4. Disassembly and Reassembly

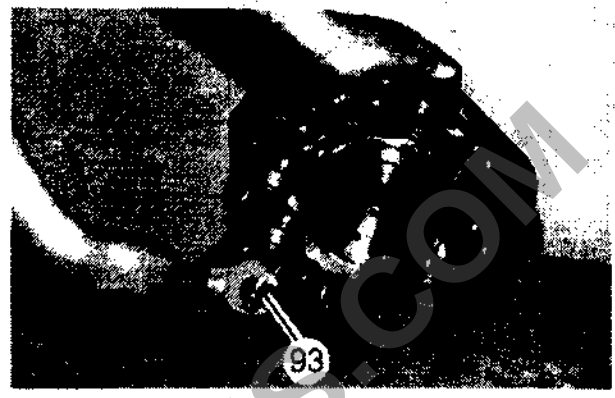
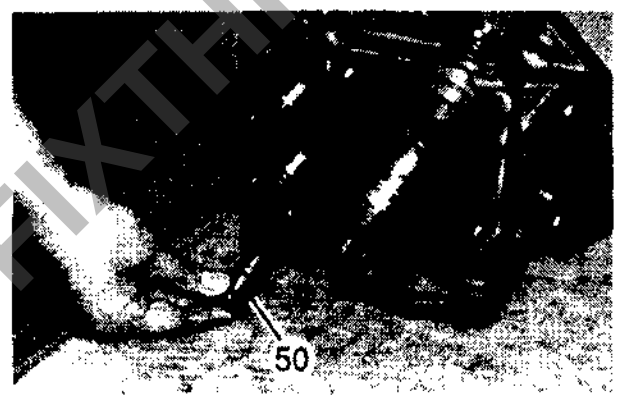
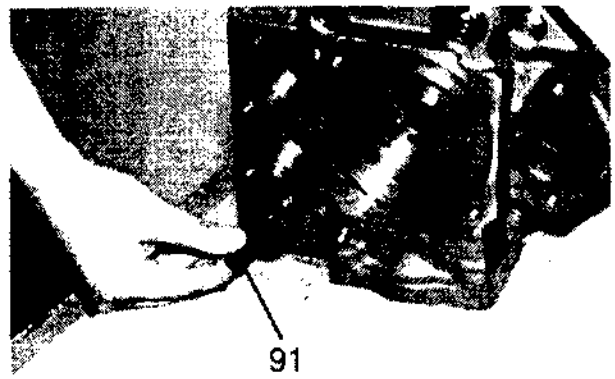
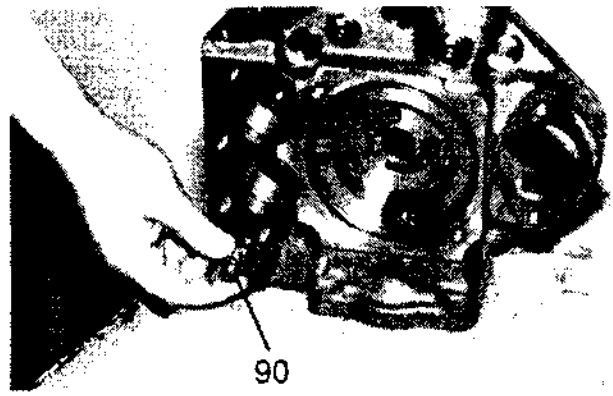
1) Tools and Tightening Torques

Tool	Size in. (mm)	Part No.	Part name	Thread size	Tightening torque ft·lbf. (N·m)	Remarks
Hexagon bar wrench	0.24 (6)	125	Hex. socket head cap screw	M8	1.95 to 2.38 (2.65 to 3.23)	
Wrench	0.87 (22)	312	Adjust nut	M14	3.36 to 3.87 (4.56 to 5.24)	
		315	Lock nut	M14	3.36 to 3.87 (4.56 to 5.24)	
	1.06 (27)	302	Disk	M14	3.36 to 3.87 (4.56 to 5.24)	
Plus screwdriver	abt. 5.91 (15 cm)	411	Screw 1	M4	0.32 to 0.40 (0.44 to 0.54)	
		421	Screw 2	M4	0.32 to 0.40 (0.44 to 0.54)	Valve without switch
					0.057 to 0.087 (0.078 to 0.118) Clearance 0.02 to 0.06 in. (0.5 to 1.5 mm)	Valve with switch
		431	Screw 3	M5	0.575 to 0.072 (0.78 to 0.098)	
Minus screwdriver	abt. 0.16 to 0.2 (4 to 5) wide	211	Plug			
Special tool		301	Joint	M14	2.35 to 2.71 (3.19 to 3.68)	
Torque wrench	0.72 to 7.23 ft·lbs. (0.98 to 9.8 N·m)					

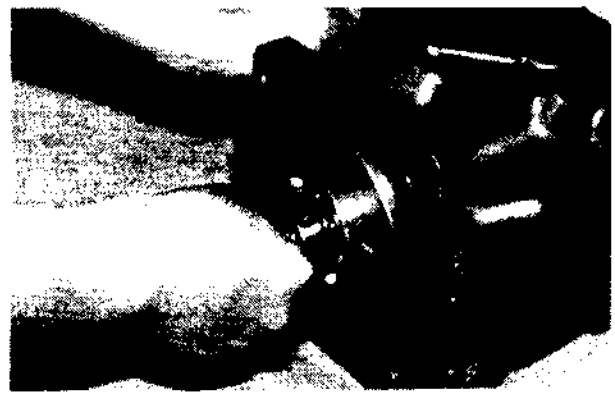
Others:

- Volatile rust preventives
- Kerosene
- High-temperature grease (Spray type recommended)
- Loctite #241 (Special #261)
- Sandpaper (#1000 & #2000)
- Oilstone
- Vice

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Procedure	
(29) Remove nut 93. ***Note*** : *Pressure is set at the factory. Loosen or remove only when required.*	
(30) Remove adjust screw 50. ***Note*** : *Pay attention to shim 92 installed inside.*	
(31) Remove spring 91.	
(32) Remove spool 90.	

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Procedure	
(13) Check if three dowel pin of rotary group 18 are not remain in pump.	
(14) Remove snap ring 1. Tool : Snap ring priers (For internal snap ring 80 mm)	
(15) Remove seal case 2 with using two screw drivers. ***Note:*** *Remove O-ring 4 at the same time.*	
(16) Pull out shaft 7. ***Note:*** *Slightly drive end of shaft with plastic hammer if it is tight.*	

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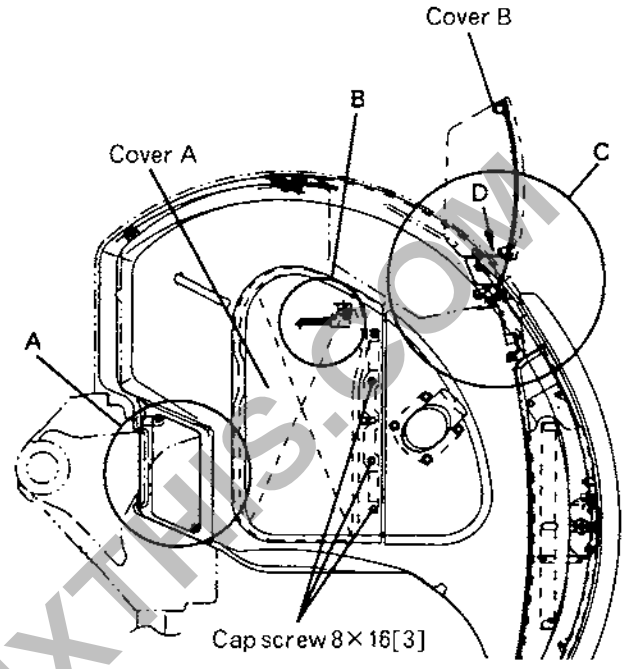
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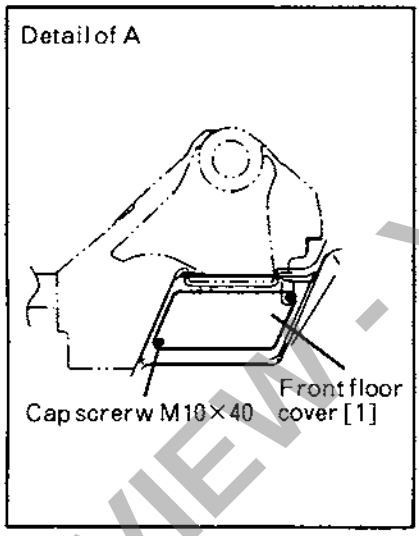
(7) Remove front floor cover ①.

