544E, 544E LL, 544E TC, 624E and 644E Loaders Repair

REPAIR TECHNICAL MANUAL

4WD Loaders models 544E, 624E, 644E

TM1414 22 FEB 05 (ENGLISH)

For complete service information also see:

544E, 544E LL, 544E TC, 624E, 644E Loader Diagnostic	TM1413
Series 300, 3029, 4039, 4045, 6059 and 6068 Diesel Engines	CTM8
Alternators and Starting Motors	CTM77
Series 400, 6076 Diesel Engines (- 499999)	CTM6
TeamMate II 1200, 1400,and 1600 Series Inboard Planetary Axles	CTM43
Series 300 - 3179,4239,6359,4276,6414 Diesel Engines	CTM4

John Deere Construction and Forestry
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TM1414

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Group I - Safety Information

Handle Fluids Safely-Avoid Fires



Avoid Fires

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.

Prevent Battery Explosions



Battery Explosions

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

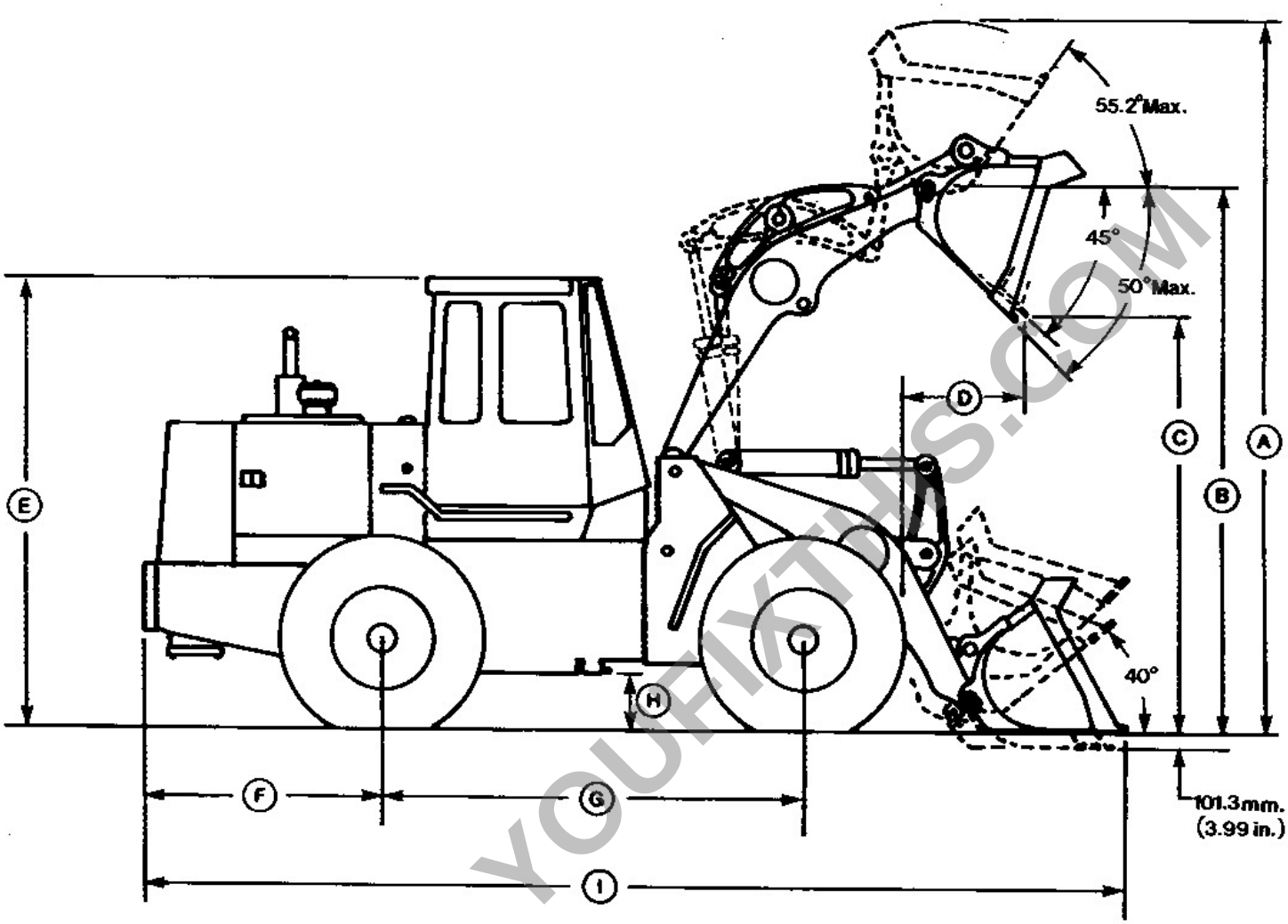
Prepare for Emergencies

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Group II - General Specifications

544E Specifications



544E Dimensions

544E Specifications

A-Overall operating height (boom full raise)	4.83 m (15 ft 10 in.)
B-Bucket hinge height	3.72 m (12 ft 3 in.)
C-Dump height	2.84 m (9 ft 4 in.)
D-Dump reach	0.94 m (3 ft 1 in.)
E-Overall height	3.14 m (10 ft 4 in.)
F-Overhang	1.63 m (5 ft 4 in.)
G-Wheelbase	2.90 m (9 ft 6 in.)
H-Ground clearance	390 mm (1 ft 3 in.)
I-Overall length	6.89 m (22 ft 7 in.)
Standard operating weight	10 246 kg (22,589 lb)
Counterweight weight	
(1st optional counterweight) (2nd optional counterweight)	358 kg (790 lb) 424 kg (935 lb)

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544E Brakes And Service

Brakes, Service:
Power-actuated, 4-wheel, inboard-mounted, wet disk
Foot-operated, by either pedal
Left pedal also disconnects transmission (if selected by operator)
External inspection
Low brake pressure warning light and buzzer in monitor
Brakes, Park:
Expanding shoe on transmission output shaft, foot-operated
Transmission disconnects with park brake applied
Warning light in monitor-Dual-level
Amber lights with transmission in neutral Red lights, and buzzer sounds with transmission in gear

544E Steering

Steering:	
Turning radius (to centerline of outside tire)	4.95 m (16 ft 3 in.)

544E Tires

Tires
14.0-24, 10 PR, G2
15.5R-25, 1 STAR, L2 Equivalent
15.5-25, 12 PR L2
17.5-25, 12 PR, L2
17.5-25, 12 PR, L3
17.5R-25, 1 STAR, L2 Equivalent
20.5-25, 12 PR, L2
20.5-25, 12 PR, L3
23.1-26, 10 PR, LS-2
28 L-26, 14 PR, LS-2

544E Wheel Treads

Wheel Treads:	
Front and rear	1.94 m (76.4 in.)
Front and rear w/20.5-25 tires	1.90 m (74.8 in.)

