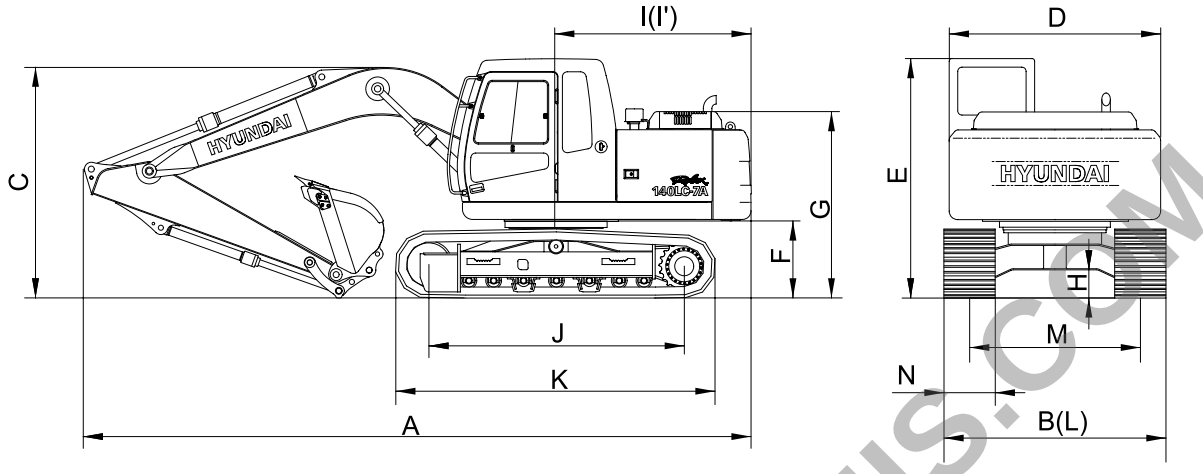
2. SPECIFICATIONS

1) R140LC-7A



1407A2SP02

Description		Unit	Specification
Operating weight		kg(lb)	13980(30820)
Bucket capacity(SAE heaped), standard		$m^3(yd^3)$	0.58(0.76)
Overall length	A	mm(ft-in)	7800(25' 7")
Overall width, with 600mm shoe	B		2600(8' 6")
Overall height	C		2760(9' 1")
Superstructure width	D		2500(8' 2")
Overall height of cab	E		2820(9' 3")
Ground clearance of counterweight	F		935(3' 1")
Engine cover height	G		2200(7' 2")
Minimum ground clearance	H		440(1' 5")
Rear-end distance	I		2285(7' 6")
Rear-end swing radius	I'		2310(7' 7")
Distance between tumblers	J		3000(9'10")
Undercarriage length	K		3750(12' 4")
Undercarriage width	L		2600(8' 6")
Track gauge	M		2000(6' 7")
Track shoe width, standard	N		600(24")
Travel speed(Low/high)		km/hr(mph)	3.3/5.1(2.1/3.3)
Swing speed		rpm	13.1
Gradeability		Degree(%)	35(70)
Ground pressure(600mm shoe)		$kgf/cm^2(psi)$	0.36(5.12)