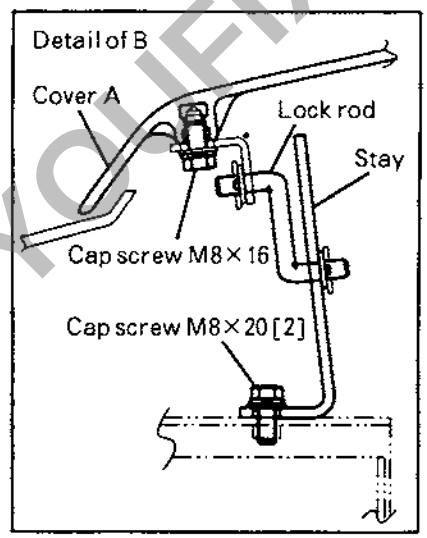
(8) Open cover A to remove stay holding cap screw ②.

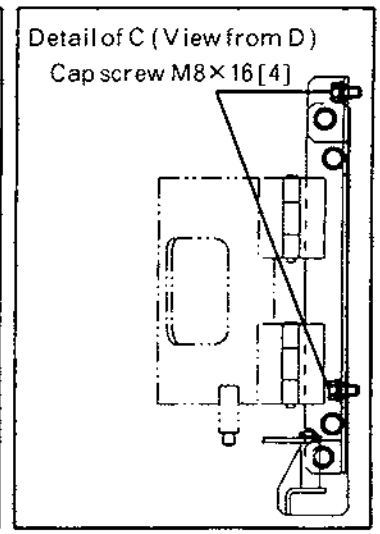
(9) Remove cover A to holding cap screws ③ to remove cover A.

(10) Open cover B to remove two cap screws ④.









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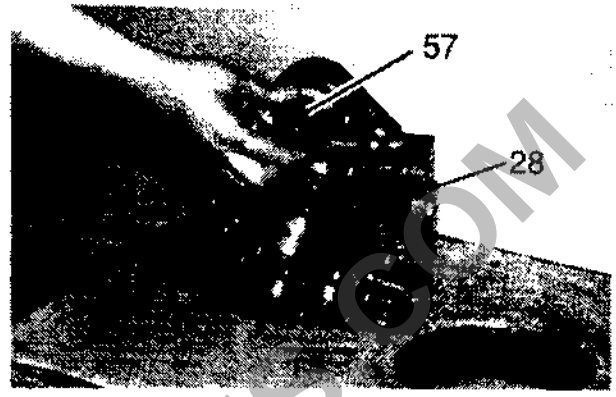
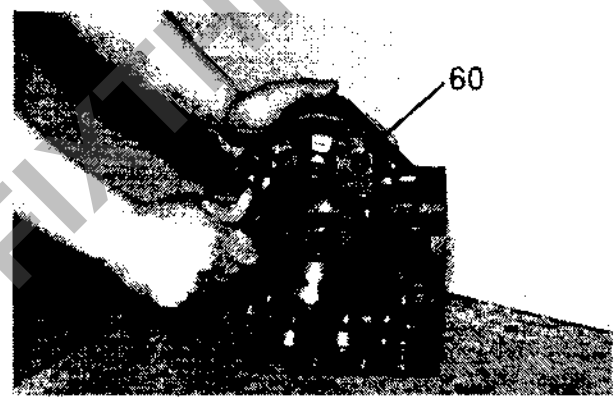
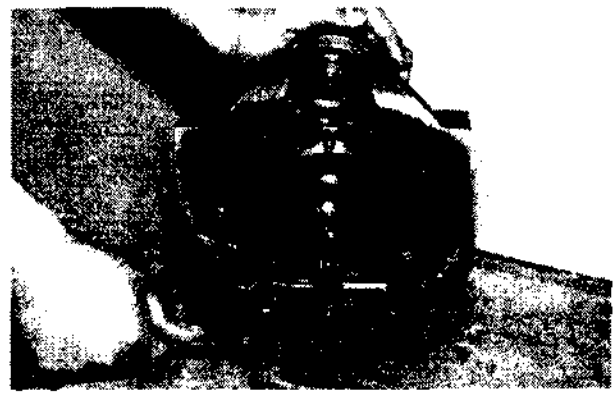
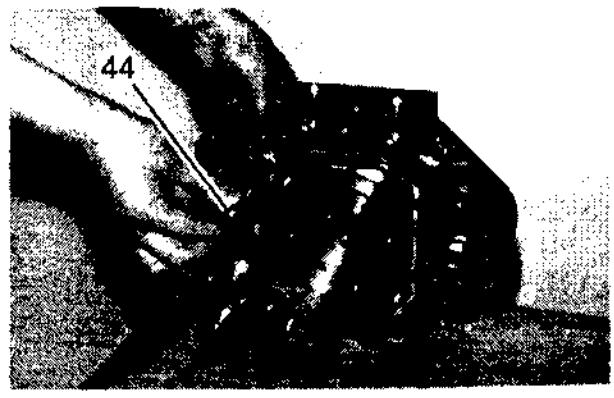
2. TECHNICAL DATA

Item		Unit	V1070 (US
Fuel injection pump			
	Injection pump		YPES-A type
	Injection pump plunger dia.	in. (mm)	ϕ0.37 (ϕ9.5)
	Injection pump cam lift	in. (mm)	0.31 (8)
	Fuel injection timing (FID)	degrees	10 to 12
	Firing order		1-3-4-2

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Procedure	
(17) Install spring seat 57 with O-ring 58 onto cover 28.	
(18) Tighten two Allen-head screws 60 to 40.5 to 50.6 ft•lbf. (54.9 to 68.6 N•m) to install cover 59. (Tool : Set screw wrench 8 mm)	
(19) Install orifice 41 and O-rings 42 and 43 into cylinder 40. Tighten two Allen-head screws 38 to 40.5 to 50.6 ft•lbf. (54.9 to 68.6 N•m) to install the cylinder on cover 28. (Tool : Set screw wrench 8 mm) (Lock agent : Loctite 270)	
(20) Install two pistons 44.	

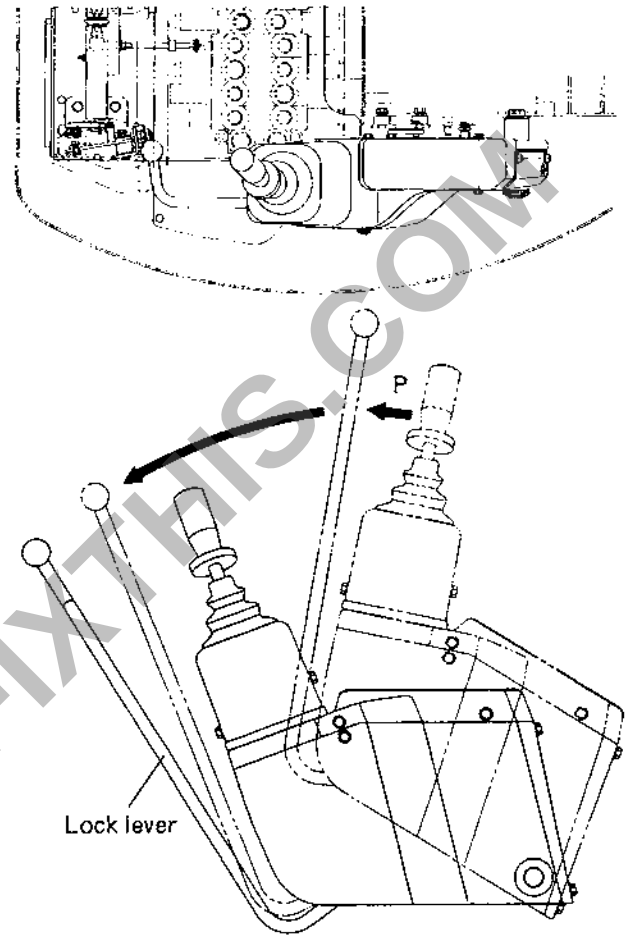
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2) Operation of lock lever

(1) Operation force should be less than 26.5 lbf. (12 kgf) when moving from P.