544E Lift Capacity

Maximum Lift Capacity With Standard Equipment	
Maximum height	5 302 kg (11,691 lb)
Ground level	10 757 kg (23,719 lb)

544E Drain And Refill Capacities

Drain And Refill Capacities

	Metric	**U.S.**
Cooling system	23.5 L	25 qt
Fuel tank	208 L	55 qt
Engine crankcase and filter	19 L	20 qt
Transmission case and filter	9.5 L	10 qt
Front differential	16 L	17 qt

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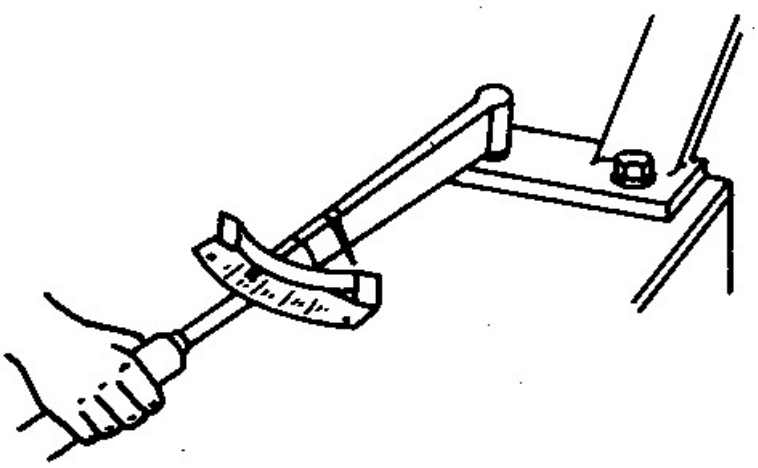
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Group III - Torque Values

Hardware Torque Specifications

Check cap screws and nuts to be sure they are tight. If hardware is loose, tighten to torque shown on the following charts unless a special torque is specified.

ROPS Torque Specifications



ROPS Mounting Cap Screws

CAUTION:

Make certain all parts are reinstalled correctly if the roll-over protective structure (ROPS) is loosened or removed for any reason. Tighten mounting bolts to proper torque.

The protection offered by ROPS will be impaired if ROPS is subjected to structural damage, is involved in an overturn incident, or is in any way altered. A damaged ROPS should be replaced, not reused.

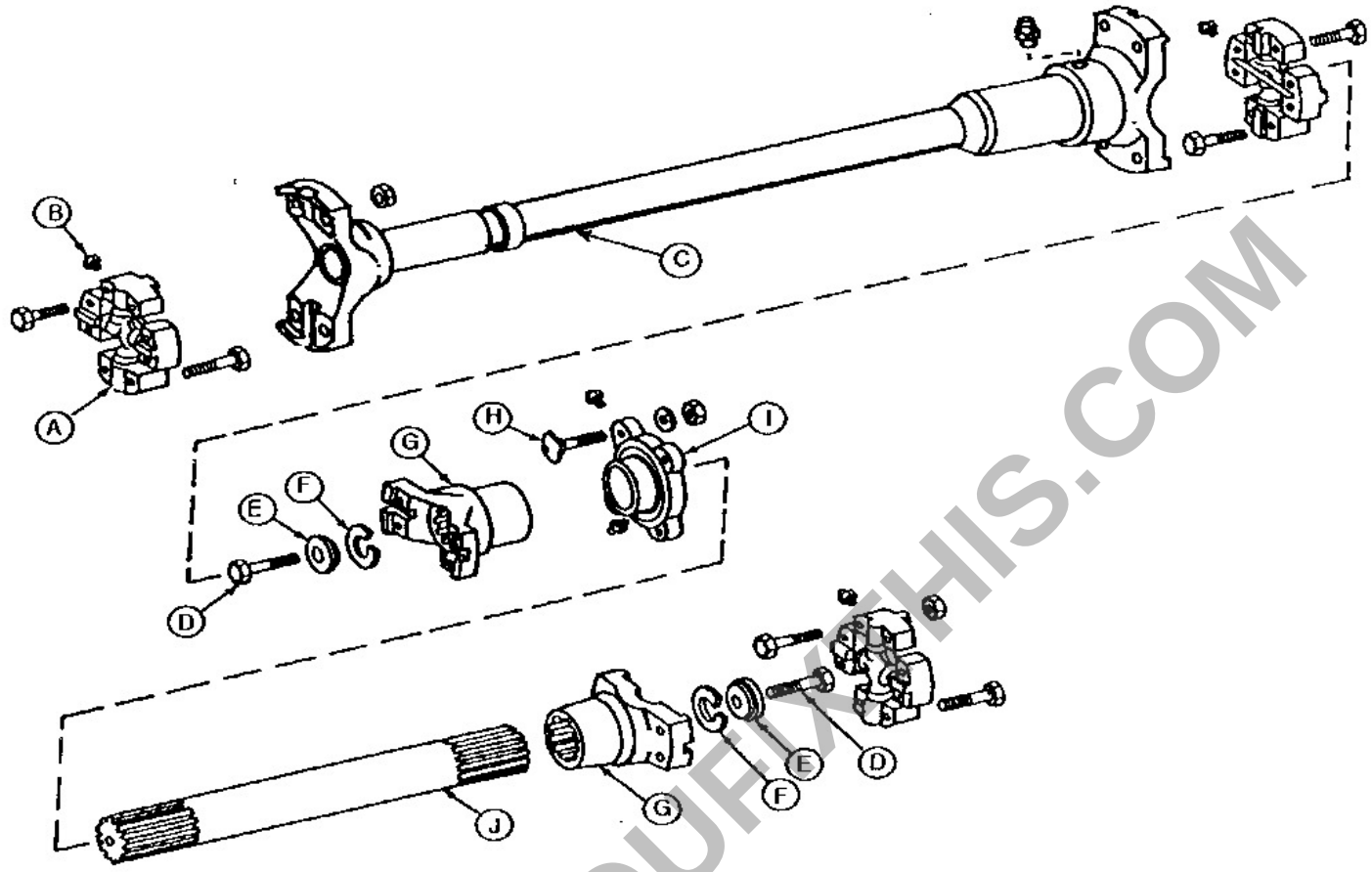
When installation of equipment on a machine necessitates loosening or removing ROPS, mounting bolts must be tightened to 620 ± 120 N·m (457 ± 88 lb-ft).

Item	Measurement	Specification
ROPS Mounting Bolts	Torque	620 ± 120 N·m (457 ± 88 lb-ft)

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Disassemble, Inspect, And Assemble Double Universal Joint, Support Bearing And Universal Joint Drive Shaft



Driveshaft Assembly

LEGEND:

A	Spider and Bearing Assembly (3 used)
B	Lubrication Fitting (6 used)
C	Splined Yoke Coupling
D	Cap Screw (2 used)
E	Washer (2 used)
F	Snap Ring (2 used)
G	Universal Joint Yoke (2 used)
H	Round Head Bolt (4 used)
I	Support Bearing
J	Universal Joint Drive Shaft

Apply John Deere NEVER-SEEZ ™ or an equivalent on inside surface of support bearing.

Number	Name	Use
• PT569 (us)	John Deere NEVER-SEEZ ™ Lubricant	Applied on inside surface of support bearing.

On 544E, use thread lock and sealer (medium strength) on front axle-to-spider gear nuts.

Number	Name	Use
• T43512 (us) • TY9473 (canadian) • 242 LOCTITE ™ (loctite)	Thread Lock and Sealer (Medium Strength) Products	Used to seal axle nut threads.

Item	Measurement	Specification
Drive Shaft Universal Joint Cap Screws:		

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Remove And Install Front Axle And Differential

[1] - Apply park brake.

[2] - Install locking bar.

[3] - Position bucket and lift unit.

[4] -



Floor Stands

Install floor stands (A).

