

SPECIFICATION TABLES

Operating mass	Rubber crawler	Canopy	kg (lb)	–
		Cab	kg (lb)	1865 (4110)
	Steel crawler	Canopy	kg (lb)	–
		Cab	kg (lb)	1915 (4220)
Rated horse power*	NET (IOS 14396)		kW (hp)	11.5 (15.4)
			min ⁻¹ (rpm)	2400 (2400)
	NET (IOS 9249/SAEJ1349)		kW (hp)	11.1 (14.9)
			min ⁻¹ (rpm)	2400 (2400)
Bucket capacity	Heaped capacity		m ³ (ft. ³)	0.038 (1.34)
	Struck capacity		m ³ (ft. ³)	0.028 (0.99)

Performance

Standard loading mass			kg (lb)	70 (150)
Slew speed			min ⁻¹ (rpm)	9.2 (9.2)
Travel speed	Rubber crawler	1st	km/h (mph)	2.2 (1.37)
		2nd	km/h (mph)	4.2 (2.61)
	Steel crawler	1st	km/h (mph)	2.1 (1.30)
		2nd	km/h (mph)	4.0 (2.49)
Maximum tractive force			kN (lbf)	19.4 (4360)
Gradeability			%	58
			deg.	30
Ground pressure	Rubber crawler	Canopy	kPa (psi)	–
		Cab	kPa (psi)	31.0 (4.50)
	Steel crawler	Canopy	kPa (psi)	–
		Cab	kPa (psi)	34.5 (5.00)
Noise level	Sound-power level		dB (A)	L _{WA} 93
	Sound-pressure level*		dB (A)	L _{PA} 78

*: At the operator location as stipulated by ISO 6396: 2008.

Dimensions of completed machine

Overall length	Standard arm		mm (in.)	–
	Middle arm		mm (in.)	–
	Long arm		mm (in.)	3870 (152.3)
Overall width	During normal operation		mm (in.)	1300 (51.2)
	Track retracted		mm (in.)	1055 (41.5)
Overall height	Rubber crawler	Canopy	mm (in.)	–
		Cab	mm (in.)	2360 (92.8)
	Steel crawler	Canopy	mm (in.)	–
		Cab	mm (in.)	–

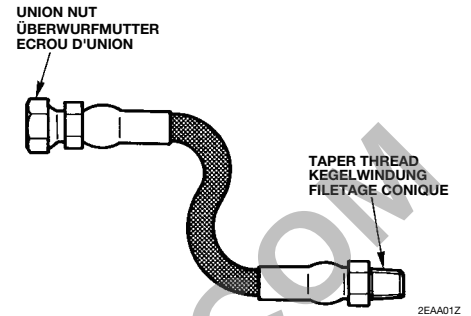
Dimensions of base machine

Overall length of base machine		mm (in.)	1755 (69.1)
Overall width of base machine	During normal operation	mm (in.)	1300 (51.2)
	Track retracted	mm (in.)	1055 (41.5)
Upper structure overall width		mm (in.)	1055 (41.5)
Upper structure overall width	Left	mm (in.)	550 (21.7)
	Right	mm (in.)	505 (19.9)

TIGHTENING TORQUE

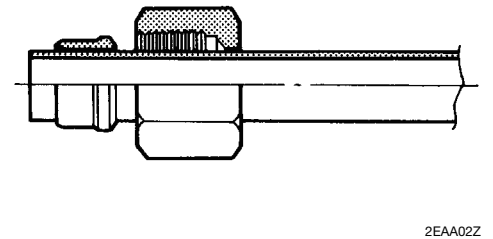
Hydraulic hose

Hose fitting size	Tightening torque			
	Union nut (G)		Taper thread (R)	
	N·m	ft.-lb	N·m	ft.-lb
1/8	9.8 ^{+4.9} ₀	7.3 ^{+3.5} ₀	11.8 ± 1.2	8.7 ± 0.8
1/4	24.5 ^{+4.9} ₀	18.1 ^{+3.5} ₀	29.4 ± 2.9	21.7 ± 2.1
3/8	49.0 ^{+4.9} ₀	36.2 ^{+3.5} ₀	53.9 ± 5.4	39.8 ± 3.9
1/2	58.8 ^{+4.9} ₀	43.4 ^{+3.5} ₀	88.3 ± 8.8	65.1 ± 6.4
3/4	117.7 ^{+4.9} ₀	86.8 ^{+3.5} ₀	147.1 ± 14.7	108.5 ± 10.7
1	137.3 ^{+4.9} ₀	101.3 ^{+3.5} ₀	196.1 ± 19.6	144.7 ± 14.3



