1. STRUCTURE

This service manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.
This service manual mainly contains the necessary technical information for operations performed in a service workshop.
For ease of understanding, the manual is divided into the following sections.

SECTION 1 GENERAL
This section explains the safety hints and gives the specification of the machine and major components.

SECTION 2 STRUCTURE AND FUNCTION
This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.

SECTION 3 HYDRAULIC SYSTEM
This section explains the hydraulic circuit, single and combined operation.

SECTION 4 ELECTRICAL SYSTEM
This section explains the electrical circuit, monitoring system and each component. It serves not only to give an understanding electrical system, but also serves as reference material for trouble shooting.

SECTION 5 MECHATRONICS SYSTEM
This section explains the computer aided power optimization system and each component.

SECTION 6 TROUBLESHOOTING
This section explains the troubleshooting charts correlating **problems** to **causes**.

SECTION 7 MAINTENANCE STANDARD
This section gives the judgement standards when inspecting disassembled parts.

SECTION 8 DISASSEMBLY AND ASSEMBLY
This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

SECTION 9 COMPONENT MOUNTING TORQUE
This section shows bolt specifications and standard torque values needed when mounting components to the machine.

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Contact your HYUNDAI distributor for the latest information.

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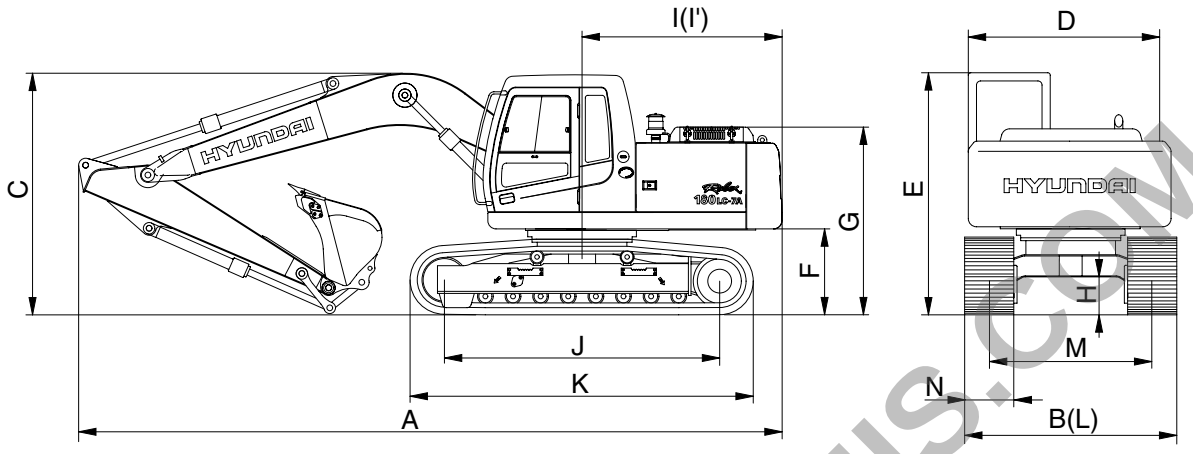
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2. SPECIFICATIONS