(2) When lock lever does not move smoothly or its operation force is out of specification, do the following adjustment.

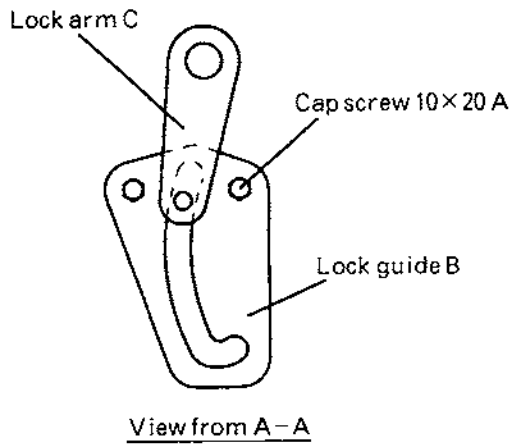


(3) Adjustment procedure

[1] Loosen two screws Ⓐ to unfix lock guide Ⓑ.

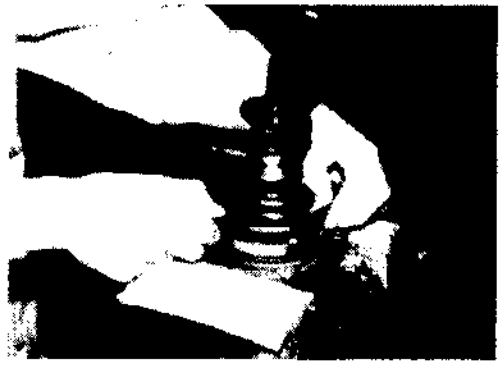
[2] Move the lock lever and adjust the position of lock guide Ⓑ to move lock arm Ⓒ smoothly, then tighten screws Ⓐ.

[3] Inspect if the lock lever moves smoothly and check if its operation force is less than 26.5 lbf. (12 kgf).



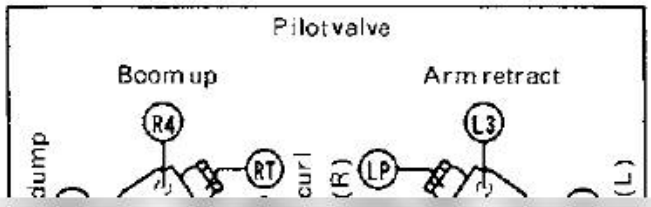
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Procedure	Photo
(24) Assemble the bush (457) to the plate and pass the cord and tube through it. ***Note:*** *Secure a margin necessary for operation.*	
(25) Determine the handle direction, tighten the lock nut (315) to the specified tightening torque to fix the handle. Tightening torque : 3.36 to 3.87 ft·lbf. (4.56 to 5.24 N·m)	
(26) Apply grease to the rotating section of the joint and contact faces of the disk and push-rod. ***Note:*** *Nichimoly. CSE-make 115B paste type grease is recommended, but commonly used spray type grease is also acceptable.* *Grease should be applied every half year.*	
(27) Assemble the lower end of bellows to the casing.	

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6) Upper-structure hydraulic piping layout
(Hydraulic pump - Pilot control valve)



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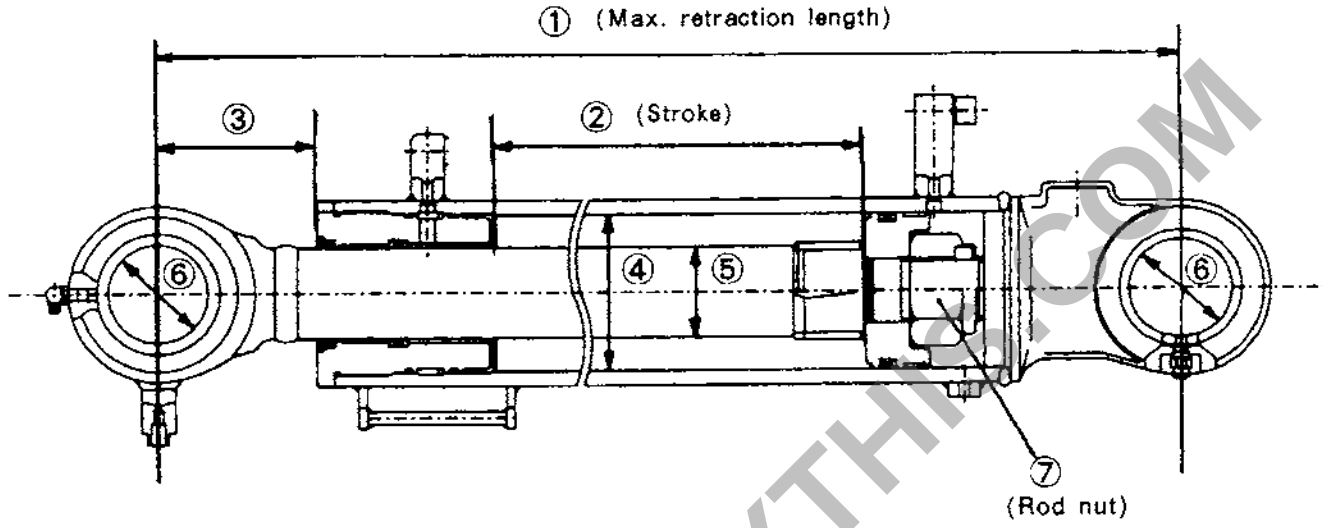
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3-5 Hydraulic Equipment