Bite-type pipe fitting for steel pipe

Outer diameter of pipe (mm)	Tightening torque	
	N·m	ft.-lb
8	34.3 ± 4.9	23.5 ± 3.5
10	41.7 ± 2.5	30.7 ± 1.7
12	58.8 ± 4.9	43.4 ± 3.5
15	88.3 ± 4.9	65.1 ± 3.5
16	93.2 ± 4.9	68.7 ± 3.5
18	132.4 ± 4.9	97.6 ± 3.5
22	205.9 ± 9.8	151.8 ± 7.2
27.2	245.2 ± 9.8	181.0 ± 7.2
28	313.8 ± 19.6	231.4 ± 14.3
32	313.8 ± 19.6	231.4 ± 14.3
35	411.9 ± 19.6	303.7 ± 14.3



Drawing No.	1
03301-00010	1

Removing the engine

1. Remove the battery ground cable from the battery terminal.
2. Remove the covers.
 "Removing the covers"
3. Disconnect the hoses, and take out the air cleaner assembly (18).
4. Loosen the radiator cap, and bleed out the engine coolant from the drain valve (4).
 - Engine coolant volume: 3.8 L (4.0 USqt)
5. Disconnect the hoses (26) and (27) from the radiator assembly (1).
6. Disconnect the hose from the drain valve (4).
7. Disconnect the hose from the sub-tank (13), and remove the sub-tank.
8. Drain the hydraulic oil from the tank.
 "Removing the hydraulic tank"
9. Disconnect the hydraulic hoses from the radiator assembly (9).
10. Remove the fan guard (2).
11. Take out the fixing nuts holding the cushion rubber in place, and remove the radiator assembly (1).
 - Slowly hoist up the radiator assembly while slowly pulling it forward so that the shroud does not strike the cooling fan. : 28 kg (13 lbs)
12. Remove the hydraulic pump.
 "Removing the hydraulic pump"
13. Disconnect the fuel hoses on the engine side.
 "Removing the hydraulic tank"
14. Disconnect the battery cable and the engine electrical wiring on the engine side.
 - Attach an identification label to each wiring. "2. Wire harness diagram"
 "Removing the battery"
15. Disconnect the engine ground cable (20).
16. Take out the nuts, and suspend the engine.
 - Adjust the clearance between the engine hood and the stopper (6). Upper side of the nut: 54.9 N·m (40.5 ft-lb)
 Lower side of the nut: 44.1 N·m (32.5 ft-lb)
 Refer to the construction diagram
 : 103 kg (227 lb)

Installing the engine

For installation of the engine, follow the same procedures as for removal but in the reverse order.

The radiator must be mounted at a right angle to the frame and parallel to the cooling fan.

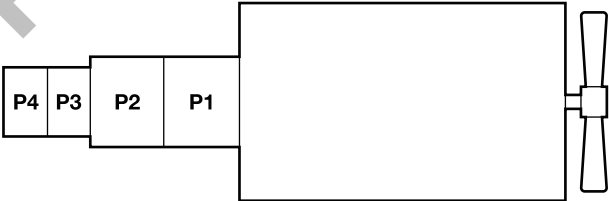
OVERALL MACHINE

No operation is possible.



1. Check the hydraulic oil level.
- Check the hydraulic oil tank level.
- ☞ “4. Disassembly and assembly, Hydraulic oil tank”
- When adding, use the same brand of oil currently being used.
- ☞ “2. Service data, Fuel and lubricant table”

2. Check the hydraulic pump.
- Check the discharge pressure of the pumps P1 and P2 (piston pumps).
- ☞ “2. Service data, Performance criteria”
 - ☞ “5. Troubleshooting, Piston pump”
- Check the pumps P3 and P4 (gear pumps).
- ☞ “2. Service data, Performance criteria”
 - ☞ “5. Troubleshooting, Piston pump”



2DAA01Z

FOREWORD

This manual, which is written for engineers who service the machine, describes procedures for disassembly and assembly, inspection and maintenance, and troubleshooting, as well as maintenance reference values and an outline of the specifications. Refer to this manual during daily work to improve your services. Note that the information is subject to change without notice due to design modifications made to the machine from time to time by the manufacturer.

Directional terms: front, rear, left, right

In this manual, the “front” refers to the end of the machine where the dozer blade is mounted, while the “rear” refers to the other end where the travel motor is mounted. The “right” or “left” refers to the side viewed by a person sitting in the operator’s seat.

Machine serial number

The machine serial number is stamped on the identification plate. Be sure to include this number when sending a report or inquiry or when ordering parts.

Control of manual

Appoint a person in charge of keeping the manuals up to date in your company and inform us of the person’s name for our records. Any revisions or additions to this manual will be sent to the person.

Symbols used in this manual

The symbols used in this manual have the following meanings.

-  Indicates the machine serial number.
-  Means “Refer to the section quoted.”
-  Indicates the mass of the equipment or machine.
-  Means “Tighten to the torque specified here.”
-  Indicates the use of thread-locking compound.
-  Indicates the use of grease.

Manual structure

This manual consists of the following parts.

1. Safety
2. Service data
3. Function
4. Disassembly and assembly
5. Troubleshooting
6. Other

SAFETY ALERT SYMBOL



This symbol represents the safety alert.

