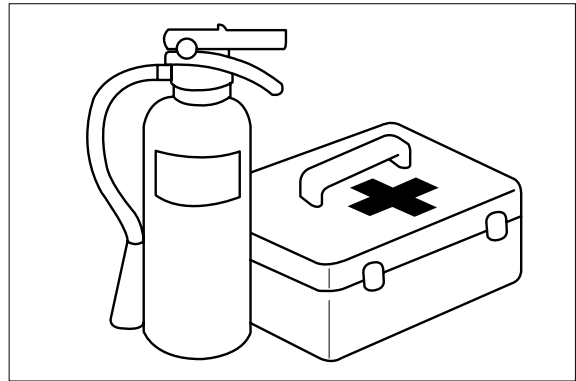


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

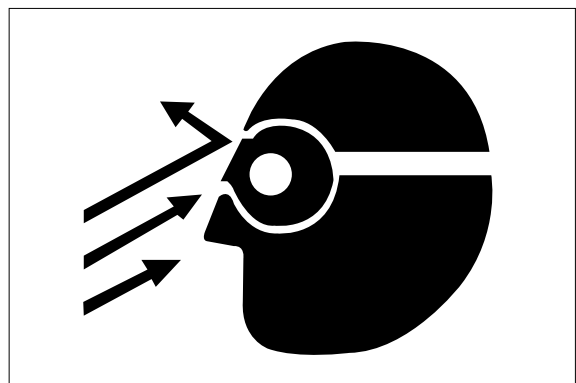
Keep a first aid kit and fire extinguisher handy.

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



PROTECT AGAINST FLYING DEBRIS

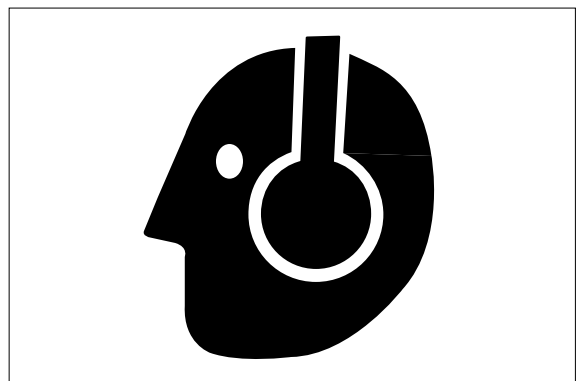
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing.

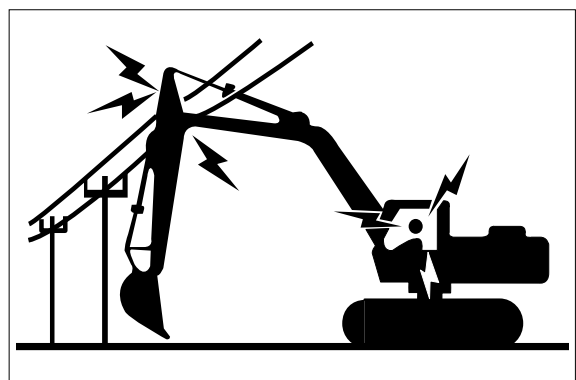
Wear a suitable hearing protective device such as ear-muffs or earplugs to protect against objectionable or uncomfortable loud noises.



AVOID POWER LINES

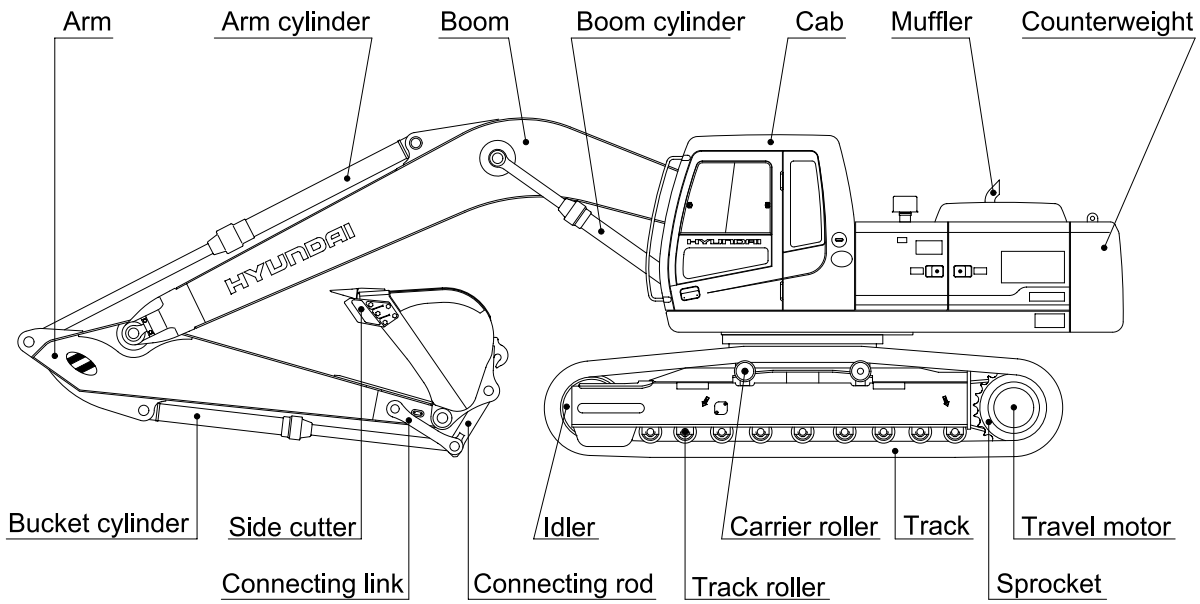
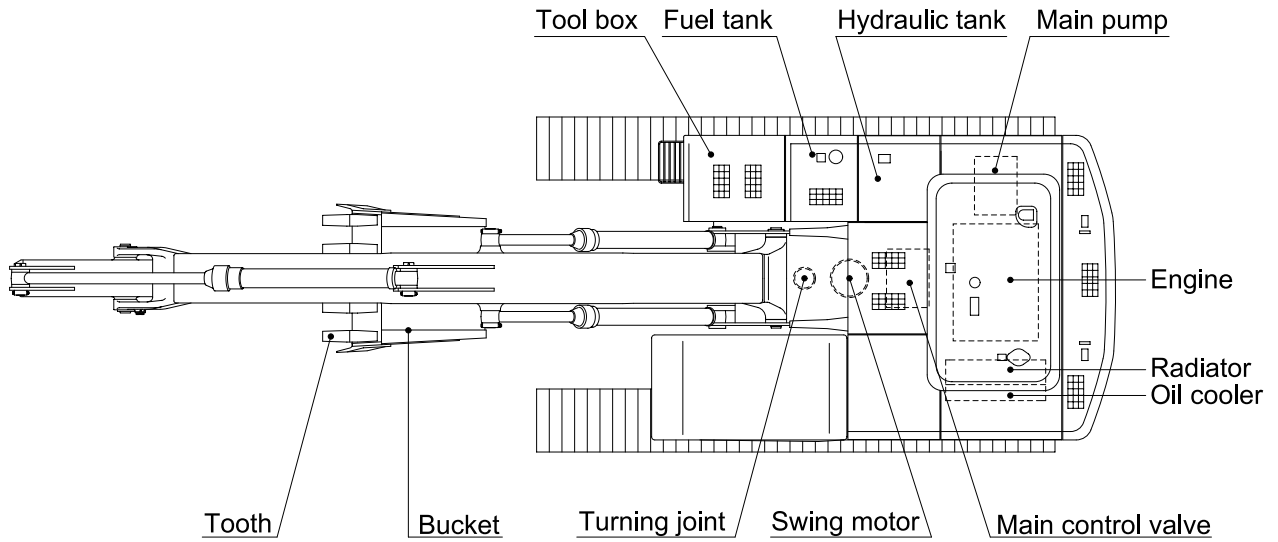
Serious injury or death can result from contact with electric lines.

Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



GROUP 2 SPECIFICATIONS

1. MAJOR COMPONENT



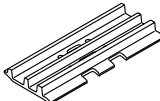
21072SP01A

7. UNDERCARRIAGE

1) TRACKS

X-leg type center frame is integrally welded with reinforced box-section track frames. The design includes dry tracks, lubricated rollers, idlers, sprockets, hydraulic track adjusters with shock absorbing springs and assembled track-type tractor shoes with triple grousers.

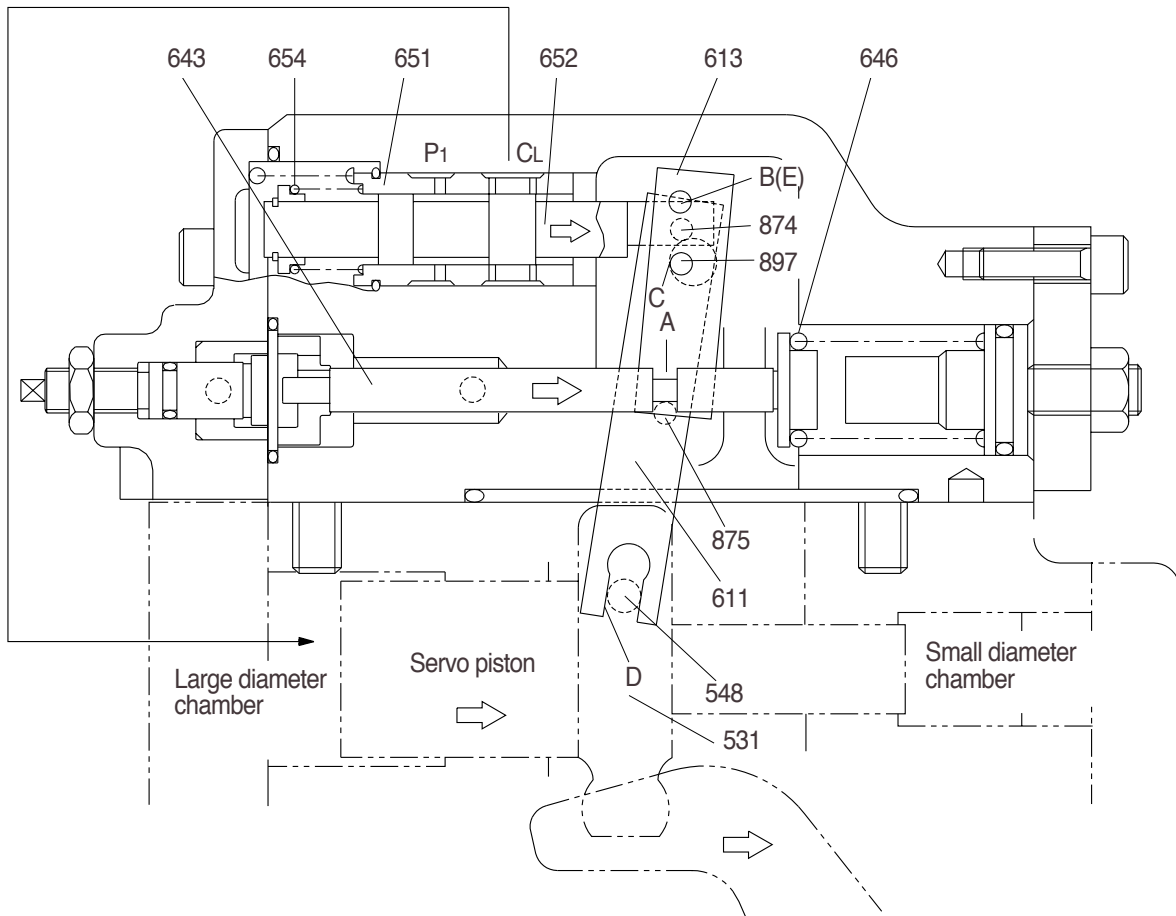
2) TYPES OF SHOES

Model	Shapes		Triple grouser			
						
R210LC-7	Shoe width	mm(in)	600(24)	700(28)	800(32)	-
	Operating weight	kg(lb)	21700(47840)	21980(48460)	22270(49100)	-
	Ground pressure	kgf/cm ² (psi)	0.46(6.54)	0.40(5.69)	0.35(4.98)	-
	Overall width	mm(ft-in)	2990(9' 10")	3090(10' 2")	3190(10' 6")	-
R210LC-7 LONG REACH	Shoe width	mm(in)	-	-	800(32)	-
	Operating weight	kg(lb)	-	-	24360(53700)	-
	Ground pressure	kgf/cm ² (psi)	-	-	0.42(5.97)	-
	Overall width	mm(ft-in)	-	-	3190(10' 6")	-
R210LC-7 HIGH WALKER	Shoe width	mm(in)	600(24)	700(28)	800(32)	Double grouser 710(28)
	Operating weight	kg(lb)	23160(51060)	23440(51680)	23730(52320)	23770(52400)
	Ground pressure	kgf/cm ² (psi)	0.49(6.97)	0.43(6.12)	0.38(5.40)	0.43(6.12)
	Overall width	mm(ft-in)	3395(11' 2")	3495(11' 6")	3595(11' 10")	3505(11' 6")

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	2EA
Track rollers	9EA
Track shoes	49EA

Flow reducing function



As the pilot pressure P_i rises, the pilot piston(643) moves to the right to a position where the force of the pilot spring(646) balances with the hydraulic force.