1) R180LC-7A



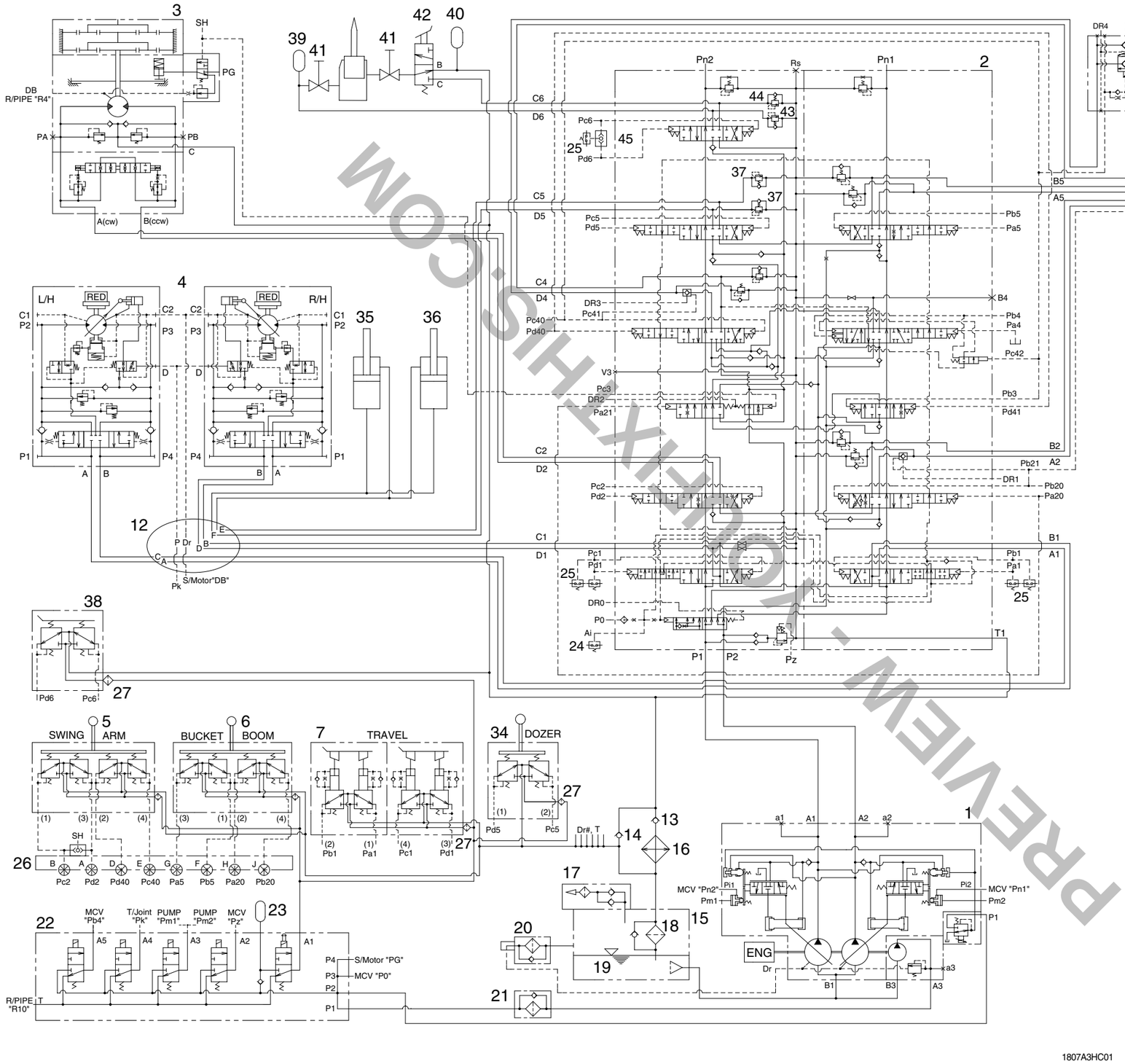
1807A2SP02

Description		Unit	Specification
Operating weight		kg (lb)	18200 (40120)
Bucket capacity(SAE heaped), standard		m^3 (yd^3)	0.76 (0.99)
Overall length	A	mm (ft-in)	8600 (28' 3")
Overall width, with 600mm shoe	B		2850 (9' 4")
Overall height	C		2910 (9' 7")
Superstructure width	D		2475 (8' 1")
Overall height of cab	E		2915 (9' 7")
Ground clearance of counterweight	F		1050 (3' 5")
Engine cover height	G		2295 (7' 6")
Minimum ground clearance	H		460 (1' 6")
Rear-end distance	I		2480 (8' 2")
Rear-end swing radius	I'		2530 (8' 4")
Distance between tumblers	J		3360 (11' 0")
Undercarriage length	K		4190 (13' 9")
Undercarriage width	L		2850 (9' 4")
Track gauge	M		2250 (7' 5")
Track shoe width, standard	N		600 (24")
Travel speed(Low/high)		km/hr (mph)	3.3/5.2 (2.1/3.2)
Swing speed		rpm	11.3
Gradeability		Degree (%)	30 (58)
Ground pressure(600mm shoe)		kgf/cm^2 (psi)	0.42 (5.97)

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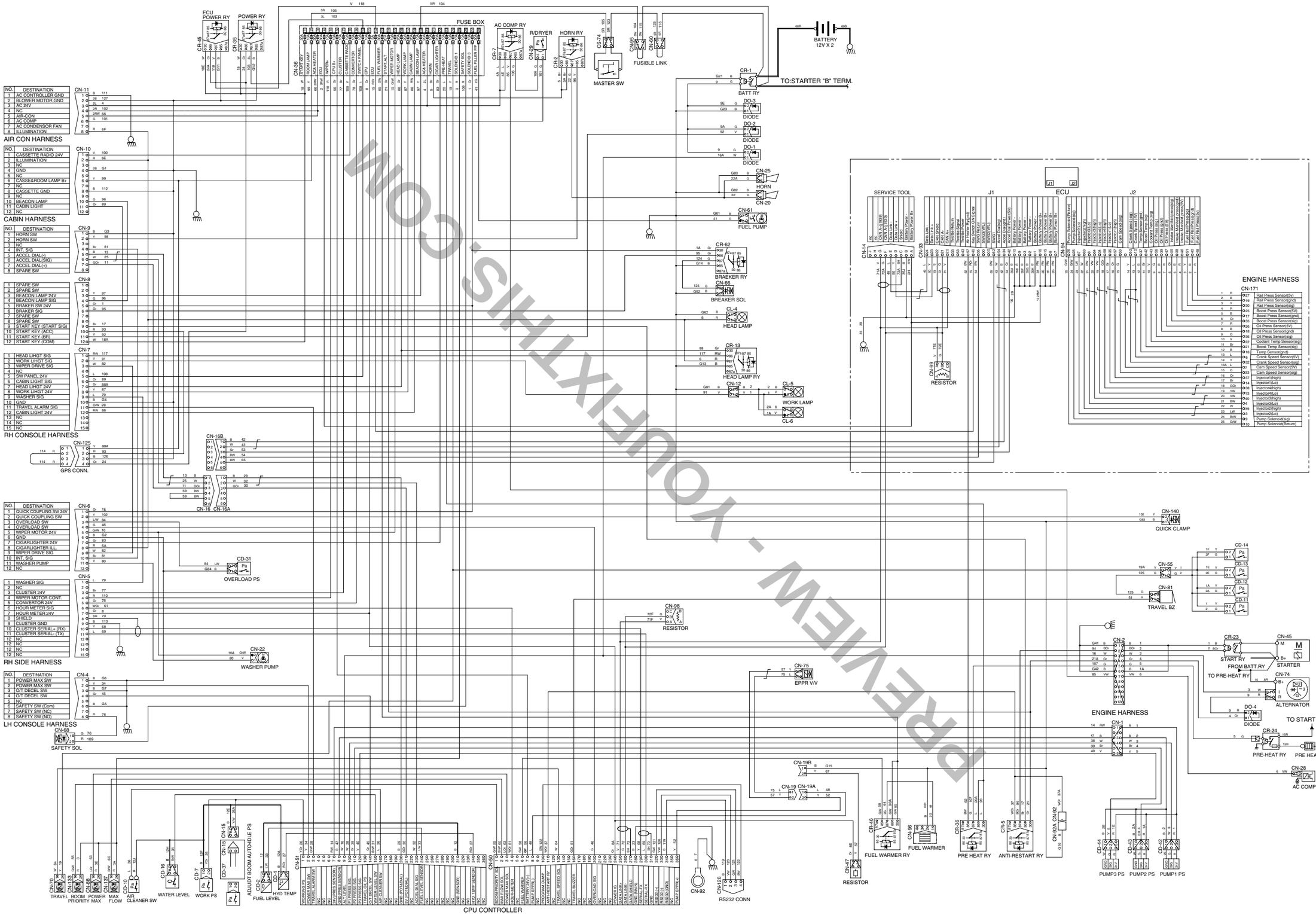
GROUP 1 HYDRAULIC CIRCUIT



1807A3HC01

1 Main pump
2 Main control valve
3 Swing motor
4 Travel motor
5 RCV lever(LH)
6 RCV lever(RH)
7 RCV pedal
8 Boom cylinder(LH)
9 Boom cylinder(RH)
10 Arm cylinder
11 Bucket cylinder
12 Turning joint
13 Check valve
14 Check valve
15 Hydraulic tank
16 Oil cooler
17 Air breather
18 Bypass valve
19 Strainer
20 Spin filter
21 Line filter
22 Solenoid valve
23 Accumulator(Option)
24 Pressure switch
25 Pressure switch(Option)
26 Terminal
27 Last guard filter
30 Boom safety valve(Option)
31 Arm safety valve(Option)
32 Pressure switch(Option)
33 Shut off valve(Option)
34 RCV lever(Dozer, option)
35 Dozer cylinder(LH, option)
36 Dozer cylinder(RH, option)
37 Port relief valve(Option)
38 Breaker pedal(Option)
39 Accumulator(Option)
40 Accumulator(Option)
41 Stop valve(Option)
42 2 way selector valve(Option)
43 Port relief valve(Option)
44 Port relief valve(Option)
45 2 way shuttle valve(Option)