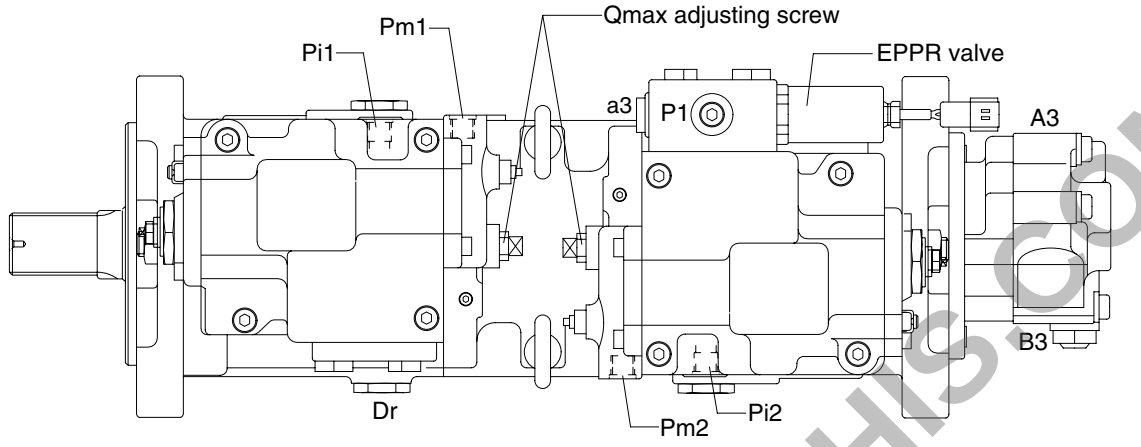
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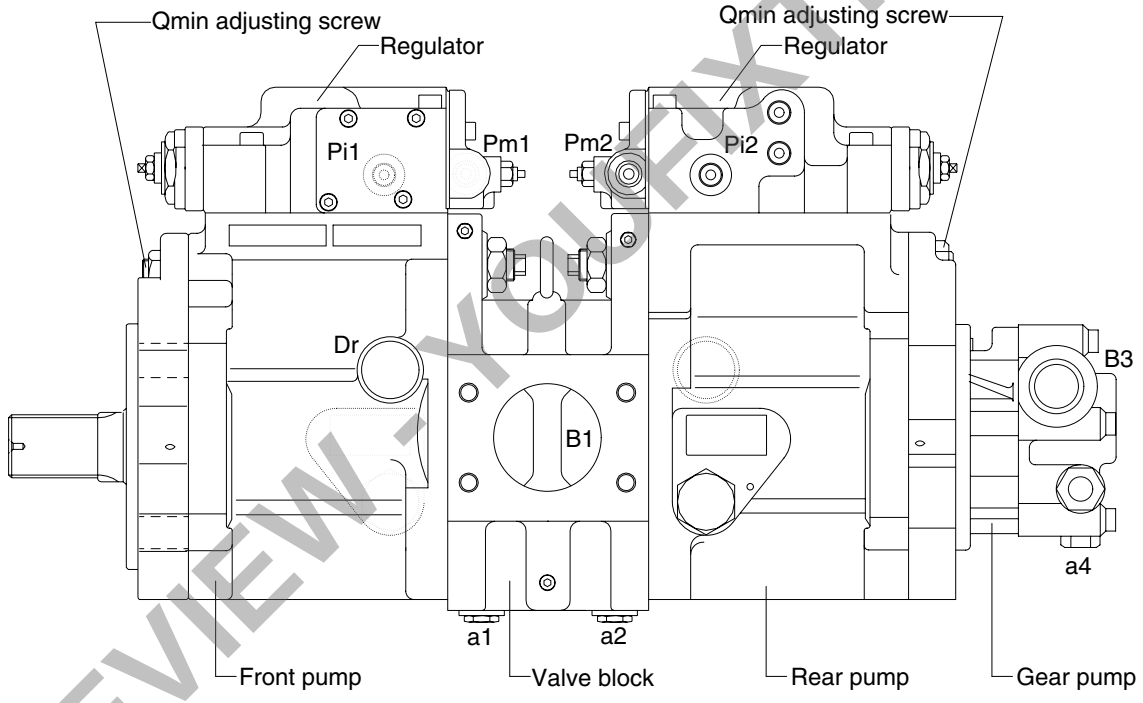
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GROUP 1 PUMP DEVICE

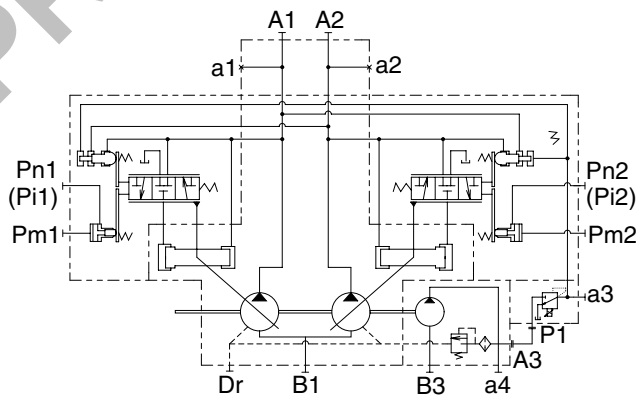
1. STRUCTURE

The pump device consists of main pump, regulator and gear pump.





