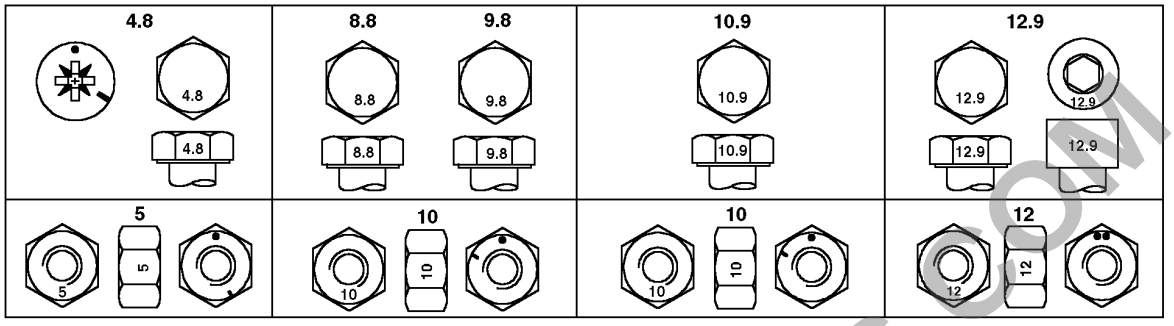
Metric Bolt and Cap Screw Torque Values



TORQ2 —UN—15APR13

Top—Property Class and Head Markings; Bottom—Property Class and Nut Markings

Bolt or Screw Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]		Hex Head[a]		Flange Head[b]	
	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in	N·m	lb·in
M6	3.6	31.9	3.9	34.5	6.7	59.3	7.3	64.6	9.8	86.7	10.8	95.6	11.5	102	12.6	112
									N·m	lb·ft	N·m	lb·ft	N·m	lb·ft	N·m	lb·ft
M8	8.6	76.1	9.4	83.2	16.2	143	17.6	156	23.8	17.6	25.9	19.1	27.8	20.5	30.3	22.3
			N·m	lb·ft	N·m	lb·ft	N·m	lb·ft								
M10	16.9	150	18.4	13.6	31.9	23.5	34.7	25.6	46.8	34.5	51	37.6	55	40.6	60	44.3
	N·m	lb·ft														
M12	—	—	—	—	55	40.6	61	45	81	59.7	89	65.6	95	70.1	105	77.4
M14	—	—	—	—	87	64.2	96	70.8	128	94.4	141	104	150	111	165	122
M16	—	—	—	—	135	99.6	149	110	198	146	219	162	232	171	257	190
M18	—	—	—	—	193	142	214	158	275	203	304	224	322	245	356	263
M20	—	—	—	—	272	201	301	222	387	285	428	316	453	334	501	370
M22	—	—	—	—	365	263	405	299	520	384	576	425	608	448	674	497
M24	—	—	—	—	468	345	518	382	666	491	738	544	780	575	864	637
M27	—	—	—	—	683	504	758	559	973	718	1080	797	1139	840	1263	932
M30	—	—	—	—	932	687	1029	759	1327	979	1466	1081	1553	1145	1715	1265
M33	—	—	—	—	1258	928	1398	1031	1788	1319	1986	1465	2092	1543	2324	1714
M36	—	—	—	—	1617	1193	1789	1319	2303	1699	2548	1879	2695	1988	2982	2199

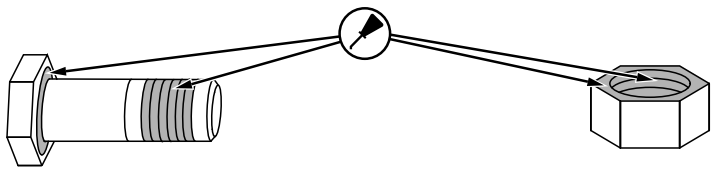
The nominal torque values listed are for general use only with the assumed wrenching accuracy of 20%, such as a manual torque wrench.
DO NOT use these values if a different torque value or tightening procedure is given for a specific application.
For lock nuts, stainless steel fasteners, or nuts on U-bolts, see the tightening instructions for the specific application.

Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original.
Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

CAUTION: Avoid injury. Use only metric tools on metric hardware. Other tools may not fit properly, causing tool to slip resulting in injury.