The groove(A) in the pilot piston is fitted with the pin(875) that is fixed to lever 2(613). Therefore, when the pilot piston moves, lever 2 rotates around the fulcrum of point B [fixed by the fulcrum plug(614) and pin(875)]. Since the large hole section(C) of lever 2 contains a protruding pin(897) fixed to the feedback lever(611), the pin(897) moves to the right as lever 2 rotates. Since the opposing-flat section(D) of the feedback lever is fitted with the pin(548) fixed by the tilting pin(531) that swings the swash plate, the feedback lever rotates around the fulcrum of point D, as the pin(897) moves.

Since the feedback lever is connected with the spool(652) via the pin(874), the spool moves to the right.

The movement of the spool causes the delivery pressure P_1 to connect to port CL through the spool and to be admitted to the large diameter section of the servo piston. The delivery pressure P_1 that is constantly admitted to the small diameter section of the servo piston moves the servo piston to the right due to the area difference, resulting in decrease of the tilting angle.

When the servo piston moves to the right, point D also moves to the right. The spool is fitted with the return spring(654) and is tensioned to the left at all times, and so the pin(897) is pressed against the large hole section(C) of lever 2.

Therefore, as point D moves, the feedback lever rotates around the fulcrum of point C, and the spool is shifted to the left. This causes the opening between the sleeve(651) and spool(652) to close slowly, and the servo piston comes to a complete stop when it closes completely.

2. FUNCTION

1) ROTARY PART

When high pressurized oil enters a cylinder through port(a), which is the inlet of balance plate(1), hydraulic pressure acting on the piston causes axial force F. The pressure force F works via the piston(2) upon the return plate(3) which acts upon the swash plate(4) via an hydrostatic bearing. Force F1 perpendicular to swash plate(4) and force F2 perpendicular to cylinder center.

Being transferred to the cylinder block(5) through piston, force F2 causes rotational moment at surroundings of cylinder.

Since cylinder block has 9 equidistantly arrayed pistons, rotational torque is transmitted to cylinder shaft in order by several pistons connected to the inlet port of high pressurized oil. When the direction of oil flow is reversed, rotational direction of cylinder is also reversed. Output torque is given by the equation.

$$T = \frac{p \times q}{2}, q = Z \cdot A \cdot \text{PCD} \cdot \tan \alpha, F_1 = \frac{F}{\cos \alpha}, F_2 = F \tan \alpha, S = \text{PCD} \times \tan \alpha$$

Where p : Effective difference of pressure(kgf/cm²)

q : Displacement(cc/rev)

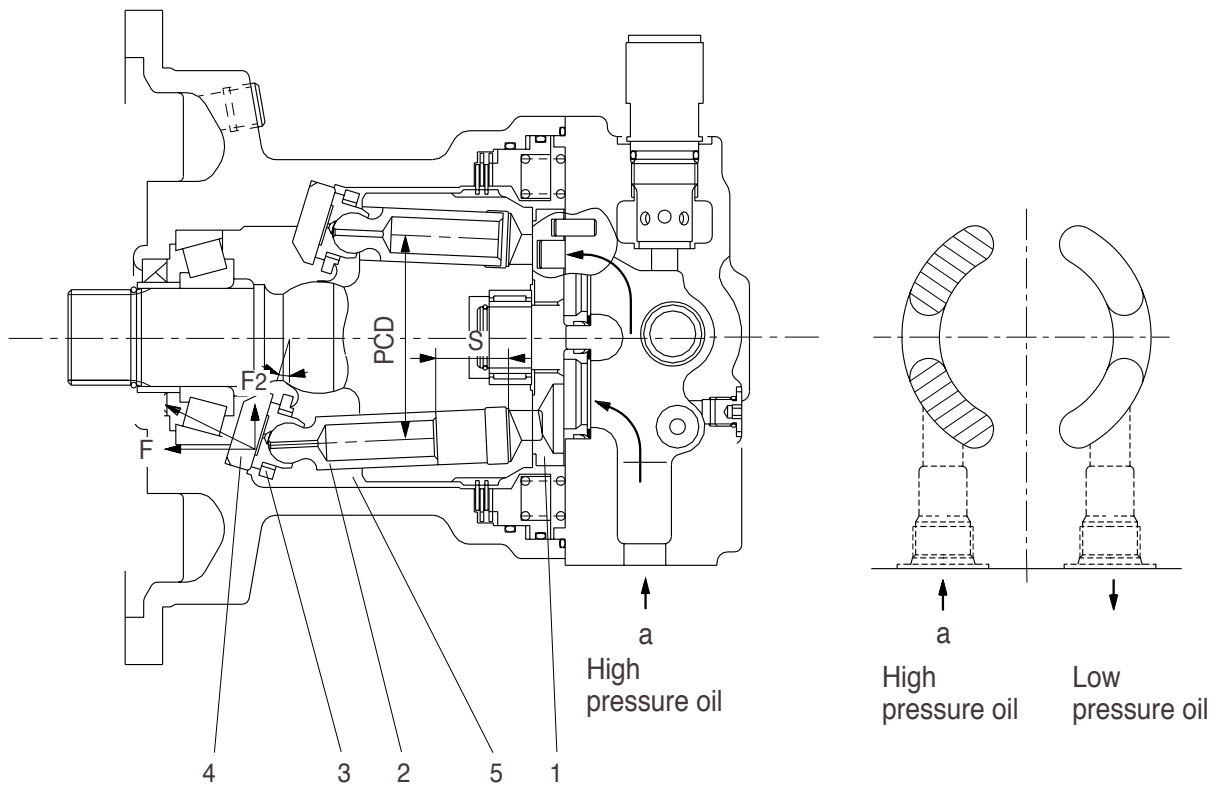
T : Output torque(kgf · cm)

Z : Piston number(9EA)

A : Piston area(cm²)

α : Tilting angle of swash plate(degree)

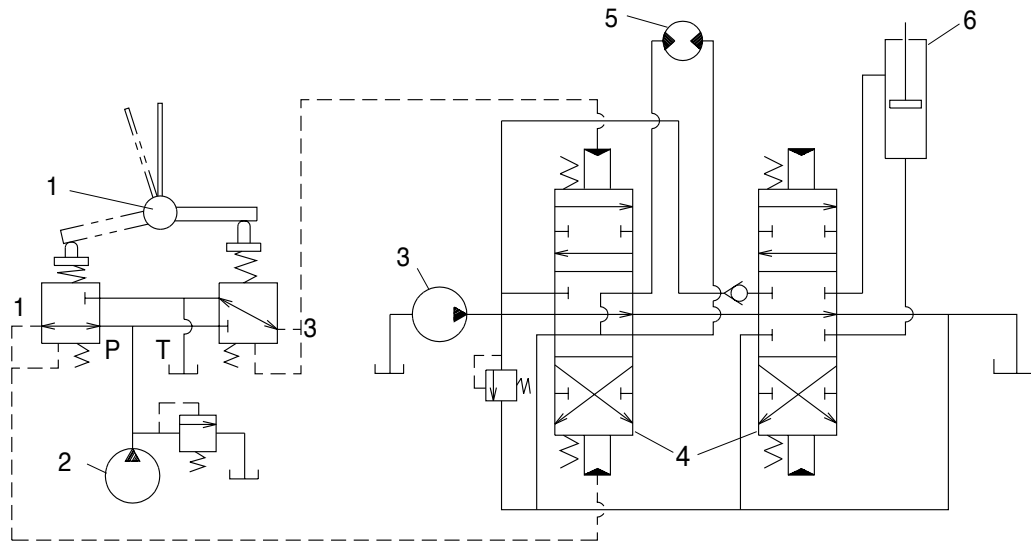
S : Piston stroke(cm)



