

# **450K, 550K, and 650K Crawler Dozer Repair**

**(PIN: 1T0450KX\_\_F304771— )**

**(PIN: 1T0550KK\_\_F305398— )**

**(PIN: 1T0650KK\_\_F305399— )**

## **REPAIR TECHNICAL MANUAL 450K, 550K, and 650K Crawler Dozer**

**TM14163X19 15FEB18 (ENGLISH)**

**Worldwide Construction  
And Forestry Division**  
PRINTED IN U.S.A.

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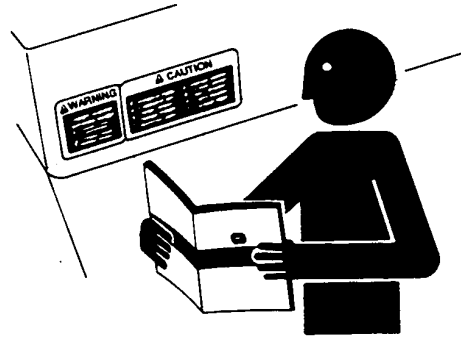
### Follow Safety Instructions

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.



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

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

TS201—UN—15APR13

### 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

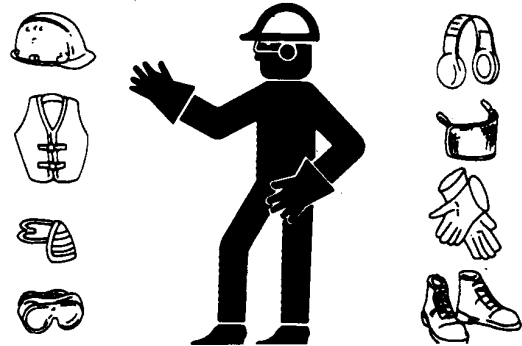
### Wear Protective Equipment

Guard against injury from flying pieces or metal or debris; wear goggles or safety glasses.

Wear close fitting clothing and safety equipment appropriate to the job.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protection such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises. Radio or music headphones are not suitable to use for hearing protection.



TX,WEAR,PE -19-22SEP10-1/1

TS206—UN—15APR13

## 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.

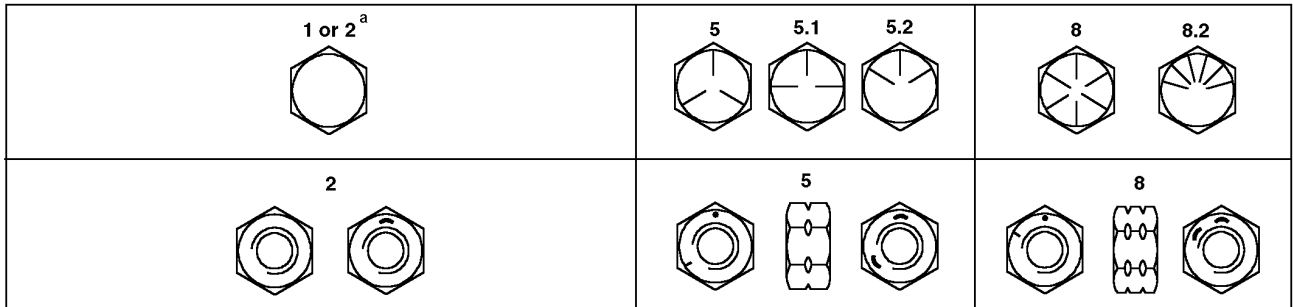
Do not rely on the rear camera and radar object detection systems, if equipped, to determine if personnel are behind the machine. The system has limitations due to maintenance practices, environmental conditions, and operating range.



Torque Values

Unified Inch Bolt and Cap Screw Torque Values

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



Top—SAE Grade and Head Markings; Bottom—SAE Grade and Nut Markings

Thread Size	Grade 1 (No Mark)		Grade 2 <sup>a</sup> (No Mark)		Grade 5, 5.1, or 5.2		Grade 8 or 8.2	
	Lubricated <sup>b</sup>	Dry <sup>c</sup>	Lubricated <sup>b</sup>	Dry <sup>c</sup>	Lubricated <sup>b</sup>	Dry <sup>c</sup>	Lubricated <sup>b</sup>	Dry <sup>c</sup>
	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)
1/4	3.8 (33)	4.7 (42)	6 (53)	7.5 (66)	9.5 (84)	12 (108)	13.5 (120)	17 (150)
							N·m (lb-ft)	N·m (lb-ft)
5/16	7.7 (68)	9.8 (86)	12 (108)	15.5 (138)	19.5 (174)	25 (222)	28 (20.5)	35 (26)
					N·m (lb-ft)	N·m (lb-ft)		
3/8	13.5 (120)	17.5 (156)	22 (192)	27.5 (240)	35 (26)	44 (32.5)	49 (36)	63 (46)
		N·m (lb-ft)	N·m (lb-ft)	N·m (lb-ft)				
7/16	22 (192)	28 (20.5)	35 (26)	44 (32.5)	56 (41)	70 (52)	80 (59)	100 (74)
	N·m (lb-ft)							
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)

<sup>a</sup> 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.

<sup>b</sup> "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings, or 7/8 in and larger fasteners with JDM F13C, F13F, or F13J zinc flake coating.

<sup>c</sup> "Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in fasteners with JDM F13B, F13E, or F13H zinc flake coating.

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 the thread engagement is properly started. This will prevent fasteners from failing when tightening.

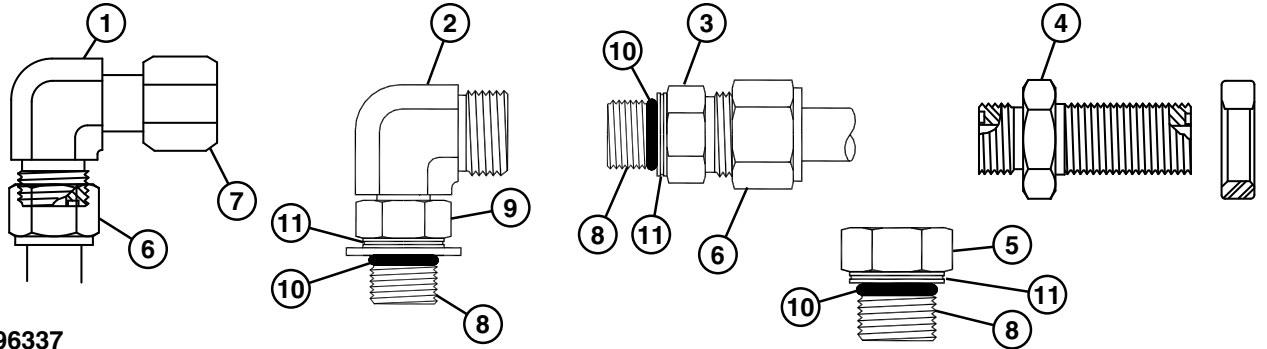
Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

OUT3035,TORQUE1 -19-08MAR17-1/1

TORQ1A—UN—15APR13

### O-Ring Face Seal Fittings With Metric Hex Nut and Stud End for High-Pressure Service Recommendations

O-RING FACE SEAL FITTINGS WITH METRIC HEX NUT AND STUD END FOR HIGH-PRESSURE, ABOVE 27 600 kPa (275.8 bar) (4000 psi), TORQUE VALUES—Tolerance is +15 -20% unless otherwise specified.



T196337

O-Ring Face Seal Fittings

- 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	24 (18)	22	32 (24)
8	-5	7.92 (0.312)	—	—	—	—	—
10	-6	9.53 (0.375)	11/16-16	22	37 (27)	27	42 (31)
12	-8	12.70 (0.500)	13/16-16	24	75 (55)	30	93 (69)
16	-10	15.88 (0.625)	1-14	30	103 (76)	36	118 (87)
20	-12	19.05 (0.750)	1-3/16-12	36	152 (112)	41	175 (129)
22	-14	22.23 (0.875)	1-3/16-12	36	152 (112)	41	175 (129)
25	-16	25.40 (1.000)	1-7/16-12	41	214 (158)	46	247 (182)
28	—	—	—	—	—	—	—
32	-20	31.75 (1.250)	1-11/16-12	—	286 (211)	50	328 (242)
38	-24	38.10 (1.500)	2-12	—	326 (240)	60	374 (276)

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 <sup>a</sup>	Straight Hex Size <sup>b</sup>	Adjustable Nut Hex Size	Steel or Gray Iron Torque
mm	mm	mm	N·m (lb·ft)
M8 x 1	12	12	8 (6)
M10 x 1	14	14	15 (11)
M12 x 1.5	17	17	35 (26)
M14 x 1.5	19	19	45 (33)
M16 x 1.5	22	22	55 (41)
M18 x 1.5	24	24	70 (52)
M22 x 1.5	27	27	100 (74)
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)

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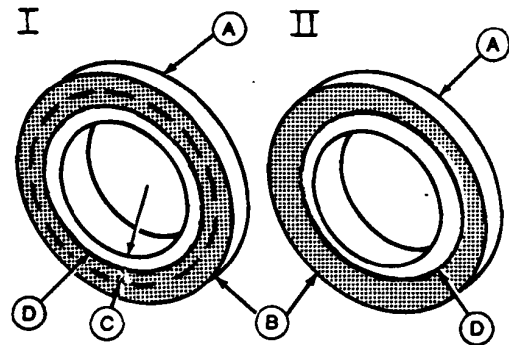
## Section 01 Tracks

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2. Illustration shows examples of worn seal rings (A).  
 I—Sealing area (D) is in inner half of seal ring face (C).  
 II—Sealing area (D) not concentric with ID and OD of seal ring.

A—Seal Ring  
 B—Worn Area (shaded area)  
 C—Inner Half of Seal Ring Face  
 D—Sealing Area (dark line)

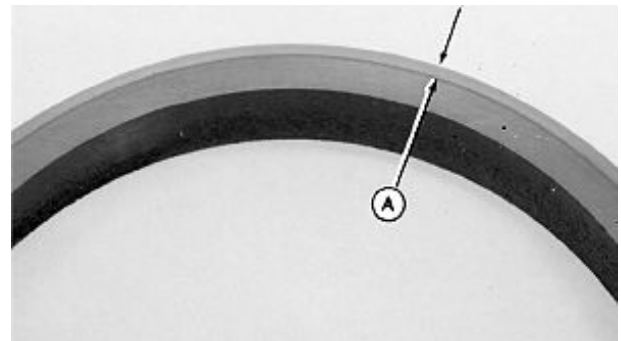


Cross Section of a Metal Face Seal

T47,0130,5939HQ -19-09APR15-2/3

T85080—UN—05DEC96

3. Clean reusable seals by removing all foreign material from seal rings, except seal face (A), 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.



Seal Face

T47,0130,5939HQ -19-09APR15-3/3

T82840—UN—23FEB89

**IMPORTANT:** The metal face seal must be extremely clean during assembly. Use a volatile, non-petroleum base type solvent to clean the metal seal ring (2) and rubber seal (1). **DO NOT** keep the rubber seal in a volatile, non-petroleum base type solvent for more than one minute. Wipe the seals dry with lint-free tissue to remove finger prints and foreign material.

12. Install rubber seal (1) on the metal seal ring (2). Make sure the rubber seal sits evenly on metal seal ring.



Rubber Seal

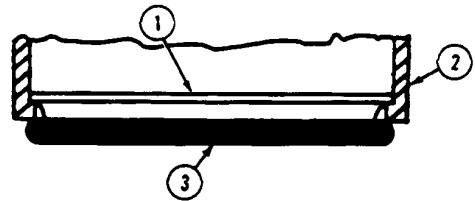
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T80574 —UN—26OCT88

**NOTE:** A volatile, non-petroleum base solvent or talcum powder may be used as a lubricant. Solvent **MUST NOT** damage the O-rings or leave an oil residue.

13. Install seal assembly in the JDG205 Seal Installation Tool (2) so tool lip is between seal ring flange (1) and O-ring (3).

- 1— Seal Ring Flange
- 2— JDG205 Seal Installation Tool
- 3— O-Ring



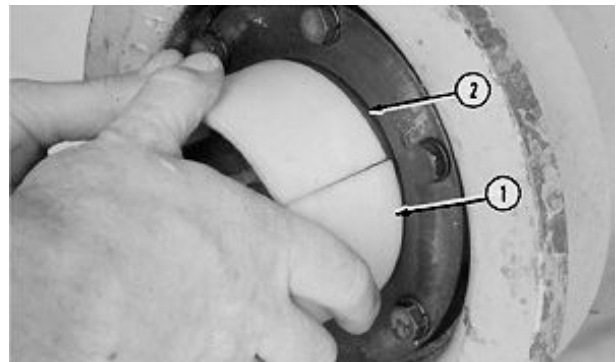
Seal Installation Tool

AB06447,0000C0B -19-04MAY15-11/16

T6077AV —UN—26OCT88

14. Push seal ring and O-ring into bore using tool (1). After O-ring (2) is pushed past retainer lip, turn tool clockwise and counterclockwise to seat O-ring uniformly. Install seal rings and O-rings in the outer and inner brackets using the same procedure.
15. Check to make sure seal ring is sitting squarely in bore. Make sure rubber seal is seated uniformly in seal bore below the retainer lip.

