31. DISASSEMBLING AND ASSEMBLING

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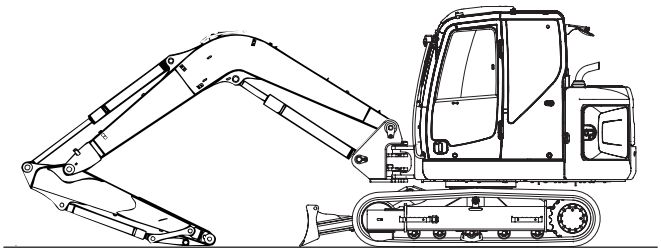
Book Code No. **S5YN3129E01**

32.1.3 ARM

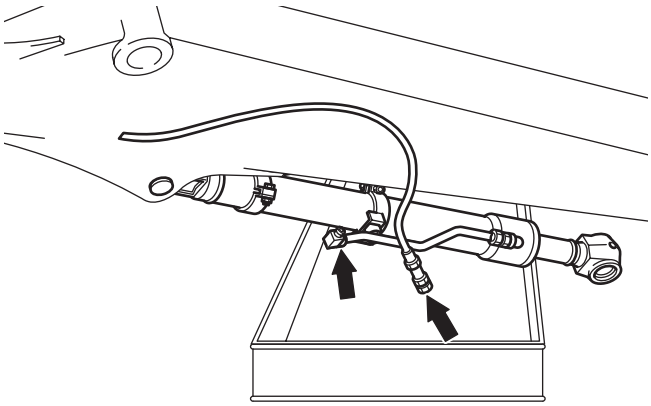
32.1.3.1 REMOVING ARM

(1) Put the machine in position to remove arm.
Extend the arm cylinder, retract the bucket cylinder and bring the arm down on the ground.



Position to remove arm

(2) Disconnecting piping of bucket cylinder
Release pressure of hydraulic tank, place oil pan to prepare for oil leaking, and disconnect pipes.
When the removal of bucket cylinder is not required, skip to procedure (6).

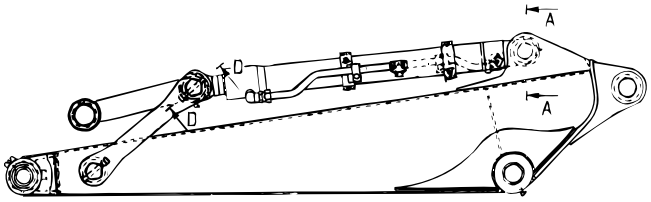


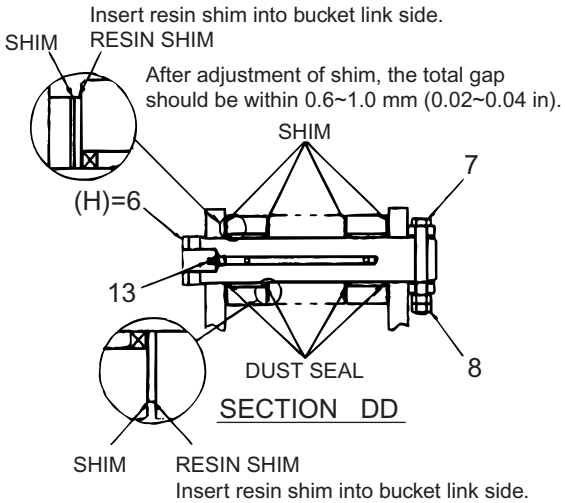
Disconnecting piping of bucket cylinder

Note

Plug both end of disconnected pipes.
Plug:
Tools section 11.5.2-(4)

(3) Removing bucket cylinder rod pin (H)
1. Loosen nut (8), remove capscrew M12X100 (7), and push out pin (H).
Tools: Spanner: 19mm
2. Retract cylinder rod.



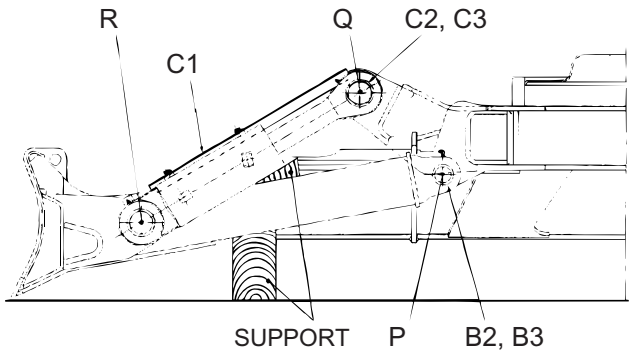


Detail of bucket cylinder rod pin (H)

32.1.6 DOZER

32.1.6.1 REMOVAL

(1) Put a support of appropriate height under the mounting side of dozer body, and make the dozer at a stable condition not to exert any load to the pin (P).
(2) Disconnect the hydraulic hoses and apply a plug to the connecting portions.
Tools : Spanner : 22 mm
(3) Apply a nylon sling to the dozer cylinder (C1), and lift it up slightly not to exert any load to the pin (Q) of rod side.
(4) Remove the capscrew (C2) and nuts (C3) those are preventing the pin (Q) from coming out. Remove the pin (Q), and support the cylinder (C1) with wood block, etc.
Tools : Spanner : 19mm
(5) Remove the capscrew (B2) and nuts (B3) that are preventing the dozer body fixing pin (Q) from coming out, and remove the two pins (P).
Tools : Spanner : 19mm
(6) Gradually move the machine to backward to remove the dozer.
Weight of dozer assembly : 450kg (992 lbs)
(7) If necessary, remove the dozer cylinder by means of removing the pin (R) of head side.
Weight of dozer cylinder : 58 kg (128 lbs)

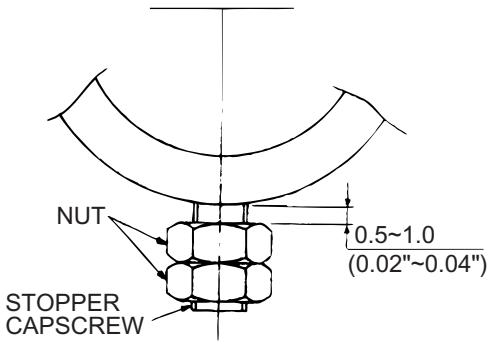


Removing / Installing Dozer

32.1.6.2 INSTALLATION

The installation is carried out with the reverse order of the removal paying attention for the following.

(1) Referring to the Section "ATTACHMENT DIMENSIONS" of Specifications, replace the worn-out bushings and dust seals to new ones.
(2) Before installing pin (P), (Q) and (R), apply grease to their shaft area.
(3) Referring to right Fig., install the nuts for capscrew to prevent the pin from coming out.
Tools : Spanner : 19mm



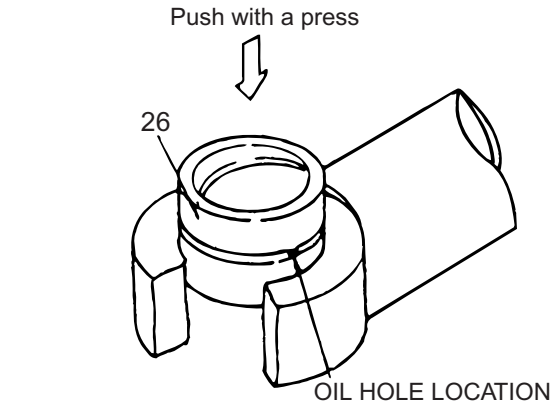
Tightening Procedures for Nuts

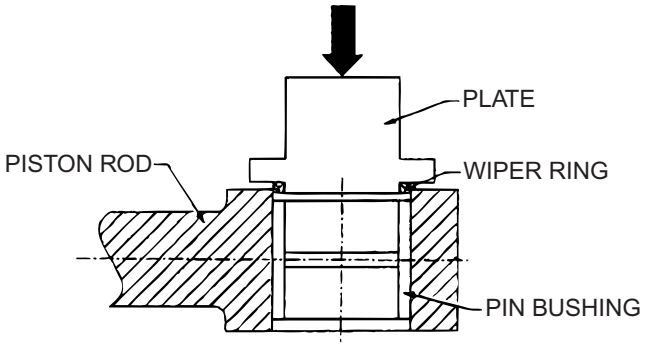
32.2.1.4 INSTALL

- Cylinder tube assembly
- Piston rod assembly
- Rod cover assembly
- Piston assembly

32.2.1.4.1 ASSEMBLING CYLINDER TUBE ASSEMBLY, PISTON ROD ASSEMBLY

(1) Apply hydraulic oil on the head in which pin bushing is inserted and on the pin bushing hole of rod.
(2) Press pin bushing (26) into cylinder tube (1) and piston rod (2), using a press.
(3) Insert wiper ring (27) in both sides.