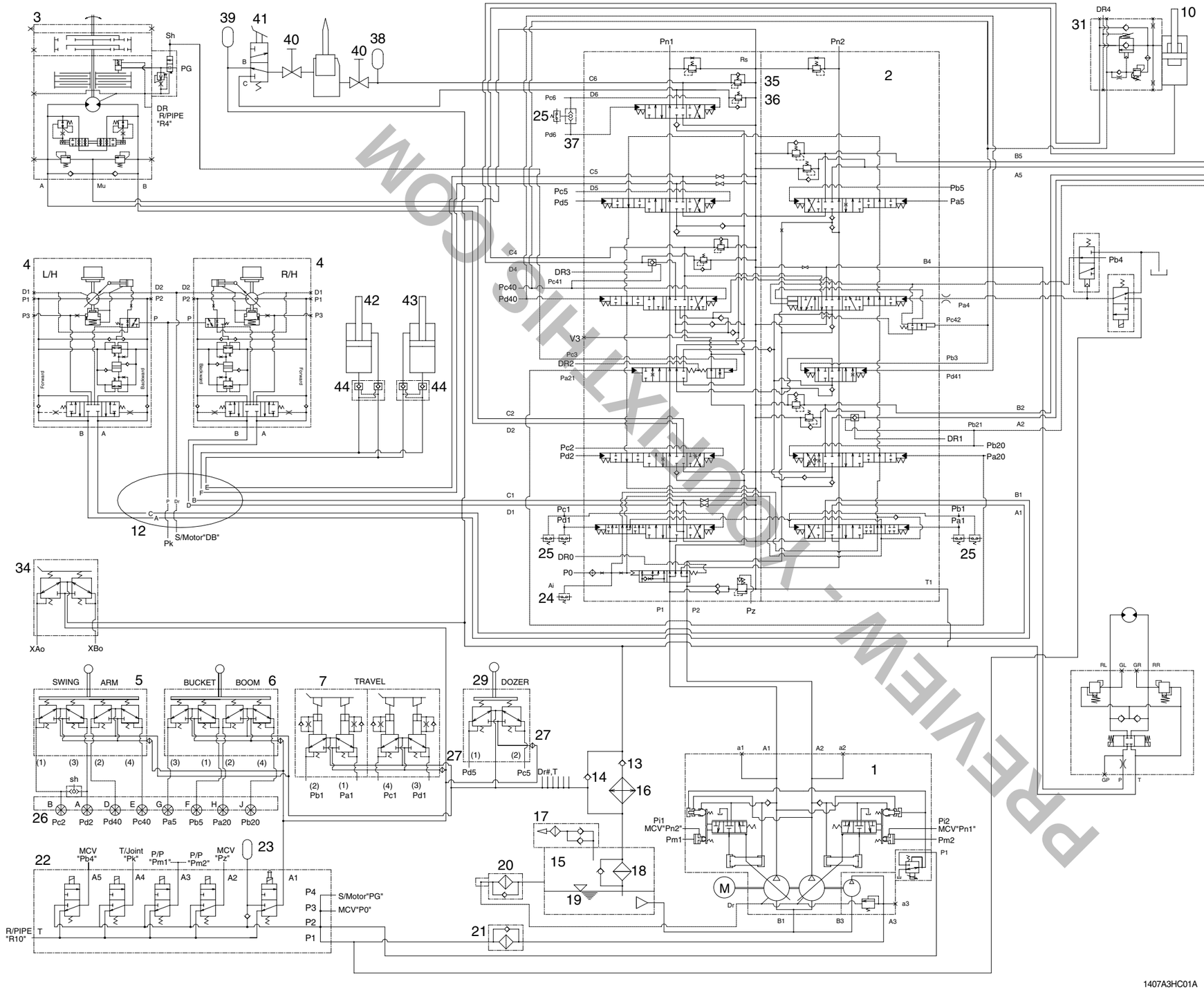
1407A2MP05



Port	Port name	Port size
A1, A2	Delivery port	SAE6000psi 3/4"
B1	Suction port	SAE2500psi 2 1/2"
Dr	Drain port	PF 1/2 - 19
Pn1, Pn2	Pilot port	PF 1/4 - 15
Pm1, Pm2	Qmax cut port	PF 1/4 - 15
P1	EPPR port	PF 1/4 - 13
a1, a2	Gauge port	PF 1/4 - 15
a3	Gauge port	PF 1/4 - 13
a4	Gauge port	PF 1/4 - 14
A3	Gear pump delivery port	PF 1/2 - 19
B3	Gear pump suction port	PF 3/4 - 20.5

