325 and 328 Skid Steer Repair

TECHNICAL MANUAL

325 and 328 Skid Steer Repair

TM2192 12NOV10 (ENGLISH)

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For complete service information also see:

325 and 328 Skid Steer Operation and Test.....	TM2191
325 and 328 Skid Steer Operator's Manual.....	OMT205051
POWERTECH™ 2.4 L & 3.0 L Diesel Engines ..	CTM301
120 Series Hydraulic Cylinders.....	CTM114319
Specifications Manual.....	SP458

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tm2192 - 325 and 328 Skid Steer Repair
Recognize Safety Information

Recognize Safety Information



T133555-UN: Safety Alert Symbols



T133588-19: Safety Alert Symbols

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.

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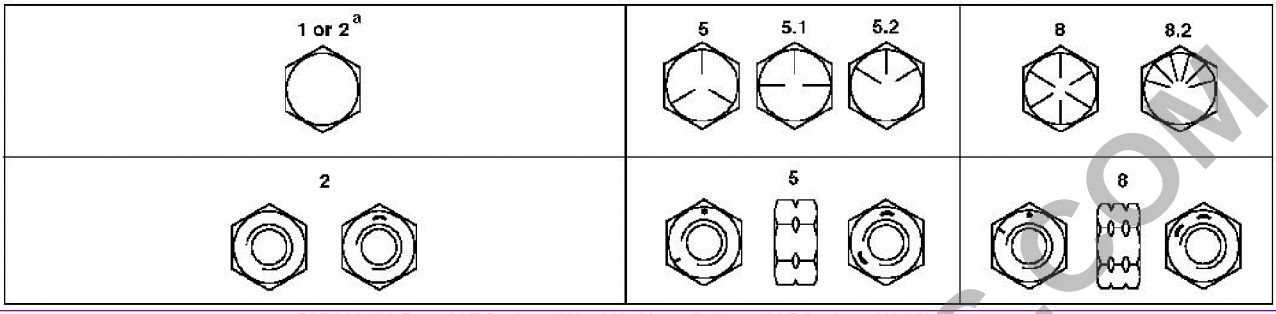
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tm2192 - 325 and 328 Skid Steer Repair
Unified Inch Bolt and Cap Screw Torque Values

Unified Inch Bolt and Cap Screw Torque Values

-: Unified Inch Bolt and Cap Screw Torque Values

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES—Tolerance is ±10% unless otherwise specified



TORQ1A-UN: Top—SAE Grade and Head Markings; Bottom—SAE Grade and Nut Markings

	Grade 1 (No Mark)		Grade 2 [a] (No Mark)		Grade 5, 5.1 or 5.2		Grade 8 or 8.2	
Thread Size	Lubricated [b] N˙m (lb-ft)	Dry [c] N˙m (lb-ft)	Lubricated [b] N˙m (lb-ft)	Dry [c] N˙m (lb-ft)	Lubricated [b] N˙m (lb-ft)	Dry [c] N˙m (lb-ft)	Lubricated [b] N˙m (lb-ft)	Dry [c] N˙m (lb-ft)
1/4	3.8 (2.8)	4.7 (3.5)	6 (4.4)	7.5 (5.5)	9.5 (7)	12 (9)	13.5 (10)	17 (12.5)
5/16	7.7 (5.7)	9.8 (7.2)	12 (9)	15.5 (11.5)	19.5 (14.5)	25 (18.5)	28 (20.5)	35 (26)
3/8	13.5 (10)	17.5 (13)	22 (16)	27.5 (20)	35 (26)	44 (32.5)	49 (36)	63 (46)
7/16	22 (16)	28 (20.5)	35 (26)	44 (32.5)	56 (41)	70 (52)	80 (59)	100 (74)
1/2	34 (25)	42 (31)	53 (39)	67 (49)	85 (63)	110 (80)	120 (88)	155 (115)
9/16	48 (35.5)	60 (45)	76 (56)	95 (70)	125 (92)	155 (115)	175 (130)	220 (165)
5/8	67 (49)	85 (63)	105 (77)	135 (100)	170 (125)	215 (160)	240 (175)	305 (225)
3/4	120 (88)	150 (110)	190 (140)	240 (175)	300 (220)	380 (280)	425 (315)	540 (400)
7/8	190 (140)	240 (175)	190 (140)	240 (175)	490 (360)	615 (455)	690 (510)	870 (640)
1	285 (210)	360 (265)	285 (210)	360 (265)	730 (540)	920 (680)	1030 (760)	1300 (960)
1-1/8	400 (300)	510 (375)	400 (300)	510 (375)	910 (670)	1150 (850)	1450 (1075)	1850 (1350)
1-1/4	570 (420)	725 (535)	570 (420)	725 (535)	1280 (945)	1630 (1200)	2050 (1500)	2600 (1920)
1-3/8	750 (550)	950 (700)	750 (550)	950 (700)	1700 (1250)	2140 (1580)	2700 (2000)	3400 (2500)
1-1/2	990 (730)	1250 (930)	990 (730)	1250 (930)	2250 (1650)	2850 (2100)	3600 (2650)	4550 (3350)