The message that follows the symbol contains important information regarding human safety.

Read and understand the message to avoid personal injury or death.

Safety label

Safety labels are used to alert operators or other people exposed to the risks of injury or damage. There are the following three types of labels.

Read the labels carefully as they are important for your safety.



DANGER

The word “DANGER” indicates an imminently hazardous situation which, if not avoided, is likely to result in serious injury or death.



WARNING

The word “WARNING” indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.



CAUTION

The word “CAUTION” indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT: The word “IMPORTANT” is used to alert operators and maintenance personnel about situations which could result in damage to the machine and its components.

This manual is intended for trained and qualified personnel only. Warnings or cautions described in this manual do not necessarily cover all safety measures. It is also impossible to cover all hazards and risks which may be associated with the maintenance of the machine in every environment. For maintenance work, each person must take adequate safety precautions against possible hazards in the respective working environment.

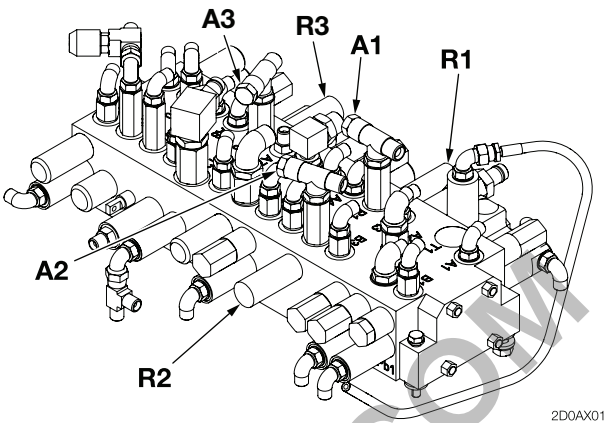
Methods for inspecting performance

Hydraulic oil pressure (Boom, arm, dozer blade)

Measurement method

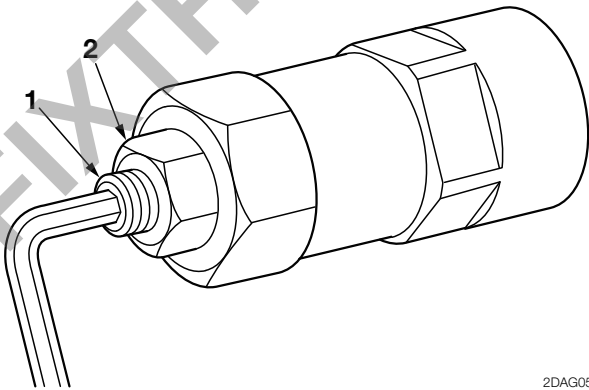
- Engine: Maximum R.P.M.
- Hydraulic oil temp.: 50°C to 60°C (122°F to 140°F)
- Install a pressure gauge on the pressure detection port. Operate the hydraulic circuit to be tested, and measure the relief pressure.

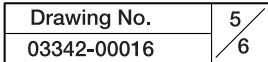
Circuit	Relief valve	Pressure detection port	
		Port	Size
Boom	R1, R2	A1, A2	G1/4
Arm			
Dozer blade	R3	A3	G1/4



Adjustment method

1. Loosen the locknut (2), and turn the setscrew (1) to adjust the set pressure.
 - Turn the setscrew clockwise to increase the set pressure.
 - Turn the setscrew counterclockwise to decrease the set pressure.
2. In order to keep the setscrew (1) from turning after the pressure has been adjusted, tighten the locknut (2) while holding the setscrew (1) firmly in place.
 - 🔑 Lock nut: 30 ± 2 N·m (22.1±1.5 ft.-lb)
3. Operate the relief valve once more to confirm that the pressure that has been set is stabilized.



