

240DLC and 270DLC Excavator Repair

TECHNICAL MANUAL 240DLC and 270DLC Excavator Repair

TM2323 27APR06 (ENGLISH)

For complete service information also see:

240DLC and 270DLC Excavator Operation and Tests	TM2320
POWERTECH™ 4.5L/6.8L POWERTECH Plus™ 6.8L Diesel Engines—Base Engine	CTM104
POWERTECH Plus™ 6.8L Diesel Engines—Level 14 Electronic Fuel System with Denso HPCR	CTM320
Alternators and Starter Motors.....	CTM77
Undercarriage Appraisal Manual	SP326

**Worldwide Construction
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JOHN DEERE

November 5, 2007

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David Bussan
Manager, Service Information
November 5, 2007

Introduction

Foreword

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

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

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

DX,TMIFC -19-29SEP98-1/1

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THANK YOU!

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A John Deere ILLUSTRATION® Manual

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Section 00

General Information

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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.



▲ DANGER

▲ WARNING

▲ CAUTION

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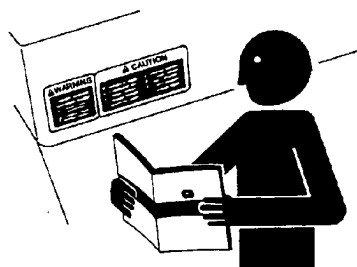
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Follow Safety Instructions

Read the safety messages in this manual and on the machine. Follow these warnings and instructions carefully. Review them frequently.

Be sure all operators of this machine understand every safety message. Replace operator's manual and safety labels immediately if missing or damaged.



T133556 -UN-24AUG00

TX03679,00016F9 -19-28FEB06-1/1

Operate Only If Qualified

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

Familiarize yourself with the job site and your 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 your work situation and your work site.

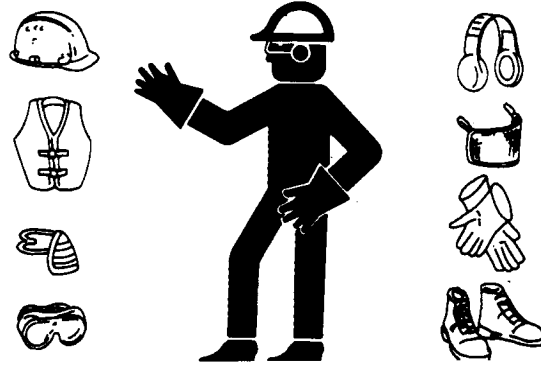
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Wear Protective Equipment

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

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

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.



TS206 -UN-23AUG88

TX03679,00016D0 -19-28FEB06-1/1

Avoid Unauthorized Machine Modifications

John Deere recommends using only genuine John Deere replacement parts to ensure machine performance. Never substitute genuine John Deere parts with alternate parts not intended for the application as these can create hazardous situations or hazardous performance. Non-John Deere Parts, or any damage or failures resulting from their use are not covered by any John Deere warranty.

Modifications of this machine, or addition of unapproved products or attachments, may affect

machine stability or reliability, and may create a hazard for the operator or others near the machine. The installer of any modification which may affect the electronic controls of this machine is responsible for establishing that the modification does not adversely affect the machine or its performance.

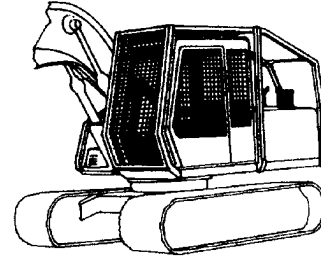
Always contact an authorized dealer before making machine modifications that change the intended use, weight or balance of the machine, or that alter machine controls, performance or reliability.

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Add Cab Guarding For Special Uses

Special work situations or machine attachments may create an environment with falling or flying objects. Working near an overhead bank, doing demolition work, using a hydraulic hammer, or working in a wooded area, for example, may require added guarding to protect the operator.

FOPS (falling object protective structures) and special screens or guarding should be installed when falling or flying objects may enter or damage the machine. Contact your authorized dealer for information on devices intended to provide protection in special work situations.



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Inspect Machine

Inspect machine carefully each day by walking around it before starting.

Keep all guards and shields in good condition and properly installed. Fix damage and replace worn or broken parts immediately. Pay special attention to hydraulic hoses and electrical wiring.



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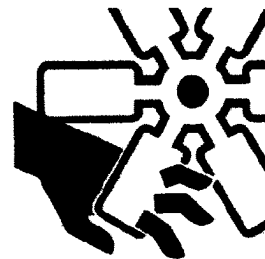
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Stay Clear of Moving Parts

Entanglements in moving parts can cause serious injury.

Stop engine before examining, adjusting or maintaining any part of machine with moving parts.

Keep guards and shields in place. Replace any guard or shield that has been removed for access as soon as service or repair is complete.



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Avoid High-Pressure Fluids

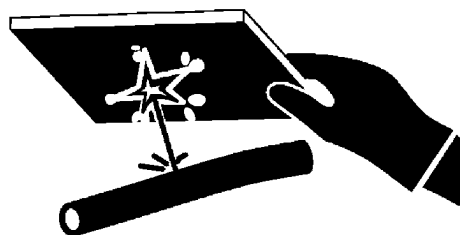
This machine uses a high-pressure hydraulic system. Escaping fluid under pressure can penetrate the skin causing serious injury.

Never search for leaks with your hands. Protect hands. Use a piece of cardboard to find location of escaping fluid. Stop engine and relieve pressure before disconnecting lines or working on hydraulic system.

If hydraulic fluid penetrates your skin, see a doctor immediately. Injected fluid must be removed surgically within hours or gangrene may result. Contact a knowledgeable medical source or the Deere & Company Medical Department in Moline, Illinois, U.S.A.



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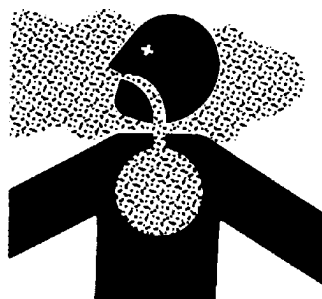
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Beware of Exhaust Fumes

Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.

If you must operate in a building, provide adequate ventilation. Use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring outside air into the area.



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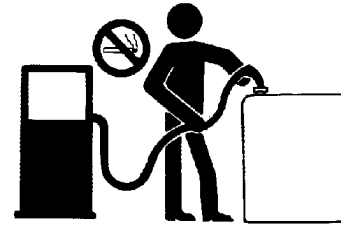
Prevent Fires

Handle Fuel Safely: Store flammable fluids away from fire hazards. Never refuel machine while smoking or when near sparks or flame.

Clean Machine Regularly: Keep trash, debris, grease and oil from accumulating in engine compartment, around fuel lines, hydraulic lines and electrical wiring. Never store oily rags or flammable materials inside a machine compartment.

Maintain Hoses and Wiring: Replace hydraulic hoses immediately if they begin to leak, and clean up any oil spills. Examine electrical wiring and connectors frequently for damage.

Keep A Fire Extinguisher Available: Always keep a multi-purpose fire extinguisher on or near the machine. Know how to use extinguisher properly.



T133552 -UN-14SEP00

T133553 -UN-07SEP00

T133554 -UN-07SEP00

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Prevent Battery Explosions

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

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

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



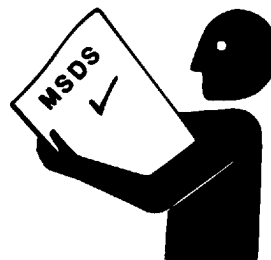
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Handle Chemical Products Safely

Exposure to hazardous chemicals can cause serious injury. Under certain conditions, lubricants, coolants, paints and adhesives used with this machine may be hazardous.

If uncertain about safe handling or use of these chemical products, contact your authorized dealer for a Material Safety Data Sheet (MSDS) or go to internet website <http://www.jdmsds.com>. The MSDS describes physical and health hazards, safe use procedures, and emergency response techniques for chemical substances. Follow MSDS recommendations to handle chemical products safely.



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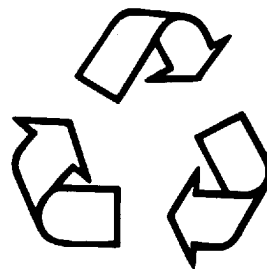
Dispose of Waste Properly

Improper disposal of waste can threaten the environment. Fuel, oils, coolants, filters and batteries used with this machine may be harmful if not disposed of properly.

Never pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants can damage the atmosphere. Government regulations may require using a certified service center to recover and recycle used refrigerants.

If uncertain about the safe disposal of waste, contact your local environmental or recycling center or your authorized dealer for more information.



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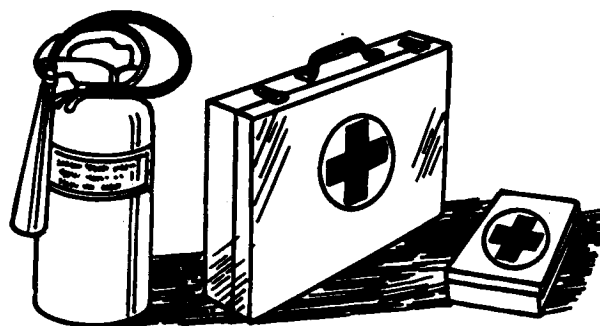
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Prepare for Emergencies

Be prepared if an emergency occurs or a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



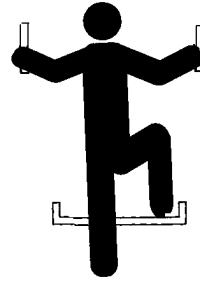
TS291 -UN-23AUG88

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Use Steps and Handholds Correctly

Prevent falls by facing the machine when you get on and off. Maintain 3-point contact with steps and handrails. Never use machine controls as handholds.

Use extra care when mud, snow, or moisture present slippery conditions. Keep steps clean and free of grease or oil. Never jump when exiting machine. Never mount or dismount a moving machine.



T133468 -UN-30AUG00

TX03679,00016F2 -19-18APR06-1/1

Start Only From Operator's Seat

Avoid unexpected machine movement. Before starting engine, sit in operator's seat. Ensure park lock lever is in "lock" position.

Never attempt to start engine from the ground or tracks. Do not attempt to start engine by shorting across the starter solenoid terminals.



T133715 -UN-07SEP00

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Use and Maintain Seat Belt

Use seat belt when operating machine. Remember to fasten seat belt when loading and unloading from trucks and during other uses.

Examine seat belt frequently. Be sure webbing is not cut or torn. Replace seat belt immediately if any part is damaged or does not function properly.

The complete seat belt assembly should be replaced every three years, regardless of appearance.

**USE
SEAT
BELT**

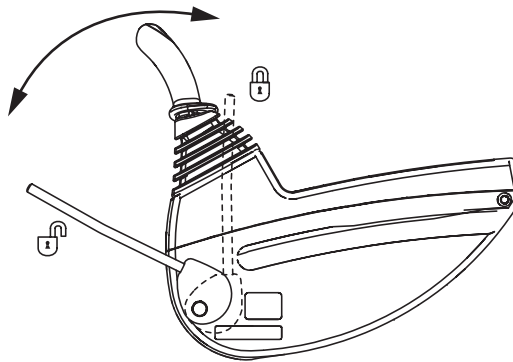
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Prevent Unintended Machine Movement

Be careful not to accidentally actuate control levers when co-workers are present. Pull pilot shutoff lever to locked position during work interruptions. Pull pilot shutoff lever to locked position and stop engine before allowing anyone to approach machine.

Always lower work equipment to the ground and pull pilot shutoff lever to locked position before standing up or leaving the operator's seat. Stop engine before exiting.



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Avoid Work Site Hazards

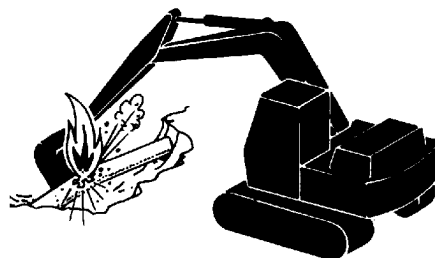
Avoid contact with gas lines, buried cables and water lines. Call utility line location services to identify all underground utilities before you dig.

Prepare work site properly. Avoid operating near structures or objects that could fall onto the machine. Clear away debris that could move unexpectedly if run over.

Avoid boom or arm contact with overhead obstacles or overhead electrical lines. Never move any part of machine or load closer than 3 m (10 ft) plus twice the line insulator length to overhead wires.

Keep bystanders clear at all times. Use barricades or a signal person to keep vehicles and pedestrians away. Use a signal person if moving machine in congested areas or where visibility is restricted. Always keep signal person in view. Coordinate hand signals before starting machine.

Operate only on solid footing with strength sufficient to support machine. When working close to an excavation, position propel motors away from the hole.



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T133650 -UN-27SEP00



T133549 -UN-24AUG00

TX03679,0001748 -19-28FEB06-1/1

Keep Riders Off Machine

Only allow operator on machine.

Riders are subject to injury. They may fall from machine, be caught between machine parts, or be struck by foreign objects.

Riders may obstruct operator's view or impair his ability to operate machine safely.



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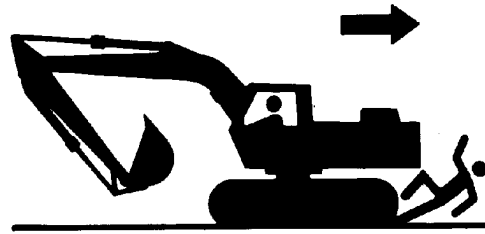
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Avoid Backover Accidents

Before moving machine, be sure all persons are clear of both travel and swing paths. 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 travel 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.



T133548 -JUN-24AUG00

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Avoid Machine Tip Over

Use seat belt at all times.

Do not jump if the machine tips. You will be unlikely to jump clear and the machine may crush you.

Load and unload from trucks or trailers carefully. Be sure truck is wide enough and on a firm level surface. Use loading ramps and attach them properly to truck bed. Avoid trucks with steel beds because tracks slip more easily on steel.

Be careful on slopes. Use extra care on soft, rocky or frozen ground. Machine may slip sideways in these conditions. When traveling up or down slopes, keep the bucket on uphill side and just above ground level.

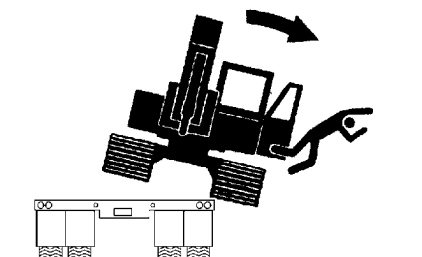
Be careful with heavy loads. Using oversize buckets or lifting heavy objects reduces machine stability. Extending a heavy load or swinging it over side of undercarriage may cause machine to tip.

Ensure solid footing. Use extra care when operating near banks or excavations that may cave-in and cause machine to tip or fall.

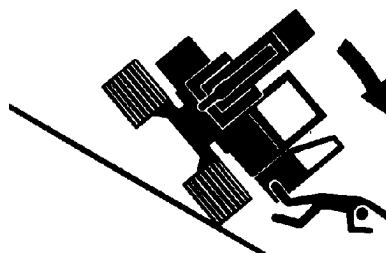


USE SEAT BELT

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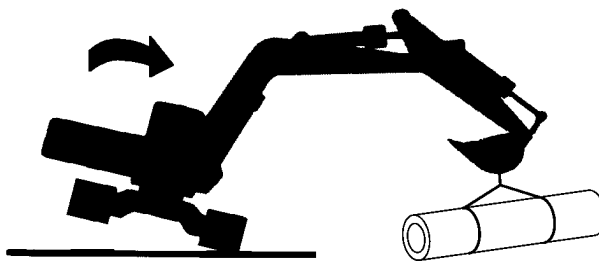
Use Special Care When Lifting Objects

Never use this machine to lift people.

Never lift a load above another person. Keep bystanders clear of all areas where a load might fall if it breaks free. Do not leave the seat when there is a raised load.

Do not exceed lift capacity limits posted on machine and in this manual. Extending heavy loads too far or swinging over undercarriage side may cause machine to tip over.

Use proper rigging to attach and stabilize loads. Be sure slings or chains have adequate capacity and are in good condition. Use tether lines to guide loads and prearranged hand signals to communicate with co-workers.



T133839 -UN-27SEP00

TX03679,00016E1 -19-23MAR06-1/1

Add and Operate Attachments Safely

Always verify compatibility of attachments by contacting your authorized dealer. Adding unapproved attachments may affect machine stability or reliability, and may create a hazard for others near the machine.

Ensure that a qualified person is involved in attachment installation. Add guards to machine if operator protection is required or recommended. Verify that all connections are secure and attachment responds properly to controls.

Carefully read attachment manual and follow all instructions and warnings. In an area free of bystanders and obstructions, carefully operate attachment to learn its characteristics and range of motion.

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Park and Prepare for Service Safely

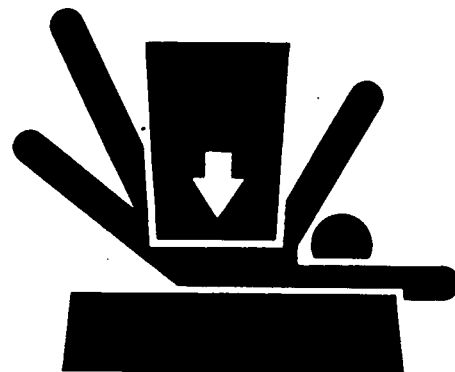
Warn others of service work. Always park and prepare your machine for service or repair properly.

- Park machine on a level surface and lower equipment and attachments to the ground.
- Place pilot shutoff lever in "lock" position. Stop engine and remove key.
- Attach a "Do Not Operate" tag in an obvious place in the operator's station.

Securely support machine or attachment before working under it.

- Do not support machine with boom, arm, or other hydraulically actuated attachments.
- Do not support machine with cinder blocks or wooden pieces that may crumble or crush.
- Do not support machine with a single jack or other devices that may slip out of place.

Understand service procedures before beginning repairs. Keep service area clean and dry. Use two people whenever the engine must be running for service work.



T133332 -19-14DEC01

TS229 -JUN-23AUG88

TX03679,00016E9 -19-18APR06-1/1

Service Cooling System Safely

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.



TS281 -UN-23AUG88

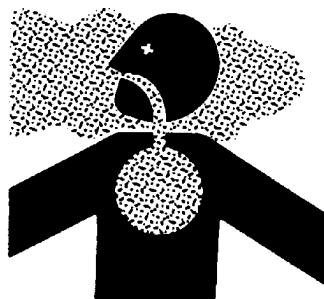
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Remove Paint Before Welding or Heating

Hazardous fumes can be generated when paint is heated by welding or using a torch. Dust from sanding or grinding paint can also be hazardous.

Remove paint to at least 76 mm (3 in.) from area to be heated. Wear an approved respirator when sanding or grinding paint. If a solvent or paint stripper is used, wash area with soap and water. Remove solvent or paint stripper containers from work area and allow fumes to disperse at least 15 minutes before welding or heating.

Work outside or in a well-ventilated area. Dispose of waste, paint and solvents properly.



T133546 -UN-24AUG00

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Make Welding Repairs Safely

NOTE: Disable electrical power before welding. Turn off main battery switch or disconnect positive battery cable. Separate harness connectors to engine and vehicle microprocessors.

Avoid welding or heating near pressurized fluid lines. Flammable spray may result and cause severe burns if pressurized lines fail as a result of heating. Do not let heat go beyond work area to nearby pressurized lines.

Remove paint properly. Do not inhale paint dust or fumes. Use a qualified welding technician for structural repairs. Make sure there is good ventilation. Wear eye protection and protective equipment when welding.



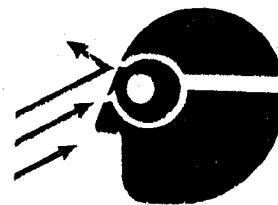
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TX03679,00016D5 -19-28FEB06-1/1

Drive Metal Pins Safely

Always wear protective goggles or safety glasses and other protective equipment before striking hardened parts. Hammering hardened metal parts such as pins and bucket teeth may dislodge chips at high velocity.

Use a soft hammer or a brass bar between hammer and object to prevent chipping.



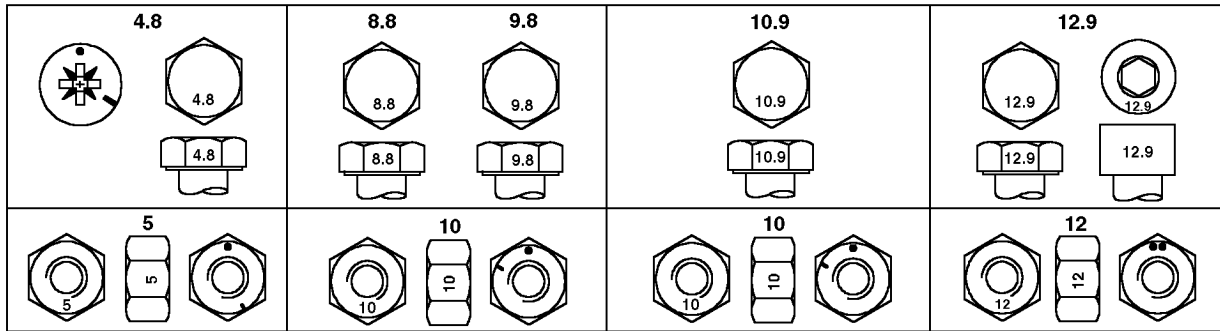
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TX03679,0001745 -19-28FEB06-1/1

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Metric Bolt and Cap Screw Torque Values



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

METRIC BOLT AND CAP SCREW TORQUE VALUES—Tolerance is $\pm 10\%$ unless otherwise specified								
	Class 4.8		Class 8.8 or 9.8		Class 10.9		Class 12.9	
Thread Size	Lubricated ^a N•m (lb-ft)	Dry ^b N•m (lb-ft)	Lubricated ^a N•m (lb-ft)	Dry ^b N•m (lb-ft)	Lubricated ^a N•m (lb-ft)	Dry ^b N•m (lb-ft)	Lubricated ^a N•m (lb-ft)	Dry ^b N•m (lb-ft)
M6	4.7 (3.5)	6 (4.4)	9 (6.6)	11.5 (8.5)	13 (9.5)	16.5 (12.2)	15.5 (11.5)	19.5 (14.5)
M8	11.5 (8.5)	14.5 (10.7)	22 (16)	28 (20.5)	32 (23.5)	40 (29.5)	37 (27.5)	47 (35)
M10	23 (17)	29 (21)	43 (32)	55 (40)	63 (46)	80 (59)	75 (55)	95 (70)
M12	40 (29.5)	50 (37)	75 (55)	95 (70)	110 (80)	140 (105)	130 (95)	165 (120)
M14	63 (46)	80 (59)	120 (88)	150 (110)	175 (130)	220 (165)	205 (150)	260 (190)
M16	100 (74)	125 (92)	190 (140)	240 (175)	275 (200)	350 (255)	320 (235)	400 (300)
M18	135 (100)	170 (125)	265 (195)	330 (245)	375 (275)	475 (350)	440 (325)	560 (410)
M20	190 (140)	245 (180)	375 (275)	475 (350)	530 (390)	675 (500)	625 (460)	790 (580)
M22	265 (195)	330 (245)	510 (375)	650 (480)	725 (535)	920 (680)	850 (625)	1080 (800)
M24	330 (245)	425 (315)	650 (480)	820 (600)	920 (680)	1150 (850)	1080 (800)	1350 (1000)
M27	490 (360)	625 (460)	950 (700)	1200 (885)	1350 (1000)	1700 (1250)	1580 (1160)	2000 (1475)
M30	660 (490)	850 (625)	1290 (950)	1630 (1200)	1850 (1350)	2300 (1700)	2140 (1580)	2700 (2000)
M33	900 (665)	1150 (850)	1750 (1300)	2200 (1625)	2500 (1850)	3150 (2325)	2900 (2150)	3700 (2730)
M36	1150 (850)	1450 (1075)	2250 (1650)	2850 (2100)	3200 (2350)	4050 (3000)	3750 (2770)	4750 (3500)

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

^b "Dry" means plain or zinc plated without any lubrication.



CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. Tool may slip and cause injury.

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 property class.

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

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

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

Additional Metric Cap Screw Torque Values



CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

Check tightness of cap screws periodically. Torque values listed are for general use only. Do not use these values if a different torque value or tightening procedure is listed for a specific application.

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 you properly start thread engagement. This will prevent them from failing when tightening.

Tighten cap screws having lock nuts to approximately 50 percent of amount shown in chart.

T6873AA



T6873AA -UN-18OCT88

T6873AB



T6873AB -UN-18OCT88

T6873AC



T6873AC -UN-18OCT88

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04T,90,M170 -19-29SEP99-1/2

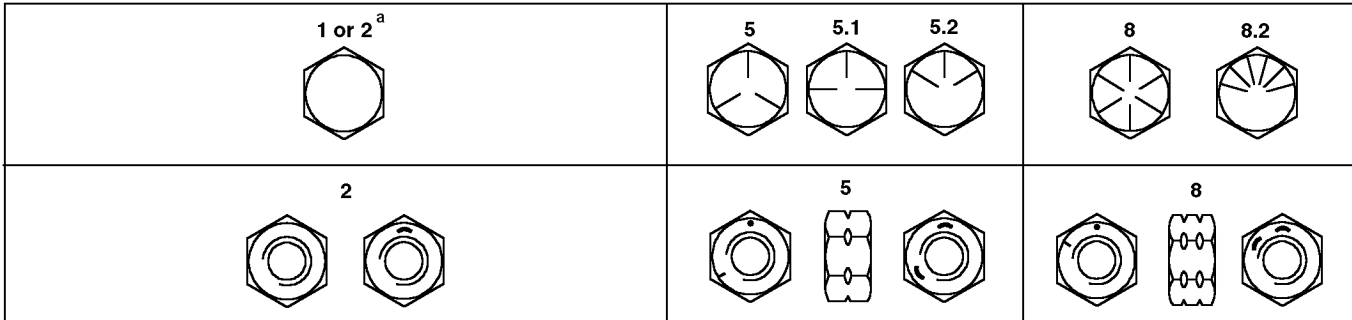
Torque Values

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0003
3

METRIC CAP SCREW TORQUE VALUES ^a						
Nominal Dia	T-Bolt		H-Bolt		M-Bolt	
	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft
8	29	21	20	15	10	7
10	63	46	45	33	20	15
12	108	80	88	65	34	25
14	176	130	137	101	54	40
16	265	195	206	152	78	58
18	392	289	294	217	118	87
20	539	398	392	289	167	125
22	735	542	539	398	216	159
24	931	687	686	506	274	202
27	1372	1012	1029	759	392	289
30	1911	1410	1421	1049	539	398
33	2548	1890	1911	1410	735	542
36	3136	2314	2401	1772	931	687
^a Torque tolerance is ±10%.						

04T,90,M170 -19-29SEP99-2/2

Unified Inch Bolt and Cap Screw Torque Values



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

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

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

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

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

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

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

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

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

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

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

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



T6234AC -JUN-18OCT88

STRAIGHT FITTING OR SPECIAL NUT TORQUE CHART

Thread Size	N•m	lb-ft
3/8 - 24 UNF	8	6
7/16 - 20 UNF	12	9
1/2 - 20 UNF	16	12
9/16 - 18 UNF	24	18
3/4 - 16 UNF	46	34
7/8 - 14 UNF	62	46
1-1/16 - 12 UN	102	75
1-3/16 - 12 UN	122	90
1-5/16 - 12 UN	142	105
1-5/8 - 12	190	140
1-7/8 - 12 UN	217	160

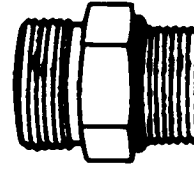
NOTE: Torque tolerance is $\pm 10\%$.

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

Service Recommendations for O-Ring Boss Fittings

Straight Fitting

1. Inspect O-ring boss seat for dirt or defects.
2. Lubricate O-ring with petroleum jelly. Place electrical tape over threads to protect O-ring. Slide O-ring over tape and into O-ring groove of fitting. Remove tape.
3. Tighten fitting to torque value shown on chart.



T6243AE -UN-18OCT88

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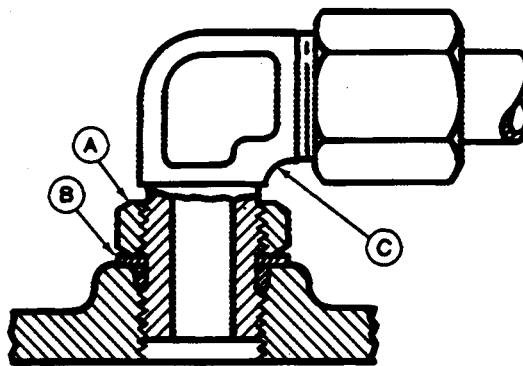
04T,90,K66 -19-29SEP99-1/2

Angle Fitting

1. Back-off lock nut (A) and back-up washer (B) completely to head-end (C) of fitting.
2. Turn fitting into threaded boss until back-up washer contacts face of boss.
3. Turn fitting head-end counterclockwise to proper index (maximum of one turn).

NOTE: Do not allow hoses to twist when tightening fittings.

4. Hold fitting head-end with a wrench and tighten locknut and back-up washer to proper torque value.



T6520AB -UN-18OCT88

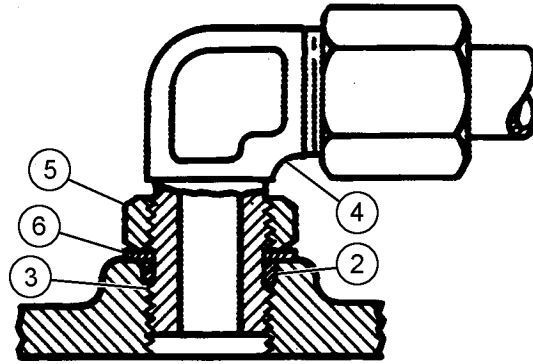
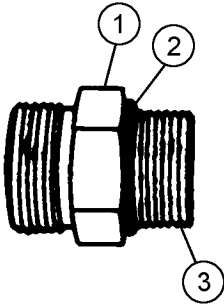
STRAIGHT FITTING OR SPECIAL NUT TORQUE CHART

Thread Size	N•m	lb-ft
3/8-24 UNF	8	6
7/16-20 UNF	12	9
1/2-20 UNF	16	12
9/16-18 UNF	24	18
3/4-16 UNF	46	34
7/8-14 UNF	62	46
1-1/16-12 UN	102	75
1-3/16-12 UN	122	90
1-5/16-12 UN	142	105
1-5/8-12 UN	190	140
1-7/8-12 UN	217	160

NOTE: Torque tolerance is $\pm 10\%$.

04T,90,K66 -19-29SEP99-2/2

00 0003 8 O-Ring Boss Fittings In Aluminum Housing Service Recommendations—Excavators



T196315

O-Ring Boss Straight and Adjustable Fittings

1—Straight Fitting
2—O-Ring

3—Stud End
4—Adjustable Fitting

5—Hex Nut

6—Backup Washer

**O-RING BOSS STRAIGHT OR ADJUSTABLE FITTING STUD
END NUT WITH METRIC THREAD IN ALUMINUM HOUSING
TORQUE VALUES—Tolerance is $\pm 10\%$ unless otherwise
specified**

Thread Size mm	Hex Nut Size mm	N•m (lb-ft)
M12 x 1.5	17	39 (29)
M14 x 1.5	19	39 (29)
M16 x 1.5	22	55 (41)
M22 x 1.5	27	75 (55)
M27 x 2	32	110 (81)
M30 x 2	36	141 (104)
M33 x 2	41	165 (122)
M38 x 2	46	165 (122)
M42 x 2	50	275 (203)

Continued on next page

OUT3035,0000353 -19-14JAN04-1/2

T196315 -UN-17NOV03

**O-RING BOSS STRAIGHT OR ADJUSTABLE FITTING STUD
END NUT WITH INCH THREAD IN ALUMINUM HOUSING
TORQUE VALUES—Tolerance is $\pm 10\%$ unless otherwise
specified**

Thread Size in.	N•m (lb-ft)
1/8	—
1/4	28 (20)
3/8	39 (29)
1/2	75 (55)
3/4	126 (93)
1	165 (122)
1-1/8	—
1-1/4	259 (191)
1-3/8	—
1-1/2	330 (243)
1-3/4	—
2	—

**O-RING BOSS PLUG STUD END WITH INCH THREAD IN
ALUMINUM HOUSING TORQUE VALUES—Tolerance is $\pm 10\%$
unless otherwise specified**

Thread Size in.	N•m (lb-ft)
1/8	7.8 (5.80)
1/4	11.8 (8.70)
3/8	23 (17)
1/2	39 (29)
3/4	55 (41)
1	86 (64)
1-1/4	126 (93)
1-1/2	157 (116)
2	204 (150)

1. Inspect fitting and O-ring boss sealing surfaces and the O-ring. They must be free of dirt, scratches, nicks, or burrs. O-ring must be free of dirt, cuts, cracks, swelling or flatten condition.
2. Back the stud end hex nut (5) off as far as possible. Push backup washer (6) towards the nut to fully expose the turn down section of stud end. Washer must fit turned down section and not be too loose
3. Wrap electrical tape over threads to protect O-ring. Slide O-ring over the tape into turned down section. Remove tape. Apply hydraulic oil to the threads of stud end, turned down section, and O-ring.
4. Turn fitting into the boss by hand until face of nut or backup washer squeezes O-ring into the seat and contacts face of boss. Loosen an adjustable fitting no more than one turn for alignment.
5. Tighten straight fitting or hex nut to the torque value given. Hold body of adjustable fitting using a second wrench when tightening hex nut.

OUT3035,0000353 -19-14JAN04-2/2

Service Recommendations For Flared Connections—Straight or Tapered Threads

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

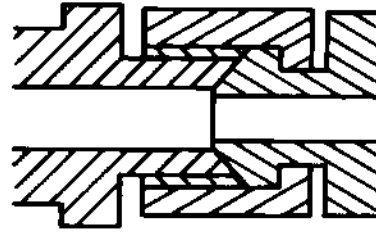
TORQUE CHART ^a

Thread Size	Straight Thread ^b		Tapered Thread	
	N•m	lb-ft	N•m	lb-ft
1/8	15	11		
1/4	20	15	45	33
3/8	29	21	69	51
1/2	49	36	93	69
3/4	69	51	176	130
1	157	116	343	253
1-1/2	196	145	539	398
2	255	188	588	434

^aTorque tolerance is $\pm 10\%$.

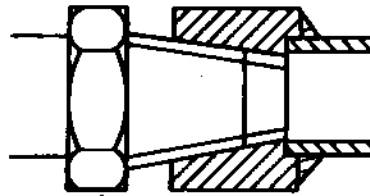
^bWith seat face.

NOTE: If female thread is cast iron (control valves, brake valves motors, etc.), torque must be reduced approximately 10%.



T6873AE

Straight Thread



T6873AD

Tapered Thread

T6873AE -UN-18OCT88

T6873AD -UN-18OCT88

Service Recommendations For Flat Face O-Ring Seal Fittings

1. Inspect the fitting sealing surfaces and O-ring. They must be free of dirt or defects.
2. Lubricate O-rings and install into groove using petroleum jelly to hold in place.
3. Index angle fittings and tighten by hand pressing joint together to insure O-ring remains in place.
4. Tighten fitting or nut to torque value shown on the chart. Do not allow hoses to twist when tightening

fittings, use backup wrench on straight hose couplings.

IMPORTANT: Tighten fittings to 150% of listed torque value if indexing is necessary or if fitting is attached to an actuating devise.

Tighten fittings to 50% of listed torque value if used in aluminum housing.

FLAT FACE O-RING SEAL FITTING TORQUE*

Nomial Tube O.D.		Thread Size	Swivel Nut		Bulkhead Nut	
mm	in.	in.	N•m	lb-ft	N•m	lb-ft
6.35	0.250	9/16-18	16	12	12	9
9.52	0.375	11/16-16	24	18	24	18
12.70	0.500	13/16-16	50	37	46	34
15.88	0.625	1-14	69	51	62	46
19.05	0.750	1 3/16-12	102	75	102	75
22.22	0.875	1 3/16-12	102	75	102	75
25.40	1.000	1 7/16-12	142	105	142	105
31.75	1.250	1 11/16-12	190	140	190	140
38.10	1.500	2-12	217	160	217	160

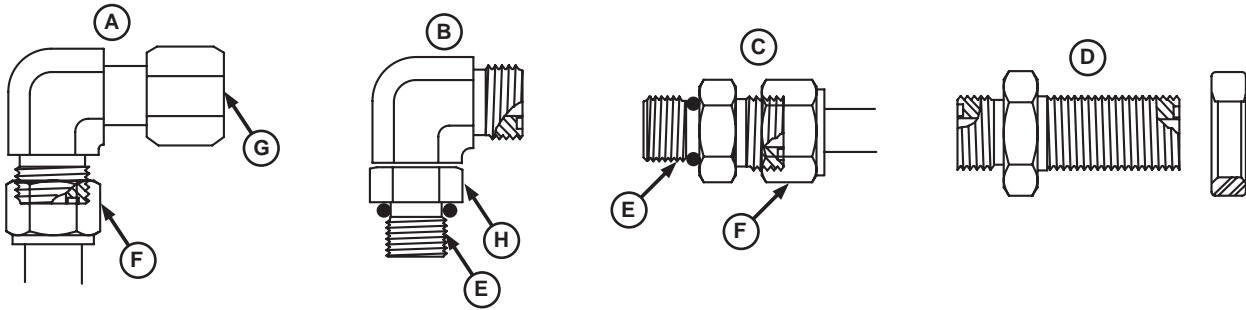
*Torque tolerance is +15 -20% unless otherwise specified.

Stud End O-ring Seal Torque for Straight and Adjustable Fittings*

Thread Size	Straight Hex Size	Locknut Hex Size	Straight Fitting or Locknut Toque	
Inch	Inch	Inch	N•m	lb-ft
3/8-24	5/8	9/16	12	9
7/16-20	5/8	5/8	21	15
1/2-20	3/4	11/16	26	19
9/16-18	3/4	3/4	34	25
3/4-16	7/8	15/16	73	55
7/8-14	1 1/16	1 1/16	104	76
1 1/16-12	1 1/4	1 3/8	176	130
1 3/16-12	1 3/8	1 1/2	230	170
1 5/16-12	1 1/2	1 5/8	285	210

*Torque tolerance is +15 -20% unless otherwise specified.

00 0003 12 O-Ring Face Seal Fittings With SAE Inch Hex Nut And Stud End For High Pressure Service Recommendations



A—90° Swivel Elbow and Tube Nut
B—90° Adjustable Stud Elbow

C—Stud Straight and Tube Nut
D—Bulkhead Union and Nut

E—Stud End
F—Tube Nut

G—Swivel Nut
H—Hex Nut

H70406 -UN-12DEC01

O-RING FACE SEAL FITTINGS WITH SAE INCH HEX NUT AND STUD END FOR HIGH PRESSURE, ABOVE 27 600 kPa (276 bar) (4000 psi), TORQUE VALUES—Tolerance is +15 -20% unless otherwise specified

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.	in.	N•m (lb-ft)	in.	N•m (lb-ft)
5	-3	4.78 (0.188)	—	—	—	—	—
6	-4	6.35 (0.250)	9/16-18	11/16	24 (18)	13/16	32 (24)
8	-5	7.92 (0.312)	—	—	—	—	—
10	-6	9.53 (0.375)	11/16-16	13/16	37 (27)	1	42 (31)
12	-8	12.70 (0.500)	13/16-16	15/16	75 (55)	1-1/8	93 (69)
16	-10	15.88 (0.625)	1-14	1-1/8	103 (76)	1-5/16	118 (87)
20	-12	19.05 (0.750)	1-3/16-12	1-3/8	152 (112)	1-1/2	175 (129)
22	-14	22.23 (0.875)	1-3/16-12	—	152 (112)	—	175 (129)
25	-16	25.40 (1.000)	1-7/16-12	1-5/8	214 (158)	1-3/4	247 (182)
32	-20	31.75 (1.250)	1-11/16-12	1-7/8	286 (211)	2	328 (242)
38	-24	38.10 (1.500)	2-12	2-1/4	326 (240)	2-3/8	374 (276)

Continued on next page

OUT3035,0000420 -19-14JAN04-1/2

O-RING STRAIGHT, ADJUSTABLE, AND EXTERNAL HEX PLUG WITH SAE INCH STUD END FOR HIGH PRESSURE, ABOVE 27 600 kPa (276 bar) (4000 psi), TORQUE VALUES—Tolerance is +15 -20% unless otherwise specified

Thread Size	Straight Hex Size ^a	Adjustable Nut Hex Size	Steel or Gray Iron Torque
in.	in.	in.	N•m (lb-ft)
3/8-24	5/8	9/16	18 (13)
7/16-20	5/8	5/8	24 (18)
1/2-20	3/4	11/16	30 (22)
9/16-18	3/4	3/4	37 (27)
3/4-16	7/8	15/16	75 (55)
7/8-14	1-1/16	1-1/16	103 (76)
1-1/16-12	1-1/4	1-3/8	177 (131)
1-3/16-12	1-3/8	1-1/2	231 (170)
1-5/16-12	1-1/2	1-5/8	270 (199)
1-5/8-12	1-3/4	1-7/8	286 (211)
1-7/8-12	2-1/8	2-1/8	326 (240)

^a *Straight hex size applies to fittings only and may not be the same as the corresponding plug of the same thread size.*

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

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

To protect an O-ring from threads, wrap electrical tape over the threads. Slide O-ring over the tape into the turned down section. Remove the tape.

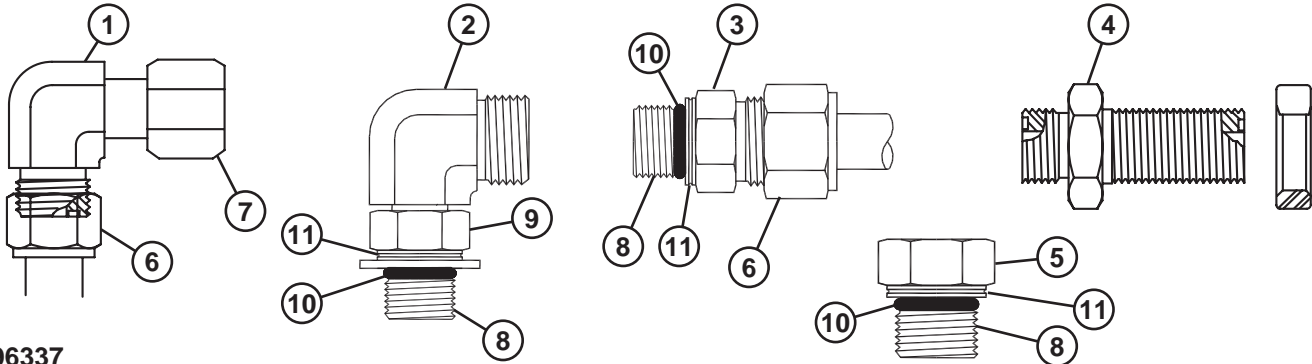
4. Turn fitting into the boss by hand until face of nut or washer squeezes the O-ring into the seat and contacts face of boss. Loosen adjustable fittings no more than one turn for alignment.

Hold connections together while tightening nut to ensure O-ring remains in place.

5. Tighten fitting or nut to torque value shown. Use a second wrench to hold the fitting in position or to keep hose from twisting while tightening nut.

OUT3035,0000420 -19-14JAN04-2/2

00 0003 14 O-Ring Face Seal Fittings With Metric Hex Nut And Stud End For Standard Pressure Service Recommendations



T196337

- 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

T196337 -UN-18NOV03

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

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

Continued on next page

OUT3035,0000366 -19-14JAN04-1/2

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

Thread Size ^a	Straight Hex Size ^b	Adjustable Nut Hex Size	Steel or Gray Iron Torque	Aluminum or Brass Torque
mm.	mm	mm	N•m (lb-ft)	N•m (lb-ft)
M8 x 1	12	12	8 (6)	5 (4)
M10 x 1	14	14	15 (11)	10 (7)
M12 x 1.5	17	17	25 (18)	17 (12)
M14 x 1.5	19	19	40 (30)	27 (20)
M16 x 1.5	22	22	45 (33)	30 (22)
M18 x 1.5	24	24	50 (37)	33 (25)
M22 x 1.5	27	27	69 (51)	46 (34)
M27 x 2	32	32	100 (74)	67 (49)
M30 x 2	36	36	130 (96)	87 (64)
M33 x 2	41	41	160 (118)	107 (79)
M38 x 2	46	46	176 (130)	117 (87)
M42 x 2	50	50	210 (155)	140 (103)
M48 x 2	55	55	260 (192)	173 (128)
M60 x 2	65	65	315 (232)	210 (155)

^a Stud end threads are identified as metric by an identification groove in the hex nut next to the O-ring.

^b Straight hex size applies to fittings only and may not be the same as the corresponding plug of the same thread size.

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

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

To protect an O-ring from threads, wrap electrical tape over the threads. Slide O-ring over the tape into the turned down section. Remove the tape.

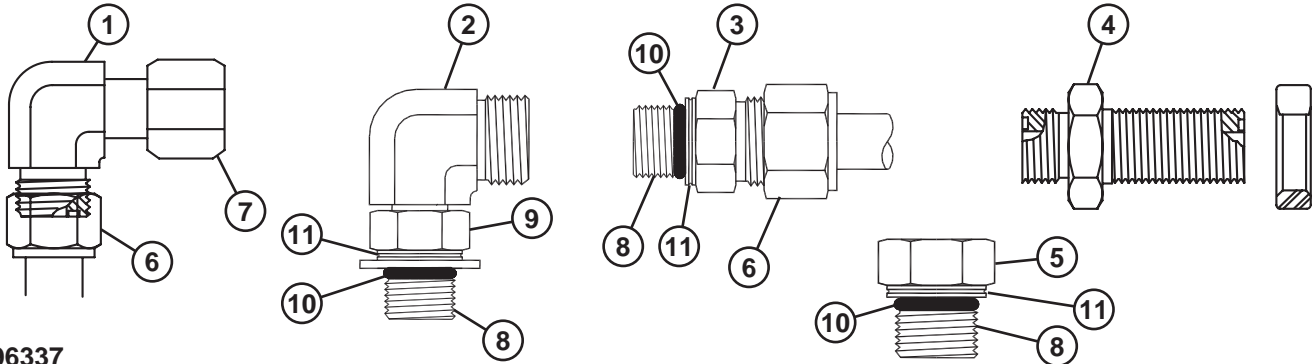
4. Turn fitting into the boss by hand until face of nut or washer squeezes the O-ring into the seat and contacts face of boss. Loosen adjustable fittings no more than one turn for alignment.

Hold connections together while tightening nut to ensure O-ring remains in place.

5. Tighten fitting or nut to torque value shown. Use a second wrench to hold the fitting in position or to keep hose from twisting while tightening nut.

OUT3035,0000366 -19-14JAN04-2/2

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



T196337

- 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

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

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)

Continued on next page

OUT3035,0000421 -19-14JAN04-1/2

O-RING STRAIGHT, ADJUSTABLE, AND EXTERNAL HEX PLUG WITH METRIC STUD END FOR HIGH PRESSURE, ABOVE 27 600 KPA (275.8 BAR) (4,000 PSI), TORQUE VALUES—Tolerance is +15 -20% unless otherwise specified

Thread Size ^a	Straight Hex Size ^b	Adjustable Nut Hex Size	Steel or Gray Iron Torque
mm.	mm	mm	N•m (lb-ft)
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)
M48 x 2	55	55	420 (310)

^a Stud end threads are identified as metric by an identification groove in the hex nut next to the O-ring.

^b Straight hex size applies to fittings only and may not be the same as the corresponding plug of the same thread size.

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

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

To protect an O-ring from threads, wrap electrical tape over the threads. Slide O-ring over the tape into the turned down section. Remove the tape.

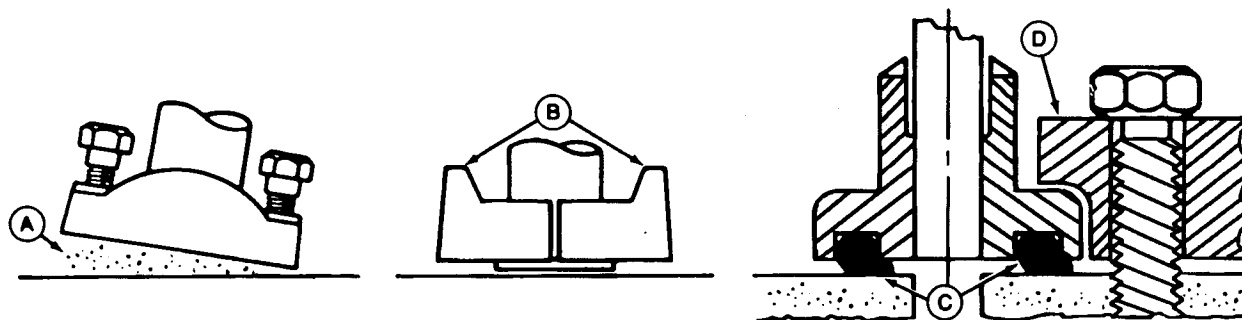
4. Turn fitting into the boss by hand until face of nut or washer squeezes the O-ring into the seat and contacts face of boss. Loosen adjustable fittings no more than one turn for alignment.

Hold connections together while tightening nut to ensure O-ring remains in place.

5. Tighten fitting or nut to torque value shown. Use a second wrench to hold the fitting in position or to keep hose from twisting while tightening nut.

OUT3035,0000421 -19-14JAN04-2/2

Service Recommendations for Metric Series Four Bolt Flange Fitting



A—Sealing Surface

B—Split Flange

C—Pinched O-Ring

D—Single Piece Flange

1. Clean sealing surfaces (A). Inspect. Scratches cause leaks. Roughness causes seal wear. Out-of-flat causes seal extrusion. If defects cannot be polished out, replace component.
2. Install the correct O-ring (and backup washer if required) into groove using petroleum jelly to hold it in place.
3. Split flange: Loosely assemble split flange (B) halves. Make sure split is centrally located and perpendicular to the port. Hand tighten cap screws to hold parts in place. Do not pinch O-ring (C).
4. Single piece flange (D): Place hydraulic line in center of flange and install four cap screws. Flange must be centrally located on port. Hand tighten cap screws to hold flange in place. Do not pinch O-ring.
5. After components are properly positioned and cap screws are hand tightened, tighten one cap screw,

then tighten the diagonally opposite cap screw. Tighten two remaining cap screws. Tighten all cap screws as specified in the chart below.

DO NOT use air wrenches. DO NOT tighten one cap screw fully before tightening the others. DO NOT over tighten.

TORQUE CHART^a

Thread ^b	N•m	lb-ft
M6	12	9
M8	30	22
M10	57	42
M12	95	70
M14	157	116
M16	217	160
M18	334	246
M20	421	318

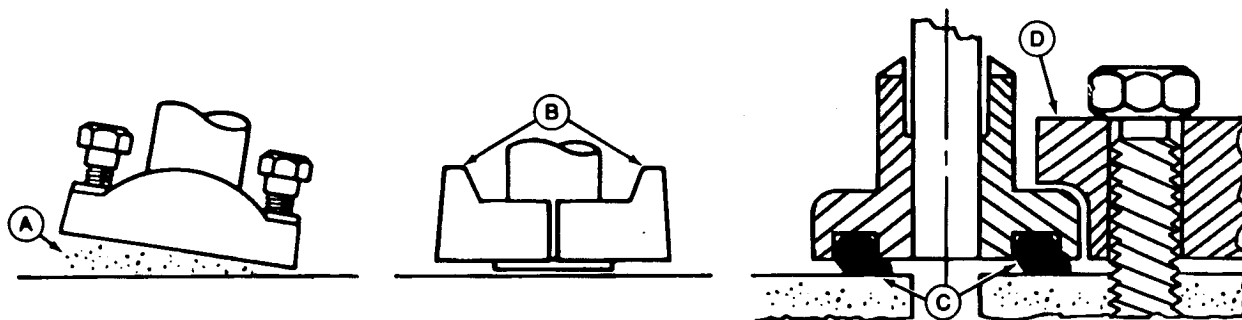
^aTolerance $\pm 10\%$. The torques given are enough for the given size connection with the recommended working pressure. Increasing cap screw torque beyond these amounts will result in flange and cap screw bending and connection failures.

^bMetric standard thread.

T6890BB -UN-01MAR90

04T,90,K175 -19-29SEP99-1/1

Service Recommendations For Inch Series Four Bolt Flange Fittings



A—Sealing Surface

B—Split Flange

C—Pinched O-Ring

D—Single Piece Flange

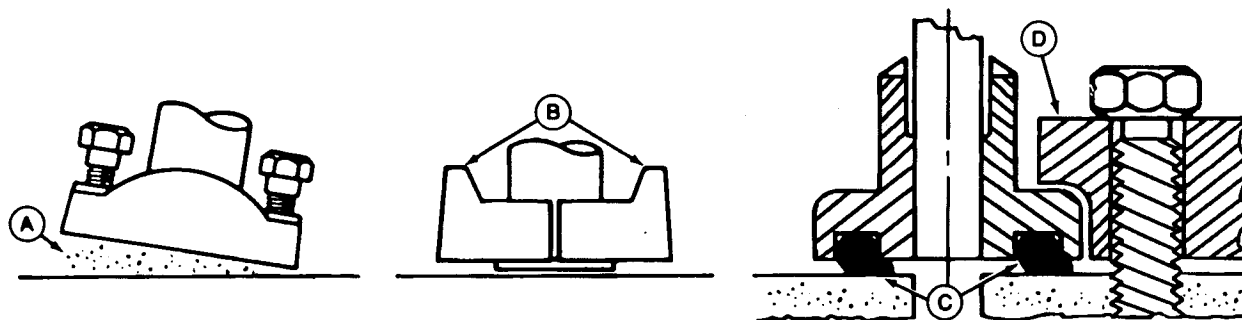
1. Clean sealing surfaces (A). Inspect. Scratches cause leaks. Roughness causes seal wear. Out-of-flat causes seal extrusion. If defects cannot be polished out, replace component.
2. Install O-ring (and backup washer if required) into groove using petroleum jelly to hold it in place.
3. Split flange: Loosely assemble split flange (B) halves. Make sure split is centrally located and perpendicular to port. Hand tighten cap screws to hold parts in place. Do not pinch O-ring (C).
4. Single piece flange (D): Place hydraulic line in center of flange and install cap screws. Flange must be centrally located on port. Hand tighten cap screws to hold flange in place. Do not pinch O-ring.
5. Tighten one cap screw, then tighten the diagonally opposite cap screw. Tighten two remaining cap screws. Tighten all cap screws as specified in the chart below.

DO NOT use air wrenches. DO NOT tighten one cap screw fully before tightening the others. DO NOT over tighten.

TORQUE CHART					
Nominal Flange Size	Cap Screw Size	N•m		lb-ft	
		Min	Max	Min	Max
1/2	5/16-18 UNC	20	31	15	23
3/4	3/8-16 UNC	28	54	21	40
1	3/8-16 UNC	37	54	27	40
1-1/4	7/16-14 UNC	47	85	35	63
1-1/2	1/2-13 UNC	62	131	46	97
2	1/2-13 UNC	73	131	54	97
2-1/2	1/2-13 UNC	107	131	79	97
3	5/8-11 UNC	158	264	117	195
3-1/2	5/8-11 UNC	158	264	117	195
4	5/8-11 UNC	158	264	117	195
5	5/8-11 UNC	158	264	117	195

04T,90,K174 -19-01AUG94-1/1

Inch Series Four Bolt Flange Fitting For High Pressure Service Recommendations



A—Sealing Surface

B—Split Flange

C—Pinched O-Ring

D—Single Piece Flange

INCH SERIES FOUR BOLT FLANGE FITTING FOR 41 400 kPa (414 bar) (6000 psi) PRESSURE SERIES TORQUE VALUES—
Tolerance is $\pm 10\%$ unless otherwise specified

Nominal Flange Size	Cap Screw Size ^a	Min—Max Torque
in.	in.	N•m (lb-ft) ^b
1/2	5/16-18 UNC	20—31 (15—23)
3/4	3/8-16 UNC	34—54 (25—40)
1	7/16-14 UNC	57—85 (42—63)
1-1/4	1/2-13 UNC	85—131 (63—97)
1-1/2	5/8-11 UNC	159—264 (117—195)
2	3/4-10 UNC	271—468 (200—345)

^a JDM A17D, SAE Grade 5 or better cap screws with plated hardware.

Lock washers are permissible but not recommended.

^b Minimum torques given are enough for the given size connection with the recommended working pressure. Torques can be increased to the maximum shown for each cap screw size if desired. Increasing cap screw torque beyond the maximum will result in flange and cap screw bending and connection failures.

1. Clean sealing surfaces (A). Inspect. Scratches, nicks, and burrs cause leaks. Roughness causes O-ring wear. Out-of-flat causes O-ring extrusion. If imperfection cannot be polished out, replace component.

2. Install the O-ring (and backup ring, if used) into groove. Use petroleum jelly to hold it in place.

IMPORTANT: DO NOT use air wrenches. DO NOT tighten one cap screw fully before tightening the others. DO NOT over tighten.

3. Split flange: Loosely assemble split flange (B) halves. Make sure split is centrally located and perpendicular to port. Hand tighten cap screws to hold flange halves and line in place. Do not pinch O-ring (C).

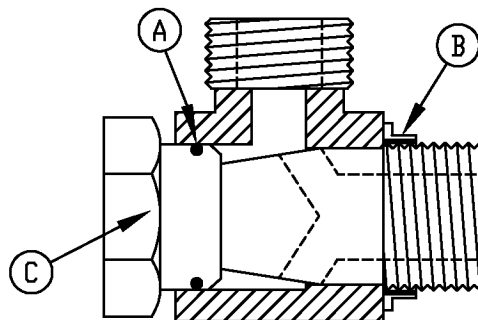
Single piece flange (D): Make sure flange is centrally located on port and line is centered in flange. Install the cap screws. Hand tighten cap screws to hold flange and line in place. Do not pinch O-ring.

4. Tighten one cap screw and then the diagonally opposite cap screw. Tighten the two remaining cap screws. Tighten cap screws within the specified torque values.

OUT3035,0000422 -19-14JAN04-1/1

Service Recommendations For Non-Restricted Banjo (Adjustable) Fittings

1. Inspect all fitting sealing surfaces. They must be free of dirt and defects.
2. Inspect O-ring (A). It must be free of damage or defects.
3. Inspect sealing ring (B) for damage or defects.
4. Hold body in desired position while tightening stud by hand.
5. Tighten stud (C) to torque value shown on the chart.
Do not allow body to twist when tightening stud.



T113948

NOTE: The *L* in the Tube Fitting OD Size column indicates "light" designed fitting and the *S* indicates "heavy" designed fitting.

Tube Fitting O.D. Size	Torque Value		
	Metric Thread	N•m	lb-ft
6 L	M 10 x 1	30	22
8 L	M 12 x 1.5	40	30
10 L	M 14 x 1.5	60	44
12 L	M 16 x 1.5	100	74
15 L	M 18 x 1.5	130	96
18 L	M 22 x 1.5	160	118
22 L	M 26 x 1.5	250	184
28 L	M 33 x 2	400	295
35 L	M 42 x 2	600	443
42 L	M48 x 2	800	590
6 S	M 12 x 1.5	40	30
8 S	M 14 x 1.5	60	44
10 S	M 16 x 1.5	100	74
12 S	M 18 x 1.5	130	96
14 S	M 20 x 1.5	160	118
16 S	M 22 x 1.5	160	118
20 S	M 27 x 2	250	184
25 S	M 33 x 2	400	295
30 S	M 42 x 2	600	443
38 S	M 48 x 2	800	590

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Torque Values

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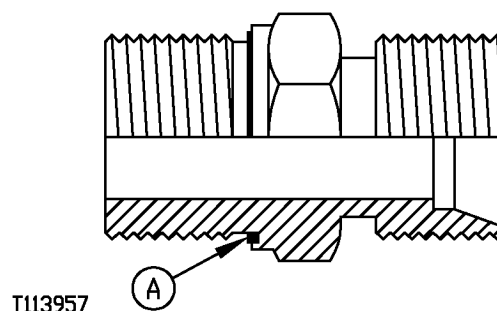
Tube Fitting O.D. Size	Torque Value		
	Inch Size	N•m	lb-ft
6 L	1/8	25	18
8 L	1/4	50	37
10 L	1/4	50	37
12 L	3/8	90	66
15 L	1/2	130	96
18 L	1/2	150	111
22 L	3/4	250	184
28 L	1	400	295
35 L	1-1/4	600	443
42 L	1-1/2	800	590
6 S	1/4	50	37
8 S	1/4	50	37
10 S	3/8	90	66
12 S	3/8	100	74
14 S	1/2	130	96
16 S	1/2	150	111
20 S	3/4	250	184
25 S	1	400	295
30 S	1-1/4	600	443
38 S	1-1/2	800	590

CED,OUO1002,562 -19-09MAR98-2/2

Service Recommendations For O-Ring Boss Fittings With Shoulder

1. Inspect component seal boss seat for dirt or defects.
2. Inspect EOlastic seal (A) for damage. Replace seal or fitting as necessary.

To replace seal, put electrical tape over threads to protect seal. Slide seal over tape and into seal groove of fitting. Remove tape.



3. Tighten fitting to torque value shown on chart.

IMPORTANT: Do not allow hoses to twist when tightening fittings.

NOTE: The L in the Tube Fitting OD Size column indicates "light" designed fitting and the S indicates "heavy" designed fitting.

Tube Fitting O.D. Size	Metric Thread	Torque Value	
		N•m	lb-ft
6 L	M 10 x 1	20	15
8 L	M 12 x 1.5	30	22
10 L	M 14 x 1.5	45	33
12 L	M 16 x 1.5	60	44
15 L	M 18 x 1.5	80	59
18 L	M 22 x 1.5	130	96
22 L	M 26 x 1.5	190	140
28 L	M 33 x 2	300	221
35 L	M 42 x 2	600	443
42 L	M48 x 2	800	590
6 S	M 12 x 1.5	40	30
8 S	M 14 x 1.5	60	44
10 S	M 16 x 1.5	80	59
12 S	M 18 x 1.5	110	81
14 S	M 20 x 1.5	140	103
16 S	M 22 x 1.5	170	125
20 S	M 27 x 2	250	184
25 S	M 33 x 2	450	332
30 S	M 42 x 2	600	443
38 S	M 48 x 2	800	590

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CED,OUO1002,563 -19-09MAR98-1/3

Torque Values

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0003
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Tube Fitting O.D. Size	Torque Value		
	Inch Size	N•m	lb-ft
6 L	1/8	20	15
8 L	1/4	40	30
10 L	1/4	40	30
12 L	3/8	80	59
15 L	1/2	140	103
18 L	1/2	100	74
22 L	3/4	180	133
28 L	1	300	221
35 L	1-1/4	600	443
42 L	1-1/2	800	590
6 S	1/4	50	37
8 S	1/4	50	37
10 S	3/8	90	66
12 S	3/8	90	66
14 S	1/2	160	118
16 S	1/2	140	103
20 S	3/4	250	184
25 S	1	400	295
30 S	1-1/4	650	479
38 S	1-1/2	800	590

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CED,OUO1002,563 -19-09MAR98-2/3

Torque Values

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25

Hex Socket Head Plugs Only		
Torque Value		
Thread Size	N•m	lb-ft
M 10 x 1	13	10
M 12 x 1.5	30	22
M 14 x 1.5	40	30
M 16 x 1.5	60	44
M 18 x 1.5	70	52
M 20 x 1.5	90	66
M 22 x 1.5	100	74
M 26 x 1.5	120	89
M 27 x 2	150	111
M 33 x 2	250	184
M 42 x 2	400	295
M 48 x 2	500	369
1/8	15	11
1/4	33	24
3/8	70	52
1/2	90	66
3/4	150	111
1	220	162
1-1/4	600	443
1-1/2	800	590

CED,OUO1002,563 -19-09MAR98-3/3

Metric 24° O-Ring Seal DIN 20078 Service Recommendations

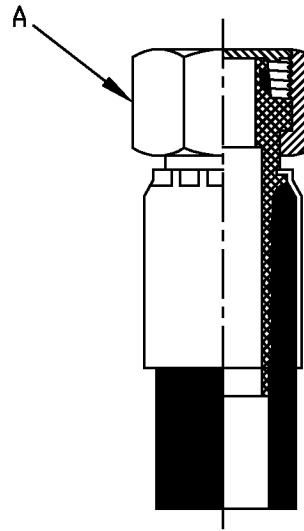
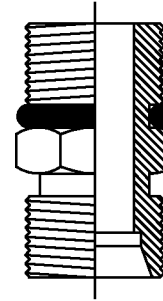
METRIC 24° O-RING SEAL DIN 20078 TORQUE VALUES			
Fitting Tube OD Size	Heavy Fitting Size	Light Fitting Size	Torque
mm	mm	mm	Turns
6	—	M12 x 1.5	Hand tighten so O-ring contacts seat plus an additional 1/4—1/3 turn using a wrench
8	M16 x 1.5	M14 x 1.5	
10	M18 x 1.5	M16 x 1.5	
12	M20 x 1.5	M18 x 1.5	
14	M22 x 1.5	—	
15	—	M22 x 1.5	
16	M24 x 1.5	—	
18	—	M26 x 1.5	
20	M30 x 2	—	
22	—	M30 x 2	
25	M36 x 2	—	
28	—	M36 x 2	
30	M42 x 2	—	
35	—	M45 x 2	
38	M52 x 2	—	

NOTE: These fittings are also referred to as EO and EO-2 Bite Type or Ermeto style fittings.

IMPORTANT: In this style of fittings, there are “heavy” and “light” designs. Usually “heavy” is used for pressure lines and “light” for return lines.

Some “heavy” and “light” sizes can be threaded together but do not seal properly. Be sure not to mix “heavy” and “light” fittings.

1. Inspect the fitting sealing surfaces. They must be free of dirt scratches, nicks, and burrs.



T113889

T113889 -UN-06MAR98

2. Inspect the O-ring. It must be free dirt, cuts, cracks, swelling or flatten condition.
3. Lubricate O-rings using a thin film of clean hydraulic oil.
4. Align an adjustable fitting with the tube.

Hold connections together while tightening nut to ensure proper seal.
5. Tighten nut (A) hand tight so O-ring contacts seat and then an additional 1/4—1/3 turn using a wrench.

CED,OUO1002,517 -19-14JAN04-2/2

Torque Values

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Section 01 Tracks

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01

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Track Shoe Remove and Install	01-0130-10
Track Chain Remove and Install	01-0130-11
Track Chain Disassemble and Assemble . .	01-0130-14
Track Chain Repair	01-0130-17
Sprocket Remove and Install	01-0130-19
Front Idler Remove and Install	01-0130-20
Front Idler Disassemble and Assemble . . .	01-0130-21
Track Adjuster and Recoil Spring Remove and Install	01-0130-23
Track Adjuster and Recoil Spring Disassemble and Assemble	01-0130-25
Track Adjuster Cylinder Disassemble and Assemble	01-0130-29

Track Roller Remove and Install

1. Swing upperstructure 90° and lower bucket to raise track off ground. Keep angle between boom and arm 90—110° and position round side of bucket on ground.

CAUTION: Prevent possible injury from unexpected machine movement. Position shop stands under frame to support machine while removing lower track roller.

Specification

240DLC—Weight (Approximate)..... 24 605 kg
54 244 lb

Specification

270DLC—Weight (Approximate)..... 28 619 kg
63 094 lb

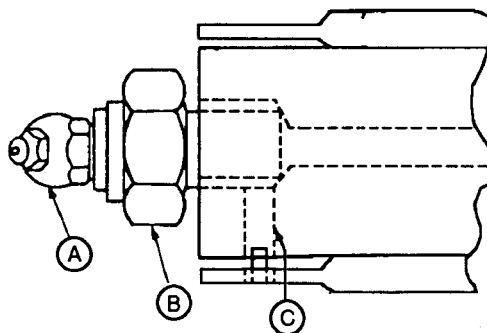
2. Put shop stands under machine.

HX00125,000007C -19-12APR06-1/4

CAUTION: Prevent possible injury from high pressure grease. Do not remove grease fitting (A) from valve (B).

3. Loosen valve (B) one to two turns to release grease through bleed hole (C).

A—Grease Fitting
B—Valve
C—Bleed Hole



T7396DZ -UN-28NOV90

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HX00125,000007C -19-12APR06-2/4



CAUTION: Heavy component; use appropriate lifting device.

Specification

Track Roller—240DLC—Weight..... 35 kg
77 lb

Specification

Track Roller—270DLC—Weight..... 57 kg
126 lb

4. Attach appropriate lifting device to track roller (B). Remove cap screws (A) and track roller (B).
5. Measure track roller tread diameter. See 240DLC Track Roller Tread Diameter or 270DLC Track Roller Tread Diameter. (SP326 Undercarriage Appraisal Manual.)
6. Repair or replace parts as necessary. See Track Roller Disassemble and Assemble. (See procedure in this group.)
7. Install track roller and tighten cap screws to specification.

Specification

Roller-to-Frame Cap Screw—
240DLC—Torque..... 460 N•m
340 lb-ft

Specification

Roller-to-Frame Cap Screw—
270DLC—Torque..... 840 N•m
620 lb-ft

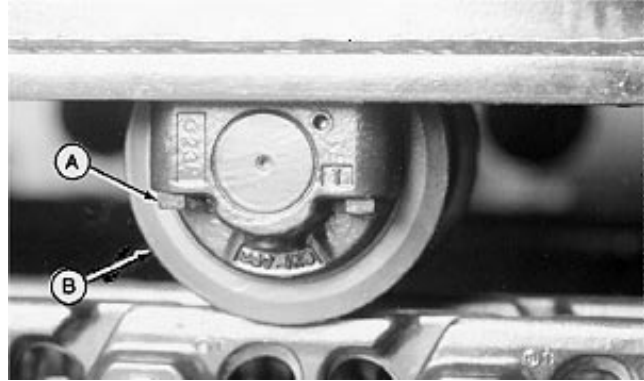
8. If equipped, install track roller guard and tighten cap screws to specification.

Specification

Track Roller Guard Cap Screw—
240DLC—Torque..... 460 N•m
340 lb-ft

Specification

Track Roller Guard Cap Screw—
270DLC—Torque..... 670 N•m
490 lb-ft



A—Cap Screw (4 used)
B—Track Roller

T6585TN -UN-25OCT88

9. Tighten valve on track adjuster to specification.

Specification

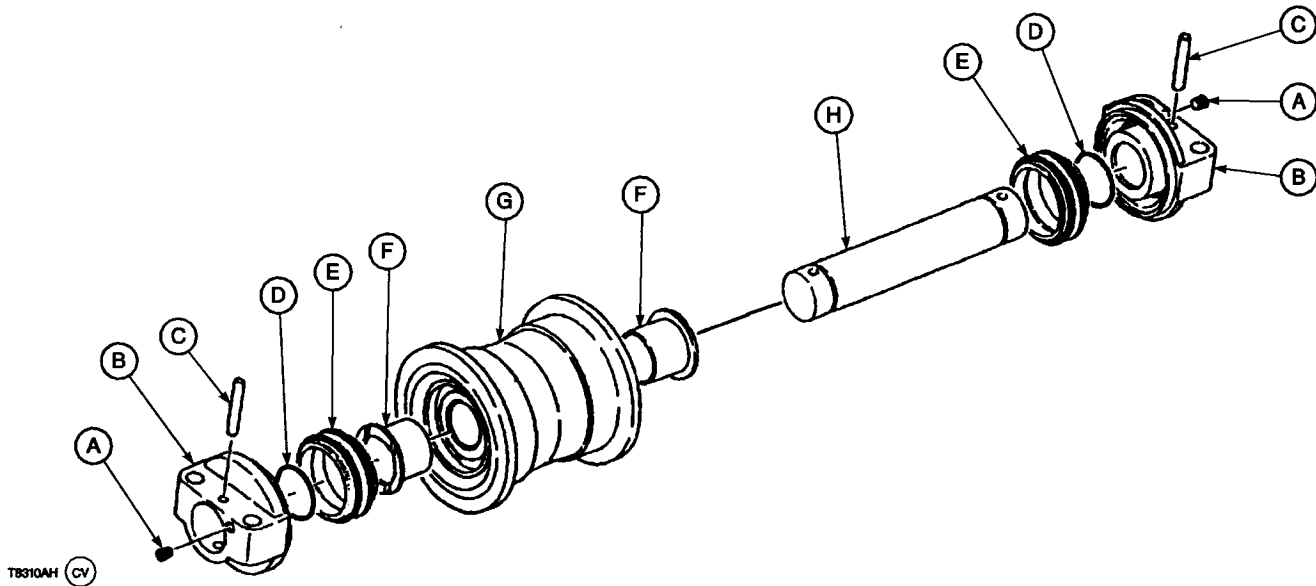
Track Adjuster Valve—Torque 88 N•m
55 lb-ft

10. Perform Check and Adjust Track Sag. (Operator's Manual.)

HX00125,000007C -19-12APR06-4/4

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Track Roller Disassemble and Assemble



A—Plug (2 used)
B—Bracket (2 used)

C—Pin (2 used)
D—O-Ring (2 used)

E—Metal Face Seal (2 used)
F—Bushing (2 used)

G—Roller
H—Axle

1. Remove plug (A) and drain oil.
2. Remove pins (C).
3. Remove brackets (B) using a bearing puller attachment and adapters from puller set.

IMPORTANT: Metal face seals can be reused if they are not worn or damaged. A used seal must be kept together as a set because of wear patterns on seal ring face.

4. Remove metal face seals (E) from roller and bracket. Keep seal rings together as a matched set with seal ring faces together to protect surfaces.
5. Inspect metal face seals. See Metal Face Seals Inspection. (See procedure in this group.)
6. Remove axle (H) from roller.

NOTE: Only remove bushings if replacement is necessary.

7. Remove bushings (F) using a 2-jaw puller and adapters from puller set.

8. Replace parts as necessary.

Apply a thin film of oil to bushings (F) and install.

IMPORTANT: O-rings and seat surfaces for O-rings must be clean, dry, and oil free so O-rings do not slip when roller is turning.

9. Thoroughly clean O-rings and seat surfaces in brackets (B) and in seal rings using volatile, non-petroleum base solvent and lint-free tissues.

10. Install seals (E) in brackets (B) and in roller (G). Apply equal pressure with fingers at four equally spaced points on seal face. Seal must “pop” down into place so O-ring is tight against seal bore. A volatile, non-petroleum base solvent or talcum powder may be used as a lubricant.

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Continued on next page

HX00125,000006E -19-20MAR06-1/2

Track System

11. Wipe finger prints and foreign material off seal ring face using clean oil and lint-free tissues. Apply a thin film of oil to each seal ring face.

Specification

Lower Track Roller—270DLC—

Capacity 420 mL
14.2 oz

12. Install axle (H) to bracket (B).

13. Install roller (G) onto axle (H).

17. Apply PM37509 Cure Primer and PM37398 Pipe Sealant to threads of plug. Install and tighten plug.

Specification

Plug—Torque..... 30 N•m
22 lb-ft

14. Install opposite side bracket (B) on roller assembly.

15. Apply TY24811 NEVER-SEEZ® anti-seize lubricant or equivalent to pins (C). Install pins (C) even with flat surface of brackets (B).

16. Fill roller to specification.

Specification

Lower Track Roller—240DLC—

Capacity 260 mL
8.8 oz

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NEVER-SEEZ is a trademark of Emhart Chemical Group.

HX00125,000006E -19-20MAR06-2/2

Track Roller Pressure Test

- 1. Hold shaft and turn shell of roller several turns to seat metal face seals.
- 2. Remove the drain plug.

NOTE: Plug, barbed adapter, and connector (A) are from leak detector kit D05361ST.

- 3. Install parts (A—F).
- 4. Tighten plug. Slowly pressurize oil cavity to test pressure specification.

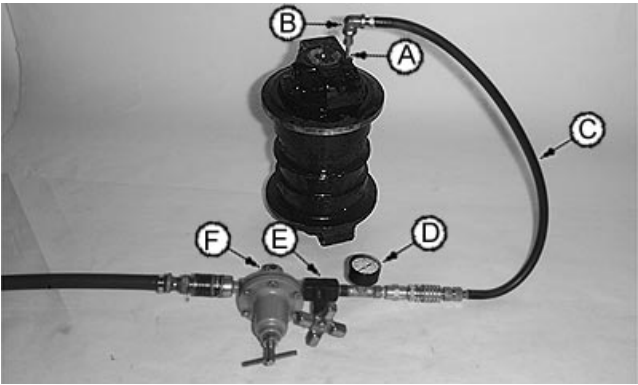
Specification

Track Roller Oil Cavity—Pressure	110 ± 28 kPa 16 ± 4 psi
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- 5. Close valve. Wait for 30 seconds. Check for oil leaks or pressure decrease.
- 6. If leakage, disassemble roller and replace parts as necessary. See Track Roller Disassemble and Assemble. (See procedure in this group.)
- 7. Apply PM37509 Cure Primer and PM37398 Pipe Sealant to threads of plug. Install and tighten plug to specification.

Specification

Plug—Torque.....	30 N•m 22 lb-ft
------------------	--------------------



- A—Plug, Barbed Adapter and Connector
- B—JT03001 Tee Fitting 7/16-20 M 37° x 7/16-20 F 37° SW x 7/16-20 M 37°
- C—Hose (2 used)
- D—Pressure Gauge
- E—Needle Valve
- F—Air Pressure Regulator

HX00125,00000E6 -19-13APR06-1/1

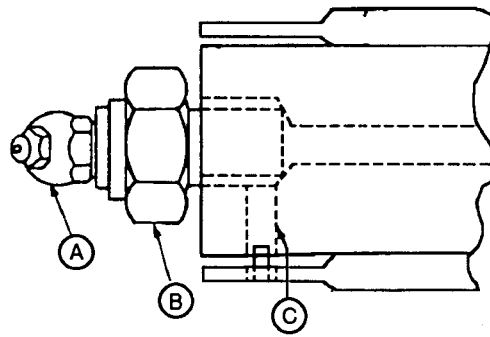
Track Carrier Roller Remove and Install



CAUTION: Prevent possible injury from high pressure grease. Do not remove grease fitting (A) from valve (B).

1. Loosen valve (B) one to two turns to release grease through bleed hole (C).

A—Grease Fitting
B—Valve
C—Bleed Hole



T7396DZ -UN-28NOV90

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HX00125,000006F -19-20APR06-1/3

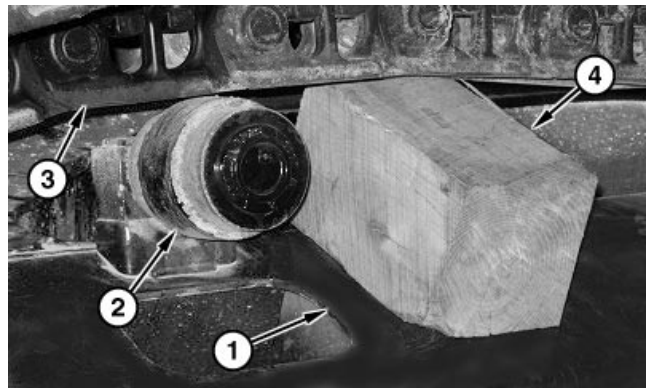
2. Raise track chain (3), using a jack, enough to permit carrier roller (2) removal.



CAUTION: Prevent accidental lowering of track by securely supporting track before attempting service procedure.

3. Install wooden block (4) between track chain (3) and track frame (1).

1—Track Frame
2—Carrier Roller
3—Track Chain
4—Wood Block



TX1006136A -UN-07APR06

Continued on next page

HX00125,000006F -19-20APR06-2/3

4. Remove cap screws (1) and carrier roller (2).
5. Measure track carrier roller tread diameter. See 240DLC Carrier Roller Tread Diameter or 270DLC Carrier Roller Tread Diameter. (SP326 Undercarriage Appraisal Manual.)

IMPORTANT: Carrier roller replaced as assembly only.

6. Replace carrier roller as necessary.

Specification

Carrier Roller—240DLC—Weight..... 21 kg
46 lb

Specification

Carrier Roller—270DLC—Weight..... 35 kg
77 lb

7. Install carrier roller and cap screws (1).
8. Tighten carrier roller cap screws (1) to specification.

Specification

Carrier Roller-to-Frame Cap
Screw—240DLC—Torque..... 270 N•m
200 lb-ft

Specification

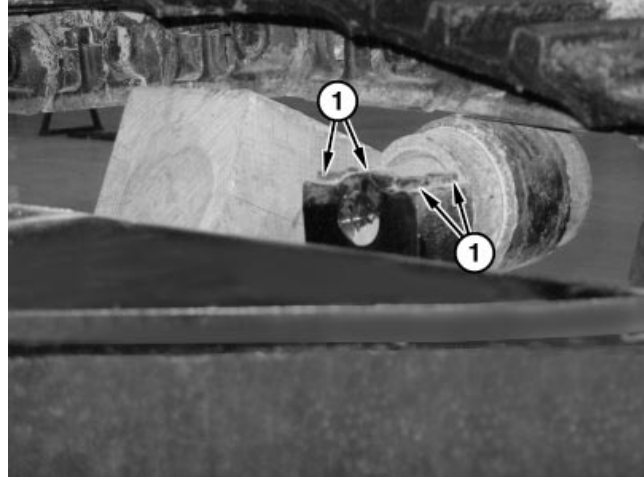
Carrier Roller-to-Frame Cap
Screw—270DLC—Torque..... 460 N•m
340 lb-ft

9. Remove wooden blocks and jack.
10. Tighten valve on track adjuster to specification.

Specification

Track Adjuster Valve—Torque 88 N•m
65 lb-ft

11. Perform Check and Adjust Track Sag. (Operator's Manual.)



1—Cap Screw (4 used)

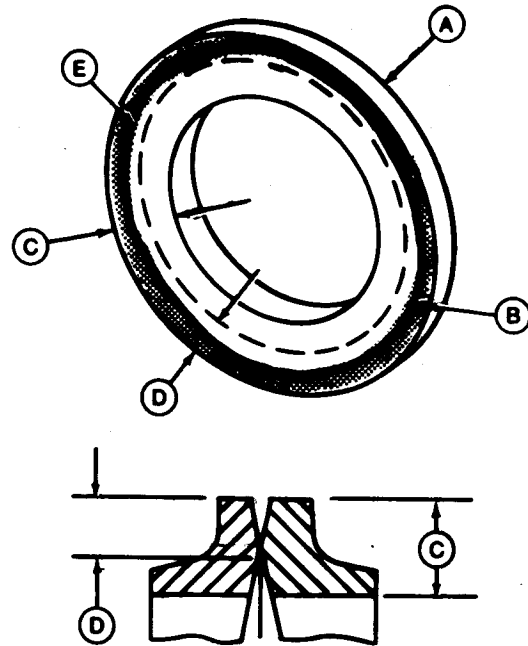
TX1006137A -UN-07APR06

Metal Face Seals Repair

Inspect Metal Face Seals

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

A—Seal Ring
 B—Worn Area (Shaded Area)
 C—Seal Ring Face
 D—Outer Half of Seal Ring Face
 E—Sealing Area (Dark Line)



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T85079 -UN-24AUG93

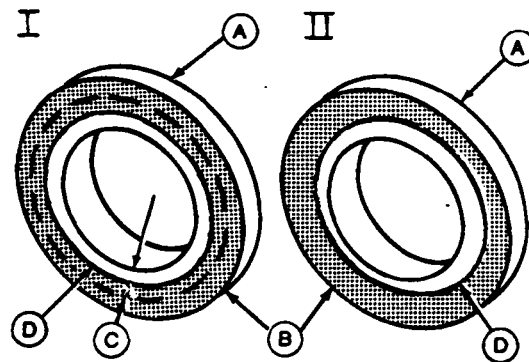
T47,0130,5939HQ -19-25JUL00-1/3

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)



T85080 -UN-05DEC96

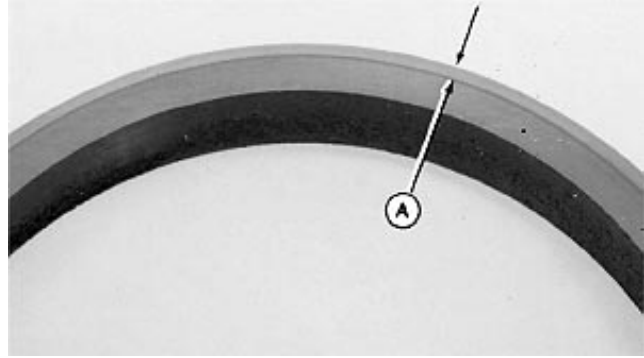
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T47,0130,5939HQ -19-25JUL00-2/3

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.

A—Seal Face

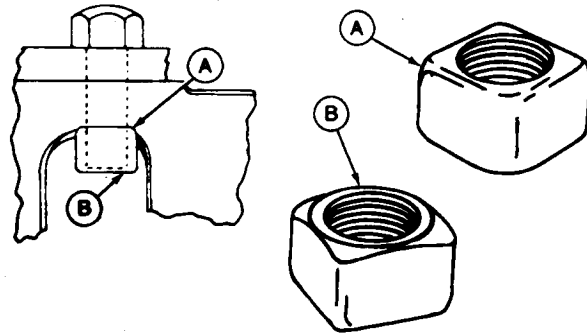


T82840 -UN-23FEB89

T47,0130,5939HQ -19-25JUL00-3/3

Track Shoe Remove and Install

1. Measure grouser height. See 240DLC Three Bar Grouser Height or 270DLC Three Bar Grouser Height. (SP326 Undercarriage Appraisal Manual.)
2. Apply a light coat of oil to cap screw threads and install shoe.
3. Install all track shoe nuts with rounded corners (A) against the link and chamfered edges (B) away from the link. Be sure nut is properly positioned in the link so there is full contact between the nut and the link.
4. Tighten cap screws in pattern shown.

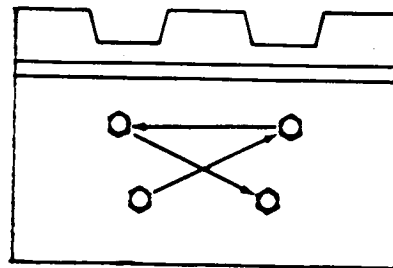


T6794AM -UN-23FEB89

Specification

Shoe-to-Link Cap Screw (20 and 22 mm)—Torque Turn..... 298 N•m plus 1/2 (180°) turn
220 lb-ft plus 1/2 (180°) turn

A—Rounded Edge
B—Chamfered Edge



T6352AH -UN-23FEB89

HX00125,0000072 -19-01MAR06-1/1

Track Chain Remove and Install

1. Swing upperstructure to side. Lower boom to raise track off the ground.

Keep the angle between boom and arm at 90—110° with the round side of bucket on the ground.



CAUTION: Prevent possible injury from unexpected machine movement. Put blocks or shop stands under machine frame to support machine while measuring track sag.

Specification

240DLC—Weight..... 24 605 kg
54 244 lb

Specification

270DLC—Weight..... 28 619 kg
63 094 lb

2. Place blocks or shop stands under the machine to support machine.

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HX00125,0000073 -19-13APR06-1/3



CAUTION: Prevent possible injury from high pressure grease. Do not remove grease fitting (A) from valve (B).

3. Loosen valve (B) one to two turns to release grease through bleed hole (C).

NOTE: Master pin and master link are identified by snap ring on master pin.

4. Move track chain so master pin is over front idler or sprocket.
5. Remove the track shoe on each side of master pin. See Track Shoe Remove and Install. (See procedure in this group.)
6. If removing chain at idler, put wooden blocks in front of idler and under chain so chain does not fall when master pin is removed.
7. Remove snap ring.

IMPORTANT: Master pin can be removed in only one direction.

8. Remove master pin using a 50-Ton Master Pin Pusher Installer.
9. If chain was disconnected at idler, slowly operate travel lever in reverse direction to remove chain from top of track frame.



CAUTION: Heavy component; use appropriate lifting device.

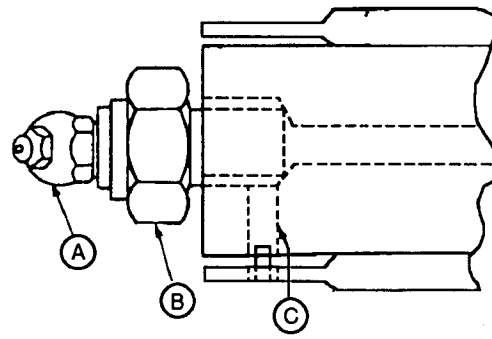
Specification

Tracks with 800 mm (32 in.)	
Shoes—240DLC—Weight	1440 kg 3175 lb

Specification

Tracks with 800 mm (32 in.)	
Shoes—270DLC—Weight	1710 kg 3770 lb

10. Remove track chain.



A—Grease Fitting
B—Valve
C—Bleed Hole

T7396DZ -UN-28NOV90

11. Measure track chain link, bushing, and pitch. (See SP326 Undercarriage Appraisal Manual.)
12. Replace parts as necessary.
13. Position track chain so section on ground has pin boss on links toward rear of machine.
14. Install end of chain on sprocket and slowly turn sprocket in forward direction to pull chain across top of frame to front idler.
15. Remove stand and lower machine.

IMPORTANT: Master pin can be installed in only one direction.

16. Pull ends of chain together. Install master pin using 50-Ton Master Pin Pusher Installer.

IMPORTANT: Replace snap ring with new one.

17. Install snap ring.
18. Install track shoe. See Track Shoe Remove and Install. (See procedure in this group.)
19. Tighten valve in track adjuster to specification.

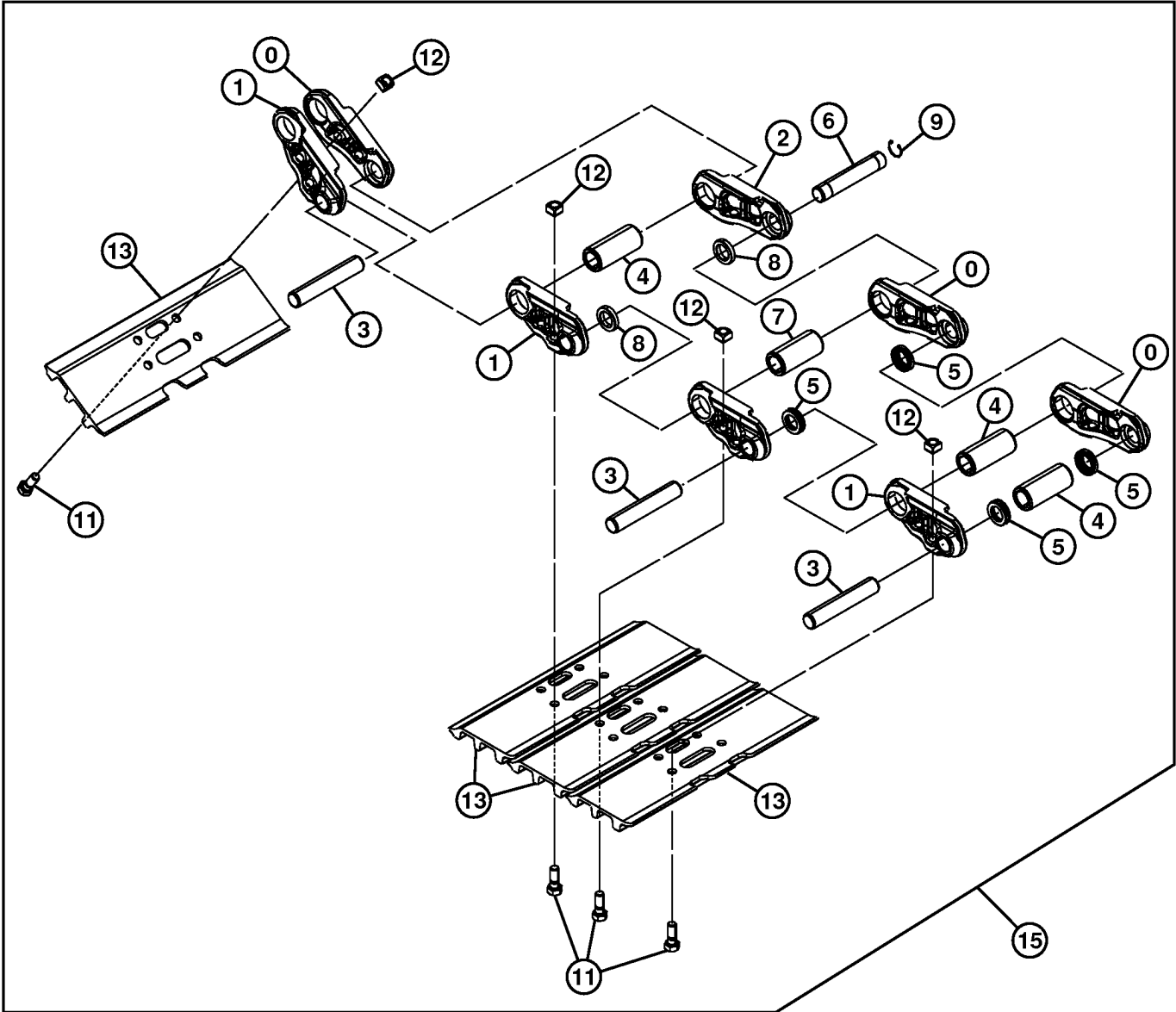
Specification

Track Adjuster Valve—Torque 88 N•m
65 lb-ft

20. Perform Check and Adjust Track Sag. (Operator's Manual.)

HX00125,0000073 -19-13APR06-3/3

Track Chain Disassemble and Assemble



10 — 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

T216244

T216244 -UN-13JAN06

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HX00125,0000074 -19-13APR06-1/4

0—Right Track Link (50 used)	6—Master Track Pin	10—Track Chain without Shoes	15—Track Chain with Shoes
1—Left Track Link (51 used)	7—Master Track Bushing	11—Bolt (204 used)	
2—Master Track Link	8—Master Track Spacer (2 used)	12—Nut (204 used)	
3—Track Pin (50 used)	9—Snap Ring	13—800 mm Open Center 3 Bar Shoe; 700 mm Triple Bar Shoe; 600 mm Open Center 3 Bar Shoe (51 used)	
4—Bushing (50 used)			
5—Seal (100 used)			

Disassemble and Assemble Track Chain—240DLC

1. Measure track components (0-10 and 13). See Track Chain. (SP326 Undercarriage Appraisal Manual.)

NOTE: Wear on pins and bushings does not extend over the entire surface. Turning pins and bushings is determined by the amount of wear.

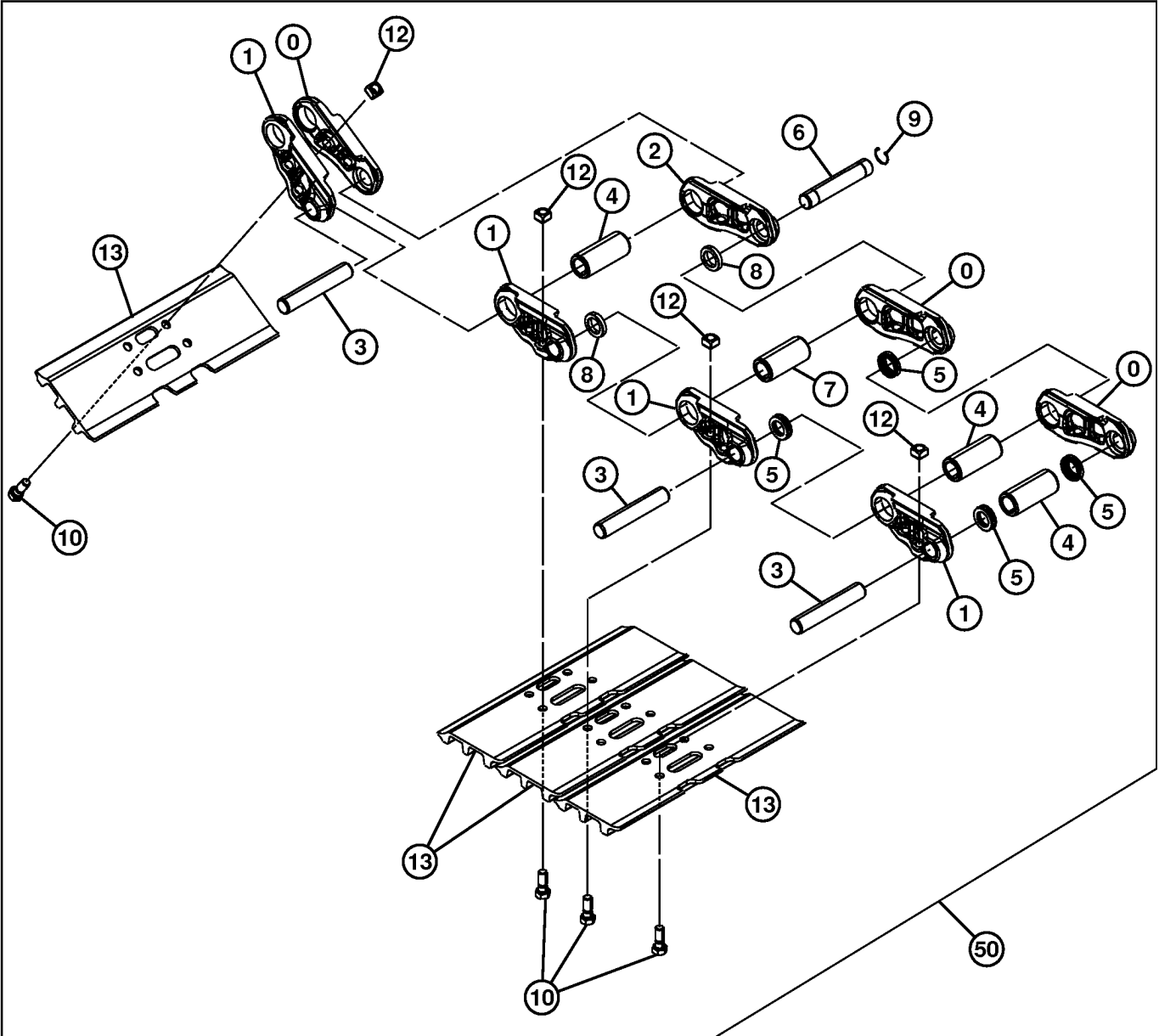
2. Turn pins (3 and 6) and bushings (4 and 7) as required.