3-5-1 Hydraulic Cylinder



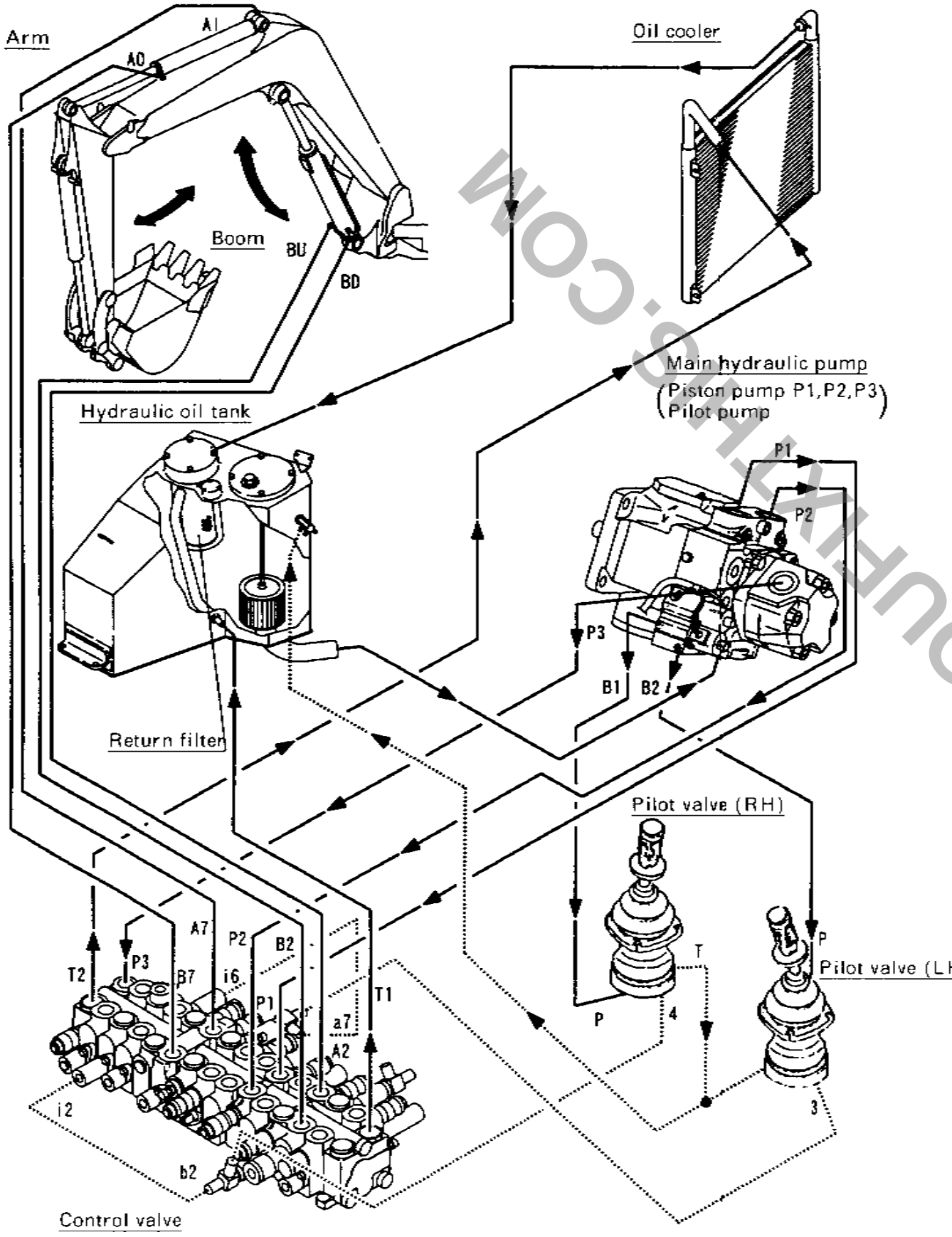
Applicable model : Vi070 (US

Unit : in. (mm)

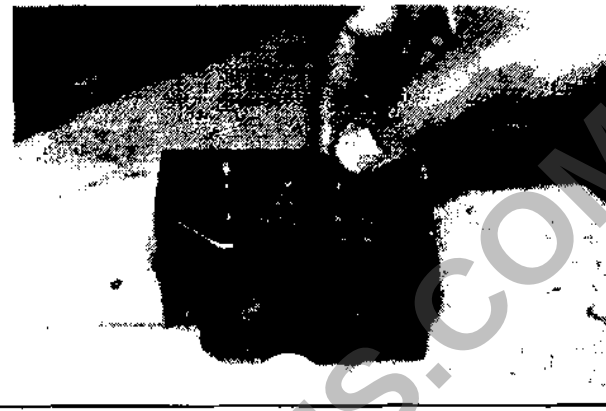
Positon	①	②	③	④	⑤	⑥	⑦		⑧	
							Standard	Wear limit	Thread size	Tightening torque (ft·lbf. (N·m))
Boom (Cabin spec.)	51.57 (110)	33.39 (848)	4.43 (112.5)	φ4.53 (φ115)	φ2.56 (φ65)	—	φ2.76 (φ70)	φ2.80 (φ71)	2.76 (70)	1720 to 2104 (2332 to 2852)
Arm	51.46 (1307)	35.08 (891)	3.74 (95)	φ3.94 (φ100)	φ2.36 (φ60)	—	φ2.36 (φ60)	φ2.40 (φ61)	2.56 (65)	1431 to 1750 (1940 to 2372)
Bucket	41.54 (1055)	27.95 (710)	4.21 (107)	φ3.54 (φ90)	φ2.17 (φ55)	—	φ2.36 (φ60)	φ2.40 (φ61)	2.36 (60)	1431 to 1750 (1940 to 2372)
Boom swing	41.56 (1055.5)	25.00 (635)	3.78 (96)	φ4.72 (φ120)	φ2.36 (φ60)	—	φ2.36 (φ60)	φ2.40 (φ61)	2.56 (65)	1431 to 1750 (1940 to 2372)
Blade	28.74 (730)	6.69 (170)	10.41 (264.5)	φ5.12 (φ130)	φ2.56 (φ65)	—	φ2.36 (φ60)	φ2.40 (φ61)	2.95 (75)	2082 to 2545 (2822 to 3450)

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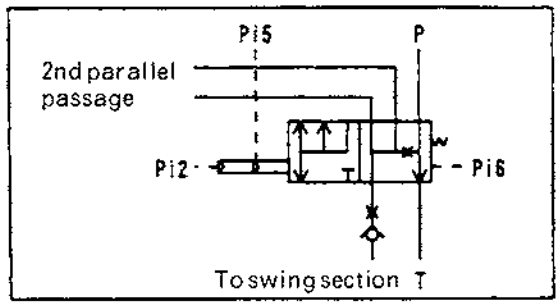
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Procedure	
(4) Remove O-ring 65.	
(5) Remove spring 67.	

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8) Parallel-flow divider

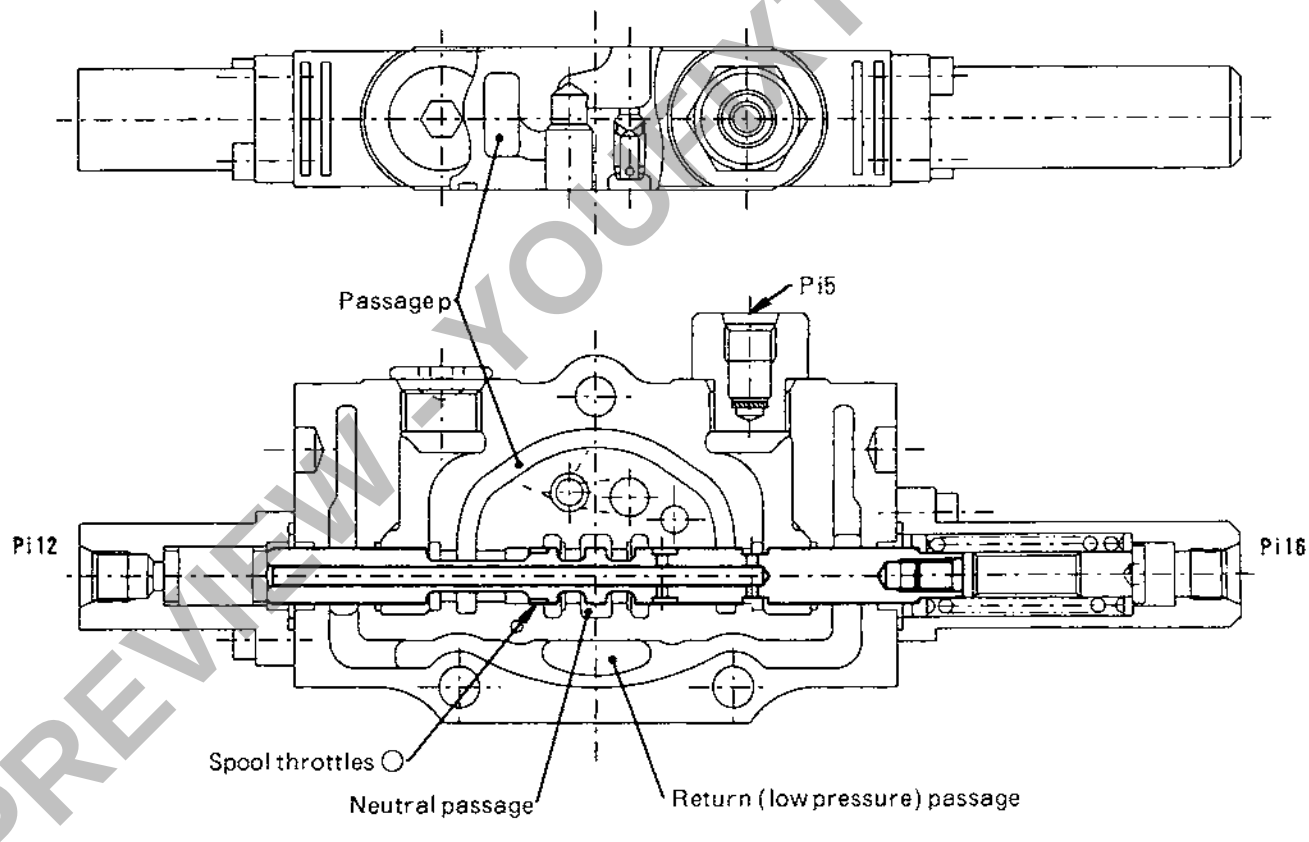


(1) Neutral

Oil from the gear pump P3 flows to the swing section through the neutral passage.

