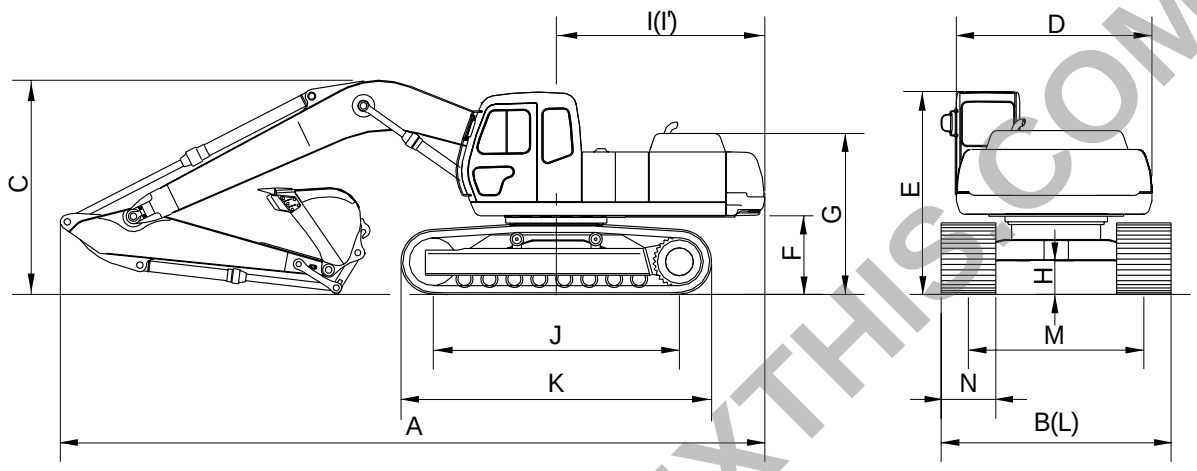
2. SPECIFICATION

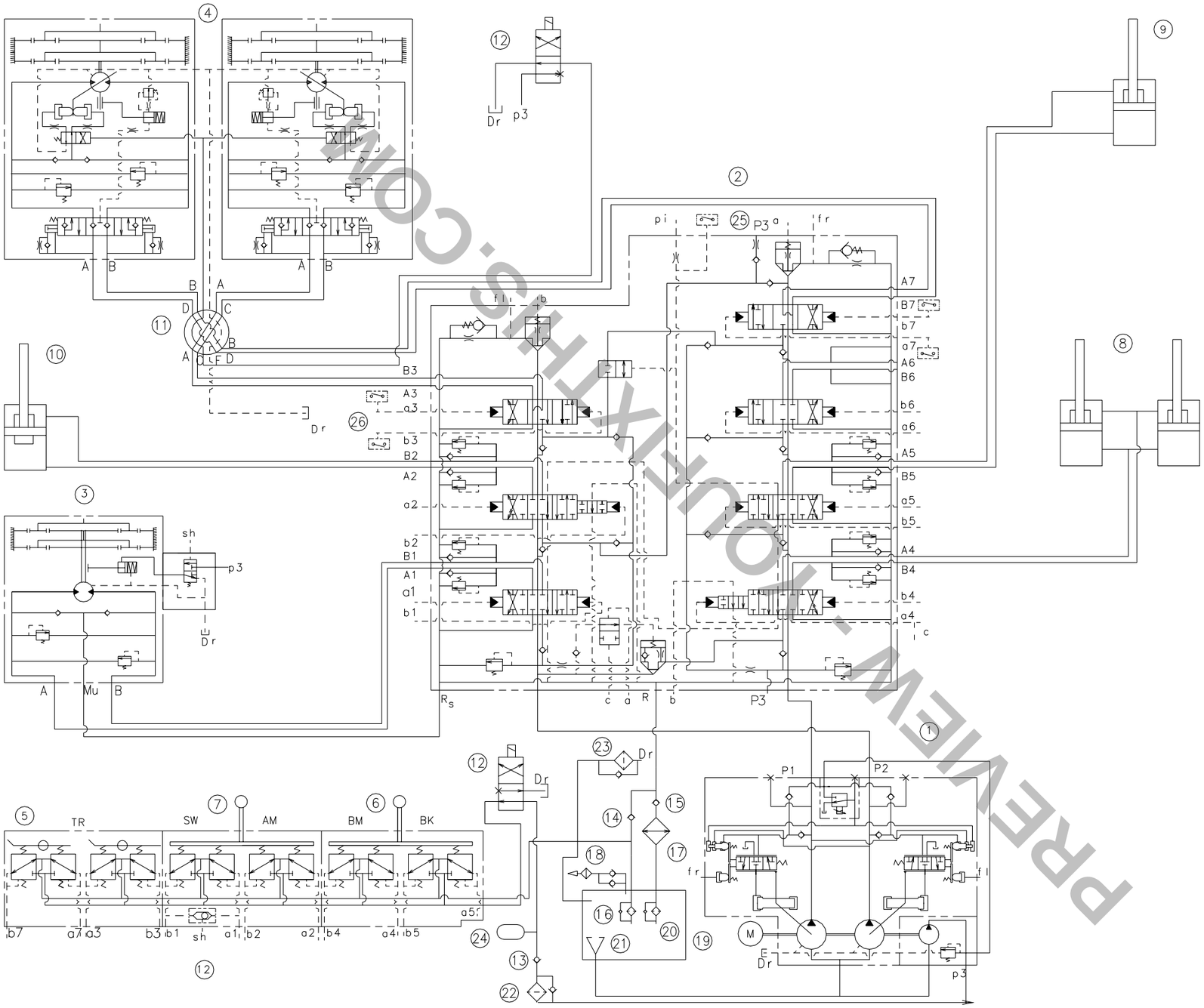
1) ROBEX 290-3



Description		Unit	Specification
Operating weight		kg (lb)	27000 (59600)
Bucket capacity(CECE heaped), standard		m^3 (yd^3)	1.1 (1.44)
Overall length	A	mm (ft-in)	10580 (34' 9")
Overall width, with 810㎜ shoe	B		3410 (11' 2")
Overall height	C		3320 (10' 11")
Superstructure width	D		2900 (9' 6")
Cab height	E		3040 (9' 12")
Ground clearance of counterweight	F		1185 (3' 11")
Engine cover height	G		2420 (7' 11")
Minimum ground clearance	H		500 (1' 8")
Rear-end distance	I		3100 (10' 2")
Rear-end swing radius	I'		3100 (10' 2")
Distance between tumblers	J		3710 (12' 2")
Undercarriage length	K		4650 (15' 3")
Undercarriage width	L		3410 (11' 2")
Track gauge	M		2600 (8' 6")
Track shoe width, standard	N		810 (32")
Travel speed (low/high)		km/hr (mph)	3.0 / 4.6 (1.9 / 2.9)
Swing speed		rpm	10.2
Gradeability		degree (%)	35 (70)
Ground pressure(810㎜ shoe)		kg/cm^2 (psi)	0.43 (6.12)