3. Clean any dust or rust from surfaces of track link pin bores, counterbores and ends of bushings.
4. Apply grease to counterbore in track links, seals, and ends of bushings.
5. For each joint, fill clearance between pin OD and bushing ID with grease.
6. Install seal (5) so tapered side is toward bushing.

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HX00125,0000074 -19-13APR06-2/4

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TX1002404

TX1002404 -UN-27FEB06

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HX00125,0000074 -19-13APR06-3/4

- | | | | |
|------------------------------|------------------------------|--|--|
| 0—Right Track Link (47 used) | 6—Master Track Pin | 12—Nut (192 used) | 20—Track Chain without Shoes |
| 1—Left Track Link (48 used) | 7—Master Track Bushing | 13—600 mm Open Center 3 Bar Shoe (48 used) and 800 mm Open Center 3 Bar Shoe | 50—600 mm and 800 mm Track Assembly with Shoes |
| 2—Track Link | 8—Master Track Seal (2 used) | | |
| 3—Pin (47 used) | 9—Snap Ring | | |
| 4—Bushing (47 used) | 10—Bolt (192 used) | | |
| 5—Seal (94 used) | | | |

Disassemble and Assemble Track Chain—270DLC

1. Measure track components (0-8 and 13). See Track Chain. (SP326 Undercarriage Appraisal Manual.)

NOTE: Wear on pins and bushings does not extend over the entire surface. Turning pins and bushing is determined by the amount of wear.

2. Turn pins (3 and 6) and bushings (4 and 7) as required.

3. Clean any dust or rust from surfaces of track link pin bores, counterbores and ends of bushings.
4. Apply grease to counterbore in track links, seals, and ends of bushings.
5. For each joint, fill clearance between pin OD and bushing ID with grease.
6. Install seal (5) so tapered side is toward bushing.

HX00125,0000074 -19-13APR06-4/4

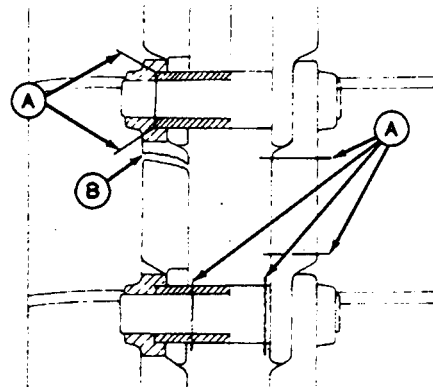
Track Chain Repair

1. Remove track shoes from each side of broken link assembly. See Track Shoe Remove and Install. (See procedure in this group.)

IMPORTANT: When making cuts using cutting torch, be careful not to cut or gouge good parts.

2. Cut links, bushing, and pin at points (A) to remove broken link (B).

A—Cut Locations
B—Broken Link



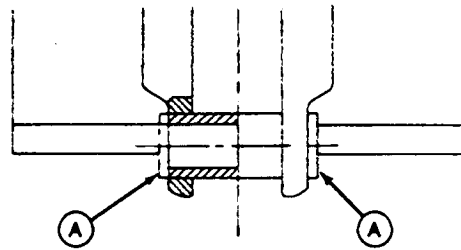
T5821AG -UN-26OCT88

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HX00125,0000075 -19-01MAR06-1/4

3. Grind ends of bushing (A) even with links to make it into a master bushing.

A—Bushing

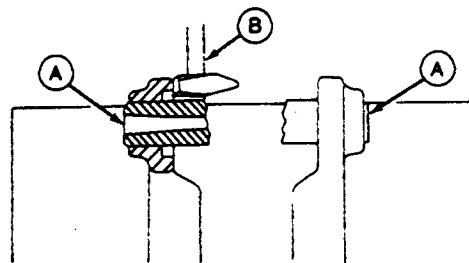


T5821AH -UN-26OCT88

HX00125,0000075 -19-01MAR06-2/4

4. Burn holes through center of pin stubs (A).
5. Hold a heavy hammer (B) against link while pin stub is being driven out.

A—Pin Stub
B—Hammer

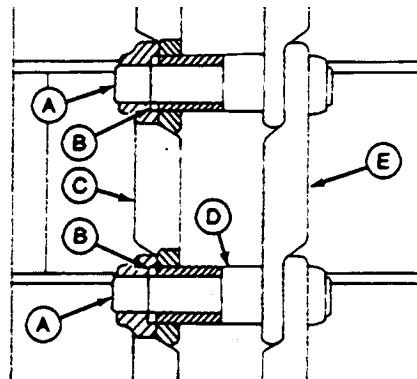


T5821AI -UN-26OCT88

HX00125,0000075 -19-01MAR06-3/4

6. Install links (C and E) on master bushing (D). Check cap screw hole spacing using a track shoe.
7. Instal spacers (B) into counterbore of links.
8. Install link assembly. Install master pins (A).
9. Install track shoes. See Track Shoe Remove and Install. (See procedure in this group.)

A—Master Pin
B—Spacer
C—Right Link
D—Master Bushing
E—Left Link



T5821AJ -UN-24MAY89

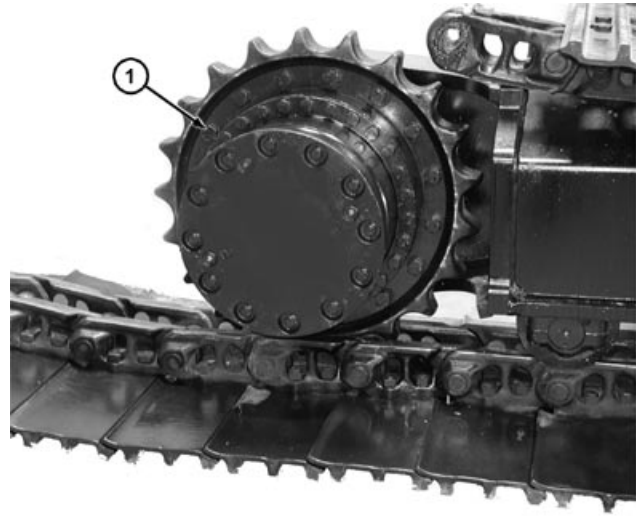
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Sprocket Remove and Install

IMPORTANT: Sprocket must be replaced when the tooth tips become excessively rounded, worn, or chipped to prevent excessive wear to chain. If machine is driven in one direction a majority of the time, wear will be on one side of teeth. To extend service life, change sprockets from one side of machine to the other.

1. Disconnect track chain. See Track Chain Remove and Install. (See procedure in this group.)
2. Lift side of machine so sprocket teeth clear chain.

CAUTION: Heavy component; use appropriate lifting device.



1—Cap Screw (20 used)

Specification

Sprocket—240DLC—Weight..... 46 kg
101 lb

Specification

Sprocket—270DLC—Weight..... 70 kg
150 lb

3. Remove cap screws (1) and sprocket.
4. Apply PM37509 Cure Primer and PM37421 Thread Lock and Sealer (High Strength) to threads of cap screws (B).
5. Install sprocket and tighten cap screws (1).

Specification

Sprocket-to-Travel Gearbox Cap
Screw—Torque..... 500 N•m
369 lb-ft

6. Lower machine.
7. Install track chain. See Track Chain Remove and Install. (See procedure in this group.)

Front Idler Remove and Install

1. Disconnect track chain. See Track Chain Remove and Install. (See procedure in this group.)
2. Slide front idler (A) forward, using pry bar.



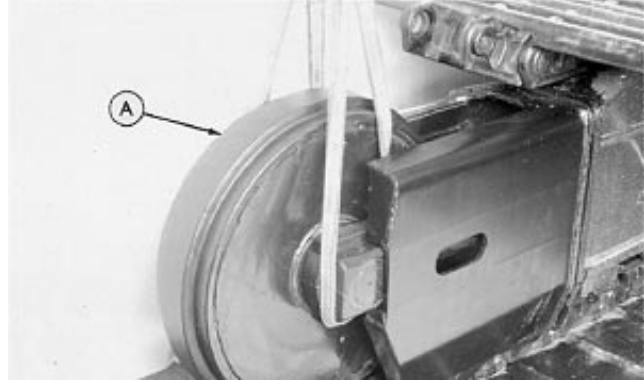
CAUTION: Heavy component; use appropriate lifting device.

Specification

Front Idler—240DLC—Weight..... 119 kg
260 lb

Specification

Front Idler—270DLC—Weight..... 187 kg
412 lb

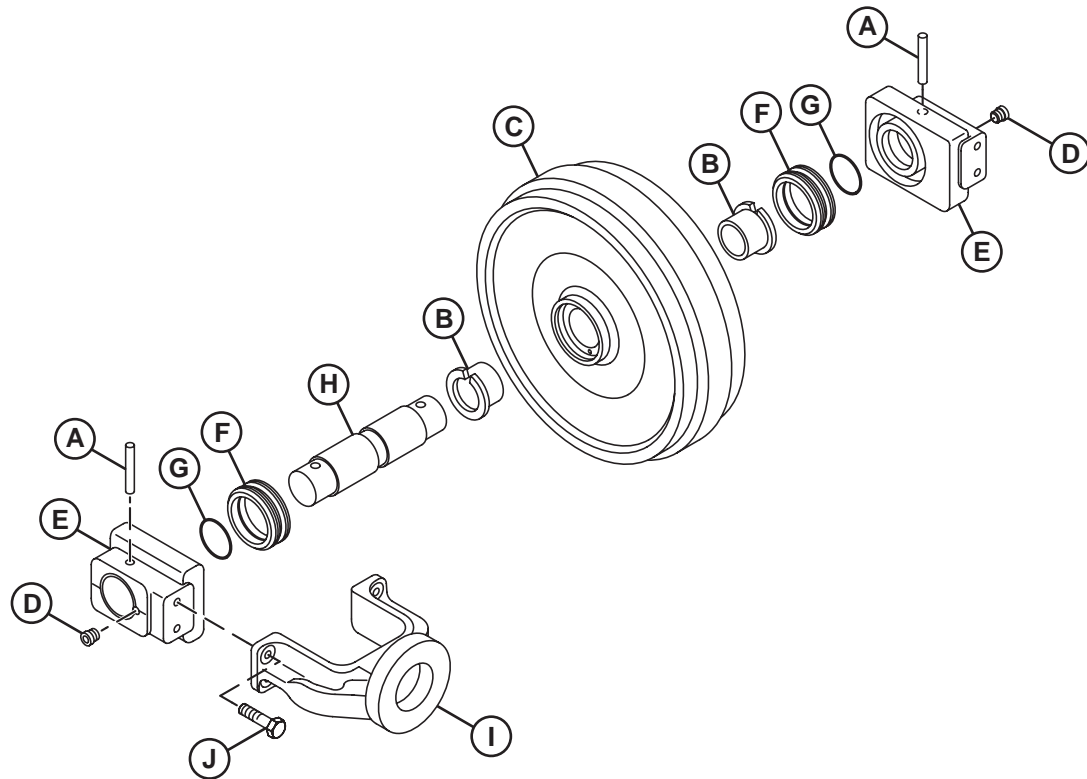


A—Front Idler

3. Attach appropriate lifting device to front idler and remove from frame.
4. Measure front idler wear. See Front Idler Flange Height. (SP326 Undercarriage Appraisal Manual.)
5. Repair or replace idler as necessary. See Front Idler Disassemble and Assemble. (See procedure in this group.)
6. Install front idler.
7. Connect track chain. See Track Chain Remove and Install. (See procedure in this group.)

HX00125,0000077 -19-13APR06-1/1

Front Idler Disassemble and Assemble



T115165

T115165 -JUN-21APR06

A—Pin (2 used)
B—Bushing (2 used)
C—Idler

D—Drain Plug (2 used)
E—Bracket (2 used)
F—Metal Face Seal (2 used)

G—O-Ring (2 used)
H—Axle

I—Yoke
J—Cap Screw (4 used)

CAUTION: Heavy component. Use appropriate lifting device.

set because of wear patterns on seal ring face.

Specification

Yoke—240DLC—Weight 17 kg
37 lb

Specification

Yoke—270DLC—Weight 25 kg
55 lb

1. Remove cap screws (J) and yoke (I).
2. Remove drain plug (D) and drain oil.

IMPORTANT: Metal face seals (F) can be reused if they are not worn or damaged. A used seal must be kept together as a

IMPORTANT: Put matching marks on brackets (E) and axle (H).

3. Remove pins (A), brackets (E), O-rings (G) and metal face seals (F).
4. Inspect metal face seals (F). See Metal Face Seals Inspection. (See procedure in this group.) Keep seal rings together as a matched set with seal ring faces together to protect surfaces.
5. Remove axle (H). Inspect axle (H) and bushings (B) for scoring or excessive wear.

Continued on next page

HX00125,0000078 -19-17APR06-1/2

NOTE: Remove bushings (B) only if replacement is necessary.

6. Remove bushing (B) using a 2-jaw puller and adapters from 17-1/2 and 30-ton puller set.
7. Apply a thin film of oil to new bushings (B). Install bushings (B) so flange is tight against shoulder of idler (C).
8. Apply a thin layer of anti-seize lubricant or equivalent to end of axle (H) and to bore in brackets (E).

IMPORTANT: Seat surfaces for O-rings must be clean, dry, and oil free so O-rings do not slip when idler is turning.

9. Thoroughly clean seat surfaces in idler (C), brackets (E), and seal rings using volatile, non-petroleum base solvent and lint-free tissues.

NOTE: A volatile, non-petroleum base solvent or talcum powder may be used as a lubricant.

10. Install metal face seal (F) in bracket (E). Apply equal pressure with fingers at four equally spaced points on seal face. Seal must "pop" down into place so O-ring is tight against seal bore.
11. Wipe finger prints and foreign material off seal ring face using clean oil and lint-free tissues. Apply a thin film of oil to each seal face.

NOTE: Repeat steps 12 and 13 for installing opposite side metal face seal (F) and bracket (E) in idler.

12. Install axle (H) into idler.

13. Install O-rings (G) on axle.
14. Install brackets (E) onto axle (H).
15. Apply anti-seize lubricant or equivalent to pins (A). Install pins.
16. Add oil through plug holes on bearing brackets (E) to specification.

Specification

Front Idler Oil—240DLC—
Capacity 265 mL
8.96 oz

Specification

Front Idler Oil—270DLC—
Capacity 300 mL
10.14 oz

17. Apply PM37509 Cure Primer to threads of drain plug (D).
18. Apply PM37418 Thread Lock and Sealer (Medium Strength) to threads of plug.
19. Install and tighten plug (D) to specification.

Specification

Front Idler Plug—Torque 30 N•m
22 lb-ft

20. Install yoke (I). Tighten cap screws (J) to specification.

Specification

Yoke-to-Bracket Cap Screw—
Torque 206 N•m
150 lb-ft

HX00125,0000078 -19-17APR06-2/2

Track Adjuster and Recoil Spring Remove and Install

1. Remove track chain. See Track Chain Remove and Install. (See procedure in this group.)
2. Remove front idler. See Front Idler Remove and Install. (See procedure in this group.)



CAUTION: Spring or rod may break if dropped while handling, transporting or disassembling. Nicks or weld craters in spring and rod assembly can cause stress concentration resulting in a weak spot. Weak spots may result in immediate or eventual failure creating a risk of personal injury. Put a heavy protective covering around spring assembly when handling, transporting, or disassembling track adjuster.

A compression tool must be used for disassembly and assembly because of the extreme preload on spring.

Continued on next page

HX00125,0000079 -19-13APR06-1/2

3. Slide track adjuster (A) forward, using a pry bar.



CAUTION: Heavy component; use appropriate lifting device.

Specification

Track Adjuster Cylinder and Recoil Spring —240DLC—Weight	135 kg 300 lb
--	------------------

Specification

Track Adjuster Cylinder and Recoil Spring—270DLC—Weight.....	185 kg 410 lb
--	------------------



T6557CX -UN-25OCT88

A—Track Adjuster

4. Attach appropriate lifting device to track adjuster and remove from frame.
5. Repair or replace parts as necessary. See Track Adjuster and Recoil Spring Disassembly and Assembly. (See procedure in this group.)
6. Install front idler. See Front Idler Remove and Install. (See procedure in this group.)
7. Install track chain. See Track Chain Remove and Install. (See procedure in this group.)

HX00125,0000079 -19-13APR06-2/2

Track Adjuster and Recoil Spring Disassemble and Assemble

CAUTION: Spring or rod may break if dropped while handling, transporting or disassembling. Nicks or weld craters in spring and rod assembly can cause stress concentration resulting in a weak spot. Weak spots may result in immediate or eventual failure creating a risk of personal injury. Put a heavy protective covering around spring assembly when handling, transporting, or disassembling track adjuster.

A compression tool must be used for disassembly and assembly because of the extreme preload on spring.

CAUTION: Heavy component; use appropriate lifting device.

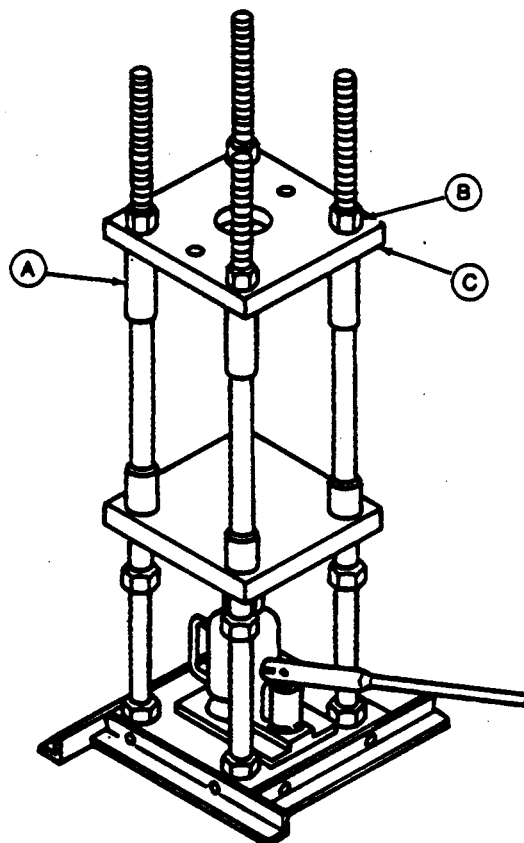
Specification

Track Recoil Spring Disassembly and Assembly Tool—Weight.....	225 kg
	496 lb

1. Place an 18-t (20-ton) jack on bottom of ST4920 Track Recoil Spring Disassembly and Assembly Tool (A). Remove nuts (B) and top plate (C). (Group 9900.)

NOTE: It is not necessary to remove the recoil spring to replace wear ring and U-ring packing on piston. To replace O-ring in the cylinder, remove recoil spring and rod.

2. Remove nuts (B). Remove top plate (C).



A—ST4920 Track Recoil Spring Disassembly and Assembly Tool
B—Nut
C—Top Plate

01
0130
25

T6557DY -UN-25OCT88

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HX00125,000007A -19-19APR06-1/5



CAUTION: Heavy component; use appropriate lifting device.

Specification

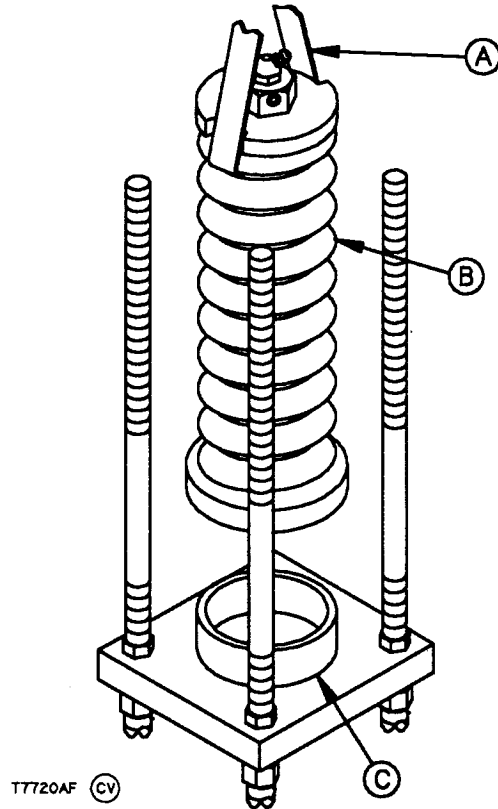
Track Adjuster Cylinder and
Recoil Spring—240DLC—Weight..... 135 kg
300 lb

Specification

Track Adjuster Cylinder and
Recoil Spring—270DLC—Weight..... 185 kg
410 lb

3. Connect appropriate lifting device to track adjuster (B) using a lifting strap (A).
4. Put track adjuster in assembly tool with cylinder end on DFT1110 Spacer (C). (Group 9900.)
5. Remove lifting strap.

A—Lifting Strap
B—Track Adjuster
C—DFT1110 Spacer



T7720AF -UN-28APR92

Continued on next page

HX00125,000007A -19-19APR06-2/5

6. Install DFT1087 Track Recoil Spring Disassembly and Assembly Guard Tool (F). (Group 9900.)
7. Install plate top (A) and nuts (B) with smallest opening to allow access to nut (D).
8. Extend jack ram to provide enough travel to release spring to the approximate free length.

Specification

Recoil Spring—240DLC—Free

Length..... 641 mm
25.2 in.

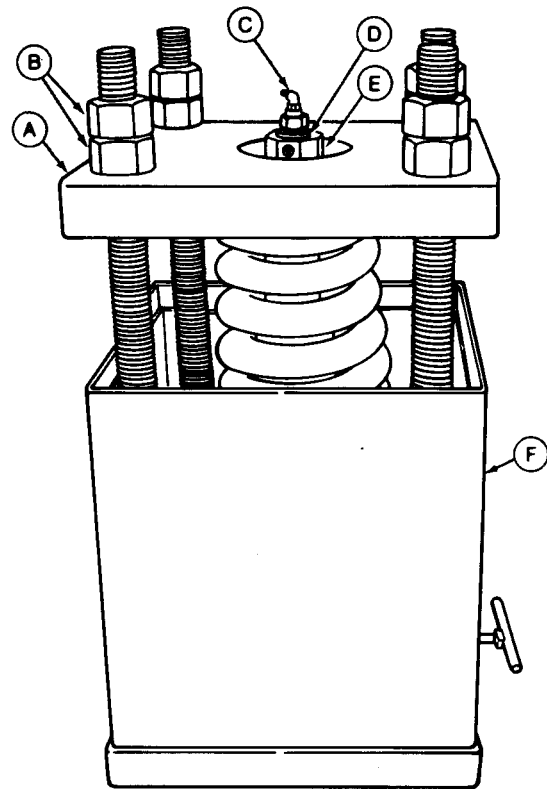
Specification

Recoil Spring—270 DLC—Free

Length..... 667 mm
26.3 in.

9. Tighten nuts (B) so top plate (A) is tight against retainer plate.
10. Remove valve (C) and special plug (E).

A—Top Plate
B—Nut (8 used)
C—Valve
D—Nut
E—Special Plug
F—DFT1087 Track Recoil Spring Disassembly and Assembly Guard Tool



01
0130
27

T7720AG -UN-28APR92

Continued on next page

HX00125,000007A -19-19APR06-3/5

11. Raise upper half of guard tool (F). Tighten T-handles.

12. Operate jack to compress spring just enough so nut (D) can be removed.

13. Lower jack ram to release spring force.

14. Repair or replace parts as necessary.

15. If disassembly of track adjuster cylinder is necessary, see Track Adjuster Cylinder Disassemble and Assemble. (See procedure in this group.)

16. Put track adjuster cylinder in assembly tool with cylinder end on spacer.

17. Install spacer on rod.

18. Install spring using appropriate lifting device and lifting strap.

Specification

Recoil Spring—240DLC—Weight..... 71 kg
160 lb

Specification

Recoil Spring—270DLC—Weight..... 90 kg
200 lb

19. Install retainer plate.

20. Install guard tool.

21. Install top plate. Install nuts.

22. Raise upper half of guard tool. Tighten T-handles.

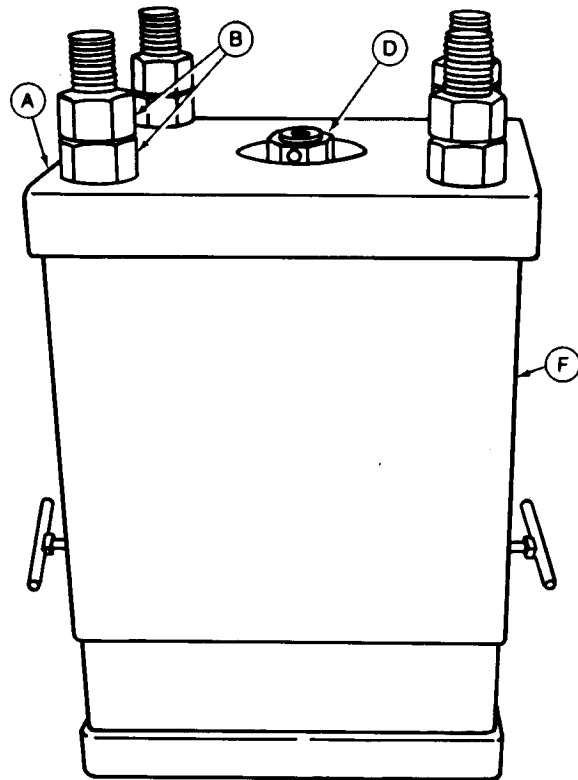
23. Operate jack to compress spring to the compressed length.

Specification

Recoil Spring—240DLC—
Compressed Length 525 mm
20.7 in.

Specification

Recoil Spring—270DLC—
Compressed Length 557 mm
21.9 in.



A—Top Plate

B—Nut (8 used)

D—Nut

F—DFT1087 Track Recoil Spring Disassembly and Assembly Guard Tool

T7720AH -UN-28APR92

Continued on next page

HX00125,000007A -19-19APR06-4/5

24. Install nut (D) so hole is aligned with hole in rod.
Install special plug.

25. Tighten special plug to specification.

Specification

Special Plug—Torque..... 15 N•m
133 lb-in.

26. Tighten valve.

Specification

Track Adjuster and Recoil Spring
Valve—Torque..... 88 N•m
65 lb-ft

HX00125,000007A -19-19APR06-5/5

Track Adjuster Cylinder Disassemble and Assemble



CAUTION: Spring or rod may break if dropped while handling, transporting or disassembling. Nicks or weld craters in spring and rod assembly can cause stress concentration resulting in a weak spot. Weak spots can result in immediate or eventual failure of spring or rod creating a risk of personal injury. Put a heavy protective covering around spring assembly when handling, transporting, or disassembling.

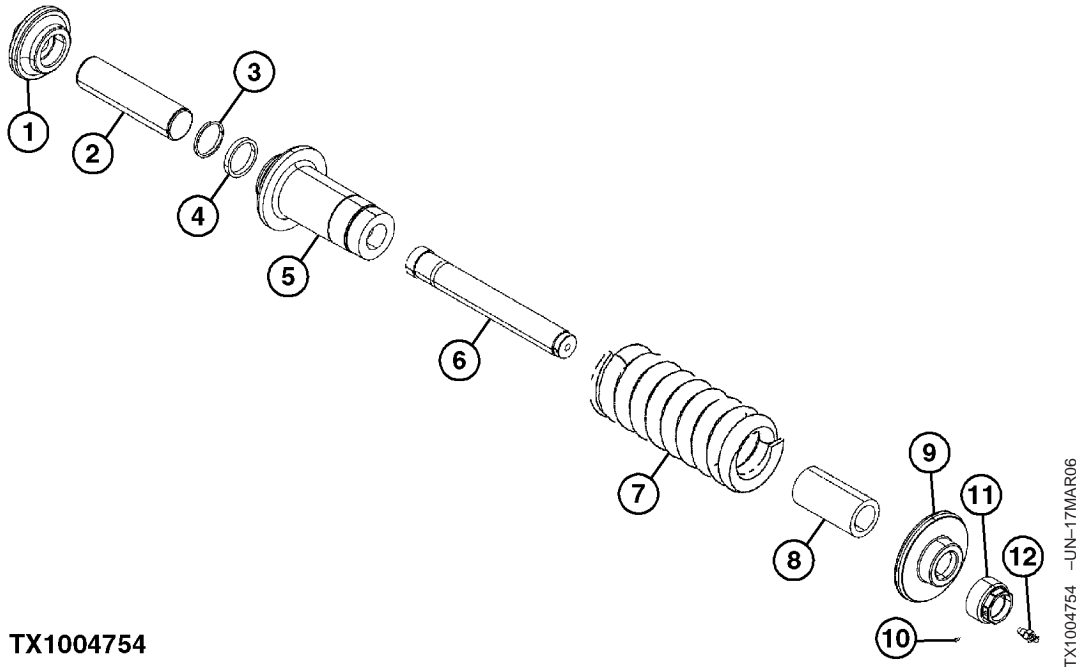
A compression tool must be used for disassembly and assembly because of the extreme preload on spring.

NOTE: It is not necessary to remove the recoil spring to replace dust seal (3) and U-ring packing (4). It is necessary to remove the recoil spring to replace rod (6).

1. Remove piston rod (2) from cylinder (5).

Continued on next page

HX00125,000007B -19-17APR06-1/2



TX1004754

1—Holder
2—Piston Rod
3—Dust Seal

4—U-Ring
5—Cylinder
6—Rod

7—Spring
8—Spacer
9—Washer

10—Plug
11—Nut
12—Grease Valve

2. Remove holder (1) from piston rod (2) using a press.

IMPORTANT: Do not damage dust seal (3) and U-ring (4).

3. Remove dust seal (3) and U-ring (4) from cylinder (5).
4. Remove recoil spring if necessary. See Track Adjuster and Recoil Spring Remove and Install. (See procedure in this group.)
5. Remove rod (6) from cylinder (5).
6. Repair or replace parts as necessary.
7. Install rod (6) into cylinder (5).

8. Install spring (7), spacer (8), washer (9), plug (10), nut (11), and grease valve (12). See Track Adjuster and Recoil Spring Disassemble and Assemble. (See procedure in this group.)

9. Apply grease to inner surfaces of U-ring (4) and dust seal (3)

NOTE: Install U-ring (4) with lip towards inside of cylinder (5).

10. Install U-ring (4) and dust seal (3) into cylinder (5).
11. Press holder (1) into piston rod (2).
12. Install piston rod (2) assembly into cylinder (5).

HX00125,000007B -19-17APR06-2/2

Axles, Differentials and Suspension Systems

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Group 0260—Hydraulic System

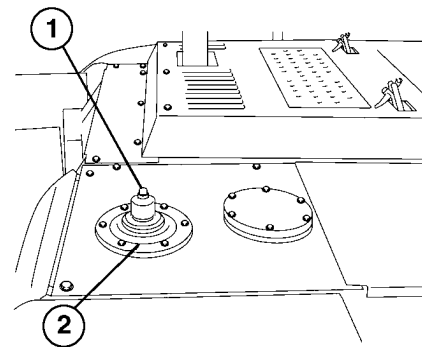
Travel Motor and Park Brake Remove and Install—240DLC.	02-0260-1
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Travel Gearbox Remove and Install

1. Disconnect track chain. See Track Chain Repair. (Group 0130.)
2. Remove sprocket. See Sprocket Repair. (Group 0130.)

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

3. Push pressure release button (1).
4. Remove cover from track frame.
5. Drain oil from travel gearbox.
6. Drain oil from hydraulic oil tank or pull vacuum in hydraulic oil tank using vacuum pump. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) The approximate capacity of hydraulic oil tank is 147.6 L (39 gal).
7. Tag and disconnect lines. Close all open lines and fittings using caps and plugs.



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

T214924 -JUN-17NOV05

Continued on next page

RO33873,0000A58 -19-21APR06-2/3



CAUTION: Heavy component; use appropriate lifting device.

8. Attach appropriate lifting device to travel gearbox using lifting straps.

Specification

Travel Gearbox and Motor Assembly (240DLC)—	
Approximate Weight	330 kg 728 lb
Travel Gearbox and Motor Assembly (270DLC)—	
Approximate Weight	460 kg 1014 lb

NOTE: Make alignment marks between travel gearbox and undercarriage to aid in installation.

9. Remove cap screws (1). Remove travel gearbox and motor assembly.

10. Repair or replace parts as necessary.

NOTE: Align marks made during removal.

11. Install travel gearbox and motor assembly. Tighten cap screws (1).

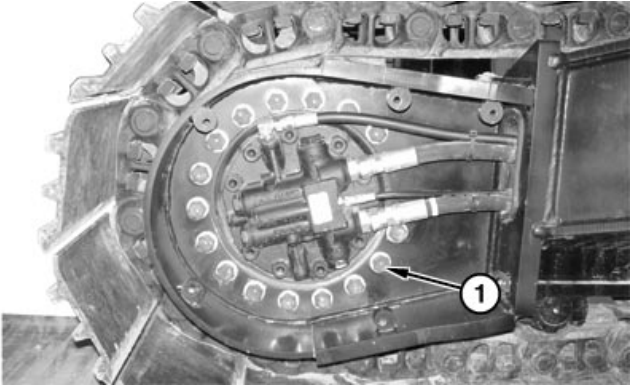
Specification

Travel Gearbox-to-Frame Cap Screw—Torque.....	630 N•m 460 lb-ft
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12. Connect lines. See Travel System Component Location. (Group 9025-15.)

13. Fill travel gearbox with oil. See Check Travel Gearbox Oil Level. (Operator's Manual.)

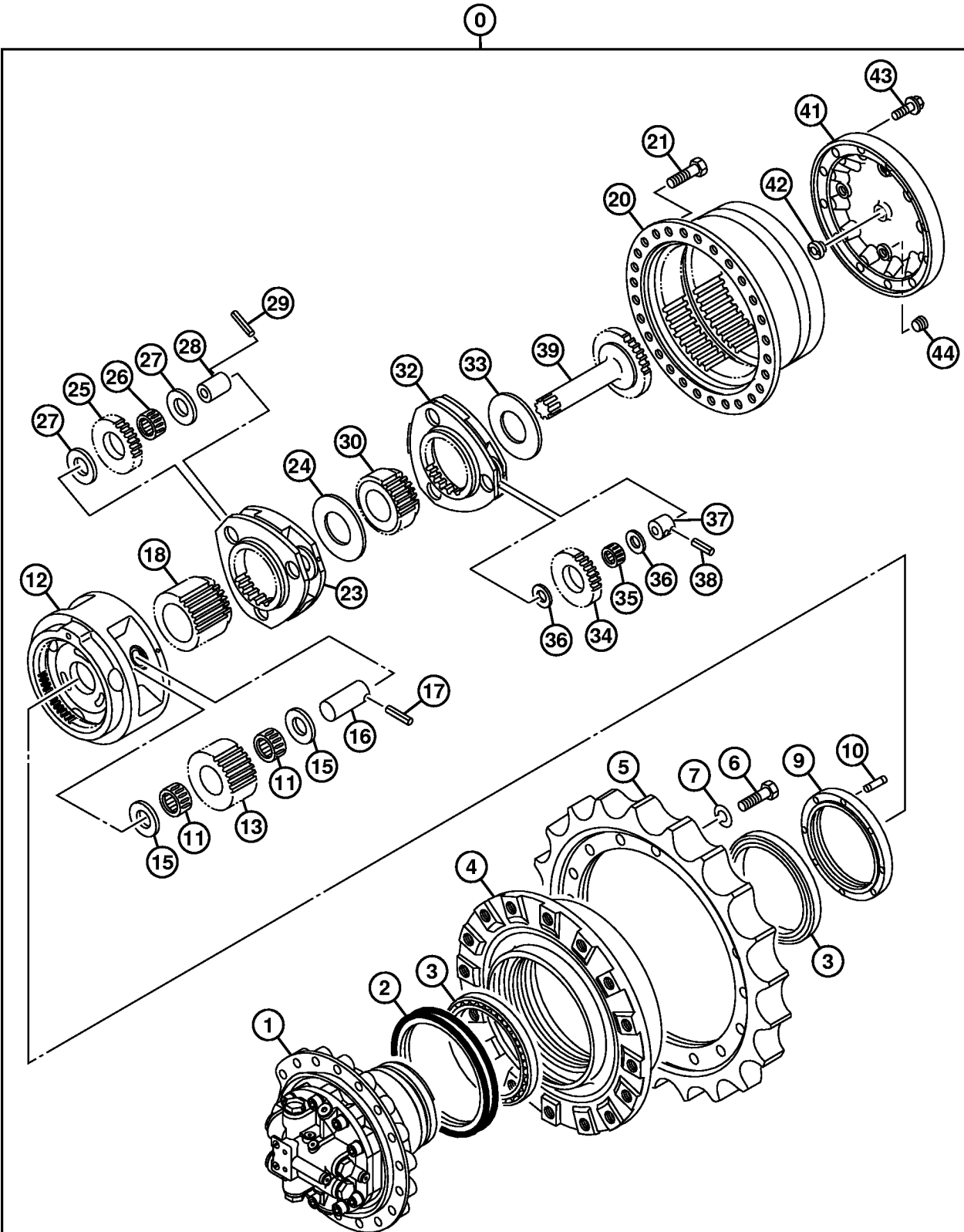
14. Do Travel Motor and Park Brake Start-Up Procedure. (Group 0260.)



TX1002979A -UN-23JAN06

1—Cap Screw (240DLC—16 used); (270DLC—20 used)

Travel Gearbox Disassemble and Assemble—240DLC



TX1000629

TX1000629 -UN-28NOV05

Continued on next page

RO33873,0000A59 -19-19APR06-1/5

0—Hydraulic Motor and Gearbox Assembly
1—Hydraulic Motor
2—Seal (2 used)
3—Tapered Roller Bearing (2 used)
4—Drum
5—Chain Sprocket
6—Cap Screw (20 used)
7—Lock Washer (20 used)
9—Bearing Nut

10—Pin Fastener
11—Needle Bearing (6 used)
12—Third Planetary Pinion Carrier
13—Planetary Gear (3 used)
15—Plate (6 used)
16—Pin Fastener (3 used)
17—Spring Pin (3 used)
18—Third Sun Gear
20—Ring Gear
21—Cap Screw (28 used)

23—Second Planetary Pinion Carrier
24—Washer
25—Planetary Gear (3 used)
26—Needle Bearing (3 used)
27—Plate (6 used)
28—Pin Fastener (3 used)
29—Pin Fastener (3 used)
30—Second Sun Gear
32—First Planetary Pinion Carrier

33—Spacer
34—Planetary Gear (3 used)
35—Needle Bearing (3 used)
36—Plate (6 used)
37—Spacer (3 used)
38—Spring Pin (3 used)
39—Shaft
41—Cover
42—Pin
43—Cap Screw (12 used)
44—Fitting Plug (3 used)

1. Remove cap screws (43) and cover (41).
2. Remove shaft (39) and first planetary pinion carrier (32).
3. Remove second sun gear (30) and second planetary pinion carrier (23) from ring gear (20).

 **CAUTION: Heavy component; use appropriate lifting device.**

Specification

Ring Gear—Approximate Weight..... 64 kg
140 lb

4. Install JT01748 Lifting Brackets to ring gear (20). Remove cap screws (21) and ring gear from drum (4).

 **CAUTION: Heavy component; use appropriate lifting device.**

Specification

Third Planetary Pinion Carrier—Approximate Weight 40 kg
88 lb

5. Remove third sun gear (13) and third planetary pinion carrier (12).
6. Remove bearing nut (9) from travel motor (1) using DFT1221 Travel Gearbox Nut Wrench. (Group 9900.)

 **CAUTION: Heavy component; use appropriate lifting device.**

Specification

Drum—Approximate Weight..... 59 kg
130 lb

7. Remove drum (4) using JT01748 Lifting Brackets.

NOTE: Disassembly of first, second, and third planetary pinion carriers are similar. Repeat procedure as required.

8. Remove spring pins, pins, thrust plates, needle bearings, and planetary gears.

Clean and inspect parts, replace as necessary. Oil parts with gear oil prior to assembly.

IMPORTANT: Metal face seals can be reused if they are not worn or damaged. A used seal must be kept together as a set because of wear patterns on seal ring face.

9. Remove metal face seal (2). See Metal Face Seals Repair. (Group 0130.)

10. Replace parts as necessary.

NOTE: Further disassembly is not necessary unless bearing replacement is required. Bearing will be destroyed during removal, replace with new bearing.

11. Inspect bearing (3) and race inside drum (4).

02
0250
5



CAUTION: DO NOT heat oil over 182°C (260°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. DO NOT allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area. Plan a safe handling procedure to avoid burns.

12. Heat inner bearing cone. Install cone tight against shoulder.

Specification

Bearing Cone—Temperature.....	50—70°C 122—158°F
-------------------------------	----------------------

13. Install drum (4).

IMPORTANT: Metal face seal O-rings and seat surfaces for O-rings must be clean, dry, and oil free so O-ring does not slip.

14. Thoroughly clean metal face seal O-rings and seat surfaces in travel motor ring gear, drum, and seal ring using volatile, non-petroleum base solvent and lint-free tissues.

NOTE: A volatile, non-petroleum base solvent or talcum powder can be used as a lubricant. Solvent must not damage the O-ring or leave an oil residue.

15. Install O-ring and metal face seal on travel motor ring gear and drum. Apply equal pressure with

fingers at four equally spaced points on seal face. Seal must “pop” down into place so O-ring is tight against seal bore and seal ring is installed squarely.

16. Clean seal ring face. Apply a thin film of clean oil.
17. Install drum (4) onto hydraulic motor (1).
18. Apply a thin coat of multi-purpose grease to threads of bearing nut (9). Install bearing nut with machined surface towards bearing.
19. Tighten bearing nut (9) using DFT1221 Travel Gearbox Nut Wrench. (Group 9900.) Seat bearings.

Specification

Bearing Nut—Torque.....	790 N•m (580 lb-ft); then tap on drum using a plastic hammer, turn drum 4—5 turns to the right and left to seat the bearings.
-------------------------	--

20. To seat bearings, tap on drum using a plastic hammer. Then turn drum four-to- five times to the right and left to seat the bearings.

Repeat steps to ensure bearings are seated properly.

21. Ensure center of dowel pin (10) is aligned with center of spline on travel motor (39). If centers are not aligned tighten bearing nut (9) until dowel pin center aligns with center of the next spline.

NOTE: Assembly of first, second, and third planetary pinion carrier assemblies is similar. Repeat procedure as required.

22. Install needle bearings (11) into planetary gears (13).

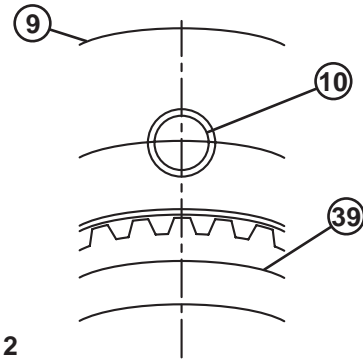
IMPORTANT: There is an identification groove on one side of third planetary gears (16). Be sure that this marked side faces the hole for the spring pin.

23. Install thrust plates (15) and planetary gears (13) into third planetary pinion carrier (12).

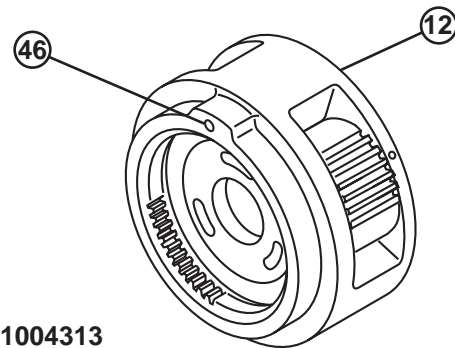
24. Install pins (16).

- 9—Bearing Nut
10—Dowel Pin
12—Third Planetary Pinion Carrier
39—Travel Motor
46—Hole

TX1004312



TX1004313



TX1004312 -JUN-14MAR06

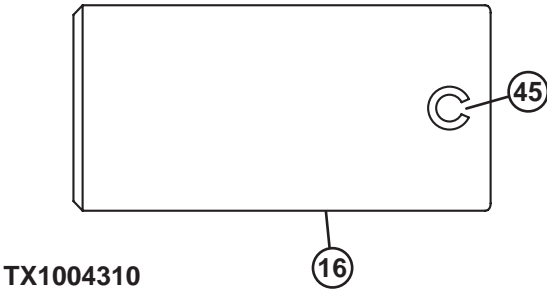
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TX1004313 -JUN-14MAR06

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RO33873.0000A59 -19-19APR06-4/5

25. Install spring pins (17) with slit (45) toward end of pins (16).
26. Assemble second and first planetary pinion carrier assemblies.
27. Install third planetary pinion carrier so dowel pin (10) enters hole (46) on third planetary pinion carrier (12).
28. Apply PM38656 Rigid Form-in-Place gasket to flange surface on ring gear.
29. Install ring gear (20) onto drum (4).
30. Apply PM37421 Thread Lock and Sealer (high strength) to cap screws (21). Install and tighten cap screws.



TX1004310

16—Pin
45—Slit

TX1004310 -UN-14MAR06

Specification

Ring Gear-to-Drum Cap Screw—
Torque 265 N•m
195 lb-ft

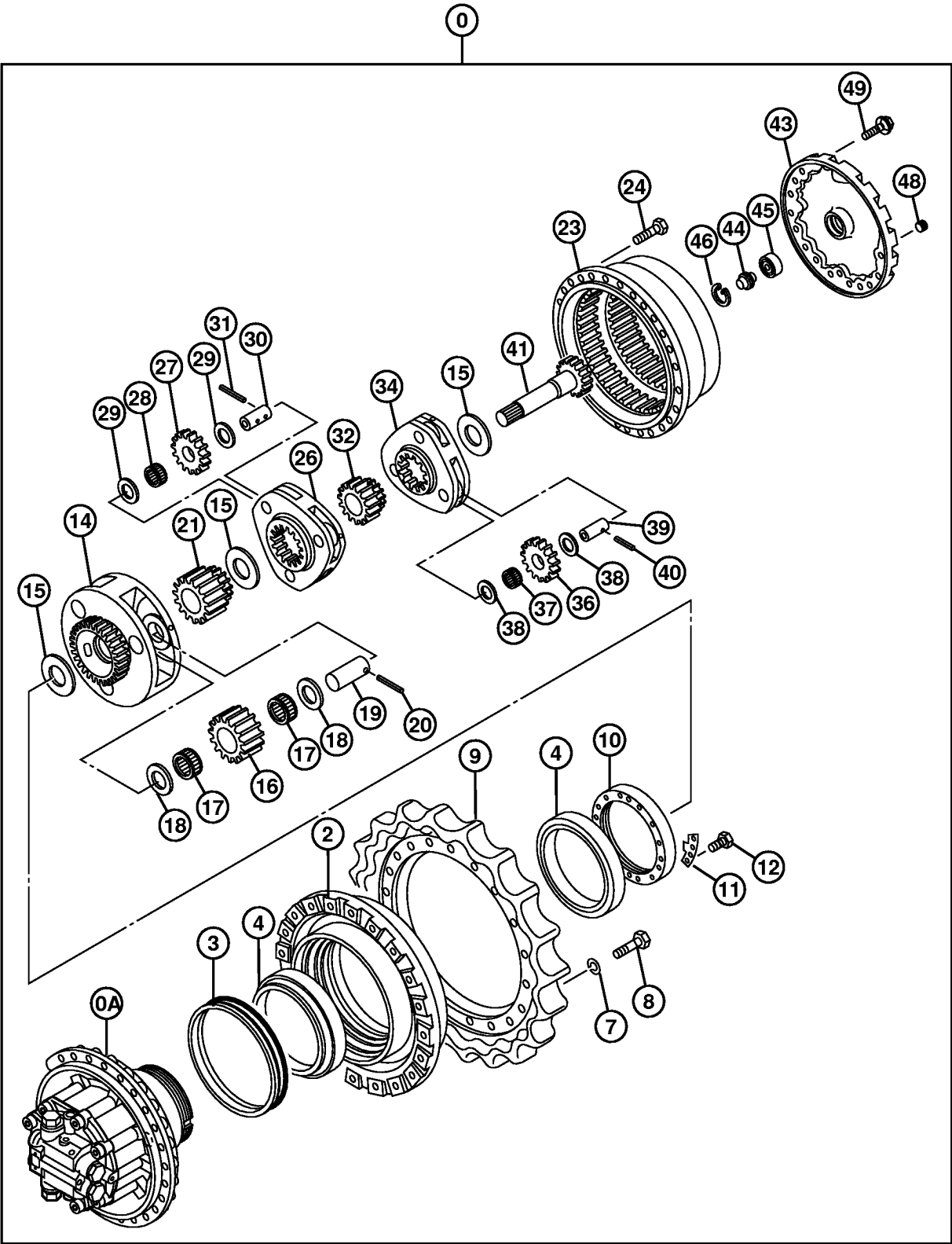
31. Install second and first planetary pinion carriers, sun gears, and shaft.
32. Apply PM38656 Form-in-Place gasket to flange surface on cover (41).
33. Install cover on ring gear (20).
34. Apply PM37418 Thread Lock and Sealer (medium strength) to thread of cap screws (43). Install and tighten cap screws.

Specification

Cover-to-Ring Gear Cap Screw—
Torque 110 N•m
83 lb-ft

RO33873,0000A59 -19-19APR06-5/5

Travel Gearbox Disassemble and Assemble—270DLC



TX1000669

TX1000669 -UN-29NOV05

0—Hydraulic Motor and Gearbox Assembly	14—Third Planetary Pinion Carrier	26—Second Planetary Pinion Carrier	37—Needle Bearing (3 used)
2—Drum	15—Spacer (3 used)	27—Planetary Gear (3 used)	38—Shim (6 used)
3—Seal	16—Planetary Gear (3 used)	28—Needle Bearing (3 used)	39—Pin (3 used)
4—Tapered Roller Bearing (2 used)	17—Needle Bearing (6 used)	29—Shim (6 used)	40—Spring Pin (3 used)
7—Lock Washer	18—Thrust Washer (6 used)	30—Pin (3 used)	41—Shaft
8—Cap Screw (24 used)	19—Pin (3 used)	31—Spring Pin (3 used)	43—Cover
9—Chain Sprocket	20—Spring Pin (3 used)	32—Second Sun Gear	44—Pilot Pin
10—Bearing Nut	21—Third Sun Gear	34—First Planetary Pinion Carrier	45—Ball Bearing
11—Lock Plate	23—Ring Gear	36—Planetary Gear (3 used)	46—Snap Ring
12—Cap Screw (2 used)	24—Cap Screw (28 used)		48—Fitting Plug (3 used)
			49—Cap Screw (16 used)


1. Make alignment marks between cover (43), ring gear (23) and drum (2).
2. Remove cap screws (8) and cover (43).
3. Remove snap ring (46), pilot pin (44), and ball bearing (45).
4. Remove shaft (41) and first planetary pinion carrier (34) from ring gear (23).
5. Remove second sun gear (32), second planetary pinion carrier (26), and third sun gear (21) from ring gear (23).

 **CAUTION: Heavy component; use appropriate lifting device.**

Specification

Ring Gear—Approximate Weight..... 55 kg
121 lb

6. Install JT01748 Lifting Brackets to ring gear (23). Remove cap screws (24) and ring gear from drum (2).

 **CAUTION: Heavy component; use appropriate lifting device.**

Specification

Third Planetary Pinion Carrier—
Approximate Weight 52 kg
115 lb

7. Remove third planetary pinion carrier (14).

8. Remove cap screws (12) and lock plate (11) from bearing nut (10).
9. Remove bearing nut (10) using DFT1221 Travel Gearbox Nut Wrench. (Group 9900.)

 **CAUTION: Heavy component; use appropriate lifting device.**

Specification

Drum—Approximate Weight 70 kg
154 lb

10. Remove drum (2) using JT01748 Lifting Brackets from hydraulic motor (0).

IMPORTANT: Metal face seals can be reused if they are not worn or damaged. A used seal must be kept together as a set because of wear patterns on seal ring face.

11. Remove metal face seal (3). See Metal Face Seals Repair. (Group 0130.)

NOTE: Disassembly of first, second, and third planetary pinion carriers are similar. Repeat procedure as required.

12. Remove spring pins, pins, thrust plates, needle bearings, and planetary gears.

Clean and inspect parts, replace as necessary. Oil parts with gear oil prior to assembly.

NOTE: Further disassembly is not necessary unless bearing replacement is required. Bearing will be destroyed during removal, replace with new bearing.

- 13. Inspect bearings (4) and races inside ring gear.
- 14. Replace parts as necessary.

CAUTION: DO NOT heat oil over 182°C (260°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. DO NOT allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area. Plan a safe handling procedure to avoid burns.

- 15. Heat inner bearing cone. Install cone tight against shoulder.

Specification	
Bearing Cone—Temperature.....	50—70°C 122—158°F

IMPORTANT: Metal face seal O-rings and seat surfaces for O-rings must be clean, dry, and oil free so O-ring does not slip.

- 16. Thoroughly clean metal face seal O-rings and seat surfaces in travel motor ring gear, drum, and seal ring using volatile, non-petroleum base solvent and lint-free tissues.

NOTE: A volatile, non-petroleum base solvent or talcum powder can be used as a lubricant. Solvent must not damage the O-ring or leave an oil residue.

- 17. Install O-ring and metal face seal on travel motor ring gear and drum. Apply equal pressure with fingers at four equally spaced points on seal face. Seal must “pop” down into place so O-ring is tight against seal bore and seal ring is installed squarely.

- 18. Clean seal ring face. Apply a thin film of clean oil.

IMPORTANT: Install bearing nut with stepped surface towards bearing.

- 19. Apply a thin coat of multi-purpose grease to bearing nut (10). Tighten bearing nut using DFT1221 Travel Gearbox Bearing Nut Wrench. (Group 9900.)

Specification	
Bearing Nut—Torque.....	790 N•m (580 lb-ft); then tap on drum using a plastic hammer. Then turn drum four-to-five times to the right and left to seat the bearings.

- 20. To seat bearings, tap on drum using a plastic hammer. Then turn drum four-to- five times to the right and left to seat the bearings.

Repeat steps to ensure bearings are seated properly.

NOTE: If lock plate (11) will not engage with spline of ring gear tighten bearing nut (10) until lock plate engages.

- 21. Install lock plate (11). Apply PM37421 Thread Lock and Sealer (high strength) to threads of cap screws (12). Tighten cap screws.

Specification	
Lock Plate-to-Nut Cap Screw—Torque.....	88 N•m 65 lb-ft

NOTE: Assembly of first, second, and third planetary pinion carrier assemblies is similar. Repeat procedure as required.

- 22. Install needle bearings (17) into planetary gears (16).

IMPORTANT: There is an identification groove on one side of third planetary gears (16). Be sure that this marked side faces the hole for the spring pin.

23. Install planetary gears (16) and thrust plates (18) into third planetary pinion carrier (14).

24. Install pins (19).

RO33873.0000A5A -19-22MAR06-4/5

25. Install spring pins (20) with slit toward end of pin (19).

26. Assemble first and second planetary pinion carrier assemblies.

27. Install third planetary pinion carrier (14) and third sun gear (21).

28. Apply PM38627 Rigid Form-in-Place gasket to flange surface on ring gear (23).

29. Install ring gear (23) onto drum (2).

30. Apply PM37421 Thread Lock and Sealer (high strength) to cap screws (24). Install and tighten cap screws.



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19—Pin
20—Spring Pin

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13

Specification

Ring Gear-to-Drum Cap Screw—
Torque 265 N•m
195 lb-ft

31. Install second and first planetary pinion carriers, sun gears, and shaft.

32. Inspect ball bearing (45), replace if necessary.

33. Install ball bearing (45), pilot pin (44), and snap ring (46).

34. Apply PM38656 Rigid Form-in-Place gasket to flange surface on cover (43).

35. Install cover (43) on ring gear (23).

36. Apply PM37418 Thread Lock and Sealer (medium strength) to thread of cap screws (49). Install and tighten cap screws.

Specification

Cover-to-Ring Gear Cap Screw—
Torque 110 N•m
83 lb-ft

RO33873.0000A5A -19-22MAR06-5/5

02
0250
14

Travel Motor and Park Brake Remove and Install—240DLC



CAUTION: Prevent possible injury from unexpected machine movement. Block both tracks when removing travel motors. When travel motors are removed, machine has no brakes and can move. The machine will roll free on a slope or while being towed.

1. Block tracks.
2. Drain oil from travel gearbox. Approximate capacity is 7.8 L (8.2 qt).

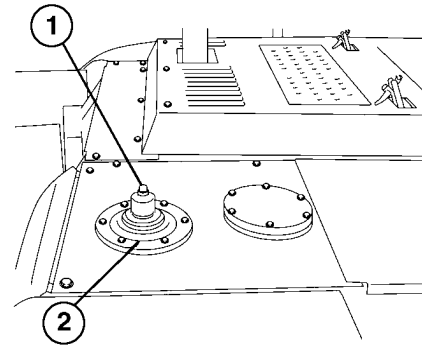
RO33873,0000A61 -19-19APR06-1/5

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1



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

3. Push pressure release button (1).
4. Drain oil from hydraulic oil tank or pull vacuum in hydraulic oil tank using vacuum pump. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) The approximate capacity of hydraulic oil tank is 147.6 L (39 gal).



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

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5. Tag and disconnect lines. Close all open lines and fittings using caps and plugs.

CAUTION: Heavy component; use appropriate lifting device.

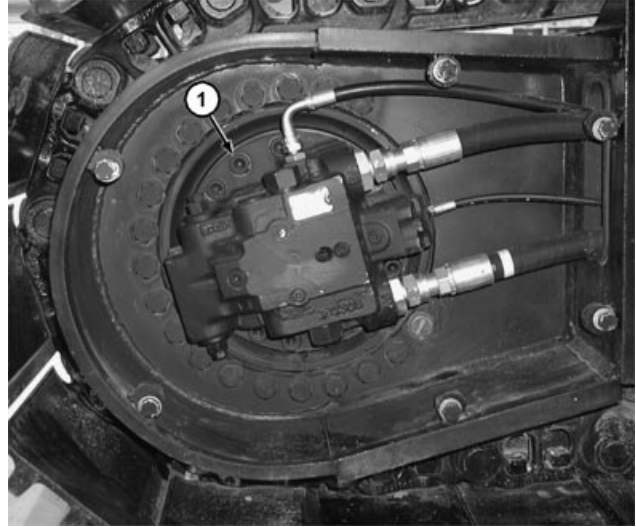
Specification

Travel Motor—Approximate
Weight..... 330 kg
728 lb

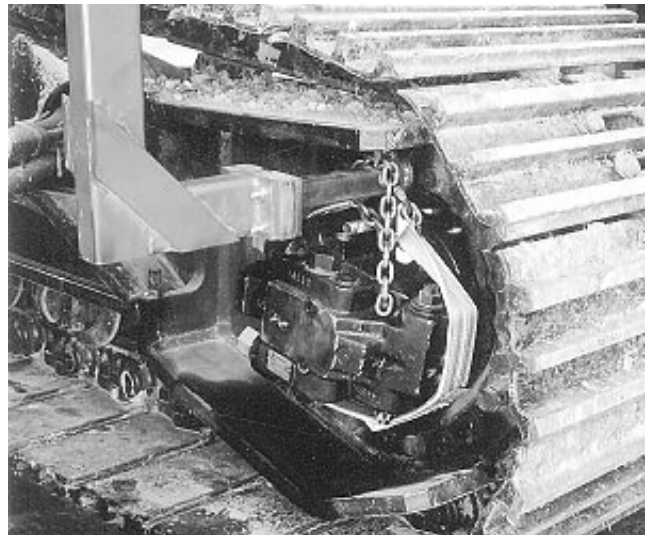
NOTE: Cap screws (1) used to hold travel motor and park brake to travel gearbox have heads longer than those holding travel motor cover to housing.

6. Loosen cap screws and lock washers (1).
7. Connect travel motor and park brake to appropriate lifting device using lifting straps or chains and DF1063 Lift Bracket and DFT1130 Adapter. (Group 9900.)

1—Cap Screw and Lock Washer (4 used)



T147509B -UN-19NOV01



T8318AC -UN-20SEP94

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0—Hydraulic Motor	10—Roller Bearing	22—Plate (4 used)	31—O-Ring (2 used)
0A—Housing	14—Piston (9 used)	23—Plate (4 used)	32—Travel Motor Cover
1—Seal	16—Retainer	25—Piston	33—Needle Bearing
3—Piston	17—Bushing	26—O-Ring	37—Dowel Pin (2 used)
7—Shaft	18—Swash Plate	28—O-Ring	39—Plate
8—Snap Ring	19—Spring (6 used)	29—Spring	40—Bolt (9 used)
9—Pin (2 used)	21—Rotor	30—O-Ring	

8. Remove cap screws (40), remove travel motor cover (32), and O-ring (30).

9. Replace parts as necessary.

10. Install O-ring (30).

11. Install travel motor cover (32).

12. Install and tighten cap screws (40).
13. Connect lines. See Travel System Component Location. (Group 9025-15.)

14. Fill travel gearbox with oil. See Check Travel Gearbox Oil Level. (Operator's Manual.)


15. Do Travel Motor Start-Up Procedure. (See procedure in this group.)

Specification

Travel Motor Cover-to-Travel	
Gearbox Cap Screw—Torque	300 N•m 221 lb-ft

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Travel Motor and Park Brake Remove and Install—270DLC

 **CAUTION:** Prevent possible injury from unexpected machine movement. Block both tracks when removing travel motors. When travel motors are removed, machine has no brakes and can move. The machine will roll free on a slope or while being towed.

1. Block tracks.

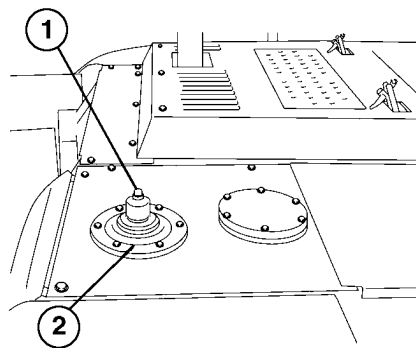
2. Drain oil from travel gearbox. Approximate capacity is 9.2 L (9.7 qt).



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

3. Push pressure release button (1).
4. Pull vacuum in hydraulic oil tank using vacuum pump or drain hydraulic oil tank. See 270DLC Drain and Refill Capacities. (Operator's Manual.)

1—Pressure Release Button
2—Hydraulic Oil Tank Cover



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5. Tag and disconnect lines. Close all open lines and fittings using caps and plugs.



CAUTION: Heavy component; use appropriate lifting device.

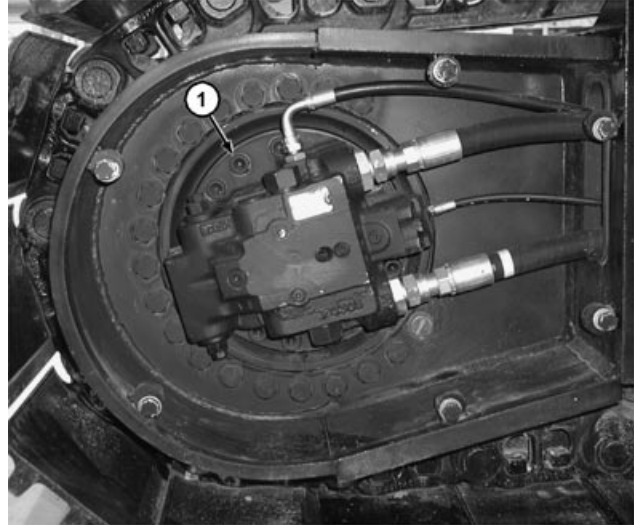
Specification

Travel Motor—Approximate
Weight..... 457 kg
1008 lb

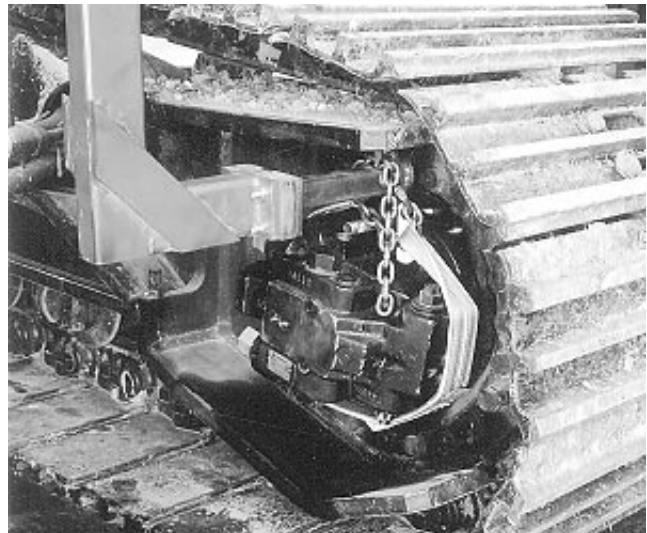
NOTE: Cap screws (1) used to hold travel motor and park brake to travel gearbox have heads longer than those holding travel motor cover to housing.

6. Loosen cap screws and lock washers (1).
7. Connect travel motor and park brake to appropriate lifting device using lifting straps or chains and DF1063 Lift Bracket and DFT1130 Adapter. (Group 9900.)

1—Cap Screw and Lock Washer (4 used)



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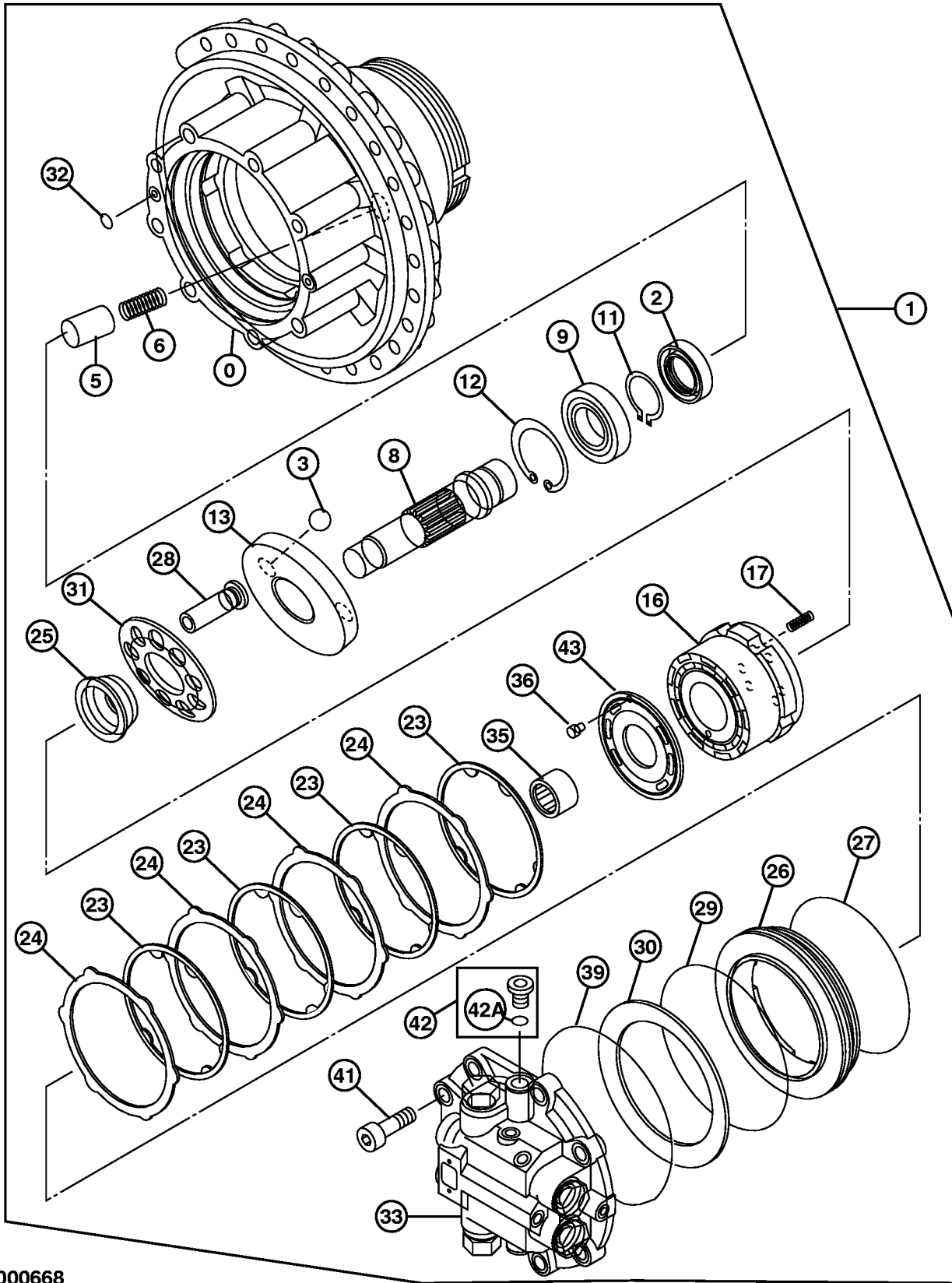
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Hydraulic System

0—Housing	11—Snap Ring	25—Bushing	33—Travel Motor Cover
1—Hydraulic Motor	12—Snap Ring	26—Piston	35—Needle Bearing
2—Seal	13—Plate	27—O-Ring	36—Pin
3—Ball (2 used)	16—Rotor	28—Piston (9 used)	39—O-Ring
5—Piston	17—Compression Spring (6 used)	29—O-Ring	41—Cap Screw (8 used)
6—Compression Spring	23—Clutch Plate (4 used)	30—Disk Spring	42—Fitting Plug
8—Shaft	24—Plate (4 used)	31—Retainer	42A—O-Ring
9—Roller Bearing		32—O-Ring (2 used)	43—Plate

8. Remove cap screws (41) and remove travel motor cover (33).
9. Remove O-ring (39).
10. Replace parts as necessary.
11. Install O-ring (39).
12. Install travel motor cover (33).
13. Install and tighten cap screws (41).
14. Connect lines. See Travel System Component Location. (Group 9025-15.)
15. Fill travel gearbox with oil. See Check Travel Gearbox Oil Level. (Operator's Manual.)
16. Do Travel Motor Start-Up Procedure. (See procedure in this group.)

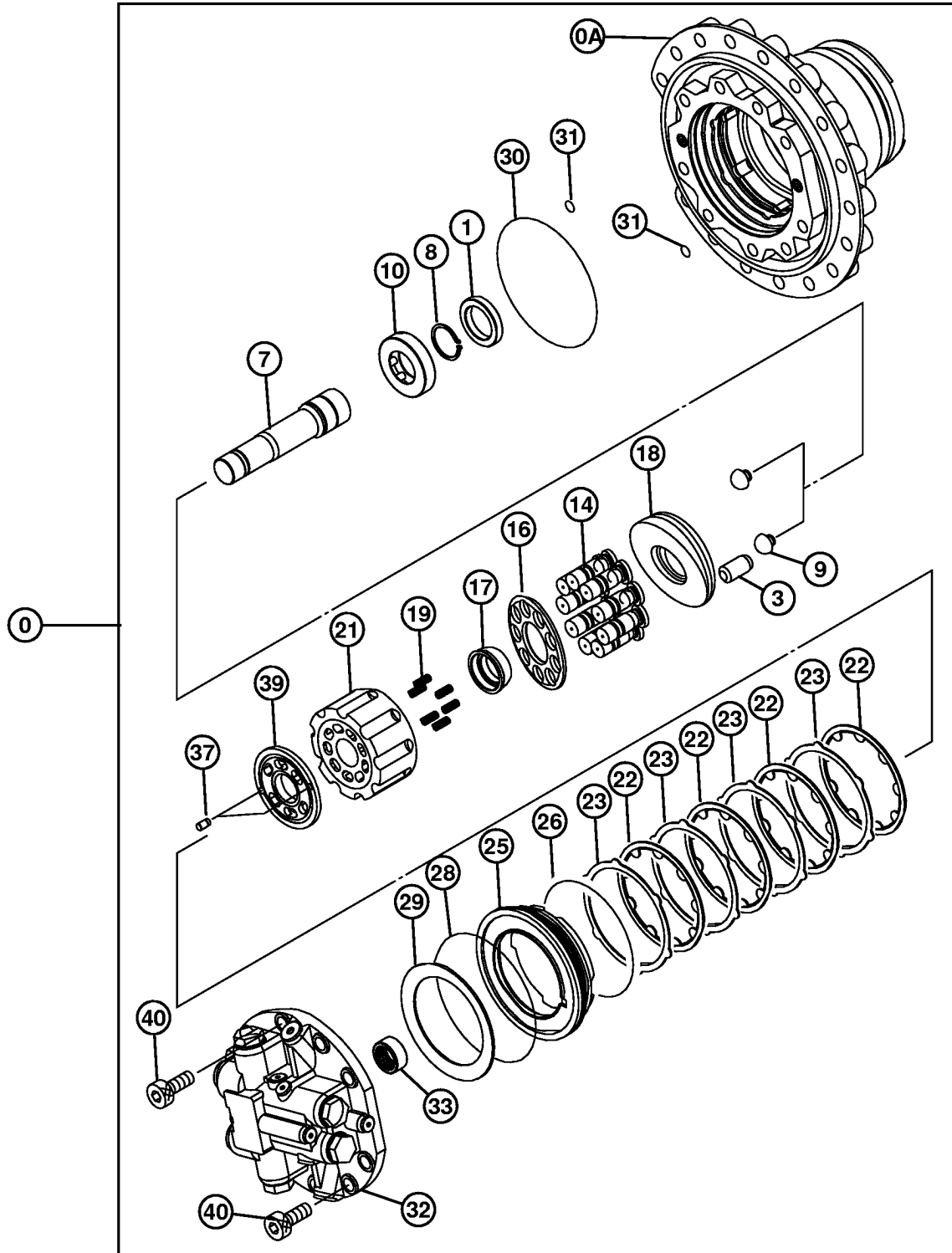
Specification

Travel Motor Cover-to-Travel	
Gearbox Cap Screw—Torque	400 N•m 295 lb-ft

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9

Travel Motor and Park Brake Disassemble and Assemble—240DLC



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Continued on next page

RO33873,0000A63 -19-16MAR06-1/3

- 0—Hydraulic Motor

0A—Housing

1—Seal

3—Piston

7—Shaft

8—Snap Ring

9—Pin (2 used)
- 10—Roller Bearing

14—Piston (9 used)

16—Retainer

17—Bushing

18—Swash Plate

19—Spring (6 used)

21—Rotor
- 22—Plate (4 used)

23—Plate (4 used)

25—Piston

26—O-Ring

28—O-Ring

29—Spring

30—O-Ring
- 31—O-Ring (2 used)

32—Travel Motor Cover

33—Needle Bearing

37—Dowel Pin (2 used)

39—Valve Plate

40—Bolt (9 used)

 **CAUTION: Heavy component; use appropriate lifting device.**

Specification	
Travel Motor—Approximate Weight.....	330 kg 728 lb

IMPORTANT: Use care when removing travel motor cover (32), valve plate is easily damaged.

1. Remove travel motor cover (32), and plate (39).

IMPORTANT: Remove needle bearing (33) only if replacement is necessary. Do not reuse needle bearing as it may have been damaged during removal.

2. Remove needle bearing (33) as required.
3. Remove disc spring (29). Inspect part for wear or damage.

Specification	
Disc Spring—Height	7.0—6.9 mm 0.276—0.272 in.

4. Apply 100—300 kPa (14—43 psi) air pressure to brake release passage to remove brake piston (25).

5. Remove friction plates (22) and plates (23).
6. Inspect parts for wear or damage.

Specification	
Friction Plate—Height.....	2.75—2.70 mm 0.108—0.106 in.
Plate—Height.....	1.80—1.75 mm 0.071—0.069 in.

IMPORTANT: Pistons must be installed into the same bores because of wear patterns. Mark location of pistons with respect to bores to aid in assembly.

7. Remove parts (21, 19, 17, 16, and 14).
8. Remove parts (7, 10, 8, and 1) through motor side of housing (0A).
9. Replace parts as necessary.
10. Apply multi-purpose grease to lip of seal (1) and apply PM38627 Rigid Form-in-Place Gasket to outer surface of seal.
11. Install parts (7, 10, 8, and 1) using D01044AA Bushing, Bearing and Seal Driver Set.

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12. Lubricate parts (21, 19, 17, 16, 14, and 18) with hydraulic oil and install. Ensure that pistons (14) are installed in their original bores. Install bushing (17) and retainer (16) as shown.

13. Install parts (29, 28, 25, 26, 22, and 23).

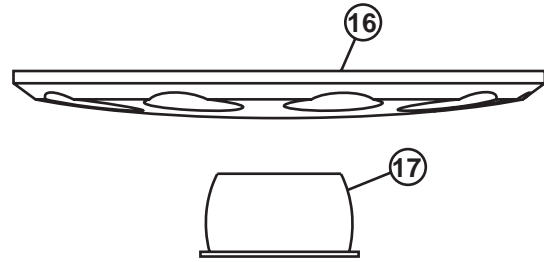
14. Install needle bearing (33) into travel motor cover (32).

NOTE: Apply petroleum jelly to mating surface of valve plate to adhere it to travel motor cover during assembly.

15. Install pins (37) then valve plate (39).

16. Assemble travel motor cover to housing (0A).

17. Install cap screws (40) and tighten.



17—Bushing
16—Retainer

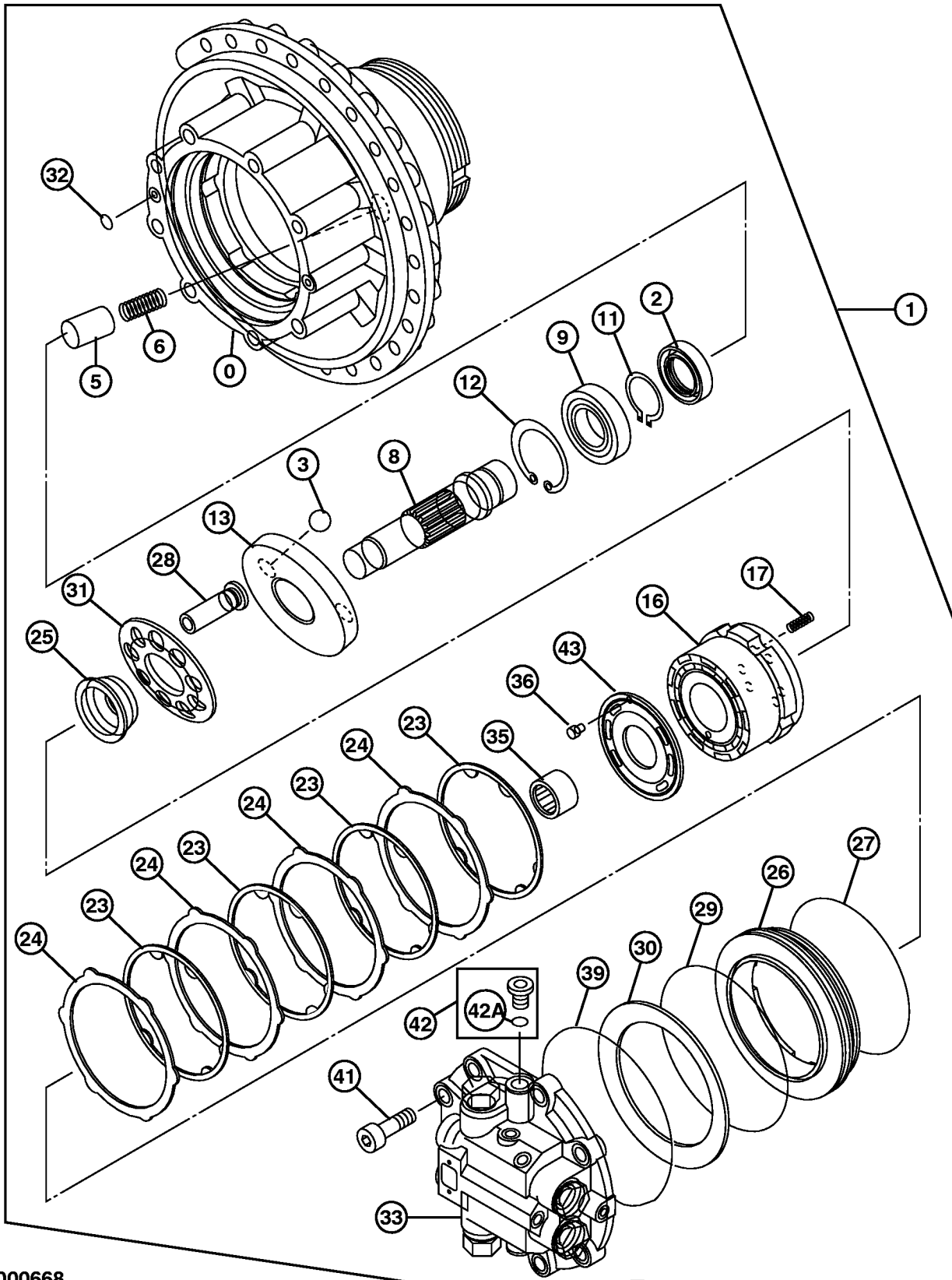
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Specification

Travel Motor Cover-to-travel	
Motor Housing Cap Screw—	
Torque	300 N•m 221 lb-ft

RO33873,0000A63 -19-16MAR06-3/3

Travel Motor and Park Brake Disassemble and Assemble—270DLC



TX1000668

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Continued on next page

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0—Housing	11—Snap Ring	25—Bushing	33—Travel Motor Cover
1—Hydraulic Motor	12—Snap Ring	26—Piston	35—Needle Bearing
2—Seal	13—Plate	27—O-Ring	36—Pin
3—Ball (2 used)	16—Rotor	28—Piston (9 used)	39—O-Ring
5—Piston	17—Compression Spring (6 used)	29—O-Ring	41—Cap Screw (8 used)
6—Compression Spring	23—Clutch Plate (4 used)	30—Disk Spring	42—Fitting Plug
8—Shaft	24—Plate (4 used)	31—Retainer	42A—O-Ring
9—Roller Bearing		32—O-Ring (2 used)	43—Plate

IMPORTANT: Use care when removing travel motor cover (33), valve plate is easily damaged.

1. Remove travel motor cover (33), and valve plate.

IMPORTANT: Remove needle bearing (35) only if replacement is necessary. Do not reuse needle bearing as it may have been damaged during removal.

2. Remove needle bearing (35) as required.
3. Remove disc spring (30). Inspect part for wear or damage.
- Specification**
- Disc Spring—Height 7.6—7.2 mm
0.300—0.283 in.
4. Apply 100—300 kPa (14—43 psi) air pressure to brake release passage to remove brake piston (26).
5. Remove friction plates (23) and plates (24).
6. Inspect parts for wear or damage.

Specification

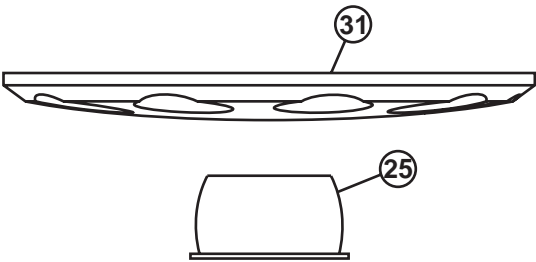
Plate—Height..... 1.80—1.75 mm
0.071—0.069 in.

IMPORTANT: Pistons must be installed into the same bores because of wear patterns. Mark location of pistons with respect to bores to aid in assembly.

7. Remove parts (36, 43, 16, 17, 25, 31, 28, 13, and 3).
8. Remove parts (8, 12, 9, 11, and 2) through motor side of housing (0).
9. Replace parts as necessary.
10. Apply multi-purpose grease to lip of seal (2) and apply PM38656 Rigid Form-in-Place Gasket to outer surface of seal.
11. Install parts (8, 12, 9, 11, and 2) using D01044AA Bushing, Bearing and Seal Driver Set.

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15

12. Lubricate parts (16, 17, 25, 31, 28, 13, and 3) with hydraulic oil and install. Ensure that pistons (28) are installed in their original bores. Install bushing (25) and retainer (31) as shown.
13. Install parts (39, 30, 29, 26, 27, 24, and 23).
14. Install needle bearing (35) into travel motor cover (33).
15. Install pins (36).
16. Assemble travel motor cover (33) to housing (0).
17. Install cap screws (41) and tighten.



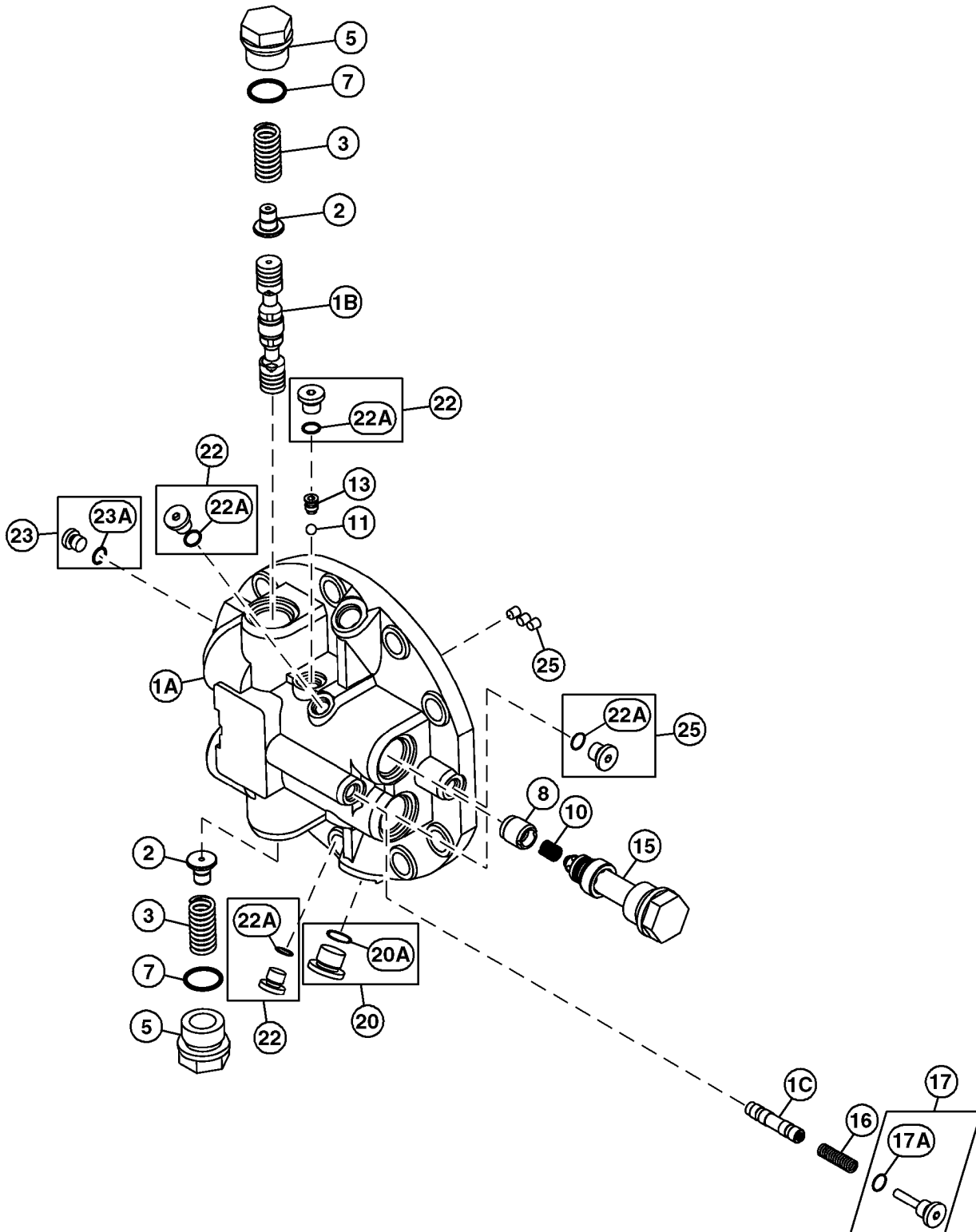
25—Bushing
31—Retainer

Specification

Travel Motor Cover-to-Travel	
Motor Housing Cap Screw—	
Torque	400 N•m 295 lb-ft

TX1004977 -UN-23MAR06

Travel Motor Cover Disassemble and Assemble—240DLC



TX1004976

Continued on next page

RO33873,0000A65 -19-16MAR06-1/2

Hydraulic System

1A—Travel Motor Cover	7—O-Ring (2 used)	16—Compression Spring	22—Pipe Plug (4 used)
1B—Valve Spool	8—Poppet (2 used)	17—Pipe Plug	22A—Packing (4 used)
1C—Valve Spool	10—Spring (2 used)	17A—Packing	23—Drain Plug (2 used)
2—Spool (2 used)	11—Ball	20—Fitting Plug	23A—O-Ring (2 used)
3—Spring (2 used)	13—Seat	20A—O-Ring	25—Pipe Plug (3 used)
5—Counterbalance Valve Plug (2 used)	15—Relief Valve (2 used)		

NOTE: Valves may be removed with travel motor in machine.

- Apply a film of clean hydraulic oil to parts before assembly.

Relief Valve (15)—Torque	450 N•m
	332 lb-ft
Travel Speed Change Plug	
(17)—Torque.....	35 N•m
	26 lb-ft

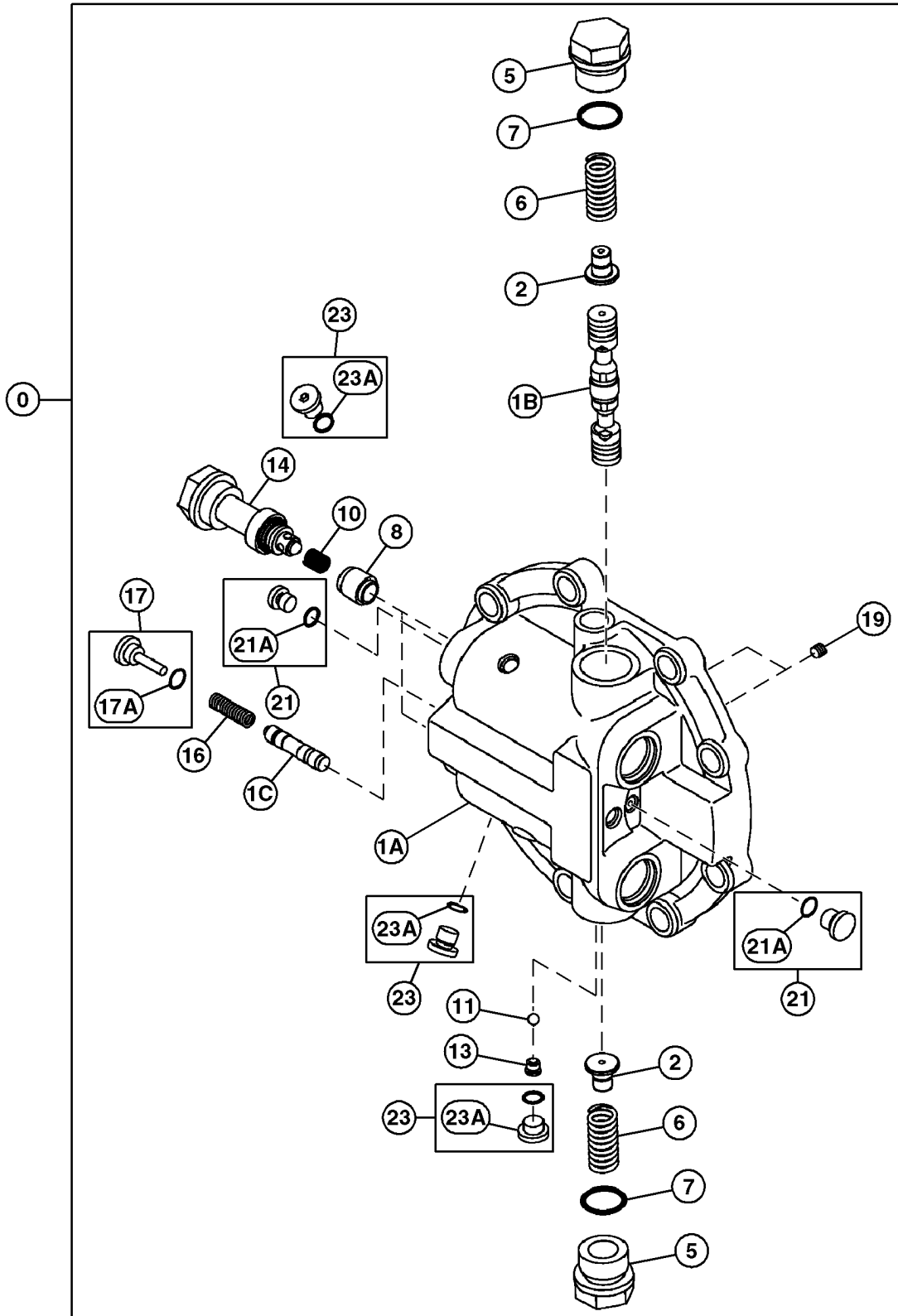
Specification

Counterbalance Valve Plug	
(5)—Torque.....	450 N•m
	332 lb-ft

RO33873,0000A65 -19-16MAR06-2/2

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Travel Motor Cover Disassemble and Assemble—270DLC



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RO33873,0000A66 -19-16MAR06-1/2

- 0—Travel Motor Cover Assembly

1A—Travel Motor Cover

1B—Spool

1C—Spool

2—Stop (2 used)

5—Counterbalance Valve Plug (2 used)
- 6—Compression Spring (2 used)

7—O-Ring (2 used)

8—Poppet (2 used)

10—Spring (2 used)

11—Ball
- 13—Valve Seat

14—Pressure Relief Valve (2 used)

16—Compression Spring

17—Pipe Plug

17A—Packing
- 19—Pipe Plug (2 used)

21—Drain Plug (2 used)

21A—O-Ring

23—Drain Plug (3 used)

23A—Packing

NOTE: Travel motor cover can be removed with travel motor on machine.

NOTE: Valves may be removed with travel motor in machine.

- Apply a film of clean hydraulic oil to parts before assembly.

Specification

Counterbalance Valve Plug (5)—Torque.....	350 N•m 258 lb-ft
Relief Valve (14)—Torque.....	450 N•m 332 lb-ft
Travel Speed Change Plug—Torque.....	35 N•m 26 lb-ft

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RO33873,0000A66 -19-16MAR06-2/2

Travel Motor Start-Up Procedure

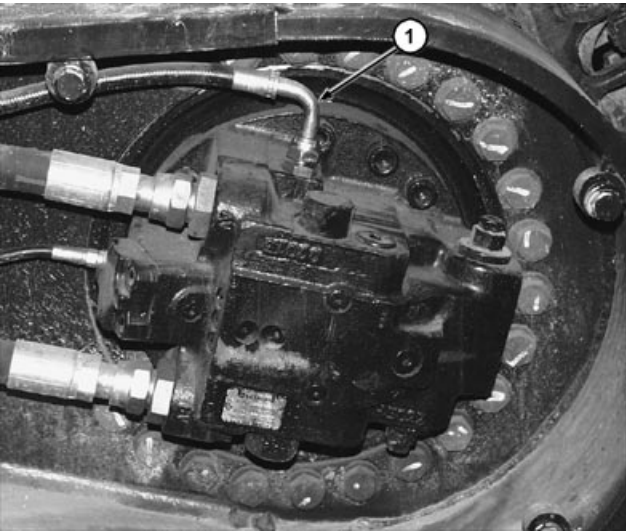
IMPORTANT: Travel motor will be damaged if not filled with oil before operating travel function. Procedure must be performed whenever a new travel motor is installed or oil has been drained from the motor.

1. Disconnect drain line (1).
2. Fill motor with hydraulic oil until oil reaches top of drain port.

NOTE: Use a funnel with suitable diameter neck to allow air to escape while filling.

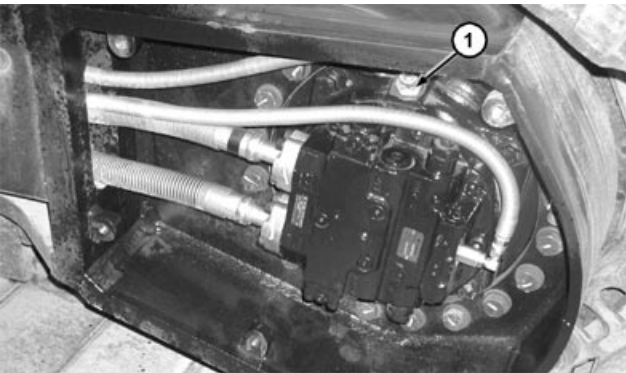
3. Connect drain line (1).

1—Travel Motor Drain Line



240DLC Travel Motor Drain Line

T146686C -UN-01NOV01



270DLC Travel Motor Drain Line

T139271D -UN-03MAY01

RO33873,0000A53 -19-28FEB06-1/1

Section 04
Engine

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Group 0400—Removal and Installation	
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Fuel Injection Pump Remove and Install . .	04-0400-10
Starter Motor Remove and Install	04-0400-11

Engine Remove and Install

1. Disconnect battery ground (negative) cable.

OUC1073,0001FE6 -19-25APR06-1/16



CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Remove filler cap when cool to touch. Slowly loosen filler cap to first stop to relieve pressure, then remove.