Pilot oil from the port Pi5 is led to the return (low pressure) passage through a pilot line.

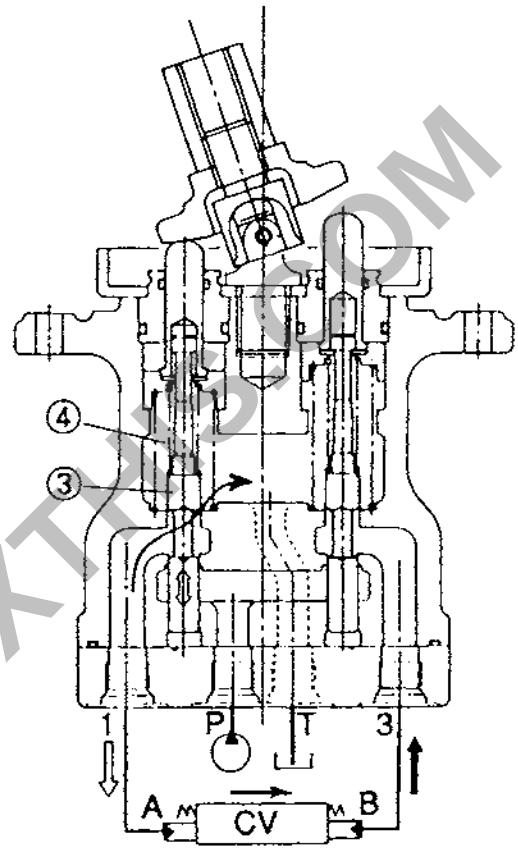
When the arm spool is moved, the oil from the gear pump P3 flows to the boom and bucket sections through the spool throttles 0 and 2nd parallel passages.



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(3) Handle Inclined and Held

When the handle ⑭ is inclined and held at a definite position, the pressure at the port 1 rises, the spool ③ is pushed up by the hydraulic force applied on the spool ③ and the ports P and 1 start to close, causing the force of the spring ④ and the hydraulic power equalized. When the pressure of the port 1 exceeds the set pressure, the spool ③ is pushed up, the ports P and 1 are blocked and the port T opens, causing the pressurized oil of the port P to escape. When the pressure of the port P falls below the set pressure, the spool ③ is pushed down, the port T is blocked and the port P opens. This means that the pressure of the port 1 maintains a certain pressure according to the displacement of the lever while CV displaces according to the pressure of the port 1.



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3. Reduction Gear

1) Structure and Functions

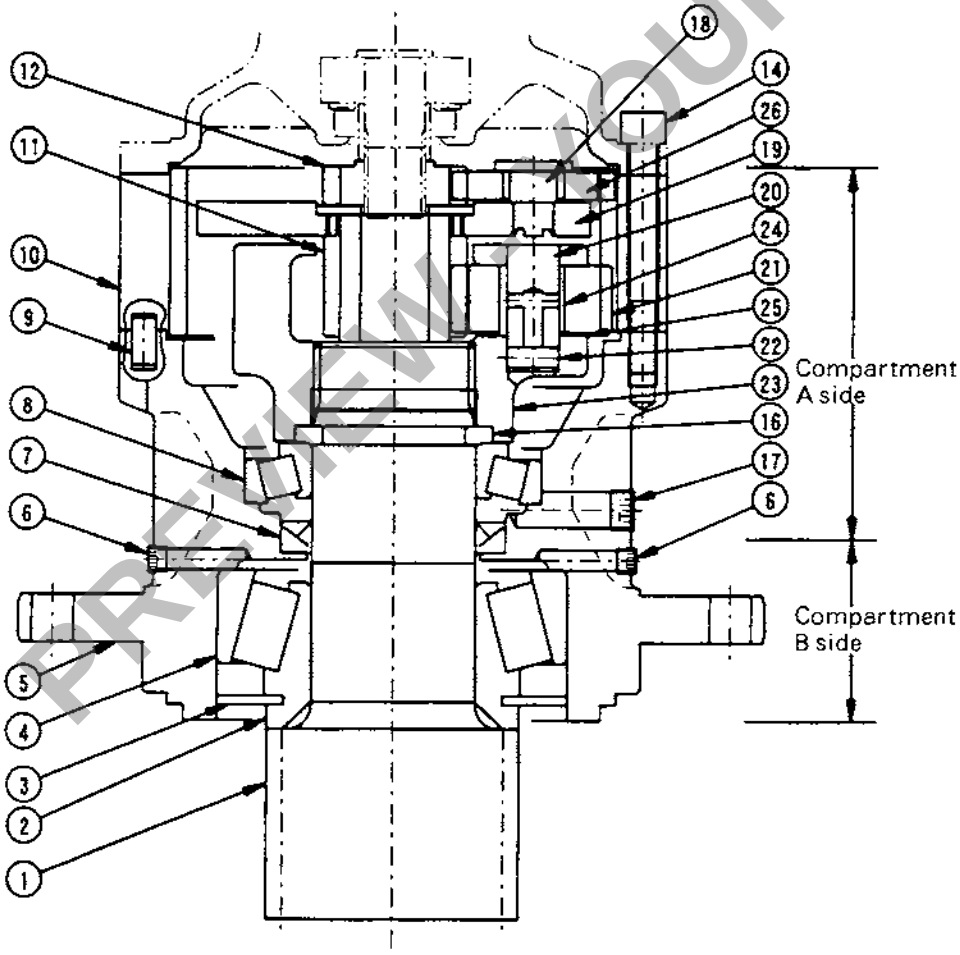
Power is transmitted from the hydraulic motor output shaft through the first level sun gear ⑫, shaft AS1 ⑱, and holder ⑲ to the second level spur gear 4 ⑪.

Power is similarly transferred through spur gear 4 ⑪, shaft ⑳, and the second level spur gear 5 ㉑ to the pinion shaft ①. The pinion shaft ① is supported by two bearings ④ and ⑧ in the gear case.

Note:
When greasing from the plug ⑥ port, remove the other plug ⑥ on reverse side to prevent oil seal from damaging due to internal pressure.

To protect the bearings on the pinion shaft side, which must withstand heavy loads, from the dust generated by gear wear, the oil seal ⑦ is installed in the center of the gear case ⑤. Compartments A and B are lubricated with gear oil and grease, respectively.