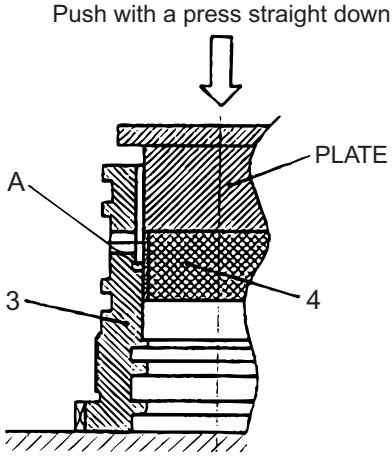




Pressing in pin bushing (rod & tube)

32.2.1.4.2 ASSEMBLING ROD COVER ASSEMBLY

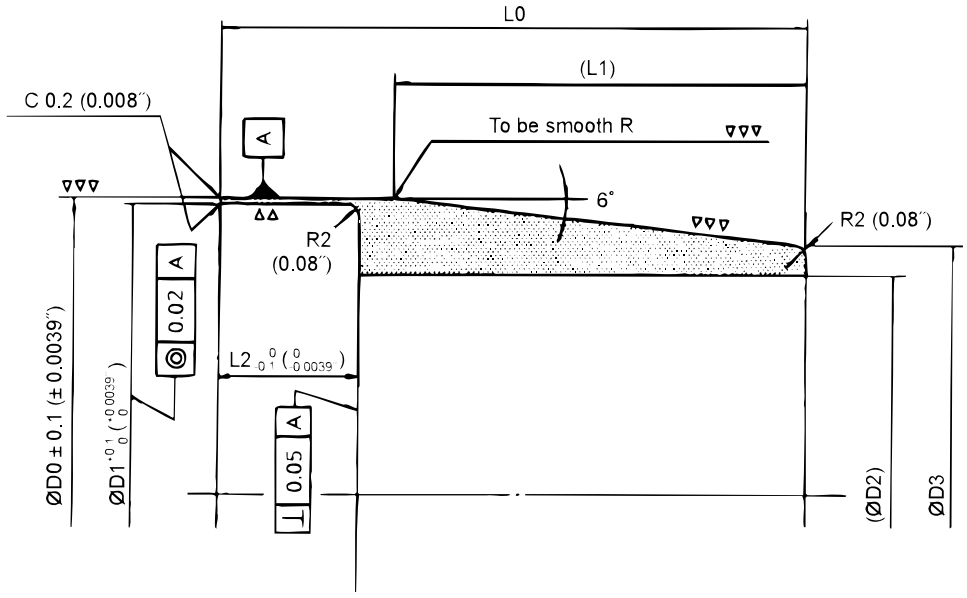
(1) Press fit bushing (4) in rod cover (3) applying plate on the section. After press-fitting, check that the bushing is not projected from the end surface (A). (See right Fig.)



Pressing in bushing

32.2.1.8 TOOL AND JIGS LIST

(1) Seal ring fitting jig (I)
Material : Mild steel



Unit: mm(in)

Applicable cylinder	D0	D1	(D2)	D3	L0	(L1)	L2
Boom	111 (4.3701)	110 (4.3307)	86 (3.39)	96 (3.78)	100 (3.94)	72 (2.83)	24 (0.9449)
Arm	96 (3.7795)	95 (3.7401)	71 (2.80)	81 (3.19)	100 (3.94)	72 (2.83)	23 (0.9055)
Bucket	81 (3.1890)	80 (3.1496)	56 (2.20)	66 (2.60)	100 (3.94)	72 (2.83)	20 (0.7874)
Dozer	131 (5.1575)	130 (4.1181)	111 (4.37)	116 (4.57)	99 (3.90)	66 (2.60)	28 (1.1024)
Swing	106 (4.1732)	105 (4.1339)	81 (3.19)	91 (3.58)	100 (3.94)	72 (2.83)	23 (0.9055)

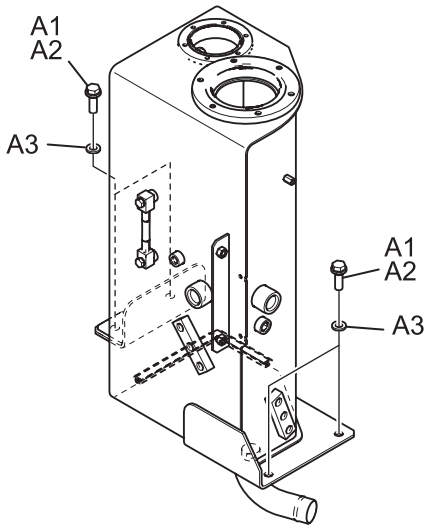
Items	Phenomenon	Related parts	Abnormalities	Measures and corrective actions
	The operation is unstable.	Air	Air is remained in cylinder.	1) Remove air. a) If cylinder is not equipped with air bleed port ; Release air by extending and retracting it at low speed several times. b) If cylinder is equipped with air bleed port ; Unload so that the internal pressure is not raised, loosen air breather and release air completely. (Reference) When cylinder has stopped in an emergency, cylinder may be extended and contracted slightly. This phenomenon is caused by the pressure of hydraulic oil, and easily occurs on the cylinder of which the stroke is longer.
4	Great shock when changed from / to extension to / from retraction.	Pin bushing Pin	The space between fitting section and pin bushing is too large.	1) Measure dimension of pin and pin bushing, if it exceeds the specified dimension, replace it with new one.
	Noise when cylinder is worked.	Lubrication	Insufficient lubrication	1) Lubricate.
		Pin bushing Pin	Scuffing on engaged section	1) Replace it with new one, and lubricate.
		WARNING **Hydraulic oil is expanded and contracted with change of temperature and pressure. Consequently the cylinder is also extended and retracted, so care must be taken in order not to mistake this for internal leakage. Check it for internal oil leakage in the constant temperature and pressure conditions.**		

33.1.3.2 INSTALL

(1) Install the battery in the reverse order of removing.
Hold down plate (A2) against battery (B1), and tighten capscrew (A3).
Tools: Socket: 17mm
Tightening torque : 10.8N-m (8.0 lbf-ft)

(2) Installing grounding cable
Install grounding cable (4) last. Especially care must be taken that the grounding face is free from painting, rust, etc.
Tools: Spanner: 13mm

(7) Remove hydraulic tank attaching bolt
Remove 4 capscrews (A1) M16X50.
Tools: Socket: 24mm
(8) Slinging hydraulic oil tank
Place a wire sling, using the lifting plate on top of the tank.
Tank weight: Approximately : 62kg (137 lbs)
(9) Remove shim (A3).



Removing hydraulic tank

Note

Record the shim locations.

33.1.12 RADIATOR & OIL COOLER

33.1.12.1 PREPARATION FOR REMOVAL

(1) Remove counterweight.

(2) Bleed air from the hydraulic tank and install the suction stopper. (See 33.1.12 RADIATOR & OIL COOLER)

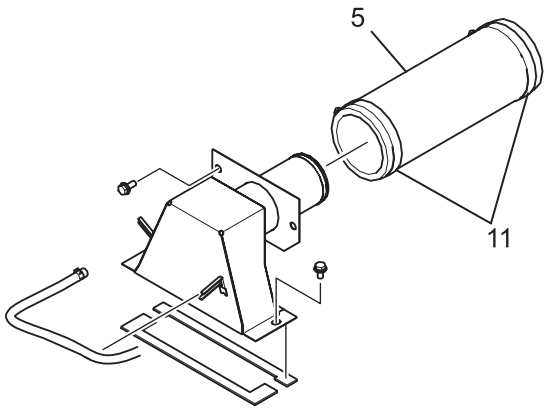
(3) Remove cover of suction strainer, and adjust oil quantity so that oil level becomes lower than the return tube level.

(4) Remove air cleaner hose

Refer to 33.1.9 AIR CLEANER

1. Loosen 2 clips (11).
2. Pulling out hose (5).

Tools: Flat-blade screwdriver

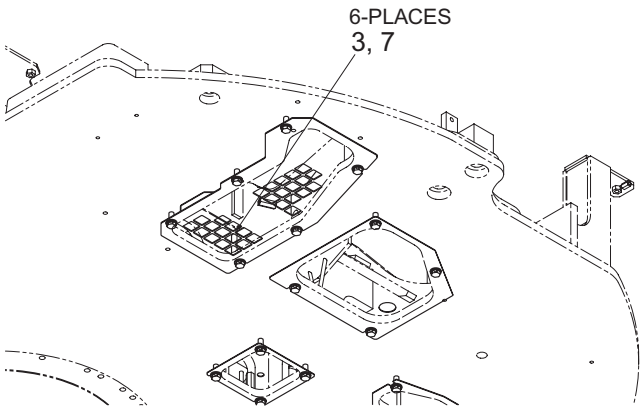


Removing hose (5)

(5) Removing under cover installed on lower side of radiator.