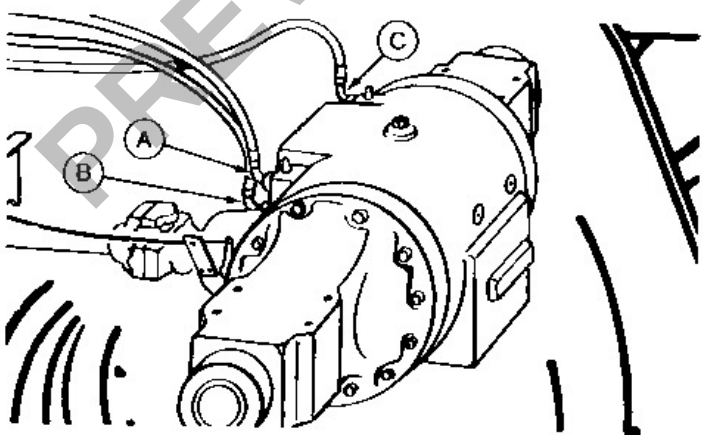
[5] - Disconnect battery ground cables.

[6] - Drain differential.

Item	Measurement	Specification
Differential-544E	Capacity	16 L (17 qt)
Front Differential-624E	Capacity	23 L (24 qt)
Rear Differential-624E	Capacity	16 L (17 qt)
Differential-644E	Capacity	23 L (24 qt)

[7] - Remove bottom guard, if equipped.

[8] -



LEGEND:

A Differential Lock Pressure-to-Pressure Regulating Valve Line
B Differential Lock Return-to-Reservoir Line
C Brake Valve-to-Axle Line

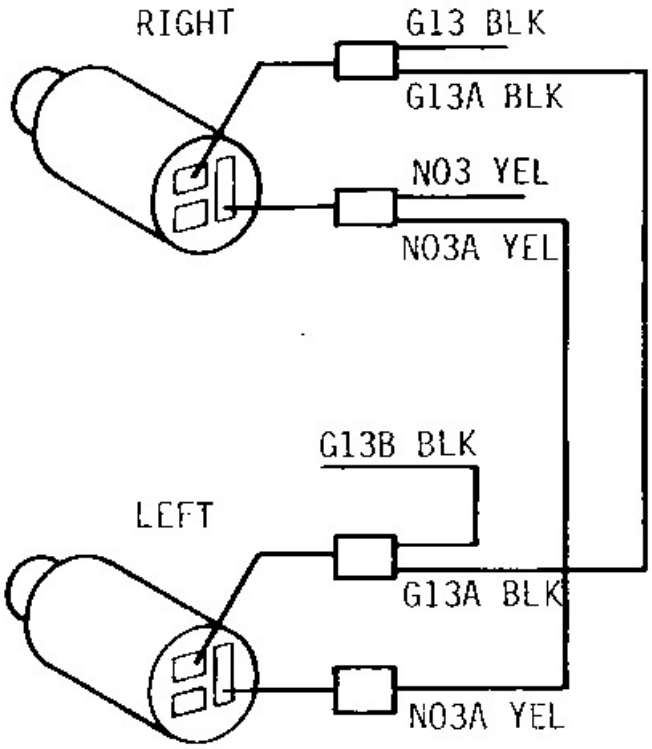
Front Axle Line Connections

Disconnect lines (A-C). Cap and plug all openings.

[9] - Disconnect drive shaft.

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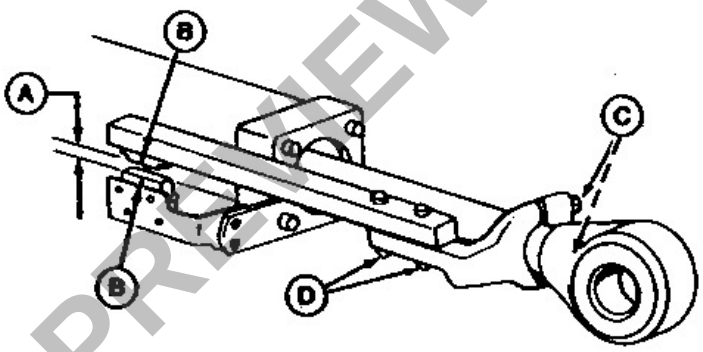


T68896W

Wiring Lead Connections

Install new switch and connect leading wiring leads.

Return-To-Dig Adjustment



LEGEND:

A	Magnet-to-Switch Clearance
B	Alignment Marks
C	Cap Screws
D	Cap Screws

Return-To-Dig

→NOTE:

Earlier units only: Whenever the key switch is turned off, the return-to-dig switch must be reset. Cycling the bucket from rolled back to dump position will reset the switch. When return-to-dig switch is activated, indicator bulb will light.

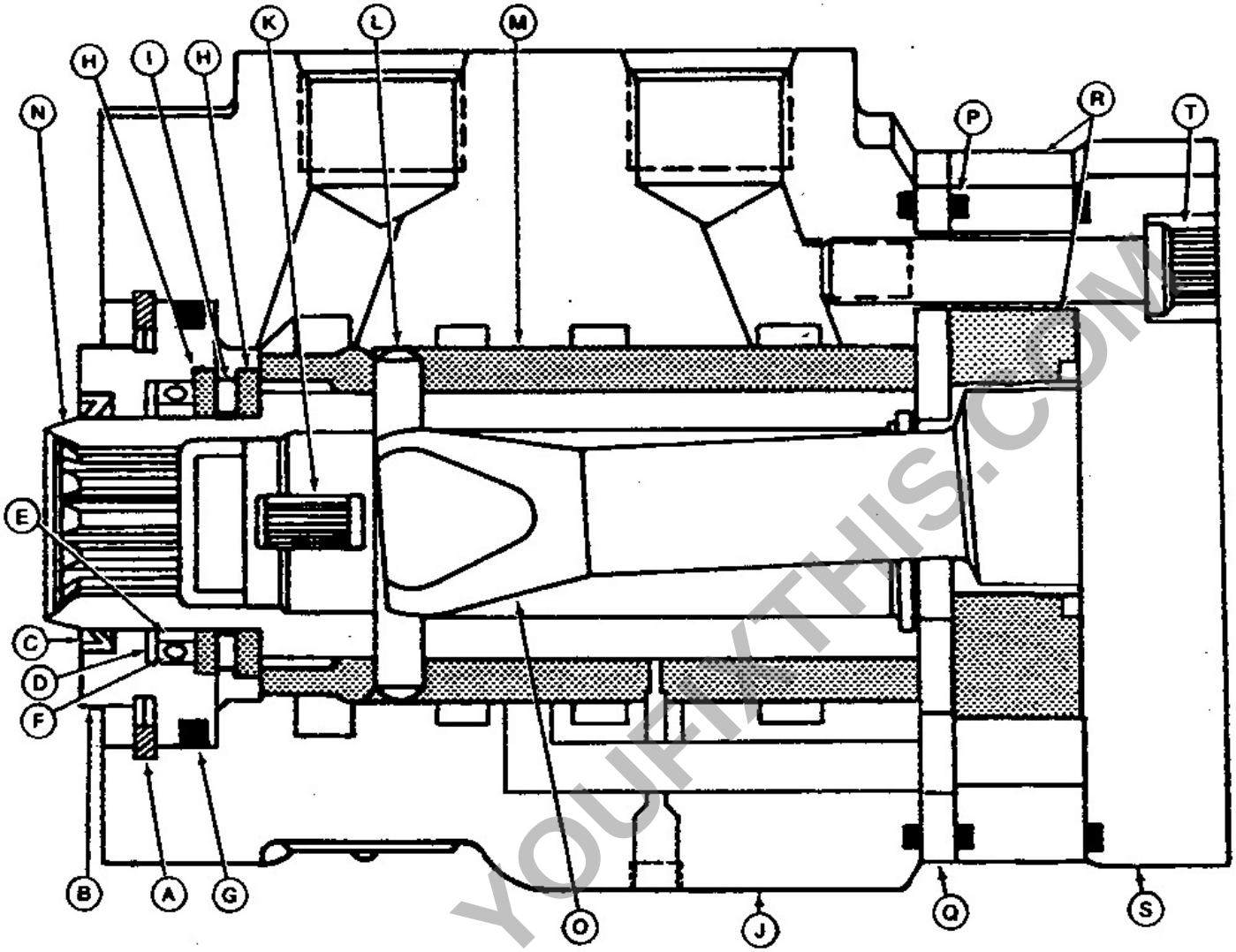
On 544E LL and 544E TC, the return-to-dig switch and magnet are located below the cylinder.