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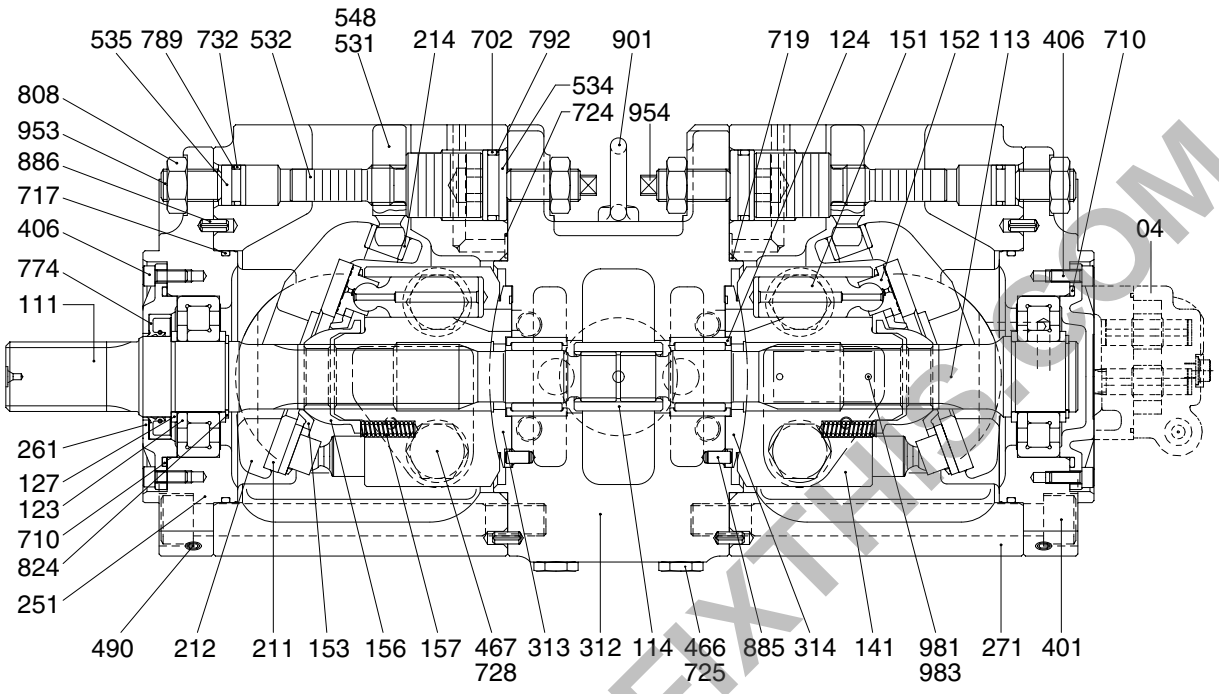
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1607A4CI01

1) MAIN PUMP(1/2)

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



1607A2MP02

04	Gear pump	271	Pump casing	719	O-ring
111	Drive shaft (F)	312	Valve block	724	O-ring
113	Drive shaft (R)	313	Valve plate (R)	725	O-ring
114	Spline coupling	314	Valve plate (L)	728	O-ring
123	Roller bearing	401	Hexagon socket bolt	732	O-ring
124	Needle bearing	406	Hexagon socket bolt	774	Oil seal
127	Bearing spacer	466	VP Plug	789	Back up ring
141	Cylinder block	467	VP Plug	792	Back up ring
151	Piston	490	Plug	808	Hexagon head nut
152	Shoe	531	Tilting pin	824	Snap ring
153	Set plate	532	Servo piston	885	Pin
156	Bushing	534	Stopper (L)	886	Spring pin
157	Cylinder spring	535	Stopper (S)	901	Eye bolt
211	Shoe plate	548	Pin	953	Set screw
212	Swash plate	702	O-ring	954	Set screw
214	Bushing	710	O-ring	981	Plate
251	Support	717	O-ring	983	Pin
261	Seal cover (F)				

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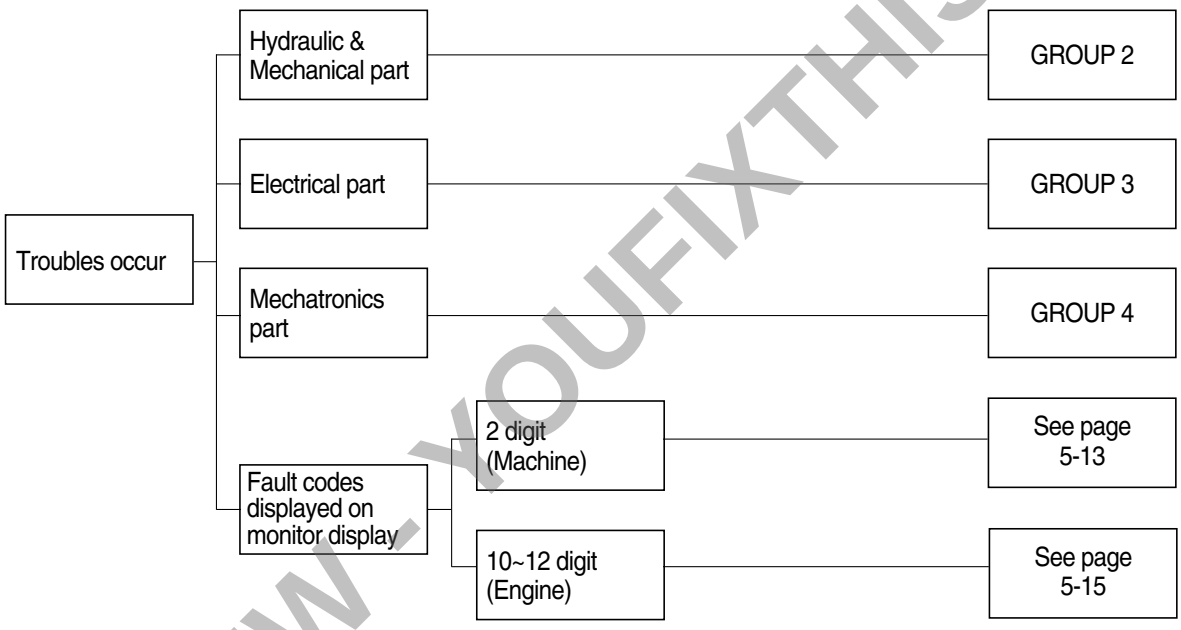
SECTION 6 TROUBLESHOOTING

GROUP 1 BEFORE TROUBLESHOOTING

1. INTRODUCTION

When a trouble is occurred in the machine, this section will help an operator to maintain the machine with easy.