Gear oil : Gear Oil SAE 90 (GL-4), approximately 1.59 Qts. (1.5 L)
Grease : Albania Grease EP2 or equivalent, approximately 0.21 Qts. (0.2 L)



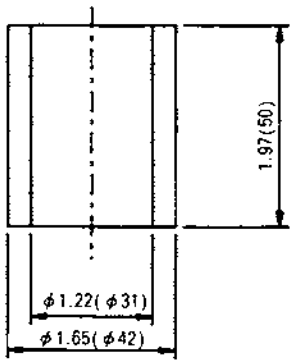
No.	Part name	Q'ty
1	Pinion shaft	1
2	Collar	1
3	Grease seal plate	1
4	Taper roller bearing	1
5	Gear case	1
6	Plug PT1/8	2
7	Oil seal	1
8	Taper roller bearing	1
9	Pin	2
10	Ring gear	1
11	Spur gear 4	1
12	Sun gear	1
14	Allen-head screw	6
16	Split collar	2
17	Plug PT3/8	1
18	Shaft AS 1	3
19	Holder 1	1
20	Shaft	3
21	Spur gear 5	3
22	Spring pin	3
23	Holder	1
24	Bushing	3
25	Thrust plate	3
26	Spur gear 2	3

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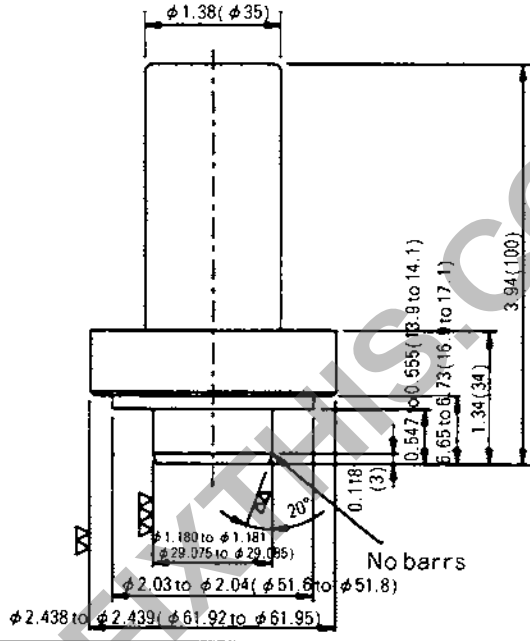
4. Jigs

Unit : in. (mm)

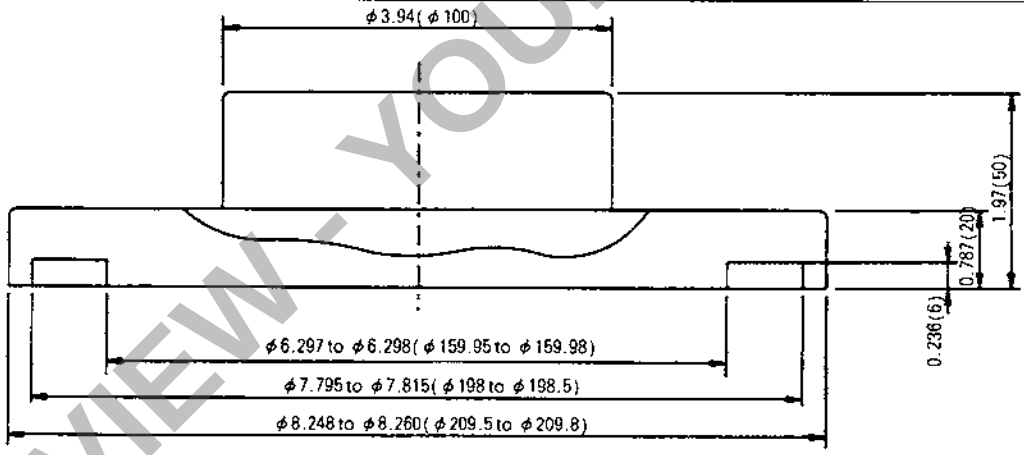
A : Bearing installation



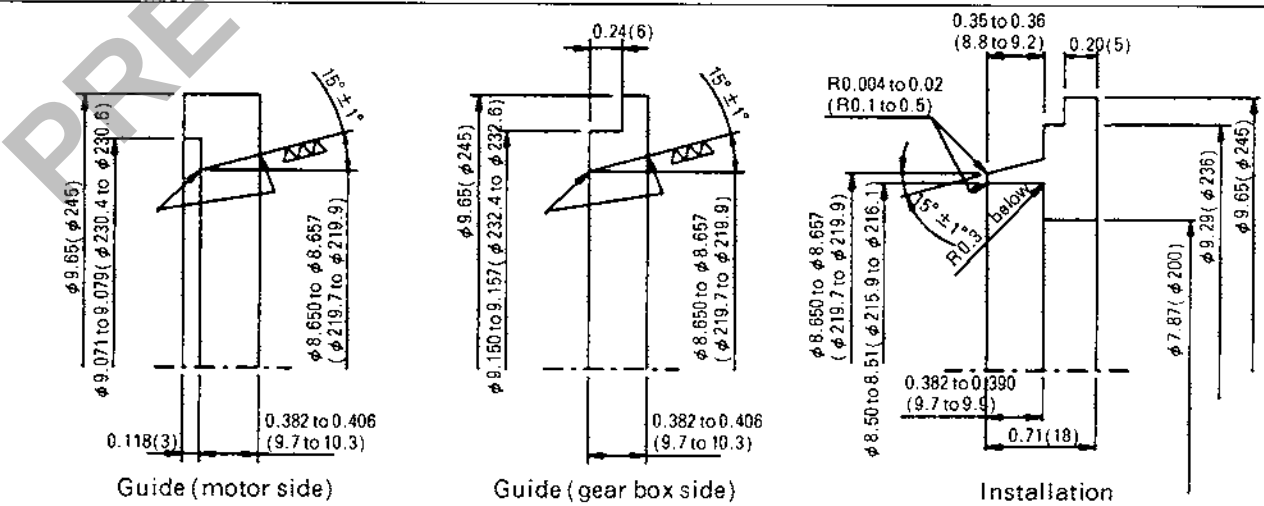
B : Oil seal installation



C : Bearing installation



D : Floating seal installation



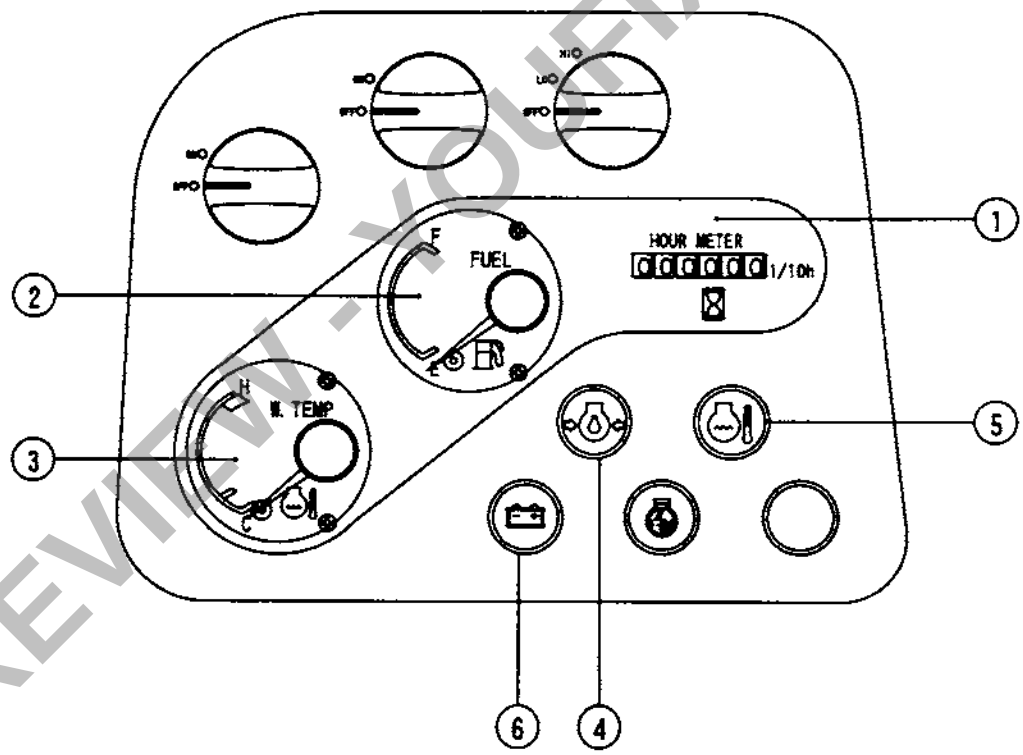
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6-1-2 Monitor and Alarm Systems

For safer machine use, the operator has to grasp machine condition. But it is difficult ① for the operator to keep an eye on every aspect of the machine he is using. Accordingly, gauges and alarms are fitted to alert the operator of abnormalities at an early stage.