[1] - Earlier units only: Raise boom. Cycle bucket from full rollback to dump to reset the switch.

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Cross Section Of Steering Valve



Cross Section Of Steering Valve

LEGEND:

A	Retaining Ring
B	Seal Gland Bushing
C	Oil Seal
D	Backup Ring
E	Wear Ring
F	O-Ring
G	O-Ring
H	Bearing Race (2 used)
I	Thrust Bearing
J	Housing
K	Centering Spring (6 used)
L	Pin
M	Control Sleeve
N	Control Spool
O	Drive Shaft
P	O-Ring (3 used)
Q	Wear Plate
R	Gerotor Assembly
S	End Cap
T	Cap Screws (7 used)

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644E Engine Specifications

Engine:	
John Deere 6076T	119 kW (160 hp)
Bore and stroke	116 x 121 mm (4.56 x 4.75 in.)
Piston displacement	7.636 L (466 cu in.)
Lubrication	Pressure system with full-flow filter
Cooling	Pressurized with thermostat, controlled bypass,and coolant recovery bottle
Fan	Blower
Aspirate dual-stage air cleaner with restriction indicator	Dry
Electrical system	12-volt with alternator
Batteries (one or two 12-volt)	
Cold cranking capacity at -18°C (0°F)	925 amps
Reserve capacity	160 min. ea.
Alternator: standard with canopy Alternator: standard with cab Alternator: optional with cab	65 amps 105 amps 130 amps
Torque Converter	single phase, planetary
Transmission	Countershaft power shift

644E Travel Speeds

Travel Speeds:		
Forward Speeds:	**km/h**	**mph**
1	0-7.7	0-4.8
2	0-12.2	0-7.6
3	0-26.4	0-16.4
4	0-41.0	0-25.5

Reverse Speeds:	**km/h**	**mph**
1	0-7.7	0-4.8
2	0-12.2	0-7.6
3	0-26.4	0-16.4

644E Differentials

Differentials:	
Front and rear	Standard
Front hydraulic differential lock with capture circuit	Optional
Front no spin	Optional

644E Drive Axles

Drive Axles:
Inboard-mounted planetary gears to each wheel
Front axle fixed
Rear axle oscillates 26° total

644E Brakes And Service

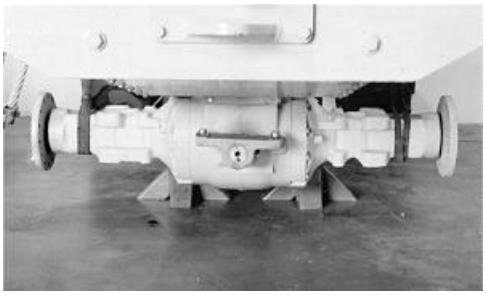
Brakes, Service:
Power-actuated, 4-wheel, inboard-mounted, wet disk
Foot-operated, by either pedal
Left pedal also disconnects transmission (if selected by operator)
External inspection
Low brake pressure warning light and buzzer in monitor

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CAUTION:

Axle weighs approximately 91 kg (200 lb).



Axle And Differential Assembly

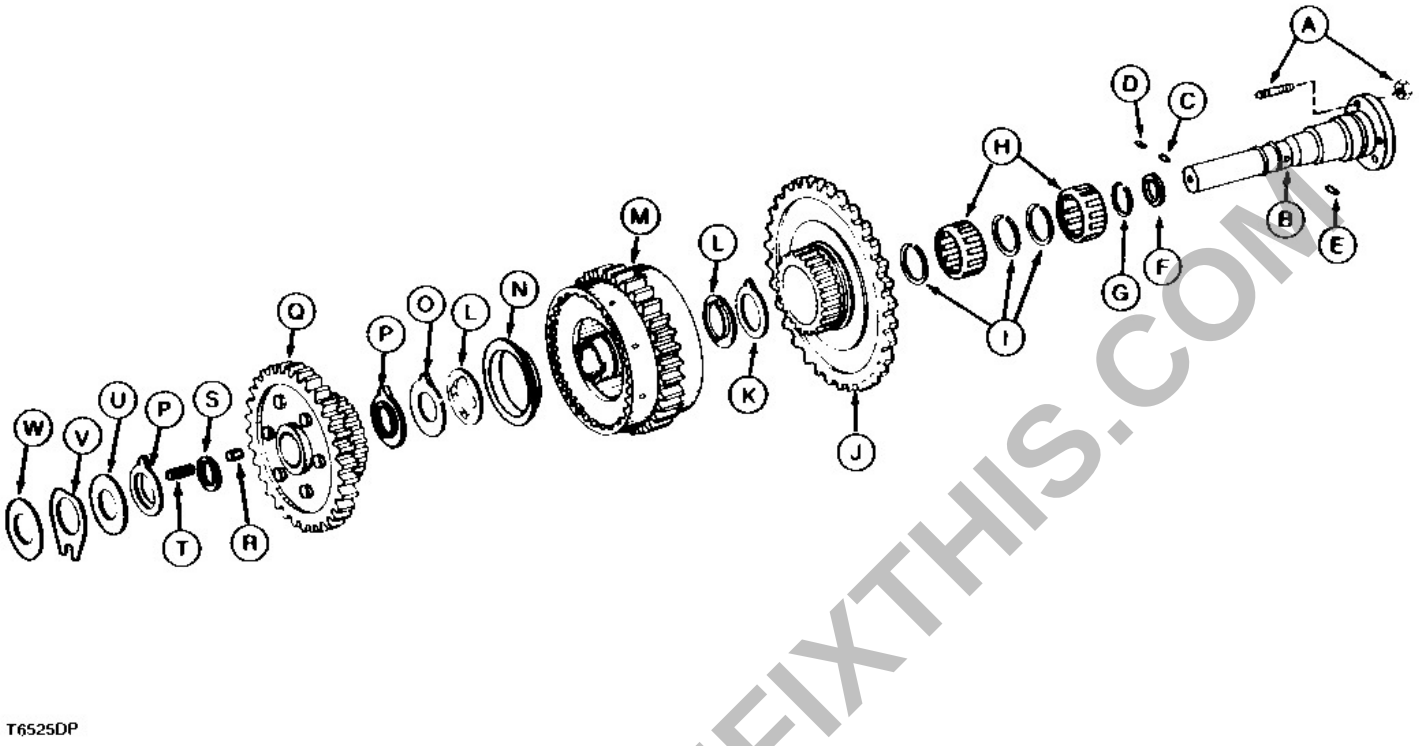
Lower axle and differential assembly.