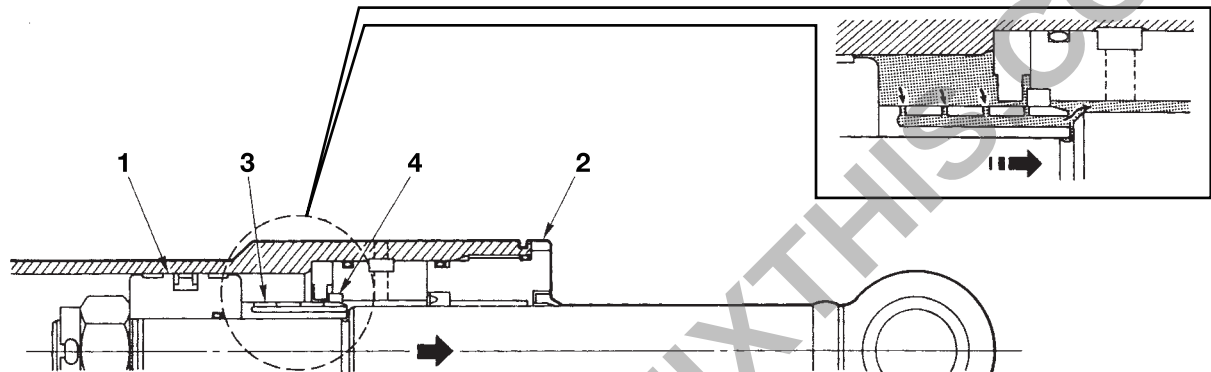


CYLINDERS

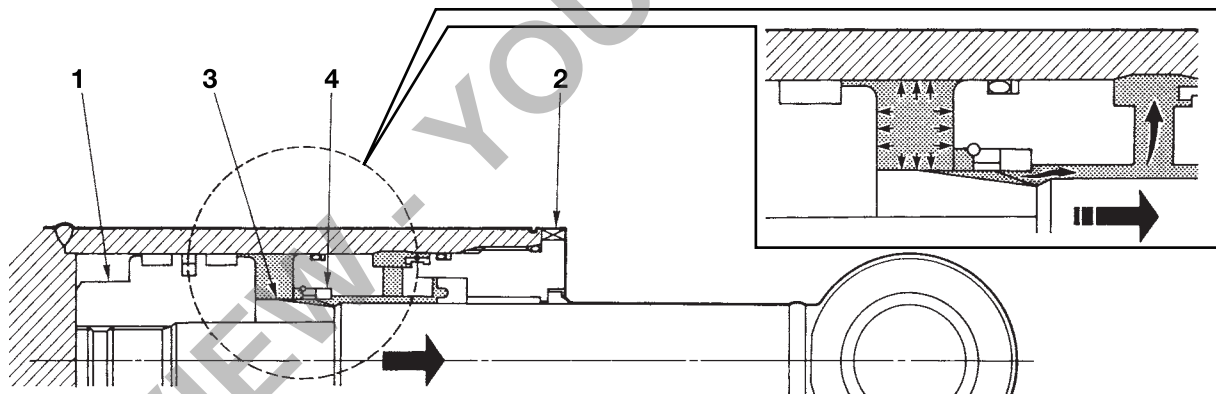
The pressure oil flowing alternately in through the outlet and inlet on both sides (head and rod sides) of the piston acts on the piston and its force causes the piston to move back and forth.

For those cylinders with a cushion mechanism, the shock resulting from the piston colliding with the cover at the stroke end is dampened by the mechanism.

Cushion mechanism



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3LAA02Z

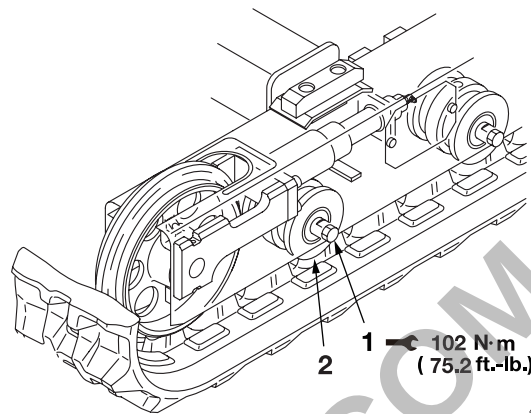
When the piston (1) approaches the stroke end and appears likely to bump into the cover (2), the cushion bearing (3) that is moving ahead of the piston enters the cushion seal (4). Since this shuts off the return channel for the hydraulic oil on the back of the piston, the oil is expelled only from the throttle hole or the groove provided in the cushion bearing (3). This causes the piston (1) backpressure to increase, slowing the piston speed.

Removing the track roller

1. Loosen the crawler tension.
2. Loosen the roller bolt (1) slightly (about one turn).
3. Lift up the machine, take out the bolt (1), and remove the roller (2).

Installing the track roller

1. Temporarily secure the roller (2) in place by tightening down the bolt (1).
2. Tighten the bolt (1) to the stipulated torque.
 -  Bolt: ThreeBond #1324
 -  Bolt: 102 N·m (75.2 ft.-lb.)
3. Lift up the machine, and adjust the crawler tension.