The trouble of machine is parted Hydraulic & Mechanical system, Electrical system and Mechatronics system. At each system part, an operator can check the machine according to the troubleshooting process diagram.



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GROUP 2 TIGHTENING TORQUE

1. MAJOR COMPONENTS

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt(Bracket-Frame, FR)	M16 × 2.0	30±3.5	217±25.3
2		Engine mounting bolt(Bracket-Frame, RR)	M20 × 2.5	55±3.5	398±25.3
3		Engine mounting bolt(Engine-Bracket)	M12 × 1.75	10.0±1.0	72.3±7.2
4		Radiator mounting bolt, nut	M12 × 1.75	12.2±1.3	88.2±9.4
5		Coupling mounting bolt	M16 × 2.0	22.0±1.0	159±7.2
6	Hydraulic system	Main pump housing mounting bolt	M10 × 1.5	6.9±1.4	49.9±10.1
7		Main pump mounting bolt	M16 × 2.0	22.5±0.5	163±3.6
8		Main control valve mounting bolt	M12 × 1.75	12.2±1.3	88.2±9.4
9		Fuel tank mounting bolt	M20 × 2.5	45±5.1	325±36.9
10	Power train system	Hydraulic oil tank mounting bolt	M20 × 2.5	45±5.1	325±36.9
11		Turning joint mounting bolt, nut	M12 × 1.75	12.2±1.3	88.2±9.4
12		Swing motor mounting bolt	M20 × 2.5	57.9±8.7	419±62.9
13		Swing bearing upper mounting bolt	M20 × 2.5	57.8±6.4	418±46.3
14		Swing bearing lower mounting bolt	M20 × 2.5	57.8±6.4	418±46.3
15	Under carriage	Travel motor mounting bolt	M16 × 2.0	23±2.5	166±18.1
16		Sprocket mounting bolt	M16 × 2.0	29.7±4.5	215±32.5
17		Carrier roller mounting bolt, nut	M20 × 2.5	54.7±6.0	396±43.4
18		Track roller mounting bolt	M20 × 2.5	54.7±6.0	396±43.4
19		Track tension cylinder mounting bolt	M16 × 2.0	29.7±4.5	215±32.5
20		Track shoe mounting bolt, nut	5/8-18UNF	42±4	304±28.9
21	Others	Track guard mounting bolt	M20 × 2.5	57.9±8.7	419±62.9
22		Counterweight mounting bolt	M30 × 3.5	199±30	1439±217
23		Cab mounting bolt, nut	M12 × 1.75	12.8±3.0	92.6±21.7
24		Operator's seat mounting bolt	M 8 × 1.25	4.05±0.8	29.3±5.8

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3. ERROR CODES TABLE

Error code No.	Description
1	Short circuit in accel actuator system
2	Potentiometer circuit is shorted to Vcc(5V) or battery +
3	Short circuit in pump EPPR valve system
4	Short circuit in boom down EPPR valve system
5	Short circuit in travel speed solenoid system
6	Short circuit in power boost solenoid system
7	Short circuit in max flow solenoid system
10	Short circuit in hour-meter system
11	Accel dial circuit is shorted to Vcc(5V) or battery +
12	P1 pressure sensor circuit is shorted to power supply(24V) line
13	P2 pressure sensor circuit is shorted to power supply(24V) line
14	P3 pressure sensor circuit is shorted to power supply(24) line
15	Boom down pressure circuit is shorted to power supply(24V) line
16	Accel actuator circuit is open or shorted to ground
17	Potentiometer circuit is open or shorted to ground
18	Pump EPPR valve circuit is open or shorted to ground
19	Boom down EPPR valve circuit is open or shorted to ground
20	Travel speed solenoid circuit is open or shorted to ground
21	Power boost solenoid circuit is open or shorted to ground
22	Max flow solenoid circuit is open or shorted to ground
25	Hour-meter circuit is open or shorted to ground
26	Accel dial circuit is open or shorted to ground
27	P1 pressure sensor circuit is open or shorted to ground
28	P2 pressure sensor circuit is open or shorted to ground
29	P3 pressure sensor circuit is open or shorted to ground
30	Boom down pressure sensor circuit is open or shorted to ground
31	Engine preheater circuit is open or shorted to ground
32	Travel alarm buzzer circuit is open or shorted to ground
33	Alternator circuit is open or shorted to ground
34	Controller input voltage is below 18V
35	Controller input voltage is over 38V
36	Communication error with cluster
37	Engine speed sensor circuit is open or shorted to ground
38	Anti-restart relay circuit is open or shorted to ground
39	Accel actuator does not stop at a target position
40	There is more than 500rpm difference between target speed and actual speed

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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 : 160 ℓ (42.2 U.S.gal)

(5) Remove socket bolts (74) and disconnect pipe (9).

(6) Disconnect pilot line hoses (48, 49, 55, 58, 64, 69, 71, 78).

(7) Remove socket bolts (72) and disconnect pump suction tube (3).

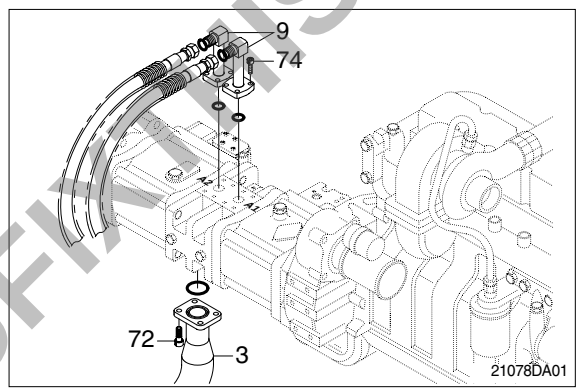
※ When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.

