



SERVICE MANUAL

EXCAVATOR

*ViG*75-A

S/N 01170 & Above

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

GENERAL CAUTIONS FOR MAINTENANCE WORK

1-1 Correct Work.....	1-1
1-2 Safety Precautions.....	1-1
1-3 Preparations	1-1
1-4 Cautions for Disassembly and Reassembly	1-1
1-5 Cautions for Removal and Installation of Hydraulic Equipment	1-2
1-6 Cautions for Removal and Installation of Hydraulic Piping	1-2
1-7 Cautions for Handling Seals	1-3
1-8 Correct Installation of Hydraulic Hose	1-3
1-9 Specifications of Hydraulic Hose	1-6
1-10 Air Release of Hydraulic Equipment	1-11


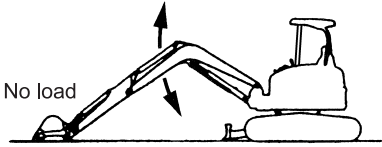

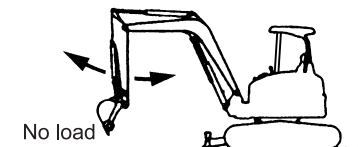

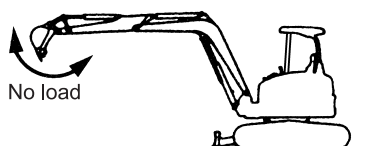

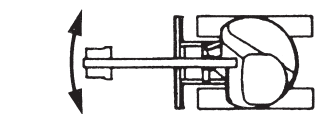

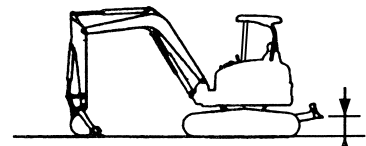
2. TECHNICAL DATA

Item	Unit	ViO75-A		
Undercarriage				
Rubber crawler	Shoe width	in. (mm)	17.7 (450)	
	Lug height	in. (mm)	1.18 (30)	
	Core metal pitch	in. (mm)	3.29 (83.5)	
Carrier roller (Upper roller)	Manner of support		Overhang type	
	Quantity (One side)	pcs.	1	
	Bearing		Bearing	
	Sealing		Shaft seal	
Number of shoe slide plates (One side)		pcs.	-	
Track roller (Lower roller)	Quantity (One side)	pcs.	5	
	Bearing		Bush	
	Sealing		Floating seal	
Idler	Quantity (One side)	pcs.	1	
	Bearing		Bush	
	Sealing		Floating seal	
Number of sprocket teeth	Steel crawler	pcs.	19	
	Rubber crawler	pcs.	19	
Crawler tension adjustment			Grease adjuster	
Engine				
Main specifications				
Engine model			4TNV98-XBV	
Type			Vertical type series water-cooled 4 cycle diesel engine	
Combustion system			Direct injection	
Number of cylinders - Bore×Stroke		pcs. - in.×in. (mm×mm)	4 - 3.86×4.33 (98×110)	
Total displacement		cu.in. (cu.cm)	202.5 (3318)	
Rated output / engine speed		HP/rpm (KW/rpm)	58.2/2000 (43.4/2000)	
Maximum torque / engine speed		ft•lbf/rpm (N•m/rpm)	173.6/1200 (235.4/1200)	
Specific fuel consumption		lbs./HP•h (g/PS•h)	0.375 (170) or less	
Maximum idling speed		rpm	2105 to 2155	
Minimum idling speed		rpm	1000 to 1050	
Engine dry mass (excluding air cleaner and silencer)		lbs. (kg)	518.2 (235)	
Lubricating method			Forced lubrication by trochoid pump	
Specific lubricating oil consumption		lbs./HP•h (g/PS•h)	0.0009 (0.4) or less	
Compression pressure		PSI (MPa)	497.7 (3.4) at 250 rpm	
Cylinder head				
Intake valve	Open	bTDC	degrees	10 to 20
	Close	aBDC	degrees	48 to 58
Exhaust valve	Open	bBDC	degrees	45 to 55
	Close	aTDC	degrees	7 to 17

3. SERVICING STANDARDS

3. Service Standards

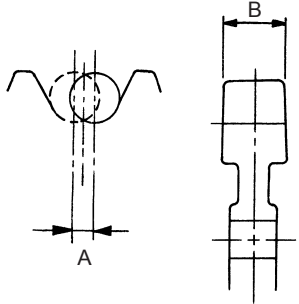
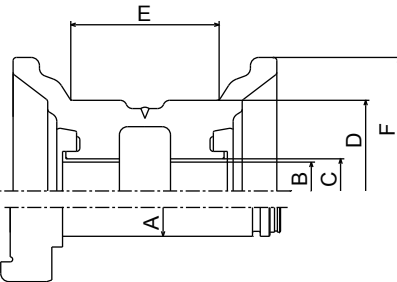
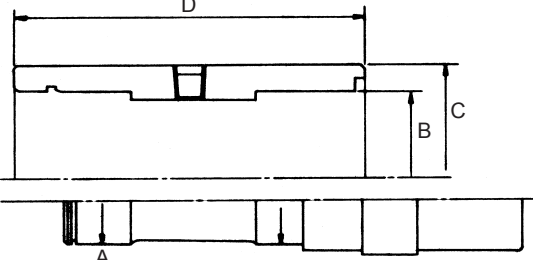
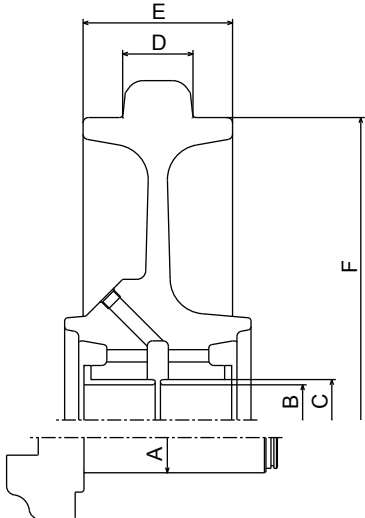
3-1 Machine Performance

Applicable model			ViO75-A		
Item	Measuring condition	Unit	Standard	Allowance	
Machine performance					
Working speed					
Boom speed Max. cylinder extension  Bucket teeth grounded	Machine position  No load <ul style="list-style-type: none"> • Engine : rated speed • Hydraulic oil temp. : 122 to 140 °F (50 to 60 °C) • Site : Firm, flat ground • Excluding cushion 	Up Down	sec. sec.	3.5 2.7 3.0	3.8 3.0
Arm speed Max. cylinder retraction  Max. cylinder extension	Machine position  No load <ul style="list-style-type: none"> • Engine : rated speed • Hydraulic oil temp. : 122 to 140 °F (50 to 60 °C) • Site : Firm, flat ground 	Extend Retract	sec. sec.	2.6 3.3	2.9 3.6
Bucket speed Max. cylinder retraction  Max. cylinder extension	Machine position  No load <ul style="list-style-type: none"> • Engine : rated speed • Hydraulic oil temp. : 122 to 140 °F (50 to 60 °C) • Site : Firm, flat ground 	Dump Curl	sec. sec.	2.5 3.7	2.8 4.0
Boom offset speed Max. cylinder retraction  Max. cylinder extension	Machine position  <ul style="list-style-type: none"> • Engine : rated speed • Hydraulic oil temp. : 122 to 140 °F (50 to 60 °C) • Site : Firm, flat ground • Full stroke 	Right swing Left swing	sec. sec.	6.4 5.8	6.8 6.2
Blade speed Max. cylinder retraction  Blade grounded	Machine position  <ul style="list-style-type: none"> • Engine : rated speed • Hydraulic oil temp. : 122 to 140 °F (50 to 60 °C) • Site : Firm, flat ground 	Up Down	sec. sec.	0.9 1.0	1.2 1.3

3. SERVICING STANDARDS

3-3-3 Common Specifications of Steel & Rubber Crawlers

[Unit : in. (mm)]

Applicable model	ViO75-A		
Part	Measuring position	Standard	Wear limit
Common specifications of steel & rubber crawlers			
(1) Sprocket 	A	0.31 (8)	-
	B	1.50 (38)	1.30 (33)
(2) Track roller & shaft 	A	Ø1.50 (Ø38)	Ø1.48 (Ø37.5)
	B	Ø1.50 (Ø38)	Ø1.51 (Ø38.4)
	C	Ø1.89 (Ø48)	-
	D	Ø4.72 (Ø120)	Ø4.57 (Ø116)
	E	4.25 (108)	4.49 (114)
	F	Ø6.93 (Ø176)	Ø6.77 (Ø172)
(3) Carrier roller & shaft 	A	Ø1.18 (Ø30)	-
	B	Ø2.44 (Ø62)	-
	C	Ø3.15 (Ø80)	Ø2.99 (Ø76)
	D	4.72 (120)	-
(4) Idler & shaft 	A	Ø1.73 (Ø44)	Ø1.71 (Ø43.5)
	B	Ø1.73 (Ø44)	Ø1.75 (Ø44.4)
	C	Ø1.97 (Ø50)	-
	D	1.69 (43)	1.46 (37)
	E	3.94 (100)	3.62 (92)
	F	Ø14.76 (Ø375)	Ø14.53 (Ø369)

CHAPTER 4

ENGINE

4-1 General	4-1-1	4-5-4 Servicing Points.....	4-5-2
4-1-1 How to Read This Manual	4-1-1	4-5-5 Parts Inspection and Measurement.....	4-5-2
4-1-2 Precautions for Service Work.....	4-1-3	4-6 Cooling System	4-6-1
4-1-3 Engine External Views	4-1-4	4-6-1 Cooling Water System.....	4-6-1
4-1-4 Structural Description	4-1-4	4-6-2 Cooling Water Pump Components.....	4-6-1
4-1-5 Exhaust Gas Emission Regulation	4-1-5	4-6-3 Disassembly (Reverse the Procedure Below for Assembly)	4-6-2
4-2 Troubleshooting	4-2-1	4-6-4 Servicing Points.....	4-6-2
4-2-1 Quick Reference Table for Troubleshooting.....	4-2-1	4-7 Fuel Injection Pump / Governor.....	4-7-1
4-2-2 Troubleshooting by Measuring Compression Pressure.....	4-2-4	4-7-1 Introduction.....	4-7-1
4-3 Inspection and Adjustment.....	4-3-1	4-7-2 Fuel Injection Pump.....	4-7-1
4-3-1 Oil Inspection.....	4-3-1	4-8 Starting motor	4-8-1
4-3-2 Cooling Water Inspection	4-3-1	4-8-1 Specifications	4-8-1
4-3-3 Inspecting Water Leak from Cooling Water System and Radiator	4-3-1	4-8-2 Components	4-8-2
4-3-4 Fan Belt Tension Inspection and Adjustment.....	4-3-2	4-8-3 Troubleshooting.....	4-8-3
4-3-5 Adjusting the Valve Clearance	4-3-3	4-9 Alternator.....	4-9-1
4-3-6 Inspecting the Fuel Injection Valve Injection Pressure and Spray Pattern.....	4-3-5	4-9-1 Components	4-9-1
4-3-7 Fuel Injection Timing Adjustment / Fuel Injection Pump Inspection and Adjustment	4-3-9	4-9-2 Specifications	4-9-3
4-3-8 Sensor Inspection.....	4-3-12	4-9-3 Wiring diagram	4-9-3
4-3-9 Battery Inspection.....	4-3-13	4-9-4 Standard output characteristics.....	4-9-4
4-3-10 Adjusting Operation.....	4-3-15	4-9-5 Troubleshooting.....	4-9-5
4-3-11 Long Storage.....	4-3-16	4-10 Air Heater	4-10-1
4-3-12 Periodic Maintenance Schedule.....	4-3-17		
4-4 Engine Body	4-4-1		
4-4-1 Introduction.....	4-4-1		
4-4-2 Cylinder Head.....	4-4-2		
4-4-3 Gear Train and Camshaft.....	4-4-12		
4-4-4 Cylinder Block	4-4-17		
4-5 Lubrication System.....	4-5-1		
4-5-1 Lubrication System Diagram	4-5-1		
4-5-2 Trochoid Pump Components.....	4-5-1		
4-5-3 Disassembly (Reverse the Procedure Below for Assembly)	4-5-1		

4. ENGINE

4-2 Troubleshooting

4-2-1 Quick Reference Table for Troubleshooting

The following table summarizes the general trouble symptoms and their causes. If any trouble symptom occurs, take corrective action before it develops into a serious problem so as not to shorten the engine service life.

Cause	Trouble symptom	Starting failure			Insufficient engine output			Poor exhaust color		High knocking sound during combustion	Abnormal engine sound	Uneven combustion sound	Hunting		Large engine vibration	Difficulty in returning to low speed	Excessive fuel consumption	Lubricating oil				Cooling water		Air intake		Exhaust temperature rise	Corrective action		
		Engine does not start	Engine starts but stops soon			Exhaust color			During work				During idling	During work				Excessive consumption	Dilution by fuel oil	Mixture with water	Low L.O. pressure	Much blow-by gas	Overheat	Low water temperature	Pressure drop			Pressure rise	
			None	Little	Much	Ordinary	White	Black	White																				Black
Engine system	Improper clearance of intake/exhaust valve	○	○		○						○															Adjust the valve clearance.			
	Compression leakage from valve seat				○		○		○							○											Lap the valve seat.		
	Seizure of intake/exhaust valve	○		○	○		○		○				○	○													Correct or replace.		
	Blowout from cylinder head gasket				○														○								Replace the gasket.		
	Seized or broken piston ring	○		○		○		○		○		○		○				○	○								Replace the piston ring.		
	Worn piston ring, piston or cylinder	○		○		○		○										○	○								Perform honing and use oversize parts.		
	Seized crankpin metal or bearing	○	○							○		○	○	○													Repair the replace.		
	Improper arrangement of piston ring joints		○			○												○									Correct the ring joint positions.		
	Reverse assembly of piston rings					○		○										○									Reassemble correctly.		
	Worn crankpin and journal bearing				○					○		○	○	○						○							Measure and replace.		
	Loosened connecting rod bolt									○				○						○							Tighten to the specified torque.		
	Foreign matter trapped in combustion chamber	○								○								○									Disassemble and repair.		
	Excessive gear backlash									○																	Adjust gear meshing.		
	Worn intake/exhaust valve guide					○														○							Measure and replace.		
	Defective governor		○										○	○	○	○											Make adjustment.		
Improper open/close timing of intake/exhaust valves	○				○	○	○	○	○																	Adjust the valve clearance.			

4. ENGINE

[2] Measuring valve clearance

Insert a 0.008 or 0.012 in. (0.2 or 0.3 mm) thickness gage between the rocker arm and valve cap and adjust the valve clearance. Tighten the adjusting screw.

Standard valve clearance :
0.006 to 0.01 in. (0.15 to 0.25 mm)

[3] Apply oil to the contact surface between adjusting screw and push rod.

[4] Adjusting other cylinders

Turn the crankshaft 180° then and make adjustment for the No.3 cylinder. Then adjust the No.4 and No.2 cylinders in this order.

The cylinder to be adjusted first does not have to be the No.1 cylinder. Select and adjust the cylinder where the piston is the nearest to the top dead center after turning, and make adjustment for other cylinders in the order of ignition by turning the crankshaft 180° each time.

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

CAUTION

Wear protective glasses when testing injection from the fuel injection valve. Never approach the injection nozzle portion with a hand. The oil jetting out from the nozzle is at a high pressure to cause loss of sight or injury if coming into careless contact with it.

1) Injection Pressure Measurement

Standard : 3133 to 3278 PSI (21.6 to 22.6 MPa)

*Remove carbon deposit at the nozzle hole thoroughly before

4. ENGINE

4-3-10 Adjusting Operation

Perform adjusting operation as follows after the maintenance job:

(1) Supply the fuel oil, lubricating oil and cooling water.

Note :

Check the levels of the lubricating oil and cooling water again after test running (for about 5 minutes) and add as required.

(2) Start the engine, and carry out idling at a low revolution (700 to 900 RPM) for a few minutes.

(3) Run in the engine for about five minutes at the rated revolution (no-load). Check any water, fuel or oil leak and existence of abnormal vibration or noise. Also check the oil pressure, cooling water temperature and exhaust gas color.

(4) Adjust the no-load minimum and maximum revolutions according to the specifications.

(5) Perform loaded operation as required.

4. ENGINE

[4] Seat contact

Apply a thin coat of minium on the valve seat. Insert the valve in the cylinder and push it against the seat to check seat contact.

Standard : Continuous contact all around

(2) Valve guide

Mainly check damage and wear on the inside wall. Apply supply part code 129907-11800 when replacing the part.

[1] Inside diameter

in. (mm)

		Standard	Limit
Intake valve	Guide I.D.	0.275 to 0.276 (7.000 to 7.015)	0.279 (7.08)
	Stem O.D.	0.273 to 0.274 (6.945 to 6.960)	0.272 (6.90)
	Clearance	0.0016 to 0.0028 (0.040 to 0.070)	0.0067 (0.17)
Exhaust valve	Guide I.D.	0.275 to 0.276 (7.000 to 7.015)	0.279 (7.08)
	Stem O.D.	0.273 to 0.274 (6.940 to 6.955)	0.272 (6.90)
	Clearance	0.0018 to 0.0030 (0.045 to 0.075)	0.0067 (0.17)

(3) Intake/exhaust valve

Mainly clean and check damage and wear at the valve stem and seat.

[1] Seat contact : See (1) [5] above.

[2] Stem outside diameter : See (2) [1] above.

[3] Valve head thickness

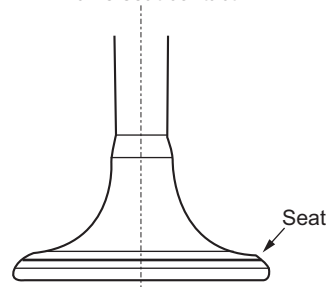
in. (mm)

	Standard	Limit
Intake	0.057 to 0.072 (1.44 to 1.84)	0.039 (1.0)
Exhaust	0.067 to 0.083 (1.70 to 2.10)	0.039 (1.0)

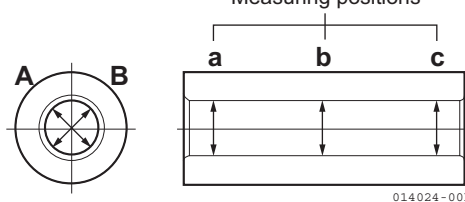
[4] Valve stem bend

Limit	0.00039 in. (0.01 mm)
-------	-----------------------

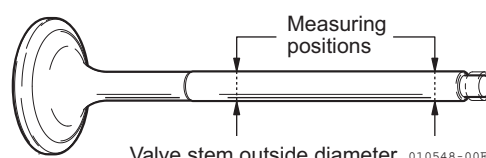
Valve seat contact



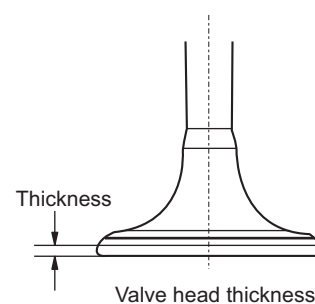
Measuring positions



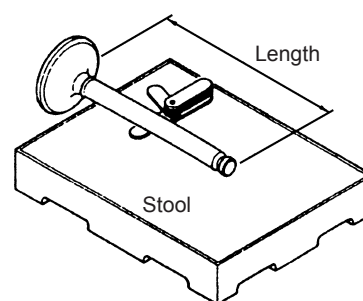
Valve guide inside diameter



Valve stem outside diameter 010548-00E



Valve head thickness



Valve bend and length

4. ENGINE

3) Reassembly Procedure :

Reverse of the disassembly procedure.

4) Servicing Points

Point 1 Oil pan

Disassemble :

- Sealant is applied to the oil pan mounting surface on the block. Carefully operate so as not to damage or distort the bonding surface.

Reassemble :

- Apply sealant (code No.977770-01212) before reassembly.

Point 2 Piston w/rod

Disassemble :

- Measure the connecting rod side gap.
Standard : 0.0079 to 0.0157 in. (0.20 to 0.40 mm)
- Carefully remove the carbon deposit on top of the cylinder so as not to damage the inner side of the cylinder.
- Set the piston at the BDC position and remove the connecting rod cap. Then set the piston at the TDC position, and push the connecting rod big end with the wooden shaft of a hammer. Proceed carefully so as not to cause the cylinder block catch the rod big end. Set the rod caps and crankpin metals in their correct combinations.

Reassemble :

- Apply oil especially carefully to the sliding contact surfaces of the pistons, rods and rings.
- Use the piston insertion tool to insert each piston w/rod in the cylinder block and install the bearing metal cap.
Rod bolt tightening torque : $T = 39.8$ to 43.4 ft•lbf. (53.9 to 58.8 N•m), apply lube oil

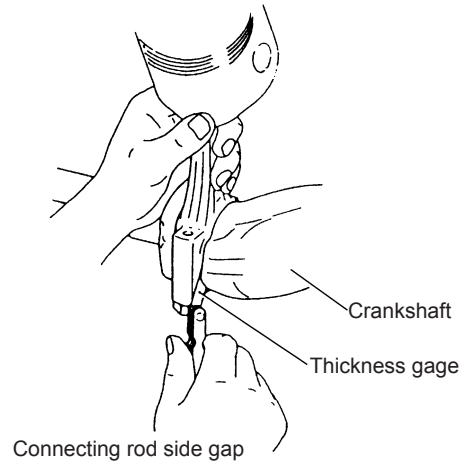
Point 3 Mounting flange

Disassemble :

- Place the engine on a stable base with the cylinder block upper surface facing down, and remove the mounting flange carefully so as not to damage the combustion surface.

Reassemble :

- Apply sealant (code No.977770-01212) and install the mounting flange by matching the two dowel pins. After assembly, raise the engine with its mounting flange on the bottom side.



⚠ CAUTION

Unforeseen injury may arise due to falling or slipping when raising or reversing the engine. Carefully operate so as not to lose balance.