[a] Grade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.

[b] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.

[c] "Dry" means plain or zinc plated without any lubrication.

-: Unified Inch Bolt and Cap Screw Torque Value Instructions

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

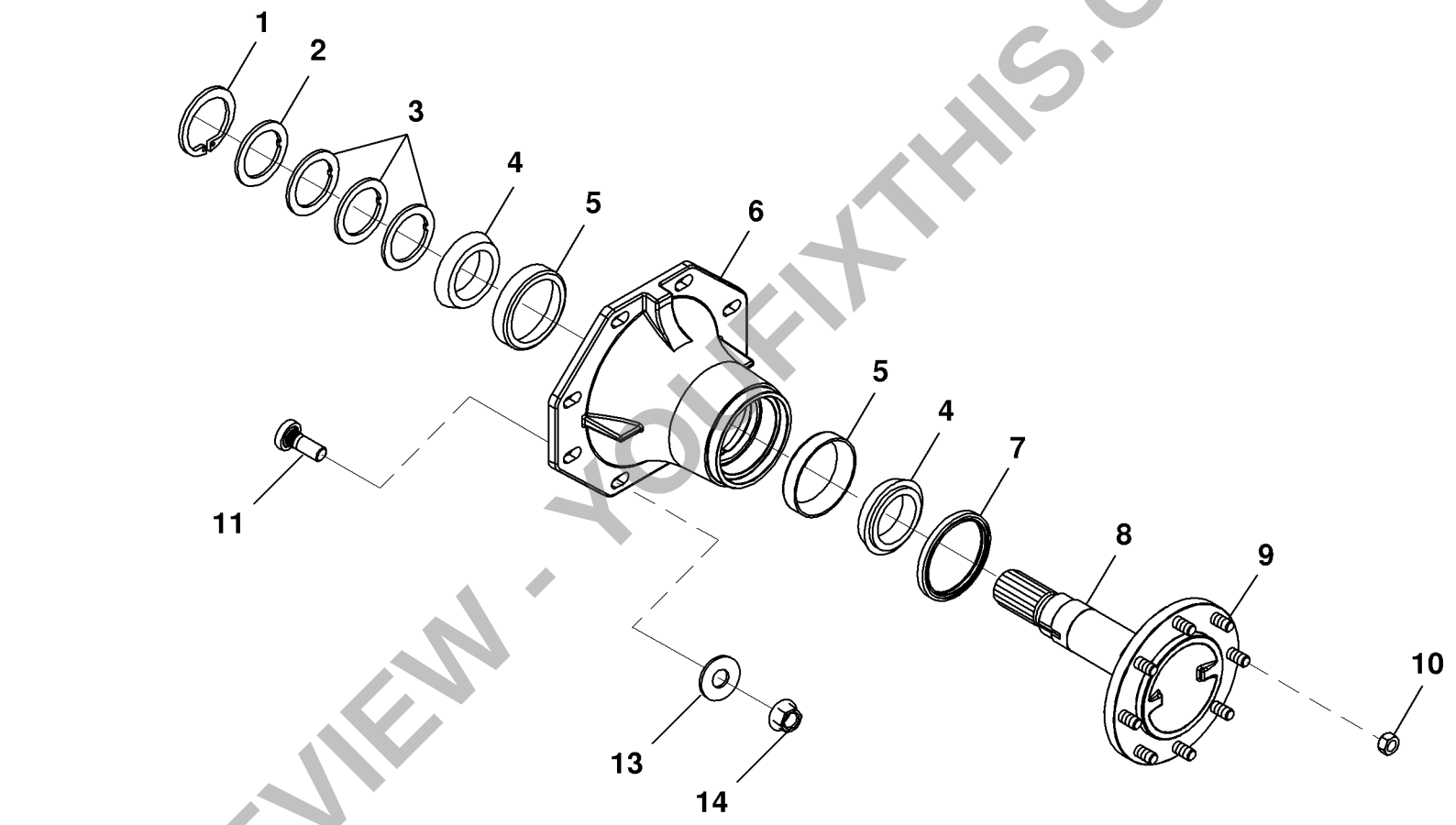
Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