Note:
Monitor indications do not give full assurance of the conditions of the machine. Operators are recommended to use these indications as a guide for the routine checks and maintenance listed in the operation and maintenance manual.

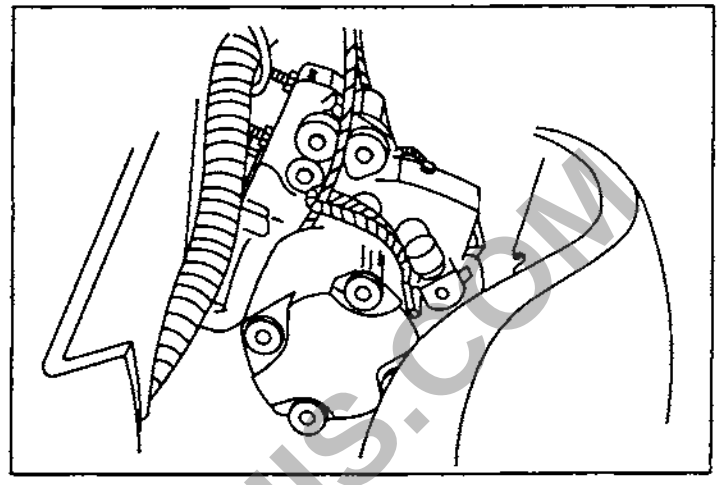
Instrument Panel



(1) Hourmeter
(2) Fuel oil lever meter
(3) Engine coolant temperature meter
(4) Engine oil pressure alarm light
(5) Engine coolant temperature alarm light
(6) Battery charge alarm light

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(21) Remove hydraulic pump.



2) Reinstall hydraulic pump by reverse procedure of remove.

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8) Sash windowpane

(1) Front sash window

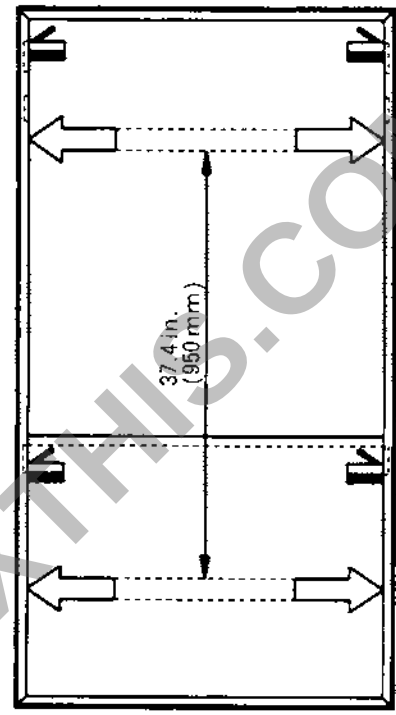
[1] Center both glasses.

[2] Install two frame extension tools on sash frame with 37.4 in. (950 mm) of space.

[3] Extend sash frame 0.4 in. (10 mm) to replace glass with new one.

Note:

Never extend frame more than 0.4 in. (10 mm), or sash frame will be eternally deformed.



(2) Side sliding window

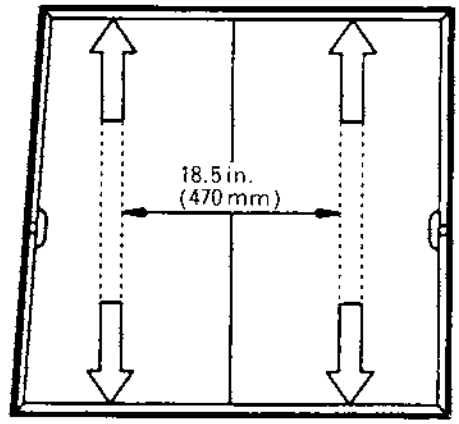
[1] Center both glasses.

[2] Install two frame extension tools on sash frame with 18.5 in. (470 mm) of space.

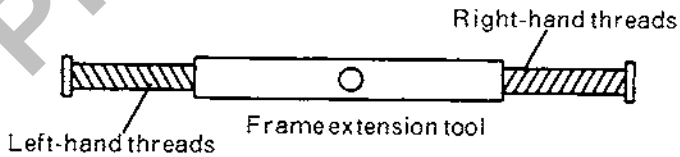
[3] Extend sash frame to replace glass with new one.

Note:

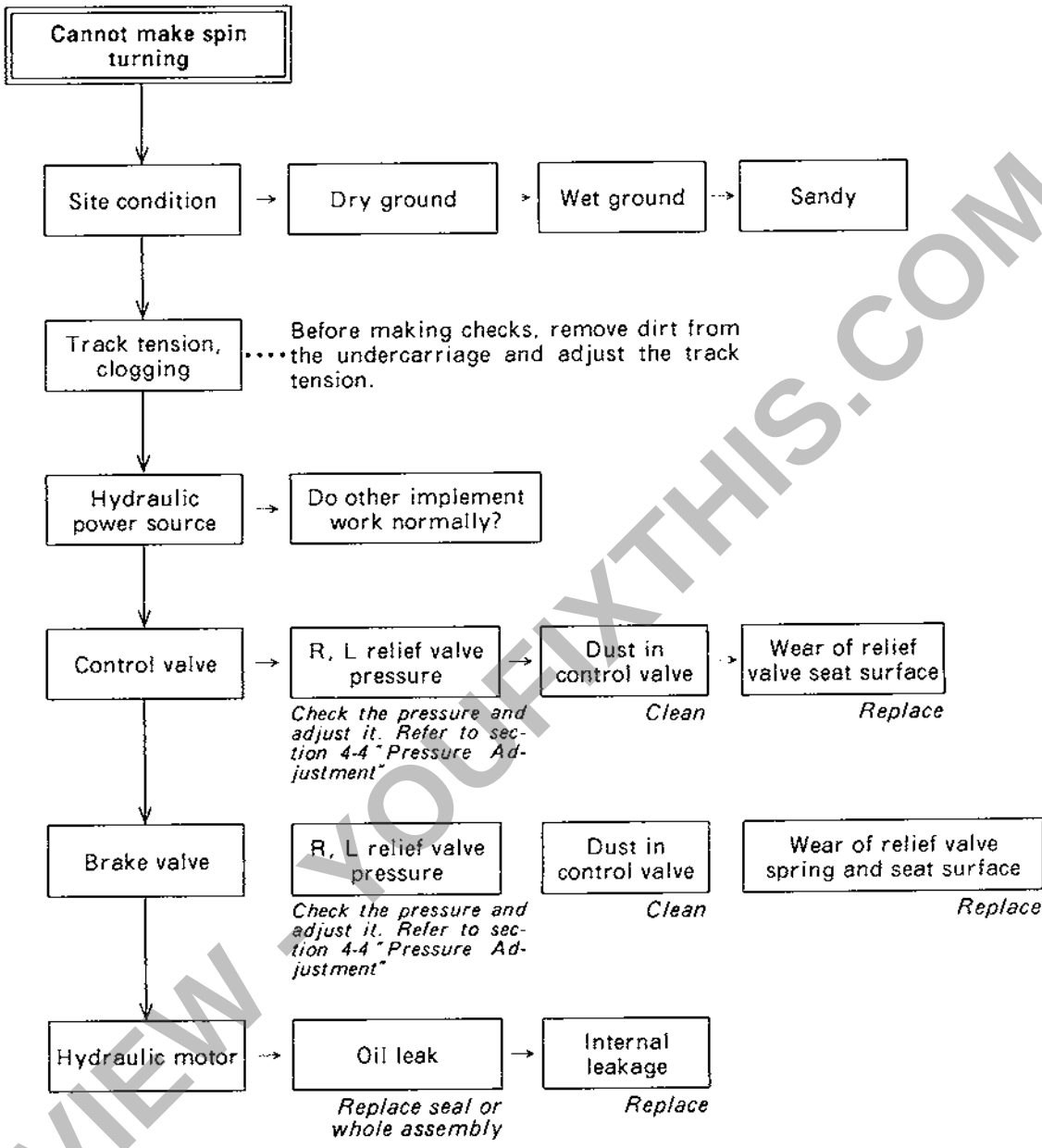
Never extend frame more than 0.4 in. (10 mm), or sash frame will be eternally deformed.