4. ENGINE

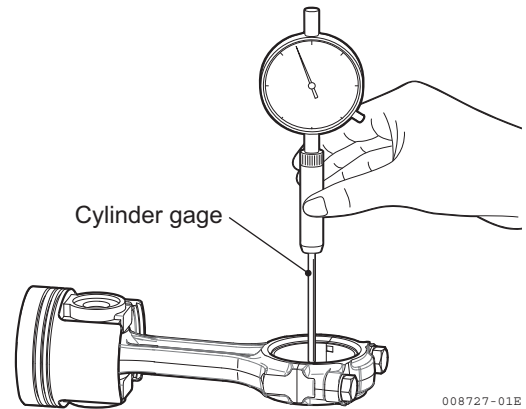
Calculate the oil clearance of a crank pin metal and a crank pin from the measured values of the crank pin metal inner diameter and the crank pin outside diameter.

Replace a crank pin metal if the oil clearance becomes about the limit dimension of the below table.

Correct by grinding if unevenly wear, roundness exceeding the limit or insufficient outside diameter is found. Also use an undersized metal.

Notice :

When measuring the inside diameter of the rod big end, install the crankpin metals in the rod big end not to mistake the top and bottom of the metals and tighten the rod bolts by the standard torque.



Rod bushing I.D. measurement

Tightening torque of rod bolt

Tightening torque ft•lbf (N•m)	Lubricating oil application (threaded portion, and bearing seat surface)
40 to 43 (53.9 to 58.8)	Lube. oil applied

Standard of rod big end in. (mm)

Item	Standard	Limit
Rod I.D. bushing	2.2835 to 2.2845 (58.000 to 58.026)	-
Crankpin O.D.	2.2816 to 2.2820 (57.952 to 57.962)	2.2796 (57.902)
Metal thickness	0.0587 to 0.0591 (1.492 to 1.500)	-
Clearance	0.0015 to 0.0029 (0.038 to 0.074)	0.0059 (0.150)

4. ENGINE

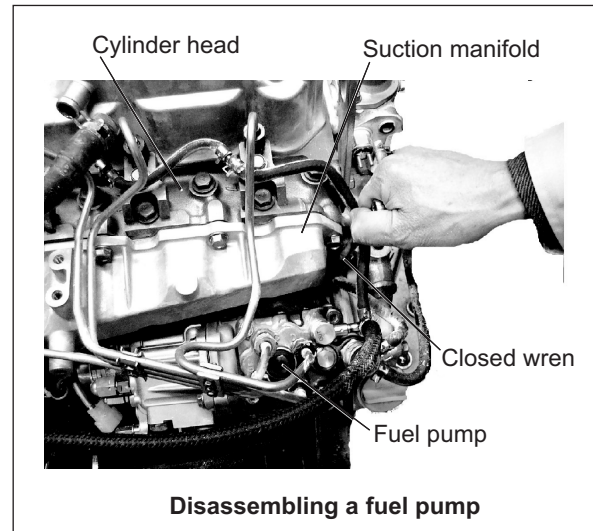
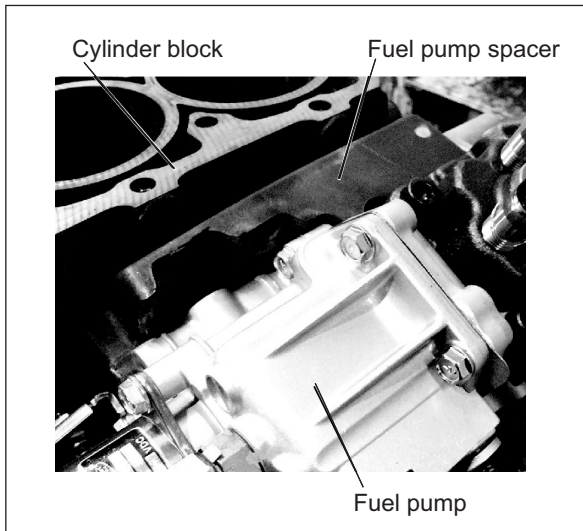
Point 3

Disassemble :

There is an acoustic material part to name as fuel pump spacer between the fuel pump and the cylinder block. Loosen fuel pump installation bolts with a closed wrench when disassembling a fuel pump.

Notice :

An intake manifold may obstruct the disassembly of the fuel pump by the engine model. Remove the fuel pump after removing the intake manifold first.



Reassemble :

When installing a fuel pump on the gear case, put a fuel pump spacer between the cylinder block and the pump.

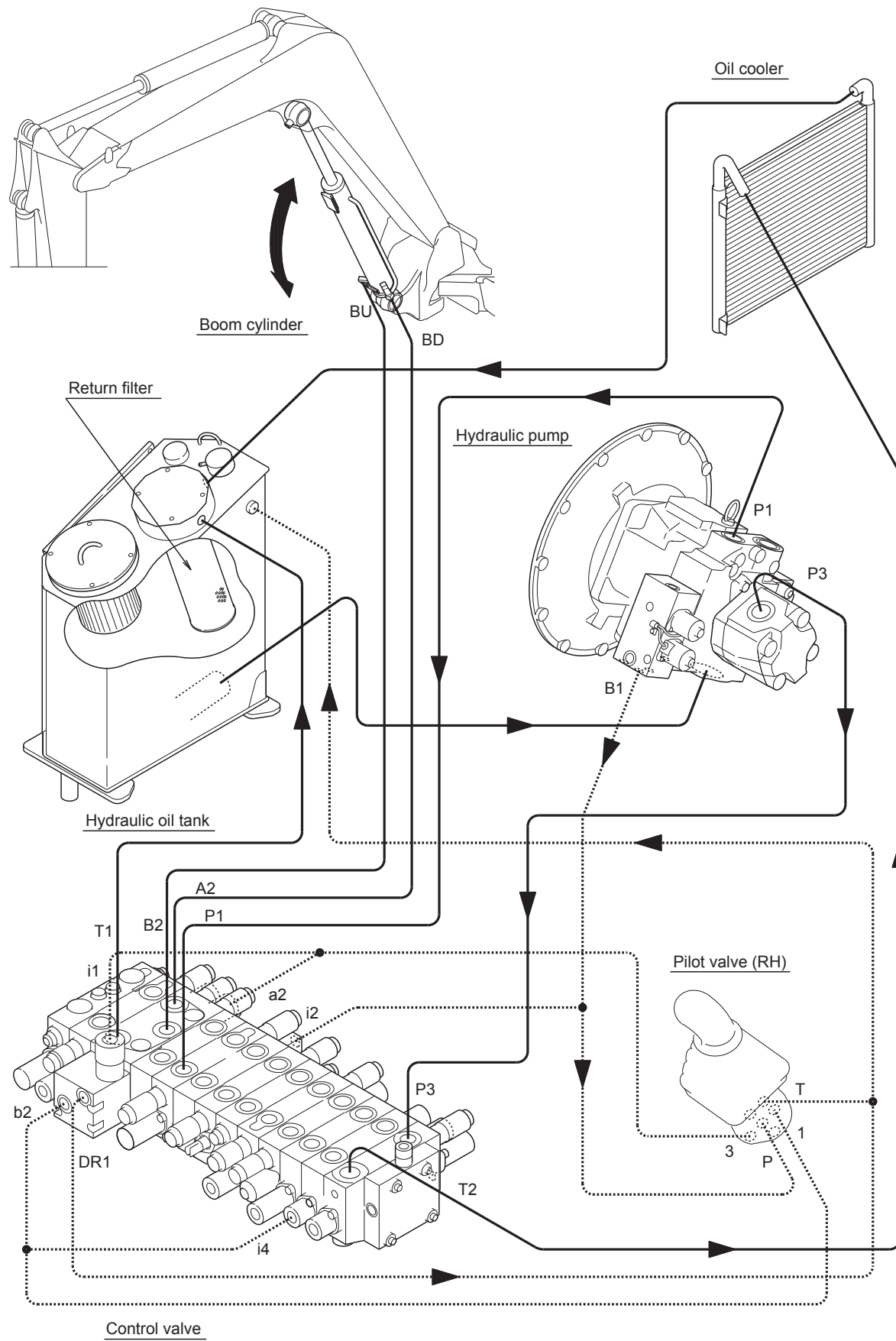
See the Service Manual of "Fuel Injection Equipment (Model YPD-MP2 / YPD-MP4 series)" for further information of the fuel injection pump.

CHAPTER 5

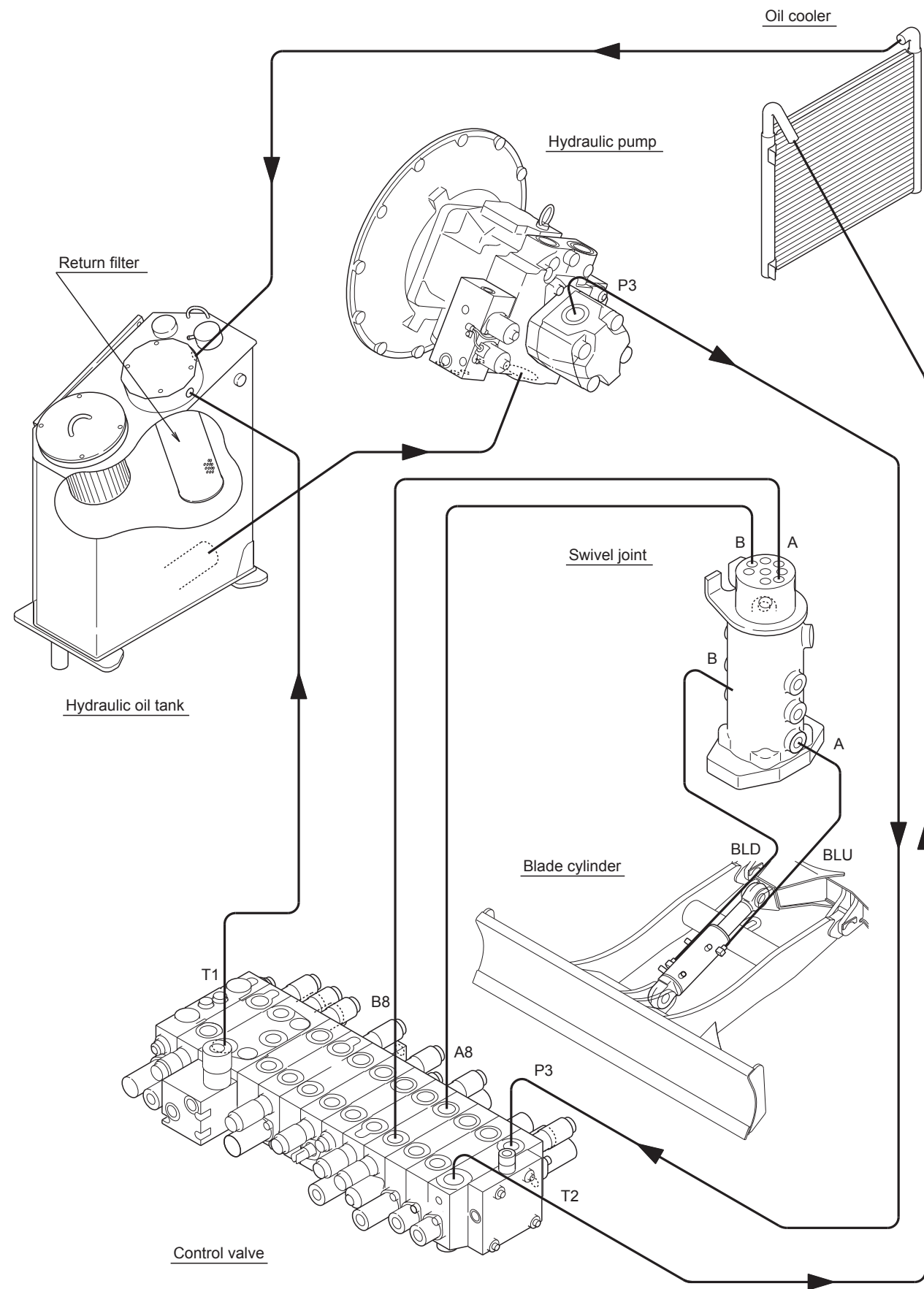
HYDRAULIC SYSTEM

5-1 Outline	5-1-1
5-1-1 Control Valve Operation.....	5-1-4
5-1-2 Additional Operation of Control Valve.....	5-1-6
5-2 Hydraulic Circuit Schematic.....	5-2-1
5-2-1 For Standard Type Machines.....	5-2-1
5-3 Circuit Operation	5-3-1
5-3-1 Boom.....	5-3-1
5-3-2 Arm	5-3-3
5-3-3 Bucket.....	5-3-5
5-3-4 Swing	5-3-7
5-3-5 Boom Swing.....	5-3-9
5-3-6 Blade.....	5-3-11
5-3-7 Travel.....	5-3-13
5-3-8 Non-deviation Travel (with Boom, Arm, Bucket or Boom Swing Operation)	5-3-15
5-3-9 Simultaneous Operation of Boom Up and Arm Retract	5-3-17
5-3-10 Simultaneous Operation of Boom Up and Bucket	5-3-19
5-3-11 Simultaneous Operation of Boom Up and Swing.....	5-3-21
5-3-12 Simultaneous Operation of Arm and Bucket.....	5-3-23
5-3-13 Hydraulic P.T.O.	5-3-25
5-3-14 Travel Alarm.....	5-3-27
5-3-15 4th P.T.O.....	5-3-29
5-3-16 Quick Coupler	5-3-30
5-4 Pressure Adjustment	5-4-1
5-4-1 Relief Valves	5-4-1
5-4-2 Swing Brake Valve.....	5-4-3
5-4-3 Cut-off Valve	5-4-4

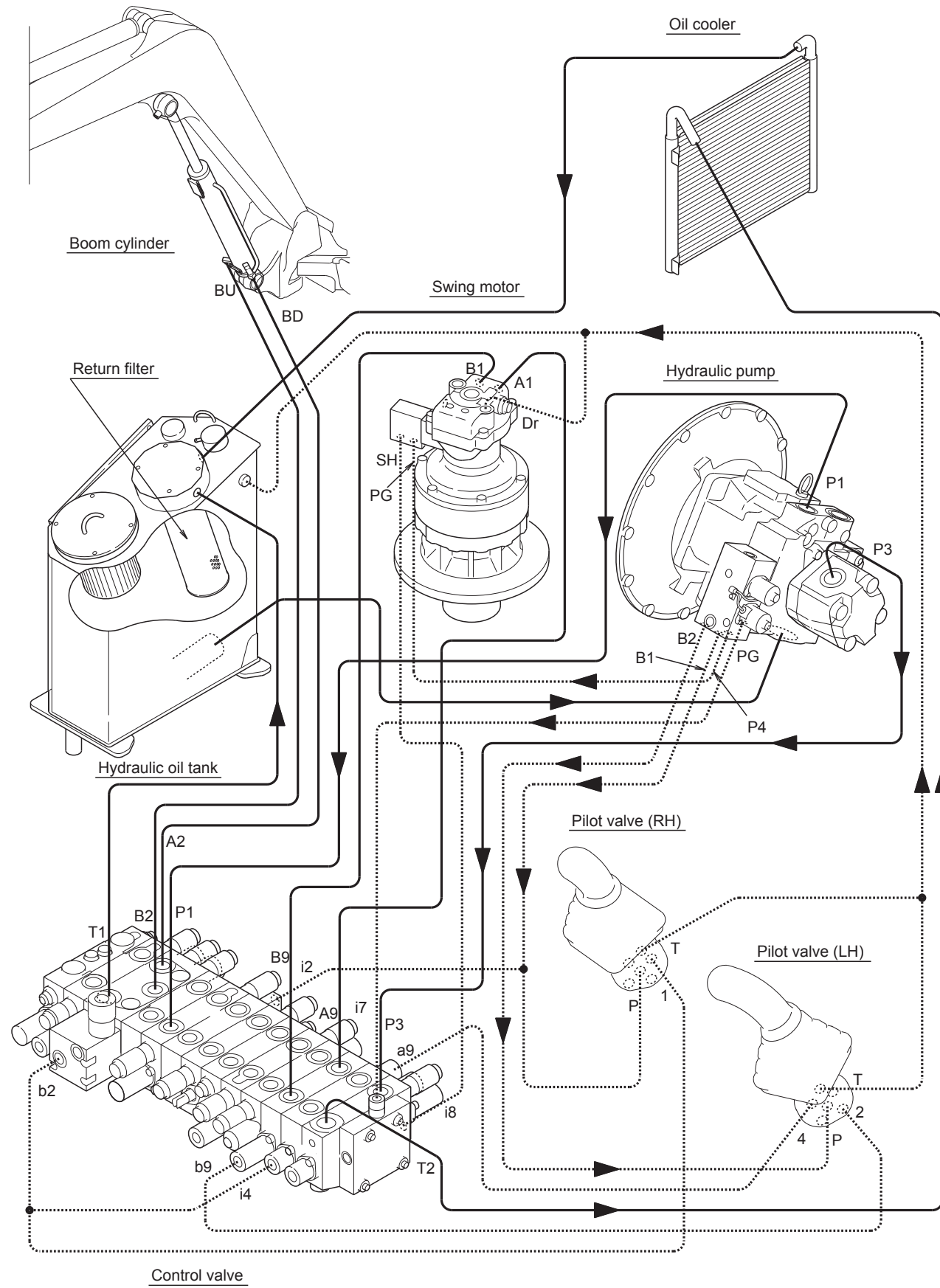
5. HYDRAULIC SYSTEM



5. HYDRAULIC SYSTEM



5. HYDRAULIC SYSTEM



5. HYDRAULIC SYSTEM

5-4 Pressure Adjustment

5-4-1 Relief Valves

1) Conditions

- (1) Engine : rated speed
- (2) Hydraulic oil temperature : 122 to 140 °F (50 to 60 °C)
- (3) Pressure gauge capacity : 7110 PSI (49.0 MPa), 4977 PSI (34.3 MPa)

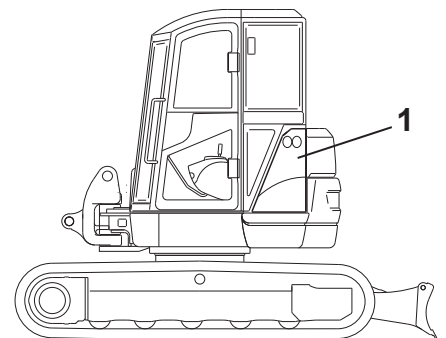
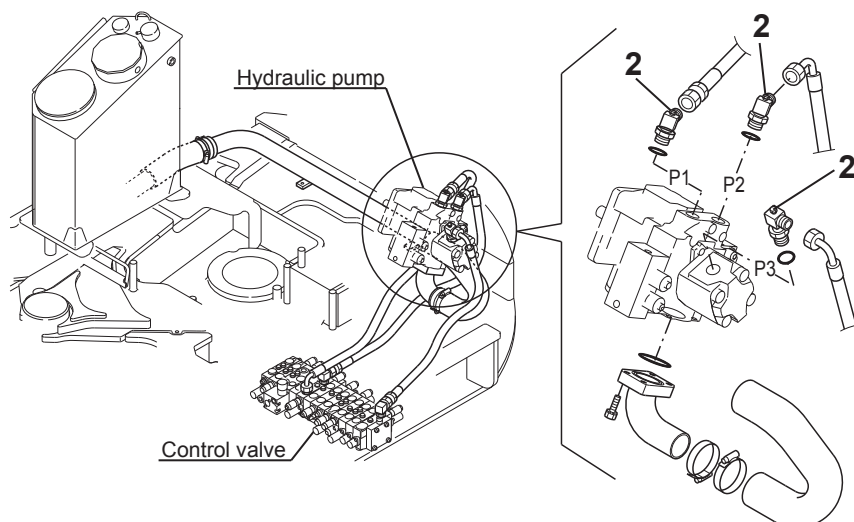
2) Relief Valve Specification

[Unit : PSI (MPa) at GPM (L / min)]

Valve	Pump	Set pressure	
		ViO75-A	
System relief valve	No.1	Piston pump P1	3555.0 (24.5) at 18.5 (70)
	No.2	Piston pump P2	3555.0 (24.5) at 18.5 (70)
	No.3	Gear pump P3	2986.2 (20.6) at 15.0 (57)
Circuit relief valve	Boom (rod end)	Piston pump P1	3981.6 (27.5) at 10.6 (40)
	Boom (bottom end)	Piston pump P1	4266.0 (29.4) at 10.6 (40)
	Arm (rod end)	Piston pump P2	3981.6 (27.5) at 10.6 (40)
	Arm (bottom end)	Piston pump P2	3981.6 (27.5) at 10.6 (40)
	Bucket (bottom end)	Piston pump P1	3981.6 (27.5) at 10.6 (40)
	Boom swing (rod end)	Piston pump P2	3981.6 (27.5) at 10.6 (40)
	Boom swing (bottom end)	Piston pump P2	3981.6 (27.5) at 10.6 (40)
	Blade (rod end)	Gear pump P3	2133.0 (14.7) at 15.0(57)

3) Measurement Procedure

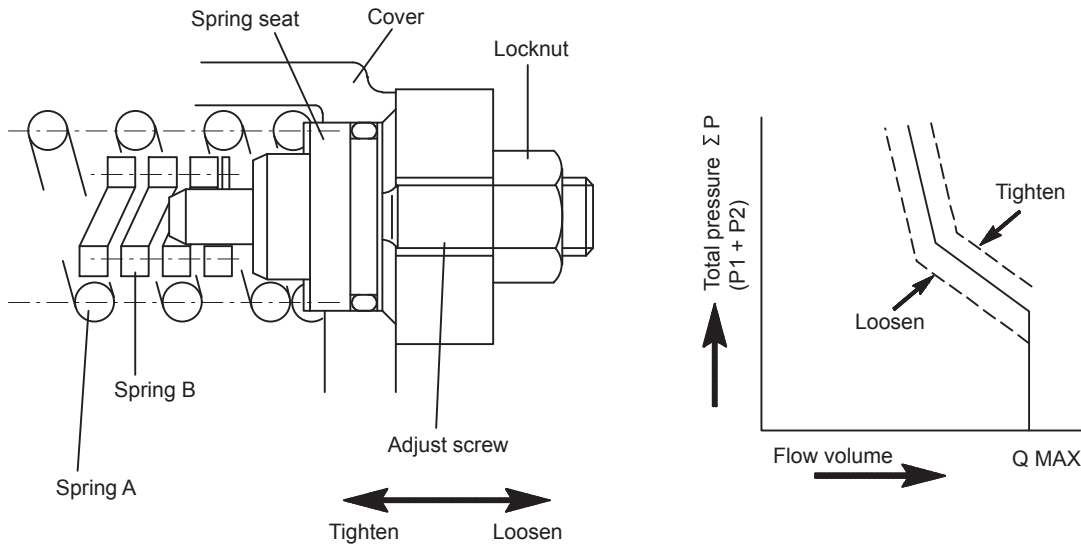
- (1) Open cover B 1.
- (2) Remove plugs R (PT) 1/8 2 from the output port of the variable displacement piston pumps and the gear pump and install the oil pressure gauge.