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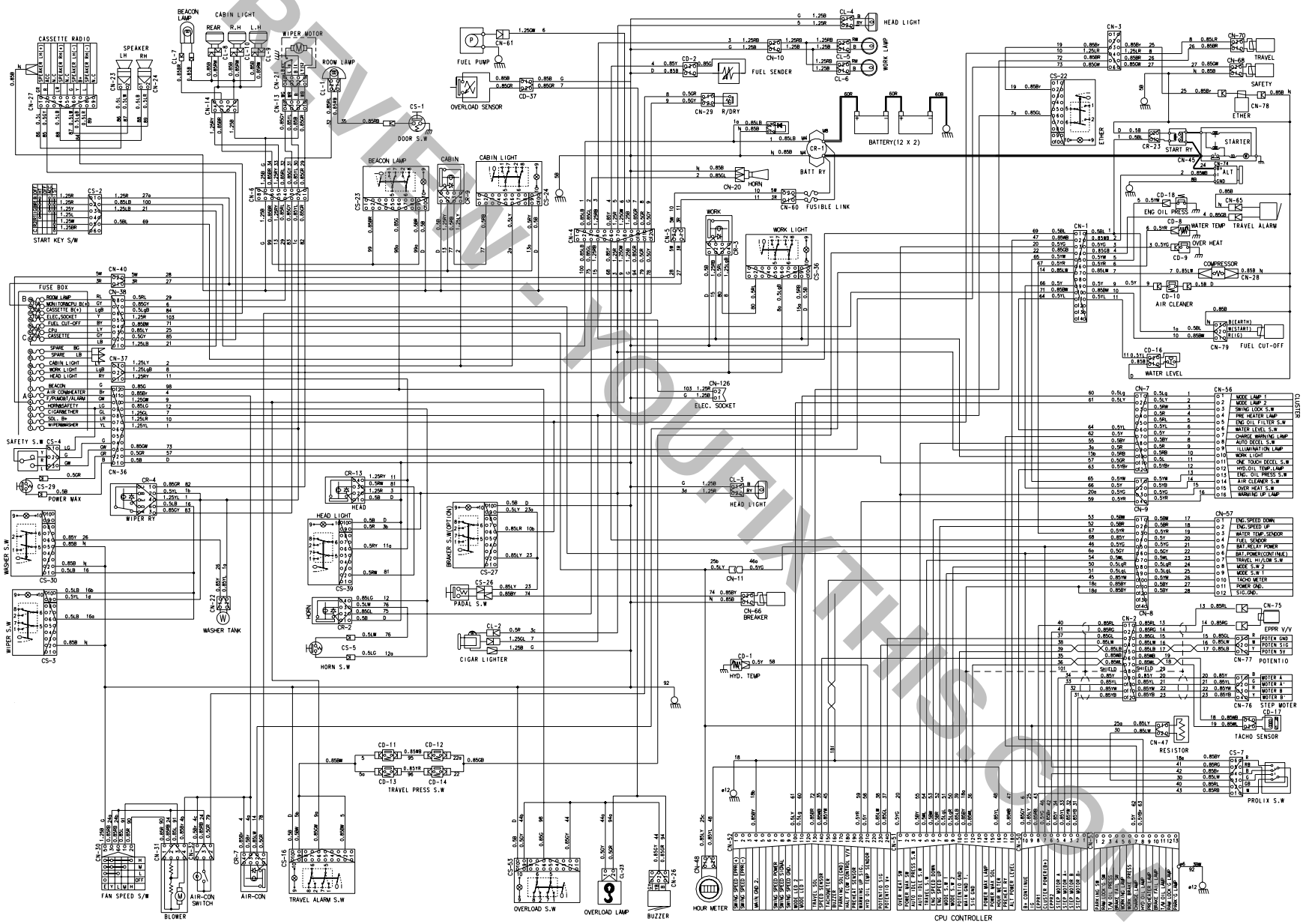
GROUP 1 HYDRAULIC CIRCUIT



1 PUMP
2 MCV
3 SWING MOTOR
4 TRACK MOTOR
5 RCV PEDAL
6 RCV LEVER
7 RCV LEVER
8 BOOM CYL
9 BUKT CYL
10 ARM CYL
11 TURNING JOINT
12 SOLENOID VALVE
13 CHECK VALVE
14 CHECK VALVE
15 CHECK VALVE
16 HYD TANK
17 OILCOOLER
18 BREATHER
19 BY PASS VALVE
20 RETURN FILTER
21 STRAINER
22 LINE FILTER
23 SPIN FILTER
24 ACCUMULATOR
25 PRESSURE SWITCH
26 PRESSURE SWITCH

