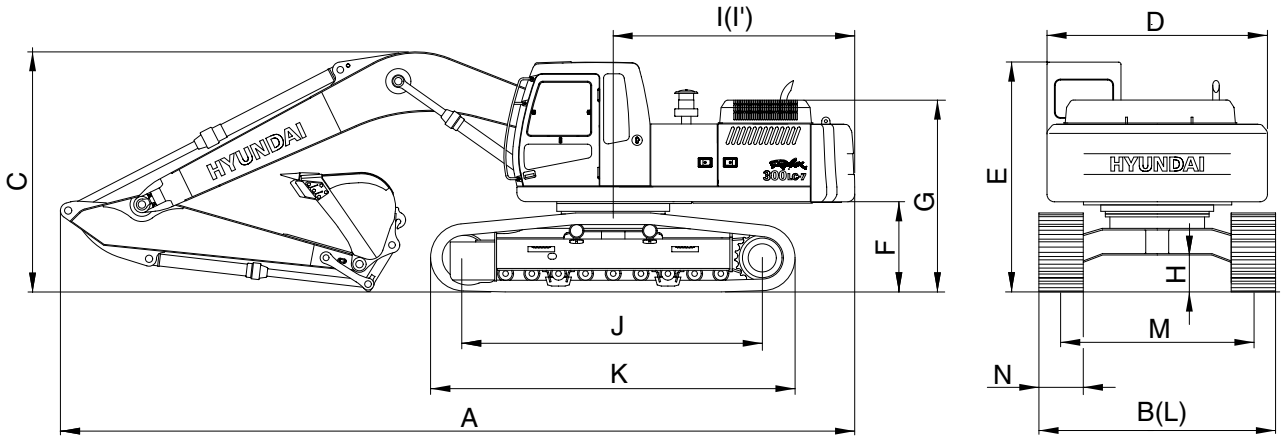
CONTENTS

SECTION 1 GENERAL

2. SPECIFICATIONS

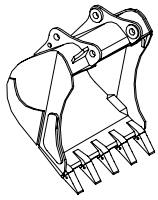
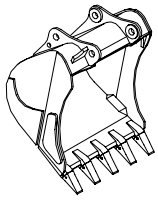
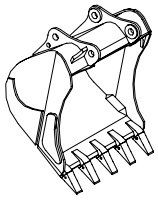
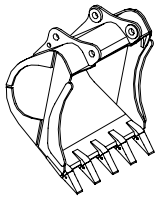
1) 6.25m (20' 6") BOOM, 2.50m (8' 2") ARM



30072SP01

Description		Unit	Specification
Operating weight		kg(lb)	29600(65300)
Bucket capacity(SAE heaped), rock bucket		$m^3(yd^3)$	1.16(1.52)
Overall length	A	mm(ft-in)	10800(35' 5")
Overall width, with 600mm shoe	B		3200(10' 6")
Overall height	C		3470(11' 7")
Superstructure width	D		2980(9' 9")
Overall height of cab	E		3010(9' 11")
Ground clearance of counterweight	F		1190(3' 11")
Engine cover height	G		3190(10' 6")
Minimum ground clearance	H		500(1' 8")
Rear-end distance	I		3270(10' 9")
Rear-end swing radius	I'		3350(11' 0")
Distance between tumblers	J		4030(13' 3")
Undercarriage length	K		4940(16' 2")
Undercarriage width	L		3200(10' 6")
Track gauge	M		2600(8' 6")
Track shoe width, standard	N		600(24")
Travel speed(Low/high)		km/hr(mph)	3.1/5.4(1.9/3.4)
Swing speed		rpm	11.0
Gradeability		Degree(%)	35(70)
Ground pressure(600mm shoe)		$kgf/cm^2(psi)$	0.57(8.11)

2) ROCK AND HEAVY DUTY BUCKET, CASTING BUCKET

			
◈1.07m³ SAE ◈1.15m³ SAE heaped bucket	◈1.27m³ SAE heaped bucket	★1.27m³ SAE ◈1.46m³ SAE heaped bucket	※ ⊙1.16m³ SAE ⊙1.49m³ SAE heaped bucket

Capacity		Width		Weight	Recommendation			
					6.25m (20' 6") boom			
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.1m arm (6' 11")	2.5m arm (8' 2")	3.05m arm (10' 0")	3.75m arm (12' 4")
◈1.07m³ (1.40yd³)	0.95m³ (1.24yd³)	1150mm (45.3")	-	1120kg (2470lb)				
◈1.15m³ (1.50yd³)	1.00m³ (1.31yd³)	1210mm (47.6")	-	1160kg (2560lb)				
◈1.27m³ (1.66yd³)	1.10m³ (1.44yd³)	1310mm (51.6")	-	1240kg (2730lb)				
◈1.46m³ (1.91yd³)	1.28m³ (1.67yd³)	1460mm (57.5")	-	1320kg (2910lb)				
※ ⊙1.16m³ (1.52yd³)	1.00m³ (1.31yd³)	1340mm (52.8")	-	1280kg (2820lb)				
⊙1.49m³ (1.95yd³)	1.28m³ (1.67yd³)	1620mm (63.8")	-	1440kg (3170lb)				
★1.27m³ (1.66yd³)	1.10m³ (1.44yd³)	1290mm (50.8")	1305mm (51.4")	1270kg (2800lb)				

※ : Standard bucket

◈ : Heavy duty bucket

⊙ : Rock bucket

★ : Casting bucket

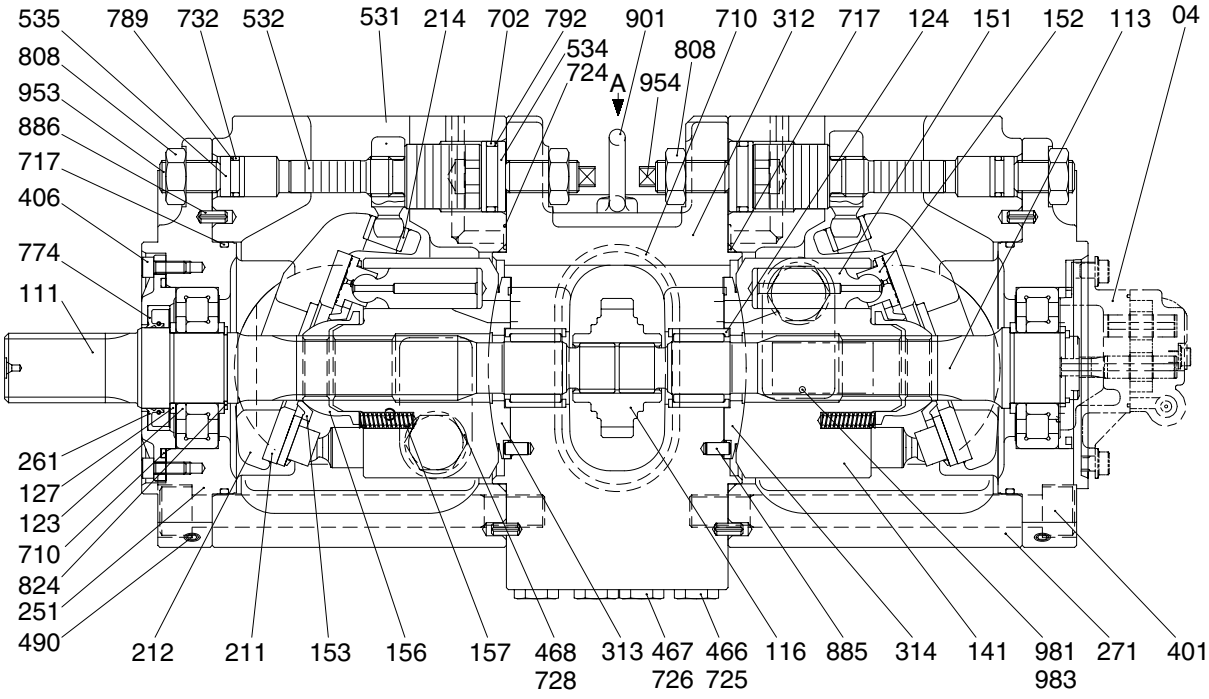
Applicable for materials with density of 2000kgf/m³ (3370lbf/yd³) or less

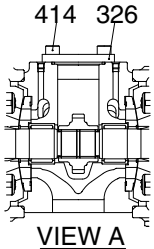
Applicable for materials with density of 1600kgf/m³ (2700lbf/yd³) or less

Applicable for materials with density of 1100kgf/m³ (1850lbf/yd³) or less

1) MAIN PUMP(1/2)

The main pump consists of two piston pumps(front & rear) and valve block.





VIEW A

30072MP02

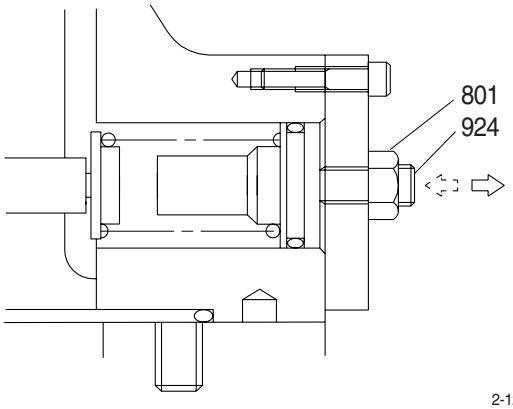
04	Gear pump	312	Valve block	724	O-ring
111	Drive shaft(F)	313	Valve plate(R)	725	O-ring
113	Drive shaft(R)	314	Valve plate(L)	728	O-ring
116	Gear	326	Cover	732	O-ring
123	Roller bearing	401	Hexagon socket bolt	774	Oil seal
124	Needle bearing	406	Hexagon socket bolt	789	Back up ring
127	Bearing spacer	414	Hexagon socket bolt	792	Back up ring
141	Cylinder block	466	VP plug	806	Hexagon head nut
151	Piston	467	VP plug	808	Hexagon head nut
152	Shoe	468	VP plug	824	Snap ring
153	Set plate	490	VP plug	885	Pin
156	Bushing	531	Tilting pin	886	Spring pin
157	Cylinder spring	532	Servo piston	901	Eye bolt
211	Shoe plate	534	Stopper(L)	953	Set screw
212	Swash plate	535	Stopper(S)	954	Set screw
214	Bushing	548	Pin	981	Name plate
251	Swash plate support	702	O-ring	983	Pin
261	Seal cover(F)	710	O-ring		
271	Pump casing	717	O-ring		

③ Adjustment of flow control characteristic

The flow control characteristic can be adjusted with the adjusting screw.

Adjust it by loosening the hexagon nut (801) and by tightening(or loosening) the hexagonal socket head screw(924).

Tightening the screw shifts the control chart to the right as shown in the figure.



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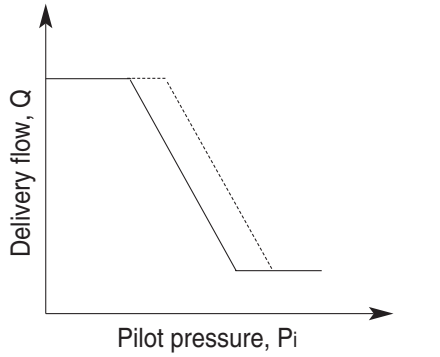
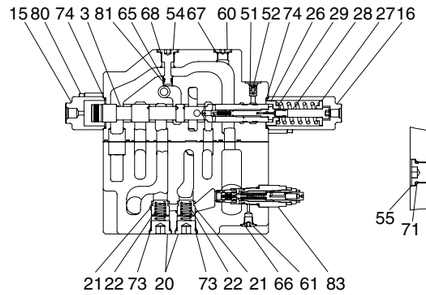
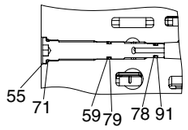
※ **Adjusting values are shown in table.**

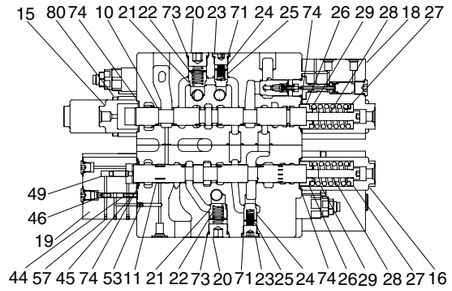
Speed	Adjustment of flow control characteristic		
	Tightening amount of adjusting screw(924)	Flow control starting pressure change amount	Flow change amount
(min $^{-1}$)	(Turn)	(kgf/cm^2)	(ℓ /min)
1900	+1/4	+2.0	+15.4

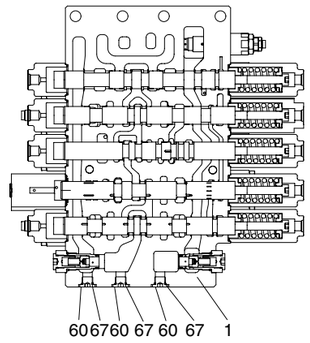




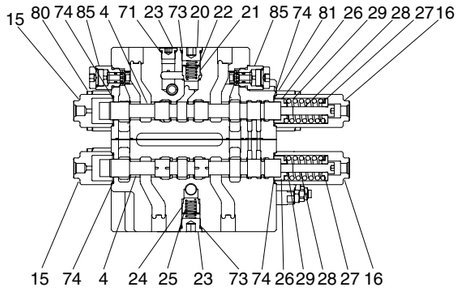
A-A (STRAIGHT-TRAVEL & SUPPLY)



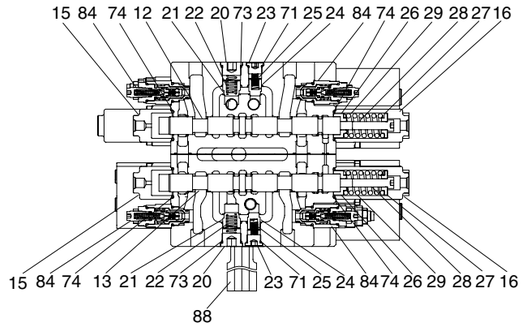




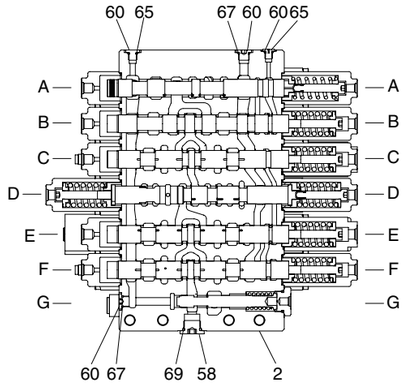
P1 BLOCK SPOOL SECTION



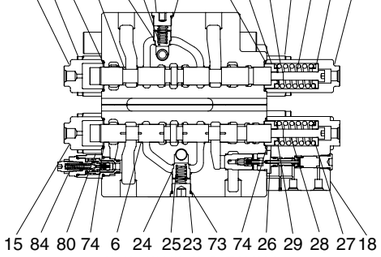
B-B (TRAVEL RIGHT& LEFT)



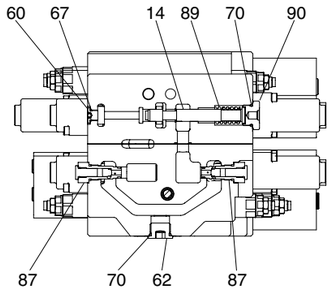
F-F (OPTION & BUCKET)



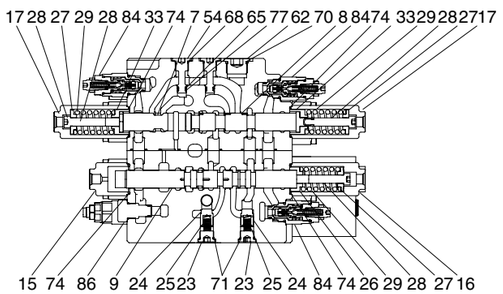
P2 BLOCK SPOOL SECTION



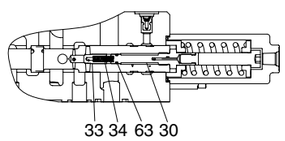
C-C (SWING & BOOM)



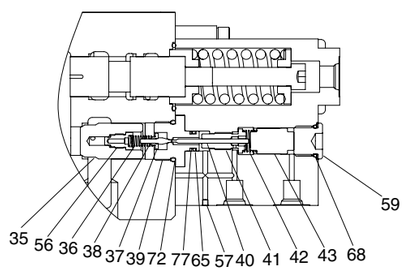
G-G (CENTER BYPASS CUT-OFF & NEGATIVE CONTROL)



D-D (SWING PRIORITY & BOO2 & ARM2)



STRAIGHT-TRAVEL SPOOL DETAIL



DETAIL OF LOCK VALVE (BOOM & ARM)

300072MCV02

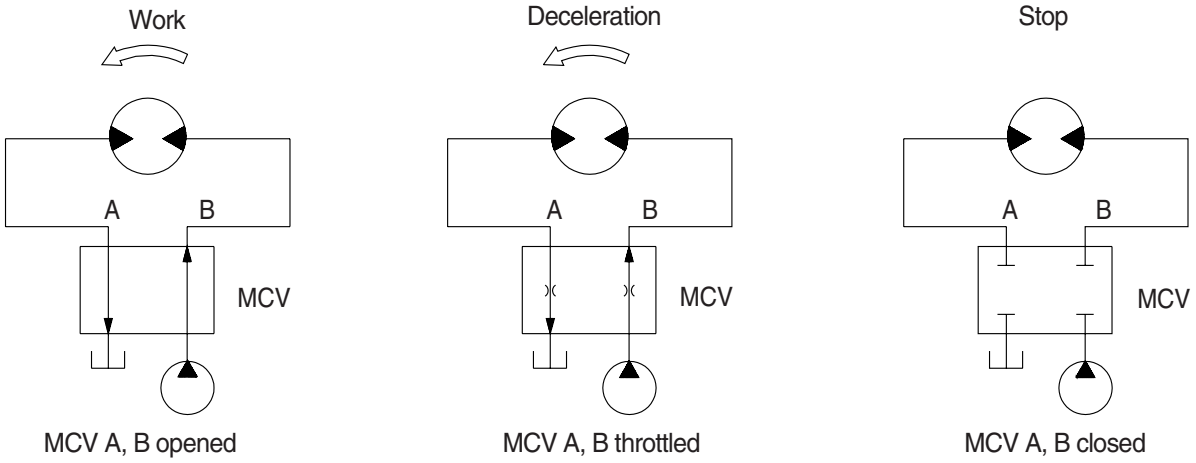
1 Body(P1)
2 Body(P2)
3 Spool-travel straight
4 Spool-travel
5 Spool-swing
6 Spool-boom
7 Spool-swing priority
8 Spool-boom 2
9 Spool-arm 2
10 Spool-arm
11 Spool-arm regeneration
12 Spool-bucket
13 Spool-option
14 Spool-bypass cut
15 Cover-pilot A
16 Cover-pilot B1
17 Cover-pilot B2
18 Block-holding
19 Block-regeneration
20 Plug
21 Poppet 1-check valve
22 Spring-check valve
23 Plug
24 Poppet 2-check valve
25 Spring-check valve
26 Spring seat 1
27 Spring seat 2
28 Spacer bolt
29 Spring-return(L)
30 Stopper 1-TS
31 Stopper 2-priority
32 Spring seat 3
33 Poppet-check valve TS
34 Spring-check valve TS
35 Poppet-lock valve
36 Spring-lock valve pilot
37 Guide poppet
38 Poppet-pilot
39 Seat-poppet
40 Piston 1
41 Guide-piston
42 Spring 1-lock valve
43 Piston 2
44 Spool-regen selector
45 Spring-regeneration
46 Stopper-regeneration
47 Piston-cut off
48 Poppet-signal
49 Spring-signal
50 Plug
51 Orifice-signal
52 Coin type filter
53 Orifice-plug
54 Plug
55 Plug
56 Restrictor-lock valve
57 Plug
58 Plug
59 Plug
60 Plug
61 Plug
62 Plug
63 O-ring
64 O-ring
65 O-ring
66 O-ring
67 O-ring
68 O-ring
69 O-ring
70 O-ring
71 O-ring
72 O-ring
73 O-ring
74 O-ring
75 Back-up ring
76 Back-up ring
77 Back-up ring
78 Socket head bolt with washer
79 Socket head bolt with washer
80 Socket head bolt with washer
81 Main relief valve
82 Overload relief valve
83 Plug-relief valve
84 Plug-relief valve
85 Negative control valve
86 Socket head bolt with washer
87 Socket head bolt with washer
88 Nipple-check valve
89 Spring-bypass cut spool
90 Plug-bypass cut spool
91 Backup ring

4) BRAKE SYSTEM

(1) Control valve swing brake system

This is the brake system to stop the swing motion of the excavator during operation.

In this system, the hydraulic circuit is throttled by the swing control valve, and the resistance created by this throttling works as a brake force to slow down the swing motion.



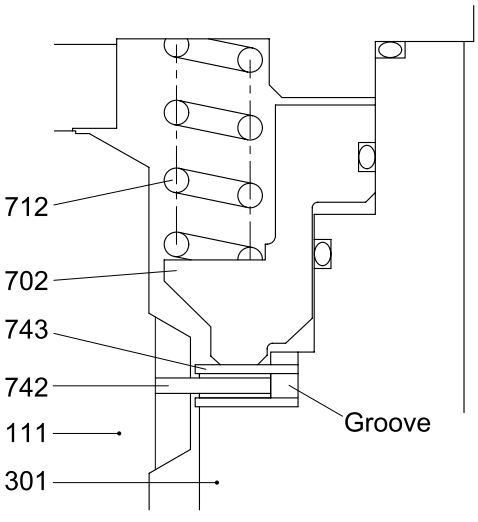
(2) Mechanical swing parking brake system

The mechanical swing parking brake system is installed to prevent the upper structure from swinging downhill because of its own weight when the excavator is parked on a slope since it completely eliminates the hydraulic drift of swing motion while the excavator is on a slop, work can be done more easily and safely.

① Brake assembly

Circumferential rotation of separate plate(743) is constrained by the groove located at casing(301). When housing is pressed down by brake spring(712) through lining plate(742), separate plate(743) and brake piston(702), friction force occurs there.

Cylinder(111) is constrained by this friction force and brake acts, while brake releases when hydraulic force exceeds spring force.



30572SM03

111	Cylinder	712	Brake spring
301	Casing	742	Lining plate
702	Brake piston	743	Separate plate

(2) External pilot pressure : Pi $\geq$ 20kgf/cm^2(small displacement)

If the force operating on spool(64) of the displacement changeover valve is stronger than the spring(68), and the spool moves to the left side.

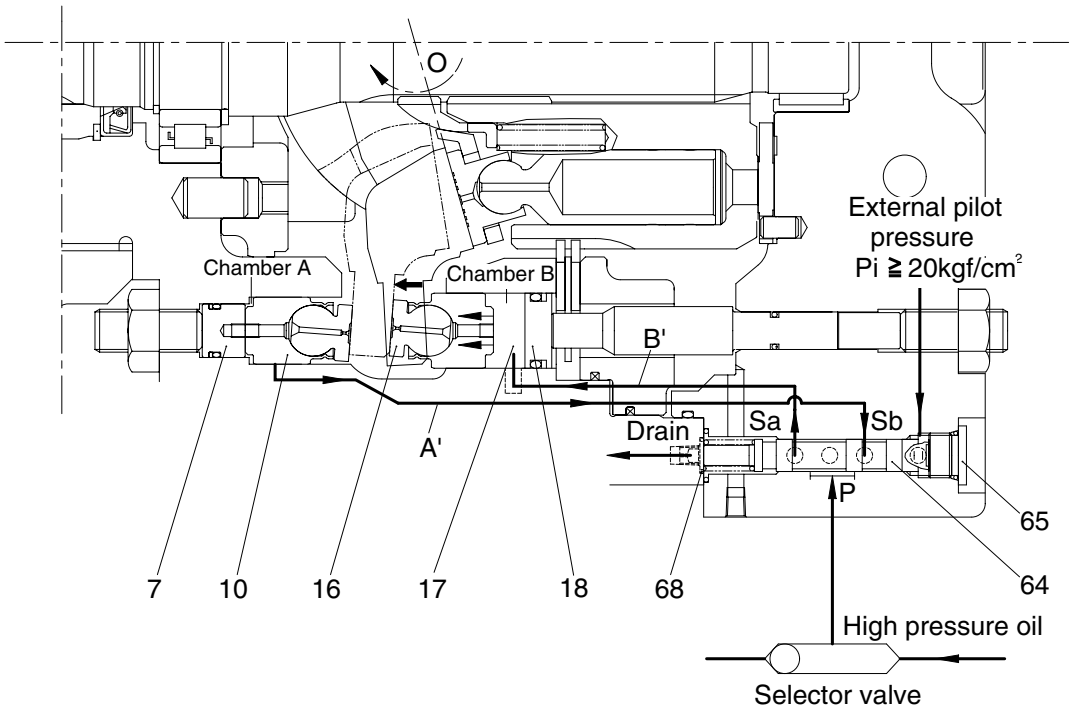
The high pressure oil is works on room B through passage Sa → B' from port P.

The oil in chamber A flows into the drain line through the passage A' → Sb.

The displacement changeover piston(17) is pushed left and the swash plate(16) moves in the arrowed direction around rotation center 'O'. The swash plate moves until it touches stopper(7), and then is fixed there.

If the load increase while the motor is working with its small displacement(Pi $\geq$ 20kgf/cm^2, 2nd speed) until the motor inlet port pressure reaches the preset value, the motor increase its displacement in response to the load, while maintaining the pressure at the preset value(automatic 2 -speed function). As motor inlet port pressure reaches the preset value and then spool(64) moves right side, inlet pressure oil flows into chamber A through port Sb and the swash plate moves until it touches stopper(17). If the load further increase until the displacement of the motor reaches the maximum value, the inlet port pressure increase further.

If the load decreases under this condition, the motor continues reducing its displacement in the reverse sequence. As the load and inlet port pressure decreases and reaches the preset value, spool(64) moves left side by the pilot pressure(Pi). Therefore inlet port pressure flow into chamber B through port Sa and the swash plate moves until it touches stopper(10).



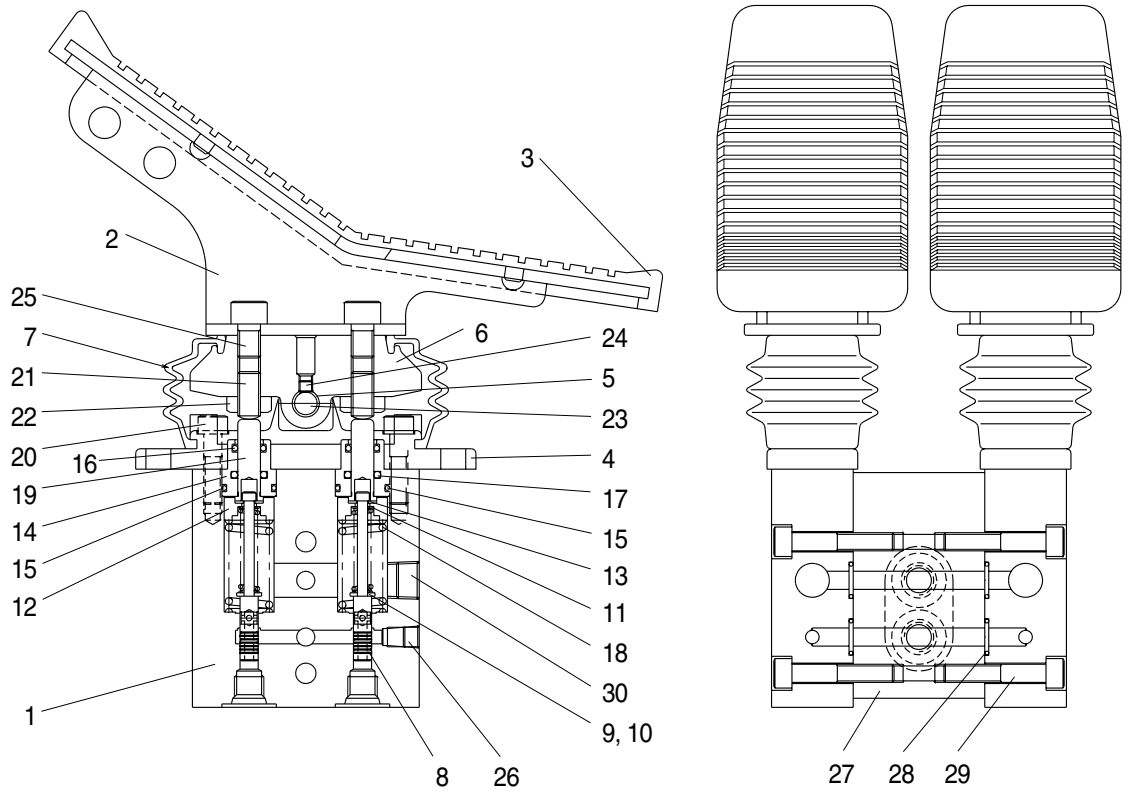
2907A2TM06

CROSS SECTION

The construction of the RCV pedal is shown in the below drawing. The casing has vertical holes in which reducing valves are assembled.

The pressure reducing section is composed of the spool(8), spring(11) for setting secondary pressure, return spring(18), stopper(13), spring seat(12) and shim(9). The spring for setting the secondary pressure has been generally so preset that the secondary pressure is 5 to 19 kgf/cm^2 (depending on the type). The spool is pushed against the push rod(19) by the return spring.

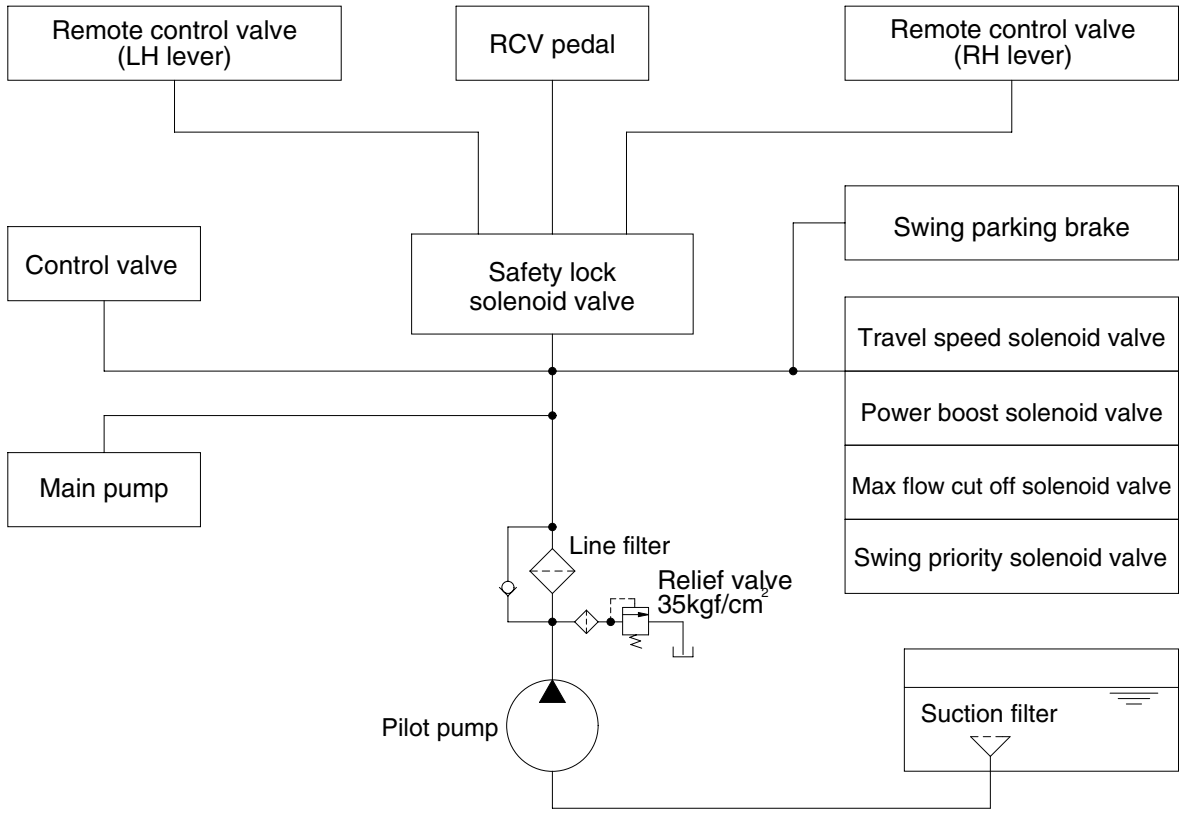
When the push rod is pushed down by tilting pedal, the spring seat comes down simultaneously and changes setting of the secondary pressure spring.



2-74

1	Casing	11	Spring	21	Set screw
2	Pedal	12	Spring seat	22	Nut
3	Pedal cover	13	Stopper	23	Cam shaft
4	Cover	14	Plug	24	Set screw
5	Bushing	15	O-ring	25	Hexagon socket bolt
6	Cam	16	Dust seal	26	Plug
7	Bellows	17	Rod seal	27	Spacer
8	Spool	18	Spring	28	O-ring
9	Shim	19	Push rod	29	Hexagon socket bolt
10	Spring seat	20	Hexagon socket bolt	30	Plug

GROUP 3 PILOT CIRCUIT

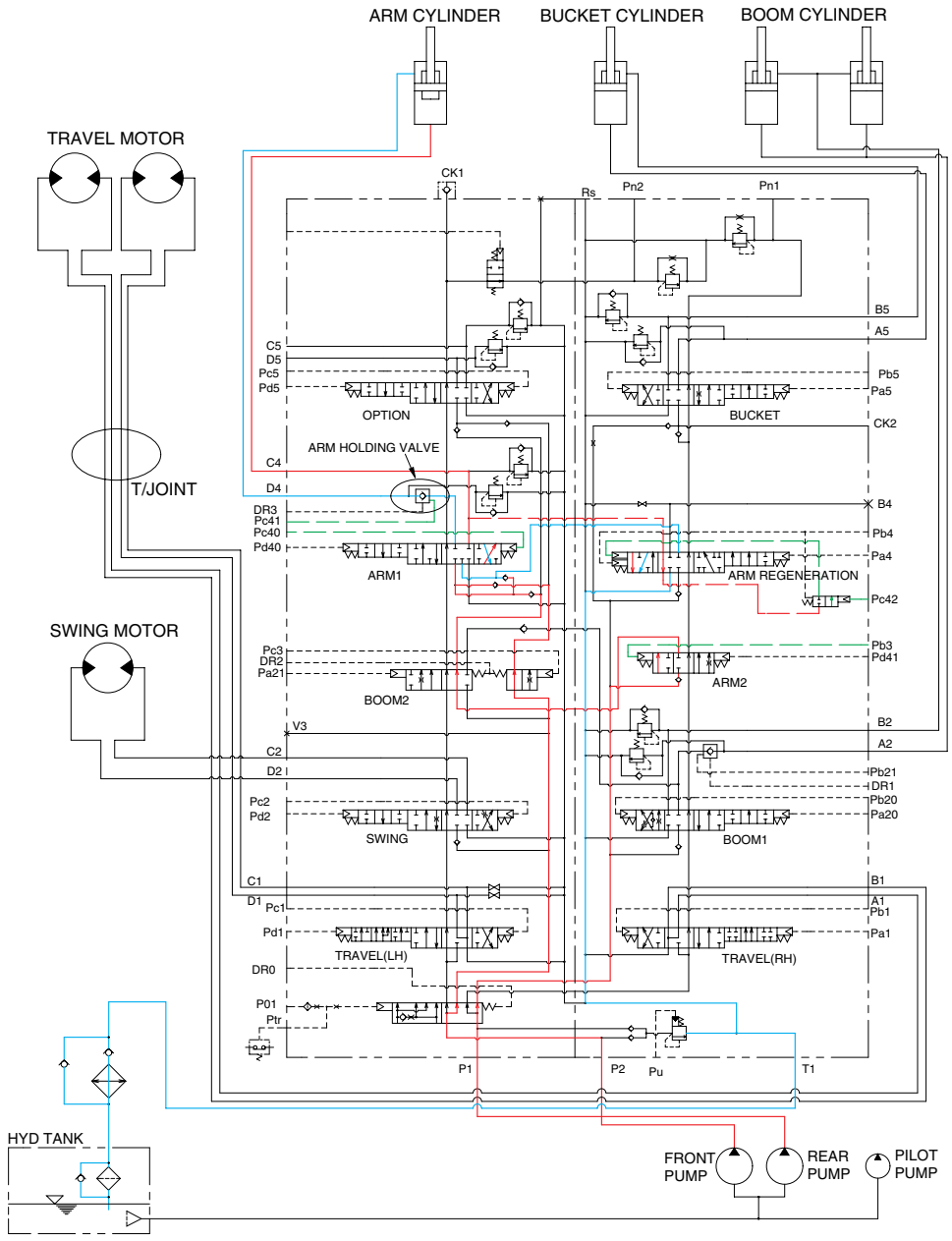


The pilot circuit consists of suction circuit, delivery circuit and return circuit.

The pilot pump is provided with relief valve, receives the oil from the hydraulic tank through the suction filter.

The discharged oil from the pilot pump flows to the remote control valve through line filter, EPPR valve, solenoid valve assemblies, swing parking brake, main control valve and safety lock solenoid valve.

3. ARM ROLL IN OPERATION



2907A3HC12

When the LH control lever is pulled back, the arm spools in the main control valve are moved to the roll in position by the pilot oil pressure from the remote control valve.

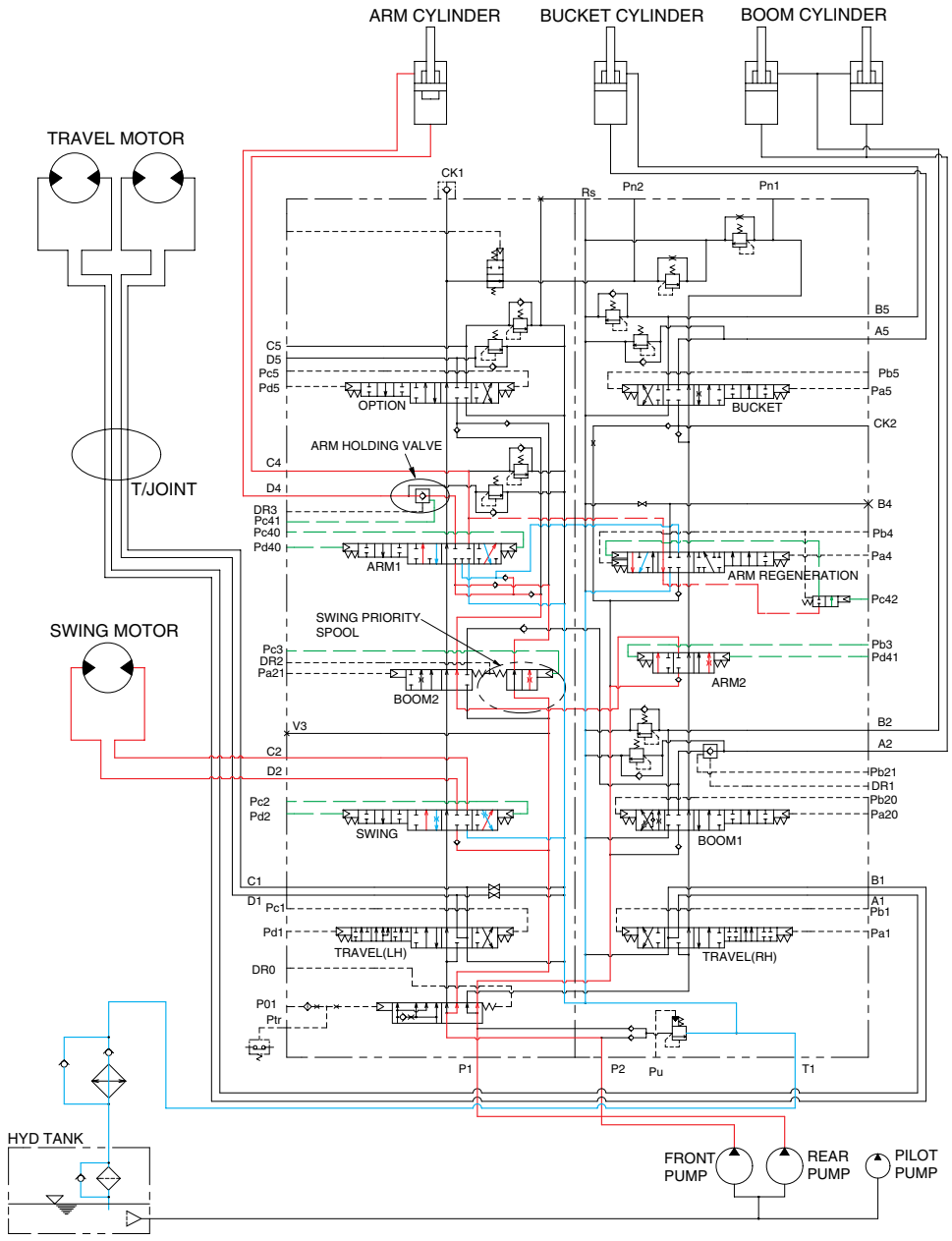
The oil from the front and rear pump flows into the main control valve and then goes to the large chamber of arm cylinder.

At the same time, the oil from the small chamber of arm cylinder returns to the hydraulic oil tank through the arm spool in the main control valve. When this happens, the arm roll in.

When the roll in speed of arm is faster, the oil returned from the small chamber of arm cylinder combines with the oil from both pump, and flows into the large chamber of the arm cylinder by a make up valve.

The excessive pressure in the arm cylinder bottom end circuit is prevented by relief valve.

3. COMBINED SWING AND ARM OPERATION



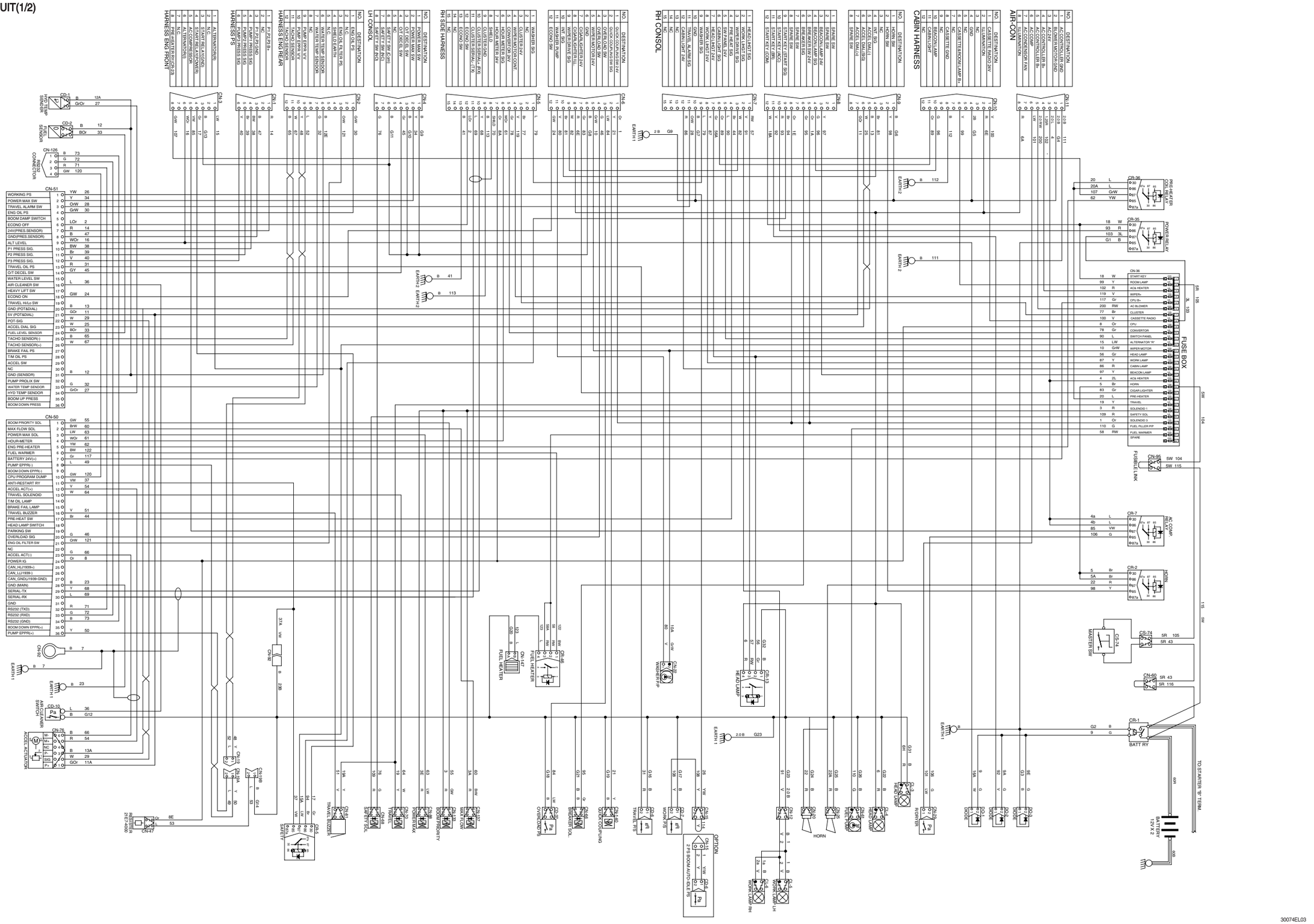
2907A3HC22

When the swing and arm functions are operated, simultaneously the swing spool and arm spools changed. The oil flows from the front pump through arm1 and swing section of the main control valve to arm cylinder and swing motor, and the arm and swing functions.

At the same time, the pressure in the arm circuit can be high while the swing pressure is low, therefore the oil flows from front pump to arm cylinder is reduced by swing priority spool.

Refer to page 3-12 for swing priority function.

• ELECTRICAL CIRCUIT(1/2)



5. BEACON LAMP AND CAB LIGHT CIRCUIT

1) OPERATING FLOW

Fuse box (No.17) → I/conn 〔CN-8(3)〕 → Beacon lamp switch 〔CN-23(6)〕
Fuse box (No.16) → I/conn 〔CN-7(12)〕 → Switch panel 〔CN-116(16, 17)〕

(1) Beacon lamp switch ON

Beacon lamp switch ON 〔CS-23(2)〕 → Switch Indicator lamp ON 〔CS-23(9)〕
→ I/conn 〔CN-8(4)〕 → I/conn 〔CN-10(10)〕
→ Beacon lamp ON 〔CL-7〕

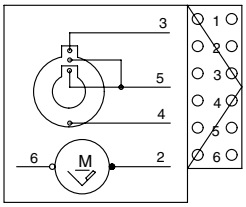
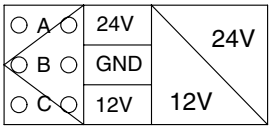
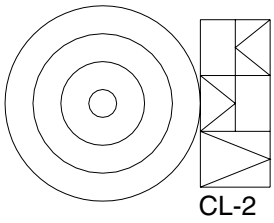
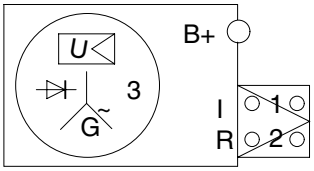
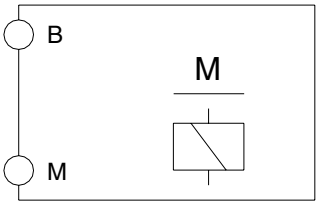
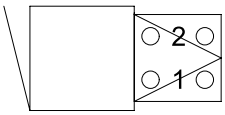
(2) Cab light switch ON

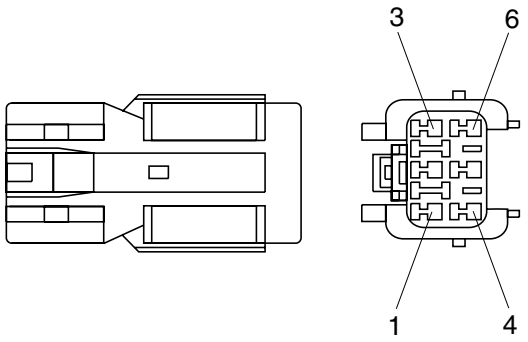
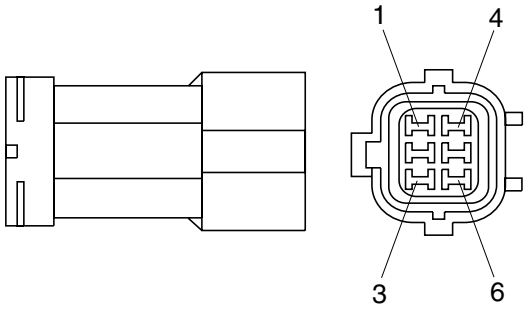
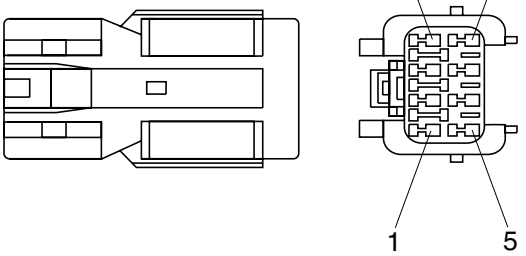
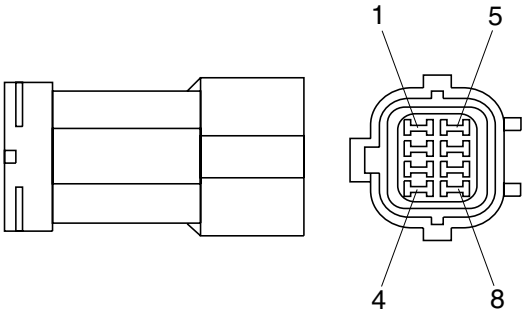
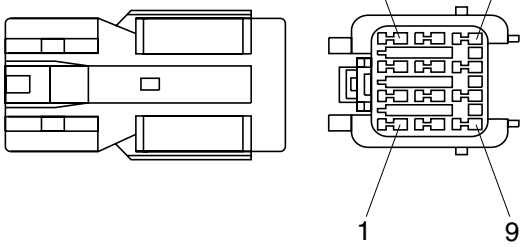
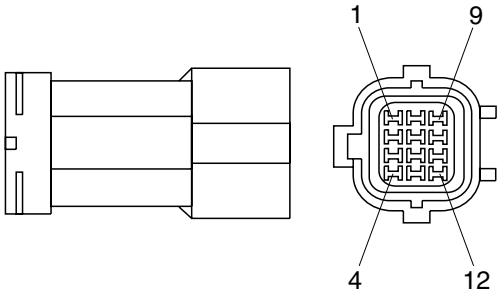
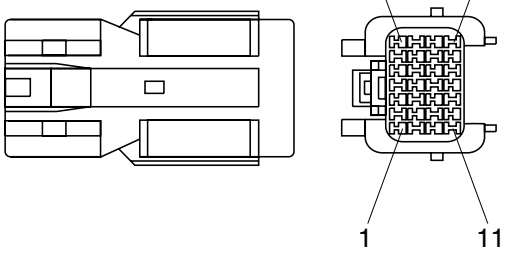
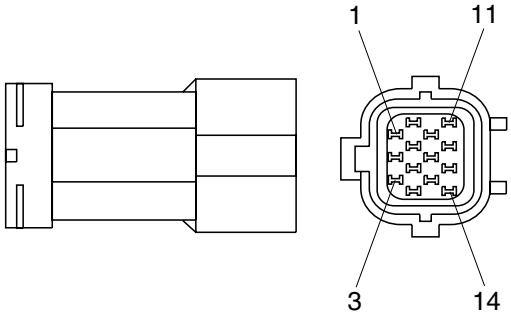
Cab light switch ON 〔CN-116(7, 8)〕 → I/conn 〔CN-7(6)〕 → I/conn 〔CN-10(11)〕
→ Cab light ON 〔CL-8(2), CL-9(2)〕

2) CHECK POINT

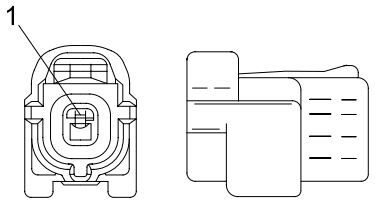
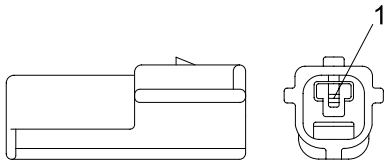
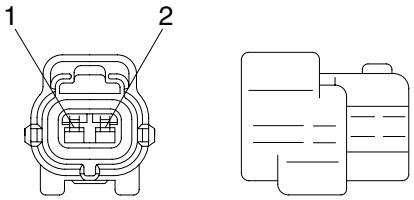
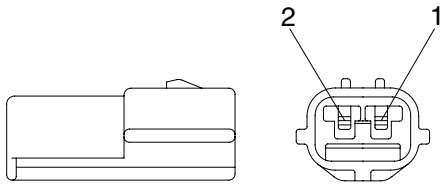
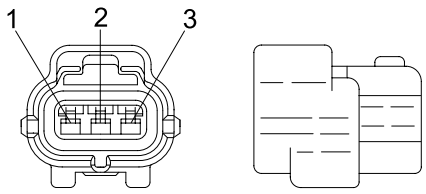
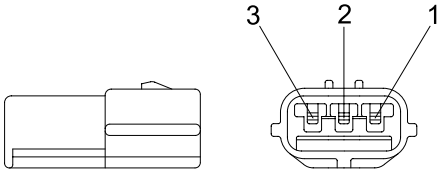
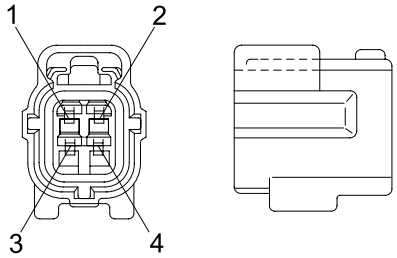
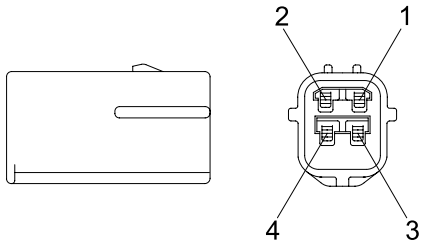
Engine	Start switch	Check point	Voltage
STOP	ON	① - GND(Fuse box) ② - GND(Switch power input) ③ - GND(Switch power output) ④ - GND(Beacon lamp)	20~25V
STOP	ON	⑤ - GND(Fuse box) ⑥ - GND(Switch power input) ⑦ - GND(Switch power output) ⑧ - GND(Cab light)	20~25V

※ GND : Ground

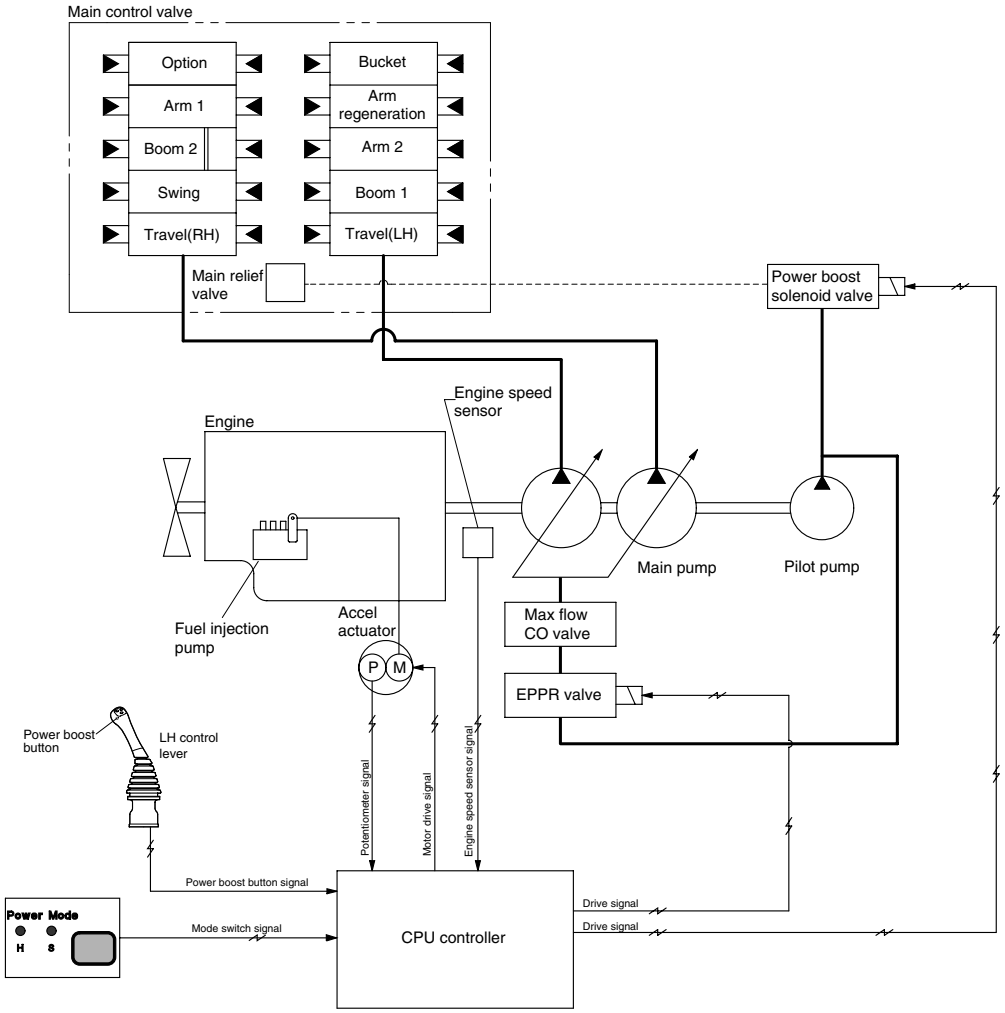
Part name	Symbol	Specifications	Check
Wiper motor	 CN-21	24V 2A	※ Check disconnection Normal : 7 Ω (For terminal 2-6)
DC/DC Converter	 CN-138	12V 3A	24V(A-B) 12V (B-C)
Cigar lighter	 CL-2	24V 5A 1.4W	※ Check coil resistance Normal : About 1M Ω ※ Check contact Normal : ∞ Ω Operating time : 5~15sec
Alternator	 CN-74	24V 55A	※ Check contact Normal : 0 Ω (For terminal B+-I) Normal : 24~27.5V
Starter	 CN-45	Delco Remy 28MT 24V	※ Check contact Normal : 0.1 Ω
Travel alarm	 CN-65	24V 0.5A	※ Check contact Normal : 5.2 Ω

No. of pin	Connector(Female)	Connector(Male)
6	 S814-006000	 S814-106000
8	 S814-008000	 S814-108000
12	 S814-012000	 S814-112000
14	 S814-014000	 S814-114000

18) ECONOSEAL J TYPE CONNECTORS

No. of pin	Connector(Female)	Connector(Male)
1	 S816-001002	 S816-101002
2	 S816-002002	 S816-102002
3	 S816-003002	 S816-103002
4	 S816-004002	 S816-104002

GROUP 4 POWER BOOST SYSTEM



30007A5MS05

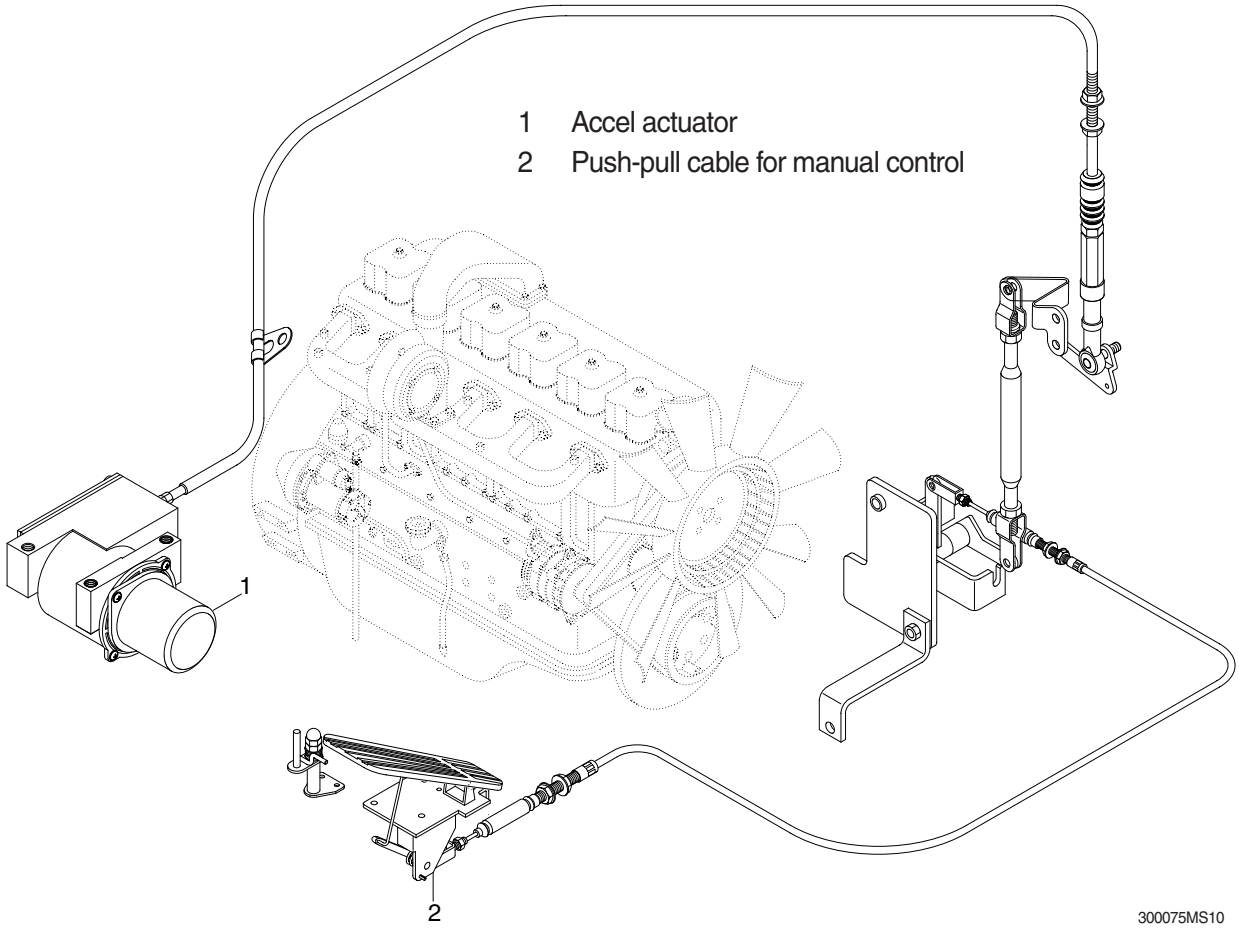
· When the power boost switch on the left control lever knob is pushed ON, the maximum digging power is increased by 10%.

· When the power set is at M, H or S and the power boost function is activated, the power boost solenoid valve pilot pressure raises the set pressure of the main relief valve to increase the digging power.

Description	Power boost switch	
	OFF	ON
Power set	M, H or S	M or H
Main relief valve set pressure	330kgf/cm^2	360kgf/cm^2
Time of operation	-	Even when pressed continuously, it is canceled after 8 sec.

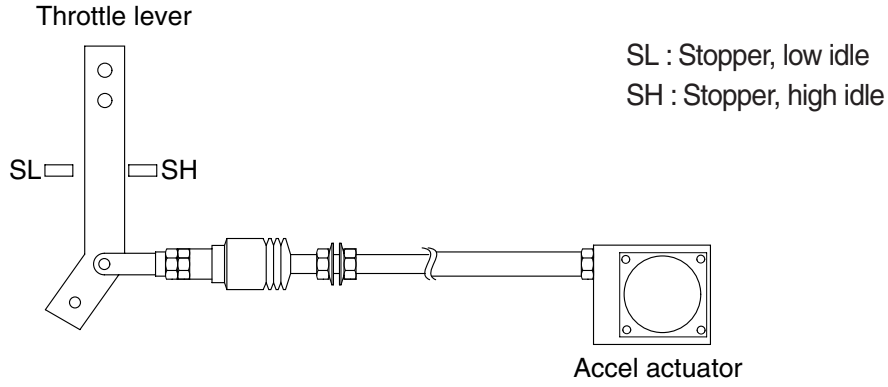
※ Default - Power boost solenoid valve : OFF

4. ENGINE ACCEL ACTUATOR



300075MS10

1) ENGINE THROTTLE LEVER



5-18(2)

2) EMERGENCY CABLE (Push-pull cable)

It controls engine speed by connecting onto the lever of the injection pump when the malfunction of the MCU controller or the accel actuator happen.

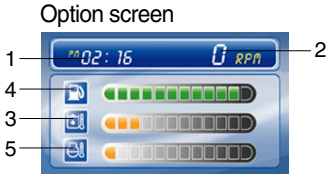
4. CLUSTER FUNCTION

1) LCD main operation display

Default screen

1607A3CD02A

Option screen



1607A3CD02B

1 Time display
2 RPM display
3 Hydraulic oil temperature gauge
4 Fuel level gauge
5 Engine coolant temperature gauge

(1) Time display

1607A3CD02C

① This displays the current time.

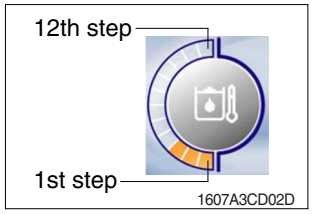
※ **Refer to the page 5-31 to set time for details.**

(2) RPM display

1607A3CD02C

① This displays the engine rpm.

(3) Hydraulic oil temperature gauge



1607A3CD02D

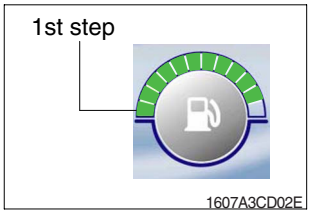
① This gauge indicates the temperature of hydraulic oil in 12 step gauge.
- 1st step : Below 30°C(86°F)
- 2nd~10th step : 30-105 °C(86-221°F)
- 11th~12th step : Above 105°C(221°F)

② The gauge between 2nd and 10th steps illuminates when operating.

③ Keep idling engine at low speed until the gauge between 2nd and 10th steps illuminates, before operation of machine.

④ When the gauge of 11th and 12th steps illuminates, reduce the load on the system. If the gauge stays in the 11th~12th steps, stop the machine and check the cause of the problem.

(4) Fuel level gauge



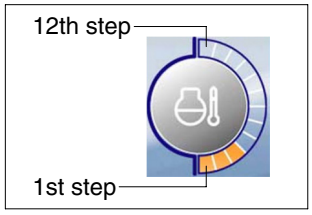
1607A3CD02E

① This gauge indicates the amount of fuel in the fuel tank.

② Fill the fuel when the 1st step or fuel icon blinks in red.

※ **If the gauge illuminates the 1st step or fuel icon blinks in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.**

(5) Engine coolant temperature gauge



1607A3CD02F

① This gauge indicates the temperature of coolant in 12 step gauge.
- 1st step : Below 30°C(86°F)
- 2nd~10th step : 30-105 °C(86-221°F)
- 11th~12th step : Above 105°C(221°F)

② The gauge between 2nd and 10th steps illuminates when operating.

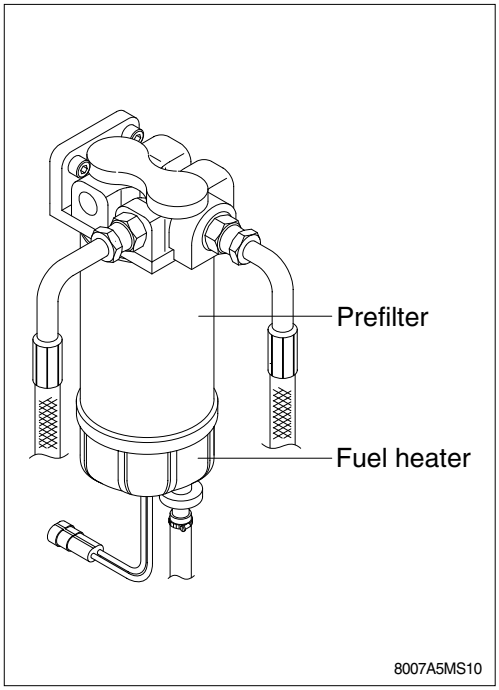
③ Keep idling engine at low speed until the gauge between 2nd and 10th steps illuminates, before operation of machine.

④ When the gauge of 11th and 12th steps illuminates, turn OFF the engine, check the radiator and engine.

GROUP 13 FUEL WARMER SYSTEM

1. SPECIFICATION

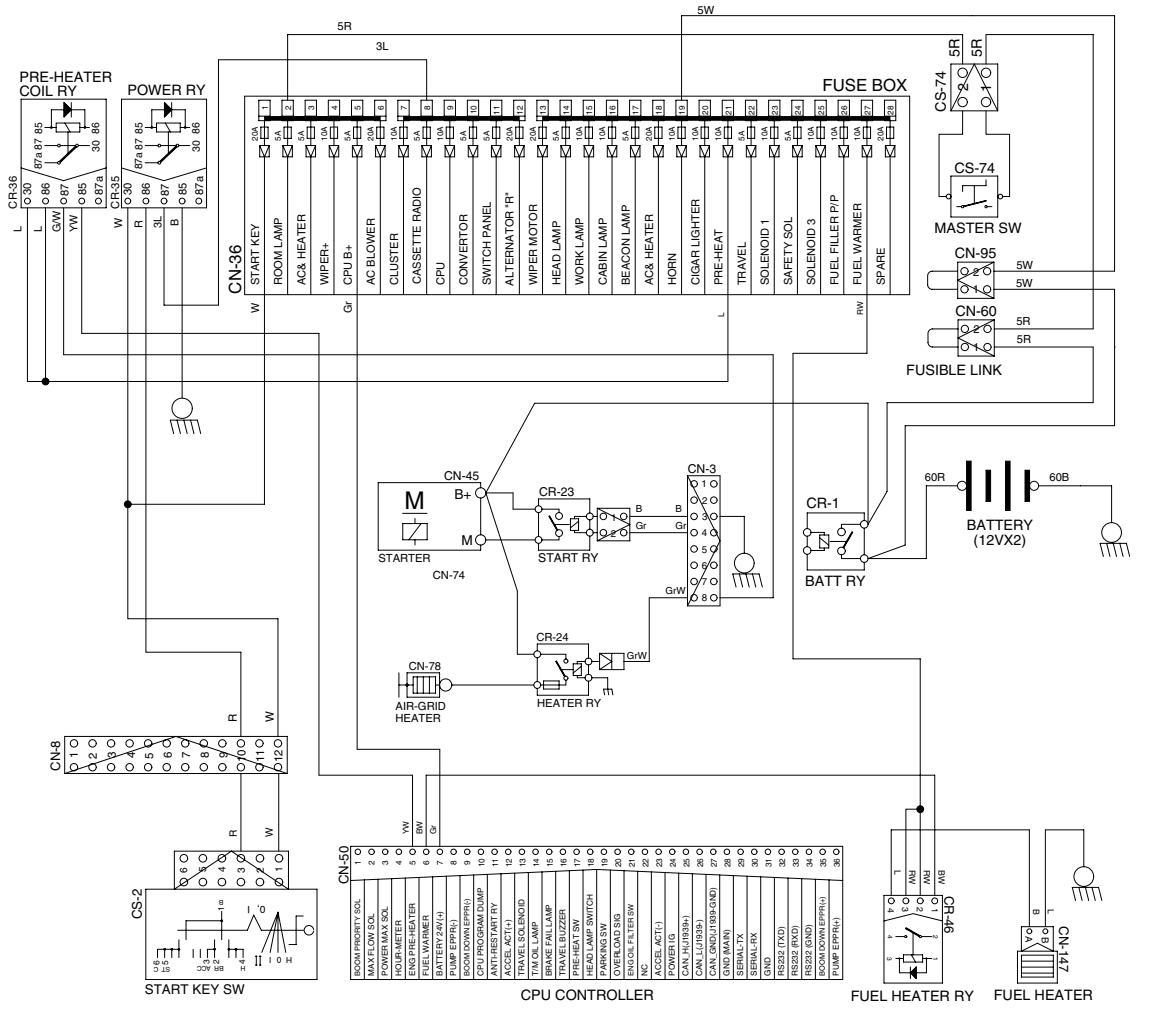
1) Operating voltage : 24±4V
2) Power : 200±50W
3) Current : 15A



2. OPERATION

1) The current of fuel warmer system is automatically controlled without thermostat according to fuel temperature.
2) At the first state, the 15A current flows to the fuel warmer and engine may be started in 1~2 minutes.
3) If the fuel starts to flow, ceramic-disk in the fuel warmer heater senses the fuel temperature to reduce the current as low as 1.5A.
   So, fuel is protected from overheating by this mechanism.

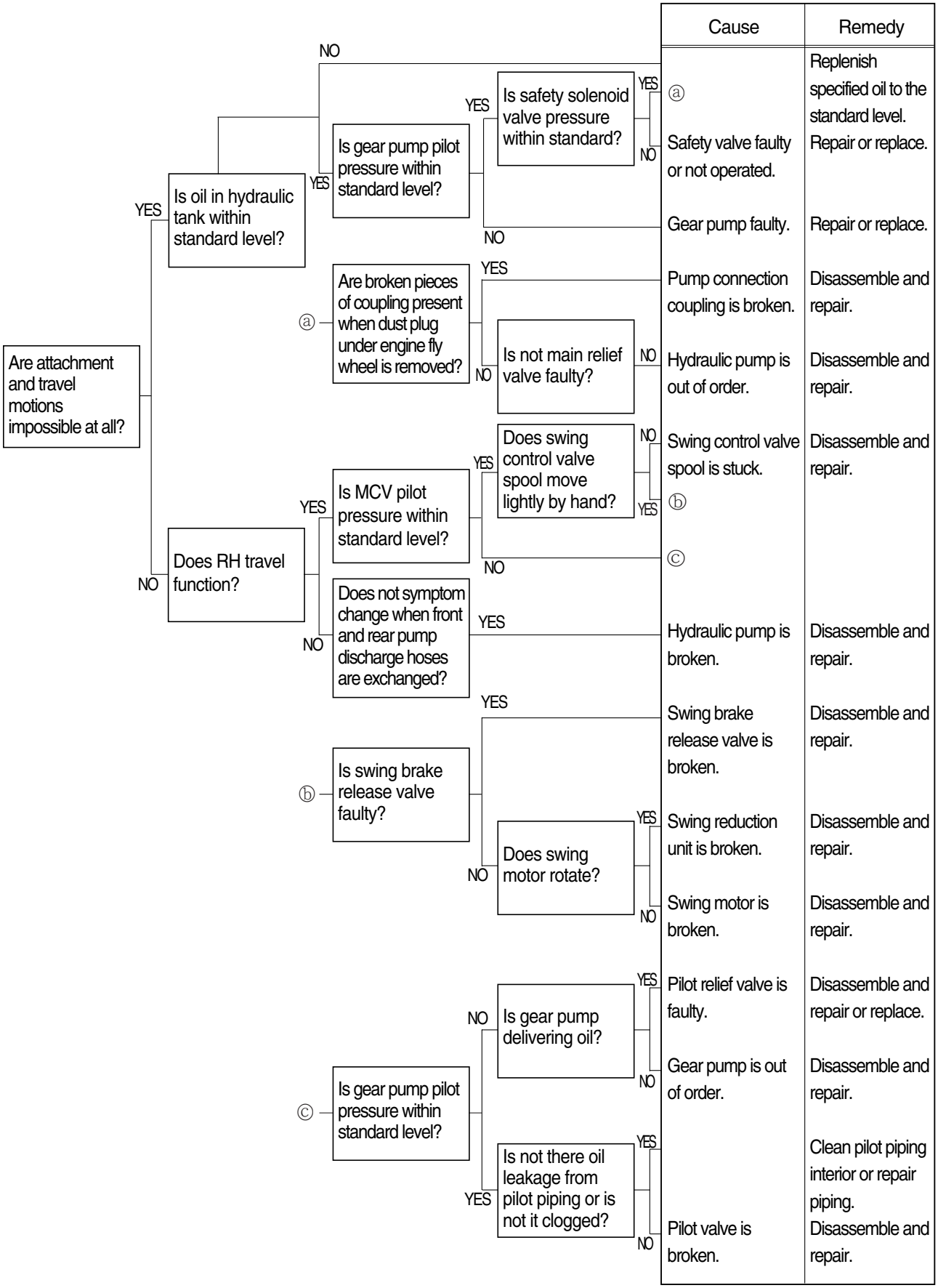
3. ELECTRIC CIRCUIT



30007A5MS13

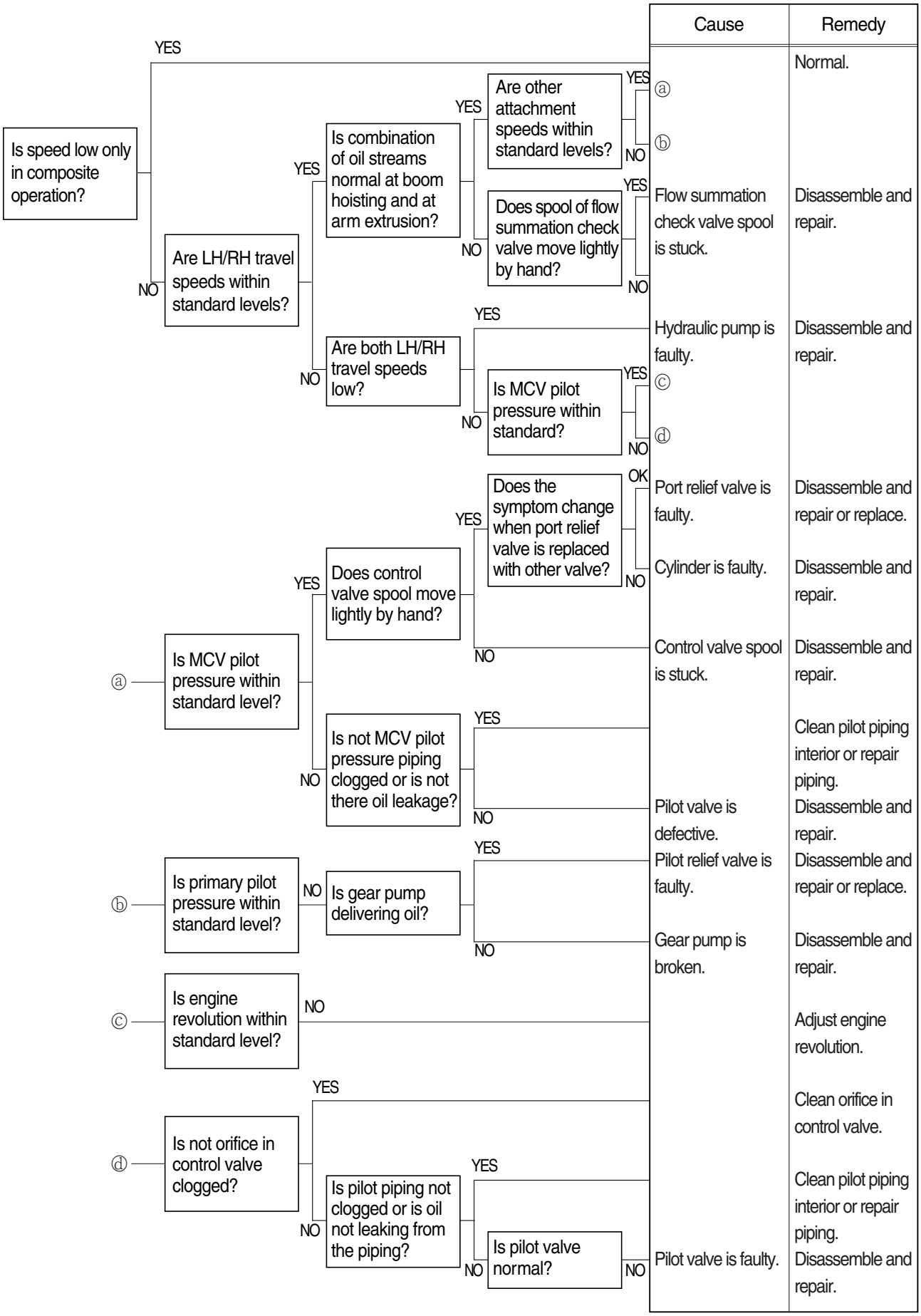
4. SWING SYSTEM

1) BOTH LH AND RH SWING ACTIONS ARE IMPOSSIBLE



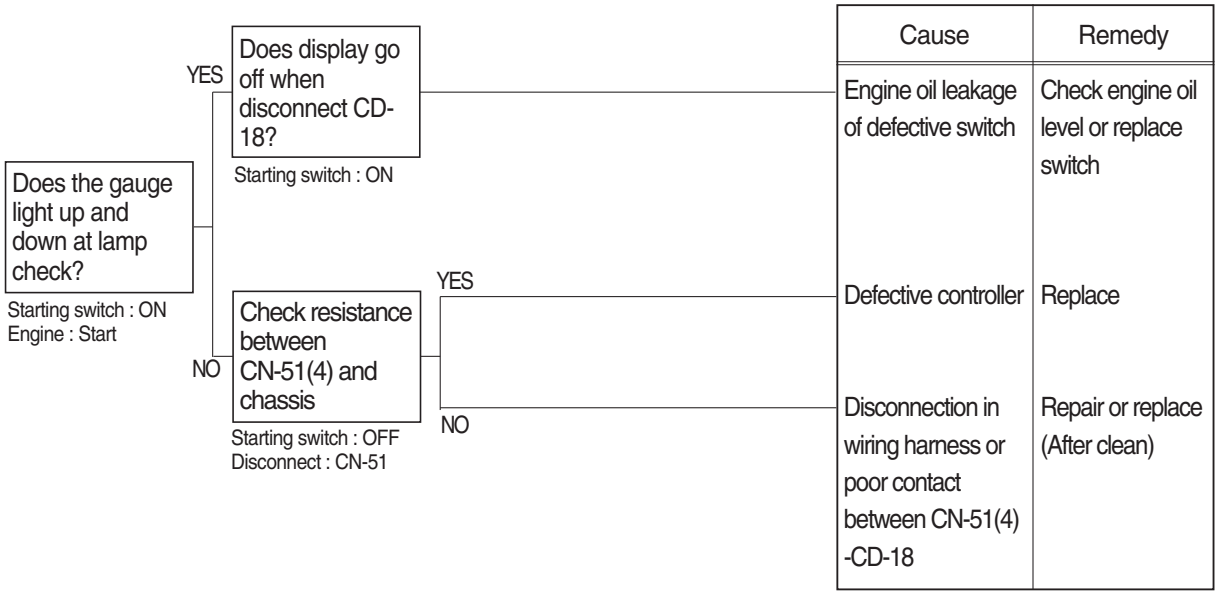
Cause	Remedy
ⓐ Safety valve faulty or not operated.	Replenish specified oil to the standard level. Repair or replace.
Gear pump faulty.	Repair or replace.
Pump connection coupling is broken.	Disassemble and repair.
Hydraulic pump is out of order.	Disassemble and repair.
Swing control valve spool is stuck.	Disassemble and repair.
ⓑ	
ⓒ	
Hydraulic pump is broken.	Disassemble and repair.
Swing brake release valve is broken.	Disassemble and repair.
Swing reduction unit is broken.	Disassemble and repair.
Swing motor is broken.	Disassemble and repair.
Pilot relief valve is faulty.	Disassemble and repair or replace.
Gear pump is out of order.	Disassemble and repair.
	Clean pilot piping interior or repair piping.
Pilot valve is broken.	Disassemble and repair.

2) BOOM, ARM OR BUCKET SPEED IS LOW



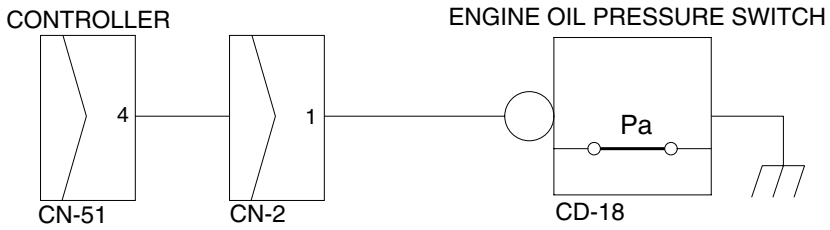
6. WHEN ENGINE OIL PRESSURE WARNING LAMP LIGHTS UP(Engine is started)

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



Check resistance

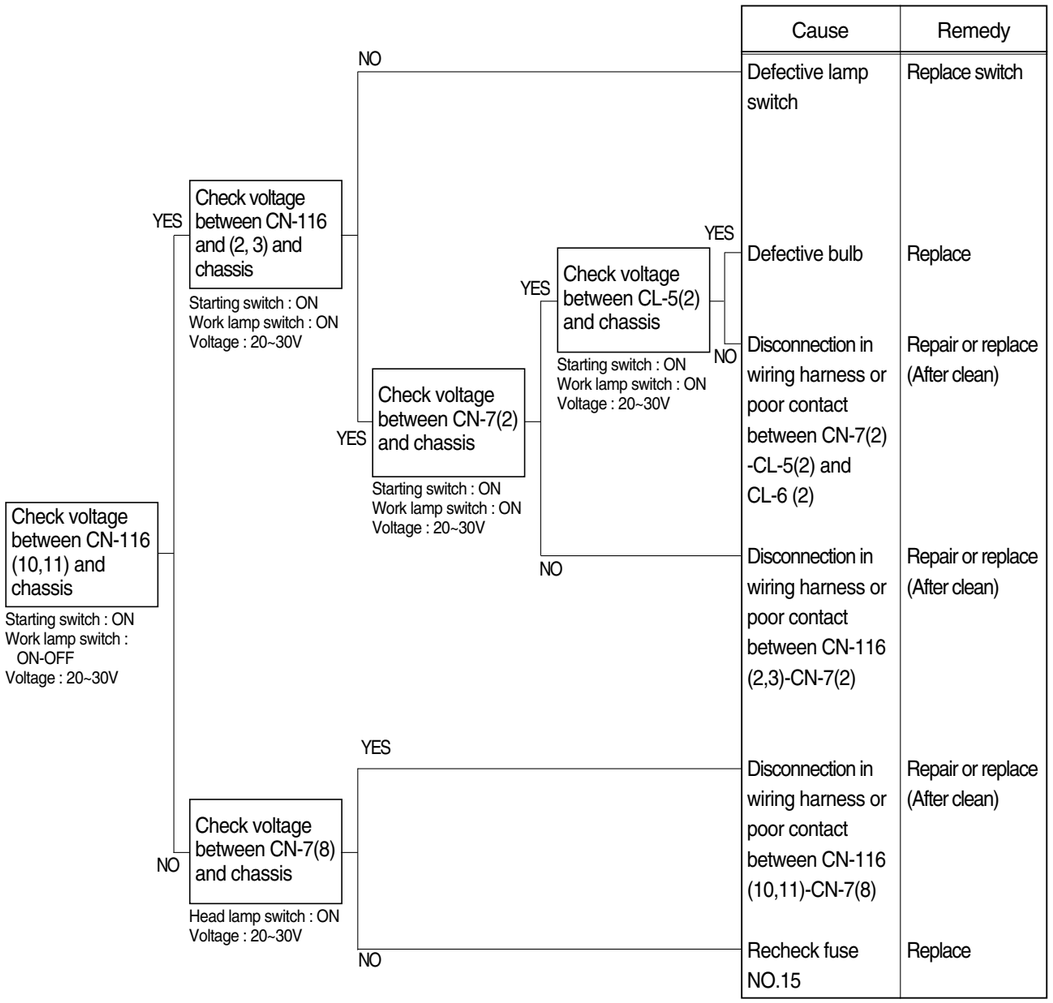
YES	MAX 1Ω
NO	MIN 1MΩ

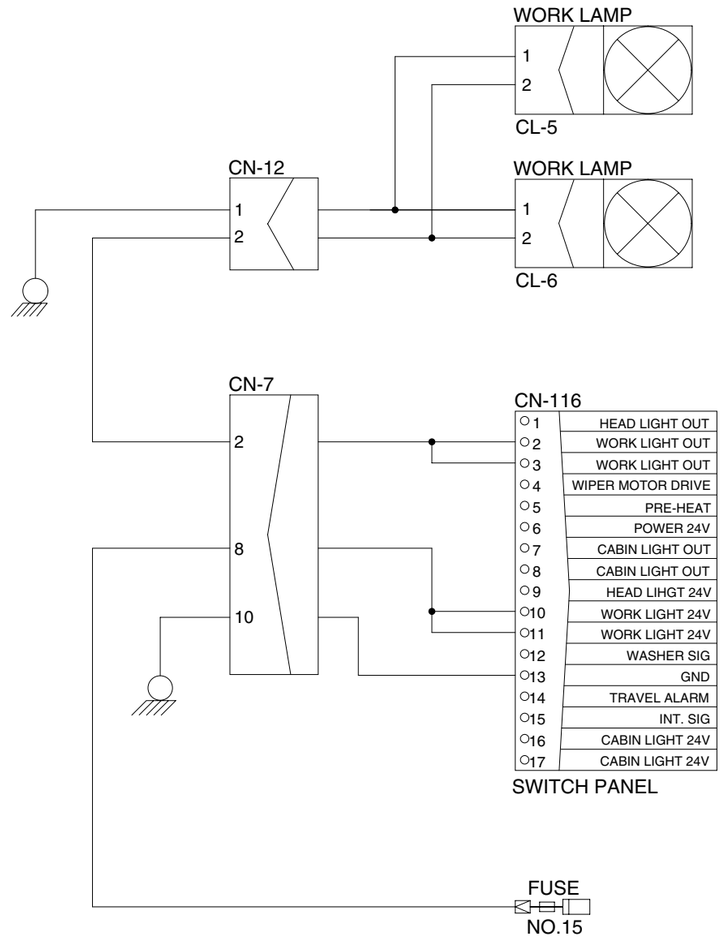


29076ES03

16. WHEN STARTING SWITCH IS TURNED ON, WORK LAMP DOES NOT LIGHTS UP

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted and short of fuse No.15.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.





30076ES09

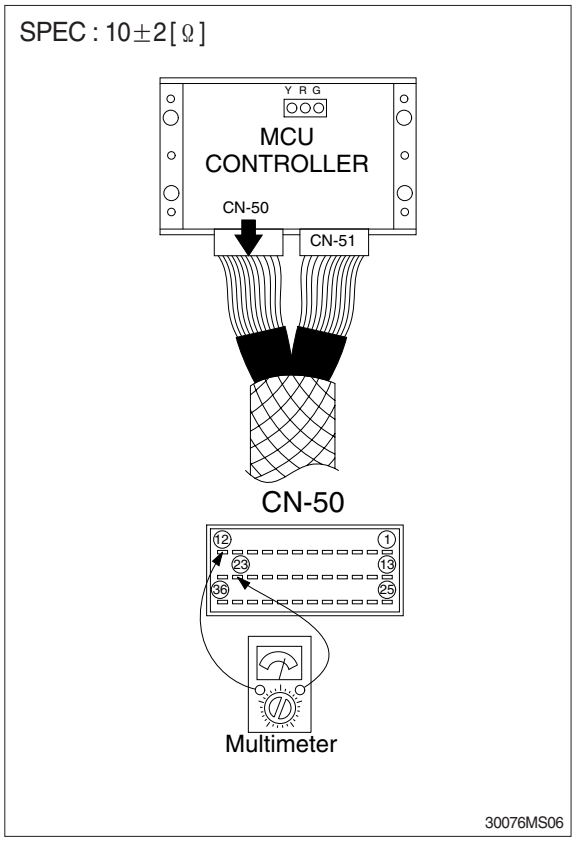
2) TEST PROCEDURE

(1) **Test 10 :** Check resistance.

① Starting key OFF.

② Disconnect connector CN-50 from MCU controller.

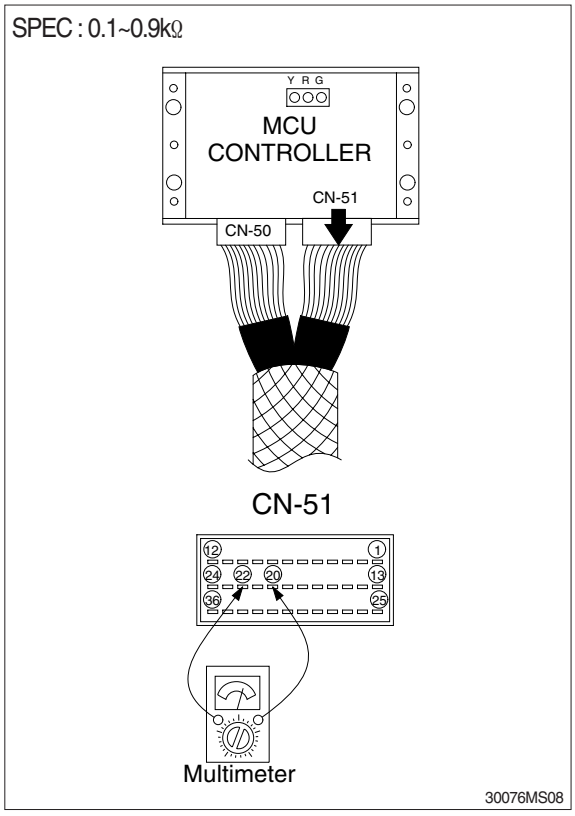
③ Check resistance between CN-50(12)-(23) as figure.



(2) **Test 11 :** Check voltage and resistance.

① Check resistance between CN-51(20)-(22).

- Starting key OFF.
- Disconnect connector CN-51 from MCU controller.
- Check resistance value with multimeter as figure.



3. OPERATION FOR PERFORMANCE TESTS

1) Observe the following rules in order to carry out performance tests accurately and safely.

(1) The machine

Repair any defects and damage found, such as oil or water leaks, loose bolts, cracks and so on, before starting to test.

(2) Test area

① Select a hard, flat surface.

② Secure enough space to allow the machine to run straight more than 20m, and to make a full swing with the front attachment extended.

③ If required, rope off the test area and provide signboards to keep unauthorized personnel away.

(3) Precautions

① Before starting to test, agree upon the signals to be employed for communication among coworkers. Once the test is started, be sure to communicate with each other using these signals, and to follow them without fail.

② Operate the machine carefully and always give first priority to safety.

③ While testing, always take care to avoid accidents due to landslides or contact with high voltage power lines. Always confirm that there is sufficient space for full swings.

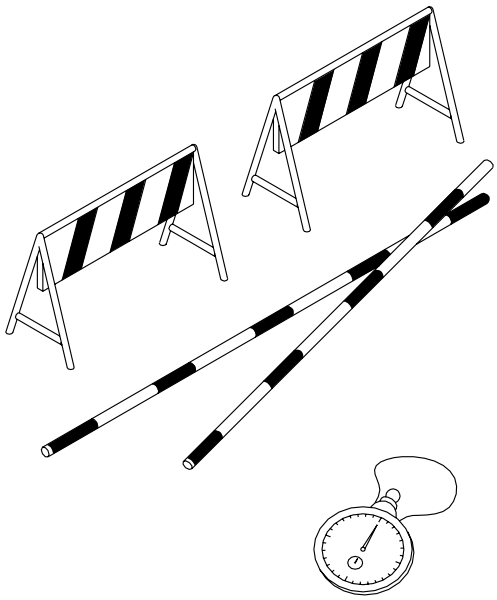
④ Avoid polluting the machine and the ground with leaking oil. Use oil pans to catch escaping oil. Pay special attention to this when removing hydraulic pipings.

(4) Make precise measurements

① Accurately calibrate test instruments in advance to obtain correct data.

② Carry out tests under the exact test conditions prescribed for each test item.

③ Repeat the same test and confirm that the test data obtained can be procured repeatedly. Use mean values of measurements if necessary.



7-3

10) DIG FUNCTION DRIFT CHECK

(1) Measure dig function drift, which can be caused by oil leakage in the control valve and boom, standard arm, and standard bucket cylinders, with the loaded bucket.
When testing the dig function drift just after cylinder replacement, slowly operate each cylinder to its stroke end to purge air.

(2) Preparation

① Load bucket fully. Instead of loading the bucket, weight(W) of the following specification can be used.

· $W=M^3 \times 1.5$

Where :

M^3 = Bucket heaped capacity(m^3)

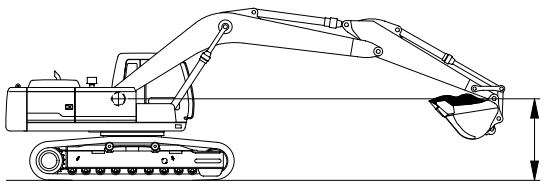
1.5 = Soil specific gravity

② Position the arm cylinder with the rod 20 to 30㎜ extended from the fully retracted position.

③ Position the bucket cylinder with the rod 20 to 30㎜ retracted from the fully extended position.

④ With the arm rolled out and bucket rolled in, hold the bucket so that the height of the bucket pin is the same as the boom foot pin.

⑤ Keep the hydraulic oil temperature at 50±5°C.



290LC7MS05

(3) Measurement

① Stop the engine.

② Five minutes after the engine has been stopped, measure the changes in the positions of the boom, arm and bucket cylinders.

③ Repeat step ② three times and calculate the average values.

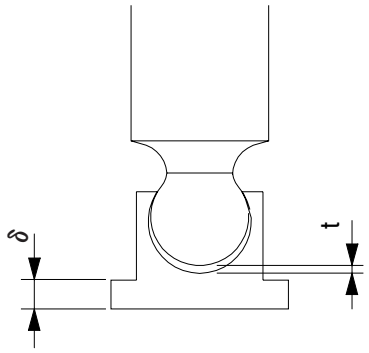
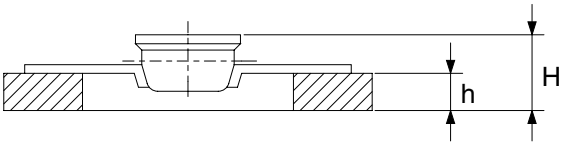
(4) The measured drift should be within the following specifications.

Unit : mm / 5min

Model	Drift to be measured	Standard	Maximum allowable	Remarks
R300LC-7	Boom cylinder	10 below	15	
	Arm cylinder	10 below	15	
	Bucket cylinder	40 below	50	

3. SWING DEVICE

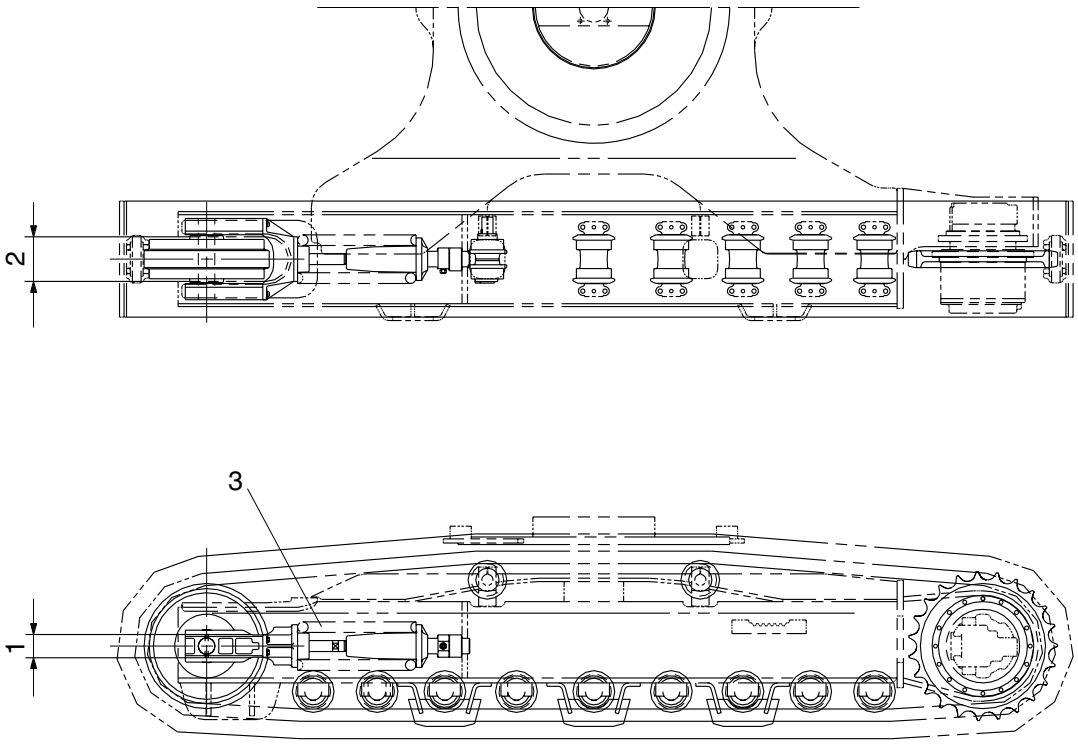
1) WEARING PARTS

Inspection item	Standard dimension	Recommended replacement value	Counter measures
Clearance between piston and cylinder block bore	0.028	0.058	Replace piston or cylinder block
Play between piston and shoe caulking section(δ)	0	0.3	Replace assembly of piston and shoe
Thickness of shoe(t)	5.5	5.3	Replace assembly of piston and shoe
Combined height of retainer plate and spherical bushing (H-h)	6.5	6.0	Replace set of retainer plate and spherical bushing
Thickness of friction plate	4.0	3.6	Replace
			

2) SLIDING PARTS

Part name	Standard roughness	Allowable roughness	Remark
Shoe	0.8-Z(Ra=0.2) (LAPPING)	3-Z(Ra=0.8)	
Shoe plate	0.4-Z(Ra=0.1) (LAPPING)	3-Z(Ra=0.8)	
Cylinder	1.6-Z(Ra=0.4) (LAPPING)	12.5-Z(Ra=3.2)	
Valve plate	0.8-Z(Ra=0.2) (LAPPING)	6.3-Z(Ra=1.6)	

5) TRACK FRAME AND RECOIL SPRING



21037MS05

Unit : mm

No.	Check item	Criteria					Remedy
1	Vertical width of idler guide		Standard size	Tolerance	Repair limit		Rebuild or replace
		Track frame	132	+2 0	136		
		Idler support	130	0 -1.5	126		
2	Horizontal width of idler guide	Track frame	292	+2 0	297		
		Idler support	290	-	288		
3	Recoil spring	Standard size			Repair limit		Replace
		Free length	Installation length	Installation load	Free length	Installation load	
		ø253×710	580	19012kg	-	15210kg	

2) INSTALL

(1) Carry out installation in the reverse order to removal

(2) Remove the suction strainer and clean it.

(3) Replace the return filter with a new one.

(4) Remove breather and clean it.

(5) After adding oil to the hydraulic tank to the specified level.

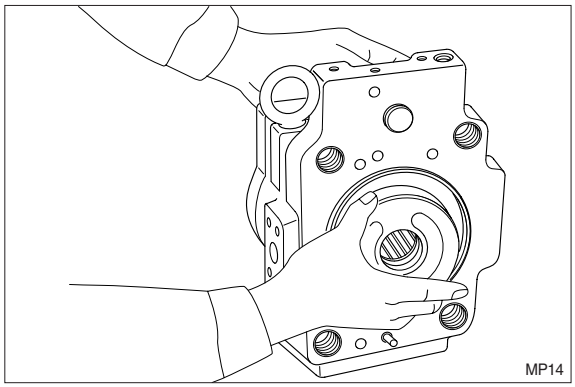
(6) Bleed the air from the hydraulic pump.
① Remove the air vent plug(2EA)
② Tighten plug lightly
③ Start the engine, run at low idling, and check oil come out from plug.
④ Tighten plug.

(7) Start the engine, run at low idling(3~5 minutes) to circulate the oil through the system.

(8) Confirmed the hydraulic oil level and check the hydraulic oil leaks or not.

(7) Fit valve plate(313) to valve block(312), entering pin into pin hole.

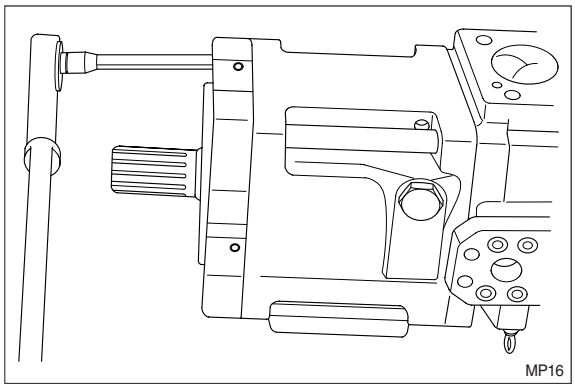
※ Take care not to mistake suction / delivery directions of valve plate.



(8) Fit valve block(312) to pump casing (271) and tighten hexagon socket head bolts(401).

※ At first assemble this at rear pump side, and this work will be easy.

※ Take care not to mistake direction of valve block.

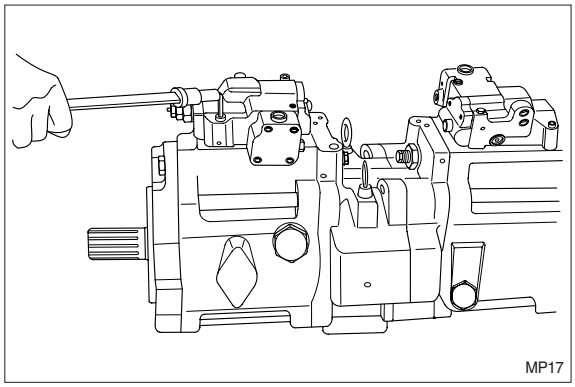


※ Clockwise rotation(Viewed from input shaft side)

※ Fit block with regulator up and with delivery flange left, viewed from front side.

(9) Putting feedback pin of tilting pin into feedback lever of regulator, fit regulator and tighten hexagon socket head bolts (412, 413).

※ Take care not to mistake regulator of front pump for that of rear pump.



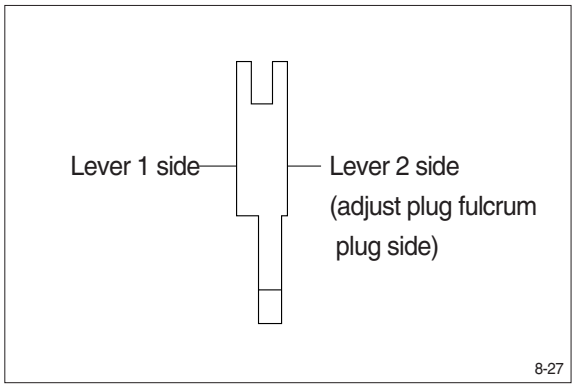
(10) Fit drain port plug(468).

This is the end of reassembling procedures.

(5) Fit feedback lever(611), matching its pin hole with pin hole in spool.
Then insert pin(874).

※ Insert pin in feedback lever a little to ease operation.

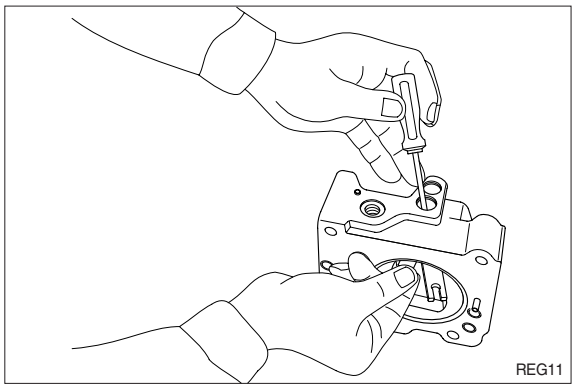
※ Take care not to mistake direction of feedback lever.



(6) Put pilot piston(643) into pilot hole of casing.

※ Confirm that pilot piston slides smoothly without binding.

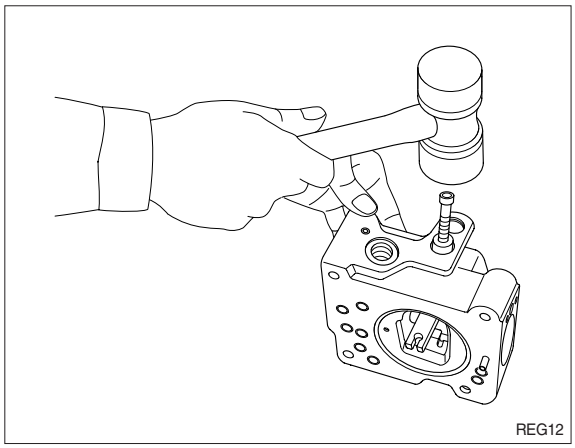
(7) Put pin force-fitted in lever(2, 613) into groove of pilot piston.
Then fix lever(2).



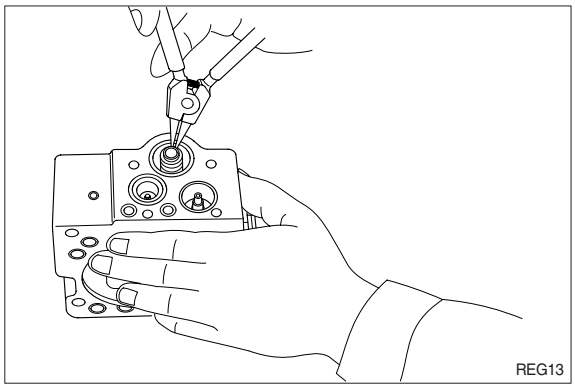
(8) Fit fulcrum plug(614) so that pin force-fitted in fulcrum plug(614) can be put into pin hole of lever(2).
Then fix locking ring(858).

(9) Insert adjusting plug(615) and fit locking ring.

※ Take care not to mistake inserting holes for fulcrum plug and adjusting plug.
At this point in time move feedback lever to confirm that it has no large play and is free from binding.



(10) Fit return spring(654) and spring seat (653) into spool hole and attach snap ring (814).



(6) Inspection after disassembly

Clean all disassembled parts with clean mineral oil fully, and dry them with compressed air. Then, place them on clean papers or cloths for inspection.

① Control valve

a. Check whole surfaces of all parts for burrs, scratches, notches and other defects.
b. Confirm that seal groove faces of body and block are smooth and free of dust, dent, rust etc.
c. Correct dents and damages and check seat faces within the body, if any, by lapping.
※ Pay careful attention not to leave any lapping agent within the body.
d. Confirm that all sliding and fitting parts can be moved manually and that all grooves and path's are free foreign matter.
e. If any spring is broken or deformed, replace it with new one.
f. When a relief valve does not function properly, repair it, following it's the prescribed disassembly and assembly procedures.
g. Replace all seals and O-rings with new ones.

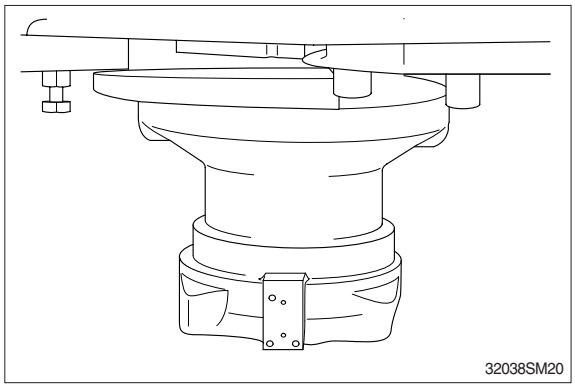
② Relief valve

a. Confirm that all seat faces at ends of all poppets and seats are free of defects and show uniform and consistent contact faces.
b. Confirm manually that main poppet and seat can slide lightly and smoothly.
c. Confirm that outside face of main poppet and inside face of seat are free from scratches and so on.
d. Confirm that springs are free from breakage, deformation, and wear.
e. Confirm that orifices of main poppet and seat section are not clogged with foreign matter.
f. Replace all O-rings with new ones.
g. When any light damage is found in above inspections, correct it by lapping.
h. When any abnormal part is found, replace it with a completely new relief valve assembly.

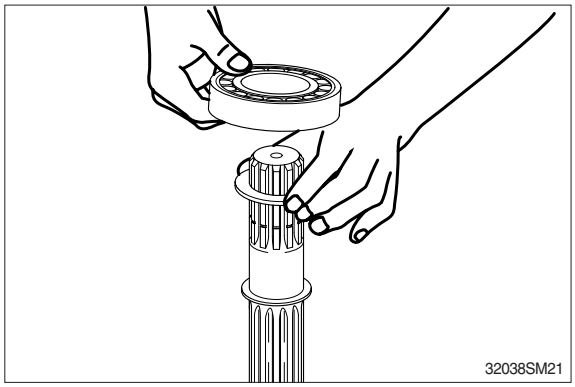
3) ASSEMBLY

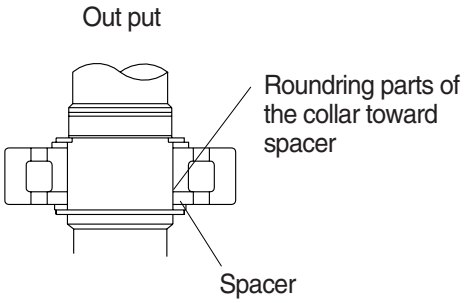
Do the reassembly in the reverse procedure of the disassembly.

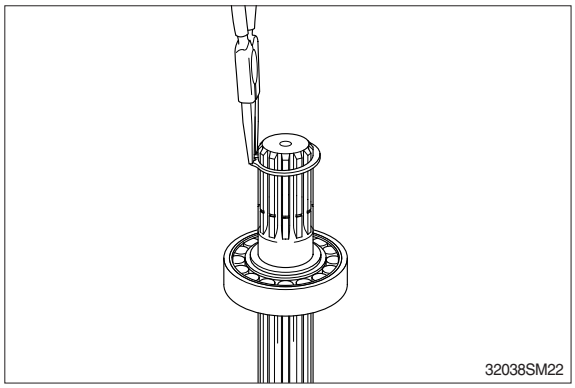
(1) Place the casing(301) on the workbench with the valve casing(303) downward.



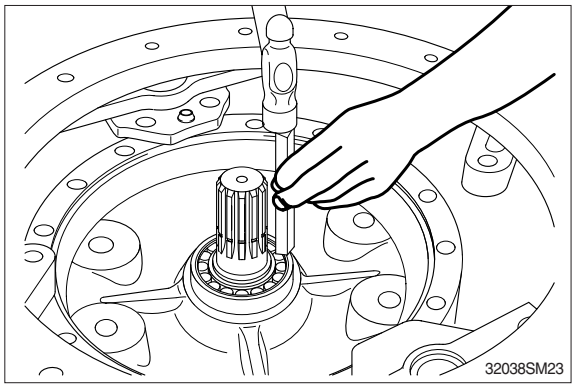
(2) When reassembling the roller bearing, install the snap ring(432), and spacer(106) to the drive shaft(101). Insert the collar and cone of the roller bearing(443). Install the spacer(106) and stop ring(432). Install stop ring(433) to the output shaft (101) by heating the cone of the roller bearing(444).





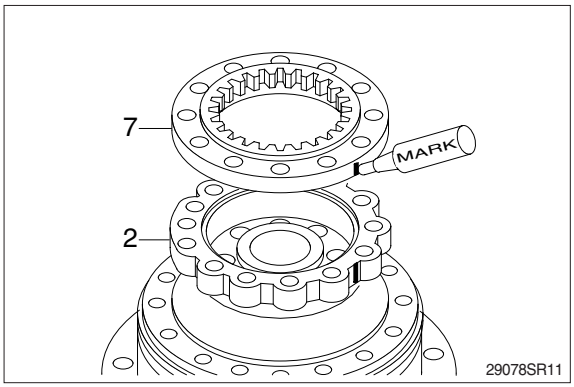


(3) Insert the drive shaft(101) into the casing (301) with the end of output shaft upward and tap the outer race of roller bearing with the hammer.

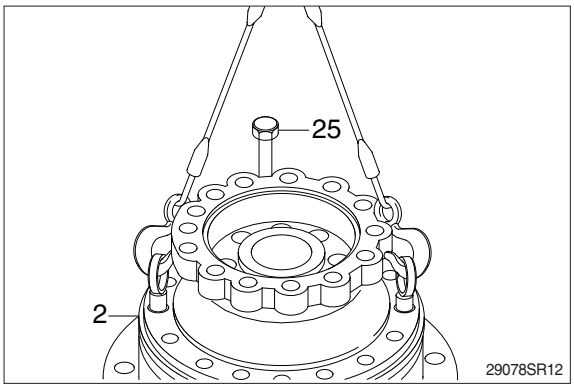


(8) Remove ring gear(7) from middle casing (2).

※ Put matching mark for easy reassembly.

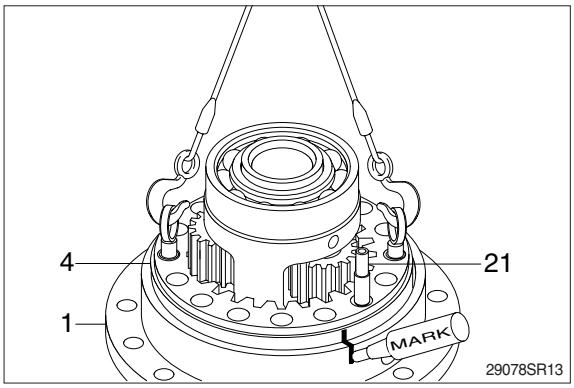


(9) Loosen the socket bolt(25) and tighten 2 M18 eye bolts to middle casing(2) and then lift up and remove middle casing(2).

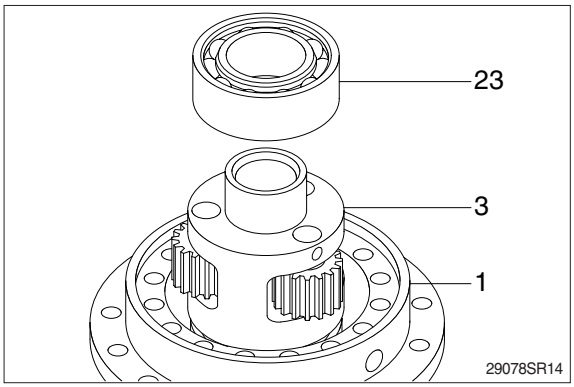


(10) Remove knock pin(21) and then remove ring gear2(4).

※ Put marks at the knock pin hole and across the matching line between ring gear2(4) and front casing(1) and then remove ring gear2(4) for easy reassembly.



(11) Using the bearing disassembly tool, remove roller bearing(23).



2. DISASSEMBLING

1) GENERAL INSTRUCTIONS

(1) Generally, hydraulic equipment is precisely manufactured and clearances between each parts are very narrow. Therefore, disassembling and assembling works should be performed on the clean place where dusts hardly gather. Tools and kerosene to wash parts should also be clean and handled with great care.

(2) When motor is removed from the host machine, wash around the ports sufficiently and put the plugs so that no dust and/or water may invade. Take off these plugs just before the piping works when re-attach it to the host machine.

(3) Before disassembling, review the sectional drawing and prepare the required parts, depending on the purpose and the range of disassembling.
Seals, O-rings, etc., if once disassembled, are not reusable.
There are some parts that should be replaced as a subassembly.
Consult with the parts manual in advance.

(4) The piston can be inserted to whichever cylinder block for the initial assembling.
However, their combination should not be changed if they are once used. To reuse them, put the matching mark on both pistons and cylinder block before disassembling.

⚠ Take great care not to pinch your hand between parts while disassembling nor let fall parts on your foot while lifting them.

(16) Assemble friction plate(27) and separated plate(28) into cylinder.

300072TM66

(17) After insert piston shoe(26) into set plate(25), assemble it into cylinder.

300072TM67

300072TM67A

(18) Using jig, compress oil seal(73) into shaft casing(01).

300072TM68

(19) Assemble the body of a motor.

① Bond seven piece of plug(02) in shaft casing plug with standard torque.

a. After taping plug with seal taper and spread rock tight, assemble it.

· Tightening torque : 7~11kgf · m
(50.63~79.5lbf · ft)

300072TM69

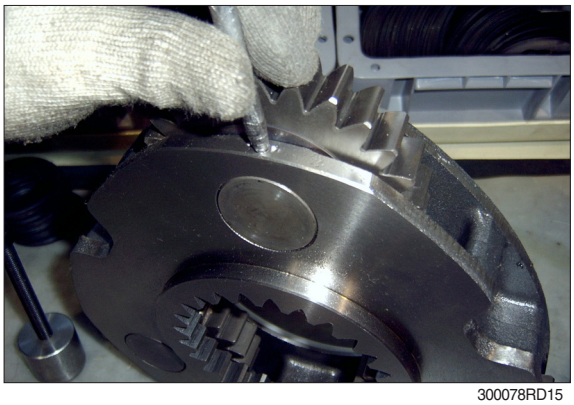
300072TM69A

14) Dissembling No.1 carrier

(1) Remove thrust ring(16) from carrier.

(2) Knock spring pin(89-6) fully into No.1 pin(90-5).

(3) Remove planetary, thrust washer, No.1 pin, bearing from carrier.



300078RD15

15) Disassembling No.2,3 carrier

(1) Disassemble(14) carriers, using the same method for No.1 carrier assembly.

GROUP 7 RCV LEVER

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.

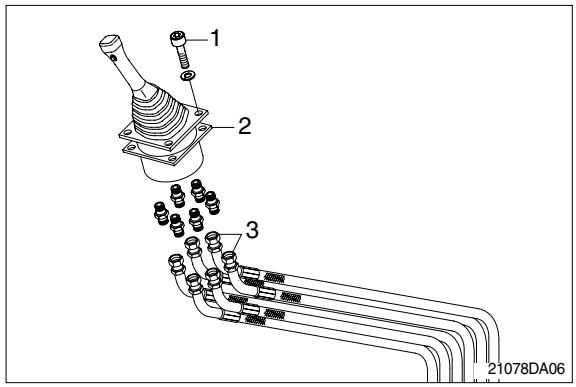
(4) Loosen the socket bolt(2).

(5) Remove the cover of the console box.

(6) Disconnect pilot line hoses(3).

(7) Remove the pilot valve assembly(1).

※ When removing the pilot valve assembly, check that all the hoses have been disconnected.



2) INSTALL

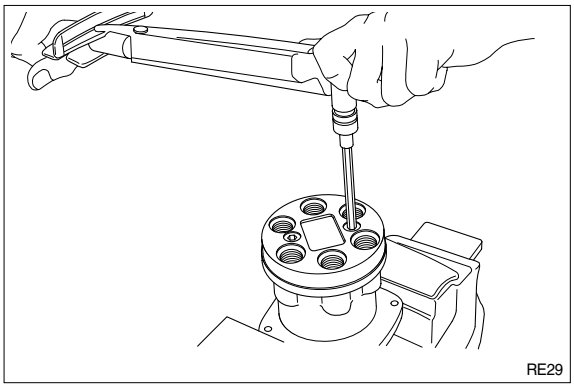
(1) Carry out installation in the reverse order to removal.

(2) Confirm the hydraulic oil level and check the hydraulic oil leak or not.

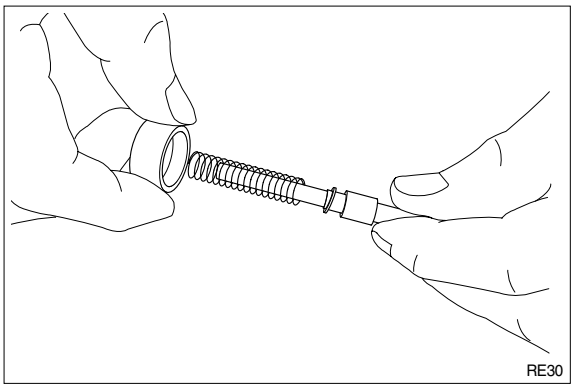
4) ASSEMBLY

(1) Tighten hexagon socket head plug(2) to the specified torque.

※ Tighten two bolts alternately and slowly.

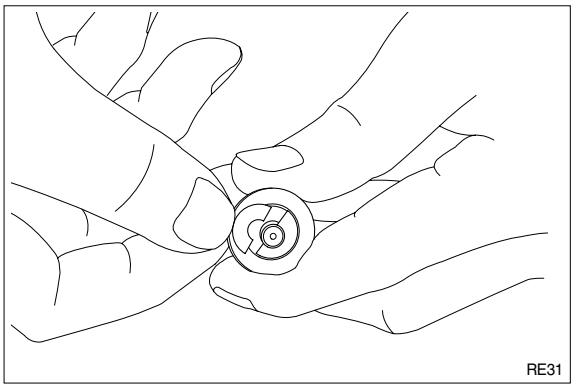


(2) Put shim(6), springs(7, 29) and spring seat(8, 30) onto spool(5) in this order.



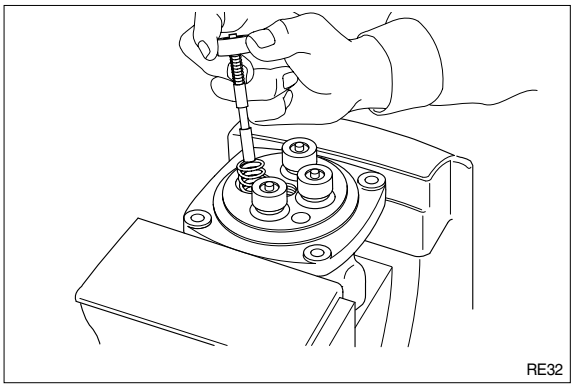
(3) Stand spool vertically with its bottom placed on flat workbench, and with spring seat pushed down, put two pieces of semicircular stopper(9) on spring seat without piling them on.

※ Assemble stopper(9) so that its sharp edge side will be caught by head of spool. Do not push down spring seat more than 6mm.



(4) Assemble spring(10) into casing.
Assemble reducing valve subassembly into casing.

※ Assemble them to their original positions.



1. REMOVAL AND INSTALL

1) BUCKET CYLINDER

(1) Removal

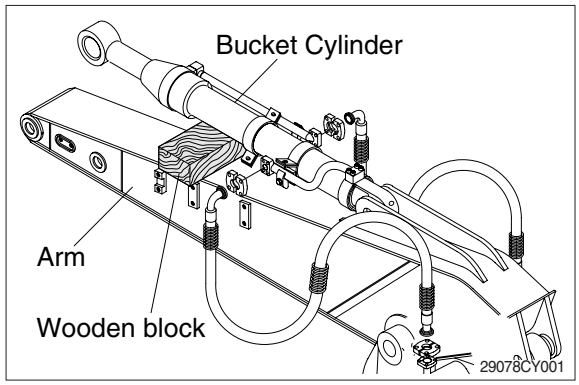
※ Expand the arm and bucket fully, lower the work equipment to the ground and stop the engine.

※ Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping.

⚠ Loosen the breather slowly to release the pressure inside the hydraulic tank.

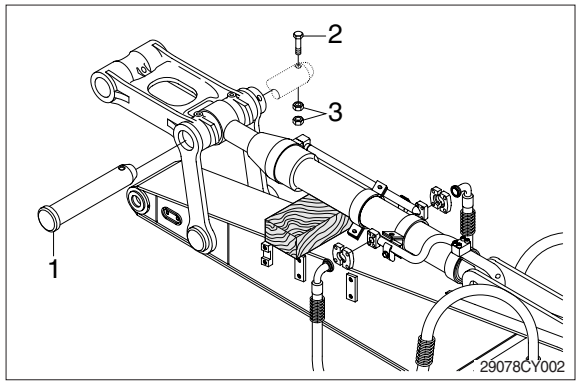
※ Escaping fluid under pressure can penetrate the skin causing serious injury. Fit blind plugs in the hoses after disconnecting them, to prevent dirt or dust from entering.

① Set block between bucket cylinder and arm.

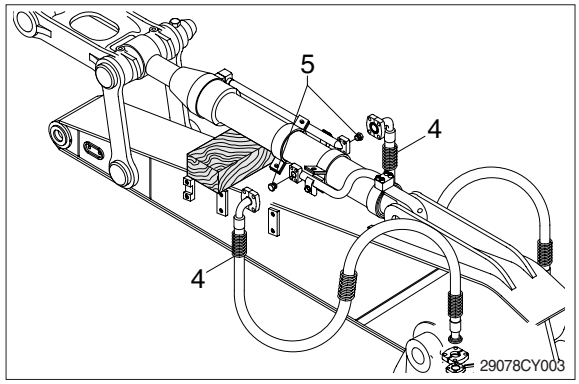


② Remove bolt(2), nut(3) and pull out pin (1).

※ Tie the rod with wire to prevent it from coming out.



③ Disconnect bucket cylinder hoses(4) and put plugs(5) on cylinder pipe.



3) DISASSEMBLY

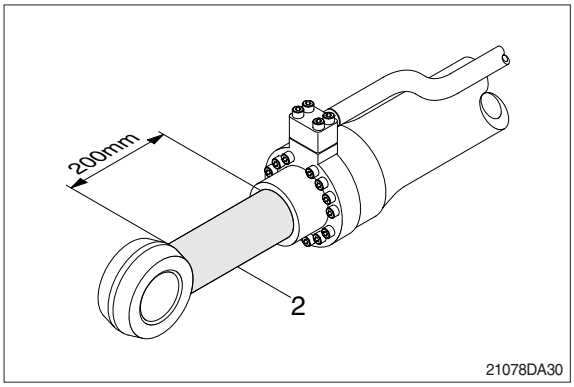
(1) Remove cylinder head and piston rod

※ **Procedures are based on the bucket cylinder.**

① Hold the clevis section of the tube in a vise.

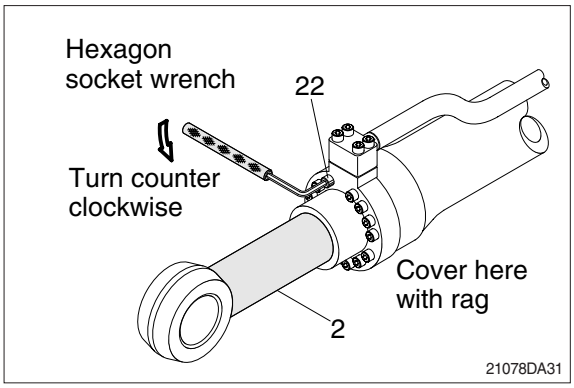
※ Use mouth pieces so as not to damage the machined surface of the cylinder tube. Do not make use of the outside piping as a locking means.

② Pull out rod assembly(2) about 200㎜ (7.1in). Because the rod assembly is rather heavy, finish extending it with air pressure after the oil draining operation.



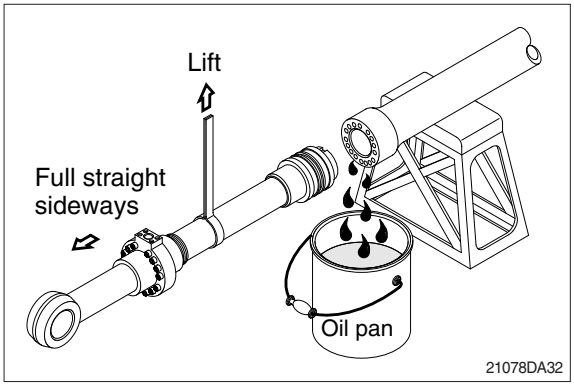
③ Loosen and remove socket bolts(22) of the gland in sequence.

※ Cover the extracted rod assembly(2) with rag to prevent it from being accidentally damaged during operation.



④ Draw out cylinder head and rod assembly together from tube assembly(1).

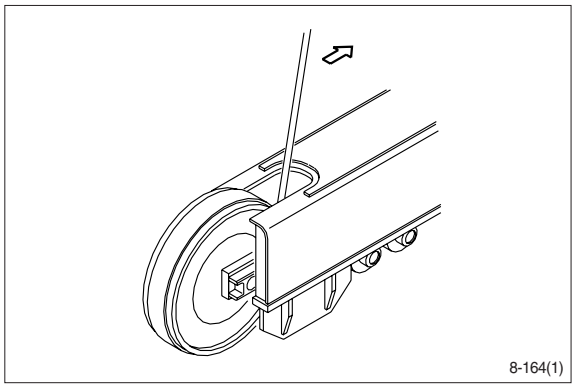
※ Since the rod assembly is heavy in this case, lift the tip of the rod assembly(2) with a crane or some means and draw it out. However, when rod assembly(2) has been drawn out to approximately two thirds of its length, lift it in its center to draw it completely.



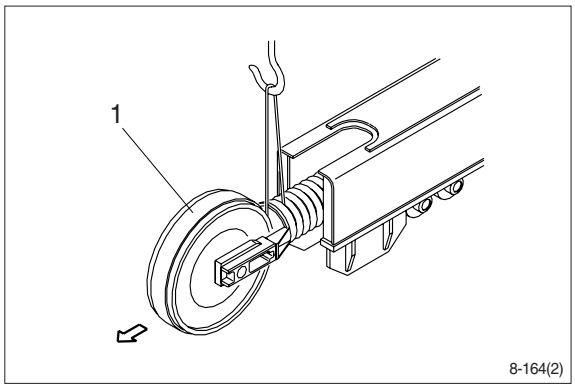
4. IDLER AND RECOIL SPRING

1) REMOVAL

(1) Remove the track link.
For detail, see **removal of track link**.

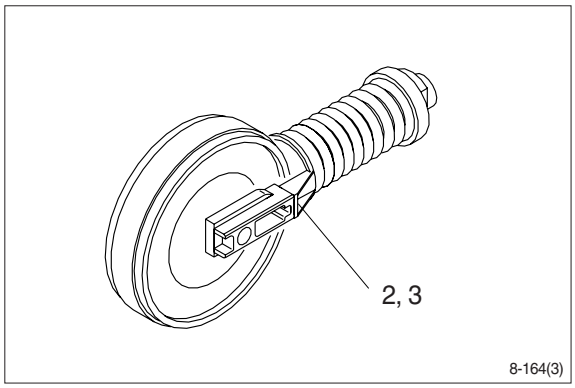

8-164(1)

(2) Sling the recoil spring(1) and pull out idler and recoil spring assembly from track frame, using a pry.
· Weight : 457kg(1010lb)



8-164(2)

(3) Remove the bolts(2), washers(3) and separate ilder from recoil spring.

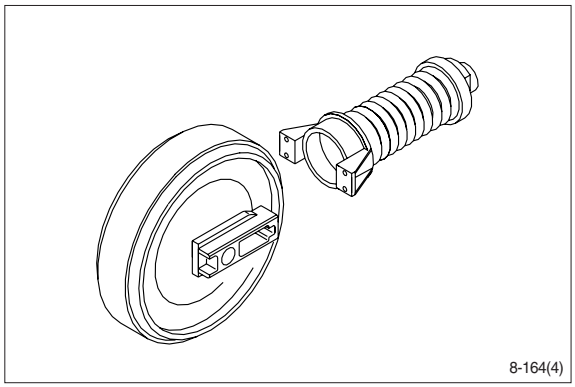


8-164(3)

2) INSTALL

(1) Carry out installation in the reverse order to removal.

※ Make sure that the boss on the end face of the recoil cylinder rod is in the hole of the track frame.

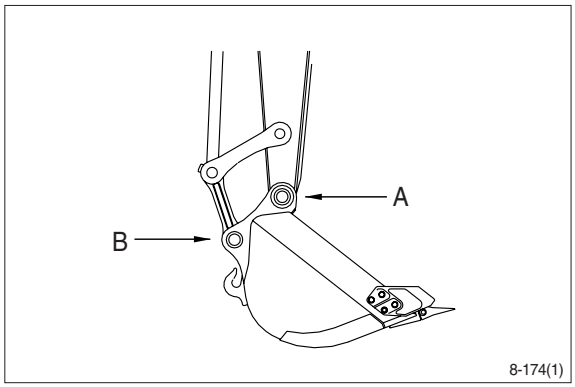

8-164(4)

2. REMOVAL AND INSTALL

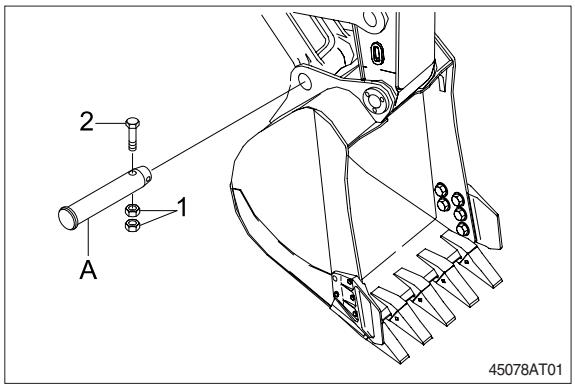
1) BUCKET ASSEMBLY

(1) Removal

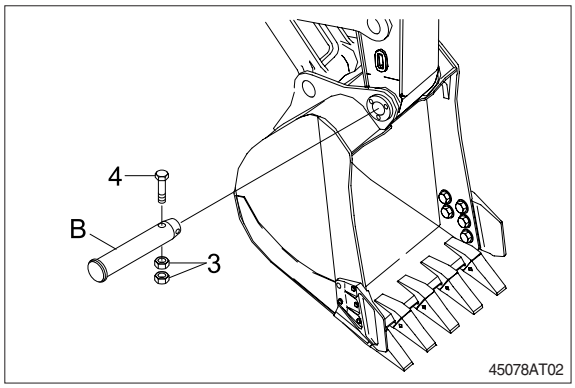
① Lower the work equipment completely to ground with back of bucket facing down.



② Remove nut(1), bolt(2) and draw out the pin(A).



③ Remove nut(3), bolt(4) and draw out the pin(B).



(2) Install

① Carry out installation in the reverse order to removal.

⚠ When aligning the mounting position of the pin, do not insert your fingers in the pin hole.

※ Adjust the bucket clearance.
For detail, see **operation manual.**