Item	Measurement	Specification
Axle	Weight	91 kg (200 lb)

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Remove And Install Reverse And Second Drive Gears



T6525DP

Reverse And Second Drive Gears

LEGEND:

A	Stud with Hex Nut (3 used)
B	Reverse/Second Gear Shaft (Axle)
C	Pin (7 used)
D	Pin-544E (2 used)
E	Pin (2 used)
F	O-Ring
G	Sealing Ring (3 used)
H	Roller Bearing (2 used)
I	Ring (3 used)
J	Second Gear Drive Gear
K	Thrust Washer, Fiber
L	Thrust Washer Steel, Formed (2 used)
M	Disk and Plate Carrier
N	Baffle Ring (544E)
O	Thrust Washer, Fiber
P	Thrust Washer Steel (2 used)
Q	Reverse Drive Gear
R	Needle Roller, Short (14 used)
S	Backup Ring
T	Needle Roller, Long (14 used)
U	Thrust Washer, Fiber
V	Forked Thrust Washer
W	Shim (as required) (14 thicknesses)

IMPORTANT:

Pins (C, D, and E) should not be removed from shaft unless replacement is required. The pins provide proper oil orifice size.

For proper assembly, replace rollers by matching corresponding roller length to wear pattern on inside of gear (Q).

Bent forks on thrust washer (V) must face transmission case.

Install bearings (H) so that the smooth side of each bearing case faces away from each other.

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[15] - Remove inner snap ring from groove (K), to measure roller bearing outer race end play at other end of shaft.

[16] - Replace shaft (A), bearing (H), shim (I) and outer snap ring (J).

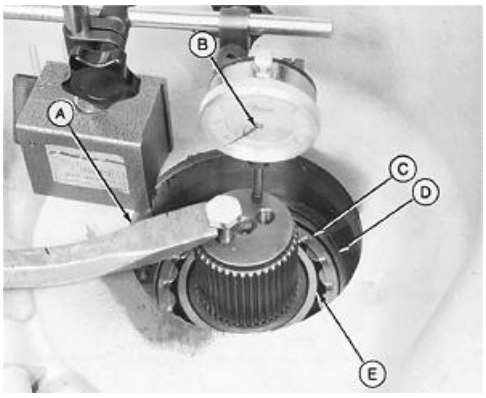
[17] - Install parts (A-J) into housing (L).

→NOTE:

If transmission is in stand, turn 180°.

[18] - Install cap screw in shaft.

[19] -



LEGEND:

A	Pry Bar
B	Dial Indicator
C	Outer Bearing Race
D	Snap Ring
E	Inner Bearing Race

End Play Measurement

Position dial indicator (B) to read off of shaft end, and zero needle.

[20] - Tap on bearings (C and E) to seat inner and outer races.

[21] - Raise shaft with pry bar (A) and record end play.

[22] - Repeat steps 20 and 21.

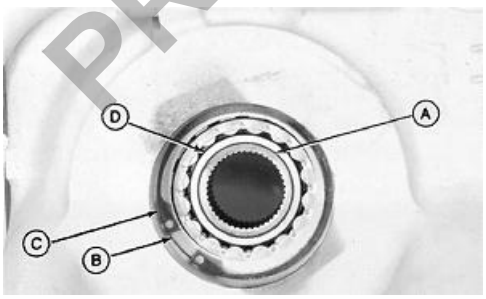
Example:

Item	Measurement	Specification
Clutch Pack	Measured End Play	0.9 mm (0.035 in.)
	Required End Play	0.3-0.5 mm (0.012-0.020 in.)
Shim	Thickness	0.5 mm (0.020 in.)
Clutch Pack	End Play	0.4 mm (0.016 in.)

Shims are available in three sizes:

- 0.2 mm (0.008 in.)
- 0.3 mm (0.012 in.)
- 0.5 mm (0.020 in.)

[23] -



LEGEND:

A	Gear
B	Shim
C	Snap Ring
D	Inner Race

Gear, Shim, Snap Ring And Inner Race

Remove snap ring (C) at roller bearing end.

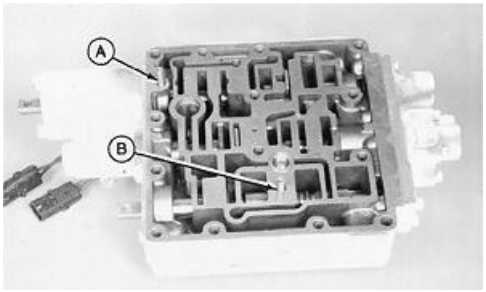
[24] - Install shim (B) between snap ring and bearing outer race.

[25] - Install snap ring (C).

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Install Transmission Control Valve



Detent Pin And Spring

[1] - Install detent pin and spring (A).

[2] - Install detent ball and spring (B).

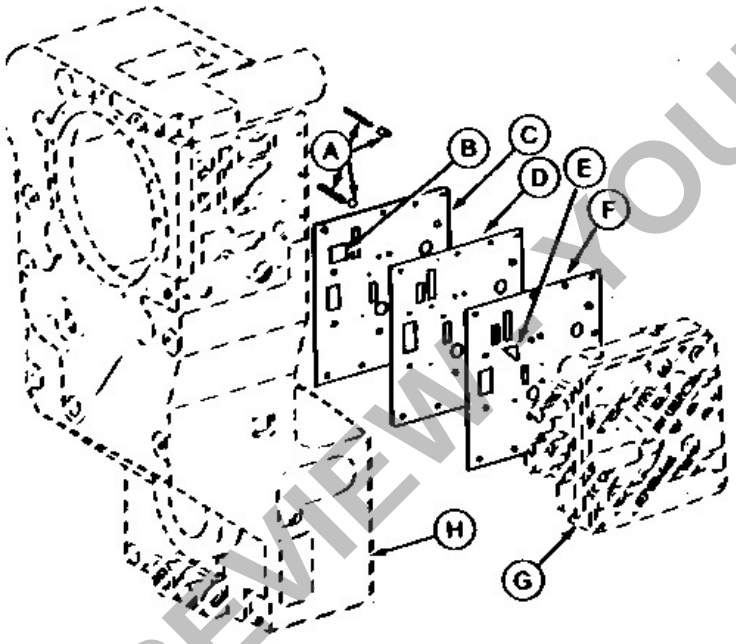
[3] -

IMPORTANT:

Be sure detent pin, spring, detent ball, and spring (A) stay positioned when installing control valve.

→NOTE:

Gasket (C) with square hole (B) goes towards housing (H). Gasket (F) with triangle (E) goes toward control valve (G).



LEGEND:

A	Springs, Ball and Detent
B	Square Hole in Gasket (C)
C	Gasket, Plate-to-Housing
D	Plate
E	Triangle in Gasket (F)
F	Gasket, Plate-to-Control Valve
G	Control Valve
H	Housing

Gaskets And Plate On Housing

Position gaskets and plate on control valve housing and secure control valve to transmission housing.

[4] - Tighten all screws to 7 N·m (5 lb-ft), then starting at the center, tighten cap screws to specified torque.

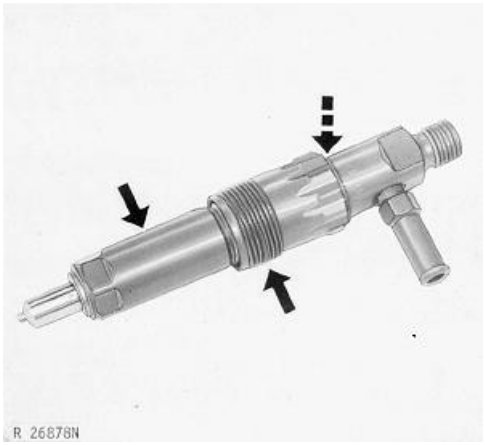
Item	Measurement	Specification
Control Valve To Transmission Housing Cap Screws	Torque	7 N·m (5 lb-ft)
Control Valve Allen Head Wrench	Torque	25 N·m (18 lb-ft)

[5] -

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Install Fuel Injection Nozzle-644E



Fuel Injection Nozzle

[1] - Apply NEVER-SEEZ ™ or an equivalent anti-seize compound to the gland nut threads and nozzle barrel (arrows).