3) OPERATION

The operation of the pilot valve will be described on the basis of the hydraulic circuit diagram shown below and the attached operation explanation drawing.

The diagram shown below is the typical application example of the pilot valve.



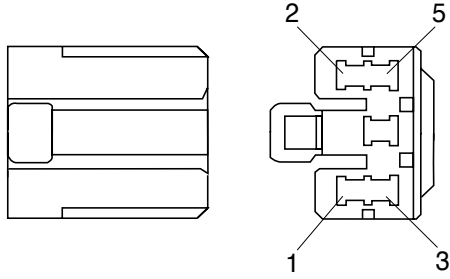
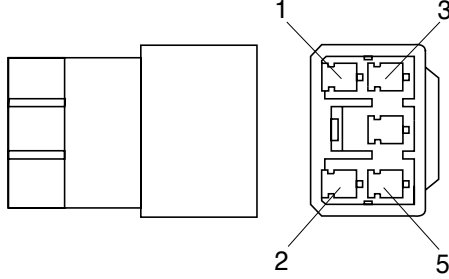
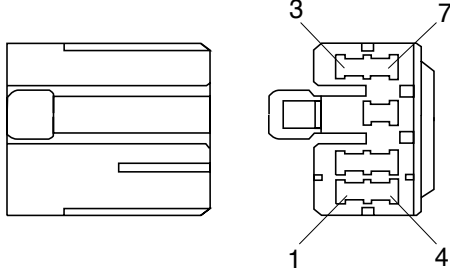
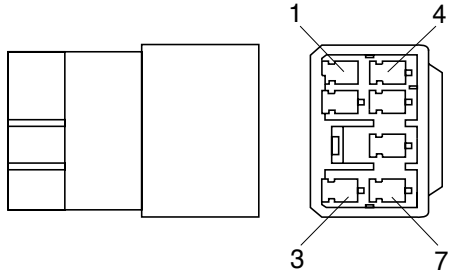
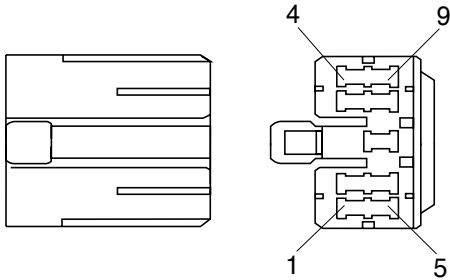
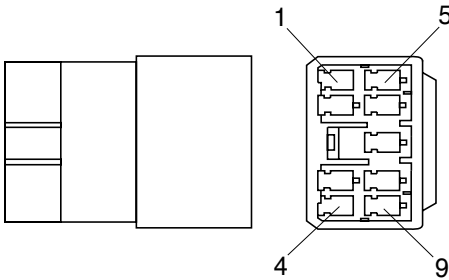
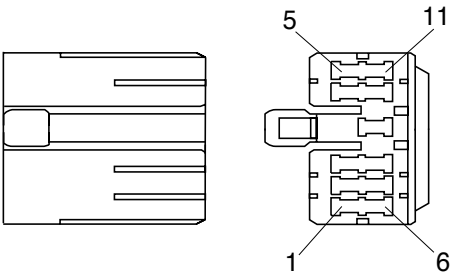
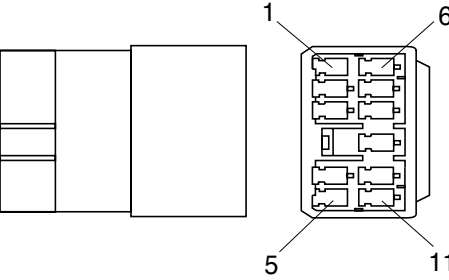
- 1 Pilot valve
- 2 Pilot pump

- 3 Main pump
- 4 Main control valve

- 5 Hydraulic motor
- 6 Hydraulic cylinder

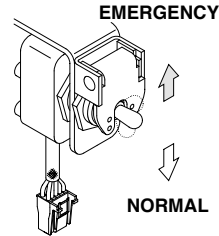
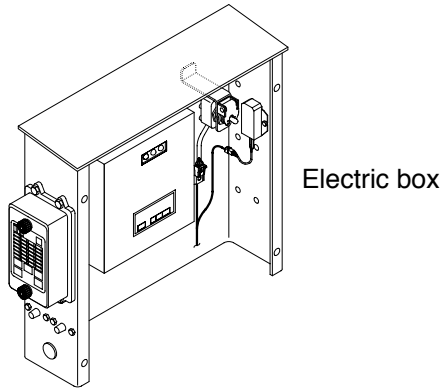
2. CONNECTION TABLE FOR CONNECTORS

1) PA TYPE CONNECTOR

No. of pin	Receptacle connector(Female)	Plug connector(Male)
5	 <p style="text-align: center;">S811-005002</p>	 <p style="text-align: center;">S811-105002</p>
7	 <p style="text-align: center;">S811-007002</p>	 <p style="text-align: center;">S811-107002</p>
9	 <p style="text-align: center;">S811-009002</p>	 <p style="text-align: center;">3S811-109002</p>
11	 <p style="text-align: center;">S811-011002</p>	 <p style="text-align: center;">S811-111002</p>

GROUP 12 PROLIX SWITCH (up to # 0179)

Is the conversion switch to manual control temporarily when the electronic control system is out of order, until repair work be done.

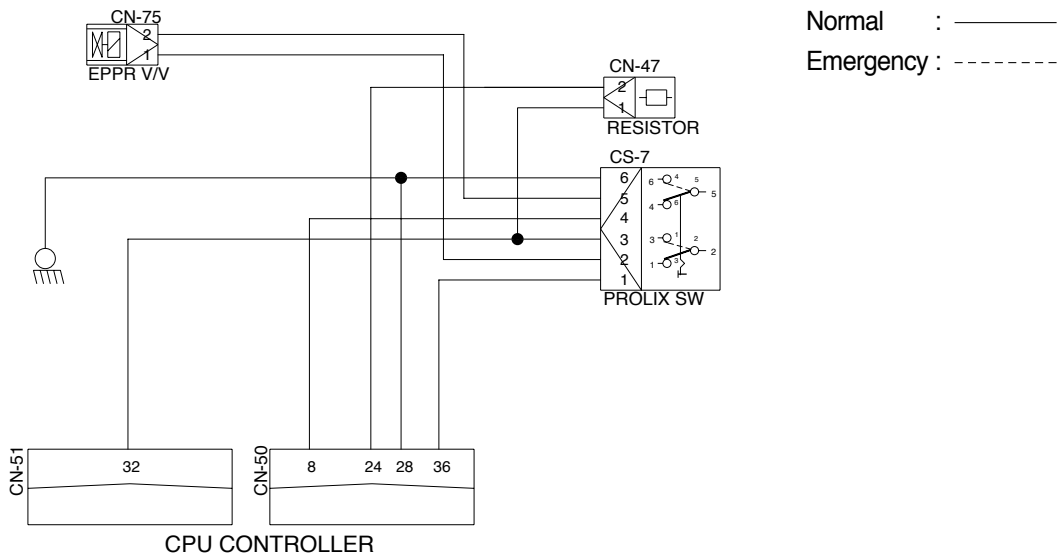


21075MS19

Never place this switch in EMERGENCY position when the CPU is in normal operation.

21075MS18

1. OPERATING PRINCIPLE WIRING DIAGRAM



21075MS17

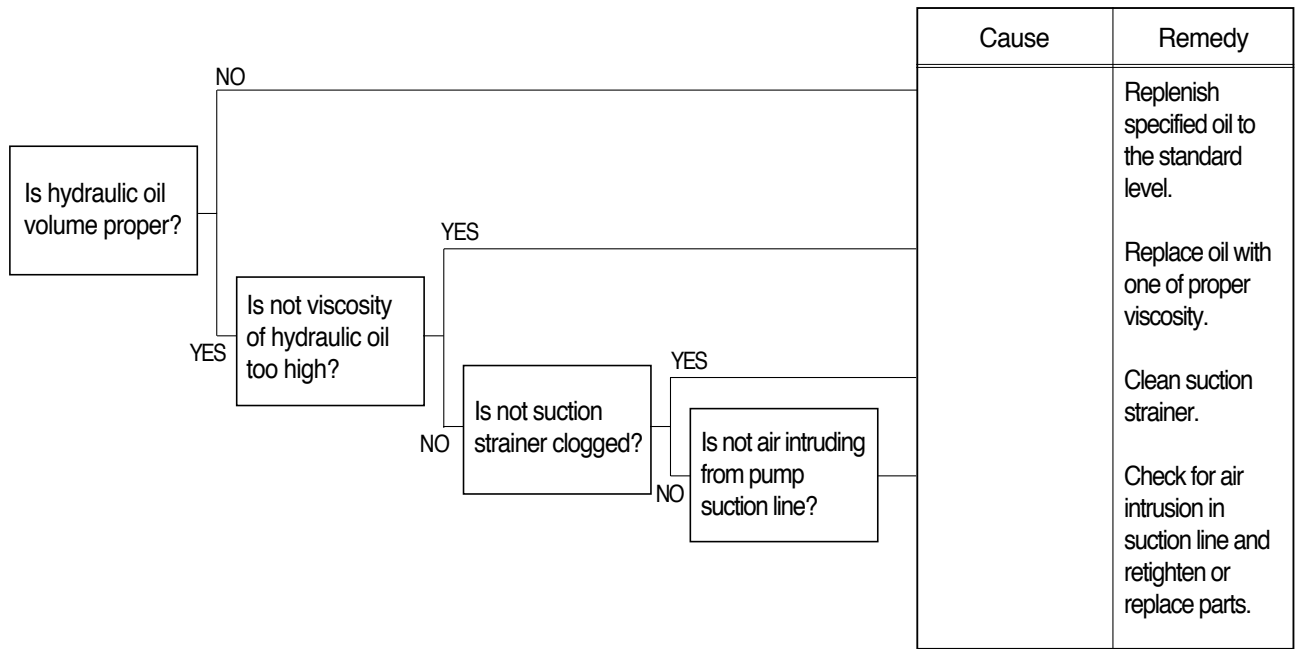
1) NORMAL POSITION

- EPPR valve supply specified amount of pilot pressure to the flow regulator of hydraulic pump and regulate hydraulic pump delivery amount depending upon the signal of CPU controller by selected mode.

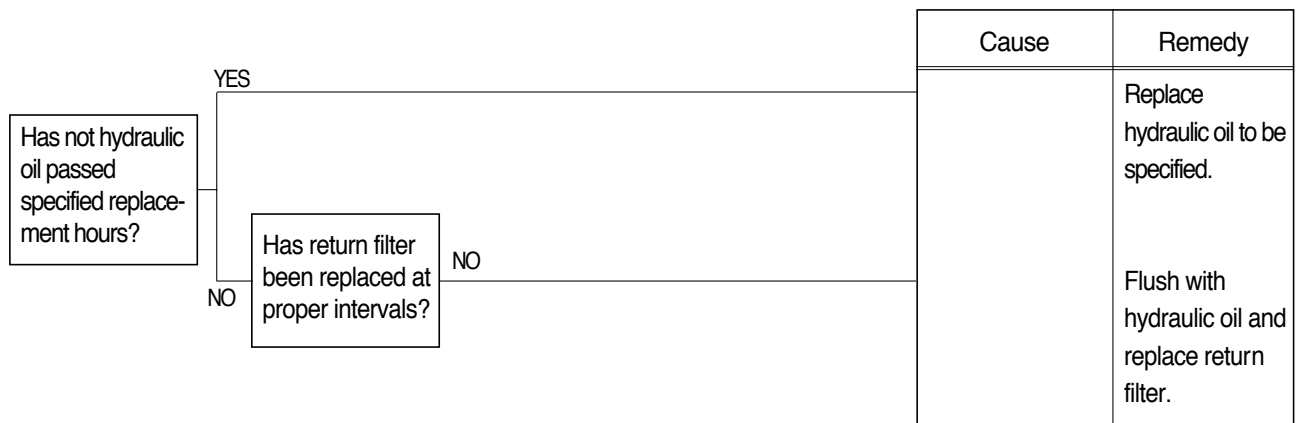
2) EMERGENCY POSITION

- If prolix switch is set at the emergency position when any abnormality occurs in NEW CAPO system, constant electric current from battery flows to EPPR valve so that EPPR valve can be fixed at the predetermined position.
- In this case excavator can be operated at an equivalent performance to S mode.

3) CAVITATION OCCURS WITH PUMP



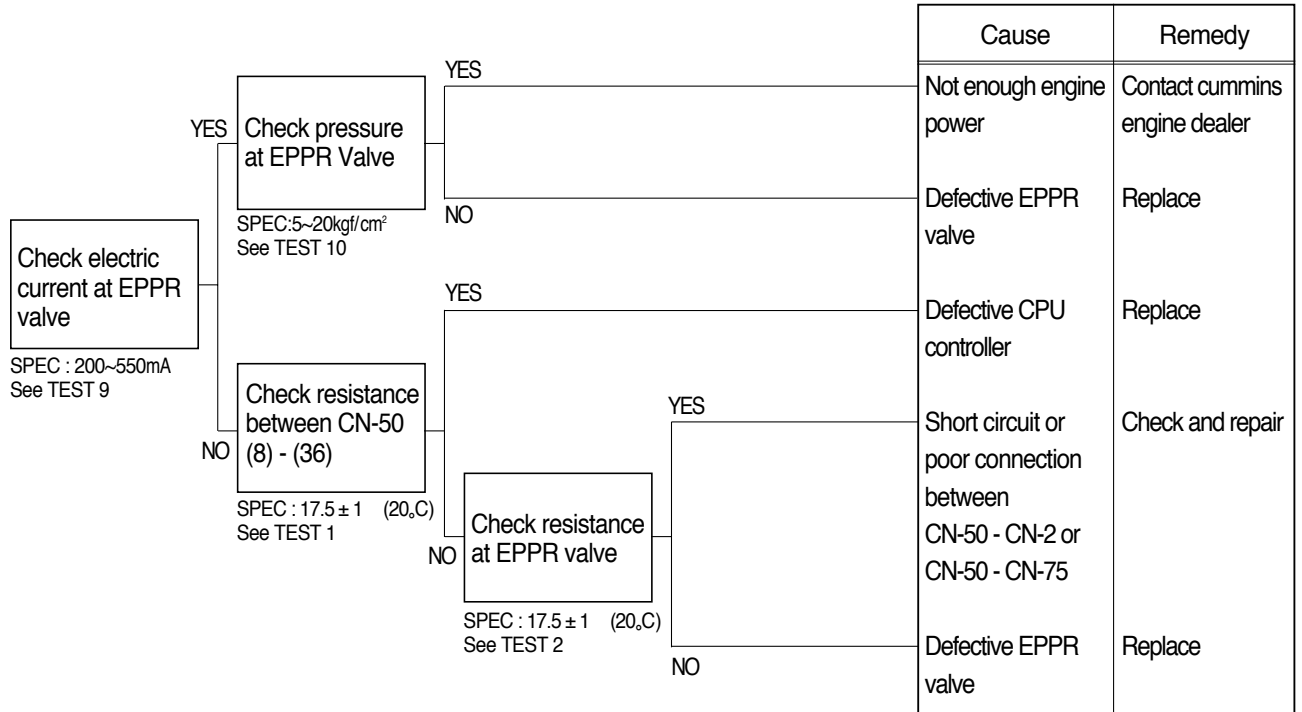
4) HYDRAULIC OIL IS CONTAMINATED



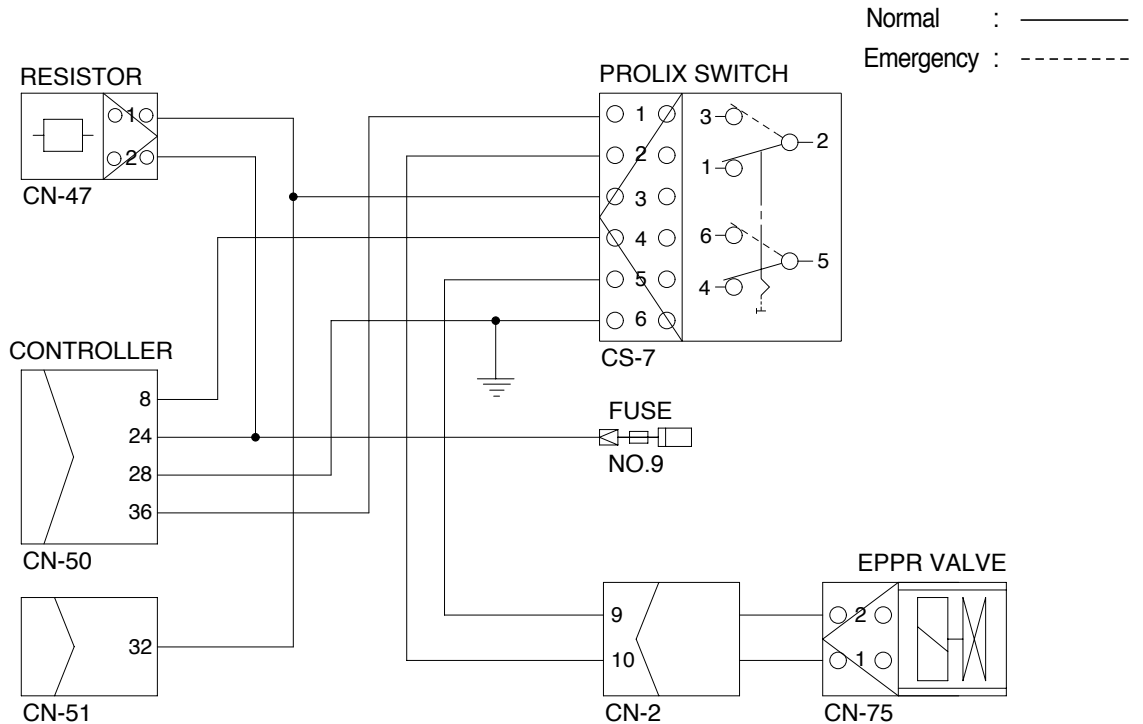
3. ENGINE STALL(up to #0179)

Before carrying out below procedure, check all the related connectors are properly inserted.

1) INSPECTION PROCEDURE




Wiring diagram



29076MS01

3. SWING DEVICE

Part name	Inspection item	Remedy
Balance plate	<ul style="list-style-type: none"> · Worn less than 0.03mm · Worn more than 0.03mm · Sliding surface has a seizure(Even through small). 	<ul style="list-style-type: none"> · Lapping · Replacement
Shoe of piston assembly	<ul style="list-style-type: none"> · Sliding surface has a damage. · Sliding surface depression() dimension less than 0.45mm or has a large damage. 	<ul style="list-style-type: none"> · Replacement · Lapping · Replace parts or motor
Piston of piston assembly	<ul style="list-style-type: none"> · Sliding surface has a seizure(Even though small). 	<ul style="list-style-type: none"> · Replace motor
Piston hole of cylinder assembly	<ul style="list-style-type: none"> · Sliding surface has a seizure. · Sliding surface has a damage. 	<ul style="list-style-type: none"> · Replace motor · Replace motor
Taper roller bearing Needle bearing Roller bearing	<ul style="list-style-type: none"> · In case 3000hour operation. · Rolling surface has a damage. 	<ul style="list-style-type: none"> · Replacement · Replacement

GROUP 3 PUMP DEVICE

1. REMOVAL AND INSTALL

1) REMOVAL

- (1) Lower the work equipment to the ground and stop the engine.
- (2) Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping
- (3) Loosen the breather slowly to release the pressure inside the hydraulic tank.

▲ Escaping fluid under pressure can penetrate the skin causing serious injury.

- (4) Loosen the drain plug under the hydraulic tank and drain the oil from the hydraulic tank.

· Hydraulic tank quantity : 180

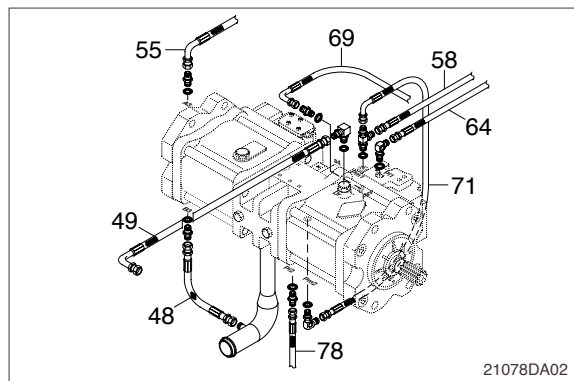
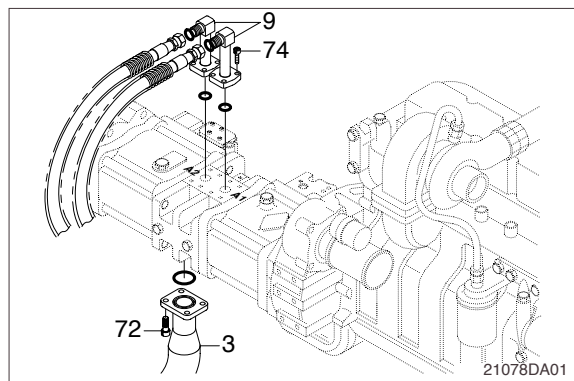
- (5) Remove socket bolts(74) and disconnect pipe(9).
- (6) Disconnect pilot line hoses(4, 5, 6, 7, 8, 9).
- (7) Remove socket bolts(72) and disconnect pump suction tube(3).

When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.

- (8) Sling the pump assembly and remove the pump mounting bolts.

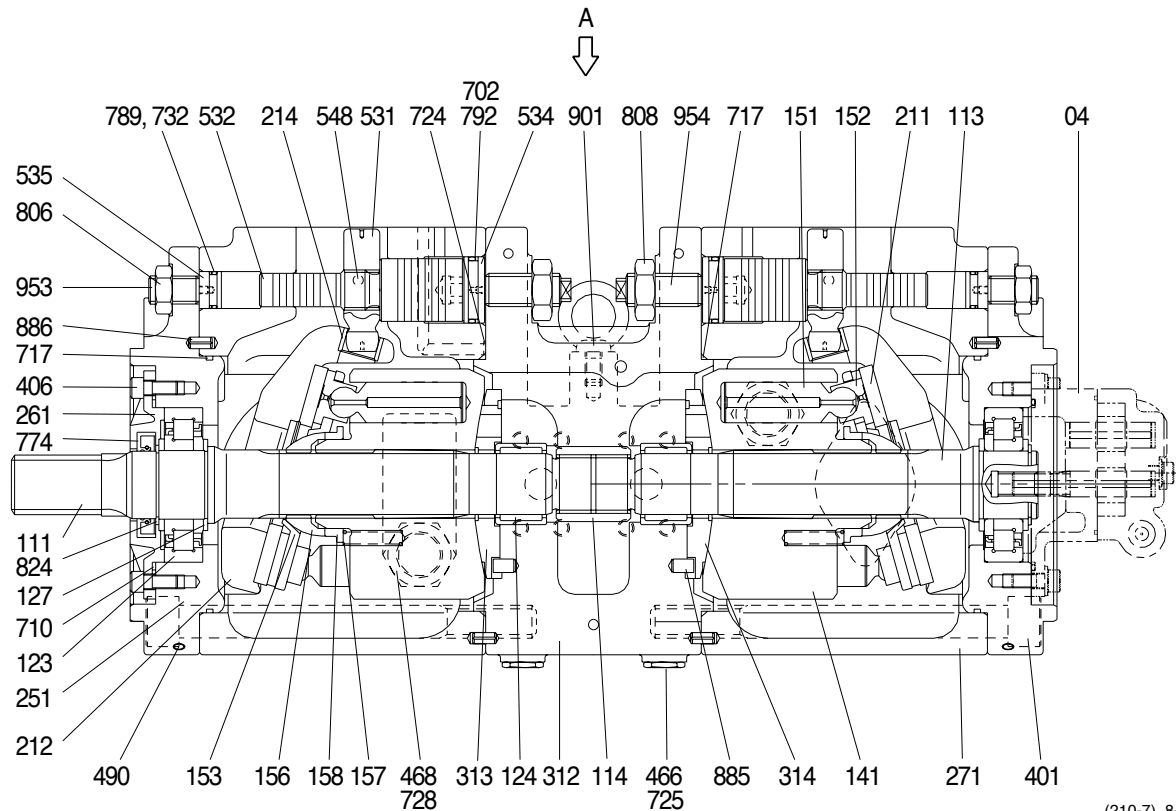
· Weight : 120kg(265lb)

Pull out the pump assembly from housing. When removing the pump assembly, check that all the hoses have been disconnected.