- 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] *Hex head column values are valid for ISO 4014 and ISO 4017 hex head, ISO 4162 hex socket head, and ISO 4032 hex nuts.*

Continued on next page

OUT3035,TORQUE2 -19-26JUN18-1/2

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Track Roller Remove and Install

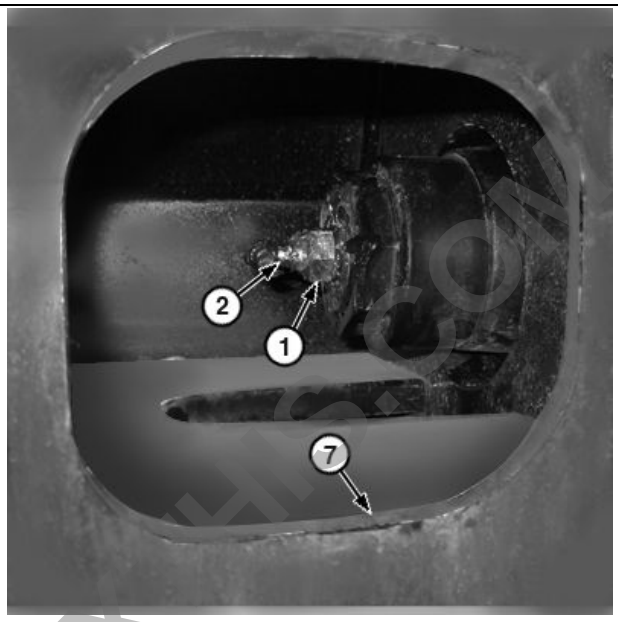
SPECIFICATIONS	
135G Excavator Weight (approximate)	15 400 kg 33 951 lb
Track Roller Weight (approximate)	22 kg 49 lb
Roller-to-Frame Cap Screw Torque	310 N·m 229 lb·ft
Grease Fitting Torque	90 N·m 66 lb·ft

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

CAUTION: Personal injury may result from 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 a vent hole (2) in track adjuster cylinder.

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



Grease Fitting

TX1089326A —UN—15MAR11

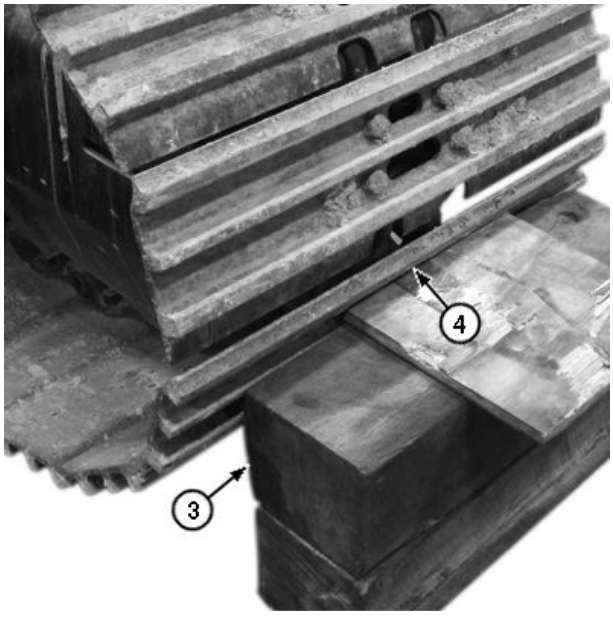
JL48493,0000062 -19-06JUN16-1/4

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



Procedure for Retracting Idler

TX1098609A —UN—23SEP11

Continued on next page

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Blade Pump Remove and Install

SPECIFICATIONS	
Hydraulic Oil Tank Capacity	60 L 15.9 gal
Blade Pump-to-Pilot Pump Nut Torque	50 N·m 37 lb·ft

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

CAUTION: To avoid injury from escaping fluid under pressure, stop engine and relieve the pressure in the system before disconnecting or connecting hydraulic or other lines. Tighten all connections before applying pressure.