Number	Name	Use
• PT569 (us)	John Deere NEVER-SEEZ ™ Lubricant	Applied to gland nut, threads and nozzle barrel.

Apply anti-seize compound also to inside bore of gland nut during assembly.

→NOTE:

Apply anti-seize compound at these locations will help prevent possible seizure of the gland nut to the holder body.

[2] -

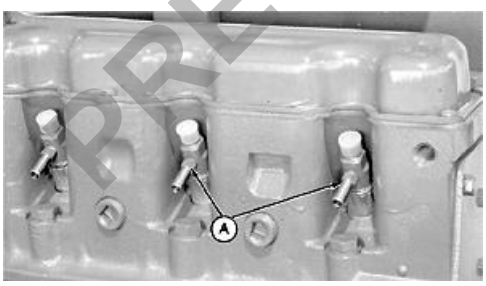


Steel Washer

Install a new R64840 special steel washer (A) on tip end of injection nozzle.

[3] - Insert injection nozzle into cylinder head. Make sure that it is threaded straight in cylinder head.

[4] -



Leak-Off Connectors

Remove leak-off connectors (A) and washers.

[5] - Use outer socket of JDE92 Nozzle socket and turn gland nut down.

Nozzle Socket

JDE-92

Used to remove nozzles.

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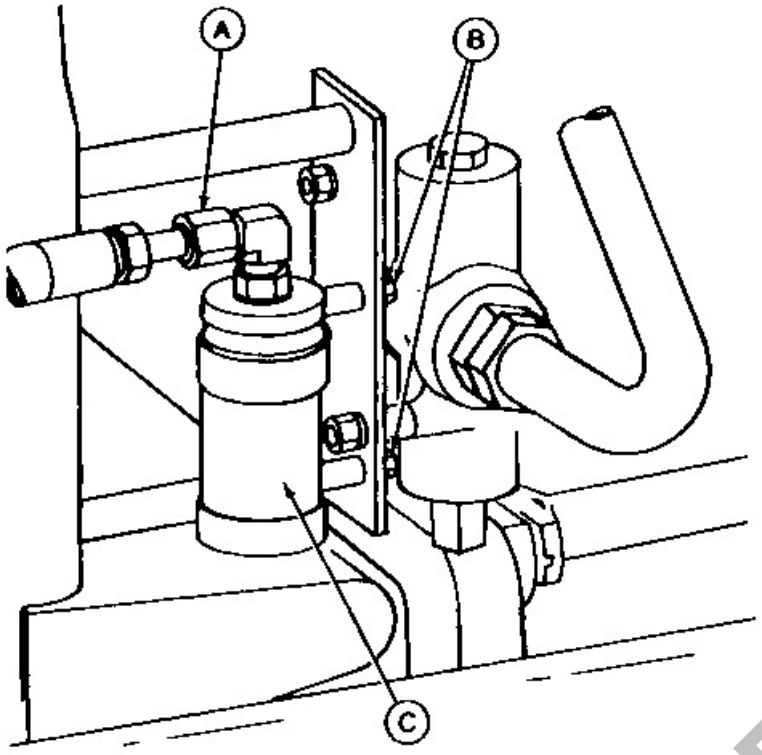
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T7011AM

Accumulator Connections

Disconnect and cap line (A).

[4] - Remove cap screws (B) to remove accumulator (C).

[5] - To install accumulator, install clamps and cap screws (B). Connect line (A).

Disassemble And Assemble Steering Accumulator-644E Later Machines



Nitrogen Charging Kit To Gas Valve

LEGEND:

A	Fitting
B	O-Ring
C	Accumulator
D	O-Ring
E	Gas Valve
F	Guard
G	Screw (2 used)
H	Cap

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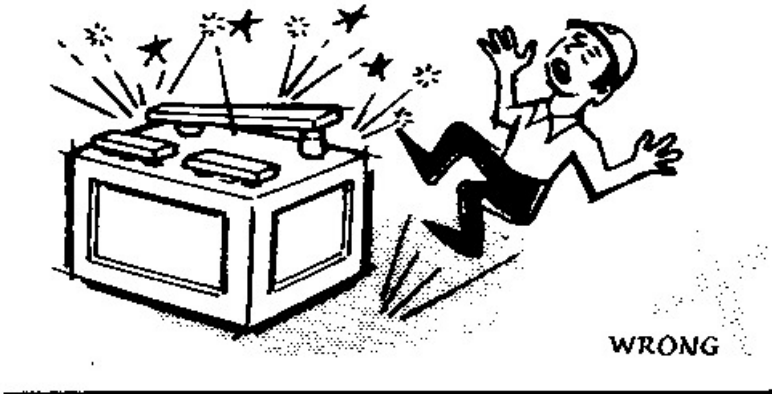
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Group 1671 - Batteries, Support And Cables

Specifications

Item	Measurement	Specification
Battery	Cold cranking amps at -18° C (0°F)	925 amps
	Reserve capacity minutes at 25 amps and 27° C (80°F)	180 minutes
Battery Terminal Nuts	Torque	9.5 N·m (85 lb-in.)

Handle Batteries Safely



Handle Batteries Safely

CAUTION:

An explosive gas is produced while batteries are in use or being charged. Keep flames or sparks away from the battery area. Make sure the batteries are charged in a well ventilated area.

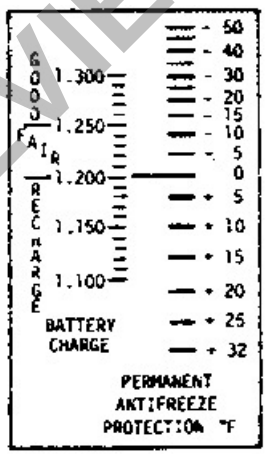
Never lay a metal object on top of a battery as a short circuit can result.

Test Batteries Using Coolant And Battery Tester

[1] - Clean the measuring window (A) and bottom of the plastic cover on the tester.

[2] - Use the black dipstick to place a few drops of electrolyte on the measuring window through the opening in the cover. Each battery cell must be tested separately.