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GROUP 1 HYDRAULIC CIRCUIT

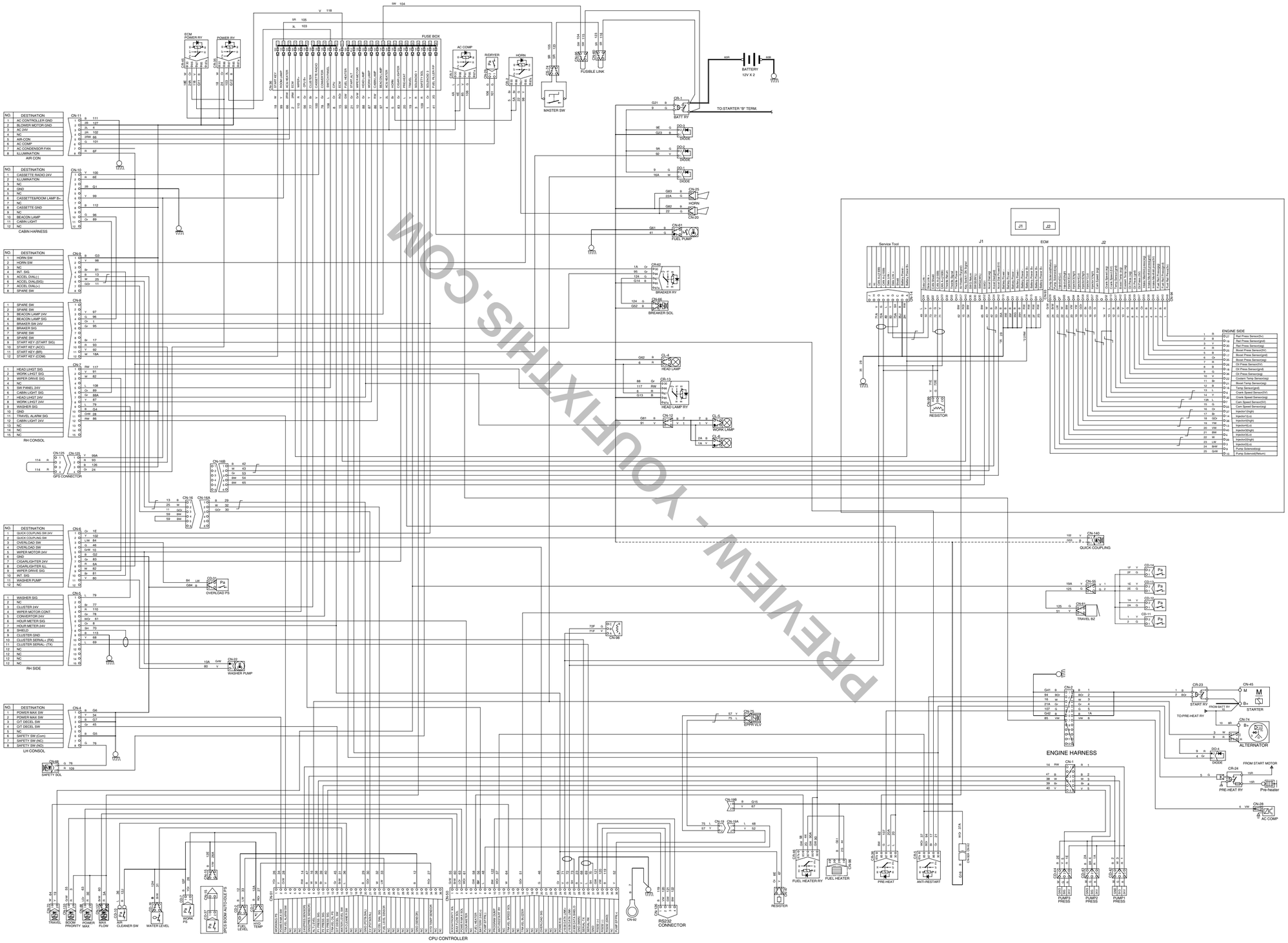


1407A3HC01A

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 Return filter
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
28 Pressure switch
29 RCV lever-dozer(Option)
30 Boom safety lock valve(Option)
31 Arm safety lock valve(Option)
32 Pressure switch(Option)
33 Shutoff valve(Option)
34 Single pedal(Option)
35 Port relief valve(Option)
36 Port relief valve(Option)
37 Shuttle valve
38 Accumulator(Option)
39 Accumulator(Option)
40 Stop valve(Option)
41 Selector valve(Option)
42 Dozer cylinder(LH,option)
43 Dozer cylinder(RH,option)
44 Check valve(Option)

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· ELECTRICAL CIRCUIT (1/2)