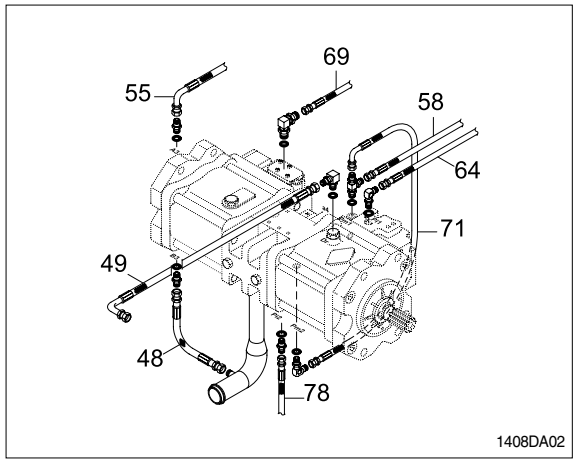
(8) Sling the pump assembly and remove the pump mounting bolts.

- Weight : 90kg (200lb)

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







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Millimeters to inches

1mm = 0.03937in

	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 = 2.2046lb

	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

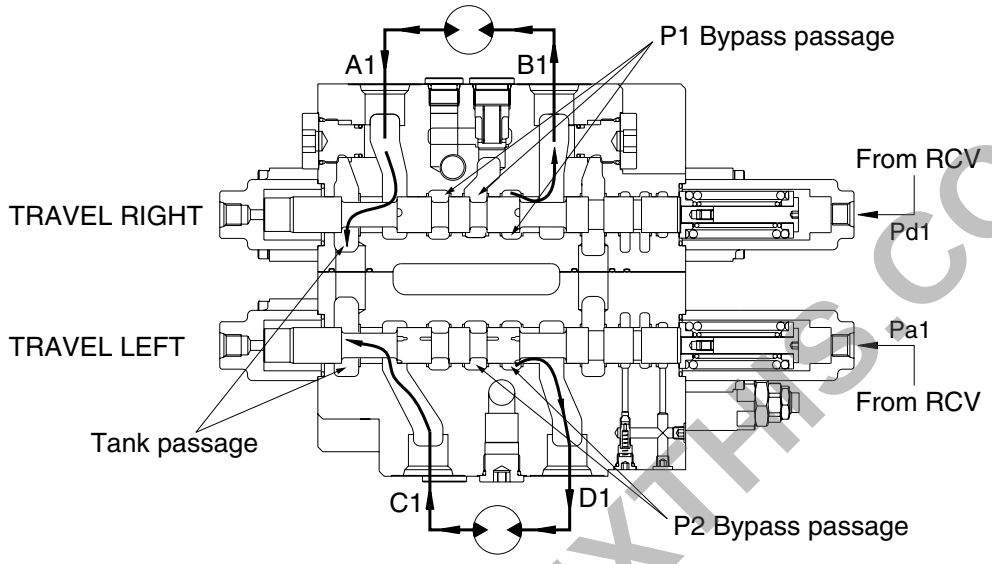
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2) EACH SPOOL OPERATION