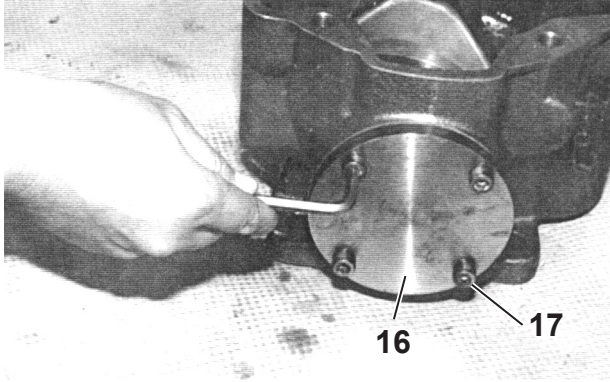
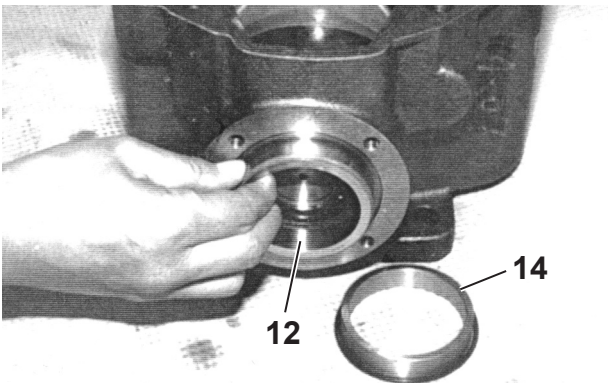
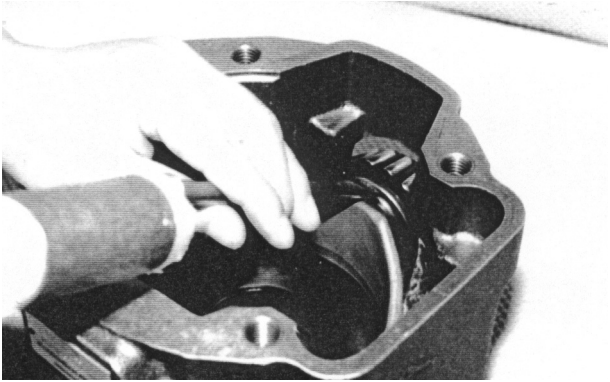
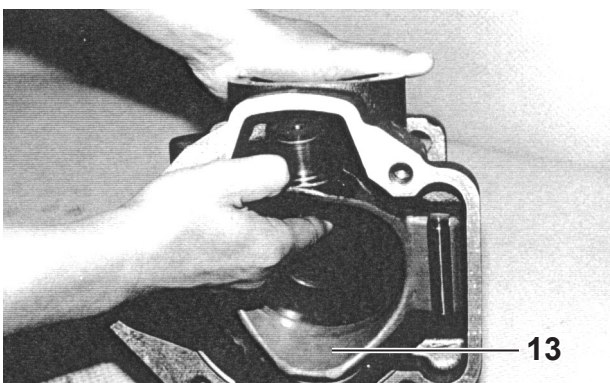
6. HYDRAULIC EQUIPMENT

3) Adjustment

- (1) Loosen the locknut.
- (2) Set the horsepower curve by tightening or loosening the adjust screw.



6. HYDRAULIC EQUIPMENT

Procedure	
<p>(17) Loosen four hexagon socket head bolts 17 to remove cover 16.</p> <p>Tool : Hexagon socket screw key 6</p>	 <p>A close-up photograph showing a person's hand using a hex key to turn one of four hexagonal bolts on a circular metal cover. The cover is labeled '16' and the bolt is labeled '17'. The cover is being removed from a larger hydraulic component.</p>
<p>(18) Remove O-ring 15, distance piece 14 and outer race of bearing 12.</p>	 <p>A close-up photograph showing a person's hand removing an O-ring (labeled '15') and a distance piece (labeled '14') from the outer race of a bearing (labeled '12'). The bearing is partially disassembled from the hydraulic component.</p>
<p>(19) Remove inner race of bearing 12.</p> <p>Note : <i>Drive it via a pipe from inside until the half of the inner race comes out, and remove it.</i></p>	 <p>A photograph showing a person's hand using a pipe to drive the inner race of a bearing (labeled '12') out of the hydraulic component. The pipe is inserted from the inside of the component.</p>
<p>(20) Remove hanger 13.</p>	 <p>A photograph showing a person's hand removing a hanger (labeled '13') from the hydraulic component. The hanger is a cylindrical part that fits into the component.</p>

6. HYDRAULIC EQUIPMENT

Procedure

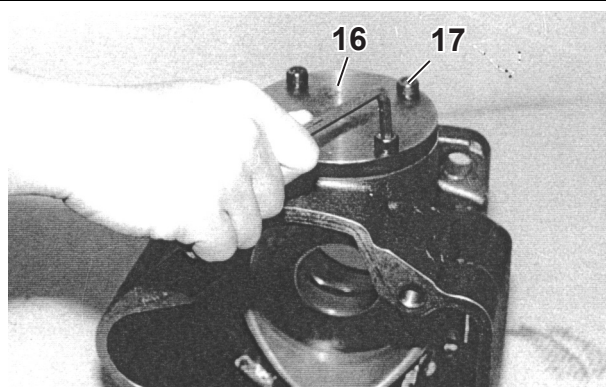
(5) Install distance piece **14** and O-ring **15**.



(6) Tighten four hexagon socket head bolts **17** to hold cover **16**.

Tool : hexagon socket screw key 6

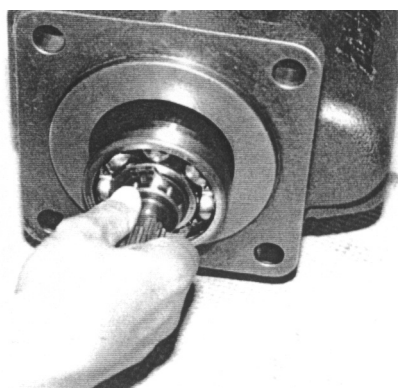
Tightening torque	20.95 to 28.18 ft·lbf (28.4 to 38.2 N·m)
-------------------	---



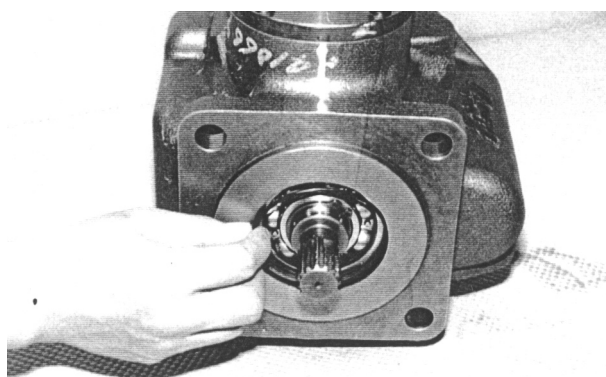
(7) Install shaft **7** in housing **9**.

Note :

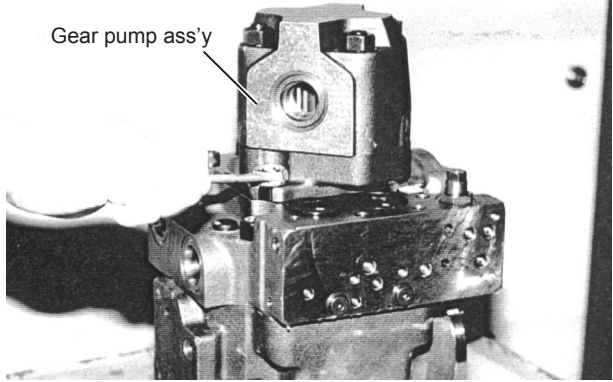
Slightly drive end of shaft spline with plastic hammer until bearing contacts with housing.

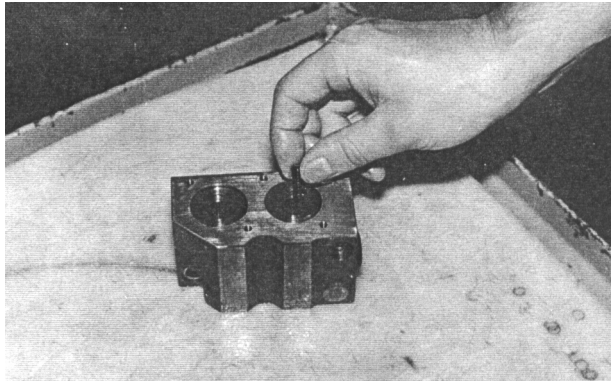


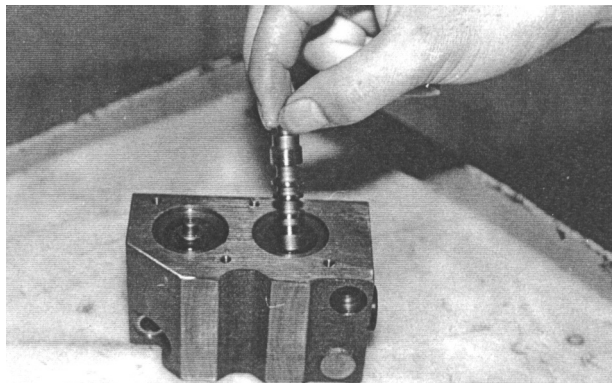
(8) Apply grease on O-ring **4** and install it.

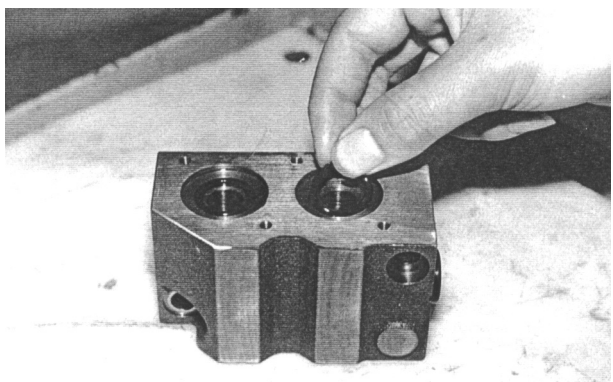


6. HYDRAULIC EQUIPMENT

Procedure		
(9) Tighten two hexagon head bolts 96 to hold gear pump ass'y.		
<table border="1"><tr><td>Tightening torque</td><td>40.49 to 50.6 ft·lbf (54.9 to 50.6 N·m)</td></tr></table>		Tightening torque
Tightening torque	40.49 to 50.6 ft·lbf (54.9 to 50.6 N·m)	

3. Valve ass'y Applicable to without quick coupler type (1) Install springs 100 .	
---	---

(2) Install spools 101 .	
---------------------------------	--

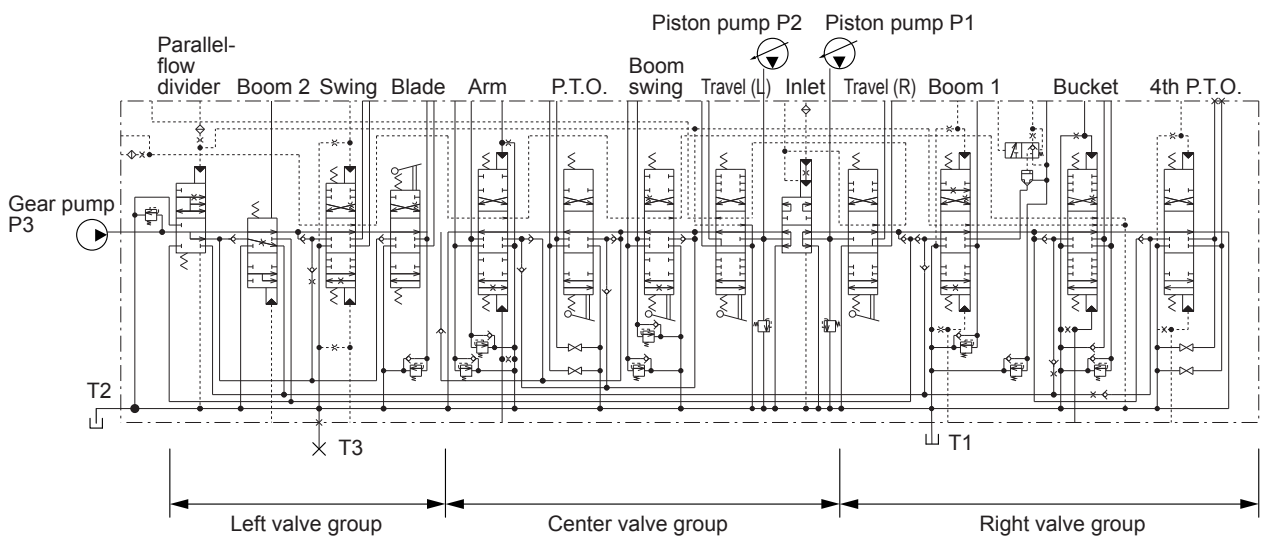
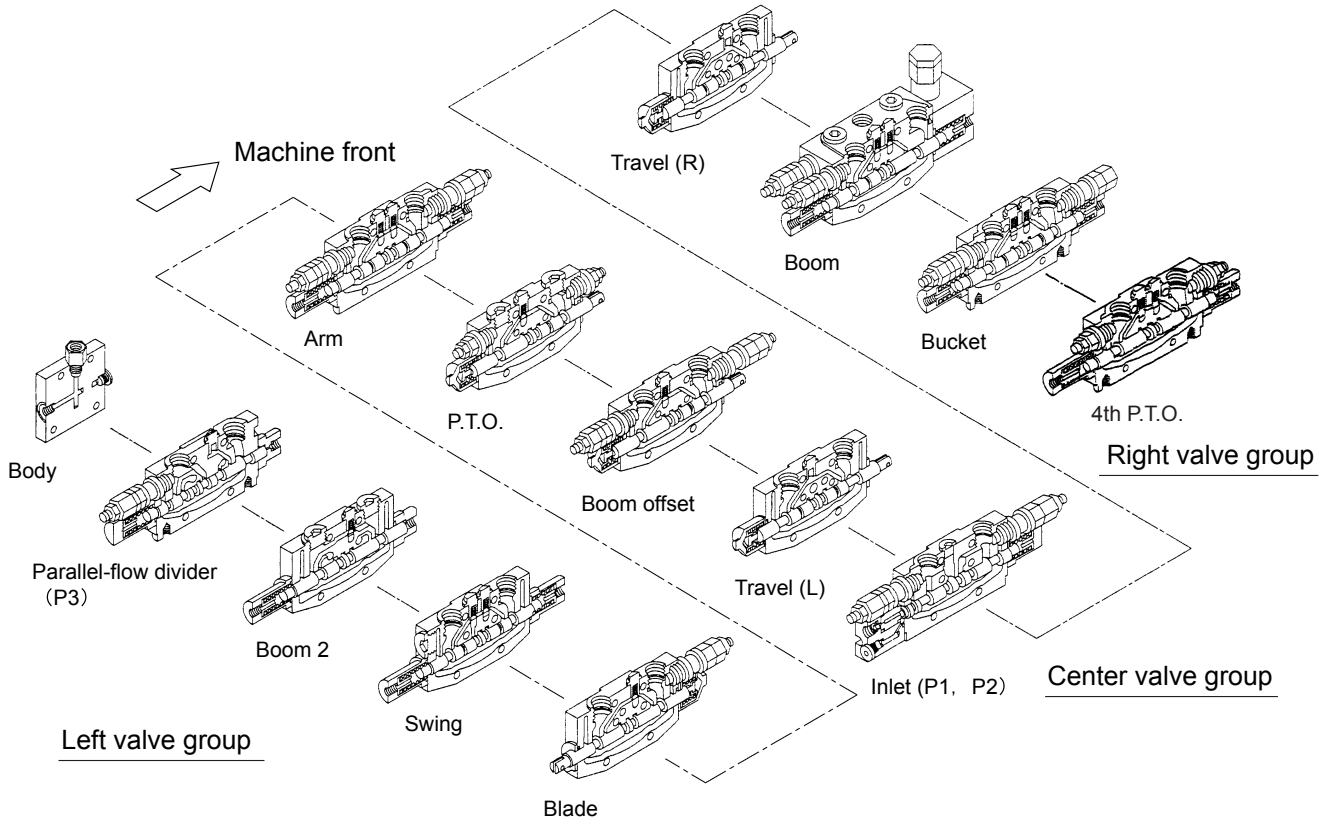
(3) Install O-rings 102 .	
----------------------------------	--

6. HYDRAULIC EQUIPMENT

6-2 Control Valve

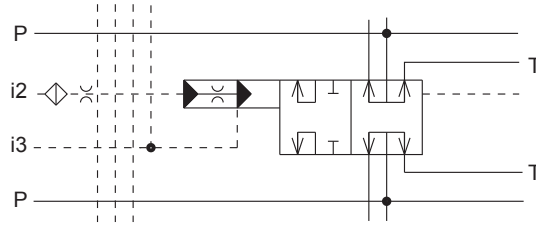
1. Outline

This control valve is a twelve-series (except 4th P.T.O.) sectional type design (each section combined) that consists of three groups: right valve, center valve and left valve groups.



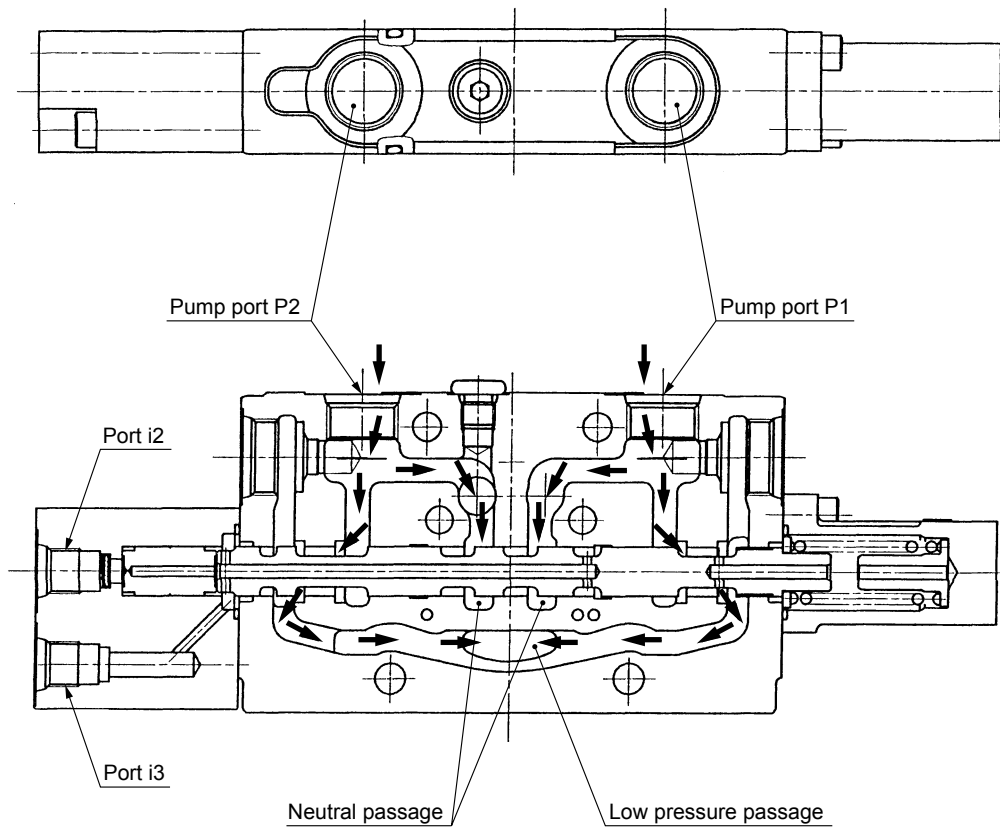
6. HYDRAULIC EQUIPMENT

4) Inlet



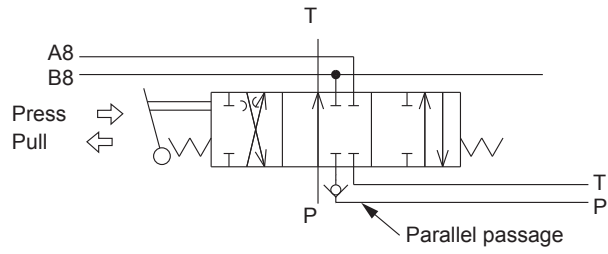
(1) Neutral

The oil discharged from the piston pump P1 and that from the piston pump P2 return to the hydraulic oil tank through the neutral passage and the low pressure passage.