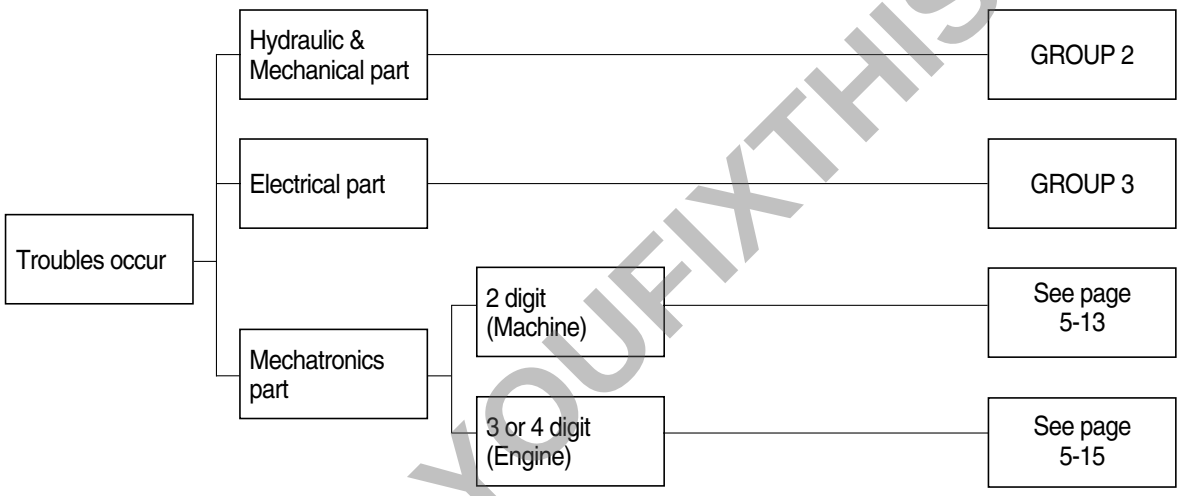


GROUP 1 BEFORE TROUBLESHOOTING

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 1 OPERATIONAL PERFORMANCE TEST

1. PURPOSE

Performance tests are used to check:

1) OPERATIONAL PERFORMANCE OF A NEW MACHINE

Whenever a new machine is delivered in parts and reassembled at a customer's site, it must be tested to confirm that the operational performance of the machine meets **Hyundai spec**.

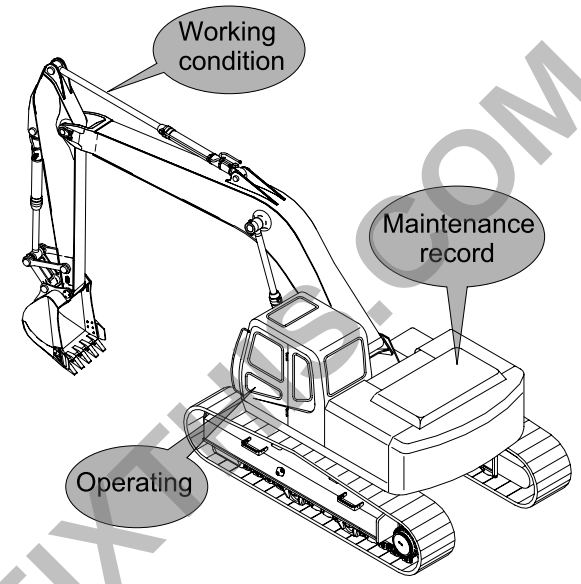
2) OPERATIONAL PERFORMANCE OF A WORKING MACHINE

With the passage of time, the machine's operational performance deteriorates, so that the machine needs to be serviced periodically to restore it to its original performance level.