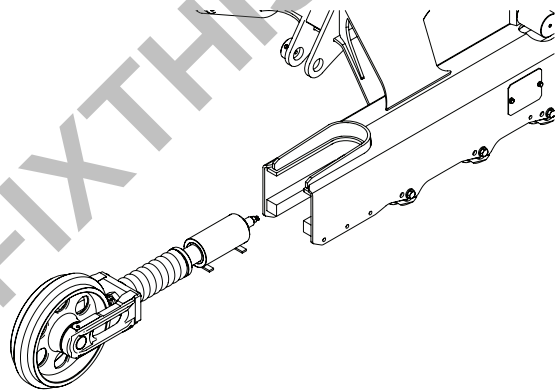
Removing the idler and track adjuster

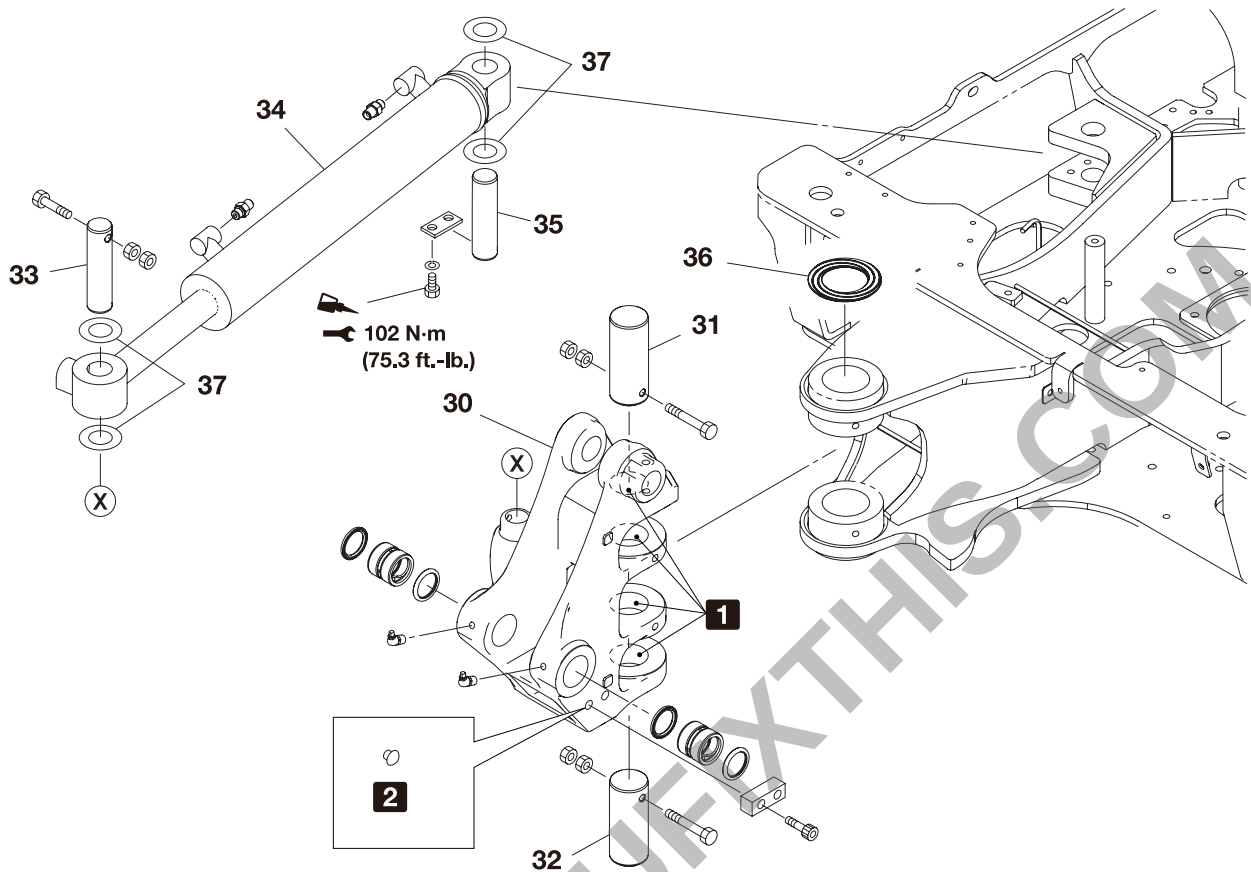
1. Remove the crawler.
 -  "Removing the crawler"
2. Pull out the idler and the track adjuster.
 -  Idler and track adjuster: 21 kg (46.3 lb)

Installing the idler and track adjuster

To install, follow the same procedures as for removal but in the reverse order.

-  Apply grease on the sliding surfaces of the track adjuster piston and cylinder.





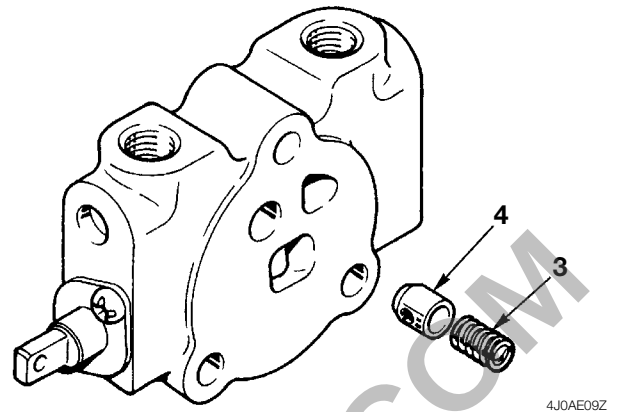
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- 1** After applying NEVER-SEEZ NS (Regular grade) or an equivalent anti-seizing lubricant, put the parts together.
- 2** With no swing stopper inserted