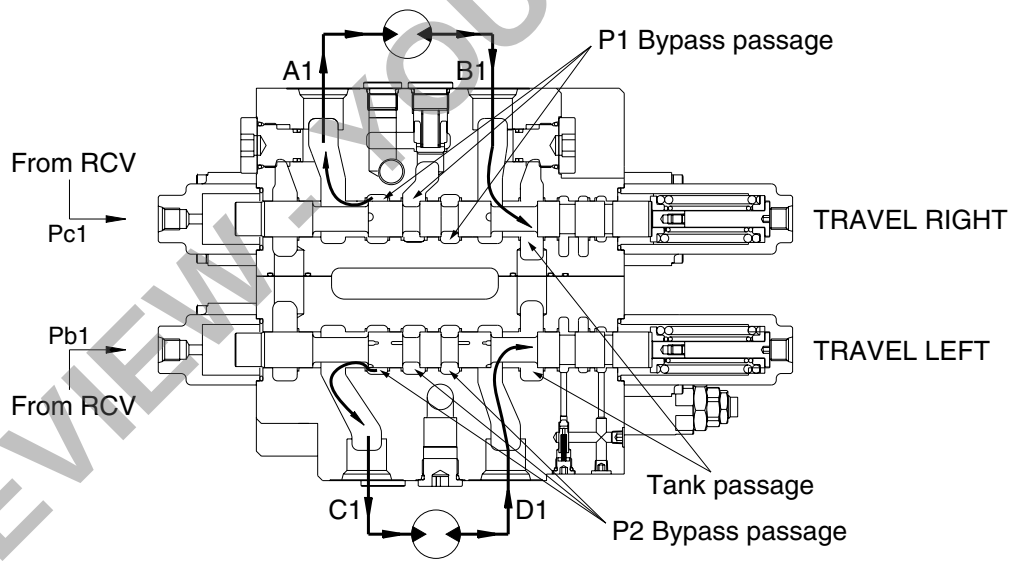
(1) TRAVEL OPERATION

① Travel forward operation



1607A2MC17A

② Travel backward operation

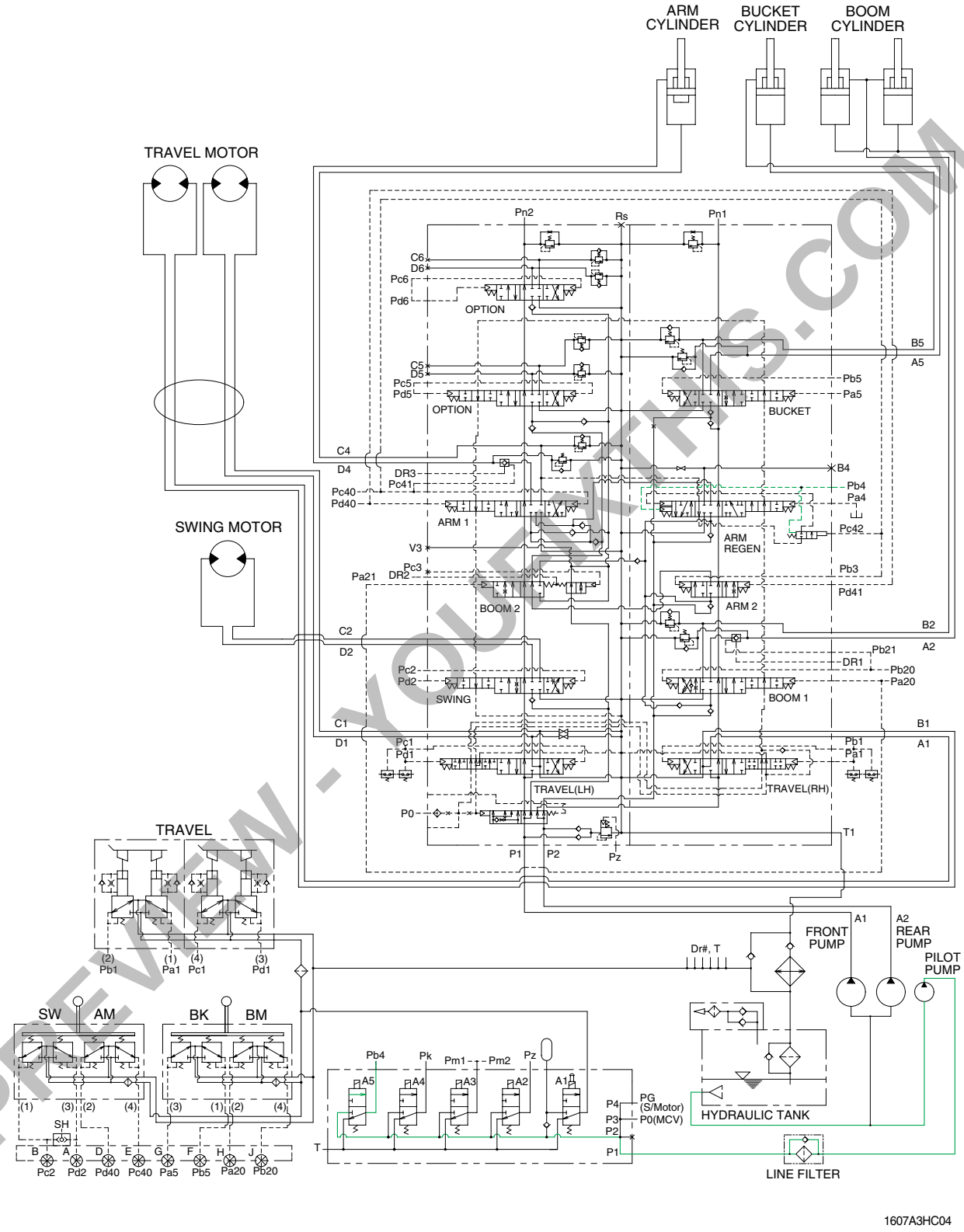


1607A2MC18A

During the travel operation, the hydraulic fluid of the pump A2 is supplied to the travel motor and the hydraulic fluid of the pump A1 is supplied to the other travel motor.
The pilot pressure from the pilot control valve is supplied to the spring side of pilot port (pa1, pd1).
And it shifts travel right and left spools in the left direction against springs. Hydraulic fluid from the pump A1 flow into the travel right spool through the bypass passage and hydraulic fluid from the pump A2 flow into the travel left spool through the bypass passage.
Then they are directed to the each travel motor through port A1 and D1. As a result, the travel motors turn and hydraulic fluid returns to the tank passage through the travel spools.
In case of the opposite operation, the operation is similar.

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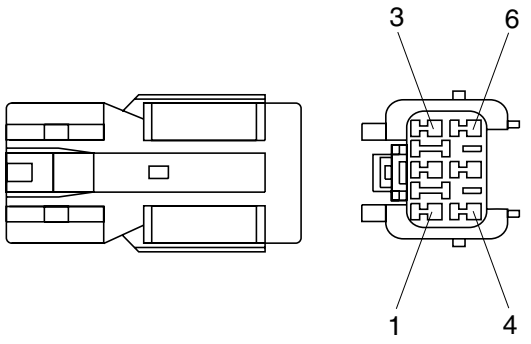
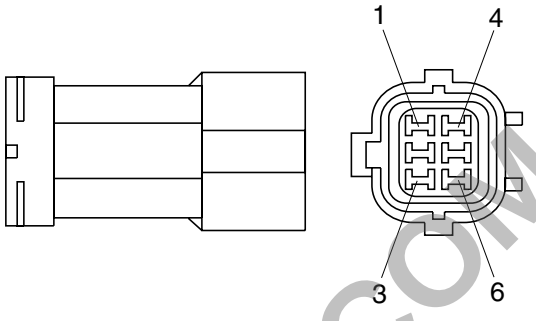
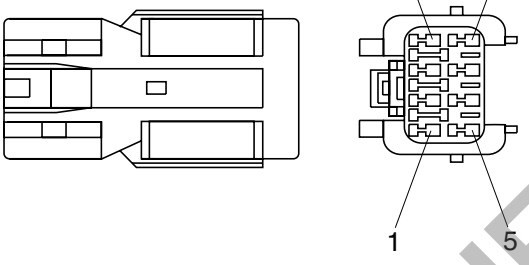
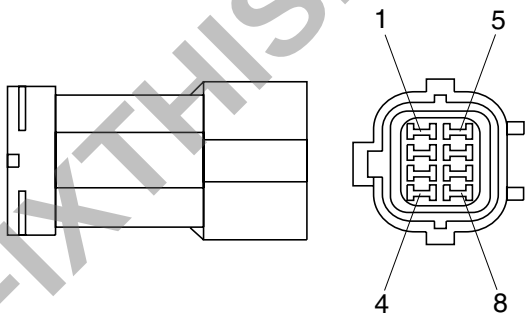
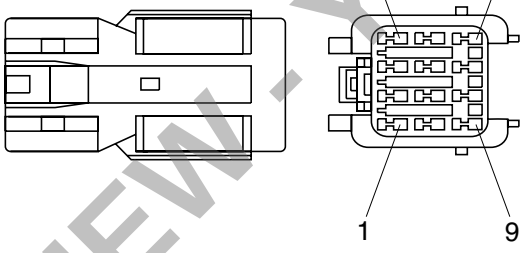
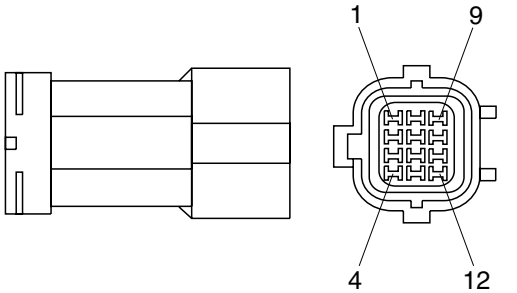
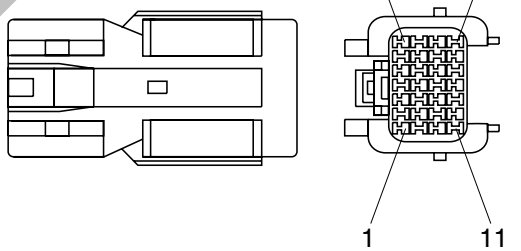
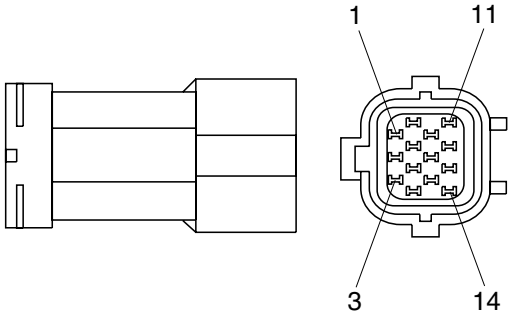
3. ARM REGENERATION SYSTEM



1607A3HC04

Then the heavy duty mode switch on the cluster is pushed ON, the arm regeneration solenoid valve is deactivated and the arm regeneration spool is returned to neutral position.
Then, the arm regeneration function is activated and arm operation speed is increased.