[3] -



Battery Specific Gravity Gauge

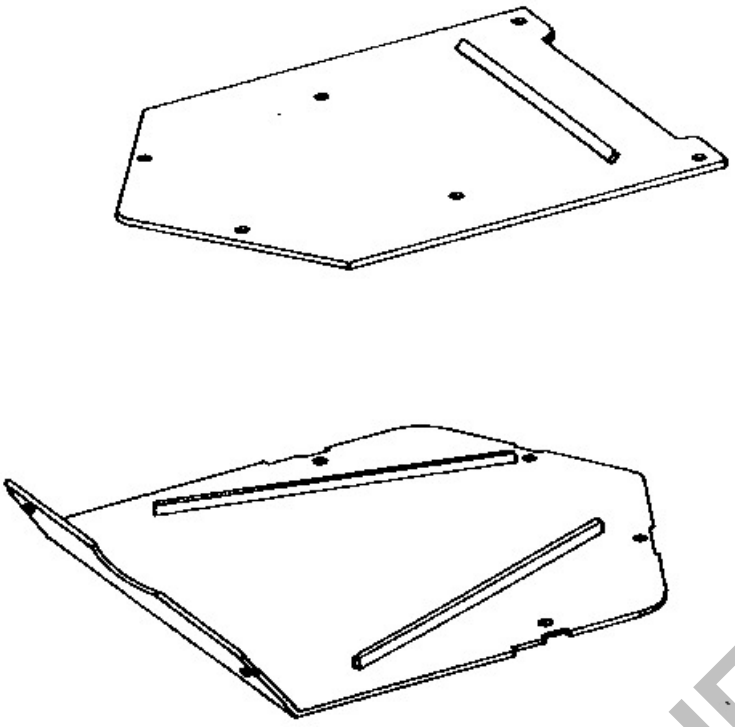
Look into the eyepiece and hold the measuring window toward a light source. The specific gravity of the electrolyte is indicated by the line that divides the light and dark portions of the scale. The example shows a specific gravity of 1.275.

[4] - If the specific gravity readings are more than 0.050 between the highest and lowest cell, the battery is defective and must be replaced.

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Remove And Install Auxiliary Bottom Guards (If Equipped)



Auxiliary Bottom Guards

CAUTION:

The approximate weight of transmission guard is 69 kg (153 lb).

Item	Measurement	Specification
Transmission Guard	Weight	69 kg (153 lb)

The approximate weight of loader frame guard is:

- ***544E: 65 kg (145 lb)***

Item	Measurement	Specification
Bottom Guard-544E	Weight	65 kg (145 lb)

- ***624E: 49 kg (107 lb)***

Item	Measurement	Specification
Bottom Guard-624E	Weight	49 kg (107 lb)

- ***644E: 55 kg (123 lb)***

Item	Measurement	Specification
Bottom Guard-644E	Weight	55 kg (123 lb)

Weight may increase due to the build-up of mud and debris.

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Item	Measurement	Specification
Adjusting Bolt (10 mm)	Torque	45 N·m (33 lb-ft)
Hub Retaining Nut	Torque	16 N·m (12 lb-ft)
Through-bolts	Torque	26 N·m (19 lb-ft)
Belt Tension	Deflection at 111 N (25 lb force)	13 mm (0.5 in.)
Condenser		
Condenser Door-to-Cab Cap Screws	Torque	73 N·m (54 lb-ft)
Motor Mount-to-Condenser Housing Cap Screws	Torque	One full turn after initial grommet compression

Item	Measurement	Specification
Thermostat Switch		
Opens at Maximum Cooling	Temperature	-2-0°C (28-32°F)
Closes at Maximum Cooling	Temperature	2-4°C (35-39°F)
Opens at Minimum Cooling	Temperature	10-14°C (49-57°F)
Closes at Minimum Cooling	Temperature	13-18°C (56-64°F)
Hysteresis	Temperature	4 ± 1°C (7 ± 2°F)

Proper Refrigerant Handling

The U.S. Environmental Protection Agency prohibits discharge of any refrigerant into the atmosphere, and requires that refrigerant be recovered using the approved recovery equipment.

IMPORTANT:

Use correct refrigerant recovery, recycling and charging stations. DO NOT use refrigerant, hoses, fittings, components or refrigerant oils intended for use with R12 refrigerant.

Recovery, recycling and charging stations for R12 and R134a refrigerants MUST NOT be interchanged.

Number	Name	Use
• TY6334 (us)	Refrigerant-12	Used to charge air conditioning system.

Systems containing R12 refrigerant use a different oil than systems using R134a. Certain seals are not compatible with both types of refrigerants.

Refrigerant (R-12) Cautions

CAUTION:

DO NOT allow liquid refrigerant (R-12) to contact eye or skin. Liquid refrigerant (R-12) will freeze eye or skin on contact. Wear goggles, gloves and protective clothing.

If liquid refrigerant (R-12) contacts eye or skin, DO NOT rub the area. Splash large amounts of COOL water on affected area. Go to a physician or hospital immediately for treatment.

DO NOT allow refrigerant (R-12) to contact open flames or very hot surfaces such as electric welding arc, electric heating element and lighted smoking materials. Refrigerant (R-12), exposed to high temperature, forms phosgene gas.

Inhaling toxic phosgene gas may result in serious illness or death. Phosgene gas has an odor like new mown hay or green corn. If you inhale phosgene gas, go to a physician or hospital immediately for treatment.

DO NOT heat refrigerant (R-12) over 52°C (125°F) in a closed container. Heated refrigerant (R-12) will develop high pressure which can burst the container.

Keep refrigerant (R-12) containers away from heat sources. Store refrigerant (R-12) in a cool place.

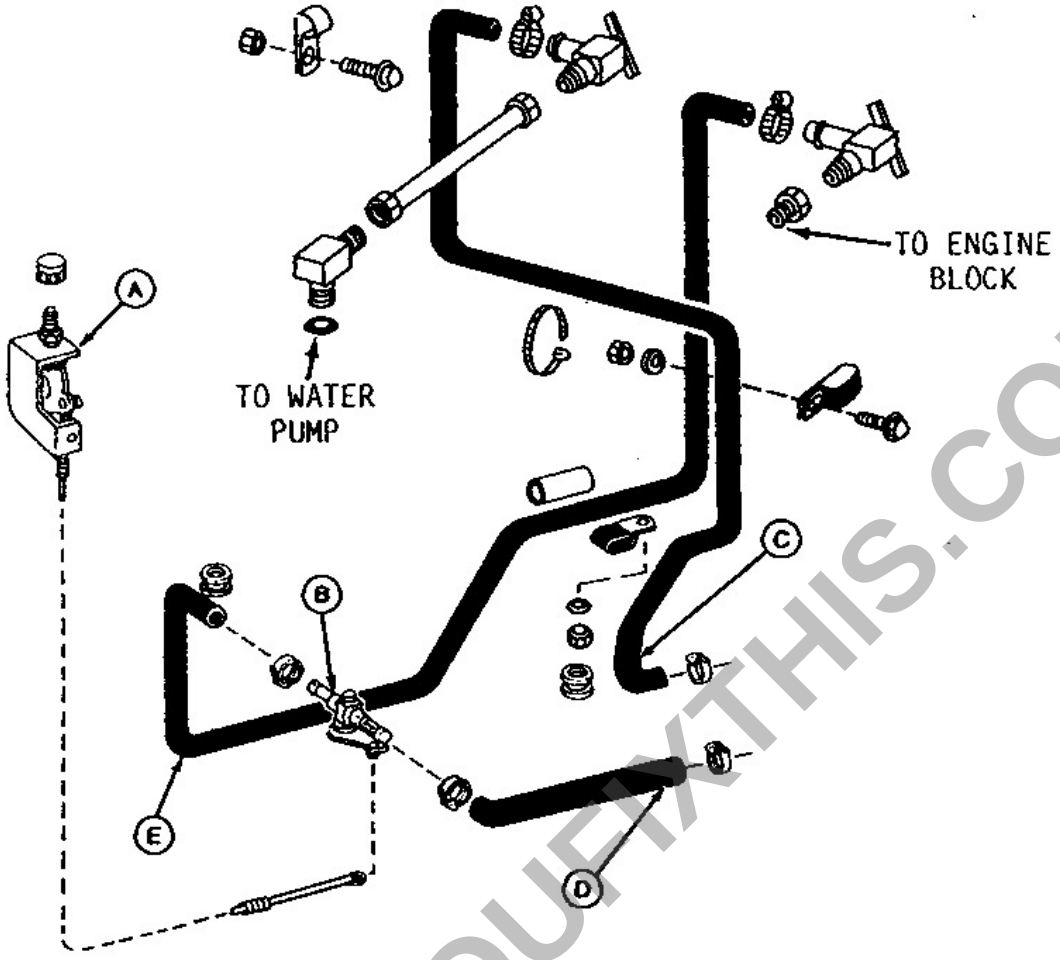
DO NOT handle damp refrigerant (R-12) container with your bare hands. Skin may freeze to container. Wear gloves.