1. Remove 6 sems-bolts (7) M12X25.
2. Remove cover (3).

Tools: Socket: 19mm



Removing under cover (3)

(6) Drain down of radiator

Put container 18L (4.8gal) under drain valve hose for draining water.

[Water capacity of radiator : 4.6L (1.2gal)]

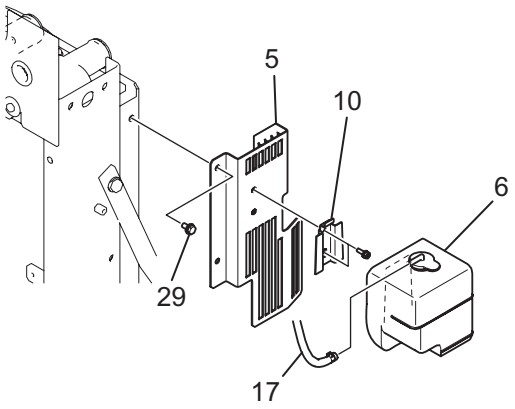
(7) Remove hose from radiator sub tank (6).

1.

Remove clip of radiator cap side and disconnect hose (17).

2. Remove 2 sems-bolts (29) M8X20.
3. Remove radiator sub tank (6) and guard (5).

Tools: Socket: 13mm



Removing hose of sub tank (1)

CAUTION

Do not loosen the joints of the hoses related to the air-conditioner. Otherwise the refrigerant leaks.

33.1.15 CONTROL VALVE

33.1.15.1 PREPARATION FOR REMOVING

(1) Remove panel assembly (2-1) (See 33.1.4.2 Fig. "Removing cover assembly (2-1)")
(2) Remove cover assembly (2-5) (See 33.1.4.2 Fig. "Removing panel assembly (2-4)")
(3) Release air in hydraulic oil tank, open cover of suction element of hydraulic oil, and lower the level.
(See 33.1.8.1 Fig. "Hydraulic oil tank")

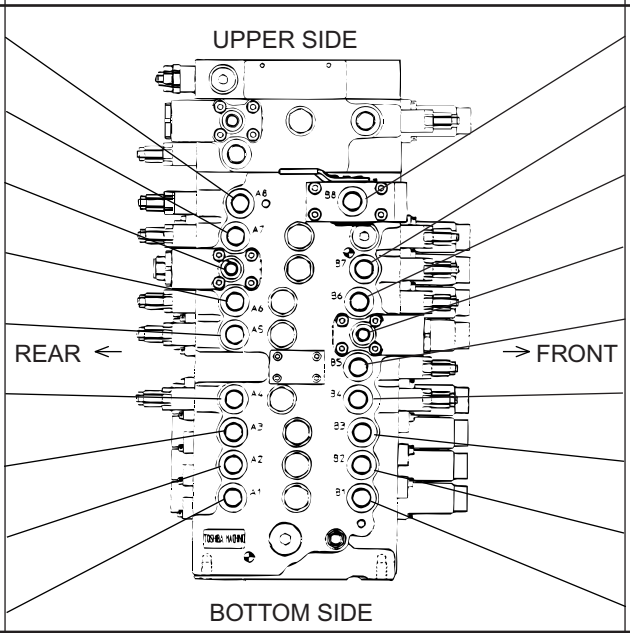
Note

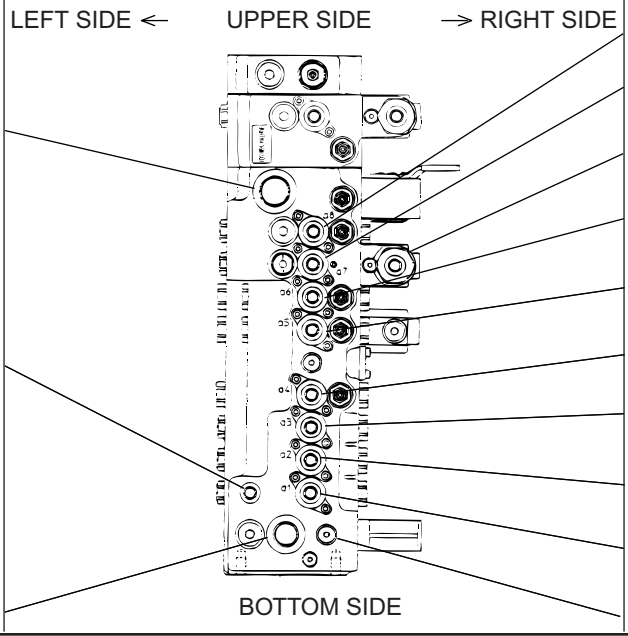
Mark each hose with a port name before removing it.

33.1.15.2 REMOVAL

(1) Removing hoses for each piping

Attach tag on hose, and write port name on it, then remove hoses.

Ports	Functions	Ports on right sides (on machine)	Ports	Functions
A8	Option (Head)		B8	Option (Rod)
A7	Arm out		B7	Arm in
Dr3	Drain		B6	Bucket digging
A6	Bucket dump		Dr2	Drain
A5	Boom down		B5	Boom up
A4	Dozer down		B4	Dozer up
A3	Travel left (Forward)		B3	Travel left (Reverse)
A2	Travel right(Forward)		B2	Travel right (Reverse)
A1	Swing (Right)		B1	Swing (Left)

Ports	Functions	Ports on rear sides (on machine)	Ports	Functions
			a8	Option (Head)
			a7	Arm out
P3	Pump		Pi2	
			a6	Bucket dump
			a5	Boom down
Pr	Back press. CompensatonPump		a4	Dozer down
			a3	Travel left
			a2	Travel right
			a1	Swing (Right)
P	Pump		Ps	LS press. detection

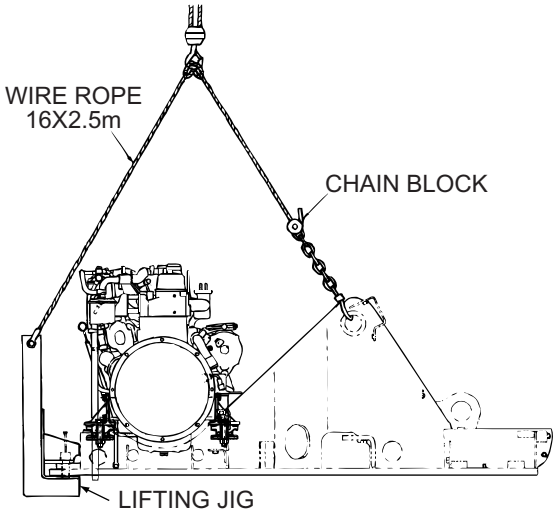
33.1.20 UPPER FRAME

33.1.20.1 PREPARATION FOR REMOVING

(1) Remove attachment (See chapter 32)
(2) Remove cab (See 33.1.2 CAB)
(3) Remove guard (See 33.1.4 GUARD)
(4) Remove counterweight (See 33.1.11 COUNTERWEIGHT)
(5) Remove swivel joint (See 33.1.19 SWIVEL JOINT)

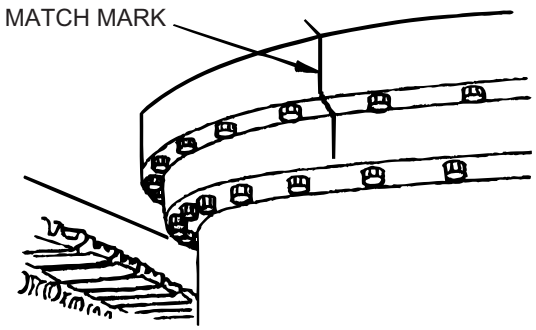
33.1.20.2 REMOVAL

(1) Lifting up upper frame temporarily
Attach an upper-frame hoisting jig to attaching holes of counterweight. Attach 2 chain blocks to holes of boom foot pin and use these four points and hoist upper-frame.
Wire ropes ;
16 dia. X 2.5m, 1 pc.
16 dia. X 1.5m, 2 pcs.
Chain blocks ; For 1 ton, 2 pcs.



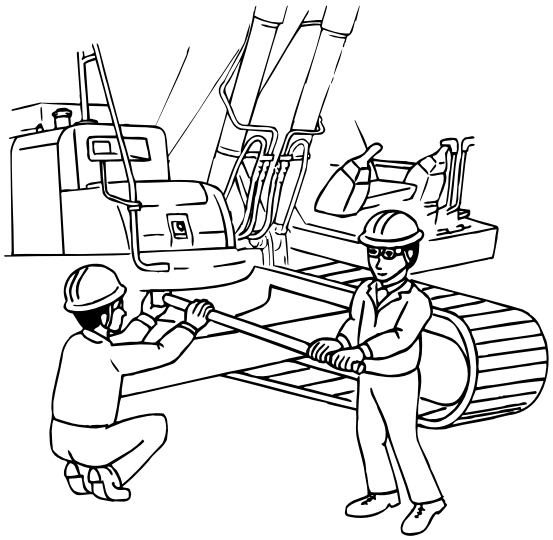
Lifting up upper frame temporarily

(2) Marking match marks on swing bearing
Put match marks on upper frame and swing bearing.