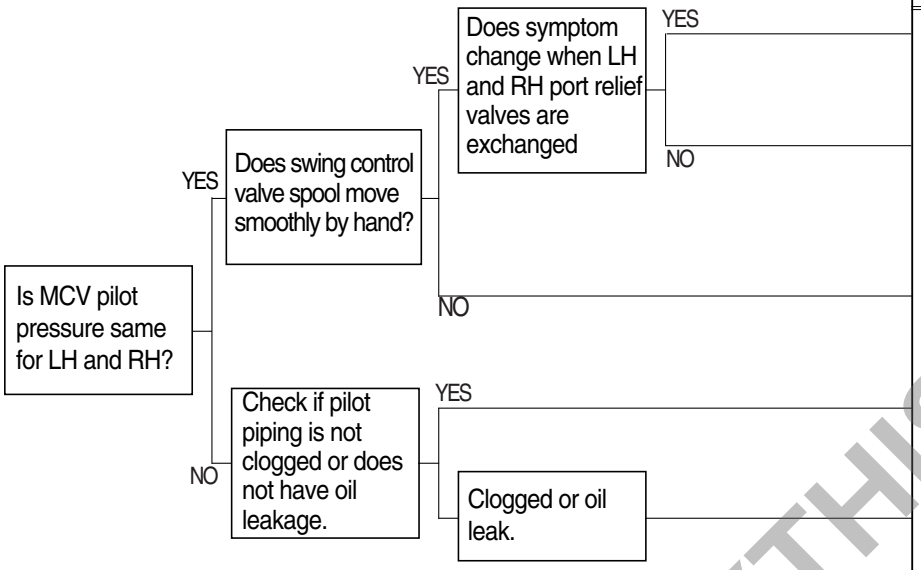
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No. of pin	Receptacle connector(Female)	Plug connector(Male)
6	 S814-006000	 S814-106000
8	 S814-008000	 S814-108000
12	 S814-012000	 S814-112000
14	 S814-014000	 S814-114000

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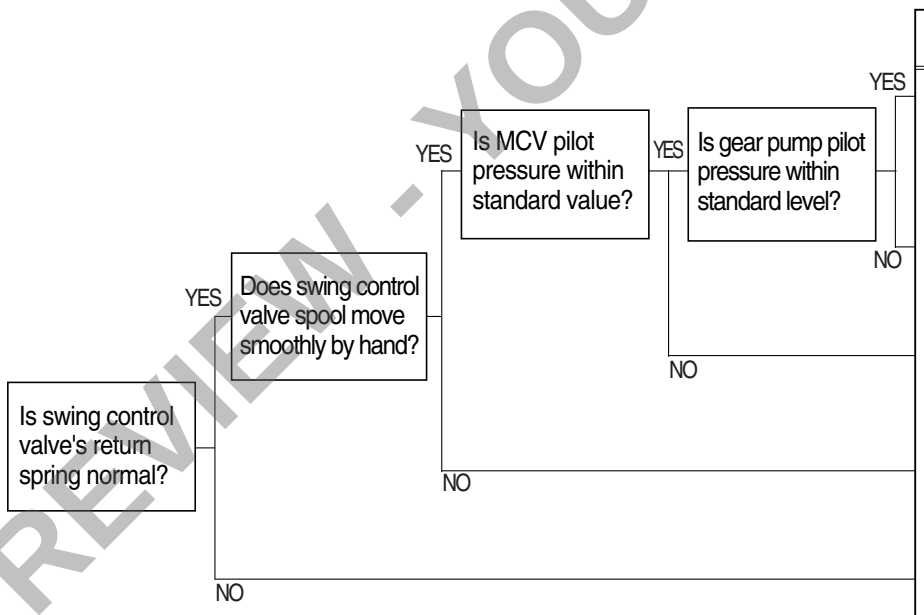
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3) SWING MOTION IS IMPOSSIBLE IN ONE DIRECTION



Cause	Remedy
Swing port relief valve is faulty.	Disassemble and repair.
Shuttle valve is faulty.	Disassemble and repair.
Swing control valve spool is stuck.	Disassemble and repair.
Pilot valve is faulty.	Disassemble and repair.
	Clean pilot piping interior or repair piping.

