870GLC Excavator Repair

(PIN: 1FF870GX__F890001—)

REPAIR TECHNICAL MANUAL

870GLC Excavator

TM13343X19 10JUN20 (ENGLISH)

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Recognize Safety Information

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

Follow the precautions and safe operating practices highlighted by this symbol.

A signal word — DANGER, WARNING, or CAUTION — is used with the safety alert symbol. DANGER identifies the most serious hazards.

On your machine, DANGER signs are red in color, WARNING signs are orange, and CAUTION signs are yellow. DANGER and WARNING signs are located near specific hazards. General precautions are on CAUTION labels.

T133555 —UN—15APR13

T133588 —19—28AUG00

TX,RECOGNIZE -19-28JUN10-1/1

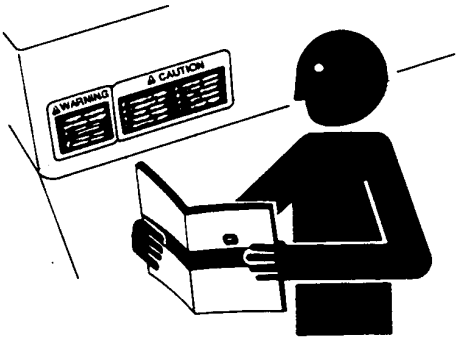
Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Use this operator's manual for correct safety sign placement. Be sure that new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine could impair the function or safety and affect machine life.



TS201 —UN—15APR13

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.

TX,FOLLOW -19-20JAN11-1/1

Operate Only If Qualified

Do not operate this machine unless the operator's manual has been read carefully, and you have been qualified by supervised training and instruction.

Operator should be familiar with the job site and surroundings before operating. Try all controls and machine functions with the machine in an open area before starting to work.

Know and observe all safety rules that may apply to every work situation and work site.

TX,QUALIFIED -19-18JAN11-1/1

Keep Riders Off Machine

Always use seat belt.

Only allow operator on machine.

The instructional seat, if equipped, is used to accommodate trainers, persons that need to observe machine operation, and for coworkers to provide further operational instructions.

Riders are subject to injury due to fall from machine, being caught between machine parts, or being struck by foreign objects. Riders may obstruct the operator's view or impair the operator's ability to operate machine safely.

TX1094208 —UN—27JUN13

Keep Riders Off Machine

TX,NO,RIDERS,EXC -19-23APR20-1/1

Avoid Backover Accidents

Before moving machine, be sure that all persons are clear of machine path. Turn around and look directly for best visibility. Use mirrors to assist in checking all around machine. Keep windows and mirrors clean, adjusted, and in good repair.

Be certain reverse warning alarm is working properly.

Use a signal person when backing if view is obstructed or when in close quarters. Keep signal person in view at all times. Use prearranged hand signals to communicate.

Do not rely on the rear camera and radar object detection systems, if equipped, to determine if personnel are behind the machine. The system has limitations due to maintenance practices, environmental conditions, and operating range.

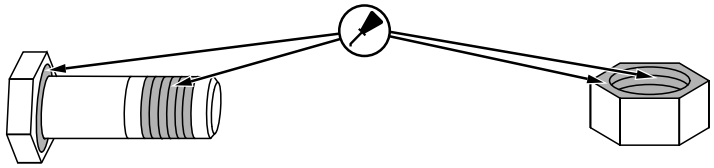
PC10857XW —UN—15APR13

TX,AVOID,BACKOVER -19-04MAR16-1/1

Bolt or Screw Size	SAE Grade 1[a]		SAE Grade 2[b]		SAE Grade 5, 5.1 or 5.2		SAE Grade 8 or 8.2	
	Hex Head[c]	Flange Head[d]	Hex Head[c]	Flange Head[d]	Hex Head[c]	Flange Head[d]	Hex Head[c]	Flange Head[d]

- Make sure that fastener threads are clean.
- Apply a thin coat of Hy-Gard™ or equivalent oil under the head and on the threads of the fastener, as shown in the following image.
- Be conservative with the amount of oil to reduce the potential for hydraulic lockup in blind holes because of excessive oil.
- Properly start thread engagement.

TS1741 —UN—22MAY18



Lubricant Locations

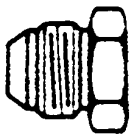
[a]*Grade 1 applies for hex cap screws over 6 in (152 mm) long, and for all other types of bolts and screws of any length.*
[b]*Grade 2 applies for hex cap screws (not hex bolts) up to 6 in (152 mm) long.*
[c]*Hex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.*
[d]*Hex flange column values are valid for ASME B18.2.3.9M, ISO 4161, or EN 1665 hex flange products.*

Hy-Gard is a trademark of Deere & Company

OUT3035,TORQUE1 -19-20FEB20-2/2

Service Recommendations for 37° Flare and 30° Cone Seat Connectors

1. Inspect flare and flare seat. They must be free of dirt or obvious defects.
2. Defects in tube flare cannot be repaired. Overtightening a defective flared fitting will not stop leaks.
3. Align tube with fitting before attempting to start nut.
4. Lubricate male threads with hydraulic fluid or petroleum jelly.
5. Index angle fittings and tighten by hand.
6. Tighten fitting or nut to torque value shown on torque chart. Do not allow hoses to twist when tightening fittings.



T6234AC —UN—15APR13

Cone Seat Connector

STRAIGHT FITTING OR SPECIAL NUT TORQUE CHART		
Thread Size	**N·m**	**lb·ft**
3/8 - 24 UNF	8	6
7/16 - 20 UNF	12	9
1/2 - 20 UNF	16	12
9/16 - 18 UNF	24	18
3/4 - 16 UNF	46	34
7/8 - 14 UNF	62	46
1-1/16 - 12 UN	102	75
1-3/16 - 12 UN	122	90
1-5/16 - 12 UN	142	105
1-5/8 - 12	190	140
1-7/8 - 12 UN	217	160

NOTE: Torque tolerance is ± 10%.

T82,BHMA,EL -19-29SEP99-1/1

O-RING STRAIGHT, ADJUSTABLE, AND EXTERNAL HEX PLUG WITH METRIC STUD END FOR HIGH PRESSURE, ABOVE 27 600 kPa (275.8 bar) (4000 psi), TORQUE VALUES—Tolerance is +15 -20% unless otherwise specified.			
Thread Size[a]	**Straight Hex Size[b]**	**Adjustable Nut Hex Size**	**Steel or Gray Iron Torque**
mm	**mm**	**mm**	**N·m (lb·ft)**
M27 x 2	32	32	170 (125)
M30 x 2	36	36	215 159)
M33 x 2	41	41	260 (192)
M38 x 2	46	46	320 (236)
M42 x 2	50	50	360 (266)
M48 x 2	55	55	420 (310)
[a]Stud end threads are identified as metric by an identification groove in the hex nut next to the O-ring.			
[b]Straight hex size applies to fittings only and may not be the same as the corresponding plug of the same thread size.			

1. Inspect fitting and connector sealing surfaces and the O-rings. They must be free of dirt, scratches, nicks, and burrs. O-ring must be free of dirt, cuts, cracks, swelling, or flatten condition.
2. Back the stud end hex nut off as far as possible. Push backup washer towards the nut to fully expose the turn down section. Washer must fit turned down section and not be too loose.
3. Lubricate O-rings using a thin film of clean hydraulic oil or as needed, petroleum jelly to hold O-ring in place.

   Install O-ring into groove making sure it is seated at the bottom. Excess petroleum jelly will prevent seating of O-ring and cause it to pop out.

   To protect an O-ring from threads, wrap electrical tape over the threads. Slide O-ring over the tape into the turned down section. Remove the tape.
4. Turn fitting into the boss by hand until face of nut or washer squeezes the O-ring into the seat and contacts face of boss. Loosen adjustable fittings no more than one turn for alignment.

   Hold connections together while tightening nut to ensure O-ring remains in place.
5. Tighten fitting or nut to torque value shown. Use a second wrench to hold the fitting in position or to keep hose from twisting while tightening nut.

OUT3035,0000421 -19-04MAR16-2/2

Track Roller Remove and Install

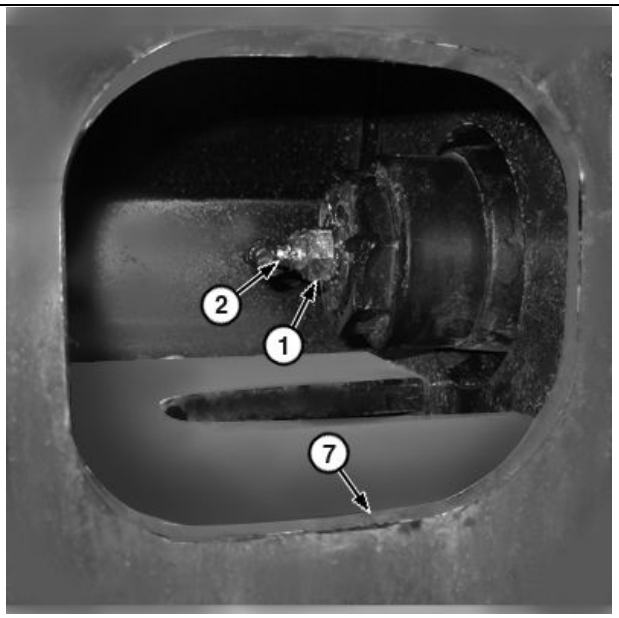
SPECIFICATIONS	
870GLC Excavator Weight (approximate)	85 600 kg 188 715 lb
Track Roller Weight (approximate)	142 kg 313 lb
Cap Screw Torque	950 N·m 700 lb·ft
Grease Fitting Torque	150 N·m 111 lb·ft

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

CAUTION: Prevent personal injury from escaping high-pressure grease. DO NOT remove grease fitting to release track tension.

2. Loosen grease fitting (1) counterclockwise 1—2 turns. Grease will escape through vent hole (2) in track adjuster cylinder.

1— Grease Fitting
2— Vent Hole
7— Track Frame



TX1089326A —UN—15MAR11

Grease Fitting

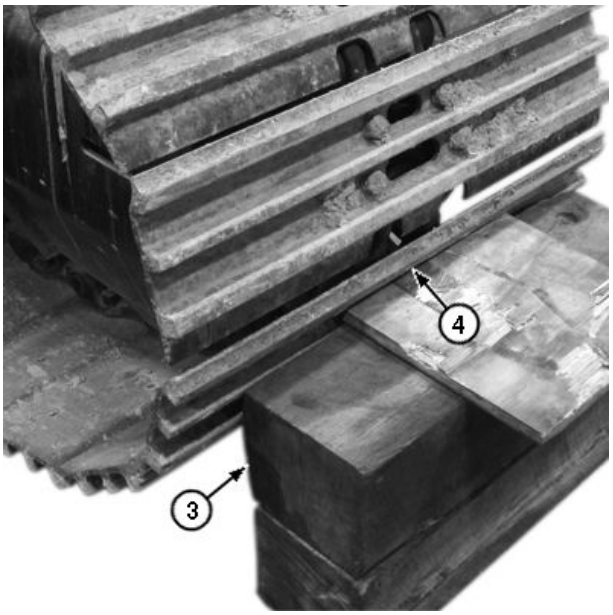
JS20420,000135A -19-01OCT15-1/4

3. Place wood block (3) in front of track to catch bar on grouser (4).

CAUTION: Prevent possible injury from unexpected machine movement. Alert bystanders to stay clear before performing procedure.

4. To relieve track tension, start machine and slowly rotate track so grouser mounts wood block and idler retracts.

3— Wood Block
4— Grouser



TX1098609A —UN—23SEP11

Procedure for Retracting Idler

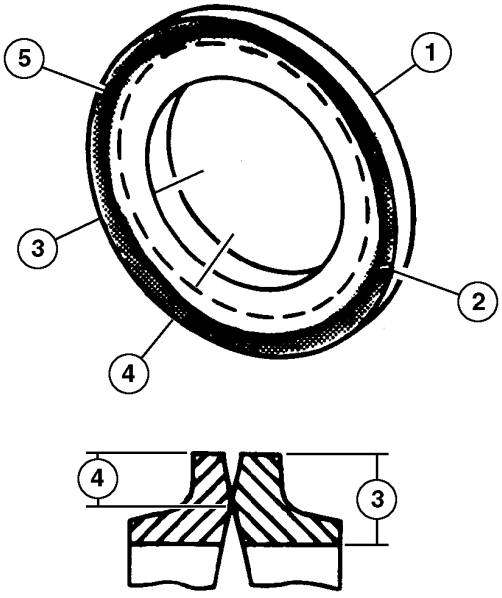
Continued on next page

JS20420,000135A -19-01OCT15-2/4

Metal Face Seals Repair

1. Inspect for the following conditions to determine if seals can be reused:
   a. The narrow, highly polished sealing area (5) must be in the outer half of seal ring face (4).
   b. Sealing area must be uniform and concentric with the inside diameter and outside diameter of seal ring (1).
   c. Sealing area must not be chipped, nicked, or scratched.

1— Seal Ring
2— Worn Area (shaded area)
3— Seal Ring Face
4— Outer Half of Seal Ring Face
5— Sealing Area (dark line)



TX1008208 —UN—24MAY06

Seal Inspection Areas

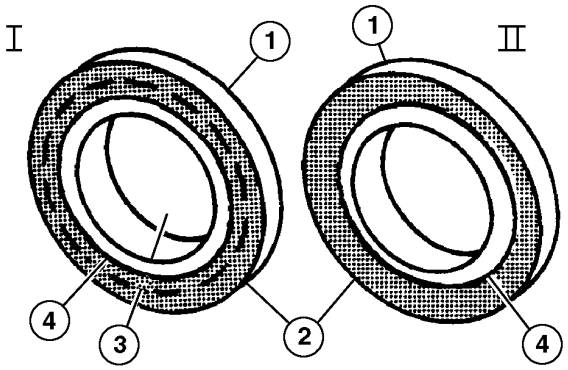
DV53278,0000A2C -19-24AUG15-1/3

2. Illustration shows examples of worn seal rings (1).

   I—Sealing area (4) is in inner half of seal ring face (3).

   II—Sealing area (4) not concentric with inside diameter and outside diameter of seal ring.

1— Seal Ring (2 used)
2— Worn Area (shaded area)
3— Inner Half of Seal Ring Face
4— Sealing Area (dark line)



TX1008209 —UN—31MAY06

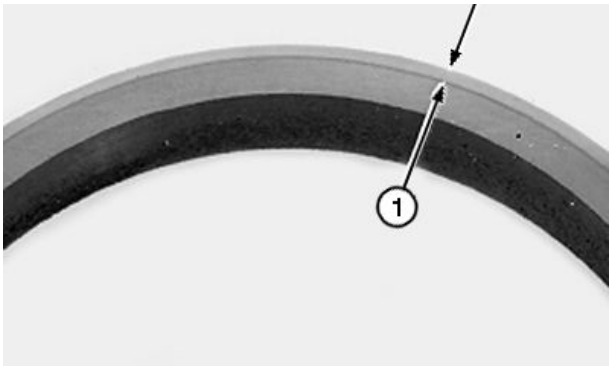
Examples of Worn Seal Rings

DV53278,0000A2C -19-24AUG15-2/3

3. Clean reusable seals by removing all foreign material from seal rings, except seal face (1), using a scraper or a stiff bristled fiber brush.
4. Wash seal rings and O-rings using a volatile, non-petroleum base solvent to remove all oil. Thoroughly dry parts using a lint-free tissue.