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..... 60 L
15.9 gal

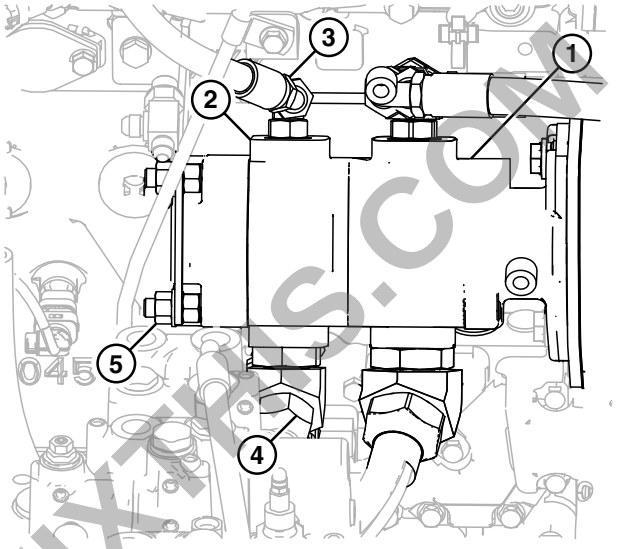
IMPORTANT: Prevent hydraulic system contamination. Absolute cleanliness is essential when working on hydraulic components. Clean component and adjacent areas before starting work. Close all openings using caps and plugs.

4. Install identification tags and disconnect suction hose (3) and pressure hose (4). Close all openings using caps and plugs.
5. Remove nuts (5) and blade pump (2).
6. Repair or replace parts as necessary. See Blade Pump Disassemble and Assemble. (Group 3260.)
7. Install blade pump and nuts. Tighten nuts to specification.

Specification

Blade Pump-to-Pilot Pump Nut—Torque.....50 N·m
37 lb·ft

8. Connect pressure hose and suction hose.
9. 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.)



TX1126361 —UN—20NOV12

Blade Pump

1— Pilot Pump
2— Blade Pump
3— Suction Hose
4— Pressure Hose
5— Nut (4 used)

10. Bleed blade cylinder. See Hydraulic Cylinder Bleed Procedure. (Group 3360.)

IMPORTANT: Hydraulic pump will be damaged if not filled with oil before starting. Procedure must be performed to fill pump housing whenever oil has been drained from the pump or hydraulic oil tank.

11. If hydraulic oil tank was drained, perform pump 1 and 2 start-up procedure. See Pump 1 and 2 Start-Up Procedure. (Group 3360.)
12. Check hydraulic oil level. See Check Hydraulic Tank Oil Level. (Operator's Manual.)

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

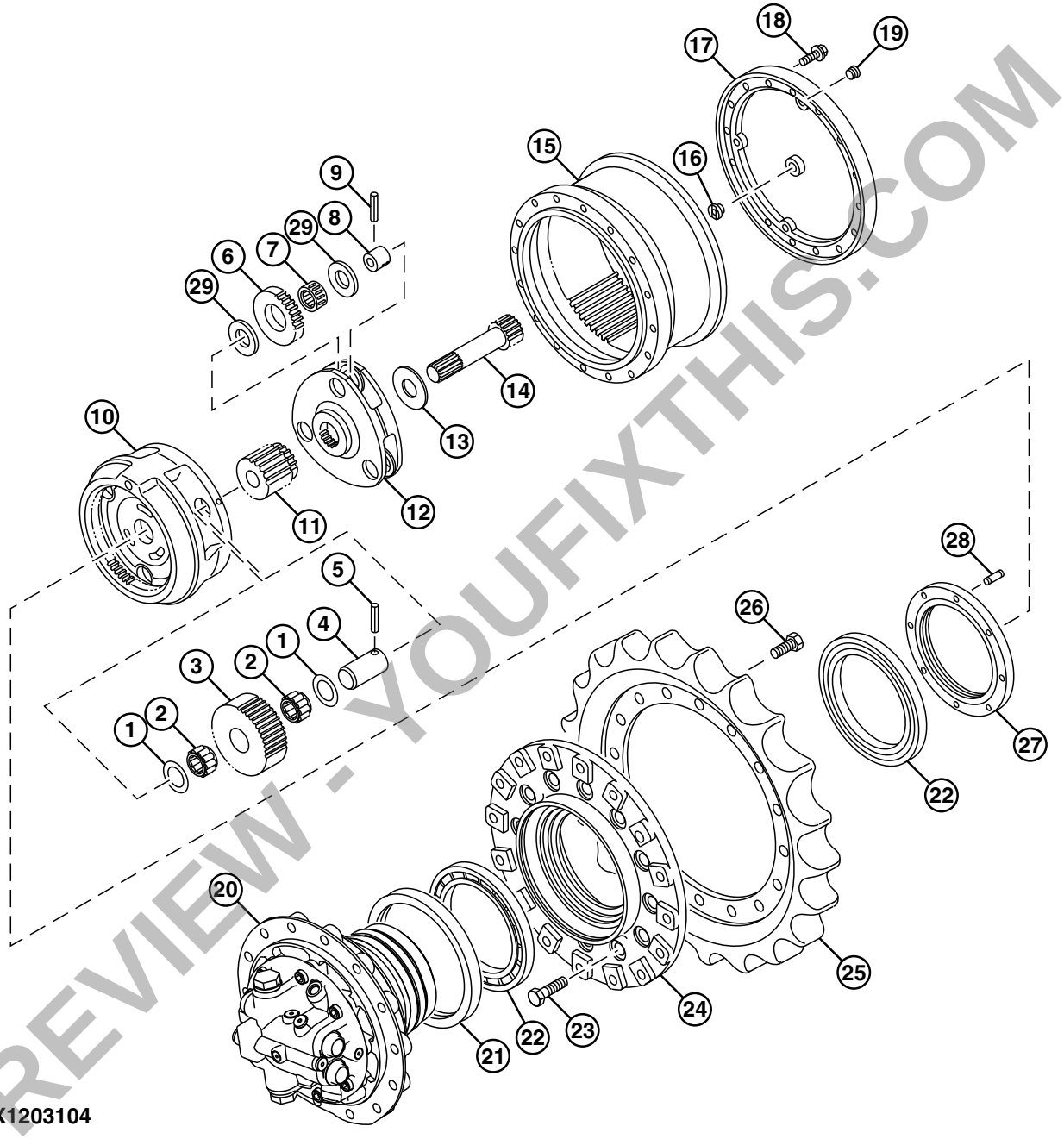
13. Operate machine and check for leaks.

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Disassemble Travel Gear Case



Travel Gear Case

1— Thrust Plate (6 used)
2— Needle Bearing (6 used)
3— Planetary Gear (3 used)
4— Pin Fastener (3 used)
5— Spring Pin (3 used)
6— Planetary Gear (3 used)
7— Needle Bearing (3 used)
8— Pin Fastener (3 used)
9— Spring Pin (3 used)
10— Second Stage Planetary Carrier
11— Second Stage Sun Gear
12— First Stage Planetary Carrier
13— Spacer
14— Shaft
15— Ring Gear
16— Stopper
17— Cover
18— Cap Screw (12 used)
19— Plug (3 used)
20— Travel Motor
21— Metal Face Seal
22— Tapered Roller Bearing (2 used)
23— Cap Screw (16 used)
24— Drum
25— Sprocket
26— Cap Screw (16 used)
27— Bearing Nut
28— Dowel Pin
29— Thrust Plate (6 used)

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

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JB51320,00000AC -19-04DEC17-2/7

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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.



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T133588 —19—28AUG00

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

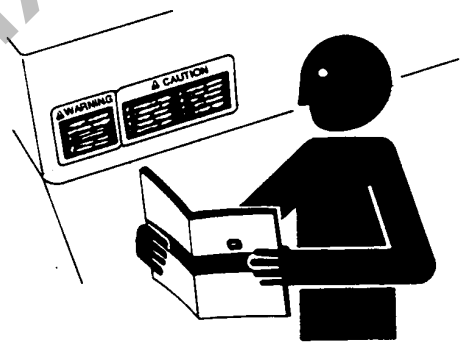
Follow Safety Instructions

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

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10. Remove cap screws (17) and fan (18).

11. Repair or replace parts as necessary.

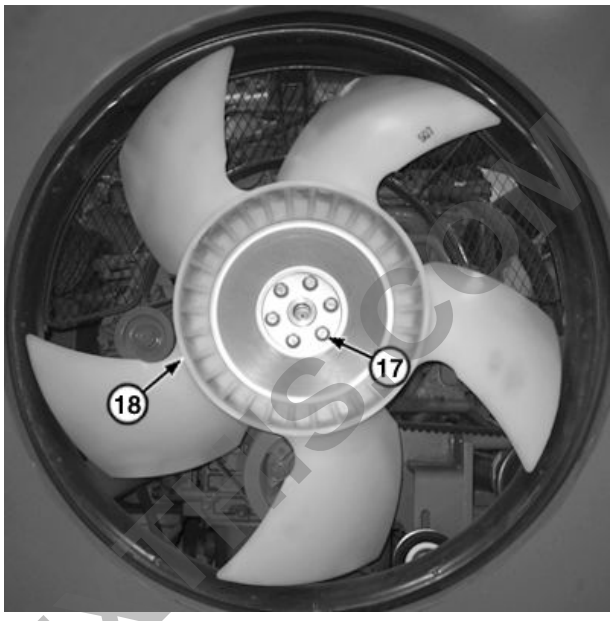
INSTALLATION

Installation is reverse of removal procedure.

NOTE: Coolant deaeration procedure is necessary after any service is performed on coolant system.

- Fill cooling system and perform deaeration procedure. See Drain, Flush, and Refill Engine Cooling System. (Operator's Manual.)

17— Cap Screw (6 used) **18— Fan**



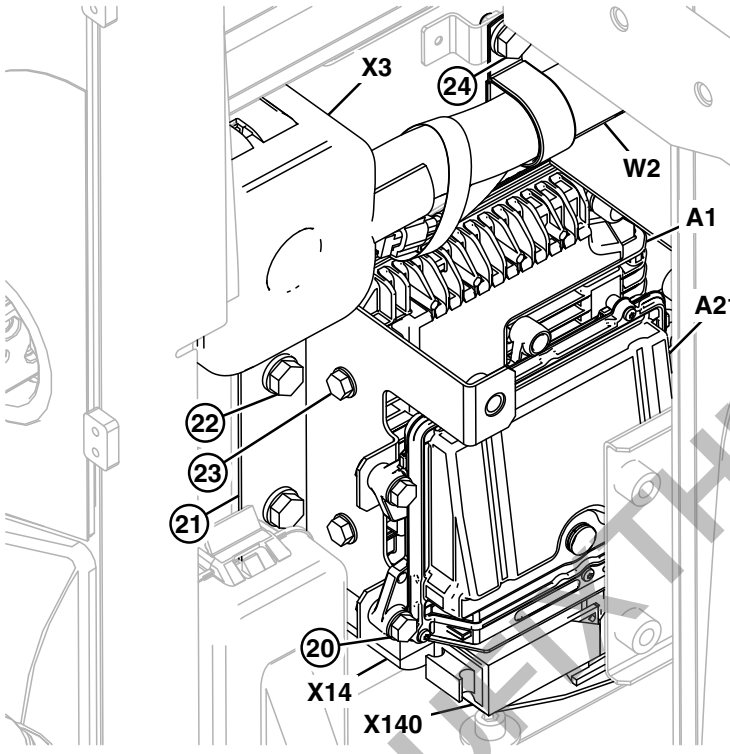
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Fan

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TX1221204

TX1221204 —UN—18AUG16

Controllers

20— Cap Screw (4 used)
21— Controller Support Bracket
22— Cap Screw (4 used)
23— Cap Screw (4 used)
24— Cap Screw
A1— Engine Control Module (ECM)
A21— Dosing Control Unit (DCU)
W2—Machine Harness
X3— Cab Harness-to-Machine Harness 100-Pin Connector
X14— Engine Control Module (ECM)-to-Machine Harness 105-Pin Connector
X140— Dosing Control Unit (DCU) 86-Pin Connector

13. Install identification tags and disconnect engine control module (ECM)-to-machine harness 105-pin connector (X14), engine control module (ECM)-to-machine harness 91-pin connector (X15), dosing control unit (DCU) 86-pin connector (X140), and dosing control unit (DCU) 53-pin connector (X141). See Machine Harness (W2) Component Location. (Group 9015-10.)
14. Remove controller support bracket (21), engine control module (ECM) (A1), and dosing control unit (DCU) (A21).
15. Disconnect cab harness-to-machine harness 100-pin connector (X3). See Machine Harness (W2) Component Location. (Group 9015-10.)

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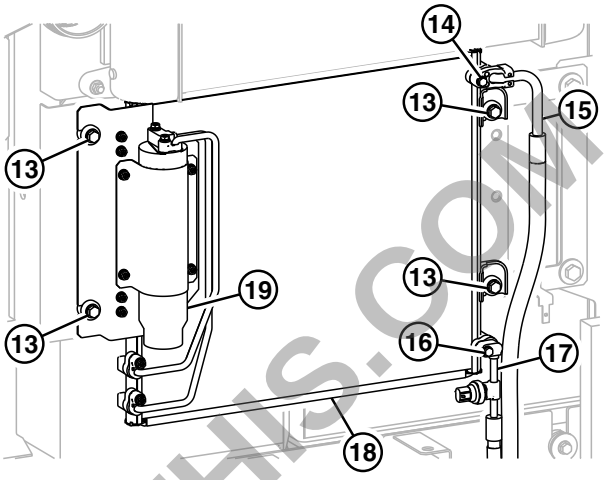
14. Install identification tags to compressor-to-condenser line (15) and condenser-to-evaporator line (17).
15. Remove cap screws (14 and 16) and disconnect condenser lines (15 and 17). Discard O-rings and close all openings using caps and plugs.

NOTE: Condenser can be removed without removing receiver-dryer (19). If removing receiver-dryer, see Receiver-Dryer Remove and Install. (Group 1830.)

16. Remove cap screws (13) and condenser (18).
17. Repair or replace parts as necessary.
18. Install condenser and cap screws (13).
19. Lubricate and install new O-rings. Connect compressor-to-condenser line and condenser-to-evaporator line.
20. Install cap screws (14 and 16) and tighten to specification.

Specification	
Cap Screw (14)—Torque	23 N·m 204 lb·in
Cap Screw (16)—Torque	23 N·m 204 lb·in

21. Install bracket and cap screws (11).
22. Install MTG controller housing and cap screws (7).
23. Connect electrical connectors (8 and 9).
24. Install battery relay housing and cap screws (4).
25. Install air cleaner and cap screws (2).
26. Connect intake hose, air filter restriction switch, and MAF/IAT sensor.
27. Install DEF tank. See Diesel Exhaust Fluid (DEF) Tank Remove and Install. (Group 0530.)



TX1221080 —UN—15AUG16

Condenser

13— Cap Screw (4 used)
14— Cap Screw
15— Compressor-to-Condenser Line
16— Cap Screw
17— Condenser-to-Evaporator Line
18— Condenser
19— Receiver-Dryer

28. Install fuel cooler. See Fuel Cooler Remove and Install. (Group 0510.)
29. Install radiator screen. See Check and Clean Radiator Air Inlet Screen. (Operator's Manual.)
30. Turn battery disconnect switch to ON position. See Battery Disconnect Switch. (Operator's Manual.)
31. Evacuate and charge system. See Evacuate R134a System and see Charge R134a System. (Group 1830.)

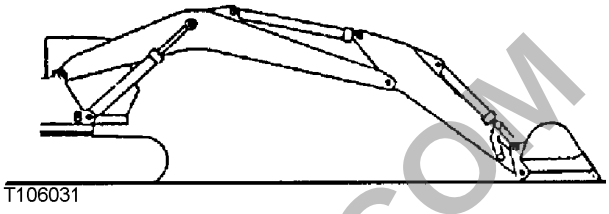
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Arm Remove and Install

SPECIFICATIONS	
2.52 m (8 ft 3 in) Arm With Bucket Cylinder and Linkage Weight (approximate)	594 kg 1310 lb
3.01 m (9 ft 11 in) Arm With Bucket Cylinder and Linkage Weight (approximate)	663 kg 1462 lb
Arm Shim Clearance	0—1.5 mm 0—0.06 in



T106031 —UN—10JAN97

Machine Position

MACHINE PREPARATION

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)
2. Remove bucket and bucket links. See Bucket Remove and Install and see Bucket Links Remove and Install. (Group 3302.)
3. Retract arm cylinder and lower front attachment to 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.

4. 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.)
5. 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.)

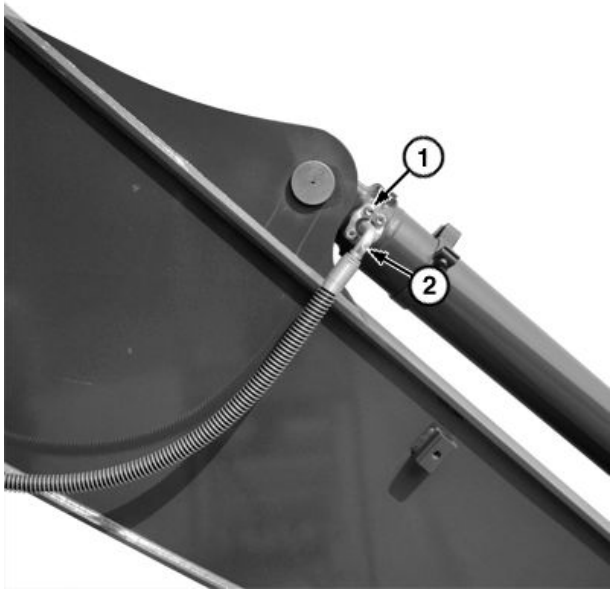
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REMOVAL

1. Remove cap screws (1). Install identification tags and disconnect hydraulic hoses (2). Close all openings using caps and plugs.