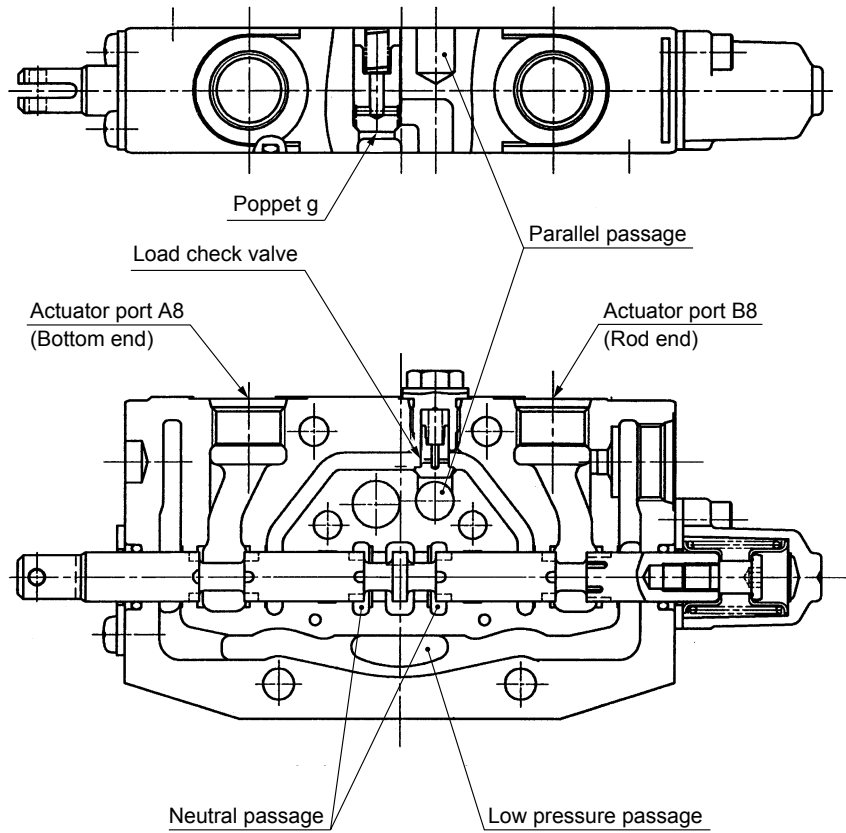
6. HYDRAULIC EQUIPMENT

9) Blade



(1) Neutral

The oil discharged from the gear pump P3 returns to the hydraulic oil tank through the neutral passage. The actuator ports A8 and B8 are closed.



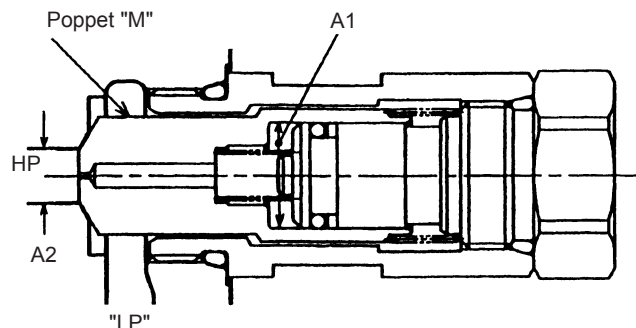
6. HYDRAULIC EQUIPMENT

15) Anti-Void Valve

The anti-void valve is installed in the circuit at the rod end of the bucket cylinder.

When cavitation occurs in the actuator port "HP", the anti-void valve opens to feed oil from the hydraulic oil tank.

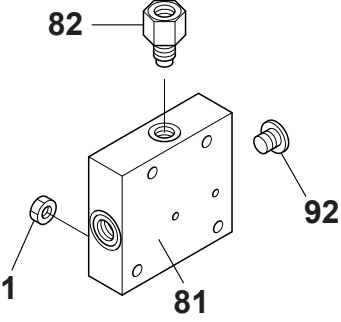
The poppet "M" is seated by the pressure "HP" in the actuator port applied to the large area at the rear of the O-ring.



When the pressure "HP" becomes lower than the pressure of "LP", the poppet "M" opens because the pressure "LP" in the hydraulic oil tank exceeds the pressure in the actuator port and the spring force due to the difference in pressure receiving area ($A1-A2$) between both sides of the poppet "M". After filling the void area with oil, the poppet "M" returns to the original position by the spring force and is completely sealed by the pressure "HP" in the actuator port.

6. HYDRAULIC EQUIPMENT

• Body

Procedure	
<p>Remove plugs 82 and 92 from the body 81.</p> <p>Note : <i>Do not remove the filter on the plug 82 as the filter is caulked to the plug 82.</i></p>	 <p>The diagram shows a rectangular hydraulic body labeled 81. It has several ports on its top and side surfaces. A plug labeled 82 is shown being removed from the top surface. Another plug labeled 92 is shown being removed from the side surface. A third plug labeled 1 is shown on the front-left side of the body.</p>

6. HYDRAULIC EQUIPMENT

3) Disassembly and Reassembly of Circuit Relief Valves

(Installed in the circuit at the bottom end of the bucket cylinder, at both ends of the boom, boom swing and arm cylinders, and at the rod end of the blade cylinder.)

(1) Reassembly

- [1] Hold body **1** with a vice to remove plug **2**. (remove the whole plug unit including the inner parts.)
- [2] Remove wave washer **16**, spring **7**, piston **5**, poppet **4** and sleeve **3** from body **1**.
- [3] Remove O-ring **15** from body **1**.
- [4] Remove O-ring **10** and backup rings **11** from poppet **4**.
- [5] Hold plug **2** with a vice to loosen the lock nut of the adjuster kit **9**.
- [6] Remove the adjuster kit. Then, remove spring **8**, pilot poppet **6** and O- ring **18**.
- [7] Remove O-rings **12** and **14** and backup ring **13** from plug **2**.

Note :

Place the removed parts in order on a clean work table.

(2) Reassembly

- [1] Install O-ring **10** and backup rings **11** to poppet **4**.

Note :

Check the locations of the O-ring and the backup rings.

- [2] Install sleeve **3**, poppet **4**, piston **5** and spring **7** to body **1**.
- [3] Install O-ring **15** to body **1**.
- [4] Install O-rings **12** and **14**, and backup ring **13**.

Note :

Check the locations of the O-rings and the backup ring.

- [5] Install poppet **6** and spring **8** to plug **2**.
- [6] Install O-ring **18** to the adjuster kit and temporarily tighten the adjuster kit on plug **2**.
- [7] Install four wave washers **16** into plug **2**. Then, install the plug to body **1**, and hold body **1** with a vice to tighten plug **2**.

Tightening torque	20.95 to 28.18 ft·lbf (28.4 to 38.2 N·m)
-------------------	---

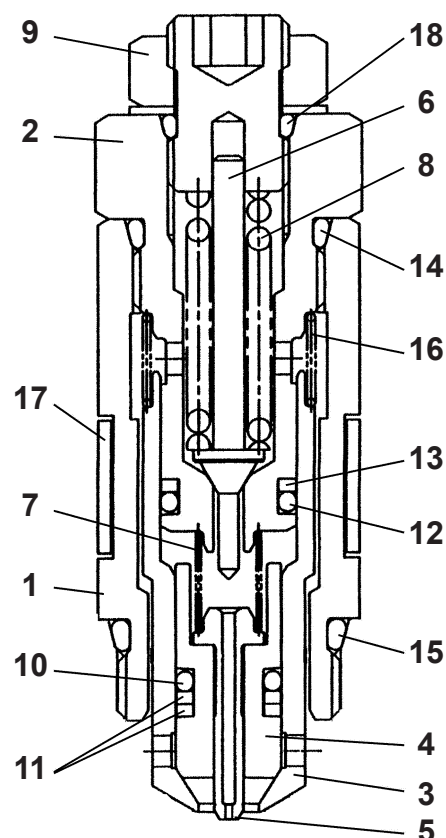
Note :

*Push piston **5** with a finger and release it to check whether the piston returns immediately after release. (do this check several times.)*

- [8] Install the body to the control valve housing.

Tightening torque	50.7 to 57.9 ft·lbf (68.7 to 78.5 N·m)
-------------------	---

- [9] For pressure adjustment, see the section 4) Adjustment (P6-2-50).



No.	Part
1	Body
2	Plug
3	Sleeve
4	Poppet
5	Piston
6	Pilot poppet
7	Spring
8	Spring (for pilot poppet)
9	Adjuster kit (lock nut)
10	O-ring
11	Backup ring
12	O-ring
13	Backup ring
14	O-ring
15	O-ring
16	Wave washer
17	Name plate
18	O-ring

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below

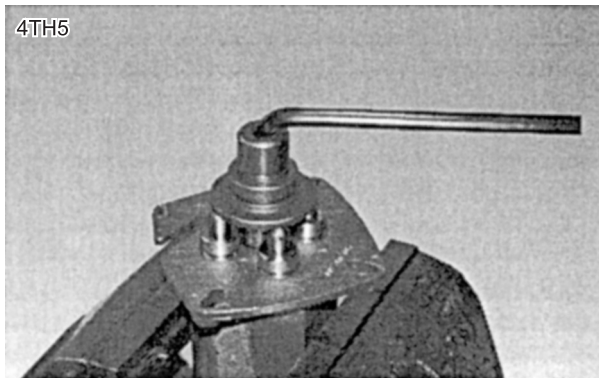
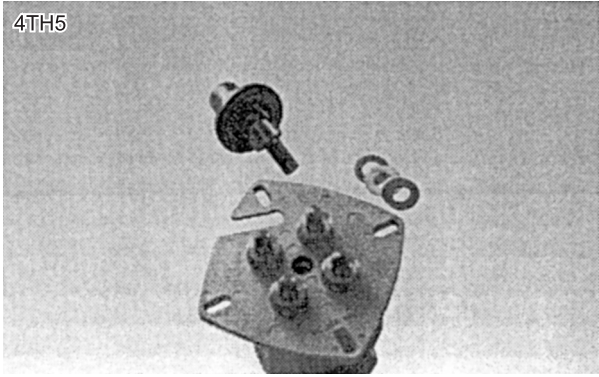


- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

6. HYDRAULIC EQUIPMENT

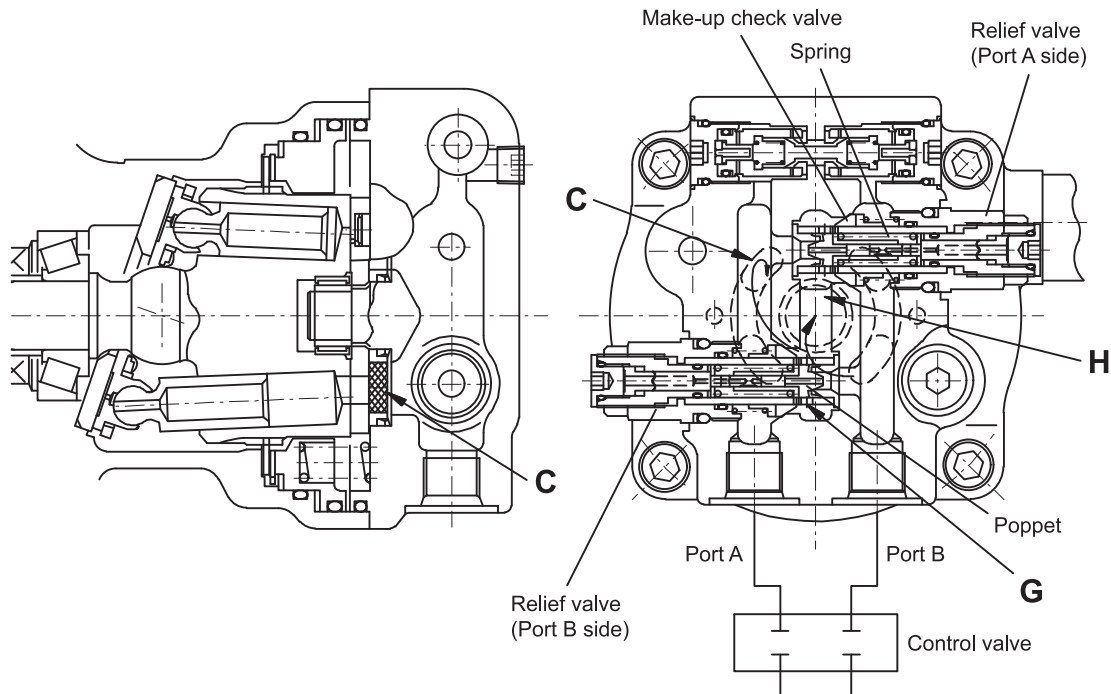
3) Cardan Replacement

Procedure	
<p>Preliminary operations Remove the pilot control unit from the machine's arm rest. Secure the pilot control unit in a vice (clamp onto the body). Remove the handle.</p> <p>Note : <i>It is recommended to remove the pilot control unit from the machine. Nevertheless, the servicing on machine is possible by securing the unit into a vice-grip wrench (65 opening). This is performed by extracting the body from the arm rest so as to clamp the vice-grip wrench onto the body in order to hold it above the arm rest.</i></p> <p>Removal of the cardan Fit an Allen wrench into the assembly screw and unscrew it (8 mm Allen wrench).</p> <p>Reassembly : torque : 45 ± 4 N·m Remove : - the cardan, - the shim (s)</p> <p>Reassembly : Adjust the pre-depression of the cardan by selecting the shims necessary to obtain play-free contact between the switch-plate and the plungers. In neutral position, the depression of the plungers must not exceed 0.2 mm. In order to check this value, observe the displacement of the plunger located opposite to the one being pressed.</p> <p>Note : <i>The pre-depression may be difficult to achieve on site. Could be necessary to readjust it after reassembly and system working control.</i></p>	 

6. HYDRAULIC EQUIPMENT

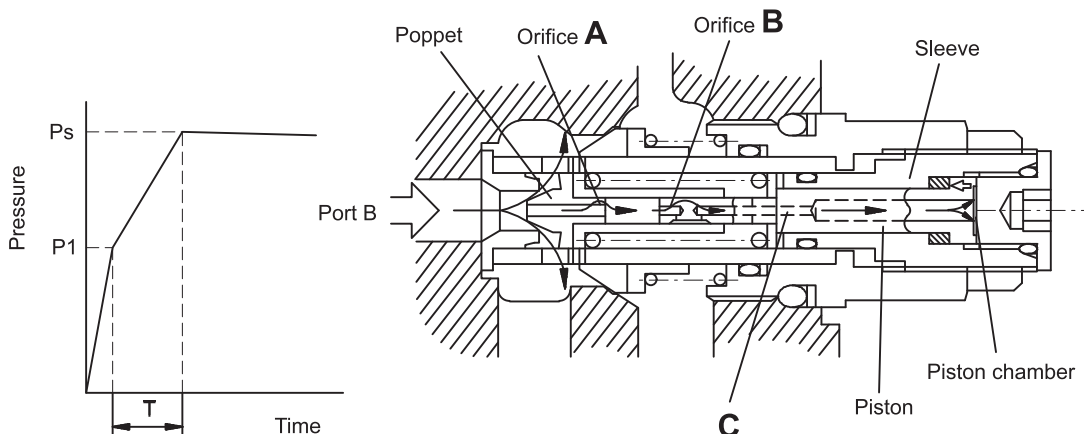
(2) When stopping the swing motor (cushioning)

When the control valve is returned to its neutral position, even though the motor ports A and B are blocked, the motor continues to rotate for some time due to the great inertia force of the upperstructure. At this time the pressure at the port B increases. The increased pressure at the port B overcomes the force of the spring of the relief valve to press and open the poppet, and flows through passage **G** to passage **H**. This force also presses and opens the make-up check valve, and allows oil to flow to passage **C** to absorb the inertia energy of the upperstructure. (Stage 1)

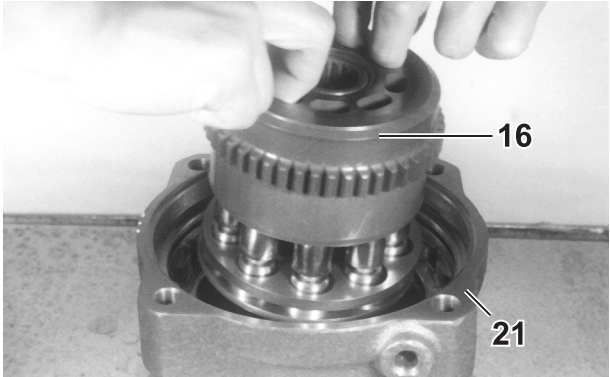
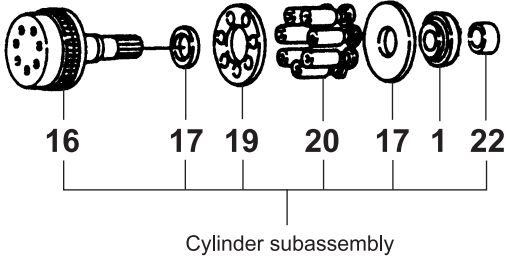


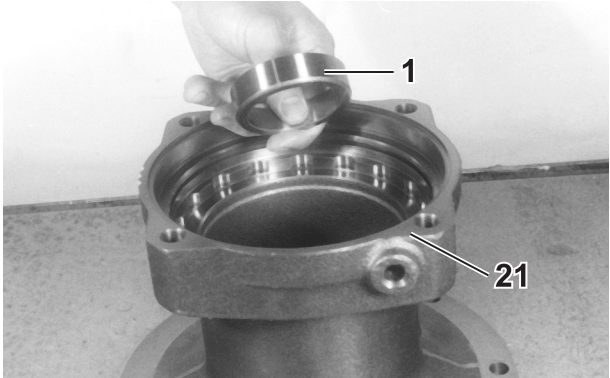
While the pressure at the port B increases, the oil from the port B flows through the orifice **A** of the poppet, the orifice **B** and the passage **C** of the piston to the piston chamber to move the piston to the left until it contacts with the sleeve. As the poppet has been opened during this process, cushioning starts at a lower pressure at first and the pressure rises to the specified value in an instant. (Stage 2)

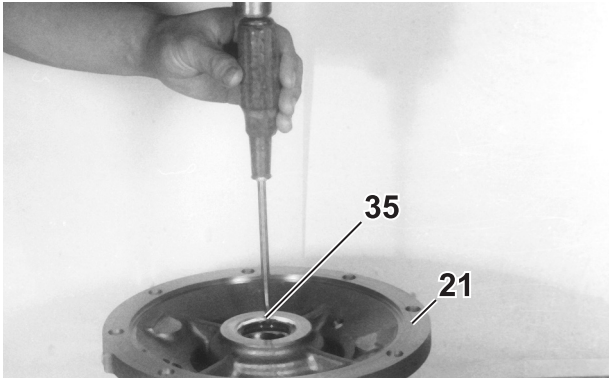
The shock due to starting and stopping the motor is reduced by incorporating the function of two stages.



6. HYDRAULIC EQUIPMENT

Procedure	
<p>(12) Remove cylinder assembly from housing 21.</p> <p>Notes :</p> <ul style="list-style-type: none">• Oil seal 35 and outer race of taper roller bearing 1 remain in housing 21.• Take care not to damage cylinder sliding surfaces.• Mark each piston S/A and cylinder bore to aid in assembly.	 <p>A photograph showing a hand lifting a cylindrical gear assembly (16) out of a larger metal housing (21). The gear assembly has a series of teeth on its outer circumference.</p>  <p>An exploded view diagram of the cylinder subassembly. The components are labeled with numbers: 16 (oil seal), 17 (screw), 19 (taper roller bearing), 20 (piston and connecting rod assembly), 17 (screw), 1 (taper roller bearing), and 22 (oil seal). A bracket below the diagram labels the entire group as 'Cylinder subassembly'.</p>

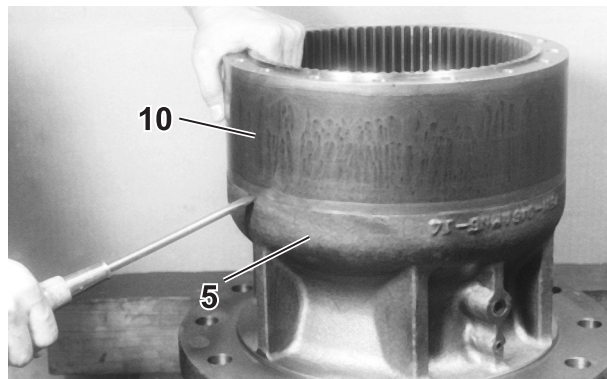
<p>(13) Remove outer race of taper roller bearing 1 from housing 21.</p>	 <p>A photograph showing a hand lifting the outer race of a taper roller bearing (1) out of the housing (21). The bearing is a cylindrical component with a flange on one end.</p>
--	--

<p>(14) Tap oil seal 35 with using a screw driver and a hammer to remove it from housing 21.</p> <p>Note : Discard oil seal 35 and replace it with a new one.</p>	 <p>A photograph showing a hand using a screwdriver and a hammer to tap the oil seal (35) out of the housing (21). The oil seal is a circular component with a lip on one side.</p>
--	---

6. HYDRAULIC EQUIPMENT

Procedure

- (5) Remove ring gear **10** from gear case **5** while prying up ring gear **10** by inserting a screwdriver or the like into the notch of gear case **5**.

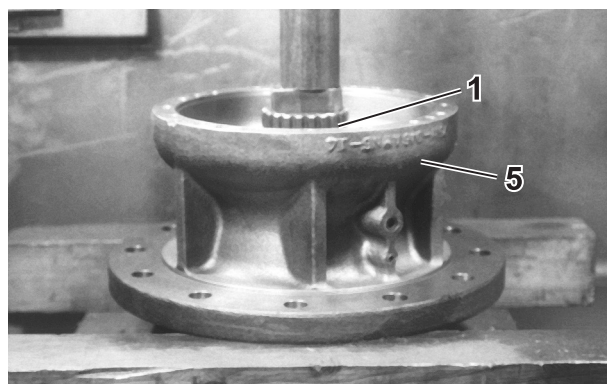


- (6) Put a screwdriver on split collar **16** and tap it to remove it from shaft **1**.

- (7) To secure space for removing shaft **1**, put gear case **5** on approximately 11.8 in. (300 mm) high blocks. Press shaft end to remove shaft **1** collar **2**, plate **3** and taper roller bearing **4** as an assembly.