2. Drain coolant from radiator. Approximate capacity is 29.9 L (7.9 gal).



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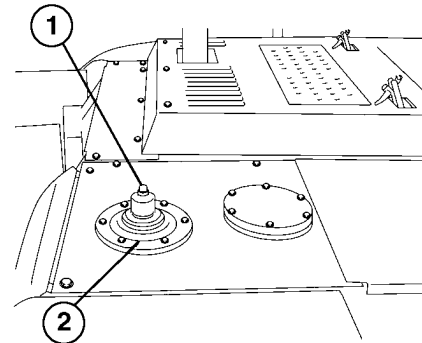
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OUC1073,0001FE6 -19-25APR06-2/16



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

3. Push pressure release button (1).
4. Pull a vacuum in hydraulic oil tank using a vacuum pump, or drain tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.)
5. Close fuel supply valve on bottom of fuel tank.
6. Remove fan speed solenoid valve. See Fan Speed Solenoid Valve Remove and Install. (Group 0510.)



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

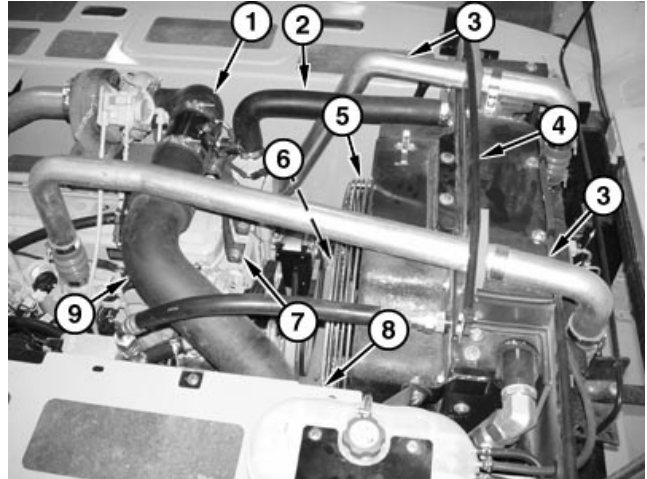
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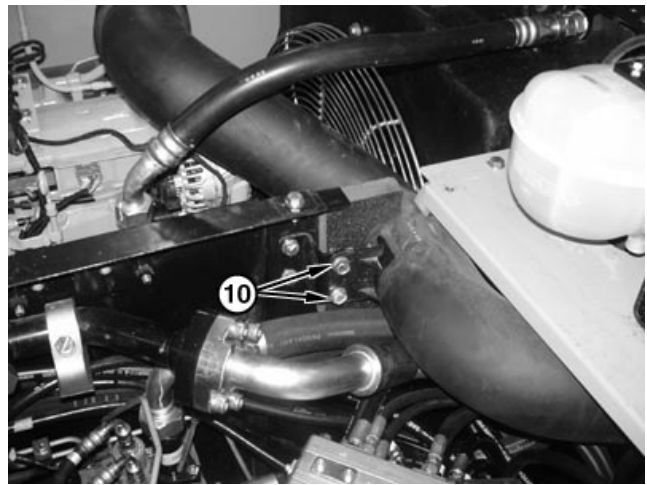
OUC1073,0001FE6 -19-25APR06-3/16

7. Remove seal (4) from top of cooler assembly.
8. Remove charge air cooler tubes (3).
9. Remove upper radiator hose (2) and lower radiator hose (6).
10. Remove fan guard (5).
11. Remove air intake tube (1) and mounting bracket (7).
12. Remove cover (8).
13. Remove cap screws (10) and intake tube (9).
14. Disconnect engine wiring. Label wiring to aid installation. See Engine Harness (W4) Component Location, and Machine Harness (W2) Component Location. (Group 9015-10.)

- 1—Intake Tube
- 2—Upper Radiator Hose
- 3—Charge Air Cooler Tubes
- 4—Seal
- 5—Fan Guard
- 6—Lower Radiator Hose
- 7—Mounting Bracket
- 8—Cover
- 9—Intake Tube
- 10—Cap Screws



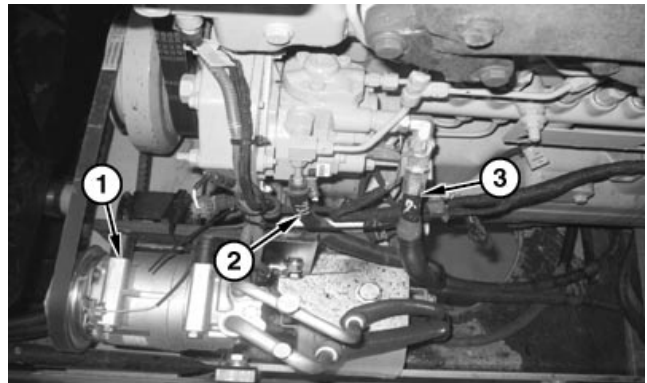
TX1005827A -UN-12APR06



TX1005828A -UN-12APR06

OUO1073.0001FE6 -19-25APR06-4/16

15. Disconnect fuel lines (1 and 2) from fuel injection pump.
 16. Remove any clamps attaching fuel lines to engine block.
- NOTE: It is not necessary to discharge the air conditioning system.*
17. Disconnect air conditioner compressor (1) from engine mounting bracket. Fasten compressor so it will not interfere with engine removal.



TX1006339A -UN-12APR06

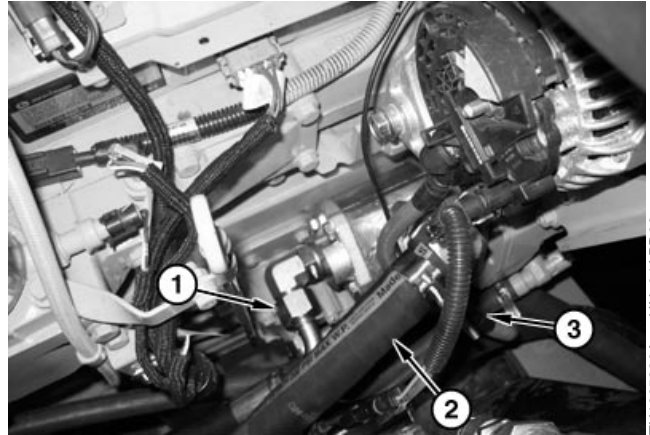
- 1—Air Conditioning Compressor
- 2—Fuel Hose (to Fuel Cooler)
- 3—Fuel Hose (Inlet From Final Fuel Filter)

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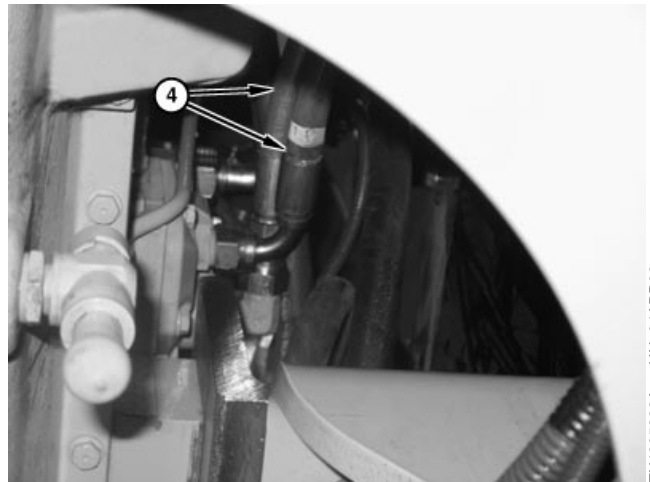
OUO1073.0001FE6 -19-25APR06-5/16

18. Disconnect hydraulic hoses (1 and 2) from fan drive pump. Close all open lines and fittings using caps and plugs.
19. Disconnect heater hose (3).
20. Disconnect oil lines (4) to remote oil filter. Close all open lines and fittings using caps and plugs.

- 1—Hydraulic Hose
- 2—Hydraulic Hose
- 3—Heater Hose
- 4—Remote Oil Filter Hoses



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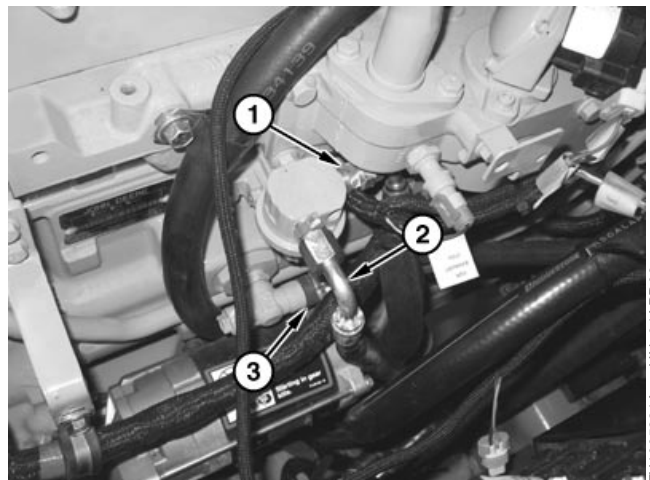
TX1005898A -UN-04APR06

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3

OOU1073,0001FE6 -19-25APR06-6/16

21. Disconnect fuel lines (1 and 2) from fuel transfer pump on engine.
22. Disconnect heater hose (3).

- 1—Fuel Line (from Primary Fuel Filter)
- 2—Fuel Line (to Final Fuel Filter)
- 3—Heater Hose



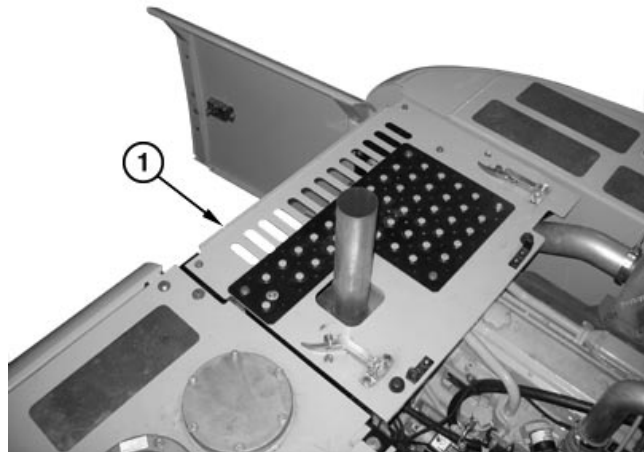
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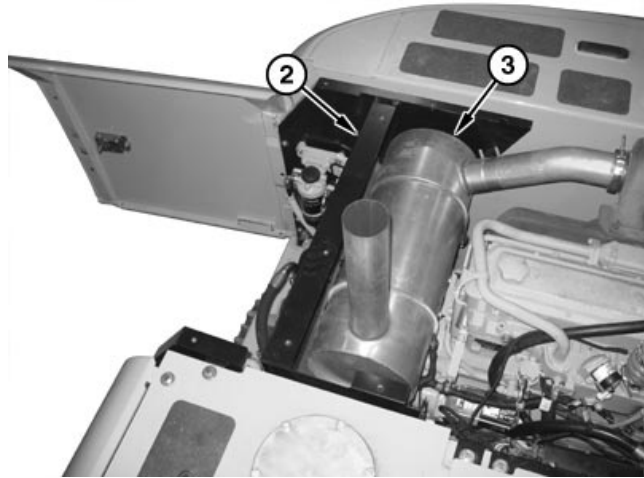
OOU1073,0001FE6 -19-25APR06-7/16

23. Remove cover (1).
24. Disconnect exhaust pipe from turbocharger. Remove nuts, U-bolts, and muffler (3).
25. Remove shields (2, 4, and 5) surrounding pump 1 and 2.

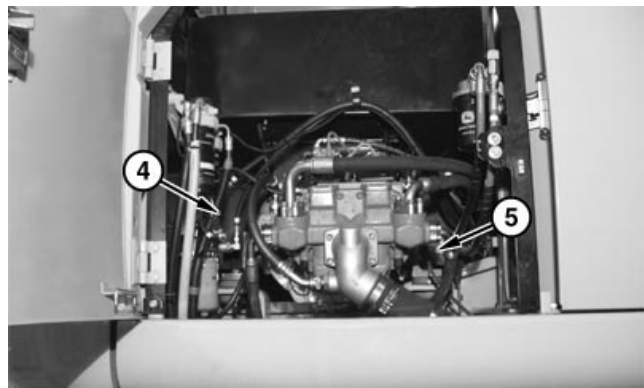
- 1—Cover
- 2—Shield
- 3—Muffler
- 4—Shield
- 5—Shield



TX1005833A -UN-04APR06



TX1005834A -UN-04APR06



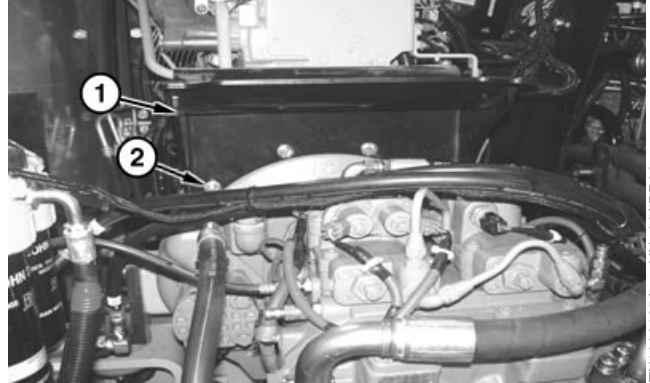
TX1005835A -UN-04APR06

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OUO1073,0001FE6 -19-25APR06-8/16

26. Support pump 1 and 2. Remove cap screws (2) and muffler bracket (1). Reinstall cap screws.

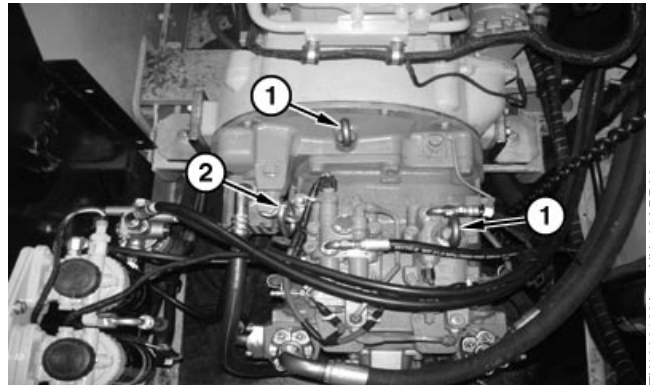
1—Muffler Bracket
2—Cap Screw (4 used)



OUO1073,0001FE6 -19-25APR06-9/16

27. Install JT05550 Lifting Eyebolts (1) and JDG19 Lifting Bracket (2) in housing of pump 1 and 2.

1—Eyebolts
2—Lifting Bracket



OUO1073,0001FE6 -19-25APR06-10/16

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- CAUTION:** Heavy component; use appropriate lifting device.

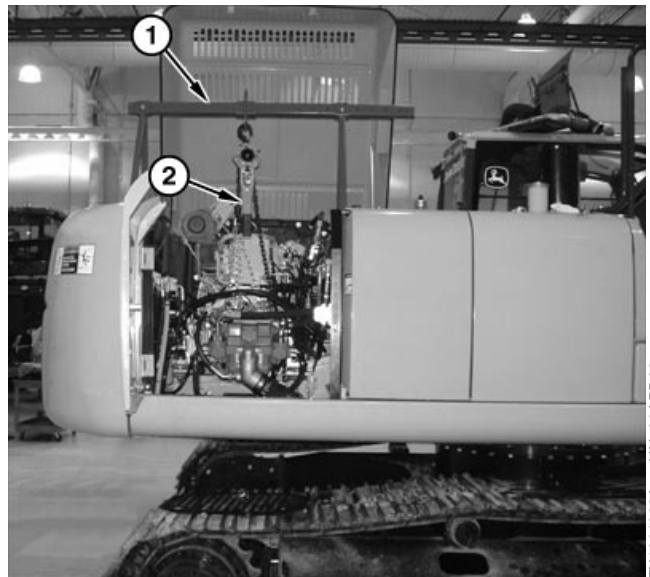
28. Install DFT1119 Pump Support (1) on machine as shown. (Group 9900.)

Specification

Pump 1 and 2—Weight..... 164 kg
362 lb

29. Attach pump support to machine using C-clamps to prevent movement.
30. Support pump 1 and 2 using DFT1119 Pump Support (1) and a lever block (2). Attach lever block to eyebolts and lifting bracket installed in pump housing using suitable lifting sling.

1—DFT1119 Pump Support
2—Lever Block



Continued on next page

OUO1073,0001FE6 -19-25APR06-11/16

31. Install JD244 Lifting Eye (1) at location shown using Grade 10.9 M12 x 40 cap screw. Install JD244 Lifting Eye (2) at location shown using Grade 10.9 M12 x 35 cap screw. Tighten cap screws to specification.

Specification

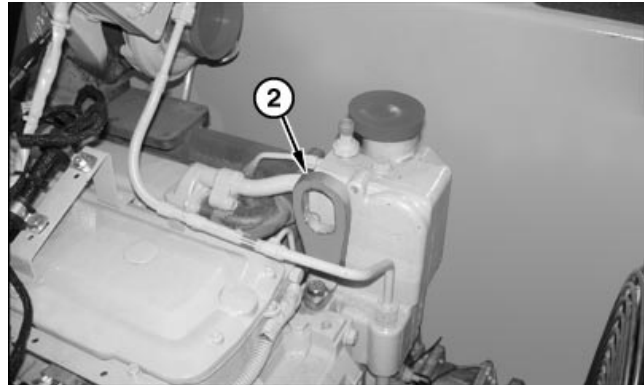
Lifting Eye Cap Screw—Torque..... 170 N•m
125 lb-ft

1—JD244-1 Lifting Eye

2—JD244-2 Lifting Eye



TX1004020A -UN-22FEB06



TX1004021A -UN-22FEB06

OUO1073,0001FE6 -19-25APR06-12/16



CAUTION: Heavy component; use appropriate lifting device.

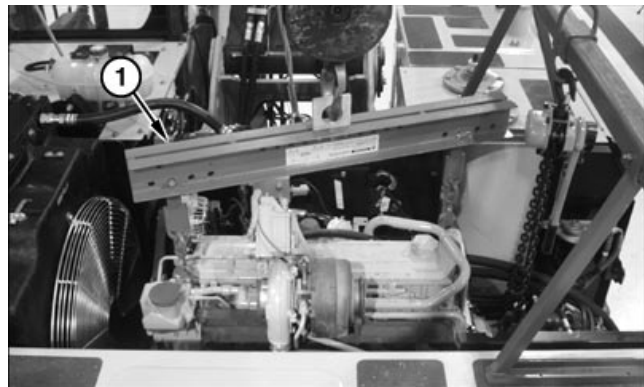
Specification

Engine—Approximate Weight 954 kg
2100 lb

IMPORTANT: The recommended method for lifting the engine is using the JDG23 Lifting Sling. The lifting force must be at 90° at the lifting points.

32. Attach JDG23 Lifting Sling (1) to engine as shown.

33. Remove cap screws securing pump 1 and 2 and drive gearbox to engine flywheel housing.



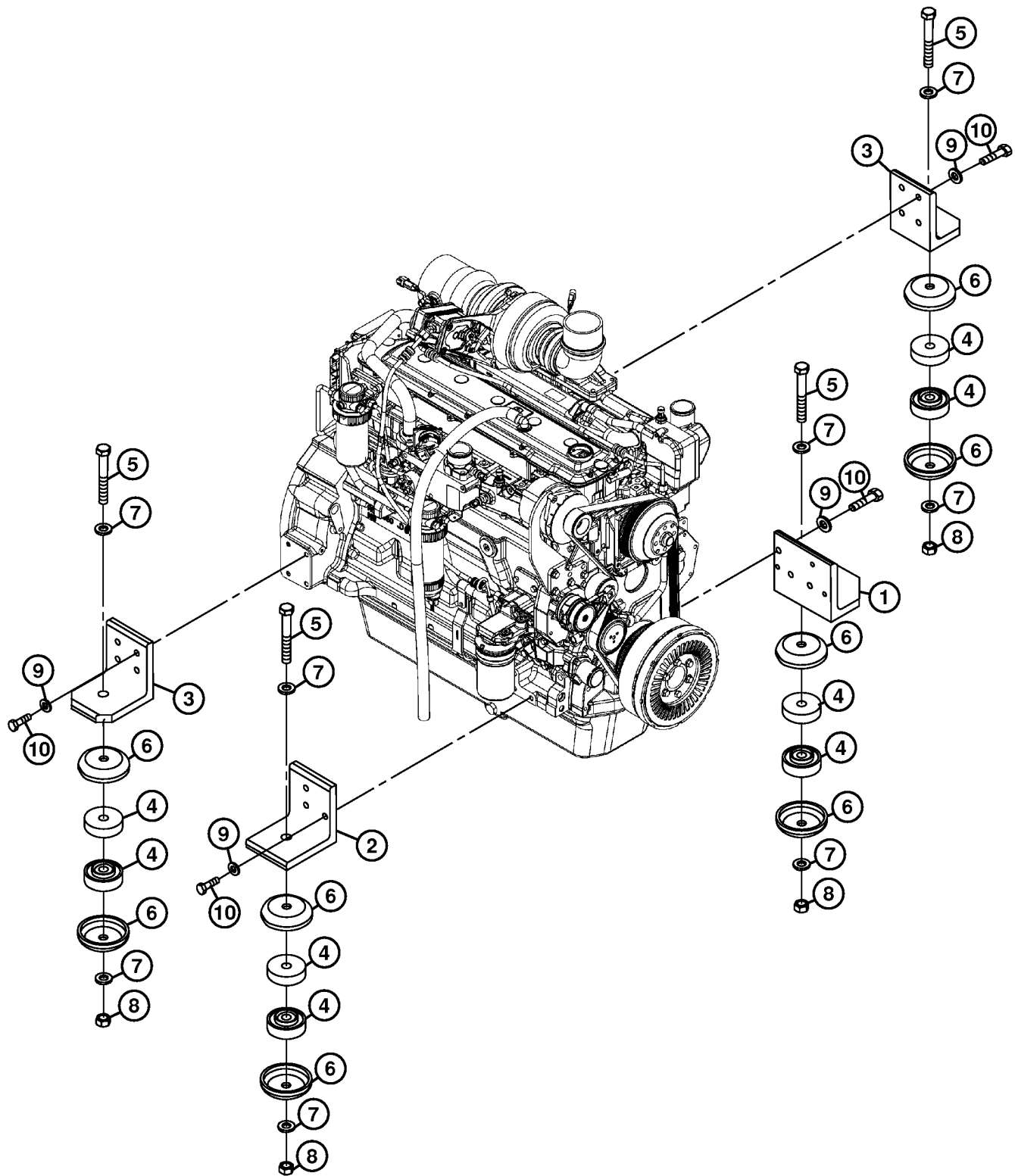
TX1004023A -UN-22FEB06

1—JDG23 Lifting Sling

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TX1000690

TX1000690 -UN-13JAN06

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OUC1073,0001FE6 -19-25APR06-14/16

1—Engine Mount (Fan End)
2—Engine Mount (Fan End)
3—Engine Mount (Flywheel End)(2 used)

4—Isolator (8 used)
5—Isolator Cap Screw (4 used)
6—Stop (8 used)

7—Washer (8 used)
8—Nut (8 used)
9—Washer (8 used)

10—Engine Mount-to-Engine Block Cap Screw (14 used)

34. Remove cap screws (5), washers (7), and nuts (8) from engine mounts.

35. Raise engine slightly. Move engine away from pump 1 and 2 and drive gearbox. Lift and remove engine when disengaged from hydraulic pump drive coupling.

36. Repair or replace parts as necessary. If disassembly is necessary, see Engine Disassembly Sequence. (CTM104.)

37. If removed, install engine mounts (1, 2, and 3), cap screws (10), and washers (9). Tighten cap screws to specification.

Specification

Engine Mount Cap Screw—
Torque..... 350 N•m
260 lb-ft



CAUTION: Heavy component; lift engine using JDG23 Lifting Sling. Lifting force must be 90° to engine lift points.

Specification

Engine—Approximate Weight..... 954 kg
2100 lb

38. Use JDG23 Lifting Sling to install engine. Install cap screws (5) washers (7), and nuts (8). Tighten cap screws.

Specification

Engine Isolator Cap Screws—
Torque..... 343 N•m
253 lb-ft

39. Align hydraulic pump and drive gearbox to engine. Install cap screws and muffler bracket. Tighten cap screws to specification.

Specification

Pump 1 and 2
Housing-to-Flywheel Housing
Cap Screw—Torque 65 N•m
48 lb-ft

40. Remove lifting sling and lifting eyes from engine.

41. Remove lifting bracket, lifting eyebolt, and pump support from pump 1 and 2.

42. Install shields surrounding pump 1 and 2. Tighten shield hardware to specification.

Specification

Pump Shield Cap Screws—
Torque..... 50 N•m
37 lb-ft

43. Install nuts, U-bolts, and muffler.

44. Connect heater hoses.

45. Connect inlet and outlet hydraulic hoses to fan drive pump.

46. Connect oil lines to remote oil filter.

47. Connect fuel lines to fuel transfer pump.

48. Connect fuel lines to fuel injection pump.

49. Open fuel supply valve on bottom of fuel tank.

50. Install air conditioning compressor and mounting bracket to engine.

51. Connect engine wiring. See Engine Harness (W4) Component Location and Machine Harness (W2) Component Location. (Group 9015-10.)

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52. Install air intake mounting bracket at front of engine.

Specification
Cover Cap Screws—Torque..... 50 N•m
37 lb-ft

53. Connect air intake tubes.

54. Connect upper and lower radiator hoses.

55. Install charge air cooler tubes.

56. Install seal on top of cooler assembly.

57. Tighten all clamps to specification.

59. Fill cooling system. See Cooling System Fill and Deaeration Procedure. (See Operator's Manual.)

60. Fill and check hydraulic oil level. See 240DLC Drain and Refill Capacities or 270DLC Drain and Refill Capacities. (Operator's Manual.)

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.

Specification
T-Bolt Type Clamp—Torque..... 4.4 N•m
39 lb-in.

Specification
Worm Gear Type Clamp—
Torque..... 6.5 N•m
58 lb-in.

58. Install top covers over control valve and muffler. Tighten cap screws to specification.

61. If hydraulic oil tank was drained, perform pump start-up procedure. See Pump 1 and 2 Start-Up Procedure. (Group 3360.)

62. Bleed Fuel System. (Operator's Manual.)

OUC1073,0001FE6 -19-25APR06-16/16

Fuel Injection Pump Remove and Install

IMPORTANT: Never steam clean or pour cold water on injection pump while pump is running or still warm to prevent pump seizure.

For replacement of fuel injection pump, see the following:

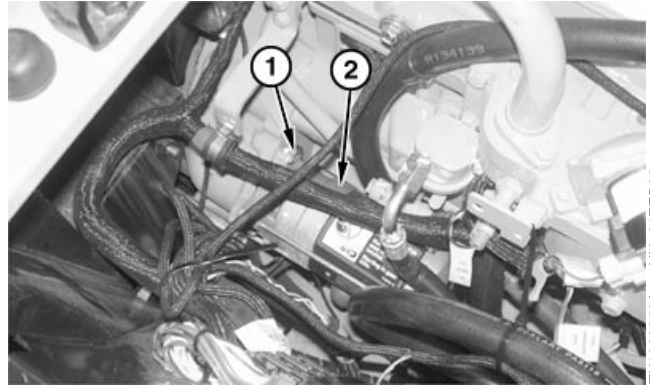
- Remove and Install High Pressure Fuel Pump. (CTM320.)

OUC1073,0001FE7 -19-28FEB06-1/1

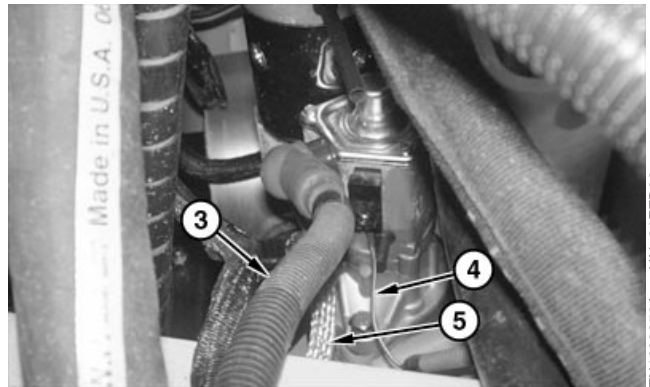
Starter Motor Remove and Install

IMPORTANT: Always disconnect battery ground (negative) cable before removing starter to prevent short circuits.

1. Disconnect battery ground (negative) cable.
2. Disconnect ground strap (5), battery cable (3) and wire (4) from starter motor terminals.
3. Remove cap screws (1) and starter motor.
4. Repair or replace as necessary. See Alternators and Starter Motors. (CTM77.)
5. Install starter and cap screws.
6. Connect ground strap and electrical connectors. See System Functional Schematic, Component Location, and Wiring Diagram Master Legend. (Group 9015-10.)
7. Connect battery ground (negative) cable.



TX1003859A -UN-21FEB06



TX1003859A -UN-21FEB06

- 1—Cap Screw (3 used)
- 2—Starter
- 3—Battery Cable
- 4—Wire
- 5—Ground Strap

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Section 05

Engine Auxiliary System

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Group 0560—External Fuel Supply System

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Primary Fuel Filter (Water Separator) Remove and Install	05-0560-4
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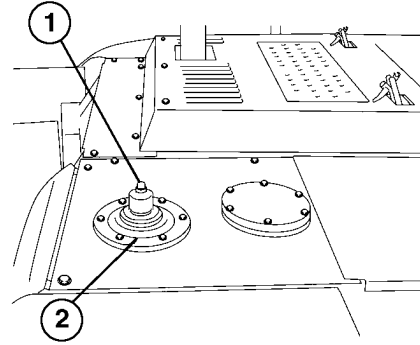
Radiator Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).

1—Pressure Release Button
2—Hydraulic Oil Tank Cover



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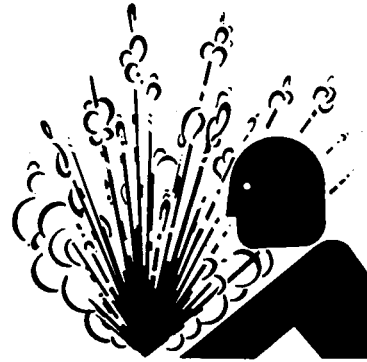
OUC1073,0001FE3 -19-13APR06-1/7



CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

2. Remove surge tank filler cap to relieve pressure.
3. Drain coolant from radiator. Approximate capacity is 29.9 L (7.9 gal).
4. Remove charge air cooler. See Charge Air Cooler Remove and Install. (See procedure in this group.)
5. Remove fan, fan guard, and fan shroud. See Fan, Fan Guard, and Fan Shroud Remove and Install. (See procedure in this group.)



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TS281 -UN-23AUG88

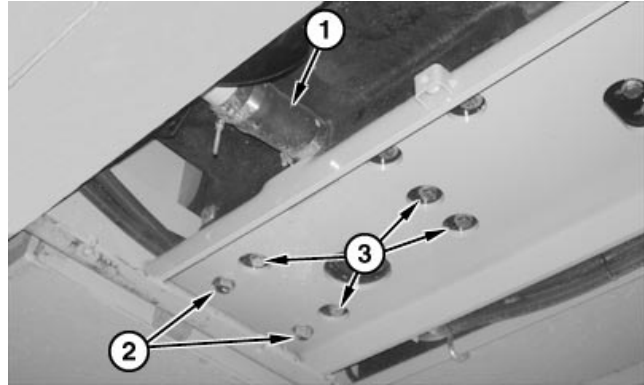
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OUC1073,0001FE3 -19-13APR06-2/7

Cooling System

6. Loosen clamp and disconnect lower radiator hose (1).
7. Remove lower mounting cap screws (2 and 3).

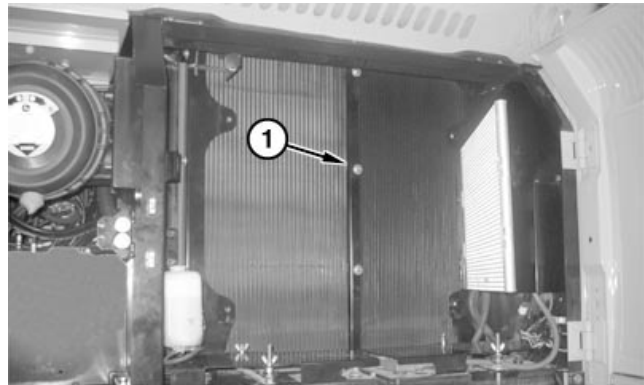
1—Lower Radiator Hose
2—Cap Screws
3—Cap Screws



OUO1073,0001FE3 -19-13APR06-3/7

8. Remove cap screws (1) and washers from each side of cooler assembly.

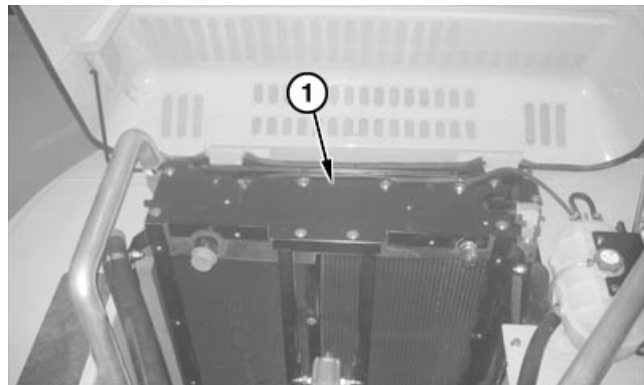
1—Cap Screw (8 used)



OUO1073,0001FE3 -19-13APR06-4/7

9. Remove cap screws and cover (1) from top of cooler assembly.

1—Cover



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OUO1073,0001FE3 -19-13APR06-5/7

10. Remove seal (2) from radiator (3).
11. Remove cap screw (1), washers, and nut from upper mount.

CAUTION: Heavy component; use appropriate lifting device.

Specification

Radiator and Mounting Bracket—

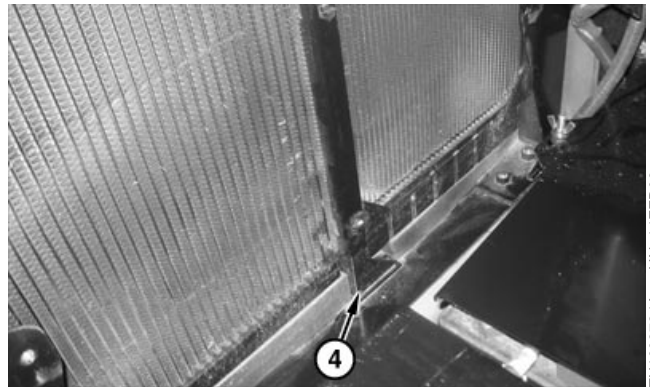
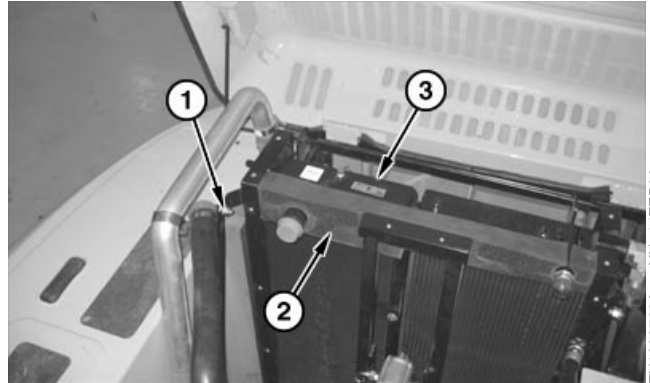
Approximate Weight 55 kg
122 lb

IMPORTANT: Use caution when removing radiator. Ensure that edge of radiator mount (4) is clear of mounting slots in charge air cooler frame when lifting.

12. Attach appropriate lifting device to radiator and remove.
13. Remove mounting bracket from side of radiator.
14. Repair or replace radiator as necessary.
15. Reinstall mounting bracket to side of radiator.

IMPORTANT: Ensure that air conditioning hoses and wiring harness are clear of radiator before completely lowering.

16. Install radiator.
17. Install lower mounting cap screws.
18. Connect lower radiator hose and tighten clamp.
19. Install cap screws and washers on each side of cooler assembly.
20. Install cap screw, washers, and nut to upper mount.
21. Install cover and cap screws to top of cooler assembly.
22. Install fan, fan guard, and fan shroud. See Fan, Fan Guard, and Fan Shroud Remove and Install. (See procedure in this group.)



- 1—Cap Screw
- 2—Seal
- 3—Radiator
- 4—Radiator Lower Mount

TX1003733A -UN-14FEB06

TX1003734A -UN-14FEB06

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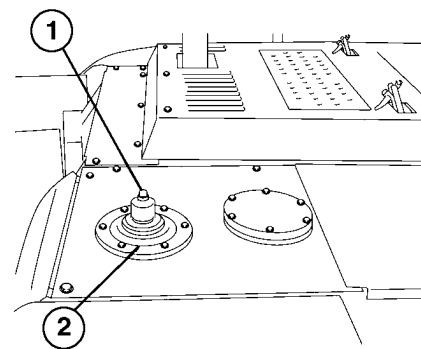
23. Install charge air cooler. See Charge Air Cooler Remove and Install. (See procedure in this group.)
24. Fill cooling system. See Cooling System Fill and Deaeration Procedure. (See Operator's Manual.)
25. Start engine and check for leaks.

OUO1073,0001FE3 -19-13APR06-7/7

Oil Cooler Remove and Install

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Pull a vacuum in hydraulic oil tank using a vacuum pump, or drain tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) Approximate capacity of hydraulic oil tank is 147.6 L (39 gal).
3. Remove charge air cooler. See Charge Air Cooler Remove and Install. (See procedure in this group.)
4. Remove fan, fan guard, and fan shroud. See Fan, Fan Guard, and Fan Shroud Remove and Install. (See procedure in this group.)



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

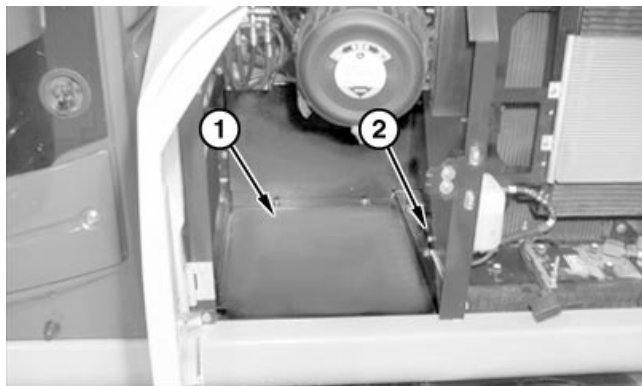
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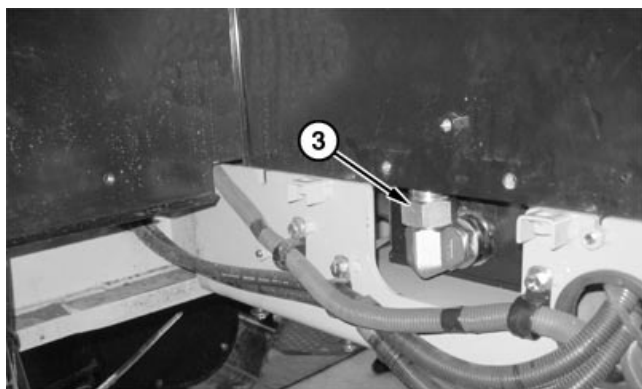
OUO1073,0001FDC -19-13APR06-1/8

5. Remove cap screws and access panel (2).
6. Remove cap screws and bottom plate (1).
7. Disconnect oil cooler lower hydraulic hose fitting (3).
Close all open lines and fittings using caps and plugs.

1—Bottom Plate
2—Access Panel
3—Oil Cooler Bottom Fitting



TX1003750A -UN-14FEB06

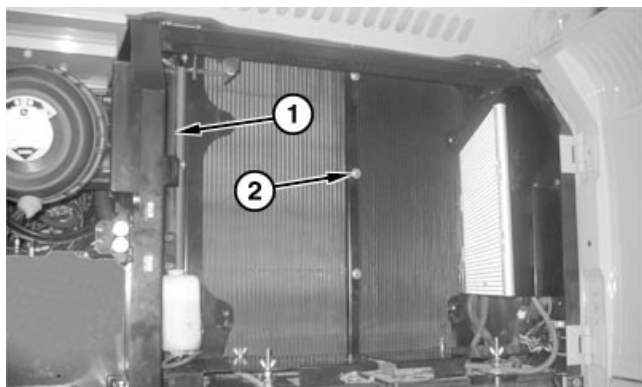


TX1003751A -UN-14FEB06

OUO1073.0001FDC -19-13APR06-2/8

8. Remove cap screws, channel, and seal (1) from side of oil cooler.
9. Remove cap screws (2) and washers from each side of cooler assembly.

1—Seal
2—Cap Screw (8 used)

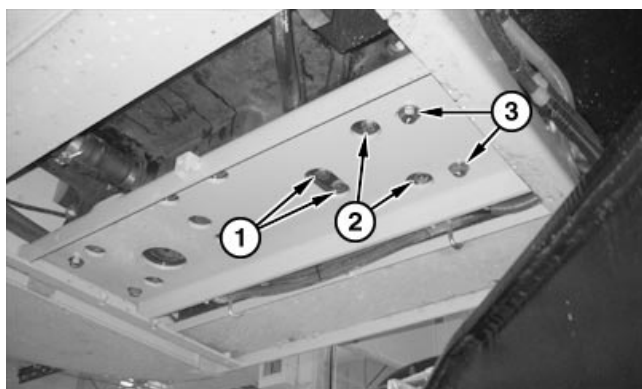


TX1003755A -UN-14FEB06

OUO1073.0001FDC -19-13APR06-3/8

10. Remove lower mounting cap screws (1, 2, and 3) and washers.

1—Cap Screw (2 used)
2—Cap Screw (2 used)
3—Cap Screw (2 used)



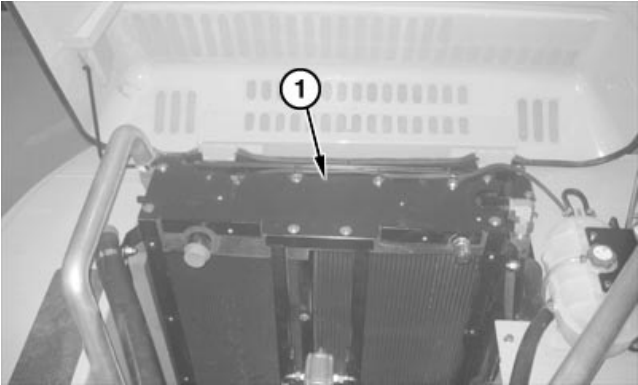
TX1003752A -UN-14FEB06

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OUO1073.0001FDC -19-13APR06-4/8

11. Remove cap screws and cover (1) from top of cooler assembly.

1—Cover



TX1003732A -UN-14FEB06

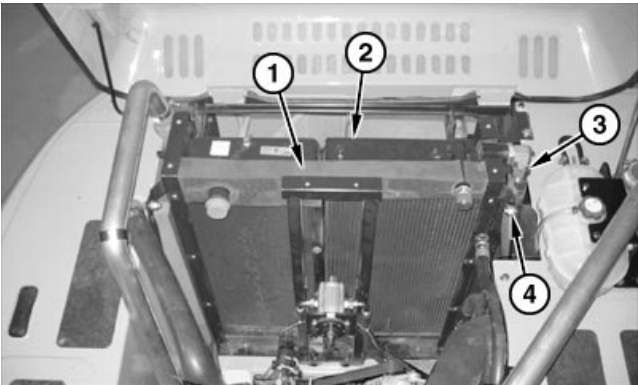
QUO1073,0001FDC -19-13APR06-5/8

12. Disconnect hydraulic hose (3) from top of oil cooler (2). Close all open lines and fittings using caps and plugs.

13. Remove seal (1) from oil cooler.

14. Remove cap screw (4), washers, and nut from upper mount.

CAUTION: Heavy component; use appropriate lifting device.



TX1003753A -UN-14FEB06

Specification

Oil Cooler and Mounting	
Bracket—Approximate Weight	68 kg 150 lb

- 1—Seal
- 2—Oil Cooler
- 3—Hydraulic Hose
- 4—Cap Screw

15. Attach appropriate lifting device to oil cooler and remove.

16. Remove mounting bracket from side of oil cooler.

17. Repair or replace oil cooler as necessary.

18. Install mounting bracket to side of oil cooler.

19. Install oil cooler.

Continued on next page

QUO1073,0001FDC -19-13APR06-6/8

20. Install lower mounting cap screws (1, 2, and 3).
Tighten cap screws (1) to specification.

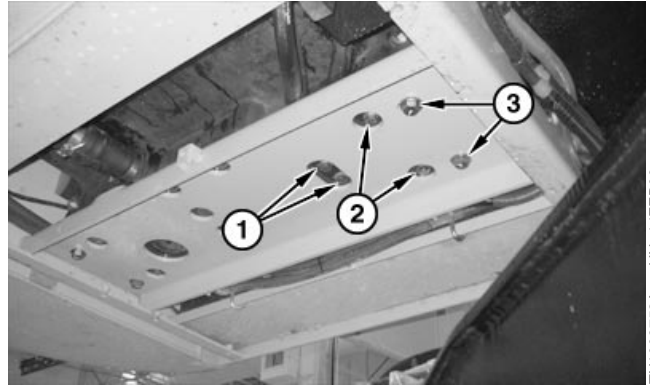
Specification

Oil Cooler Lower
Mount-to-Bracket Cap Screws—
Torque 60 N•m
44 lb-ft

21. Connect hydraulic hose to bottom of oil cooler.
22. Install bottom plate, access panel, and cap screws.
23. Install channel and cap screws.
24. Install cap screws and washers to each side of cooler assembly.
25. Install cap screw, washers, and nut to upper mount.
26. Connect hydraulic hose to top of oil cooler.
27. Install cover and cap screws to top of cooler assembly.
28. Install fan, fan guard, and fan shroud. See Fan, Fan Guard, and Fan Shroud Remove and Install. (See procedure in this group.)
29. Install charge air cooler. See Charge Air Cooler Remove and Install. (See procedure in this group.)
30. Fill cooling system. See Cooling System Fill and Deaeration Procedure. (See Operator's Manual.)
31. Fill and check hydraulic oil level. See 240DLC Drain and Refill Capacities or 270DLC Drain and Refill Capacities. (Operator's Manual.)

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.

32. If hydraulic oil tank was drained, perform pump start-up procedure. See Pump 1 and 2 Start-Up Procedure. (Group 3360.)



- 1—Cap Screw (2 used)
2—Cap Screw (2 used)
3—Cap Screw (2 used)

TX1003752A -UN-14FEB06

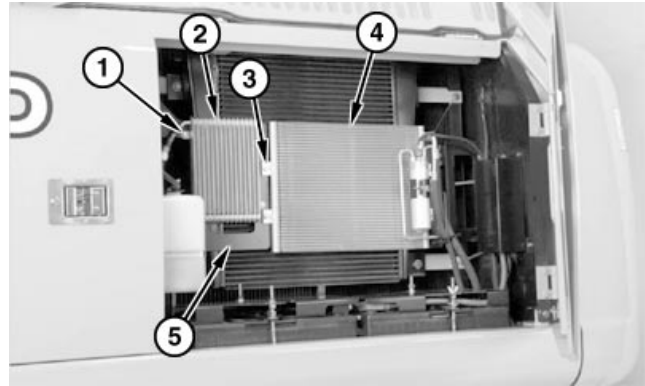
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33. Start engine and check for leaks.

OUC1073,0001FDC -19-13APR06-8/8

Charge Air Cooler Remove and Install

1. Remove cap screws (1).
2. Lay fuel cooler (2) aside.
3. Remove nuts and cap screws (3) and swing condenser (4) outward to access charge air cooler.
4. Remove cap screws and fuel cooler mounting bracket (5).



TX1003876A -UN-21FEB06

- 1—Cap Screw (4 used)
- 2—Fuel Cooler
- 3—Cap Screw (2 used)
- 4—Condenser
- 5—Fuel Cooler Mounting Bracket

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OUC1073,0001FDD -19-13APR06-1/2

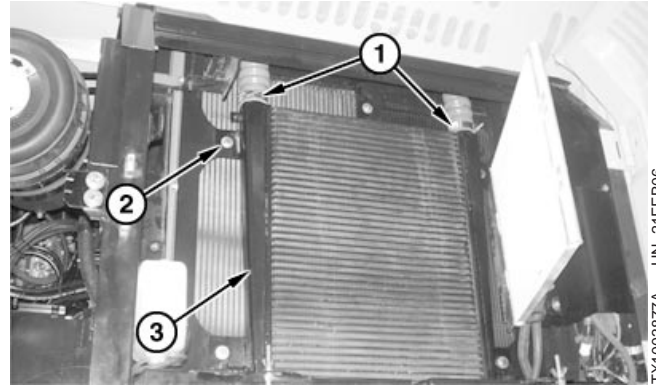
5. Remove clamps securing charge air cooler tubes to top of cooler assembly.
6. Loosen hose clamps and disconnect charge air cooler tubes (1). Close all opening with caps and plugs.

CAUTION: Heavy component; use appropriate lifting device.

Specification

Charge Air Cooler—Approximate

Weight..... 27 kg
59 lb



- 1—Charge Air Cooler Tubes
- 2—Cap Screw (4 used)
- 3—Charge Air Cooler

7. Attach appropriate lifting device to charge air cooler (3).
8. Remove cap screws (2) and charge air cooler.
9. Install charge air cooler and cap screws.
10. Connect charge air cooler tubes and tighten clamps.
11. Install fuel cooler mounting bracket.
12. Position condenser and install cap screws, washers, and nuts.
13. Install fuel cooler and cap screws.
14. Install charge air cooler tube clamps on top of cooler assembly.

TX1003877A —UN-2/FEB06

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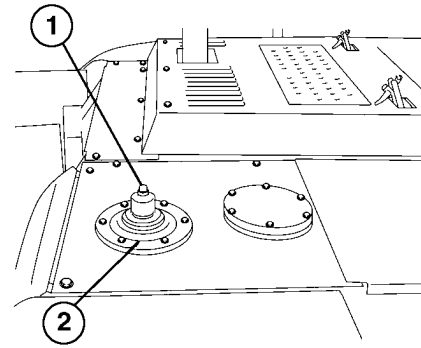
OUO1073.0001FDD —19-13APR06-2/2

Fan Drive Motor Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Pull a vacuum in hydraulic oil tank using a vacuum pump. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) Approximate capacity of hydraulic oil tank is 147.6 L (39 gal).



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

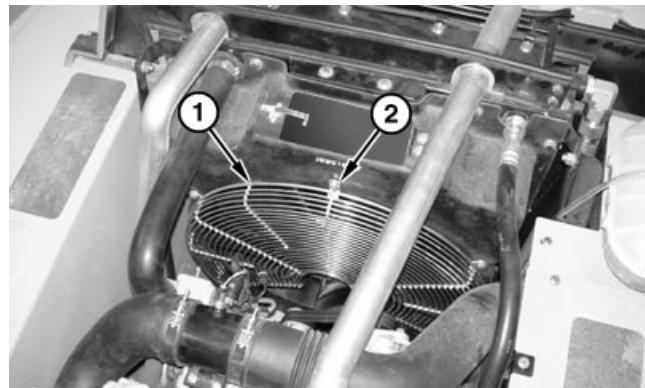
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OUC1073,0001FD9 -19-13APR06-1/5

NOTE: Lower cap screws (3) can be accessed by removing access panel on bottom of upperstructure.

3. Remove upper cap screws (2) and lower cap screws (3) to remove fan guard (1).

1—Fan Guard
2—Upper Cap Screw (3 used)
3—Lower Cap Screw (2 used)



TX1003219A -UN-02FEB06



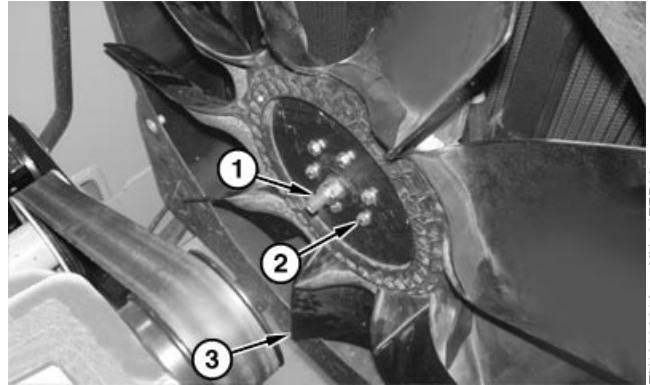
TX1003220A -UN-02FEB06

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OUC1073,0001FD9 -19-13APR06-2/5

4. Remove fan hub lock nut (1) and washer from motor shaft. Discard nut.
5. Remove cap screws (2), washers, and fan (3).

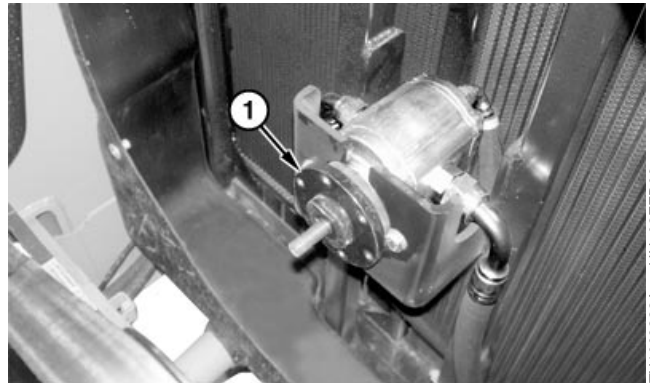
1—Lock Nut
2—Cap Screw (6 used)
3—Fan



OUO1073,0001FD9 -19-13APR06-3/5

6. Remove hub (1) and key from motor shaft using suitable puller.

1—Hub



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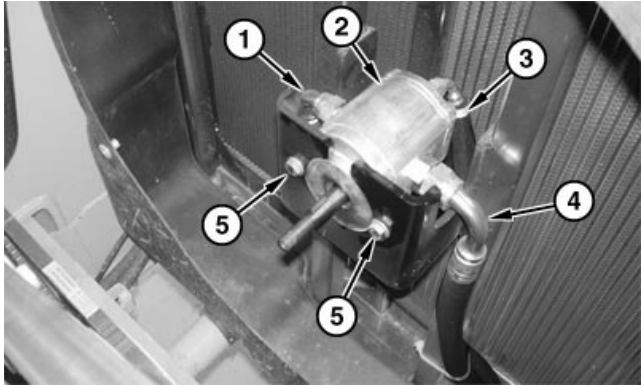
OUO1073,0001FD9 -19-13APR06-4/5

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- 7. Disconnect hydraulic hoses (1 and 4) and case drain hose (3). Close all open lines and fittings using caps and plugs.
- 8. Remove cap screws and nuts (5) to remove fan drive motor (2).
- 9. Install fan drive motor, cap screws, and nuts.
- 10. Connect hydraulic hoses and case drain hose.
- 11. Install key and hub on motor shaft.
- 12. Install fan, washers, and cap screws to hub.
- 13. Install washer and new lock nut on motor shaft.
Tighten lock nut to specification.

Specification	
Fan Hub Lock Nut—Torque	50 N•m 37 lb-ft

- 14. Install fan guard and cap screws.
- 15. Install lower access panel if removed.



1—Hydraulic Hose
2—Fan Drive Motor
3—Case Drain Hose
4—Hydraulic Hose
5—Cap Screw and Nut

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OUO1073,0001FD9 -19-13APR06-5/5

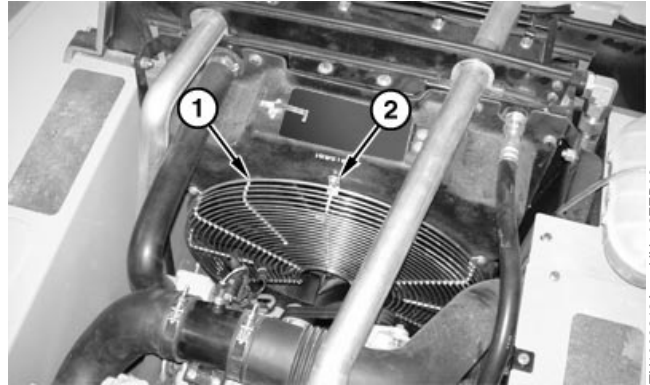
Fan, Fan Guard, and Fan Shroud Remove and Install

Remove and Install Fan and Fan Guard

NOTE: Lower cap screws (3) can be accessed by removing access panel on bottom of upperstructure.

1. Remove upper cap screws (2), lower cap screws (3), and fan guard (1).

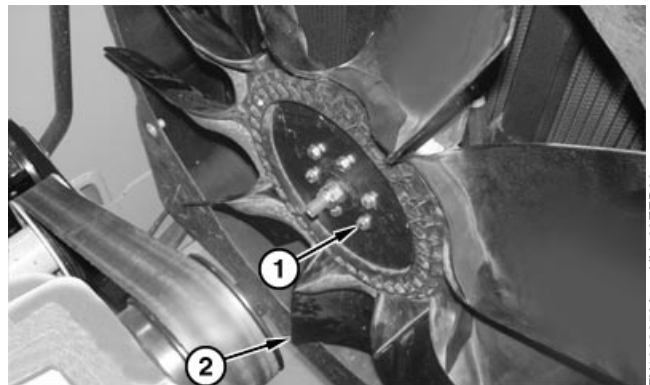
- 1—Fan Guard
- 2—Upper Cap Screw (3 used)
- 3—Lower Cap Screw (2 used)



OUO1073,0001FDB -19-13APR06-1/4

2. Remove cap screws (1), washers, and fan (2).
3. Install fan, washers, and cap screws.
4. Install fan guard and cap screws.

- 1—Cap Screw (6 used)
- 2—Fan



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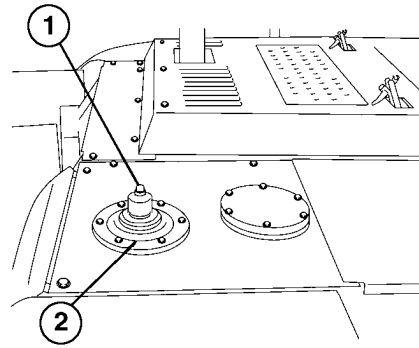
Remove and Install Fan Shroud



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Remove fan and fan guard.

1—Pressure Release Button
2—Hydraulic Oil Tank Cover



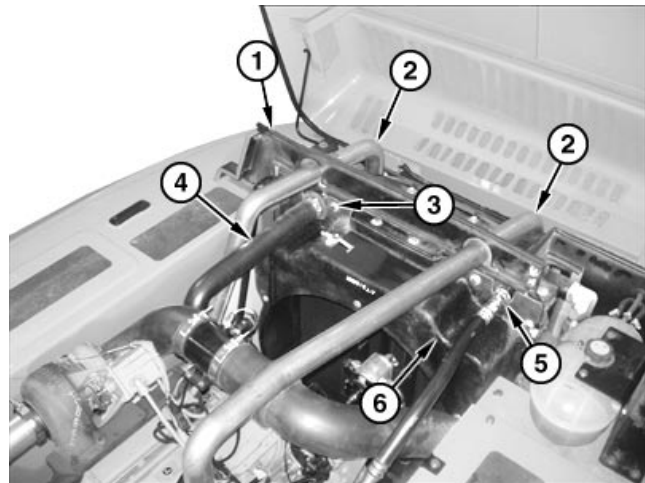
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OUO1073,0001FDB -19-13APR06-3/4

3. Partially drain cooling system.
4. Remove cap screws and seal (1).
5. Remove charge air cooler tubes (2).
6. Loosen hose clamp and disconnect upper radiator hose (4) from radiator.
7. Disconnect hydraulic oil cooler hose (5). Close all open lines and fittings using caps and plugs.

NOTE: Lower shroud cap screws can be accessed by removing access panel on bottom of upperstructure.

8. Remove cap screws (3), washers, and fan shroud (6).
9. Install fan shroud, washers, and cap screws.
10. Connect hydraulic oil cooler hose.
11. Install charge air cooler tubes.
12. Install seal and cap screws.
13. Fill cooling system. See Cooling System Fill and Deaeration Procedure. (See Operator's Manual.)



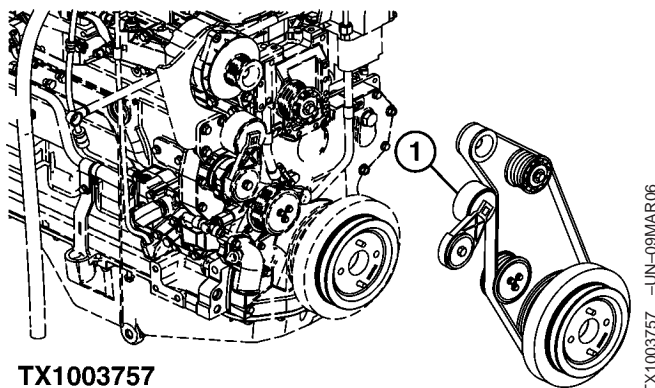
1—Seal
2—Charge Air Cooler Tubes
3—Cap Screw (10 used)
4—Upper Radiator Hose
5—Hydraulic Oil Cooler Hose
6—Fan Shroud

TX1003267A -UN-09FEB06

OUO1073,0001FDB -19-13APR06-4/4

Serpentine Belt Remove and Install

1. Remove air conditioning compressor belt.
2. Place a 1/2 in. drive breaker bar in square recess of tensioner assembly (1).
3. Rotate tensioner assembly counterclockwise to release belt tension.
4. Remove belt.
5. Inspect belt for wear or cracks. Replace as necessary.
6. Install belt.
7. Install air conditioning compressor drive belt and adjust tension. See Check and Adjust A/C Belt. (See Operator's Manual)



TX1003757

1—Tensioner Assembly

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OUO1073,0001FE1 —19-24FEB06-1/1

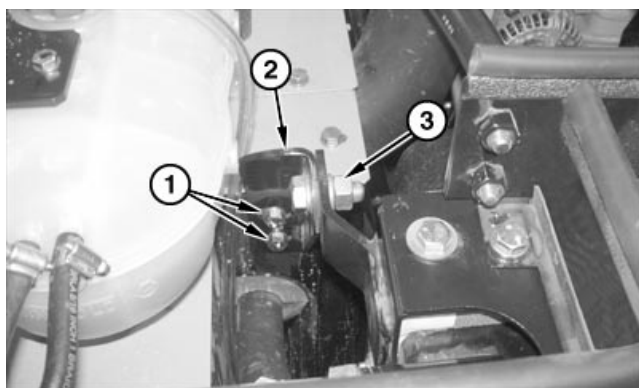
Coolant Surge Tank Remove and Install

1. Drain coolant until level is below surge tank.

OUO1073,0001FE0 —19-13APR06-1/3

2. Remove cap screw, washers, and nut (3) from cooler assembly mounting bracket.
3. Remove cap screws (1) and cooler assembly mounting bracket (2).

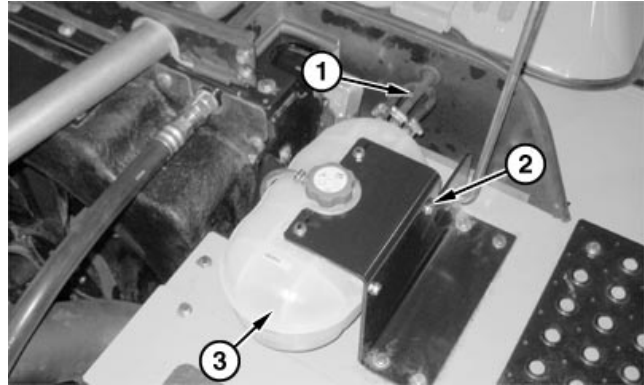
- 1—Cap Screws
2—Cooler Assembly Mounting Bracket
3—Nut



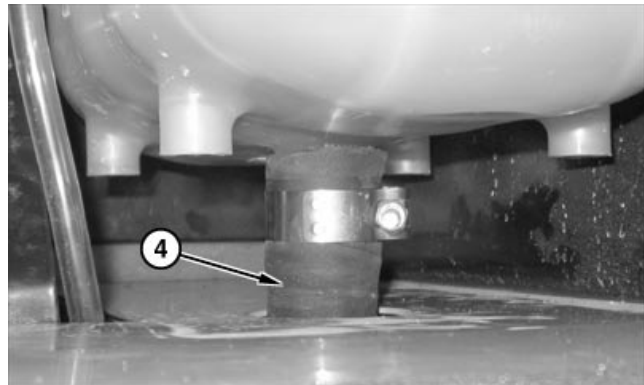
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OUO1073,0001FE0 —19-13APR06-2/3

4. Loosen hose clamp and disconnect hose (1).
5. Remove cap screws (2) from surge tank (3).
6. Remove surge tank from mounting bracket. Loosen clamp to disconnect hose (4).
7. Remove surge tank. Replace as necessary.
8. Connect hose to bottom of surge tank and tighten clamp.
9. Position surge tank in mounting bracket and install cap screws.
10. Connect radiator to surge tank hose and tighten clamp.
11. Install cooler assembly mounting bracket and cap screws.
12. Install cap screw, washers, and nut to mounting bracket.
13. Fill cooling system. See Cooling System Fill and Deaeration Procedure. (See Operator's Manual.)



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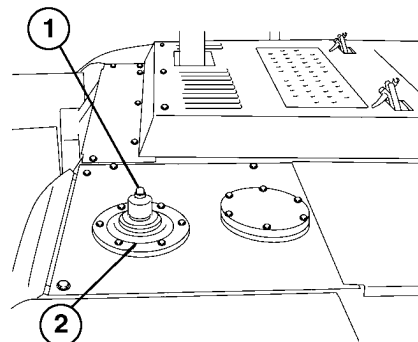
- 1—Hose
2—Cap Screw (4 used)
3—Surge Tank
4—Hose

OUO1073,0001FE0 -19-13APR06-3/3

Fan Drive Pump Remove and Install

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Pull a vacuum in hydraulic oil tank using a vacuum pump, or drain tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) Approximate capacity of hydraulic oil tank is 147.6 L (39 gal).



- 1—Pressure Release Button
2—Hydraulic Oil Tank Cover

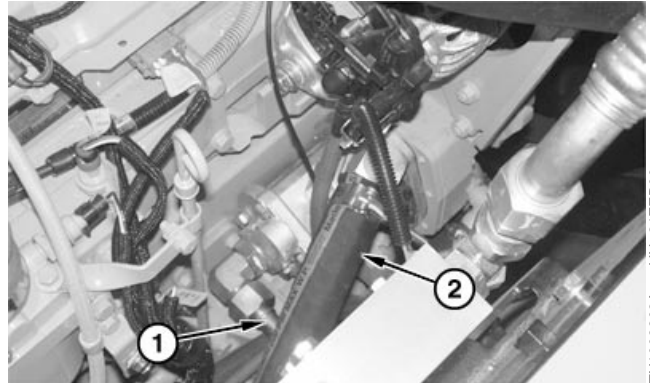
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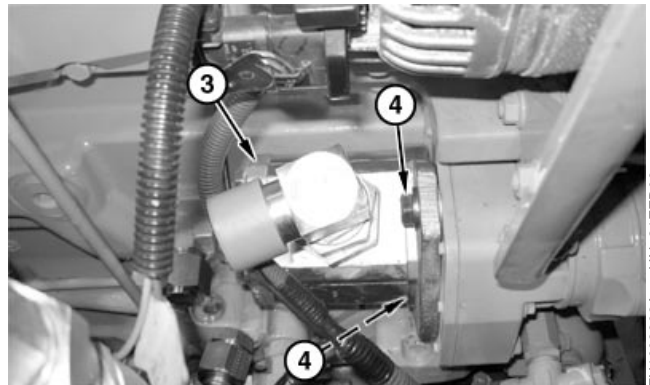
OUO1073,0001FE4 -19-13APR06-1/2

3. Loosen clamp and disconnect inlet hose (2).
4. Disconnect outlet hose (1). Install caps and plugs. Close all open lines and fitting using caps and plugs.
5. Remove cap screws (4), washers, pump (3), and gasket.
6. If installing new pump, remove fittings and top cap screw from existing pump and install onto new pump using new O-rings on fittings.
7. Install pump and new gasket.
8. Tighten cap screws.
9. Connect inlet and outlet hoses.
10. Tighten fittings and clamp.
11. Fill and check hydraulic oil level. See 240DLC Drain and Refill Capacities or 270DLC Drain and Refill Capacities. (Operator's Manual.)

- 1—Outlet Hose
2—Inlet Hose
3—Fan Drive Pump
4—Cap Screws (2 used)



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TX1003809A -UN-21FEB06

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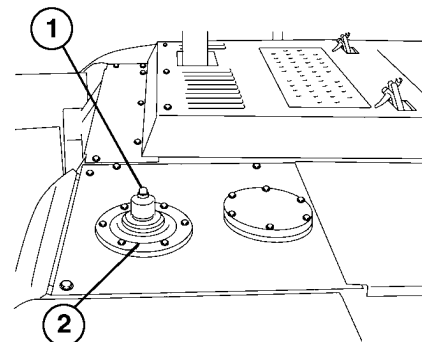
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Fan Speed Solenoid Valve Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Pull a vacuum in hydraulic oil tank using a vacuum pump. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) Approximate capacity of hydraulic oil tank is 147.6 L (39 gal).



- 1—Pressure Release Button
2—Hydraulic Oil Tank Cover

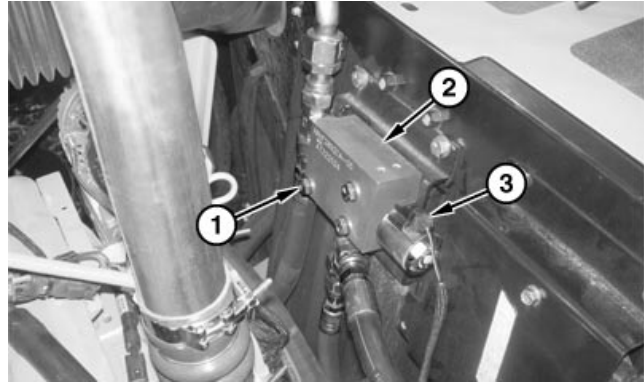
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OUO1073.0001FDA -19-13APR06-1/2

NOTE: Standard valve shown, reversing valve similar.

3. Disconnect wiring harness connector (3) from solenoid.
4. Tag and disconnect hydraulic hoses. Close all open lines and fittings using caps and plugs.
5. Remove cap screws (1) and fan speed solenoid valve (2).
6. Install valve and cap screws.
7. Connect hydraulic hoses and harness connector.
8. Fill and check hydraulic oil level. See 240DLC Drain and Refill Capacities or 270DLC Drain and Refill Capacities. (Operator's Manual.)



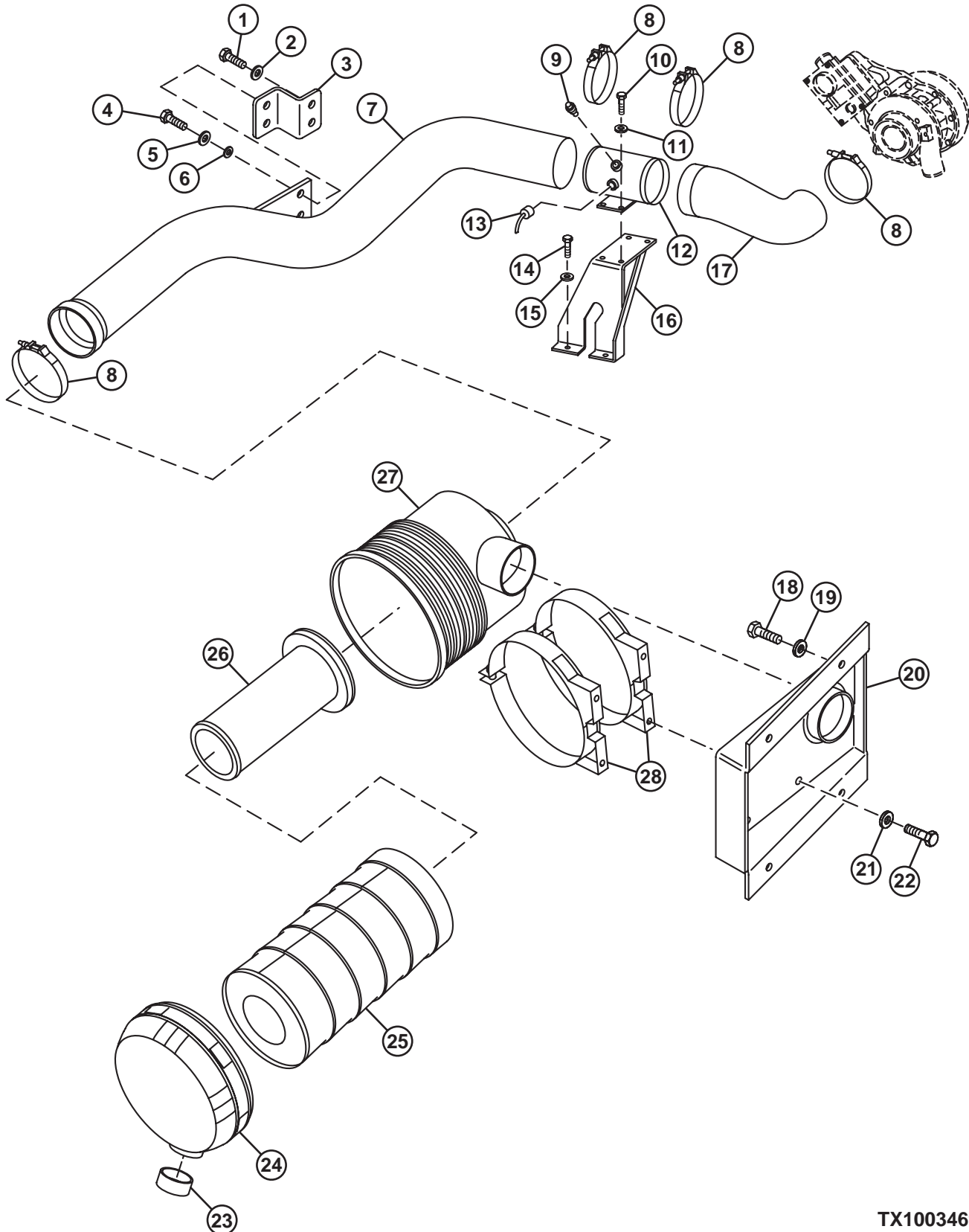
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- 1—Cap Screw (3 used)
2—Fan Speed Solenoid Valve
3—Connector

OUO1073,0001FDA -19-13APR06-2/2

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Air Cleaner Remove and Install



TX1003469

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OUO1073,0001FE2 -19-21FEB06-1/2

Intake System

1—Cap Screw (2 used)	9—Turbocharger Compressor Inlet Temperature Sensor	15—Washer (2 used)	22—Cap Screw (4 used)
2—Washer (2 used)	10—Cap Screw (4 used)	16—Mounting Bracket	23—Dust Valve
3—Mounting Bracket	11—Washer (4 used)	17—Tube	24—Cover
4—Cap Screw (2 used)	12—Tube	18—Cap Screw (4 used)	25—Primary Filter Element
5—Washer (2 used)	13—Air Filter Restriction Switch	19—Washer (4 used)	26—Secondary Filter Element
6—Spacer (2 used)	14—Cap Screw (2 used)	20—Mounting Bracket	27—Air Cleaner Housing
7—Tube		21—Washer (4 used)	28—Housing Mounting Clamps
8—Hose Clamp (4 used)			

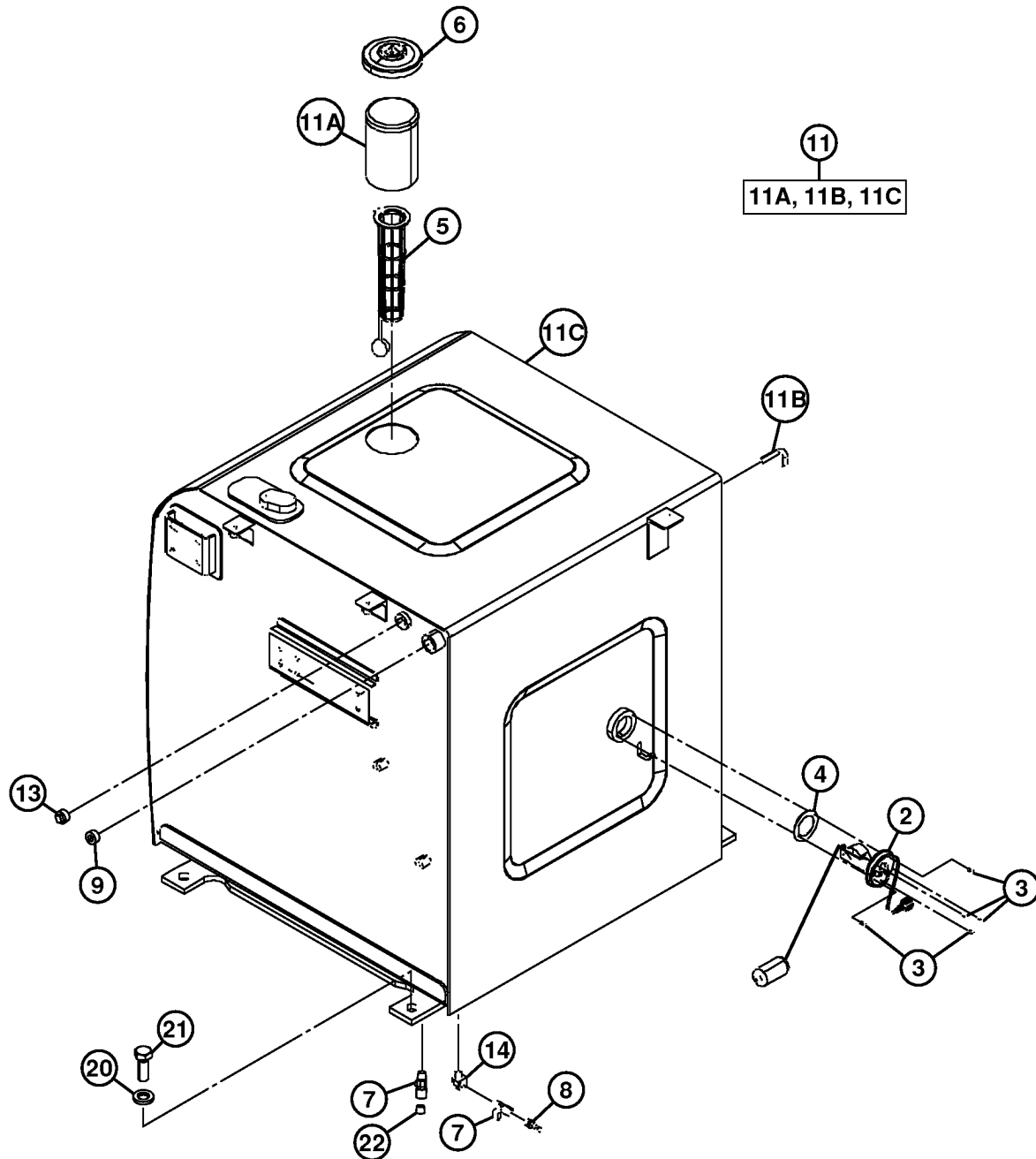
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Fuel Tank Remove and Install



TX1001603

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2—Fuel Level Sender
3—Cap Screw (5 used)
4—Gasket
5—Fuel Strainer
6—Filler Cap

7—Valve
8—Adapter Fitting
9—Plug
11—Fuel Tank Assembly

11A—Bushing
11B—Pipe
11C—Tank
13—Plug

14—Elbow Fitting
20—Washer (4 used)
21—Cap Screw (4 used)
22—Plug

1. Rotate upperstructure 90°.
2. Remove access panels below fuel and hydraulic tanks.
3. Remove side panel covering hydraulic tank to access right-hand rear tank mounting cap screw.
4. Remove step, storage compartment, and hand rail from front of fuel tank.
5. Drain fuel from fuel tank. Approximate capacity is 500 L (132 gal).
6. Disconnect supply hose from fitting (8) on bottom of tank.
7. Disconnect wiring connector to fuel level sender (2).
8. Disconnect fuel return hose from pipe (11B) at rear of tank.

 **CAUTION: Heavy component; use appropriate lifting device.**

Specification

Fuel Tank—Approximate
Weight..... 160 kg
352 lb

9. Attach appropriate lifting device to fuel tank.
10. Remove cap screws (21), washers (20) to remove fuel tank assembly (11).

11. Repair or replace as necessary.
12. Apply PM37418 Thread Lock and Sealer (Medium Strength) to threads of cap screws (3).
13. Install fuel level sender (2) and gasket (4). Tighten cap screws (3).

Specification

Fuel Level Sender Cap
Screws—Torque 4.5 N•m
40 lb-in.

14. Install fuel tank assembly (11), washers (20), and cap screws (21). Tighten to specification.

Specification

Fuel Tank Cap Screws—
Torque..... 550 N•m
405 lb-ft

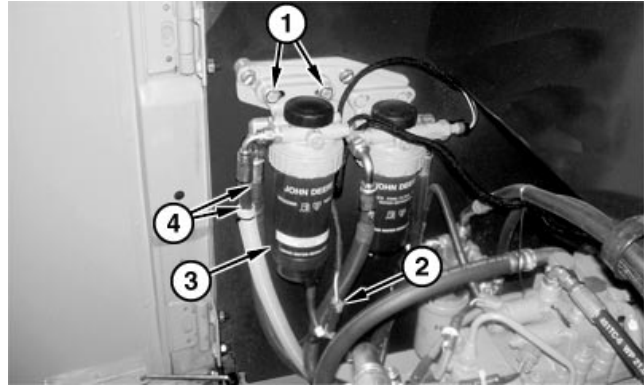
15. Connect fuel return hose.
16. Connect fuel supply hose to bottom of tank.
17. Install step, storage compartment, and hand rail to front of tank.
18. Install access panels and side panel.
19. Fill fuel tank. See Diesel Fuel. (Operator's Manual.)
20. Bleed Fuel System. (Operator's Manual.)

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OUO1073,0001FE5 -19-13APR06-2/2

Primary Fuel Filter (Water Separator) Remove and Install

1. Loosen drain valve on bottom of filter and drain fuel into a container.
2. Tag and disconnect fuel hoses (4).
3. Disconnect wiring harness connector (2).
4. Remove cap screws (1) to remove primary fuel filter assembly (3).
5. Install primary fuel filter assembly and tighten cap screws.
6. Connect fuel hoses and wiring harness connector.
7. Bleed Fuel System. (Operator's Manual.)



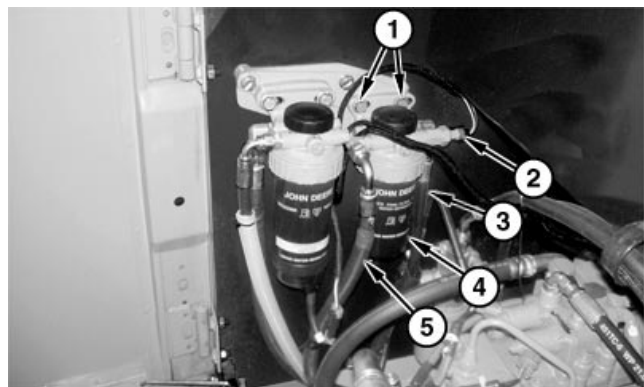
- 1—Cap Screws
2—Connector
3—Primary Fuel Filter Assembly
4—Fuel Hoses

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OUO1073,0001FDE -19-13APR06-1/1

Final Fuel Filter Remove and Install

1. Loosen drain valve on bottom of filter and drain fuel into a container.
2. Disconnect electrical connector (2).
3. Disconnect fuel hoses (3 and 5).
4. Remove cap screws (1) and final fuel filter assembly (4).
5. Install final fuel filter assembly and tighten cap screws.
6. Connect electrical connector.
7. Connect fuel hoses.
8. Bleed Fuel System. (Operator's Manual.)



- 1—Cap Screws
2—Connector
3—Fuel Hose (from Transfer Pump)
4—Final Fuel Filter Assembly
5—Fuel Hose (to Injection Pump)

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OUO1073,0001FDF -19-25APR06-1/1

Section 07 Dampener Drive (Flex Coupling)

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Group 0752—Elements

Dampener Drive (Flex Coupling) Remove and
Install07-0752-1

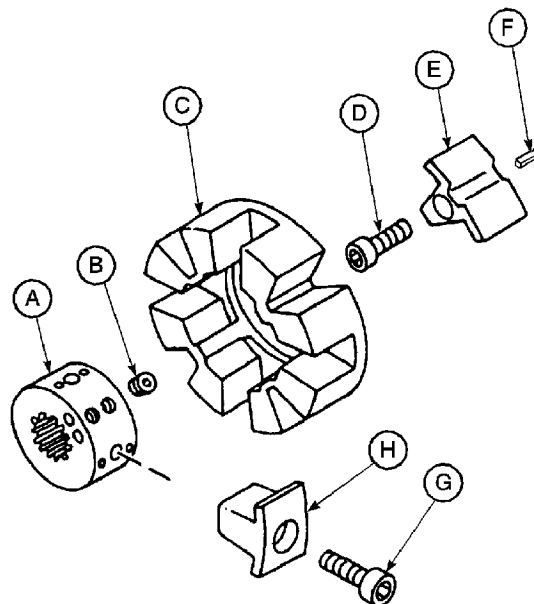
Dampener Drive (Flex Coupling) Remove and Install

1. Remove hydraulic pump. See Pump 1 and 2 Remove and Install. (Group 3360.)

NOTE: Flex coupling may come off with pump or stay on flywheel.

2. Remove parts (A—H).
3. Inspect and replace parts as necessary.

A—Coupling
B—Set Screw (4 used)
C—Flex Coupling
D—Cap Screw (4 used)
E—Insert (4 used)
F—Guide Pins (4 used)
G—Cap Screw (4 used)
H—Insert (4 used)



T105285

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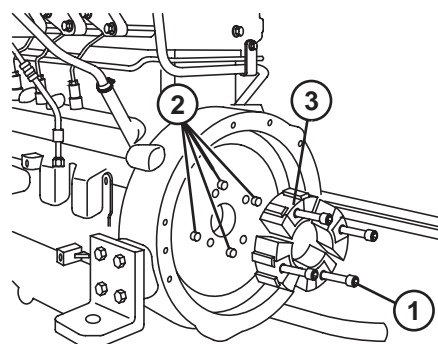
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IMPORTANT: Do not use steel hammer to install guide pins (2). Use only rubber or plastic mallet.

4. If guide pins (2) in flywheel are damaged, remove and replace pins. Use new pins and install into flywheel using a plastic or rubber mallet.
5. Apply PM37418 Thread Lock and Sealer (Medium Strength) to cap screws (1).
6. Install flex coupling (3) onto flywheel using cap screws (1).
7. Tighten cap screws (1) to specification.

Specification

Flex Coupling-to-Flywheel Cap
Screw—Torque..... 137 N•m
101 lb-ft



1—Cap Screw (4 used)
2—Guide Pins (4 used)
3—Flex Coupling

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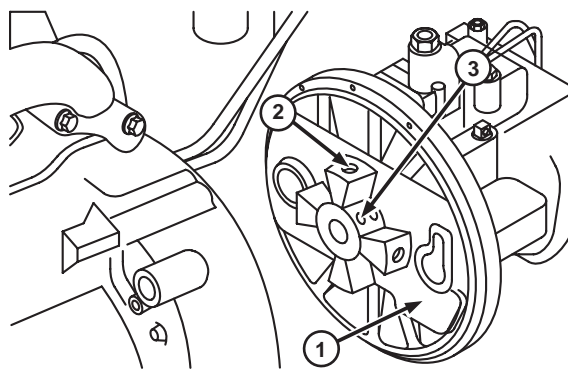
8. Clean face of hydraulic pump (1).
9. Install hydraulic pump adapter with splines (2) onto pump shaft.
10. Apply PM37418 Thread Lock and Sealer (Medium Strength) to set screws (3).
11. Tighten set screws (3) to specification.

Specification

Adapter-to-Pump Shaft Set

Screw—Torque..... 108 N•m
80 lb-ft

12. Install hydraulic pump. See Pump 1 and 2 Remove and Install. (Group 3360.)



- 1—Hydraulic Pump Face
2—Adapter Spline (4 used)
3—Set Screw (2 used)

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Section 17

Frame or Supporting Structure

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Counterweight.	17-1749-1

Welding On Machine

IMPORTANT: Electrical current traveling from the welder through the machine electrical system may damage the machine electrical system, including battery, engine control unit (ECU), information controller (ICF) and main controller (MCF). Disconnect battery cables and ECU, ICF and MCF electrical connectors before welding on the machine.

Before welding on the machine, follow the steps listed below to protect the machine electrical system.

HX00125,0000068 -19-30MAR06-1/4

1. Disconnect battery ground and positive cables.
2. Remove rear console cover behind seat. See Rear Cover Remove and Install. (9015-20.)
3. Disconnect electrical connectors (1) from MCF (2). See Cab Harness (W1) Component Location. (9015-10.)

1—Electrical Connectors
2—Main Controller (MCF)

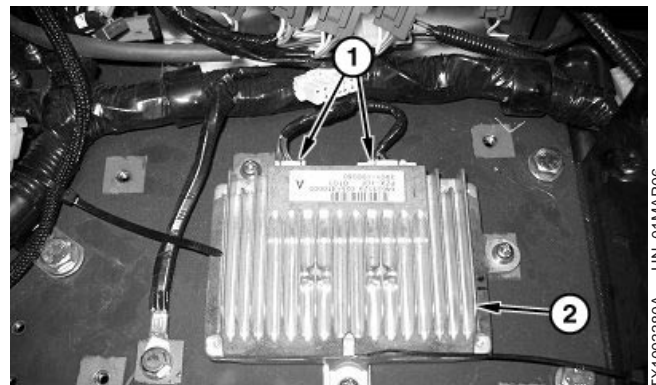


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4. Disconnect electrical connectors (1) from ICF (2). See Cab Harness (W1) Component Location. (9015-10.)

1—Electrical Connector (2 used)
2—Information Controller (ICF)



TX1003380A -UN-01MAR06

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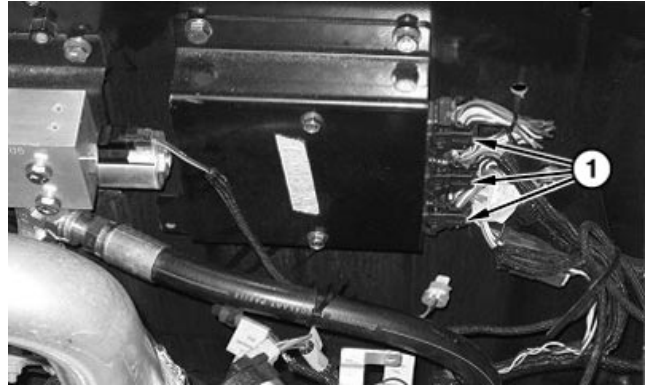
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NOTE: Engine Control Unit (ECU) is located in the engine compartment.

6. Disconnect electrical connectors (1) from engine control unit (ECU). See Engine Harness (W5) Component Location. (9015-10.)

1—Electrical Connectors (3 used)



TX1003376A -UN-07FEB06

HX00125,0000068 -19-30MAR06-4/4

Welding Repair of Major Structure



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

If you sand or grind paint, avoid breathing the dust. Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

- 1. Remove paint before welding or heating.

IMPORTANT: Disconnect battery ground strap and positive cables. Also disconnect the wiring harness connectors to the main controller (MCF), information controller (ICF) and engine control unit (ECU). See Welding on Machine. (See procedure in this group.)

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

- 2. Use one of the following weld processes:

- AWS-E-7018 covered electrode with shielded metal arc welding (SMAW) process.

- AWS-ER-70S-3 wire electrode with gas metal arc welding (GMAW) process.
- AWS-E70T-1 or E71T-1 wire electrode with flux core arc welding (FCAW) process.

Welding Repair of Major Structure—Specification

Weld Metal—Tensile Strength.....	482.6 mPa (70,000 psi)
Yield Strength	413.7 mPa (60,000 psi)
Elongation	22%

IMPORTANT: Area to be repaired must be preheated to allow better weld penetration.

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

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

Welding Repair of Major Structure—Specification

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

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Counterweight Remove and Install

1. Park machine on level ground.
2. Remove two plastic caps (1) from top of counterweight.



CAUTION: Heavy component; use appropriate lifting device.

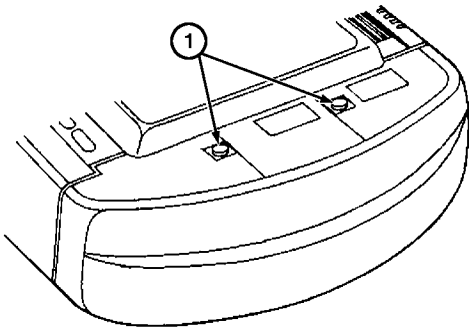
The lifting capacity of a lifting eyebolt decreases as the lift angle increases from vertical. A spreader bar should be used to obtain, as close as possible, a vertical lift from eyebolts.

Specification	
Counterweight—240DLC—Weight	5400 kg 11 900 lb

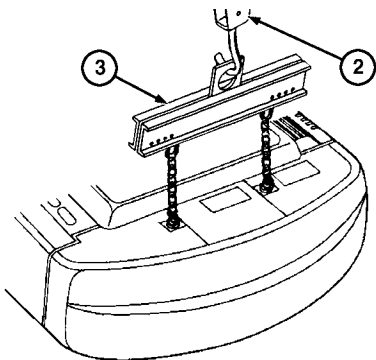
Specification	
Counterweight—270DLC—Weight	6100 kg 13 450 lb

3. Connect counterweight to an appropriate lifting device (2) with JT05558 metric lifting eyebolt using a spreader bar (3).
4. Remove cap screws and washers (4).
5. Remove counterweight.
6. Repair or replace as necessary.
7. Install counterweight onto machine using appropriate lifting device.
8. Install cap screws and washers (4). Tighten to specification.

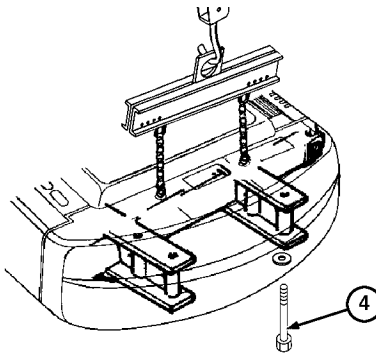
Specification	
Frame-to-Counterweight Cap	
Screw—Torque	1950 N•m 1440 lb•ft



T143043 -UN-20JUL01



T143044 -UN-03SEP02



T143045 -UN-20JUL01

- 1—Plastic Cap (2 used)
- 2—Lifting Device
- 3—Spreader Bar
- 4—Cap Screw and Washer (4 used)

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Section 18

Operator's Station

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Air Conditioner and Heater Remove and

Install.18-1830-10

Condenser Remove and Install18-1830-12

Cab Remove and Install

NOTE: Seat removal is optional.

1. Disconnect battery ground (-) cable at battery.

RO33873,0000A5B -19-21APR06-1/11



CAUTION: Coolant may be hot. Wait until radiator is cool to the touch before draining coolant.

2. Drain coolant from radiator.

Specification	
Cooling System—Approximate Capacity	29.9 L 7.9 gal



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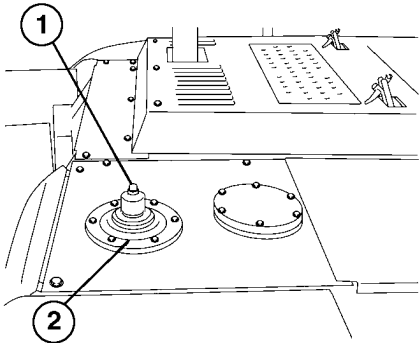
RO33873,0000A5B -19-21APR06-2/11



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

3. Push pressure release button (1).
4. Drain hydraulic oil tank. See 240DLC Drain and Refill Capacities or 270DLC Drain and Refill Capacities. (Operator's Manual.)

- 1—Pressure Release Button
2—Hydraulic Oil Tank Cover

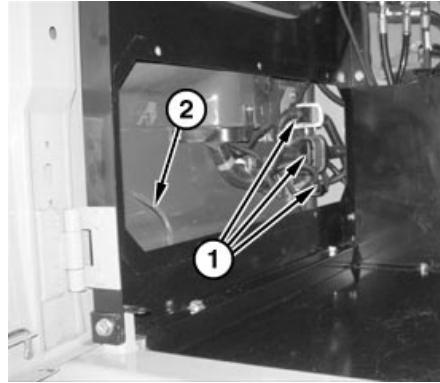


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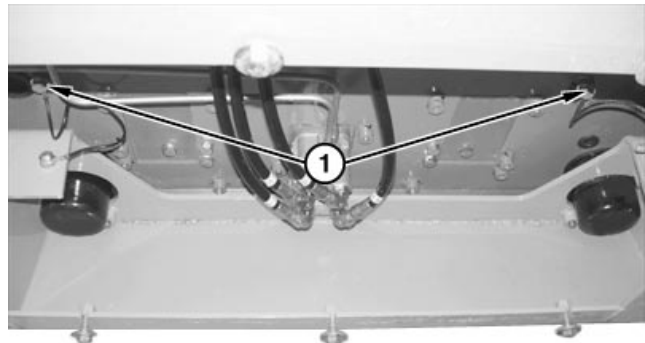
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5. Disconnect electrical connectors (1).
6. Disconnect windshield washer hose (2).