1— Cap Screw (4 used)

2— Bucket Cylinder Hydraulic Hose (2 used)



TX1166020A —UN—21JUL14

Bucket Cylinder

Continued on next page

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Pilot Shutoff Solenoid Valve Disassemble and Assemble

SPECIFICATIONS	
Plug Torque	28 N·m 21 lb·ft
Solenoid-to-Pilot Shutoff Valve Cap Screw Torque	4 N·m 35 lb·in

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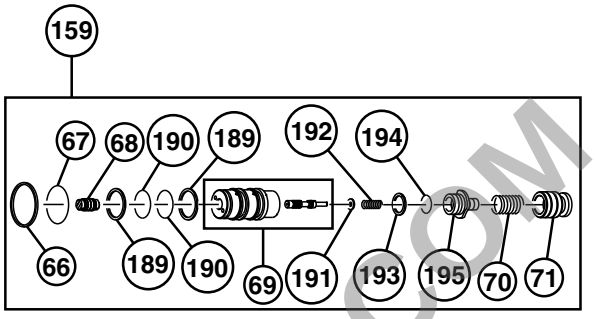
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JJ03229,000118B -19-02DEC15-1/2

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Sleeve Assembly (159) Disassemble and Assemble

1. Remove backup ring (66) and O-ring (67).
2. Remove piston (68).
3. Remove sleeve assembly (159).
4. Remove backup rings (189) and O-rings (190).
5. Remove plug (195).
6. Remove washer (191), spring (192), backup ring (193), and O-ring (194).
7. Remove spring (70) and valve (71) from control valve.
8. Inspect parts and replace as necessary.
9. Install valve and spring (70) into control valve.
10. Install parts (191—194) into sleeve.
11. Install plug.
12. Install O-rings (190) and backup rings (189) into sleeve.
13. Install sleeve into control valve.
14. Install piston, O-ring (67), and backup ring (66).



TX1121758 —UN—11SEP12

Sleeve

66— Backup Ring
67— O-Ring
68— Piston
69— Sleeve
70— Spring
71— Valve
159— Sleeve Assembly
189— Backup Ring (2 used)
190— O-Ring (2 used)
191— Washer
192— Spring
193— Backup Ring
194— O-Ring
195— Plug

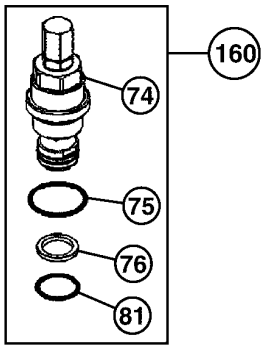
JJ03229,0001197 -19-09DEC15-16/33

Overload Relief Valve (Arm) Assembly (160) Disassemble and Assemble

1. Remove overload relief valve assembly (160).
2. Remove parts (75, 76, and 81) from overload relief valve (74).
3. Inspect parts and replace as necessary.
4. Install O-rings and backup ring onto overload relief valve.
5. Install overload relief valve. Tighten to specification.

Specification

Overload Relief Valve—Torque.....177 N·m
131 lb·ft



TX1121759 —UN—04SEP12

Overload Relief Valve

74— Overload Relief Valve
75— O-Ring
76— Backup Ring
81— O-Ring
160— Overload Relief Valve (arm) Assembly

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2. Attach appropriate lifting device and fasten head end of cylinder to JT30043 Cylinder Service Stand.

Specification	
Boom Cylinder—Weight (approximate)	110 kg 243 lb

3. Pull rod (1) out so piston nut (20) is against cylinder head (7).

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

4. Using a lifting strap, connect rod to appropriate lifting device.

Specification	
Boom Cylinder Rod—Weight (approximate)	65 kg 143 lb

5. Remove cap screws (6) from cylinder head.
6. Remove rod, cylinder head, and piston nut from barrel (12).
7. Install rod eye in sliding housing and install housing in JT30043 Cylinder Service Stand.
8. Remove staked material from set screw (18) hole using a small air grinder or a drill and bit.
9. Remove set screw and ball (19).

IMPORTANT: To avoid damaging the tapped hole for set screw, the cap screw in the ST3262 Hex Piston Nut Wrench must be tightened against a side of the nut without the tapped hole.

To avoid gouging side of nut, install a piece of steel flat stock between nut and cap screw.