If skin freezes to container, pour cool water over container to free the skin. Go to a physician or hospital immediately for treatment.

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Remove And Install Cab Heater Hoses And Controls



Cab Heater Hoses And Controls

LEGEND:

A	Heater Valve Control
B	Heater Control Valve
C	Water Pump-to-Upper Port (Output) of Heater Core Line
D	Heater Control Valve-to-Lower Port (Inlet) of Heater Core Line
E	Engine Block-to-Heater Control Valve Line

Install heater control valve (B) with arrow on valve pointing towards heater inlet (bottom port).

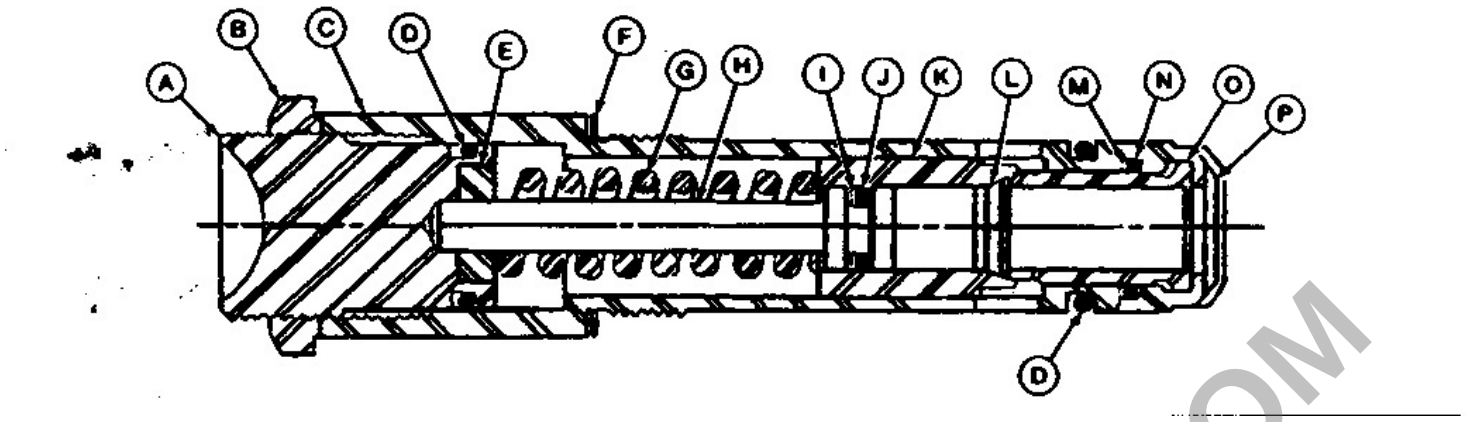
→NOTE:

Heater valve will leak if arrow on valve does not point in the direction of coolant flow.

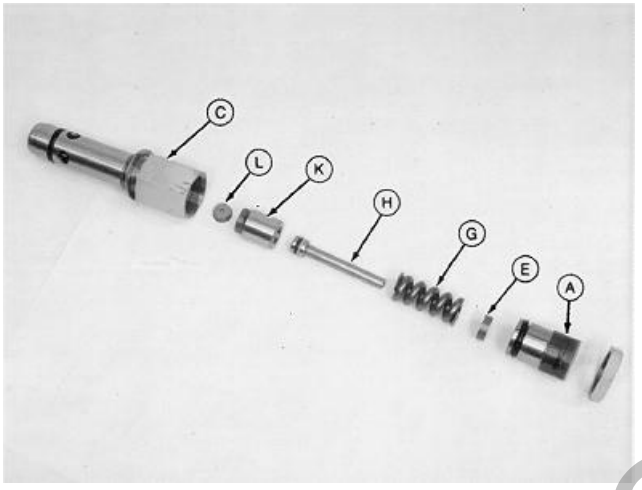
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Disassemble And Assemble System Relief Valve



System Relief Valve Cross Section



System Relief Valve Assembly

LEGEND:

A	Adjusting Screw
B	Lock Nut
C	Adjusting Screw Cartridge
D	O-Ring (2 used)
E	Slug
F	Washer
G	Spring
H	Plunger
I	Backup Ring
J	O-Ring
K	Floating Seal
L	Snubber
M	Backup Ring
N	O-Ring
O	Poppet
P	Retainer

Loosen lock nut (B) and remove the adjusting screw (A).

Inspect parts for wear or damage.

O-rings (D and J), backup ring (I) and spring (G) are the only repair parts available.

Item	Measurement	Specification
New Spring	Free Length (approximate)	52.25 mm (2.057 in.)
	Test Length at 2135 ± 213.5 N (480 ± 48 lb force)	47.96 mm (1.888 in.)

Assemble relief valve.

Check the pressure setting. (See Group 9025-25.)

Tighten lock nut (B) to 88 N·m (65 lb-ft).

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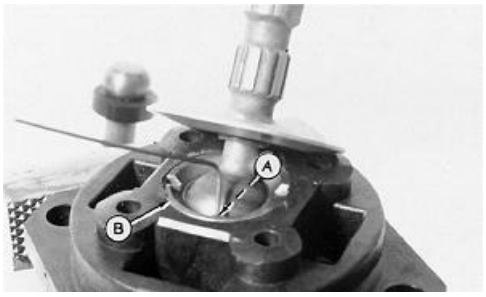
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Remove parts (A-H).

[15] - Test spring length. Replace parts as necessary.

Item	Measurement	Specification
Pilot Controller (Single Lever)		
For Machines (Serial No. -537112)-Return Spring	Free Length (approximate)	38 ± 0.71 mm (1.484 ± 0.028 in.)
	Test length at 55-61 N (12.4-13.7 lb force)	33.8 mm (1.329 in.)
For Machines (Serial No. -537112)-Main Spring	Free Length (approximate)	27 ± 0.53 mm (1.064 ± 0.021 in.)
	Test length at 17-18 N (3.75-4.15 lb force)	25.5 mm (1.003 in.)
	Test length at 80-89 N (18-19.9 lb force)	19.6 mm (0.770 in.)

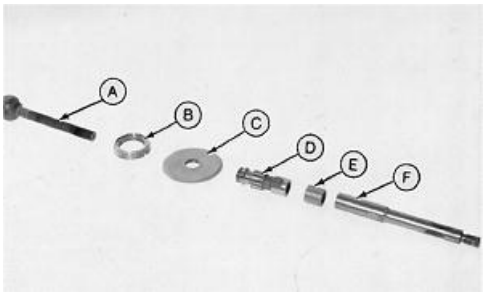
[16] -



Threaded Retainer Set Screw

Remove set screw (A) to remove threaded retainer (B) and ball joint lever.

[17] -



LEGEND:

A	Ball Joint Lever
B	Retainer
C	Push Plate
D	Special Nut
E	Spacer
F	Lever

Lever Assembly

Disassemble lever assembly (A-F). Replace parts as necessary.

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