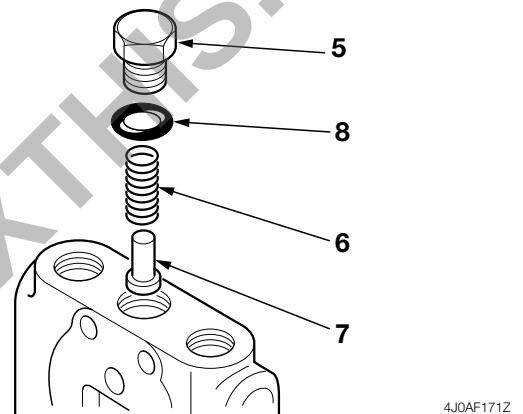
30. Boom bracket
31. Pin
32. Pin
33. Pin

34. Swing cylinder
35. Pin
36. Washer (Selected usage)
37. Shim (Selected usage)

5. Remove the load check valve.
 - a. Remove the spring (3) and then the poppet (4).

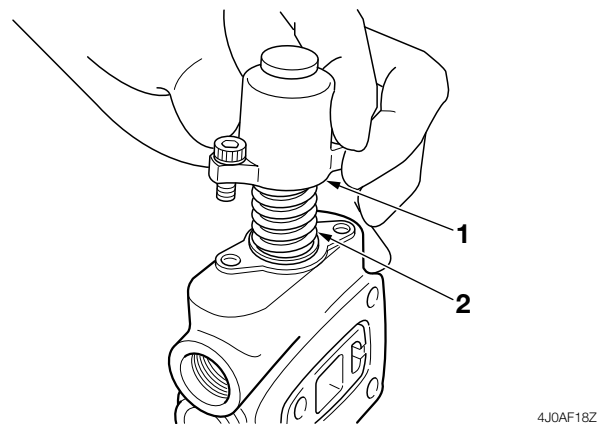


6. Remove the load check valve.
 - a. Take out the plug (5) and spring (6) and remove the poppet (7).
 - Plug: 29.4 N·m (21.7 ft-lb.)
 - b. Remove the O-ring (8) from the plug.

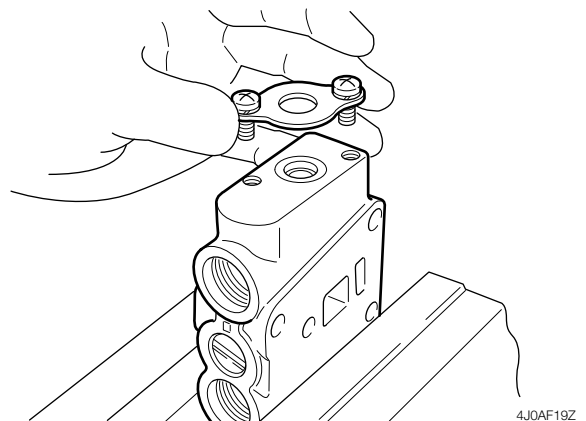


Manually operated section

1. Remove the cap screws, the cover (1) and the spool assembly (2).
- Cap screw: 7.3 N·m (5.4 ft-lb.)
2. Take out the seal holder and remove the wiper and the O-ring.



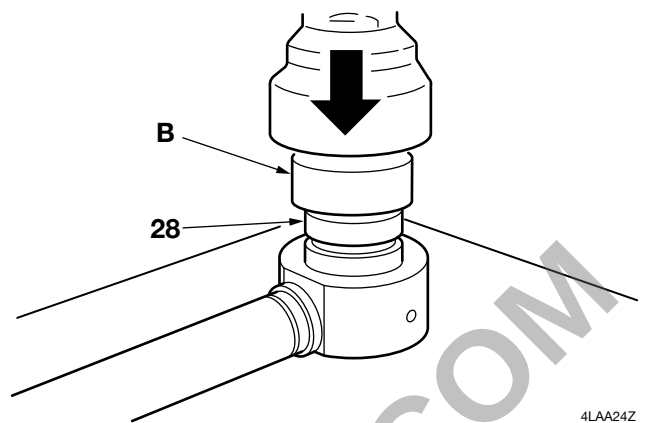
3. Take out the screws on the spool yoke side of the section, and then remove the seal holder, wiper ring and O-ring.
 - When assembling, temporarily fasten the seal holder with the screws and tighten them only after confirming that the spool turns smoothly.