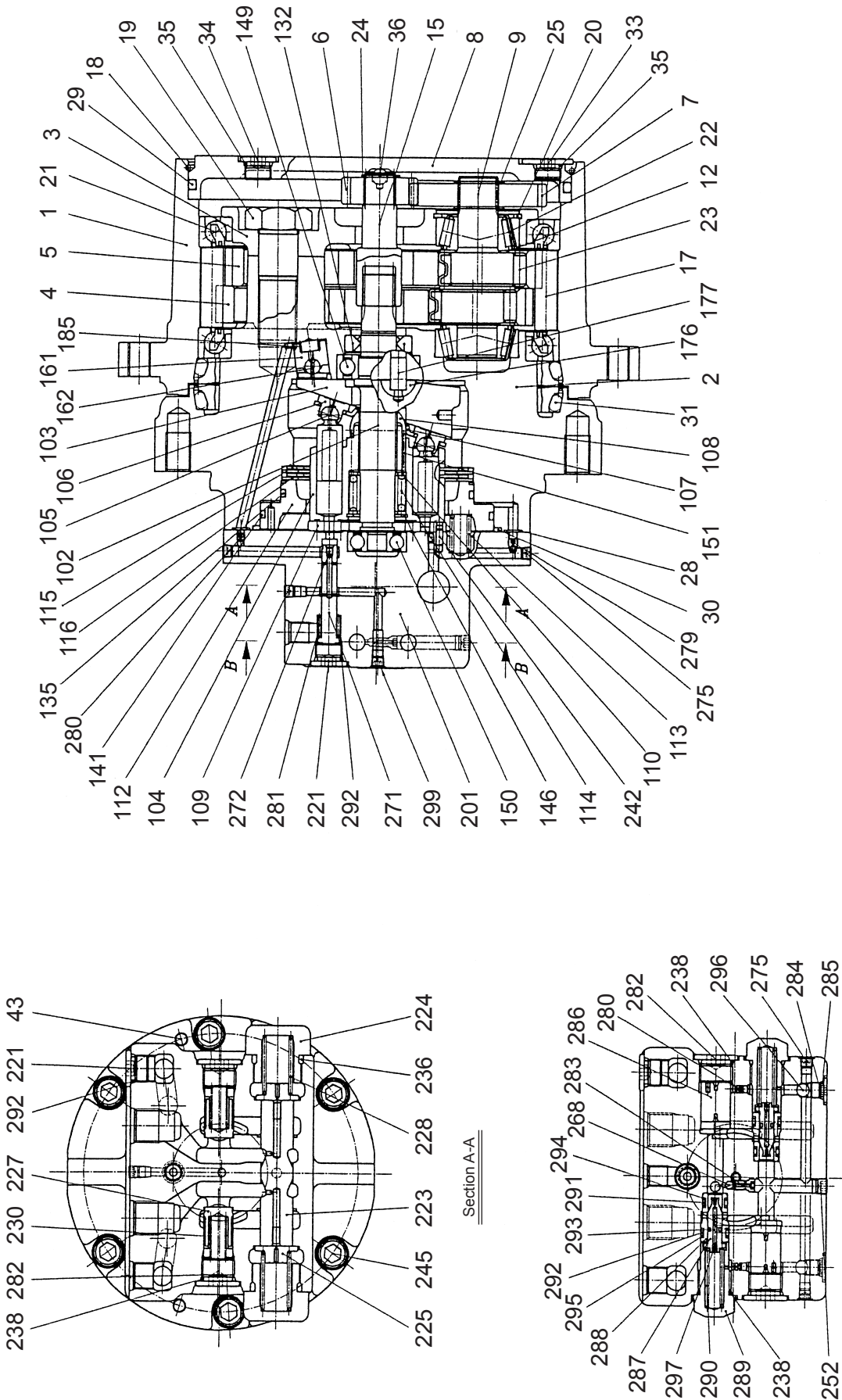
Notes :

- Do not reuse oil seal **7**.
- Do not perform further disassembly unless bearing or any other part is defective or damaged.



6. HYDRAULIC EQUIPMENT

2) Assembly Cross Section



6. HYDRAULIC EQUIPMENT

6-5-7 Maintenance and Inspection

1) Daily Inspection

The following daily maintenance and inspection items should be verified before operating the GM motor.

CAUTION

Except for confirmation of the following three abnormal sounds, maintenance and inspection must always be performed when the product is stopped.

Inspection during operation may cause injury or burns. also, confirmation of abnormal sounds should be performed in a safe area.

Touching or approaching the product during operation may cause injury or burns.

- 1] No oil leakage (working fluid, gear oil)
- 2] No loose bolts
- 3] No abnormal sounds
- 4] Casing temperature not abnormally high
(Maximum external casing temperature during continuous operation = 176°F (80°C))

CAUTION

Immediately after operation, the casing is hot. To prevent burns, use a thermometer to measure temperature and do not touch directly with the hands.

2) Changing Fluid

- The standard interval for changing hydraulic fluid is every 1000 hours or one year.
- Hydraulic fluid may be changed within the standard interval if there is significant reduction in volume, subject to the following standards.

Test item	Change standard
Viscosity change 104°F (40°C)	± 10 %
Total oxidation (mg KOH / g)	Consult oil supplier. Additive types vary according to manufacturer.
Water content (%)	0.1 %
Impurities	10 mg / 100 mL
Impurities (%)	0.05 %

3) Changing Lubrication

Reduction gear lubricating oil (gear oil) is added at time of delivery.

1. Selecting Gear Oil-Recommended Grades

[1] Use SAE 90 equivalent gear oil (API type GL-4 or higher) with ultra-high pressure additives.

[2] Recommended product names follow :

(order not significant)

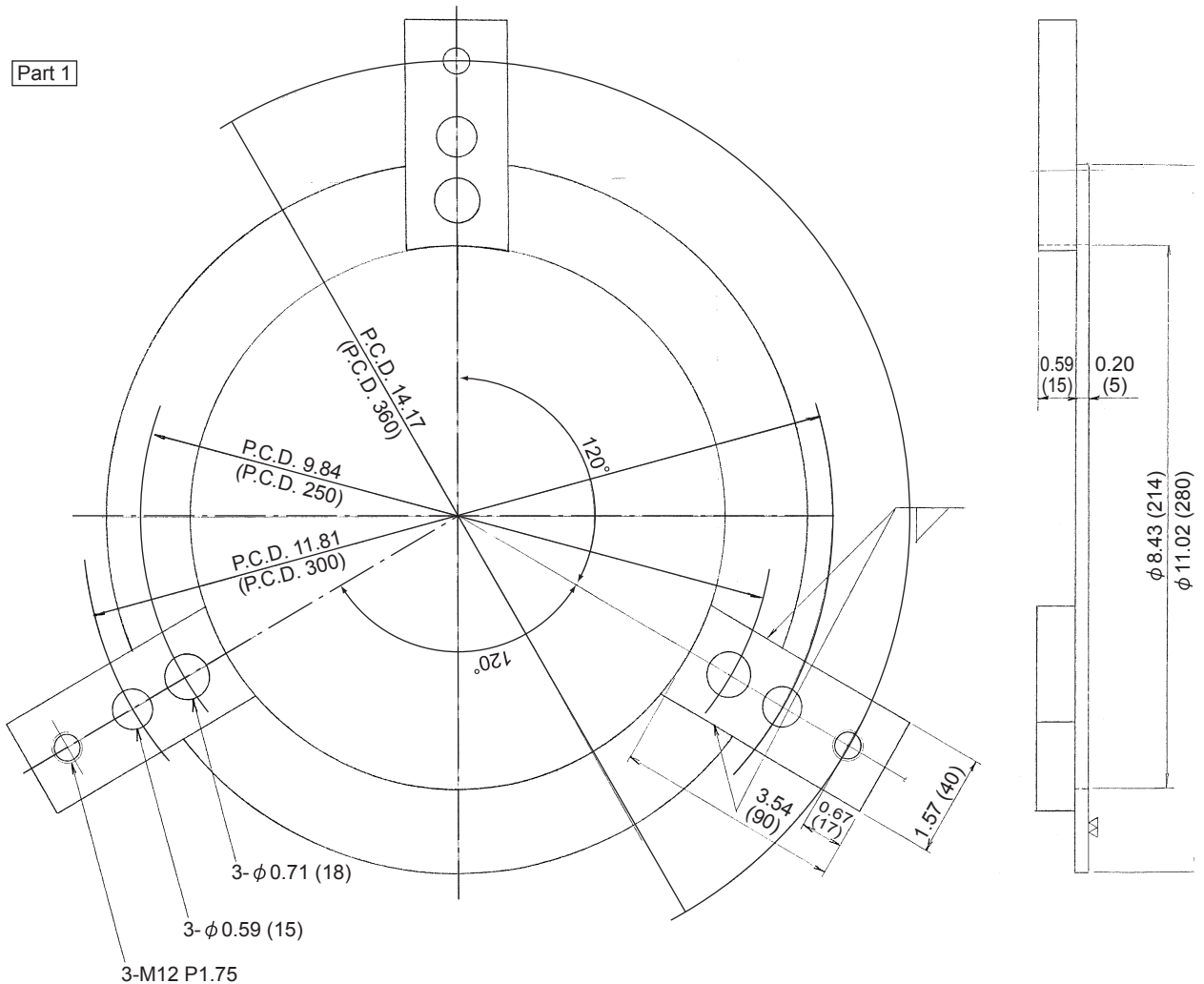
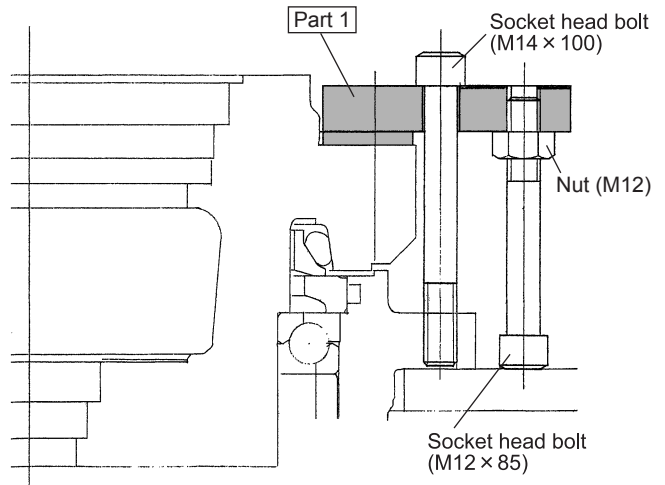
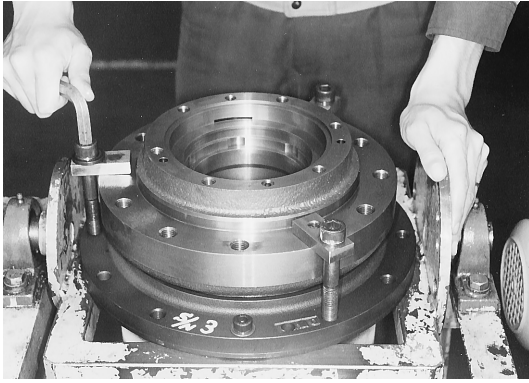
Supplier	Product name
Idemitsu	Appol oil HE 90 S
Esso	Esso gear oil GP 90
Showa Shell	Spirax EP 90
Cosmo	Cosmo gear oil GL-4 90
Nisseki Mitsubishi	Nisseki Mitsubishi hypoid gear oil 90
Mobil	Mobilube HD 90

6. HYDRAULIC EQUIPMENT




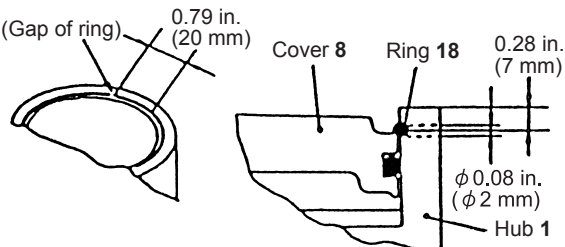

Fixture

Unit : in. (mm)

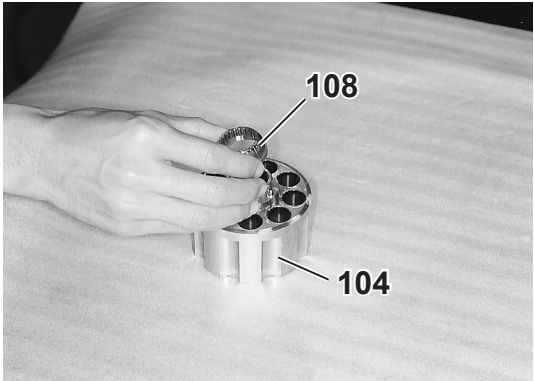
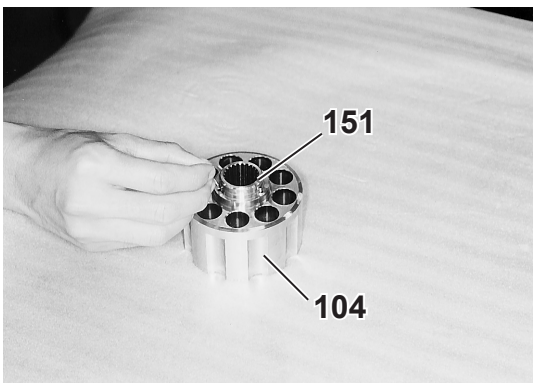
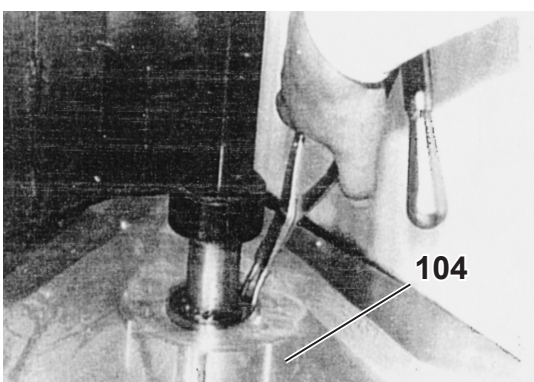
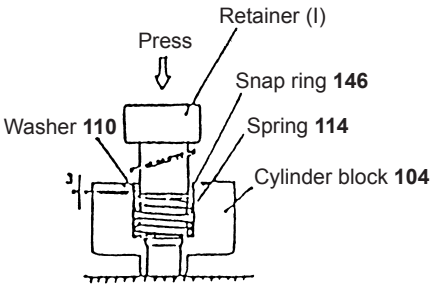
To be used for holding together hub 1 and spindle 2 when disassembly and reassembly.



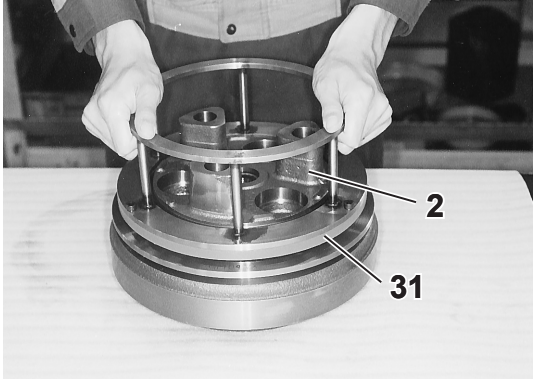
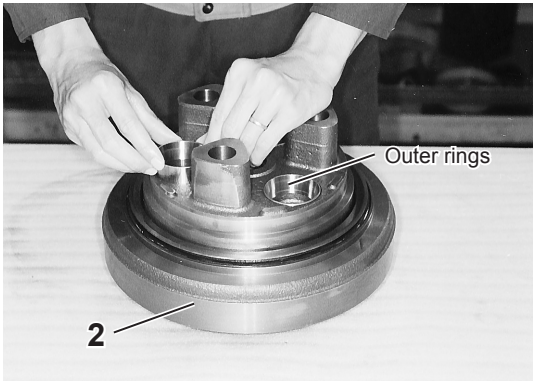
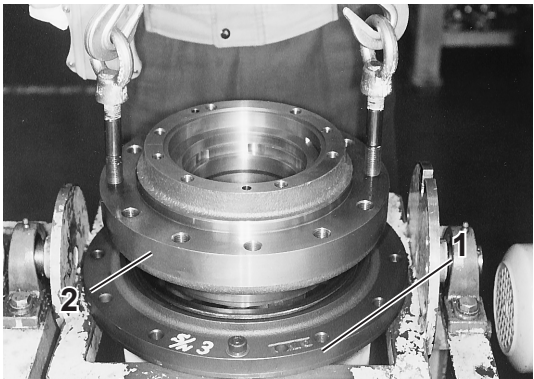
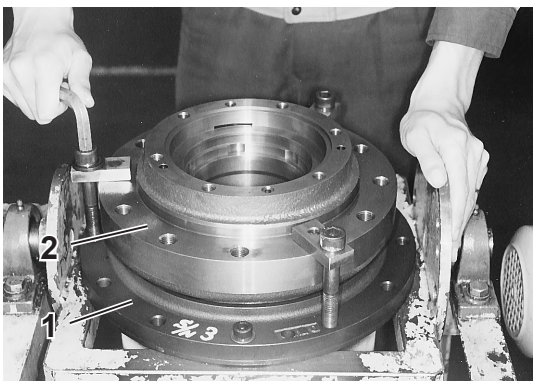
6. HYDRAULIC EQUIPMENT

Procedure	
<p>3. Lubricating oil extraction</p> <p>Notes : <i>If disassembling the rear flange only, proceed to below (1) of item (7).</i></p> <p>(1) Invert the travel motor.</p> <p>(2) Loosen and remove the hexagon socket plug 33 (1 plugs), 34 (2 plugs).</p> <p>Note : <i>When extracting the lubricating oil, place a container below the workbench.</i></p>	
<p>(3) Slowly invert the travel motor and extract the lubricating oil.</p>	
<p>4. Cover removal</p> <p>(1) Scribe match marks across the joint seam between hub 1 and cover 8 by using a paint marker.</p>	
<p>(2) Look into the seam to locate the gap of ring 18. Make a punch mark on the hub 1 at a point about 0.79 in. (20 mm) from the ring 18 end in circular direction and 0.28 in. (7 mm) from the end face of hub 1.</p> 	

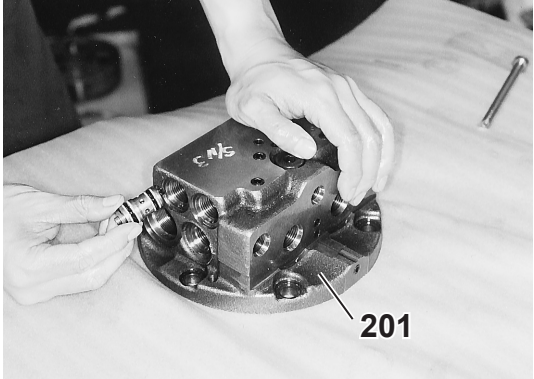
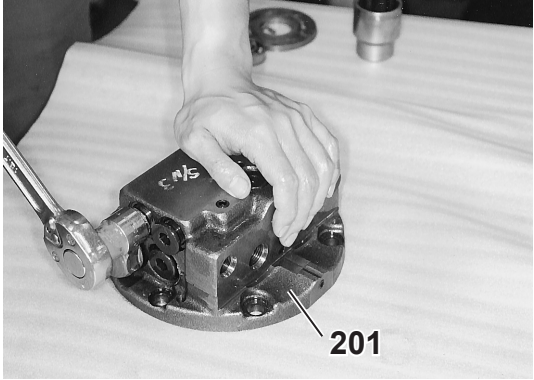
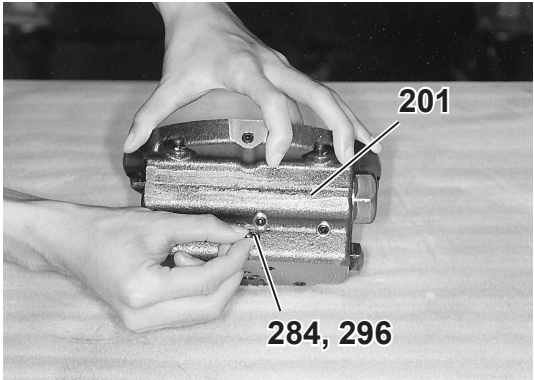
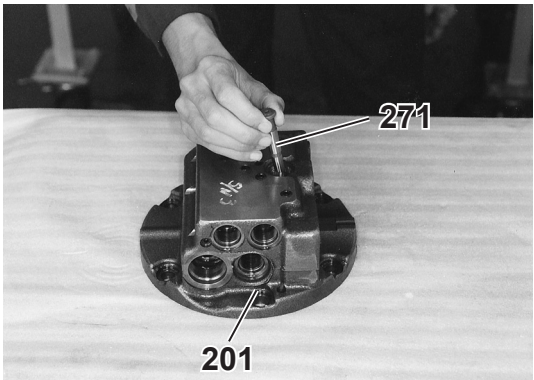
6. HYDRAULIC EQUIPMENT

Procedure	
<p>(8) Remove the thrust ball 108 from the cylinder block 104.</p>	
<p>(9) Remove the needle rollers 151 (3 rollers) from the cylinder block 104.</p>	
<p>14. Removal of spring inside cylinder block</p> <p>(1) Place the cylinder block 104 on the press bench.</p> <p>Note : <i>The spring is removed only when replacing.</i> <i>The spring is removed by lining up the shaft centers of the retainer (1) and washer 110 in order to prevent damage to the cylinder block [104] through contact.</i> <i>Cover the cylinder block 104 with a vinyl sheet to prevent the sliding surface of the cylinder block 104 from being damaged.</i></p>	
<p>(2) Place the retainer (1) on the washer 110, and while clamping the retainer (1) with the press, remove the THS snap ring 146 from the snap ring groove of the cylinder block 104 with a pair of snap ring pliers.</p> <p>Caution : <i>If the press is loosened suddenly, the spring could jump out resulting in injury.</i> <i>Loosen the press slowly.</i></p>	

6. HYDRAULIC EQUIPMENT

Procedure	
<p>2. Spindle section assembly</p> <p>(1) Apply oil to the O-ring of the floating seal 31, and mount the floating seal in the floating seal groove of the spindle 2.</p> <p>Note : <i>Separate the O-ring parts of floating seal 31, and Oil it all around, and then combine it with the seal ring part. Seat the O-ring part snugly in the groove, and after fitting the floating seal 31 in the groove, check to be sure that it is true and square in spindle 2.</i></p>	
<p>(2) Fit the outer rings (3 rings) of the tapered roller bearing 22 into the respective outer ring fastening holes in the spindle 2.</p>	
<p>(3) Mount 2 eye bolts in the spindle 2 so they are symmetrically positioned.</p> <p>(4) Hook the hook and wire in the eye bolts, hoist the spindle 2 with a crane, and slowly place the spindle 2 in the hub 1.</p>	
<p>(5) Fasten the hub 1 and spindle 2 with fixtures. At this time, fasten the fixtures so they are symmetrically positioned.</p> <p>(6) Invert the travel motor.</p>	