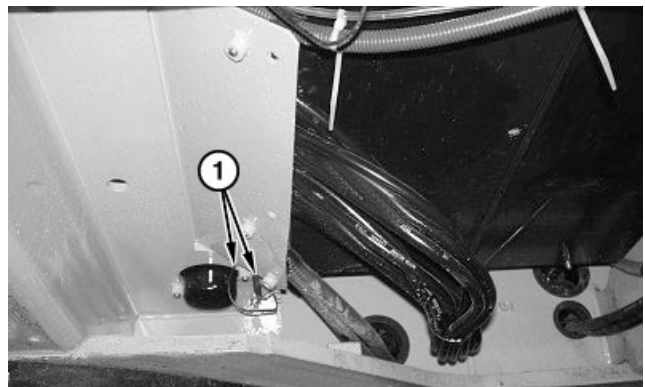
1—Electrical Connectors
2—Windshield Washer Hose



TX1004587A -UN-10MAR06



TX1004588A -UN-10MAR06

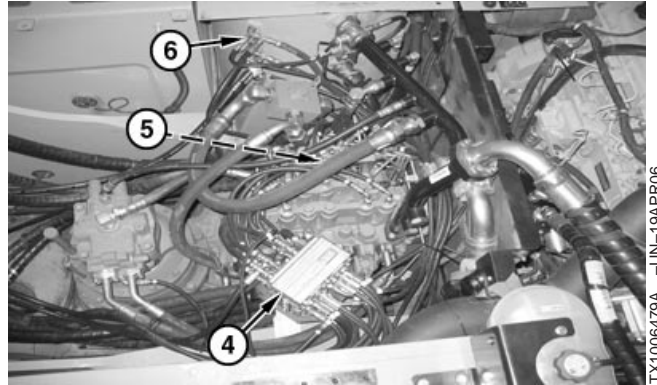


TX1003718A -UN-13FEB06

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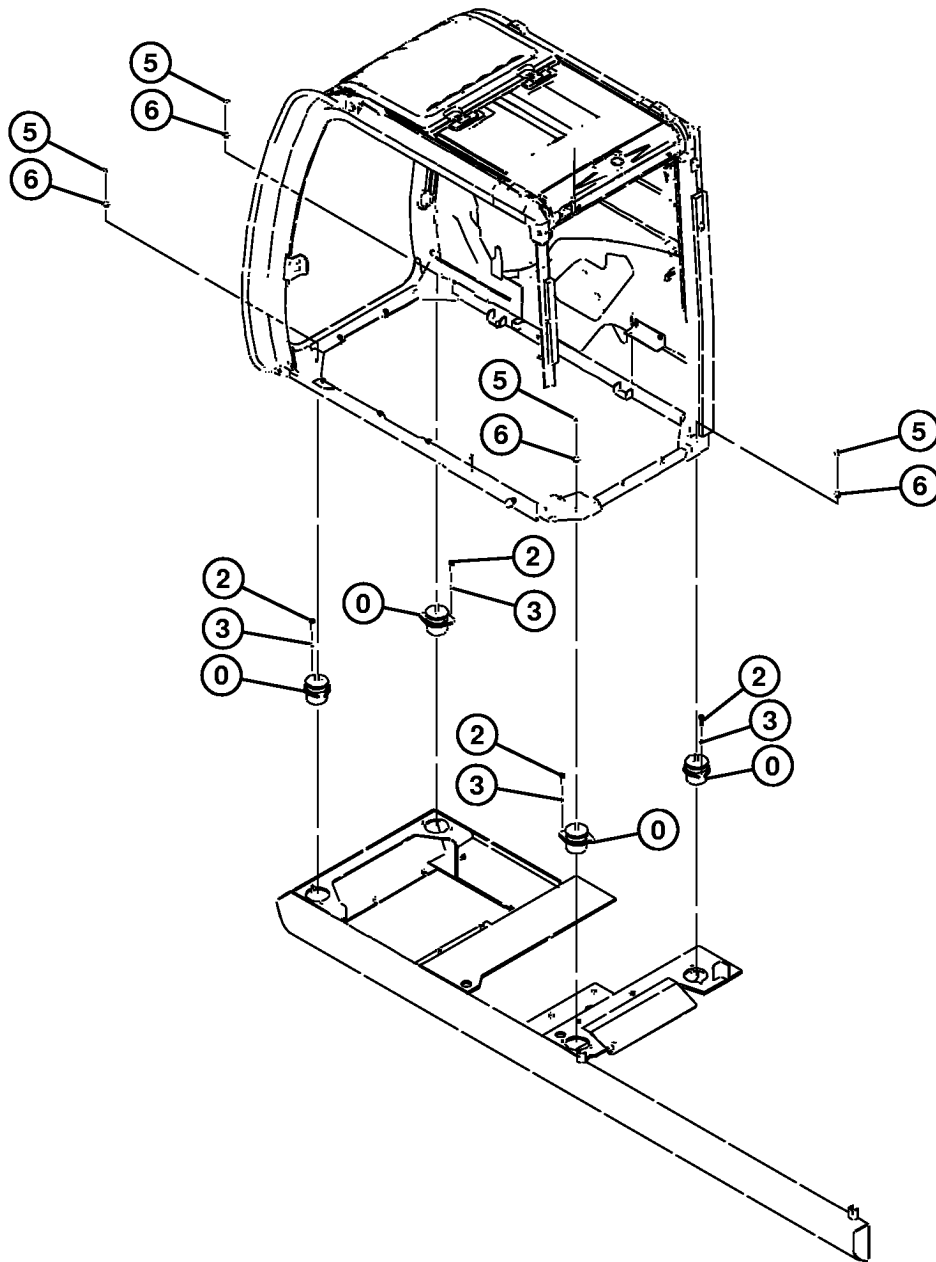
7. Disconnect hydraulic hoses from pilot signal manifold (4), solenoid valve manifold (5), and hydraulic tank (6). See Pilot Control Valve-to-Manifold Component Location—Excavator Pattern. (Group 9025-15.) and Travel Hydraulic System Line Connection. (Group 9025-15.) Tag and close all open lines and fittings using caps and plugs.
8. Recover refrigerant from air conditioning system. See Recover R134a Refrigerant. (Group 1830.)
9. Disconnect heater hoses from engine and air conditioner lines from receiver-dryer and air conditioning compressor. See Heater and Air Conditioner Component Location. (Group 9031-15.) Tag and close all open lines and fittings using caps and plugs.
10. Remove fresh air intake cowl.



4—Pilot Signal Manifold
5—Solenoid Valve Manifold
6—Hydraulic Tank

Continued on next page

RO33873,0000A5B -19-21APR06-5/11



T216300

0—Isolator (4 used)
2—Cap Screw (8 used)

3—Washer (8 used)

5—Lock Nut (4 used)

6—Washer (4 used)

Continued on next page

RO33873.0000A5B -19-21APR06-6/11

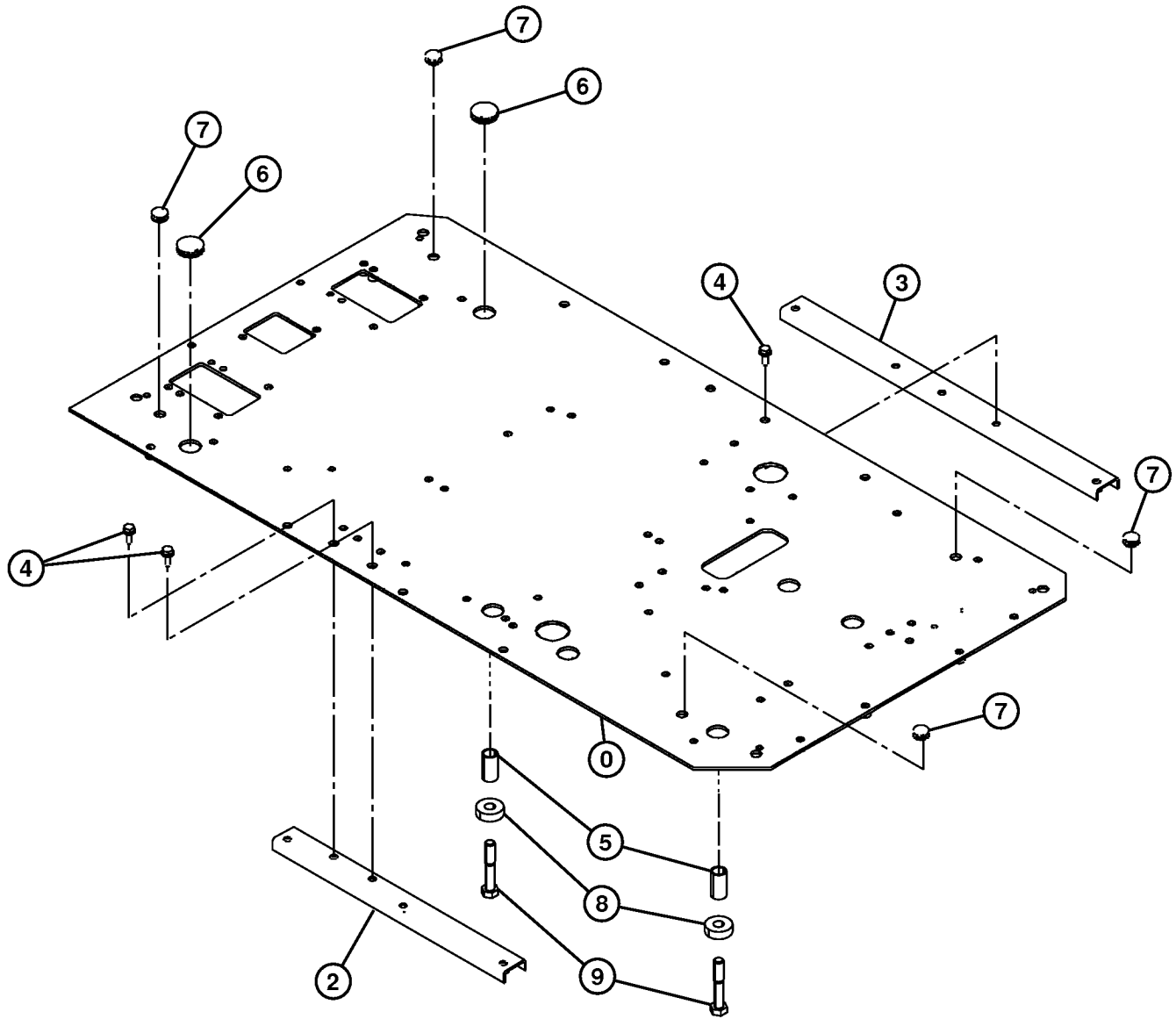
Removal and Installation

11. Remove lock nuts (5) securing cab to isolators (0) at all four corners. Discard lock nuts.

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RO33873,0000A5B -19-21APR06-7/11

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T216301

T216301 -UN-07FEB06

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RO33873.0000A5B -19-21APR06-8/11

- | | | | |
|-----------|----------------------|--------------------|----------------------|
| 0—Plate | 4—Cap Screw (3 used) | 6—Plug (2 used) | 8—Washer (2 used) |
| 2—Support | 5—Spacer (2 used) | 7—Grommet (4 used) | 9—Cap Screw (2 used) |
| 3—Support | | | |

12. Remove cap screws (9), washers (8), and spacers (5).



CAUTION: Heavy component; use appropriate lifting device.

Specification

Cab—Approximate Weight..... 385 kg
850 lb

13. Use lifting straps and connect cab to appropriate lifting device.

14. Remove cab.

15. Repair or replace parts as necessary.

16. Install cab.

17. Install washers and new lock nuts.

Specification

Cab Isolator Lock Nut—Torque..... 550 N•m
406 lb-ft

18. Install cap screws (9), washers (8), and spacers (5).

Specification

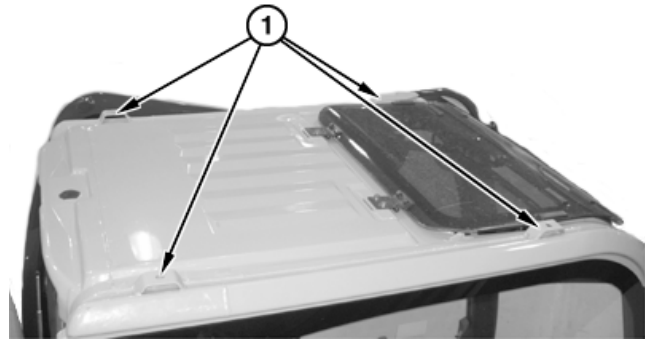
Cab Mount Cap Screw—Torque..... 550 N•m
406 lb-ft

19. Connect electrical connectors, hydraulic hoses, heater hoses, and air conditioning hoses. See Cab Harness (W1) Component Location Diagram. (Group 9015-05.)

20. Fill cooling system with coolant. See 240DLC Drain and Refill Capacities (Operator's Manual.) or 270DLC Drain and Refill Capacities. (Operator's Manual.)

21. Charge air conditioning system. See Charge R134a System. (Group 1830.)

22. Fill hydraulic oil tank. See 240DLC Drain and Refill Capacities, 270DLC Drain and Refill Capacities, and Hydraulic Oil. (Operator's Manual.)



1—Lifting Brackets

TX1003209A -UN-14MAR06

Continued on next page

RO33873,0000A5B -19-21APR06-10/11

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.

23. Do Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)

RO33873,0000A5B -19-21APR06-11/11

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1800
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Windowpane and One Piece Molding Remove and Install

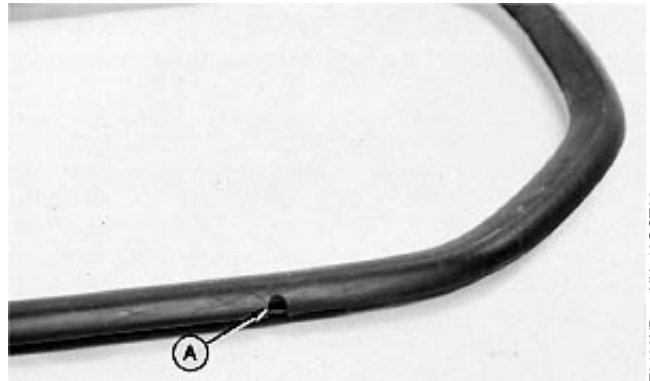
1. Lift inside of molding over cab frame and carefully push windowpane and molding out.
2. Remove molding from windowpane; replace if necessary.



RO33873,0000A5D -19-09FEB06-1/2

3. Install molding on windowpane. Position drain notches (A) at bottom and towards outside of windowpane.
4. Install windowpane and molding. Lift inside of molding over cab frame.

A—Drain Notches



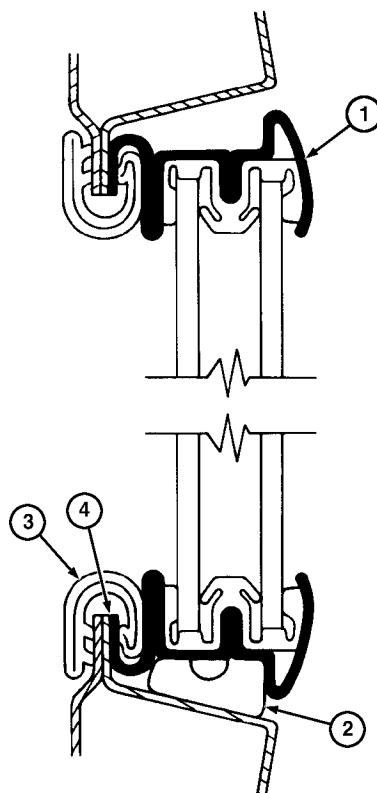
RO33873,0000A5D -19-09FEB06-2/2

Sliding Windows Remove and Install

1. Remove molding (3) from inside of window.
2. Use putty knife to cut adhesive (4) between cab flange and window frame (1).

IMPORTANT: Work carefully to avoid damaging frame and windowpane. Two technicians are required during window removal; one to push window out of cab, and one to prevent window from falling.

3. Carefully remove window frame from cab.
4. Lift frame slightly at top-center to remove and install windowpanes.
5. Apply PM37391 Instant Gel Adhesive to cab flange.
6. Install windows and frame with spacers (2) at the bottom.
7. Using water as lubricant, push window frame tight against cab flange.
8. Install molding (3) around window and cab flange.



T140968

- 1—Window Frame
- 2—Bottom Spacer (4 used)
- 3—Molding
- 4—Adhesive

T140968 -UN-30APR01

RO33873.0000A5E -19-01MAR06-1/1

Windowpanes Remove and Install

The adhesive used to secure windowpanes is a urethane adhesive used on automobile windshields. Urethane adhesive manufactured by Loctite Corporation or equivalent is recommended. DO NOT use any other type of adhesive. It is recommended that an auto glass dealer install windowpanes.

IMPORTANT: Windowpanes must include an ultraviolet barrier around edge to prevent adhesive deterioration. Windowpanes ordered through John Deere Parts include ultraviolet barrier. If windowpane is purchased through glass dealer, the dealer must incorporate ultraviolet barrier on the glass. DO NOT paint border of glass.

If auto glass dealer does not install windowpanes, proceed as follows:

1. Remove windowpane frame from cab.
2. Scrape any broken glass off existing adhesive. DO NOT remove adhesive from window frame or cab.

IMPORTANT: Adhesive will not bond to bare metal.

3. If existing adhesive is removed and paint is scraped, paint window frame. Paint must fully cure before installing windowpane.
4. Trim existing adhesive to form a smooth surface.

IMPORTANT: Follow manufacturer's instructions for using adhesive.

5. Apply 6 mm (1/4 in.) bead of adhesive over existing adhesive.
6. Position windowpane in cab frame. Use hand pressure to force windowpane down until edges are even with metal frame.
7. Secure windowpane with duct tape until adhesive cures. Allow adhesive to cure for 24 hours before operating machine.

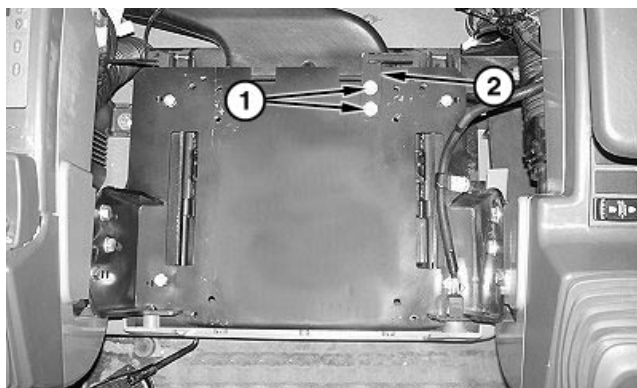
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Seat Remove and Install

NOTE: Seat shown removed for clarity.

1. Remove cap screws (1) and seat stop (2).

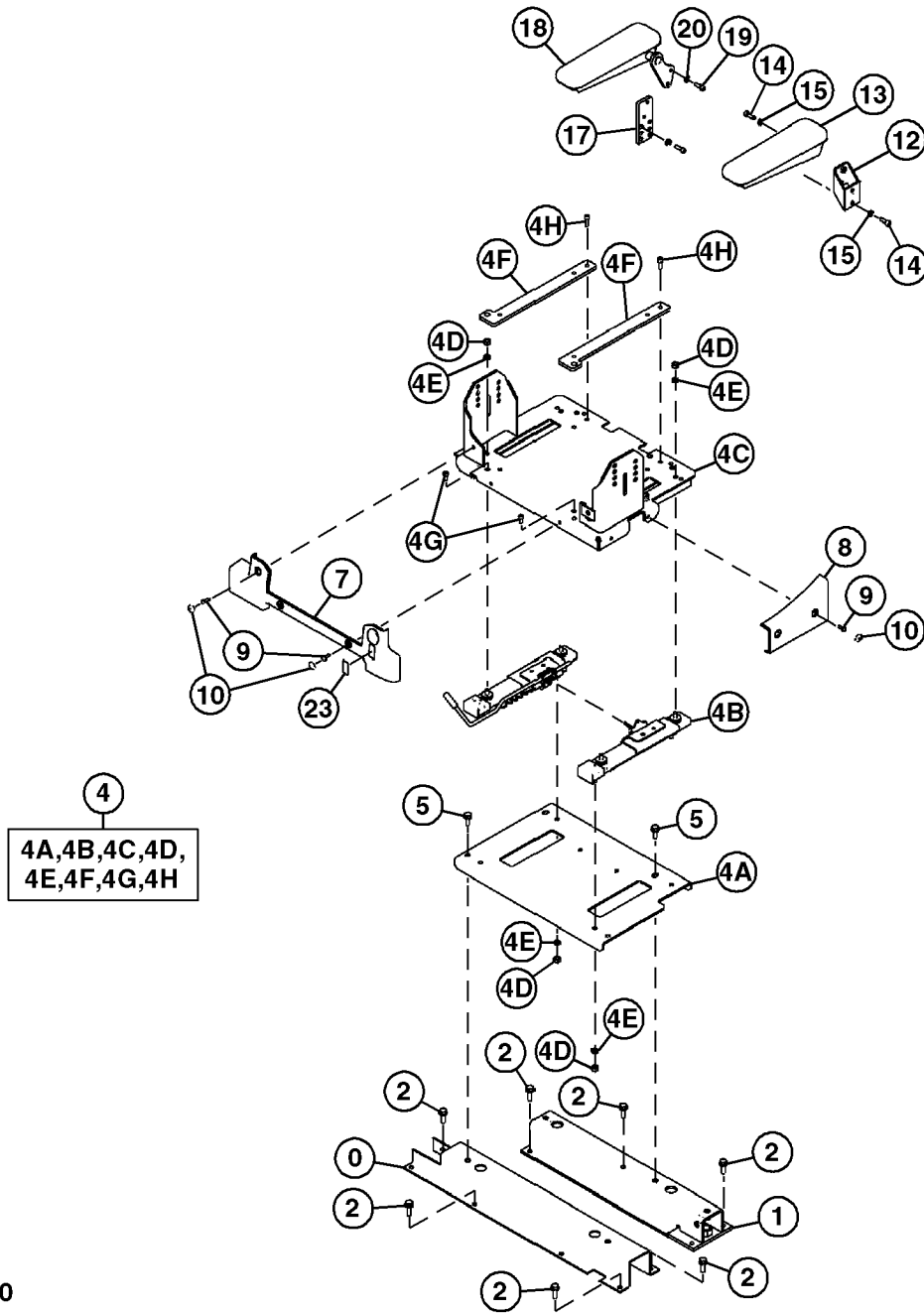
1—Cap Screw (2 used)
2—Seat Stop



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RO33873.0000A55 -19-19APR06-1/3

TX1003278A -UN-01FEB06



TX1004010

- | | | | |
|-----------------------------------|-----------------------------------|----------------------------------|-----------------------|
| 0—Support | 4D—Nut (8 used) | 7—Cover | 14—Cap Screw (4 used) |
| 1—Support | 4E—Washer (8 used) | 8—Cover | 15—Washer (4 used) |
| 2—Cap Screw with Washer (11 used) | 4F—Spacer (2 used) | 9—Cap Screw with Washer (5 used) | 17—Bracket |
| 4—Frame | 4G—Socket Head Cap Screw (2 used) | 10—Cap (5 used) | 18—Armrest Kit |
| 4A—Plate | 4H—Socket Head Cap Screw (2 used) | 12—Bracket | 19—Cap Screw (4 used) |
| 4B—Seat Slide Track Kit | 5—Cap Screw with Washer (4 used) | 13—Armrest Kit | 20—Washer (4 used) |
| 4C—Base | | | 23—Plate |

2. Remove socket head cap screws (4G and 4H).

Continued on next page

RO33873,0000A55 -19-19APR06-2/3



CAUTION: Heavy component; use additional person to remove and install seat.

Specification

Seat—Approximate Weight 37 kg
82 lb

Specification

Socket Head Cap Screw
(4G)—Torque..... 40 N•m
30 lb-ft

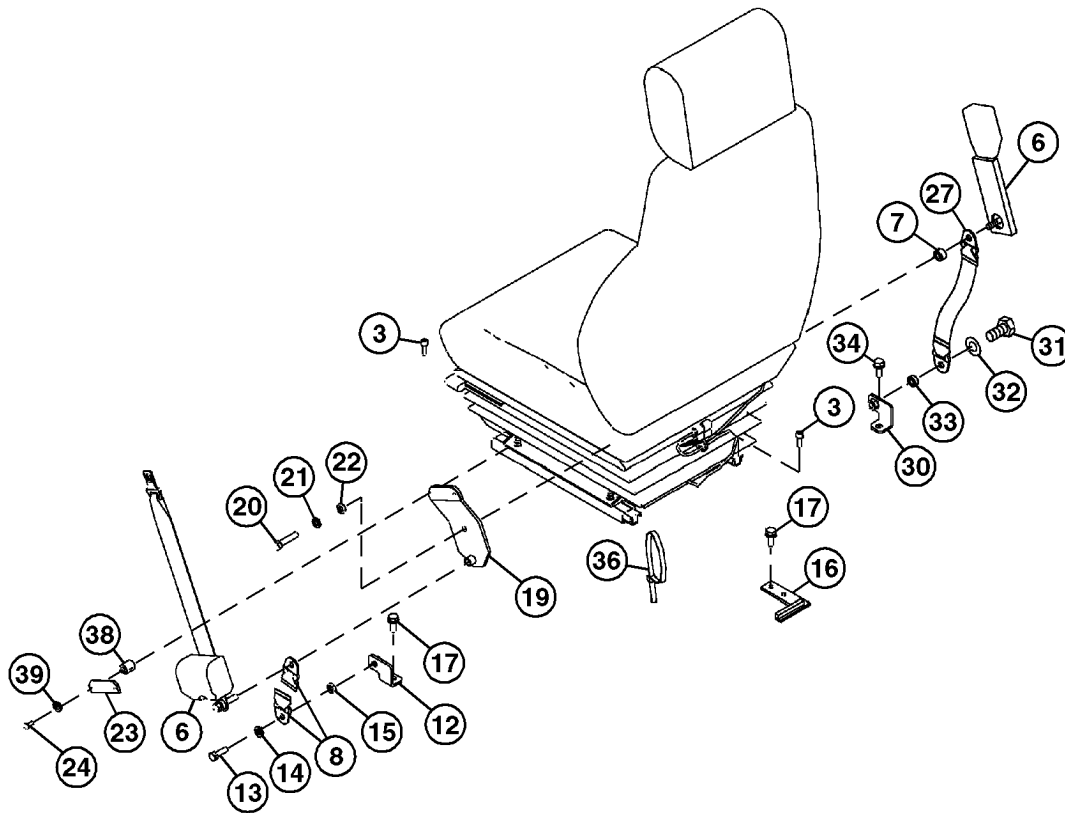
Socket Head Cap Screw (4H)—
Torque..... 47 N•m
35 lb-ft

3. Remove seat.
4. Install seat.
5. Install and tighten socket head cap screws (4G and 4H) to specification.

6. Install seat stop and cap screws.

RO33873,0000A55 -19-19APR06-3/3

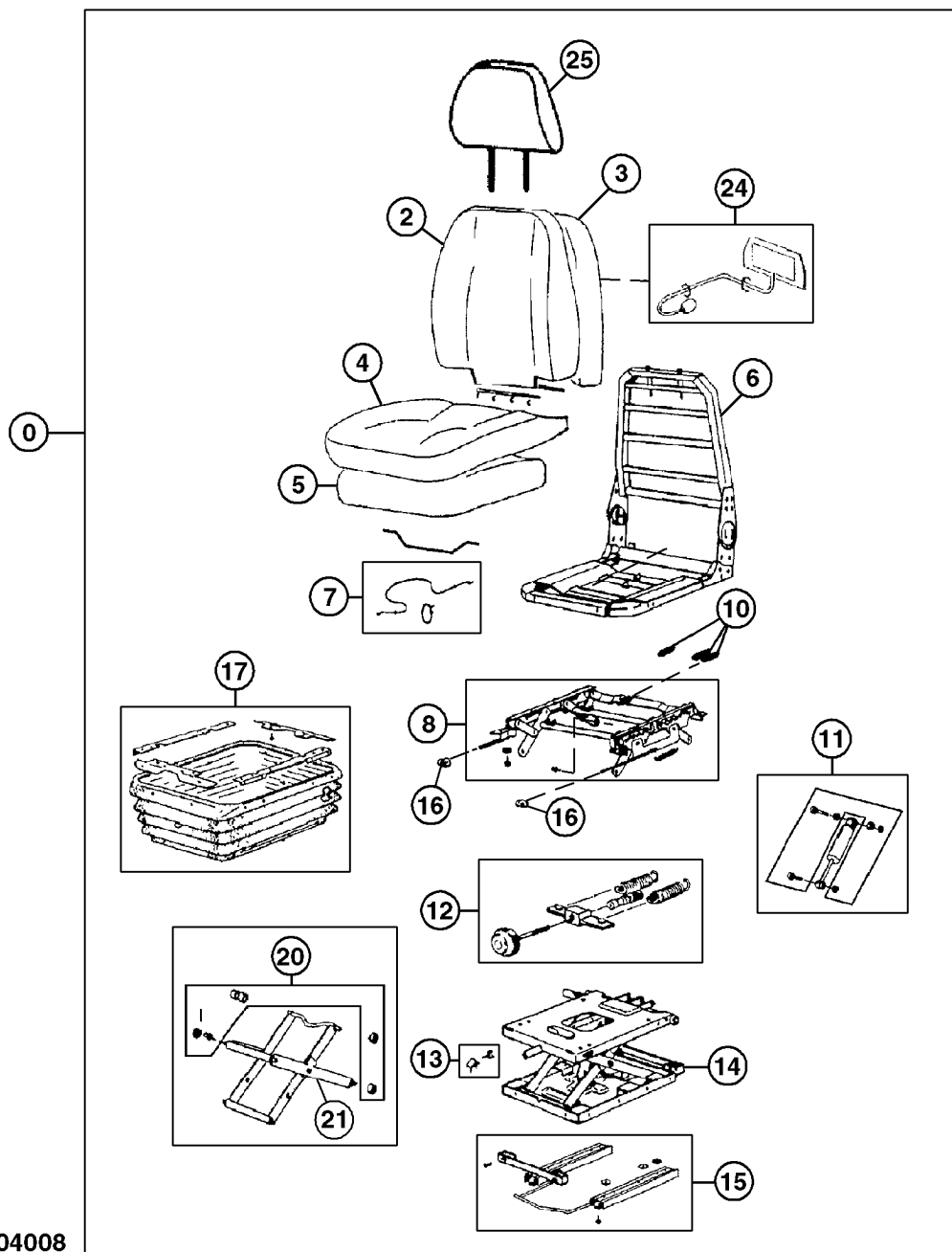
Seat Belt Remove and Install



TX1004011

3—Screw (4 used)	15—Washer	22—Washer	32—Lock Washer
6—Seat Belt	16—Bracket	23—Isolator	33—Washer
7—Spacer	17—Screw with Washer (3 used)	24—Screw with Washer (2 used)	34—Screw with Washer
8—Seat Belt	19—Bracket	27—Seat Belt	36—Tie Band
12—Bracket	20—Cap Screw	30—Bracket	38—Spacer (2 used)
13—Cap Screw	21—Lock Washer	31—Cap Screw	39—Washer (2 used)
14—Lock Washer			

Mechanical Suspension Seat Disassemble and Assemble



TX1004008

0—Seat Assembly
2—Cushion Cover
3—Support
4—Cushion
5—Pad

6—Frame
7—Cable
8—Stand
10—Spring
11—Torsional Damper

12—Adjuster
13—Lever
14—Seat Suspension
15—Seat Slide Track Kit
16—Handle

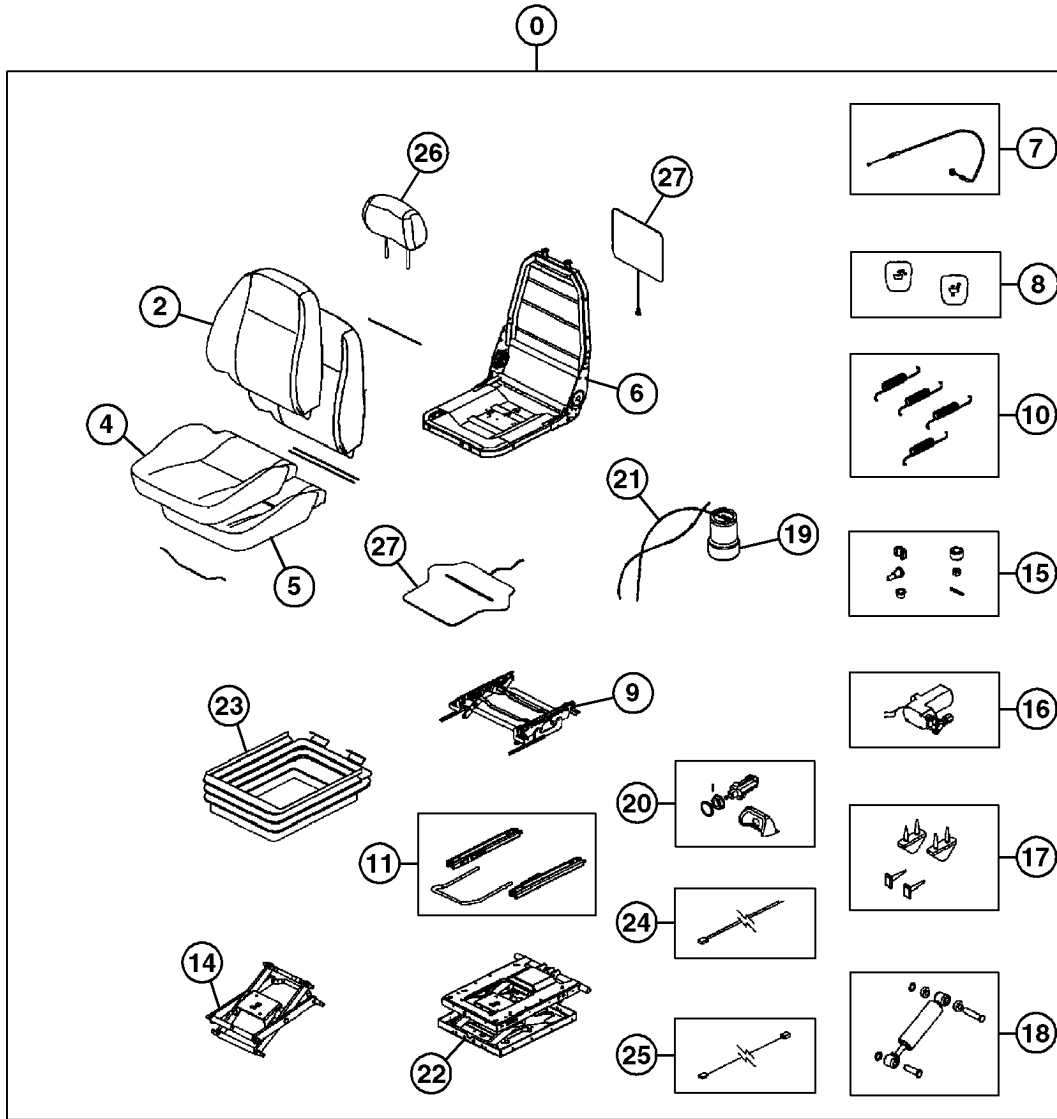
17—Cover
20—Bushing
21—Link
24—Seat Kit
25—Head Restraint

TX1004008 -UN-21FEB06

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RO33873.0000A6B -19-16MAR06-1/1

Air Suspension Seat Disassemble and Assemble



TX1004009

0—Seat Assembly
2—Cushion Cover
3—Pad
4—Cushion
5—Pad
6—Frame
7—Cable

8—Handle
9—Stand
10—Spring
11—Seat Slide Track Kit
14—Lever Kit
22—Seat Suspension
23—Seat Suspension Boot Kit

16—Compressor
17—Lever
18—Torsional Damper
19—Air Spring Seat Kit
20—Valve
21—Kit

22—Seat Suspension
23—Seat Suspension Boot Kit
24—Seat Adjustment Cable Kit
25—Wiring Lead
26—Head Restraint
27—Heater

Refrigerant Cautions and Proper Handling



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. Seek professional medical treatment immediately.

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 your bare hands. Skin can freeze to container. Wear gloves.

If skin freezes to container, pour **COOL** water over container to free the skin. Seek professional medical treatment immediately.

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. Never 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. JT02167A refrigerant test instrument should be used before any testing or repair to system is preformed.

Prism Pro Refrigerant Identification
Instrument. JT02167A

To safely identify type and check purity of refrigerant prior to recovery, recycling and recharging of A/C systems.

R134a Compressor Oil Charge Check

Remove compressor if R134a leakage was detected and repaired. See Compressor Remove and Install. (See procedure in this group.)

Drain oil from compressor and record amount. See R134a Compressor Oil Removal. (See procedure in this group.)

NOTE: Drain oil and save if this is a new compressor.

If oil drained from compressor removed from operation is very black or amount of oil is less than 6 mL (0.2 fl oz), perform the following:

1. Remove and discard receiver-dryer. See Receiver-Dryer Remove and Install. (See procedure in this group.)
2. Remove, clean, but do not disassemble expansion valve.

3. Flush complete system with TY25601 R134a Flushing Solvent.
4. If compressor is serviceable, pour flushing solvent in manifold ports and internally wash out old oil.
5. Install new receiver-dryer. See Receiver-Dryer Remove and Install. (See procedure in this group.)
6. Install required amount of TY22101 R134a Compressor Oil. See R134a Refrigerant Oil Information. (See procedure in this group.)
7. Connect all components. Evacuate R134a System and See Charge R134a System. (See procedures in this group.)

RO33873,0000A79 -19-01MAR06-1/1

R134a Compressor Oil Removal

1. Remove compressor. See Compressor Remove and Install. (See procedure in this group.)
2. Remove inlet/outlet manifold from compressor and clutch dust cover.
3. Drain oil into graduated container while rotating compressor shaft.
4. Record measured oil and discard oil properly.
5. Install new oil. See R134a Refrigerant Oil Information. (See procedure in this group.)
6. Install compressor. See Compressor Remove and Install. (See procedure in this group.)

RO33873,0000A78 -19-16MAR06-1/1

R134a Refrigerant Oil Information



CAUTION: All new compressors are charged with a mixture of nitrogen, R134a refrigerant and TY22101 (R134a) refrigerant oil. Wear safety goggles and discharge the compressor slowly to avoid possible injury.

IMPORTANT: Do not add any more oil than required or maximum cooling will be reduced.

DO NOT leave system or R134a compressor oil containers open. Refrigerant oil easily absorbs moisture. **DO NOT** spill R134a compressor oil on acrylic or ABS plastic. This oil will deteriorate these materials rapidly. Identify R134a oil containers and measures to eliminate accidental mixing of different oils.

A new compressor from parts depot contains new oil. The oil level visible through the suction port normally is below the drive shaft.

Normal operating oil level of compressor removed from operation cannot be seen through suction port of compressor.

Compressors can be divided into three categories when determining correct oil charge for system.

- New compressor from parts depot
- Used compressor removed from operation
- Compressor internally washed with flushing solvent

Determining the amount of system oil charge prior to installation of compressor on a machine.

When complete system, lines, and components are flushed add correct amount of oil as described.

Specification

Oil—Volume.....	200 mL 6.7 fl oz
R134a—Weight.....	850 ± 50 g 1.9 ± 0.1 lb

If any section of hose is removed and flushed or replaced, measure length of hose and use formula 3 mL per 30 cm (0.1 fl oz per ft) to determine correct amount of oil to be added.

Drain compressor oil into graduated container while rotating compressor shaft and record amount.

If oil drained from compressor is very black or amount of oil is less than 6 mL (0.2 fl oz), perform the following and discard oil properly:

- ☐ Determine if R134a leakage was detected, remove component and repair or replace component.
- ☐ Remove and discard receiver-dryer.
- ☐ Flush complete system with TY25601 R134a Flushing Solvent.

If component is serviceable, pour flushing solvent in ports and internally wash out old oil and discard oil properly.

Install new receiver-dryer. See Receiver-Dryer Remove and Install. (See procedure in this group.)

Install required amount of TY22101 R134a Compressor Oil.

Connect all components, evacuate, and charge system. See Evacuate R134a System and Charge R134a System. (See procedures in this group.)

R134a Refrigerant Recovery/Recycling and Charging Station Installation Procedure

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

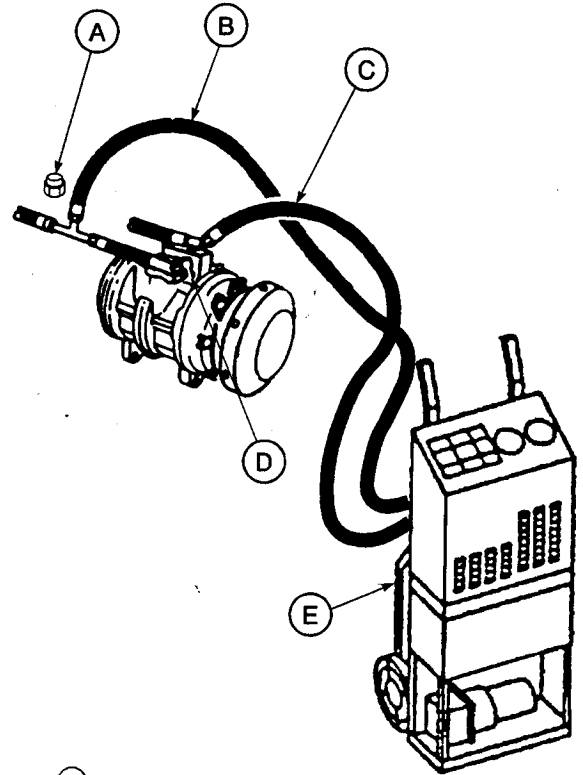
See Refrigerant Cautions and Proper Handling. (See procedure in this group.)

IMPORTANT: 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.

CAUTION: Do not remove high pressure relief valve (D). Air conditioning station will discharge rapidly causing possible injury.

IMPORTANT: Use only John Deere approved refrigerant recovery/recycling and charging stations. **DO NOT** mix refrigerant, hoses, fittings, components or refrigerant oils.

1. Follow procedures. See Refrigerant Cautions and Proper Handling. (See procedure in this group.)
2. Close both high-side and low-side valves on refrigerant recovery/recycling and charging station (E).
3. Remove cap from low-side charge port.
4. Connect blue hose (C) from refrigerant recovery/recycling and charging station (E) to low-side test port.
5. Remove cap (A) from charge port on high pressure hose and connect red hose (B).
6. Follow the manufacturers' instructions when using refrigerant recovery/recycling and charging station.



T8118AG (CV)

- A—High Pressure Hose Charge Port Cap
 B—Red Hose
 C—Blue Hose
 D—High Pressure Relief Valve
 E—Refrigerant Recovery/Recycling and Charging Station

T8118AG -UN-06DEC93

Recover R134a Refrigerant



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

See Refrigerant Cautions and Proper Handling.
(See procedure in this group.)



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

IMPORTANT: Use correct refrigerant recovery/recycling and charging stations. **DO NOT** mix refrigerant, hoses, fittings, components or refrigerant oils.

1. Run air conditioning system for three minutes to help in recovery process. Turn air conditioning system off before proceeding with recovery steps.
2. With engine OFF identify refrigerant type using JT02167A Prism Pro Refrigerant Identification Instrument.
3. Connect refrigerant recovery system. See R134a Refrigerant Recovery/Recycling and Charging Station Installation Procedure. (See procedure in this group.)
4. Follow manufacturers' instructions when using refrigerant recovery/recycling and charging station.

Evacuate R134a System

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

See Refrigerant Cautions and Proper Handling. (See procedure in this group.)

Do not remove high pressure relief valve. Air conditioning system will discharge rapidly causing possible injury.

1. Connect refrigerant recovery system. See R134a Refrigerant Recovery/Recycling and Charging Station Installation Procedure. (See procedure in this group.)
2. Open low-side and high-side valves on refrigerant recovery/recycling and charging station.
3. Follow manufacturers' instructions and evacuate system.

NOTE: Vacuum specifications listed are for sea level conditions. Subtract 3.4 kPa (34 mbar) (1 in. Hg) from 98 kPa (980 mbar) (29 in. Hg) for each 300 m (1000 ft) elevation above sea level.

Specification

Evacuate System—Vacuum Subtract 3.4 kPa (34 mbar) (1 in. Hg) from 98 kPa (980 mbar) (29 in. Hg) for each 300 m (1000 ft) elevation above sea level

4. Evacuate system until low-side gauge registers 98 kPa (980 mbar) (29 in. Hg) vacuum.

Specification

Evacuate System—Vacuum 98 kPa
980 mbar
29 in. Hg

If above specification vacuum cannot be obtained in 15 minutes, test the system for leaks. See Refrigerant Leak Test. (Group 9031-25.)

5. When vacuum reaches above specification, close low-side and high-side valves. Turn vacuum pump off.
6. If vacuum decreases more than specification in 5 minutes, there is a leak in system.

Specification

Evacuate System—Vacuum 3.4 kPa
34 mbar
1 in. Hg

7. Repair leak.
8. Evacuate system for 30 minutes after 98 kPa (980 mbar) (29 in. Hg) vacuum is reached.
9. Close low-side and high-side valves. Stop evacuation.
10. Charge system. See Charge R134a System. (See procedure in this group.)

RO33873,0000A49 -19-21FEB06-1/1

Charge R134a System



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

See Refrigerant Cautions and Proper Handling. (See procedure in this group.)

IMPORTANT: Use only John Deere approved refrigerant recovery/recycling and charging stations. **DO NOT** mix refrigerant, hoses, fittings, components or refrigerant oils.

- 1. Identify refrigerant type using JT02167A Prism Pro Refrigerant Identification Instrument.
- 2. Connect R134a Refrigerant Recovery/Recycling and Charging Station. See R134a Refrigerant Recovery/Recycling and Charging Station Installation Procedure. (See procedure in this group.)
- 3. Evacuate system. See Evacuate R134a System. (See procedure in this group.)

NOTE: Before beginning to charge air conditioning system, the following conditions must exist:

Engine STOPPED, the pump must be capable of pulling at least 28.6 in. Hg vacuum (sea level). Subtract 3.4 kPa (34 mbar) (1 in. Hg) from 98 kPa (980 mbar) (29 in. Hg) for each 300 m (1000 ft) elevation above sea level.

Specification

Evacuate System—Vacuum Subtract 3.4 kPa (34 mbar) (1 in. Hg) from 98 kPa (980 mbar) (29 in. Hg) for each 300 m (1000 ft) elevation above sea level

- 4. Follow manufacturer's instructions and charge system.
- 5. Add refrigerant to system.

Specification

Air Conditioning System
Refrigerant—Refrigerant
Quantity..... 850 ± 50 g
1.87 ± .11 lb

- 6. Check air conditioning for proper function. See Diagnose Air Conditioning System Malfunctions. (Group 9031-25.)

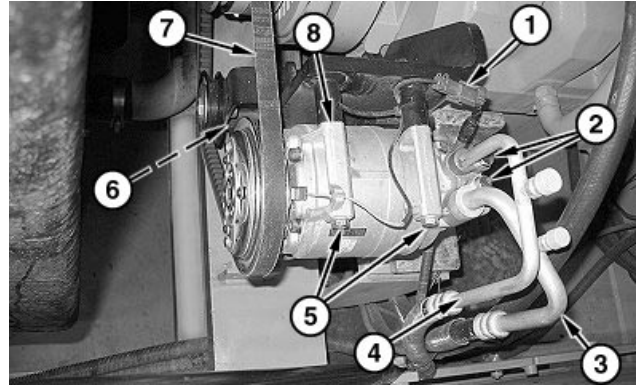
Compressor Remove and Install

1. Recover refrigerant from the system. See Recover R134a Refrigerant. (See procedure in this group.)
2. Disconnect electrical connector (1).
3. Loosen belt tensioner (6).
4. Remove belt (7).
5. Remove cap screw, lock washer and washer (2). Disconnect high and low pressure lines (3 and 4). Close all open lines and fittings using caps and plugs.
6. Remove cap screws, lock washers and washers (5) and remove compressor (8).
7. Repair or replace parts as necessary.
8. Install compressor (8) and tighten cap screws (5).
9. Install high and low pressure lines (3 and 4) Install and tighten cap screws (2).

Specification

Pressure Line Cap Screw—	
Torque	28 N•m 21 lb-ft

10. Install belt (7) and adjust belt tension. See Inspect Fan Belt. (Operator's Manual.)
11. Connect electrical connector (1).
12. Evacuate and charge the system. See Evacuate R134a System and Charge R134a System. (See procedures in this group.)



- 1—Electrical Connector
- 2—Cap Screw (2 used)
- 3—Low Pressure Line
- 4—High Pressure Line
- 5—Cap Screw (4 used)
- 6—Belt Tensioner
- 7—Belt
- 8—Compressor

RO33873,0000A77 -19-21APR06-1/1

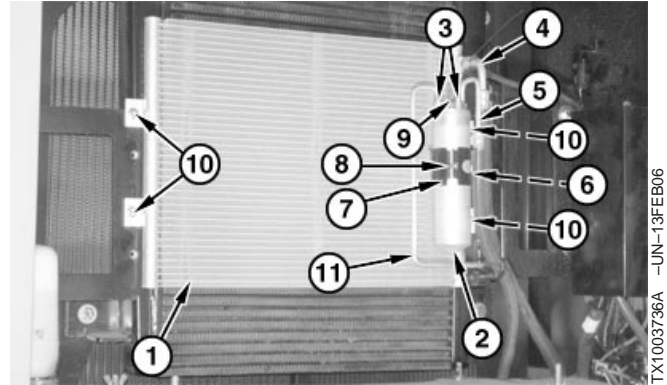
Receiver-Dryer Remove and Install

1. Recover refrigerant from the system. See Recover R134a Refrigerant. (See procedure in this group.)
2. Disconnect electrical connector (9).
3. Remove cap screw, lock washer, washer (3) and high pressure liquid input line (11).
4. Remove cap screw, lock washer, washer (3) and high pressure liquid output line (5).
5. Loosen cap screw (8) and remove receiver-dryer (2) from bracket (7).
6. Install receiver-dryer.
7. Tighten high-pressure output line cap screw and high pressure input line cap screw.

Specification

High-Pressure Output and Input
Line Cap Screw—Torque 5 N•m
44 lb-in

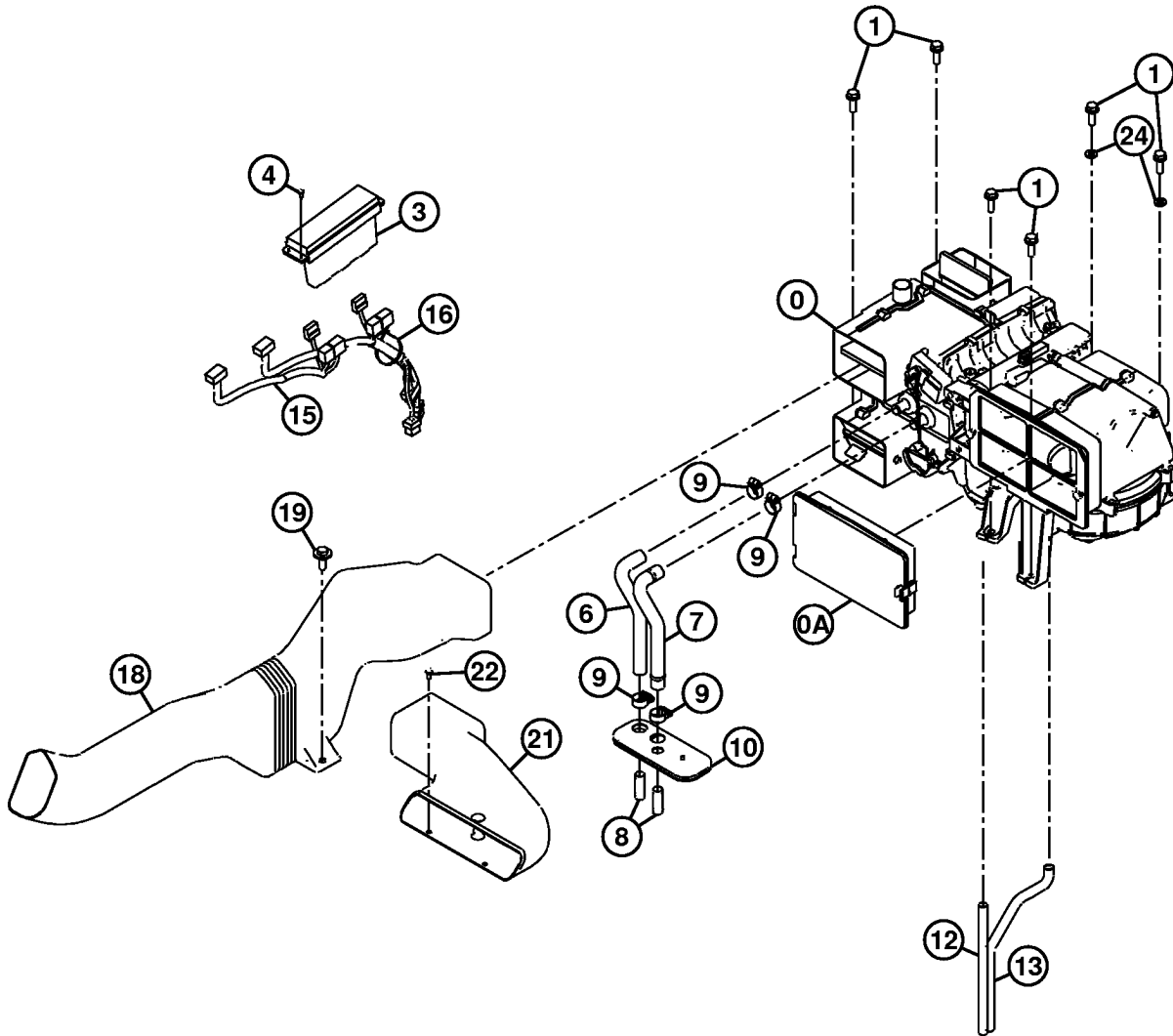
8. Connect electrical connector (9).
9. Evacuate and charge the system. See Evacuate R134a System and Charge R134a System. (See procedures in this group.)



- 1—Condenser
- 2—Receiver-Dryer
- 3—Cap Screw, Lock Washer, Washer (2 used)
- 4—High Pressure Gas Input Line
- 5—High Pressure Liquid Output Line
- 6—Cap Screw (2 used)
- 7—Bracket
- 8—Cap Screw
- 9—Electrical Connector
- 10—Cap Screw (4 used)
- 11—High Pressure Liquid Input Line

TX1003736A -UN-13FEB06

Air Conditioner and Heater Remove and Install



TX1000431

Continued on next page

RO33873,0000A76 -19-13FEB06-1/2

0—Air Conditioner	7—Heater Hose	13—Evaporator Condensation Drain Hose	19—Cap Screw
0A—Recirculating Air Filter	8—Fitting (2 used)	15—Wiring Harness	21—Air Duct
1—Cap Screw (6 used)	9—Hose Clamp (4 used)	16—Clip	22—Cap Screw (2 used)
3—Air Heater Controller	10—Plate	18—Air Duct	24—Washer (2 used)
4—Cap Screw (4 used)	12—Evaporator Condensation Drain Hose		
6—Heater Hose			

1. Drain coolant from radiator. Approximate capacity is 29.9 L (7.9 gal).

NOTE: Evaporator and heater core are integral parts of the air conditioner. If evaporator or heater core need replacement, replace entire air conditioner unit.

2. Recover refrigerant from the system. See Recover R134a Refrigerant. (See procedure in this group.)

3. Remove air conditioner (0).

4. Replace parts as necessary.

5. Install air conditioner.

6. Evacuate and charge the system. See Evacuate R134a System and Charge R134a System. (See procedures in this group.)

RO33873,0000A76 -19-13FEB06-2/2

Condenser Remove and Install

1. Recover refrigerant from the system. See Recover R134a Refrigerant. (See procedure in this group.)
2. Remove cap screws (6). Secure receiver-dryer (2) and bracket (7) so it will not interfere with condenser removal.
3. Disconnect high pressure gas input line (4).
4. Remove cap screw, lock washer, and washer and disconnect high pressure liquid output line (5).
5. Remove cap screw, lock washer, and washer (3) and disconnect high pressure liquid input line (11).
6. Remove cap screws (10) and condenser (1).
7. Install condenser.
8. Tighten high pressure gas input line.
9. Tighten high pressure liquid output line cap screw.

Specification

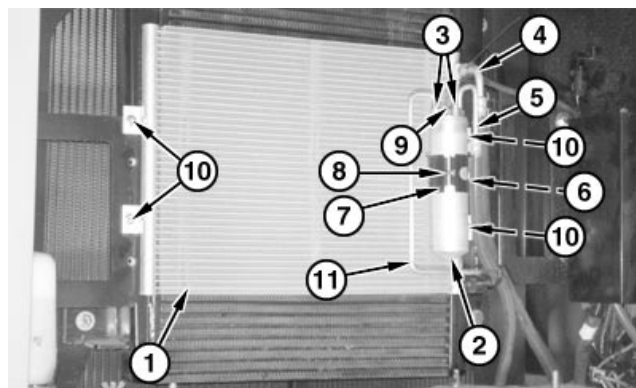
Output Line Cap Screw—Torque..... 14 N•m
124 lb-in.

10. Tighten high pressure liquid input line cap screw.

Specification

Input Line Cap Screw—Torque..... 23 N•m
204 lb-in.

11. Evacuate and charge the system. See Evacuate R134a System and Charge R134a System. (See procedures in this group.)



- 1—Condenser
- 2—Receiver-Dryer
- 3—Cap Screw, Lock Washer, Washer (2 used)
- 4—High Pressure Gas Input Line
- 5—High Pressure Liquid Output Line
- 6—Cap Screw (2 used)
- 7—Bracket
- 8—Cap Screw
- 9—Electrical Connector
- 10—Cap Screw (4 used)
- 11—High Pressure Liquid Input

TX1003736A -UN-13FEB06

RO33873,0000A75 -19-13FEB06-1/1

Section 33

Excavator

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Bucket Remove and Install

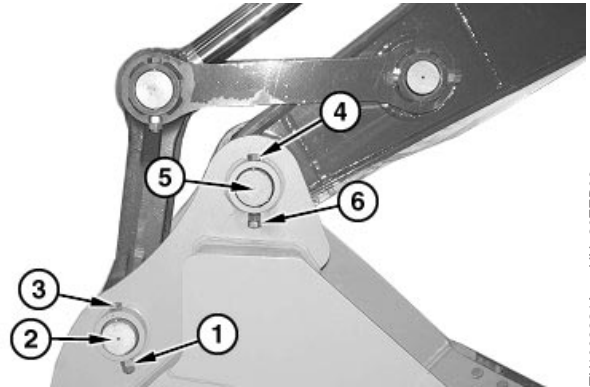


CAUTION: Bucket is heavy. Use appropriate lifting device.

	Specification
Bucket—Weight.....	953 kg 2100 lb

1. Position bucket on level surface.
2. Remove parts 1-6.
3. Remove bucket.

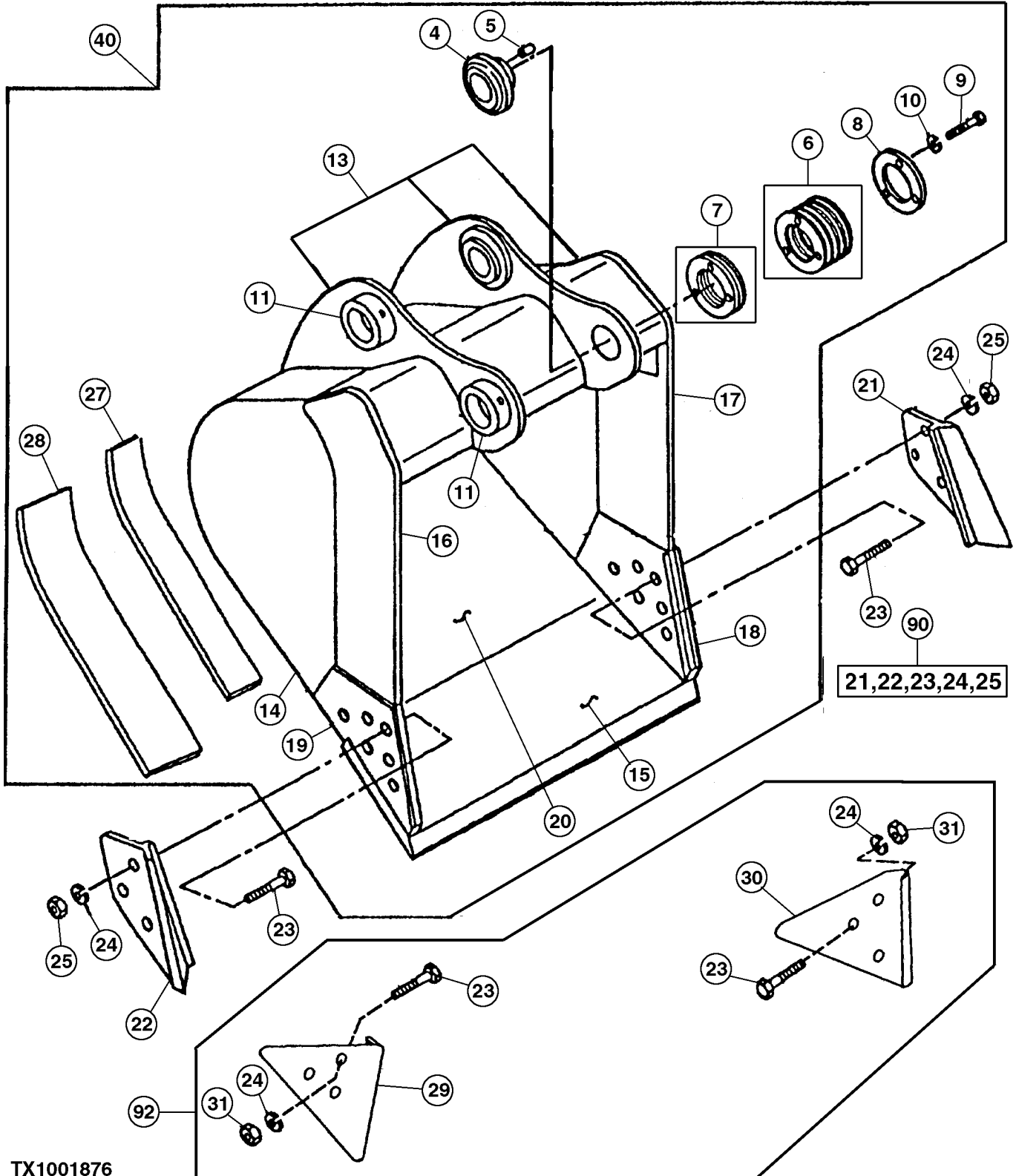
- 1—Nut (2 used)
- 2—Pin
- 3—Cap Screw
- 4—Cap Screw
- 5—Pin
- 6—Nut (2 used)



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Continued on next page

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TX1001876

Standard Bucket

TX1001876 -UN-06JAN06

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4—Bushings	11—Bushings (2 used)	19—Vertical Cutter	25—Nut (6 used)
5—Dowel Pin	13—Pivot	20—Moldboard	27—Bar (Inner Wear)
6—Washer (6 used)	14—Plate	21—Cutting Edge	28—Bar (Inner Wear)
7—Shim	15—Cutting Edge	22—Cutting Edge	29—Shroud
8—Plate	16—Vertical Cutter	23—Bolt (6 used)	30—Shroud
9—Cap Screw (3 used)	17—Vertical Cutter	24—Lock Washer (6 used)	31—Nut (6 used)
10—Lock Washer (3 used)	18—Vertical Cutter		

- Repair or replace bucket as necessary.
- Replace bushings and pins as needed. See Inspect Pins, Bushings and Bosses—Front Attachment. (Group 3340.)
- Align pin bores in bucket with pin bores in arm to prevent damage to dust seals when pin (5) is installed.
- Adjust bucket pivot end play. Do Adjust Bucket Pivot End Play. (See procedure in this group.)
- Adjust bucket to arm joint. See Adjusting Bucket to Arm Joint. (Operator's Manual.)
- Install bucket in reverse order of removal procedure.

HX00125,0000094 -19-10MAR06-3/3

Adjust Bucket Pivot End Play

- Slide O-ring up on boss of bucket.
- Measure clearance between bushing and arm.

Adjust clearance to specification.

Specification

Bucket Pivot Bushing-to-Arm—	
Clearance	As close to but not less than 0.5 mm
	As close to but not less than 0.020 in.

NOTE: Alternate buckets may have different adjustment procedures.

- Remove cap screws (1) and plate (2).
- Remove shims (3) as needed to allow bushing to move in to adjust clearance and take up excessive play.
- Install plate (2). Tighten cap screws (1) to specification.

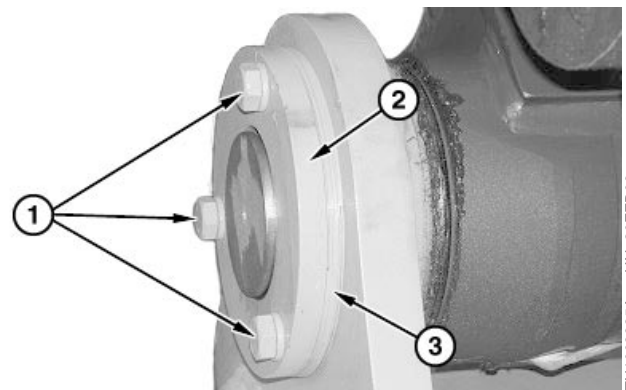
Specification

Bucket Pivot Shim-to-Plate Cap	
Screw—Torque	88 N•m
	65 lb•ft

- Slide O-ring back into position.



T95775 -UN-10NOV88



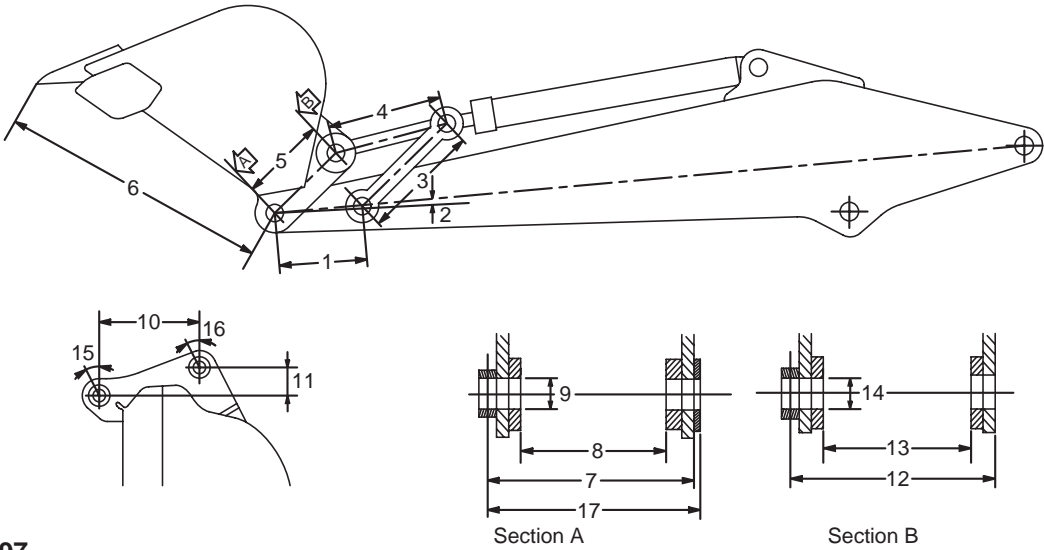
TX1003825A -UN-20FEB06

- 1—Cap Screws (3 used)
2—Plate
3—Shims

33
3302
3

HX00125,0000092 -19-09MAR06-1/1

Bucket Pin-Up Data



TX1003797

TX1003797 -UN-07MAR06

IMPORTANT: If the front attachment of a previous model machine is used, use the

grease intervals for previous model machine.

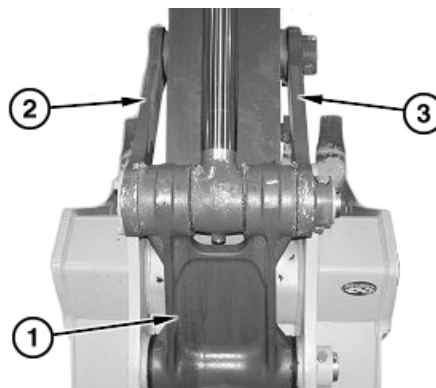
240DLC		270DLC
Item		
1	460 mm	475 mm
	18.1 in.	18.7 in.
2	5 mm	0 mm
	0.2 in.	0 in.
3	620 mm	622 mm
	24.4 in.	24.5 in.
4	580 mm	600 mm
	22.8 in.	23.6 in.
5	475 mm	475 mm
	18.7 in.	18.7 in.
6	1560 mm	1560 mm
	61.4 in.	61.4 in.
7	549 mm	549
	21.6 in.	21.6 in.
8	409 mm	409 mm
	16.1 in.	16.1 in.
9	90 mm	90 mm
	3.5 in.	3.5 in.
10	470 mm	470 mm
	18.5 in.	18.5 in.
11	69 mm	69 mm
	2.7 in.	2.7 in.
12	549 mm	549 mm
	21.6 in.	21.6 in.
13	410 mm	410 mm
	16.1 in.	16.1 in.
14	90 mm	90 mm
	3.5 in.	3.5 in.
15	45 °	45 °
16	45 °	45 °
17	565 mm	565 mm
	22.2 in.	22.2 in.

Bucket Links Remove and Install

NOTE: Removal of bucket is not necessary for removal of bucket link (1), right arm link (2), and left arm link (3).

1. Attach appropriate lifting device to bucket link (1).

- 1—Bucket Link
- 2—Right Arm Link
- 3—Left Arm Link



TX1003799 -JUN-17FEB06

HX00125,000009C -19-19APR06-1/4

2. Put wooden block between arm-to-bucket link cylinder (8) and arm to hold cylinder up when cylinder pin (6) is removed.

3. Remove nuts (5), cap screw (7) and pin (6).

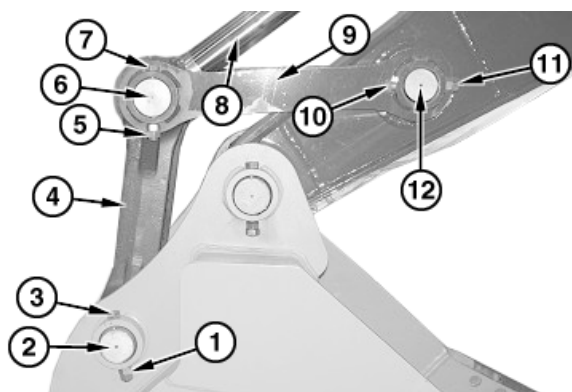
4. Remove nuts (11) and cap screw (10).

NOTE: When pin (12) is removed, left (9) and right arm links will be free to move.

5. Remove pin (12) and arm links.

6. Remove nuts (1), cap screw (3) and pin (2).

7. Remove bucket link (4).



TX1003790A -JUN-17FEB06

- 1—Nut (2 used)
- 2—Pin
- 3—Cap Screw
- 4—Bucket Link
- 5—Nut (2 used)
- 6—Cylinder Pin
- 7—Cap Screw
- 8—Arm-to-Bucket Link Cylinder
- 9—Left Arm Link
- 10—Cap Screw
- 11—Nut (2 used)
- 12—Pin

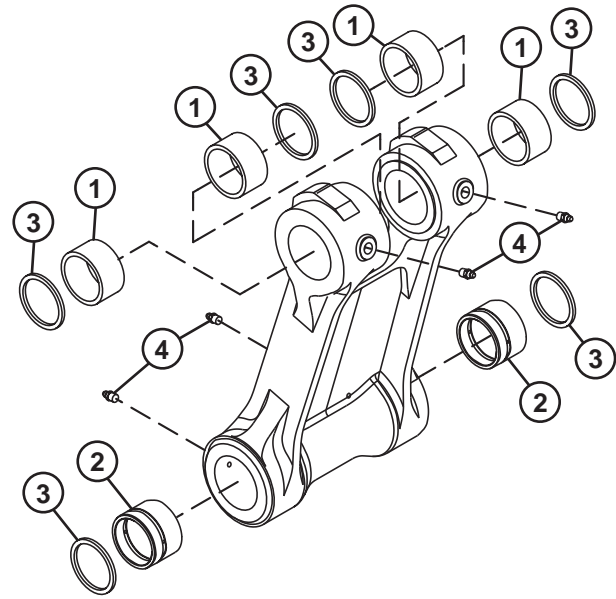
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HX00125,000009C -19-19APR06-2/4

8. Inspect bushings (1 and 2) and dust seals (3). See Inspect Pins, Bushings and Bosses—Front Attachment. (See procedure in this group.)

- 1—Bushings (4 used)
 2—Bushings (2 used)
 3—Dust Seal (6 used)
 4—Lubrication Fitting (4 used)



240DLC Bucket Link

TX1004058 -UN-22FEB06

Continued on next page

HX00125,000009C -19-19APR06-3/4

9. Replace parts as necessary. See Bushings and Seal Remove and Install. (See procedure in this group.)
10. Before installing pins, align pin bores to prevent damage to dust seal when pins are installed.
11. Install links, pins, cap screws, and nuts in reverse order of removal.

IMPORTANT: Tighten retaining nuts against each other, not retainer. Cap screw must be free to turn in hole.

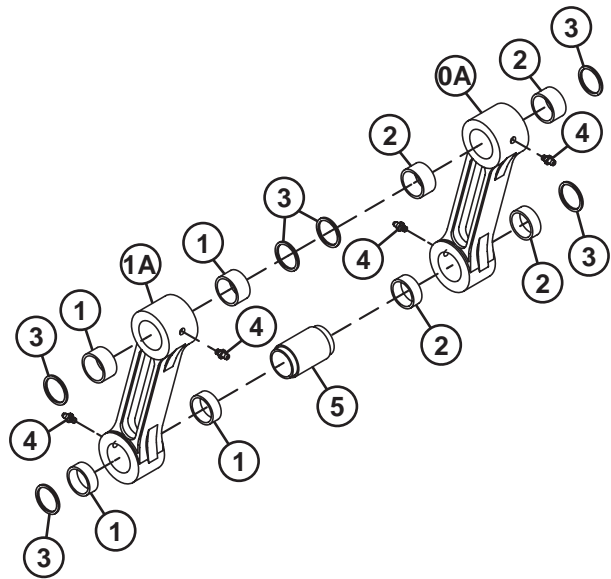
12. Tighten nuts to specification.

Specification

Bucket Links Pin Retaining	
Nuts—Torque	540 N•m 400 lb-ft

13. Apply multipurpose grease to all lubrication fittings.

- 0A—Right Bucket Link
 1A—Left Bucket Link
 1—Bushing (4 used)
 2—Bushing (4 used)
 3—Dust Seals (6 used)
 4—Lubrication Fitting (2 used)
 5—Spacer



270DLC Bucket Link

TX1004059 -UN-22FEB06

HX00125,000009C -19-19APR06-4/4

Arm Remove and Install

1. Remove bucket. See Bucket Remove and Install. (Group 3302.)
2. Retract arm cylinder.
3. Put floor stand under end of boom, so load is on boom, not on arm cylinder. Extend arm cylinder just enough to put end of arm on ground.

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HX00125,0000098 -19-19APR06-1/6

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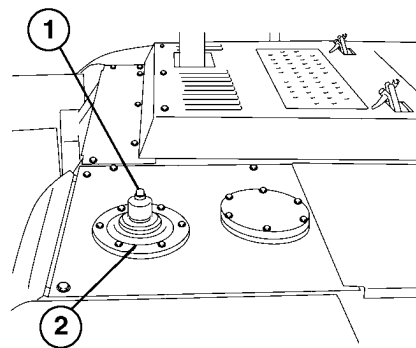


CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing pressure release button (1).

4. Push pressure release button (1).
5. Loosen bucket cylinder hydraulic lines to release any residual pressure.
6. Tag and disconnect lines. Close all open lines and fittings using caps and plugs.

NOTE: Remove bucket cylinder and linkage only if necessary to repair arm.

7. Remove bucket links and bucket cylinder. See Bucket Links Remove and Install (See procedure in this group.), and Bucket Cylinder Remove and Install. (Group 3360.)



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

T214924 -UN-17NOV05

Continued on next page

HX00125,0000098 -19-27APR06-2/6



CAUTION: Heavy component; use appropriate lifting device. Weight of boom, arm and bucket assembly and components will vary depending on machine configuration.

Weights—240DLC—Specification

Boom, Arm and Bucket	
Assembly—Approximate Weight.....	4360 kg
	9614 lb
Bucket Cylinder—Weight.....	195 kg
	430 lb
Arm Cylinder—Weight.....	290 kg
	640 lb

Weights—270DLC—Specification

Boom, Arm and Bucket	
Assembly—Approximate Weight.....	4730 kg
	10 430 lb
Bucket Cylinder—Weight.....	210 kg
	465 lb
Arm Cylinder—Weight.....	350 kg
	770 lb

8. Attach appropriate lifting device to arm.



Arm With Bucket Cylinder

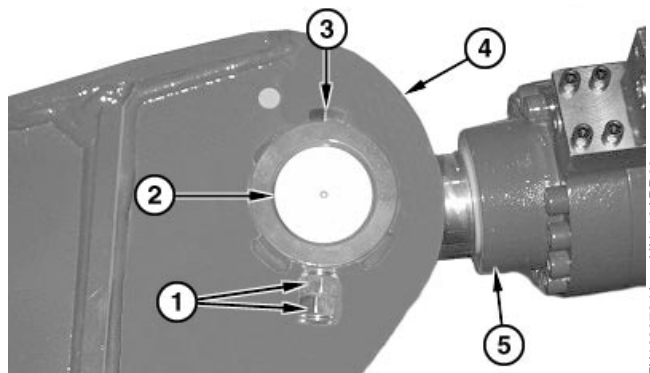
T6626JC -UN-31OCT88

HX00125,0000098 -19-27APR06-3/6

9. Put wooden block between arm cylinder (5) and boom to hold cylinder up when cylinder pin (2) is removed.

10. Remove nuts (1), cap screw (3) and pin (2).

- 1—Nut (2 used)
- 2—Pin
- 3—Cap Screw
- 4—Arm
- 5—Arm Cylinder



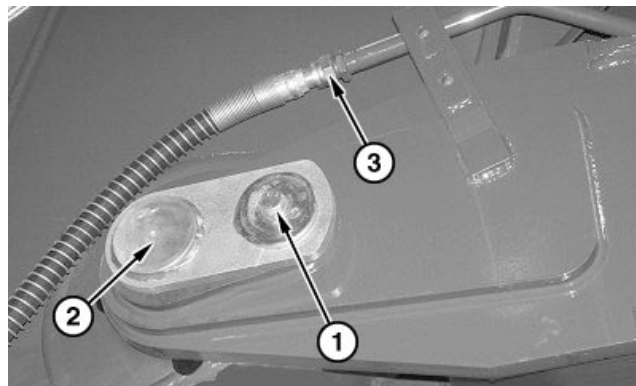
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HX00125,0000098 -19-27APR06-4/6

TX1003794A -UN-19APR06

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5

11. Tag and disconnect hydraulic lines (3). Close all open lines and fittings using caps and plugs.
12. Remove cap screw (1) and boom-to-arm pin (2).
13. Remove arm and lower to floor.
14. Inspect bushings and dust seals. See Inspect Pins, Bushings and Bosses—Front Attachment. (See procedure in this group.)
15. Repair or replace parts as necessary. See Bushings and Seals Remove and Install. (See procedure in this group.)



1—Cap Screw
2—Pin
3—Hydraulic Line

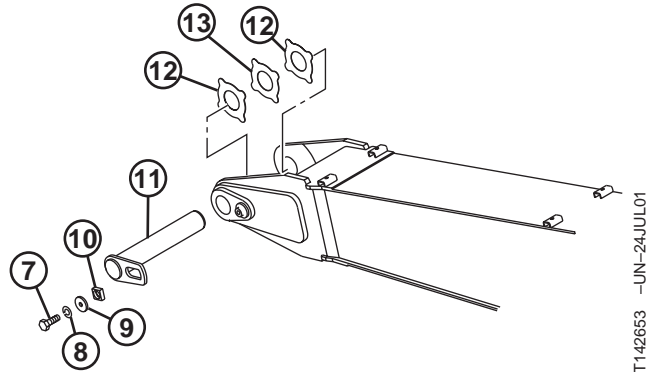
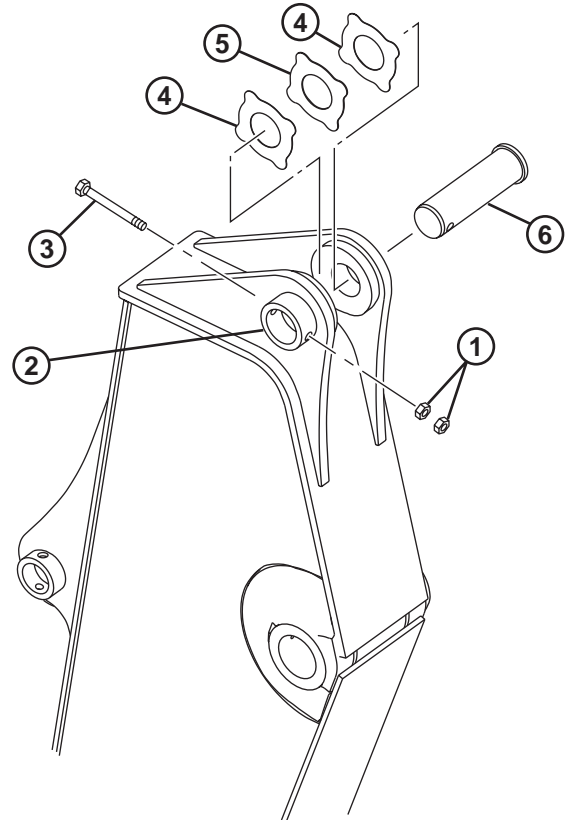
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HX00125,0000098 -19-27APR06-5/6

TX1003793A -UN-15MAR06

16. Install thrust plates (4 and 12) equally on each side of arm to get minimal amount of clearance between boom and arm.
17. Install boom-to-arm pin (11), block (10), plate (9), washer (8) and cap screw (7).
18. Connect arm cylinder by inserting cylinder pin (6), cap screw (3) and nuts (1).
19. Connect lines. See Main Hydraulic System Component Location. (Group 9025-15.)
20. Apply multi-purpose grease to all lubrication fittings.
21. Install bucket. See Bucket Remove and Install. (Group 3302.)

- 1—Nut (2 used)
 2—Stopper
 3—Cap Screw
 4—Thrust Plate (2 used)
 5—Thrust Plate
 6—Cylinder Pin
 7—Cap Screw
 8—Washer
 9—Plate
 10—Block
 11—Pin
 12—Thrust Plate (2 used)
 13—Thrust Plate



HX00125,0000098 -19-27APR06-6/6

Boom Remove and Install

1. Remove bucket and arm. See Bucket Remove and Install (Group 3302.), and Arm Remove and Install. (See procedure in this group.)
2. Lower boom to ground.

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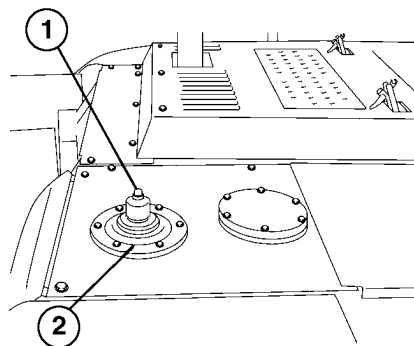
HX00125,0000099 -19-27APR06-1/10



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing pressure release button (1).

3. Push pressure release button (1).

1—Pressure Release Button
2—Hydraulic Oil Tank Cover



T214924 -UN-17NOV05

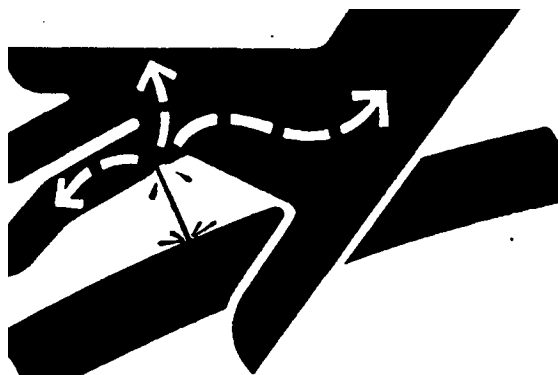
HX00125,0000099 -19-27APR06-2/10



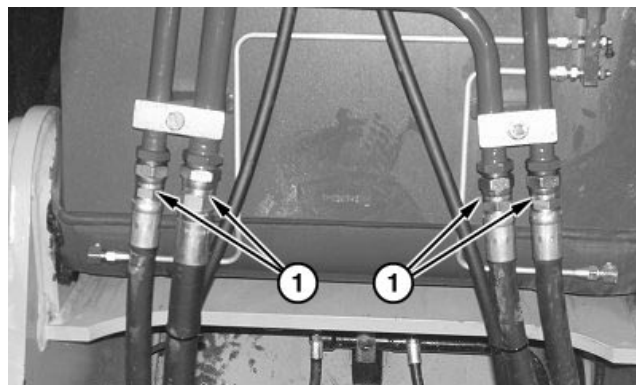
CAUTION: To avoid injury from escaping fluid under pressure, stop engine and relieve the pressure in the system before disconnecting or connecting hydraulic or other lines. Tighten all connections before applying pressure.

4. Slowly loosen hydraulic lines (1) to relieve any residual pressure; then disconnect lines. Close all open lines and fittings using caps and plugs.
5. Remove arm cylinder only if necessary to repair boom. See Arm Cylinder Remove and Install. (Group 3360.)

1—Hydraulic Lines



X9811 -UN-23AUG88



TX1003795A -UN-09MAR06

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HX00125,0000099 -19-27APR06-3/10



CAUTION: Heavy component; use appropriate lifting device.

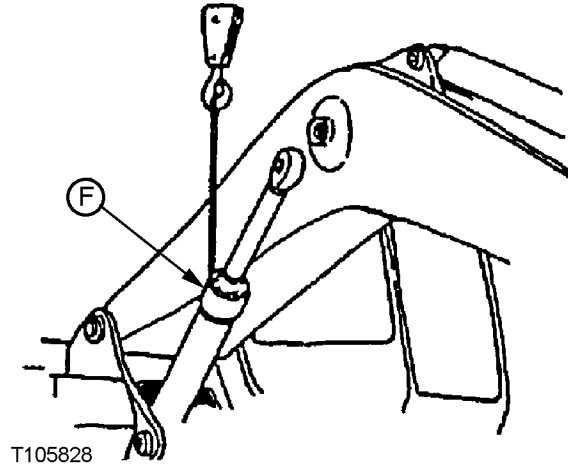
Specification

Boom Cylinder—240DLC—
Weight..... 210 kg
465 lb

Specification

Boom Cylinder—270DLC—
Weight..... 250 kg
550 lb

6. Attach appropriate lifting device to boom cylinder (F) using lifting strap.



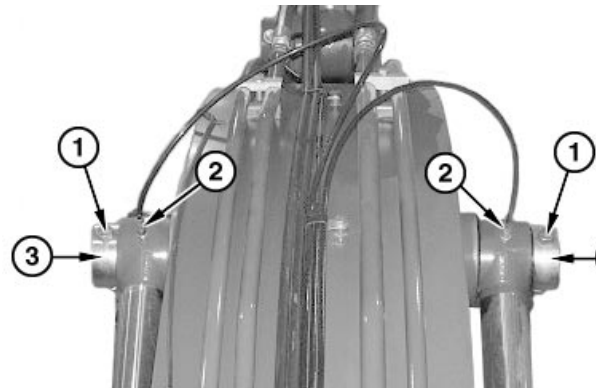
F—Boom Cylinder (2 used)

T105828 -UN-30DEC96

HX00125,0000099 -19-27APR06-4/10

7. Disconnect lubrication lines (2), nuts, cap screws (1), and retainers (3).

- 1—Cap Screw (2 used)
2—Lubrication Lines (2 used)
3—Retainer (2 used)

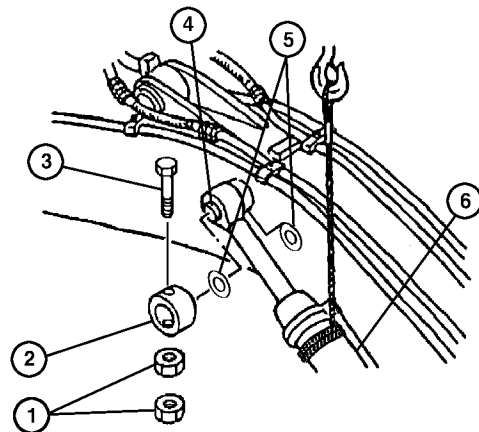


TX1003796A -UN-17FEB06

HX00125,0000099 -19-27APR06-5/10

8. Push boom cylinder-to-boom pin (4) into boom.
9. Lower boom cylinder (6) onto floor stand. Repeat procedure for second boom cylinder.

- 1—Nut (4 used)
2—Retainer (2 used)
3—Cap Screw (2 used)
4—Boom Cylinder Rod End-to-Boom Pin
5—Thrust Plate (4 used)
6—Boom Cylinder (2 used)



T142979 -UN-24JUL01

Continued on next page

HX00125,0000099 -19-27APR06-6/10



CAUTION: Heavy component; use appropriate lifting device. Weight of boom, arm, and bucket assembly and components will vary depending on machine configuration.

Weights—240DLC—Specification

Boom, Arm and Bucket Assembly—Approximate Weight.....	4360 kg
	9614 lb
Bucket Cylinder—Weight.....	195 kg
	430 lb
Arm Cylinder—Weight.....	290 kg
	640 lb

Weights—270DLC—Specification

Boom, Arm and Bucket Assembly—Approximate Weight.....	4730 kg
	10 430 lb
Bucket Cylinder—Weight.....	210 kg
	465 lb
Arm Cylinder—Weight.....	350 kg
	770 lb

10. Attach appropriate lifting device to boom. Use protective covering to prevent damage to pin if chain is used.

IMPORTANT: Arm end of boom is heavy end with arm cylinder installed. Frame end is heavy end when arm cylinder is removed.



T6626JW -UN-31OCT88

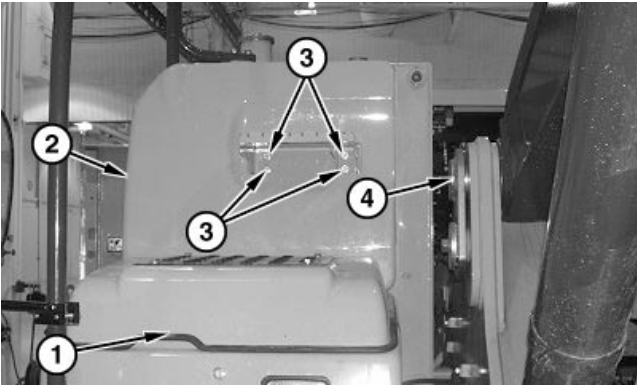
HX00125,0000099 -19-27APR06-7/10

NOTE: Step and panel (2) must be removed before removing boom-to-frame pin (4).

11. Remove panel (2).

NOTE: Two cap screws located on top of panel (2) and two are located inside tool box (1).

12. Remove cap screws (3) and step.



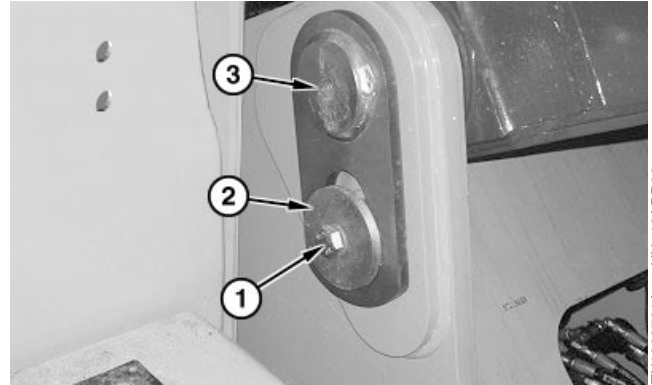
TX1003862A -UN-17FEB06

- 1—Tool Box Lid
- 2—Panel
- 3—Cap Screw (4 used)
- 4—Boom-to-Frame Pin

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HX00125,0000099 -19-27APR06-8/10

13. Remove cap screw (1), washer and spacer (2).
14. Insert bar between plate of boom-to-frame pin (3) and bracket. Pull plate out.
15. Remove boom-to-frame pin (3). Remove washers.
16. Remove boom.
17. Inspect bushings and dust seals. See Inspect Pins, Bushings and Bosses—Front Attachment. (See procedure in this group.)
18. Repair or replace parts as necessary. See Bushings and Seal Remove and Install. (See procedure in this group.)
19. Install washers equally on each side of boom to get minimal amount of clearance between boom and frame.
20. Install boom. Tighten boom-to-frame cap screw (1).



1—Cap Screw
2—Spacer
3—Boom-to-Frame Pin

Specification

Boom-to-Frame Cap Screw—	
Torque	400 N•m 295 lb-ft

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HX00125,0000099 —19—27APR06—9/10

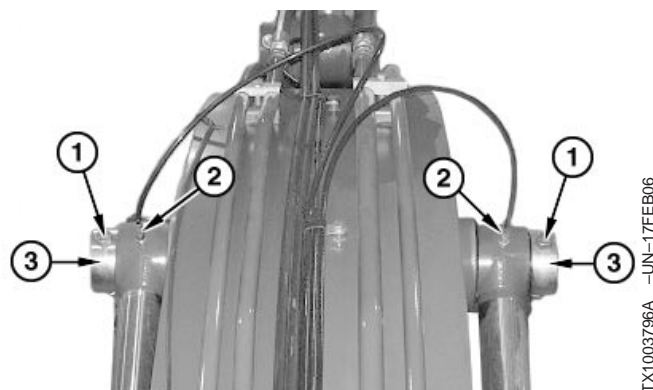
21. Connect rod end of boom cylinders. Install thrust plates equally on each side to get minimum amount of clearance between boom and cylinder rod end.
22. Install retainers (3) and cap screws (1).
23. Tighten nuts against each other allowing cap screw (1) to be free to turn in hole.

Specification

Boom Cylinder Rod End-to-Boom

Pin Retainer Nut—Torque..... 550 N•m (tighten nut against nut)
405 lb-ft (tighten nut against nut)

24. Connect lubrication lines (2).
25. Connect hydraulic lines. See Main Hydraulic System Component Location. (Group 9025-15.)
26. Apply multi-purpose grease to all pivot joints. See Track Adjuster, Working Tool Pivot, Swing Bearing, and Swing Bearing Gear Grease. (Operator's Manual.)