4) MACHINE SWINGS BUT DOES NOT STOP

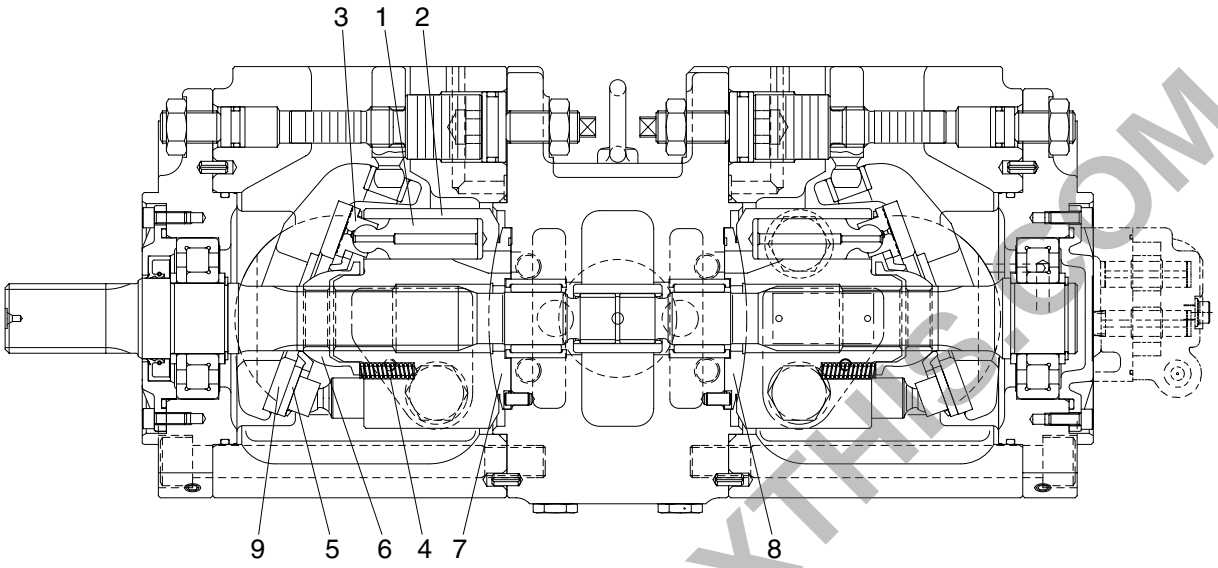


Cause	Remedy
Pilot relief valve is faulty.	Disassemble and repair or replace.
Gear pump is broken.	Disassemble and repair.
Pilot valve is faulty.	Disassemble and repair.
Swing control valve spool is stuck.	Disassemble and repair.
Return spring is faulty.	Disassemble and replace.

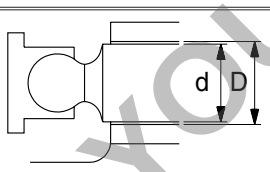
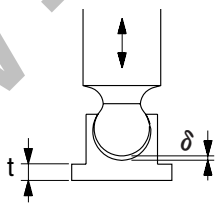
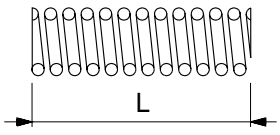
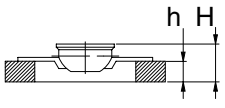
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1. MAIN PUMP



1607A7MP01

Part name & inspection item		Standard dimension	Recommended replacement value	Counter measures
Clearance between piston (1) & cylinder bore (2) (D-d)		0.028	0.056	Replace piston or cylinder.
Play between piston (1) & shoe caulking section (3) (δ)		0-0.1	0.3	Replace assembly of piston & shoe.
Thickness of shoe (t)		3.9	3.7	
Free height of cylinder spring (4) (L)		31.3	30.5	Replace cylinder spring.
Combined height of set plate (5) (H) & spherical bushing (6) (H-h)		19.0	18.3	Replace retainer or set plate.
Surface roughness for valve plate (Sliding face) (7,8), swash plate (shoe plate area) (9), & cylinder (2) (Sliding face)	Surface roughness necessary to be corrected	3z		Lapping
	Standard surface roughness (Corrected value)	0.4z or lower		

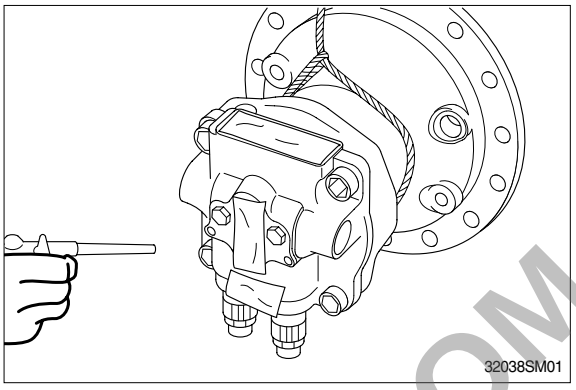
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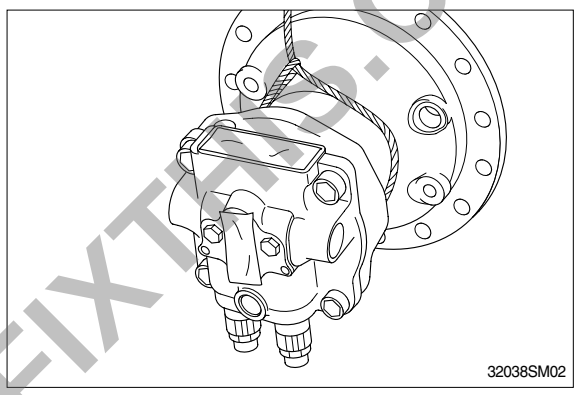
2) DISASSEMBLY

(1) Lift the motor out. Clean the motor in kerosene and dry with compressed air.

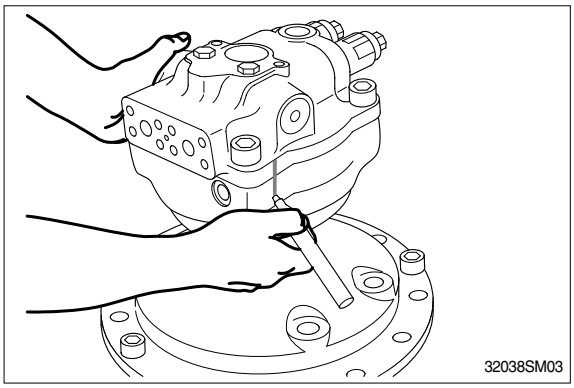
※ To avoid dust inside the motor, mask all the ports of the motor with tapes.



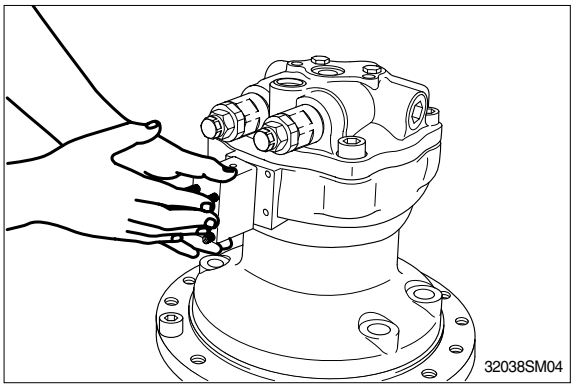
(2) Loosen the drain plug to discharge oil in the casing (301).



(3) Fix the drive shaft (101) on the workbench with the end of output shaft down. Put matching marks on casing (301) and valve casing (303) for easy reassembly.



(4) Remove the valve (052).



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1 Case
2 Plug
3 Plug
4 O-ring
5 Spool
6 Shim
7 Spring
8 Spring seat
9 Stopper
10 Spring
11 Plug
12 Rod seal
13 O-ring
14 Push rod
15 Push rod
16 Plate
17 Bushing
18 Joint assembly
19 Swash plate
20 Boot
21 Adjusting nut
22 Lock nut
23 O-ring
24 Handle bar
25 Nut
26 Boot
27 Handle assembly
28 Spring
29 Spring seat

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