6. HYDRAULIC EQUIPMENT

Procedure			
<p>(4) Insert the sleeve 288, valve 287, spring 290 in the rear flange 201.</p>			
<p>(5) Temporarily tighten the plug 289.</p>			
<p>(6) Install the steel-ball 296 to the rear flange 296.</p> <p>(7) Tighten the plugs 284.</p> <table border="1" style="margin-left: 20px; border-collapse: collapse; width: 150px;"> <tr> <td style="padding: 2px;">Tightening torque</td> <td style="padding: 2px;">7.2 to 10.8 ft·lbf (9.85 to 14.75 N·m)</td> </tr> </table>	Tightening torque	7.2 to 10.8 ft·lbf (9.85 to 14.75 N·m)	
Tightening torque	7.2 to 10.8 ft·lbf (9.85 to 14.75 N·m)		
<p>14. Assembly of the rear flange mounted parts</p> <p>(1) Install the spring 281 and the spool 271 into the rear flange 201.</p>			

6. HYDRAULIC EQUIPMENT

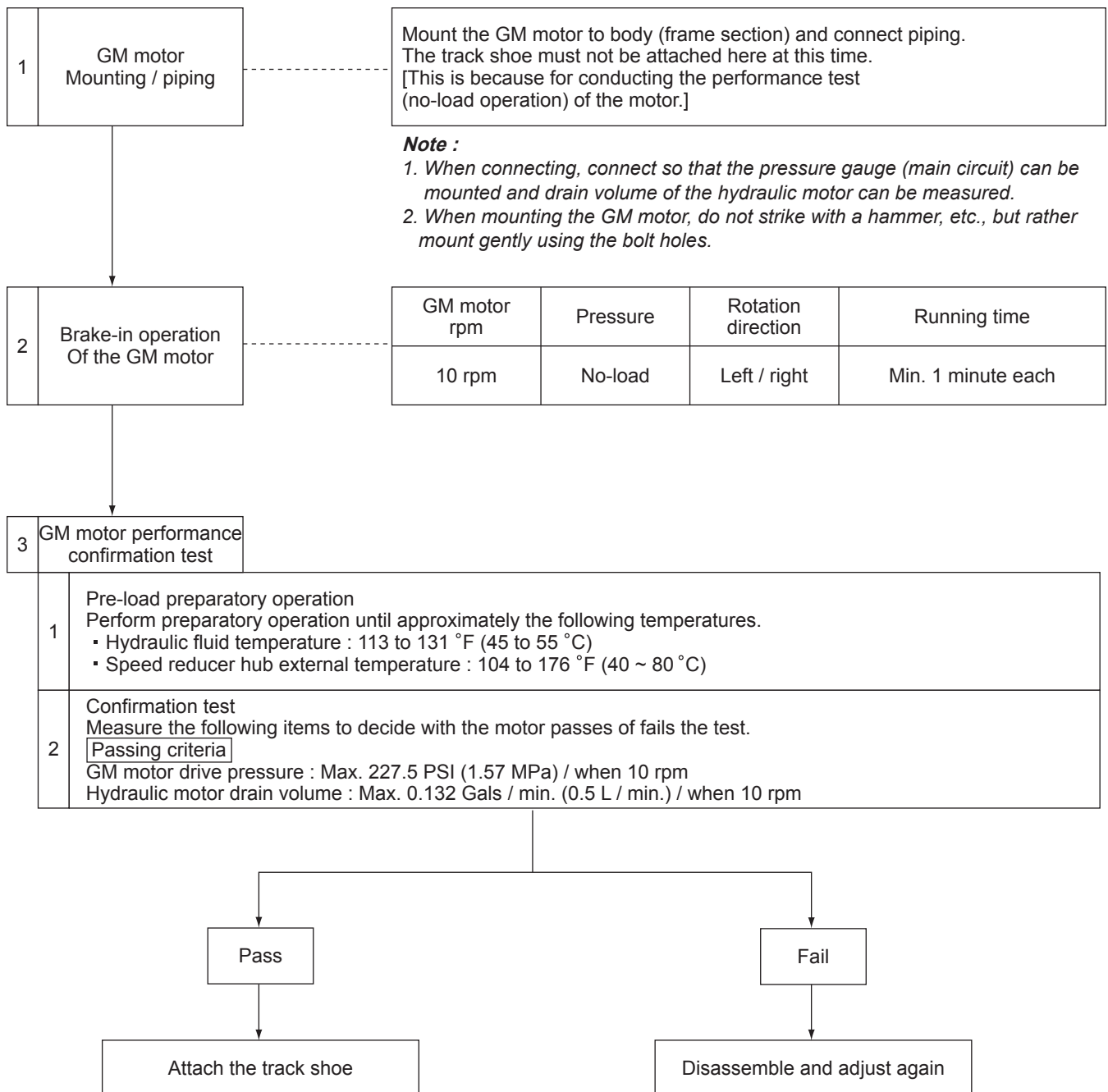
6-5-15 Performance Congirmation Test

• After servicing the GM motor, perform the following performance tests by the following procedure.

1) Required Measuring Devices

Pressure gauge {for 497.7 PSI (3.43 NOPa)}	2 pieces
Graduated cylinder {for 5.3 Qts. (5 L)}	1 piece
Stopwatch	1 piece

2) Test Procedure



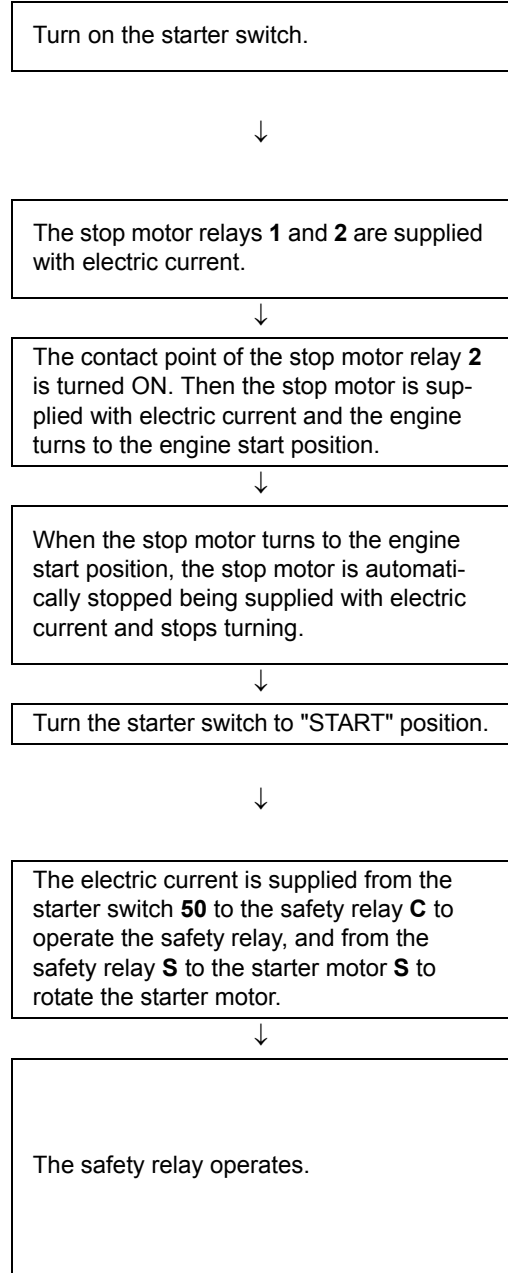
ADJUSTMENT AND REPAIR

7-1 Electric Equipment of the Machine.....	7-1-1	7-3 Controls.....	7-3-1
7-1-1 Parts Layout of Electrical Equipment	7-1-1	7-3-1 Control Train.....	7-3-1
7-1-2 Monitor and Alarm Systems	7-1-4	7-3-2 Mechanical Control Linkage	7-3-2
7-1-3 Wiring Diagram.....	7-1-7	7-3-3 Adjustment of Travel Levers.....	7-3-4
7-1-4 Stop Motor Operation	7-1-9	7-3-4 Adjustment of Boom Swing Pedal	7-3-5
7-1-5 Removal and Reinstallation of Engine	7-1-11	7-3-5 Adjustment of Blade Lever	7-3-5
7-1-6 Removal and Reinstallation of Starter Motor	7-1-21	7-3-6 Adjustment of Lock Lever.....	7-3-6
7-1-7 Removal and Reinstallation of Radiator	7-1-22	7-3-7 Adjustment Procedure of P.T.O. Pedal	7-3-7
7-1-8 Removal and Reinstallation of Fan Belt and Compressor Driving Belt	7-1-25	7-3-8 Adjustment Procedure of P.T.O. Pedal Lock....	7-3-7
7-1-9 Removal and Reinstallation of Fuel Injection Pump	7-1-26	7-3-9 Adjustment of Accelerator Lever	7-3-8
7-2 Undercarriage	7-2-1	7-4 Swing Bearing	7-4-1
7-2-1 Outline	7-2-1	7-4-1 Removal and Reinstallation of Swing Bearing	7-4-1
7-2-2 Compatibility of Main Parts.....	7-2-1	7-5 Hydraulic Equipment	7-5-1
7-2-3 Points of Reassembly (Rubber Crawler Type)	7-2-2	7-5-1 Removal and Reinstallation of Hydraulic Pump.....	7-5-1
7-2-4 Points of Reassembly (Steel Crawler Type).....	7-2-3	7-5-2 Removal and Reinstallation of Control Valve	7-5-5
7-2-5 Removal and Reinstallation of Crawler	7-2-4	7-5-3 Removal and Reinstallation of Swing Motor	7-5-8
7-2-6 Disassembly and Reassembly of Steel Crawler	7-2-7	7-5-4 Removal and Reinstallation of Swivel Joint	7-5-10
7-2-7 Disassembly and Reassembly of Front Idler.....	7-2-9	7-5-5 Disassembly and Reassembly of Swivel Joint	7-5-13
7-2-8 Disassembly and Reassembly of Track Roller.....	7-2-11	7-5-6 Disassembly and Reassembly of Hydraulic Cylinders	7-5-16
7-2-9 Installation of Floating Seal	7-2-13	7-5-7 Hydraulic Oil Tank	7-5-20
7-2-10 Drawings of Jigs.....	7-2-14	7-5-8 Piping Layout.....	7-5-26
7-2-11 Disassembly and Reassembly of Carrier Roller	7-2-16	7-6 Implement.....	7-6-1
		7-6-1 Removal and Reinstallation of Implement.....	7-6-1
		7-6-2 Quick Coupler.....	7-6-9
		7-7 Cabin	7-7-1
		7-7-1 Cabin	7-7-1
		7-8 Air Conditioner.....	7-8-1
		7-8-1 Removal and Reinstallation of Air Conditioner.....	7-8-1

7. ADJUSTMENT AND REPAIR

7-1-4 Stop Motor Operation

1. Engine Start



The starter switch **30** is always supplied with electric current from the battery. (Battery -Slow blow fuse-Starter switch **30**)

The stop motor relay **2 4A** is always supplied with electric current from the battery. (Battery-Slow blow fuse-Lead wire **R**-Fuse **5A**-Lead wire **WR**-Stop motor relay **2 4A**)

Starter switch **30**, **AC**-Lead wire **RW**-Fuse **15A**-Lead wire **YR**-Stop motor relay **1 6C**, **32**-Lead wire **YR**-Stop motor relay **2 32A**, **7Q**-Lead wire **B**-Ground

Stop motor relay **2 4A**, **38A**-Lead wire **LW**-Stop motor **20A**, **7A**-Lead wire **B**-Ground

When the stop motor turns to the engine start position, the contact point of the stop motor moves to the terminal **4A**. (Stop motor **20A**-Stop motor **4A**)

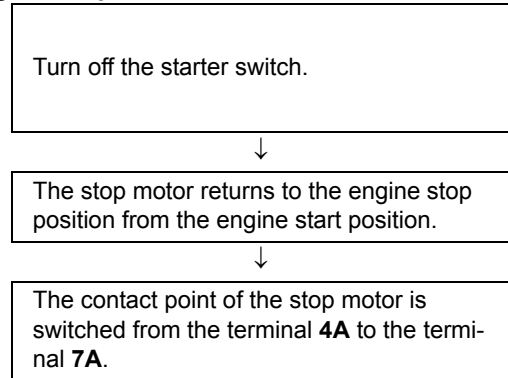
- The stop motor **4A** is supplied with positive pressure as well as the motor. Therefore, the motor does not operate.

The starter motor **B** is always supplied with electric current from the battery. The slow blow fuse, the lead wire **R** and the safety relay **B** are supplied with electric current from the battery when the starter switch is turned to "START" position.

The magnet switch of the starter motor operates to allow the pinion to jump out. At the same time, it makes the crankshaft of the engine rotate and the engine starts to run.

The alternator **P** and the safety relay **P** are connected with each other. Therefore, when the engine speed reaches the rated speed, the safety relay is supplied with electric current from the alternator. The signal from the alternator flows to the safety relay and the electric current between the safety relay **S** and the starter motor **S** is cut off, causing the pinion to be pulled back to prevent the starter motor from overrunning.

2. Engine Stop

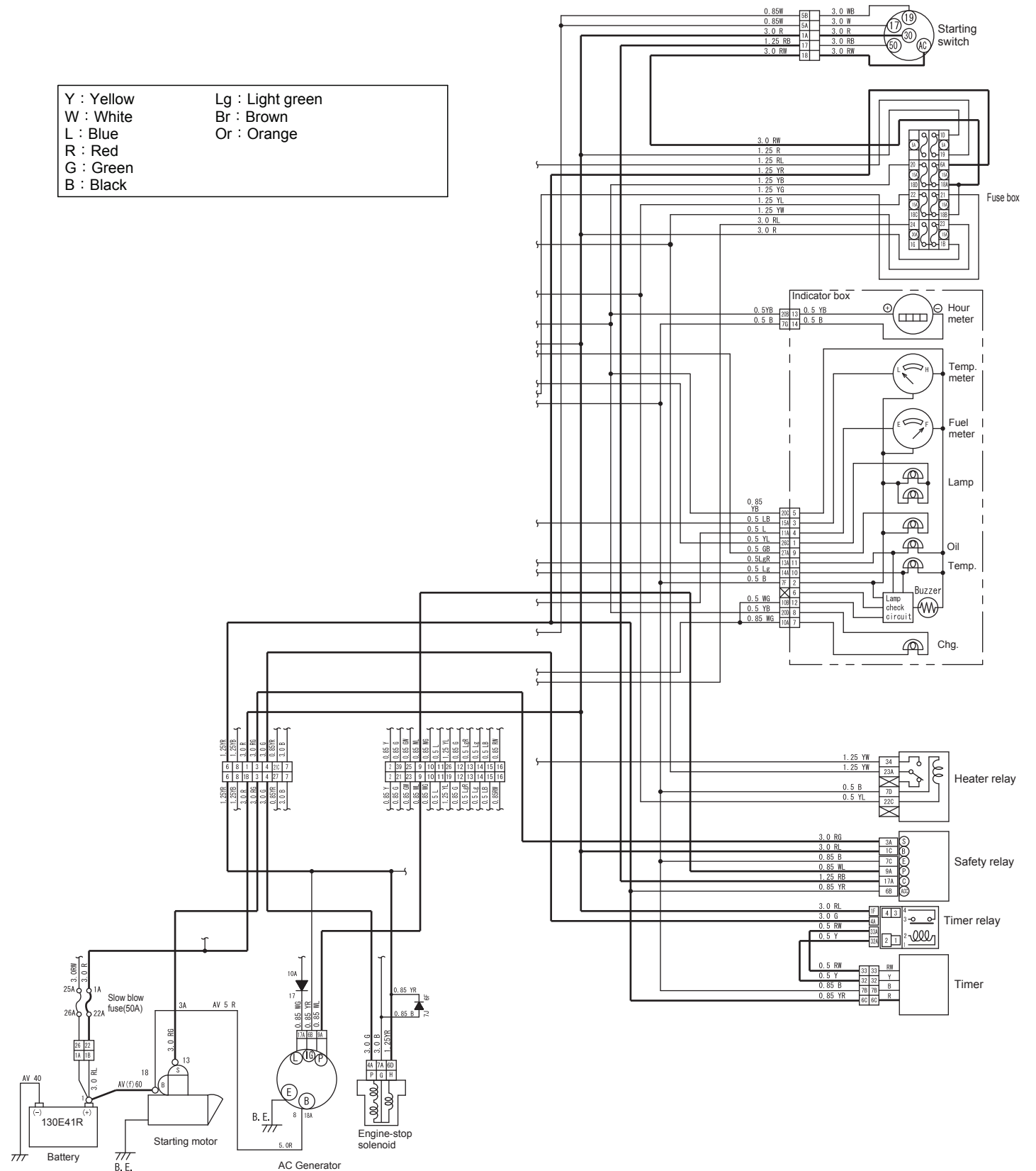


When the starter switch is turned OFF, the solenoid coil of the stop motor relay 2 is stopped being supplied with electric current, so that the contact point of the stop motor relay 2 returns to the terminal **7R**.

Battery-Lead wire **R**-Fuse **5A**-Lead wire **WR**-Stop motor **4A**, **20A**-Lead wire **LW**-Stop motor relay **2 38A**, **7R**-Lead wire **B**-Ground.

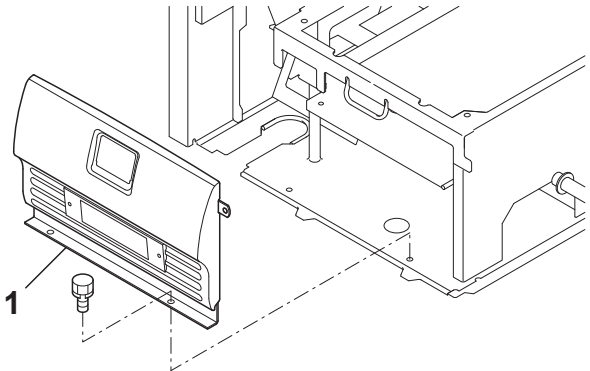
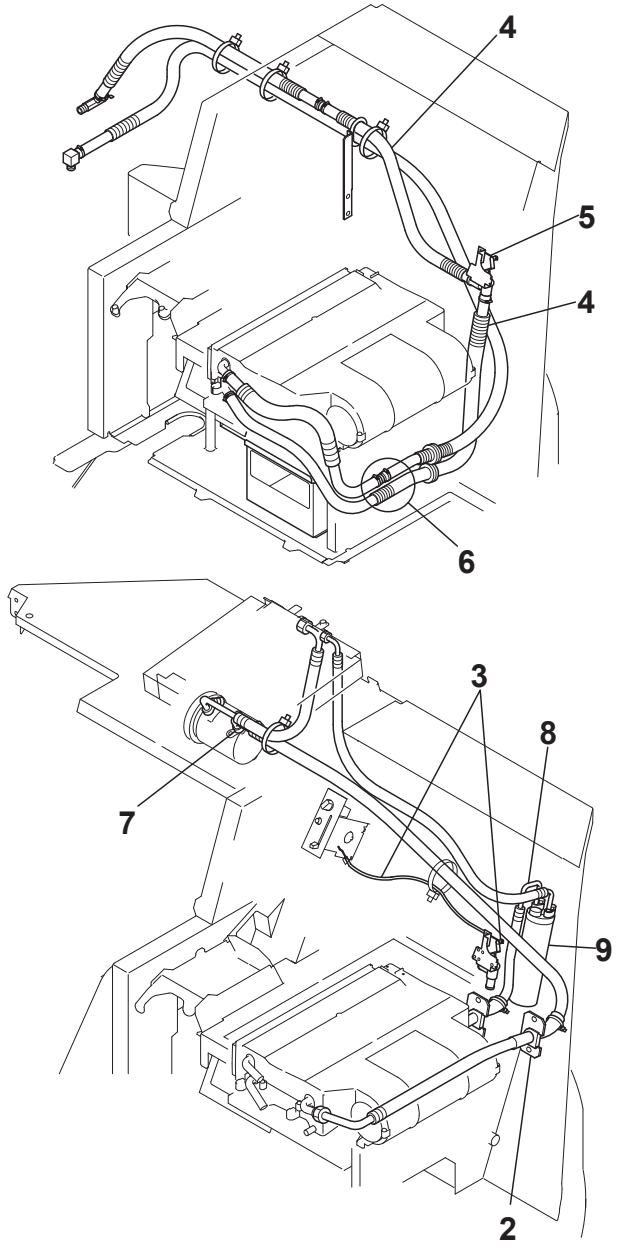
Electric current supply from the terminal **4A** to the stop motor is cut off so that the stop motor stops operating.