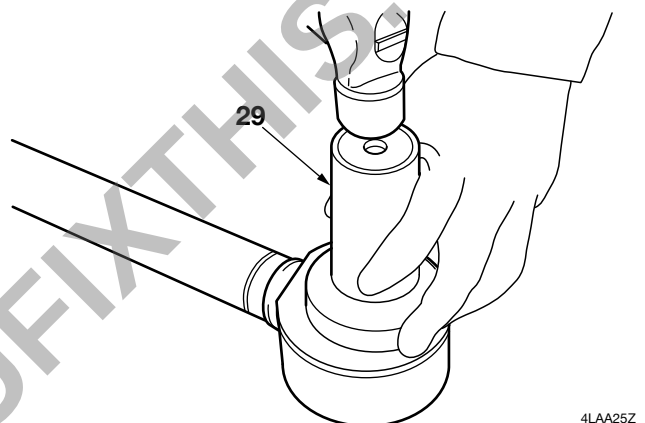
Assembly

Clevis

1. Using the installation jig B, press fit the bushings (28) into the piston rod and tube.

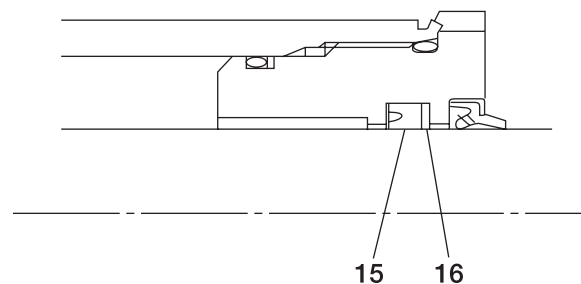


2. Install the dust seal by using the supporting metal (29).



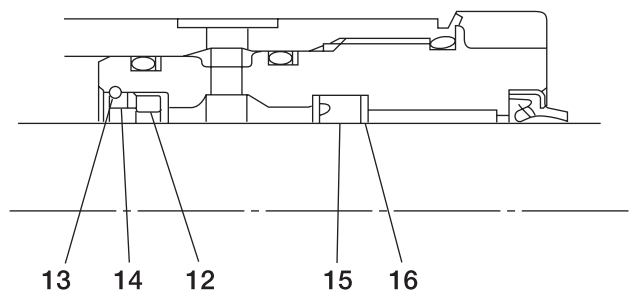
Rod cover

1. Install the rod packing.
 - a. Install the backup ring (16). (Bucket cylinder, Swing cylinder)
 - b. Install the rod packing (15).

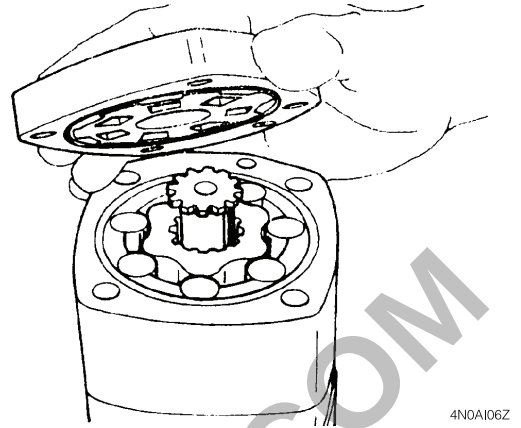


<Only for swing cylinder>

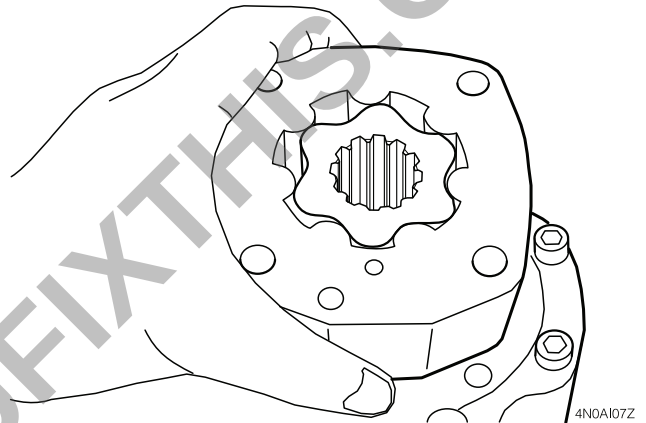
2. Install the cushion ring.
 - a. Install the cushion ring (12).
 - b. Install the spacer (14).
 - c. Install the stopper (13).



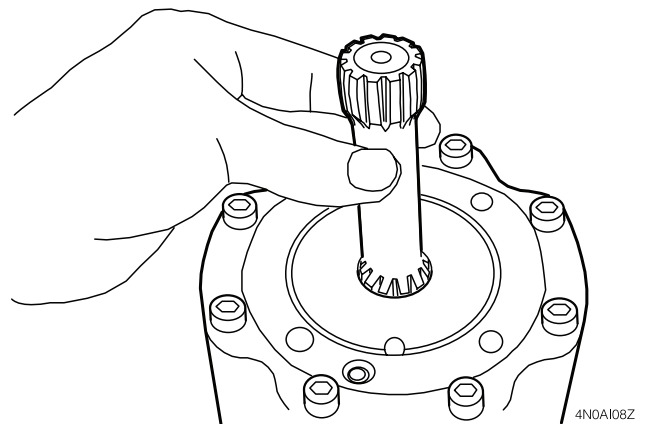
4. Remove the valve plate and the valve drive gear.