2. MAIN PUMP(1/2)

1) STRUCTURE

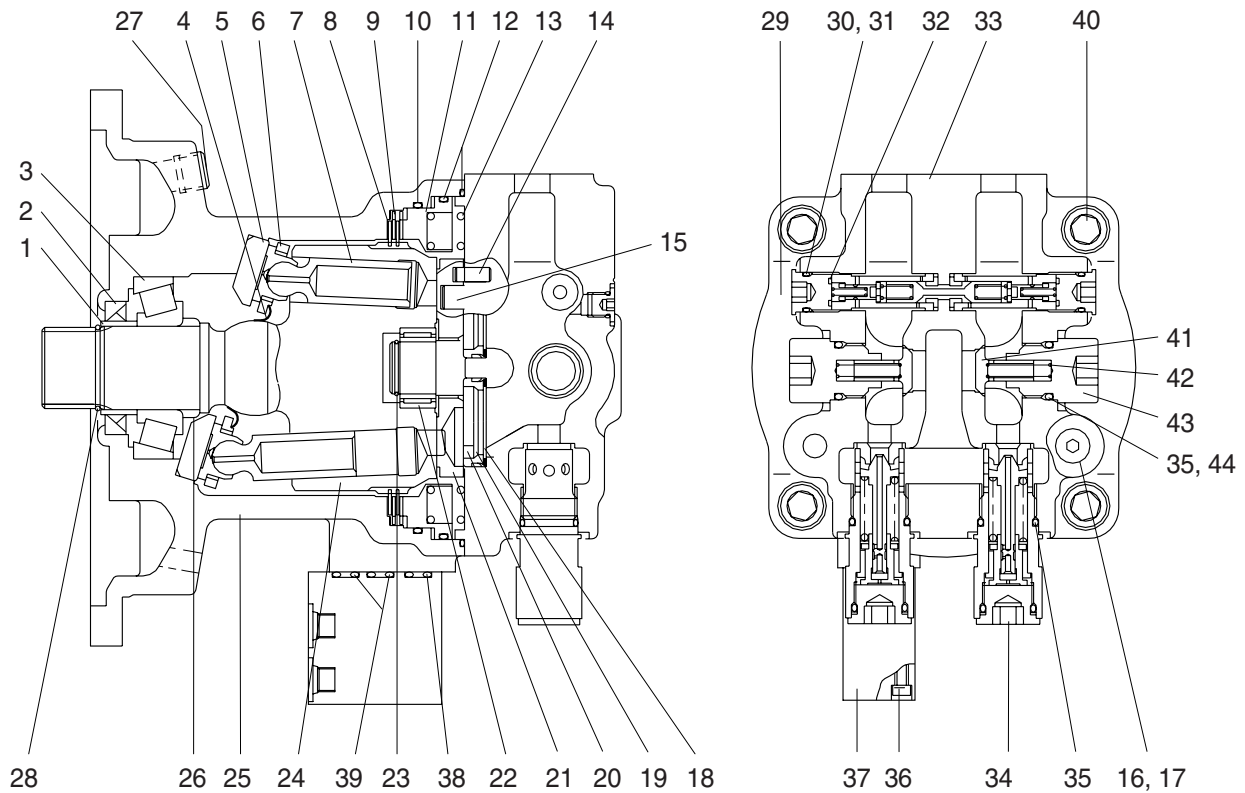


(210-7) 8-9

04	Gear pump	251	Support	710	O-ring
111	Drive shaft(F)	261	Seal cover(F)	717	O-ring
113	Drive shaft(R)	271	Pump casing	724	O-ring
114	Spline coupling	312	Valve block	725	O-ring
123	Roller bearing	313	Valve plate(R)	728	O-ring
124	Needle bearing	314	Valve plate(L)	732	O-ring
127	Bearing spacer	401	Hexagon socket bolt	774	Oil seal
141	Cylinder block	406	Hexagon socket bolt	789	Back up ring
151	Piston	466	VP Plug	792	Back up ring
152	Shoe	468	VP Plug	806	Hexagon head nut
153	Set plate	490	Plug	808	Hexagon head nut
156	Bushing	531	Tilting pin	824	Snap ring
157	Cylinder spring	532	Servo piston	885	Pin
158	Spacer	534	Stopper(L)	886	Spring pin
211	Shoe plate	535	Stopper(S)	901	Eye bolt
212	Swash plate	548	Pin	953	Set screw
214	Bushing	702	O-ring	954	Set screw

2. DISASSEMBLY AND ASSEMBLY OF SWING MOTOR

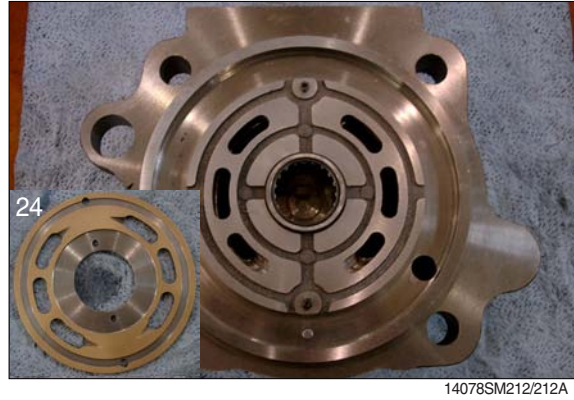
1) STRUCTURE



21072SF04

- | | | | | | |
|----|----------------------|----|-----------------------|----|---------------------|
| 1 | Inner ring | 16 | Cap | 31 | O-ring |
| 2 | Oil seal | 17 | O-ring | 32 | O-ring |
| 3 | Taper roller bearing | 18 | Coned disc spring | 33 | Cover |
| 4 | Backing spring | 19 | Teflon ring | 34 | Relief assembly |
| 5 | Cam plate | 20 | Bushing | 35 | O-ring |
| 6 | Return plate | 21 | Balance plate | 36 | Hexagon socket bolt |
| 7 | Piston assembly | 22 | Needle bearing | 37 | Time delay valve |
| 8 | Lining plate | 23 | Snap ring | 38 | O-ring |
| 9 | Plate | 24 | Cylinder | 39 | O-ring |
| 10 | O-ring | 25 | Housing | 40 | Hexagon socket bolt |
| 11 | Piston | 26 | Collar | 41 | Check |
| 12 | O-ring | 27 | Plug | 42 | Spring |
| 13 | Spring | 28 | Snap ring | 43 | Cap |
| 14 | Parallel pin | 29 | Bypass valve assembly | 44 | Back up ring |
| 15 | Piston | 30 | Back up ring | | |

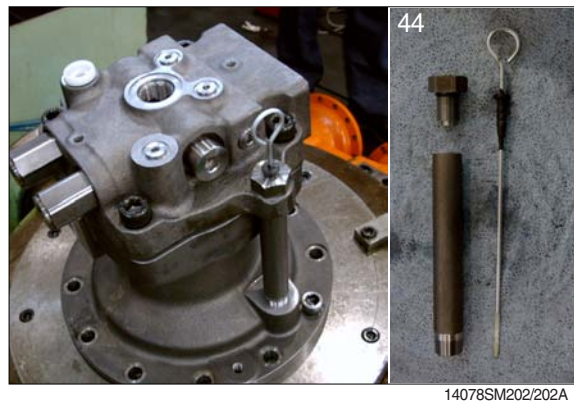
- ⑦ Spreading grease on valve plate(24),
assemble into rear cover(21).
· Valve plate × 1EA



- ⑧ Lift up rear cover assy on body(1) by a crane and assemble it with a wrench bolt(27).



- ⑨ Assemble level gauge(44) into body(1).



- ⑩ Assemble time delay valve assy(35) into rear cover(21) with a wrench bolt(36).