10. Install ST3262 Hex Piston Nut Wrench so cap screw is tightened against a side of the piston nut (20) without tapped hole.
11. Install a piece of steel flat stock between piston nut and cap screw. Tighten cap screw of piston nut wrench.
12. Remove piston nut.
13. Remove cushion bearing (21) and cushion seal (22).
14. Remove slide rings (13), wear rings (14), backup rings (15), O-ring (16), and seal ring (17) from piston nut.
15. Remove cylinder head (7) from rod (1).
16. Remove dust wiper (2), backup ring (3), U-ring (4), buffer ring (5), snap ring (9), backup ring (10), and O-ring (11) from cylinder head.

IMPORTANT: Prevent possible damage to rod guides. Do not use a hammer and punch to remove bushing (8). Only use ST8017 Bushing Driver.

17. Remove bushing using ST8017 Bushing Driver.
18. Check for rod curvature on V-blocks using dial indicator.

Specification	
Boom Cylinder Rod—Curvature	0.5 mm per 1 m 0.020 in per 3.28 ft

19. Inspect parts and repair or replace as necessary. See Inspect Pins, Bushings, and Bosses—Front Attachment. (Group 3340.)
20. Apply clean hydraulic oil to all sealing parts and machined surfaces.
21. Install bushing (8) into cylinder head (7) using ST8017 Bushing Driver.
22. Install snap ring (9).
23. Install backup ring (10) and O-ring (11).
24. Install buffer ring (5).
25. Install U-ring (4) with lip toward bushing.
26. Install backup ring (3).
27. Install dust wiper (2).
28. Install cylinder head on rod.
29. Install O-ring (16) and seal ring (17).
30. Install slide rings (13), wear rings (14), and backup rings (15).
31. Install cushion bearing (21) and cushion seal (22).
32. Install piston nut (20).

IMPORTANT: To avoid damaging the tapped hole for set screw, the cap screw in the ST3262 Hex Piston Nut Wrench must be tightened against a side of the nut without the tapped hole.

To avoid gouging side of nut, install a piece of steel flat stock between nut and cap screw.

33. Install ST3262 Hex Piston Nut Wrench so cap screw is tightened against a side of the piston nut without tapped hole.
34. Install a piece of steel flat stock between piston nut (20) and cap screw. Tighten cap screw of Hex Piston Nut Wrench.
35. Tighten piston nut to specification.

Specification	
Boom Cylinder Piston Nut—Torque	3140 N·m 2316 lb·ft

36. Install ball (19) and set screw (18).
37. Stake set screw in two places 90° from previous stake marks.

Continued on next page

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Swing Bearing Lower Seal Install

OTHER MATERIAL
Loctite® 7649™ Klean 'N Prime™ Primer
Loctite® 454™ Quick Gel® Super Glue

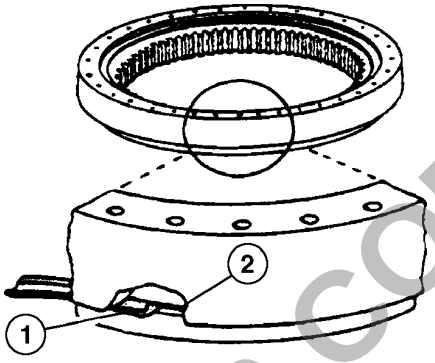
1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)

NOTE: It is not necessary to remove upperstructure to replace swing bearing lower seal.

Part of swing bearing shown is cut away to show lower seal in groove.

2. Remove old seal (1).
3. Scrape old adhesive from seal groove (2). Thoroughly clean seal groove and new seal using Loctite® 7649™ Klean 'N Prime™ Primer.
4. Apply Loctite® 454™ Quick Gel® Super Glue sparingly to seal groove.
5. Install seal with seal lip against outer race. Start approximately 76 mm (3 in) from end of seal using blunt instrument to force seal into groove. Push seal in direction of portion already installed to avoid stretching seal.
6. Before bringing ends of seal together, cut off excess length.

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TX1113412 —UN—07MAY12

Swing Bearing Lower Seal

1— Seal **2— Seal Groove**

7. Apply Loctite® 454™ Quick Gel® Super Glue to both ends of seal. Push ends into seal groove to insure a proper seal.

IMPORTANT: Prevent possible damage to seal. Avoid pulling seal out of groove. Adhesive must cure for at least 24 hours before using swing function.

8. Let adhesive cure for at least 24 hours before using swing function.

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