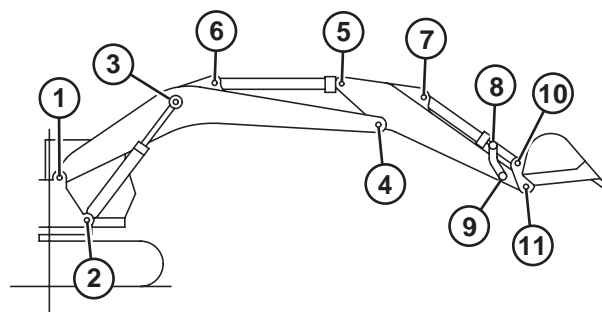
TX1003796A -UN-17FEB06

- 1—Cap Screw (2 used)
2—Lubrication Lines (2 used)
3—Retainer (2 used)

HX00125,0000099 -19-27APR06-10/10

Inspect Pins, Bushings and Bosses—Front Attachment

- 1—Boom-to-Frame Joint
- 2—Boom Cylinder Head End-to-Frame Joint
- 3—Boom Cylinder Rod End-to-Boom Joint
- 4—Boom-to-Arm Joint
- 5—Arm Cylinder Rod End-to-Arm Joint
- 6—Arm Cylinder Head End-to-Boom Joint
- 7—Bucket Cylinder Head End-to-Arm Joint
- 8—Bucket Cylinder Rod End-to-Side and Bucket Links Joint
- 9—Side Links-to-Arm Joint
- 10—Bucket Link-to-Bucket Joint
- 11—Bucket-to-Arm Joint



TX1004442

TX1004442 -UN-06MAR06

Continued on next page

HX00125,00000A5 -19-26APR06-1/5

Pins, Bushing and Bosses—240DLC

	Item	Standard	Allowable Limit	Remedy
1	Pin	100 mm 3.94 in.	99.0 mm 3.90 in.	Replace
	Bushing	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
2	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Boss (Main Frame)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
	Bushing (Boom Cylinder)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
3	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Bushing (Boom Cylinder)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
	Boss (Boom)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
4	Pin	100 mm 3.94 in.	99.0 mm 3.90 in.	Replace
	Bushing	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
5	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Boss (Arm)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
	Bushing (Arm Cylinder)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
6	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Boss (Boom)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
	Bushing (Arm Cylinder)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
7	Pin	80 mm 3.15 in.	79.0 mm 3.11 in.	Replace
	Boss (Arm)	80 mm 3.15 in.	81.5 mm 3.21 in.	Replace
	Bushing (Bucket Cylinder)	80 mm 3.15 in.	81.5 mm 3.21 in.	Replace
8	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Bushing	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
	Bushing (Bucket Cylinder)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace

33
3340
13

Continued on next page

HX00125.00000A5 -19-26APR06-2/5

Frames

Pins, Bushing and Bosses—240DLC

	Item	Standard	Allowable Limit	Remedy
9	Pin	80 mm 3.15 in.	79.0 mm 3.11 in.	Replace
	Bushing	80 mm 3.15 in.	81.5 mm 3.21 in.	Replace
10	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Bushing	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
11	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Bushing	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace

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HX00125,00000A5 -19-26APR06-3/5

Pins, Bushing and Bosses—270DLC

	Item	Standard	Allowable Limit	Remedy
1	Pin	100 mm 3.94 in.	99.0 mm 3.90 in.	Replace
	Bushing	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
2	Pin	100 mm 3.94 in.	99.0 mm 3.90 in.	Replace
	Boss (Main Frame)	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
	Bushing (Boom Cylinder)	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
3	Pin	100 mm 3.94 in.	99.0 mm 3.90 in.	Replace
	Bushing (Boom Cylinder)	100 mm 3.94 in.	101.5 mm 3.40 in.	Replace
	Boss (Boom)	100 mm 3.94 in.	101.5 mm 3.40 in.	Replace
4	Pin	100 mm 3.94 in.	99.0 mm 3.90 in.	Replace
	Bushing	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
5	Pin	80 mm 3.15 in.	79.0 mm 3.11 in.	Replace
	Boss (Arm)	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
	Bushing (Arm Cylinder)	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
6	Pin	100 mm 3.94 in.	99.0 mm 3.90 in.	Replace
	Boss (Boom)	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
	Bushing (Arm Cylinder)	100 mm 3.94 in.	101.5 mm 4.00 in.	Replace
7	Pin	80 mm 3.15 in.	79.0 mm 3.11 in.	Replace
	Boss (Arm)	80 mm 3.15 in.	81.5 mm 3.21 in.	Replace
	Bushing (Bucket Cylinder)	80 mm 3.15 in.	81.5 mm 3.21 in.	Replace
8	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Bushing	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
	Bushing (Bucket Cylinder)	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace

33
3340
15

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HX00125.00000A5 -19-26APR06-4/5

Frames

Pins, Bushing and Bosses—270DLC

	Item	Standard	Allowable Limit	Remedy
9	Pin	80 mm 3.15 in.	79.0 mm 3.11 in.	Replace
	Bushing	80 mm 3.15 in.	81.5 mm 3.21 in.	Replace
10	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Bushing	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace
11	Pin	90 mm 3.54 in.	89.0 mm 3.50 in.	Replace
	Bushing	90 mm 3.54 in.	91.5 mm 3.60 in.	Replace

HX00125,00000A5 -19-26APR06-5/5

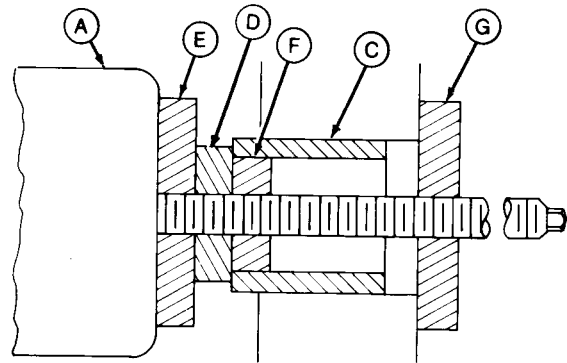
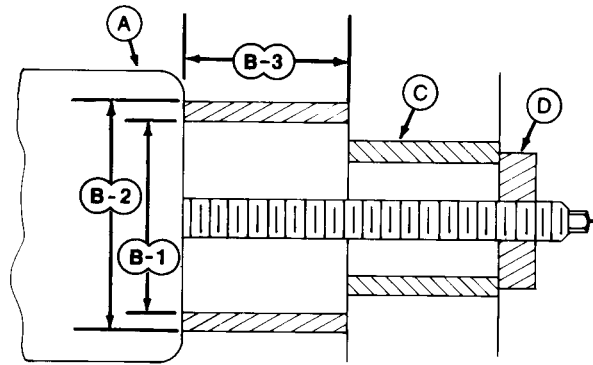
Bushings and Seal Remove and Install

IMPORTANT: Only install bushings using press as shown. Bushings will be damaged if installed with driver.

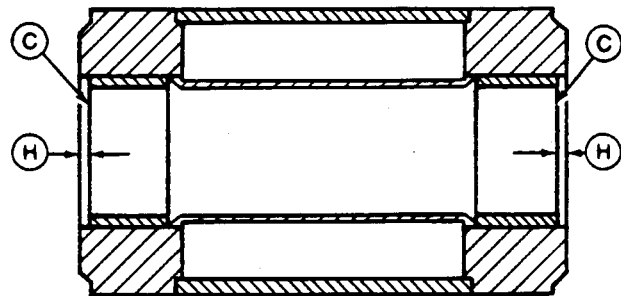
NOTE: Bushing can also be removed by welding three to five weld beads on the inside of bushing. Bushing will shrink enough to permit removal using a hammer.

1. Remove bushings (C) and dust seals using bushing, bearing, and seal driver set.
2. Install bushings with lubrication hole aligned with lubrication passage in pivot.
3. Install bushing to a depth equal to thickness of dust seal (H).
4. Install dust seals with lip toward outside of component.

A—Hydraulic Ram
 B1—Pipe—Minimum ID to Clear Bushing OD
 B2—Pipe—Maximum OD
 B3—Pipe—Length of Bushing
 C—Bushing
 D—Disks
 E—Bushing Stop (Disk)
 F—Pilot (Disk)
 G—Ram Stop (Disk)
 H—Thickness of Dust Seal



T95237 -UN-01NOV88



T6641CW -UN-31OCT88

HX00125,000009B -19-17APR06-1/1

Apply Vacuum to Hydraulic Oil Tank

Applying vacuum to hydraulic oil tank eliminates the need to drain tank prior to servicing of hydraulic system components.

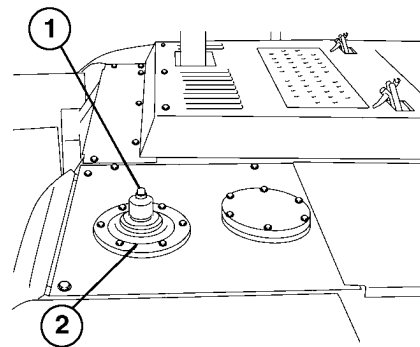
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CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).

1—Pressure Release Button
2—Hydraulic Oil Tank Cover



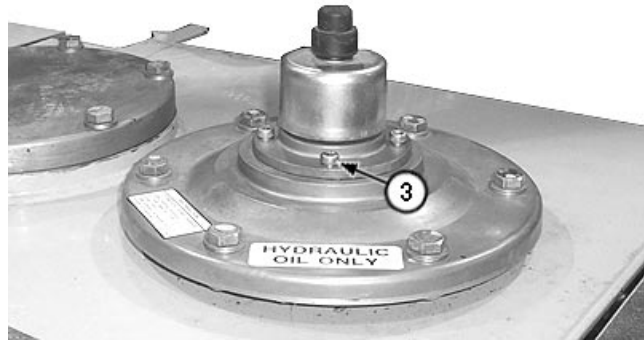
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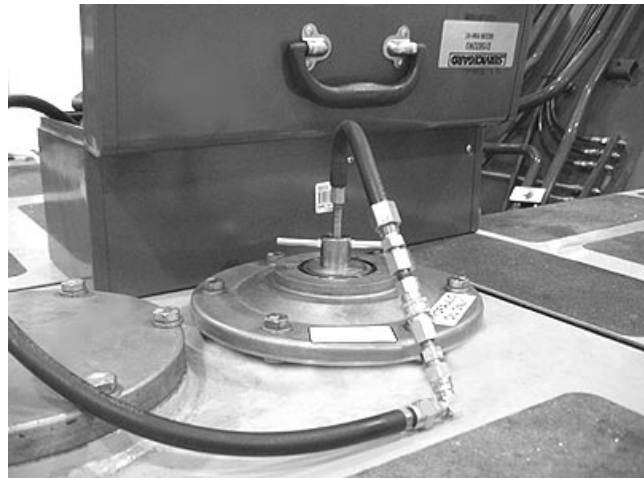
OUO1026,0000019 -19-25APR06-2/3

2. Use 5 mm hex wrench to remove cap screws (3) and cover.
3. Assemble fittings and hydraulic oil tank adapter from D15032NU Vacuum Pump Kit, and JT07085A Vacuum Pump Set. Install in hydraulic tank opening as shown. Refer to pump instructions for operating information.

3—Cap Screws (4 used)



TX1000587A -JUN-17NOV05



TX1003329A -JUN-06FEB06

OUO1026,0000019 -19-25APR06-3/3

Hydraulic Oil Cleanup Procedure Using Portable Filter Caddy

SPECIFICATIONS

Hydraulic Oil Tank Capacity	150 L approximate 39 gal approximate
Hydraulic Oil Tank Filtering Time	14 minutes approximate
Hydraulic System Capacity	250 L approximate 66 gal approximate
Hydraulic System Filtering Time	40 minutes approximate

SERVICE EQUIPMENT AND TOOLS

JDG1724A Super Caddy
JT05679 Hose 3.7 m (12 ft) x 3/4 in. ID 100R1 Hose with 3/4 M NPT Ends (2 used)
JTO5751A Suction Wand
JTO5750A Discharge Wand

1. Install new return filter elements.

NOTE: For a failure that creates a lot of debris, remove access cover from hydraulic tank. Drain hydraulic tank. Connect filter caddy suction line to drain port. Add a minimum of 19 L (5 gal) of oil to reservoir. Operate filter caddy and wash out the hydraulic tank.

IMPORTANT: The minimum ID for a connector is 13 mm (1/2 in.) to prevent cavitation of filter caddy pump.

2. Put filter caddy suction and discharge wands into hydraulic tank filler hole so ends are as far apart as possible to obtain a thorough cleaning of oil.
3. Start the filter caddy. Check to be sure oil is flowing through the filters.

Operate filter caddy until all the oil in hydraulic tank has been circulated through the filter a minimum of four times.

Specification

Hydraulic Oil Tank—Capacity.....	150 L approximate 39 gal approximate
Hydraulic Oil Tank—Filtering Time.....	14 minutes approximate

NOTE: Filtering time for hydraulic tank is 0.089 minute x number of liters (0.33 minutes x number of gallons).

4. Leave filter caddy operating for the next step.
5. Start the engine and run it at fast idle.

IMPORTANT: For the most effective results, cleaning procedure must start with the smallest capacity circuit then proceed to the next larger capacity circuit.

6. Starting with the smallest capacity circuit, operate each function through a complete cycle.

Repeat procedure until the total system capacity has circulated through filter caddy seven times. Each function must go through a minimum of three complete cycles for a thorough cleaning of oil.

Specification

Hydraulic System—Capacity	250 L approximate 66 gal approximate
Hydraulic System—Filtering Time	40 minutes approximate

NOTE: Filtering time for complete hydraulic system is 0.158 minute x number of liters (0.6 minute x number of gallons). Filtering time for machines with auxiliary hydraulic functions must be increased because system capacity is larger.

7. Stop the engine. Remove the filter caddy.
8. Install new return filter elements.
9. Check hydraulic oil level. See Check Hydraulic Oil Level. (Operator's Manual.)

Pump 1 and 2 Remove and Install

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing pressure release button (1).

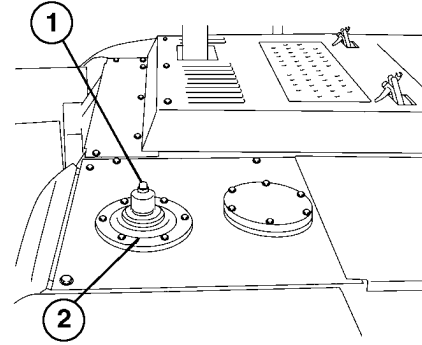
1. Push pressure release button (1).
2. Drain hydraulic oil tank. Approximate capacity is 148 L (39 gal).
3. Drain pump drive gearbox. Approximate oil capacity is 1.0 L (1.1 qt).
4. Remove hood, hood support and covers.
5. Remove muffler and muffler bracket. Reinstall cap screws to support pumps until lifting device is attached.
6. Disconnect electrical connectors.
7. Disconnect lines.

CAUTION: Heavy component; use an appropriate lifting device.

Specification

Hydraulic Pump and Drive
Gearbox—Approximate Weight..... 168 kg
370 lb

8. Install JT05550 Lifting Eyebolt and JDG19 Lifting Bracket to pump. Connect an appropriate lifting device to eyebolt and lifting bracket using lifting straps.



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

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OUC1026,000000E -19-07APR06-1/3

9. Remove cap screws (1) and remove pump.

10. Repair or replace as necessary.

IMPORTANT: Align flex coupler on drive gearbox with mating part on engine flywheel.

11. Tighten cap screws (1).

Specification

Pump Drive Gearbox-to-Flywheel	
Housing Cap Screw—Torque.....	65 N•m 48 lb-ft

12. Connect electrical connectors. See System Functional Schematic, Component Location, and Wiring Diagram Master Legend. (Group 9015.)

13. Connect lines. See Pump 1, Pump 2 and Pilot Pump Line Identification. (Group 9025-15.)

14. Install split flange and tighten cap screws.

Specification

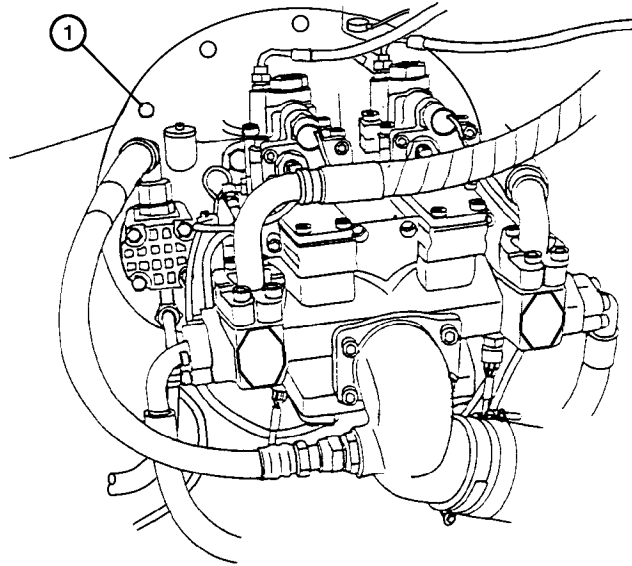
Split Flange 8 mm Cap Screw—	
Torque	50 N•m 37 lb-ft
Split Flange 10 mm Cap Screw—	
Torque	90 N•m 67 lb-ft

15. Apply pipe sealant to pump drive gearbox drain plug threads.

16. Fill and check hydraulic oil level. See 240DLC Drain and Refill Capacities or 270DLC Drain and Refill Capacities. (Operator's Manual.)

IMPORTANT: Hydraulic pump and drive gearbox will be damaged if not filled with oil before starting engine. Start-up procedure must be performed whenever a new pump or gearbox is installed or oil has been drained from the pump, gearbox or hydraulic oil tank.

17. Fill pump housing and pump drive gearbox with oil. See Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)



1—Cap Screw (8 used)

T142503 -UN-20JUL01

18. Check pump regulator adjustments. (Group 9025-25.)

For minimum flow:

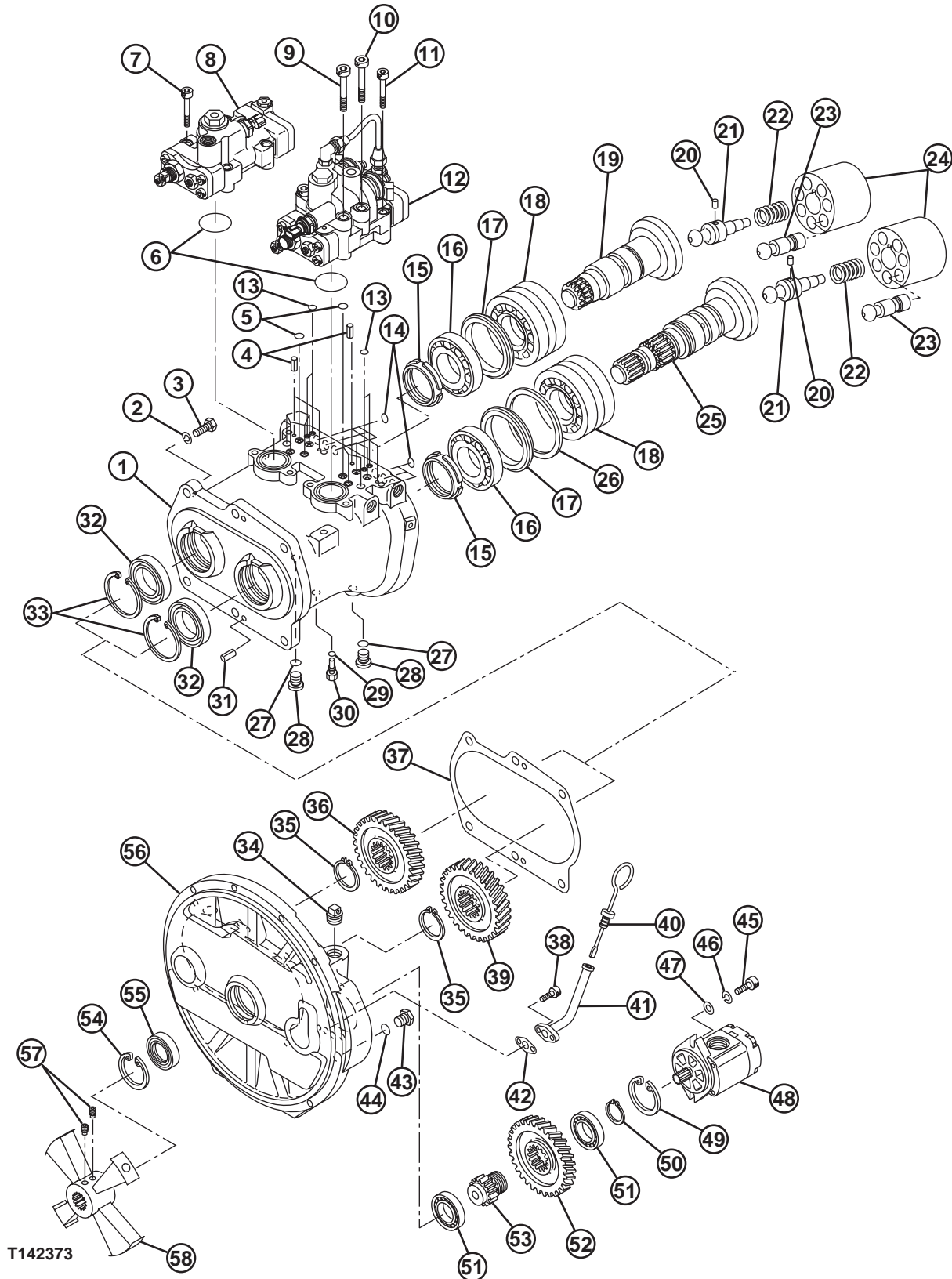
- See Hydraulic Pump Regulator Test and Adjustment—Minimum Flow—240DLC. (Group 9025-25.)
- See Hydraulic Pump Regulator Test and Adjustment—Minimum Flow—270DLC. (Group 9025-25.)

For maximum flow:

- See Hydraulic Pump Regulator Test and Adjustment—Maximum Flow—240DLC. (Group 9025-25.)
- See Hydraulic Pump Regulator Test and Adjustment—Maximum Flow—270DLC. (Group 9025-25.)

OUC1026,000000E -19-07APR06-3/3

Pump 1 and 2 Disassemble and Assemble



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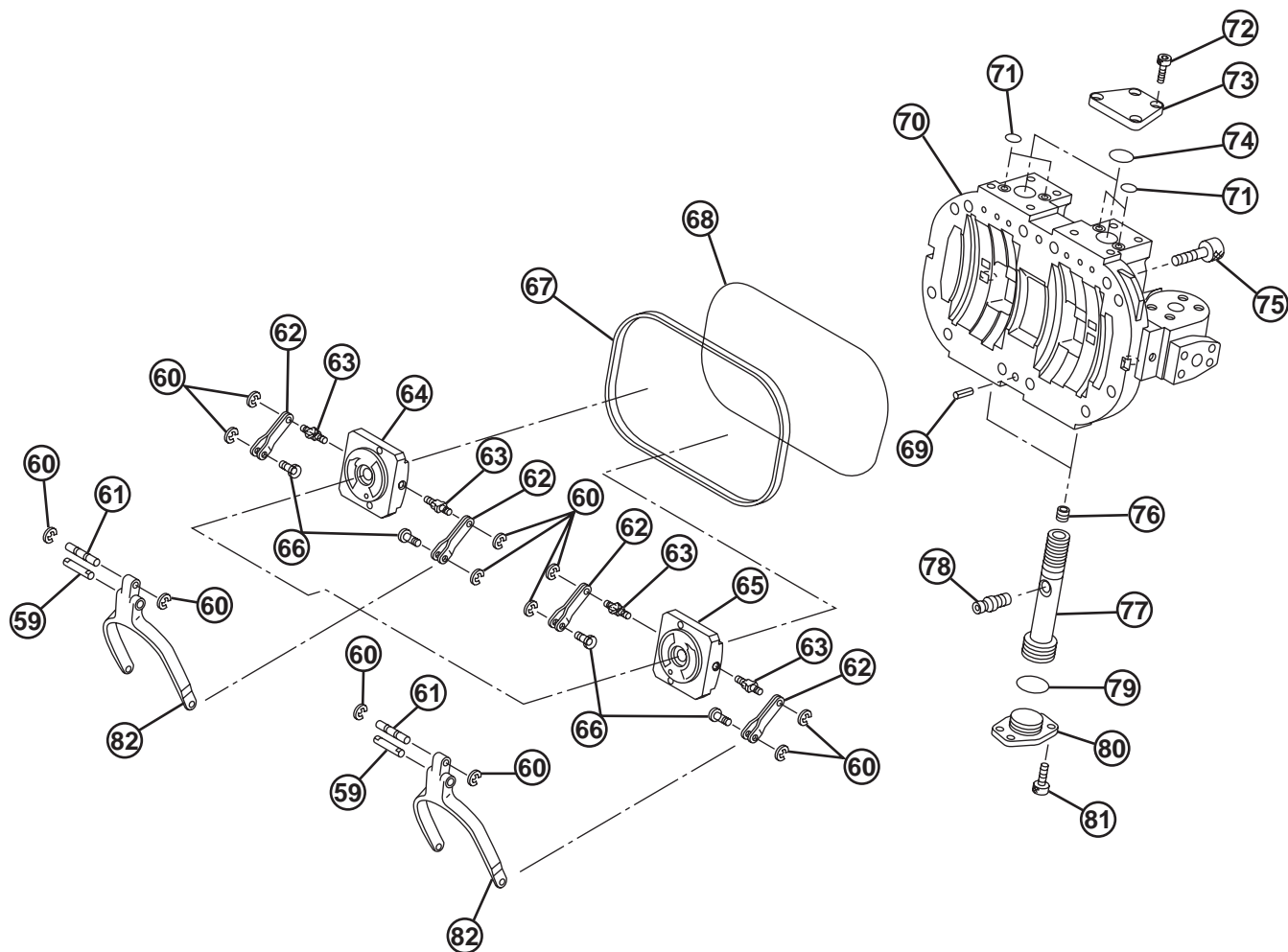
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Hydraulic System

1—Pump Housing	15—Bearing Nut (2 used)	28—Plug (2 used)	43—Drain Plug
2—Lock Washer (6 used)	16—Roller Bearing (2 used)	29—O-Ring	44—O-Ring
3—Cap Screw (6 used)	17—Ring (2 used)	30—Special Fitting	45—Cap Screw (2 used)
4—Spring Pin (4 used)	18—Roller Bearing (2 used)	31—Spring Pin (2 used)	46—Lock Washer (2 used)
5—O-Ring (10 used)	19—Pump 1 (Front) Drive	32—Oil Seal (2 used)	47—Washer (2 used)
6—O-Ring (2 used)	Shaft	33—Snap Ring (2 used)	48—Pilot Pump
7—Cap Screw (4 used)	20—Pin (2 used)	34—Fill Plug	49—Snap Ring
8—Right Regulator Pump 1	21—Center Shaft (2 used)	35—Snap Ring (2 used)	50—Snap Ring
(Front)	22—Spring (2 used)	36—Pump 1 (Front) Driven	51—Ball Bearing
9—Cap Screw (2 used)	23—Piston (14 used)	Gear	52—Pilot Pump Drive Gear
10—Cap Screw (2 used)	24—Cylinder Block (Rotor)	37—Gasket	53—Pilot Pump Drive Shaft
11—Cap Screw (2 used)	(2 used)	38—Cap Screw (2 used)	54—Snap Ring
12—Left Regulator Pump 2	25—Pump 2 (Rear) Drive Shaft	39—Pump 2 (Rear) Drive Gear	55—Oil Seal
(Rear)	26—Spacer Ring (Pump 2	40—Dipstick	56—Pump Drive Gearbox
13—O-Ring (4 used)	[Rear] Drive Shaft only)	41—Dipstick Tube	57—Set Screw (2 used)
14—O-Ring (6 used)	27—O-Ring (2 used)	42—Gasket	58—Dampener Drive Coupling

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OUC1026,000000F -19-11APR06-2/13



T142375

59—Dowel Pin
60—Snap Ring (12 used)
61—Dowel Pin (2 used)
62—Lever (4 used)
63—Dowel Pin (4 used)
64—Pump 1 (Front) Valve Plate

65—Pump 2 (Rear) Valve Plate
66—Dowel Pin (4 used)
67—Backup Ring
68—O-Ring
69—Spring Pin (2 used)
70—Cylinder Head (Cover)

71—O-Ring (4 used)
72—Cap Screw (8 used)
73—Cover (2 used)
74—O-Ring (2 used)
75—Cap Screw (12 used)
76—Set Screw (2 used)

77—Servo Piston (2 used)
78—Pin (2 used)
79—O-Ring (2 used)
80—Stop (2 used)
81—Cap Screw (8 used)
82—Feedback Link (2 used)

Continued on next page

OUC1026,000000F -19-11APR06-3/13



CAUTION: Heavy component; use an appropriate lifting device.

Specification

Hydraulic Pumps and
Gearbox—Approximate Weight..... 168 kg
370 lb

1. Loosen set screws (57) and remove dampener
drive coupling (58).

- 2. Remove pilot pump (48).
- 3. Remove cap screws (3) and lock washers (2) to
remove pump housing (1) from pump drive gearbox
(56).

4. To aid in reassembly, make timing marks on drive shafts (A and C), and mark (B) on drive (E) and driven (F) gears. The gears are not interchangeable.

Measure amount of backlash between gears.

Specification

Pump Drive and Driven Gear—	
Backlash	0.68 mm (0.027 in.) nominal 1.50 mm (0.059 in.) limit of use

Remove snap rings (D) and remove gears (E and F).

5. Remove pump regulators (8 and 12). For repair, see Hydraulic Pump Regulator Repair. (See procedure in this group.)

CAUTION: Heavy component; use an appropriate lifting device.

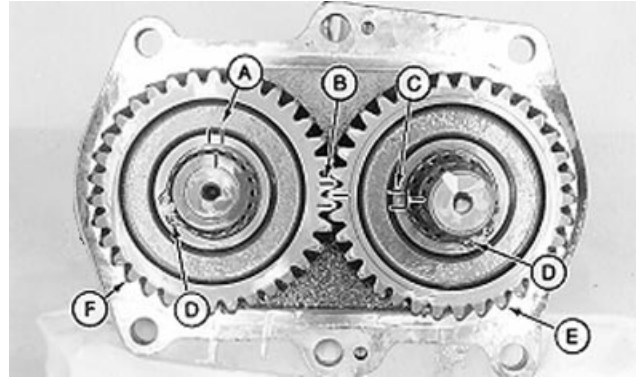
Specification

Cylinder Head—Approximate	
Weight.....	30 kg 66 lb

IMPORTANT: Valve plates (64 and 65) are connected to the feedback linkage and must remain on the cylinder blocks (24). Valve plates and end of cylinder blocks have highly machined surfaces and can be damaged.

6. Remove cap screws (75) and carefully remove cylinder head (70).
7. Remove servo pistons (77) only if replacement is necessary.

Heat set screw (76) to loosen thread lock and sealer (medium strength) used. Remove set screw using a 6 mm hex key wrench. Remove pin (78).



- A—Pump 1 (Front) Drive Shaft-to-Driven Gear Timing Mark
- B—Driven Gear-to-Drive Gear Timing Mark
- C—Pump 2 (Rear) Drive Shaft-to-Drive Gear Timing Mark
- D—Snap Ring (2 used)
- E—Drive Gear
- F—Driven Gear

T105624 -UN-11DEC96

Continued on next page

OUC1026,000000F -19-11APR06-5/13

IMPORTANT: Pump 1 (front) (64) and pump 2 (rear) (65) valve plates are not interchangeable. Take notice of the location and position of ports in plate. The inlet port in valve plate is located towards the center and top of pump housing.

8. Remove pump 1 (front) (64) and pump 2 (rear) (65) valve plates. Protect machined surfaces of plates from damage.
9. Remove special fittings (30) before removing pump 1 (front) (19) and pump 2 (rear) (25) drive shafts.
10. Remove spacer ring (26) for pump 2 (rear) drive shaft (25) from bore.
11. Remove bearing nut (15) using JDG769 Spanner Wrench.
12. Remove roller bearings (16 and 18) from pump 1 (front) (19) and pump 2 (rear) (25) drive shafts using a knife edge puller and a press.

Continued on next page

OUC1026,000000F -19-11APR06-6/13



CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. Do not allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area. Plan a safe handling procedure to avoid burns.

13. Heat roller bearings (6 and 8).

Specification

Roller Bearing Heat—
Temperature 50—80°C
122—176°F

14. Apply oil to bearing. Push roller bearing (6) on drive shaft so inner race is tight against shoulder.

15. Install spacer ring (7) and roller bearing (8).

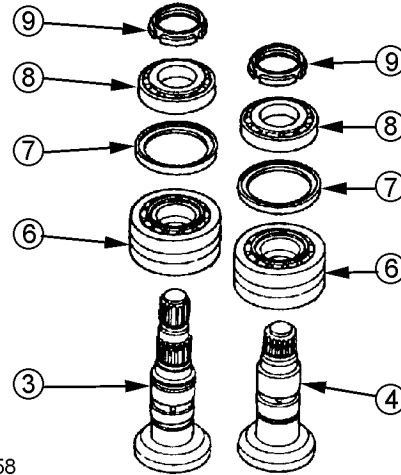
16. Apply oil to threads of bearing nut (9).

17. Tighten bearing nut using JDG769 Spanner Wrench.

Specification

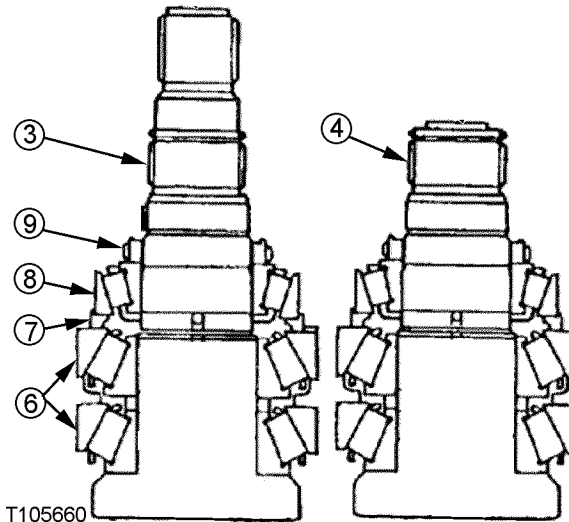
Pump Drive Shaft Bearing Nut—
Rolling Drag Torque 2.16 ± 0.49 N•m
19 ± 4 lb-in.

- 3—Pump 2 (Rear) Drive Shaft
- 4—Pump 1 (Front) Drive Shaft
- 6—Roller Bearing
- 7—Spacer Ring
- 8—Roller Bearing
- 9—Bearing Nut



T105658

T105658 -UN-12DEC96



T105660

T105660 -UN-12DEC96

OUO1026,000000F -19-11APR06-7/13

18. Install spacer ring (10) into housing bore for pump 2 (rear) drive shaft.

- 10—Spacer Ring



T105628 -UN-11DEC96

Continued on next page

OUO1026,000000F -19-11APR06-8/13

19. To help installation of drive shafts (3 and 4), heat pump housing using a heat gun such as the JT07010 Two Temperature Heat Gun.

Specification

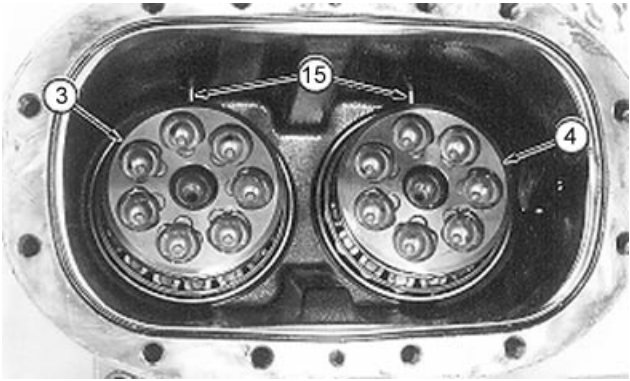
Hydraulic Pump Housing Heat—
Temperature 50—80°C
122—176°F

20. Apply a film of oil to outer race of bearings. Install the drive shafts.
21. Install and tighten special fittings (15).

Specification

Special Plug-to-Hydraulic Pump
Housing Special Fitting—Torque..... 34 N•m
300 lb-in.

22. Apply multi-purpose grease to lips of oil seals. Install oil seals with lip (spring side) toward inside of housing. Install snap rings.



3—Drive Shaft
4—Drive Shaft
15—Special Fitting (2 used)

Continued on next page

OUO1026,000000F -19-11APR06-9/13

23. For original parts, install drive (E) and driven (F) gears on shafts so timing marks (A, B, and C) are aligned.

For new parts, install the JDG1054 Aligning Bar on the socket (I and J) end of drive shafts.

Install aligning bar so end marked "Long Shaft Side" is to pump 2 (rear) drive shaft (H). Turn shafts so socket alignment dowels (L and M) engage a socket in drive shafts. The socket for pump 1 (front) drive shaft is slightly below the centerline of socket for pump 2 (rear) drive shaft when shafts are timed correctly.

Install cap screws (N) to hold bar in position.

24. From the splined end of shafts, turn shafts to the left to remove any play between socket alignment dowels and sockets.
25. Install gear on pump 2 (rear) drive shaft. Install the snap ring.

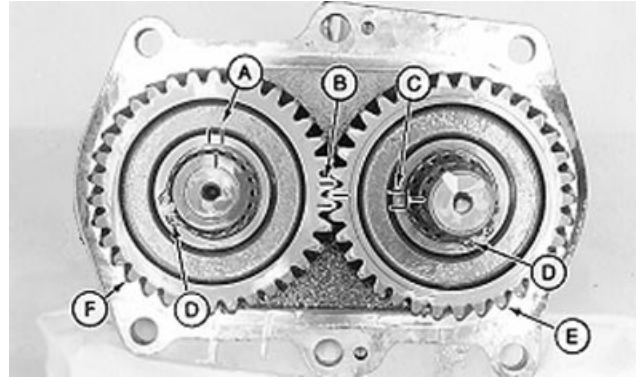
Install gear on pump 1 (front) drive shaft. As necessary, turn shaft slightly or turn gear to another position so teeth on gears engage. Install snap ring.

26. Apply oil to center shaft (21), pistons (23) and cylinder blocks (24). Use petroleum jelly to hold pin (20) in hole in center shaft.
27. Install cylinder block so pin engages slot in cylinder block.
28. Apply thread lock and sealer (medium strength) to threads of dowel pins (63). Tighten dowel pins into pump 1 (front) (64) and pump 2 (rear) (65) valve plates.

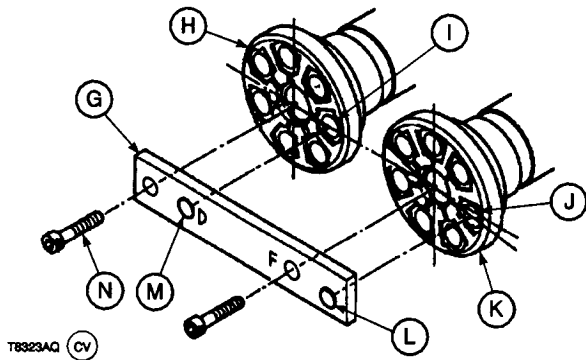
Specification

Dowel Pin-to-Pump 1 (Front) and
Pump 2 (Rear) Valve Plate—

Torque	9.8 N•m 86 lb-in.
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T105624 -UN-11DEC96



T8323AQ -UN-04OCT94

- A—Pump 1 (Front) Drive Shaft-to-Driven Gear Timing Mark
- B—Driven Gear-to-Drive Gear Timing Mark
- C—Pump 2 (Rear) Drive Shaft-to-Drive Gear Timing Mark
- D—Snap Ring (2 used)
- E—Drive Gear
- F—Driven Gear
- G—JDG1054 Aligning Bar (Pump Timing Tool)
- H—Pump 2 (Rear) Drive Shaft
- I—Socket
- J—Socket
- K—Pump 1 (Front) Drive Shaft
- L—Socket Alignment Dowel
- M—Socket Alignment Dowel
- N—M8-1.25 Cap Screw (2 used)

IMPORTANT: Pump 1 (front) (64) and pump 2 (rear) (65) valve plates are not interchangeable. The inlet port in valve plate is located toward the center and top of pump housing.

29. Apply oil to valve plates.

Install valve plates so inlet port is toward the center and top of pump housing.

Connect levers (62) for feedback linkage to valve plates.

30. Install servo pistons (77) and pins (78).

Apply thread lock and sealer (medium strength) to threads of set screw (76).

Tighten set screw (76) using a 6 mm hex key wrench.

Specification

Servo Piston-to-Pin Set Screw—
Torque 34 N•m
300 lb-in.

Tighten cap screws (72) for stop (80) and cover (73).

Specification

Stop and Cover-to-Cylinder Head
Cap Screw—Torque 19.5 N•m
180 lb-in.

31. Install cylinder head (70) checking to be sure that pins engage middle hole in valves plates.

Tighten cap screws (75).

Specification

Cylinder Head-to-Hydraulic Pump
Housing Cap Screw—Torque..... 108 N•m
80 lb-ft

32. Remove air bleed plugs from pump regulators (8 and 12).

Install regulators making sure groove in remote control sleeve and load sleeve engage dowel pin (61) in feedback link (82). Check through hole that groove in sleeves engage dowel pin.

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Tighten cap screws.

Specification

Regulator-to-Hydraulic Pump
Housing Cap Screw—Torque..... 49 N•m
36 lb-ft

33. Tighten pump pressure sensors.

Specification

Pump Pressure
Sensor-to-Hydraulic Pump
Housing—Torque..... 98 N•m
72 lb-ft

34. Tighten cap screws (3).

Specification

Hydraulic Pump
Housing-to-Gearbox Housing Cap
Screw—Torque..... 147 N•m
109 lb-ft

35. Apply rigid form-in-place gasket to mounting surface for pilot pump (48).

Tighten cap screws (45).

Specification

Pilot Pump-to-Gearbox Cap
Screw—Torque..... 49 N•m
36 lb-ft

36. Apply multi-purpose grease to lips of oil seal (55).
Install oil seal with lip (spring side) toward inside of housing.

37. Apply thread lock and sealer (medium strength) to threads of set screws (57) in dampener drive coupling (58).

Tighten set screws. For assembly of dampener drive, see Dampener Drive (Flex Coupling) Repair. (Group 0752.)

Specification

Dampener Drive Hub-to-Pump 2
(Rear) Drive Shaft Set Screw—
Torque 108 N•m
80 lb-ft

38. Fill pump and pump drive gearbox with oil. See Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)

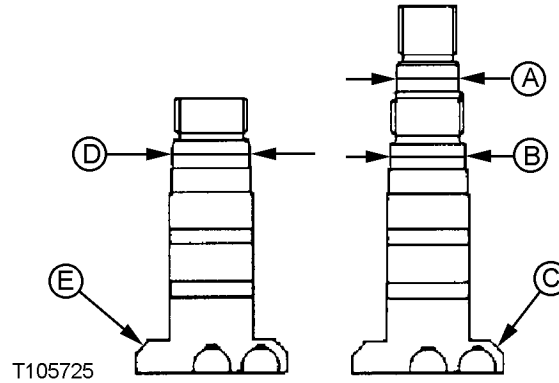
OUO1026,000000F -19-11APR06-13/13

Pump 1 and 2 Inspection

1. Measure diameter of oil seal contact surfaces (A, B, and D) on pump 1 (front) (E) and pump 2 (rear) (C) drive shafts.

Specification

Pump 2 (Rear) Drive Shaft Oil Seal Contact Surface (A)—OD	45 mm (1.77 in.) nominal 44.8 mm (1.76 in.) limit of use
Pump 2 (Rear) Drive Shaft Oil Seal Contact Surface (B)—OD	55 mm (2.17 in.) nominal 54.8 mm (2.16 in.) limit of use
Pump 1 (Front) Drive Shaft Oil Seal Contact Surface—OD	55 mm (2.17 in.) nominal 54.8 mm (2.16 in.) limit of use



- A—Oil Seal Contact Surface
B—Oil Seal Contact Surface
C—Pump 2 (Rear) Drive Shaft
D—Oil Seal Contact Surface
E—Pump 1 (Front) Drive Shaft

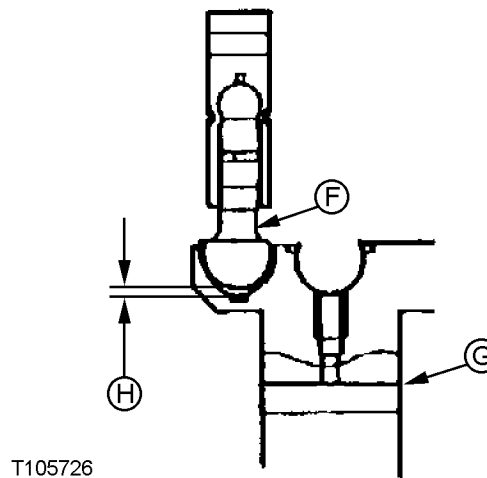
OUO1026,0000010 -19-26APR06-1/6

2. Measure play (H) between piston connecting rod (F) and socket in front and rear drive shafts (G).

Specification

Piston-to-Drive Shaft Socket—Play	0.058 mm (0.0023 in.) nominal 0.400 mm (0.0157 in.) limit of use
---	---

- F—Piston Connecting Rod
G—Rear Drive Shaft
H—Play



T105726

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OUO1026,0000010 -19-26APR06-2/6

3. Measure ID of cylinder block piston bore. Measure OD of piston. Subtract the OD from the ID for clearance.

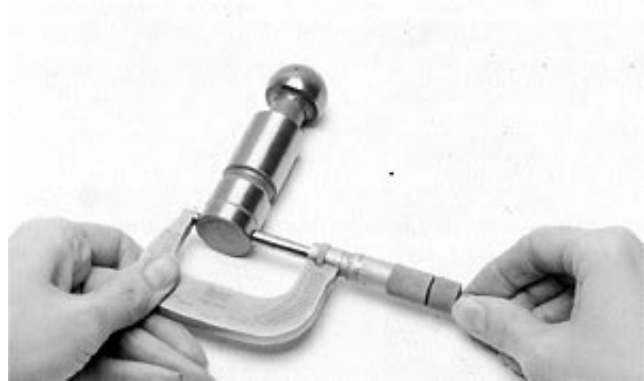
Specification

Cylinder Block Bore-to-Piston—

Clearance 0.043 mm (0.0017 in.) nominal
0.080 mm (0.0032 in.) limit of use



T6557EM -UN-18OCT88



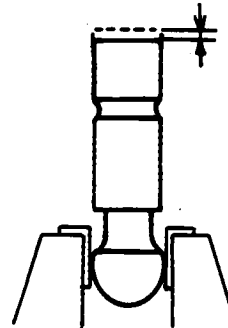
T6557EN -UN-18OCT88

OUC1026,0000010 -19-26APR06-3/6

4. Clamp the connecting rod end of a piston in a vise with soft-jaw faces. Measure play between connecting rod and piston.

Specification

Piston-to-Connecting Rod—Play 0.150 mm (0.0059 in.) nominal
0.400 mm (0.0157 in.) limit of use



T6557EK -UN-18OCT88

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OUC1026,0000010 -19-26APR06-4/6

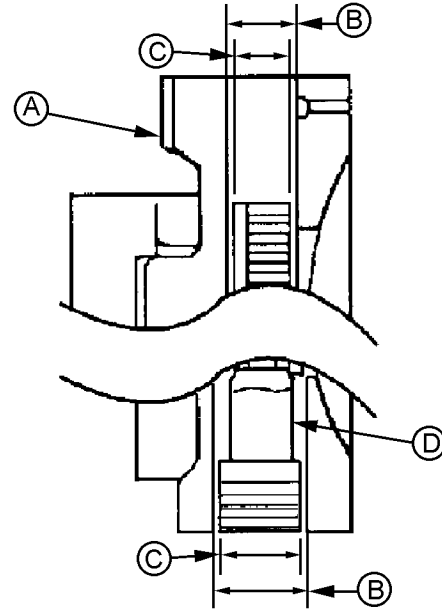
5. Measure OD (C) of small and large end of servo piston (D). Measure ID (B) of small and large end of bore in cylinder head (A). Subtract the OD from the ID for clearances.

Specification

Servo Piston-to-Cylinder Head

Bore—Clearance 0.079 mm (0.0033 in.) nominal
0.200 mm (0.0078 in.) limit of use

A—Cylinder Head
B—ID
C—OD
D—Servo Piston



T105727

T105727 -UN-19DEC96

OUC1026,0000010 -19-26APR06-5/6

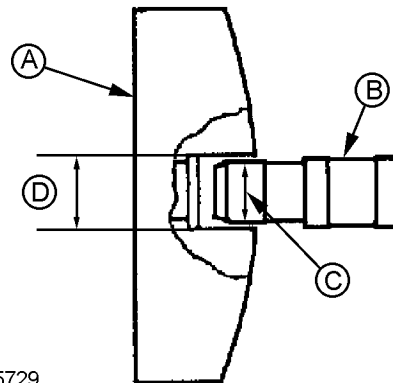
6. Measure OD (C) of servo piston pin (B). Measure ID (D) of bore in valve plate (A). Subtract the OD from the ID for the clearance.

Specification

Servo Piston Pin-to-Valve Plate

Bore—Clearance 0.051 mm (0.0020 in.) nominal
0.300 mm (0.0118 in.) limit of use

A—Valve Plate
B—Piston Pin
C—OD
D—ID



T105729

T105729 -UN-09JAN97

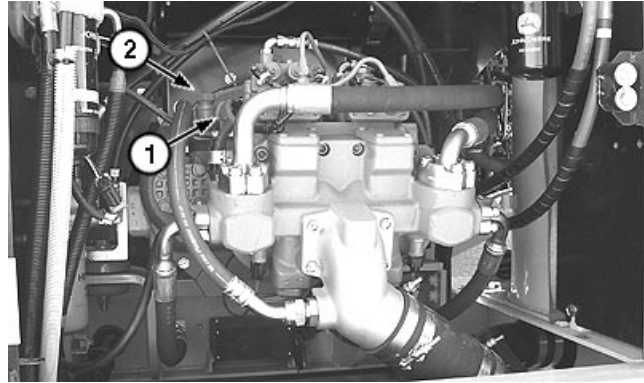
OUC1026,0000010 -19-26APR06-6/6

Pump 1 and 2 Start-Up Procedure

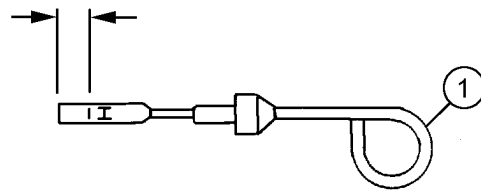
IMPORTANT: Hydraulic pump and drive gearbox will be damaged if not filled with oil before starting engine. Procedure must be performed whenever a new pump or gearbox is installed or oil has been drained from the pump, gearbox or hydraulic oil tank.

Procedure is to ensure the pumps and gearbox are filled with oil and air is bled from suction side of pumps to prevent cavitation.

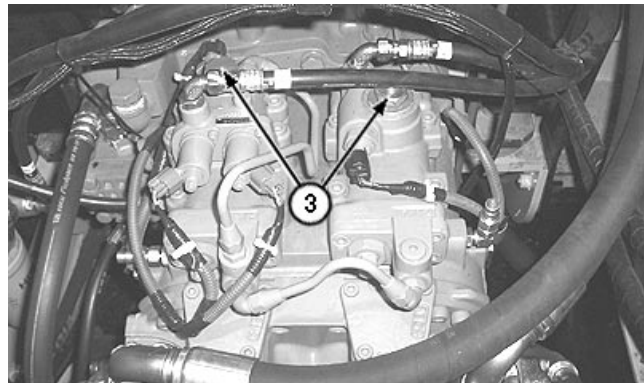
1. Fill pump drive gearbox with oil through fill plug (2) so level is above "H" mark on dipstick (1). See Swing Gearbox, Travel Gearbox and Pump Gearbox Oils. (Operator's Manual.)
2. Remove air bleed plugs (3) from the top of pump regulators to allow housing to fill with oil from the hydraulic oil tank and to let air escape.
3. When pump housing is full of oil, install plugs.
4. As necessary, add oil to hydraulic oil tank until it is between marks on sight glass. See Hydraulic Oil. (Operator's Manual.) Tighten tank cap. Tighten vent plug.
5. Start engine and run at slow idle. Slowly raise boom to full height and then lower to pressurize hydraulic oil tank.
6. Purge air from the hydraulic system by slowly operating each function through three cycles. Air in pilot circuits are purged automatically.



T215013A -UN-04OCT05



T145092 -UN-31AUG01



TX1000837A -UN-29NOV05

- 1—Dipstick
2—Fill Plug
3—Air Bleed Plug (2 used)

OUO1026,000000D -19-25APR06-1/1

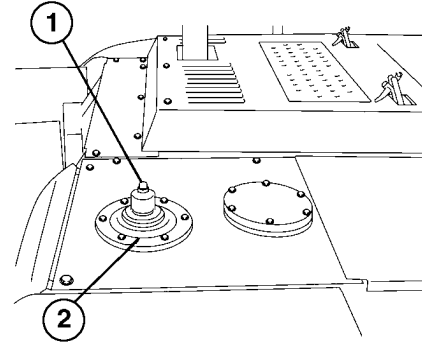
Pump 1 and 2 Regulator Remove and Install

NOTE: Pump 1 (front) and pump 2 (rear) regulators are similar in design. Removal of pump 2 (rear) regulator is shown.



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Pull a vacuum in hydraulic oil tank using a vacuum pump or drain hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank in this group. See 240DLC Drain and Refill Capacities, or 270DLC Drain and Refill Capacities. (Operator's Manual.)
3. Disconnect lines.
4. Disconnect electrical connectors.



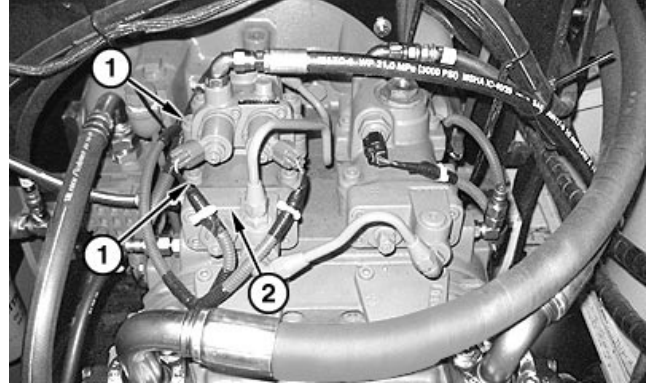
1—Pressure Release Button
2—Hydraulic Oil Tank Cover

T214924 -UN-17NOV05

Continued on next page

OUC1026,0000011 -19-23MAR06-1/2

5. Remove cap screws (1) and regulator (2).
6. Repair or replace parts as necessary.
7. Install regulators making sure groove in remote control sleeve and load sleeve engage dowel pin in feedback link. Check through hole that groove in sleeves engage dowel pin.
8. Tighten cap screws (1).



TX1003224A -UN-06FEB06

Specification

Pump 1 (Front) and Pump 2 (Rear) Regulator-to-Pump	
Housing Cap Screw—Torque.....	49 N•m 36 lb-ft

- 1—Cap Screw (8 used)
2—Hydraulic Pump Regulator (2 used)

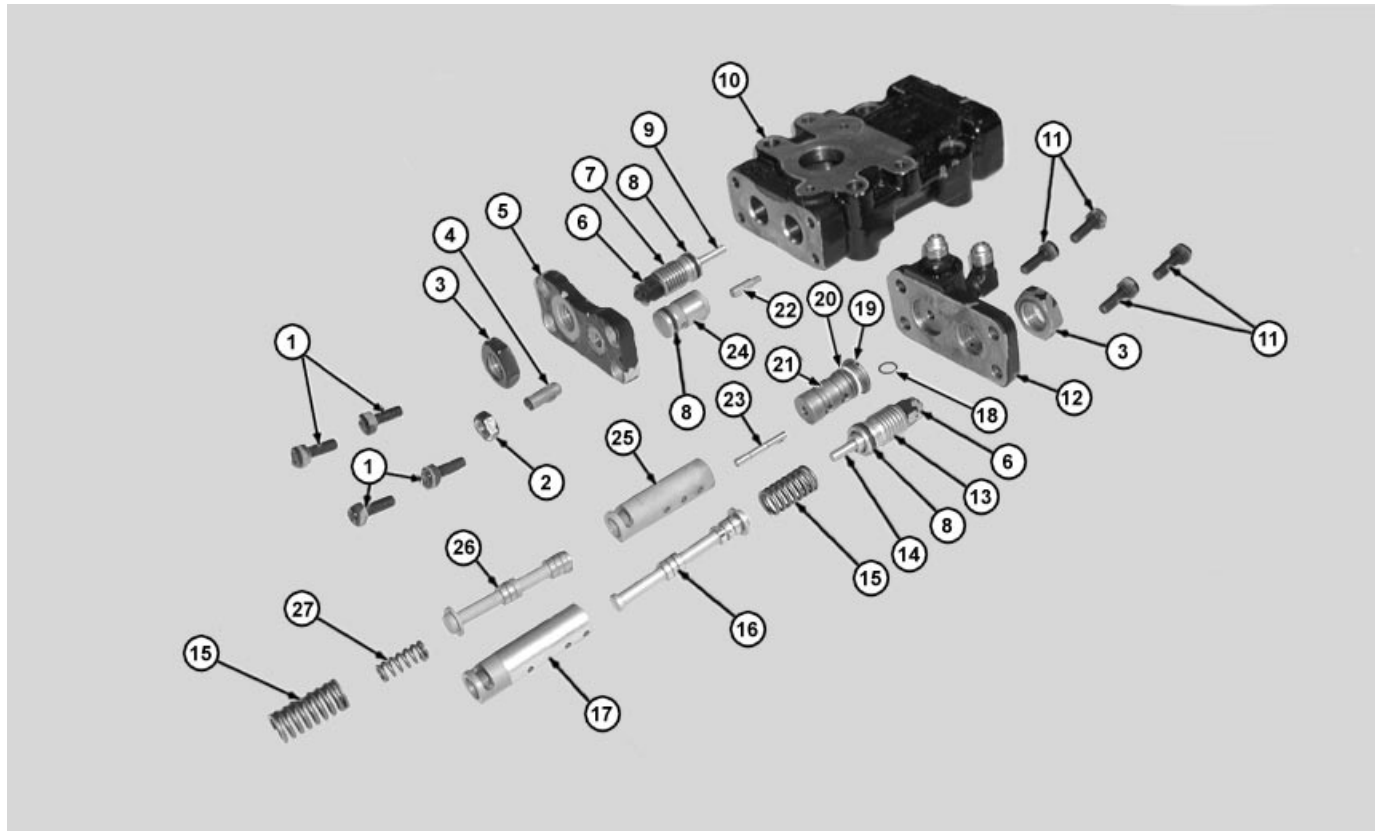
9. Connect electrical connectors. See System Functional Schematic, Component Location, and Wiring Diagram Master Legend. (Group 9015-10.)
10. Connect lines. See Pump 1, Pump 2 and Pilot Pump Line Identification. (Group 9025-15.)

IMPORTANT: Hydraulic pump will be damaged if not filled with oil before starting engine. Procedure must be performed whenever a new pump installed or oil has been drained from the pump or hydraulic oil tank.

11. Fill pump housing with oil. See Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)

OUO1026,0000011 -19-23MAR06-2/2

Pump 1 and 2 Regulator Disassemble and Assemble



TT142272B -JUN-20JUL01

Pump 2 (Rear) Regulator Shown

- | | | | |
|--------------------------------|--|--------------------------|-----------------|
| 1—Cap Screw (4 used) | 8—O-Ring (3 used) | 15—Spring (2 used) | 22—Piston |
| 2—Nut | 9—Load Adjusting Screw | 16—Remote Control Spool | 23—Load Piston |
| 3—Nut (2 used) | (Stop) | 17—Remote Control Sleeve | 24—Cylinder |
| 4—Minimum Flow Adjusting Screw | 10—Regulator Body | 18—O-Ring | 25—Load Sleeve |
| 5—Cover | 11—Cap Screw (4 used) | 19—Backup Ring | 26—Load Spool |
| 6—Nut (2 used) | 12—End Plate | 20—O-Ring | 27—Inner Spring |
| 7—Load Adjusting Cartridge | 13—Flow Adjusting Cartridge | 21—Cylinder | |
| | 14—Maximum Flow Adjusting Screw (Stop) | | |

NOTE: Pump 1 (front) and pump 2 (rear) regulators are similar. Pump 2 (rear) regulator is shown.

IMPORTANT: Removal of adjusting screws (4, 9 and 14) and cartridges (7 and 13) from end plate (12) and cover (5) will require the adjustment of pump regulators. Only remove parts from end plate and cover if replacement is necessary.

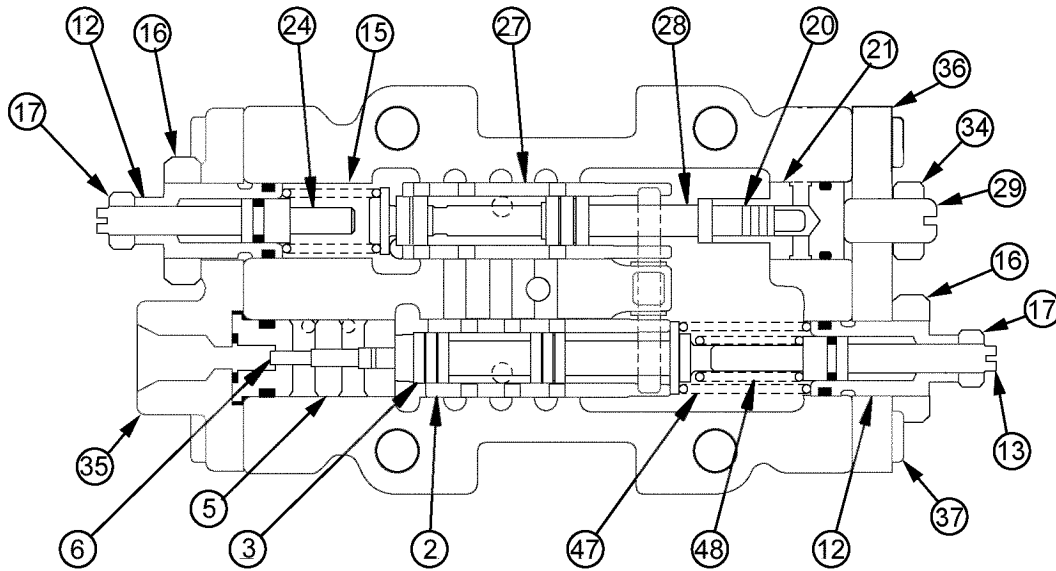
1. Remove end plate (12) and cover (5) with adjusting screws and cartridges installed.

2. Repair or replace parts as necessary.
3. Tighten cap screws (1 and 11).

Specification

Pump 1 (Front) and Pump 2 (Rear) End Plate and Cover-to-Housing Cap Screw—	
Torque.....	19.8 N•m 180 lb-in.

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T105706

T105706 -UN-09JAN97

- | | | | |
|------------------------------------|--------------------------------|--|-----------------------|
| 2—Load Sleeve | 13—Load Adjusting Screw (Stop) | 24—Maximum Flow Adjusting Screw (Stop) | 34—Nut |
| 3—Load Spool | 15—Spring | 27—Remote Control Sleeve | 35—End Plate |
| 5—Cylinder | 16—Nut (2 used) | 28—Remote Control Spool | 36—Cover |
| 6—Load Piston | 17—Nut (2 used) | 29—Minimum Flow Adjusting Screw | 37—Cap Screw (8 used) |
| 12—Load Adjusting Cartridge (Stop) | 20—Piston | | 47—Outer Spring |
| —Flow Adjusting Cartridge (Stop) | 21—Cylinder | | 48—Inner Spring |

4. Tighten cap screws.

5. Tighten air bleed plug.

Specification

Pump 1 (Front) and Pump 2 (Rear) Air Bleed

Plug-to-Housing—Torque 78 N•m
58 lb-ft

IMPORTANT: Hydraulic pump will be damaged if not filled with oil before starting engine. Procedure must be performed whenever a new pump installed or oil has been drained from the pump or hydraulic oil tank.

6. Fill pump housing with oil. See Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)

7. Check pump regulator adjustments. (Group 9025-25.)

For minimum flow:

- See Hydraulic Pump Regulator Test and Adjustments—Minimum Flow—240DLC. (Group 9025-25.)
- See Hydraulic Pump Regulator Test and Adjustment—Minimum Flow—270DLC. (Group 9025-25.)

For maximum flow:

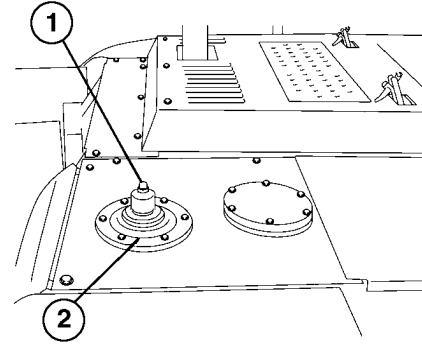
- See Hydraulic Pump Regulator Test and Adjustments—Maximum Flow—240DLC. (Group 9025-25.)
- See Hydraulic Pump Regulator Test and Adjustment—Maximum Flow—270DLC. (Group 9025-25.)

Pilot Pump Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Drain pump drive gearbox. Approximate oil capacity is 1.0 L (1.1 qt).
3. Pull a vacuum in hydraulic oil tank using a vacuum pump or drain hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank. (See procedure in this group.) See 240DLC Drain and Refill Capacities, or 270DLC Drain and Refill Capacities. (Operator's Manual.)



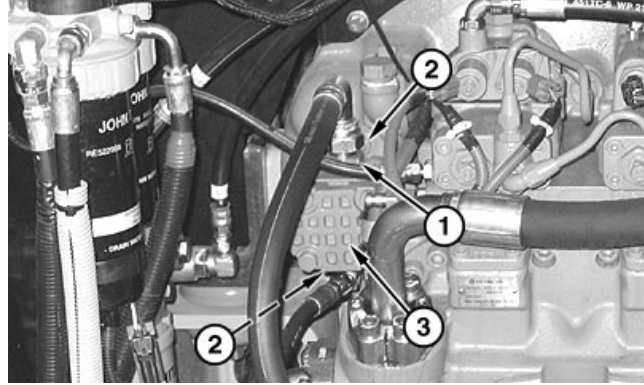
1—Pressure Release Button
2—Hydraulic Oil Tank Cover

T214924 -UN-17NOV05

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OUO1026,0000017 -19-08MAR06-1/2

4. Disconnect lines.
5. Remove adapter (1).
6. Remove cap screws (2) and pilot pump (3).
7. Repair or replace parts as necessary.
8. Apply T43514 Rigid Form-In-Place Gasket to mounting surface for pilot pump.
9. Tighten cap screw (2).



TX1003350A -UN-06FEB06

Specification

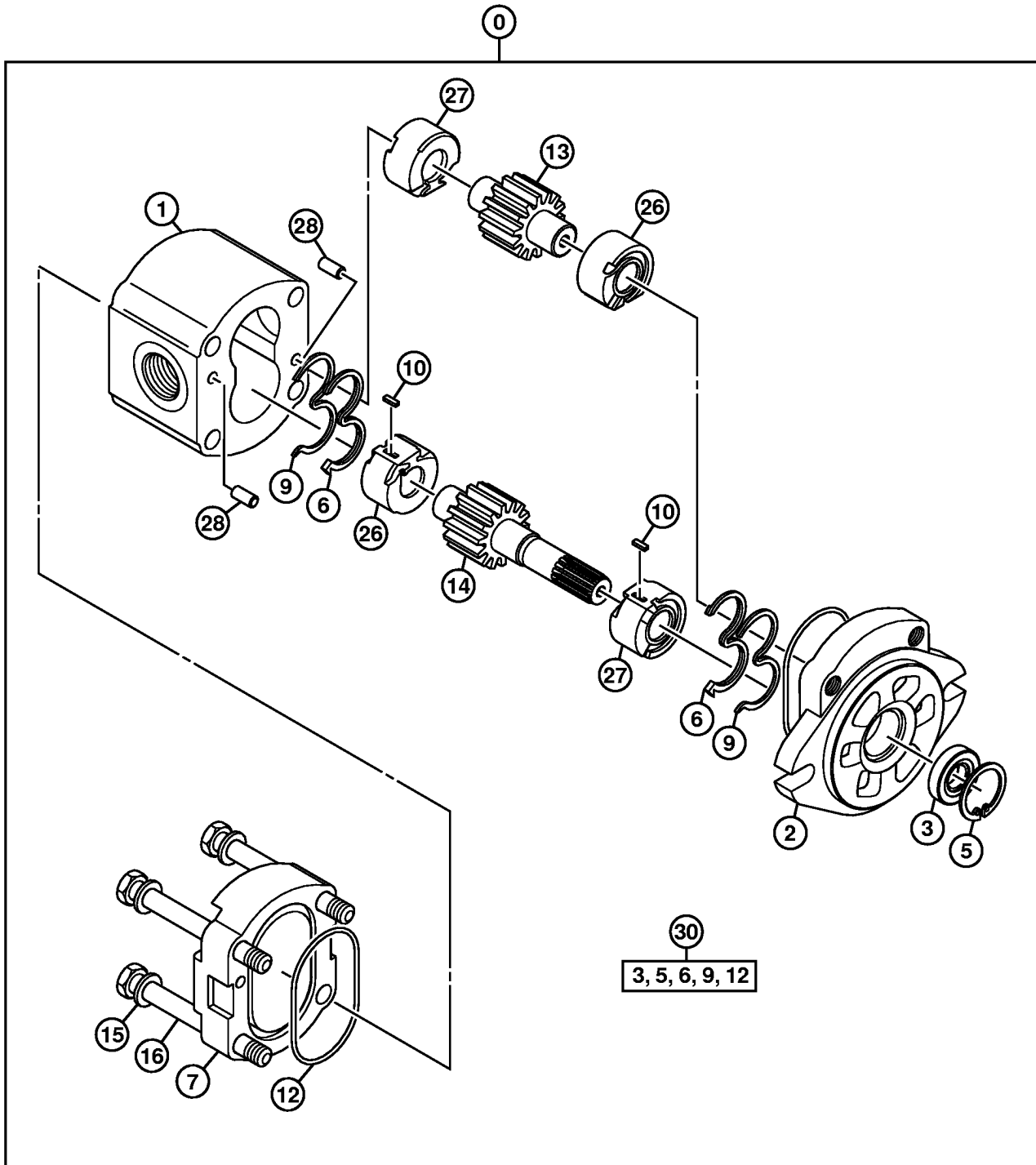
Pilot Pump-to-Drive Gearbox Cap	
Screw—Torque.....	49 N•m 36 lb-ft

- 1—Adapter
2—Cap Screw (2 used)
3—Pilot Pump

10. Install adapter (1) and O-ring.
11. Connect lines. See Pump 1, Pump 2 and Pilot Pump Line Identification. (Group 9025-15.)
12. Fill pump drive gearbox so level is above “H” mark on dipstick. See Change Pump Drive Gearbox Oil. (Operator’s Manual.)

OUO1026,0000017 -19-08MAR06-2/2

Pilot Pump Disassemble and Assemble



TX1000393

Continued on next page

OUC1026,0000018 -19-01MAR06-1/3

0—Pilot Pump	6—Seal (2 used)	13—Driven Gear	26—Bushing
1—Housing	7—End Cover	14—Drive Gear	27—Bushing
2—Flange	9—Backup Retainer (2 used)	15—Washer (4 used)	28—Pin (4 used)
3—Oil Seal	10—Key (2 used)	16—Cap Screw and Washer (4 used)	30—Kit, Seal
5—Snap Ring	12—O-Ring (2 used)		

OUO1026,0000018 -19-01MAR06-2/3

IMPORTANT: Be careful not to lose keys (B).

1. Check bushings (D). If inside diameter and surface toward gear are rough or worn, replace pump.
2. Check gears (A and C) and housing. If gear teeth, shaft, and inside of housing is rough or worn, replace pump.

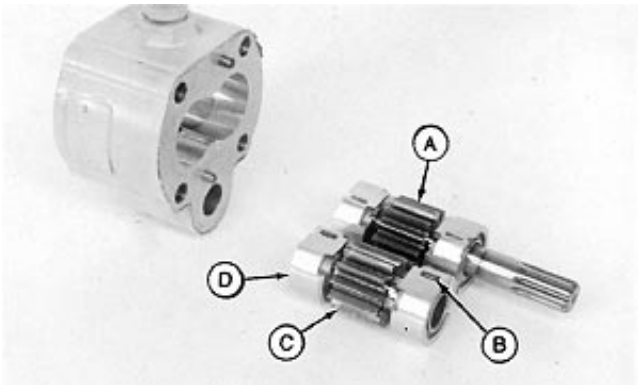
IMPORTANT: Apply clean hydraulic oil to all parts. Pump failure can result if pump is assembled dry.

3. Apply clean hydraulic oil to all parts.
4. Apply multi-purpose grease to lip of oil seal. Install oil seal with lip (spring side) towards inside of housing.
5. Tighten cap screws.

Specification

Cover-to-Flange Cap Screw—
Torque 41 N•m
31 lb-ft

6. Check pilot pressure setting. See Pilot Pressure Regulating Valve Test and Adjustment. (Group 9025-25.)



A—Drive Gear
B—Keys (2 used)
C—Driven Gear
D—Bushing

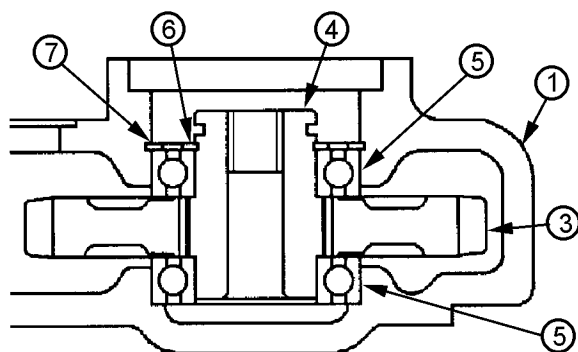
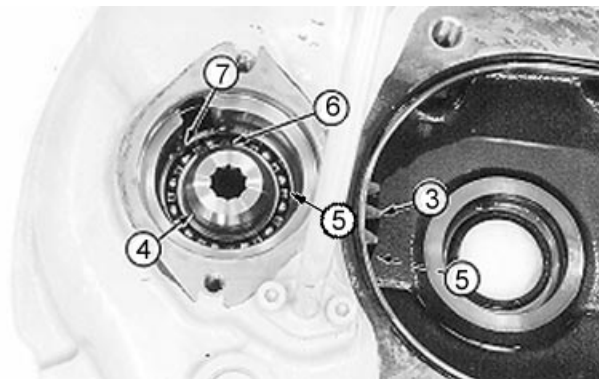
T7685IX -UN-13MAY92

OUO1026,0000018 -19-01MAR06-3/3

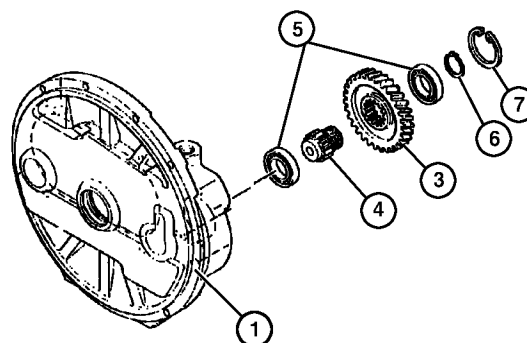
Pilot Pump Drive Shaft Remove and Install

1. Remove snap rings (6 and 7).
2. Remove pilot pump drive shaft (4) and outer ball bearing (5) using a blind-hole puller or an internal puller. Ball bearings are a press fit on drive shaft and in housing.
3. Remove pilot pump drive gear (3) through opening for hydraulic pump.

- 1—Pump Drive Gearbox Case
3—Pilot Pump Drive Gear
4—Pilot Pump Drive Shaft
5—Ball Bearing (2 used)
6—Snap Ring
7—Snap Ring



T105657



T142290 -UN-20JUL01

OUO1026,000001A -19-01MAR06-1/1

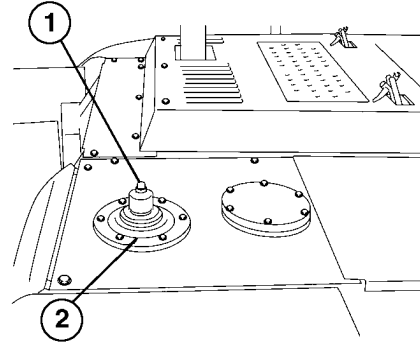
Pilot Pressure Regulating Valve and Filter Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Disconnect lines.

- 1—Pressure Release Button
2—Hydraulic Oil Tank Cover



T214924 -UN-17NOV05

OUO1026,000001B -19-08MAR06-1/2

3. Remove cap screws (1) and remove pilot pressure regulating valve (2) and pilot filter (3).
4. Repair or replace parts as necessary.
5. Install cap screws (1).

Specification

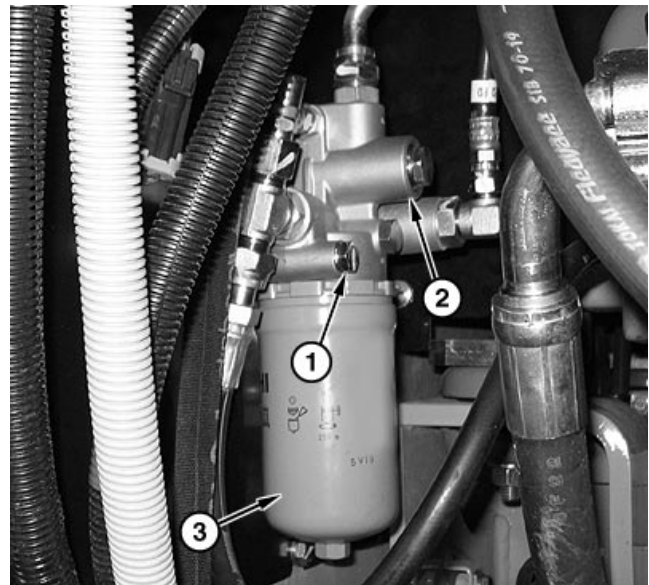
Filter Head-to-Support Cap	
Screw—Torque	49 N•m 36 lb-ft

6. Replace pilot filter (3) element.

Specification

Pilot Filter Element	
Housing-to-Filter Head—Torque	25 N•m 220 lb-in.

7. Connect lines. See Hydraulic System Component Location. (Group 9025-15.)
8. Check pilot pressure setting. See Pilot Pressure Regulating Valve Test and Adjustment. (Group 9025-25.)



- 1—Cap Screw (2 used)
2—Pilot Pressure Regulating Valve
3—Pilot Filter

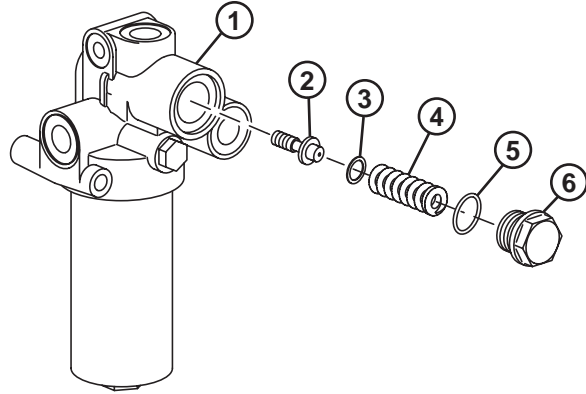
TX1003374 -UN-07FEB06

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OUO1026,000001B -19-08MAR06-2/2

Pilot Pressure Regulating Valve and Filter Disassemble and Assemble

1. Remove plug (6) with O-ring (5).
2. Remove parts (2—4).
3. Inspect, clean and replace parts as necessary.
4. Check that poppet (2) slides smoothly in pilot pressure regulating valve housing.
5. Tighten plug (6).



TX1003402 -UN-07FEB06

Specification

Plug-to-housing—Torque..... 49 N•m
36 lb-ft

- 1—Pilot Pressure Regulating Valve Housing
2—Poppet
3—Shim (as required)
4—Spring
5—O-Ring
6—Plug

OUO1026,000001D -19-01MAR06-1/1

Pilot Shut-Off Solenoid Valve Remove and Install

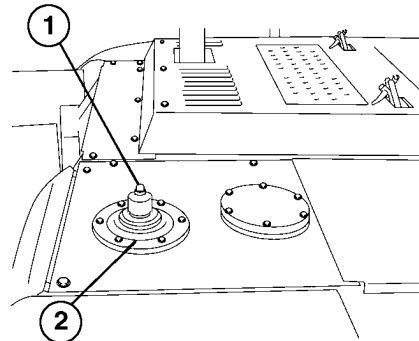
1. Turn upperstructure 90° to tracks.

OUO1026,000001C -19-25APR06-1/3

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

2. Push pressure release button (1).
3. Disconnect lines.

- 1—Pressure Release Button
2—Hydraulic Oil Tank Cover



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OUO1026,000001C -19-25APR06-2/3

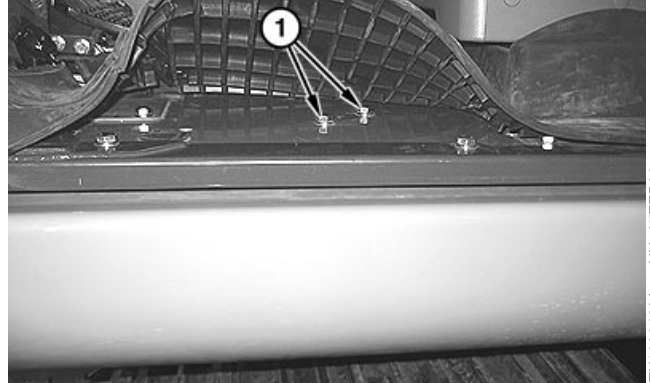
4. Disconnect solenoid connector (2).
5. Remove cap screws (1) and valve.
6. Repair or replace parts as necessary.
7. Install valve. Tighten cap screws.

Specification

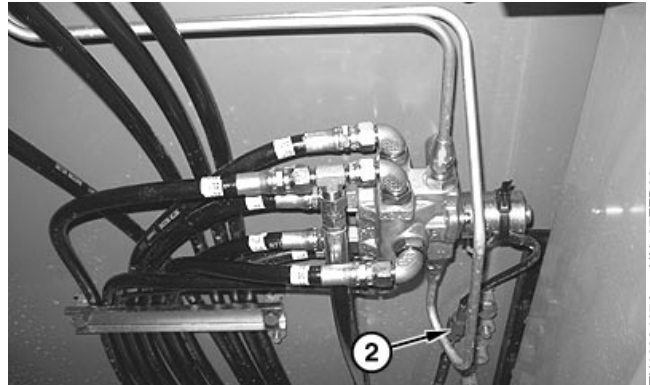
Pilot Shut-Off Valve	
Housing-to-Cab Platform Cap	
Screw—Torque.....	49 N•m 36 lb-ft

8. Connect lines. See Pilot Shut-Off Solenoid Valve Operation. (Group 9025-05.)

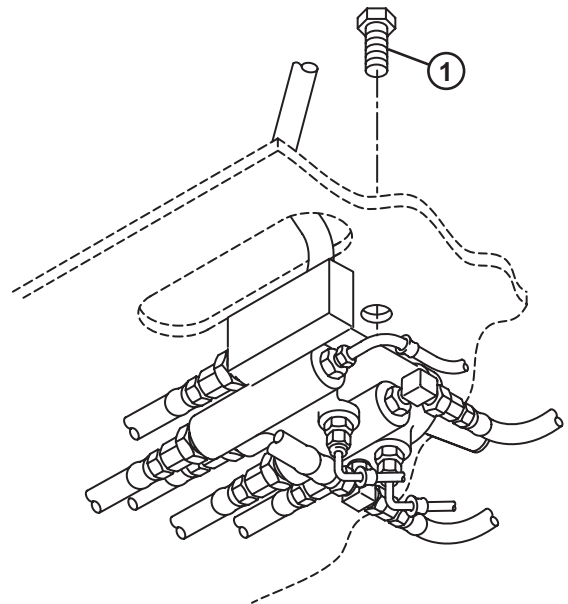
- 1—Cap Screw (2 used)
2—Connector



TX1003406A -UN-07FEB06



TX1003407A -UN-07FEB06

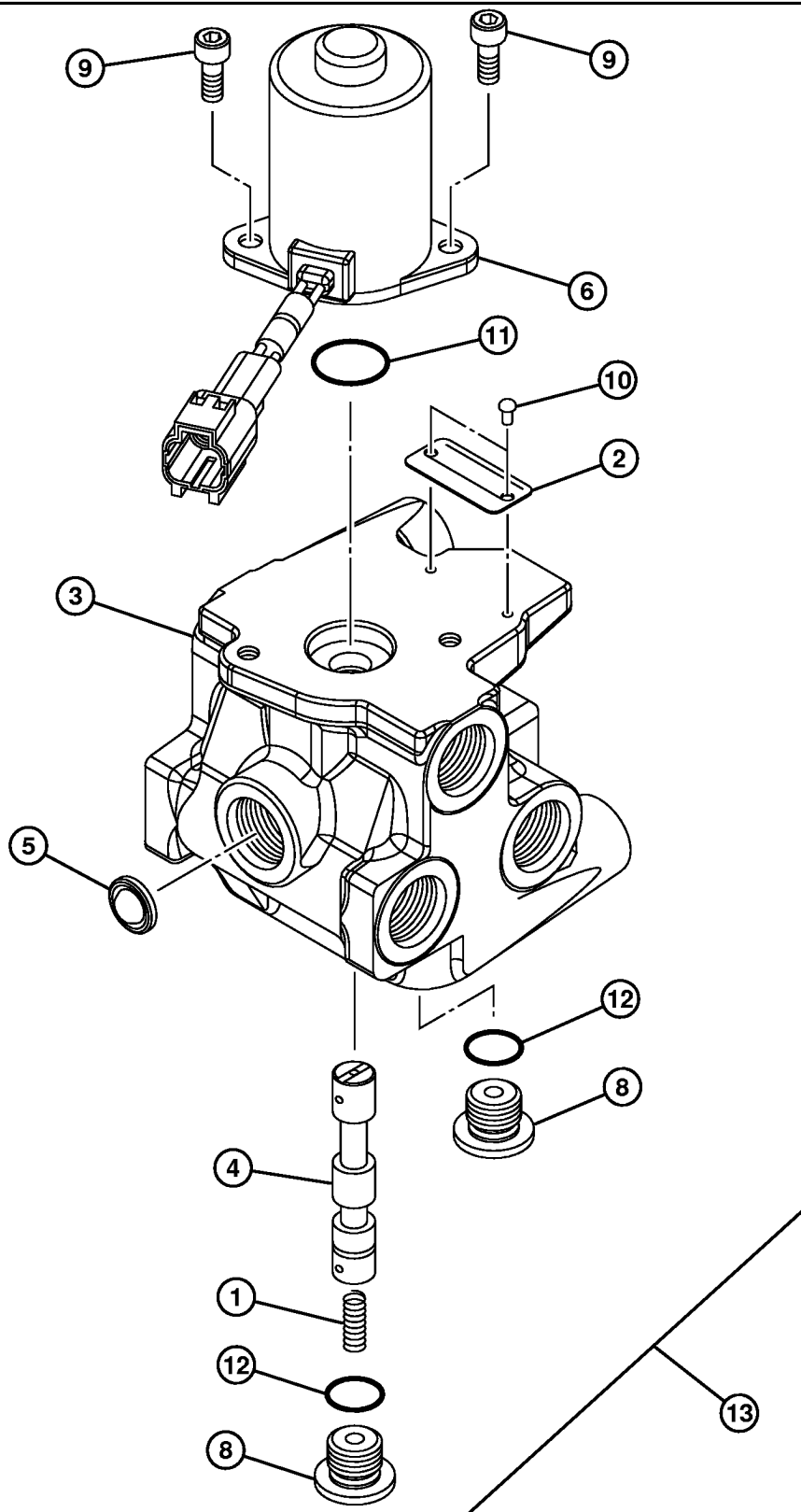


T142504 -UN-20JUL01

OUO1026,000001C -19-25APR06-3/3

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TX1000413



OUO1026,0000029 -19-07MAR06-1/2

1—Spring
2—Plate
3—Housing
4—Spool

5—Screen
6—Solenoid
8—Plug (2 used)

9—Screw (2 used)
10—Screw (2 used)
11—O-Ring

12—O-Ring (2 used)
13—Valve, Pilot Shut-Off
Solenoid

1. Clamp housing (3) in a vise.
2. Scribe a line on housing (3) and solenoid (6).
3. Remove screws (9), solenoid (6), and O-ring (11).
4. Remove plug (8), O-ring (12), spring (1), and spool (4), from housing.
5. Remove screen (5).
6. Clean and inspect all parts. Replace worn or damaged parts as necessary. Use new O-rings when assembling.
7. Install spool (4), spring (1), plug (8), and O-ring (12). Tighten plug to specification.

Specification

Shut-Off Solenoid Valve
Housing Plug—Torque 28 N•m
246 lb-in.

8. Install screen (5).
9. Install O-ring (11) to solenoid (6).
10. Align scribe marks and install solenoid (6) to housing (3), using screws (9). Tighten screws to specification.

Specification

Solenoid-to-Housing Screws—
Torque..... 4 N•m
36 lb-in.

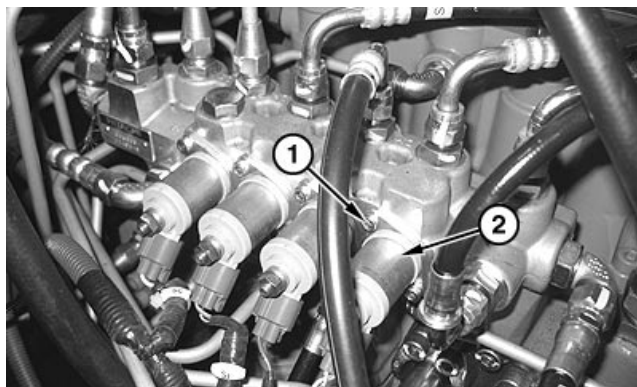
OUO1026,0000029 -19-07MAR06-2/2

Solenoid Valve Remove and Install—Power Digging (Port SG), Travel Speed (Port SI), Arm Regenerative (Port SC) and Dig Regenerative (Port SF) Valves

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).

1—Cap Screw (8 used)
2—Solenoid Valve Coil (4 used)



TX1003435A -UN-16FEB06

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OUO1026,000001F -19-11APR06-1/2

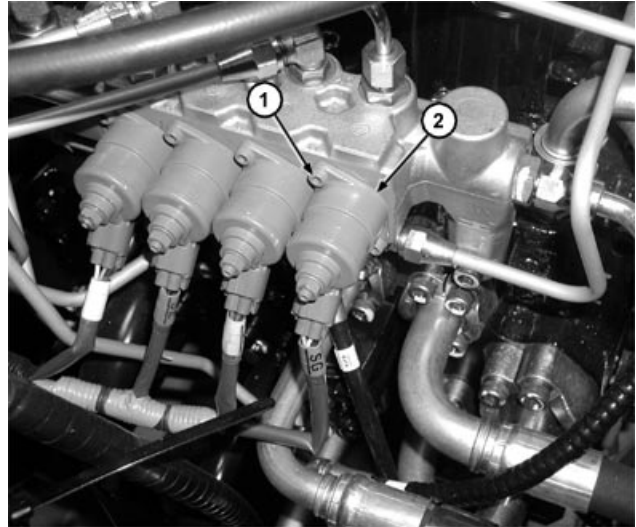
33
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2. Disconnect electrical connector.
3. Remove cap screws (1) and remove solenoid valve coil (2). Be careful not to lose spring and O-ring.
4. Keep parts for each individual solenoid valve together.
5. Install solenoid valve coil (2) with O-ring (8) and spring (7).
6. Tighten cap screws (1).

Specification

Solenoid Valve Coil-to-Manifold
 Cap Screws—Torque 3 N•m
 24 lb-in.

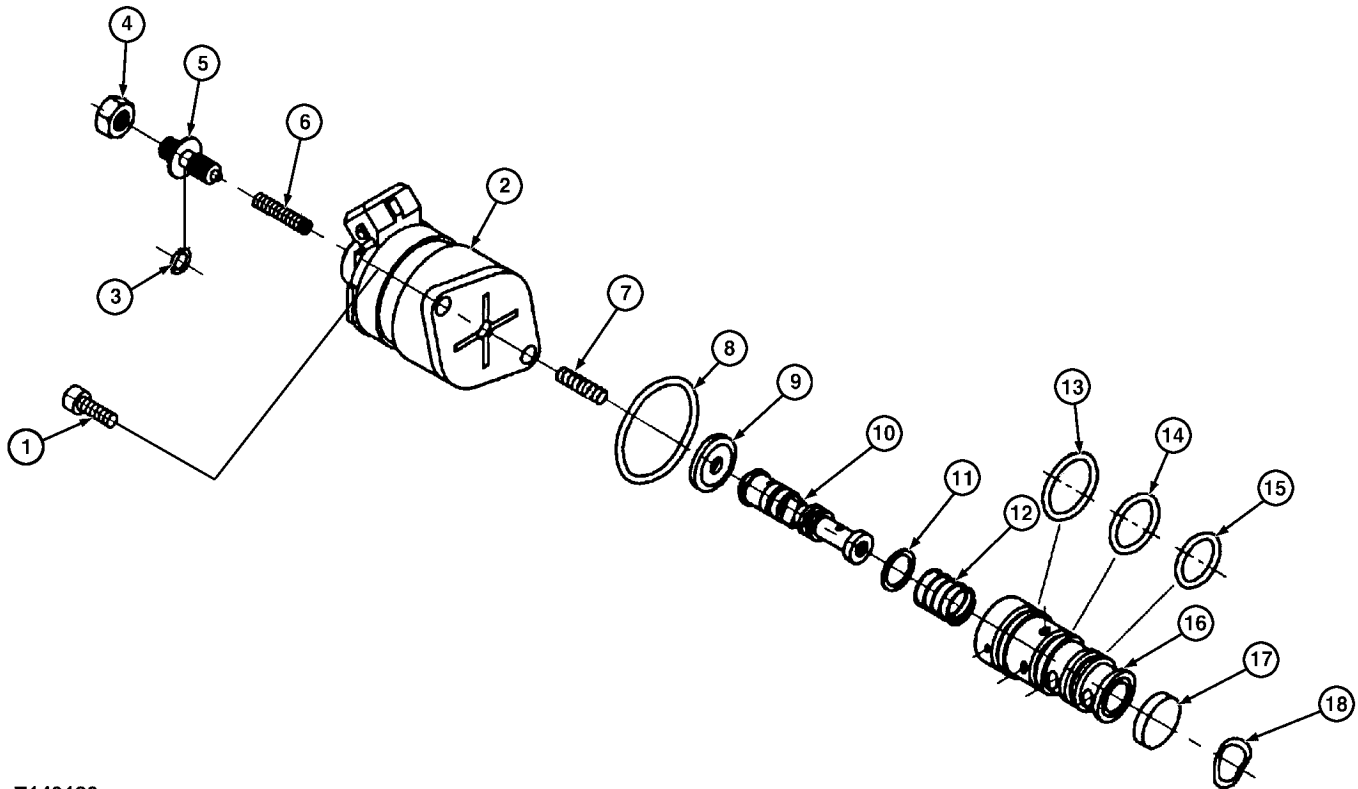
7. Connect electrical connectors.
8. Check pressure setting of solenoid valves. See Power Digging, Travel Speed, Arm Regenerative and Dig Regenerative Solenoid Valve Test and Adjustment. (Group 9025-25.)



1—Cap Screw (8 used)
 2—Solenoid Valve Coil (4 used)

OUO1026,000001F -19-11APR06-2/2

Solenoid Valve Disassemble and Assemble—Power Digging (Port SG), Travel Speed (Port SI), Arm Regenerative (Port SC) and Dig Regenerative (Port SF) Valves



T143123

T143123 -UN-20JUL01

1—Cap Screw (2 used)
2—Proportional Solenoid
Valve Coil
3—O-Ring
4—Lock Nut

5—Adjusting Screw
6—Spring
7—Spring
8—O-Ring
9—Diaphragm

10—Spool
11—Washer
12—Spring
13—O-Ring
14—O-Ring

15—O-Ring
16—Sleeve
17—Plate
18—Washer

1. Remove parts (7—18).

NOTE: Only remove the lock nut (4) and adjusting screw (5) if replacement of O-ring (3) is necessary. If disassembled, pressure setting of proportional solenoid valve will need to be adjusted. See *Power Digging, Travel Speed, Arm Regenerative and Dig Regenerative Solenoid Valve Test and Adjustment*. (Group 9025-25.)

2. Repair or replace parts as necessary.

3. Apply clean oil to sleeve (16), O-rings (13, 14 and 15) and spool (10).

After installing spool, push spool against spring to check that spool slides smoothly in sleeve.

4. Install sleeve (16) so ports align with ports in manifold.

5. Install washer (11) and spring (12) on spool and install spool.

6. Install spring (7), O-ring (8) and diaphragm (9).

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3360
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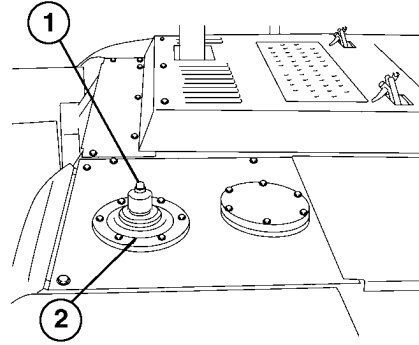
Torque Control and Pump Flow Rate Limit Solenoid Valve Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).

1—Pressure Release Button
2—Hydraulic Oil Tank Cover



T214924 -UN-17NOV05

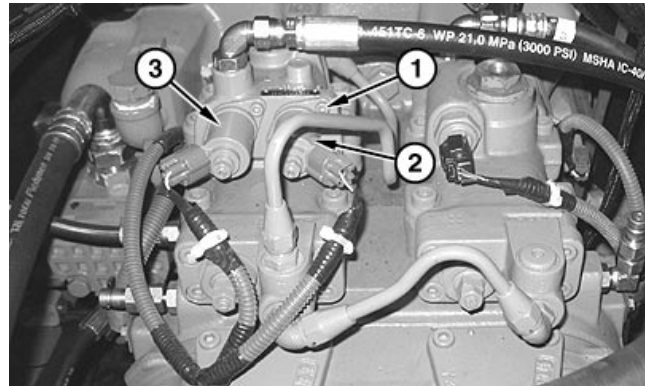
OUO1026,0000021 -19-08MAR06-1/2

2. Disconnect electrical connector.
3. Remove cap screws (1) and solenoid valve coil, O-ring, and spring.
4. Keep parts for each solenoid valve together.
5. Install solenoid valve coil, with O-ring and spring.
6. Tighten cap screws.

Specification

Solenoid Valve Coil-to-Regulator
Cap Screws—Torque 4 N•m
35 lb-in.

7. Connect electrical connectors.
8. Check pressure setting of torque control solenoid valve. See Torque Control Solenoid Valve Test and Adjustment. (Group 9025-25.)



1—Cap Screw (4 used)
2—Torque Control Solenoid Valve
3—Pump 2 Flow Rate Limit Solenoid Valve

TX1003460A -UN-16FEB06

OUO1026,0000021 -19-08MAR06-2/2

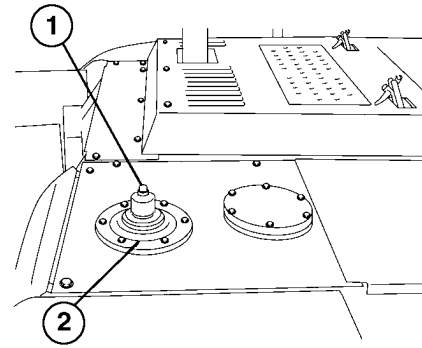
Left and Right Pilot Valve Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).

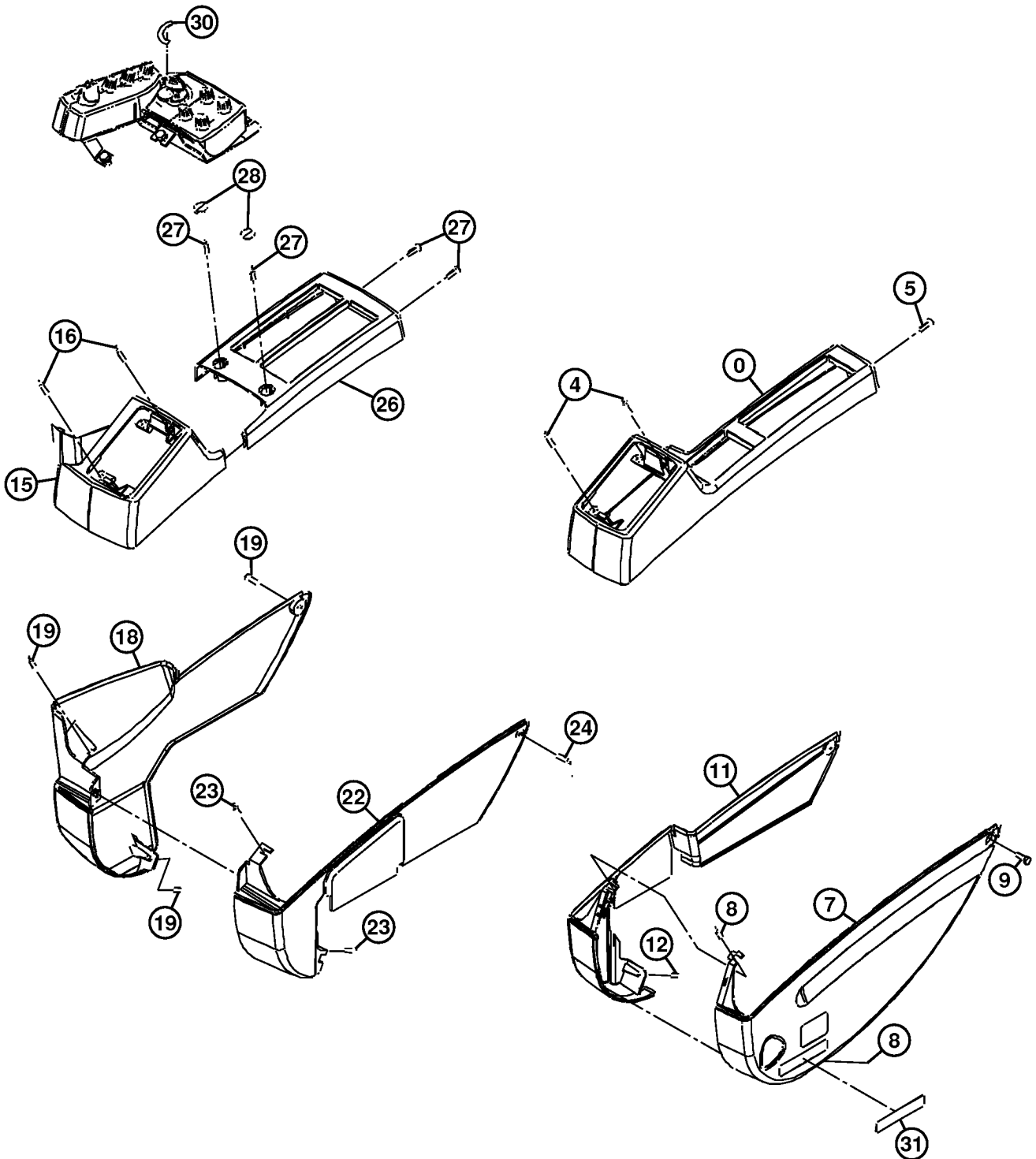
1—Pressure Release Button
2—Hydraulic Oil Tank Cover



T214924 -UN-17NOV05

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RO33873,0000A9A -19-21APR06-1/5



TX1000801

TX1000801 -UN-15DEC05

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RO33873.0000A9A -19-21APR06-2/5

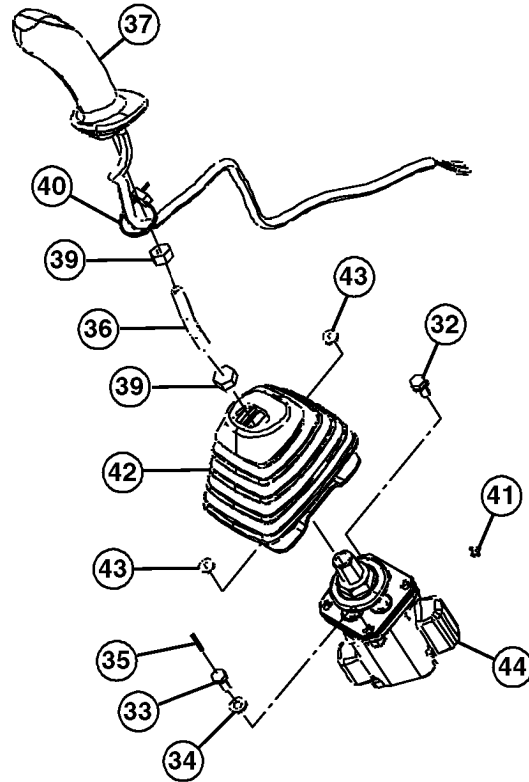
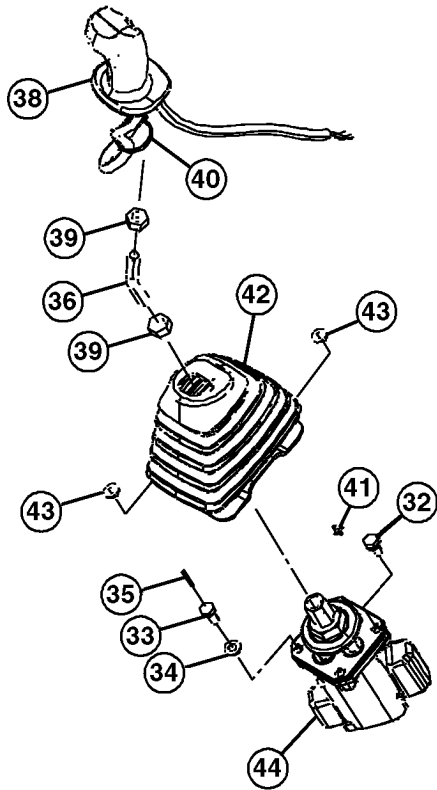
0—Cover	9—Cap Screw, Washer, and Lock Washer	18—Cover	26—Cover
4—Screw (4 used)	11—Cover	19—Cap Screw, Washer, and Lock Washer (3 used)	27—Cap Screw, Washer, and Lock Washer (4 used)
5—Cap Screw, Washer, and Lock Washer	12—Cap Screw, Washer, and Lock Washer	22—Cover	28—Cap (2 used)
7—Cover	15—Cover	23—Cap Screw, Washer, and Lock Washer (2 used)	30—Label
8—Cap Screw, Washer, and Lock Washer (2 used)	16—Screw (4 used)	24—Cap Screw, Washer, and Lock Washer	31—Label

2. Remove:
- Caps (28)

• Screws (4 and 16)

• Cap Screws (5, 8, 9, 12, 19, 23, 24, and 27)

• Covers (0, 7, 11, 15, 18, 22, and 26)



TX1006123

- 32—Cap Screw and Washer (6 used)
- 33—Cap Screw (2 used)
- 34—Washer (2 used)
- 35—Spring Pin (2 used)
- 36—Shaft (2 used)
- 37—Handle
- 38—Handle

- 39—Nut (4 used)
- 40—Tie Band (2 used)
- 41—Tie Band (2 used)
- 42—Boot (2 used)
- 43—Washer (8 used)
- 44—Pilot Valve (2 used)

3. Disconnect wiring harness and remove handles (37 and 38)
4. Remove cap screws (32 and 33) and remove pilot valves (44) from console.
5. Tag and disconnect lines. Close all open lines and fittings using caps and plugs.
6. Repair or replace parts as necessary.

7. Connect lines. See Hydraulic System Component Location. (Group 9025-15.)

NOTE: Position cap screw (33) with spring pin (35), in lower left hole of left pilot valve, and lower right hole of right pilot valve.

8. Install pilot valves (44) and tighten cap screws (32 and 33).

TX1006123 -UN-06APR06

Continued on next page

RO33873.0000A9A -19-21APR06-4/5

Specification

Pilot Valve-to-Console Cap
Screw—Torque 10 N•m
88.5 lb-in.

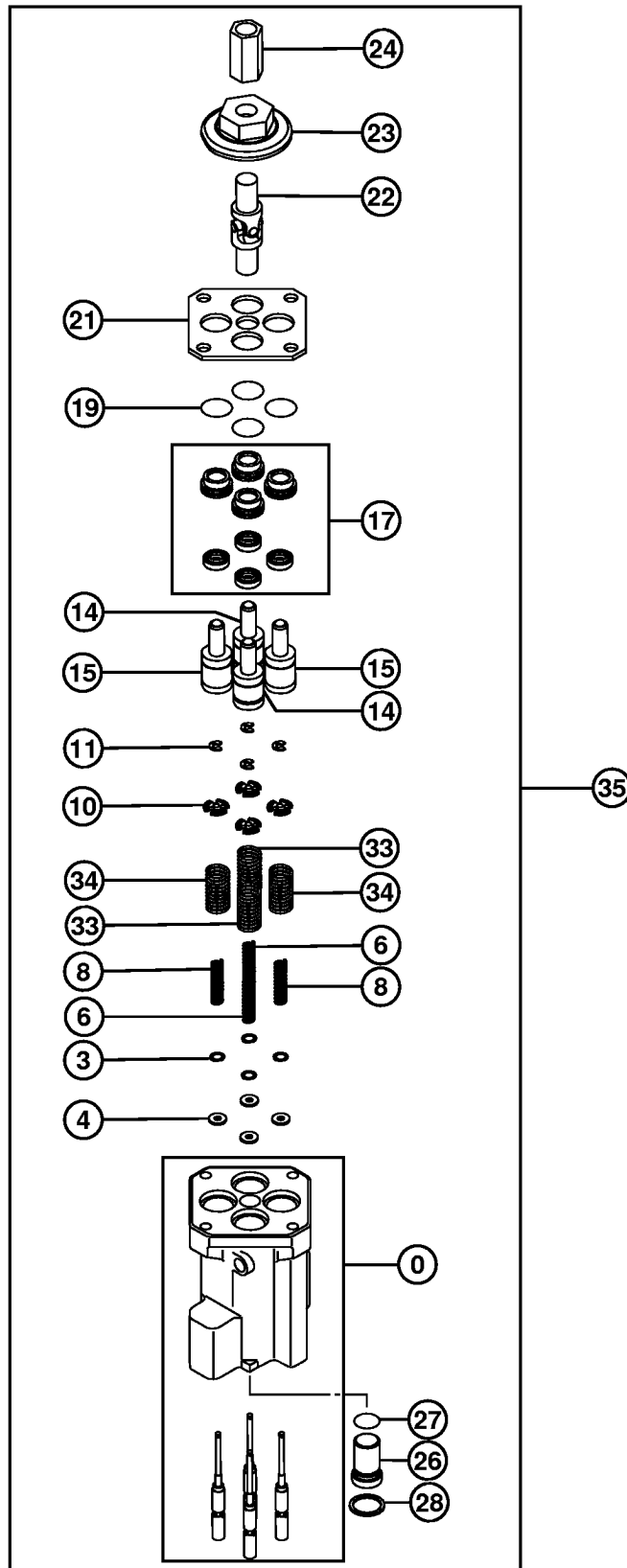
9. After pilot valve is installed, check operation of all functions. See Control Lever Pattern Operation. (Operator's Manual.)

10. Install:

- Caps (28)
- Screws (4 and 16)
- Cap Screws (5, 8, 9, 12, 19, 23, 24, and 27)
- Covers (0, 7, 11, 15, 18, 22, and 26)

RO33873,0000A9A -19-21APR06-5/5

Left and Right Pilot Valve Disassemble and Assemble



TX1000262

Continued on next page

RO33873.0000A9B -19-26APR06-1/3

0—Housing and Spools
 3—Shim (4 used)
 4—Spacer (4 used)
 6—Balance Spring (2 used)
 8—Balance Spring (2 used)
 10—Guide (4 used)

11—Snap Ring (4 used)
 14—Pusher B (2 used)
 15—Pusher A (2 used)
 17—Sleeve (4 used)
 19—O-Ring (4 used)

21—Plate
 22—Universal Joint
 23—Cam
 24—Coupling
 26—Plug

27—O-Ring
 28—Snap Ring
 33—Return Spring (2 used)
 34—Return Spring (2 used)
 35—Pilot Valve

IMPORTANT: The housing and spools (0) are replaced as an assembly because the spools are select fitted to bores in housing.

Some parts from ports 1 and 3 are different than parts from ports 2 and 4. Parts for each port must be kept together and installed into the same port from which it was removed. The port numbers are stamped on the housing.

Remove universal joint (22) only if necessary.

Note port location and quantity of shims (3) when removing. Same number of shims must be used when installing.

1. Remove:

- Coupling (24)
- Cam (23)
- Universal Joint (22)
- Plate (21)

NOTE: Sleeves (17) cannot be disassembled. Do not attempt to remove oil seal from sleeve.

2. Remove sleeves (17).

3. Remove:

- Pusher (14 and 15)
- Snap Ring (11)
- Guide (10)
- Spring (6 and 8)
- Spring (33 and 34)
- Shim (3)

- Spacer (4)
- Spools (0)
- Snap Ring (28)
- O-Ring (27)
- Plug (26)

4. Repair or replace parts as necessary.

5. Install O-ring (27) onto plug (26).

6. Install plug (26) and snap ring (28).

IMPORTANT: Components are select fit to bores. Install components in the same bore that they were removed from.

7. Install spools (0).

IMPORTANT: Ports 1 and 3 use short balance springs. Ports 2 and 4 use long balance springs.

8. Install spacers (4), shims (3), and balance springs (3 and 4).

IMPORTANT: Ports 1 and 3 use short return springs. Ports 2 and 4 use long return springs.

9. Install return springs (33 and 34).

10. Install guides (10) with protrusion facing upward.

11. Install snap rings (11).

IMPORTANT: Ports 1 and 3 use pushers with 1 outer groove. Ports 2 and 4 use pushers with 2 outer grooves.

12. Install pushers A (15) and pushers B (15).

13. Apply TY6341 Multi-Purpose SD Polyurea Grease to ball at ends of pushers A and pushers B.

14. Apply TY6341 Multi-Purpose SD Polyurea Grease to joint of universal joint (22) and to inner surface of sleeve (17) seals.

15. Install O-rings (19) and sleeves (17).

16. Apply LOCTITE® 262 Threadlocker (high strength) to threads of universal joint (22).

IMPORTANT: Align cap screw hole in plate (21) with cap screw hole in housing (0).

17. Install plate (21) and universal joint (22). Tighten universal joint.

Specification

Universal Joint—Torque 24.5 N•m
217 lb-in.

18. Install cam (23) on universal joint (22). Adjust clearance between pushers A (15) and pushers B (14) and cam.

Specification

Cam-to-Pusher A and Pusher

B—Clearance..... 0—0.20 mm
0—0.008 in.

19. Hold cam (23) and tighten coupling (24).

Specification

Coupling-to-Cam and Universal

Joint—Torque 69 N•m
51 lb-ft

LOCTITE is a trademark of Loctite Corp.

RO33873,0000A9B -19-26APR06-3/3

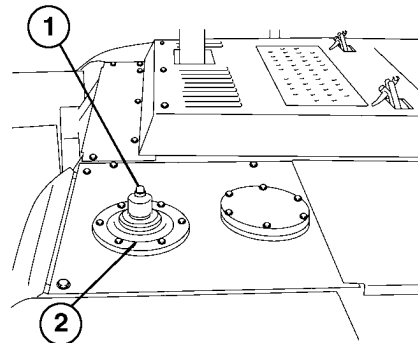
Travel Pilot Control Valve Remove and Install

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).

1—Pressure Release Button

2—Hydraulic Oil Tank Cover



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Continued on next page

OOU1026,0000025 -19-08MAR06-1/2

- 2. Disconnect lines.
- 3. Remove cap screws (1) and remove pedals and levers.
- 4. Remove cap screws (2) and remove travel pilot control valve (3).
- 5. Repair or replace parts as necessary.
- 6. Tighten cap screws (2).

Specification

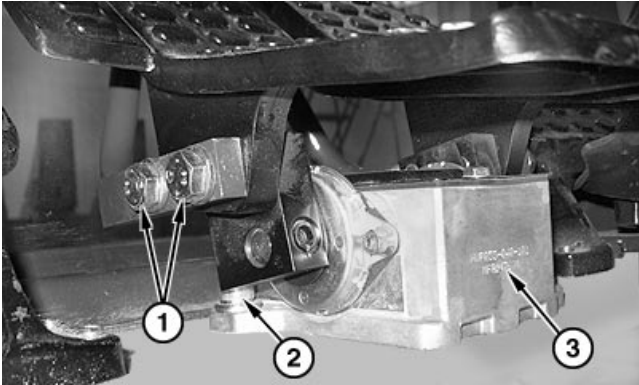
Control Valve-to-Cab Platform	
Cap Screw—Torque	49 N•m 36 lb-ft

- 7. Tighten cap screws (1).

Specification

Travel Pedal-to-Lever Cap	
Screw—Torque	49 N•m 36 lb-ft

- 8. Connect lines. See Travel System Component Location. (Group 9025-15.)
- 9. After travel pilot control valve is installed, check the operation of all functions to be sure they operate correctly.

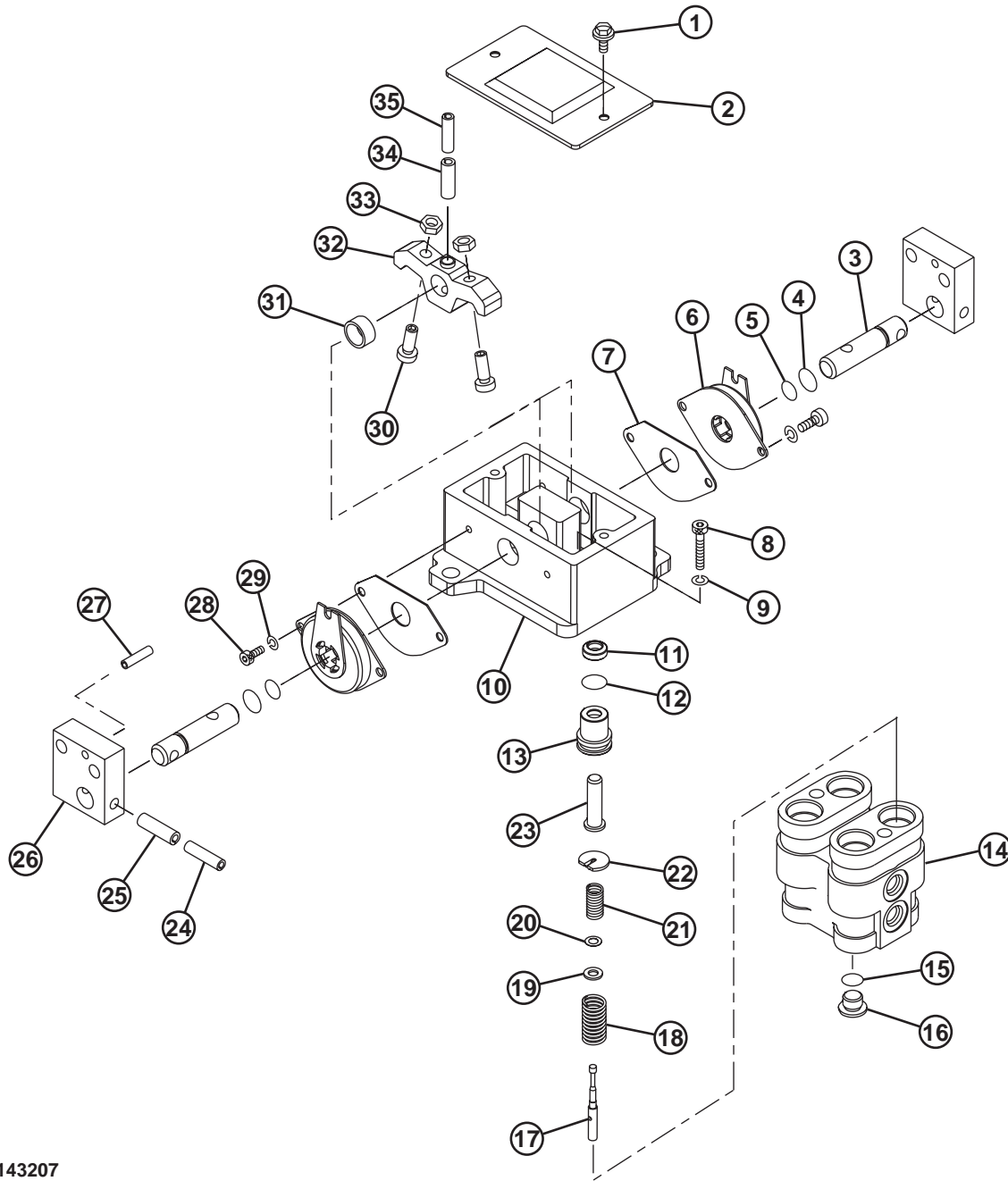


TX1003510A -UN-16FEB06

- 1—Cap Screw (4 used)
- 2—Cap Screw (2 used)
- 3—Travel Pilot Control Valve

OUO1026,0000025 -19-08MAR06-2/2

Travel Pilot Control Valve Disassemble and Assemble



T143207

- | | | | |
|------------------------|----------------------|----------------------------|----------------------------|
| 1—Cap Screw (2 used) | 10—Holder | 19—Spacer (4 used) | 28—Cap Screw (4 used) |
| 2—Cover | 11—Oil Seal (4 used) | 20—Shim (As required) | 29—Lock Washer (4 used) |
| 3—Pin (2 used) | 12—O-Ring (4 used) | 21—Balance Spring (4 used) | 30—Adjusting Bolt (4 used) |
| 4—O-Ring (2 used) | 13—Bushing (4 used) | 22—Spring Guide (4 used) | 31—Bushing (4 used) |
| 5—O-Ring (2 used) | 14—Casing | 23—Pusher (4 used) | 32—Cam (2 used) |
| 6—Dampener (2 used) | 15—O-Ring | 24—Spring Pin (2 used) | 33—Lock Nut (4 used) |
| 7—Rubber Seat (2 used) | 16—Plug | 25—Spring Pin (2 used) | 34—Spring Pin (2 used) |
| 8—Cap Screw (2 used) | 17—Spool (4 used) | 26—Bracket (2 used) | 35—Spring Pin (2 used) |
| 9—Lock Washer (2 used) | 18—Spring (4 used) | 27—Spring Pin (2 used) | |

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OUC1026,0000026 -19-26APR06-1/3

IMPORTANT: The casing (14) and spools (17) are replaced as an assembly because the spools are select fitted to bores in housing.

Parts for each port must be kept together and installed into the same port from which it was removed. The port numbers are stamped on the housing.

Note port location and quantity of shims (20) when removing. Same number of shims must be used when installing.

1. Remove parts from casing. Remember to keep parts removed from each port together. Identify each group of parts by port numbers stamped on casing.

NOTE: Spring pins (24 and 25) are stepped and can only be removed from one direction.

Remove spring pin (27) and bushings (31) only if necessary.

2. Repair or replace parts as necessary.

NOTE: Use same number of shims (20) as were removed.

3. Install spools (17), springs (18), spacers (19), shims (20) and balance springs (21) into casing (14).
4. Install spring guides (22) with stepped end facing down.
5. Apply multi-purpose grease to the end of each pusher (23) and to oil seals (11).

IMPORTANT: Note direction of insertion for spring pins (34 and 35).

6. Assemble cam (32) in holder (10) with spring pins (34 and 35), and pin (3). Install spring pins with slits 90° apart.

7. Lock pins (34 and 35) in position by displacing the bore above spring pin using a punch and hammer.
8. Install holder (10) to casing (14) with cap screws (8), lock washers (9) and tighten.

Specification

Holder-to-Casing Cap Screw—
Torque..... 49 N•m
36 lb-ft

9. Adjust clearance between cams (32) and pushers (23) .

Specification

Cams-to-Pusher—Clearance..... 0—0.20 mm
0—0.008 in.

10. Tighten lock nut (33).

Specification

Cam Adjusting Bolt Lock Nut—
Torque..... 9.8 N•m
86.7 lb-in.

11. Apply multi-purpose grease to O-rings (4 and 5) and install on pin (3).
12. Position rubber seat (7) and dampener (6) on pin (3) with lever facing upward.
13. Install cap screws (28), lock washers (29) and tighten.

Specification

Dampener-to-Holder Cap
Screw—Torque 7 N•m
62 lb-in.

IMPORTANT: Note direction of insertion for spring pins (24 and 25).

Spring pins must be positioned with slits 90° apart.

Align brackets with marks made during disassembly.

14. Install brackets (26) and spring pins (24 and 25).

15. Lock pins (24 and 25) in position by displacing the bore above spring pin using a punch and hammer.

17. Apply multi-purpose grease to spring pin (27).

16. Install cover (2) and cap screws (1) and tighten.

Specification

Cover-to-Holder Cap Screw—

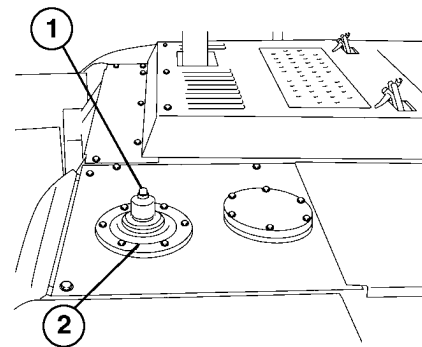
Torque..... 5 N•m
44.3 lb-in.

OUO1026,0000026 —19-26APR06-3/3

Pilot Signal Manifold Remove and Install

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Pull a vacuum in hydraulic oil tank using a vacuum pump or drain hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank. (See procedure in this group.) See 240DLC Drain and Refill Capacities, or 270DLC Drain and Refill Capacities. (Operator's Manual.)
3. Disconnect hoses and lines.
4. Disconnect electrical connectors.



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

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Continued on next page

OUO1026,0000027 —19-25APR06-1/2

5. Remove cap screws (3).
6. Repair or replace parts as necessary.
7. Position manifold (1) on bracket (2) and tighten cap screws (3).

Specification

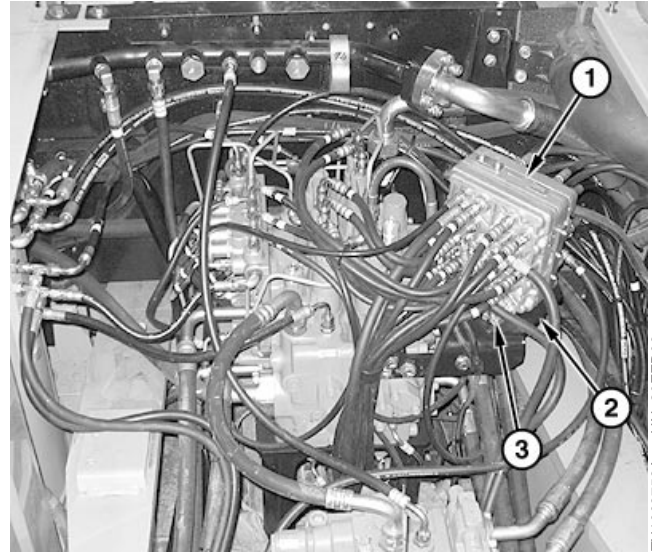
Pilot Signal Manifold-to-Bracket
 Cap Screw—Torque 50 N•m
 37 lb-ft

8. Connect electrical connectors. See System Functional Schematic, Component Location, and Wiring Diagram Master Legend. (Group 9015.)
9. Install hose and tube adapters and tighten.

Specification

Hose and Tube Adapter-to-Pilot
 Signal Manifold—Torque 39 N•m
 347 lb-in.

10. Connect hoses and lines. See Pilot Controllers-to-Pilot Signal Manifold Component Location—Excavator Pattern. (Group 9025-15.)

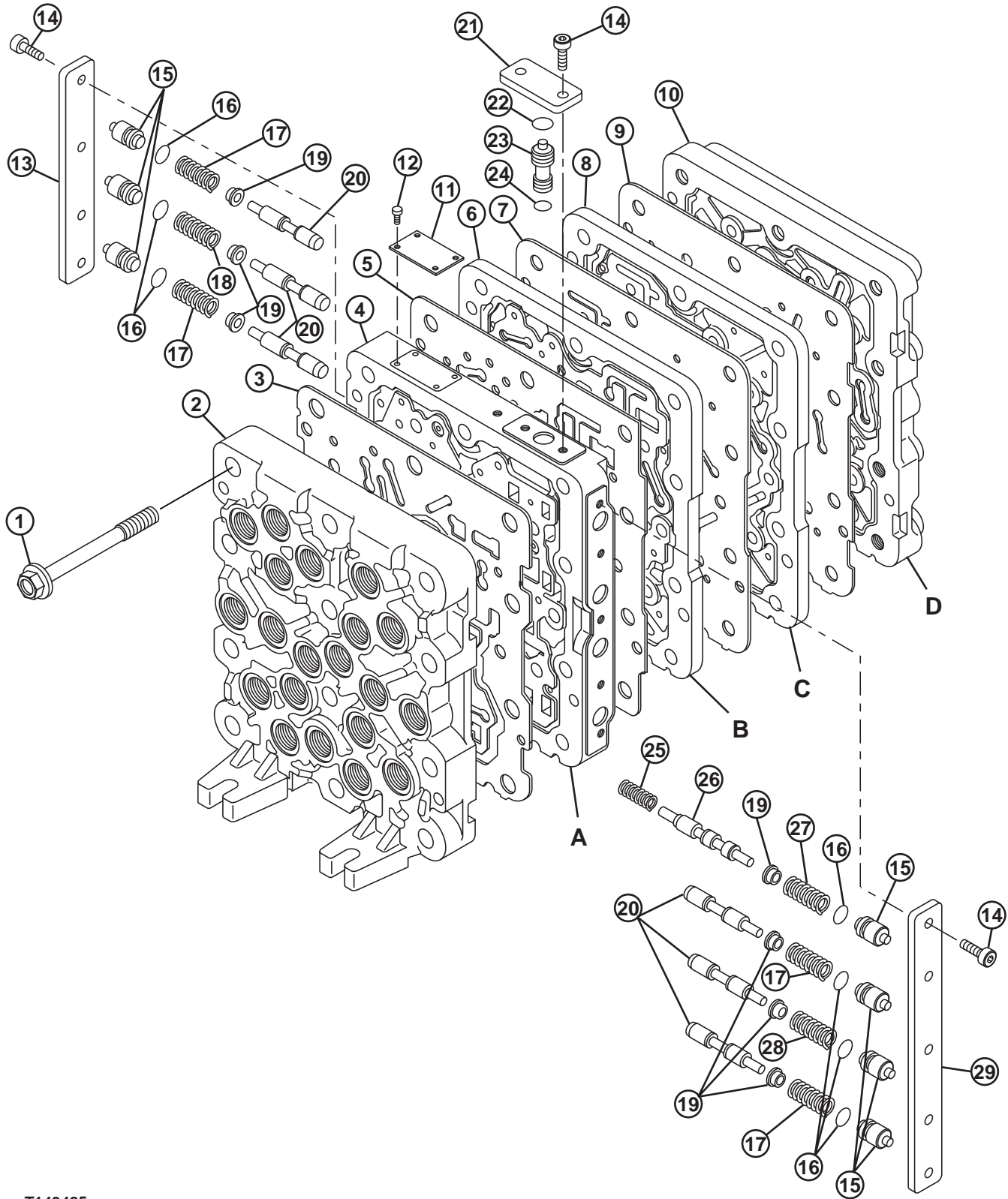


- 1—Pilot Signal Manifold
- 2—Bracket
- 3—Cap Screw (4 used)

TX1003759A -UN-20FEB06

OUO1026,0000027 -19-25APR06-2/2

Pilot Signal Manifold Disassemble and Assemble



T143485

T143485 -UN-17JUL01

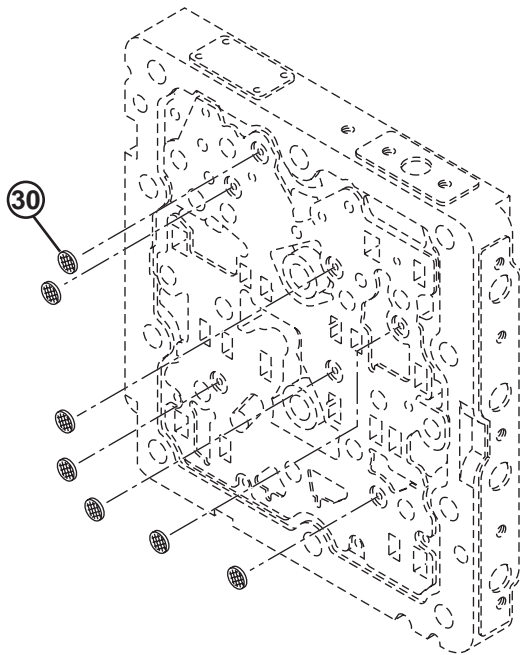
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OOU1026,0000028 -19-02MAR06-1/4

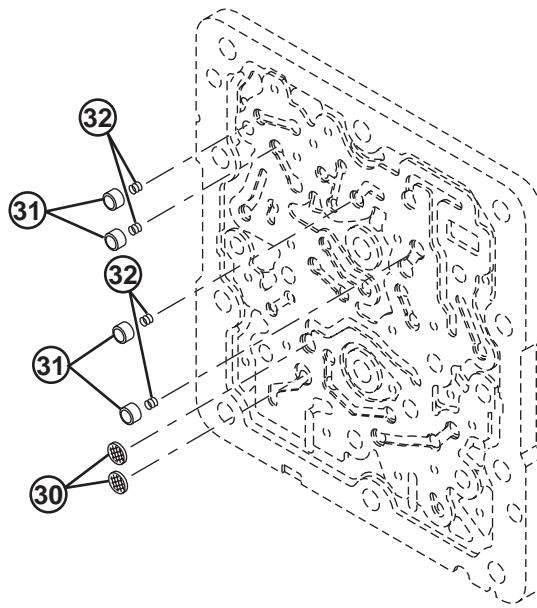
Hydraulic System

1—Cap Screw (10 used)	9—Gasket	16—O-Ring (7 used)	23—Valve
2—Body	10—Body	17—Spring (4 used)	24—O-Ring
3—Gasket	11—Name Plate	18—Spring	25—Spring
4—Body	12—Screw (4 used)	19—Spring Seat (7 used)	26—Spool
5—Gasket	13—Plate	20—Spool (6 used)	27—Spring
6—Body	14—Cap Screw (11 used)	21—Plate	28—Spring
7—Gasket	15—Plug (7 used)	22—O-Ring	29—Plate
8—Body			

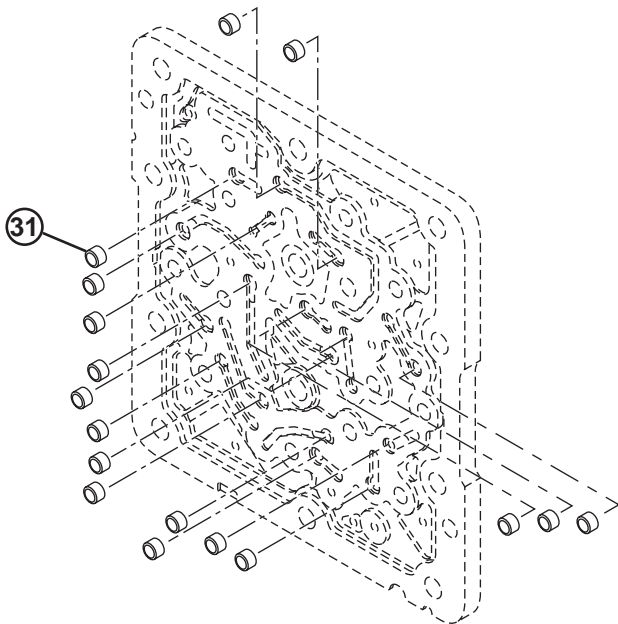
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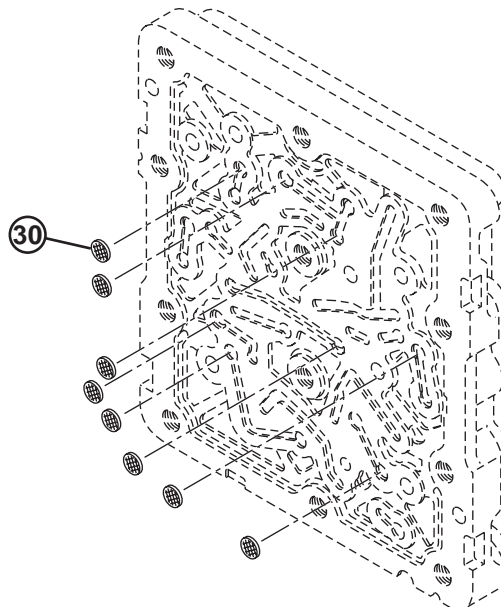
A



B



C



D

T143486

30—Filter (17 used)

31—Shuttle Valve (21 used)

32—Spring (4 used)

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OOU1026,0000028 -19-02MAR06-3/4

Install hose and tube adapters and tighten.

Specification

Hose and Tube Adapter-to-Pilot

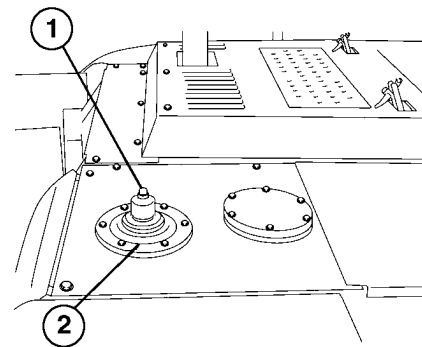
Signal Manifold—Torque 39 N•m
347 lb-in.

OUO1026,0000028 -19-02MAR06-4/4

Control Valve Remove and Install

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Pull a vacuum in hydraulic oil tank using a vacuum pump, or drain tank. See Apply Vacuum to Hydraulic Oil Tank. (See procedure in this group.) See 240DLC Drain and Refill Capacities or 270DLC Drain and Refill Capacities. (Operator's Manual.)



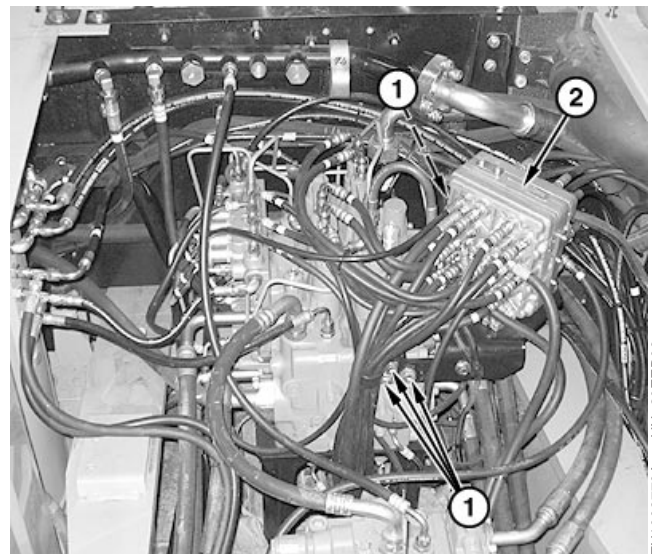
1—Pressure Release Button
2—Hydraulic Oil Tank Cover

T214924 -UN-17NOV05

OUO1073,0001FF0 -19-26APR06-1/3

3. Tag and disconnect hydraulic lines and hoses. Close all open lines and fittings using caps and plugs.
4. Disconnect electrical connectors.
5. Remove cap screws (1) and washers. Place pilot signal manifold (2) with bracket to side.
6. Attach an appropriate lifting device to control valve using lifting straps.

1—Cap Screws
2—Pilot Signal Manifold



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Continued on next page

OUO1073,0001FF0 -19-26APR06-2/3



CAUTION: Heavy component; use an appropriate lifting device.

Specification

Control Valve—Approximate
Weight..... 216 kg
475 lb

7. Remove cap screws (1), washers (2), and spacers (3). Remove control valve.
8. Replace parts as necessary.
9. Install in reverse order.
10. Tighten cap screws (1) to specification.

Specification

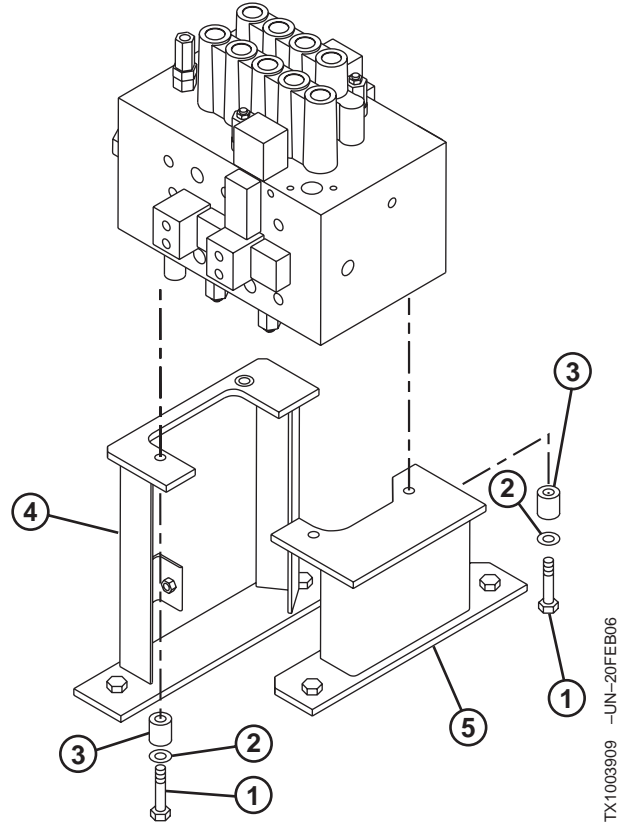
Mounting Bracket-to-Control
Valve Cap Screw—Torque..... 270 N•m
200 lb-ft

11. Install pilot signal manifold with bracket. Tighten cap screws to specification.

Specification

Pilot Signal Manifold
Bracket-to-Control Valve Cap
Screw—Torque..... 140 N•m
103 lb-ft

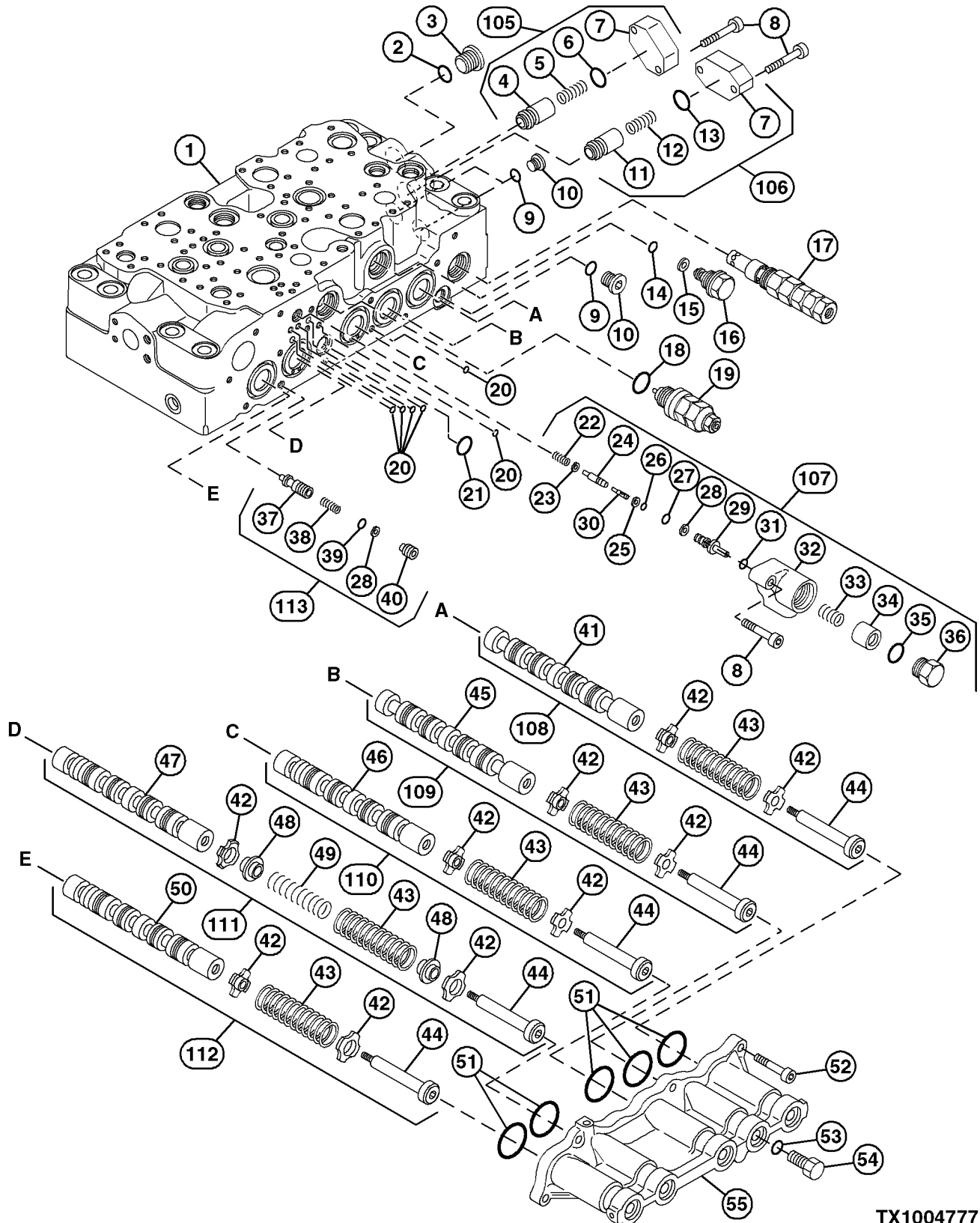
12. Connect hydraulic hoses and lines. See Hydraulic System Line Connections. (Group 9025-15.)
13. Connect electrical connectors. See Cab Harness (W1) Component Location Diagram. (Group 9015-10.)
14. Check Hydraulic Oil. (Operator's Manual.)
15. Do Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)



- 1—Cap Screw (4 used)
2—Washer (4 used)
3—Spacer (4 used)
4—Front Mounting Bracket
5—Rear Mounting Bracket

OUO1073,0001FF0 -19-26APR06-3/3

Left Control Valve (5-Spool) Disassemble and Assemble



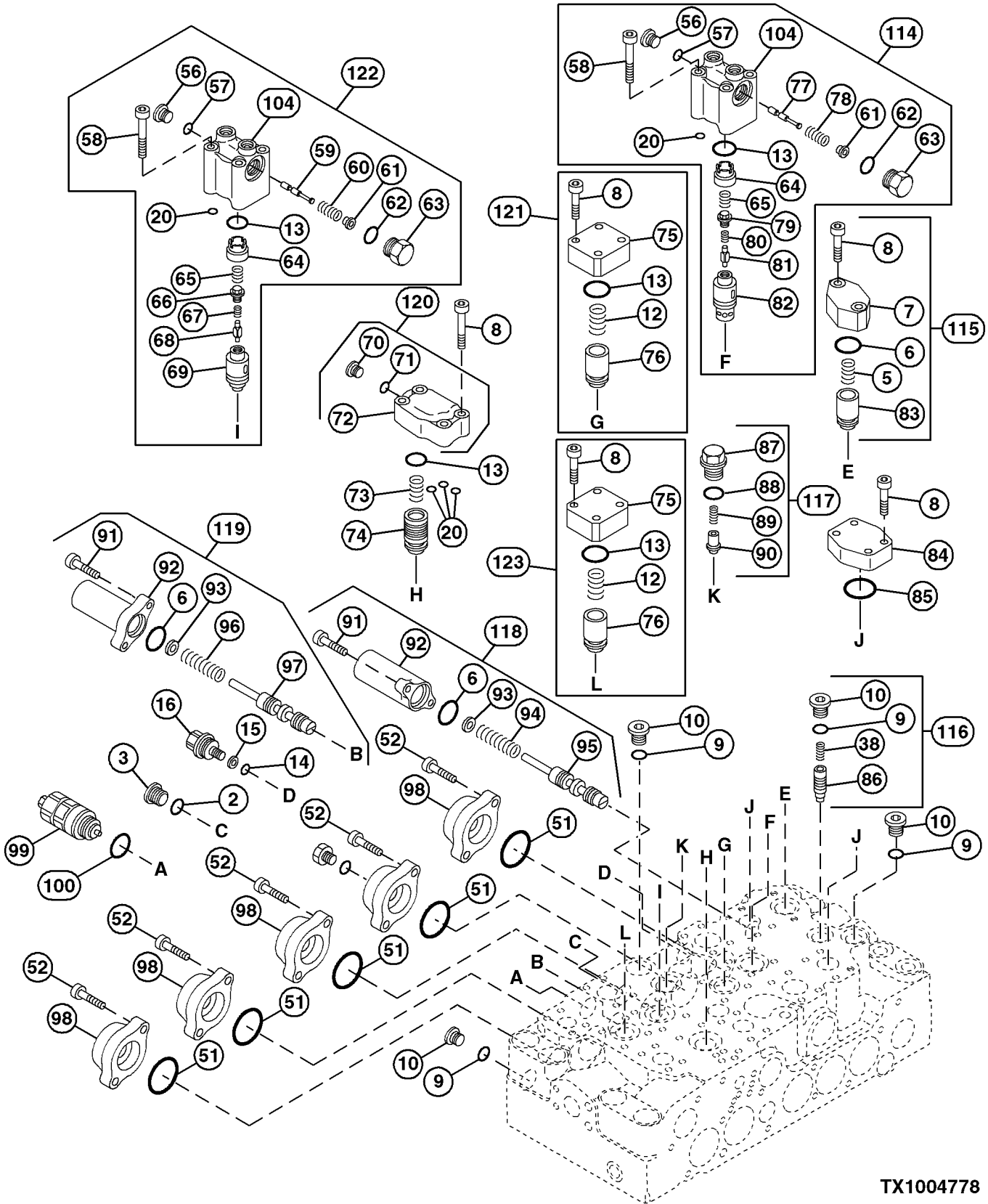
TX1004777

Control Valve End Caps 5-Spool Side
Continued on next page

RO33873.0000A7C -19-26APR06-1/8

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TX1004777 -UN-26APR06



TX1004778

TX1004778 -UN-25APR06

Continued on next page

RO33873,0000A7C -19-26APR06-2/8

1—Housing	33—Spring	68—Poppet	100—O-Ring
2—O-Ring	34—Piston	69—Poppet	104—Body
3—Plug	35—O-Ring	70—Plug	105—Auxiliary Flow Combiner Check Valve
4—Poppet	36—Plug	71—O-Ring	106—Main Relief Valve Isolation Check Valve
5—Spring	37—Poppet	72—Flange	107—Arm Reduced Leakage Valve
6—O-Ring (3 used)	38—Spring	73—Spring	108—Left Travel Spool
7—Flange	39—O-Ring	74—Poppet	109—Auxiliary Spool
8—Cap Screw (22 Used)	40—Spacer	75—Flange (2 Used)	110—Boom II Spool
9—O-Ring (4 Used)	41—Left Travel Spool	76—Poppet (2 Used)	111—Arm I Spool
10—Plug (4 Used)	42—Spring Seat (10 Used)	77—Auxiliary Flow Rate Spool	112—Swing Spool
11—Poppet	43—Spring (5 Used)	78—Spring	113—Check Valve
12—Spring (2 Used)	44—Bolt (5 Used)	79—Plug	114—Auxiliary Flow Rate Control Valve
13—O-Ring (5 Used)	45—Auxiliary Spool	80—Spring	115—Auxiliary Flow Combiner Valve Check Valve
14—O-Ring	46—Boom 2 Spool	81—Poppet	116—Lift Check (Left Travel Power Passage Check Valve)
15—Backup Ring	47—Arm 1 Spool	82—Poppet	117—Dig Regenerative Check Valve
16—Plug	48—Spring Seat (2 Used)	83—Poppet	118—Auxiliary Flow Combiner Valve
17—Main Relief and Power Digging Valve	49—Spring	84—Cover (2 Used)	119—Dig Regenerative Valve
18—O-Ring	50—Swing Spool	85—O-Ring (2 Used)	120—Arm Reduced Leakage Valve
19—Arm Out Circuit Relief and Anticavitation Valve (2 Used)	51—O-Ring (10 Used)	86—Poppet	121—Lift Check (Boom 2 Power Passage)
20—O-Ring (5 Used)	52—Cap Screw (16 Used)	87—Plug	122—Arm 1 Flow Rate Control Valve
21—O-Ring	53—O-Ring	88—O-Ring	123—Lift Check (Swing Neutral Passage)
22—Spring	54—Plug	89—Spring	
23—Seat	55—Cap	90—Poppet	
24—Poppet	56—Plug (2 Used)	91—Socket Bolt (4 Used)	
25—Backup Ring	57—O-Ring (2 Used)	92—Cap (2 Used)	
26—O-Ring	58—Cap Screw (8 Used)	93—Spring Seat (2 Used)	
27—O-Ring	59—Arm 1 Flow Rate Spool	94—Spring	
28—Backup Ring	60—Spring	95—Auxiliary Flow Combiner Spool	
29—Sleeve	61—Spring Seat (2 Used)	96—Spring	
30—Spool	62—O-Ring (2 Used)	97—Dig Regenerative Spool	
31—O-Ring	63—Plug (2 Used)	98—Cap (4 Used)	
32—Body	64—Sleeve (2 Used)	99—Arm In Circuit Relief and Anticavitation Valve	
	65—Spring (2 Used)		
	66—Plug		
	67—Spring		

1. Remove cap screws (52) and bottom pilot caps (98).

2. Remove cap screws (52) and top pilot cap (55).

3. **Spool—5 Spool (108—112):**

IMPORTANT: The spool (108—112) are select fitted to bores in housing and are a different design for each function. Spools must be installed into the same bores from which they were removed for proper operation of machine.

NOTE: Hold spool in a vise by the spool end between wooden blocks.

a. Remove spools (108—112).

b. Disassemble control valve spools.

c. Inspect control valve spools for wear and damage.

d. Replace parts as necessary.

e. Assemble in reverse order.

- f. Tighten cap screws (44) to specification.

Specification

Cap Screw-to-Control Valve	
Spool—Torque.....	15 N•m 132 lb-in.

NOTE: Apply clean hydraulic oil to spools before installation.

- g. Install spools (108—112) into housing (1) while rotating them slowly.
- h. After installing spools into housing, push them by hand to confirm smoothness.

4. Dig Regenerative Valve (119):

- a. Remove cap screws (91) and parts (92, 6, 93, 96 and 97).
- b. Inspect parts for wear and damage.
- c. Replace parts as necessary.
- d. Assemble in reverse order.
- e. Tighten cap screws (91) to specification.

Specification

Dig Regenerative	
Valve-to-Housing Cap Screw—	
Torque.....	11 N•m 84 lb-in.

5. Lift Check (Left Travel Neutral Passage) (116):

- a. Remove plug (10) O-ring (9), spring (38) and poppet (86).
- b. Inspect parts for wear and damage.
- c. Replace parts as necessary
- d. Assemble in reverse order.

- e. Install plug (10) and tighten to specification.

Specification

Left Travel Neutral	
Passage-to-Housing Lift Check	
Plug—Torque.....	76 N•m 56 lb-ft

6. Auxiliary Flow Combiner Valve Check Valve (115):

- a. Remove parts (8, 7, 6, 5 and 83).
- b. Inspect parts for wear and damage.
- c. Assemble in reverse order.
- d. Install flange (7) and tighten cap screws (8) to specification.

Specification

Auxiliary Flow Combiner Valve	
Check Valve-to-Housing Cap	
Screw—Torque.....	61 N•m 46 lb-ft

7. Arm Reduced Leakage Valve (120):

- a. Remove cap screws (8) and flange (72).
- b. Remove spring (73) and poppet (74).
- c. Inspect parts for wear and damage.
- d. Replace parts as necessary.
- e. Assemble in reverse order.
- f. Install flange (72) and tighten cap screws (8).

Specification

Arm Reduced Leakage	
Valve-to-Housing Cap Screw—	
Torque.....	61 N•m 46 lb-ft

Continued on next page

RO33873,0000A7C -19-26APR06-4/8

8. Lift Check (Boom 2 Power Passage) (121):

- a. Remove cap screws (8) and flanges (75).
- b. Remove O-ring (13), spring (12) and poppet (76).
- c. Inspect parts for wear and damage.
- d. Replace parts as necessary.
- e. Assemble in reverse order.
- f. Install flanges (75) and tighten cap screws (8) to specification.

Specification

Power Passage-to-Housing	
Cap Screw—Torque	61 N•m 46 lb-ft

9. Lift Check (Swing Neutral Passage) (123):

- a. Remove cap screws (8) and flanges (75).
- b. Remove O-ring (13), spring (12) and poppet (76).
- c. Inspect parts for wear and damage.
- d. Replace parts as necessary.
- e. Assemble in reverse order.
- f. Install flanges (75) and tighten cap screws (8) to specification.

Specification

Neutral Passage-to-Housing	
Cap Screw—Torque	61 N•m 46 lb-ft

10. Auxiliary Flow Rate Control Valve (114) and Arm I Flow Rate Control Valve (122):

- a. Remove cap screws (58) and housing (104).

- b. Loosen plugs (56 and 63) from bodies (104).
- c. Remove O-rings (20 and 13).
- d. Remove plugs (63), spring seats (61), springs (60 and 78) and spools (59 and 77).
- e. Remove plugs (56).
- f. Remove sleeves (64), springs (65), plugs (66 and 79), springs (67 and 80) and poppets (68, 69, 81, and 82) from housing (1).
- g. Inspect parts for wear and damage.
- h. Replace parts as necessary.
- i. Assemble in reverse order.
- j. Install housing (104) and tighten cap screws (58) to specification.

Specification

Flow Rate Valve	
Housing-to-Housing Cap	
Screw—Torque	61 N•m 46 lb-ft

- k. Tighten plug (63) to specification.

Specification

Flow Rate Valve Housing	
Plug—Torque	98 N•m 72 lb-ft

11. Arm Reduced Leakage Valve (107):

- a. Remove plug (36).
- b. Remove cap screws (8) and body (32).
- c. Remove parts (33—35).
- d. Remove parts (22—31).
- e. Inspects parts for wear and damage.

33
3360
63

f. Replace parts as necessary.

g. Assemble in reverse order.

h. Apply petroleum jelly to valve seat (23) and spring (22) to hold in place.

k. Tighten plug (36) to specification.

Specification

Plug-to-Arm Reduced Leakage

Valve—Torque 108 N•m
80 lb-ft

IMPORTANT: Install spool (30) with the hole side towards poppet (24) to ensure proper operation of valve.

i. Install plug (36) loosely.

j. Tighten cap screws (8) to specification.

Specification

Arm Reduced Leakage Valve

Body-to-Housing Cap Screw—

Torque..... 62 N•m
46 lb-ft

Continued on next page

RO33873,0000A7C -19-26APR06-6/8

12. Main Relief and Power Digging Valve (17)

NOTE: Disassemble valve for cleaning and inspection only. Valve is serviced as an assembly.

- Disassemble parts (A—Q).
- Inspect parts for wear and damage.
- If any part of valve is damaged, replace valve as an assembly.
- Tighten nuts (D and I) to specification.

Main Relief Valve—Specification

Main Relief Valve 27 mm Nut	
(D)—Torque.....	64 N•m 47 lb-ft
Main Relief Valve 32 mm Nut	
(I)—Torque	83 N•m 61 lb-ft

- Tighten valve cartridge (J) to specification.

Specification

Main Relief Valve	
Cartridge-to-Housing—Torque	83 N•m 61 lb-ft

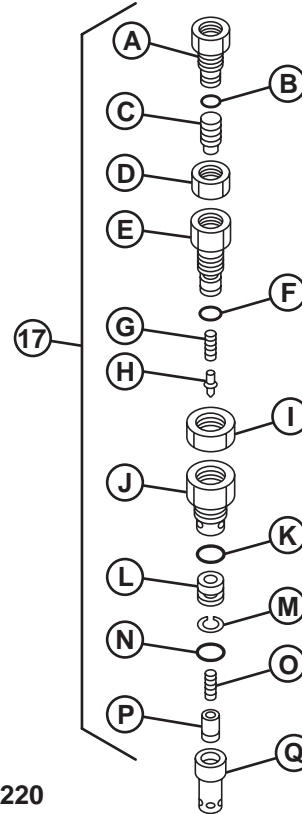
- Check and adjust pressure setting for system relief valve and power boost. See Main Relief and Power Digging Valve Test and Adjustment. (Group 9025-25.)

- Install top pilot cap (55) and tighten cap screws (52) to specification.

Specification

Top Pilot Cap-to-Housing Cap	
Screw—Torque.....	42 N•m 32 lb-ft

- Install bottom pilot caps (98) and tighten cap screws (52).

**TX1005220**

- A—First Adjusting Plug**
B—O-Ring
C—Piston
D—Nut
E—Second Adjusting Plug
F—O-Ring
G—Pilot Poppet Spring
H—Pilot Poppet
I—Nut
J—Cartridge
K—O-Ring
L—Pilot Poppet Seat
M—Backup Ring
N—O-Ring
O—Main Poppet Spring
P—Main Poppet
Q—Main Poppet Seat

TX1005220 -UN-24MAR06

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65

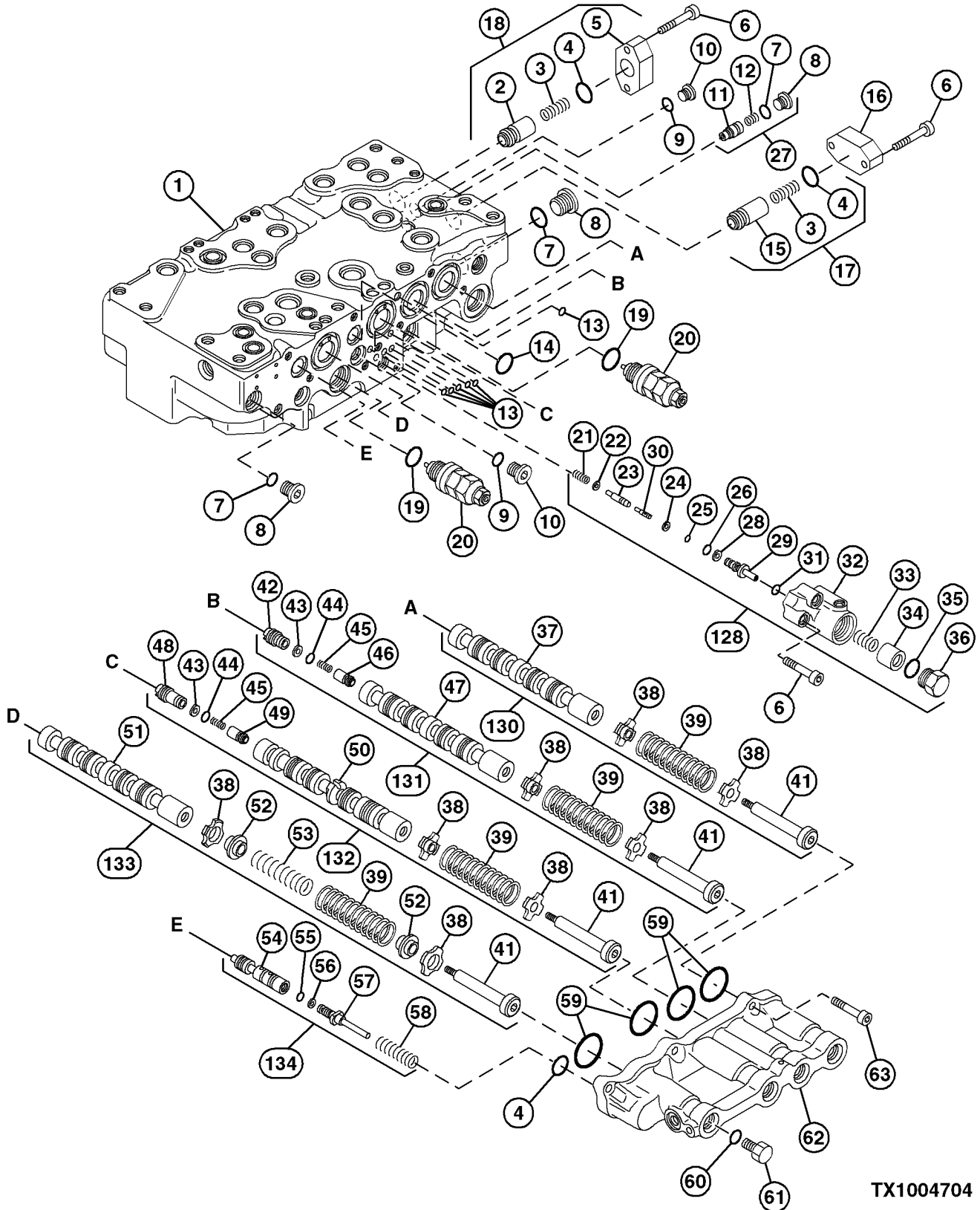
Hydraulic System

Specification

Bottom Pilot Caps-to-Housing	
Cap Screw—Torque	42 N•m
	32 lb-ft

RO33873,0000A7C -19-26APR06-8/8

Right Control Valve (4-Spool) Disassemble and Assemble

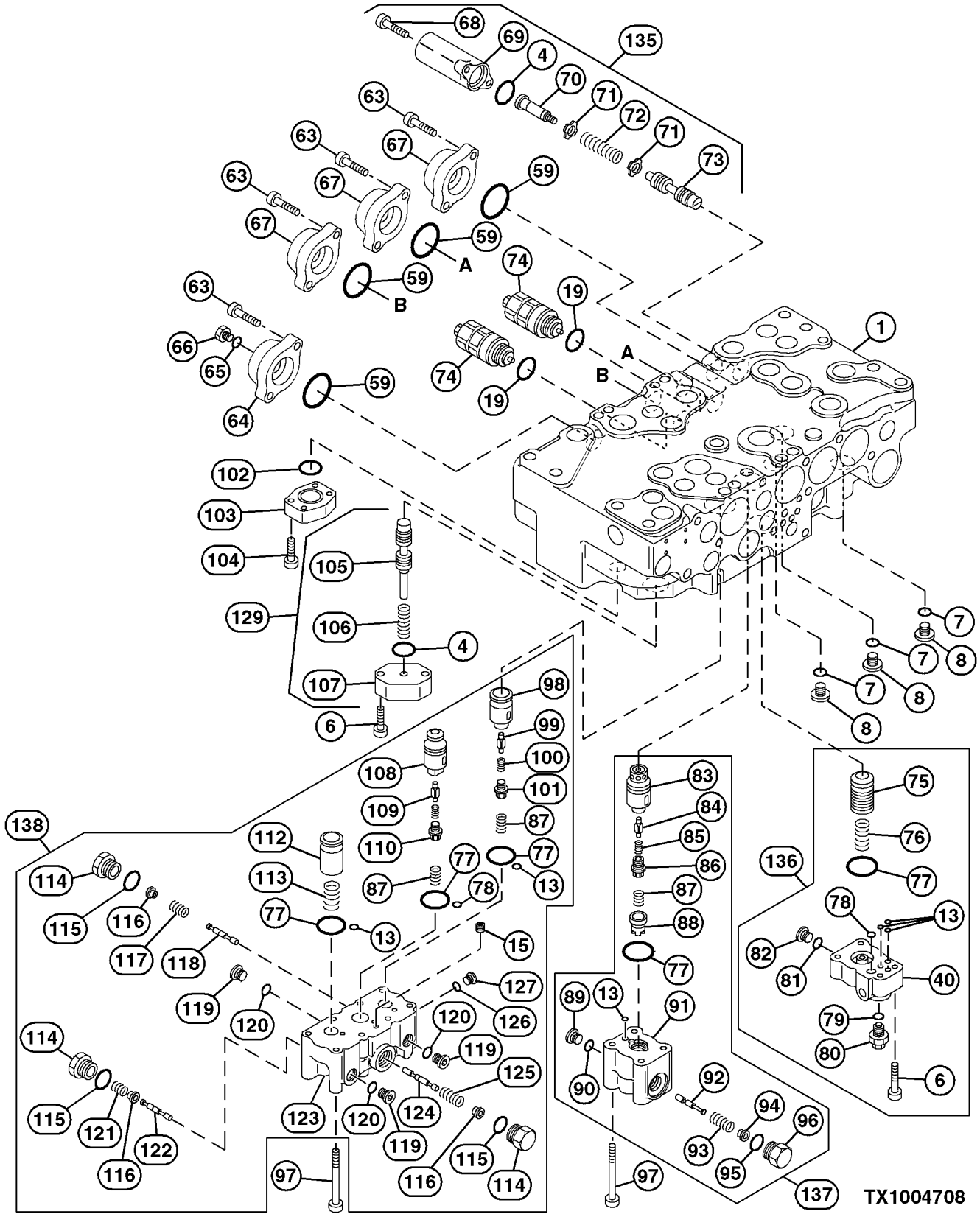


TX1004704

4-Spool Control Valve

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OUC6037,00006B9 -19-26APR06-1/6



Control Valve End Caps (4-Spool Side)

TX1004708

TX1004708 -UN-16MAR06

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OUC6037.00006B9 -19-26APR06-2/6

1—Housing	34—Piston	72—Spring	106—Spring
2—Poppet	35—O-Ring	73—Travel Flow Combiner	107—Flange
3—Spring (2 used)	36—Plug	Spool	108—Poppet
4—O-Ring (3 used)	37—Right Travel Spool	74—Circuit Relief and	109—Poppet
5—Flange	38—Spring Seat (8 used)	Anticavitation Valve (2	110—Spring
6—Cap Screw (13 used)	39—Spring (4 used)	Used)	111—Plug
7—O-Ring (3 used)	40—Body	75—Poppet	112—Poppet
8—Plug (3 used)	41—Cap Screw (4 used)	76—Spring	113—Spring
9—O-Ring (5 used)	42—Plug	77—O-Ring (5 Used)	114—Plug (3 Used)
10—Plug (3 used)	43—Backup Ring (2 used)	78—O-Ring (2 Used)	115—O-Ring (3 Used)
11—Poppet	44—O-Ring	79—O-Ring	116—Spring Seat (3 Used)
12—Spring	45—Spring	80—Manual Boom Lower	117—Spring
13—O-Ring (3 used)	46—Poppet	Screw	118—Arm 2 Flow Rate Spool
14—O-Ring	47—Bucket Spool	81—O-Ring	119—Plug (3 Used)
15—Poppet	48—Plug	82—Plug	120—O-Ring (3 Used)
16—Flange	49—Poppet	83—Poppet	121—Spring
17—Main Relief Valve Isolation	50—Boom 1 Spool	84—Poppet	122—Arm 2 Flow Rate Spool
Check Valve	51—Arm 2 Spool	85—Spring	123—Body
18—Right Travel and Bucket	52—Spring Seat (2 used)	86—Plug	124—Arm 2 Flow Rate Spool
Combined Function Check	53—Spring	87—Spring (3 Used)	125—Spring
Valve	54—Arm Regenerative Spool	88—Sleeve	126—O-Ring
19—O-Ring (2 used)	55—O-Ring	89—Plug	127—Plug
20—Circuit Relief and	56—Backup Ring	90—O-Ring	128—Boom Reduced Leakage
Anticavitation Valve (2	57—Arm Regenerative Spool	91—Body	Valve
used)	58—Spring	92—Bucket Flow Rate Spool	129—By-Pass Shut-Off Valve
21—Spring	59—O-Ring (8 Used)	93—Spring	130—Right Travel Spool
22—Washer	60—O-Ring	94—Spring Seat	131—Bucket Spool
23—Poppet	61—Plug	95—O-Ring	132—Boom 1 Spool
24—Backup Ring	62—Top Pilot Cap	96—Plug	133—Arm 2 Spool
25—O-Ring	63—Cap Screw (14 Used)	97—Cap Screw (12 Used)	134—Arm Regenerative Valve
26—O-Ring	64—Bottom Pilot Cap	98—Poppet	135—Travel Flow Combiner
27—Arm Regenerative Circuit	65—O-Ring	99—Poppet	Valve
Check Valve	66—Plug	100—Spring	136—Boom Reduced Leakage
28—Backup Ring	67—Cap (3 Used)	101—Plug	Valve
29—Sleeve	68—Cap Screw (2 Used)	102—O-Ring	137—Bucket Flow Rate
30—Spool	69—Cap	103—Cap	Control Valve
31—O-Ring	70—Cap Screw	104—Cap Screw (4 Used)	138—Arm 2 Flow Rate Control
32—Body	71—Spring Seat (2 Used)	105—By-Pass Shut-Off Spool	Valve
33—Spring			

1. Remove cap screws (63), top pilot cap (62) and O-rings (59) from housing (1).
2. Remove cap screws (63) and bottom pilot caps (67) from housing (1).

3. Spool—4 Spool (130—133):

NOTE: When disassembling spools (131, and 132), heat plugs (46, 48, and 49) to 200—300 °C (392—482 °F) to melt thread lock and sealer.

IMPORTANT: The spools (130—133) are select fit to bores in housing and are a different design for each function. Spools must be installed into same bores from which they were removed for proper operation of machine.

- a. Remove spools (130—133).

NOTE: Hold the spool in a vise by the spool end, using wooden blocks.

- b. Remove cap screws (41) and spools.
- c. Heat plugs (46, 48, and 49) with heat gun to melt thread lock and sealer and remove plugs.
- d. Inspect parts for wear and damage.
- e. Replace parts as necessary.
- f. For right travel spool (130) and arm 2 spool (133); install and tighten cap screws (41) to specification.

Specification

Cap Screw-to-Control Valve	
Spool—Torque.....	15 N•m 11 lb-ft

- g. For bucket and boom 1 spool (131 and 132):

Apply thread lock and sealer (high strength) to plugs (46, 48, and 49).

- h. Install plugs (46, 48, and 49) onto spool (131 and 132) and tighten to specification.

Specification

Plugs-to-Control Valve Spool—	
Torque.....	15 N•m 11 lb-ft

- i. Install cap screw (41) into spool and tighten to specification.

Specification

Cap Screw-to-Control Valve	
Spool—Torque.....	15 N•m 11 lb-ft

NOTE: Apply hydraulic oil to spools before installation.

- j. Install spools (130—133) into housing (1) while rotating them slowly.

IMPORTANT: After installing spool (130—133) into housing (1), push them by hand to confirm smoothness.

4. Travel Flow Combiner Valve (135):

- a. Remove cap screws (68) and cap (69).
- b. Remove parts (4,70—72).
- c. Inspect parts for wear and damage.
- d. Replace parts as necessary.
- e. Assemble in reverse order.
- f. Tighten cap screw (70) to specification.

Specification

Cap Screw-to-Flow Combiner	
Valve Spool—Torque.....	11 N•m 7 lb-ft

- g. Install spool (73), cap (69) and tighten cap screws (68) to specification.

Specification

Cap-to-Housing Cap Screw—	
Torque.....	10 N•m 7 lb-ft

5. Arm Regenerative Valve (134):

- a. Remove parts (4, 54—58).
- b. Inspect parts for wear and damage.
- c. Replace parts as necessary.
- d. Assemble in reverse order.

- e. Install parts (4, 54—58).
- 6. Arm 2 Flow Rate Control Valve (138):**
- a. Remove cap screws (97) and body (123).
 - b. Remove O-rings (77, 13) and poppet (15).
 - c. Remove plugs (114), spring seats (116), springs (117, 121, 125) and spools (118, 122, 124).
 - d. Remove plugs (119) and (127).
 - e. Remove spring (113) and poppet (112).
 - f. Remove springs (87) and poppets (98, 108).
Remove plugs (101, 111), springs (100, 110) and poppets (99, 109) from poppets (98, 108).
 - g. Inspect parts for wear and damage.
 - h. Replace parts as necessary.
 - i. Install in reverse order and loosely install plugs.
 - j. Install body (123) to housing (1) using cap screws (97). Tighten to specification.

Specification	
Arm 2 Flow Rate Control Valve	
Body-to-Housing Cap Screw—	
Torque.....	61 N•m 45 lb-ft

- 7. Boom Reduced Leakage Valve (128):**
- a. Remove plug (36).
 - b. Remove parts (33—35).
 - c. Remove cap screws (6) and body (32).
 - d. Remove parts (21—31).
 - e. Inspect parts for wear and damage.
 - f. Replace parts as necessary.

- g. Apply petroleum jelly to washer (22) and spring (21) to hold them in place.
- h. Install spool (30), with hole side towards poppet (23).
- i. Install parts (33—35).
- j. Loosely install plug (36).
- k. Install and tighten cap screws (6) to specification.

Specification	
Boom Reduced Leakage Valve	
Body-to-Housing Cap Screw—	
Torque.....	62 N•m 46 lb-ft

- l. Tighten plug (36) to specification.

Specification	
Boom Reduced Leakage	
Valve-to-Body Plug—Torque	108 N•m 80 lb-ft

- 8. Bucket Flow Rate Valve (137):**
- a. Remove cap screws (97), housing (91), and O-ring (13).
 - b. Remove parts (89, 90, 92—96)).
 - c. Remove (83—88) from housing (1).
 - d. Inspect parts for wear and damage.
 - e. Replace parts as necessary.
 - f. Assemble in reverse order.
 - g. Install housing (91) and tighten cap screws (97) to specification.

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Specification

Bucket Flow Rate Valve Housing-to-Housing Cap Screw—Torque	61 N•m 46 lb-ft
--	--------------------

- h. Tighten plug (96) to specification.

Specification

Flow Rate Valve Housing Plug—Torque	98 N•m 72 lb-ft
--	--------------------

9. Boom Reduced Leakage Valve (136):

- Remove cap screws (6), housing (40), and O-rings (13).
- Remove parts (75—78).
- Inspect parts for wear and damage.
- Replace parts as necessary.
- Assemble in reverse order.
- Install housing (40) and tighten cap screws (6) to specification.

Specification

Boom Reduced Leakage Valve-to-Housing Cap Screw— Torque	61 N•m 46 lb-ft
---	--------------------

10. By-Pass Shut-Off Valve (129):

- Remove cap screws (6), flange (107) and O-ring (4) from housing (1).
- Remove spring (106) and spool (105).
- Inspect parts for wear and damage.
- Replace parts as necessary.
- Install O-ring (4) and parts (105—107); then tighten cap screws (6) to specification.

Specification

By-Pass Shut-Off Valve-to-Housing Cap Screw— Torque	61 N•m 46 lb-ft
---	--------------------

11. Install top pilot cap (62) and tighten cap screws (63) to specification.

Specification

Top Pilot Cap-to-Housing Cap Screw—Torque	42 N•m 32 lb-ft
--	--------------------

12. Install bottom pilot caps (64 and 67) and tighten cap screws (63) to specification.

Specification

Bottom Pilot Cap-to-Housing Cap Screw—Torque	42 N•m 32 lb-ft
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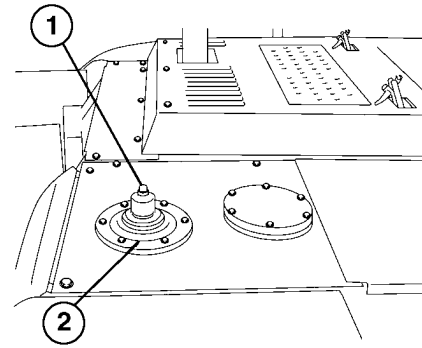
OUO6037,00006B9 -19-26APR06-6/6

Hydraulic Oil Tank Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Drain hydraulic oil tank. See 240DLC Drain and Refill Capacities or 270DLC Drain and Refill Capacities. (Operator's Manual.)
3. Remove cap screws and shields from hydraulic oil tank.
4. Tag and disconnect hydraulic lines. Close all open lines and fittings using caps and plugs.
5. Disconnect electrical connector from hydraulic oil temperature sensor.



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

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Continued on next page

OOU1073,0001FEA -19-24APR06-1/3

6. Remove cap screws (2) and washers (3).

CAUTION: Heavy component; use appropriate lifting device.

Specification

Hydraulic Oil Tank—Approximate
Weight..... 158 kg
348 lb

7. Attach appropriate lifting device to hydraulic oil tank and remove.

8. Repair or replace parts as necessary.

9. Install hydraulic oil tank (1).

10. Tighten cap screws (2).

Specification

Oil Tank-to-Frame Cap Screw—
Torque 400 N•m
295 lb-ft

11. Connect lines. See Hydraulic System Line Connections. (Group 9025-15.)

Specification

T-Bolt Type Clamp—Torque 4.4 N•m
39 lb-in.

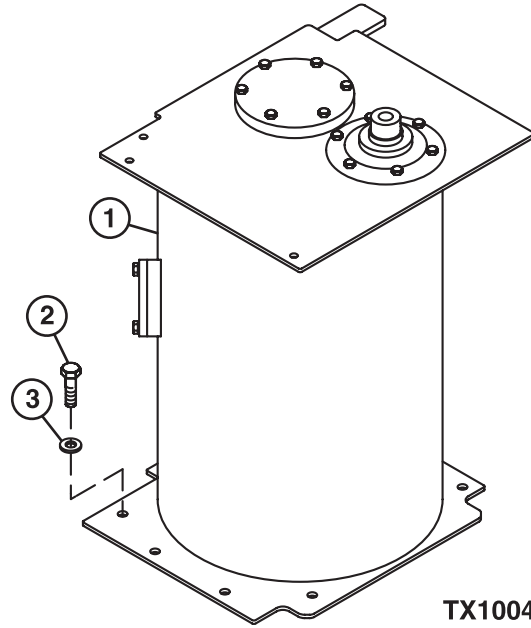
Specification

Hydraulic Oil Tank Return Line
Coupling Nuts—Torque 10.3—12.4 N•m
91—110 lb-in.

12. Connect electrical connector to hydraulic oil temperature sensor.

13. Install shields.

14. Fill hydraulic oil tank. See 240DLC Drain and Refill Capacities, 270DLC Drain and Refill Capacities, and Hydraulic Oil. (Operator's Manual.)



1—Hydraulic Oil Tank
2—Cap Screw (4 used)
3—Washer (4 used)

TX1004060

TX1004060 -UN-09MAR06

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OOU1073,0001FEA -19-24APR06-2/3

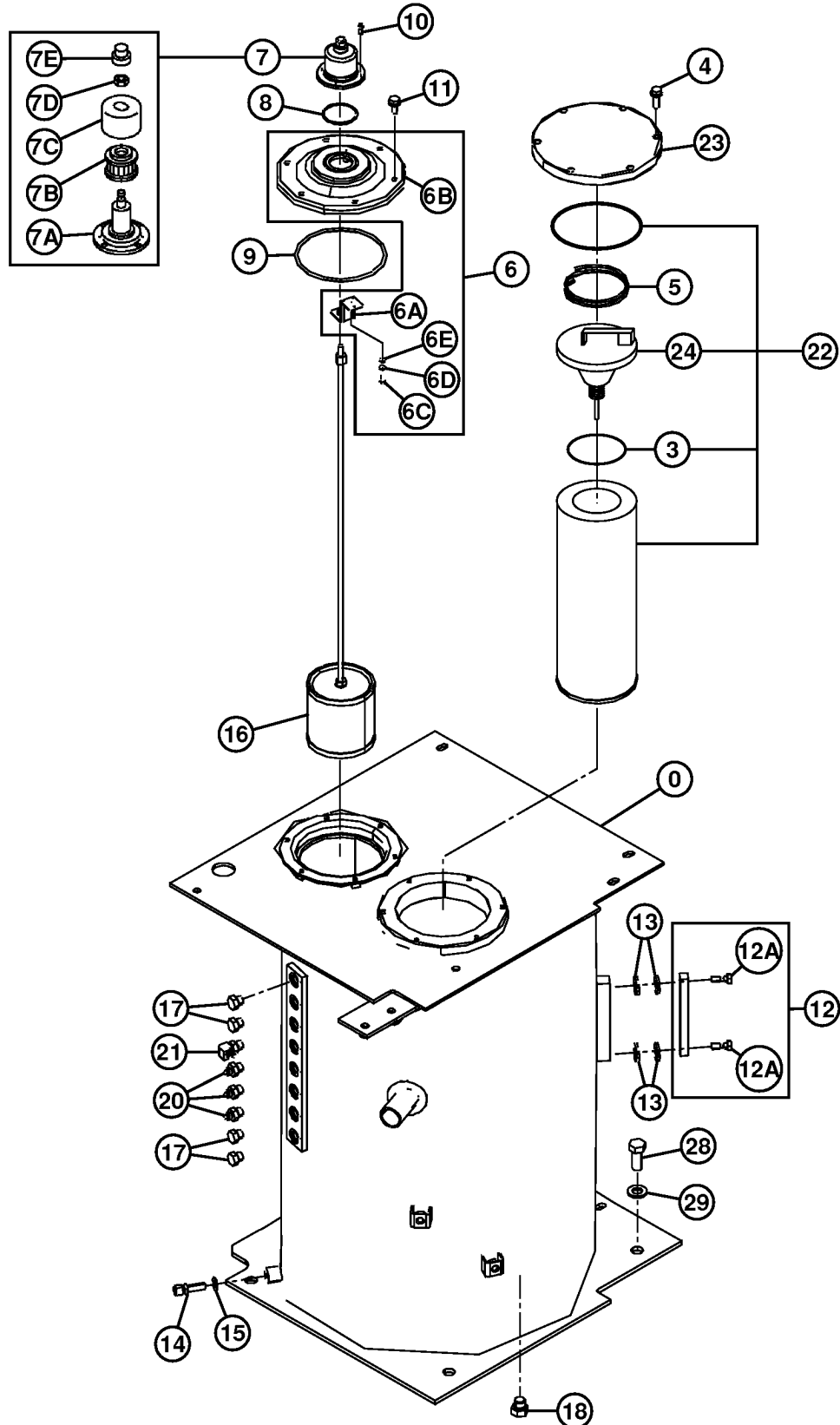
IMPORTANT: Hydraulic pump will be damaged if not filled with oil before starting. Procedure must be performed to fill pump housing whenever oil has been drained from the pump or hydraulic oil tank.

15. Do Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)

OUO1073,0001FEA -19-24APR06-3/3

33
3360
75

Hydraulic Oil Tank Disassemble and Assemble



T216143

Continued on next page

OOU1073,0001FE9 -19-25APR06-1/2

0—Hydraulic Oil Tank	7—Filter	11—Cap Screw (6 used)	18—Plug and O-Ring
3—O-Ring	7A—Housing	12—Sight Glass	20—Adapter Fitting and O-Ring (3 used)
4—Cap Screw (6 used)	7B—Filter Element	12A—Cap Screws	21—Elbow Fitting and O-Ring
5—Spring	7C—Cover	13—Washers	22—Filter Element
6—Cover Assembly	7D—Nut	14—Hydraulic Oil Temperature Sensor	23—Cover
6A—Bracket	7E—Cap	15—Gasket	24—Grip
6B—Cover	8—Packing	16—Suction Strainer and Rod	28—Cap Screw (4 used)
6C—Cap Screw	9—O-Ring	17—Plug and O-Ring (4 used)	29—Washer (4 used)
6D—Washer	10—Screw (4 used)		
6E—Washer			

1. Tighten cap screws (4 and 11).

Specification

Covers-to-Hydraulic Oil Tank	
Cap Screws—Torque	49 N•m 36 lb-ft

2. Adjust the length of rod on suction strainer (16).

Specification

Suction Strainer Rod (Top of Rod-to-Bottom of Strainer)—	
Length	869 mm 34.2 in

Specification

Suction Strainer Rod (Top of Rod-to-Top of First Nut)—	
Length	20 mm 0.79 in.

3. Tighten nuts on suction strainer rod.

Specification

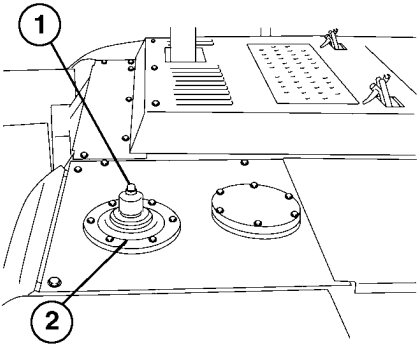
Suction Strainer Rod Nuts—	
Torque.....	17 N•m 153 lb-in.

OUC1073,0001FE9 -19-25APR06-2/2

Oil Cooler Bypass Valve Remove and Install

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

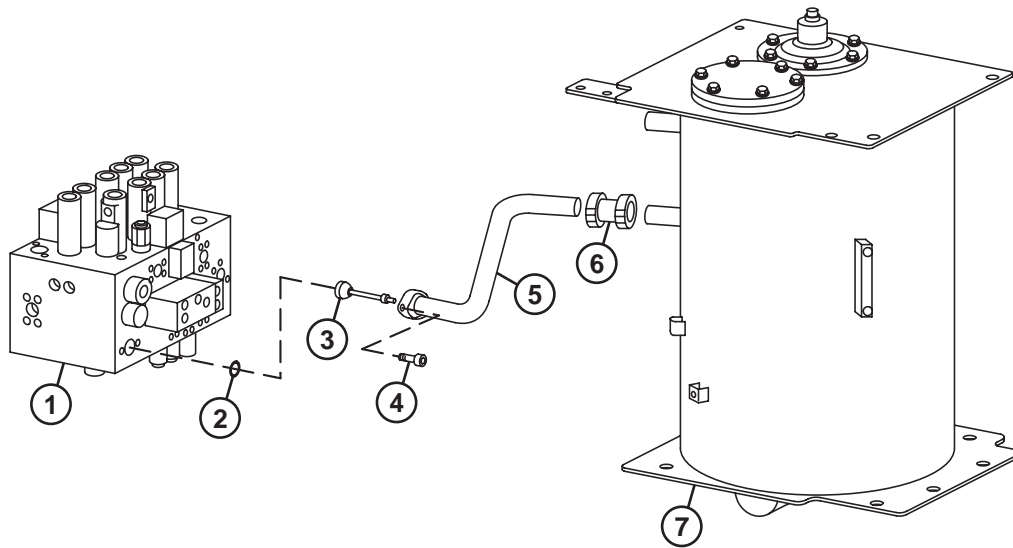
1. Push pressure release button (1).
2. Pull a vacuum in hydraulic oil tank using a vacuum pump or drain tank. See Apply Vacuum to Hydraulic Oil Tank. (See procedure in this group.) See 240DLC Drain and Refill Capacities. (Operator's Manual.) or 270DLC Drain and Refill Capacities. (Operator's Manual.)



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

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Continued on next page OUC1073,0001FEB -19-26APR06-1/2



TX1004061

TX1004061 -UN-09MAR06

1—Control Valve
2—O-Ring

3—Oil Cooler Bypass Valve
4—Socket Head Cap Screws

5—Hydraulic Return Line
6—Coupling

7—Hydraulic Oil Tank

3. Loosen cap screws and nuts on coupling (6).
4. Remove socket head cap screws (4) and hydraulic return line (5).
5. Remove oil cooler bypass valve (3) and O-ring (2) from control valve (1). Repair or replace as necessary.
6. Install oil cooler bypass valve (3) and O-ring (2).
7. Install control valve (1).
8. Install hydraulic line.
9. Install socket head cap screws (4). Tighten to specification.

Specification

Return Line Flange-to-Control	
Valve Socket Head Cap	
Screws—Torque	50 N•m 37 lb-ft

10. Tighten nuts on coupling.

Specification

Control Valve-to-Hydraulic Oil	
Tank Return Line Coupling	
Nuts—Torque.....	10.3—12.4 N•m 91—110 lb-in.

11. Fill hydraulic oil tank. See 240DLC Drain and Refill Capacities, 270DLC Drain and Refill Capacities, and Hydraulic Oil. (Operator's Manual.)

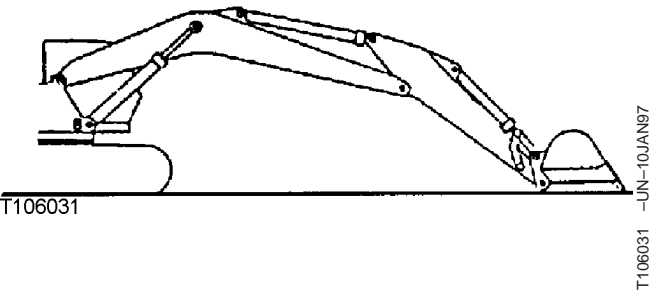
IMPORTANT: Hydraulic pump will be damaged if not filled with oil before starting. Procedure must be performed to fill pump housing whenever oil has been drained from the pump or hydraulic oil tank.

12. Do Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)

Boom Cylinder Remove and Install

NOTE: Procedure is the same for both boom cylinders.

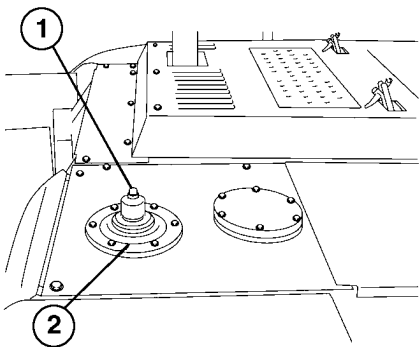
- 1. Park machine on firm, level surface.
- 2. Retract arm and bucket cylinders and lower bucket to ground.



OUO1073,0001FEF -19-25APR06-1/6

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

- 3. Push pressure release button (1).
- 4. Loosen boom cylinder hydraulic lines at frame end of boom to release any residual pressure.
- 5. Disconnect lines. Close all open lines and fittings using caps and plugs.
- 6. Disconnect lubrication line at rod end of cylinder.



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

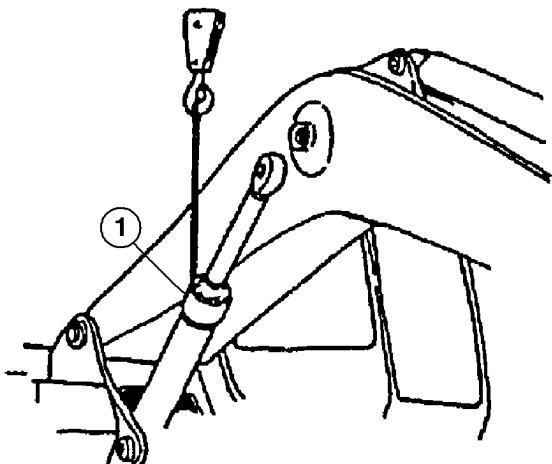
OUO1073,0001FEF -19-25APR06-2/6

CAUTION: Heavy component; use appropriate lifting device.

Specification	
Boom Cylinder—240DLC—	
Weight.....	210 kg 465 lb

Specification	
Boom Cylinder—270DLC—	
Weight.....	250 kg 550 lb

- 7. Attach appropriate lifting device to boom cylinder (1) using lifting strap.



1—Boom Cylinder

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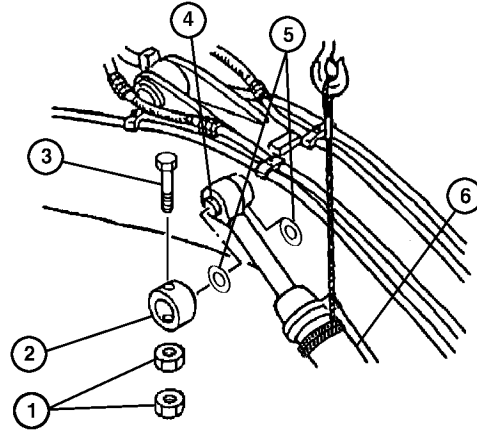
OUO1073,0001FEF -19-25APR06-3/6

8. Remove parts (1—3, and 5).

9. Push pin (4) into boom.

Lower boom cylinder (6) on floor stand.

- 1—Nut (2 used)
- 2—Retainer
- 3—Cap Screw
- 4—Boom Cylinder-to-Boom Pin
- 5—Shim (2 used)
- 6—Boom Cylinder

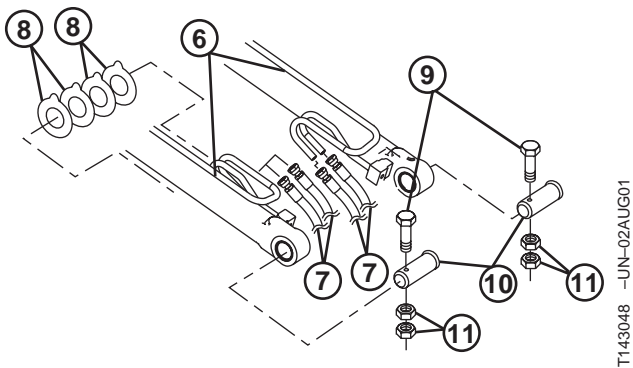


T142979 -UN-24JUL01

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OUC1073,0001FEF -19-25APR06-4/6

- 10. Disconnect hydraulic lines (7) from head end of boom cylinder (6). Close all open lines and fitting using caps and plugs.
- 11. Mark location of shims (8) to aid in assembly.
- 12. Remove parts (8—11) and remove boom cylinder (6).
- 13. Repair or replace parts as necessary.
- 14. Install shims equally on each side of cylinder head end to get the minimum amount of clearance in joint.
- 15. Align pin bores so shims are not damaged as pin (10) is installed.
- 16. Connect boom cylinder head end to frame.
- 17. Tighten nuts (11) against each other allowing cap screws (9) to be free to turn in hole.