Matching mark on swing bearing and upper frame

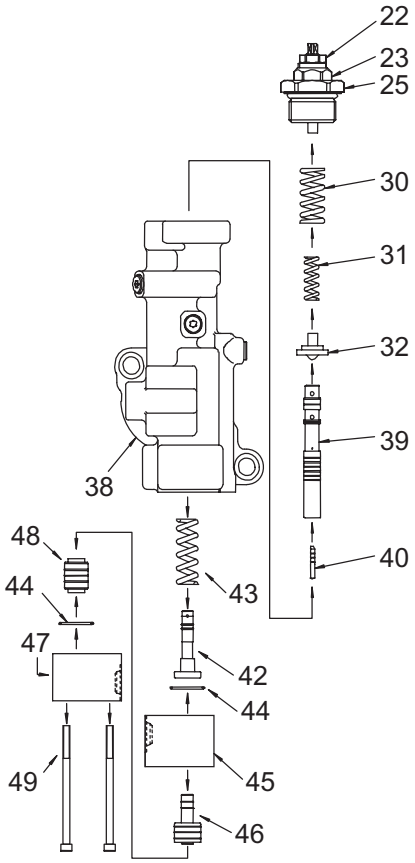
(3) Removing upper frame attaching bolts
Remove 23 capscrews (B31) M16X85 and a reamer bolt (B30) used to install swing bearing and upper frame.
Tools: Socket: 24 mm
(4) Slinging upper frame
Sling according to Fig "Lifting up upper frame temporarily", and remove upper frame and put it on a stand.
Weight: Approximately. 5 tons (11,000 lbs)



Removing upper frame attaching bolts

(3) Disassembling regulator

1. Loosen and remove cap SP (25) (Opposing flats 41) and remove springs (30) (31) and spring retainer (32). Using a magnet, remove rod (39) and piston B (40) together.
   Loosen 4 socket head bolts (49), remove regulator cover (47), piston U (48), and O-ring (44). And then remove regulator cover H (45), piston H (46), and O-ring (44).
   And remove piston (42) and spring (43).

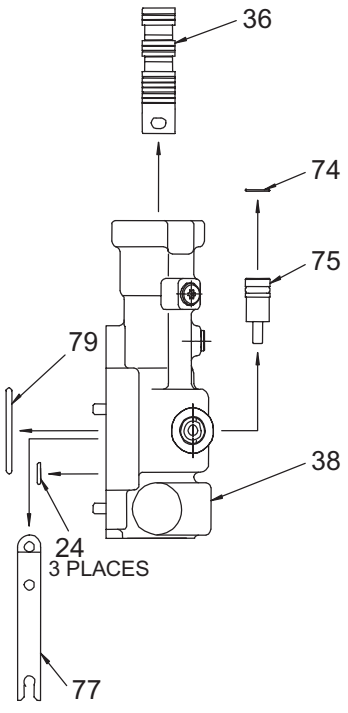


Disassembly of regulator (1/2)

CAUTION

Do not loosen nut (23) when not required.
(It might change the power setting.)

2. Remove O-rings (24) (79) from regulator casing (38).
   Using a pliers, remove snap ring (74), and using tapped hole (M5), remove plug (75).
   Remove link (77) and then remove sleeve (36).



Disassembly of regulator (2/2)

(8) Shim adjusting method

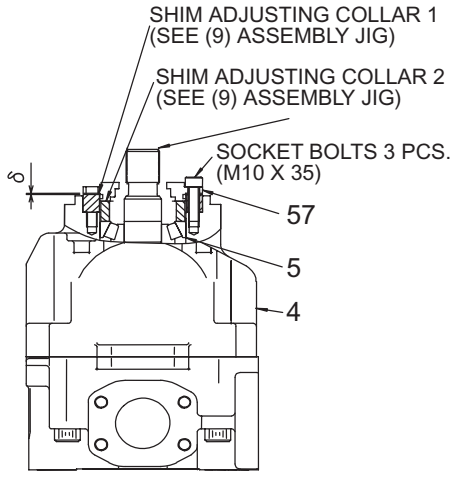
After disassembly and adjustment, if the shim thickness adjustment is required by replacement of parts, carry out the adjustment by the following procedure. Prepare shim adjusting collar 1, collar 2 for assembly jig in advance, and install collar 2 on the outer ring of taper roller bearing (5) and collar 1 on housing (4) in the condition where the procedure in Item 9) "Assembling piston pump main body" is completed.

Place seal retainer (52) on it and tighten 3 socket bolts M10X35 to the specified torque 1.5 N-m (1.1 lbf-ft).

Measure the space between collar 1 and seal retainer (52) with thickness gauge, and determine

"Shim thickness = 1.9 - measured space value (mm)".

Remove collars for adjustment and install shim (3) equivalent to the determined thickness on the outer ring of taper roller bearing (5).



Shim adjusting method

(9) Assembly jig

1. Rod PW assembly jig

   Spring

   Spring rate : 0.3

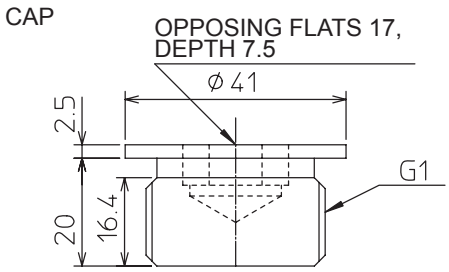
   Wire diameter : 1.4

   Free length of spring : 60

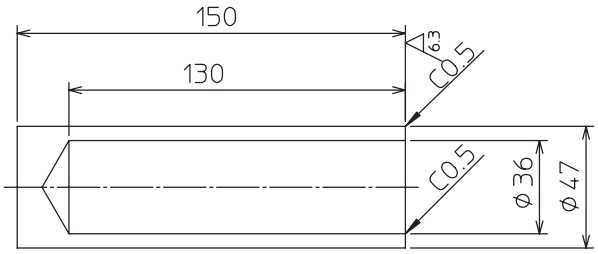
   Total number of coils : 5.25

   Outer diameter : 17

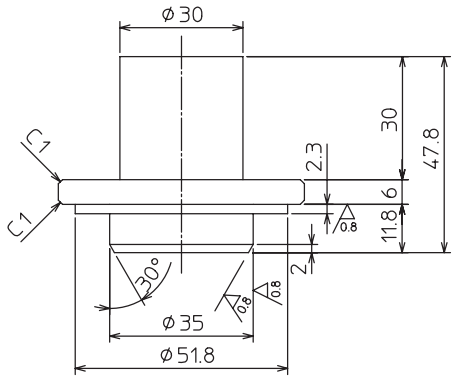
   Above mentioned specification spring or equivalent is required.



2. Taper roller bearing press-fitting jig



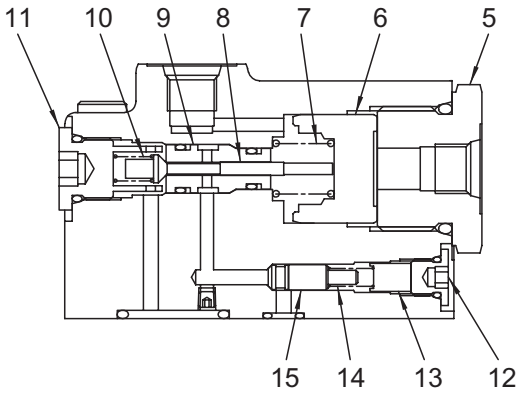
3. Oil seal press-fitting jig



Notice

After a long period of operation, the poppet does not come off in some cases because of the edge on the seat surface of sleeve. Do not disassemble it by force.

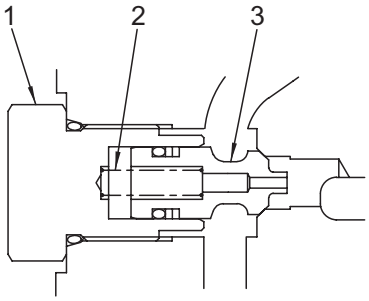
c. Remove cap (12) and remove spacer (13), spring (14), and check valve (15).
d. Knock sleeve (9) out by lightly tapping it to the left, using a pipe of ø4mm (0.157in) bore diameter and ø10mm (0.394in) OD.