Y : Yellow	Lg : Light green
W : White	Br : Brown
L : Blue	Or : Orange
R : Red	
G : Green	
B : Black	



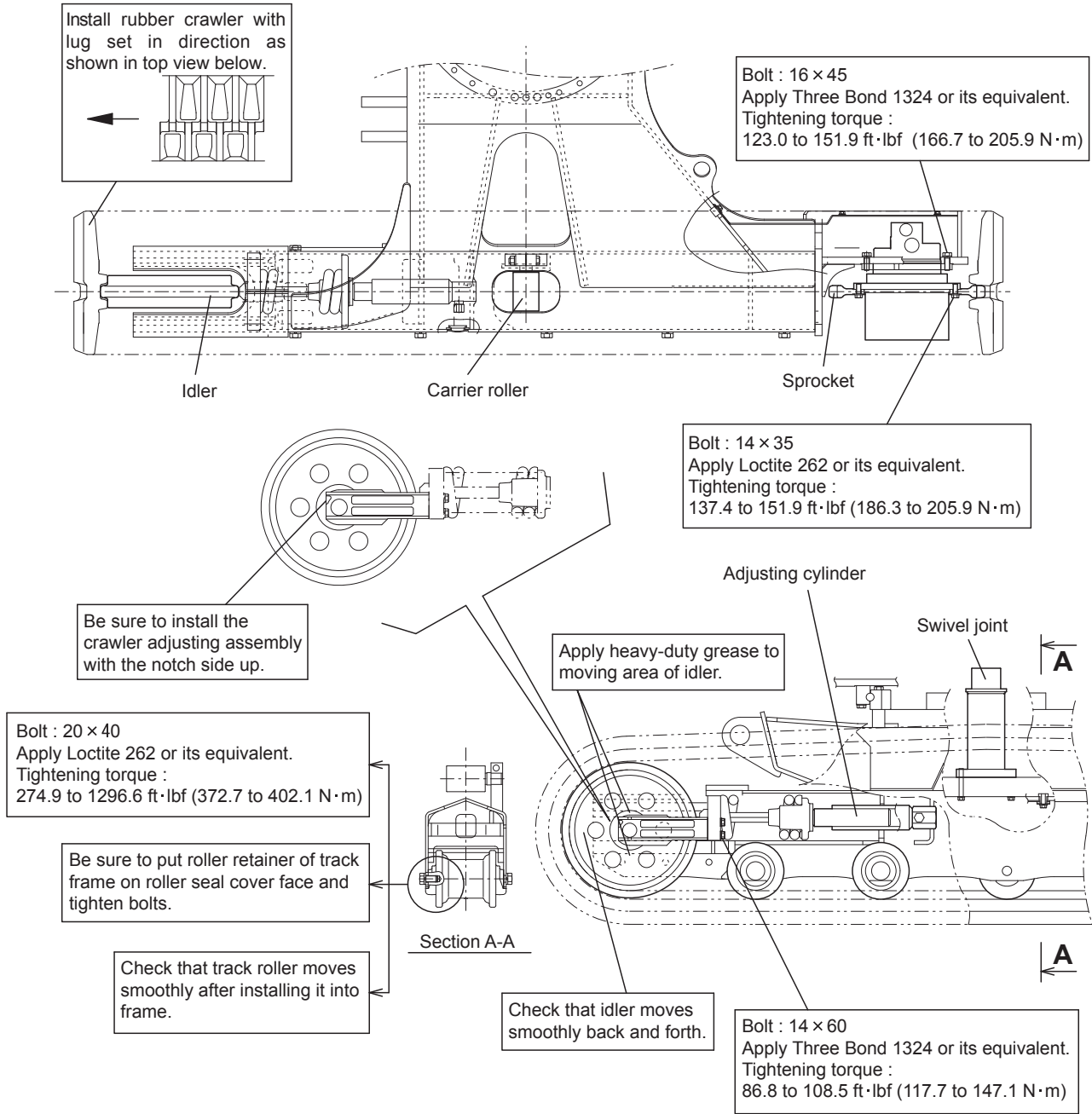
7. ADJUSTMENT AND REPAIR

Air Conditioner-Equipped Type

Procedure	
<p>(1) Follow Steps (1) to (18) of "Removal of Engine".</p> <p>(2) Remove grille 1.</p>	 <p>The diagram shows a front view of the air conditioner unit with the grille (1) being removed. A screw is shown being taken out from the grille. Dashed lines indicate the grille's position relative to the unit's frame.</p>
<p>(3) Remove piping plate 2.</p> <p>(4) Disconnect wire 3 connected to hot-water valve 5.</p> <p>(5) Disconnect the heater hoses.</p> <ol style="list-style-type: none">1. Disconnect heater hoses (1150) 4 from the connecting parts of hot-water valve 5.2. Loosen the hose clips to disconnect heater hoses (1650) 6 from the joints. <p>(6) Disconnect the gas hoses.</p> <ol style="list-style-type: none">1. Disconnect hose 7 (for the air conditioner unit) from the connecting part on the compressor side.2. Disconnect hose 8 (from the receiver dryer to the air conditioner unit) from the connecting part on the receiver dryer 9 side.	 <p>The top diagram shows the heater hoses (4) and hot-water valve (5) being disconnected. The bottom diagram shows the gas hoses (7, 8) and piping plate (2) being disconnected from the compressor and receiver dryer (9) sides. Numbered callouts 3, 4, 5, 6, 7, 8, and 9 identify the specific components being worked on.</p>

7. ADJUSTMENT AND REPAIR

7-2-3 Points of Reassembly (Rubber Crawler Type)



Crawler Tension Adjustment:

1. Raise the crawler on one side using the boom.
2. Bring the mark \triangle on the inside surface of the rubber crawler to the upper center of the carrier roller.
3. Adjust the crawler tension so that the clearance **H** between the outside rolling surface of the third track roller from the idler and the crawler tread, as shown in the figure, is within the range from 0.8 to 1.0 in. (20 to 25 mm).
4. After rotating the crawler several times, check that the clearance **H** should be within the range from 0.8 to 1.0 in. (20 to 25 mm).
5. If not, readjust the crawler tension following the above steps 1 to 3. Then check the clearance **H** again, following the step 4. Then check the clearance **H** again, following the procedure 4.

7. ADJUSTMENT AND REPAIR

Procedure					
<p>(2) Remove the plug R (PT) 1/8 3 to drain engine oil.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <td style="width: 15%; text-align: center;">Type</td> <td>Engine oil SAE 30</td> </tr> <tr> <td style="text-align: center;">Q'ty</td> <td>0.21 Qts. (0.2 L)</td> </tr> </table> <p>(3) Remove snap ring C 8 from track roller 2.</p> <p>Note : Remove the snap ring C while pressing the outer face of seal cover B 7 with a press or the like, and it can be removed easily.</p> <p>(4) Remove seal cover B 7 and floating seal 5 from roller 2.</p> <p>(5) Pull out shaft (with the seal cover) 4 and remove floating seal 1.</p> <p>Notes :</p> <ul style="list-style-type: none"> • Since shaft 4 is press-fitted into the seal cover, they cannot be disassembled. • Measure the bore of bush 9. If the measured value is within the allowable wear limit, do not remove the bush. 	Type	Engine oil SAE 30	Q'ty	0.21 Qts. (0.2 L)	
Type	Engine oil SAE 30				
Q'ty	0.21 Qts. (0.2 L)				

3) Reassembly

Reassemble the track roller in the reverse order of the disassembly procedure.

Notes :

- Replace the O-ring and the floating seals with new ones.
- Refer to Section "7-2-9 Installation of Floating Seal" for the procedure for installing the floating seals.

Plug R (PT) 1/8	
Adhesive	Apply loctite 572 or its equivalent
Tightening torque	6.5 to 7.2 ft•lbf (8.8 to 9.8 N•m)

7. ADJUSTMENT AND REPAIR

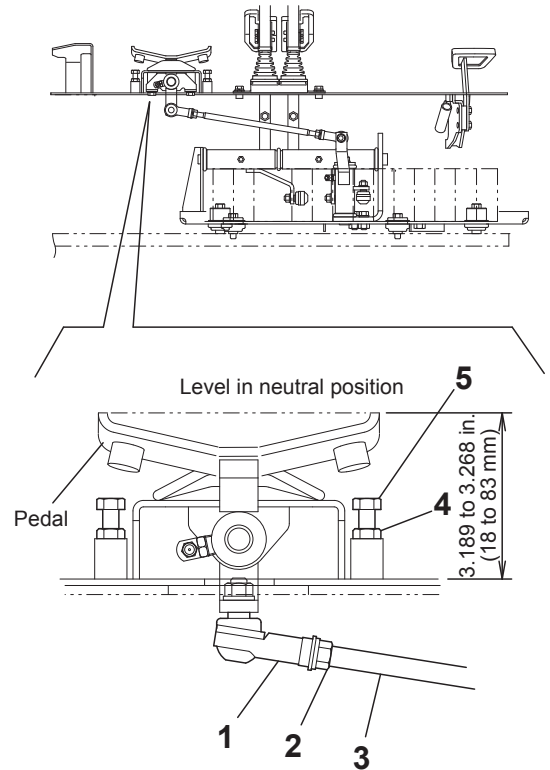
7-3-4 Adjustment of Boom Swing Pedal

1) Setting Pedal Level

- (1) Loosen nut **2** of L-ball **1**.
- (2) Adjust the boom swing pedal with rod **3** so that the pedal is level.
- (3) Tighten nut **2** of L-ball **1**.

2) Adjustment of Stopper Bolts (Right and Left Boom Swing)

- (1) Loosen lock nuts **4** and screw in stopper bolts **5** until they have no contact with the boom swing pedal.
- (2) Move the boom swing pedal to its stroke ends, and loosen stopper bolts **5** until their heads contact with the pedal.
- (3) Move the boom swing pedal to the neutral position, loosen stopper bolts **5** one more turn and tighten lock nuts **4** to fix them.

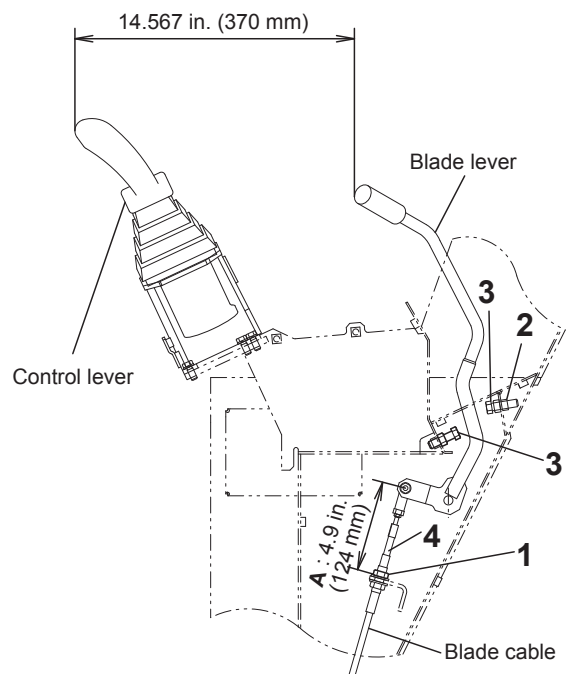


7-3-5 Adjustment of Blade Lever

- (1) Loosen nut **1** and adjust the distance **A** to 4.9 in. (124 mm) with the rod **4**.

1) Adjustment of Stopper Bolts (Blade Up and Down)

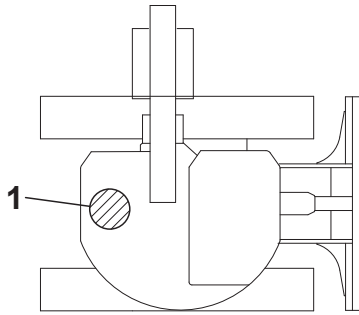
- (1) Loosen lock nuts **2** and screw in stopper bolts **3** until they have no contact with the blade lever.
- (2) Move the blade lever to its stroke ends, and loosen stopper bolts **3** until they contact with the blade lever.
- (3) Move the blade lever to the neutral position, loosen stopper bolts **3** one more turn and tighten lock nuts **2** to fix them.

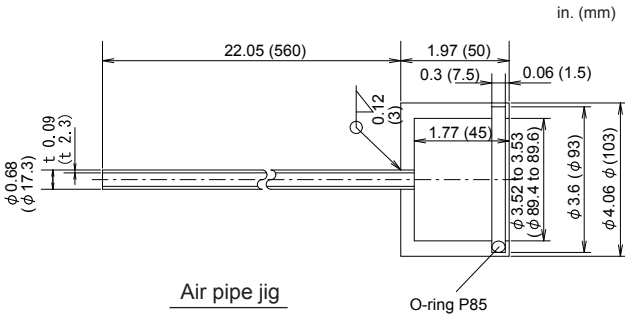
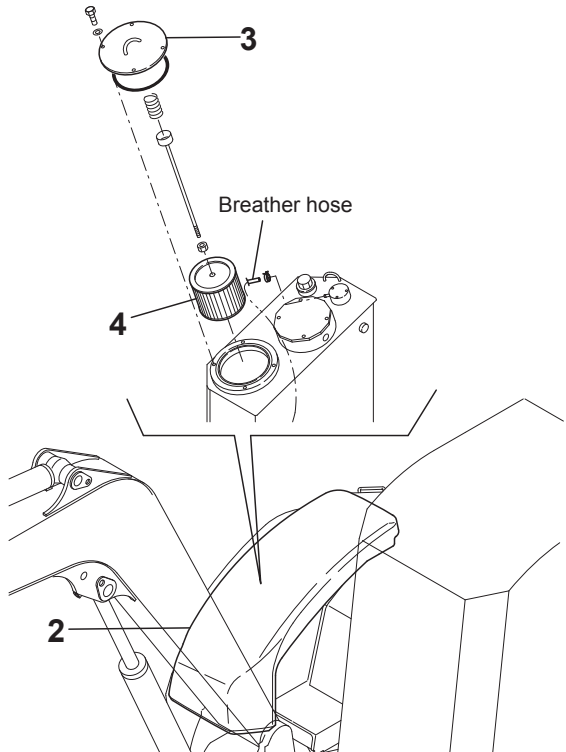


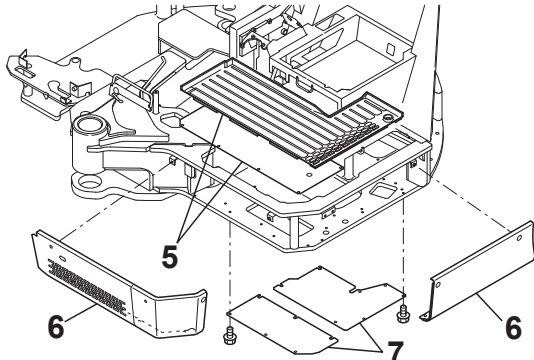
7. ADJUSTMENT AND REPAIR

7-5-2 Removal and Reinstallation of Control Valve

1) Removal

Procedure	
<p>(1) Turn the upperstructure so that control valve 1 is positioned on the opposite side to blade, lower the bucket to the ground and stop the engine.</p>	

<p>(2) When removing the hydraulic hoses, prevent the oil from flowing out as follows :</p> <p>[1] Open bonnet B 2.</p> <p>[2] Remove hydraulic oil tank cover 3 and suction filter 4.</p> <p>[3] Insert an air pipe jig, as shown in the figure below, into the hole for the suction filter.</p> <p>Alternatively, a compression vacuum, which is installed to the breather hose of the hydraulic oil tank, can be used if a stable air pressure (air from a compressor) can be ensured.</p> <p>[4] Run the engine for about 30 to 60 seconds and stop the engine immediately after a bubbling sound is heard from the top end of the air pipe.</p> <div style="text-align: right; margin-right: 50px;">in. (mm)</div> 	
--	---

<p>(3) Remove floor mat and step 5. Then remove frame covers (F and L) 6 and under covers (A and B) 7.</p>	
---	--

7. ADJUSTMENT AND REPAIR

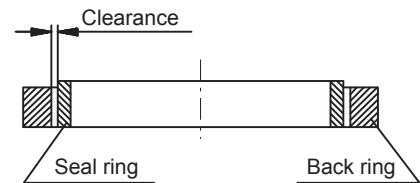
3) Cautions for Handling and Storing Seals

- (1) O-rings are packed in the package that is suitable for storage.
- (2) Do not leave the O-rings outside the package.
- (3) For storing, put the O-rings in the packages and place them in a dark and cool place (in a parts box or cardboard box) under 104°F (40°C) to avoid direct sunlight.
- (4) Do not put anything on the O-rings, or they may be distorted.

4) How to Fit O-rings (for inner side)

• Before fitting

- (1) There may be a clearance (within 3% of the shaft dia.) between the seal ring and the back ring.
This is normal condition.
- (2) Check that there is no distortion, flaw or other abnormality on the seal ring and the back ring.



• Fitting

- (1) Dry the seal groove. Push an end of the seal ring into the groove and fit the whole part while pressing the seal ring with your fingers.
Take care not to twist the seal ring.
- (2) Use lithium soap group multipurpose grease.
- (3) For fitting a seal ring, make it heart-shaped as shown in the figures at the right and press one end of it into the groove. Then, fit the whole seal ring while pressing it with your finger (Figs. 1 and 2).
- (4) When using jigs for fitting seal rings, use the jigs with round edges to avoid damaging the seal rings. (Fig. 3)
- (5) If the seal ring is distorted after fitting, correct the distortion with the jig before assembly. (Fig. 4)

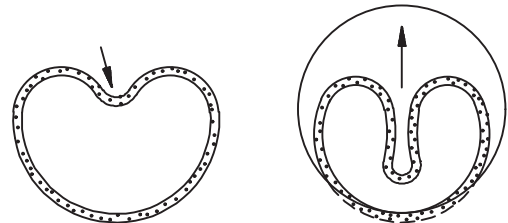


Fig. 1

Fig. 2

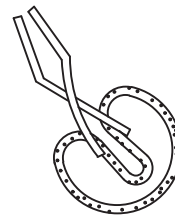


Fig. 3

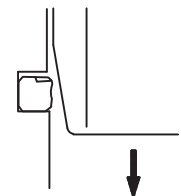


Fig. 4

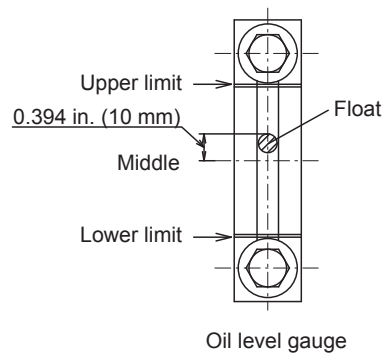
5) Repair and Replacement of Parts

- (1) Disassemble and reassemble at a place free from dust.
- (2) Completely remove the contamination, foreign matter (sludge), etc. from the disassembled parts.
- (3) Check for flaws or nicks on the seal surface of the shaft.
Repair or replace the part when necessary.
- (4) Replace the shaft if it is worn.
- (5) Replace all seals in reassembly.

7. ADJUSTMENT AND REPAIR

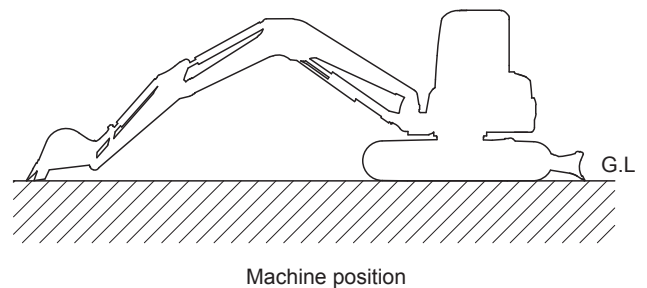
3) Oil Level Check

- (1) Place the machine on a firm and flat ground when checking the hydraulic oil level.
- (2) Check the hydraulic oil level with the oil level gauge when the oil temperature is 32 to 86 °F (0 to 30°C).
- (3) The proper oil level is 0.39 in. (10 mm) above the middle of the oil level gauge. The hydraulic oil level increases or decreases depending on the hydraulic oil temperature due to its nature; therefore, check it when the oil is cooled.

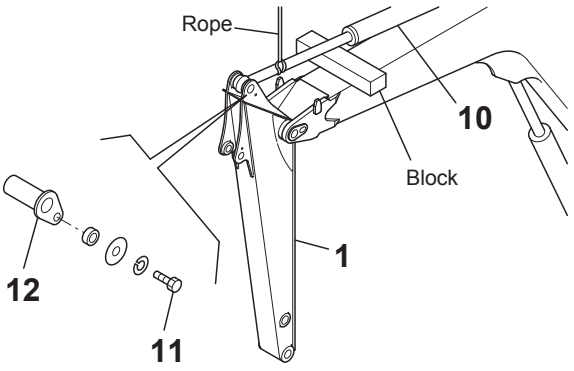
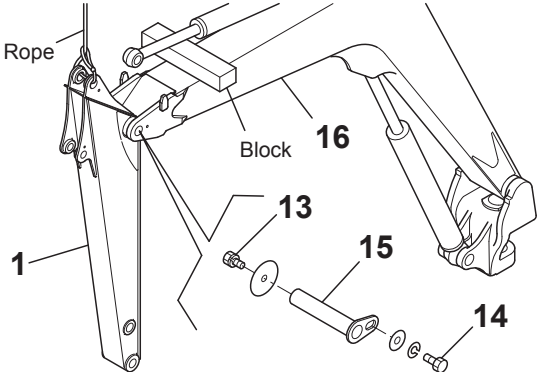


4) Machine Position in Oil Level Check

- (1) Retract the bucket and arm cylinder rods completely to lower the bucket to the ground.
- (2) Lower the blade to the ground.