- 1— JDG205 Seal Installation Tool
- 2— O-Ring



Bore Tool

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AB06447,0000C0B -19-04MAY15-12/16

T80577 —UN—26OCT88

## Track System

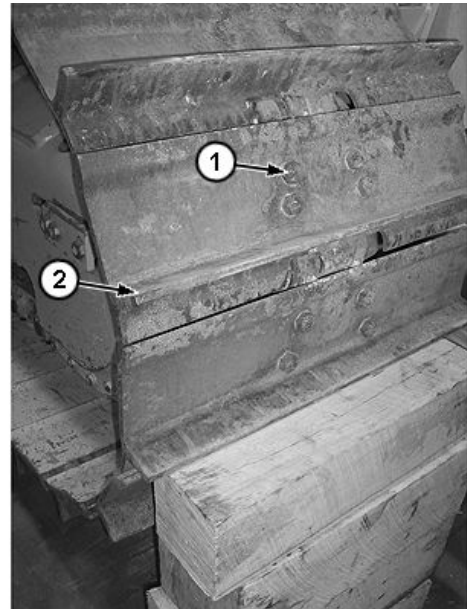
3. Rotate track until split link (9) is positioned in front of idler.
4. To prevent track from falling, block track as shown.
5. Remove four cap screws (1) to remove track shoe (2) and disassemble split link.
6. Attach chain (10) to track and support track chain with hoist to avoid damage to split link.
7. Start machine and slowly rotate drive sprocket in reverse direction to move track off drive sprocket.

**IMPORTANT: Track chain must be installed under track frame with wide end of links toward rear of machine or accelerated wear to track chain will occur.**

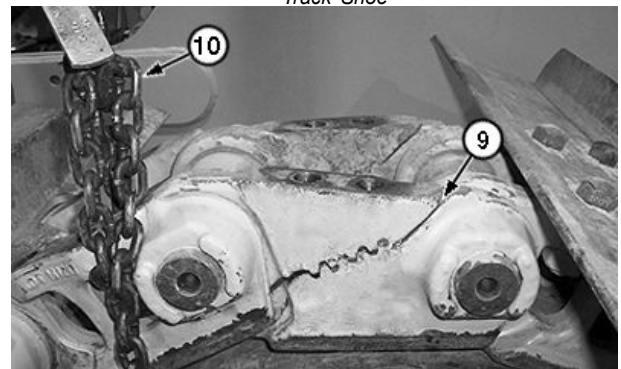
8. Install track chain by putting chain under track frame with the wide end of links toward rear of machine.
9. Block track shoes so split link is positioned directly over idler.

1— Cap Screw (4 used)  
2— Track Shoe

9— Split Link  
10— Chain



Track Shoe



Split Chain Link

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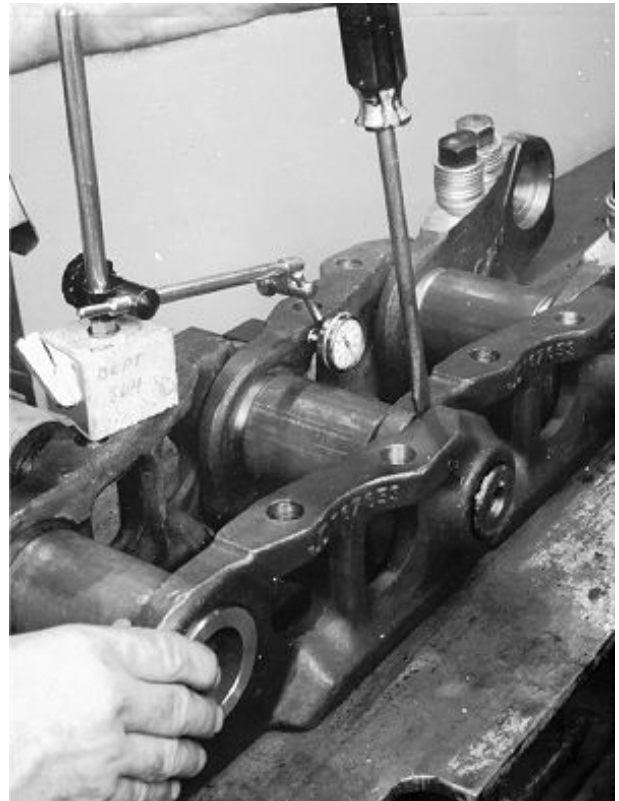
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T211292A —UN—11MAY05

TX1098970A —UN—30SEP11

## Track System

35. After one complete joint has been assembled, check end play of track links to make sure bushing, thrust rings, and link counterbore faces are pressed solid against each other. Position base of dial indicator on one link assembly and pointer against the other link assembly.
36. Pry link assemblies in one direction then in opposite direction to measure the amount of end play. End play must be zero.
37. As track chain is being further assembled, end play may be checked by manually prying upward on each link. If link rotates downward increase press force and re-press.



*Measuring End Play*

Continued on next page

BS40810,000012C -19-04MAY15-17/18

T 96285 —UN—27OCT88

### Front Idler Remove and Install

SPECIFICATIONS	
450K/550K Front Idler Weight (approximate)	94 kg 207 lb
650K Front Idler Weight (approximate)	121 kg 267 lb
Front Idler Yoke Cap Screw Torque	140 N·m 103 lb·ft

#### REMOVAL

1. Disconnect track chain. [See Lubricated Track Chain Remove and Install.](#) (Group 0130.)
2. Remove cap screws (1) from both sides.

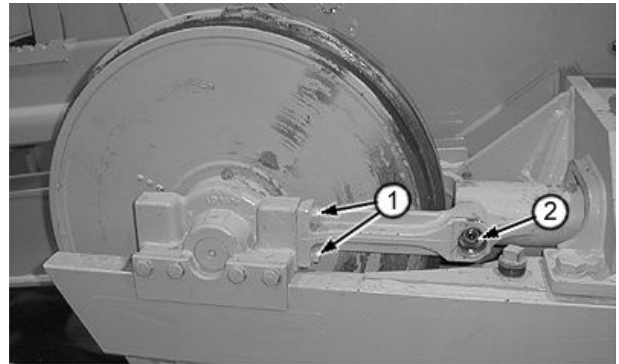
**⚠ CAUTION: Prevent possible crushing injury from heavy component. Use appropriate lifting device.**

3. Attach appropriate lifting device and slide front idler forward off track frame.

#### Specification

450K/550K Front Idler—Weight (approximate).....	94 kg 207 lb
650K Front Idler—Weight (approximate).....	121 kg 267 lb

4. Clean and inspect parts. Repair or replace parts as necessary. [See Front Idler Disassemble and Assemble.](#) (Group 0130.)



Front Idler

1— Cap Screw (4 used)

2— Track Adjuster Check Valve

#### INSTALLATION

Installation is reverse of removal procedure.

- Install idler on track frame. Tighten cap screws to specification.

#### Specification

Front Idler Yoke Cap Screw—Torque.....	140 N·m 103 lb·ft
--	----------------------

- Adjust idler. [See Front Idler Adjustment.](#) (Group 0130.)

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T118526B—UN—17NOV98

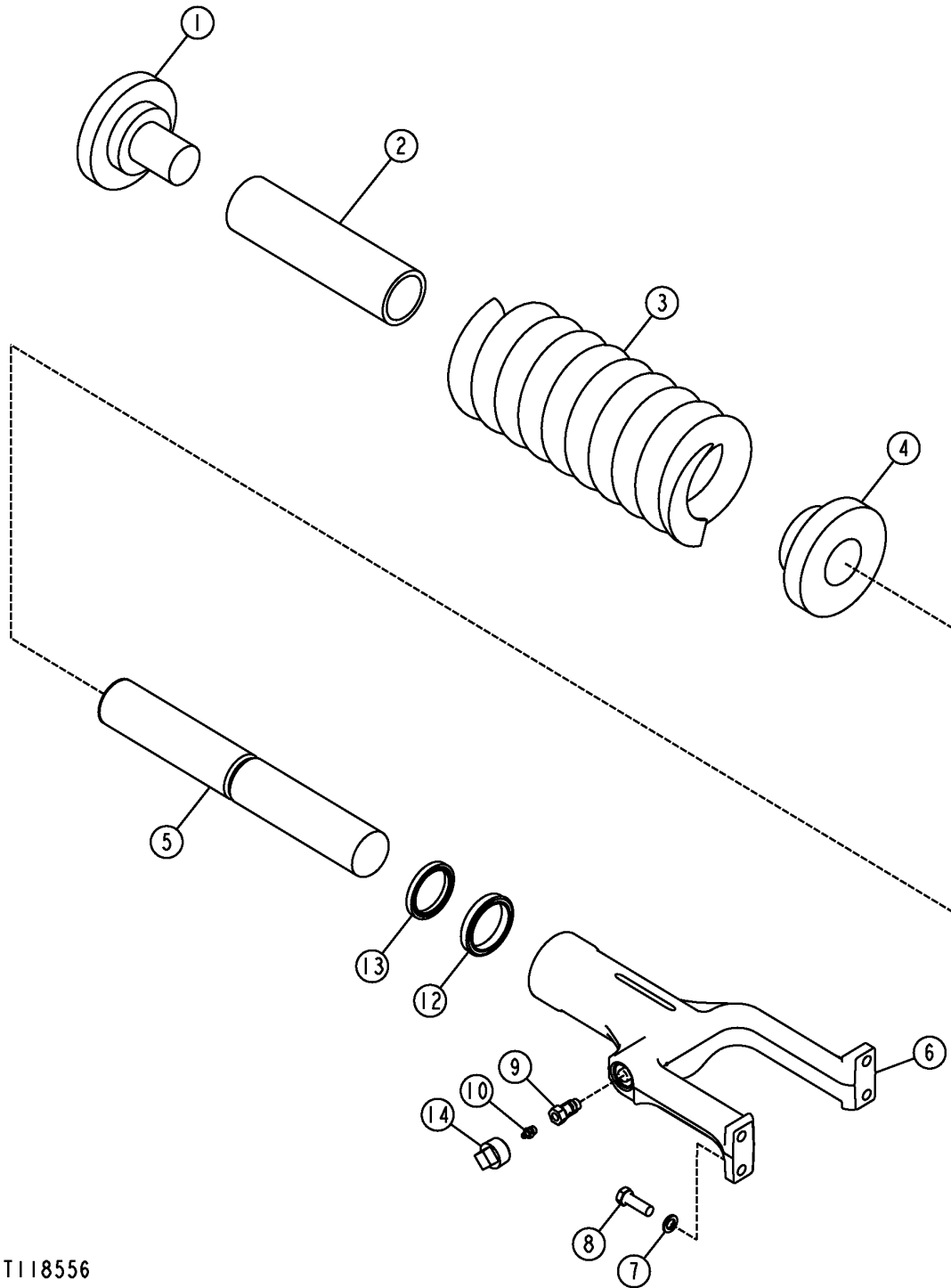
### Track Tension Adjuster Repair

#### SERVICE EQUIPMENT AND TOOLS

Bearing, Bushing and Seal Driver Set

#### SPECIFICATIONS

Adjusting Cylinder Yoke-to-Idler	155 Nm
Bracket Cap Screws Torque	115 lb.-ft.



T118556

T118556 —UN—23NOV98

Continued on next page

BS40810.0000133 -19-17MAR15-1/4

## Track System

5. Clamp wear strip in position, using dimensions (C and D).
6. Weld each wear strip in eight places as indicated using E7018 electrodes.
7. Install and adjust front idler. [See Front Idler Remove and Install](#) and [see Front Idler Adjustment](#). (Group 0130.)

MH66O88,0000958 -19-25MAR08-2/2

### Sprocket Remove and Install

SPECIFICATIONS	
Sprocket Weight (approximate)	69 kg 152 lb.
Drive Sprocket-to-Axle Shaft Cap Screw Torque (lubricated)	420 N·m 310 lb.-ft.
Sprocket Guard Upper Cap Screw Torque	624 N·m 460 lb.-ft.
Sprocket Guard Lower Cap Screw Torque	203 N·m 150 lb.-ft.

*NOTE: Sealed sprocket shown.*

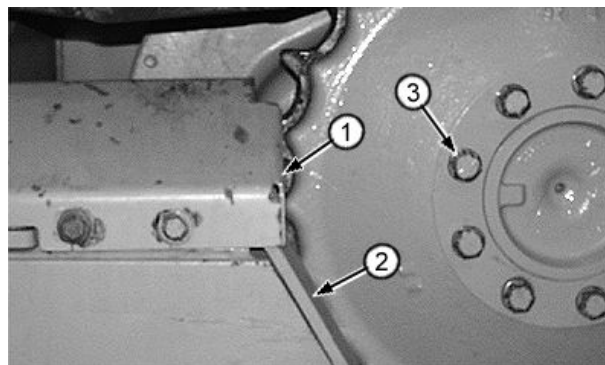
1. Disconnect track chain. [See Lubricated Track Chain Remove and Install](#). (Group 0130.)
2. Raise rear of machine using a 10-ton floor jack and support with blocks.
3. Remove guards (1 and 2).

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

4. Attach appropriate lifting device to sprocket.

	Specification
Sprocket—Weight (approximate).....	69 kg 152 lb.

5. Remove cap screws (3) and lift sprocket from final drive.
6. Sprocket is not repairable. If excessively worn or damaged, replace.
7. Install sprocket. Tighten cap screws to specification.



*Sprocket (sealed sprocket shown)*

1— Guard  
2— Guard

3— Cap Screw (12 used)

#### Specification

Drive Sprocket-to-Axle Shaft Cap Screw—Torque (lubricated).....	420 N·m 310 lb.-ft.
---	------------------------

8. Install sprocket guards. Tighten cap screws to specification.

#### Specification

Sprocket Guard Upper Cap Screw—Torque.....	624 N·m 460 lb.-ft.
Sprocket Guard Lower Cap Screw—Torque.....	203 N·m 150 lb.-ft.

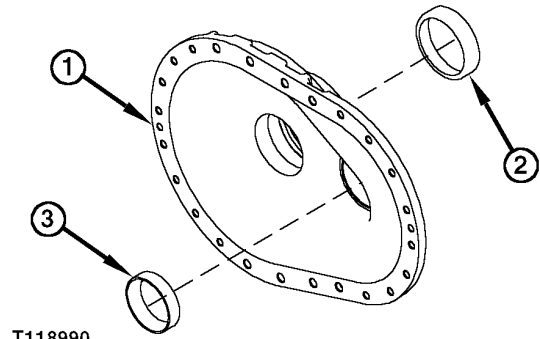
9. Install track chain. [See Lubricated Track Chain Remove and Install](#). (Group 0130.)