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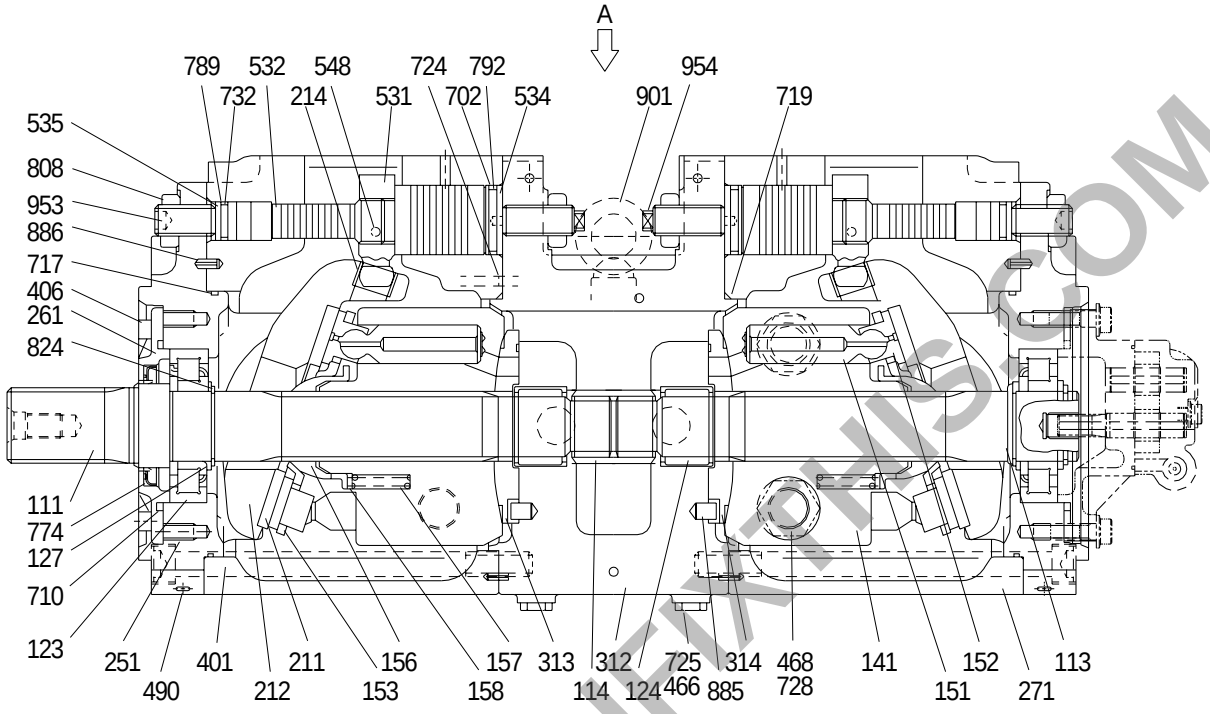


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1) MAIN PUMP(1/2)

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



111	Drive shaft(F)	271	Pump casing	719	O-ring
113	Drive shaft(R)	312	Valve block	724	O-ring
114	Spline	313	Valve plate(R)	725	O-ring
123	Roller bearing	314	Valve plate(L)	726	O-ring
124	Needle bearing	325	Casing	728	O-ring
127	Bearing spacer	401	Hexagon socket bolt	732	O-ring
141	Cylinder block	406	Hexagon socket bolt	774	Oil seal
151	Piston	466	VP Plug	789	Back up ring
152	Shoe	468	VP Plug	792	Back up ring
153	Push plate	490	VP 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	Hexagon socket screw
214	Bushing	702	O-ring	954	Set screw
251	Support plate	710	O-ring		
261	Seal cover(F)	717	O-ring		

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GROUP 3 PUMP DEVICE

1. REMOVAL AND INSTALL

1) REMOVAL

(1) Lower the work equipment to the ground and stop the engine.

(2) Loosen the breather slowly to release the pressure inside the hydraulic tank.

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

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

· Hydraulic tank quantity : 275 ℓ

(4) Remove bolts(12) and disconnect pipe(1,2)

(5) Disconnect pilot line hoses(4,5,6,7,8,9,10)

(6) Remove bolts(11) 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.

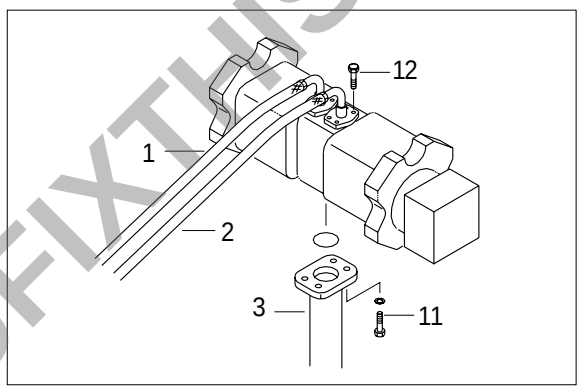
(7) Sling the pump assembly and remove the pump mounting bolts.

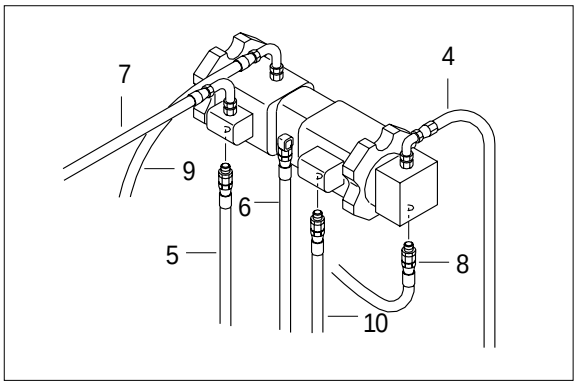
· Weight : 155 kg (342 lb)

Pull out the pump assembly from housing.

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





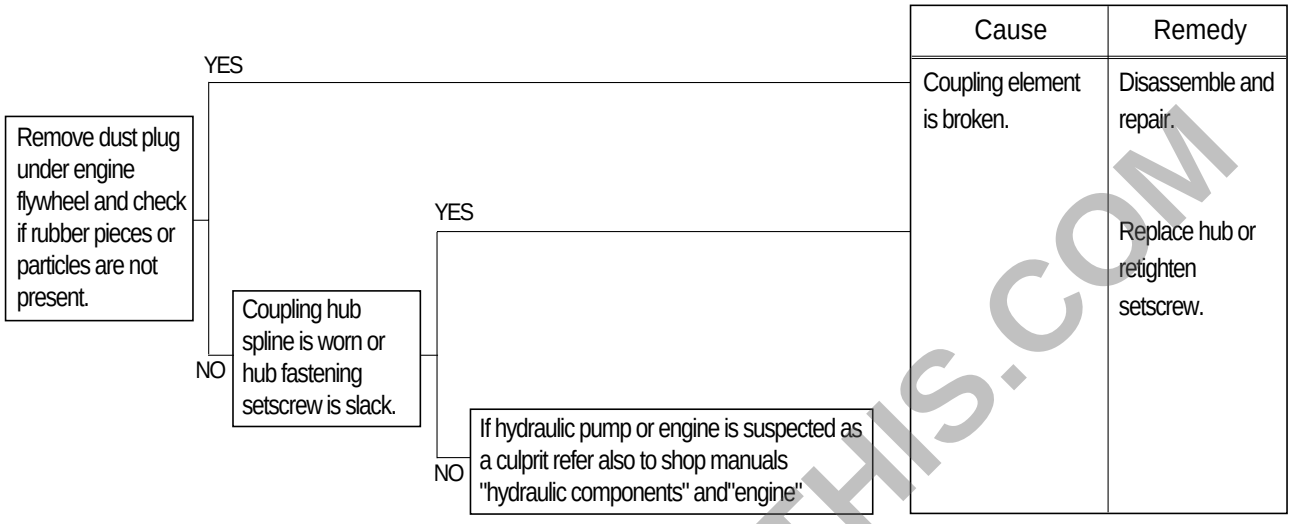


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2. DRIVE SYSTEM

1) UNUSUAL NOISE COMES OUT OF PUMP CONNECTION



Cause	Remedy
Coupling element is broken.	Disassemble and repair.
	Replace hub or retighten setscrew.

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Millimeters to inches

1mm = 0.03937 in

	0	1	2	3	4	5	6	7	8	9
0		0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Kilogram to Pound

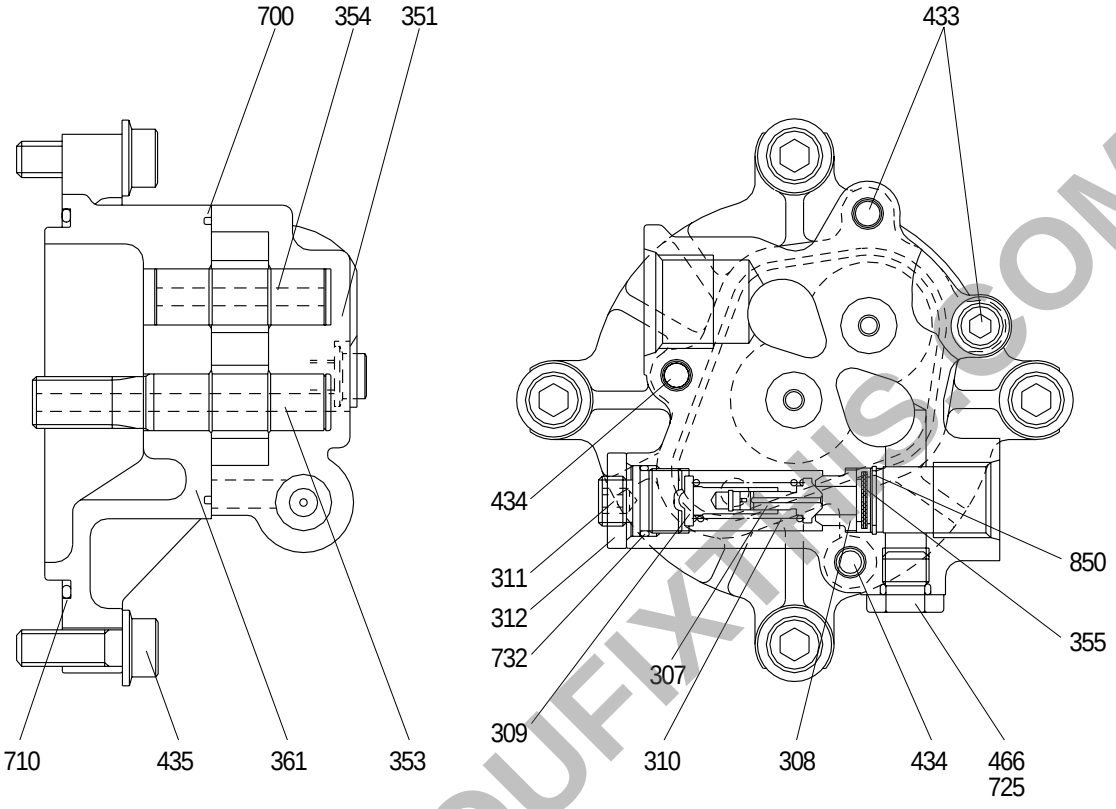
1kg = 2.2046 lb

	0	1	2	3	4	5	6	7	8	9
0		2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.5.	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26

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3) GEAR PUMP



307	Poppet	353	Drive gear	466	Plug
308	Seat	354	Driven gear	700	Ring
309	Spring seat	355	Filter	710	O-ring
310	Spring	361	Front case	725	O-ring
311	Screw	433	Flange socket	732	O-ring
312	Nut	434	Flange socket	850	Snap ring
351	Gear case	435	Flange socket		

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2. FUNCTION

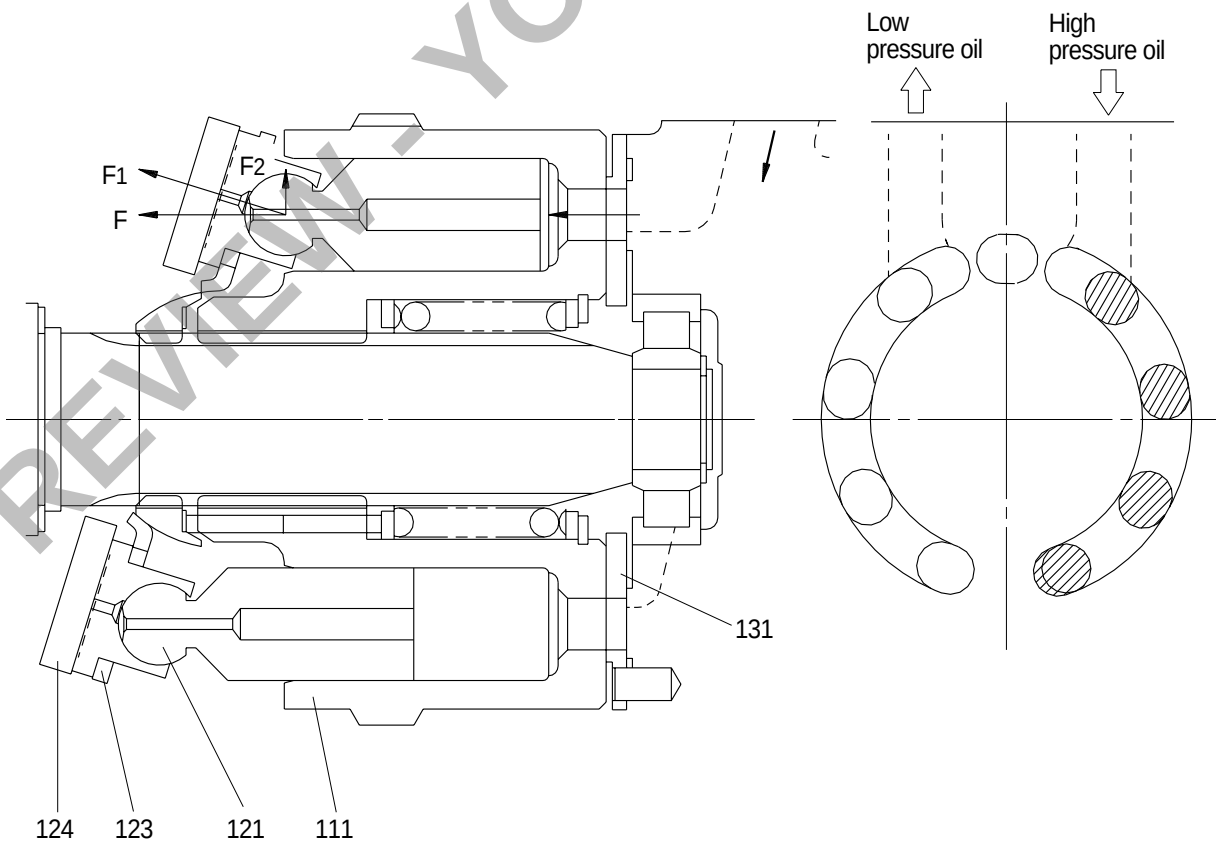
1) ROTARY PART

When high pressurized oil enters a cylinder through port(a), which is the inlet of balance plate(131), hydraulic pressure acting on the piston causes axial force F. The pressure force F works via the piston(121) upon the return plate(123) which acts upon the swash plate(124) via an hydrostatic bearing. Force F1 perpendicular to swash plate(124) and force F2 perpendicular to cylinder center. Being transferred to the cylinder block(111) 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.

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

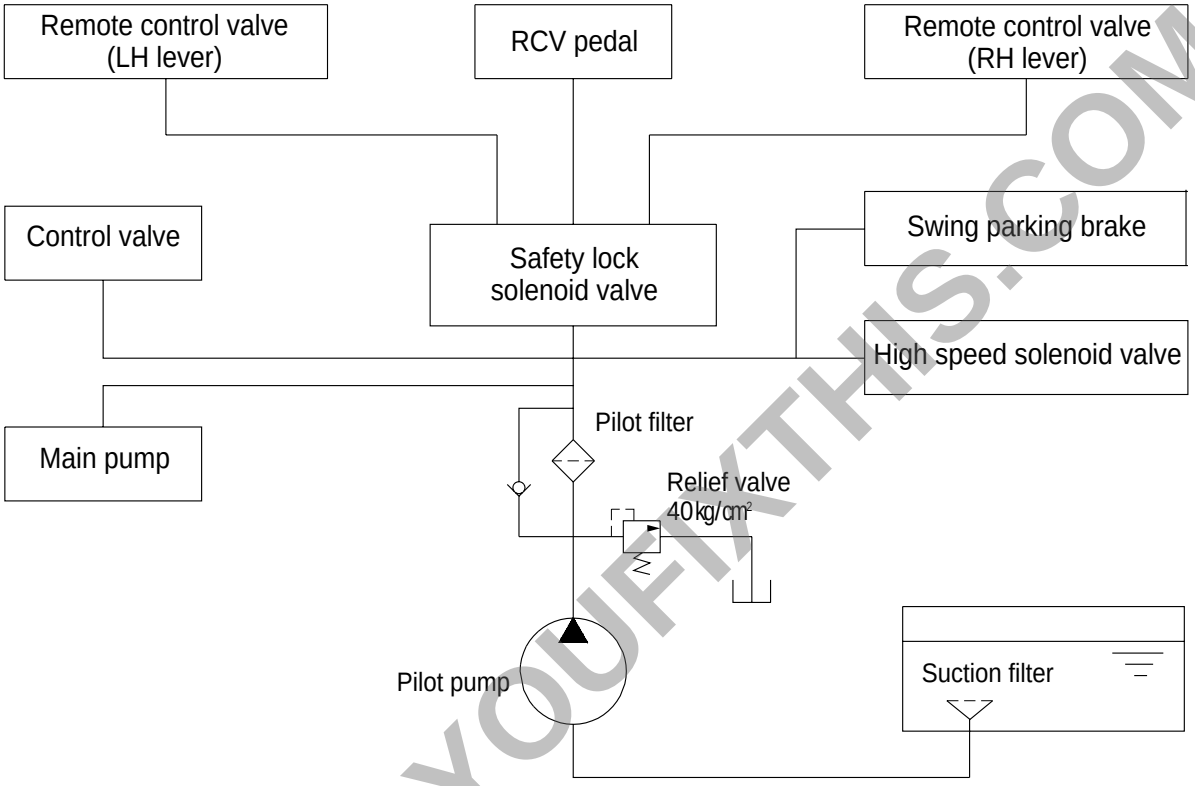
Where p : Effective difference of pressure(kgf/cm^2)
q : Displacement(cc/rev)
T : Output torque(kgf · cm)
Z : Piston number
A : Piston area(cm^2)
θ : Tilting angle of swash plate(degree)
S : Piston stroke(cm)



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GROUP 3 PILOT CIRCUIT



The pilot circuit consists of suction circuit, delivery circuit and return circuit.
The pilot pump is provide 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 pilot filter, EPPR valve, high speed solenoid valve, swing parking brake, main control valve and safety lock solenoid valve.

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HEAD LIGHT CIRCUIT(CE Regulation not applied)

1) OPERATING FLOW

Fuse box (No.8) → I/conn 〔CN-37(1)〕 → Head light switch 〔CS-39(6)〕
Head light relay 〔CR-13(4)〕

※ When Light switch ON

Head light switch ON 〔CS-39(2)〕 → Head light relay 〔CR-13(3) → (1)〕 → Ground
〔CR-13(4) → (2)〕 →

→ Head light ON 〔CL-3(3)〕
→ I/conn 〔CN-4(7)〕 → Head light ON 〔CL-4(3)〕
→ I/conn 〔CN-7(9)〕 → Cluster illumination Lamp 〔CN-56(9)〕

2) CHECK POINT

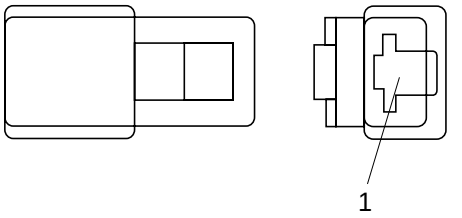
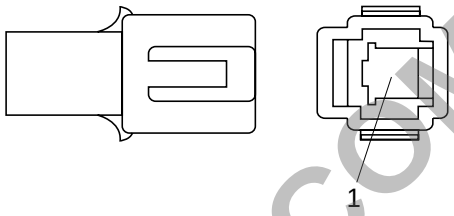
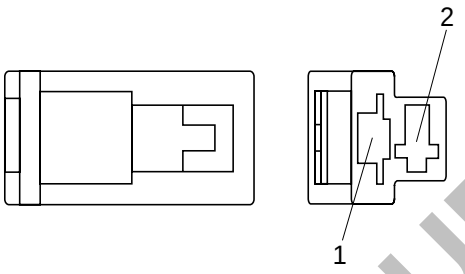
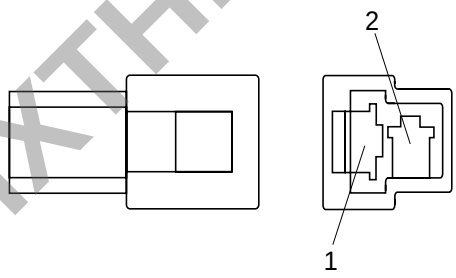
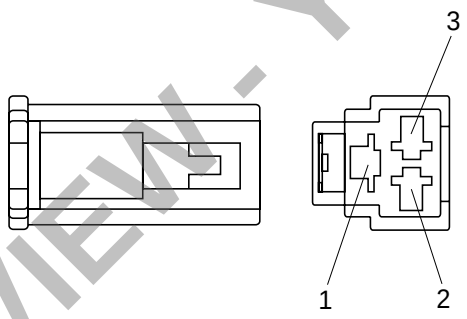
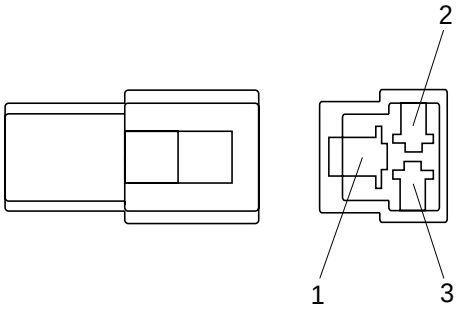
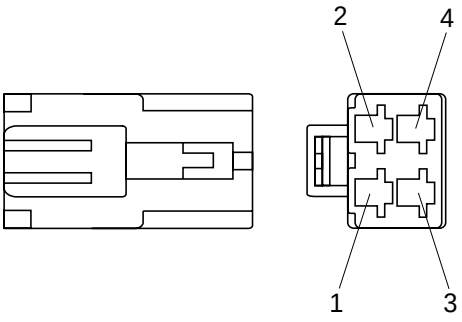
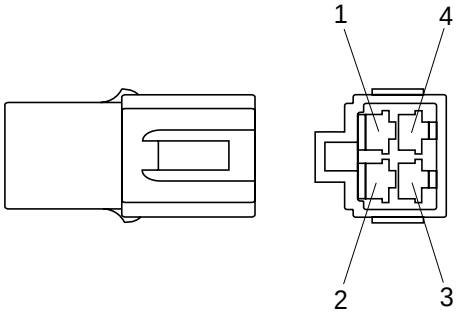
Engine	Key switch	Check point	Voltage
STOP	ON	① - GND (Fuse box) ② - GND (Switch power input) ③ - GND (Switch power output) ④ - GND (Relay input) ⑤ - GND (Relay coil) ⑥ - GND (Relay output) ⑦ - GND (Head light)	20 ~ 25V

※ GND : Ground

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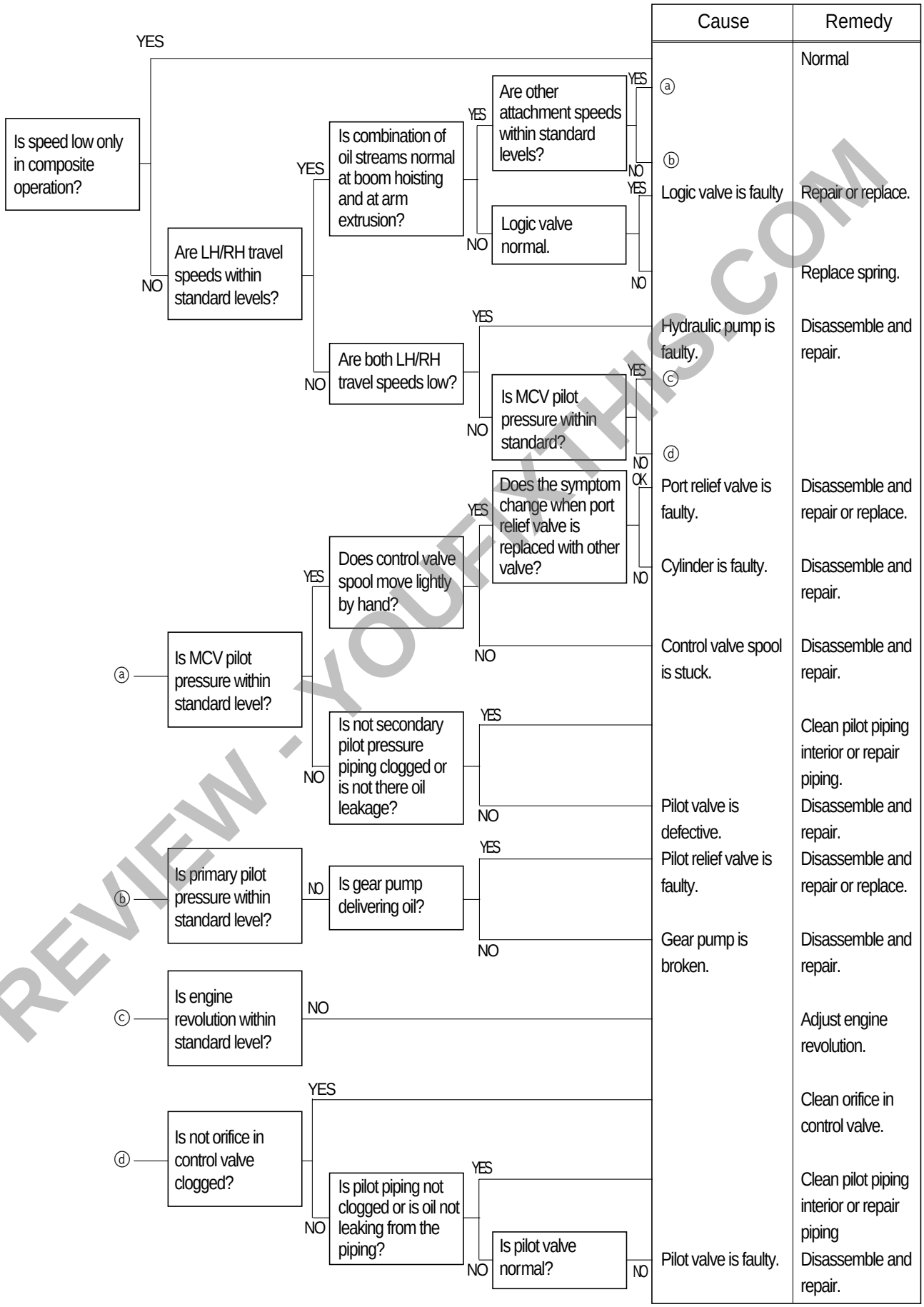
7) CN TYPE CONNECTOR

No. of pin	Receptacle connector(Female)	Plug connector(Male)
1	 S810-00120	 S810-10120
2	 S810-002202	 S810-102202
3	 S810-003202	 S810-103202
4	 S810-004202	 S810-104202

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2) BOOM, ARM OR BUCKET SPEED IS LOW



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8. ONE TOUCH DECEL SYSTEM DOES NOT WORK

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

1) INSPECTION PROCEDURE

Check resistance value between CN-51(4) - GND.

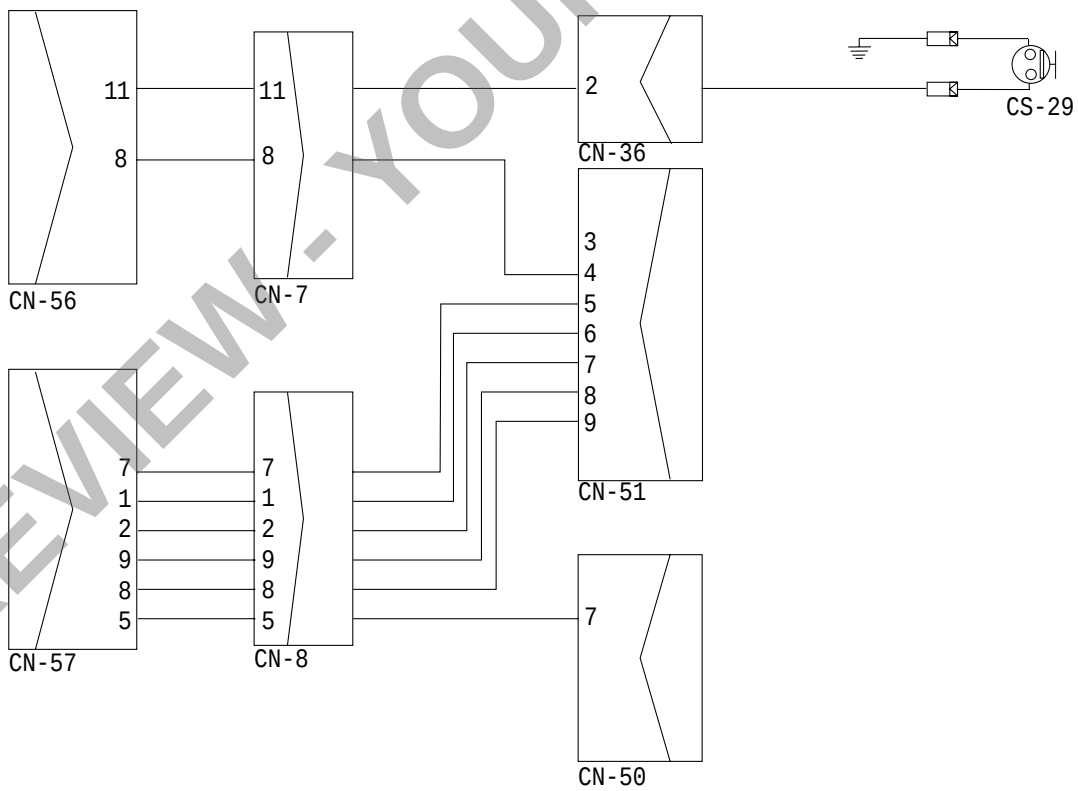
SPEC :
Switch ON : 0 Ω
Switch OFF : ∞ Ω
SEE : TEST 19

YES

NO

Cause	Remedy
Defective CPU controller.	Replace.
Short circuit or poor connection between CN-51(3) - (4)	Replace or repair.
Defective cluster.	Replace.

Wiring diagram



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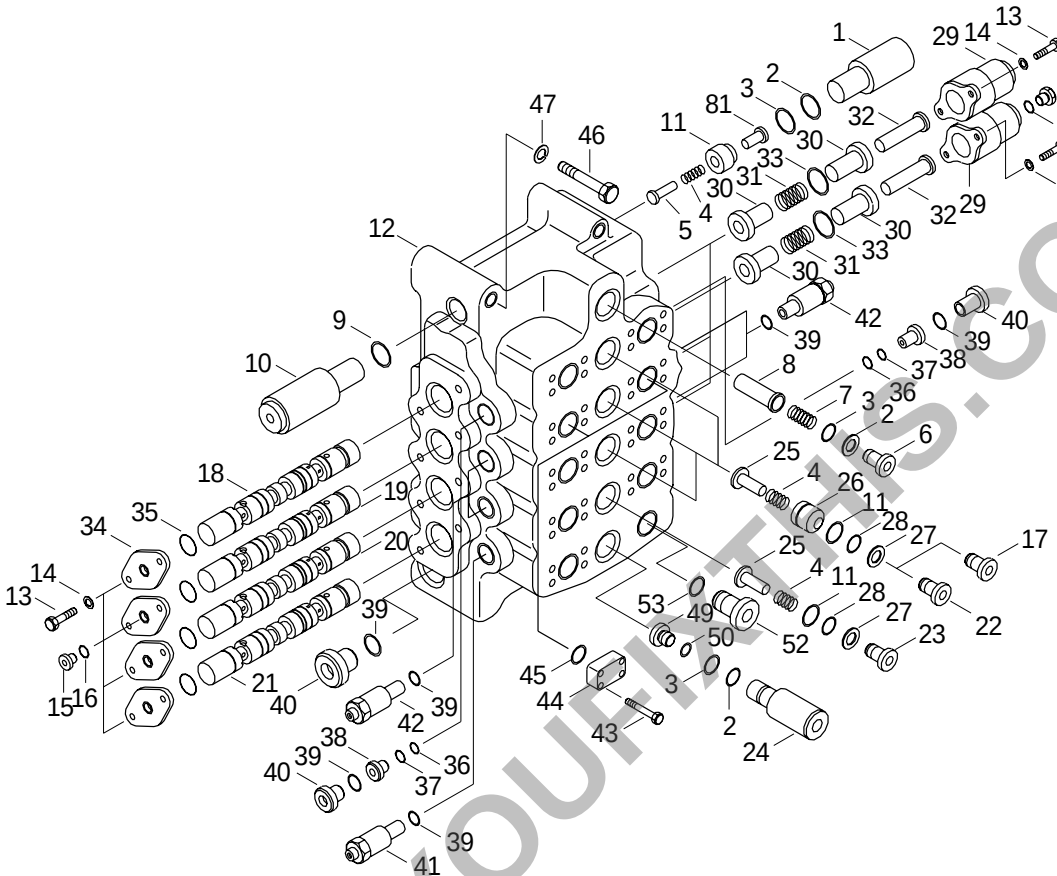
8. CYLINDER

Part name	Inspecting section	Inspection item	Remedy
Piston rod	· Neck of rod pin	· Presence of crack	· Replace.
	· Weld on rod hub	· Presence of crack	· Replace.
	· Stepped part to which piston is attached.	· Presence of crack	· Replace.
	· Threads	· Presence of crack	· Recondition or replace.
	· Bend	· Measure degree of bend (See Fig. 39.)	· Refer to Table 4.
	· Plated surface	· Plating is not worn off to base metal · Rust is not present on plating. · Scratches are not present.	· Replace or replate. · Replace or replate. · Recondition, replate or replace.
	· Rod	· Wear of O.D.	· Recondition, replate or replace.
	· Bushing at mounting part	· Wear of I.D.	· Replace.
Cylinder tube	· Weld on bottom	· Presence of crack	· Replace.
	· Weld on head	· Presence of crack	· Replace.
	· Weld on hub	· Presence of crack	· Replace.
	· Tube interior	· Presence of faults	· Replace if oil leak is seen.
	· Bushing at mounting part	· Wear on inner surface	· Replace.
Cylinder head	· Bushing	· Wear on inner surface · Flaw on inner surface	· See para. 4.2. · Replace if flaw is deeper than coating.

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STRUCTLURE(3/3)



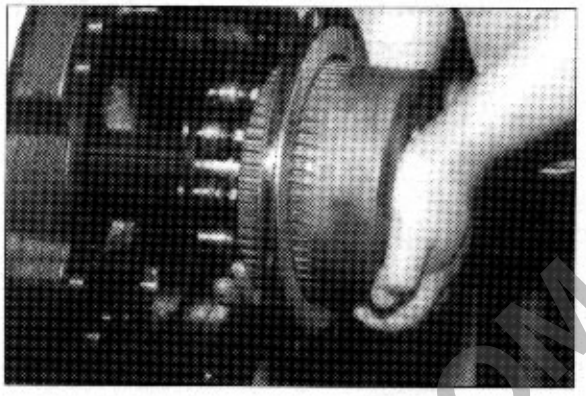
1	Cap	19	Plunger	37	Back up ring
2	Back up ring	20	Plunger	38	Plug
3	O-ring	21	Plunger	39	O-ring
4	Spring	22	Plunger	40	Cap
5	Check	23	Cap	41	Main relief
6	Cap	24	Cap	42	Port relief
7	Spring	25	Check	43	Bolt
8	Poppet	26	Check	44	Plunger
9	O-ring	27	Back up ring	45	O-ring
10	Port relief	28	O-ring	46	Bolt
11	Nylon chip	29	Cover	47	Spring washer
12	Housing	30	Spring guide	49	Cap
13	Bolt	31	Spring	50	O-ring
14	Spring washer	32	Plunger cap	52	Cap
15	Cap	33	O-ring	53	O-ring
16	O-ring	34	Retainer	81	Check
17	Cap	35	O-ring		
18	Plunger	36	O-ring		

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⑧ Pull out cylinder and piston sub-assembly.

※ For easy operation, place motor in horizontal position.

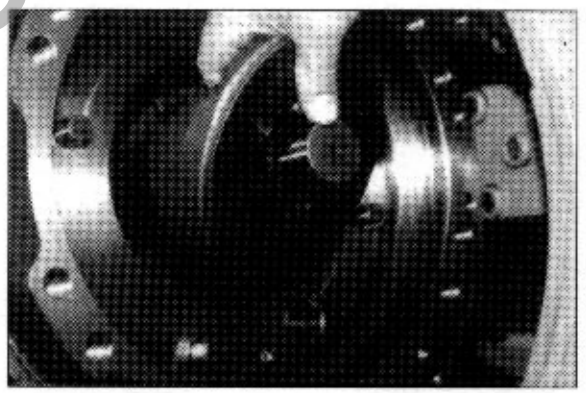


⑨ Remove stopper L(503) and piston(501).

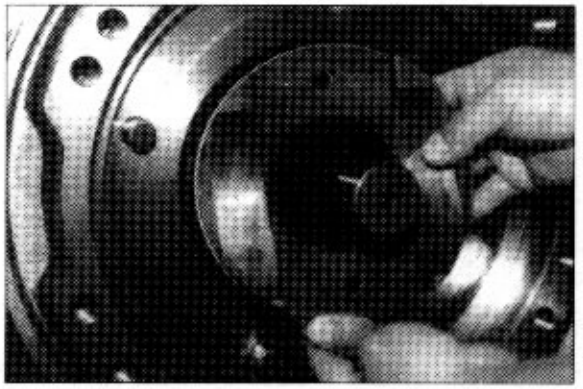
※ Use M5 bolt and they can be removed easily.



⑩ Remove swash plate(201).



⑪ Screw M12 bolt to swash plate supporter(202) and pull it out.



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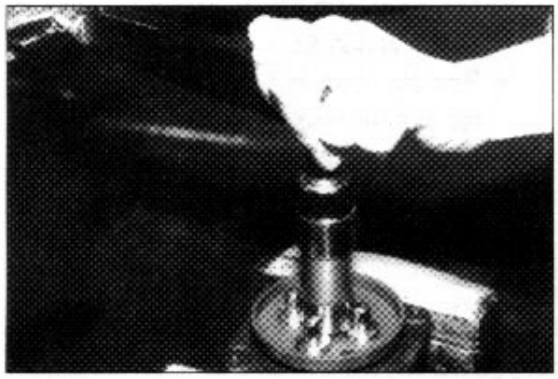
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(11) When return spring is strong in force, assemble 4 sets at the same time, utilizing plate(151), and tighten joint(301) temporarily.



(12) Fit plate(151).

(13) Tighten joint(301) with the specified torque to casing, utilizing jig.



(14) Assemble disk(302) to joint(301).

※ Screw it to position that it contacts with 4 push rods evenly.

※ Do not screw it over.



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