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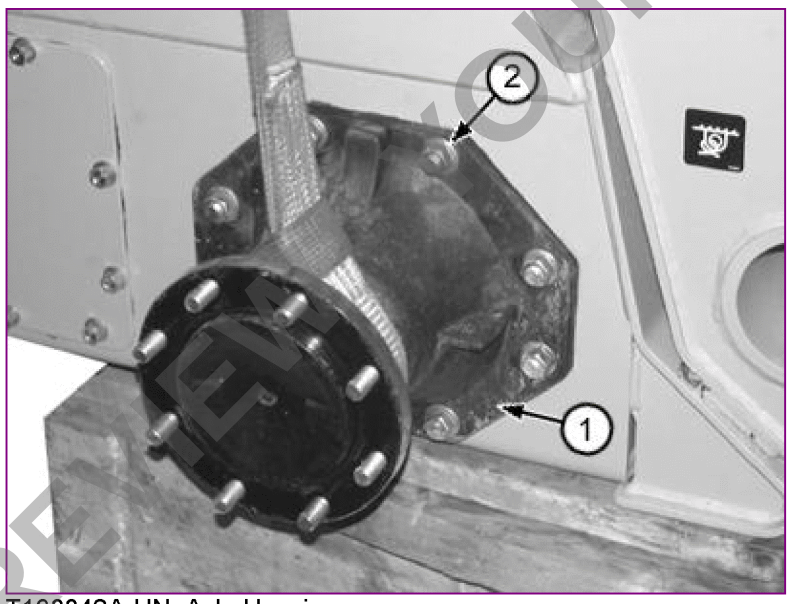
tm2192 - 325 and 328 Skid Steer Repair
Axle Housing Remove and Install

Axle Housing Remove and Install

1. Park machine on flat level surface.
2. Raise and block machine. See Raising and Blocking Machine . (Operator's Manual.)
3. Remove wheel from axle being serviced.
4. Drain chain case oil. See Change Chain Case Oil . (Operator's Manual.)
5. Clean area around axle housing to prevent debris from entering chain case.
6.

CAUTION:

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



T198842A-UN: Axle Housing

LEGEND:

1 - Axle Housing
2 - Nut (8 used)

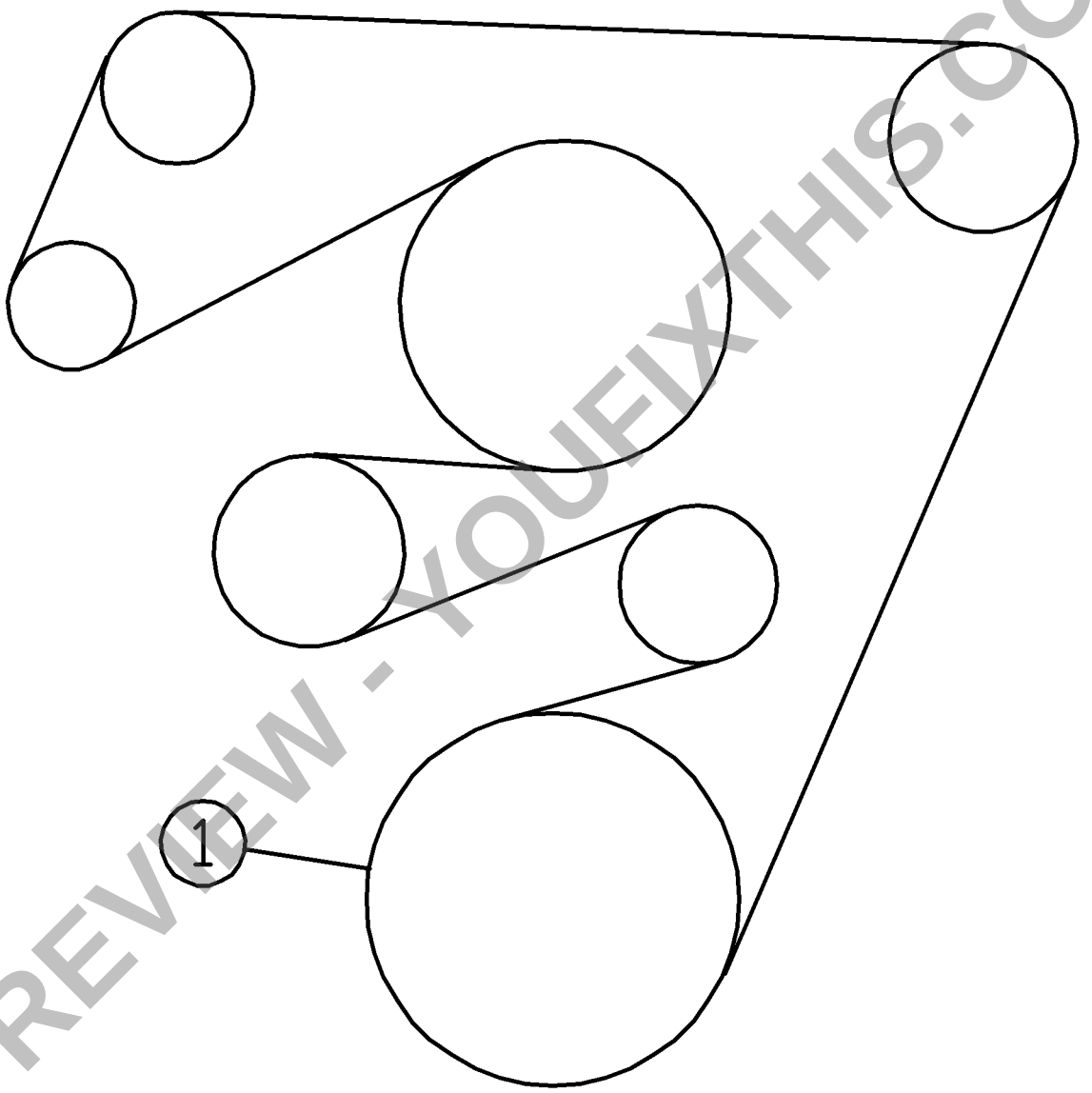
Support axle housing (1) using appropriate lifting device. Remove axle housing.

Item	Measurement	Specification
Axle Housing	Weight	33 kg 72 lb

7. Clean and inspect parts. Repair or replace parts as necessary. See Axle Disassemble and Assemble . (Group 0201.)

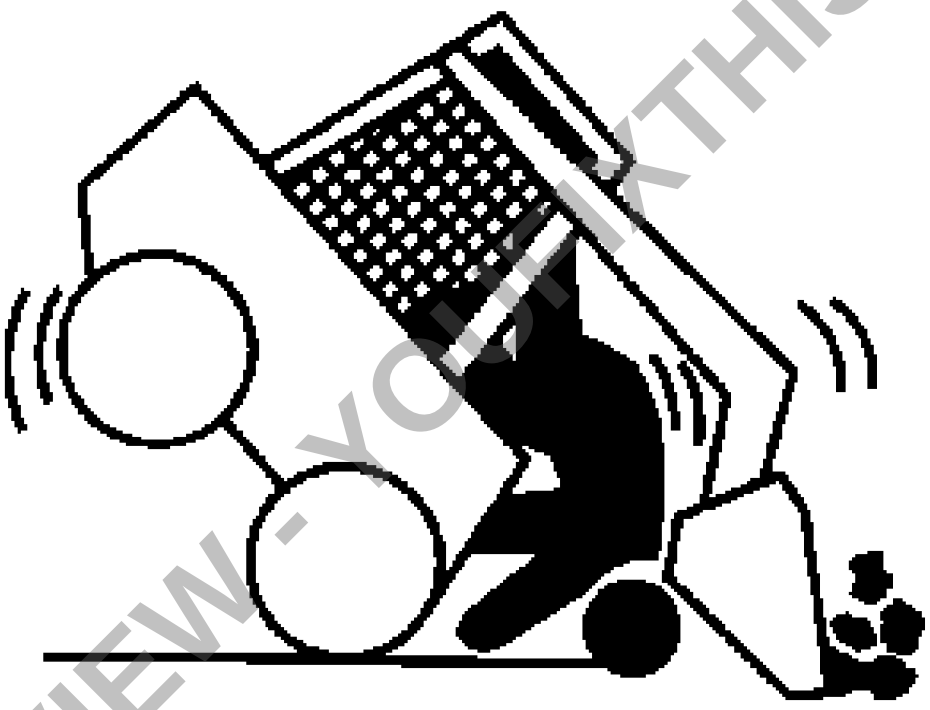
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O-Ring Face Seal Fittings With Metric Hex Nut And Stud End For Standard Pressure Service Recommendations

O-Ring Face Seal Fittings With Metric Hex Nut And Stud End For Standard Pressure Service Recommendations

-: O-Ring Face Seal Fittings with Metric Hex and Stud End for Standard Pressure Torque Values

O-RING FACE SEAL AND FITTINGS WITH METRIC HEX NUT AND STUD END FOR STANDARD PRESSURE, BELOW 27 600 kPa (275.8 bar) (4,000 psi), TORQUE VALUES—Tolerance is +15 -20% unless otherwise specified



T196337-UN: O-Ring Face Seal Fittings

LEGEND:

1 - 90° Swivel Elbow
2 - 90° Adjustable Stud Elbow
3 - Stud Straight
4 - Bulkhead Union and Nut
5 - External Hex Stud End Plug
6 - Tube Nut
7 - Swivel Nut
8 - Stud End
9 - Hex Nut
10 - O-Ring
11 - Identification Groove

Nominal Tube OD or Hose ID			O-Ring Face Seal Hose or Tube Swivel Nut			Bulkhead Nut	
Metric Tube OD	Inch Tube OD or Hose ID		Thread Size	Hex Size	Torque	Hex Size	Torque
mm	Dash Size	mm (in.)	in.	mm	N˙m (lb-ft)	mm	N˙m (lb-ft)
4	-2	3.18 (0.125)	—	—	—	—	—
5	-3	4.78 (0.188)	—	—	—	—	—
6	-4	6.35 (0.250)	9/16-18	17	16 (12)	22	32 (24)
8	-5	7.92 (0.312)	—	—	—	—	—
10	-6	9.53 (0.375)	11/16-16	22	24 (18)	27	42 (31)
12	-8	12.70 (0.500)	13/16-16	24	50 (37)	30	93 (69)
16	-10	15.88 (0.625	1-14	30	69 (51)	36	118 (87)
20	-12	19.05 (0.750)	1-3/16-12	36	102 (75)	41	175 (129)
22	-14	22.23 (0.875)	1-3/16-12	36	102 (75)	41	175 (129)
25	-16	25.40 (1.000)	1-7/16-12	41	142 (105)	46	247 (182)
28	—	—	—	—	—	—	—
32	-20	31.75 (1.250)	1-11/16-12	50	190 (140)	50	328 (242)
38	-24	38.10 (1.500)	2-12	60	217 (160)	60	374 (276)
50	-32	50.80 (2.000)	—	—	—	—	—

O-RING STRAIGHT, ADJUSTABLE, AND EXTERNAL HEX PLUG WITH METRIC STUD END FOR STANDARD PRESSURE, BELOW 27 600 kPa (275.8 bar) (4,000 psi), TORQUE VALUES—Tolerance is +15 -20% unless otherwise specified

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Hub Coupler Remove and Install

Hub Coupler Remove and Install

1. Remove hydrostatic pumps. See Hydrostatic Pump Remove and Install . (Group 0360.)
2. Measure or mark position of coupler on pump input shaft to aid in assembly.
3. Loosen two set screws in coupler and slide coupler from pump shaft.
4. Inspect hub for wear or damage repair or replace parts as necessary.
5. Install hub coupler on input shaft and set gap between the pump and the hub coupler to specification.

Item	Measurement	Specification
Distance Between Hub Coupler and Pump	Gap	6 mm 0.250 in.

6. Apply medium strength thread lock to set screws and tighten to specification.

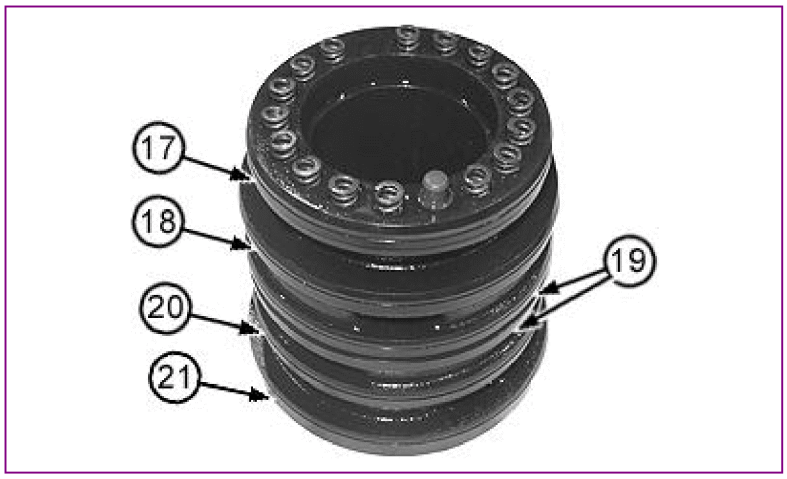
Item	Measurement	Specification
Coupler-to-Pump Shaft Set Screw	Torque	37 N·m 27 lb-ft

7. Install hydraulic pump. See Hydrostatic Pump Remove and Install . (Group 0360.)

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14. 

T200596A-UN: Distributor

LEGEND:

17 - Seal
18 - Seal
19 - Seal (2 used)
20 - Seal
21 - Seal

Remove seals (17—21) from distributor.

15. Remove cam ring and cylinder block assembly.

---

16. 

T200605A-UN: Cylinder Block Assembly

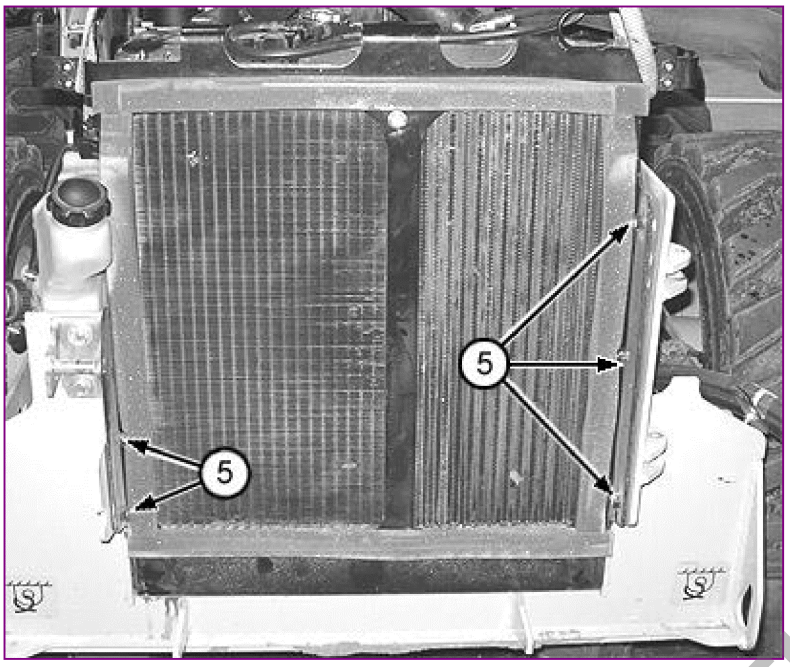
LEGEND:

22 - Snap Ring (2 used)
23 - Retaining Ring (2 used)
24 - Roller and Piston (8 used)

Remove snap rings, retaining rings, rollers and pistons (22—24) from cylinder block assembly.

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14. 

T199852A-UN: Radiator Assembly—332 Shown

LEGEND:

5 - Cap Screw (5 used)

Remove cap screws (5) holding radiator assembly to frame.

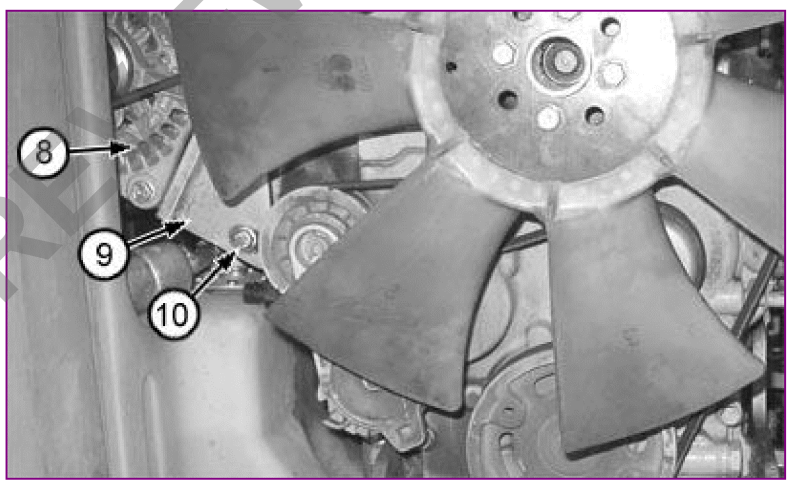
15. Remove radiator assembly.