5. Remove the gerolol.

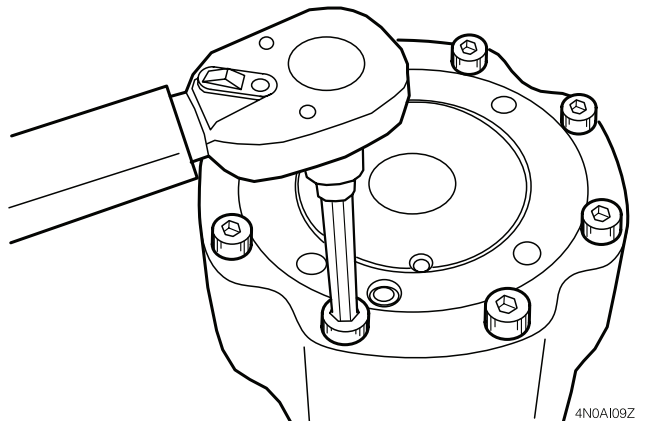


6. Remove the drive.



7. Take out the socket bolts, and remove the flange mounting.

- Do not disassemble the rear bearing unless necessary.



1. Is the veering within specs?

If the veering is within specifications, the machine is normal. Problem is caused by the combination of devices.

☞ "2. Service data, Performance criteria"

2. Check the crawler tension.

☞ "2. Service data, Performance criteria"

3. Check the spool operation

☞ "No travel is possible, 2. Check the linkage."

4. Switch the discharge hoses between the pumps.

Switch the discharge hoses between the pumps P1 and P2. If the veering direction is changed to the opposite side, the pumps are faulty.

- Disassemble and check the pump

☞ "4. Disassembly and assembly, Hydraulic pump"

5. Test by switching the main relief valves.

Switch the main relief valves between the right travel circuit and the left travel circuit, and operate the machine. If the veering is changed to the opposite side, one of the main relief valves is faulty.

- Check the main relief valve

☞ "5. Troubleshooting, Overall machine, All systems working, but insufficient force, 4. Check the main relief valve."

6. Check the swivel joint.

☞ "Right or left travel is impossible, 4. Check the swivel joint"

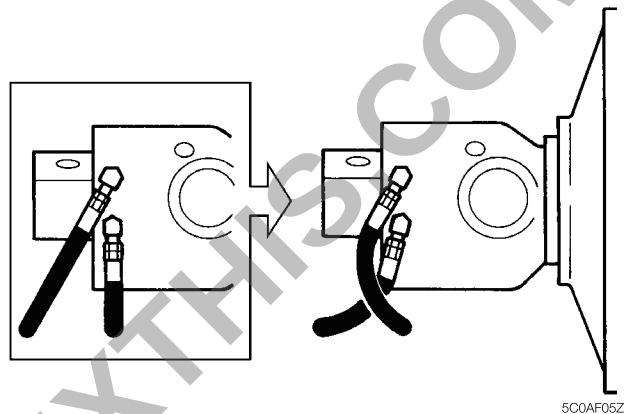
7. Check the counter balance valve.

Check to see if the spool of the counter balance valve moves smoothly.

☞ "Right or left travel is impossible, 5. Check the counter balance valve"

8. Check the travel motor.

☞ "4. Disassembly and assembly, Travel motor"



c. Raise the dozer boom and apply a load on the blade.

- If the machine drops while oil drains from the cylinder's piping, the cylinder is faulty.
If the machine drops even though no oil drains out, the control valve or the swivel joint is faulty.
If the machine cannot be supported by the blade, try replacing the port relief valve with a normal one. If the blade can support the machine after this replacement, then the port relief valve is faulty.

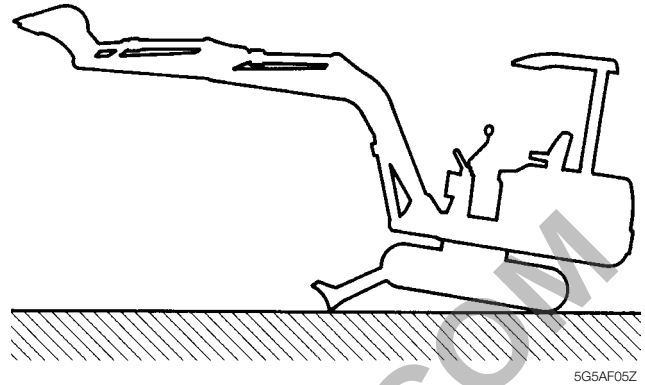
3. Inspect the swivel joint and the control valve.

Disconnect the hose connecting the swivel joint and control valve from the control valve. Insert a plug into the hose just disconnected.

Apply a load to the blade by following the steps 2 (a) through (c) above.

If the machine drops, the swivel joint is faulty.

If the machine does not drop, there is a leak inside the control valve.



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