BS40810,0000138 -19-26MAR15-1/1

T118653B—UN—30NOV98

28. Remove final drive axle bearing cup (2) and second pinion outer bearing cup (3) from final drive housing (1).
29. Install final drive axle bearing cup (2) and second pinion outer bearing cup (3) into final drive housing (1). Fully seat bearing cups in bottom of bores.

- |                                |                                   |
|--------------------------------|-----------------------------------|
| 1—Housing                      | 3—Second Pinion Outer Bearing Cup |
| 2—Final Drive Axle Bearing Cup |                                   |



T118990

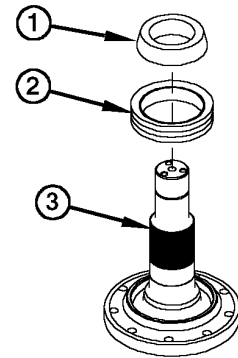
Seat Bearings in Housing

TE14778,0000024 -19-04MAY15-12/25

T118990—UN—14DEC98

30. Clean seal rubber rings and all surfaces that contact rubber rings with a non-petroleum based solvent. Thoroughly dry parts and surfaces using a lint-free tissue.
31. Install seal assembly (2) onto axle shaft (3).
32. Install bearing cone (1) onto axle shaft (3), tight against shoulder.

- |                |              |
|----------------|--------------|
| 1—Bearing Cone | 3—Axle Shaft |
| 2—Seal         |              |



T118986

Seal Assembly

TE14778,0000024 -19-04MAY15-13/25

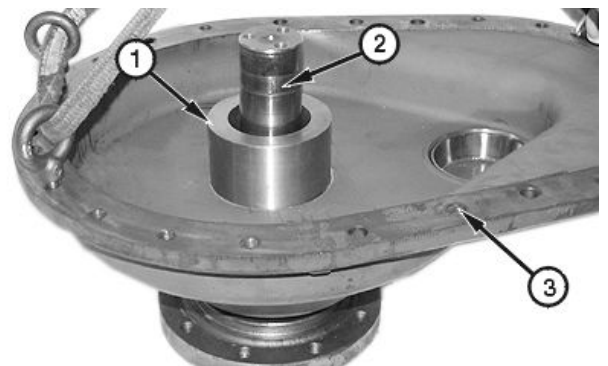
T118986—UN—14DEC98

**IMPORTANT: Special tool JDG1266 Final Drive Seal Protector centers axle in housing during installation. Failure to use the tool will result in a torn or damaged seal assembly.**

33. Install special tool (1) JDG1266 in bore of housing.
34. Place axle shaft assembly (2) on level surface.
35. Lower housing (3) onto axle shaft assembly (2).

*NOTE: Axle shaft and housing must be square and level for assembly.*

36. With the weight of the housing on the axle flange, block and support housing using a level.
37. Disconnect hoist and remove special tool (1).



Special Tool, 450J Final Drive

- |                                      |           |
|--------------------------------------|-----------|
| 1—JDG1266 Final Drive Seal Protector | 3—Housing |
| 2—Axle Shaft Assembly                |           |

Continued on next page

TE14778,0000024 -19-04MAY15-14/25

T118867B—UN—23DEC98

## Hydrostatic Pump and Motor Initial Start-Up Procedure

SPECIFICATIONS	
Transmission Charge Pressure	345 kPa 3.45 bar 50 psi
Engine Speed	Slow Idle
Engine Speed	Fast Idle

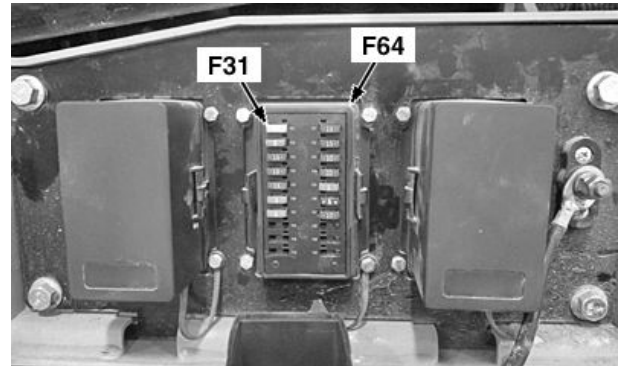
SERVICE EQUIPMENT AND TOOLS
D01182AA 20-Ton Floor Stand (4 used)

This procedure is used to bleed air from the hydrostatic circuit after a major component repair.

**⚠ CAUTION: Prevent possible injury from unexpected track movement. Raise the machine off the ground and support with appropriate stands. Tracks MUST be clear of tools and objects before rotating.**

1. Raise machine off the ground and support with D01182AA 20-Ton Floor Stands. Lower blade to ground. Tracks must be free to rotate in either direction.
2. Fill reservoir with specified oil. See Hydraulic and Hydrostatic Oil. (Operator's Manual.)
3. Check oil level. See Check Hydraulic/Hydrostatic System Oil Level. (Operator's Manual.)
4. Turn battery disconnect switch to OFF position.
5. Remove engine control unit (ECU) unswitched power 25 A fuse 1 (F31) from fuse box 2 (F64).
6. Turn battery disconnect to ON position.
7. Display transmission charge pressure on standard display unit (SDM). See Diagnostics—Machine Information, SDM. (Group 9015-16.)

**IMPORTANT: Overheating, caused by excessive operation, will severely damage starting motor. Never operate starting motor more than 30 seconds. Allow at least 2 minutes for cooling and battery recovery before operating again.**



Fuse Panel

F31— Engine Control Unit (ECU) Unswitched Power 25 A Fuse 1

F64— Fuse Box 2

8. Crank engine in 30 second intervals until transmission charge pressure reaches specification.

#### Specification

Transmission Charge—Pressure.....	345 kPa 3.45 bar 50 psi
-----------------------------------	-------------------------------

9. Turn battery disconnect switch to OFF position.
10. Install ECU unswitched power 25 A fuse 1.
11. Turn battery disconnect to ON position.
12. Start engine and run at specification for 1 minute.

#### Specification

Engine—Speed.....	Slow Idle
-------------------	-----------

13. Set engine speed to specification.

#### Specification

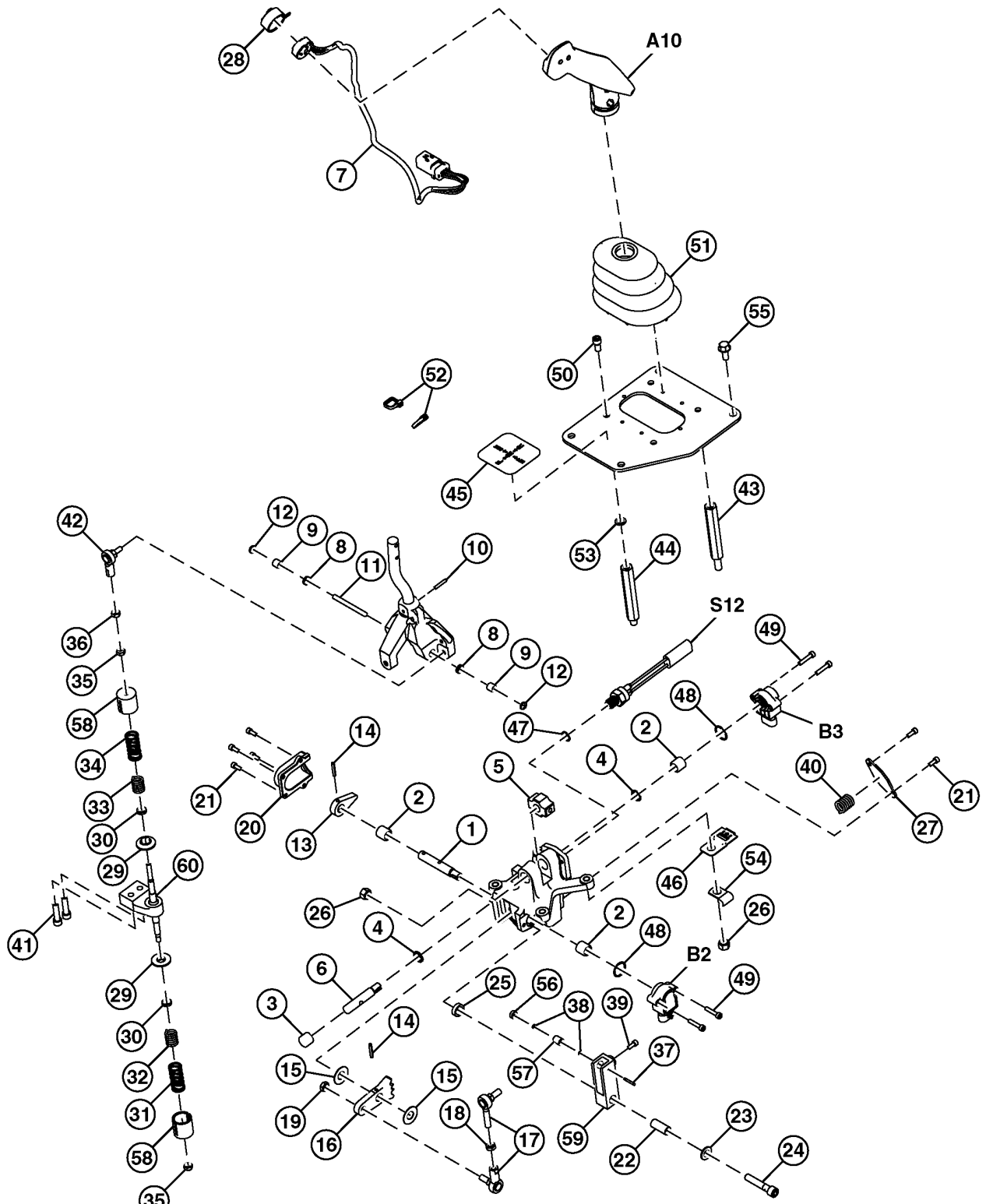
Engine—Speed.....	Fast Idle
-------------------	-----------

14. Operate machine at low speed in forward, reverse, and counter-rotation for several minutes. This process flushes the displacement control valve areas.
15. Check oil level in hydraulic oil reservoir.

BS40810,0000233 -19-27JAN17-1/1

TX1232810A —UN—24JAN17

Controls Linkage



TX1181019

Transmission Control Lever (TCL)

TX1181019 — UN — 19JAN15

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DA93471.00000C3 -19-06MAY15-2/38

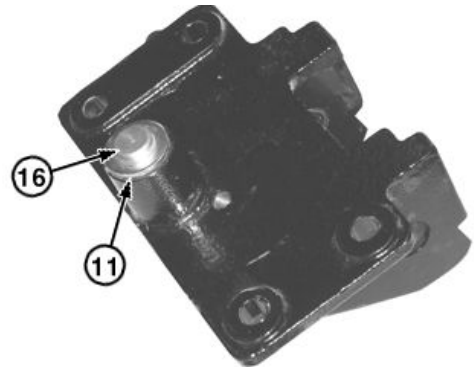


Controls Linkage

17. Install pin fastener (16) through washer (11) into back of support (3).

11— Washer

16— Pin Fastener



Pin Fastener

DA93471,00000C5 -19-11FEB15-8/12

TX1180971A —UN—13JAN15

18. Install spring (14) and washer (11) onto shaft and compress to install snap ring (12).

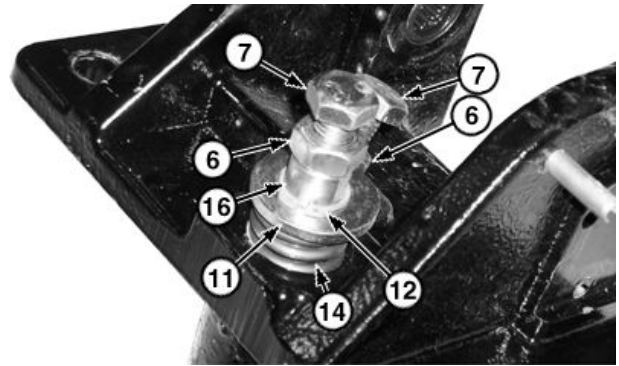
19. Install cap screws (7) with nuts (6). Tighten nuts to specification.

Specification

Nut (6)—Torque.....73 N·m  
54 lb.-ft.

6— Nut (2 used)  
7— Cap Screw (2 used)  
11— Washer

12— Snap Ring  
14— Spring  
16— Pin Fastener



Brake Stop

DA93471,00000C5 -19-11FEB15-9/12

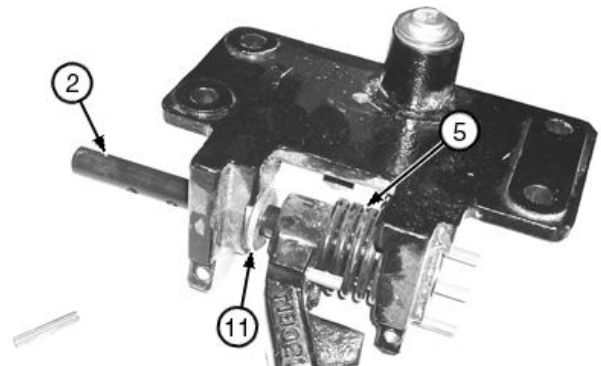
TX1180969A —UN—13JAN15

20. Assemble torsion spring (5) onto pedal then rotate spring until spring is stopped by pin.

21. Place pedal with spring and washer (11) into support and install shaft (2) through assembly.

2— Shaft  
5— Torsion Spring

11— Washer



Shaft and Pedal

Continued on next page

DA93471,00000C5 -19-11FEB15-10/12

T200196A —UN—19MAY04

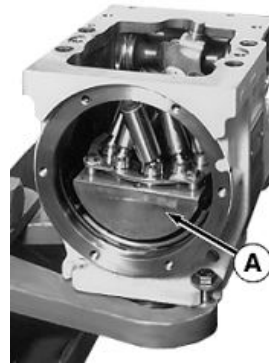
## Hydrostatic System

39. Remove the swash plate and piston assembly (A) through the housing side cover opening.

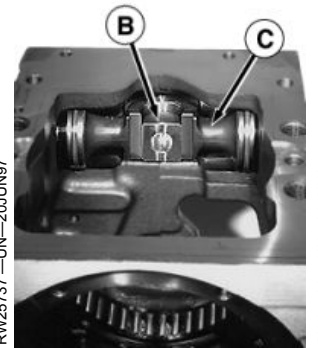
**IMPORTANT: Wear patterns develop between servo pistons and servo cylinders. Servo piston must be installed with original orientation.**

40. Tag or identify servo piston orientation to aid in proper assembly.  
41. Remove the servo piston (C) and slider block (B).

A—Swash Plate and Piston Assembly  
B—Slider Block  
C—Servo Piston



Piston Assembly



Servo Piston and Slider Block

DA93471,0000102 -19-03MAR17-14/19

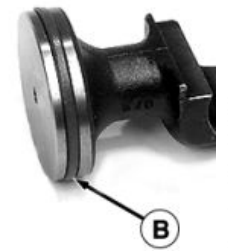
**NOTE: Do not stretch seal rings (B) any more than necessary when installing.**

42. Replace expander O-ring (A) on each end of servo piston.  
43. Install seal ring (B) over O-ring on each end of piston.

A—O-Ring  
B—Seal Ring



Expander O-Ring

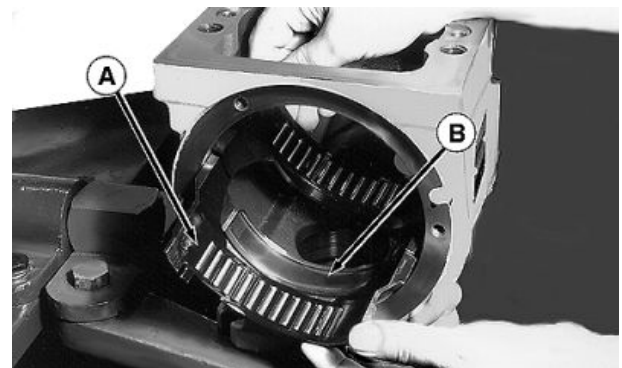


Seal Ring

DA93471,0000102 -19-03MAR17-15/19

**IMPORTANT: Bearing cage wears patterns in bearing race and swash plate. Components must be installed in proper position with original orientation.**

44. Tag or identify swash plate bearing cage positions to aid in proper assembly.  
45. Remove and inspect swash plate bearing cage (A). Replace as required.  
46. Tag or identify bearing race positions to aid in proper assembly.  
47. Remove and inspect the two bearing races (B). Replace as required.



Swash Plate Bearing Cage and Bearing Races

A—Bearing Cage (2 used)  
B—Bearing Race (2 used)

Continued on next page

DA93471,0000102 -19-03MAR17-16/19

## Hydrostatic Pump Assemble

SPECIFICATIONS	
Cap Screw Torque	14 N·m 124 lb·in
Servo Cylinder Cap Screws Torque	33 N·m 24 lb·ft
Side Cover-to-Pump Housing Blind Hole Cap Screws Torque	33 N·m 24 lb·ft
Side Cover-to-Pump Housing Through (Top Two) Hole Cap Screws Torque	33 N·m 24 lb·ft
End Cap/Adapter-to-Pump Cap Screws (Large) Torque	298 N·m 220 lb·ft
End Cap-to-Pump Cap Screws (Small) Torque	33 N·m 24 lb·ft
Input Shaft Seal Carrier Retaining Cap Screw Torque	16 N·m 142 lb·in

ESSENTIAL TOOLS
JDG1094 Leveling Plate

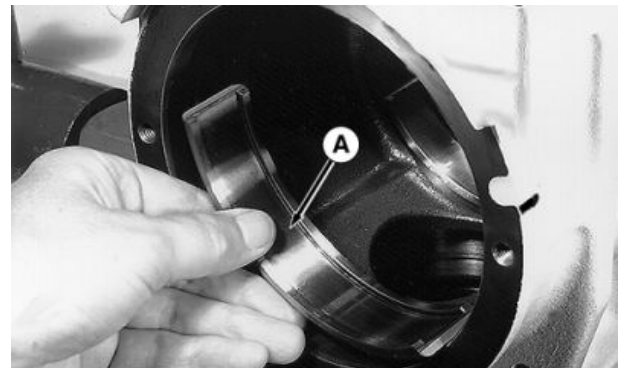
OTHER MATERIAL
Loctite® 242® Threadlocker (medium strength)

**NOTE:** Apply clean hydrostatic oil to all internal parts before assembly.

**IMPORTANT:** Components must be installed in proper position with original orientation to prevent premature pump failure. Bearing races must be completely seated in housing.

Inspect bearing cage wear patterns in bearing race and swash plate to determine remaining service life.

1. Install bearing races (A) in housing.



Installing Bearing Races

**A**—Bearing Race (2 used)

2. Lubricate and install bearing cage on the bearing races.

DA93471.00000FE -19-07MAR17-1/17

RW25758 —UN—16JUN97

**IMPORTANT:** Damage to polished surfaces can cause premature pump failure. Be careful when handling parts with polished surfaces to prevent nicks or scratches.

**NOTE:** Either side of slipper guide can be installed against slippers. Flip slipper guide if excessive wear is on top bearing surface.

3. Inspect slipper guide surface, install smoothest side away from slippers.

Clean slipper guide bearing screw holes on swash plate surface using M8 tap.

**NOTE:** Apply clean hydrostatic oil to all internal parts before assembly.



Piston Assemblies

4. Install the piston assemblies into the slipper guide.
5. Apply clean hydrostatic oil on slippers. Center the pistons and guide on the swash plate.

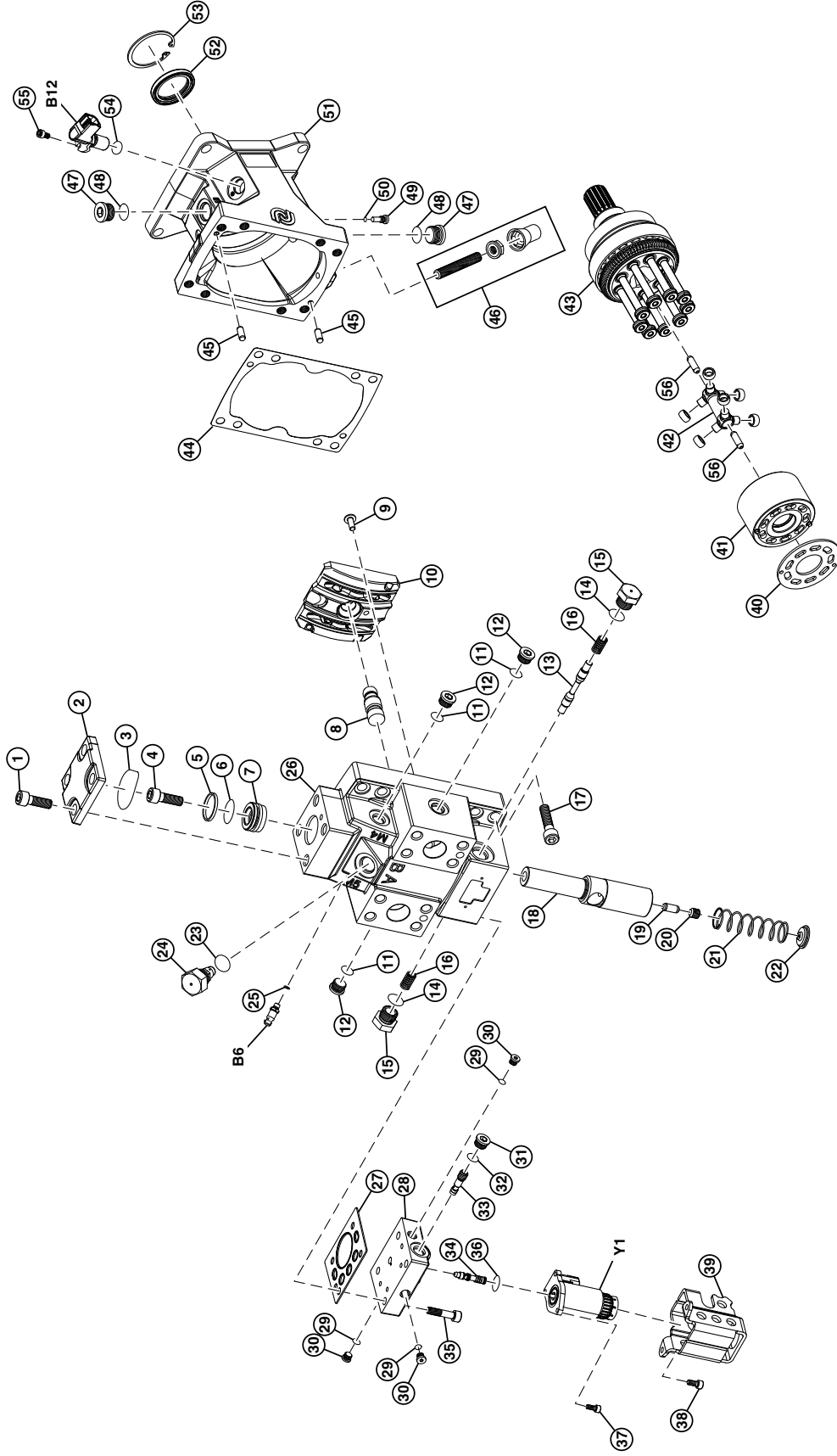
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DA93471.00000FE -19-07MAR17-2/17

T8464BL —UN—14JUN95

Hydrostatic System

TX1191950—JUN—26APR15



TX1191950

550K/650K Hydrostatic Motor (exploded view shown)

Continued on next page

DA93471,0000119 -19-11MAY15-2/16

TM14163X19 (15FEB18)

03-0360-27

450K, 550K, and 650K Crawler Dozer  
CA1918  
PN=201

### Hydrostatic Motor Assemble

SPECIFICATIONS	
Dowel Pin Torque	8 N·m 71 lb·in
Cap Screw (55) Torque	8 N·m 71 lb·in
Set Screw Torque	34 N·m 25 lb·ft
Retaining Cap Screw Torque	8 N·m 71 lb·in
Cap Screw (17) Torque	78 N·m 58 lb·ft
Bushing Cap Screw Torque	66 N·m 49 lb·ft
Cap Screw (1) Torque	115 N·m 85 lb·ft
Left Hydrostatic Pressure Sensor Torque	42 N·m 31 lb·ft
Operating Charge Relief Valve Torque	67 N·m 49 lb·ft
Cap Screw (35) Torque	37 N·m 27 lb·ft
Plug (15) Torque	67 N·m 49 lb·ft
Cap Screw (37) Torque	6 N·m 53 lb·in

Continued on next page

DA93471,00000F4 -19-08MAR17-1/17

8. Install bearing plate (40) on cylinder block (41).

*NOTE: Apply clean hydrostatic oil to all internal parts prior to assembly.*

9. Install new gasket (44).

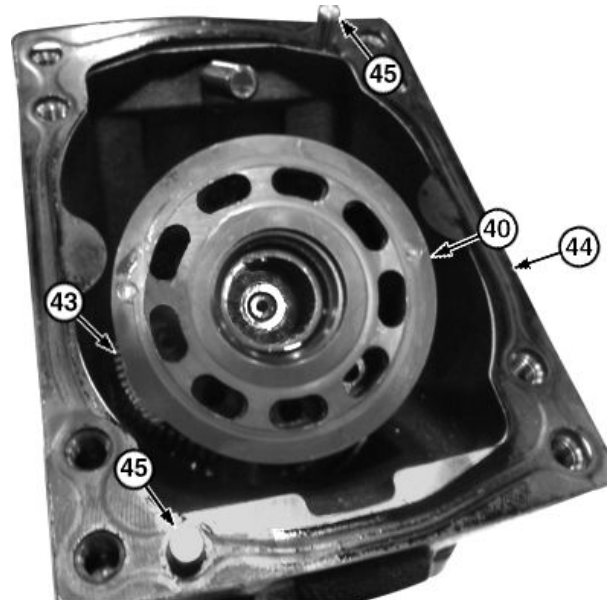
**IMPORTANT: To prevent damage to the hydrostatic motor, DO NOT force the end cap into position on the housing. Apply clean hydrostatic oil to all parts while assembling.**

10. Apply clean hydrostatic oil to valve segment (10) and bearing plate (40) mating surfaces.

**IMPORTANT: To prevent damage to the hydrostatic motor, DO NOT allow the pistons or synchronizing shaft rollers to fall out of position. Apply clean hydrostatic oil to all parts while assembling.**

*NOTE: The valve segment (10) must engage bearing in cylinder block (41) for proper assembly.*

11. Using orientation marks from disassembly, install end cap housing (26) onto rotating group housing (51) using dowel pins (45) for assembly alignment.



Rotating Group Housing

40— Bearing Plate  
43— Shaft Assembly

44— Gasket  
45— Dowel Pin (2 used)

Continued on next page

DA93471,00000F4 - 19-08MAR17-10/17

TX1183209A —UN—27.JAN15

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10. Install identification tags and disconnect hydraulic lines (7) and fill neck line (15) from hydraulic oil reservoir (13). Close all openings using caps and plugs.

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

11. Attach appropriate lifting device to hydraulic oil reservoir.

**Specification**

Hydraulic Oil Reservoir—Weight (approximate).....	159 kg 351 lb
---	------------------

12. Remove cap screws (12) and hydraulic oil reservoir.

13. Clean and inspect parts. Repair or replace as necessary.

**INSTALLATION**

Installation is reverse of removal procedure.

- Tighten cap screws (12) to specification.

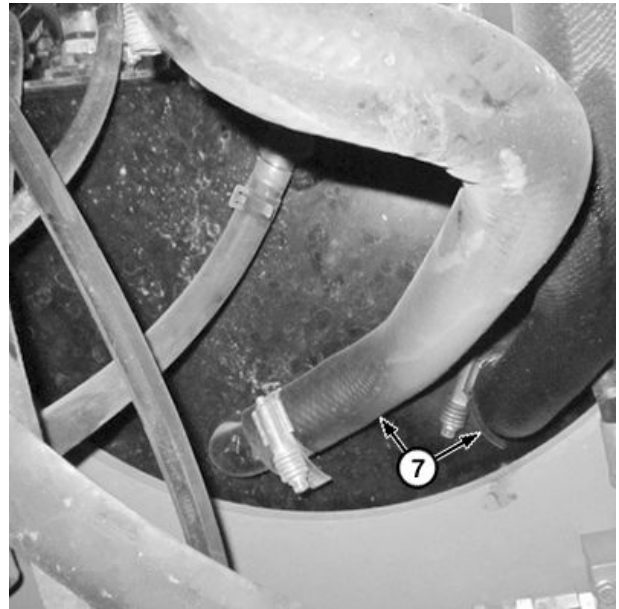
**Specification**

Cap Screw (12)—Torque.....	320 N·m 236 lb·ft
----------------------------	----------------------

- Tighten cap screws (10) to specification.

**Specification**

Cap Screw (10)—Torque.....	130 N·m 96 lb·ft
----------------------------	---------------------



*Hydraulic Oil Reservoir (bottom view)*

**7—Hydraulic Line (650K, 8 used; 450K/550K, 7 used)**

TX1234292A —UN—28FEB17

*Removal and Installation*

1— Engine Mount Cap Screw (4 used)  
 2— Washer (4 used)  
 3— Isolator (4 used)

4— Plate (4 used)  
 5— Nut (4 used)  
 6— Washer (8 used)  
 7— Cap Screw (8 used)

8— Washer (6 used)  
 9— Cap Screw (6 used)  
 10— Left Rail Assembly

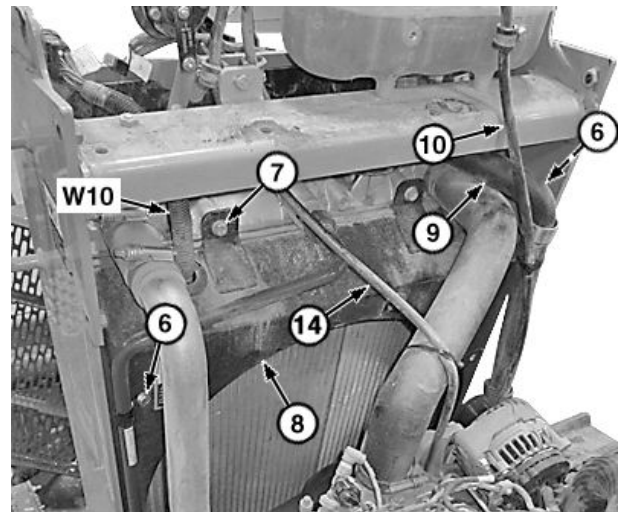
11— Right Rail Assembly

<b>Item</b>	<b>Measurement</b>	<b>Specification</b>
Engine	Weight (approximate)	595 kg 1310 lb.
<b>Item</b>	<b>Measurement</b>	<b>Specification</b>
Engine Cradle	Weight (approximate)	52 kg 113 lb.
<b>Item</b>	<b>Measurement</b>	<b>Specification</b>
Engine Mount Cap Screws	Torque	346 N·m 255 lb.-ft.

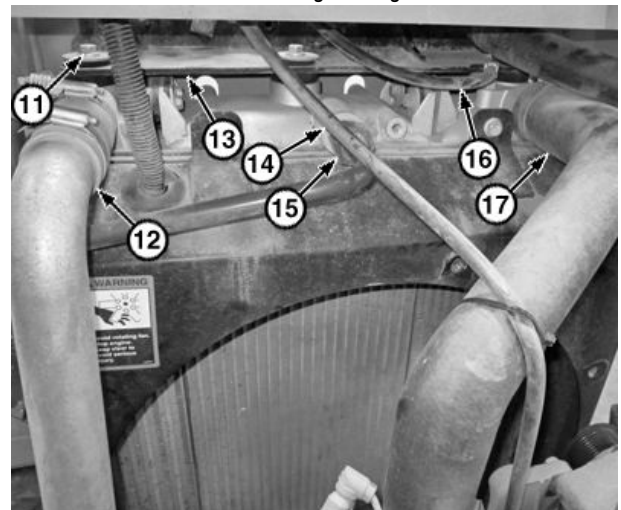
AB51738,0000AB6 -19-04MAR15-2/2

7. Disconnect cooling package harness (W10). See Cooling Package Harness (W10) Component Location or see Cooling Package (IGC Controls) Harness (W11) Component Location. (Group 9015-10.)
8. Remove cap screws (6) to disconnect lines and hoses from fan shroud and frame.
9. Disconnect hoses (9, 10, and 14) from surge tank. Close all openings using caps and plugs.
10. Disconnect upper hose and line connections (12 and 15—17) from cooling package. Close all openings using caps and plugs.
11. Remove fan shroud (8).
12. Remove bracket (13).

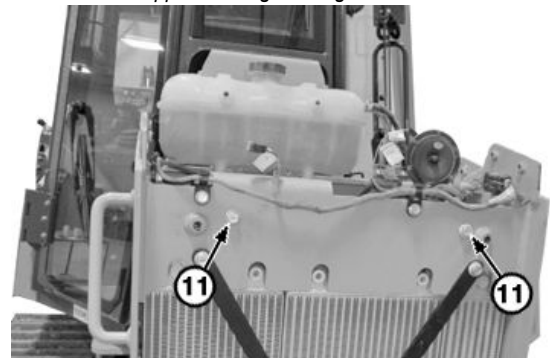
- |                                  |   |
|----------------------------------|---|
| 6— Cap Screw (4 used)            | 13— Bracket                               |
| 7— Cap Screw (4 used)            | 14— Surge Tank-to-Thermostat Housing Hose |
| 8— Fan Shroud                    | 15— Upper Hydraulic Cooler Line           |
| 9— Surge Tank Hose               | 16— Radiator-to-Surge Tank Hose           |
| 10— Surge Tank Overflow Hose     | 17— Upper Radiator Hose                   |
| 11— Cap Screw (5 used)           | W10—Cooling Package Harness               |
| 12— Upper Charge Air Cooler Hose |   |



Cooling Package



Upper Cooling Package Connections



Bracket Cap Screws

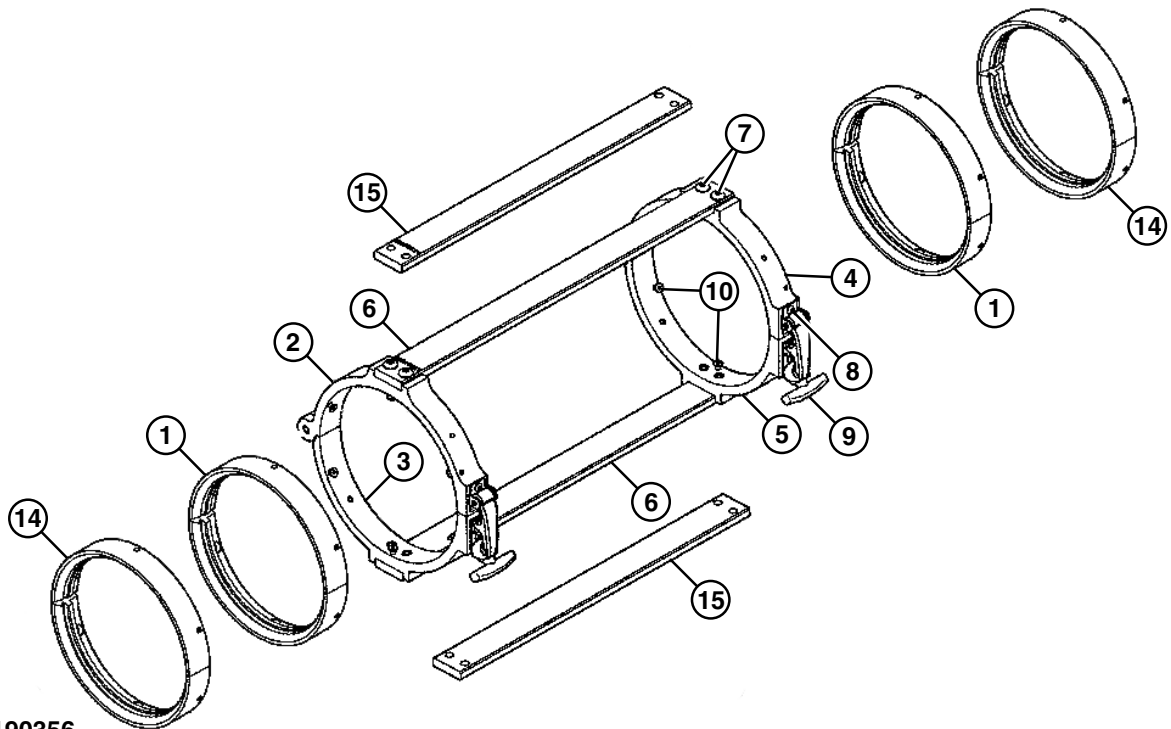
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TX1232325A —UN—15FEB17

TX1232328A —UN—18JAN17

TX1234084A —UN—15FEB17



TX1190356

JDG11340 Bellows Alignment Fixture Components

- |                             |                          |  |
|-----------------------------|--------------------------|--|
| 1— JDG11340 Insert (2 used) | 5— JDG11340 Collar       | 9— Latch (2 used)  |
| 2— JDG11340 Collar          | 6— JDG11340 Bar (2 used) | 10— Cap Screw (12 used)                                    |
| 3— JDG11340 Collar          | 7— Cap Screw (8 used)    | 14— JDG15039 Insert (2 used)                               |
| 4— JDG11340 Collar          | 8— Cap Screw (6 used)    | 15— JDG11335P3P1 Bar (2 used) (not included with JDG11340) |

**NOTE:** All tool parts are common except the inserts and bars. Refer to the tables below for configurations and part numbers for the inserts and bars.

Using the table below, construct tool with proper configuration.

Configuration A	
Insert	JDG11340
Bar 238.1 mm (9.38 in)	JDG11340
Center of Groove-to-Center of Groove Measurement	210.0 mm 8.27 in

Configuration B	
Insert	JDG15039
Bar 278.1 mm (10.90 in)	JDG11335P3P1
Center of Groove-to-Center of Groove Measurement	251.0 mm 9.88 in

Configuration C	
Insert	JDG15039
Bar 238.1 mm (9.38 in)	JDG11340
Center of Groove-to-Center of Groove Measurement	210.0 mm 8.27 in

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VD76477,000059F -19-15FEB17-2/4

TX1190356 —UN—16APR15

## Exhaust Filter Remove and Install

SPECIFICATIONS	
Nut Torque	42 N·m 31 lb·ft

### REMOVAL

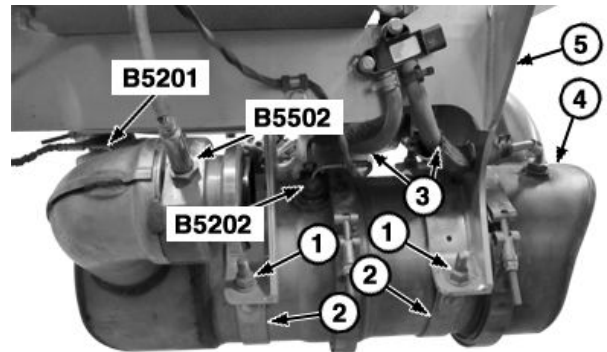
1. Park and prepare machine for service. See Park and Prepare for Service Safely. (Group 0001.)

**⚠ CAUTION: Prevent possible burn injuries. Allow exhaust components sufficient time to cool before performing service.**

2. Remove aftertreatment assembly. See Aftertreatment Assembly Remove and Install. (Group 0530.)
3. Install identification tags and disconnect hoses (3). Close all openings using caps and plugs.
4. Install identification tags and disconnect electrical sensors (B5201, B5202, and B5502).
5. Remove nuts (1) and mounting bands (2) from aftertreatment assembly (5).
6. Remove exhaust filter (4).
7. Clean and inspect parts. Repair or replace parts as necessary.

### INSTALLATION

Installation is reverse of removal procedure.



Aftertreatment Assembly (left side shown)

- 1— Nut (4 used)
- 2— Mounting Band (2 used)
- 3— Hose (2 used)
- 4— Exhaust Filter

- 5— Aftertreatment Assembly
- B5201—Diesel Oxidation Catalyst (DOC) Inlet Temperature Sensor
- B5202—Diesel Oxidation Catalyst (DOC) Outlet Temperature Sensor
- B5502—Aftertreatment Inlet NOx Sensor

- Tighten nuts (1) to specification.

	Specification
Nut—Torque.....	42 N·m 31 lb·ft

TX1233417A—UN—08FEB17

BS40810,000024B -19-27FEB17-1/1

## Diesel Exhaust Fluid (DEF) Dosing Injector Remove and Install

**⚠ CAUTION:** Prevent possible injury from hot spraying fluids. Shut off engine. Remove filler cap only when cool enough to touch with bare hands. Slowly loosen cap to relieve pressure before removing completely.

**⚠ CAUTION:** Prevent possible burning injuries. Allow exhaust component sufficient time to cool before performing service.

**IMPORTANT:** Do not remove battery leads for at least 4 minutes after engine stops. The selective catalytic reduction (SCR) system automatically purges itself of diesel exhaust fluid (DEF) immediately after the engine is stopped. If adequate time is not allowed for lines to be purged, residual DEF can freeze and possibly damage components of the SCR system during cold-weather exposure.

### Machine Preparation

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



Pressurized Fluids

2. Disconnect negative battery lead.
3. Remove right engine side shield. [See Engine Side Shields Remove and Install.](#) (Group 1910.)

### Additional Information

- [See DEF Dosing Injector — Removal.](#) (CTM120119.)
- [See DEF Dosing Injector — Installation.](#) (CTM120119.)

AB51738,0000A81 -19-30MAR15-1/1

TS281 —UN—15APR13

## Diesel Exhaust Fluid (DEF) Decomposition Tube Remove and Install

**⚠ CAUTION:** Prevent possible burning injuries. Allow exhaust components sufficient time to cool before performing service.

### Machine Preparation

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

2. Remove right engine side shield. [See Engine Side Shields Remove and Install.](#) (Group 1910.)

### Additional Information

- [See DEF Decomposition Tube — Removal.](#) (CTM120119.)
- [See DEF Decomposition Tube — Installation.](#) (CTM120119.)

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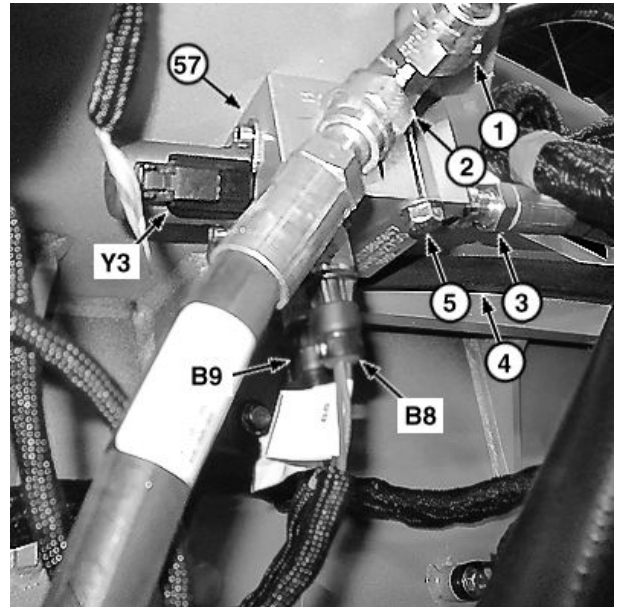
### Park Brake Valve Remove and Install

1. Lower all equipment to ground and stop engine.
2. Place park lock lever in UP (locked) position.
3. Turn battery disconnect switch OFF.
4. Disconnect hoses (1—4).
5. Disconnect harness connectors (B8, B9, and Y3).
6. Remove cap screws (5) and park brake valve manifold (57).
7. Install park brake valve manifold and tighten cap screws to specification.

#### Specification

Park Brake Valve	
Mounting Cap	
Screw—Torque.....	37 N·m 27 lb.-ft.

8. Connect harness connectors.
9. Connect hoses.
10. Turn battery disconnect switch to ON.



Park Brake Valve

- |   |                                       |
|---|---------------------------------------|
| 1— Right Park Brake Hose                | 57— Park Brake Valve Manifold         |
| 2— Left Park Brake Hose                 | B8—Hydrostatic Charge Pressure Sensor |
| 3— Hydrostatic Reservoir Hose           | B9—Brake Pressure Sensor              |
| 4— Charge Pump-to-Park Brake Valve Hose | Y3— Park Brake Solenoid               |
| 5— Cap Screw (2 used)                   |                                       |

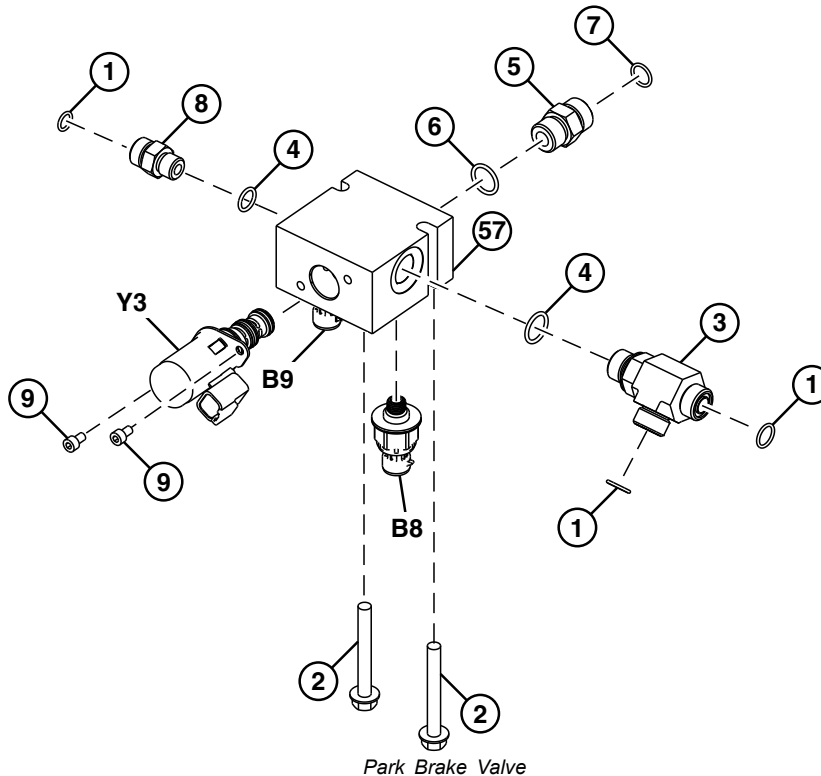
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### Park Brake Valve Disassemble and Assemble

SPECIFICATIONS	
Socket Head Cap Screw Torque	3—4 N·m 27—35 lb·in
Pressure Sensor (B8 and B9) Torque	20 N·m 177 lb·in

OTHER MATERIAL
Loctite® 7649™ Primer N™ Cure Primer
Loctite® 242® Threadlocker (medium strength)



#### TX1186070

- |                       |                                   |  |                         |
|-----------------------|-----------------------------------|--|-------------------------|
| 1— O-Ring (3 used)    | 5— Adapter Fitting                | 57— Park Brake Valve Manifold          | Y3— Park Brake Solenoid |
| 2— Cap Screw (2 used) | 6— O-Ring                         | B8— Hydrostatic Charge Pressure Sensor |                         |
| 3— Tee Fitting        | 7— O-Ring                         | B9— Brake Pressure Sensor              |                         |
| 4— O-Ring (2 used)    | 8— Adapter Fitting                |  |                         |
|                       | 9— Socket Head Cap Screw (2 used) |  |                         |

1. Mark position of hydraulic tee fitting (3) to aid in assembly and remove.
2. Remove pressure sensors (B8 and B9).
3. Remove adapter fittings (5 and 8).

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JL48493.000036A -19-08FEB17-1/2

TX1186070—UN—16MAR15

## Removal and Installation

1— Nut (8 used)  
2— Cap Screw (5 used)  
3— Cap Screw (8 used)  
4— Washer (16 used)

5— Gasket (2 used)  
7— Nut (4 used)  
8— Plate (2 used)  
9— Boot  
12— Electrical Connector

13— Cover (2 used)  
14— Multit-Function Controller  
19— Plate  
20— Screw (3 used)

21— Screw  
22— Nut (2 used)  
23— Cap Screw (2 used)

Disassemble and assemble parts as shown.

JL05046,0000159 -19-14APR15-2/2

### Auxiliary Joystick Remove and Install—IGC

1. Park and prepare machine for service. [See Park and Prepare for Service Safely](#). (Group 0001.)
2. Turn battery disconnect switch to the OFF position. [See Battery Disconnect Switch](#). (Operator's Manual.)
3. Open right rear service door.
4. Disconnect electrical connector (3) from auxiliary joystick (1).
5. Remove screws (2) and remove auxiliary joystick.

**NOTE:** Auxiliary joystick is not serviceable and must be replaced as an assembly.

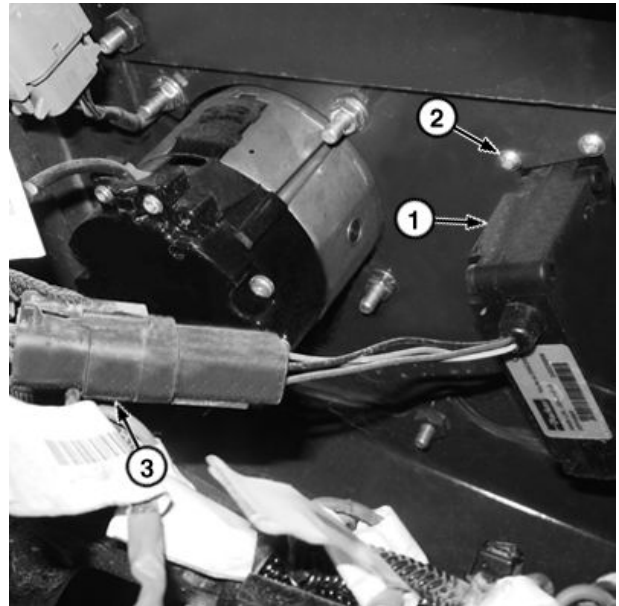
6. Replace auxiliary joystick as needed.
7. Install auxiliary joystick and screws.
8. Connect electrical connector.
9. Close right rear service door.
10. Turn battery disconnect switch to the ON position. [See Battery Disconnect Switch](#). (Operator's Manual.)
11. Start engine and verify operation of ripper.

1— Auxiliary Joystick  
2— Screw (4 used)

3— Electrical Connector



Auxiliary Joystick



Auxiliary Joystick (bottom view)

JL05046,0000152 -19-11MAR15-1/1

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TX1187341A —UN—11MAR15

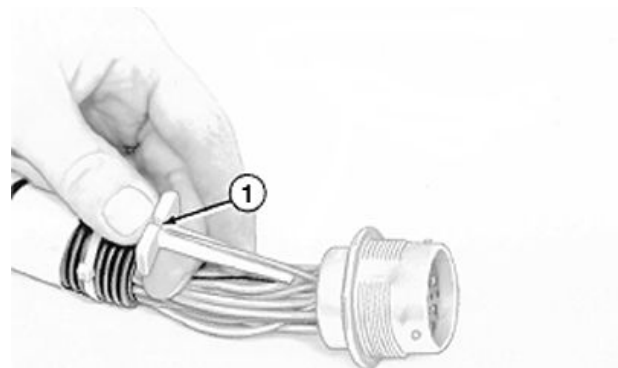
## Replace DEUTSCH® Circular Connectors

*NOTE: JDG361 Extractor Tool, JDG362 Extractor Tool, and JDG363 Extractor Tool are available in JDG359 DEUTSCH Electrical Repair Tool Kit.*

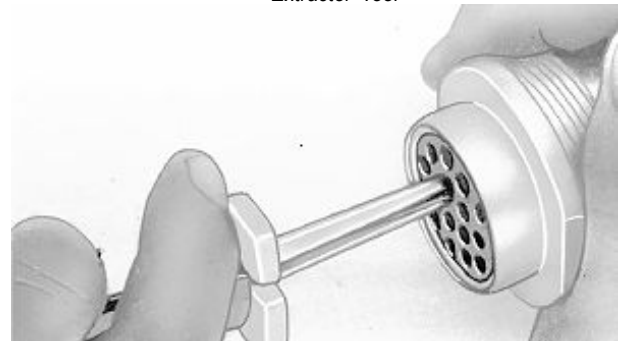
1. Select correct size extractor tool for size of wire to be removed:
  - JDG361 Extractor Tool for 12 to 14 gauge wire
  - JDG362 Extractor Tool for 16 to 18 gauge wire
  - JDG363 Extractor Tool for 20 gauge wire
2. Start correct size extractor tool (1) over wire at handle.
3. Slide extractor tool along wire until tool tip snaps onto wire.

**IMPORTANT: Avoid damage to wire and terminal contact. Do not twist extractor tool when inserting in connector. Slide extractor tool along wire into connector body.**

4. Slide extractor tool along wire into DEUTSCH® connector body until it is positioned over terminal contact.
5. Using extractor tool (1), pull wire out of connector body.
6. Install contact in proper connector location using correct size grommet.



Extractor Tool



Slide Extractor Tool

1— Extractor Tool

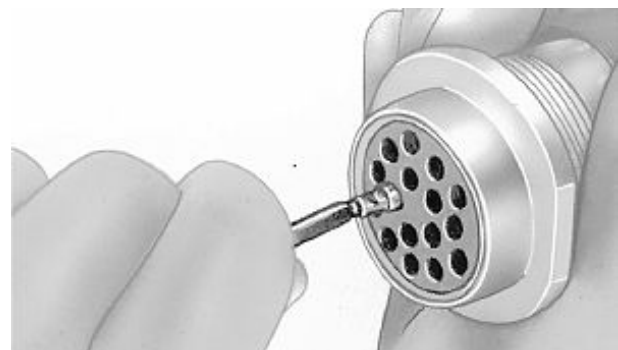
*DEUTSCH is a trademark of TE Connectivity Ltd.*

TX,DEUTSCH2 -19-31AUG16-1/2

TX1222336A —UN—31AUG16

TS120 —UN—23AUG88

7. Push contact straight into connector body until positive stop is felt.
8. Pull on wire and verify that contact is locked in place.



Push Contact

TX,DEUTSCH2 -19-31AUG16-2/2

TS122 —UN—23AUG88

4. Once terminal lock is released, slowly remove extraction tool and wire (6).

5. Repair or replace as necessary.

**IMPORTANT: Prevent terminal damage during insertion. Ensure proper orientation of terminals.**

6. Insert wire into proper terminal until secured by the terminal lock.

7. Secure wires to connector with new tie band.

8. Install cover.

6— Wire



Wire Extraction

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### Replace TYCO™ Connectors

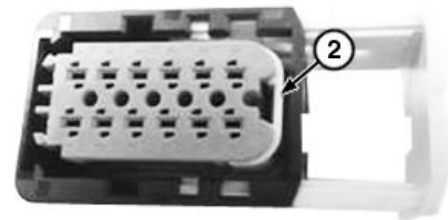
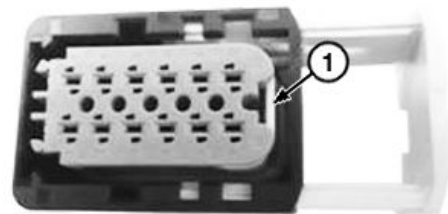
#### ESSENTIAL TOOLS

JDG1725 Terminal Extractor Tool

1. Move secondary lock slightly outward to secondary lock open position (2) on TYCO™ connector.

1— Secondary Lock Closed Position

2— Secondary Lock Open Position



Secondary Lock Positions

TX1191078A —UN—24APR15

TYCO is a trademark of TE Connectivity Ltd.

Continued on next page

TX,TYCO -19-25AUG16-1/3

## Section 18 Operator's Station

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- 1— Front Window
- 2— Rear Window
- 3— Heater Lines Cover
- 4— Cap Screw (4 used)
- 5— Air Conditioner Lines Cover

- 6— Screw (2 used)
- 7— Cover
- 8— Cap Screw (3 used)
- 9— Door Windowpane
- 10— Spacer
- 11— Door Handle
- 12— Spacer

- 13— Screw (2 used)
- 14— Latch
- 15— Sliding Windowpane
- 16— Seal
- 17— Nut (2 used)
- 18— Stationary Windowpane

- 19— Seal
- 20— Filler Vinyl Seal
- 21— Filler Vinyl Seal
- 22— Screw (2 used)

**Fixed Windowpanes:**

*NOTE: Use this procedure to replace all rear/front windowpanes and door windowpanes.*

**REMOVAL**

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)
2. Purchase urethane adhesive and appropriate primers from a local auto glass dealer.
3. If window frame is removable, remove frame from cab.
4. **Fixed Cab Windowpanes:**
  - a. Remove front window wiper arms and rear window wiper motor (if equipped). See Window Wiper Motor Remove and Install. (Group 1810.)
  - b. Remove heater lines cover (3) and air conditioner lines cover (5).
  - c. Remove front window (1) and rear window (2).
5. **Door Windowpanes:**
  - a. Remove window wiper motors from doors. See Window Wiper Motor Remove and Install. (Group 1810.)
  - b. Remove cover (7).
  - c. Remove cap screws (8). Disconnect and remove door handle (11).
  - d. Support and remove door windowpane (9).
6. Scrape broken glass off existing adhesive. DO NOT remove adhesive from window frame or cab.
7. Trim existing adhesive so it has a smooth surface.
8. Inspect and clean both replacement glass and window frame. Use water with a mild detergent and allow to dry.

**INSTALLATION**

Use a urethane auto glass adhesive sealant to hold windowpanes in place. Also, use the primers that are recommended for the adhesive formulation, which has been selected. DO NOT use any other type of adhesive other than a urethane. It is also recommended that an auto glass dealer install the windowpanes.

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

**IMPORTANT: Windowpanes must have an ultraviolet barrier around the edge of the glass since ultraviolet rays deteriorate the adhesive. Windowpanes ordered through John Deere Parts have the ultraviolet barrier. If the windowpane is purchased through a glass dealer, the dealer must put an ultraviolet barrier on the glass. DO NOT apply paint to the border of the glass.**

1. Apply primers according to adhesive manufacturer's recommendations.
2. Apply a 12.5 mm (1/2 in) bead of adhesive on top of the existing adhesive. Bead must be high enough to fill gap between frame and installed window.
3. Put the new windowpane into position. Use light hand pressure to force down windowpane around the edges until even with metal frame. DO NOT over press adhesive.
4. If windowpane is installed directly on cab, use tape to hold it in place while adhesive cures. Allow adhesive to cure for 24 hours before operating machine.
5. Install cab and door hardware as shown.
6. Install window wiper motors. See Window Wiper Motor Remove and Install. (Group 1810.)

**Sliding Windowpanes:**

**REMOVAL**

1. Park and prepare machine for service safely. See Park and Prepare for Service Safely. (Group 0001.)
2. Remove screws (22) and filler vinyl seals (20 and 21).
3. Remove seal (19) and stationary windowpane (18).
4. Remove screws (13) and latch (14).
5. Remove seal (16) and sliding windowpane (15).
6. Replace windowpanes as necessary.

**INSTALLATION**

Installation is reverse of removal procedure.

# Group 1830 Heating and Air Conditioning

## R134a Refrigerant Cautions and Proper Handling

### SERVICE EQUIPMENT AND TOOLS

Refrigerant Identifier

**⚠ CAUTION: DO NOT** allow liquid refrigerant to contact eyes or skin. Liquid refrigerant will freeze eyes or skin on contact. Wear goggles, gloves, and protective clothing.

If liquid refrigerant contacts eyes or skin, **DO NOT** rub the area. Splash large amounts of **COOL** water on affected area. Go to a physician or hospital immediately for treatment.

**DO NOT** allow refrigerant to contact open flames or very hot surfaces such as electric welding arc, electric heating element, and lighted smoking materials.

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

Keep refrigerant containers away from heat sources. Store refrigerant in a cool place.

**DO NOT** handle damp refrigerant container with bare hands. Skin may freeze to container. Wear gloves.

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

**IMPORTANT:** To meet government standards relating to the use of refrigerants, R134a is used in the air conditioning system. Because it does not contain chlorine, R134a is not detrimental to the ozone in the atmosphere. However, it is illegal to discharge any refrigerant into the atmosphere. It must be recovered using the appropriate recovery stations.

Use correct refrigerant recovery, recycling, and charging stations. Do not mix refrigerants, hoses, fittings, components, or refrigerant oils.

Use only John Deere approved R134a refrigerant products. Mixing of products not compatible will cause system damage and contaminate recovery, recycling, and charging station equipment. Care must be taken to identify and use equipment, refrigerant oil, and refrigerant designed only for R134a refrigerant systems. Refrigerant should be tested for type and purity before recovery, recycling, or charging of system. Refrigerant identifier should be used before any testing or repair to system is performed.

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Refrigerant Identifier

Used to safely and correctly identify type and check purity of refrigerant prior to recovery, recycling, and charging of air conditioning systems.

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## Expansion Valve Remove and Install

SPECIFICATIONS	
Expansion Valve Cap Screw (3) Torque	5.5 N·m 49 lb·in
Expansion Valve Cap Screw (8) Torque	4.5—5.1 N·m 40—45 lb·in

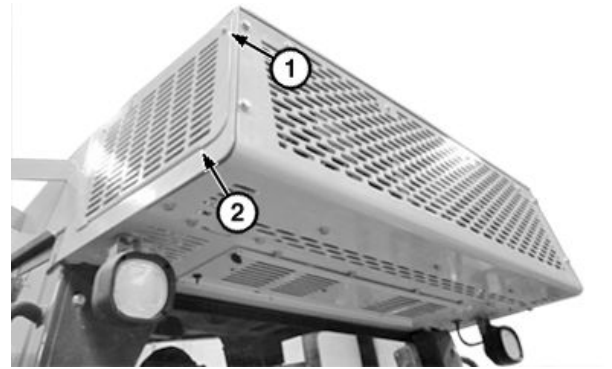
### MACHINE PREPARATION

1. Park and prepare machine for service safely. [See Park and Prepare for Service Safely.](#) (Group 0001.)
2. Turn battery disconnect switch to the OFF position. [See Battery Disconnect Switch.](#) (Operator's Manual.)
3. Recover air conditioning system. [See Recover R134a Refrigerant.](#) (Group 1830.)

### REMOVAL

**NOTE:** Any time air conditioning system is discharged, a new receiver-dryer must be installed.

1. Remove cover (2).



Expansion Valve Cover

1— Cap Screw (2 used)

2— Cover

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2. Remove adapter plate (4). Install identification tags and disconnect evaporator core lines (5). Close all openings using caps and plugs.
3. Remove cap screws (8) and disconnect expansion valve (7) from adapter plate (6) and evaporator core.

### INSTALLATION

Installation is reverse of removal procedure.

- Tighten expansion valve cap screws (3 and 8) to specification.

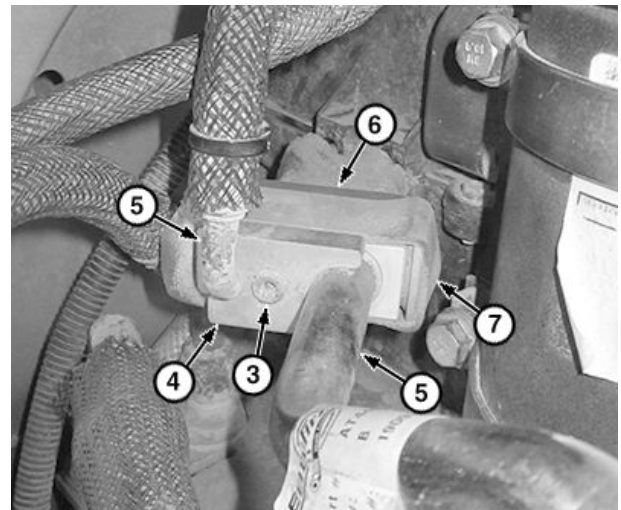
#### Specification

Expansion Valve Cap  
Screw (3)—Torque.....5.5 N·m  
49 lb·in

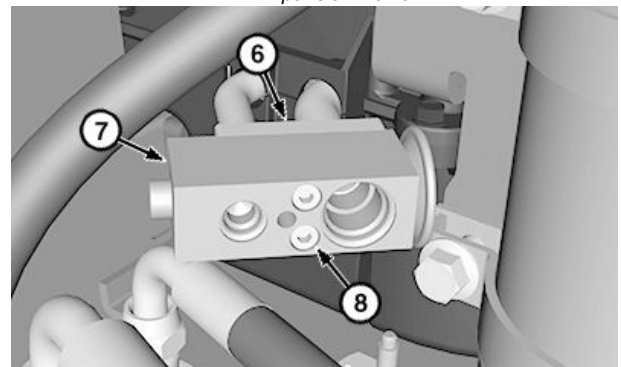
Expansion Valve Cap  
Screw (8)—Torque.....4.5—5.1 N·m  
40—45 lb·in

- Install new receiver-dryer. [See Receiver-Dryer Remove and Install.](#) (Group 1830.)
- Add oil. [See R134a Refrigerant Oil Information.](#) (Group 1830.)
- Evacuate and charge the air conditioning system. [See Evacuate R134a System](#) and [see Charge R134a System.](#) (Group 1830.)
- Verify operation of air conditioning system. [See Air Conditioner Check—If Equipped.](#) (Group 9005-10.)

- |                                  |                       |
|----------------------------------|-----------------------|
| 3— Cap Screw                     | 6— Adapter Plate      |
| 4— Adapter Plate                 | 7— Expansion Valve    |
| 5— Evaporator Core Line (2 used) | 8— Cap Screw (2 used) |



Expansion Valve



Expansion Valve

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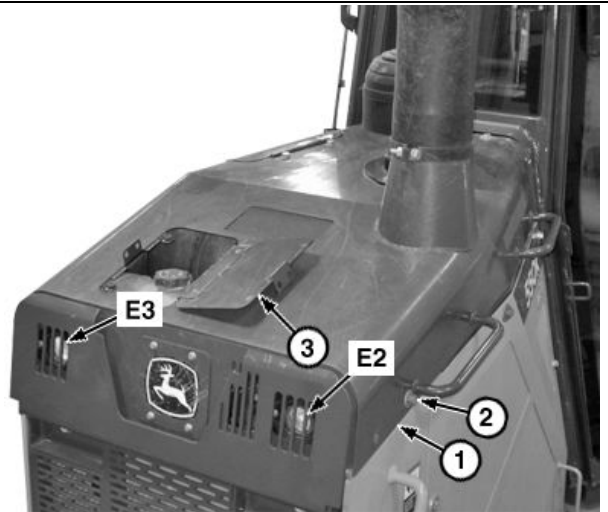
# Group 1910 Hood or Engine Enclosure

## Hood Remove and Install

SPECIFICATIONS	
Hood Weight (approximate)	39 kg 86 lb

### REMOVAL

1. Park and prepare machine for service. See Park and Prepare for Service Safely. (Group 0001.)
2. Remove engine side shields. See Engine Side Shields Remove and Install. (Group 1910.)
3. Open access door (3).
4. Install identification tags and disconnect electrical connectors from left front drive light (E2) and right front drive light (E3).
5. Remove cap screws (2) from hood (1).



*Hood*

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

6. Attach appropriate lifting device and remove hood.

Specification	
Hood—Weight (approximate).....	39 kg 86 lb

7. Clean and inspect parts. Repair or replace as necessary.

- |                       |                             |
|-----------------------|-----------------------------|
| 1— Hood               | E2— Left Front Drive Light  |
| 2— Cap Screw (8 used) | E3— Right Front Drive Light |
| 3— Access Door        |                             |

### INSTALLATION

Installation is reverse of removal procedure.