16. Remove harness from alternator, engine coolant temperature sensor, fuel shut-off solenoid, fuel level sensor and air conditioner compressor clutch.

---

17. *NOTE:*

Bottom cap screw of alternator and air conditioner compressor bracket is easier to remove before belt is removed.



T198899A-UN: Alternator

LEGEND:

8 - Alternator
9 - Mounting Bracket
10 - Cap Screw

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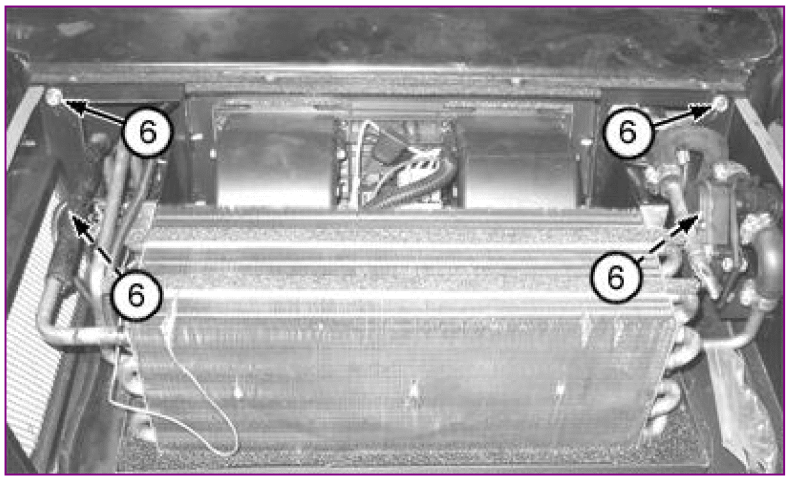
Welding Repair of Major Structure

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

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9. 

T199002A-UN: Air Conditioner and Heater

LEGEND:

6 - Cap Screw (4 used)

Remove cap screws (6) and remove air conditioner and heater.

10. Repair or replace parts as necessary.

11. Install air conditioner and heater and tighten cap screws (6).

12. Install hot water lines to hot water valve and heater core.

13. Install refrigerant lines (2 and 3) to expansion valve.

Item	Measurement	Specification
Low Pressure Output Line Nut	Torque	24—33 N˙m 18—24 lb-ft
High Pressure Input Line Nut	Torque	14—20 N˙m 139—177 lb-in.

14. Connect air conditioner and heater harness to cab harness.

15. Install tail lights, rear work light, and connect harness.

16. *NOTE:*

In dusty or harsh environments, additional sealant may be needed. Apply PM37463 silicon rubber adhesive to perimeter of cover, rear corners of air conditioner and heater box, and around lights.

Install new foam gasket between air conditioner and cover.

17. Install air conditioner and heater cover.

18. Evacuate air conditioning system and charge. See Evacuate R134a System , and see Charge 134a System . (Group 1830.)

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Attach lifting device to front of boom. Raise boom.

10.

CAUTION:

Prevent possible crushing injury from heavy component. Do not enter cab.

Push in boom lock pin.

11. Lower boom to the ground.

12. Raise cab. See Raising Operator's Station . (Operator's Manual.)

13. **IMPORTANT:**

Do not hit bottom of cab with boom.

NOTE:

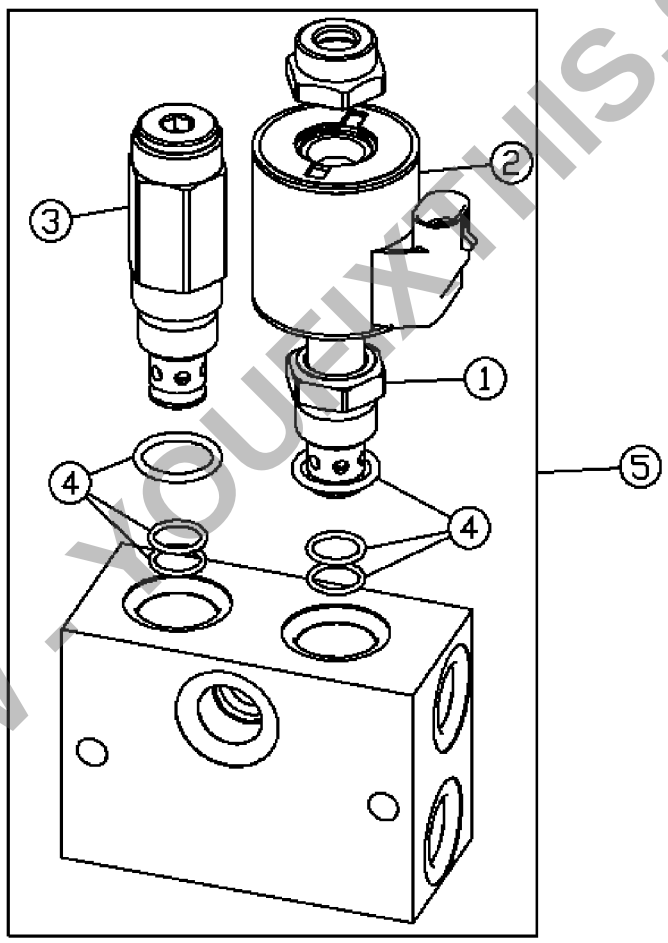
Boom must be raised high enough to allow rear lower link cap screw to clear radiator bracket (4).



T199586A-UN: Front of Machine

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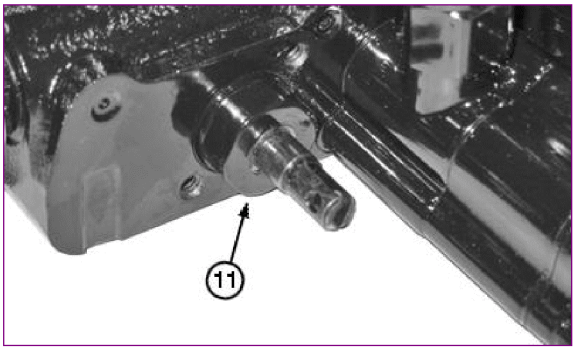
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9 - O-Ring
10 - Backup Ring (2 used)

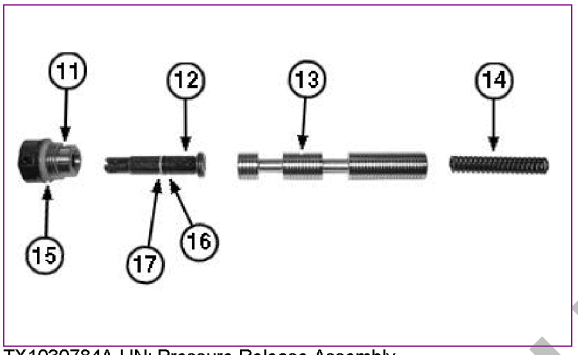
Mark position of electrical connector for port lock solenoid (4) to aid in assembly.

4. Remove nut (3). Remove port lock solenoid and port lock solenoid valve (5).

---

5. 

TX1030637A-UN: Pressure Release Assembly



TX1030784A-UN: Pressure Release Assembly

LEGEND:

11 - Pressure Release Base
12 - Pressure Release Plunger
13 - Spool
14 - Spring
15 - Seal
16 - O-Ring
17 - Backup Ring

Remove pressure release base (11) and plunger assembly.

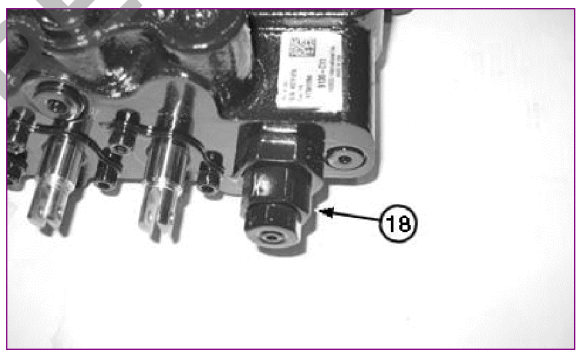
6. Gently tap on clevis end of pressure release plunger (12) to remove plunger from base.

7. *NOTE:*

Close tolerances between control valve body and spool may prevent easy removal of spool from plunger end. Spool may be removed from control valve body after removing system relief valve (18) and plug (60). Remove spring (14) and gently tap on spool end to remove.

Remove spool (13) and spring (14) from control valve body.

---

8. 

TX1030638A-UN: System Relief Valve

LEGEND:

18 - System Relief Valve

Remove system relief valve (18).

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