(3) Tool



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3. ENGINE BODY

3-1. Oil Inspection ····· 3-1

3-2. Cooling Water Inspection ····· 3-1

3-3. Inspecting Water Leak form Cooling Water System and Radiator ····· 3-1

3-4. Fan Belt Tension Inspection and Adjustment ····· 3-2

3-5. Adjusting the Valve Clearance ····· 3-3

3-6. Inspecting the Fuel Injection Valve Injection Pressure and Spray Pattern ····· 3-4

3-7. Fuel Injection Timing Inspection and Adjustment ····· 3-7

3-8. Sensor Inspection ····· 3-8

3-9. Battery Inspection ····· 3-9

3-10. Adjusting Operation ····· 3-11

3-11. Long Storage ····· 3-12

3-12. Periodic Maintenance Schedule ····· 3-13

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Point 7 Oil seal

Reassemble:

- Replace the oil seal with a new one whenever disassembled. Apply lithium grease at the time of assembly.

(5) Parts inspection and measurement

(5-1) Cylinder block

Especially clean head surface, cylinder bores and oil holes, and check after removing any carbon deposit and bonding agent.

① Appearance inspection

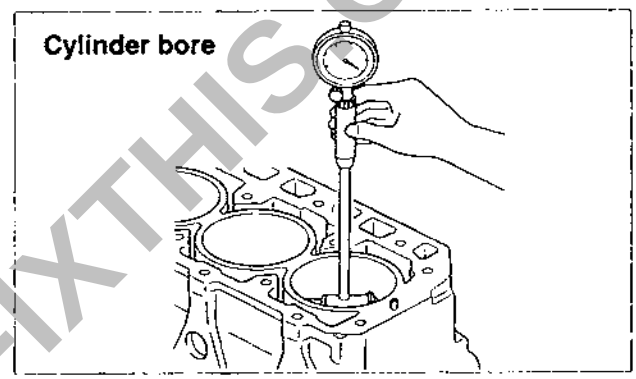
Check if there is any discoloration or crack. If crack is suspected, perform color check. Sufficiently clean the oil holes and check they are not clogged.

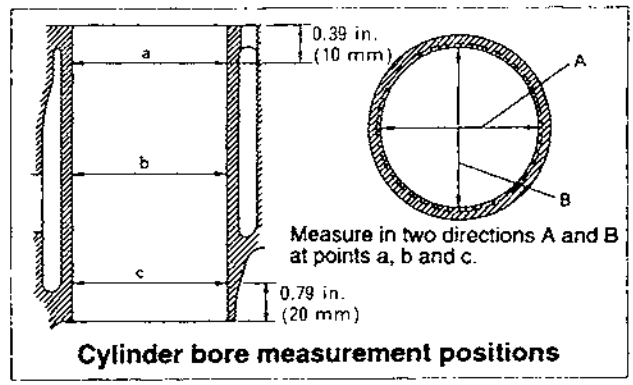
② Cylinder bore and distortion

Measure at 0.39 in. (10 mm) below the crest of the liner, at 0.79 in. (20 mm) from the bottom end and at the center.

Roundness: Maximum value of the difference between the measured values in the same cross section.

Cylindricity: Maximum value of the difference between the measured values in the same direction.





Cylinder bore measurement positions

in. (mm)

	Standard	Limit
Bore	3.8583 to 3.8594 (98.000 to 98.030)	3.8634 (98.130)
Roundness	0.0004 (0.01) or less	0.0012 (0.03)
Cylindricity	0.0004 (0.01) or less	0.0012 (0.03)

③ If the limit is exceeded or any surface defect is found, repair by boring and honing. Use an oversized piston (and new piston rings) as required.

0.25 OS	Piston ass'y code (incl./Piston ring ass'y)	Piston ring ass'y code	Boring dimension in. (mm)	Head gasket code
	129902-22900	129903-22950	ϕ3.8681 to ϕ3.8693 (ϕ98.250 to ϕ98.280)	129902-01330 (STD)

0.50 OS	Piston ass'y code (incl./Piston ring ass'y)	Piston ring ass'y code	Boring dimension in. (mm)	Head gasket code
	129902-22920	129903-22970	ϕ3.8779 to ϕ3.8791 (ϕ98.500 to ϕ98.530)	129902-01340 (OS)

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(d) Armature and commutator runout

Use a dial gage and measure the armature core runout and commutator runout. Correct or replace if the limit is exceeded.

in. (mm)

	Standard	Limit
Armature	0.0012 (0.03)	0.0079 (0.2)
Commutator	0.0012 (0.03)	0.0079 (0.2)

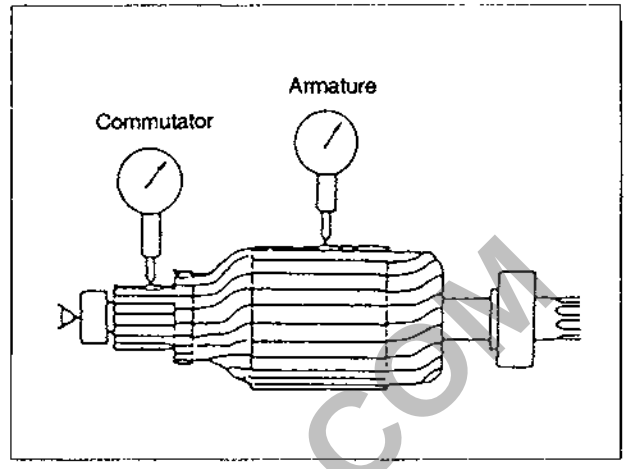


Fig. 13

(e) Commutator surface inspection

If the commutator surface is roughened, grind with #500 to #600 emery cloth.

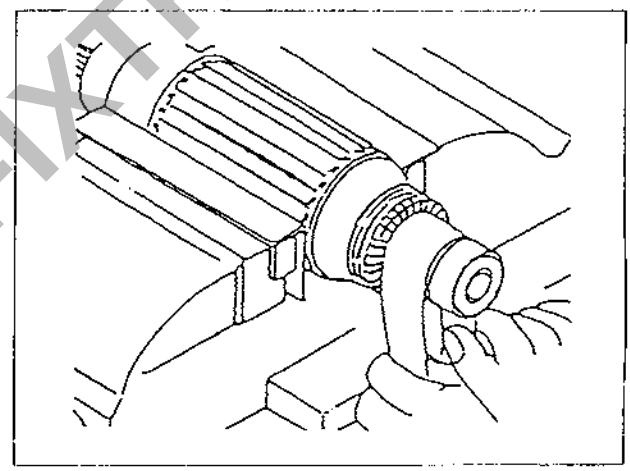


Fig. 14

(f) Commutator insulation depth

Measure the depth of the insulating material between commutator segments, and correct it if it is less than the limit.

in. (mm)

Standard	Limit
0.0197 to 0.0315 (0.5 to 0.8)	0.0079 (0.25)

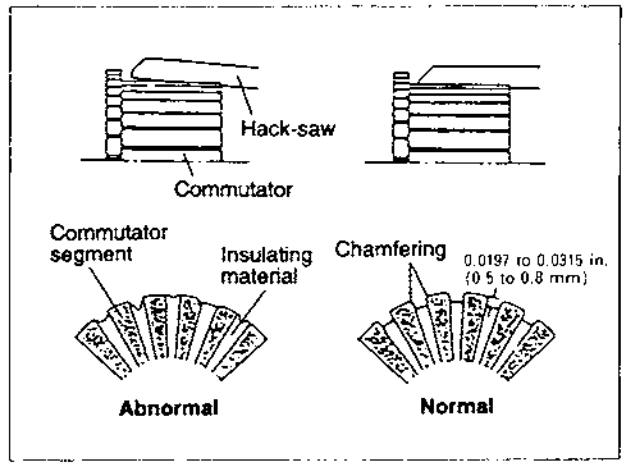


Fig. 15

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