   Apply a thin film of oil to seal ring face. Put face of seal rings together and hold using tape.

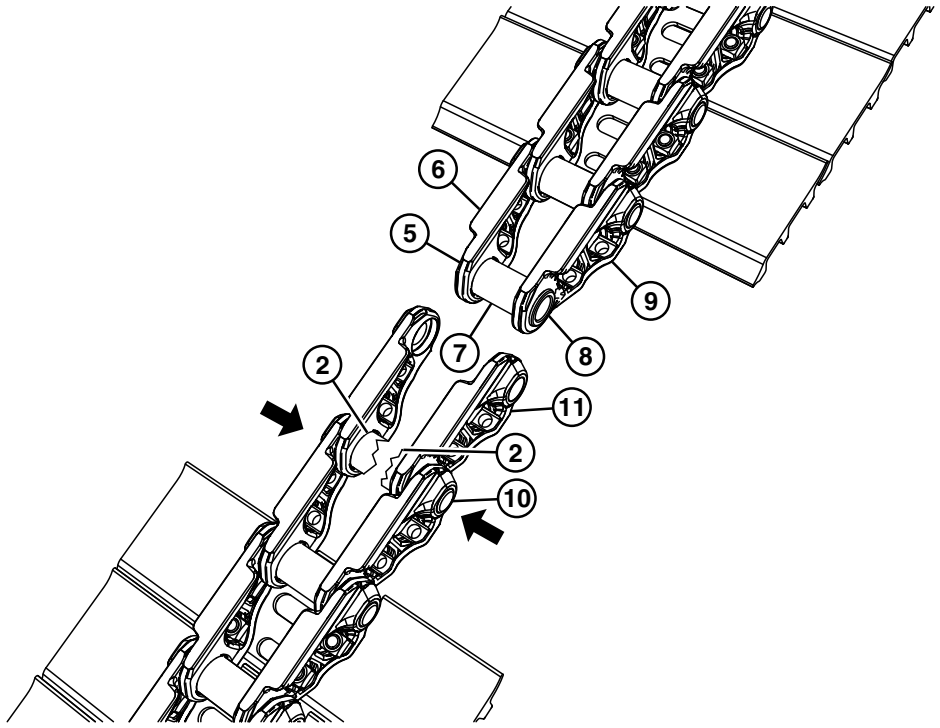
1— Seal Face



TX1008335A —UN—26MAY06

Seal Face

DV53278,0000A2C -19-24AUG15-3/3



TX1098002

TX1098002 —UN—21SEP11

Bushing

2— Bushing
5— Grind Point
6— Track Link
7— Bushing
8— Grind Point
9— Track Link
10— Track Pin
11— Track Link Assembly

4. Push remaining sections of bushing (2) and track pin (10) inward to remove and discard damaged parts.
5. Grind bushing (7) at grind points (5 and 8) until flush with track links (6 and 9).
6. Inspect and replace parts as necessary.

Continued on next page

DV53278,0000A28 -19-24AUG15-2/6

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

3. Using appropriate lifting device, remove cap screws (11) and yoke (10).

Specification	
Yoke—Weight (approximate)	72 kg 159 lb

4. Remove plugs (4) and drain oil.

Specification	
Front Idler Oil (engine oil SAE 30)—Capacity (approximate)	500 mL 17 oz

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Loctite and its related brand marks are trademarks of Henkel Corporation

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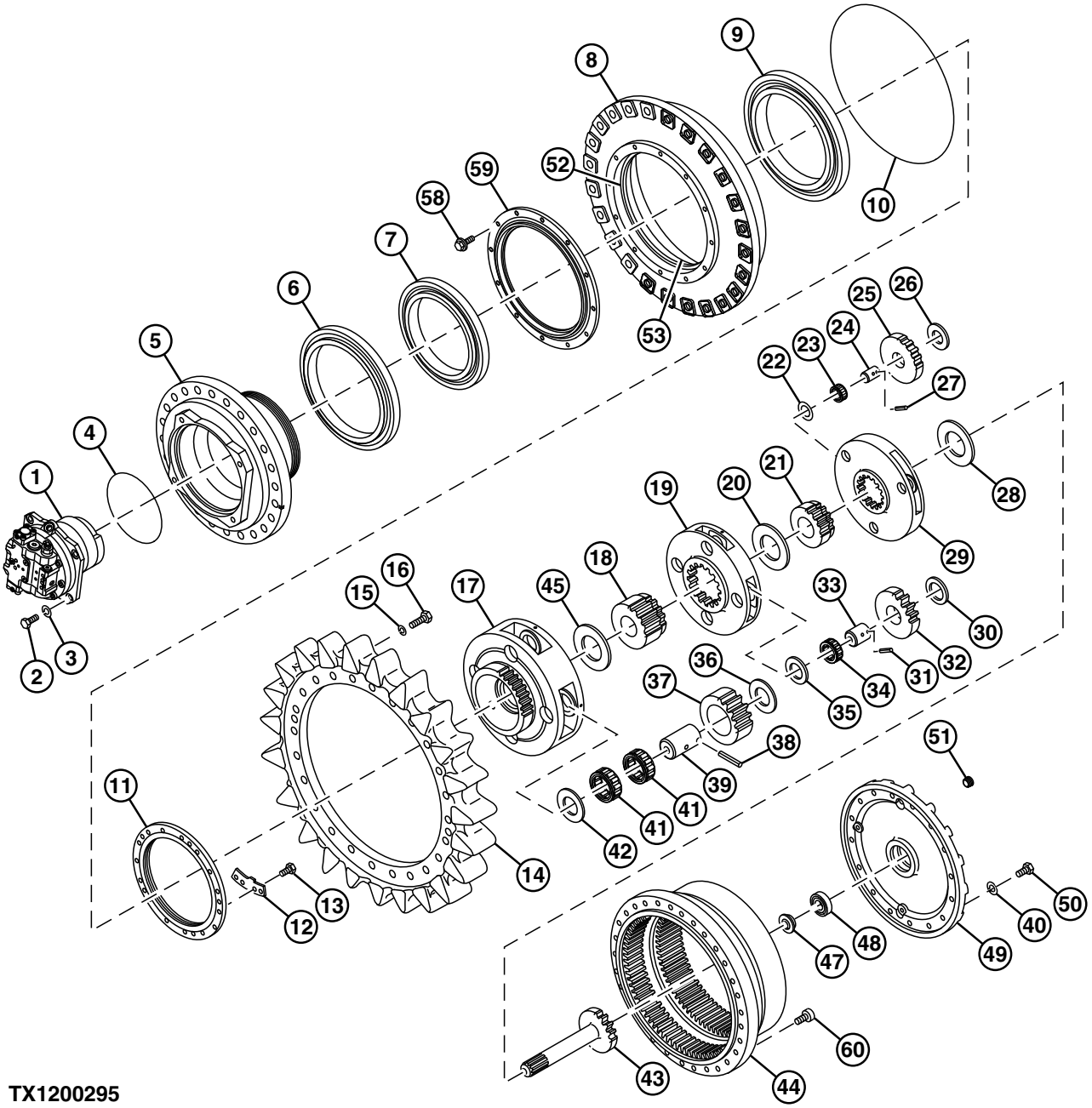
Section 02
Axles and Suspension Systems

Contents



TX1200295

Travel Gear Case

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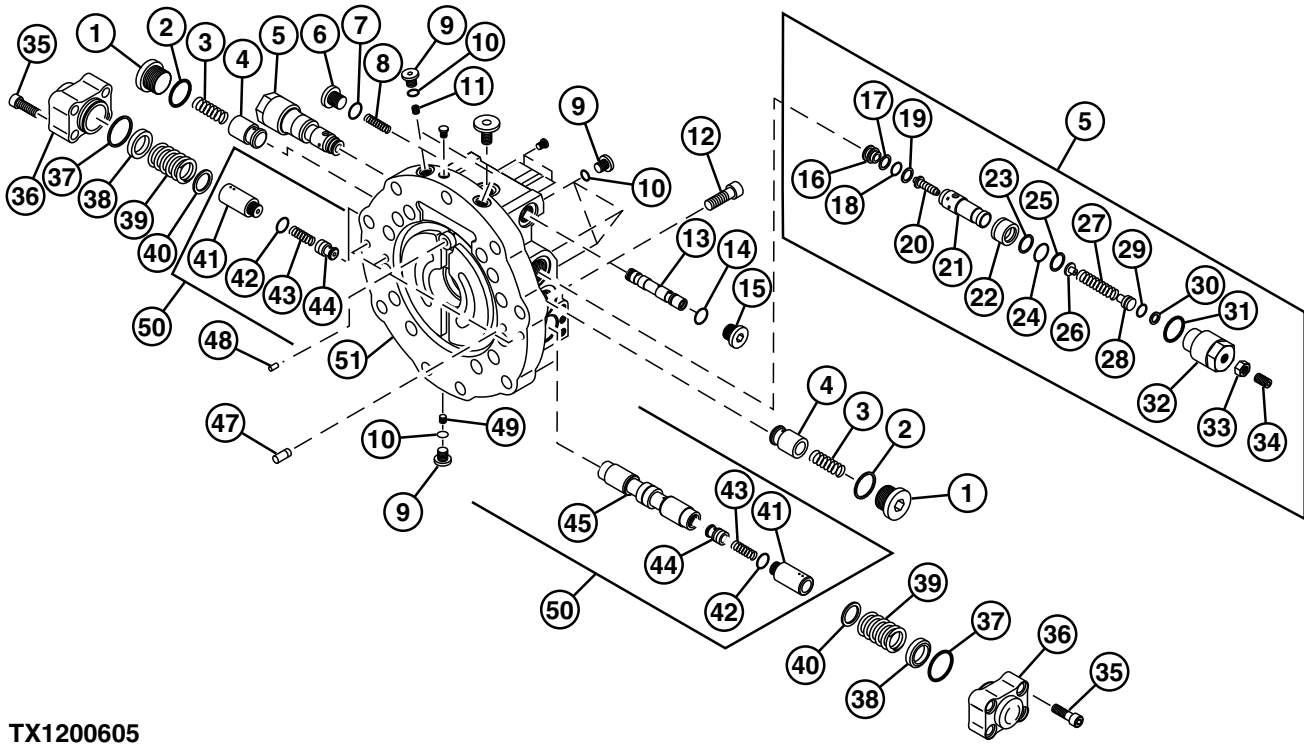
BD53302,0001AC1 -19-17DEC18-6/12

Park Brake Valve Disassemble and Assemble



TX1200605

Park Brake Disassemble and Assemble

1— Plug (2 used)
2— O-Ring (2 used)
3— Spring (2 used)
4— Make-Up Check Valve (2 used)
5— Crossover Relief Valve (2 used)
6— Plug
7— O-Ring
8— Spring
9— Plug (6 used)
10— O-Ring (6 used)
11— Orifice (2 used)
12— Socket Cap Screw (9 used)
13— Travel Speed Selector Valve
14— O-Ring
15— Plug
16— Poppet Seat (2 used)
17— Backup Ring (2 used)
18— O-Ring (2 used)
19— Backup Ring (2 used)
20— Poppet (2 used)
21— Relief Housing (2 used)
22— Piston (2 used)
23— Backup O-Ring (2 used)
24— O-Ring (2 used)
25— Backup Ring (2 used)
26— Spring Seat (2 used)
27— Spring (2 used)
28— Spring Guide (2 used)
29— O-Ring (2 used)
30— Backup Ring (2 used)
31— O-Ring (2 used)
32— Plug (2 used)
33— Nut (2 used)
34— Set Screw (2 used)
35— Cap Screw (8 used)
36— Cap (2 used)
37— O-Ring (2 used)
38— Spring Seat (2 used)
39— Spring (2 used)
40— Spring Seat (2 used)
41— Plug (2 used)
42— O-Ring (2 used)
43— Spring (2 used)
44— Check Valve (2 used)
45— Spool
47— Pin (4 used)
48— Pin
49— Orifice
50— Counterbalance Valve
51— Park Brake Housing

SPECIFICATIONS	
Cap Screw Torque	110 N·m 81 lb·ft
Crossover Relief Valve Torque	420 N·m 310 lb·ft
Make-Up Check Valve Plug Torque	420 N·m 310 lb·ft

1. Remove park brake housing (51). See Travel Motor and Park Brake Disassemble and Assemble. (Group 0260.)
2. Remove plugs (6 and 15), O-rings (7 and 14), and spring (8) from park brake housing (51).

IMPORTANT: Prevent travel speed selector valve (13) damage. Remove travel speed selector valve while rotating park brake housing. If resistance is felt, do not try to force the travel speed selector valve. Return travel speed selector valve to its original position and try again. Do not disassemble travel speed selector valve.

3. Remove travel speed selector valve (13).
4. Remove plugs (1), O-rings (2), springs (3), and make-up check valves (4).

IMPORTANT: Prevent O-ring (24) damage. Do not move piston (22) attached on the outer surface of crossover relief valves (5).

IMPORTANT: Do not disassemble crossover relief valves (5). Crossover relief valves should be replaced as an assembly. Attach an identification tag to each crossover relief valve to install in original position.

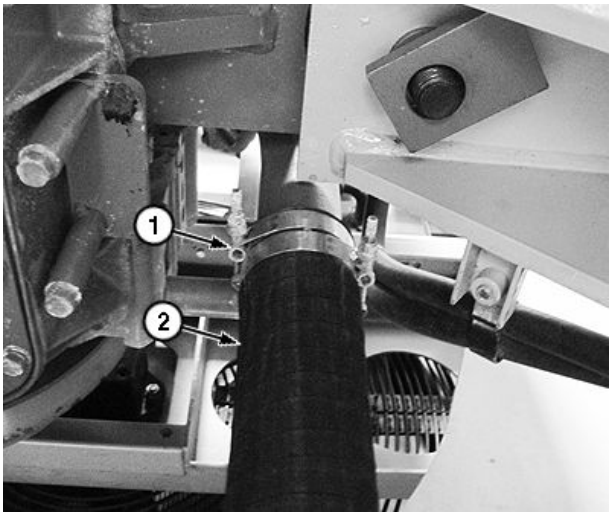
5. Install identification tags and remove crossover relief valves (5).

Continued on next page

DV53278,00009B1 -19-12OCT15-1/2

16. Install identification tags, loosen clamps (1), and disconnect lower radiator hose (2). Close all openings using caps and plugs.

1— Clamp (2 used) **2— Lower Radiator Hose**



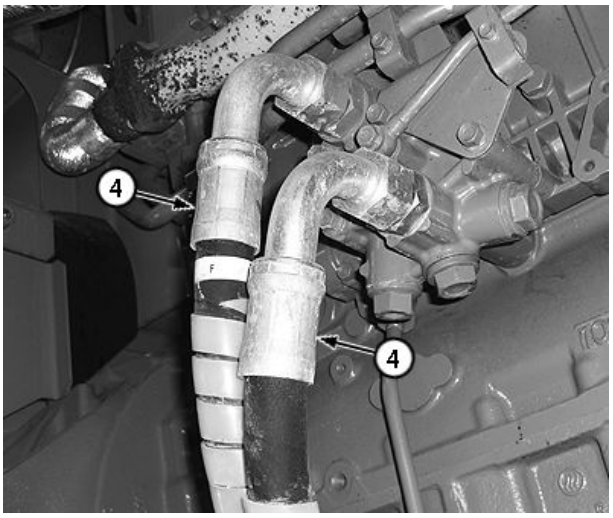
TX1094801A —UN—19JUL11

Lower Radiator Hose

DV53278,0000B10 -19-17NOV15-8/15

17. Install identification tags and disconnect engine oil hoses (4). Close all openings using caps and plugs.

4— Engine Oil Hose (2 used)



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Engine Oil Hoses

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DV53278,0000B10 -19-17NOV15-9/15

Hydraulic Oil Cooler Remove and Install

See Hydraulic Oil Cooler Remove and Install. (Group 3360.)

BD53302,0001AB1 -19-17NOV15-1/1

Charge Air Cooler Remove and Install

SPECIFICATIONS	
Charge Air Cooler Weight (approximate)	40 kg 88 lb
Mounting Cap Screw Torque	90 N·m 66 lb·ft
Hose Clamps Torque	10 N·m 89 lb·in

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

IMPORTANT: Avoid machine damage to diesel exhaust fluid (DEF) system. After key switch is switched to OFF position, wait at least 5 minutes before turning battery disconnect switch to OFF position.

2. Turn battery disconnect switch to OFF position. See Battery Disconnect Switch. (Operator's Manual.)
3. Open cooling package doors. See Cooling Package Door Remove and Install. (Group 1921.)
4. Loosen hose clamps (1) and disconnect charge air cooler hoses (2). Close all openings using caps and plugs.

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

5. Using appropriate lifting device, support charge air cooler (4).

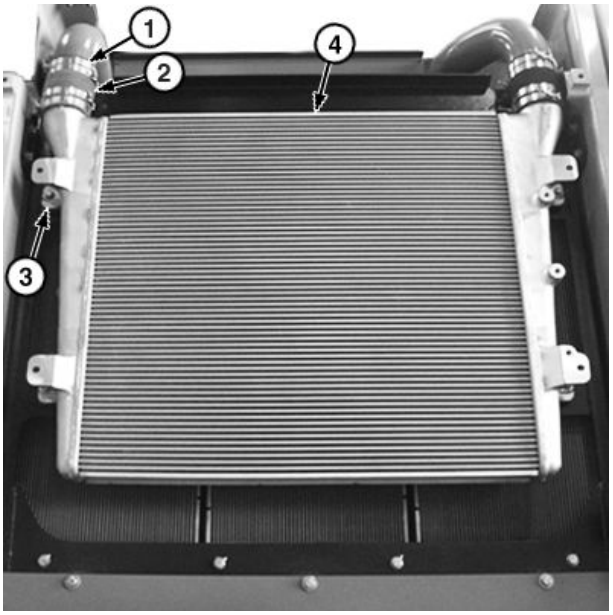
Specification

Charge Air Cooler—Weight (approximate) ..... 40 kg 88 lb

6. Remove cap screws (3) and charge air cooler.
7. Repair or replace parts as necessary.

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

8. Using appropriate lifting device, support charge air cooler. Install cap screws and tighten to specification.



TX1203797A —UN—15OCT15

Charge Air Cooler

1— Hose Clamp (4 used)
2— Charge Air Cooler Hose (2 used)
3— Cap Screw (4 used)
4— Charge Air Cooler

Specification

Mounting Cap Screw—Torque ..... 90 N·m 66 lb·ft

9. Connect charge air cooler hoses and tighten hose clamps.

Specification

Hose Clamp—Torque ..... 10 N·m 89 lb·in

10. Close cooling package doors. See Cooling Package Door Remove and Install. (Group 1921.)
11. Turn battery disconnect switch to ON position. See Battery Disconnect Switch. (Operator's Manual.)

BD53302,0001AE8 -19-28OCT15-1/1

Engine Radiator Fan Motor Remove and Install

SPECIFICATIONS	
Hydraulic Oil Tank Capacity	500 L 132.1 gal
Engine Radiator Fan Motor Support With Engine Radiator Fan Motor and Fan Weight (approximate)	120 kg 265 lb
Hydraulic Hose Cap Screw Torque	50 N·m 37 lb·ft
Fan Cap Screw Torque	90 N·m 66 lb·ft
Engine Radiator Fan Motor Support Cap Screw Torque	90 N·m 66 lb·ft
Fan Guard Cap Screw Torque	90 N·m 66 lb·ft

OTHER MATERIAL
Loctite® 271™ Threadlocker (high strength)

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

IMPORTANT: Avoid machine damage to diesel exhaust fluid (DEF) system. After key switch is switched to OFF position, wait at least 5 minutes before turning battery disconnect switch to OFF position.

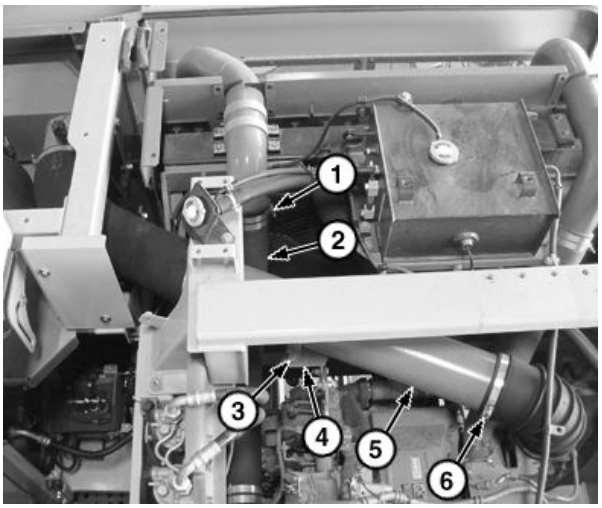
2. Turn battery disconnect switch to OFF position. See Battery Disconnect Switch. (Operator's Manual.)

CAUTION: High-pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing pressure release button.

3. Release hydraulic oil tank pressure by pressing pressure release button at top of hydraulic oil tank. See Hydraulic Oil Tank Pressure Release Procedure. (Group 9025-25.)
4. Apply vacuum or drain hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) See Drain and Refill Hydraulic Tank Oil and Clean Suction Screen. (Operator's Manual.)

Specification	
Hydraulic Oil Tank—Capacity	500 L 132.1 gal

5. Remove hood and engine side shields. See Hood Remove and Install and see Engine Side Shields Remove and Install. (Group 1910.)
6. Loosen hose clamps (1) and remove charge air cooler hose (2). Close all openings using caps and plugs.
7. Remove cap screws (3) and bracket (4).



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Air Cleaner and Charge Air Cooler

1— Hose Clamp (4 used)
2— Charge Air Cooler Hose
3— Cap Screw (2 used)
4— Bracket
5— Air Cleaner Pipe
6— Hose Clamp (3 used)

8. Loosen hose clamps (6) and remove air cleaner pipe (5). Close all openings using caps and plugs.

Continued on next page

BD53302,0001AEC -19-28OCT15-1/7

8. Install identification tags and disconnect sensors (B49, B50, B64, and B66). See Exhaust Aftertreatment Harness (W53) Component Location. (Group 9015-10.)
9. Remove exhaust tube (9). See Exhaust Tube Remove and Install. (Group 0530.)

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

10. Attach appropriate lifting device to lifting brackets (7) and support exhaust aftertreatment assembly (5).

Specification	
Exhaust Aftertreatment Assembly—Weight (approximate)	200 kg 441 lb

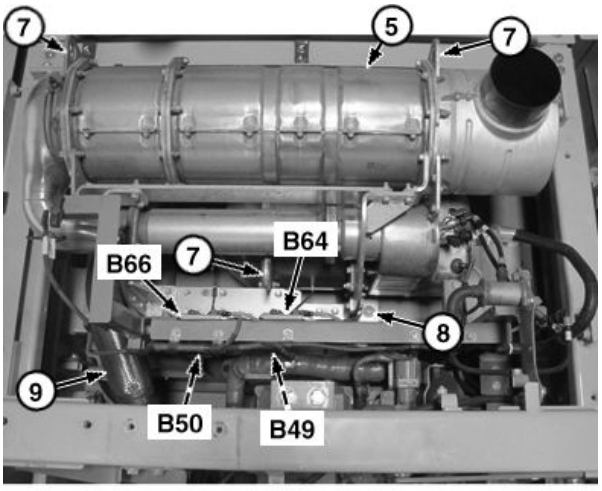
11. Remove cap screws (8) and exhaust aftertreatment assembly.
12. Repair or replace parts as necessary. See Exhaust Aftertreatment Assembly Disassemble and Assemble. (Group 0530.)

INSTALLATION

Installation is reverse of removal procedure.

Additional Information

IMPORTANT: Prevent damage to diesel exhaust fluid (DEF) system hoses. DEF system hoses are fragile and can easily be damaged if proper care is not used. Avoid bending, twisting, or kinking DEF system hoses.



TX1217790A —UN—21JUN16

Exhaust Aftertreatment Assembly

5— Exhaust Aftertreatment Assembly
7— Lifting Bracket (3 used)
8— Cap Screw (6 used)
9— Exhaust Tube
B49— Exhaust Temperature Sensor 1 (marked CSF)
B50— Exhaust Temperature Sensor 2 (marked DOC)
B64— Aftertreatment NOx Sensor 1
B66— Aftertreatment NOx Sensor 2 (S.N. 890002—)

- See Diesel Exhaust Fluid (DEF) Leak Test With MPDr. (Group 9015-20.)
- See Coolant Bleeding With MPDr. (Group 9015-20.)

JN86345,0000104 -19-20JUL16-2/2

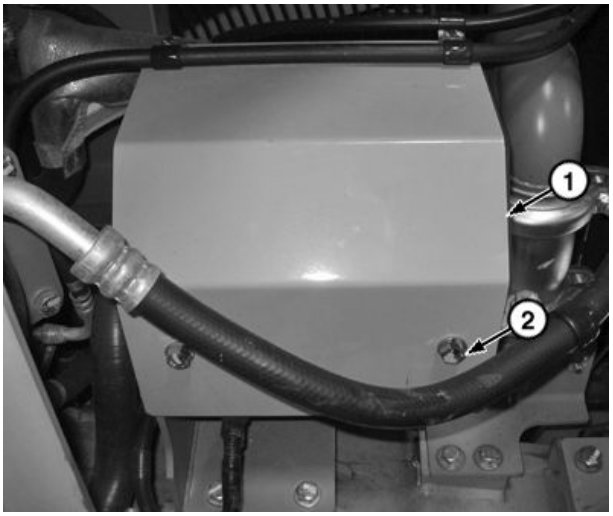
Diesel Exhaust Fluid (DEF) Supply Module Remove and Install

REMOVAL

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

IMPORTANT: Avoid machine damage to diesel exhaust fluid (DEF) system. After key switch is switched to OFF position, wait at least 5 minutes before turning battery disconnect switch to OFF position.

2. Turn battery disconnect switch to OFF position. See Battery Disconnect Switch. (Operator's Manual.)
3. Drain cooling system. See Drain Cooling System. (Operator's Manual.)
4. Drain or pump diesel exhaust fluid (DEF) from DEF tank into approved container.
5. Remove cap screws (2) and cover (1).



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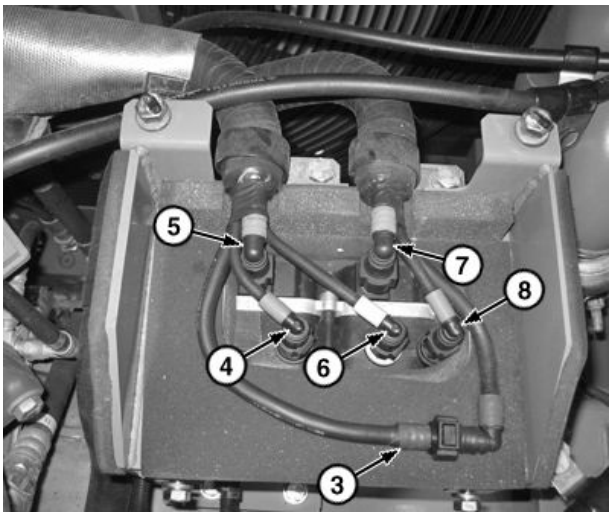
Supply Module Cover

1— Cover
2— Cap Screw (4 used)

DV53278,0000ADB -19-17SEP15-1/3

6. Install identification tags and disconnect coolant hoses (6—8) and diesel exhaust fluid (DEF) hoses (3—5). Close all openings using caps and plugs. See Diesel Exhaust Fluid (DEF) System Component Location. (Group 9010-05.)

3— Diesel Exhaust Fluid (DEF) Hose
4— Diesel Exhaust Fluid (DEF) Hose
5— Diesel Exhaust Fluid (DEF) Hose
6— Coolant Hose
7— Coolant Hose
8— Coolant Hose



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Diesel Exhaust Fluid (DEF) Hoses

Continued on next page

DV53278,0000ADB -19-17SEP15-2/3

Pump Drive Gear Case Remove and Install

SPECIFICATIONS	
Pump Drive Gear Case Capacity	6.2 L 1.6 gal
Pump Drive Gear Case Weight (approximate)	318 kg 705 lb
Pump Drive Gear Case-to-Flywheel Housing Cap Screw Torque	110 N·m 81 lb·ft
Rear Engine Mounting Nut Torque	1950 N·m 1438 lb·ft

OTHER MATERIAL
Loctite® 271™ Threadlocker (high strength)
Loctite® 242® Threadlocker (medium strength)

REMOVAL

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

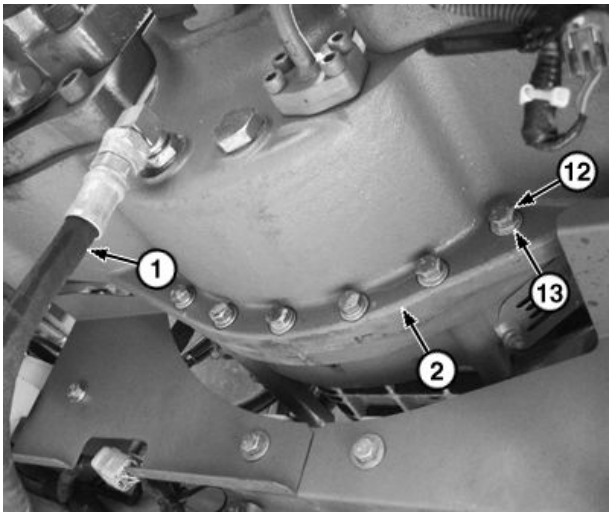
CAUTION: Avoid personal injury from high-pressure fluid. High-pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure from hydraulic system before servicing.

2. Release hydraulic oil tank pressure by pressing pressure release button at top of hydraulic oil tank. See Hydraulic Oil Tank Pressure Release Procedure. (Group 9025-25.)
3. Remove exhaust aftertreatment assembly. See Exhaust Aftertreatment Assembly Remove and Install. (Group 0530.)
4. Remove pump 1 and 2. See Pump 1 and 2 Remove and Install. (Group 3360.)
5. Drain pump drive gear case oil. See Drain and Refill Pump Drive Gear Case Oil. (Operator's Manual.)

Specification

Pump Drive Gear Case—Capacity..... 6.2 L
1.6 gal

6. Install identification tags and disconnect drain hose (1). Close all openings using caps and plugs.



TX1201860A —UN—21SEP15

Pump Drive Gear Case

1— Drain Hose
2— Pump Drive Gear Case
12— Cap Screw (14 used)
13— Washer (14 used)

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JS20420,0001388 -19-17NOV15-1/4

Welding on Machine

CAUTION: Do not weld or apply heat on any part of a reservoir or tank that has contained oil or fuel. Heat from welding and cutting can cause oil, fuel, or cleaning solution to create gases which are explosive, flammable, or toxic. Avoid welding or heating near pressurized fluid lines. Flammable spray may result and cause severe burns if pressurized lines fail as a result of heating. Do not let heat go beyond work area to nearby pressurized lines.

CAUTION: Avoid potentially toxic fumes and dust. Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch. Complete all work outside or in a well ventilated area. Dispose of paint and solvent properly.

When sanding or grinding painted surfaces, avoid breathing the dust. Wear an approved respirator. If using solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

1. Remove paint before welding or heating.
   - When sanding or grinding paint, avoid breathing the dust.
   - Wear an approved respirator. When using solvent or paint stripper, remove stripper with soap and water before welding.
   - Remove solvent or paint stripper containers and other flammable material from area.
   - Allow fumes to disperse at least 15 minutes before welding or heating.

IMPORTANT: Avoid machine damage to diesel exhaust fluid (DEF) system. After key switch is switched to OFF position, wait at least 10 minutes before turning battery disconnect switch to OFF position or disconnecting battery cables. During cold-weather exposure, if adequate time is not allowed for lines to be purged, residual DEF can freeze and possibly damage components of the DEF system.

IMPORTANT: Avoid damage to electrical system from welding current. Disconnect negative (-) and positive (+) battery cables before welding on machine.

2. Disconnect the negative (-) battery cable(s).
3. Disconnect the positive (+) battery cable(s).
4. Cover, protect, or move any wiring harness sections away from welding area.

IMPORTANT: Have only a qualified welder perform this job. Connect welder ground clamp close to each weld area so electrical current does not pass through any bearings, articulation joints, or pivot points. Remove or protect all parts that can be damaged by heat or weld splatter.

5. Connect welder ground close to welding point and away from control units.
6. Use one of the following weld processes:
   - AWS-E-7018 covered electrode with shielded metal arc welding (SMAW) process.
   - AWS-ER-70S-3 wire electrode with gas metal arc welding (GMAW) process.
   - AWS-E70T-1 or E71T-1 wire electrode with flux core arc welding (FCAW) process.

Welding Repair of Major Structure—Specification

Weld Metal—Tensile Strength	482.6 MPa 70 000 psi 4 826 bar
Yield Strength	413.7 MPa 60 000 psi 4 137 bar
Elongation	22%

IMPORTANT: Avoid insufficient weld penetration. Preheat area that will be repaired to allow better weld penetration. Insufficient weld penetration can lead to further damage.

7. To repair weld metal failure, remove failed weld metal using arc gouging or grinding equipment. Thoroughly clean area to be welded. Preheat structural assemblies to a minimum of 38°C (100°F). Preheat ground engaging tools (cutting edges, skid shoes, and teeth shanks) to 177°C (350°F).

   To repair base metal failure remove enough material to allow weld to penetrate to the bottom of crack. Preheat structural assemblies to a minimum of 38°C (100°F). Preheat ground engaging tools (cutting edges, skid shoes, and teeth shanks) to 177°C (350°F).

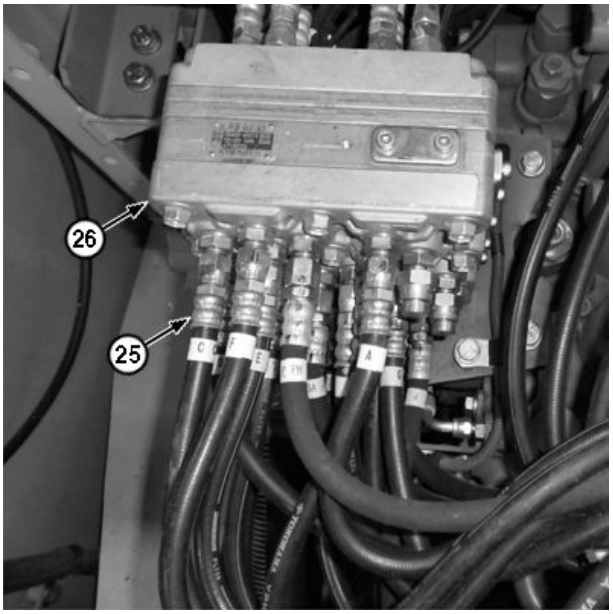
Welding Repair of Major Structure—Specification

Structural Assemblies—Preheat Temperature	38°C 100°F
Ground Engaging Tools—Preheat Temperature	177°C 350°F

TP97644,000011E -19-04MAR16-1/1

19. Install identification tags and disconnect hydraulic hoses (25) from pilot signal manifold (26). Close all openings using caps and plugs. Secure hydraulic hoses to cab. See Pilot Control Line Connections or see Travel Hydraulic System Line Connections. (Group 9025-15.)

25— Hydraulic Hose (13 used) **26— Pilot Signal Manifold**



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Pilot Signal Manifold

DV53278,0000B1A -19-17NOV15-10/13

⚠ CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

20. Support cab by attaching appropriate lifting device (28) to cab lifting points (27).

Specification

Cab—Weight (approximate)	658 kg 1450 lb

27— Lifting Point (4 used) **28— Lifting Device**

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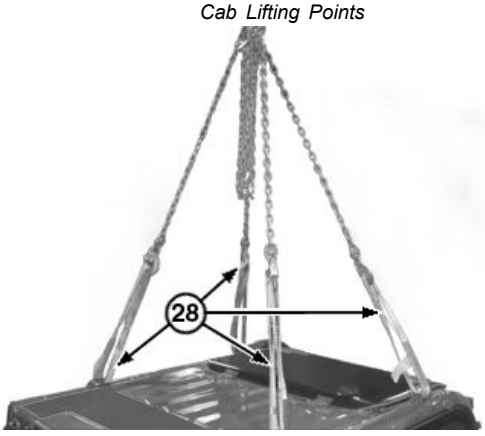
Cab Lifting Points



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Lifting Device

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DV53278,0000B1A -19-17NOV15-11/13

Sliding Windows Remove and Install

OTHER MATERIAL
Loctite® 5572™ Adhesive

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)
2. Remove molding (1) from inside of sliding window assembly (2).

IMPORTANT: Avoid damage to window, use two technicians during window removal to prevent window from falling out of machine.

3. Cut adhesive between sliding window assembly and cab door (3).
4. Remove sliding window assembly.
5. Repair or replace as necessary.
6. Gently lift sliding window frame in the middle from the top of frame to remove and install glass panes.
7. Apply Loctite® 5572™ Adhesive to cab door.
8. Install sliding window assembly.
9. Push window assembly tight against cab door.
10. Install molding.

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TX1089899A —UN—06APR11

Sliding Window

1— Molding
2— Sliding Window Assembly
3— Cab Door

JS20420,0001386 -19-06MAY20-1/1

Windowpanes Remove and Install

The adhesive used to hold the windowpanes in place is a urethane adhesive that is used on most automobile windshields. Urethane adhesive manufactured by Loctite Corporation or equivalent is recommended. Do not use any other type of adhesive. It is recommended that an auto glass dealer install the windowpanes.

IMPORTANT: Windowpanes must have an ultra-violet barrier around the edge of the glass since ultra-violet rays will deteriorate the adhesive. Windowpanes ordered through a parts dealer have the ultra-violet barrier. If the windowpane is purchased through a glass dealer, the dealer must put an ultra-violet barrier on the glass. Do not apply paint to the border of the glass.

If an auto glass dealer is not installing the windowpanes, use the following procedure:

1. Purchase urethane adhesive from your local auto glass dealer.
2. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)
3. Scrape broken glass off existing adhesive. Do not remove adhesive from window frame or cab.

NOTE: Adhesive will not stick to bare metal.

NOTE: Paint must be fully cured before installing windowpane.

4. If existing adhesive is removed from frame and paint is scraped off window frame, paint window frame. Paint must be fully cured before installing windowpane.
5. Trim existing adhesive so it has a smooth surface.
6. Follow the manufacturer's instructions for using the adhesive.
7. Apply a 6 mm (1/4 in) bead of adhesive on top of the existing adhesive.
8. Put a new windowpane into position. Use hand pressure to force windowpane down around the edges.
9. Use duct tape to hold windowpane in place while adhesive cures.
10. Allow adhesive to cure for 24 hours before operating machine.

JS20420,0001387 -19-15SEP15-1/1

Seat Remove and Install

SPECIFICATIONS	
Seat Weight (approximate)	42 kg 93 lb
Cap Screw Torque	20 N·m 180 lb·in

OTHER MATERIAL
Loctite® 242® Threadlocker (medium strength)

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

NOTE: Sliding seat to different positions may aid in the removal of cap screws.

CAUTION: Avoid crushing injury from heavy component. Use appropriate lifting device.

2. Attach appropriate lifting device to seat (2). Remove cap screws (1) and seat.

Specification

Seat—Weight (approximate) ..... 42 kg
93 lb

3. Repair or replace parts as necessary.
4. Apply Loctite® 242® Threadlocker (medium strength) on cap screws (1).
5. Install seat and cap screws. Tighten to specification.

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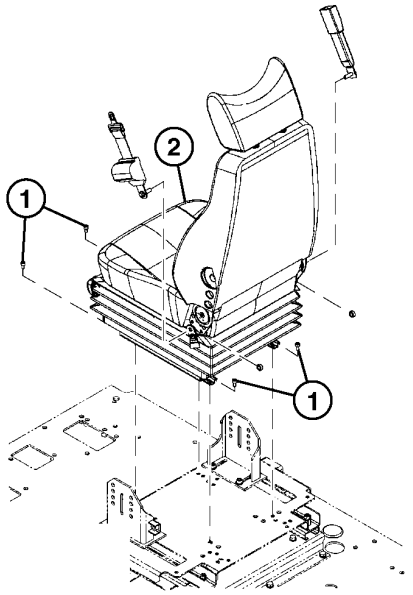

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Seat Remove and Install

1— Cap Screw (4 used) **2— Seat**

Specification

Cap Screw—Torque ..... 20 N·m
180 lb·in

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R134a Refrigerant Recovery, Recycling, and Charging Station Installation Procedure

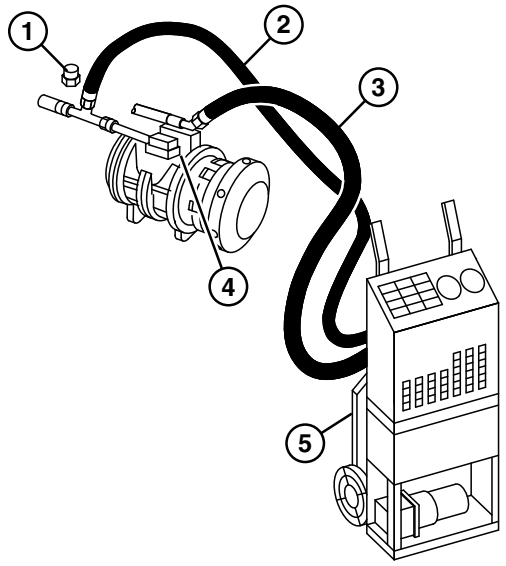
CAUTION: Avoid possible injury. Liquid refrigerant will freeze eyes or skin on contact. Wear goggles, gloves, and protective clothing.

1. Handle refrigerant carefully. See R134a Refrigerant Cautions and Proper Handling. (Group 1830.)
2. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

IMPORTANT: Prevent possible air conditioning system contamination. Use correct refrigerant recovery, recycling, and charging station. Do not mix refrigerant, hoses, fittings, components, or refrigerant oils.

CAUTION: Avoid possible injury. Do not remove high-pressure relief valve. Air conditioning system will discharge.

3. Close both high and low-pressure valves on refrigerant recovery, recycling, and charging station (5).
4. Remove caps (1) from test ports.
5. Connect low-side pressure (blue) hose (2) from refrigerant recovery, recycling, and charging station to low-pressure test port on compressor.
6. Connect high-side pressure (red) hose (3) to high-pressure test port on compressor.



TX1153908 —UN—18FEB14

Refrigerant Recovery, Recycling, and Charging Station

1— Cap (2 used)
2— Low-Side Pressure (blue) Hose
3— High-Side Pressure (red) Hose
4— Air Conditioner Compressor
5— Refrigerant Recovery, Recycling, and Charging Station

7. Follow manufacturer's instructions when using refrigerant recovery, recycling, and charging station.

DV53278,0000B1E -19-17NOV15-1/1

Recover R134a Refrigerant

CAUTION: Prevent possible injury. Liquid refrigerant will freeze eyes or skin on contact. Wear goggles, gloves, and protective clothing.

1. Handle refrigerant carefully. See R134a Refrigerant Cautions and Proper Handling. (Group 1830.)
2. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)
3. Run air conditioning system for 3 minutes to help in recovery process.
4. Turn air conditioning system off before proceeding with recovery steps.

CAUTION: Avoid possible injury from air conditioning system refrigerant. Do not remove high-pressure relief valve. Air conditioning system will discharge rapidly.

IMPORTANT: Prevent possible air conditioning system damage. Use correct refrigerant recovery, recycling, and charging stations. Do not mix refrigerant, hoses, fittings, components, or refrigerant oils.

5. With engine OFF, connect refrigerant recovery, recycling, and charging station. See R134a Refrigerant Recovery, Recycling, and Charging Station Installation Procedure. (Group 1830.)
6. Follow the air conditioning refrigerant recovery, recycling, and charging station manufacturer's instruction.

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Section 19
Sheet Metal

Contents

Bucket Remove and Install

For additional information, see Removing the Bucket.
(Operator's Manual.)

BE78919,000075C -19-18JUL17-1/1

20. Using appropriate lifting device, install arm cylinder rod end pin.

Specification	
Arm Cylinder Rod End Pin—Weight (approximate)	45 kg 99 lb

21. Install retaining plate, washers, and cap screws. Tighten to specification.

Specification	
Arm Cylinder Pin Cap Screw—Torque	400 N·m 295 lb·ft

22. Connect lubrication hose. Tighten to specification.

Specification	
Lubrication Hose—Torque	30 N·m 22 lb·ft

23. Connect hydraulic hoses, flanges, and install cap screws. Tighten to specification.

Specification	
Hydraulic Hose Cap Screw—Torque	140 N·m 103 lb·ft

24. Remove vacuum or fill hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) See Drain and Refill Hydraulic Tank Oil and Clean Suction Screen. (Operator's Manual.)
25. Bleed air from bucket cylinder. See Hydraulic Cylinder Bleed Procedure. (Group 3360.)
26. Install bucket. See Bucket Remove and Install. (Group 3302.)
27. Grease arm and arm cylinder pin joints. See Lubricate Front End Pin Joints. (Operator's Manual.)
28. Operate machine and check for leaks.

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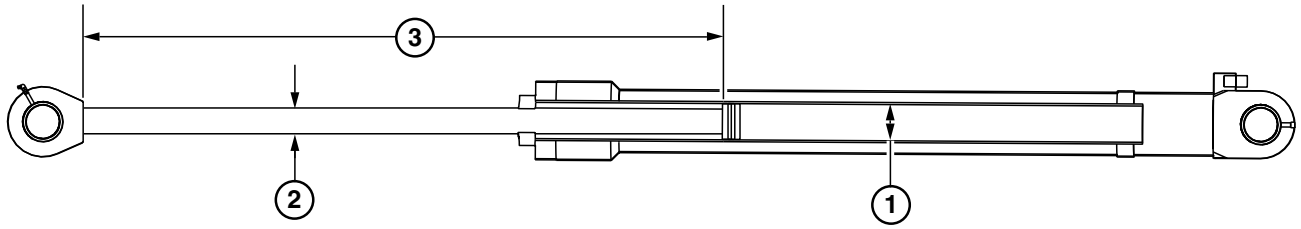
Cylinder Specifications



TX1241088 —UN—29JUN17

TX1241088

Cylinder

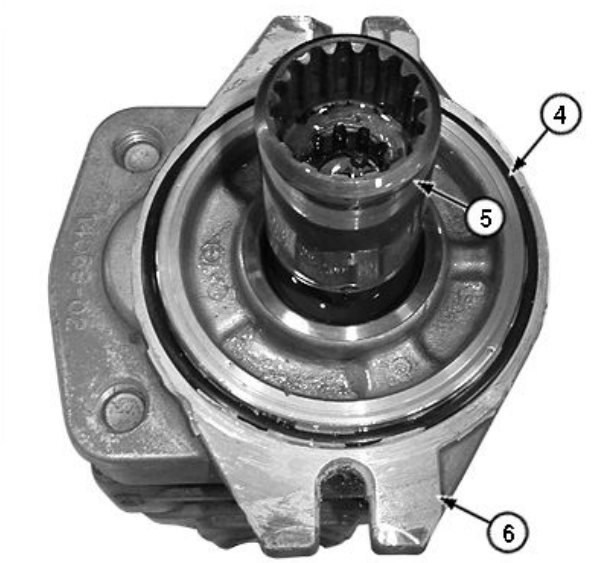
1— Bore
2— Rod Diameter
3— Stroke

Specifications				
	Bore (1)	**Rod Diameter (2)**	**Stroke (3)**	**Cylinder Length (fully retracted)**
Boom Cylinder	215 mm 8.47 in	150 mm 5.91 in	1835 mm 72.24 in	Information currently unavailable
Arm Cylinder	225 mm 8.86 in	160 mm 6.30 in	2225 mm 44.67 in	Information currently unavailable
Bucket Cylinder	200 mm 9.94 in	140 mm 2.76 in	1555 mm 87.60 in	Information currently unavailable

BE78919,0000692 -19-05OCT17-1/1

7. Clean pilot pump surface (6).
8. Install O-ring (4).
9. Inspect and replace coupler (5) as necessary. Install coupler to pilot pump.

4— O-Ring
5— Coupler
6— Pilot Pump Surface



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Pilot Pump Surface, O-Ring, and Coupler

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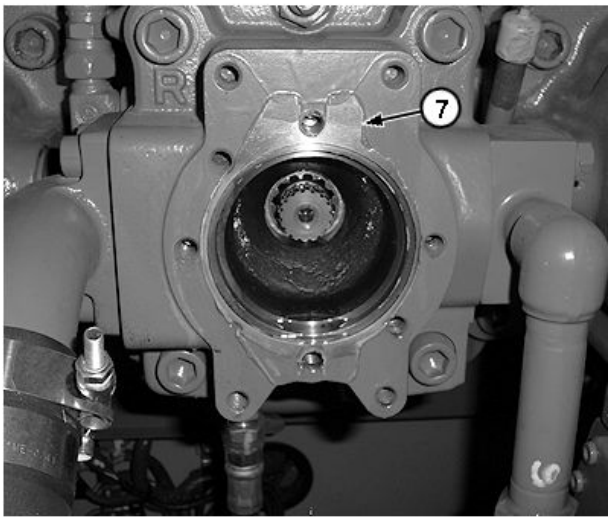
10. Clean pilot pump mounting surface (7).
11. Apply Loctite® 5699™ Grey High Performance RTV Silicone Gasket Maker to pilot pump mounting surface.
12. Install pilot pump and cap screws. Tighten cap screws to specification.

Specification

Pump Mounting Cap Screw—Torque.....50 N·m
37 lb·ft

13. Connect hoses (1 and 8). See Hydraulic System Line Connections. (Group 9025-15.)
14. Remove vacuum from hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.)
15. Check hydraulic oil level. See Check Hydraulic Tank Oil Level. (Operator's Manual.)
16. Operate machine and check for leaks.

7— Pilot Pump Mounting Surface



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Pilot Pump Mounting Surface

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1— Cap Screw (4 used)
2— Cover
3— Seal
4— O-Ring
5— Shaft
6— Bearing
7— Spacer
8— Snap Ring
9— O-Ring
10— Lock Pin
11— Adjustment Screw
12— Nut
13— Plug
14— O-Ring
15— Stopper
16— Ring
17— O-Ring
18— Plug (2 used)
19— O-Ring (2 used)
20— Plug
21— O-Ring
22— Eyebolt
23— Pin
24— Tilt Pin
25— O-Ring (7 used)
26— Regulator
27— Piston
28— O-Ring
29— Ring
30— Stop
31— O-Ring (4 used)
32— Support
33— Plug (2 used)
34— Swash Plate
35— Bushing
36— Plate
37— Plunger (9 used)
38— Sleeve (9 used)
39— Plate
40— Bushing
41— Spring (6 used)
42— Cylinder Block
43— O-Ring
44— Valve Plate
45— Bearing
46— Pin (2 used)
47— Cap Screw (2 used)
48— Nut
49— Adjusting Screw
50— Cover
51— Case
52— Ring
53— Coupling
54— Plug
55— Cap Screw (2 used)

SPECIFICATIONS	
Tilt Pin Temperature	260°C 500°F
Plug (13) Torque	220 N·m 162 lb·ft
Cap Screw (1) Torque	12 N·m 106 lb·in
Cap Screw (47 and 55) Torque	240 N·m 177 lb·ft
Plug (18) Torque	110 N·m 81 lb·ft

OTHER MATERIAL
Loctite® 271™ Threadlocker (high strength)

1. Remove ring (52) and coupling (53) from shaft (5).
2. Remove plugs (18) and O-rings (19) from case (51).
3. Remove regulator (26). See Fan Drive Pump Regulator Remove and Install. (Group 3360.)

NOTE: Do not remove nut (48) and adjusting screw (49). Fan pump settings will change if removed.

4. Remove cap screws (47 and 55) and cover (50).
5. Remove valve plate (44) from cover.

IMPORTANT: Avoid bearing (45) damage. Only remove if necessary. Bearing cannot be reused.

6. Remove bearing (45).
7. Remove O-rings (25 and 43).
8. Remove plugs (33) and O-rings (31).
9. Remove cylinder block (42).
10. Remove plungers (37), plate (39), bushing (40), and springs (41).
11. Remove cap screws (1) and cover (2).

IMPORTANT: Avoid seal (3) damage. Only remove if necessary. Seal cannot be reused.

12. Remove O-ring (4) and seal (3).
13. Remove shaft (5).
14. Remove snap ring (8), spacer (7), and bearing (6).

IMPORTANT: Avoid bushing (35) damage. Only remove if necessary. Bushing cannot be reused.

15. Remove plate (36) and swash plate (34).

Continued on next page

18. Install identification tags and disconnect hydraulic hoses (21, 22, and 25). Close all openings using caps and plugs.
19. Remove cap screws (24) and hydraulic oil cooler fan motor (23).
20. Repair or replace parts as necessary. See Hydraulic Oil Cooler Fan Motor Disassemble and Assemble. (Group 3360.)
21. Install hydraulic oil cooler fan motor and cap screws.
22. Connect hydraulic hoses (21, 22, and 25). See Fan Drive Hydraulic System Component Location. (Group 9025-15.)
23. Install hub with key to hydraulic oil cooler fan motor shaft.
24. Apply Loctite® 271™ Threadlocker (high strength) to cap screws (20). Install fan and cap screws to hydraulic oil cooler fan motor.

Specification

Fan Cap Screw—Torque ..... 90 N·m (66 lb·ft)

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

25. Using appropriate lifting device, install hydraulic oil cooler fan motor support assembly.

Specification

Hydraulic Oil Cooler Fan Motor Support Assembly—Weight (approximate) ..... 111 kg (245 lb)

26. Install cap screws (15 and 17) and hydraulic oil cooler fan motor support. Tighten cap screws to specification.

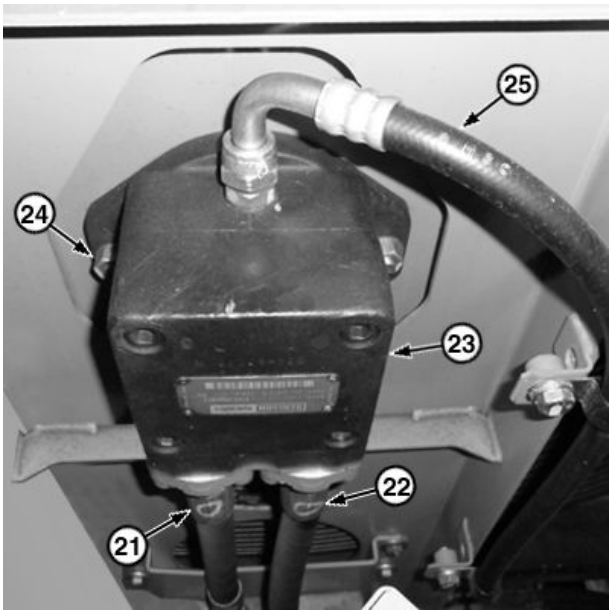
Specification

Hydraulic Oil Cooler Fan Motor Support Cap Screw—Torque ..... 90 N·m (66 lb·ft)

27. Connect fan reversing solenoid 2 (Y55). See Oil Cooler Harness (W31) Component Location. (Group 9015-10.)
28. Connect hydraulic hoses (12—14) to hydraulic oil cooler fan drive reversing control valve. See Fan Drive Hydraulic System Component Location. (Group 9025-15.)
29. Install fan guards and cap screws (10 and 11). Tighten to specification.

Specification

Fan Guard Cap Screw—Torque ..... 90 N·m (66 lb·ft)



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Hydraulic Oil Cooler Fan Motor

21— Supply Pressure Hose
22— Return Hose
23— Hydraulic Oil Cooler Fan Motor
24— Cap Screw (2 used)
25— Case Drain Hose

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

30. Using appropriate lifting device, install air cleaner bracket and air cleaner support bracket. Install cap screws (6 and 7) and tighten to specification.

Specification

Air Cleaner Bracket and Support Bracket—Weight (approximate) ..... 29 kg (65 lb)

Specification

Air Cleaner Bracket Cap Screw—Torque ..... 90 N·m (66 lb·ft)

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

31. Using appropriate lifting device, install air cleaner and cap screws (2).

Specification

Air Cleaner—Weight (approximate) ..... 28 kg (62 lb)

32. Connect air cleaner hose and tighten hose clamp.

Continued on next page

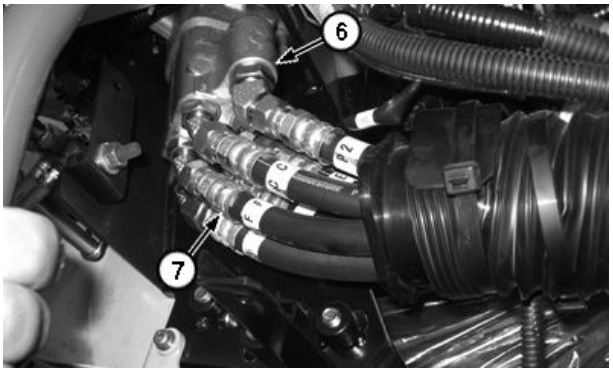
BD53302,0001B01 -19-17NOV15-9/10

10. Install identification tags, disconnect pilot valve hydraulic hoses (7), and remove pilot valve (6). Close all openings using caps and plugs.
11. Repair or replace parts as necessary.
12. Connect pilot valve hydraulic hoses. See Pilot Control Line Connections. (Group 9025-15.)
13. Install pilot valve and boot (5).
14. Install cap screws and tighten to specification.

Specification	
Cap Screw—Torque	20 N·m 177 lb·in

15. Install lever by threading into shaft and tighten lock nuts.
16. Connect horn switch (S5) and install tie bands.
17. Slide boot (1) into place.
18. Install console covers.
19. Turn battery disconnect switch to ON position. See Battery Disconnect Switch. (Operator's Manual.)

CAUTION: Prevent possible injury from unexpected machine movement. Clear all personnel from area before operating machine.



TX1096360A —UN—19AUG11

Pilot Valve Hoses

6— Pilot Valve

7— Pilot Valve Hydraulic Hose (6 used)

20. Operate machine and check for leaks. Verify all machine functions operate correctly. See Operational Checkout. (Group 9005-10.)

BE78919,000018F -19-18NOV15-2/2

Travel Pilot Control Valve Remove and Install

SPECIFICATIONS	
Hydraulic Oil Tank Capacity	500 L 132.1 gal
Valve-to-Cab Platform Cap Screw Torque	50 N·m 37 lb·ft
Travel Pedal-to-Lever Cap Screw Torque	50 N·m 37 lb·ft

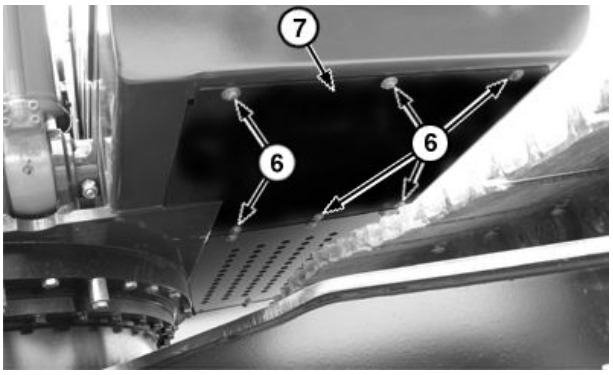
1. Swing upperstructure 90° to tracks.
2. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

CAUTION: Avoid personal injury from high-pressure fluid. High-pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure from hydraulic system before servicing.

3. Release hydraulic oil tank pressure by pressing pressure release button at top of hydraulic oil tank. See Hydraulic Oil Tank Pressure Release Procedure. (Group 9025-25.)
4. Apply vacuum or drain hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) See Drain and Refill Hydraulic Tank Oil and Clean Suction Screen. (Operator's Manual.)

Specification	
Hydraulic Oil Tank—Capacity	500 L 132.1 gal

5. Remove floor mat from cab.
6. Remove cap screws (6) and access panel (7) from underside of cab.



TX1092277A —UN—16MAY11

Access Panel

6— Cap Screw (6 used) **7— Access Panel**

Continued on next page

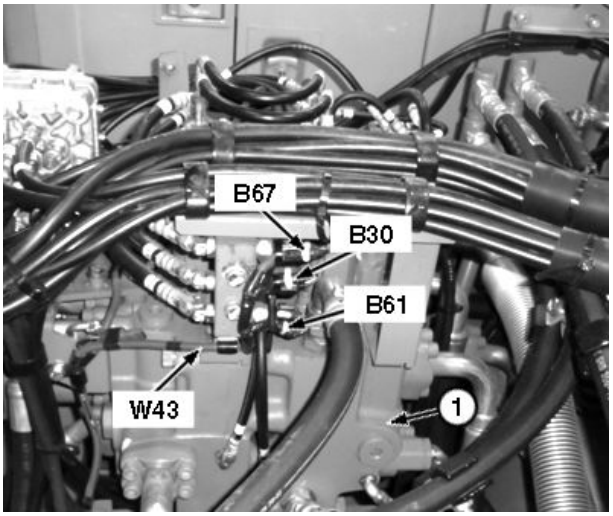
1— Cap Screw (10 used)
2— Body 1
3— Gasket
4— Filter (17 used)
5— Body 2
6— Gasket
7— Sleeve (21 used)
8— Spring (4 used)
9— Body 3
10— Gasket
11— Body 4
12— Gasket
13— Body 5

Continued on next page

DV53278,00009FA -19-28JUL15-2/3

8. Install identification tags and disconnect sensors (B30, B61, and B67). See Control Valve Harness (W43) Component Location. (Group 9015-10.)

1— Control Valve
B30— Boom Up Pressure Sensor
B61— Arm Out Pressure Sensor
B67— Bucket Dump Pressure Sensor
W43—Control Valve Harness



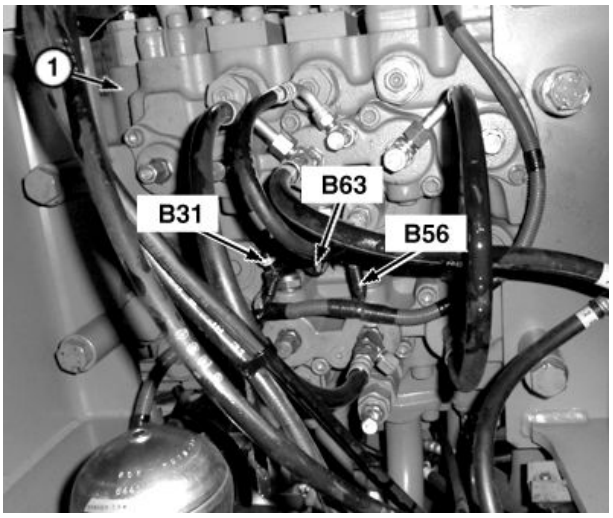
TX1097201A —UN—07SEP11

Control Valve (front view)

BE78919,000019F -19-19JUL16-2/8

9. Install identification tags and disconnect sensors (B31, B63, and B56). See Control Valve Harness (W43) Component Location. (Group 9015-10.)

1— Control Valve
B31— Arm In Pressure Sensor
B63— Boom Down Pressure Sensor
B56— Bucket Curl Pressure Sensor



TX1219582A —UN—20JUL16

Control Valve (bottom view)

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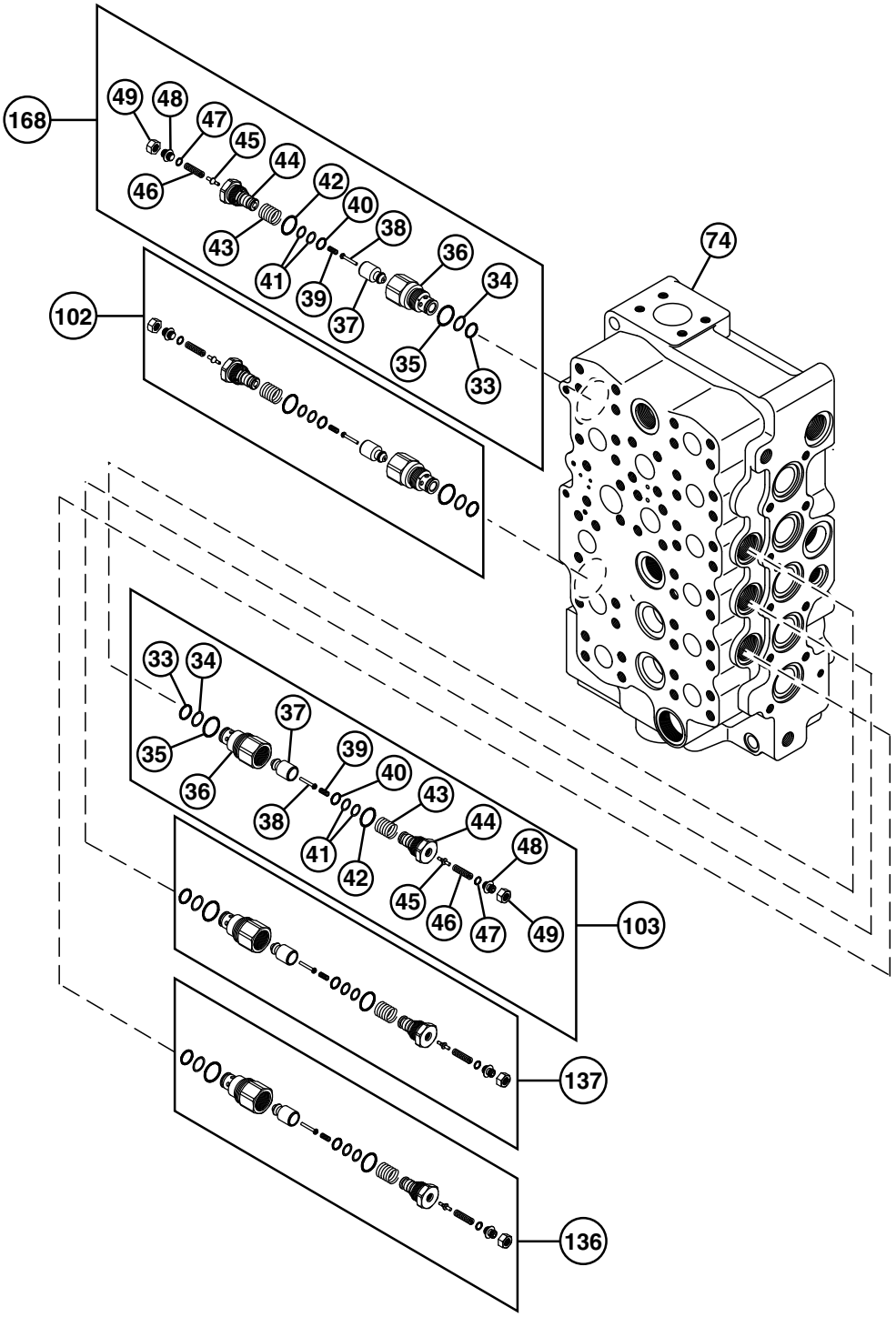
BE78919,000019F -19-19JUL16-3/8

Circuit Relief and Anticavitation Valves



TX1199608 —UN—17AUG15

TX1199608

Circuit Relief and Anticavitation Valves

Continued on next page

BD53302,0001AC8 -19-13NOV15-9/33

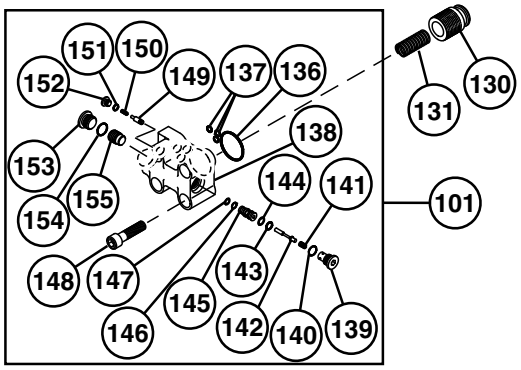
74— Left Control Valve (5-spool)
101— Arm Reduced Leakage Valve (valve and poppet)
105— Check Valve (lift check)—Boom 2 Power Circuit
130— Poppet
131— Spring
134— O-Ring (2 used)
135— Spring
136— O-Ring
137— O-Ring (3 used)
138— Housing (arm reduced leakage valve)
139— Plug
140— O-Ring
141— Spring
142— Poppet
143— Backup Ring
144— O-Ring
145— Sleeve
146— Backup Ring
147— O-Ring
148— Socket Head Cap Screw (4 used)
149— Spool
150— Spring
151— O-Ring
152— Plug
153— Plug
154— O-Ring
155— Piston
156— Plug
157— Backup Ring
158— O-Ring
159— Spring
160— Check Valve
161— Spool
162— Bypass Shutoff Valve (5-spool)
163— Sleeve
164— Piston
165— Plug

BD53302,0001AC8 -19-13NOV15-25/33

Arm Reduced Leakage Valve (Valve and Poppet) (101) Disassemble

NOTE: Not all parts are serviceable. Disassembly of arm reduced leakage valve (valve and poppet) (101) is for inspection purposes only.

1. Remove socket head cap screws (148) and arm reduced leakage valve (valve and poppet) (101) from left control valve.
2. Remove spring (131) and poppet (130) from left control valve.
3. Remove O-rings (136 and 137) from housing (138).
4. Remove plug (139) and sleeve (145) from housing (138).
5. Remove O-ring (147) and backup ring (146) from sleeve.
6. Remove O-rings (140 and 144), backup ring (143), spring (141), and poppet (142).
7. Remove plug (153) and piston (155) from arm reduced leakage valve housing.
8. Remove O-ring (154) from plug.
9. Remove plug (152), spring (150), and spool (149) from arm reduced leakage valve housing.
10. Remove O-ring (151) from plug.



TX1199633 —UN—14AUG15

Arm Reduced Leakage Valve (valve and poppet)

101— Arm Reduced Leakage Valve (valve and poppet)
130— Poppet
131— Spring
136— O-Ring
137— O-Ring (3 used)
138— Housing (arm reduced leakage valve)
139— Plug
140— O-Ring
141— Spring
142— Poppet
143— Backup Ring
144— O-Ring
145— Sleeve
146— Backup Ring
147— O-Ring
148— Socket Head Cap Screw (4 used)
149— Spool
150— Spring
151— O-Ring
152— Plug
153— Plug
154— O-Ring
155— Piston

11. Inspect parts for wear or damage.

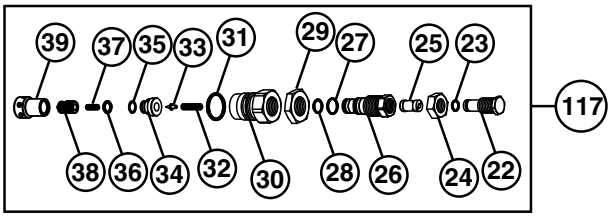
Continued on next page

BD53302,0001AC8 -19-13NOV15-26/33

Main Relief and Power Dig Valve (117) Disassemble

NOTE: Not all parts are serviceable. Disassembly of the main relief and power dig valve (117) is for inspection purposes only.

1. Remove main relief and power dig valve (117) from right control valve.
2. Remove O-ring (31) from main relief valve.
3. Remove valve seat (34) to remove spring (37) and piston (38) from poppet (39).
4. Remove O-ring (36) and backup ring (35) from valve seat (34).
5. Remove spring (32) and piston (33).
6. Remove O-ring (28) and backup ring (27) from sleeve (26).
7. Remove plug (22) and nut (24) to remove check valve (25) and O-ring (23).
8. Inspect parts for wear or damage.



TX1203227 —UN—08OCT15

Main Relief and Power Dig Valve

22— Plug
23— O-Ring
24— Nut
25— Check Valve
26— Sleeve
27— Backup Ring
28— O-Ring
29— Nut
30— Sleeve
31— O-Ring
32— Spring
33— Piston
34— Valve Seat
35— Backup Ring
36— O-Ring
37— Spring
38— Piston
39— Poppet
117— Main Relief and Power Dig Valve

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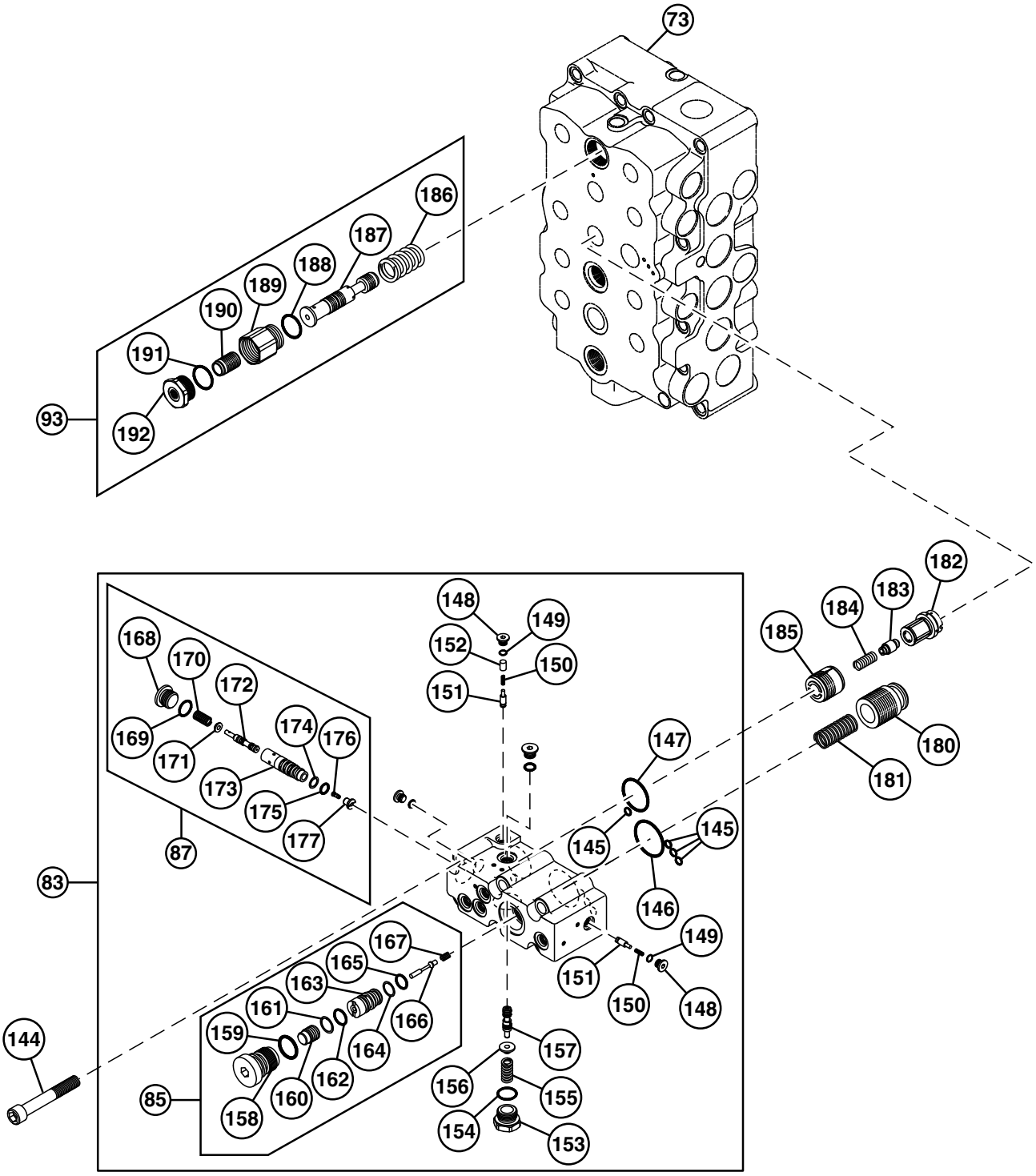
BD53302,0001AC6 -19-13NOV15-8/32

Flow Rate Control Valve Assembly and Bypass Shutoff Valve (4-Spool)



TX1199700

Flow Rate Control Valve Assembly and Bypass Shutoff Valve (4-spool)

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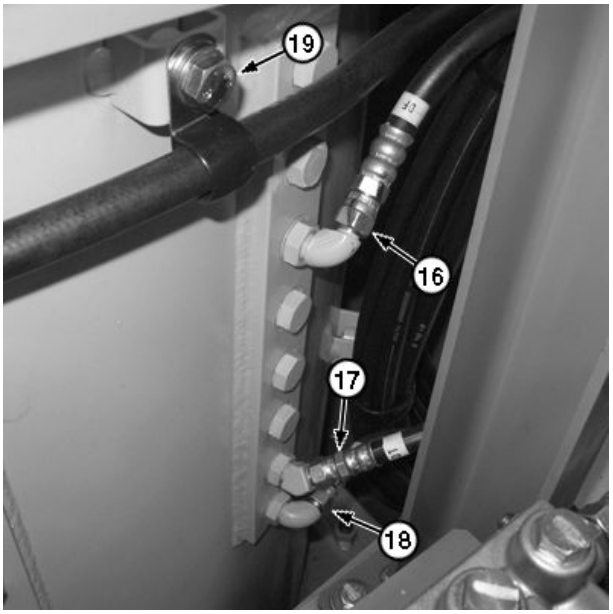
BD53302,0001AC6 -19-13NOV15-24/32

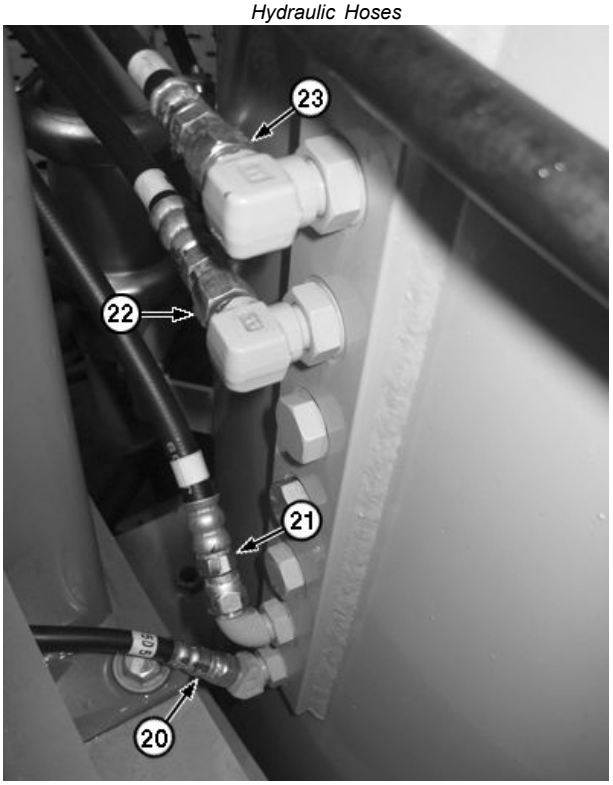
13. Remove cap screws (19).
14. Install identification tags and disconnect hydraulic hoses (16—18 and 20—23). Close all openings using caps and plugs.

16— Hydraulic Hose
17— Hydraulic Hose
18— Hydraulic Hose
19— Cap Screw (2 used)
20— Hydraulic Hose
21— Hydraulic Hose
22— Hydraulic Hose
23— Hydraulic Hose



TX1097912A —UN—15SEP11

Hydraulic Hoses



TX1097913A —UN—15SEP11

Hydraulic Hoses

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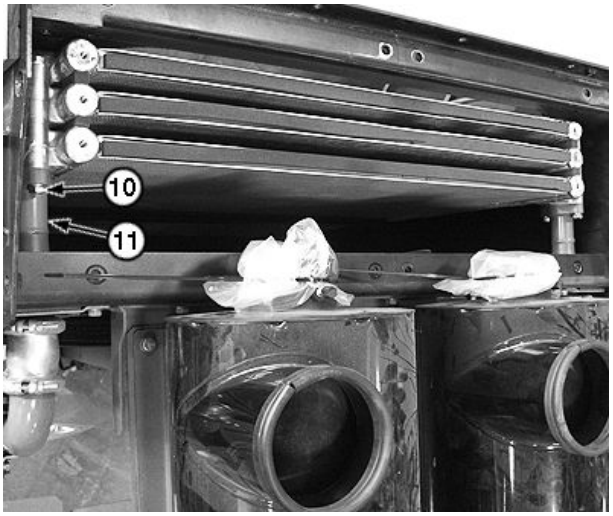
BE78919,0000198 -19-24NOV15-5/8

13. Remove cap screws (10) and disconnect upper hydraulic oil cooler lines (11). Close all openings using caps and plugs.

10— Cap Screw (4 used)

11— Upper Hydraulic Oil Cooler Line (2 used)



TX1095672A —UN—08AUG11

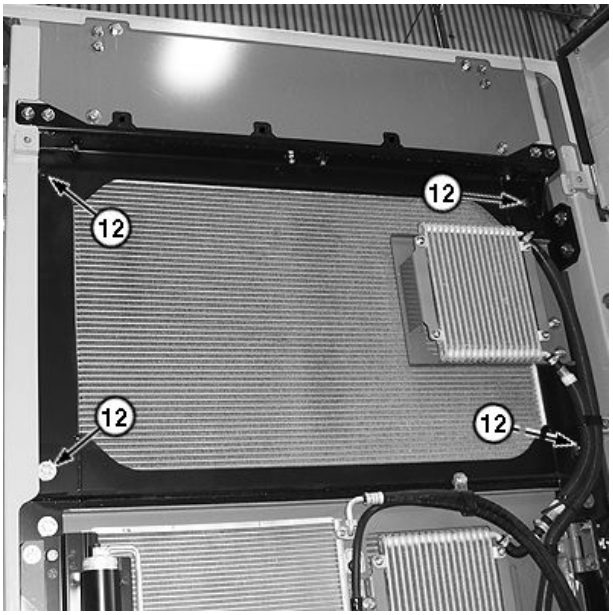
Upper Hydraulic Oil Cooler Lines

BD53302,0001B02 -19-13NOV15-4/7

NOTE: It is not necessary to remove fuel coolers or condenser/dryer to remove hydraulic oil coolers.

14. Remove cap screws (12) from upper hydraulic oil cooler.

12— Cap Screw (4 used)



TX1095675A —UN—08AUG11

Upper Hydraulic Oil Cooler Mounting Cap Screws

Continued on next page

BD53302,0001B02 -19-13NOV15-5/7

IMPORTANT: Avoid cylinder damage. DO NOT reuse slide rings (14 and 15). Always replace with new slide rings when assembling.

12. Using appropriate lifting device, remove slide rings (14 and 15), seal ring (16), and O-ring (17) from piston.

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

13. Using appropriate lifting device, remove cushion bearing (13), cushion seal (12), and cylinder head from cylinder rod.

Specification

Boom Cylinder Rod—Weight (approximate)	380 kg 838 lb
Boom Cylinder Head—Weight (approximate)	57 kg 126 lb

14. Remove O-ring (6), backup ring (5), wiper ring (2), retaining ring (11), ring (9), U-ring (8), and backup ring (7).
15. Remove bushing (10) from cylinder head by using ST1195 Cylinder Head Bushing Puller and Installer.
16. Inspect cylinder rod, cylinder barrel outside, and inside for wear, scratches, and nicks that may cut or damage a seal or wear ring during assembly.

TX1096255A —UN—02SEP11

Piston and Rings

14— Slide Ring (2 used)
15— Slide Ring (2 used)
16— Seal Ring
17— O-Ring
18— Piston

Specification

Boom Cylinder Rod—Outside Diameter (OD)	150 mm 5.9 in

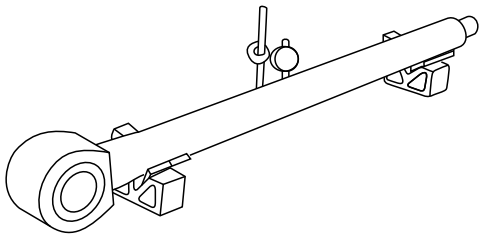
17. Inspect seals and bushings on both rod end and head end of cylinder for wear and damage. See Inspect Pins, Bushings, and Bosses—Front Attachment. (Group 3340.)

BE78919,0000168 -19-07AUG18-3/5

18. Check cylinder rod for curvature using V-blocks and dial indicator.

IMPORTANT: Premature component malfunction will result if components are assembled dry. Friction between nonlubricated parts generates significant heat buildup and wear. Apply clean hydraulic oil to all components while assembling.

19. Apply clean hydraulic oil onto components.
20. Install bushing to cylinder head using ST1195 Cylinder Head Bushing Puller and Installer.
21. Install retaining ring (11) to cylinder head.
22. Install ring (9) to cylinder head with lip facing bushing side.
23. Install backup ring (7) to cylinder head.
24. Install U-ring (8) to cylinder head with lip facing bushing side.



TX1095813 —UN—11AUG11

Cylinder Rod on V-Blocks

25. Install wiper ring to cylinder head using ST2055 Seal Ring Pushing Tool and soft face hammer.
26. Install O-ring (6) and backup ring (5) to cylinder head.

Continued on next page

BE78919,0000168 -19-07AUG18-4/5

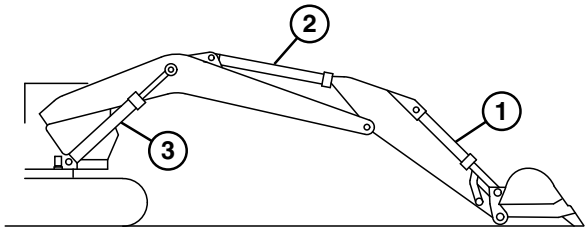
Bucket Cylinder Remove and Install

SPECIFICATIONS	
Hydraulic Oil Tank Capacity	500 L 132.1 gal
Bucket Cylinder Pin (8) Weight (approximate)	104 kg 229 lb
Bucket Cylinder (1) Weight (approximate)	680 kg 1499 lb
Bucket Cylinder Pin (15) Weight (approximate)	34 kg 75 lb
Cap Screw (5 and 12) Torque	400 N·m 295 lb·ft
Lubrication Hose Torque	30 N·m 22 lb·ft
Cap Screw (9) Torque	140 N·m 103 lb·ft

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)
2. Position the machine as shown. Fully retract the bucket cylinder (1) and arm cylinder (2) and lower bucket to the ground.

CAUTION: Avoid personal injury from high-pressure fluid. High-pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure from hydraulic system before servicing.

3. Release hydraulic oil tank pressure by pressing pressure release button at top of hydraulic oil tank. See Hydraulic Oil Tank Pressure Release Procedure. (Group 9025-25.)
4. Release hydraulic circuit pressure. See Hydraulic Circuit Pressure Release Procedure. (Group 3360.)



TX1098619 —UN—23SEP11

Machine Position

1— Bucket Cylinder
2— Arm Cylinder
3— Boom Cylinder (2 used)

IMPORTANT: Avoid machine damage to diesel exhaust fluid (DEF) system. After key switch is switched to OFF position, wait at least 5 minutes before turning battery disconnect switch to OFF position.

5. Turn battery disconnect switch to OFF position. See Battery Disconnect Switch. (Operator's Manual.)
6. Apply vacuum or drain hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) See Drain and Refill Hydraulic Tank Oil and Clean Suction Screen. (Operator's Manual.)

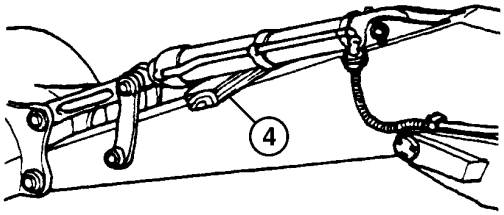
Specification

Hydraulic Oil Tank—Capacity..... 500 L
132.1 gal

BE78919,00001A8 -19-23NOV15-1/6

7. Install wood block (4) between bucket cylinder and arm.

4— Wood Block



TX1097331 —UN—07SEP11

Wood Block

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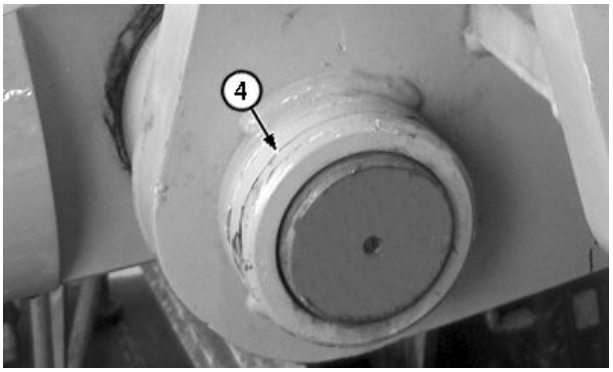
BE78919,00001A8 -19-23NOV15-2/6

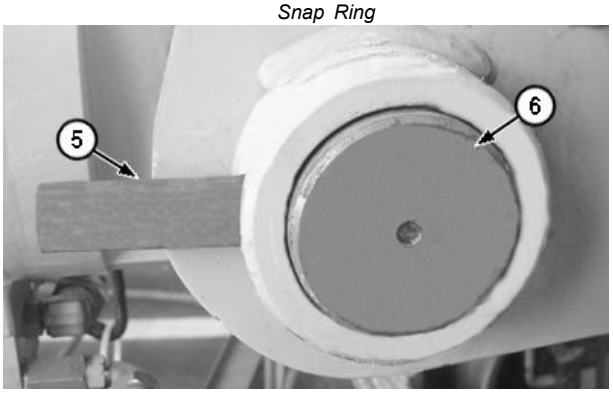
13. Remove snap ring (4).
14. Remove snap ring pin (5) and cylinder retaining pin (6).

4— Snap Ring
5— Snap Ring Pin
6— Cylinder Retaining Pin



TX1097864A —UN—14SEP11

Snap Ring



TX1097865A —UN—14SEP11

Cylinder Retaining Pin

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BE78919,000017F -19-25NOV15-3/4

Section 43
Swing System

Contents

1— Swing Motor
2— Cap Screw (12 used)
3— Ring Gear
4— Sun Gear
5— Thrust Plate
6— Planetary Pinion Carrier
7— Sun Gear
8— Thrust Plate
9— Planetary Pinion Carrier
10— Bearing Nut
11— Tapered Roller Bearing
12— Lock Plate
13— Cap Screw (2 used)
14— Thrust Plate (3 used)
15— Needle Bearing (6 used)
16— Planetary Gear (3 used)
17— Spring Pin (3 used)
18— Pin (3 used)
19— Spring Pin (3 used)
20— Thrust Plate (3 used)
21— Planetary Gear (3 used)
22— Needle Bearing (3 used)
23— Pin (3 used)
24— Cap Screw (12 used)
25— Plug (2 used)
26— Drain Valve (2 used)
27— Drain Plug (2 used)
28— Housing
29— Oil Seal
30— Tapered Roller Bearing
31— Screw (4 used)
32— Magnet (4 used)
33— Sleeve
34— O-Ring
35— Shaft

1. Apply Loctite® 277™ Threadlocker (high strength) to screws (31). Install magnets (32) and screws to sleeve (33).
2. Install O-ring (34) to sleeve.
3. Install sleeve and cone of tapered roller bearing (30) to shaft (35) using ST7289 and ST7292 Bearing Pusher tools.
4. Install cup of tapered roller bearing (30) to housing (28).
5. Apply Loctite® 277™ Threadlocker (high strength) to outside diameter of oil seal (29) and multipurpose grease to lip of seal.
6. Install oil seal into housing (28) with lip of seal facing motor side of housing using ST7300 and ST7296 Seal Install Tools.
7. Install cup of tapered roller bearing (11) to housing.

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

8. Using appropriate lifting device, install housing onto shaft (35).

Specification

Housing—Weight (approximate) ..... 135 kg
298 lb

9. Install cone of tapered roller bearing (11) to shaft. Tap cone until two threads of shaft (35) for bearing nut (10) appear.
10. Install bearing nut to shaft to prevent shaft from falling out.

CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.

11. Using appropriate lifting device, lift and place housing (28) in a press.

Specification

Housing and Shaft—Weight (approximate) ..... 230 kg
507 lb

12. Remove bearing nut (10) from shaft (35).
13. Install tapered roller bearing (11) to housing using ST2924 Bearing Pusher.
14. Apply grease to threads of bearing nut (10).

    Install bearing nut to shaft (35).

    Tighten bearing nut using either DFT1220 Swing Gear Case Nut Spanner Wrench or ST2926 Swing Gear Case Nut Spanner Wrench.

    To make DFT1220 Swing Gear Case Nut Spanner Wrench tool, see DFT1220 Swing Gear Case Nut Spanner Wrench. (Group 9900.)

Specification

Bearing Nut—Torque ..... 490 N·m
361 lb·ft

15. Apply Loctite® 277™ Threadlocker (high strength) to cap screws (13). Install lock plate (12) to bearing nut (10) using cap screws (13). Tighten to specification.

Specification

Lock Plate Cap Screw—Torque ..... 50 N·m
37 lb·ft

16. Install thrust plate (8) to planetary pinion carrier (9) with oil groove facing sun gear (7).
17. Apply grease onto upper and lower sides of planetary gears (16). Install needle bearings (15) to planetary gears.
18. Install thrust plates (14) so oil grooves face planetary gear.
19. Install planetary gears, needle bearings, and thrust plates to planetary pinion carrier (9).
20. Install pins (18).

Continued on next page

2. Using appropriate lifting device, place outer bearing race (2) on a clean and flat surface.

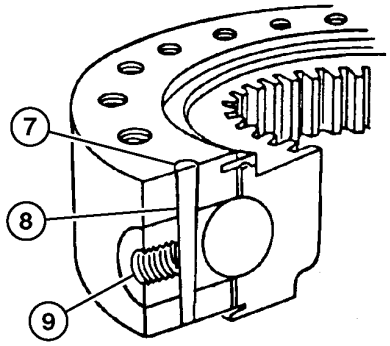
Specification	
Swing Bearing—Weight (approximate)	1240 kg 2734 lb

JG33441,00001A3 -19-02SEP15-2/5

NOTE: Taper pin may be tack welded or crimped.

3. Grind tack weld (7) or crimp off of top of taper pin (8).
4. Drive taper pin out from the bottom side of swing bearing.
5. Remove loading plug (9) using a M10 x 1.5 pitch cap screw.

7— Tack Weld
8— Taper Pin
9— Loading Plug



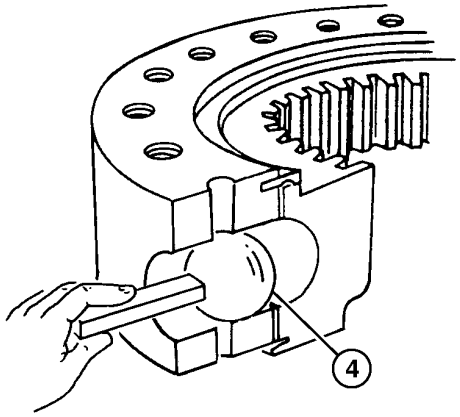
TX1095361 —UN—02AUG11

Swing Bearing Cross Section

JG33441,00001A3 -19-02SEP15-3/5

6. Using a magnet and wire, remove ball bearings (4).

4— Ball Bearing (86 used)



TX1095362 —UN—01AUG11

Ball Bearing

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JG33441,00001A3 -19-02SEP15-4/5

Swing Motor and Park Brake Remove and Install

SPECIFICATIONS	
Hydraulic Oil Tank Capacity	500 L 132.1 gal
Left Swing Motor and Park Brake Weight (approximate)	69 kg 152 lb
Swing Motor and Park Brake Cover-to-Housing Cap Screw Torque	90 N·m 66 lb·ft

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

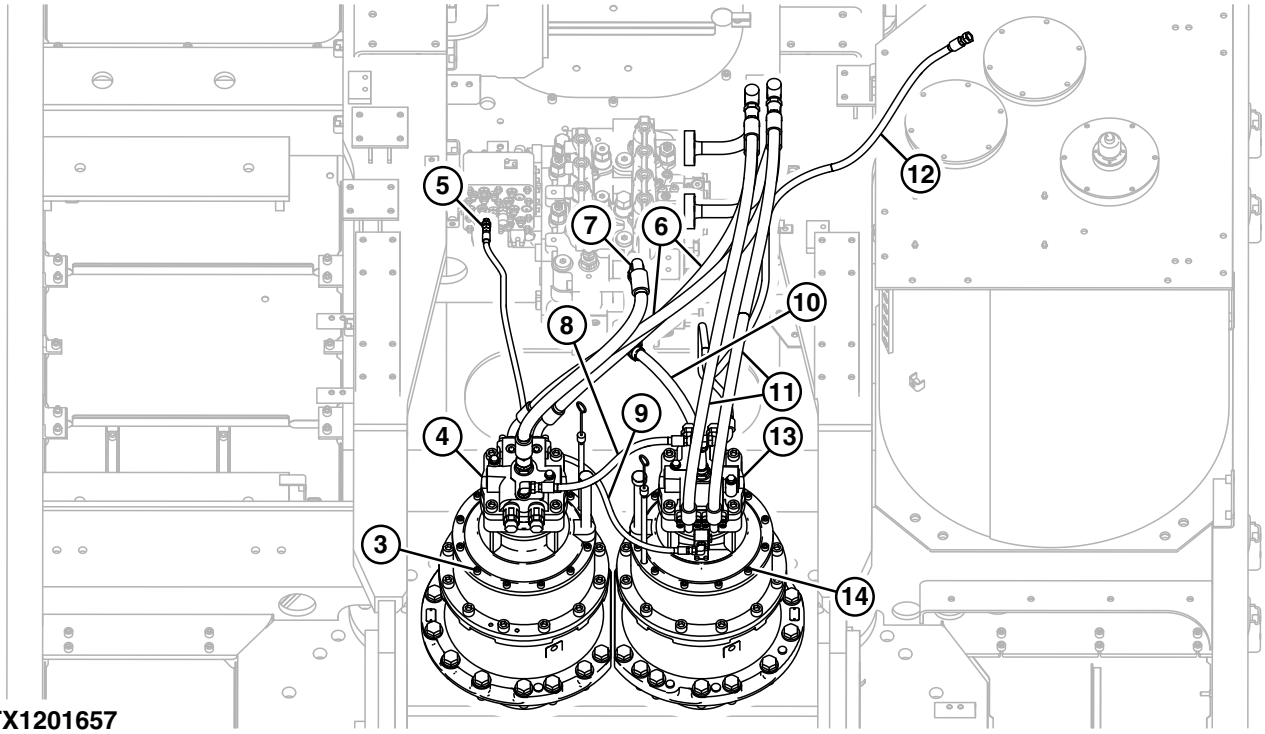
CAUTION: Avoid personal injury from high-pressure fluid. High-pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure from hydraulic system before servicing.

2. Release hydraulic oil tank pressure by pressing pressure release button at top of hydraulic oil tank. See Hydraulic Oil Tank Pressure Release Procedure. (Group 9025-25.)
3. Apply vacuum or drain hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) See Drain and Refill Hydraulic Tank Oil and Clean Suction Screen. (Operator's Manual.)

Specification

Hydraulic Oil Tank—Capacity..... 500 L
132.1 gal

4. Remove swing motor panels. See Swing Motor Panels Remove and Install. (Group 1910.)



Left and Right Swing Motor and Park Brake

3— Cap Screw (8 used)
4— Right Swing Motor and Park Brake
5— Pilot Signal Manifold Swing Park Brake Release Pilot Valve-to-Right Swing Motor Line
6— Left Control Valve (5-spool)-to-Right Swing Motor Hose (2 used)
7— Left Control Valve (5-spool) Bypass Shutoff Valve-to-Right Swing Motor Hose
8— Right Swing Motor-to-Hydraulic Oil Tank Hose
9— Pilot Signal Manifold Swing Park Brake Release Pilot Valve-to-Left Swing Motor Line
10— Left Control Valve (5-spool) Bypass Shutoff Valve-to-Left Swing Motor Hose
11— Left Control Valve (5-spool)-to-Left Swing Motor Hose (2 used)
12— Left Swing Motor-to-Hydraulic Oil Tank Hose
13— Left Swing Motor and Park Brake
14— Cap Screw (8 used)

NOTE: Removal and installation of swing motors and park brakes are similar. Removal of left swing motor and park brake is used in this procedure shown.

Hydraulic hoses and lines (5—7 and 9) do not need to be disconnected to remove left swing gear case.

5. Install identification tags and disconnect appropriate hydraulic hoses and lines. Close all openings using caps and plugs.

Continued on next page

JG33441,00001AF -19-07OCT15-1/2

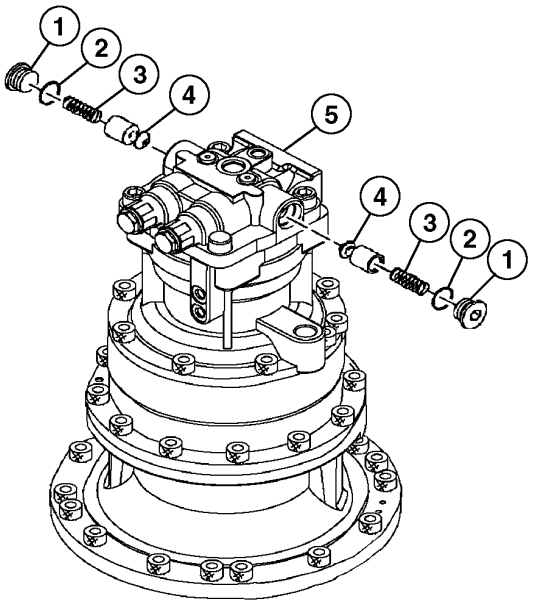
Make-Up Check Valve Disassemble and Assemble

SPECIFICATIONS	
Make-Up Check Valve Plug Torque	350 N·m 258 lb·ft

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)
2. Remove make-up check valves from swing motor and park brake (5). See Crossover Relief Valve and Make-Up Check Valve Remove and Install. (Group 4360.)
3. Inspect O-rings (2), springs (3), and poppets (4) for wear and damage.
4. Replace parts as necessary.
5. Install O-rings, springs, poppets, and make-up check valve plugs (1).
6. Tighten make-up check valve plugs to specification. See Crossover Relief Valve and Make-Up Check Valve Remove and Install. (Group 4360.)

Specification

Make-Up Check Valve Plug—Torque.....350 N·m
258 lb·ft



TX1113765 —UN—15MAY12

Make-Up Check Valve

1— Make-Up Check Valve Plug (2 used)
2— O-Ring (2 used)
3— Spring (2 used)
4— Poppet (2 used)
5— Swing Motor and Park Brake

JS20420,00013A0 -19-06OCT15-1/1

- 159.4 x 38.1 x 6.35 mm (6.65 x 1.5 x .25 in.)

DV53278,0000A6C -19-24AUG15-2/2