- 6—Boom Cylinder
- 7—Rod End-to-Boom Section Bottom Port Line
—Head End-to-Boom Section Top Port Line
- 8—Shim (as required)
- 9—Cap Screw (2 used)
- 10—Boom Cylinder-to-Frame Pin (2 used)
- 11—Nut (4 used)

Specification

Boom Cylinder-to-Frame Pin
Retainer Nut—Torque 550 N•m (tighten nut against nut)
405 lb-ft (tighten nut against nut)

- 18. Connect lines. See Hydraulic System Line Connections. (Group 9025-15.)
- 19. Tighten boom cylinder hoses.

Specification

Boom Cylinder Hose Fitting—
36mm—Torque 175 N•m
130 lb-ft

Specification

Boom Cylinder Hose Fitting—
41mm—Torque 205 N•m
150 lb-ft

IMPORTANT: Trapped air suddenly compressed in a cylinder is heated and ignites the oil used for assembly causing cap seal and ring damage. Start with cylinder rod retracted and the rod end filled with clean oil. Connect the cylinder head end and lines. Operate function to slowly extend rod. Procedure will eliminate most of the air and reduce the possibility of damage.

20. Start engine.
21. Slowly extend boom cylinder (6) to align pin bores so shims (5) are not damaged as pin (4) is installed.
22. Install shims to get the minimum amount of clearance between boom and boom cylinder rod end.
23. Connect boom cylinder rod end to boom.
24. Tighten nuts (1) against each other allowing cap screw (3) to be free to turn in hole.

Specification

Boom Cylinder-to-Frame Pin
 Retainer Nut—Torque 550 N•m (tighten nut against nut)
 405 lb-ft (tighten nut against nut)

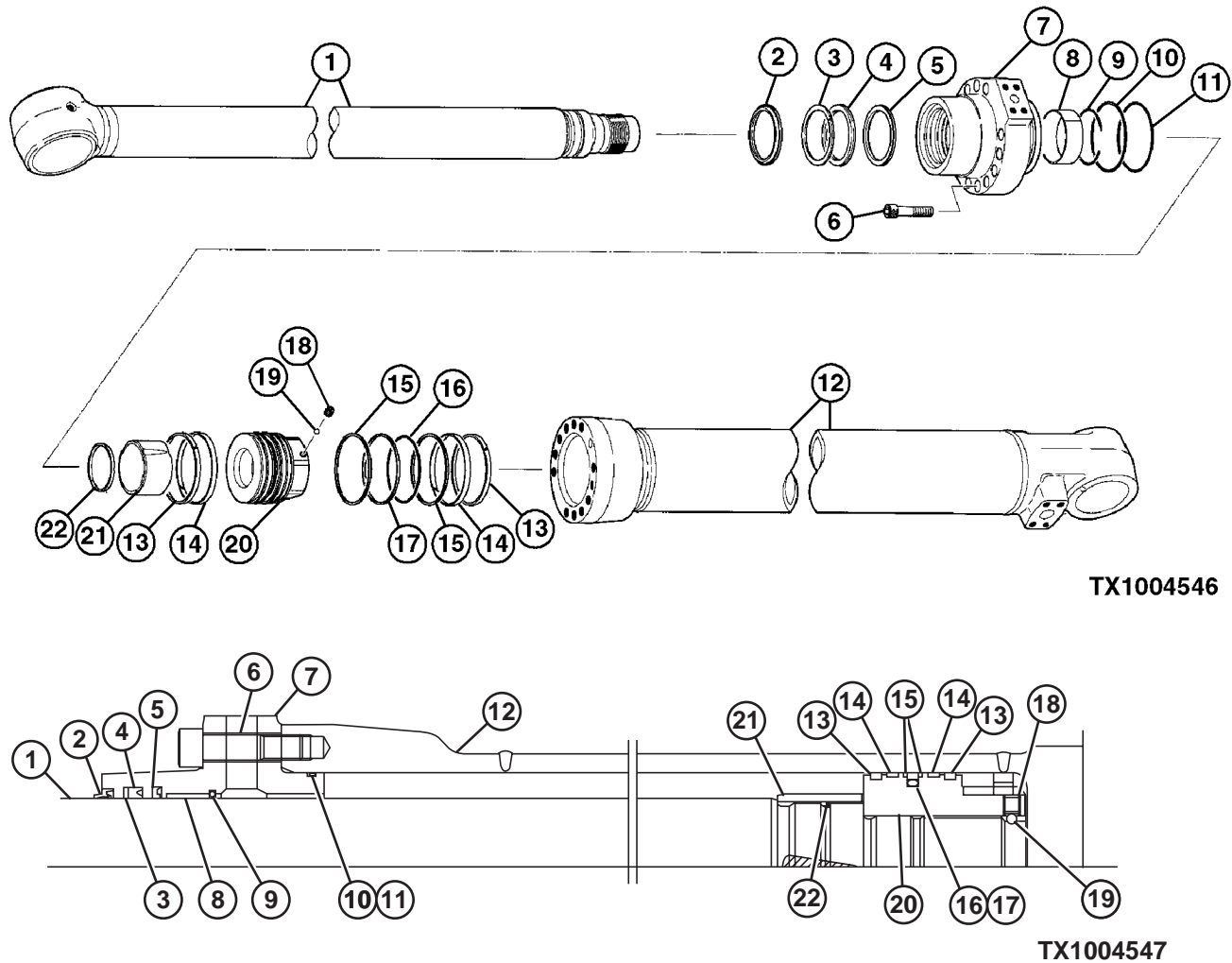
25. Connect lubrication line.

Specification

Boom Cylinder Pivot Lubrication
 Line—Torque 25 N•m
 18 lb-ft

26. Lubricate all pivot joints. See Track Adjuster, Working Tool Pivot, Swing Bearing, and Swing Bearing Gear Grease. (Operator's Manual.)
27. Bleed air from cylinder. See Hydraulic Cylinder Bleed Procedure. (Group 3360.)
28. Check hydraulic oil level. See Check Hydraulic Oil Tank Level. (Operator's Manual.)

Boom Cylinder Disassemble and Assemble—240DLC



TX1004546

TX1004547

- | | | | |
|-----------------------|-----------------|-------------------------|--------------------|
| 1—Rod | 7—Cylinder Head | 13—Slide Ring (2 used) | 18—Set Screw |
| 2—Dust Wiper | 8—Bushing | 14—Wear Ring (2 used) | 19—Ball |
| 3—Backup Ring | 9—Snap Ring | 15—Backup Ring (2 used) | 20—Piston Nut |
| 4—U-Ring | 10—Backup Ring | 16—O-Ring | 21—Cushion Bearing |
| 5—Buffer Ring | 11—O-Ring | 17—Seal Ring | 22—Cushion Seal |
| 6—Cap Screw (12 used) | 12—Barrel | | |

CAUTION: Heavy component; use appropriate lifting device.

Specification

Boom Cylinder—Approximate
Weight..... 210 kg
465 lb

1. Fasten head end of cylinder to JT30043 Cylinder Service Stand.

2. Pull rod out so piston nut is against cylinder head.
3. Connect rod to appropriate lifting device using a lifting strap.
4. Remove cap screws (6) from cylinder head (7).
5. Remove rod, cylinder head and piston nut from barrel (12).

Continued on next page

OOU1073,0001FF7 -19-25APR06-1/3

6. Install rod eye in sliding housing and install housing in JT30043 Cylinder Service Stand.
7. Make an alignment mark on piston nut (20) and rod (1).
8. Remove staked material from set screw (18) hole using a small air grinder or a drill and bit.
9. Remove set screw (18) and steel ball (19).

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

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

10. Install JTXXXX Hex Piston Nut Wrench so cap screw is tightened against side of 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 (20) using JT30043 Cylinder Service Stand.

Specification

Boom Cylinder Piston Nut—
Torque..... XXXX N•m
XXXX lb-ft

IMPORTANT: Note direction of oil groove in cushion bearing (21) and notch in cushion seal (22) for installation.

13. Remove cushion bearing (21) and cushion seal (22) from rod (1).
14. Remove components (13—17) from piston nut (20).
15. Remove cylinder head (7) from rod (1).

IMPORTANT: Note direction of dust wiper (2) and U-ring (4) for installation.

16. Remove components (2—5) and (8—11) from cylinder head (7).
17. Inspect dust seals and bushings in rod (1) and barrel (12) for wear or damage. Repair or replace parts as necessary. See Inspect Pins, Bushings and Bosses—Front Attachment. (Group 3340.)
18. Check for rod curvature on V-blocks using dial indicator.

Specification

Boom Rod—Curvature 0.5 mm per 1 m
0.020 in. per 3.25 ft

19. Repair or replace parts as necessary.
20. Install bushing (8) into cylinder head (7) using a driver disk and a press. Press to bottom of bore.
21. Install snap ring (9).
22. Install backup ring (10) and O-ring (11).
23. Install buffer ring (5).
24. Install U-ring (4) with lip towards bushing (8).
25. Install backup ring (3).
26. Install dust wiper (2) with lip towards outside of cylinder.
27. Install assembled cylinder head (7) on rod (1).
28. Install O-ring (16) and seal ring (17) to piston nut (20) using JTXXXX Installer. Adjust seal ring (17) using JTXXXX Adjustment Tool.
29. Install backup rings (15) on each side of seal ring.
30. Install wear rings (14) and slide rings (13) to piston nut (20)..

Continued on next page

OUO1073,0001FF7 -19-25APR06-2/3

IMPORTANT: Install cushion seal (22) so that notch is towards piston.

31. Install cushion seal (22).

IMPORTANT: Note direction of oil groove in cushion bearing (21) during installation.

32. Install cushion bearing (21).

33. Align marks made during disassembly and install piston nut (20).

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

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

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

screw of piston nut wrench. Tighten piston nut (20) to specification using JT30043 Cylinder Service Stand.

Specification

Boom Cylinder Piston Nut—
Torque..... XXXX N•m
XXXX lb-ft

35. Install steel ball (19) and set screw (18).

36. Stake set screw (18) in two places 90° from previous stake marks.

37. Apply clean oil to piston nut and seals. Attach appropriate lifting device to rod using a lifting strap. Carefully install piston nut, rod and cylinder head into barrel.

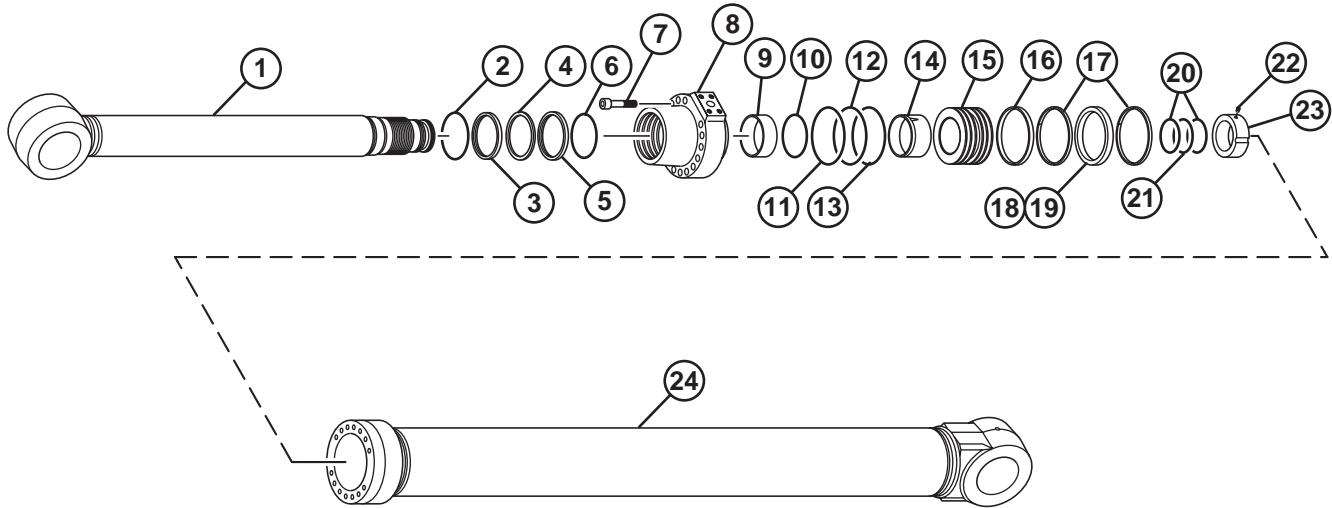
38. Install cylinder head cap screws (6). Tighten to specification.

Specification

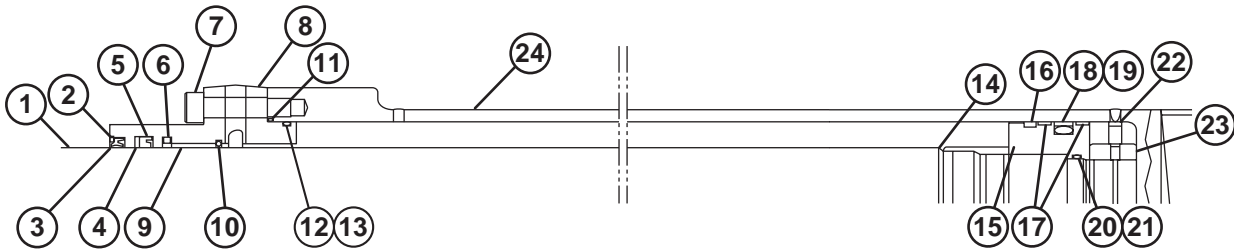
Boom Cylinder Head-to-Barrel
Cap Screw—Torque 267 N•m
197 lb-ft

OUO1073,0001FF7 -19-25APR06-3/3

Boom Cylinder Disassemble and Assemble—270DLC



TX1004562



TX1004563

- 1—Rod
- 2—Retaining Ring
- 3—Dust Wiper
- 4—Backup Ring
- 5—U-Ring
- 6—Buffer Ring

- 7—Cap Screw (14 used)
- 8—Cylinder Head
- 9—Bushing
- 10—Retaining Ring
- 11—O-Ring
- 12—Backup Ring

- 13—O-Ring
- 14—Cushion Bearing
- 15—Piston
- 16—Slide Ring
- 17—Wear Rings
- 18—Slipper Seal

- 19—Back Ring
- 20—Backup Ring
- 21—O-Ring
- 22—Set Screw
- 23—Piston Nut
- 24—Barrel

CAUTION: Heavy component; use appropriate lifting device.

3. Connect rod to appropriate lifting device using a lifting strap.
4. Remove cap screws (7) from cylinder head (8).
5. Remove rod, cylinder head and piston from barrel (24).
6. Install rod eye in sliding housing and install housing in JT30043 Cylinder Service Stand.

1. Fasten head end of cylinder to JT30043 Cylinder Service Stand.
2. Pull rod out so piston is against cylinder head.

Specification

Boom Cylinder—Approximate Weight..... 250 kg
550 lb

Continued on next page

OUC1073.0001FFE -19-25APR06-1/3

7. Make an alignment mark on piston nut (23) and rod (1).
8. Remove staked material from set screw (22) hole using a small air grinder or a drill and bit.
9. Remove set screw (22).
10. Remove piston nut (23) using JTXXXX Spanner Wrench and JT30043 Cylinder Service Stand.

Specification

Boom Cylinder Piston Nut—
Torque..... 1860 N•m
1372 lb-ft

11. Remove piston (15) using JTXXXX Piston Wrench and JT30043 Cylinder Service Stand.

Specification

Boom Cylinder Piston—Torque..... 981 N•m
724 lb-ft

IMPORTANT: Note direction of oil groove in cushion bearing (14) for installation.

12. Remove cushion bearing (14) from rod (1).
13. Remove cylinder head (8) from rod (1).
14. Remove components (16—21) from piston (15).

IMPORTANT: Note direction of dust wiper (3) and U-ring (5) for installation.

15. Remove components (2—6) and (9—13) from cylinder head (8).
16. Inspect dust seals and bushings in rod (1) and barrel (24) for wear or damage. Repair or replace parts as necessary. See Inspect Pins, Bushings and Bosses—Front Attachment (Group 3340.)
17. 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 3.25 ft

18. Repair or replace parts as necessary.
19. Install bushing (9) into cylinder head (8) using a driver disk and a press. Press to bottom of bore.
20. Install retaining ring (10).
21. Install O-ring (11).
22. Install backup ring (12) and O-ring (13) into cylinder head.
23. Install buffer ring (6).
24. Install U-ring (5) with lip towards bushing (9).
25. Install backup ring (4).
26. Install dust wiper (3) with lip towards outside of cylinder.
27. Install assembled cylinder head (8) on rod (1).
28. Install back ring (19) and slipper seal (18) to piston (15) using JTXXXX Installer. Adjust slipper seal (18) using JTXXXX Adjustment Tool.
29. Install slide rings (16), wear rings (17), backup rings (20), and O-ring (21) to piston (15).

IMPORTANT: Note direction of oil groove in cushion bearing (14) during installation.

30. Install cushion bearing (14) on rod (1).
31. Install piston (15). Tighten to specification using JTXXXX Piston Wrench and JT30043 Cylinder Service Stand.

Specification

Boom Cylinder Piston—Torque..... 981 N•m
724 lb-ft

33
3360
87

32. Align mark made during disassembly and install piston nut (23). Tighten to specification using JTXXXX Spanner Wrench and JT30043 Cylinder Service Stand.

Specification

Boom Cylinder Piston Nut—
Torque..... 1860 N•m
1372 lb-ft

33. Install set screw (22). Tighten to specification.

Specification

Set Screw—Torque 15 N•m
130 lb-in.

34. Stake set screw (22) in two places 90° from previous stake marks.

35. Apply clean oil to piston and seals. Attach appropriate lifting device to rod using a lifting strap. Carefully install piston, rod and cylinder head into barrel.

36. Install cylinder head cap screws (7). Tighten to specification.

Specification

Boom Cylinder Head-to-Barrel
Cap Screw—Torque 353 N•m
260 lb-ft

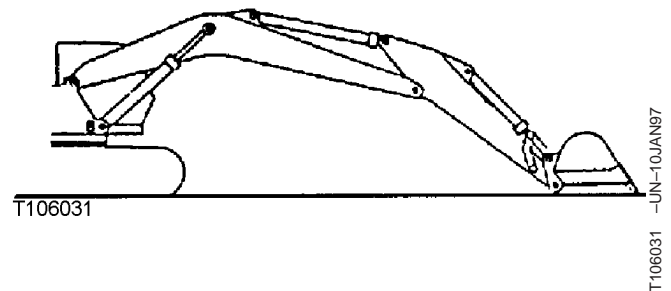
OUO1073,0001FEE -19-25APR06-3/3

Arm Cylinder Remove and Install

1. Park machine on firm, level surface.

OUO1073,0001FEE -19-27APR06-1/8

2. Retract arm and bucket cylinders and lower bucket to ground.



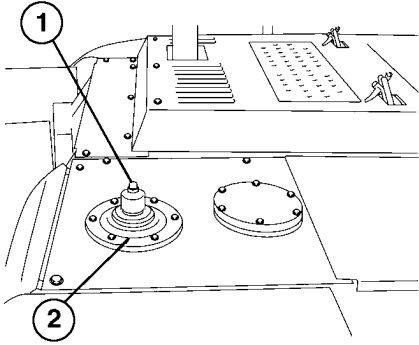
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OUO1073,0001FEE -19-27APR06-2/8



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

3. Push pressure release button (1).
4. Loosen arm cylinder hydraulic lines at frame end of boom to release any residual pressure.
5. Disconnect lines. Close all open lines and fittings using caps and plugs.



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

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OUO1073,0001FEE -19-27APR06-3/8

6. Insert wood block (3) between arm cylinder (1) and boom (2).



CAUTION: Heavy component; use appropriate lifting device.

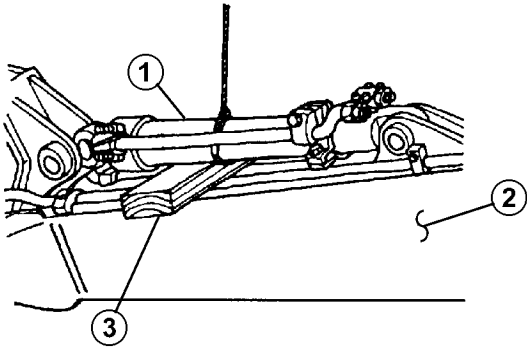
Specification

Arm Cylinder—240DLC—Weight 290 kg
640 lb

Specification

Arm Cylinder—270DLC—Weight 350 kg
770 lb

7. Attach arm cylinder to appropriate lifting device using lifting straps.



1—Arm Cylinder
2—Boom
3—Wood Block

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OUO1073,0001FEE -19-27APR06-4/8

8. **240DLC:** Remove parts (1 and 2).

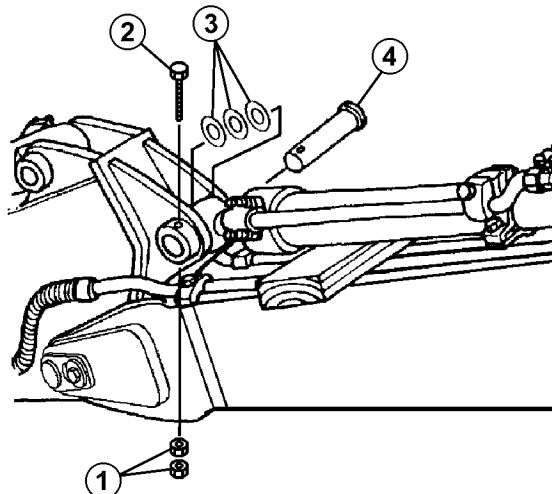
9. **270DLC:** Remove cap screw (6) and plate (5).

NOTE: Note location of shims (3) to aid in assembly.

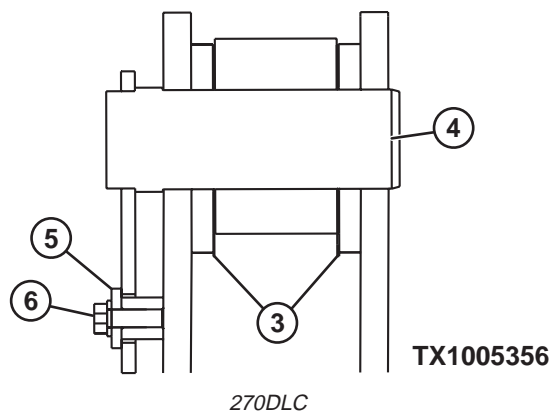
10. Push pin (4) out and remove shims.

11. Disconnect lubrication line.

- 1—Nut (2 used)
- 2—Cap Screw
- 3—Shim (as required)
- 4—Arm Cylinder-to-Arm Pin
- 5—Plate
- 6—Cap Screw



240DLC



270DLC

TX1005356

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TX1005356 -UN-30MAR06

Continued on next page

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12. **240DLC:** Remove parts (1 and 2).

13. **270DLC:** Remove cap screw (6) and plate (5).

NOTE: Note location of shims (3) to aid in assembly.

14. Push pin (4) out and remove shims.

15. Remove arm cylinder

16. Repair or replace parts as necessary.

17. Install shims equally on each side of cylinder to get minimum amount of clearance in joint. There must be some clearance in the joint.

18. Align pin bores so shims are not damaged as pin (4) is installed.

19. Connect lubrication line.

Specification

Arm Cylinder Pivot Lubrication
Line—Torque 25 N•m
18 lb-ft

20. Connect arm cylinder head end to boom.

21. **240DLC:** Tighten nuts (1) against each other allowing cap screw (2) to be free to turn in hole.

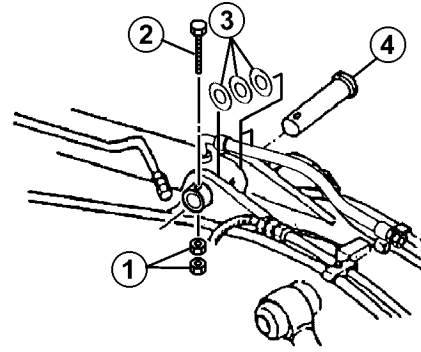
Specification

Arm Cylinder-to-Boom Pin
Retainer Nut—240DLC—Torque..... 750 N•m (tighten nut against nut)
555 lb-ft (tighten nut against nut)

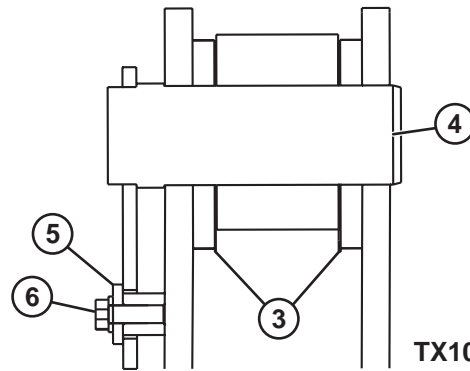
22. **270DLC:** Install plate (5) and cap screw (6). Tighten cap screw to specification.

Specification

Arm Cylinder to-Boom Pin
Retainer Cap Screw—270DLC—
Torque 400 N•m
295 lb-ft



240DLC



270DLC

- 1—Nut (2 used)
- 2—Cap Screw
- 3—Shim (as required)
- 4—Arm Cylinder-to-Boom Pin
- 5—Plate
- 6—Cap Screw

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Continued on next page

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IMPORTANT: Trapped air suddenly compressed in a cylinder is heated and ignites the oil used for assembly causing cap seal and ring damage. Start with cylinder rod retracted and the rod end filled with clean oil. Connect the cylinder head end and lines. Operate function to slowly extend rod. Procedure will eliminate most of the air and reduce the possibility of damage.

23. Slowly extend arm cylinder to align pin bores so shims are not damaged as pin is installed.

24. Connect arm cylinder rod end to arm.

25. **240DLC:** Tighten nuts (1) against each other allowing cap screw (2) to be free to turn in hole.

Specification

Arm Cylinder-to-Arm Pin Retainer

Nut—240DLC—Torque 750 N•m (tighten nut against nut)
555 lb-ft (tighten nut against nut)

26. **270DLC:** Install plate (5) and cap screw (6). Tighten cap screw to specification.

Specification

Arm Cylinder to-Arm Pin Retainer

Cap Screw—270DLC—Torque 400 N•m
295 lb-ft

27. Connect lubrication line.

Specification

Arm Cylinder Pivot Lubrication

Line—Torque 25 N•m
18 lb-ft

28. Tighten arm cylinder hoses.

Specification

Arm Cylinder Hose Fitting—

36mm—Torque 175 N•m
130 lb-ft

Specification

Arm Cylinder Hose Fitting—

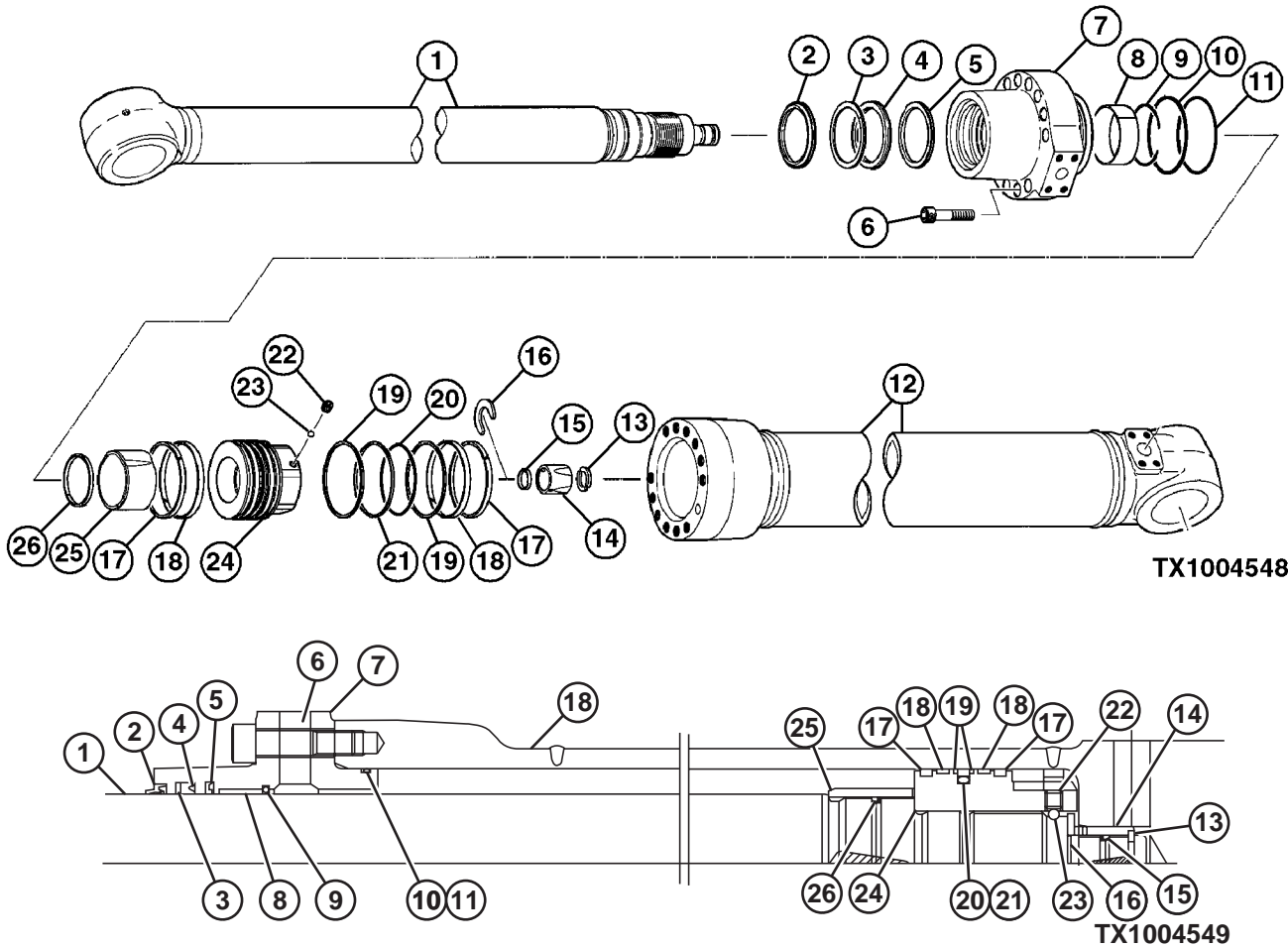
41mm—Torque 205 N•m
150 lb-ft

29. Lubricate all pivot joints. See Track Adjuster, Working Tool Pivot, Swing Bearing, and Swing Bearing Gear Grease. (Operator's Manual.)
30. Bleed air from cylinder. See Hydraulic Cylinder Bleed Procedure. (Group 3360.)
31. Check hydraulic oil level. See Check Hydraulic Oil Tank Level. (Operator's Manual.)

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3360
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Arm Cylinder Disassemble and Assemble—240DLC



- | | | | |
|-----------------------|---------------------|-------------------------|--------------------|
| 1—Rod | 8—Bushings | 15—Cushion Seal | 21—Seal Ring |
| 2—Dust Wiper | 9—Snap Ring | 16—Snap Ring | 22—Set Screw |
| 3—Backup Ring | 10—Backup Ring | 17—Slide Ring (2 used) | 23—Ball |
| 4—U-Ring | 11—O-Ring | 18—Wear Ring (2 used) | 24—Piston Nut |
| 5—Buffer Ring | 12—Barrel | 19—Backup Ring (2 used) | 25—Cushion Bearing |
| 6—Cap Screw (12 used) | 13—Stopper (2 used) | 20—O-Ring | 26—Cushion Seal |
| 7—Cylinder Head | 14—Cushion Bearing | | |

CAUTION: Heavy component; use appropriate lifting device.

Specification

Arm Cylinder—Approximate
Weight..... 290 kg
640 lb

1. Fasten head end of cylinder to JT30043 Cylinder Service Stand.

- Pull rod out so piston nut is against cylinder head.
- Connect rod to appropriate lifting device using a lifting strap.
- Remove cap screws (6) from cylinder head (7).
- Remove rod, cylinder head and piston nut from barrel (12).

Continued on next page

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IMPORTANT: Note direction of oil groove in cushion bearing (14) and notch in cushion seal (15) for installation.

- 6. Remove stopper (13), cushion bearing (14), cushion seal (15), and snap ring (16).
- 7. Install rod eye in sliding housing and install housing in JT30043 Cylinder Service Stand.
- 8. Make an alignment mark on piston nut (24) and rod (1).
- 9. Remove staked material from set screw (22) hole using a small air grinder or a drill and bit.
- 10. Remove set screw (22) and steel ball (23).

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

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

- 11. Install JTXXXX Hex Piston Nut Wrench so cap screw is tightened against side of piston nut (24) without tapped hole.
- 12. Install a piece of steel flat stock between nut and cap screw. Tighten cap screw of piston nut wrench.
- 13. Remove piston nut (24) using JT30043 Cylinder Service Stand.

Specification

Arm Cylinder Piston Nut—	
Torque.....	XXXX N•m XXXX lb-ft

IMPORTANT: Note direction of oil groove in cushion bearing (25) and notch in cushion seal (26) for installation.

- 14. Remove cushion bearing (25) and cushion seal (26) from rod (1).
- 15. Remove components (17—21) from piston nut (24).
- 16. Remove cylinder head (7) from rod (1).

IMPORTANT: Note direction of dust wiper (2) and U-ring (4) for installation.

- 17. Remove components (2—5) and (8—11) from cylinder head (7).
- 18. Inspect dust seals and bushings in rod (1) and barrel (12) for wear or damage. Repair or replace parts as necessary. See Inspect Pins, Bushings and Bosses—Front Attachment. (Group 3340.)
- 19. Check for rod curvature on V-blocks using dial indicator.

Specification

Arm Cylinder Rod—Curvature.....	0.5 mm per 1 m 0.020 in. per 3.25 ft
---------------------------------	---

- 20. Repair or replace parts as necessary.
- 21. Install bushing (8) into cylinder head (7) using a driver disk and a press. Press to bottom of bore.
- 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 towards bushing (8).
- 26. Install backup ring (3).
- 27. Install dust wiper (2) with lip towards outside of cylinder.
- 28. Install assembled cylinder head (7) on rod (1).

29. Install O-ring (20) and seal ring (21) to piston nut (24) using JTXXXX Installer. Adjust seal ring (21) using JTXXXX Adjustment Tool.

30. Install backup rings (19) on each side of seal ring.

31. Install slide rings (17) and wear rings (18) to piston nut (24).

IMPORTANT: Install cushion seal (26) so that notch is towards piston.

32. Install cushion seal (26).

IMPORTANT: Note direction of oil groove in cushion bearing (25) during installation.

33. Install cushion bearing (25).

34. Align marks made during disassembly and install piston nut (24).

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

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

35. Install JTXXXX Hex Piston Nut Wrench so cap screw is tightened against side of piston nut (24) without tapped hole. Install a piece of steel flat stock between nut and cap screw. Tighten cap screw of piston nut wrench. Tighten piston nut (24)

to specification using JT30043 Cylinder Service Stand.

Specification

Arm Cylinder Piston Nut—
Torque..... XXXX N•m
XXXX lb-ft

36. Install steel ball (23) and set screw (22).

37. Stake set screw (22) in two places 90° from previous stake marks.

IMPORTANT: Install cushion seal (15) so that notch is towards piston.

38. Install snap ring (16) and cushion seal (15).

IMPORTANT: Note direction of oil groove in cushion bearing (14) during installation.

39. Install cushion bearing (14) and stopper (13).

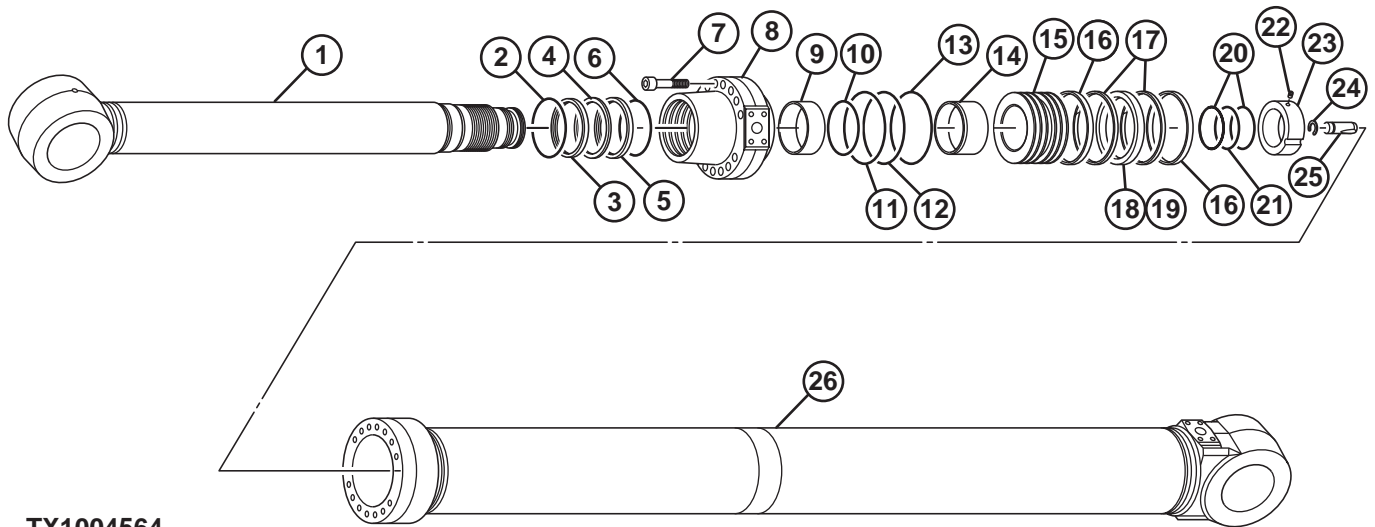
40. Apply clean oil to piston nut and seals. Attach appropriate lifting device to rod using a lifting strap. Carefully install piston nut, rod and cylinder head into barrel.

41. Install cylinder head cap screws (6). Tighten to specification.

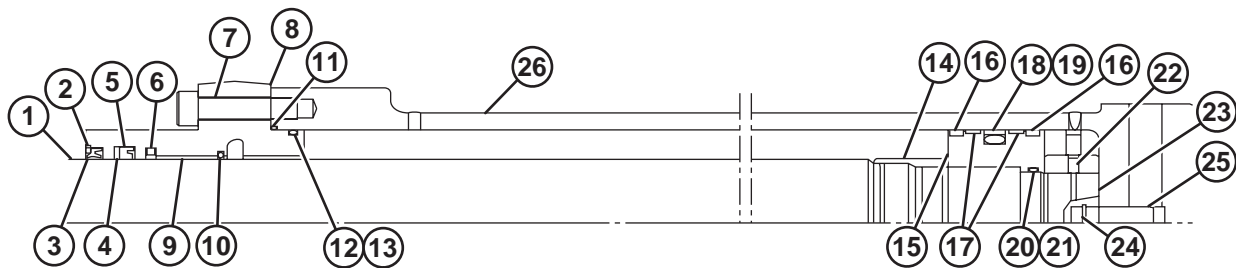
Specification

Arm Cylinder Head-to-Barrel
Cap Screw—Torque 367 N•m
270 lb-ft

Arm Cylinder Disassemble and Assemble—270DLC



TX1004564



TX1004565

- 1—Rod
- 2—Retaining Ring
- 3—Dust Wiper
- 4—Backup Ring
- 5—U-Ring
- 6—Buffer Ring
- 7—Cap Screw (14 used)

- 8—Cylinder Head
- 9—Bushing
- 10—Retaining Ring
- 11—O-Ring
- 12—Backup Ring
- 13—O-Ring
- 14—Cushion Bearing

- 15—Piston
- 16—Slide Rings
- 17—Wear Rings
- 18—Slipper Seal
- 19—Back Ring
- 20—Backup Ring

- 21—O-Ring
- 22—Set Screw
- 23—Piston Nut
- 24—Stop Ring
- 25—Cushion Plunger
- 26—Barrel



CAUTION: Heavy component; use appropriate lifting device.

Specification

Arm Cylinder—Approximate

Weight..... 350 kg
770 lb

1. Fasten head end of cylinder to JT30043 Cylinder Service Stand.
2. Pull rod out so piston is against cylinder head.

3. Connect rod to appropriate lifting device using a lifting strap.

4. Remove cap screws (7) from cylinder head (8).

5. Remove rod, cylinder head and piston from barrel (26).

6. Install rod eye in sliding housing and install housing in JT30043 Cylinder Service Stand.

Continued on next page

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IMPORTANT: Stop ring (24) and cushion plunger (25) cannot be removed from cylinder.

7. Make an alignment mark on piston nut (23) and rod (1).
8. Remove staked material from set screw (22) hole using a small air grinder or a drill and bit.
9. Remove set screw (22).
10. Remove piston nut (23) using JTXXXX Spanner Wrench and JT30043 Cylinder Service Stand.

Specification

Arm Cylinder Piston Nut—
Torque..... 1860 N•m
1372 lb-ft

11. Remove piston (15) using JTXXXX Piston Wrench and JT30043 Cylinder Service Stand.

Specification

Arm Cylinder Piston—Torque..... 981 N•m
724 lb-ft

IMPORTANT: Note direction of oil groove in cushion bearing (14) for installation.

12. Remove cushion bearing (14) from rod (1).
13. Remove cylinder head (8) from rod (1).
14. Remove components (16—21) from piston (15).

IMPORTANT: Note direction of dust wiper (3) and U-ring (5) for installation.

15. Remove components (2—6) and (9—13) from cylinder head (8).
16. Inspect dust seals and bushings in rod (1) and barrel (26) for wear or damage. Repair or replace parts as necessary. See Inspect Pins, Bushings and Bosses—Front Attachment. (Group 3340.)
17. Check for rod curvature on V-blocks using dial indicator.

Specification

Arm Cylinder Rod—Curvature..... 0.5 mm per 1 m
0.020 in. per 3.25 ft

18. Repair or replace parts as necessary.
19. Install bushing (9) into cylinder head (8) using a driver disk and a press. Press to bottom of bore.
20. Install retaining ring (10).
21. Install O-ring (11).
22. Install backup ring (12) and O-ring (13) into cylinder head.
23. Install buffer ring (6).
24. Install U-ring (5) with lip towards bushing (9).
25. Install backup ring (4).
26. Install dust wiper (3) with lip towards outside of cylinder.
27. Install assembled cylinder head (8) on rod (1).
28. Install back ring (19) and slipper seal (18) to piston (15) using JTXXXX Installer. Adjust slipper seal (18) using JTXXXX Adjustment Tool.
29. Install slide rings (16), wear rings (17), backup rings (20), and O-ring (21) to piston (15).

IMPORTANT: Note direction of oil groove in cushion bearing (14) during installation.

30. Install cushion bearing (14) on rod (1).
31. Install piston (15). Tighten piston using JTXXXX Piston Wrench and JT30043 Cylinder Service Stand.

Specification

Arm Cylinder Piston—Torque..... 981 N•m
724 lb-ft

Continued on next page

OUO1073,0001FFD -19-25APR06-2/3

32. Align mark made during disassembly and install piston nut (23). Tighten to specification using JTXXXX Spanner Wrench and JT30043 Cylinder Service Stand.

Specification

Arm Cylinder Piston Nut—
Torque..... 1860 N•m
1372 lb-ft

33. Install set screw (22). Tighten to specification.

Specification

Set Screw—Torque 15 N•m
130 lb-in.

34. Stake set screw (22) in two places 90° from previous stake marks.

35. Apply clean oil to piston and seals. Attach appropriate lifting device to rod using a lifting strap. Carefully install piston, rod and cylinder head into barrel.

36. Install cylinder head cap screws (7). Tighten to specification.

Specification

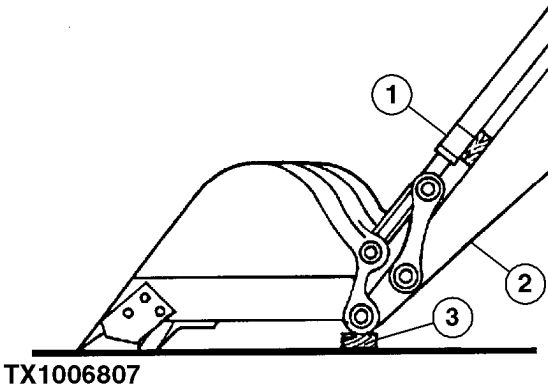
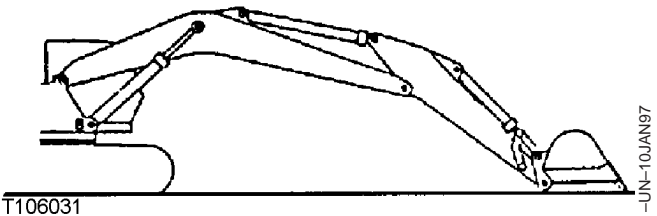
Arm Cylinder Head-to-Barrel
Cap Screw—Torque 481 N•m
355 lb-ft

OUO1073,0001FFD -19-25APR06-3/3

Bucket Cylinder Remove and Install

1. Park machine on firm, level surface.
2. Retract arm cylinder and bucket cylinder (1) and lower bucket to ground. Position end of arm (2) on wood block (3).

- 1—Bucket Cylinder
2—End of Arm
3—Wood Block



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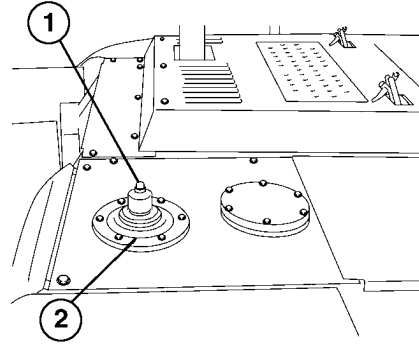
OUO1073,0001FED -19-25APR06-1/6



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. Relieve pressure by pushing pressure release button (1).

3. Push pressure release button (1).

1—Pressure Release Button
2—Hydraulic Oil Tank Cover



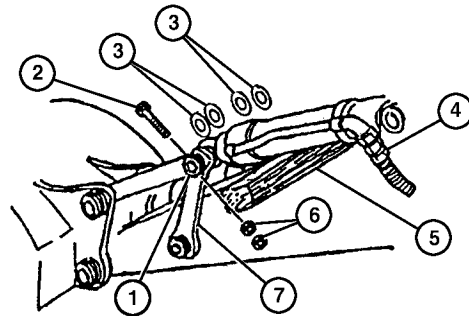
OUO1073,0001FED -19-25APR06-2/6

T214924 -UN-17NOV05

4. Disconnect lines. Close all open lines and fittings using caps and plugs.
5. Connect center link to appropriate lifting device using lifting strap.
6. Put wood block (5) between bucket cylinder and arm to hold cylinder up when pin (1) is removed.
7. Remove parts (2 and 6).

NOTE: Mark location of shims (3) to aid in assembly.

8. Push pin (1) out and remove shims (3).



1—Side and Center Links-to-Bucket Cylinder Pin
2—Cap Screw
3—Shim (as required)
4—Bucket Cylinder Rod End-to-Bucket Section Top Port Line
5—Wood Block
6—Nut (2 used)
7—Side Link

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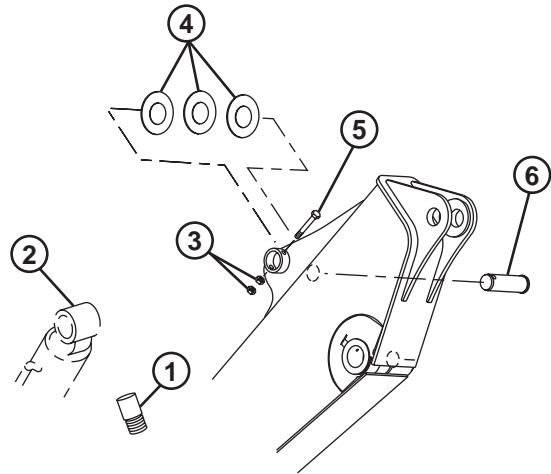
CAUTION: Heavy component; use appropriate lifting device.

Specification

Bucket Cylinder—240DLC—
Weight..... 195 kg
430 lb

Specification

Bucket Cylinder—270DLC—
Weight..... 210 kg
465 lb



- 1—Bucket Cylinder Rod End Hose
- 2—Bucket Cylinder
- 3—Nut (2 used)
- 4—Shim (as required)
- 5—Cap Screw
- 6—Bucket Cylinder-to-Arm Pin

9. Disconnect bucket cylinder rod end hose (1).

10. Connect bucket cylinder (2) to appropriate lifting device using lifting strap.

11. Remove parts (3 and 5).

NOTE: Mark location of shims (4) to aid in assembly.

12. Push pin (6) out and remove shims (4).

13. Remove bucket cylinder.

14. Repair or replace parts as necessary. See Bucket Cylinder Disassemble and Assemble—240DLC or See Bucket Cylinder Disassemble and Assemble—270DLC. (Group 3360.)

15. Install shims equally on each side of bucket cylinder head end to get minimum amount of clearance in joint.

16. Align pin bores so shims are not damaged as pin is installed.

17. Connect bucket cylinder head end to arm.

18. Tighten nuts (3) against each other allowing cap screw (5) to be free to turn in hole.

Specification

Bucket Cylinder-to-Arm Pin
Retainer Nut—Torque 550 N•m (tighten nut against nut)
405 lb-ft (tighten nut against nut)

19. Connect lines. See Hydraulic System Line Connections. (Group 9025-15.)

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20. Tighten bucket cylinder hoses.

Specification

Bucket Cylinder Hose—
240DLC—Torque..... 175 N•m
130 lb-ft

Specification

Bucket Cylinder Hose—
270DLC—Torque..... 205 N•m
150 lb-ft

IMPORTANT: Trapped air suddenly compressed in a cylinder is heated and ignites the oil used for assembly causing cap seal and ring damage. Start with cylinder rod retracted and the rod end filled with clean oil. Connect the cylinder head end and lines. Operate function to slowly extend rod. Procedure will eliminate most of the air and reduce the possibility of damage.

21. Start engine.

22. Slowly extend bucket cylinder to align pin bores so shims are not damaged as pin is installed.

23. Install shims equally on each side of cylinder rod end and side links to get minimum amount of clearance in joint.

24. Connect bucket cylinder head end to arm.

25. Tighten nuts against each other allowing cap screw to be free to turn in hole.

Specification

Bucket Cylinder-to-Pin Retainer
Nut—Torque..... 550 N•m (tighten nut against nut)
405 lb-ft (tighten nut against nut)

26. Lubricate all pivot joints. See Track Adjuster, Working Tool Pivot, Swing Bearing, and Swing Bearing Gear Grease. (Operator's Manual.)

27. Bleed air from cylinder. See Hydraulic Cylinder Bleed Procedure. (Group 3360.)

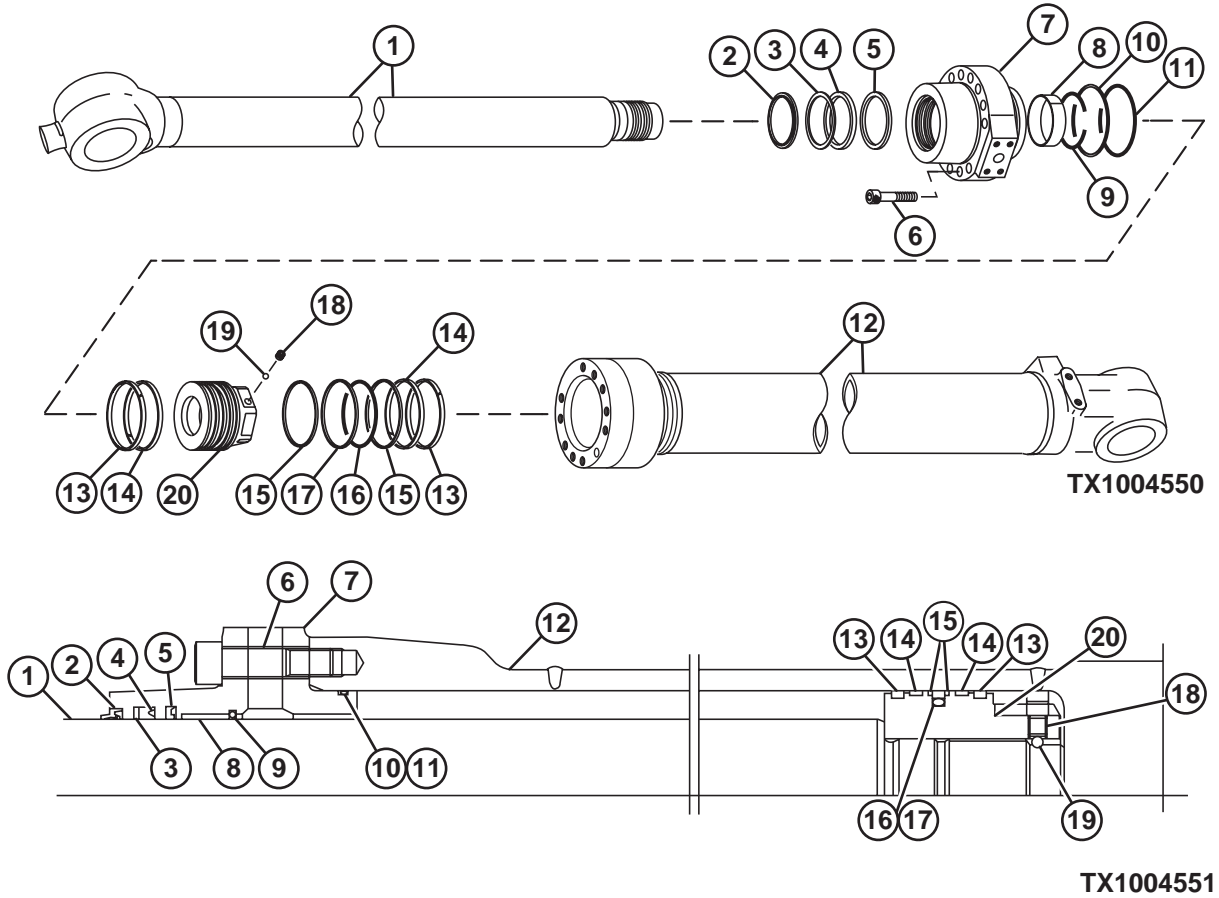
Hydraulic System

28. Check hydraulic oil level. See Check Hydraulic Oil Tank Level. (Operator's Manual.)

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Bucket Cylinder Disassemble and Assemble—240DLC



- 1—Rod
- 2—Dust Wiper
- 3—Backup Ring
- 4—U-Ring
- 5—Buffer Ring

- 6—Cap Screw (12 used)
- 7—Cylinder Head
- 8—Bushing
- 9—Snap Ring
- 10—Backup Ring

- 11—O-Ring
- 12—Barrel
- 13—Slide Ring (2 used)
- 14—Wear Ring (2 used)
- 15—Backup Ring (2 used)

- 16—O-Ring
- 17—Seal Ring
- 18—Set Screw
- 19—Ball
- 20—Piston Nut

CAUTION: Heavy component; use appropriate lifting device.

Specification

Bucket Cylinder—Approximate
Weight..... 195 kg
430 lb

1. Fasten head end of cylinder to JT30043 Cylinder Service Stand.
2. Pull rod out so piston nut is against cylinder head.
3. Connect rod to appropriate lifting device using a lifting strap.

4. Remove cap screws (6) from cylinder head (7).
5. Remove rod, cylinder head and piston nut from barrel (12).
6. Install rod eye in sliding housing and install housing in JT30043 Cylinder Service Stand.
7. Make an alignment mark on piston nut (20) and rod (1).
8. Remove staked material from set screw (18) hole using a small air grinder or a drill and bit.

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9. Remove set screw (18) and steel ball (19).

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

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

10. Install JTXXXX Hex Piston Nut Wrench so cap screw is tightened against side of piston nut (20) without tapped hole.
11. Install a piece of steel flat stock between nut and cap screw. Tighten cap screw of piston nut wrench.
12. Remove piston nut (20) using JT30043 Cylinder Service Stand.

Specification

Bucket Cylinder Piston Nut—
Torque..... XXXX N•m
XXXX lb-ft

13. Remove components (13—17) from piston nut (20).
14. Remove cylinder head (7) from rod (1).

IMPORTANT: Note direction of dust wiper (2) and U-ring (4) for installation.

15. Remove components (2—5) and (8—11) from cylinder head (7).
16. Inspect dust seals and bushings in rod (1) and barrel (12) for wear or damage. Repair or replace parts as necessary. See Inspect Pins, Bushings and Bosses—Front Attachment. (Group 3340.)

17. Check for rod curvature on V-blocks using dial indicator.

Specification

Bucket Cylinder Rod—
Curvature..... 0.5 mm per 1 m
0.020 in. per 3.25 ft

18. Repair or replace parts as necessary.
19. Install bushing (8) into cylinder head (7) using a driver disk and a press. Press to bottom of bore.
20. Install snap ring (9).
21. Install backup ring (10) and O-ring (11).
22. Install buffer ring (5).
23. Install U-ring (4) with lip towards bushing (8).
24. Install backup ring (3).
25. Install dust wiper (2) with lip towards outside of cylinder.
26. Install assembled cylinder head (7) on rod (1).
27. Install O-ring (16) and seal ring (17) to piston nut (20) using JTXXXX Installer. Adjust seal ring (17) using JTXXXX Adjustment Tool.
28. Install backup rings (15) on each side of seal ring.
29. Install slide rings (13) and wear rings (14) to piston nut (20).
30. Align marks made during disassembly and install piston nut (20).

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

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

31. Install JTXXXX Hex Piston Nut Wrench so cap screw is tightened against side of piston nut (20) without tapped hole. Install a piece of steel flat stock between nut and cap screw. Tighten cap screw of piston nut wrench. Tighten piston nut (20) to specification using JT30043 Cylinder Service Stand.

Specification

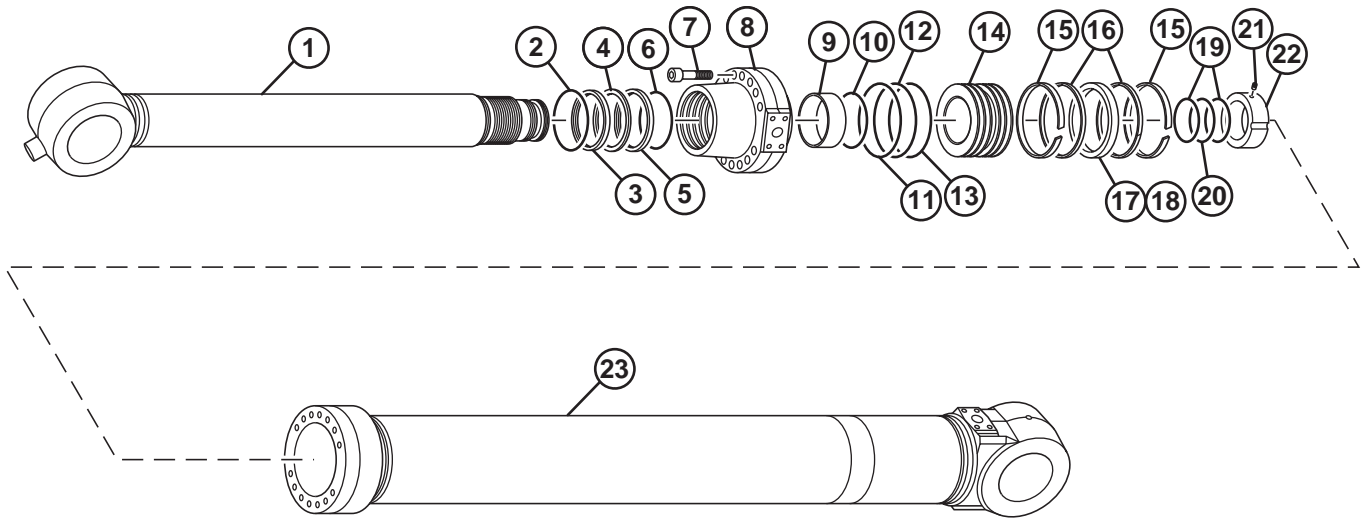
Bucket Cylinder Piston Nut—
Torque..... XXXX N•m
XXXX lb-ft

32. Install steel ball (19) and set screw (18).
33. Stake set screw (18) in two places 90° from previous stake marks.
34. Apply clean oil to piston nut and seals. Attach appropriate lifting device to rod using a lifting strap. Carefully install piston nut, rod and cylinder head into barrel.
35. Install cylinder head cap screws (6). Tighten to specification.

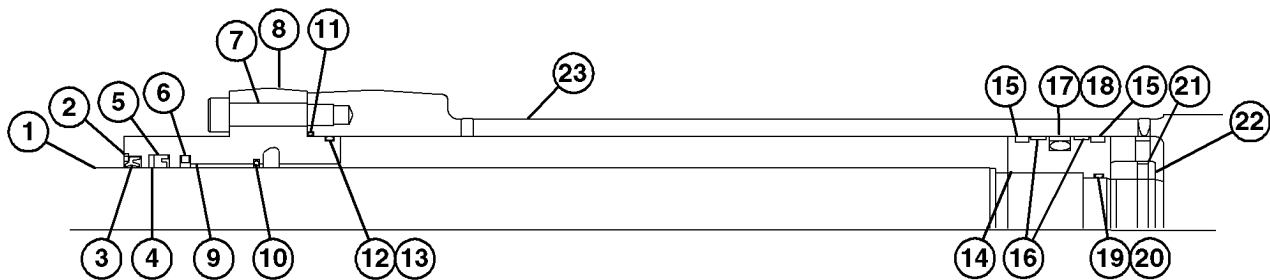
Specification

Bucket Cylinder Head-to-Barrel
Cap Screw—Torque 367 N•m
270 lb-ft

Bucket Cylinder Disassemble and Assemble—270DLC



TX1004566



TX1004567

- | | | | |
|------------------|-----------------------|-----------------|----------------|
| 1—Rod | 7—Cap Screw (14 used) | 13—O-Ring | 19—Backup Ring |
| 2—Retaining Ring | 8—Cylinder Head | 14—Piston | 20—O-Ring |
| 3—Dust Wiper | 9—Bushing | 15—Slide Rings | 21—Set Screw |
| 4—Backup Ring | 10—Retaining Ring | 16—Wear Rings | 22—Piston Nut |
| 5—U-Ring | 11—O-Ring | 17—Slipper Seal | 23—Barrel |
| 6—Buffer Ring | 12—Backup Ring | 18—Back Ring | |

CAUTION: Heavy component; use appropriate lifting device.

Specification

Bucket Cylinder—Approximate
Weight..... 210 kg
465 lb

- Fasten head end of cylinder to JT30043 Cylinder Service Stand.

- Pull rod out so piston is against cylinder head.
- Connect rod to appropriate lifting device using a lifting strap.
- Remove cap screws (7) from cylinder head (8).
- Remove rod, cylinder head and piston from barrel (23).

Continued on next page

OUO1073,0001FFC -19-25APR06-1/3

6. Install rod eye in sliding housing and install housing in JT30043 Cylinder Service Stand.
7. Make an alignment mark on piston nut (22) and rod (1).
8. Remove staked material from set screw (21) hole using a small air grinder or a drill and bit.
9. Remove set screw (21).
10. Remove piston nut (22) using JTXXXX Spanner Wrench and JT30043 Cylinder Service Stand.

Specification

Bucket Cylinder Piston Nut—	
Torque.....	1860 N•m 1372 lb-ft

11. Remove piston (14) using JTXXXX Piston Wrench and JT30043 Cylinder Service Stand.

Specification

Bucket Cylinder Piston—Torque	981 N•m 724 lb-ft
-------------------------------------	----------------------

12. Remove cylinder head (8) from rod (1).
13. Remove components (15—20) from piston (14).

IMPORTANT: Note direction of dust wiper (3) and U-ring (5) for installation.

14. Remove components (2—6) and (9—13) from cylinder head (8).
15. Inspect dust seals and bushings in rod (1) and barrel (23) for wear or damage. Repair or replace parts as necessary. See Inspect Pins, Bushings and Bosses—Front Attachment. (Group 3340.)
16. Check for rod curvature on V-blocks using dial indicator.

Specification

Bucket Cylinder Rod—	
Curvature	0.5 mm per 1 m 0.020 in. per 3.25 ft

17. Repair or replace parts as necessary.
18. Install bushing (9) into cylinder head (8) using a driver disk and a press. Press to bottom of bore.
19. Install retaining ring (10).
20. Install O-ring (11).
21. Install backup ring (12) and O-ring (13) into cylinder head.
22. Install buffer ring (6).
23. Install U-ring (5) with lip towards bushing (9).
24. Install backup ring (4).
25. Install dust wiper (3) with lip towards outside of cylinder.
26. Install assembled cylinder head (8) on rod (1).
27. Install back ring (18) and slipper seal (17) to piston (14) using JTXXXX Installer. Adjust slipper seal (17) using JTXXXX Adjustment Tool.
28. Install slide rings (15), wear rings (16), backup rings (19), and O-ring (20) to piston (14).
29. Install piston (14). Tighten to specification using JTXXXX Piston Wrench and JT30043 Cylinder Service Stand.

Specification

Bucket Cylinder Piston—Torque	981 N•m 724 lb-ft
-------------------------------------	----------------------

30. Align mark made during disassembly and install piston nut (22). Tighten to specification using JTXXXX Spanner Wrench and JT30043 Cylinder Service Stand.

Specification

Bucket Cylinder Piston Nut—	
Torque.....	1860 N•m 1372 lb-ft

31. Install set screw (21). Tighten to specification.

Specification

Set Screw—Torque 15 N•m
130 lb-in.

32. Stake set screw (21) in two places 90° from previous stake marks.

33. Apply clean oil to piston and seals. Attach appropriate lifting device to rod using a lifting

strap. Carefully install piston, rod and cylinder head into barrel.

34. Install cylinder head cap screws (7). Tighten to specification.

Specification

Bucket Cylinder Head -to-Barrel
Cap Screw—Torque 353 N•m
260 lb-ft

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Hydraulic Cylinder Bleed Procedure

IMPORTANT: Trapped air suddenly compressed in a cylinder is heated and ignites the oil used for assembly causing cap seal and ring damage. Start with cylinder rod retracted and the rod end filled with clean oil. Connect the cylinder head end and lines. Operate function to slowly extend rod. Procedure will eliminate most of the air and reduce the possibility of damage.

NOTE: Bleed air at initial start-up, whenever major repairs or maintenance (oil change) is done on hydraulic system, or when machine has been in storage for a period of time.

1. Run engine at slow idle.
2. Slowly operate function to move cylinder to the most horizontal position possible.
3. Slowly extend and retract cylinder several times to approximately 100 mm (4 in.) from end of stroke.
4. Operate cylinder several times to full stroke.
5. Check hydraulic oil level. See Check Hydraulic Oil Tank Level. (Operator's Manual.)

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Section 43

Swing or Pivoting System

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Group 4360—Hydraulic System

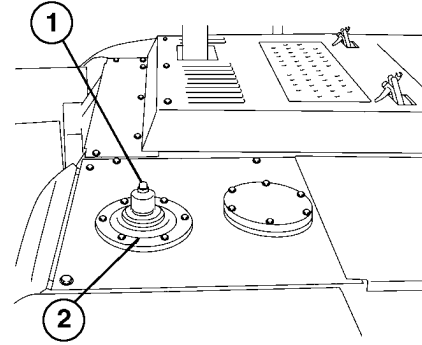
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Swing Gearbox Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Pull vacuum in hydraulic oil tank using vacuum pump or drain hydraulic oil tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360.) The approximate capacity of hydraulic oil tank is 147 L (39 gal).
3. Tag and disconnect lines from swing motor. Close all open lines and fittings using caps and plugs.



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

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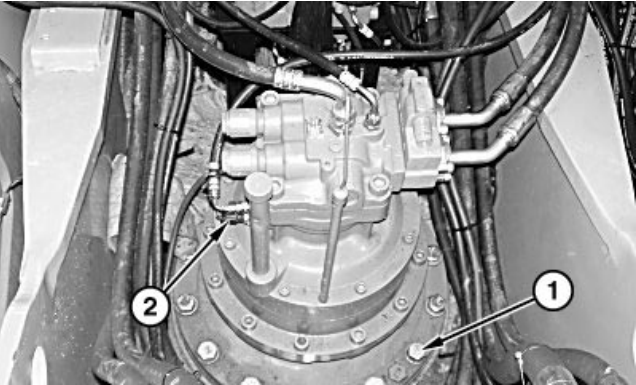
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CAUTION: Heavy component; use appropriate lifting device.

NOTE: Swing motor may be removed by itself or with swing gearbox. To remove swing motor only see Swing Motor and Park Brake Remove and Install. (Group 4360.)

Mark swing gearbox housing to machine upperstructure to aid in installation.



TX1003159A -UN-02FEB06

1—Cap Screw and Washer (14 used)
2—Electrical Connector

4. Install JT01748 Lifting Brackets and connect to appropriate lifting device.

Specification

Swing Motor, Brake, and Gearbox—240DLC—Weight	286 kg
	630 lb

Specification

Swing Motor, Brake, and Gearbox—270DLC—Weight	357 kg
	790 lb

5. Disconnect electrical connector (2).
6. Remove cap screws and washers (1).
7. Remove swing gearbox and motor.
8. Repair or replace parts as necessary. See Swing Gearbox Disassemble and Assemble—240DLC, or Swing Gearbox Disassemble and Assemble—270DLC. (See procedure in this group.)
9. Apply PM38656 Thread Lock and Sealer (High Strength) to mating surfaces of swing gearbox housing and upperstructure.
10. Install swing gearbox and motor.
11. Tighten cap screws.

Specification

Swing Gearbox-to-Upperstructure	
Cap Screw—Torque	650 N•m
	480 lb-ft

12. Connect electrical connector (2).

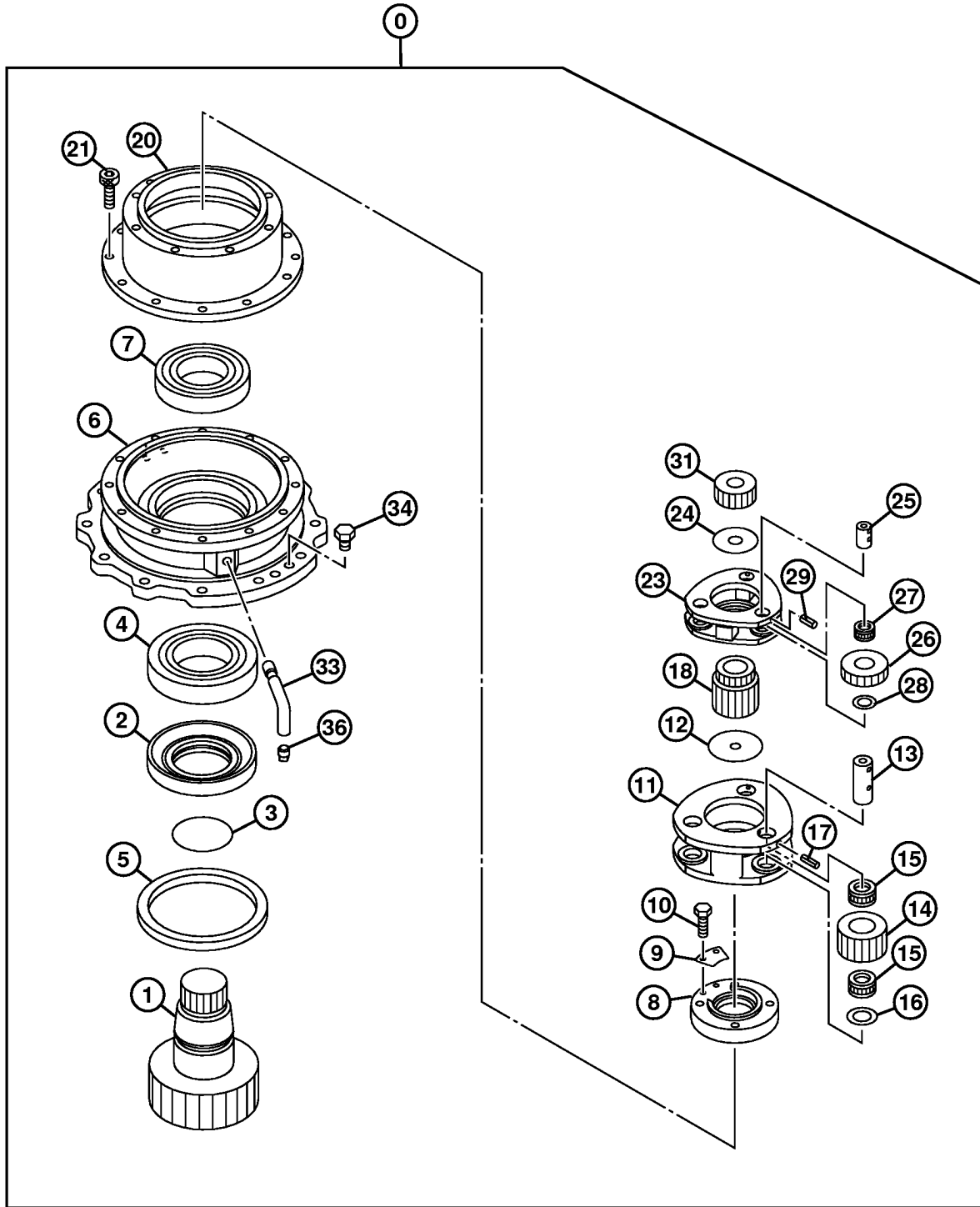
13. Connect lines. See Hydraulic System Line Connections. (Group 9025-15.)
14. See Swing Gearbox Start-Up Procedure. (See procedure in this group.) See Swing Motor and Park Brake Start-Up Procedure. (Group 4360.)
15. If hydraulic oil tank was drained, fill hydraulic oil tank. See 240DLC Drain and Refill Capacities, or 270DLC Drain and Refill Capacities. (Operator's Manual.)

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.

16. If hydraulic oil tank was drained, perform pump start-up procedure. See Pump 1 and 2 Start-Up Procedure. (Group 3360.)

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Swing Gearbox Disassemble and Assemble



TX1000241

Swing Gearbox Disassemble and Assemble

Continued on next page

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TM2323 (27APR06)

43-4350-4

240DLC and 270DLC Excavator Repair

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TX1000241 -UN-22NOV05

0—Swing Gearbox
1—Shaft
2—Sleeve
3—O-Ring
4—Roller Bearing
5—Seal
6—Housing
7—Roller Bearing
8—Bearing Nut

9—Plate
10—Cap Screw
11—Second Planetary Pinion Carrier
12—Washer
13—Pin (2 used)
14—Planetary Gear (3 used)
15—Needle Bearing (6 used)
16—Thrust Plate (3 used)

17—Spring Pin (3 used)
18—Second Stage Sun Gear
20—Ring Gear Housing
21—Cap Screw (12 used)
23—First Planetary Pinion Carrier
24—Thrust Plate
25—Pin (3 used)

26—Planetary Gear (3 used)
27—Needle Bearing (3 used)
28—Thrust Plate (3 used)
29—Spring Pin (3 used)
31—First Stage Sun Gear
33—Line
34—Fitting Plug (2 used)
36—Fitting Plug

1. Make alignment marks between swing motor, ring gear housing (20) and housing (6) to aid in assembly.
2. Remove swing motor. See Swing Motor and Park Brake Remove and Install. (Group 4360.)



CAUTION: Heavy component; use appropriate lifting device.

Specification

Swing Motor—240DLC—
Weight..... 48 kg
105 lb

Specification

Swing Motor—270DLC—
Weight..... 70 kg
155 lb

3. Remove first planetary pinion carrier assembly (23-29) from ring gear housing (20).

NOTE: First stage sun gear (31) may be removed separately or along with carrier.



CAUTION: Heavy component; use appropriate lifting device.

Specification

Ring Gear—240DLC—Weight..... 27 kg
60 lb

Specification

Ring Gear—270DLC—Weight..... 38 kg
85 lb

4. Remove cap screws (21) and ring gear housing (20).

5. Remove second planetary pinion carrier assembly (11-18).

NOTE: Second stage sun gear (18) may be removed separately or with carrier.

6. Disassemble first planetary pinion carrier (23) assembly.

IMPORTANT: Hole for spring pin (29) located on first planetary pinion carrier (23) is not a through hole.

7. Tap spring pin (29) into pin (25) until it reaches the center of pin (25).

8. Remove pin (25), planetary gear (26), needle bearing (27), and thrust plate (28) from first planet pinion carrier (23).

9. Inspect needle bearing (27) for wear.

10. Remove thrust plate (24) from carrier.

IMPORTANT: Damaging the surface of pin (25) can cause bearing failure, use care when handling pin.

11. Using wood blocks, clamp pin (25) in vise. Tap spring pin (29) out of pin.

12. Disassemble second planetary pinion carrier (11) assembly as in Steps 7-11.

13. Remove cap screws (10) and lock plate (9) from bearing nut (8).

14. Remove bearing nut (8) from shaft (1) using DFT1220 Swing Gearbox Nut Spanner Wrench. (Group 9900.)

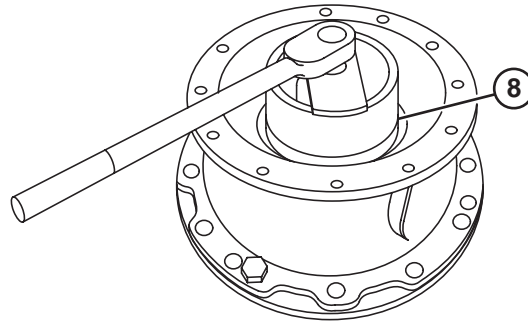
CAUTION: Heavy component; use appropriate lifting device.

Specification

Housing Assembly—240DLC—
Weight..... 153 kg
337 lb

Specification

Housing Assembly—270DLC—
Weight..... 178 kg
392 lb



8—Bearing Nut

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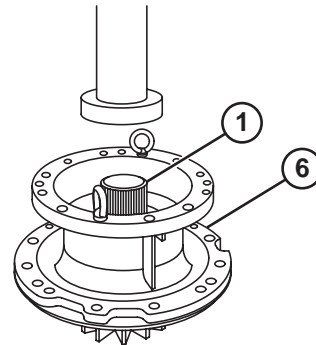
15. Install eyebolts into bolt hole on housing (6). Use appropriate lifting device and position housing assembly (6) onto press.

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NOTE: Bearing and sleeve are pressed onto shaft.

16. Using press, push upper end of shaft (1) and remove from housing (6). Inner race of roller bearing (4) and sleeve (2) are removed with shaft (1).

1—Shaft
6—Housing



TX1004268 -UN-01MAR06

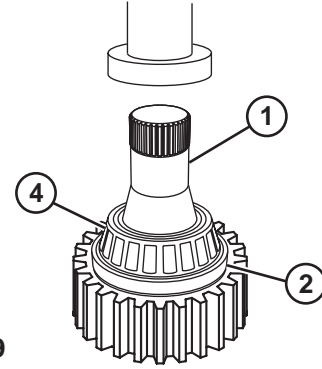
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17. Inspect shaft (1), roller bearing (4), and sleeve (2).
 18. If disassembly is necessary, use press and knife edge bearing puller to push upper end of shaft (1) and remove inner race of roller bearing (4) and sleeve (2).
 19. Remove O-ring (3) from sleeve (2).
 20. Insert a round bar into oil passage in housing (6). Tap and remove outer race of roller bearing (4).
 21. Remove oil seal (5) from housing (6).
- NOTE:** Oil seal (5) can not be reused.
22. Remove outer race of roller bearing (7) from housing (6) using brass drift and hammer.
 23. Repair or replace parts as necessary.
 24. Install O-ring (3) in sleeve (2).
 25. Install sleeve (2) and inner race of roller bearing (4) to shaft (1) using press and a piece of pipe.
 26. Install outer race of roller bearing (4) into housing (6).
 27. Apply PM38656 Thread Lock and Sealer (High Strength) to OD of oil seal (5).
 28. Install oil seal (5) so lip (spring side) is toward bottom of bore. Push seal to bottom of bore.
 29. Apply grease to ID of oil seal (5).
 30. Apply grease to outer surface of sleeve (2) on shaft (1).

TX1004269

1—Shaft
2—Sleeve
4—Roller Bearing



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7



CAUTION: Heavy component; use appropriate lifting device.

Specification

Housing Assembly—240DLC—

Weight..... 95 kg
209 lb

Specification

Housing Assembly—270DLC—

Weight..... 115 kg
254 lb

31. Install eyebolts into bolt holes in housing (6).

32. Using appropriate lifting device, slowly lift housing (6) assembly onto shaft (1).

IMPORTANT: Align carefully so as not to damage oil seal (5) lip.

33. Install inner race of roller bearing (7) onto shaft (1).

34. Tap inner race of roller bearing (7) until upper end of inner race reaches two threads for bearing nut (8) on shaft (1).

35. Hand tighten bearing nut (8) to shaft (1) to retain shaft assembly.

36. Install eyebolts into ring gear housing (20) and lift onto housing (6).

37. Remove bearing nut (8) from shaft (1).

38. Press on inner race of roller bearing (7).

39. Apply film of grease on threaded surface of bearing nut (8). Install bearing nut (8) on shaft (1) with stepped side of bearing nut (8) towards roller bearing (7).

40. Tighten bearing nut (8) to specification. Use DFT1220 Swing Gearbox Nut Spanner Wrench. (Group 9900.)

Specification

Bearing Nut—Torque..... 490 N•m
360 lb-ft

Continued on next page

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41. Install lock plate (9) to bearing nut (8) with cap screws (10). Tighten to specification.

Specification

Lock Plate-to-Bearing Nut Cap

Screws—Torque..... 50 N•m
37 lb-ft

42. If lock plate (9) does not engage with splines of shaft (1), tighten bearing nut until lock plate engages.
43. Assemble planetary gears (14), needle bearings (15), and thrust plates (16).
44. Position gear assemblies (14, 15, 16) into second planetary pinion carrier (11).
45. Align holes in pins (13) and planetary carrier (11).

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HX00125,000007E -19-19APR06-7/8

46. Install spring pins (17) with slit (38) of spring pins towards end of pins (13).

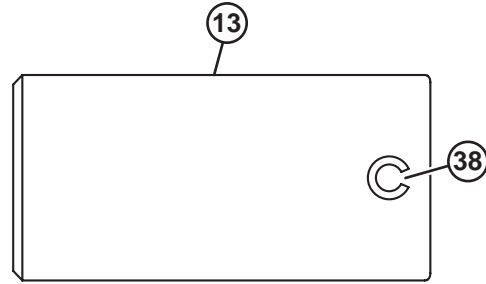
NOTE: Procedure for assembly of first and second planetary pinion carrier assemblies is identical.

47. Assemble first planetary pinion carrier (23) assembly following Step 43 through 46.
48. Align the spline of shaft (1) and install the second planetary carrier assembly (11).
49. Install thrust plate (12) with oil grooves towards second planet pinion carrier (11).
50. Install second stage sun gear (18) into second planetary pinion carrier (11) assembly with smaller diameter of second stage sun gear upward.
51. Apply PM38656 Thread Lock and Sealer (High Strength) to ring gear housing (20) mounting surface of housing (6).
52. Align mating marks and install ring gear housing (20) to housing (6).
53. Apply PM37418 Thread Lock and Sealer (Medium Strength) to cap screws (21). Tighten cap screws (21) to specification.

Specification

Ring Gear Housing-to-Housing	
Cap Screw—Torque	300 N•m 220 lb-ft

54. Align spline of second stage sun gear (18) and install first planetary pinion carrier (23) assembly.
55. Install first stage sun gear (31) into first planetary pinion carrier (23) assembly with stepped side of sun gear down.
56. Install swing motor. See Swing Motor and Park Brake Remove and Install. (Group 4360.)



TX1004270

13—Pin (2 used)
38—Slit

TX1004270 -UN-19APR06

Swing Gearbox Start-Up Procedure

IMPORTANT: Swing gearbox will be damaged if not filled with oil before operating swing function. Procedure must be performed whenever a new swing gearbox is installed or oil has been drained from the gearbox.

1. Check that drain line plug is installed.
2. Remove fill cap and add oil. See Swing Gearbox, Travel Gearbox and Pump Gearbox Oils. (Operator's Manual.)
3. Install fill cap. Check oil level on dipstick.

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Swing Bearing Remove and Install

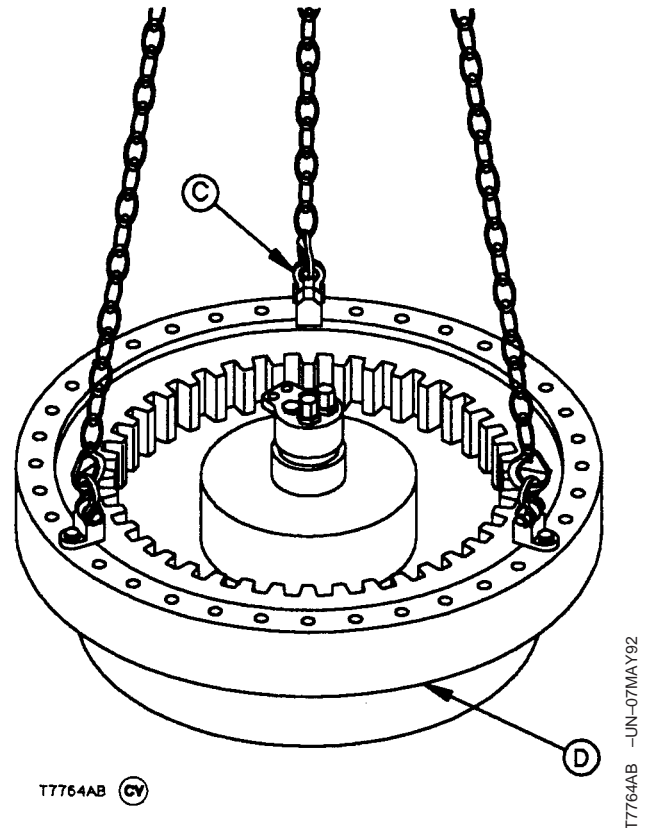
1. Remove upperstructure.

CAUTION: Heavy component; use appropriate lifting device.

Specification

Swing Bearing—Weight..... 324 kg
715 lb

2. Connect swing bearing to appropriate lifting device using lifting brackets (C) such as JT01748 Lifting Brackets.
3. Remove cap screws and lock washers (D) and remove swing bearing.
4. Check and replace swing bearing upper and lower seals if necessary. See Swing Bearing Upper Seal Install or Swing Bearing Lower Seal Install. (See procedures in this group.)
5. Replace steel balls and ball supports as necessary.
6. Repair or replace parts as necessary.
7. Clean mating surfaces of swing bearing, upperstructure, and undercarriage.



C—JT01748 Lifting Brackets
D—Cap Screw and Lock Washer

T7764AB -UN-07MAY92

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4350
11

Continued on next page

HX00125,0000081 -19-13MAR06-1/2

IMPORTANT: The tooth marked with the letter “G” or “S” or equivalent is the starting and stopping point for the hardening process. The tooth and the bearing loading plug must be installed on the right side of the machine so the use of that part of the swing bearing is minimized.

8. Install swing bearing on undercarriage so tooth (A) marked “G” or “S” or equivalent and bearing loading plug (B) is to right side of machine.

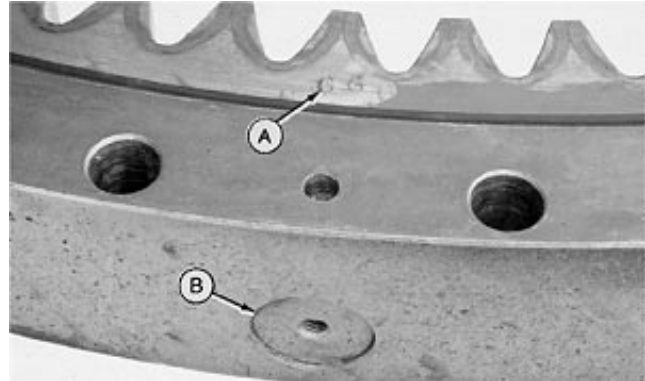
9. Install cap screws and lock washers and tighten.

Specification

Undercarriage-to-Swing Bearing	
Cap Screw—Torque	650 N•m 480 lb-ft

10. Apply multi-purpose grease to swing bearing teeth and pinion shaft. See Track Adjuster, Working Tool Pivot, Swing Bearing, and Swing Bearing Gear Grease. (Operator’s Manual.)

11. Install upperstructure.

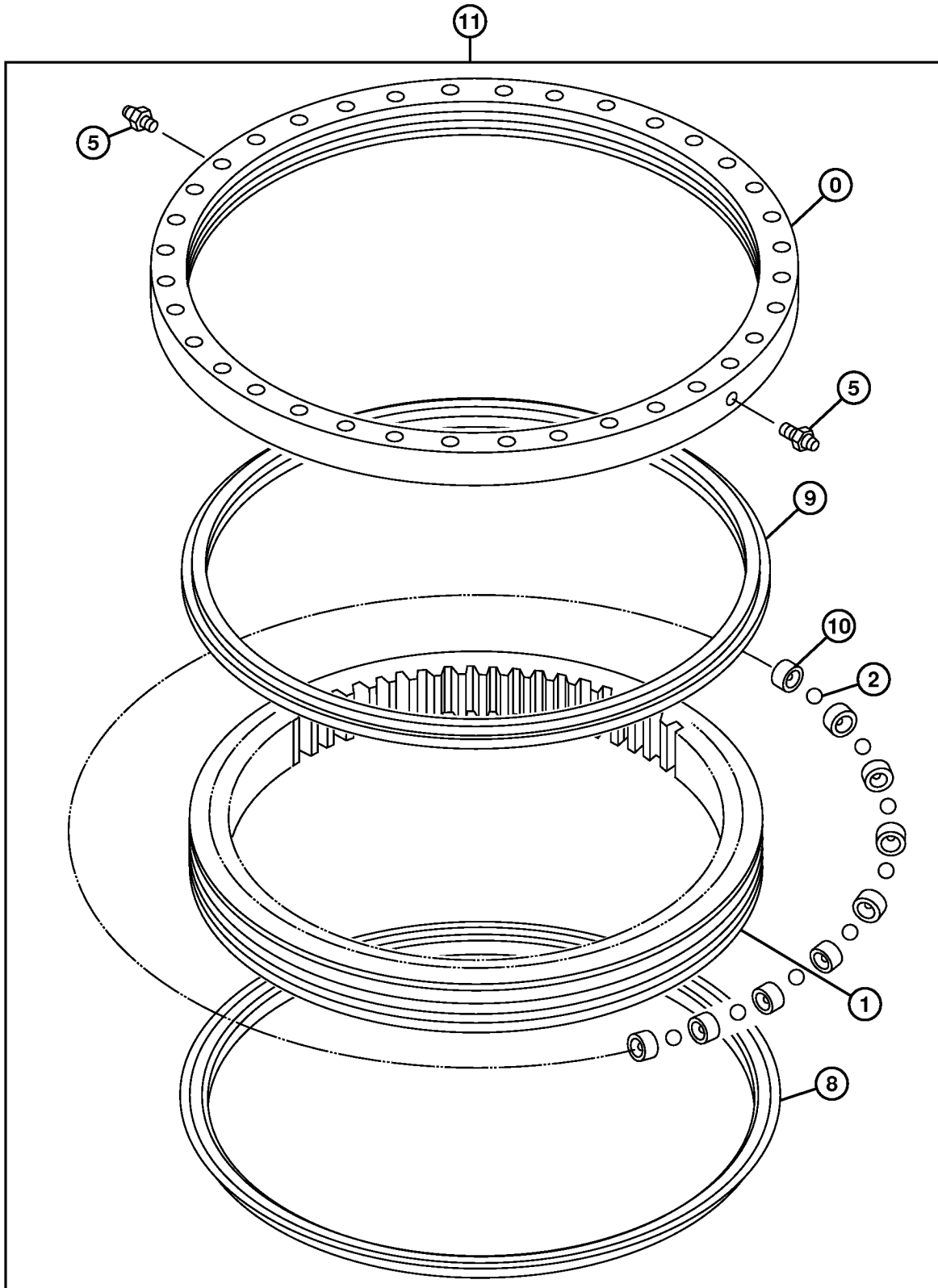


A—Tooth
B—Loading Plug

T5925AA -UN-11APR90

HX00125,0000081 -19-13MAR06-2/2

Swing Bearing Disassemble and Assemble



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Continued on next page

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0—Outer Race
1—Inner Race

2—Steel Ball (99 used)
5—Lubrication Fitting (2 used)

8—Lower Seal
9—Upper Seal

10—Spacer (99 used)
11—Swing Bearing

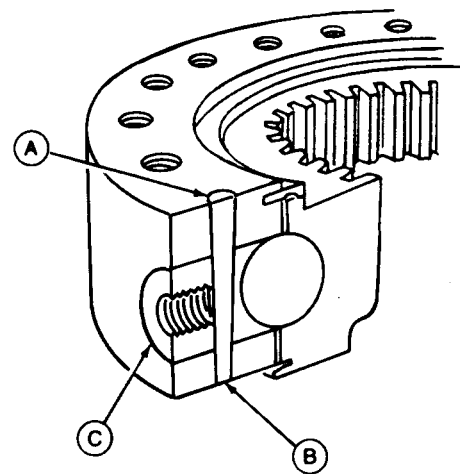
1. Check swing bearing upper seal (9) and lower seal (8). If damaged, replace. See Swing Bearing Upper

Seal Install or Swing Bearing Lower Seal Install.
(See procedures in this group.)

HX00125,0000082 -19-20APR06-2/5

2. Grind tack weld (A) off top of taper pin (B).
3. Drive taper pin out from bottom side of bearing.
4. Remove loading plug (C) using an M8-1.25 cap screw.

A—Tack Weld
B—Taper Pin
C—Loading Plug



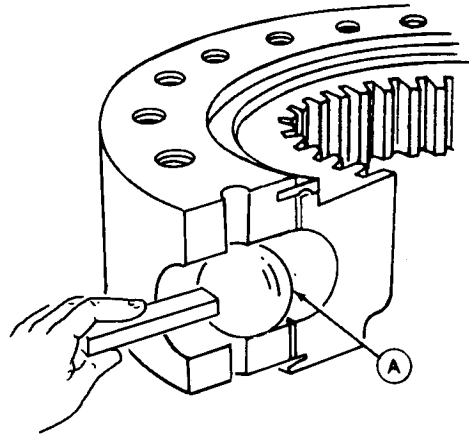
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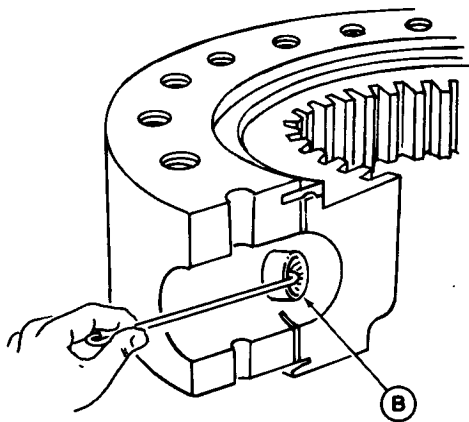
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5. Remove steel balls (A) and spacers (B).
6. Turn inner race to remove remaining steel balls and spacers.
7. Lift outer race off inner race.
8. Replace parts as necessary.
9. Install spacers (B) and steel balls (A). Turn inner race as needed to install spacers and steel balls.

A—Spacer (99 used)
B—Steel Ball (99 used)



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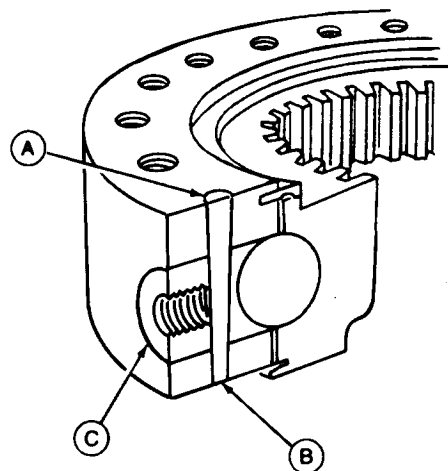


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10. Install loading plug (C).
11. Install taper pin (B) even with top of swing bearing.
12. Tack weld pin (A) to swing bearing.
13. Add multi-purpose grease to swing bearing through lubrication fittings. See Track Adjuster, Working Tool Pivot, Swing Bearing, and Swing Bearing Gear Grease. (Operator's Manual.)

A—Tack Weld
B—Taper Pin
C—Loading Plug



T6876FI -UN-07MAY92

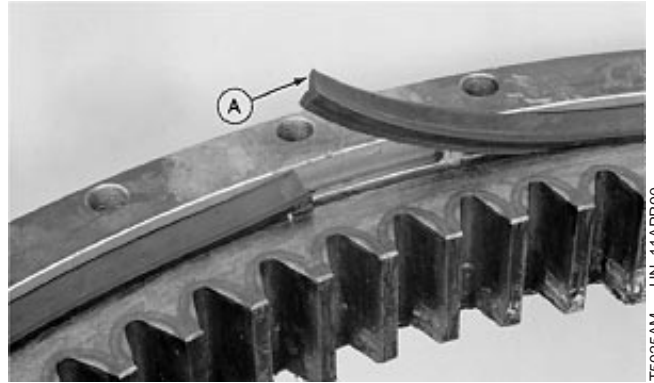
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Swing Bearing Upper Seal Install

1. Remove upperstructure.
2. Remove old seal (A).
3. Scrape old adhesive from seal groove. Thoroughly clean seal groove and new seal using PM37509 Cure Primer.
4. Apply PM37391 Gel Super Glue sparingly to seal groove.
5. Install seal with lip against inner bearing race. Start about 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.
7. Apply PM37391 Gel Super Glue to both ends of seal. Push ends into seal groove making sure they come together.