7. ADJUSTMENT AND REPAIR

Procedure	
<p>(7) Put rope onto arm cylinder 10, and slightly lift it up.</p> <p>(8) Remove bolt 11 (M14) to pull out arm pin 12. Start the engine and retract the arm cylinder rod to disconnect it from arm 1.</p> <p>(9) Slacken the rope to put down arm cylinder 10 on the block.</p>	 <p>The diagram illustrates the process of removing bolt 11 and pin 12. It shows a vertical arm labeled '1' attached to a horizontal boom. A rope is attached to the top of the arm. A block labeled '10' is positioned at the top of the arm. A bolt labeled '11' is shown being removed from the arm, and a pin labeled '12' is shown being pulled out. The rope is shown being slackened and the arm cylinder 10 is shown being put down on the block.</p>
<p>(10) After putting rope onto arm 1, remove bolts (M12) 13 and (M14) 14 to pull out pin 15.</p> <p>(11) Lift up arm 1 to remove it from boom 16.</p>	 <p>The diagram illustrates the process of removing bolts 13 and 14, and pin 15. It shows a vertical arm labeled '1' attached to a horizontal boom labeled '16'. A rope is attached to the top of the arm. A block labeled '16' is positioned at the top of the arm. A bolt labeled '13' is shown being removed from the arm, and a bolt labeled '14' is shown being removed from the boom. A pin labeled '15' is shown being pulled out. The rope is shown being slackened and the arm cylinder 10 is shown being put down on the block.</p>

7. ADJUSTMENT AND REPAIR

7-7 Cabin

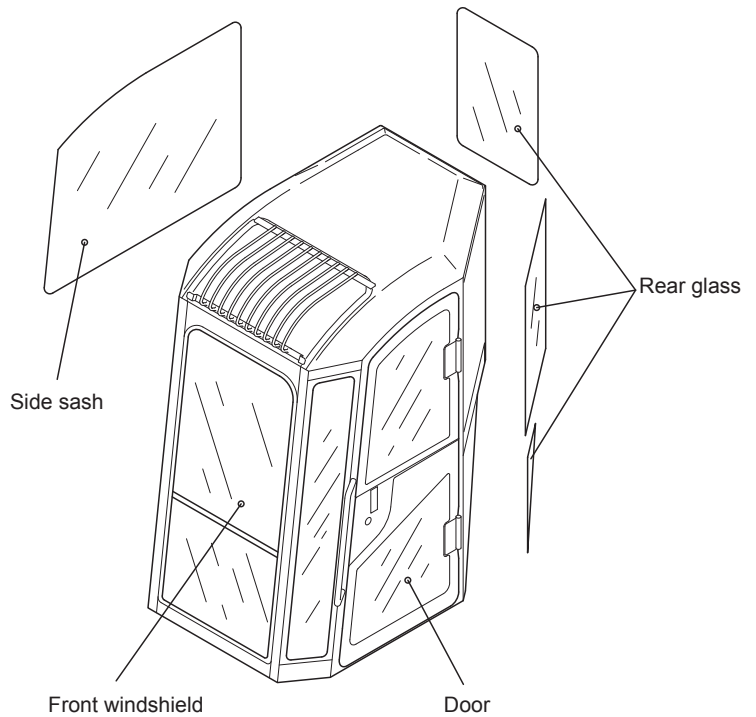
7-7-1 Cabin

! When there are two people for the work, the signs for communication between them must be decided before starting the work.

! Housing the front windshield (the upper and lower parts) in the specified positions allows an easy start of the work.

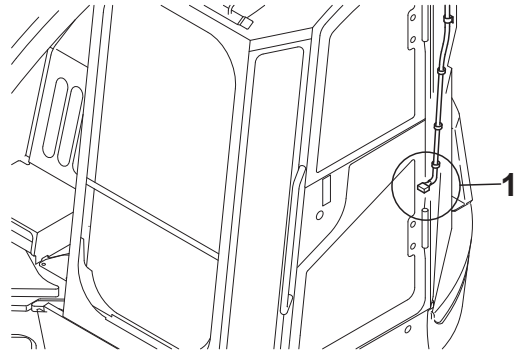
Weight of cabin components (reference value)

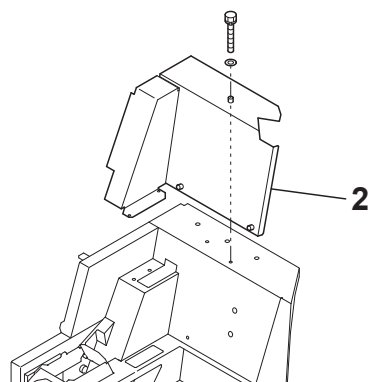
No.	Part	Weight lbs. (kg)
1	Front windshield	30.9 (14.0)
2	Side sash	22.7 (10.3)
3	Rear glass	26.9 (12.2)
4	Door assembly	57.3 (26.0)
5	Cabin assembly (including door)	493.9 (224)



1. Removal and Reinstallation of Cabin

1) Removal

Procedure	
(1) Disconnect coupler 1 from the wire harness B.	

(2) Remove operator's seat mount cover 2.	
---	--

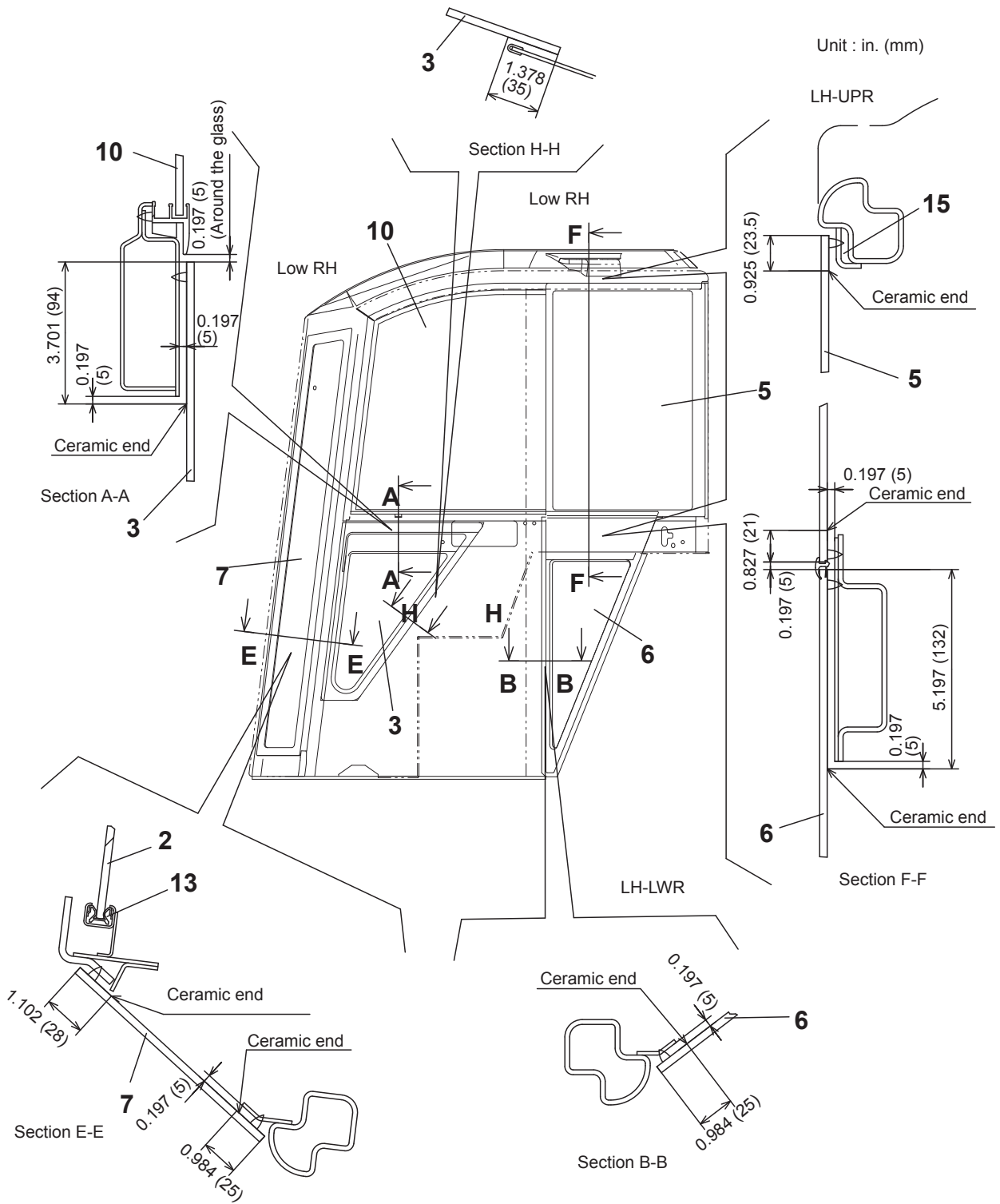
7. ADJUSTMENT AND REPAIR

2) Removal and Reinstallation of Glasses RH-FRT, LOW RH, LH-LWR and LH-UPR

- (1) Remove and reinstall the glasses according to the procedures described above.
- (2) Stick on the respective dam rubbers. (Refer to the figure below for the locations of the dam rubbers.)

Note :

Follow the procedure described above for handling after installing the glasses.



7. ADJUSTMENT AND REPAIR

2) Reinstallation

Reinstall the air conditioner in the reverse order of the removal procedure.

For tightening torque for bolts and nuts, refer to Section "3-7-3 Tightening Torque for General Bolts and Nuts".

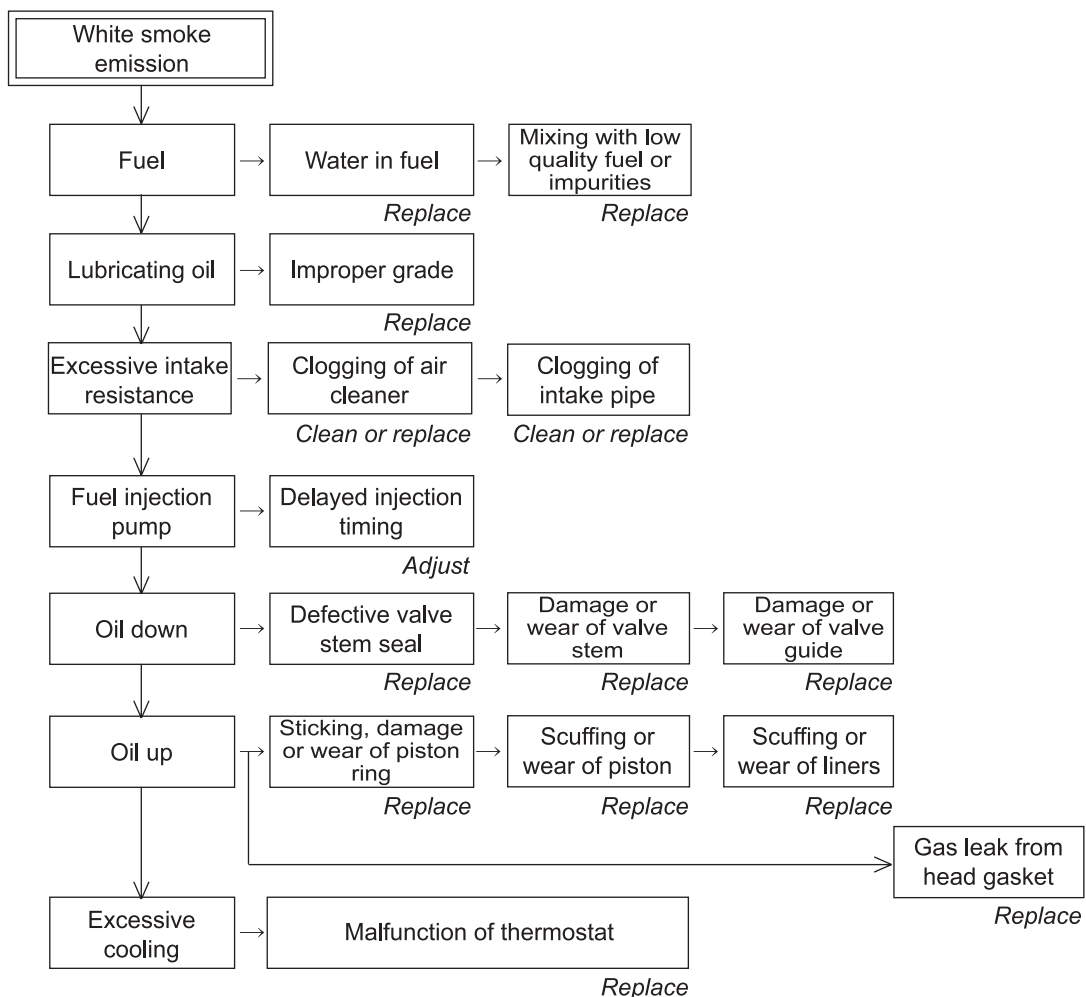
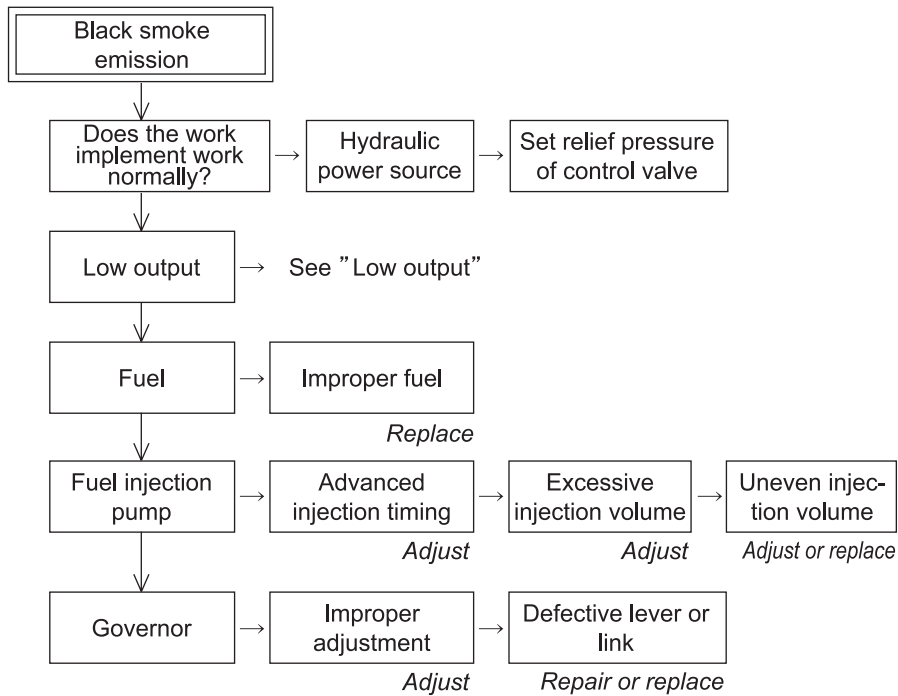
Compressor driving belt (V-belt)

Size		A-type low edge multiply belt MPMF-6570
Pressing force	lbs. (N)	22 (98)
Slack	in. (mm)	0.91 to 0.94 (23 to 24)

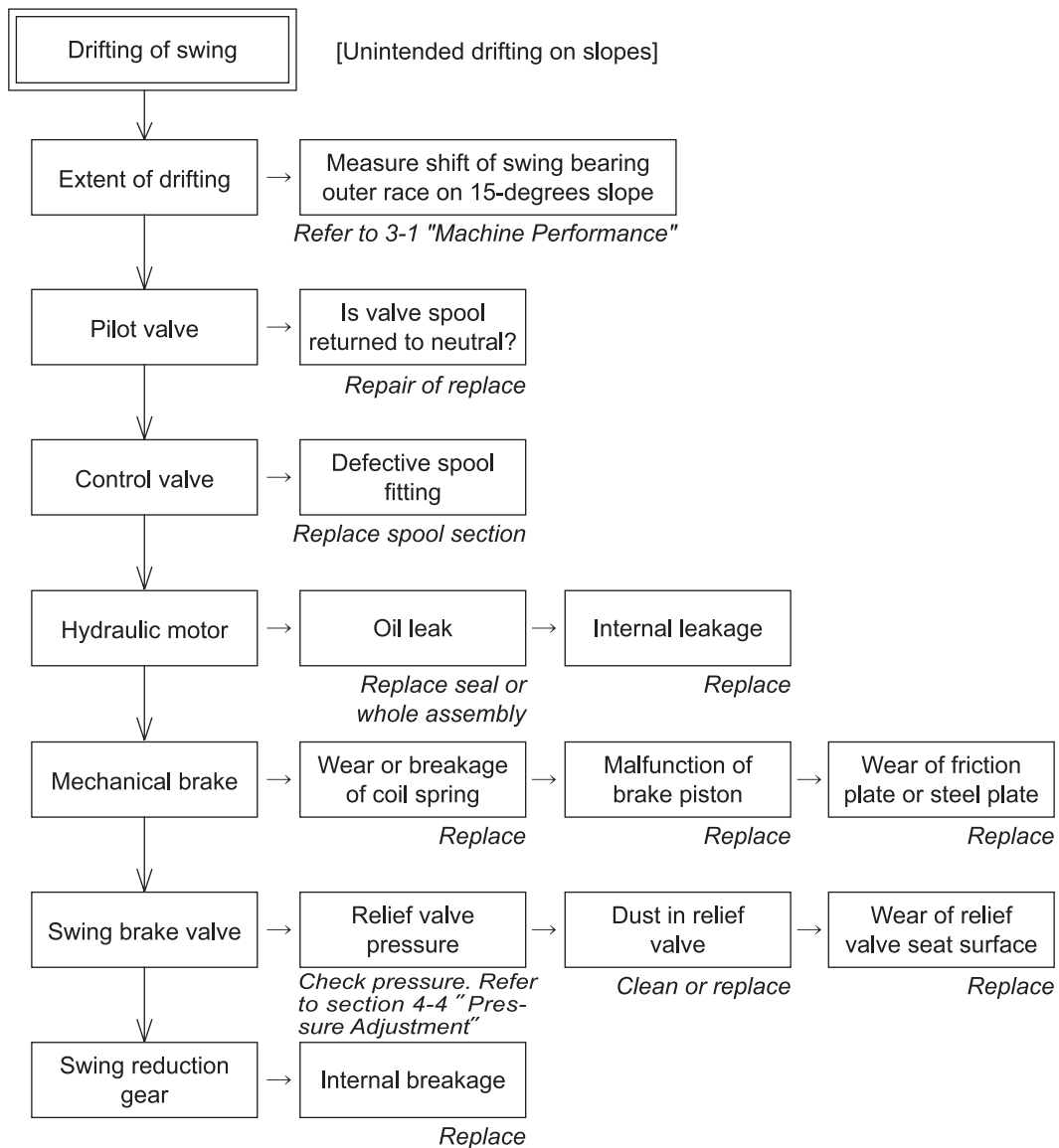
TROUBLESHOOTING

10-1 Non-breakdowns.....	10-1-1
10-1-1 Natural Release of Bucket	10-1-1
10-1-2 Discontinuous Arm Movement	10-1-1
10-1-3 Thermal Shock of Travel Motor.....	10-1-2
10-1-4 Elongation of Boom Swing Cylinder on 68 degrees Swing.....	10-1-3
10-1-5 Time Lag on Travel Speed Switching	10-1-4
10-1-6 Fluctuation in Oil Level of Hydraulic Oil Tank due to Temperature Change.....	10-1-5
10-2 Troubleshooting	10-2-1
10-2-1 Machine and Engine	10-2-1
10-2-2 Electrical Equipment on Panel	10-2-22

10. TROUBLESHOOTING



10. TROUBLESHOOTING



Inspection procedure

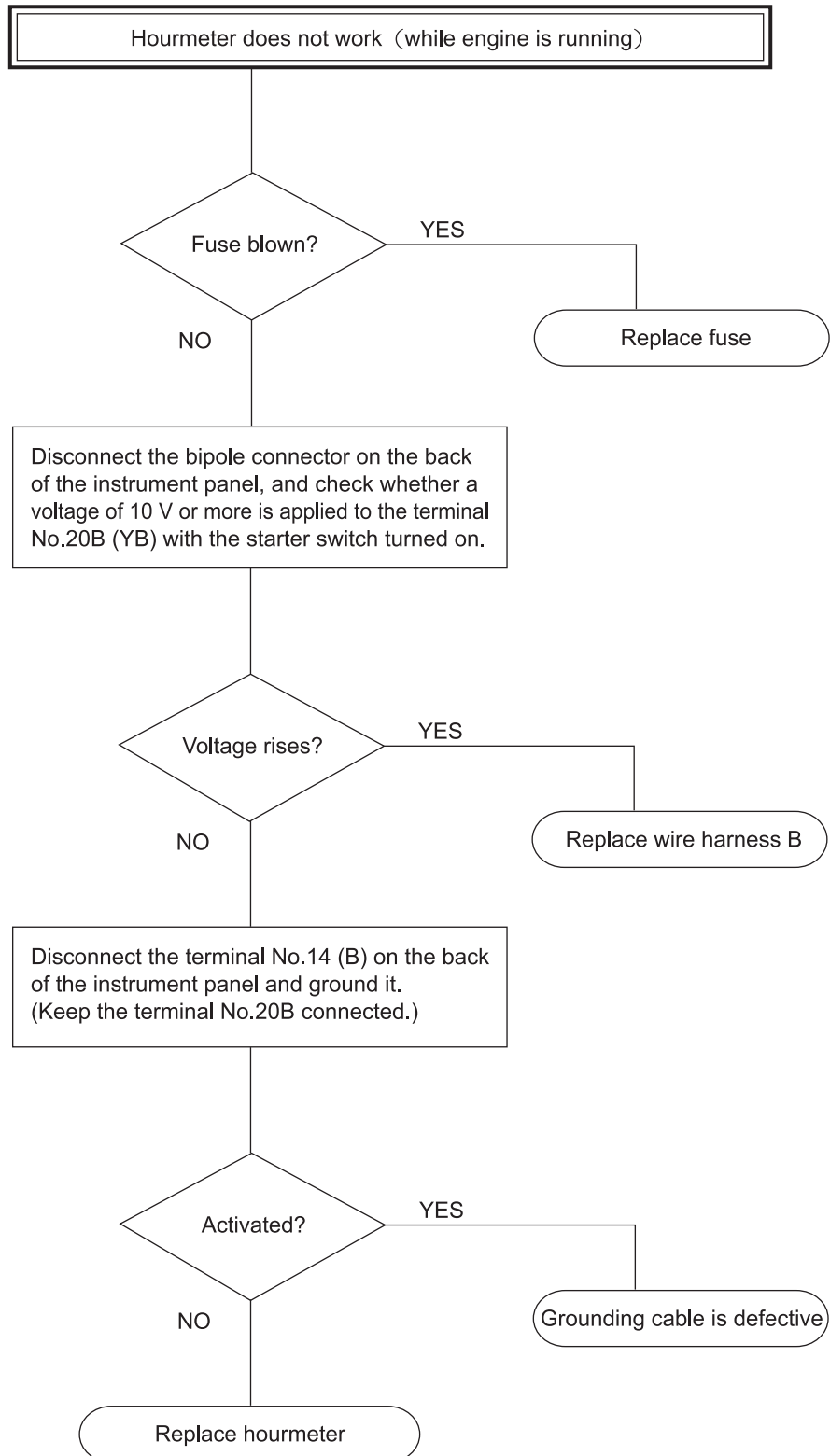
Check the drifting pattern when the machine is placed on a slope with 15 degrees in slope angle.

Phenomena :

- [1] Continuous drifting : The swing brake valve is faulty.
- [2] Discontinuous drifting : The hydraulic motor is faulty.

10. TROUBLESHOOTING

Hourmeter



CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL