (F).

[4] - Remove SCV (C).

[5] -

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MAJOR COMPONENTS:

- Radiator
- Coolant Hoses
- Water Pump
- Cooling Fan
- Fan Belt
- Engine Block
- Cylinder Head
- Thermostat
- Coolant Temperature Sender
- Coolant Recovery Tank
- Pressure Cap
- Engine Oil Cooler

THEORY OF OPERATION:

The pressurized cooling system includes the radiator, water pump, fan and thermostat.

During the warm-up period, thermostat (B) remains closed and coolant is directed through a bypass passage to suction side of water pump. The coolant then circulates through the cylinder block providing a fast warm-up period.

Once the engine has reached operating temperature, the thermostat opens and coolant is pumped from the bottom of radiator (F) via the lower radiator hose (G) into the cylinder block. Here it circulates through the block and around the cylinder liners. From the block, coolant is then directed through the cylinder head, and into thermostat housing. With the thermostat open, 82°C (180°F), warm engine coolant passes through the housing into the top of radiator where it is circulated to dissipate heat.

When coolant system pressure exceeds 48 kPa (0.48 bar) (7 psi), the fluid volume expands to allow coolant to discharge into the coolant recovery chamber (D) in the top of the radiator.

When temperature is reduced, a vacuum is produced in the radiator and coolant is drawn back out of the coolant recovery chamber through four small holes in the radiator fill neck.

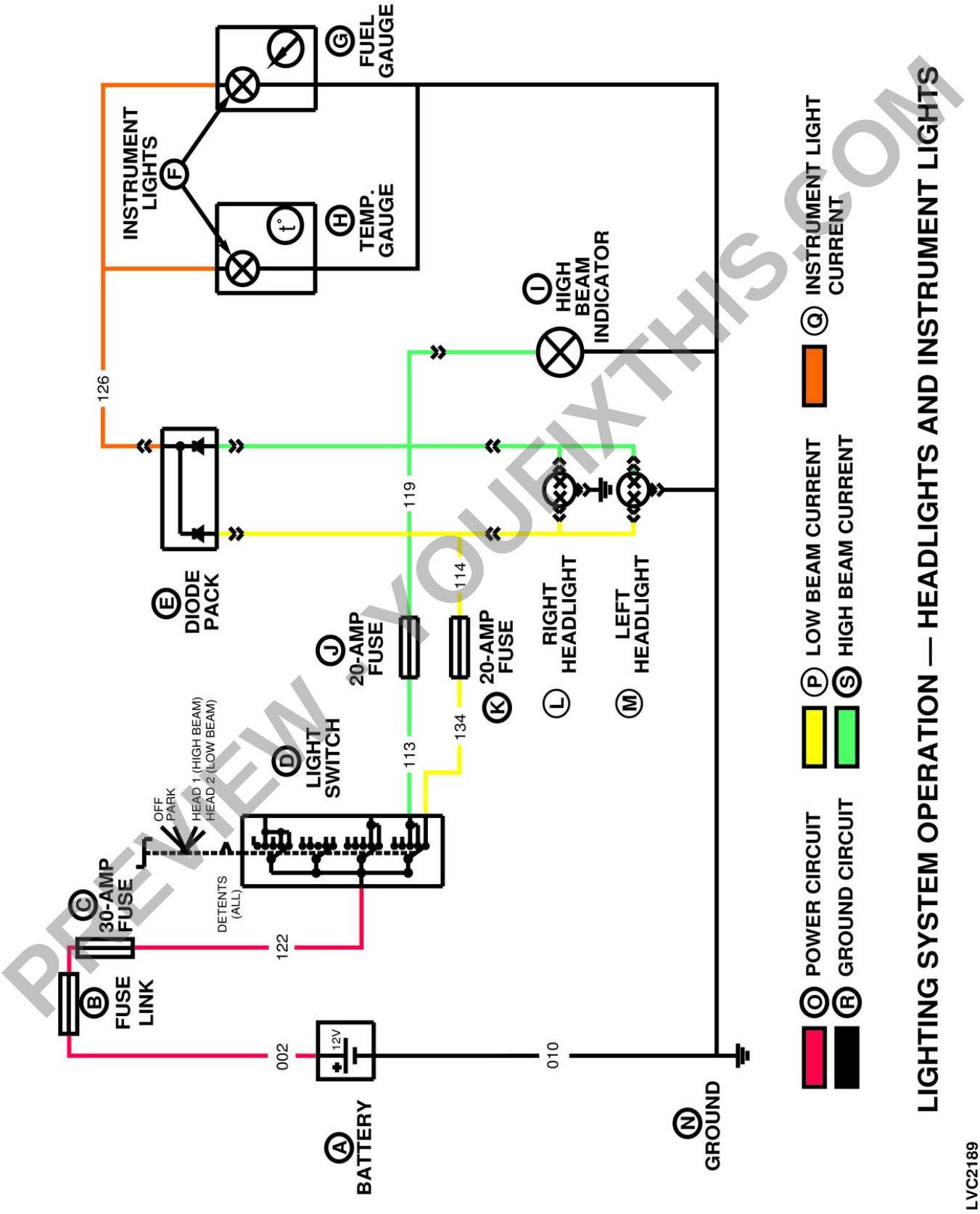
Oil cooler (H) is used to help reduce the temperature of engine oil. Pressurized oil enters the oil cooler and passes through a network of tubing surrounded by engine coolant. Prior to entering the oil cooler, the engine coolant passes through the radiator, which transfers much of the coolant′s heat into the surrounding air. The coolant, its temperature now reduced, enters the oil cooler and passes over the warmer tubing. Heat transfers from the oil to the coolant, thus reducing oil temperature.

Coolant temperature sender (C) senses critical coolant temperature and sends a signal to a gauge in the instrument panel.

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Lighting System Operation—Headlights and Instrument Lights



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[2] - Turn load knob of tester clockwise until amperage reading (D) is equal to:

Cold cranking amperage rating (blue scale).

OR—

Three times ampere hour rating (black scale).

[3] - Hold for 15 seconds, note voltage reading, and turn load knob of tester to off.

Item	Measurement	Specification
Battery	Minimum Voltage	9.6 Volts Under Load

RESULTS:

- If the battery passes the test, battery is good.
- If the battery does not pass the test, replace battery.

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A Steering Valve Return Line
B Steering Valve
C Supply Line to Brake Valve
D Pressure Line
E Pressure Line
F Piston Rod End
G Steering Cylinder
I Steering Pump
J Suction Oil
K Pump Pressure Oil
L Return Oil
M Trapped Oil

FUNCTION:

Offer hydraulic power steering for ease of operation.

MAJOR COMPONENTS:

- Steering Valve
- Hydraulic Pump
- Steering Cylinder

THEORY OF OPERATION:

The steering pump (I) takes filtered suction oil (J) from the transmission sump and pressurizes it. Pump pressure oil (K) is supplied to the steering valve (B). The steering valve distributes oil through pressure lines (D and E) to the steering cylinder (G) as needed.

Under neutral steering conditions (no steering wheel movement), the pressure lines and steering cylinder contain trapped oil (M), which maintains steering direction. Turning the steering wheel to the right, even a slight amount, allows pump pressure oil to enter line (E), pushing the steering cylinder piston (F) outward (Under these conditions pressure line (D) allows oil to flow from the steering cylinder to the steering valve and through steering valve return line (A) to the transmission. This return oil (L) lubricates the transmission top shaft before returning to sump.

When the steering wheel is turned to the left, pressure oil enters line (D) pushing the steering cylinder piston inword. Return oil can flow through pressure line (E) from the steering cylinder to the steering valve and through steering valve return line to the transmission.

→NOTE:

The steering valve is designed to allow manual steering if the engine is not running or the hydraulic pump fails.

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