IMPORTANT: To avoid pulling seal out of groove, adhesive must cure for at least 24 hours before using swing function.

8. Install upperstructure.



A—Seal

TS925AM -UN-11APR90

HX00125,0000083 -19-19APR06-1/1

Swing Bearing Lower Seal Install

1. Remove upperstructure.

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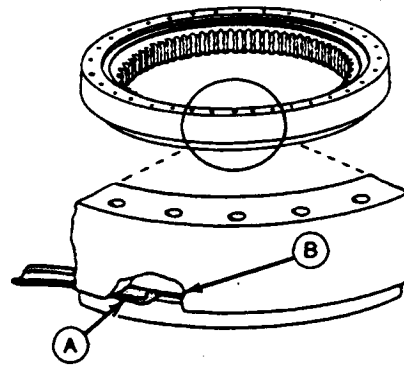
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4350
17

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

2. Remove old seal (A).
3. Scrape old adhesive from seal groove (B). Thoroughly clean seal groove and new seal using PM37509 Cure Primer.
4. Apply PM37391 Gel Super Glue sparingly to seal groove.
5. Install seal with seal lip against outer race. Start about 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.
7. Apply PM37391 Gel Super Glue to both ends of seal. Push ends into seal groove making sure they come together.

IMPORTANT: To avoid pulling seal out of groove, adhesive must cure for at least 24 hours before using swing function.

8. Install upperstructure.



A—Seal
B—Seal Groove

T5936BA -UN-17MAY89

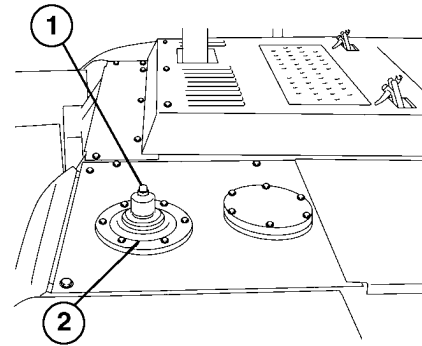
HX00125,0000084 -19-19APR06-2/2

Center Joint Remove and Install



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Apply vacuum to hydraulic tank or drain hydraulic tank. See Apply Vacuum to Hydraulic Oil Tank. (Group 3360). The approximate capacity of hydraulic oil tank is 147 L (39 gal).



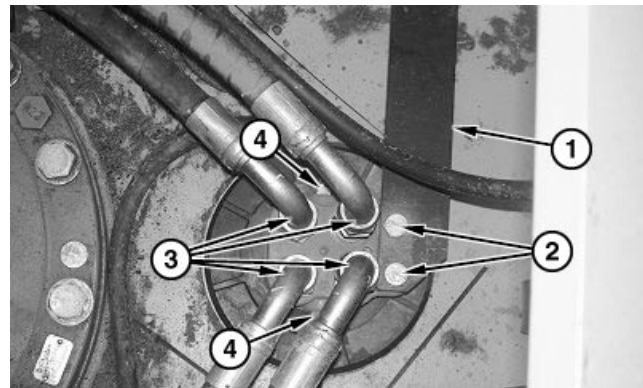
1—Pressure Release Button
2—Hydraulic Oil Tank Cover

T214924 -UN-17NOV05

HX00125,0000085 -19-19APR06-1/3

3. Tag and disconnect upper hydraulic lines (3). Close all open lines and fittings using caps and plugs.
4. Remove cap screws (2) and bracket (1).
5. Disconnect smaller hydraulic lines (4).

- 1—Bracket
2—Cap Screw (2 used)
3—Hydraulic Lines (4 used)
4—Small Hydraulic Lines (2 used)



TX1003359A -UN-19APR06

Continued on next page

HX00125,0000085 -19-19APR06-2/3

6. Attach the center joint to an appropriate lifting device using a lifting strap and two Center Joint Lifting Tools. (Group 9900.)

7. Tag and disconnect lower hydraulic lines.

CAUTION: Heavy component; use appropriate lifting device.

Specification	
Center Joint—Weight	27 kg 60 lb

8. Remove four cap screws and lower center joint.

9. Replace parts as necessary. See Center Joint Disassemble and Assemble. (See procedure in this group.)

10. Install center joint. Tighten four cap screws to specifications.

Specification	
Center Joint-to-Frame Cap Screw—Torque.....	90 N•m 66 lb-ft

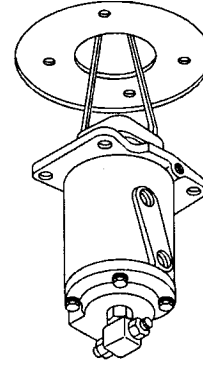
11. Install stop bracket. Tighten cap screws.

Specification	
Stop Bracket-to-Frame Cap Screw—Torque.....	140 N•m 103 lb-ft

12. Connect upper and lower hydraulic lines.

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.

13. If hydraulic oil tank was drained, perform pump start-up procedure. See Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)



T7685JC -UN-27APR92

Center Joint Disassemble and Assemble

1. Make alignment marks on spindle assembly (B), housing (G) and cover (K) to aid in assembly.
2. Remove parts (H—L).
3. Install puller to housing (G) using cap screws (L). Carefully remove spindle assembly (B) from housing (G).
4. Remove plug (A) in spindle and clean port.
5. Remove parts (C—F).

NOTE: Heat must be applied to bushing (E) to shrink for removal.

6. Inspect and repair as necessary.
7. Apply grease to outer surface of bushing (E). Install bushing (E) using a press.

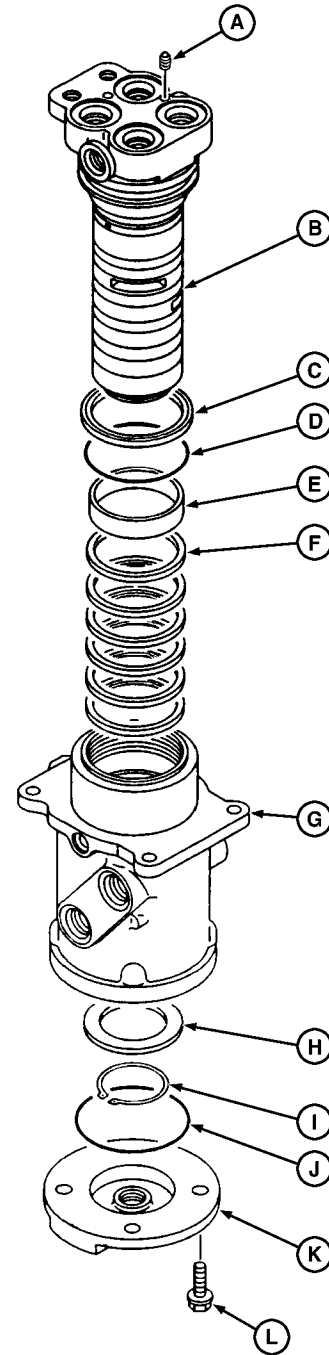
IMPORTANT: Install dust seal (C) with lip side toward housing (G).

8. Install parts (C, D, and F).

IMPORTANT: Install spindle assembly (B) slowly into housing (G) so oil seals (F) are not damaged.

9. Install spindle assembly (B) in housing (G), aligning marks made during disassembly.
10. Remove puller from housing (G).

- A—Plug
- B—Spindle Assembly
- C—Dust Seal
- D—O-Ring
- E—Bushing
- F—Oil Seal Rings (6 used)
- G—Housing
- H—Ring
- I—Snap Ring
- J—O-Ring
- K—Cover
- L—Cap Screw (4 used)



T115530

T115530 -UN-17JUN98

IMPORTANT: Install ring (H) with chamfered side facing spindle assembly (B).

11. Install parts (H—L), aligning marks made during disassembly.
12. Tighten cap screws (L) to specification.

Specification

Cover-to-Housing Cap Screw—
Torque 49 N•m
36 lb-ft

13. Install plug (A).

HX00125,0000086 -19-20APR06-2/2

Center Joint Air Test

1. Install a plug in one port.
2. Apply air pressure using JDG185 Air Test Plug and shop air pressure through the other port in that passage.
3. Listen for air leaks at ports on either side of pressurized port.



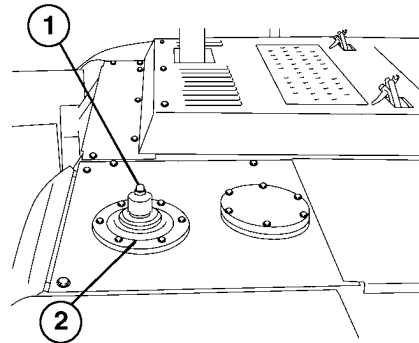
T6557JB -UN-01NOV/88

HX00125,0000087 -19-01MAR06-1/1

Swing Motor and Park Brake Remove and Install

CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Apply vacuum to hydraulic tank or drain hydraulic tank. See Apply Vacuum to Hydraulic Tank. (Group 3360). The approximate capacity of hydraulic oil tank is 147 L (39 gal).



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

T214924 -UN-17NOV/05

Continued on next page

HX00125,0000088 -19-20APR06-1/3

3. Tag and disconnect hydraulic lines (2, 3, 4, and 6).
Close all openings using caps and plugs.

4. Disconnect electrical connector (1).

CAUTION: Heavy component; use appropriate lifting device.

Specification

Swing Motor and Park Brake—	
240DLC—Weight.....	48 kg
	105 lb

Specification

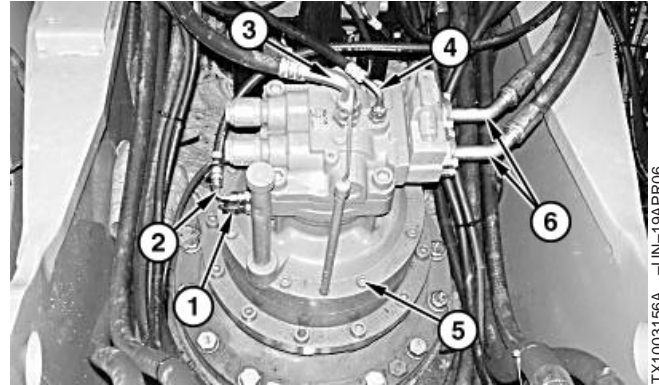
Swing Motor and Park Brake—	
270DLC—Weight.....	70 kg
	155 lb

5. Remove cap screws (5) to remove swing motor and park brake.
6. Repair or replace parts as necessary. See Swing Motor and Park Brake Disassemble. (See procedure in this group.)
7. Install swing motor and park brake.
8. Tighten cap screws (5).

Specification

Swing Motor-to-Ring Gear Cap	
Screw—Torque.....	90 N•m
	67 lb-ft

9. Connect electrical connector (1).
10. Connect lines. See Hydraulic System Line Connections. (Group 9025-15.)
11. See Swing Motor and Park Brake Start-Up Procedure. (See procedure in this group.)
12. Check oil level in hydraulic oil tank. See Checking Hydraulic Oil Level. (Operator's Manual). Add oil if necessary. See Hydraulic Oil. (Operator's Manual).



- 1—Electrical Connector
- 2—Hydraulic Line
- 3—Main Hydraulic Line
- 4—Hydraulic Line
- 5—Cap Screw (8 used)
- 6—Swing Dampener Valve Hydraulic Lines

TX1003156A —UN—19APR06

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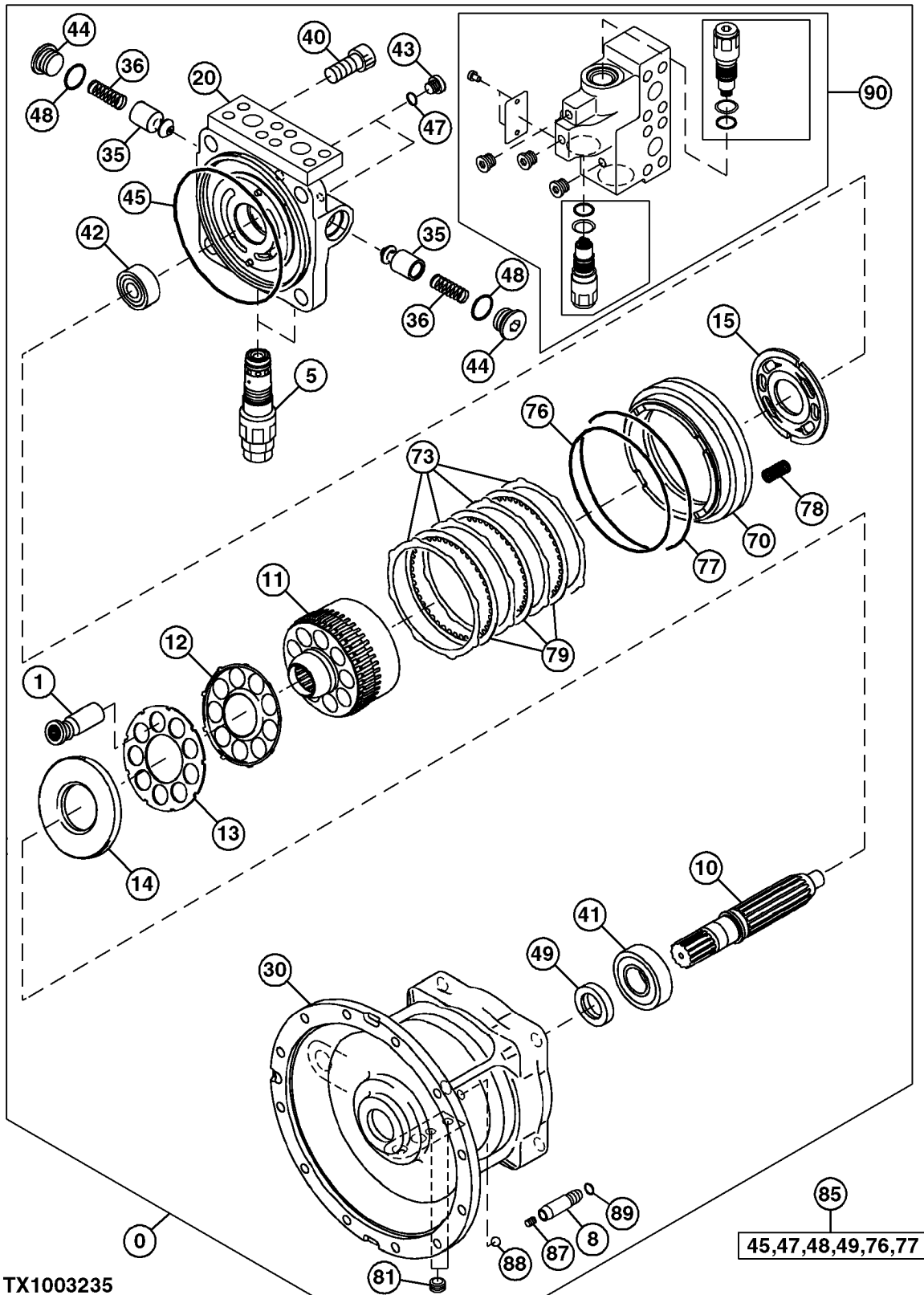
HX00125,0000088 —19—20APR06—2/3

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.

13. If hydraulic oil tank was drained, perform pump start-up procedure. See Pump 1 and 2 Start-Up Procedure. (See procedure in this group.)

HX00125,0000088 -19-20APR06-3/3

Swing Motor and Park Brake Disassemble—240DLC



TX1003235

Swing Motor and Park Brake—240DLC
Continued on next page

HX00125,00000B1 -19-19APR06-1/3

TX1003235 -UN-02FEB06

43
4360
7

0—Hydraulic Motor	15—Valve Plate	45—O-Ring	79—Friction Plates (3 used)
1—Piston (9 used)	20—Swing Motor Cover	47—O-Ring (2 used)	81—Pipe Plug (2 used)
5—Crossover Relief Valve (2 used)	30—Housing	48—O-Ring (2 used)	85—Seal Kit
8—Piston	35—Poppet (2 used)	49—Seal	87—Spring
10—Shaft	36—Spring (2 used)	70—Brake Piston	88—Ball
11—Cylinder Block	40—Cap Screw (4 used)	73—Plates (4 used)	89—Packing
12—Retainer	41—Roller Bearing	76—O-Ring	90—Dampener Valve Assembly
13—Plate	42—Roller Bearing	77—O-Ring	
14—Shoe Plate	43—Fitting Plug (2 used)	78—Spring (24 used)	
	44—Make-Up Check Valve Plug (2 used)		

IMPORTANT: Do not disassemble crossover relief valve (5).

1. Remove crossover relief valves (5) from swing motor cover (20).
2. Remove dampener valve assembly (90). See Swing Dampener Valve Remove and Install. (See procedure in this group.)
3. Remove make-up check valve plugs (44).
4. Remove springs (36) and poppets (35).

CAUTION: Heavy component; use appropriate lifting device.

Specification

Swing Motor and Park Brake—	
240DLC—Weight	48 kg 105 lb

CAUTION: Swing motor housing and swing motor cover is under spring pressure. Remove cap screws evenly to release spring force.

5. Mark alignment of swing motor housing (30) and swing motor cover (20) assembly. Loosen cap screws (40).

IMPORTANT: Do not remove roller bearing (42) unless necessary.

IMPORTANT: Valve plate (15) has a polished surface. Valve plate may remain on

swing motor cover (20) or stay with cylinder block (11). Valve plate may be damaged if dropped. Hold valve plate during disassembly.

6. Remove valve plate (15) from cylinder block (11).
7. Remove O-ring (45).
8. Remove springs (78).
9. Remove brake piston (70).
10. Remove O-rings (76, 77) from housing (30).
11. Remove parts (1, 13 and 12) from shaft (10).
12. Remove plates (73) and friction plates (79).

IMPORTANT: Do not damage sliding surface of shoe plate (14).

13. Remove shoe plate (14).
14. Remove shaft (10) from housing (30) using a plastic hammer.
15. Push out oil seal (49) and remove outer race of roller bearing (41) from housing (30).
16. Remove inner race of roller bearing (41) from shaft (10) using a press.

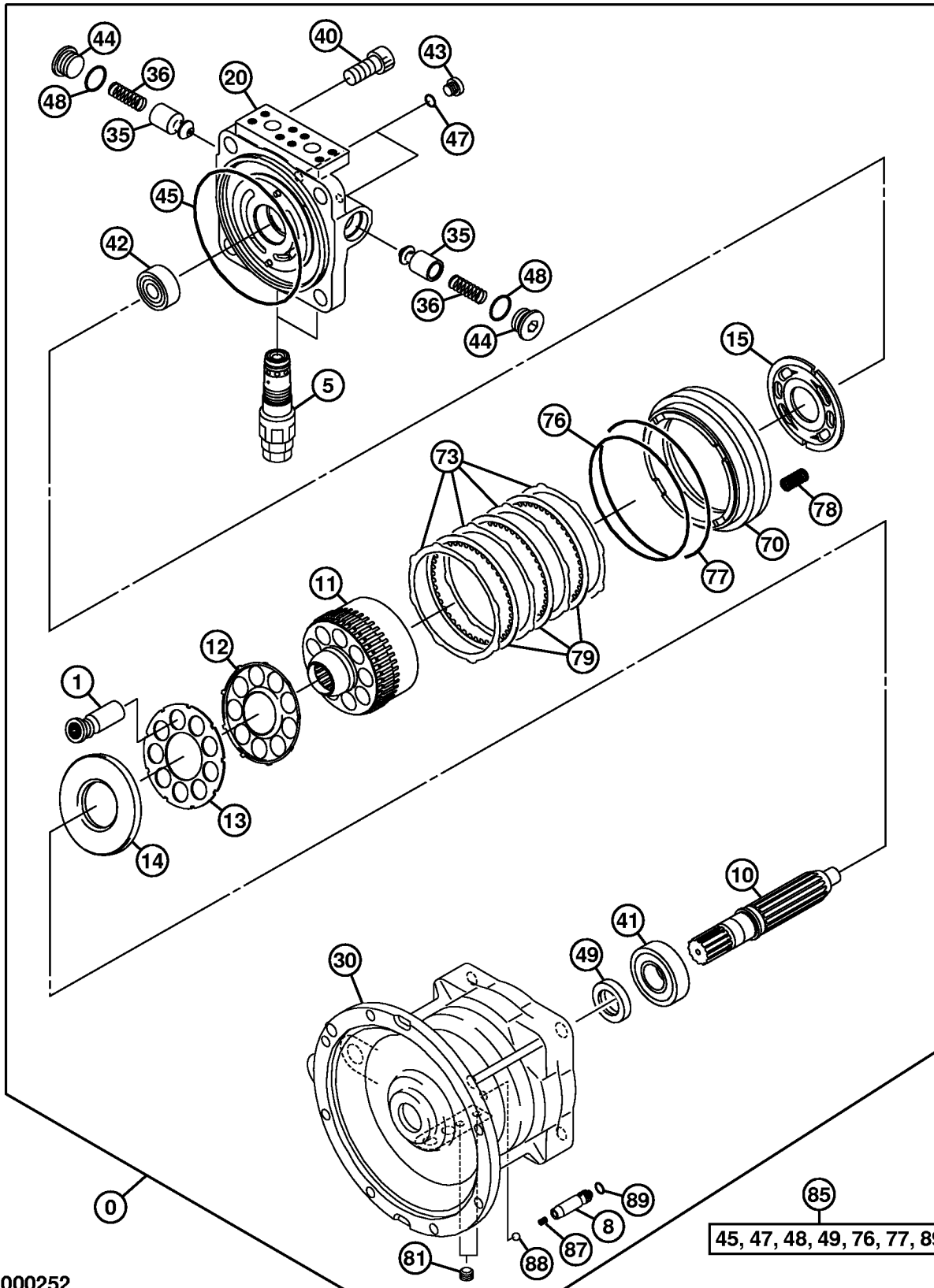
NOTE: Filter and orifice are mounted inside of piston (8). Unless clogged or deformed, do not disassemble. Do so only when absolutely needed. If internal parts need to be replaced, replace piston (8) as an assembly.

NOTE: Use seal kit (85) to replace seals and O-rings.

17. Replace parts as necessary.

HX00125,00000B1 -19-19APR06-3/3

Swing Motor and Park Brake Assemble—240DLC



TX1000252

Swing Motor and Park Brake—240DLC

Continued on next page

HX00125,00000B2 -19-19APR06-1/3

0—Hydraulic Motor
1—Piston (9 used)
5—Crossover Relief Valve (2 used)
8—Piston
10—Shaft
11—Cylinder Block
12—Retainer
13—Plate

14—Shoe Plate
15—Valve Plate
20—Swing Motor Cover
30—Housing
35—Poppet (2 used)
36—Spring (2 used)
40—Cap Screw (4 used)
41—Roller Bearing
42—Roller Bearing

43—Fitting Plug (2 used)
44—Make-Up Check Valve Plug (2 used)
45—O-Ring
47—O-Ring (2 used)
48—O-Ring (2 used)
49—Seal
70—Brake Piston
73—Plate (4 used)

76—O-Ring
77—O-Ring
78—Spring (24 used)
79—Friction Plate (3 used)
81—Pipe Plug (2 used)
85—Seal Kit
87—Spring
88—Ball
89—Packing

IMPORTANT: Install inner race of roller bearing (41) with flange facing step side of shaft (10).

1. Install inner race of roller bearing (41) onto shaft (10) using a press.
2. Install oil seal (49) to housing (30).
3. Install outer race of roller bearing (41) to housing (30).

IMPORTANT: Wind tape onto spline end of shaft (10) to prevent damage to oil seal (49).

4. Install shaft (10) into housing (30).
5. Install shoe plate (14) to housing (30) with chamfered surface toward housing.
6. Align notches on plate (13) and retainer (12). Install pistons (1).
7. Install retainer (12) and plate (13) to pistons (1) with notches facing shoe plate (14).
8. Apply hydraulic oil into piston holes in cylinder block (11).
9. Insert piston (1) assembly into cylinder block (11).
10. Install cylinder block (11) assembly to shaft (10).

IMPORTANT: There are four notches on outer side of plates (73) and four notches on spline teeth side of friction plates (79).

IMPORTANT: Align each notch when installing.

11. Alternately install plates (73) and friction plates (79) to housing (30).
12. Install O-rings (76, 77) to housing (30).
13. Align mating marks and install brake piston (70).
14. Install springs (78) to brake piston (70).

NOTE: Do step 15 only if bearing (42) was removed.

15. Install roller bearing (42) into swing motor cover (20) using plastic hammer.
16. Install O-ring (45) to swing motor cover (20).
17. Install valve plate (15) to swing motor cover (20) with notch in port facing toward cylinder block (11).
18. Apply grease to valve plate (15) to help retain to swing motor cover (20).
19. Apply grease to roller bearing (42) ID to ease shaft (10) installation.
20. Align mating marks on swing motor cover (20) and housing (30). Install cap screws (40) and tighten to specification.

Specification

Swing Motor Cover-to-Housing	
Cap Screw—240DLC—Torque	430 N•m 320 lb-ft

21. Install poppets (35) and spring (36). Tighten make-up check valve plug (44) with O-ring (48) attached.

Specification

Make-Up Check Valve Plug—
240DLC—Torque..... 334 N•m
245 lb-ft

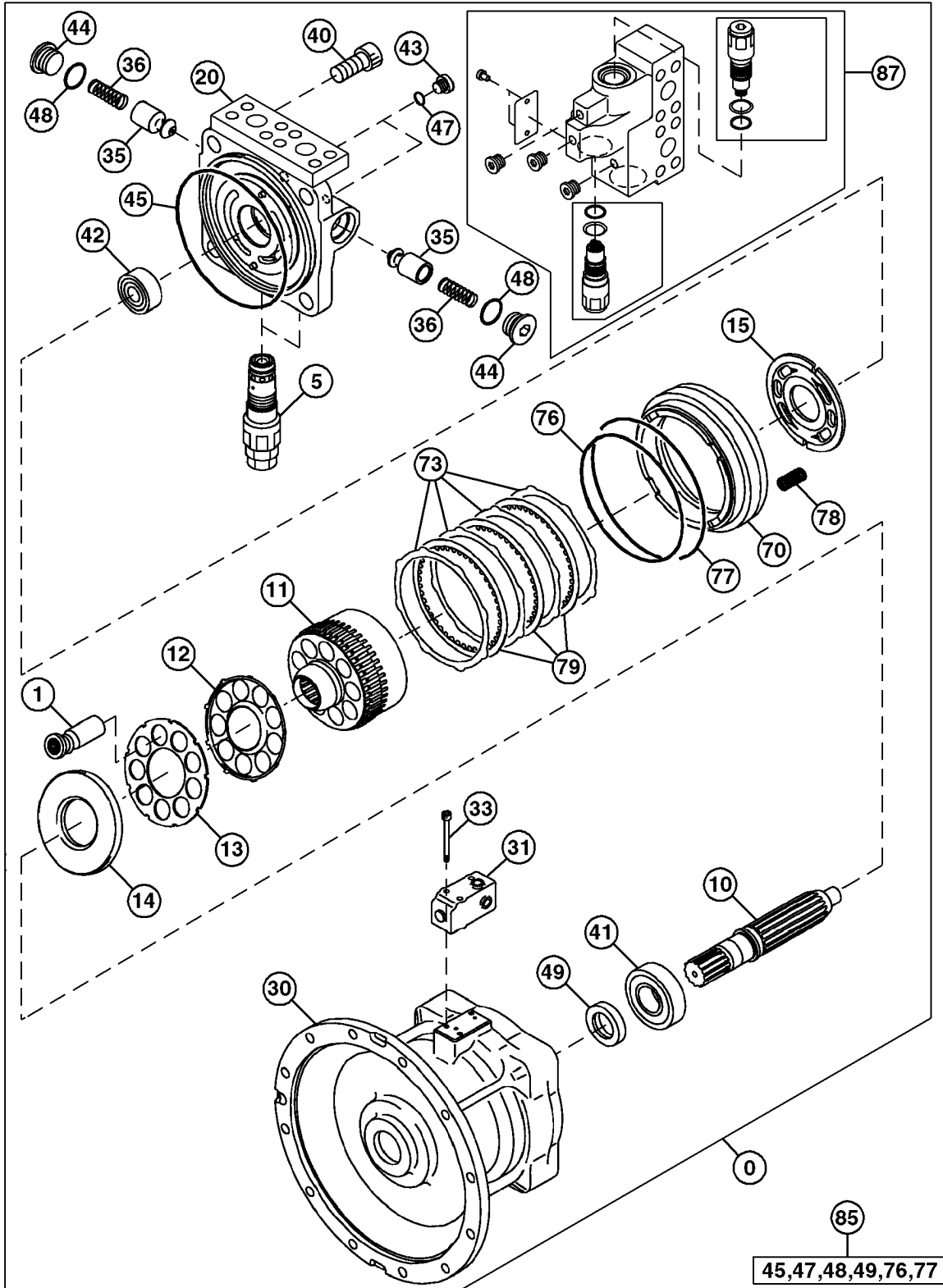
22. Install crossover relief valves (5) into swing motor cover (20).

Specification

Crossover Relief Valve—
Torque..... 177 N•m
130 lb-ft

HX00125,00000B2 -19-19APR06-3/3

Swing Motor and Park Brake Disassemble—270DLC



TX1003234

Swing Motor and Park Brake—270DLC
Continued on next page

HX00125,00000B3 -19-19APR06-1/2

0—Hydraulic Motor	15—Valve Plate	41—Roller Bearing	70—Brake Piston
1—Piston (9 used)	20—Swing Motor Cover	42—Roller Bearing	73—Plate (4 used)
5—Crossover Relief Valve (2 used)	30—Housing	43—Fitting Plug (2 used)	76—O-Ring
10—Shaft	31—Swing Park Brake Check Valve	44—Make-Up Check Valve Plug (2 used)	77—O-Ring
11—Cylinder Block	33—Cap Screw (3 used)	45—O-Ring	78—Spring (20 used)
12—Retainer	35—Poppet (2 used)	47—O-Ring (2 used)	79—Friction Plate (3 used)
13—Plate	36—Spring (2 used)	48—O-Ring (2 used)	85—Seal Kit
14—Shoe Plate	40—Cap Screw (4 used)	49—Seal	87—Dampener Valve Assembly

IMPORTANT: Do not disassemble crossover relief valves (5).

1. Remove crossover relief valves (5) from swing motor cover (20).
2. Remove dampener valve assembly (87). See Swing Dampener Valve Remove and Install. (See procedure in this group.)
3. Remove make-up check valve plugs (44).
4. Remove springs (36) and poppets (35).

CAUTION: Heavy component; use appropriate lifting device.

Specification

Swing Motor and Park Brake—	
270DLC—Weight	70 kg 155 lb

CAUTION: Swing motor and swing motor cover is under spring pressure. Remove cap screws evenly to release spring force.

5. Mark alignment of swing motor housing (30) and swing motor cover (20) assembly. Loosen cap screws (40).

IMPORTANT: Do not remove roller bearing (42) unless necessary.

IMPORTANT: Valve plate (15) has a polished surface. Valve plate may remain on swing motor cover (20) or stay with cylinder block (11). Valve plate may be damaged if dropped. Hold valve plate during disassembly.

6. Remove valve plate (15) from cylinder block (11).
7. Remove O-ring (45).
8. Remove springs (78).
9. Remove brake piston (70).
10. Remove O-rings (76, 77) from housing (30).
11. Remove parts (1, 13 and 12) from shaft (10).
12. Remove plates (73) and friction plates (79).

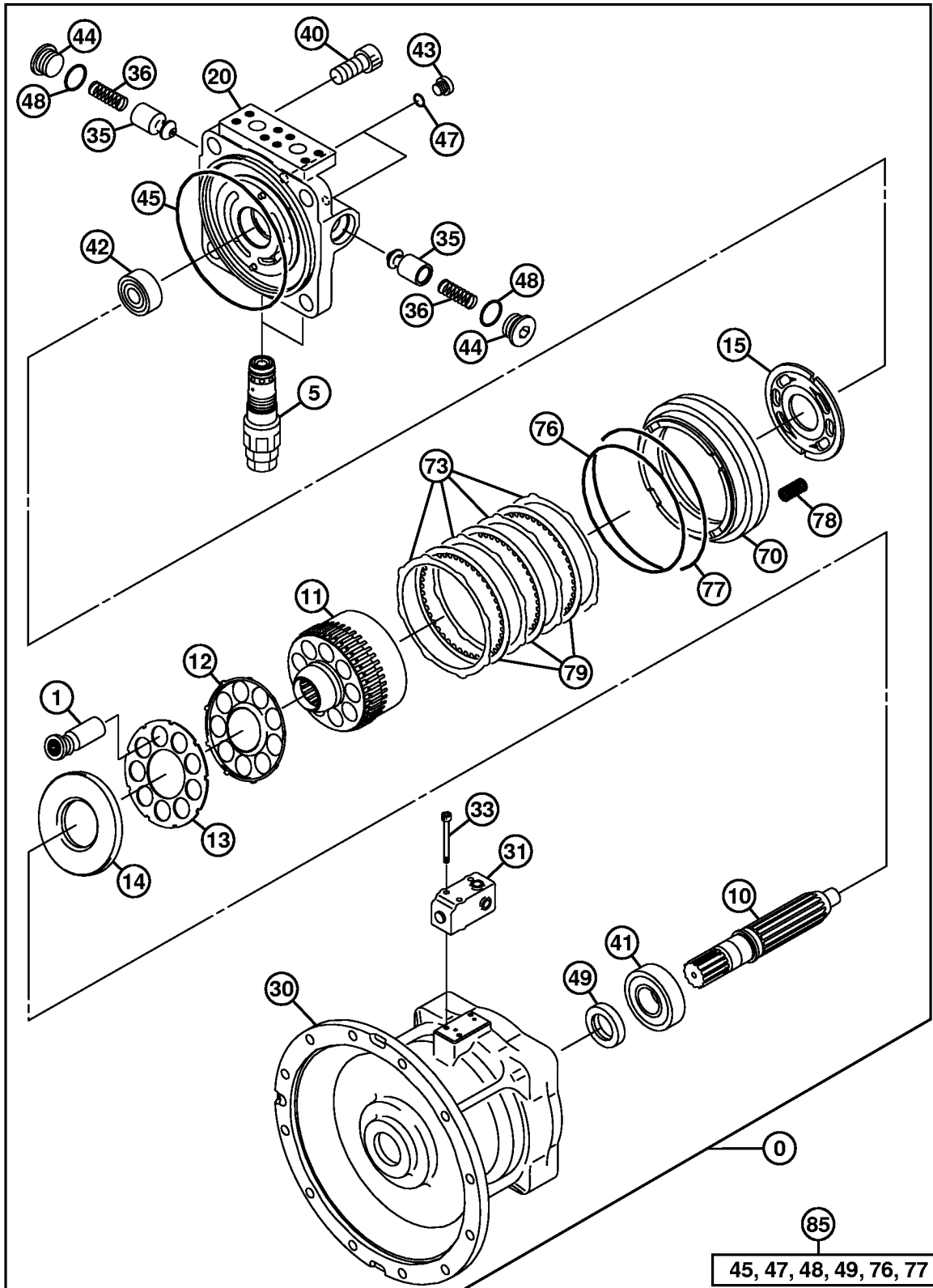
IMPORTANT: Do not damage sliding surface of shoe plate (14).

13. Remove shoe plate (14).
14. Remove shaft (10) from housing (30) using plastic hammer.
15. Push out oil seal (49) and remove outer race of roller bearing (41) from housing (30).
16. Remove inner race of roller bearing (41) from shaft (10) using a press.
17. Remove cap screws (33) from swing park brake check valve (31).
18. Remove swing park brake check valve (31) from housing (30).

NOTE: Use seal kit (85) to replace seals and O-rings.

19. Replace parts as necessary.

Swing Motor and Park Brake Assemble—270DLC



TX1000258

Swing Motor and Park Brake—270DLC

Continued on next page

HX00125,00000B4 -19-19APR06-1/3

0—Hydraulic Motor	15—Valve Plate	41—Roller Bearing	49—Seal
1—Piston (9 used)	20—Swing Motor Cover	42—Roller Bearing	70—Brake Piston
5—Crossover Relief Valve (2 used)	30—Housing	43—Fitting Plug (2 used)	73—Plate (4 used)
10—Shaft	31—Swing Park Brake Check Valve	44—Make-Up Check Valve Plug (2 used)	76—O-Ring
11—Cylinder Block	33—Cap Screw (3 used)	45—O-Ring	77—O-Ring
12—Retainer	35—Poppet (2 used)	47—O-Ring (2 used)	78—Spring (20 used)
13—Plate	36—Spring (2 used)	48—O-Ring (2 used)	79—Friction Plate (3 used)
14—Shoe Plate	40—Cap Screw (4 used)		85—Seal Kit

1. Install swing park brake check valve (31) to housing (30) using cap screws (33).

2. Tighten cap screws (33) to specification.

Specification

Swing Park Brake Check

Valve-to-Housing Cap Screw—

Torque..... 12 N•m
106 lb-in.

NOTE: Perform Step 3 only if roller bearing (42) was removed.

3. Install roller bearing (42) into swing motor cover (20) using plastic hammer.

IMPORTANT: Install inner race of roller bearing (41) with flange facing step side of shaft (10).

4. Install inner race of roller bearing (41) onto shaft (10).

5. Install oil seal (5) to housing (30).

6. Install outer race of roller bearing (41) to housing (30).

IMPORTANT: Wind tape onto spline end of shaft (10) to prevent damage to oil seal (49).

7. Install shaft (10) into housing (30).

8. Install shoe plate (14) to housing (30) with chamfered surface toward housing.

9. Align notches on plate (13) and retainer (12). Install pistons (1).

10. Install retainer (12) and plate (13) to pistons (1) with notches facing shoe plate (14).

11. Apply hydraulic oil into piston hole in cylinder block (11).

12. Insert piston (1) assembly into cylinder block (11).

13. Install cylinder block (11) assembly to shaft (10).

IMPORTANT: There are four notches on outer side of plates (73) and four notches on spline teeth side of friction plates (79).

IMPORTANT: Align each notch at same place when installing.

14. Alternately install plates (73) and friction plates (79) to housing (30).

15. Install O-rings (76, 77) to housing (30).

16. Align mating marks and install brake piston (70).

17. Install springs (78) to brake piston (70).

18. Install O-ring (45) to swing motor cover (20).

19. Install valve plate (15) to swing motor cover (20) with notch in port facing toward cylinder block (11).

20. Apply grease to valve plate (15) to help retain to swing motor cover (20).

21. Apply grease to roller bearing (42) ID to ease shaft (10) installation.

22. Align mating marks on swing motor cover (20) and housing (30). Install cap screws (40) and tighten to specification.

Specification

Valve Casing-to-Housing Cap
Screw—270DLC—Torque 430 N•m
320 lb-ft

23. Install poppets (35) and spring (36). Tighten make-up check valve plug (44) with O-ring (48) attached.

Specification

Make-up Check Valve Plug—
270DLC—Torque 539 N•m
400 lb-ft

24. Install crossover relief valves (5) into swing motor cover (20).

Specification

Crossover Relief Valve—
Torque 177 N•m
130 lb-ft

HX00125,00000B4 -19-19APR06-3/3

Swing Motor and Park Brake Inspection

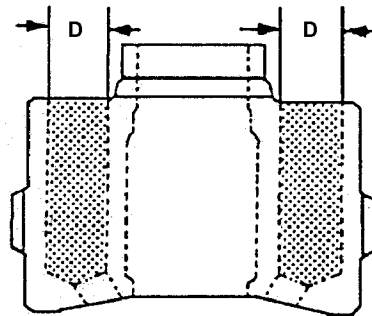
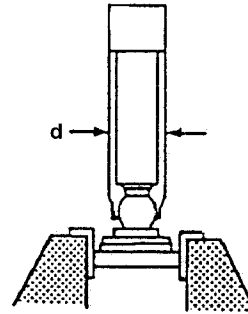
1. Measure clearance between outer diameter of piston and inner bore of cylinder.

Specification

Piston-to-Cylinder—240DLC—
Clearance 0.027 mm (0.0011 in.) new
0.052 mm (0.0020 in.) maximum
used

Specification

Piston-to-Cylinder—270DLC—
Capacity 0.028 mm (0.0011 in.) new
0.058 mm (0.002 in.) maximum
used



T142067

T142067 -UN-22JUN01

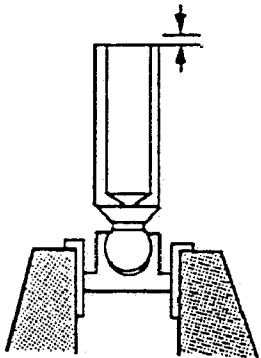
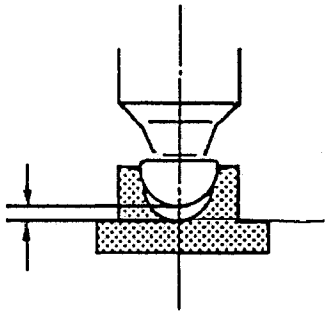
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HX00125,000008A -19-19APR06-1/3

2. Measure clearance between piston and slipper.

Specification

Piston-to-Slipper—Clearance 0.0 mm (0.0 in.) new
0.3 mm (0.012 in.) maximum
used



T142069

T142069 -UN-22JUN01

Continued on next page

HX00125,000008A -19-19APR06-2/3

3. Measure thickness of slipper.

Specification

Slipper—Thickness..... 5.5 mm (0.217 in.) new
5.3 mm (0.209 in.) minimum

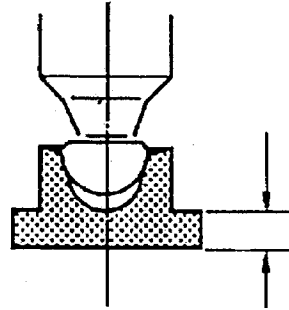
4. Measure thickness of friction plate.

Specification

Friction Plate—240DLC—
Thickness..... 2.0 mm (0.079 in.) new
1.8 mm (0.071 in.) minimum

Specification

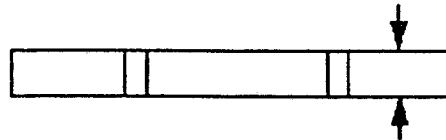
Friction Plate—270DLC—
Thickness..... 2.0 mm (0.079 in.) new
1.6 mm (0.063 in.) minimum



T142072

Slipper Thickness

T142072 -UN-22JUN01



T142073

Friction Plate Thickness

T142073 -UN-22JUN01

HX00125,000008A -19-19APR06-3/3

Swing Motor and Park Brake Start-Up Procedure

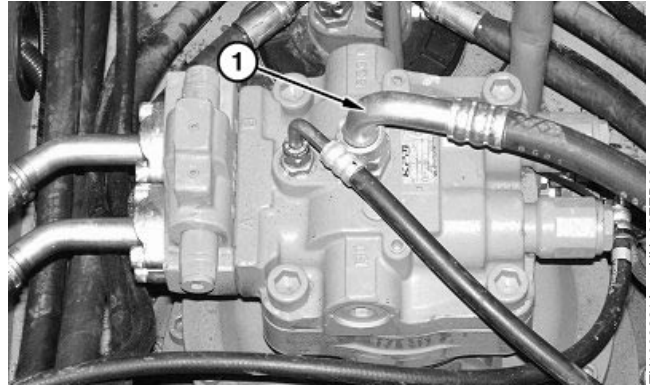
IMPORTANT: Swing motor will be damaged if not filled with oil before operating swing function. Start-up procedure must be performed whenever a new swing motor is installed or oil has been drained from the motor.

NOTE: Procedure is to ensure swing motor is filled with oil.

1. Disconnect swing motor hydraulic line (1).
2. Fill motor with Hydraulic Oil through port until oil reaches level of port. (Operator's Manual.)

NOTE: Air must be allowed to escape from the swing motor while filling.

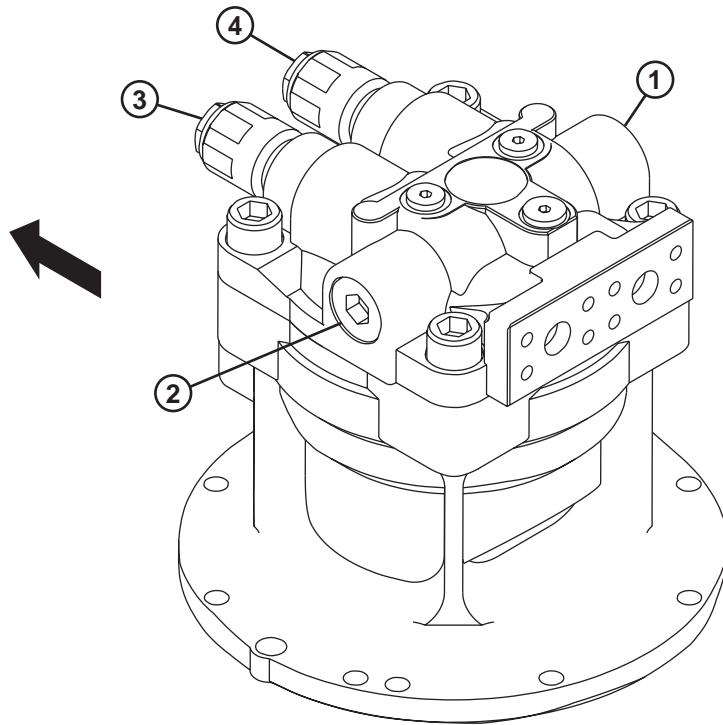
3. Connect hydraulic line (1).



1—Hydraulic Line

HX00125,000008C -19-26APR06-1/1

Crossover Relief Valve and Make-Up Check Valve Remove and Install



T139645

1—Make-Up Check Valve

2—Make-Up Check Valve

3—Crossover Relief Valve

4—Crossover Relief Valve

T139645 -UN-30APR01

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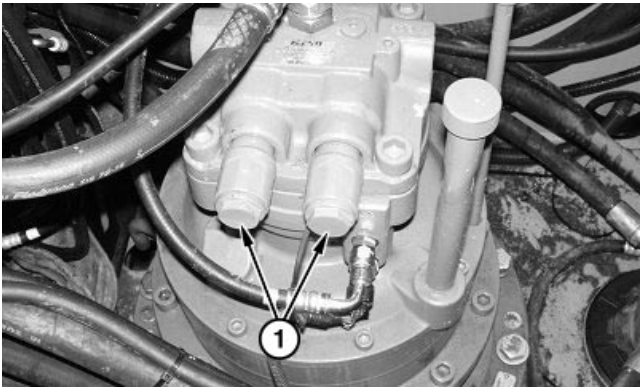
HX00125,000008D -19-19APR06-1/3

Remove and Install Crossover Relief Valve

- 1. Remove crossover relief valves (1).
- 2. Replace crossover relief valves (1) as necessary.
- 3. Install crossover relief valves (1). Tighten to specification.

Specification	
Crossover Relief Valve—Torque.....	177 N•m 130 lb-ft

- 4. Check crossover relief valve pressure setting. See Swing Motor Crossover Relief Valve Test and Adjustment—240DLC, or Swing Motor Crossover Relief Valve Test and Adjustment—270DLC. (Group 9025-25.)



TX1003161A -UN-02FEB06

1—Crossover Relief Valve (2 used)

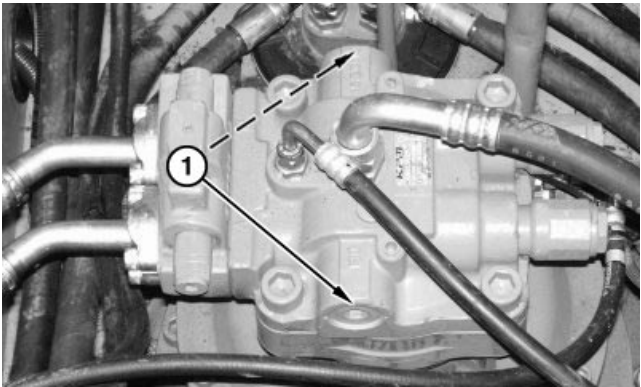
HX00125,000008D -19-19APR06-2/3

Remove and Install Make-Up Check Valve

- 1. Remove make-up check valves (1).
- 2. Repair or replace parts as necessary. See Make-Up Check Valve Disassemble and Assemble. (See procedure in this group.)
- 3. Install make-up check valves (1). Tighten to specification.

Specification	
Make-Up Check Valve— 240DLC—Torque.....	334 N•m 245 lb-ft

Specification	
Make-Up Check Valve— 270DLC—Torque.....	539 N•m 400 lb-ft



TX1003232A -UN-02FEB06

1—Make-Up Check Valve (2 used)

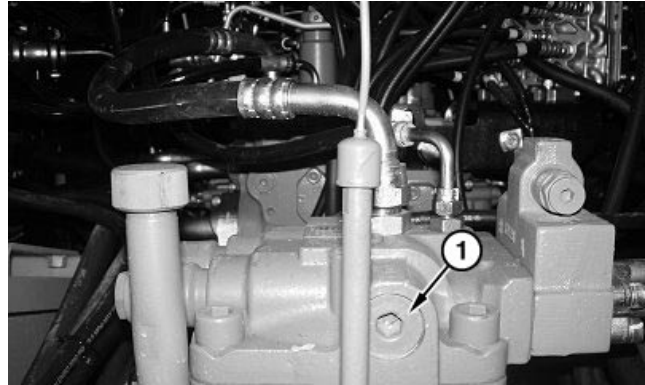
HX00125,000008D -19-19APR06-3/3

Make-Up Check Valve Disassemble and Assemble

Disassemble and Assemble Make-Up Check Valve—240DLC and 270DLC

1. Remove make-up check valves (1). See Crossover Relief Valve and Make-Up Check Valve Remove and Install. (See procedure in this group.)

1—Make-Up Check Valve (2 used)

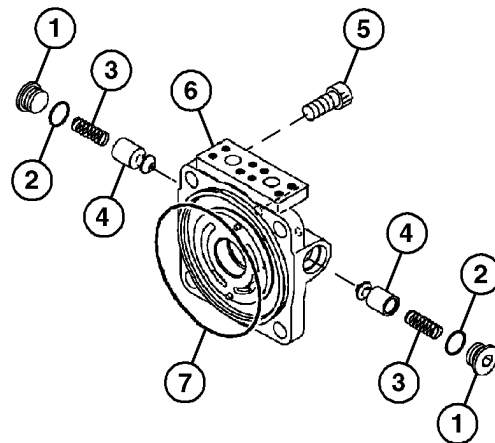


TX1003721A -UN-16FEB06

HX00125,000008E -19-25APR06-1/2

2. Examine O-rings (2), springs (3), and poppets (4) for wear and damage.
3. Replace parts as necessary.
4. Install O-rings (2), springs (3), poppets (4), and make-up check valve plugs (1).
5. Tighten make-up check valve plugs (1) to specification. See Crossover Relief Valve and Make-Up Check Valve Remove and Install. (See procedure in this group.)

1—Make-Up Check Valve Plug (2 used)
 2—O-Ring (2 used)
 3—Spring (2 used)
 4—Poppet (2 used)
 5—Cap Screw (4 used)
 6—Swing Motor Top Plate
 7—O-Ring



TX1003722 -UN-16FEB06

HX00125,000008E -19-25APR06-2/2

Swing Dampener Valve Remove and Install

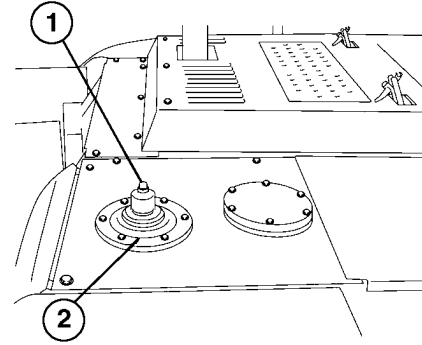


CAUTION: To avoid injury from escaping fluid under pressure, stop engine and relieve the pressure in the system before disconnecting or connecting hydraulic or other lines. Tighten all connections before applying pressure.



CAUTION: High pressure release of oil from pressurized system can cause serious burns or penetrating injury. The hydraulic tank is pressurized. Relieve pressure by pushing pressure release button (1).

1. Push pressure release button (1).
2. Pull vacuum in hydraulic oil tank using vacuum pump or drain hydraulic oil tank. See 240DLC Drain and Refill Capacities, or 270DLC Drain and Refill Capacities. (Operator's Manual.)



1—Pressure Release Button
2—Hydraulic Oil Tank Cover

T214924 -UN-17NOV05

Continued on next page

HX00125,000008F -19-21APR06-1/4

3. Remove cap screws (1), flange fittings (3) and hydraulic lines. Close all lines and fittings using caps and plugs.

NOTE: Two O-rings are between dampener valve and swing motor and two O-rings are on hydraulic lines.

4. Remove dampener valve (2).
5. Repair and replace parts as necessary. See Disassemble and Assemble Swing Dampener Valve. (See procedure in this group.)

IMPORTANT: Be sure two O-rings are installed on dampener valve face towards swing motor and two O-rings on hydraulic lines.

IMPORTANT: Use grease to hold O-rings in place while installing.

6. Install O-rings.

IMPORTANT: Hand tighten split flange cap screws taking care not to pinch O-rings.

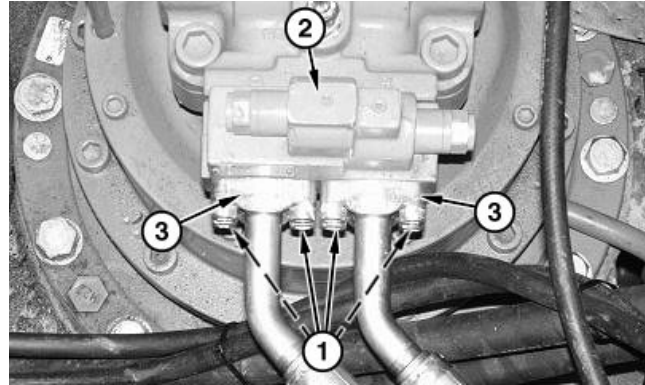
IMPORTANT: Tighten cap screws alternately in a diagonal pattern.

7. Install swing dampener valve (2), hydraulic lines, flange fittings (3) and cap screws (1).

8. Tighten cap screws to specification.

Specification

Dampener Valve to Swing Motor	
Cap Screw—Torque	60 N•m 42 lb-ft

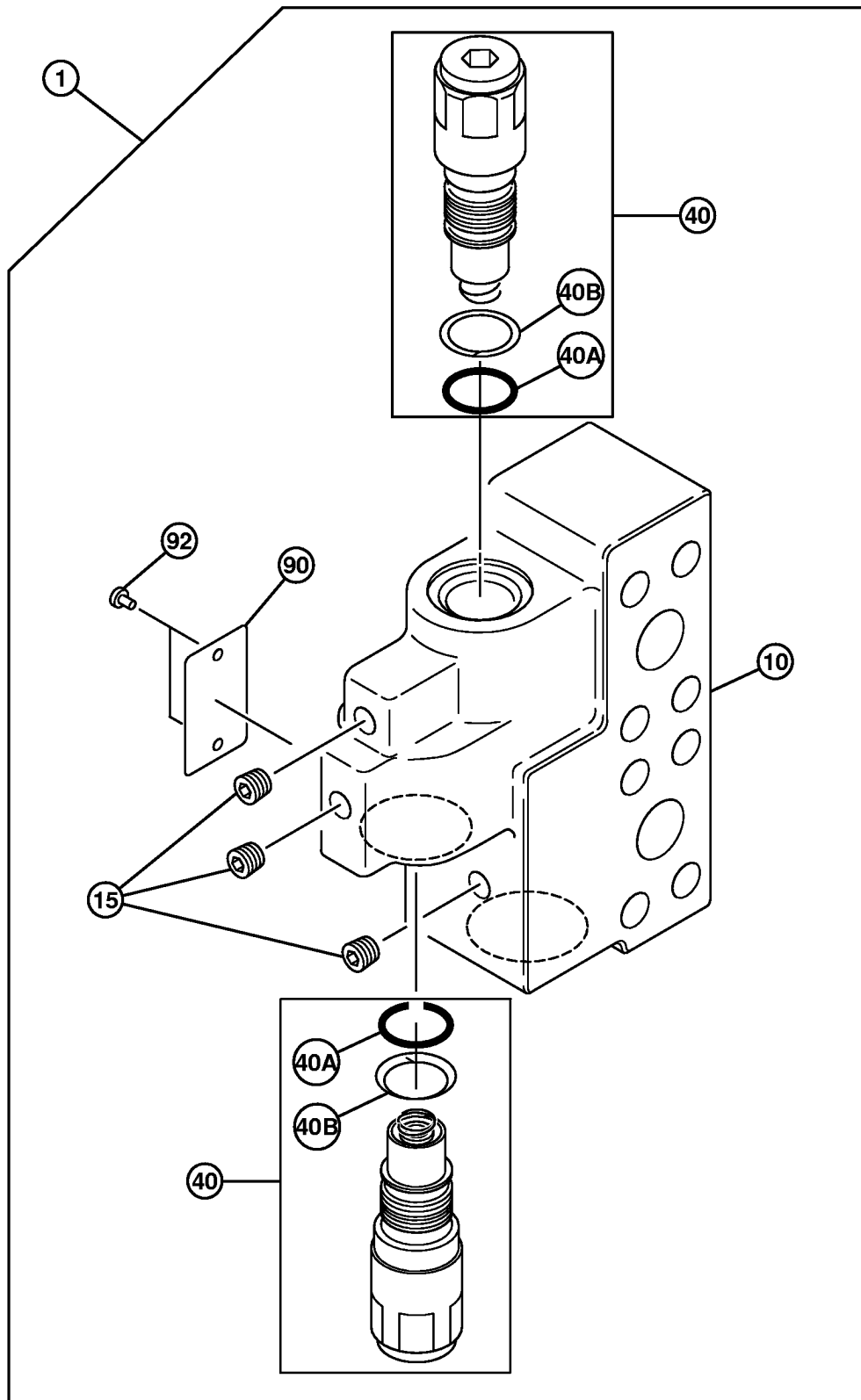


1—Cap Screw (8 used)
2—Swing Dampener Valve
3—Flange Fitting (4 used)

TX1003233 -UN-07FEB06

Continued on next page

HX00125,000008F -19-21APR06-2/4



TX1000411

1—Swing Dampener Valve
10—Housing

15—Pipe Plug (3 used)
40—Valve (2 used)

40A—O-Ring (2 used)
40B—Backup Ring (2 used)

90—Plate
92—Cap Screw (2 used)

Continued on next page

HX00125,000008F -19-21APR06-3/4

TX1000411 -JUN-16NOV05

43
4360
27

Disassemble and Assemble Swing Dampener Valve

1. Remove dampener valve. See Remove and Install Swing Dampener Valve. (See procedure in this group.)
2. Remove valves (40) from housing (10).
3. Inspect valves (40), O-rings (40A) and backup rings (40B).
4. Replace parts as necessary.

5. Install valves (40), O-rings (40A) and backup rings (40B) into swing motor cover (10).
6. Tighten valves to specification.

Specification

Swing Dampener Valve—
Torque..... 60 N•m
42 lb-ft

HX00125,000008F -19-21APR06-4/4

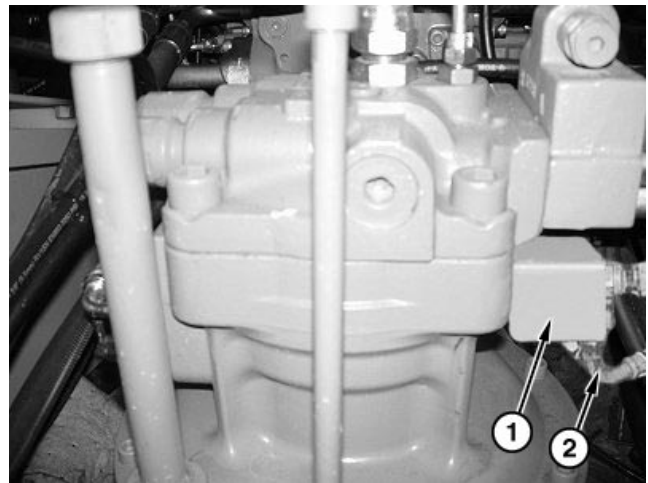
Swing Park Brake Check Valve and Orifice Remove and Install—270DLC

NOTE: Swing Park Brake Check Valve is internally located in swing motor on 240DLC. See Swing Motor and Park Brake Disassemble. (See procedure in this group.)

1. Disconnect electrical connector.
2. Disconnect hydraulic line (2).
3. Remove cap screws (3 used) and remove swing park brake check valve (1).
4. Replace valve as necessary.
5. Install in reverse order. Tighten cap screws to specification.

Specification

Swing Park Brake Check
Valve-to-Swing Motor Mounting
Cap Screws—Torque..... 12 N•m
106 lb-in.



1—Swing Park Brake Check Valve
2—Hydraulic Line

TX1003160 -UN-02FEB06

HX00125,0000090 -19-20MAR06-1/1

Section 99 Dealer Fabricated Tools

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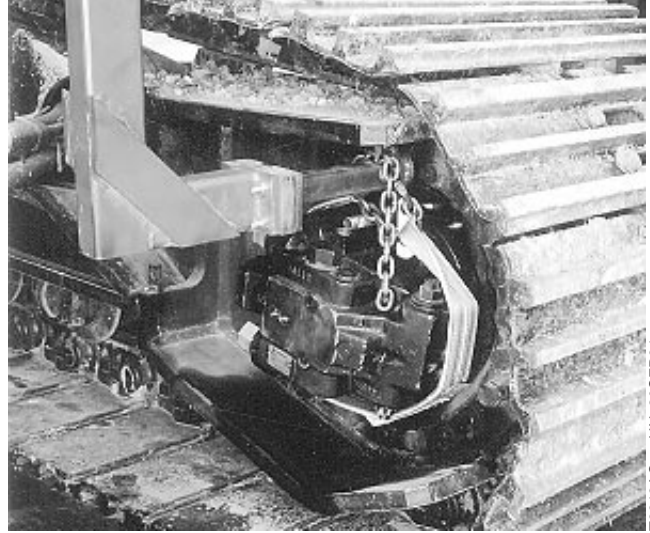
DF1063 Lift Bracket

Tool is the same as used on other machines. Only the lift bracket of the tool is used for this machine with adapter DFT1130.

Lift Bracket is used to remove and install travel motor.

Material required:

- 38.1 mm x 76.2 mm x .48 mm (1-1/2 in. x 3 in. x 3/16 in.) Square Tube
- 1.3 mm (1/2 in.) 1020 Steel Plate
- 1 mm x 38.1 mm (3/8 in. x 1-1/2 in.) Cap Screw with Nut (4 used)



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T8318AC -UN-20SEP94

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HX00125,00000E8 -19-11APR06-1/2



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.

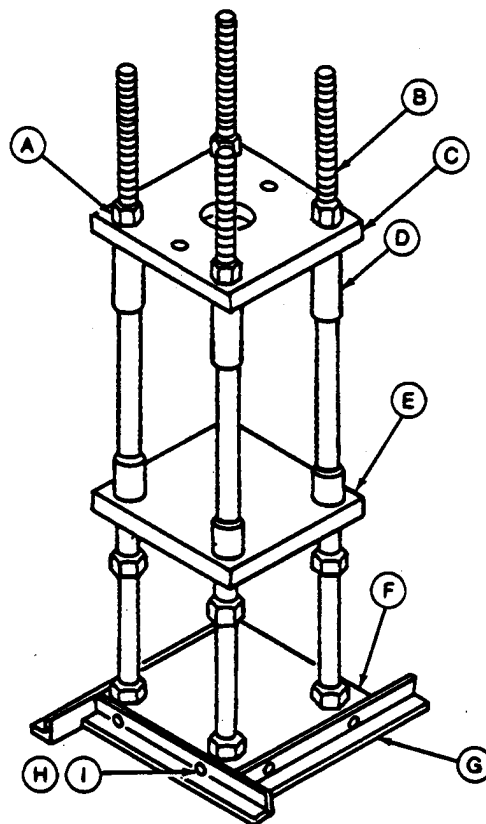
Track Recoil Spring Disassembly and Assembly Tool (compression tool) is used with hydraulic jack to compress recoil spring in track adjuster repair.

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)
- C-ST4036 Holder (Plate)
- C-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



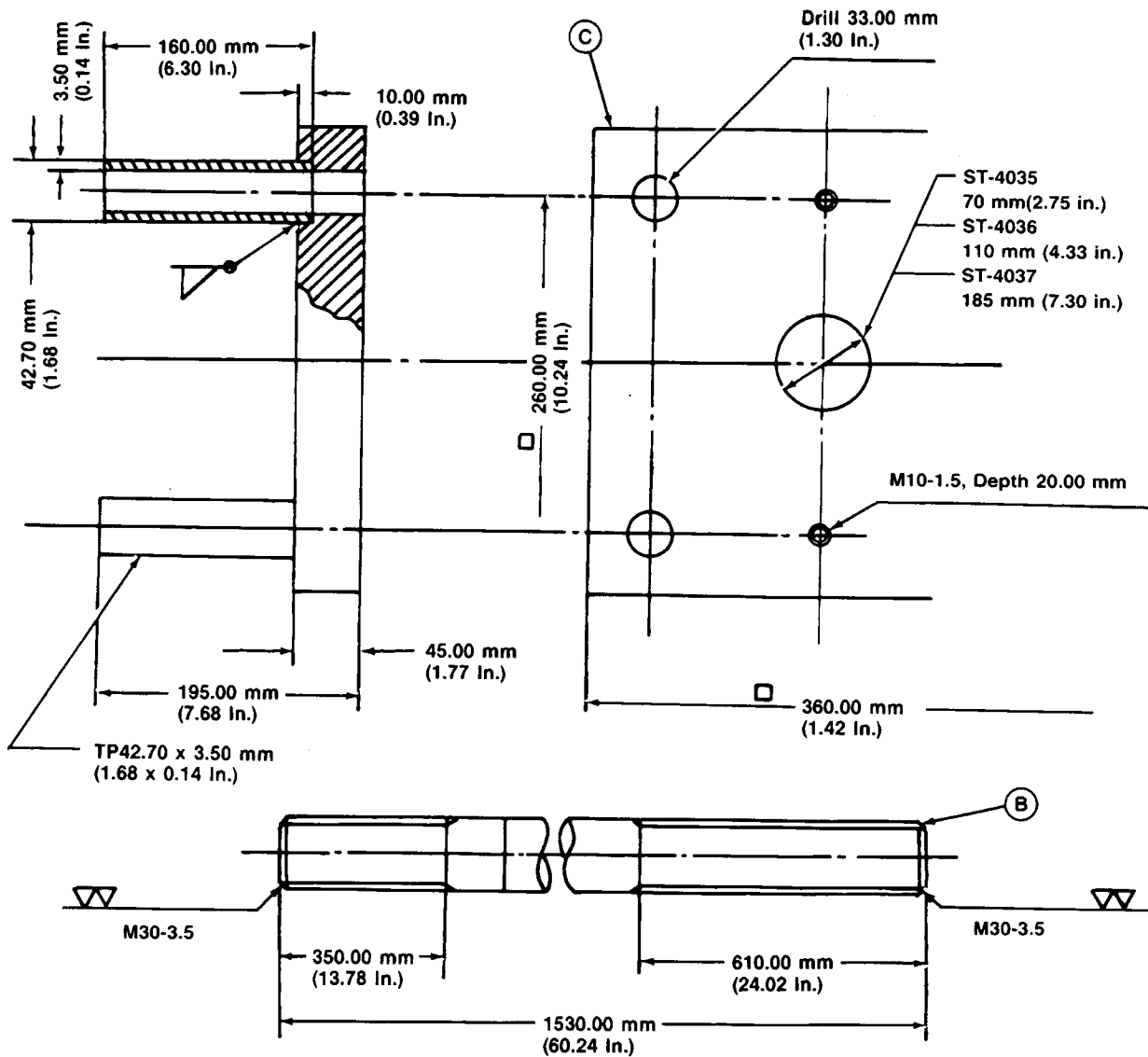
- A—Nut (12 used)
- B—Stud (4 used)
- C—Holder
- D—Eyebolt (2 used)
- E—Supporting Plate
- F—Base Plate
- G—Base (4 used)
- H—Cap Screw (4 used)
- I—Lock Washer (8 used)

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T6585UY -UN-24MAR98

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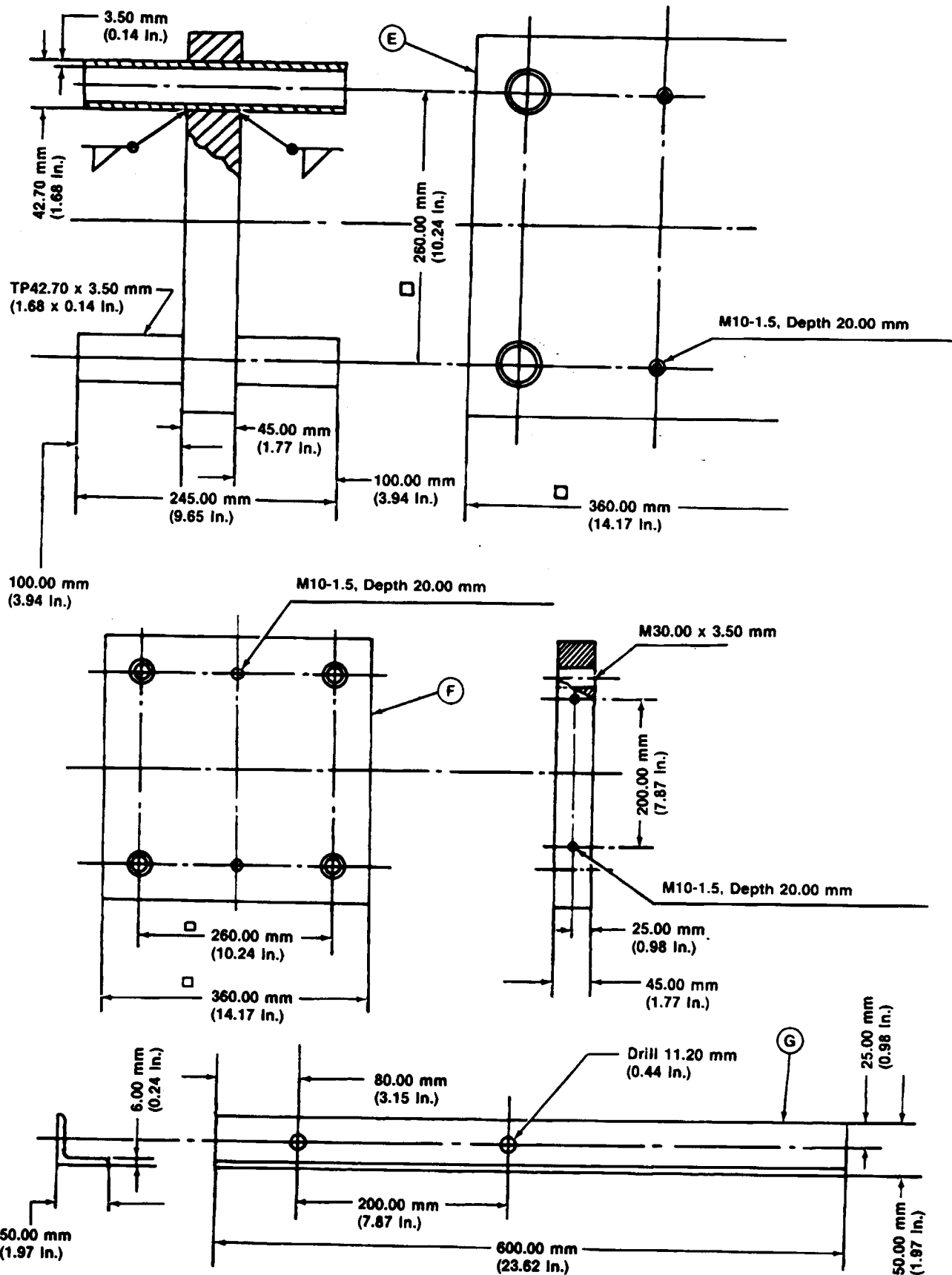
TX,99,SB548 -19-08JAN97-1/4



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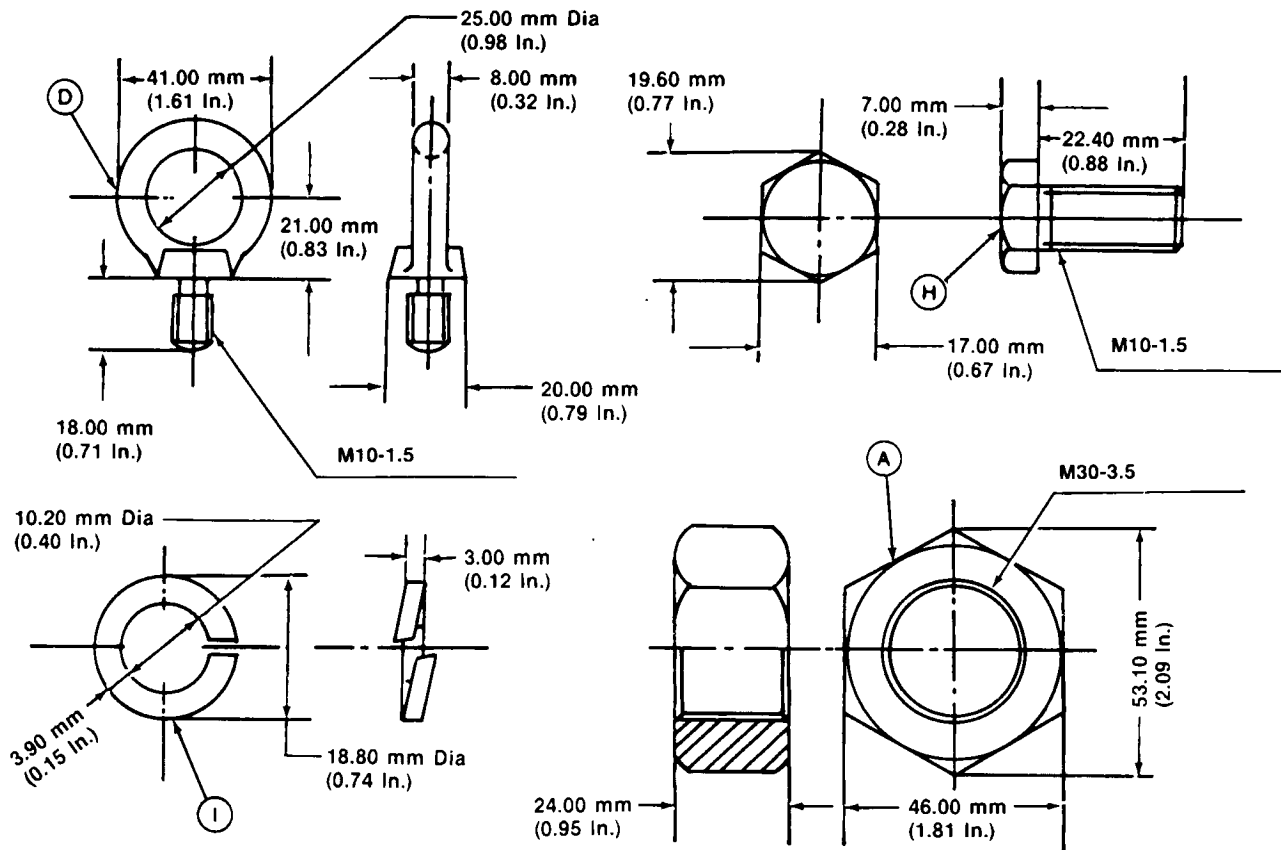
TX,99,SB548 -19-08JAN97-2/4

T7029C1 -UN-06JUL89



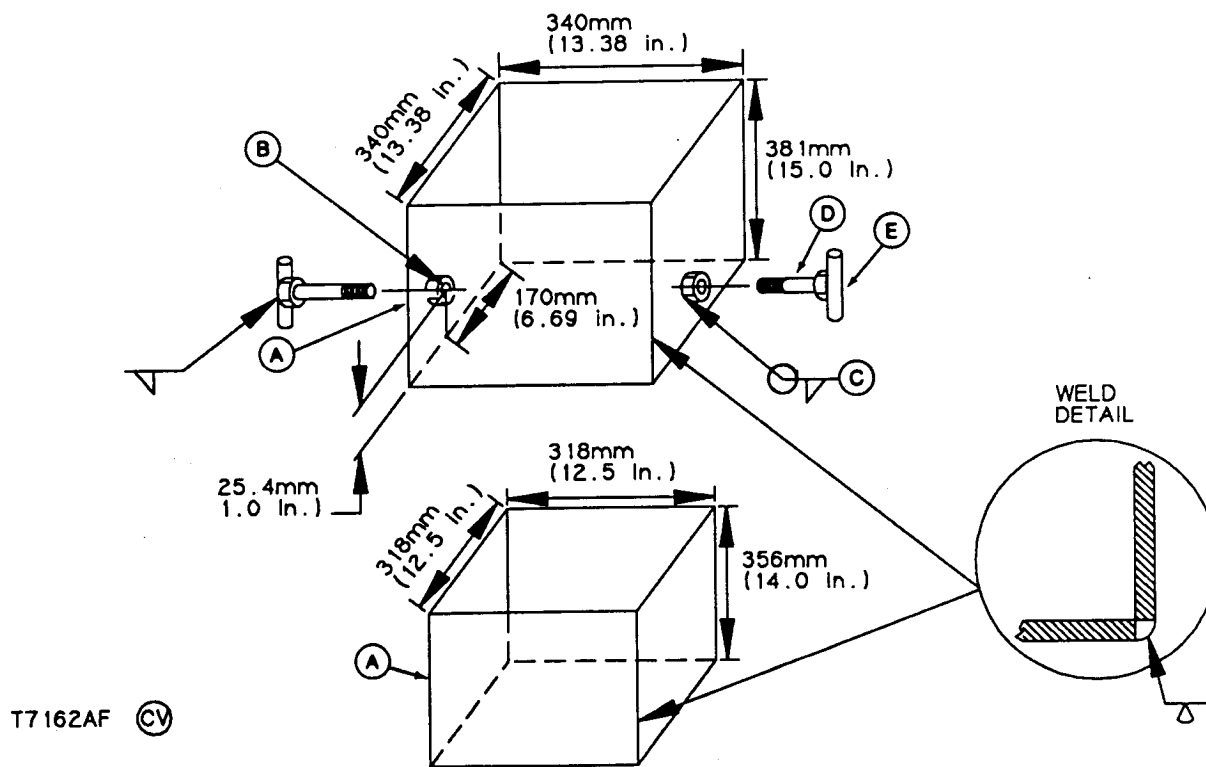
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TX,99,SB548 -19-08JAN97-3/4



T7029CG -UN-06JUL89

TX,99,SB548 -19-08JAN97-4/4

DFT1087 Track Recoil Spring Disassembly and Assembly Guard Tool

A—3/16 in. 1020 CR Steel Plate C—1/2 in. Nut (2 used)
B—9/16 in. Hole (2 places)

D—1/2 x 2 in. Cap Screw (2 used)

E—1/2 x 3 in. Steel Round Stock (2 used)

Track Disassembly and Assembly Guard Tool is used with ST4920 Track Recoil Spring Disassembly and Assembly Tool.

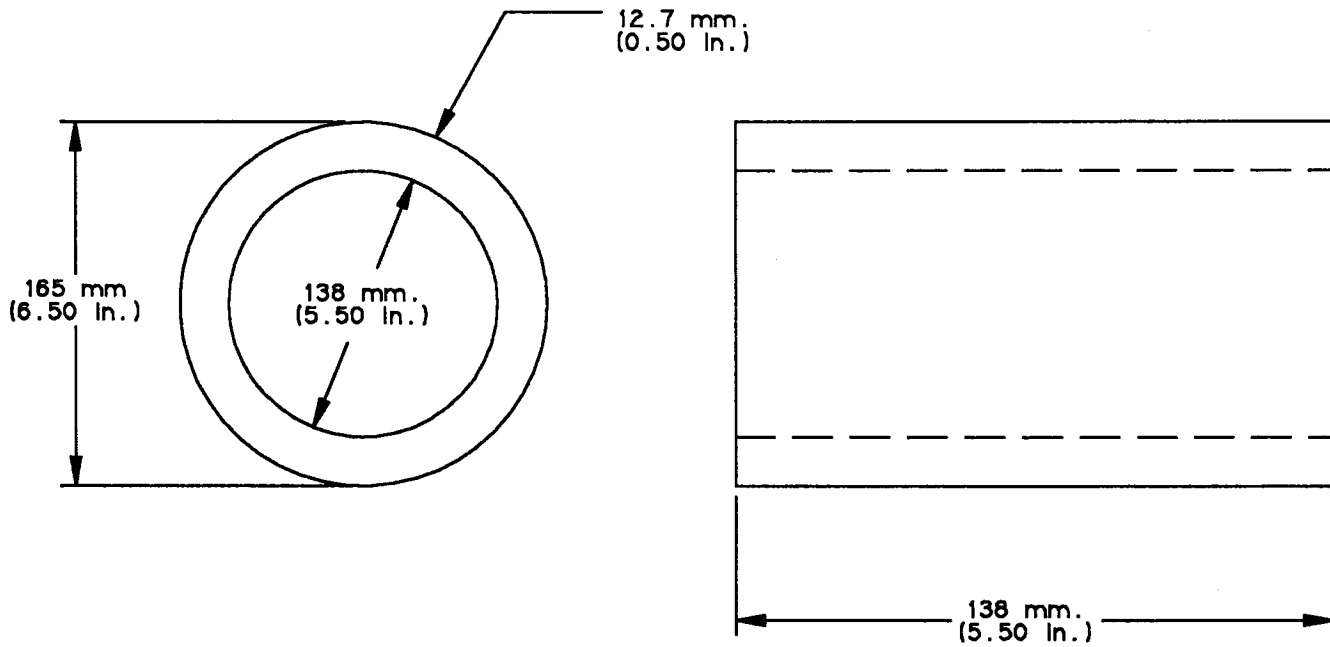
Material required:

- 3/16 in. 1020 CR Steel Plate (A)
- 9/16 in. Hole (2 places) (B)
- 1/2 in. Nut (2 used) (C)
- 1/2 x 2 in. Cap Screw (D) (2 used)
- 1/2 x 3 in. Steel Round Stock (E) (2 used)

TX,99,SB542 -19-08JAN97-1/1

T7162AF -UN-17OCT89

DFT1110 Spacer



T7708AC (CV)

Spacer is used with ST4920 Track Recoil Spring Disassembly and Assembly Tool. Spacer is installed on the bottom plate so force is applied to spring flange on cylinder and not to the piston.

Cut the ends of spacer so they are parallel to each other.

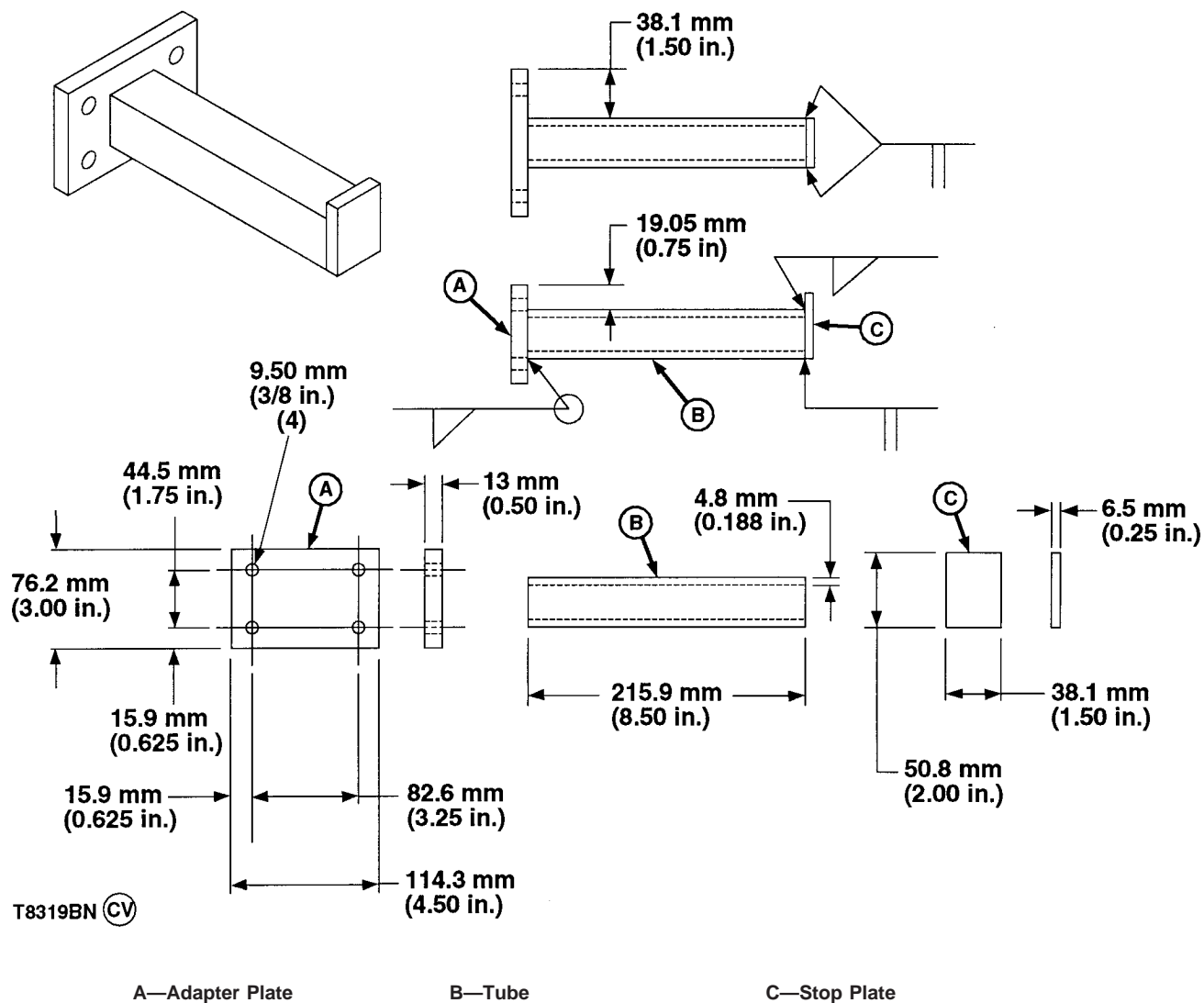
Material Required:

- 165 x 138 x 138 mm (6.50 x 5.50 x 5.50 in.) Heavy Wall Steel Pipe

T7708AC -UN-23FEB92

TX,99,SB549 -19-08JAN97-1/1

DFT1130 Adapter



Adapter is used with DF1063 Lift Bracket to remove and install travel motor.

Material required:

- 1.3 mm (1/2 in.) 1020 Steel Plate (A)
- 38.1 mm x 38.1 mm x .48 mm (1-1/2 in. x 1-1/2 in. x 3/16 in.) Square Tube (B)
- .6 mm (1/4 in.) 1020 Steel Plate (C)

T8319BN -UN-20SEP94

HX00125,00000E9 -19-11APR06-1/1

Center Joint Lifting Tool

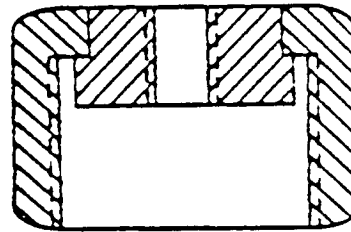
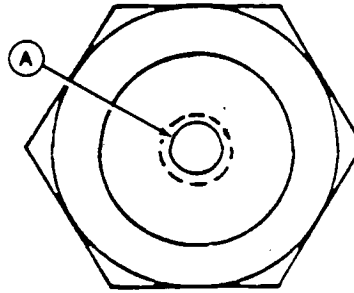
Tool is used to remove and install center joint.

Drill and tap disk in fitting cap to M8-1.25 mm threads (A).

Material required:

- 38H1416 Cap (—12)
- M8-1.25 Lifting Eyebolt such as JT05548 Metric Lifting Eyebolt

A—Threads

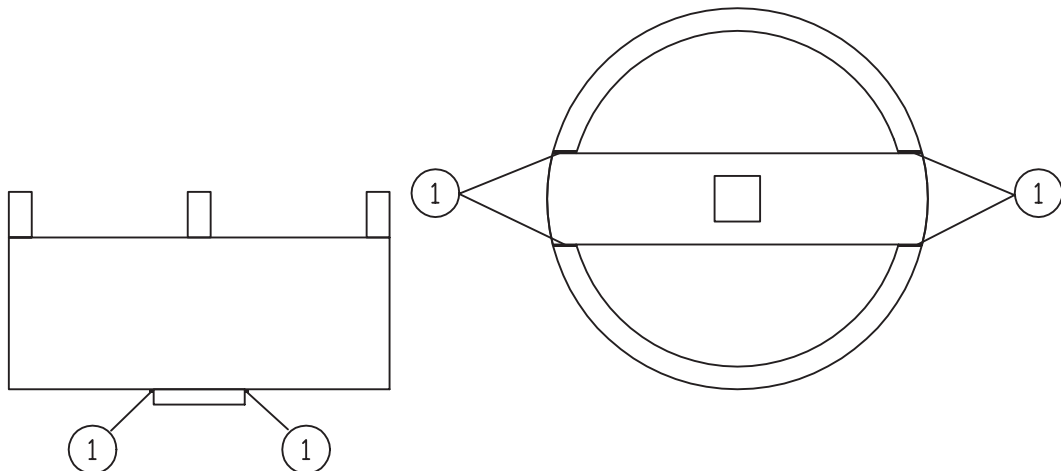
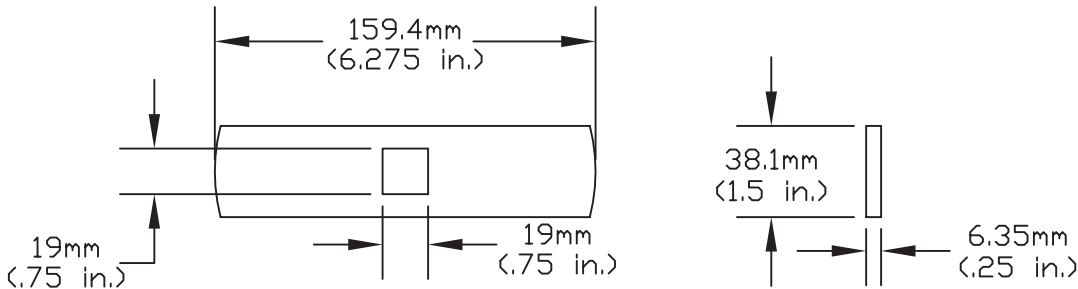
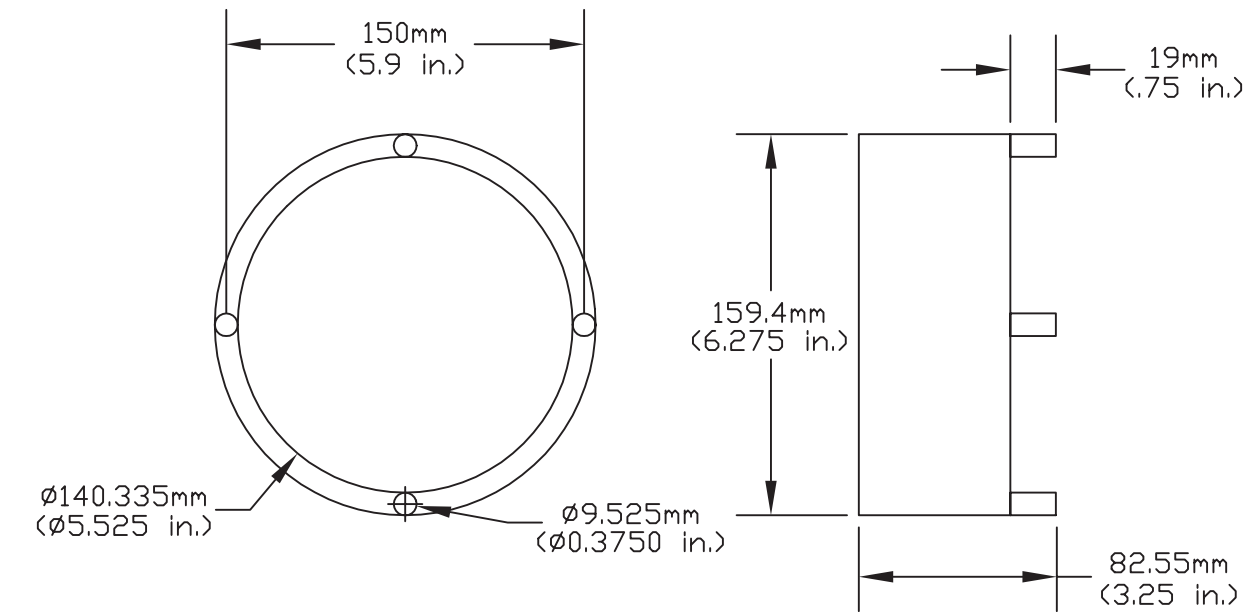


T6641DO -UN-24OCT88

HX00125,000006D -19-06FEB06-1/1

DFT1220 Swing Gearbox Nut Spanner Wrench

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T143704

T143704 -UN-17JUL01

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1—Weld (4 Places)

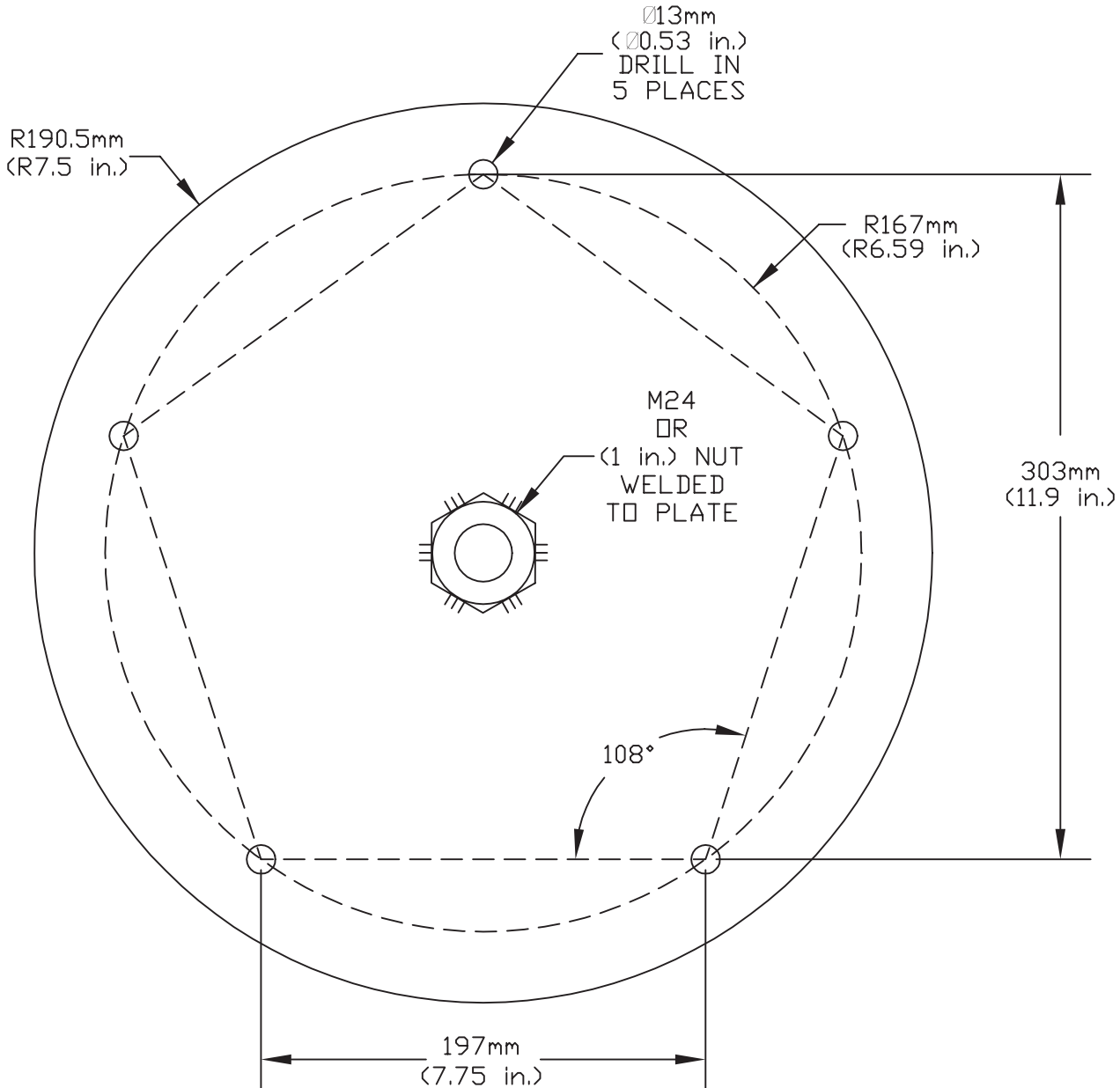
Material required:

- 159.4 x 38.1 x 6.35 mm (6.65 x 1.5 x .25 in.)
- 159.4 x 82.5 mm (6.275 x 3.25 in.) Steel Tubing

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OUOE047,000000E -19-19NOV01-2/2

DFT1221 Travel Gearbox Nut Wrench



T143628

Travel Gearbox Nut Wrench is used to remove and install the bearing nut on the travel gearbox.

The tool is used with a socket and drive tool to fit the nut welded to the plate.

Material required:

- 16 mm (5/8 in.) Flat Stock
- M24 (1 in.) Nut
- M12-1.75 x 45 mm or (1/2-20 x 1 3/4 in.) Cap Screw (5 used)
- M12-1.75 or (1/2-20) Nut (5 used)

T143628 -19-16JUL01

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