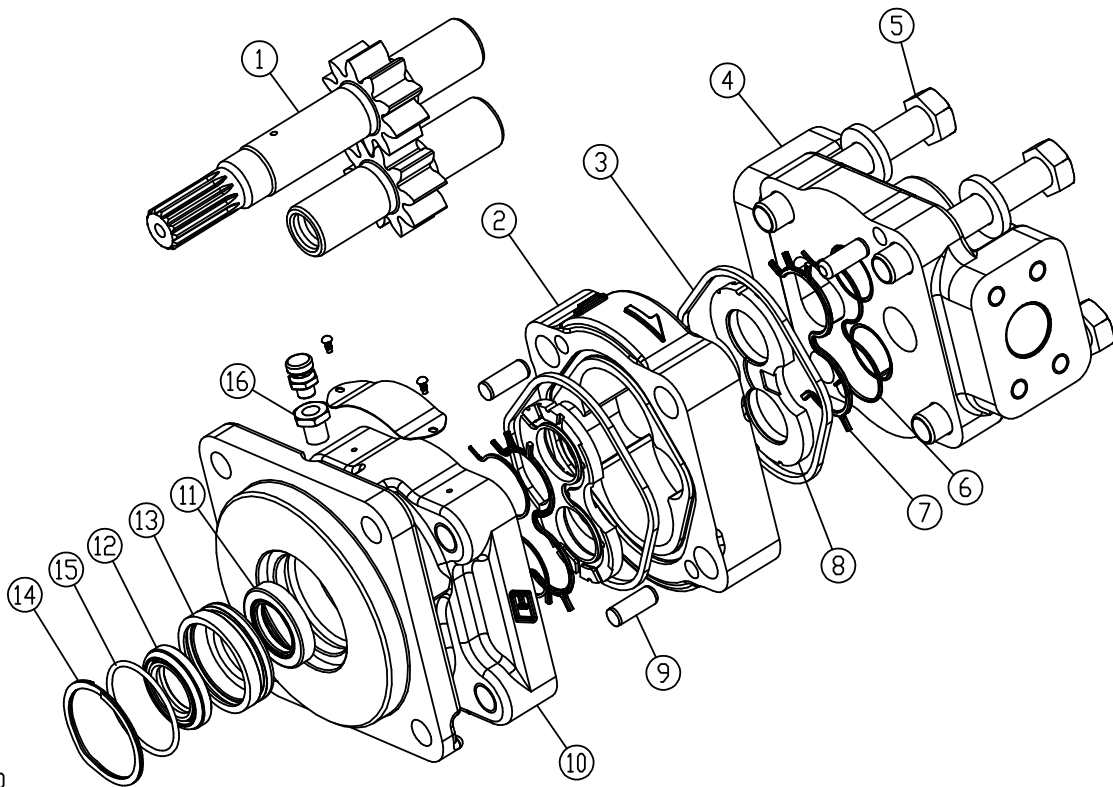
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## Section 21 Main Hydraulic System

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T156550

Hydraulic Pump Assembly

- |                         |                          |                           |                   |
|-------------------------|--------------------------|---------------------------|-------------------|
| 1— Matched Gear Set     | 5— Cap Screw (4 used)    | 9— Alignment Pin (4 used) | 14— O-ring        |
| 2— Center Gear Housing  | 6— Backing Seal (2 used) | 10— Lower Gear Housing    | 15— Retainer Ring |
| 3— Gasket Seal (2 used) | 7— Channel Seal (2 used) | 11— Seal                  |                   |
| 4— Upper Gear Housing   | 8— Thrust Plate (2 used) | 12— Seal                  |                   |
|                         |                          | 13— Seal Retainer         |                   |

6. Put a mark across housings (2, 4 and 10) to aid in assembly.
7. Remove cap screws and washers. Separate housings.
8. Remove matched gear set (1) and thrust plates (8) with seals (6 and 7).

*NOTE: Pump parts (1, 2, 4, 8 and 10) are not serviceable. If any of these parts are worn or damaged, replace pump.*

9. Inspect parts for wear or damage. Replace parts as necessary.
10. Apply clean hydraulic oil on all internal parts.
11. Install matched gear set (1) in center gear housing (2).
12. Install channel seals (7) in thrust plates (8). Install backing seals (6) into step of channel seals.

13. Install thrust plate (8) and seal assemblies on the matched gear set (1) with the seals facing away from the gear and sealing toward the pressure side of the pump as shown above.

14. Assemble center gear housing (2) and lower gear housing (10).
15. Install upper gear housing and cap screws. Tighten cap screws to specifications.

**Hydraulic Pump—Specification**

Hydraulic Pump Housing	
Cap Screws (Without	
Winch Option)—Torque.....	271 N·m
	200 lb-ft

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**Blade Control Lever Linkage Remove and Install**

SPECIFICATIONS	
<b>Blade Control Lever Linkage</b>	
Blade Control Linkage Mount Cap Screw Torque	15 N·m 11 lb.-ft.
3/8 in. Lock Nut Torque	35 N·m 26 lb.-ft.
5/16 in. Lock Nut Torque	19 N·m 14 lb.-ft.

*Continued on next page*

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**NOTE:** The number of hydraulic lines (5) on the hydraulic control valve may vary depending on machine options. The 650K 4-spool hydraulic control valve (7) is shown.

8. Disconnect hydraulic lines (5) and hydraulic pump pressure sensor (B42).

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

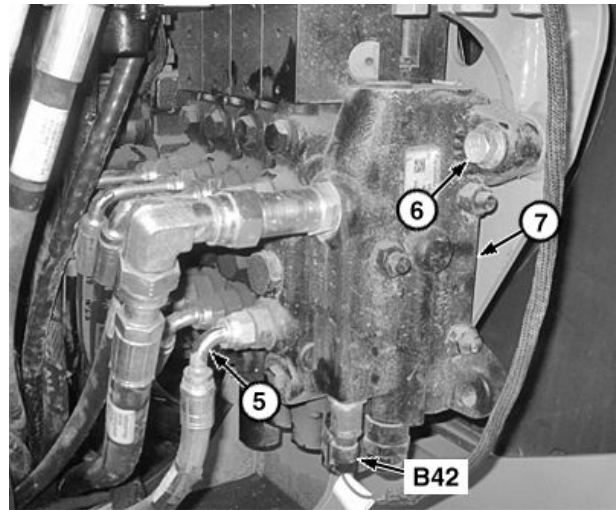
9. Use appropriate lifting device to support hydraulic control valve (7).

**Specification**

3-Spool Hydraulic Control Valve—Weight (approximate).....	31 kg 68 lb
4-Spool Hydraulic Control Valve—Weight (approximate).....	37 kg 82 lb

10. Remove cap screws (6) and hydraulic control valve.
11. Disconnect electrical connectors from solenoids (Y9 and Y21—Y28). If equipped with SmartGrade™, see Control Valve (SmartGrade™ and IGC Controls) Harness (W14) Component Location. (Group 9015-10.)
12. Clean and inspect parts. Repair and replace as necessary. See Hydraulic Control Valve Disassemble and Assemble—IGC. (Group 3260.)

*SmartGrade is a trademark of Deere & Company*



Hydraulic Control Valve (650K shown)

- 5— Hydraulic Line (13 used)
- 6— Cap Screw (3 used)
- 7— Hydraulic Control Valve
- B42— Hydraulic Pump Pressure Sensor

**INSTALLATION**

Installation is reverse of removal procedure.

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Hydraulic System

**IMPORTANT: Tightening work ports relief using jam nut on end of relief will cause damage to work ports relief. Do not tighten work ports relief using jam nut on end of relief.**

9. Assemble work ports reliefs (14) into housing (1).  
Tighten reliefs to specification.

**Hydraulic Control Valve—Specification**

Angle Valve Circuit	
Relief—Torque.....	41—49 N·m 30—36 lb.-ft.

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**Section 42**  
**Ground Conditioning Tool**

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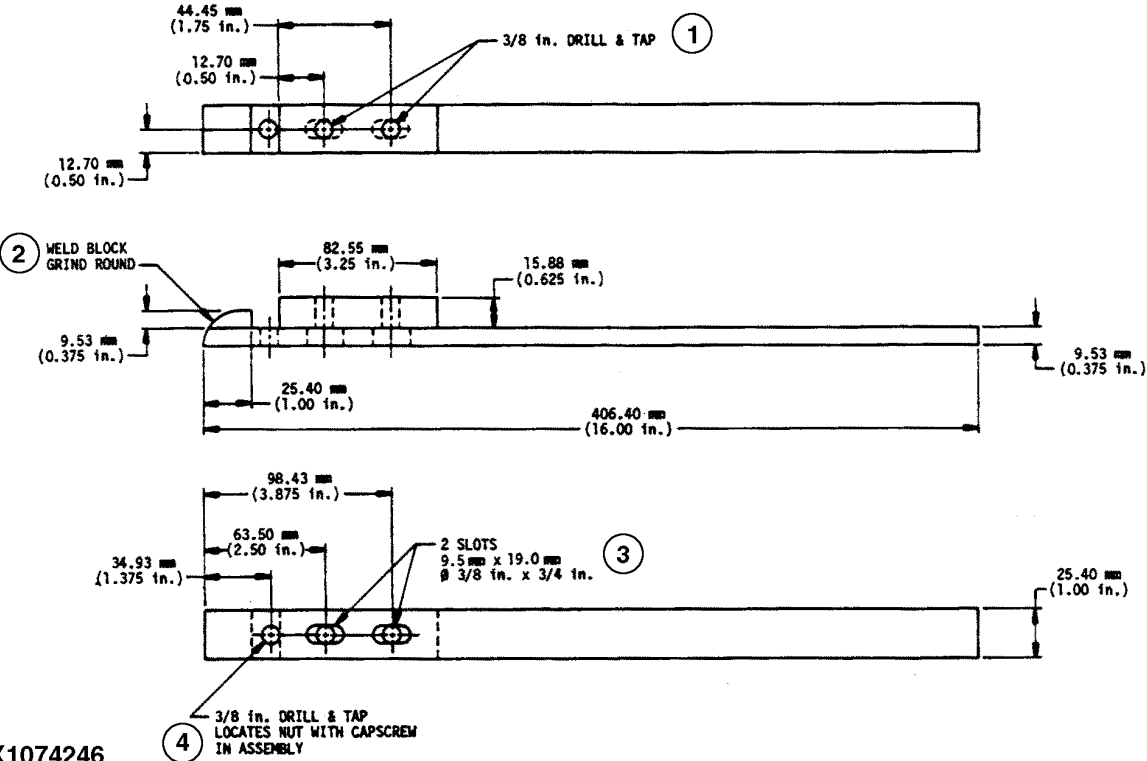
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**Group 4260—Hydraulic System**

Ripper Cylinder Remove and  
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DF1041 Track Nut Removal Tool



TX1074246

DF1041 Track Nut Removal Tool

- 1— 3/8 in Drill and Tap
- 2— Weld Block; Grind Round
- 3— 2 Slots 9.5 mm x 19.0 mm (3/8 in x 3.4 in)
- 4— 3/8 in Drill and Tap; Locates Nut with Cap Screw in Assembly

Use DF1041 Track Nut Removal Tool to remove and install track shoe nuts.

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## ST4920 Track Recoil Spring Disassembly and Assembly Tool

*NOTE: It is recommended that DFT1087 Track Recoil Spring Disassembly and Assembly Guard Tool be used with track recoil spring disassembly and assembly tool.*

*Dimensions given are metric.*

Tool is the same as used on other machines except the holder (C). For each track adjuster use the holder with the correct size hole for the nut on that track adjuster.

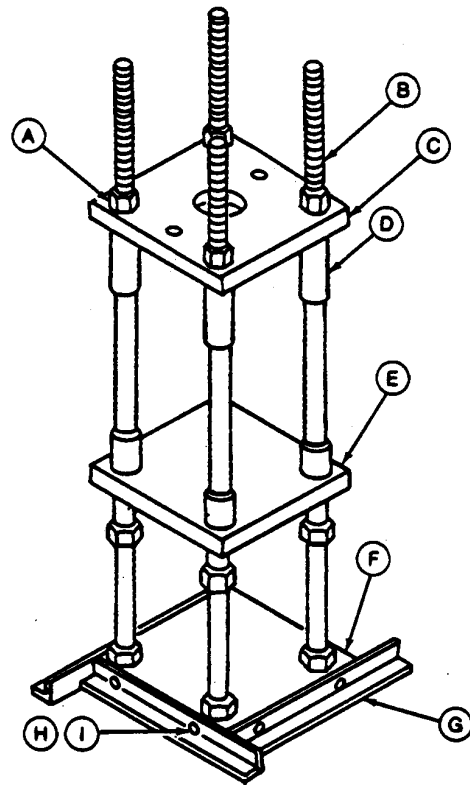
Track Recoil Spring Disassembly and Assembly Tool (compression tool) is used with hydraulic jack to compress recoil spring in track adjuster repair.

Material required:

- 1020 HR Steel for Holder (C), Supporting Plate (E), Base Plate (F), and Base (G).
- "D" Grade (SAE Grade 5) for Eyebolts (D), Nuts (A), and Cap Screws (H).
- "F" Grade (SAE Grade 8) for Studs (B).

Print Numbers:

- A—ST4050 Nut
- B—ST4045 Bolt
- C—ST4035 Holder (Plate)  
- ST4036 Holder (Plate)  
- ST4037 Holder (Plate)
- D—ST4047 Eyebolt
- E—ST4040 Supporting Base
- F—ST4042 Base Plate
- G—ST4041 Base
- H—ST4046 Cap Screw
- I—ST4049 Lock Washer



A—Nut (12 used)  
B—Stud (4 used)  
C—Holder  
D—Eyebolt (2 used)  
E—Supporting Plate

F—Base Plate  
G—Base (4 used)  
H—Cap Screw (8 used)  
I—Lock Washer (8 used)

Continued on next page

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