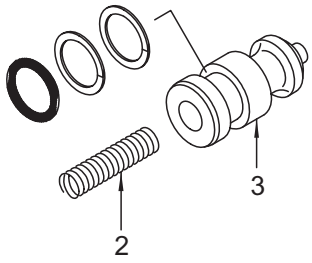
Removing sleeve (9)

(6) Disassembling of recirculation valve (Boom, Bucket)

1. Remove cap (1), and remove spring (2) and check valve (3).
   Tools: Allen wrench: 27mm
   Tightening torqu : 80 N-m (59 lbf-ft)

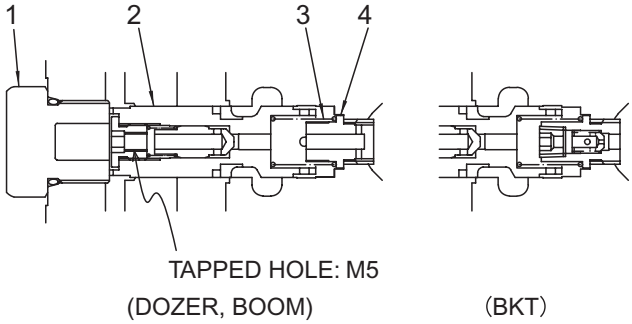


Disassembling of recirculation valve (Boom, Bucket)



(7) Disassembling of pressure compensation valve (Dozer, Boom, Bucket)

1. Remove cap (1), and remove spool assembly (2) and spring (3).
   Tools: Allen wrench: 27mm
   Tightening torqu : 80 N-m (59 lbf-ft)
2. Hold spool assembly in the holder, hold it further in a vise, and remove cap, spring (6), and check valve (7).
   Tools: Allen wrench: 5mm
   Tightening torqu : 20 N-m (14.8 lbf-ft)

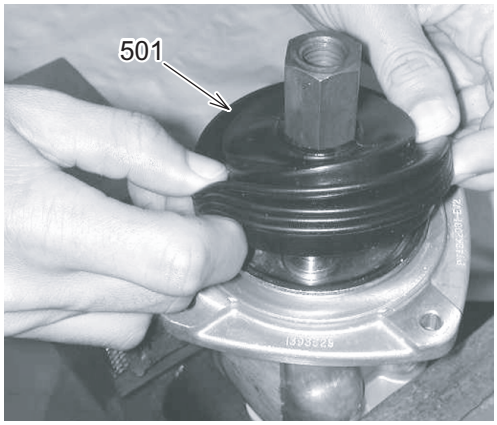


Disassembling of pressure compensation valve (Dozer, Boom, Bucket)

33.2.3.2 DISASSEMBLY

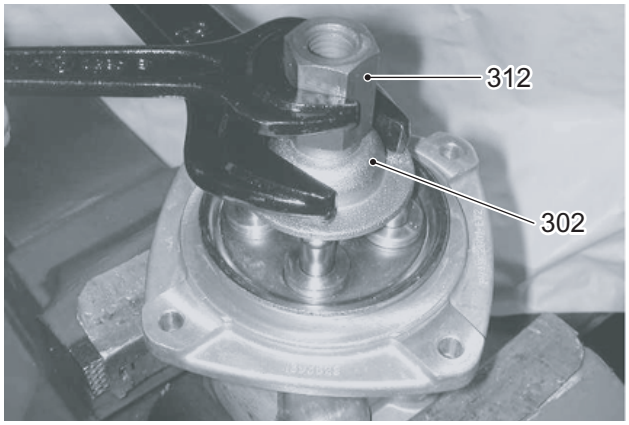
(1) Plug each port of pilot valve, and clean it with kerosine.
P port: PF1/4
1 to 4 and T port: PF3/8

(2) Fix pilot valve with vise via a protective plate (Alminum plate etc.), and remove boots (501).



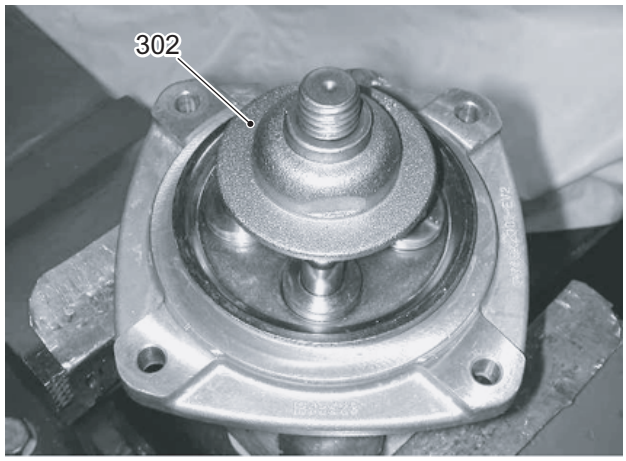
Removing boot (501)

(3) Remove adjusting nut (312) applying spanners to adjusting nut (312) and circular plate (302).
Tools: Spanner: 22mm, 32mm

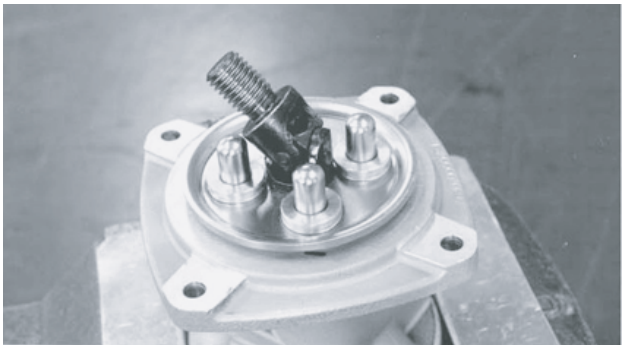


Removing adjusting nut (312)

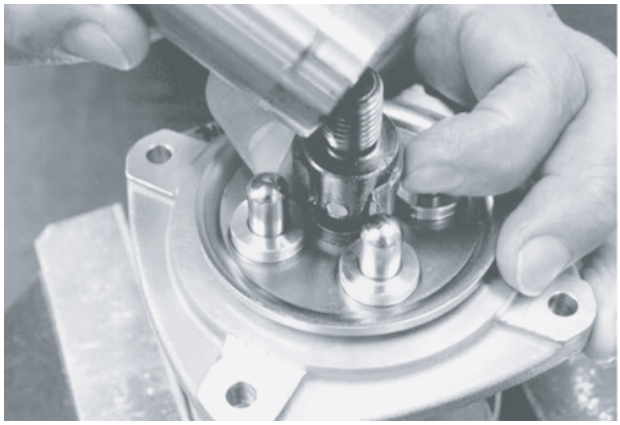
(4) Remove circular plate (302)
Tools: Spanner: 32mm



Removing circular plate (302)



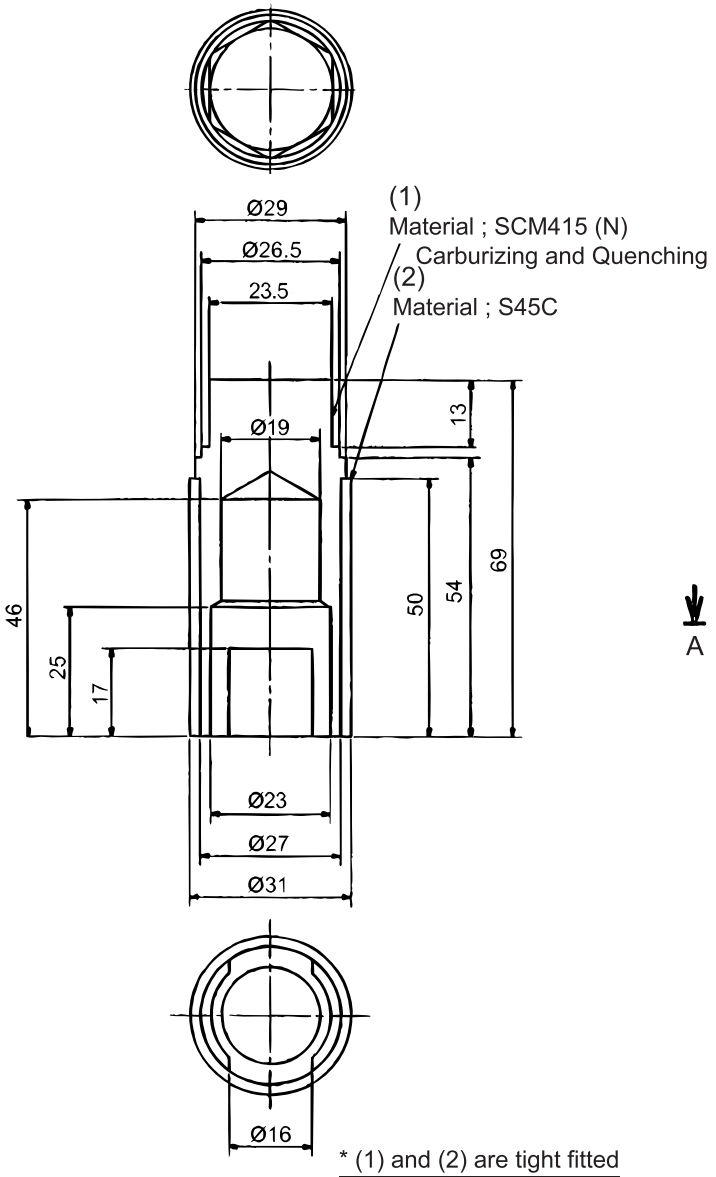
Circular plate is removed



Installing Jig A

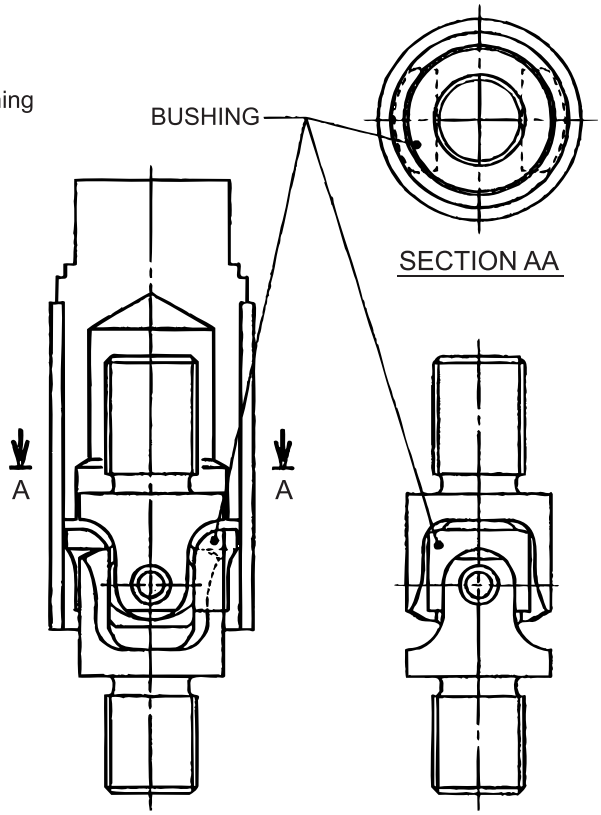
33.2.3.7 JIG

(1) Jig for removing and installing joint (301)

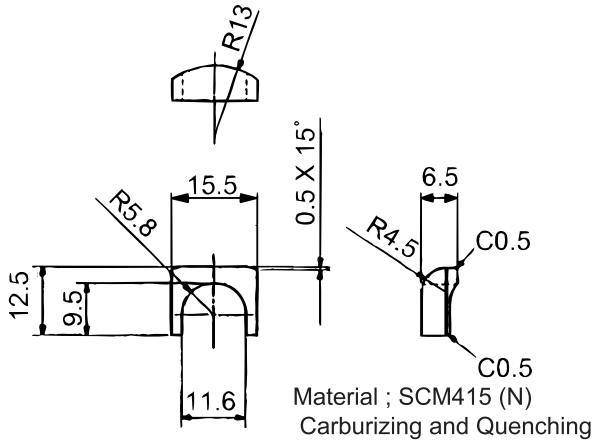


* (1) and (2) are tight fitted

Sectional drawing of jig



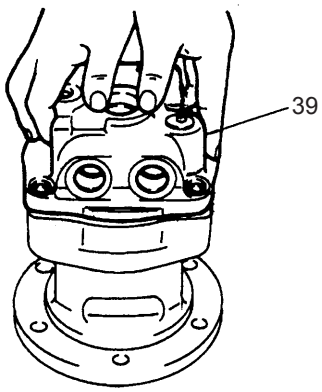
Installing condition on joint



Material ; SCM415 (N)
Carburizing and Quenching
Q'ty ; 2

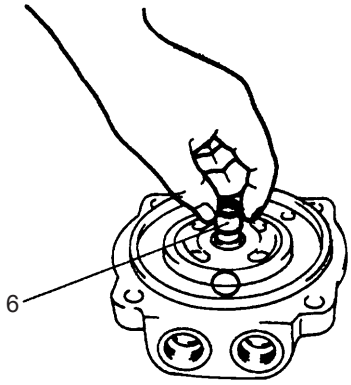
Detail of bushing

5. Lift up and remove cover (39).



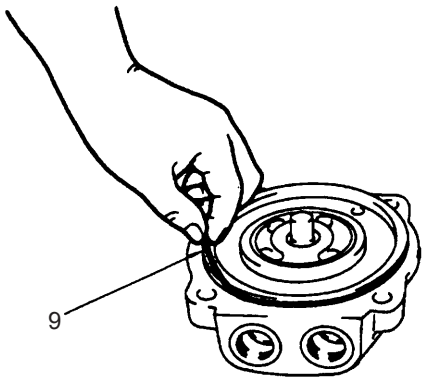
Removing cover

6. Remove snap ring (5) with plier.
7. Remove inner race of needle bearing (6).



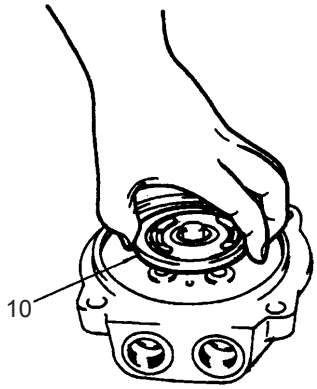
Removing bearing (6) inner race

8. Remove the O-ring (9).



Removing O-ring (9)

9. Remove the balance plate (10).

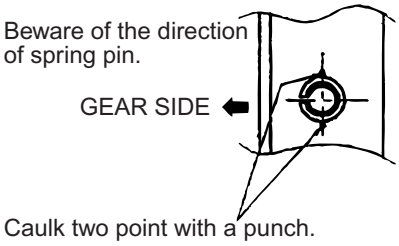


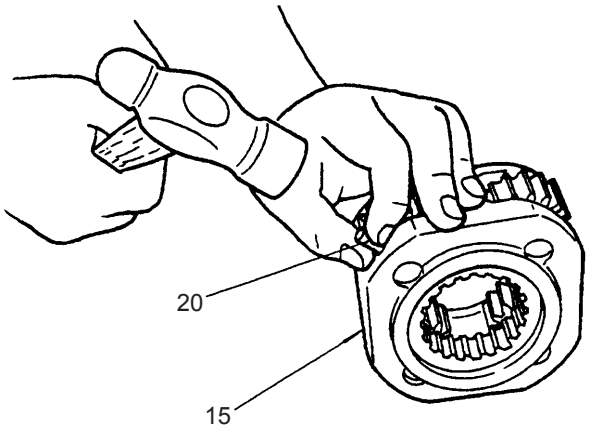
Removing balance plate

b. Drive the spring pin (20)

Note

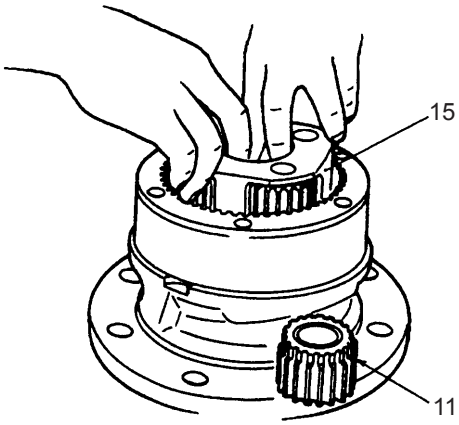
Drive spring pin facing the split to gear side.





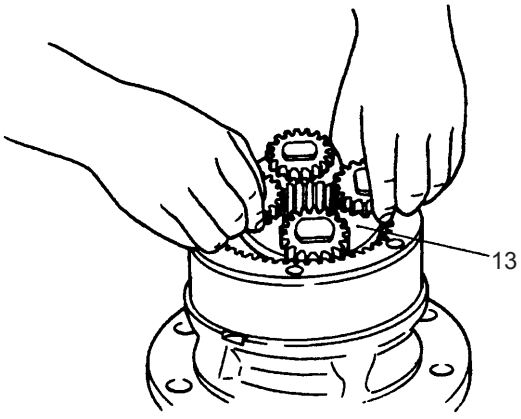
Driving spring pin (20)

8. Carefully mesh the holder 2 assembly (15) in the internal teeth of the ring gear (10), and the spline of the pinion shaft (1) with its mating part. In this condition, insert the holder 2 assembly (15) while turning it.
9. Carefully mesh spur gear 4 (11) in the spur gear 5 (18).



Inserting holder 2 assembly (15)

10. Installing the holder 1 assembly (13)
    a.
    Carefully mesh the holder 1 assembly (13) in the internal teeth of the ring gear (10), and holder 1 (13) in the teeth of sun gear (12). In this condition, insert the holder 1 assembly (13) while turning it slowly.
    b.
    Place sun gear (12) in while engaging with planet gear of holder 1 assembly (13) slowly.
11. Turn the holder 1 assembly (13) with your hand to confirm that the pinion shaft rotates smoothly.



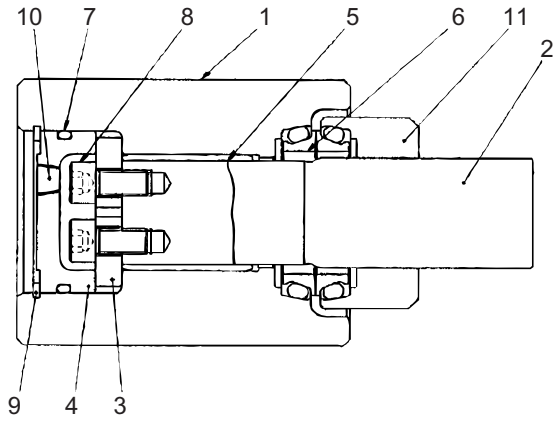
Inserting holder 1 assembly (13)

33.2.6.3.3 TROUBLESHOOTING

Trouble	Cause	Remedy
1. External leakage of hydraulic oil	Defective O-ring & seal	Replace all seals.
2. Internal leakage of hydraulic oil	1) Defective slipper seal 2) Sliding face worn excessively	1) Replace all seals. 2) Replace assembly.
3. Swivel stem seized	1) Stem and body seized 2) Inappropriate swivel stopper bracket	1) Grind and hone. Replace assembly, if stem and body are too loose and causing oil leakage. 2) Reinstall Secure 2 to 3 mm (0.08 to 0.12 in) allowance for bolt stopper.
4. Loose swivel stem and cover	Socket bolt tightened insufficiently.	Retighten to specified torque.

34.1.3.4 CONSTRUCTION

ASSY PART No.		YT64D01001F1			
No.	Parts	Q'ty	No.	Parts	Q'ty
1	ROLLER	1	7	O-RING ; G45 1A	1
2	SHAFT	1	8	SOCKET BOLT	
3	PLATE	1		; M8 X 22	2
4	COVER	1	9	SNAP RING	1
5	BUSHING	1	10	PLUG	1
6	FLOATING SEAL	1	11	COLLAR	1

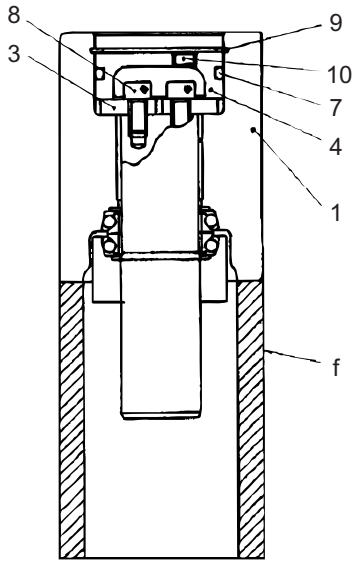


Construction of upper roller

34.1.3.5 DISASSEMBLY AND ASSEMBLY

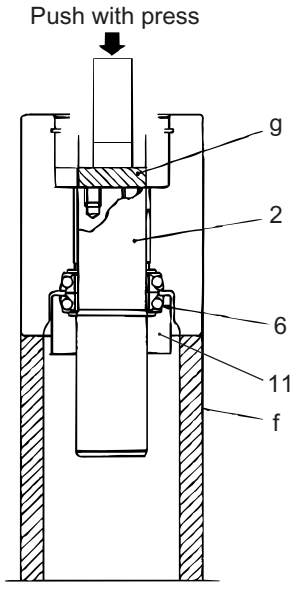
(1) Disassembly

1. Draining out oil
   Remove plug (10) and drain out oil.
   Tools: Allen wrench: 5 mm
2. Removing snap ring (9)
   Mount the end face inside upper roller (1) on stand jig (f) and separate snap ring (9), using snap ring pliers.
3. Removing cover (4)
   Take off cover (4) upwards, utilizing the screwed hole for the plug.



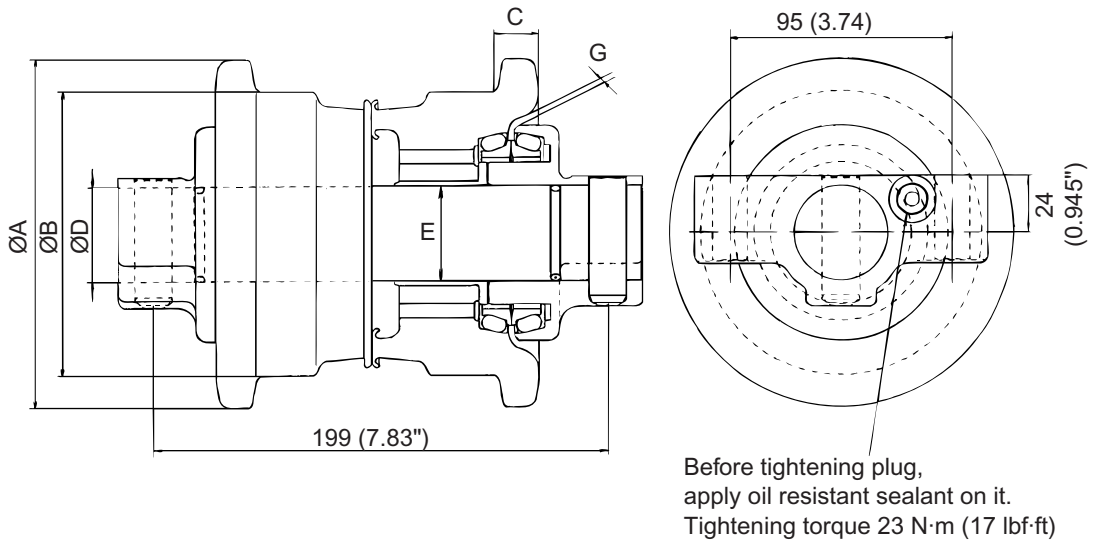
Removing snap ring (9), cover (4), O-ring (7), plate (3)

4. Removing O-ring (7)
   Separate O-ring (7) from cover (4).
5. Removing plate (3)
   Loosen 2 socket bolts (8) and draw out plate (3) from roller (1).
   Tools: Allen wrench: 6mm
6. Removing shaft (2)
   Put the extrusion jig (g) against the end face of shaft (2) and push shaft (2) with collar (11) for floating seal (6), using a press or hammer.



Extruding shaft (2)

34.1.4.6 MAINTENANCE STANDARD



Lower roller (Track roller)

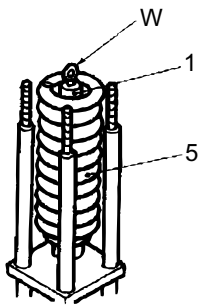
Unit : mm (in)

No.	ITEM	STANDARD VALUE			REPAIRABLE LEVEL	SERVICE LIMIT	REMEDY
A	O.D. of flange	Ø147 (5.79)			—	—	Reinforcement weld repair or replace
B	Tread dia.	Ø120 (4.72)			Ø110 (4.33)	Ø106 (4.17)	
C	Flange width	17.5 (0.689)			12 (0.472)	10 (0.394)	Replace bushing
D	Clearance between shaft and bushing (Coiled bushing)	Basic dimension	Tolerance		Fit	Fit	
		Ø40 (1.57480)	Shaft	-0.060 (-0.00236) -0.090 (-0.00354)	Clearance 0.7 (0.028)	Clearance 1.0 (0.39)	
E	Interference between roller and bushing	Ø44 (1.73228)	Hole	+0.025 (+0.00098) -0.020 (-0.00079)	Interference 0	Clearance 0.01 (0.0004)	
	Oil	Engine oil API grade CD #30, 90 cc (5.49 cu•in)					Replenish
	Roller rotation	Rotates smoothly by hand.					Reassembly
G	Clearance between roller and collar	Keep 2.5±0.5 (0.09843±0.01969) space.					

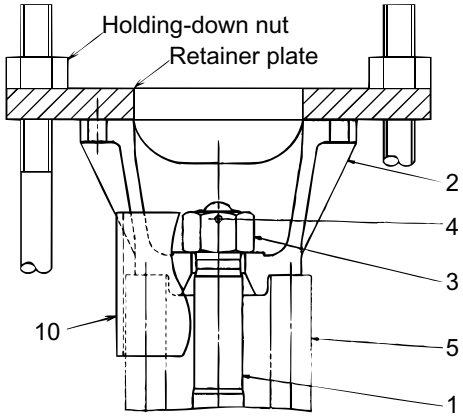
(2) Assembly

Assembly is done in the reverse order of disassembly.

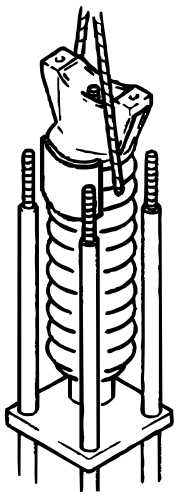
1. Installing spring (5), grease cylinder (1)
   Insert grease cylinder (1) into spring (5) and attach lifting eye nut (W) to screw M36 X P3 at the tip of the grease cylinder. Lift the grease cylinder by crane and erect it in the center of the jig stand upright.
2. Fixing idler adjuster assy
   Install bracket (2), cover (10) on top of spring (5). Center the rod of grease cylinder (1) and the holes in bracket (2). Attach the retainer plate and four holding-down nuts. Fasten the nuts evenly all round and fix the idler adjuster assy to the jig body.
   Tools: Spanner: 46 mm
3. Compressing spring (5) and tightening nut (3)
   Extend the hydraulic jack, compress spring (5) to a set length and screw in nut (3) to the screwed part at the tip of grease cylinder (1).
   Set length of the spring: 270 mm (10.63 in)
4. Installing spring pin (4)
   Tighten nut (3) till the holes for locking spring pins (4) are aligned. Then fit spring pin (4).
   Tools: Spanner: 46 mm
   Tools: Socket: 55 mm
5. Removing idler adjuster assy
   Remove idler adjuster assy from jig.



Attach spring (5) and grease cylinder (1) to the jig



Compression of spring (5), and attaching nut (3) and spring pin (4)



Removing idler adjuster assy

CAUTION

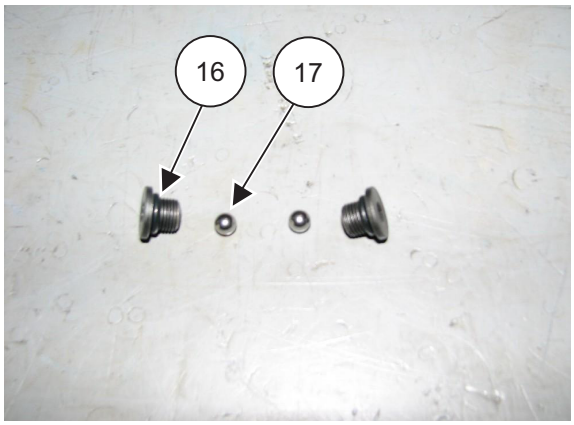
To insert ball (3) and retainer (4), use a push rod, etc., to protect persons from injury from inserting fingers into plug hole.

4. Fit plug (6) to outer race (2) while checking it for direction and position of taper pin hole.
5. Coat seal (8) with adhesive Cyano Bond P0-1 equivalent and fit it in the groove of outer race (2).
6. Check that grease nipple (10) is properly fitted, and fill it with grease. Then, check bearing for smooth rotation and flaws on seal lip portion.

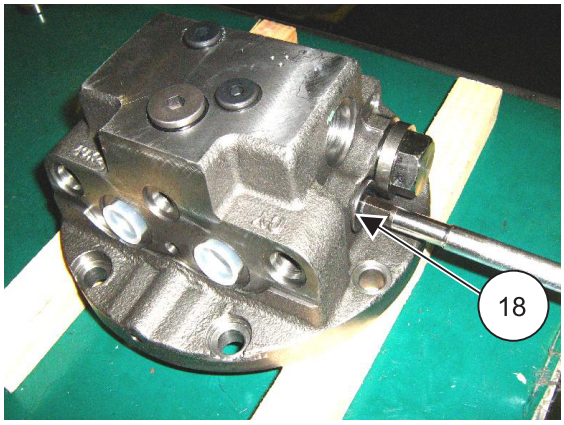
34.1.8.5 MAINTENANCE STANDARD

Maintenance standard concerning wear of swing bearing is described in the section 13.6 MEASURING SWING PERFORMANCES of "Maintenance Standard and Test Procedure" in this manual.

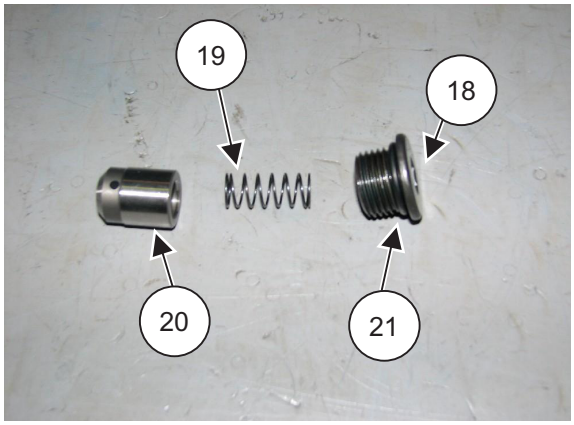
12. Remove the O-rings (16) from respective plugs. And remove the steel balls (17) from the motor cover.



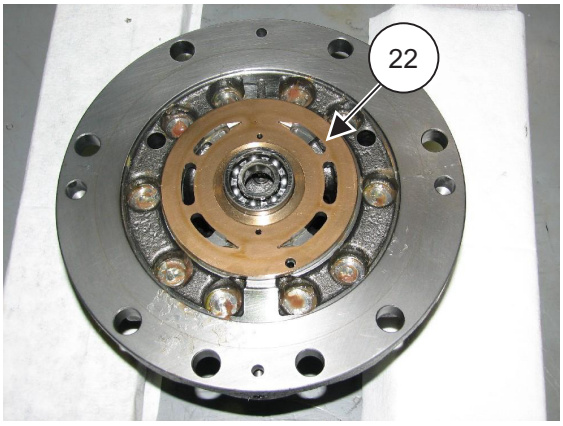
13. Remove the plug (18) from the motor cover.



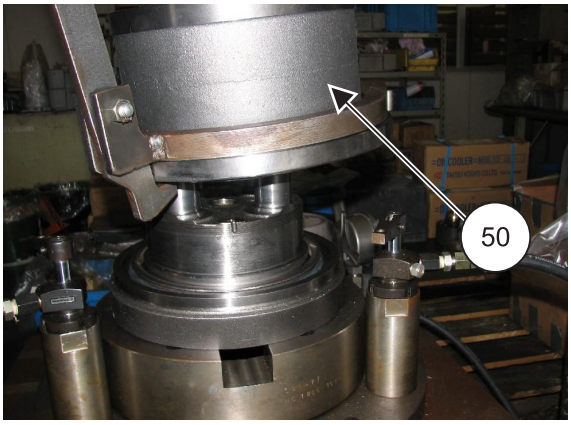
14. Remove the spring (19) and poppet (20) from under the plug (18). Remove the O-ring (21) from the plug (18).



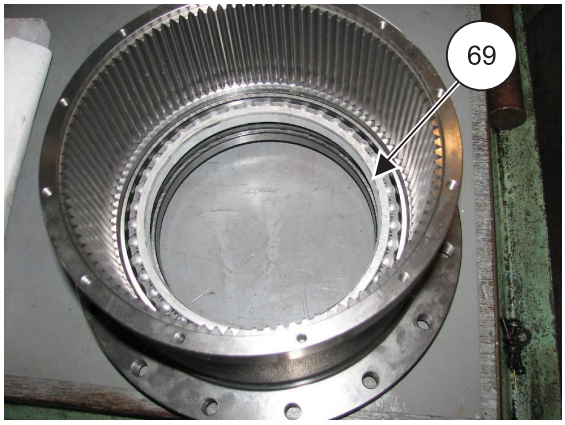
15. Turn the motor cover over. And remove the valve plate (22) from the motor cover.



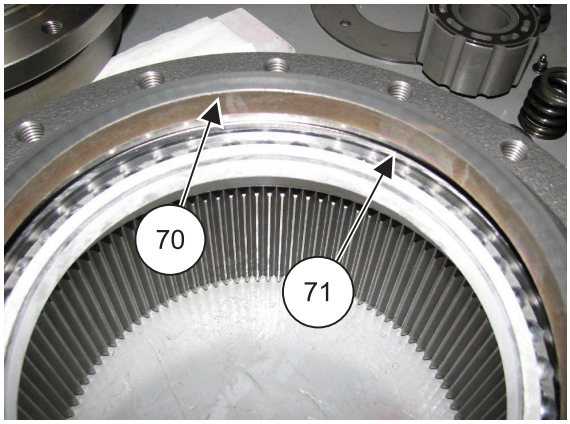
41. Using a crane, remove the gear casing (50) from the body casing.



42. Remove one of the angular bearings (69) from the gear casing.



43. Turn the gear casing over. Remove the floating seal (72) and the other angular bearings (69) from the gear casing.



44. Remove another floating seal (72) from the body casing (73).
To remove them from the body casing, strike the shaft (74) and the bearing (75) with plastic hammer and suitable jig in direction shown in the figure.