Before servicing the machine, conduct performance tests to check the extent of deterioration, and to decide what kind of service needs to be done(by referring to the "Service Limits" in this manual).

3) OPERATIONAL PERFORMANCE OF A REPAIRED MACHINE

After the machine is repaired or serviced, it must be tested to confirm that its operational performance was restored by the repair and/or service work done.



140LC7MS01

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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 : 124 ℓ

(5) Remove socket bolts(2) and disconnect pipe(1).

(6) Disconnect pilot line hoses(5, 6, 7, 8, 9, 10, 11, 12).

(7) Remove socket bolts(4) and disconnect pump suction tube(3).

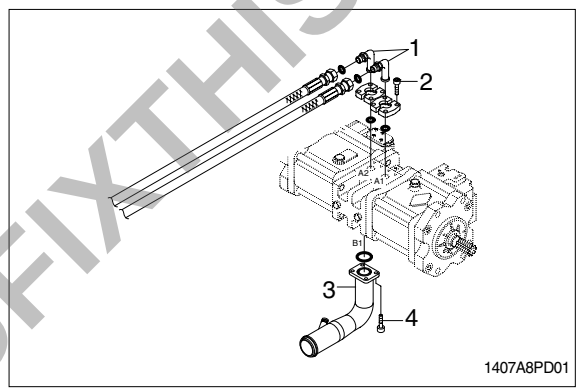
※ When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.

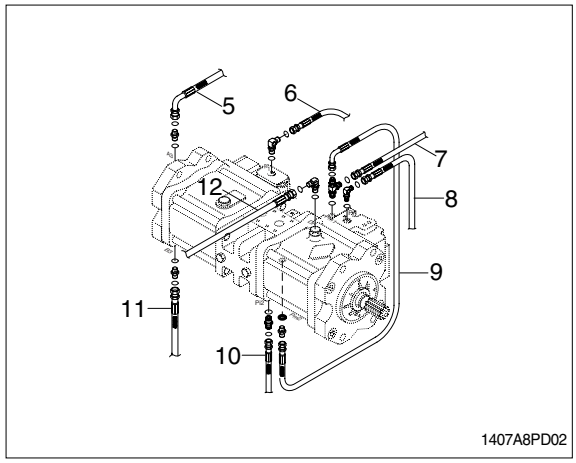
(8) Sling the pump assembly and remove the pump mounting bolts.

- Weight : 85kg(188lb)

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







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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, nut(Front)	M16 × 2.0	30 ± 3.5	217 ± 25.3
2		Engine mounting bolt, nut(Rear)	M20 × 2.5	55 ± 3.5	398 ± 25.3
3		Radiator mounting bolt	M12 × 1.75	12.8 ± 3	92.5 ± 21.6
4		Coupling mounting socket bolt	M16 × 2.0	22 ± 1	159 ± 7.2
5		Main pump housing mounting bolt	M10 × 1.5	6.9 ± 0.3	49.9 ± 2.2
6	Hydraulic system	Main pump mounting socket bolt	M16 × 2.0	22.5 ± 0.5	163 ± 3.6
7		Main control valve mounting bolt	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
8		Fuel tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.9
9		Hydraulic oil tank mounting bolt	M20 × 2.5	45 ± 1	325 ± 7.2
10		Turning joint mounting bolt, nut	M12 × 1.75	12.3 ± 1.3	88.9 ± 9.4
11	Power train system	Swing motor mounting bolt	M16 × 2.0	29.6 ± 3.2	215 ± 32.5
12		Swing bearing upper part mounting bolt	M18 × 2.5	41.3 ± 4.5	299 ± 32.5
13		Swing bearing lower part mounting bolt	M16 × 1.5	31.3 ± 3.2	226 ± 23.1
14		Travel motor mounting bolt	M16 × 2.0	23 ± 2.5	166 ± 18.1
15		Sprocket mounting bolt	M16 × 2.0	23 ± 2.5	166 ± 18.1
16	Under carriage	Carrier roller mounting bolt, nut	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
17		Track roller mounting bolt	M16 × 2.0	29.6 ± 3.2	214 ± 23.1
18		Roller mounting bolt(R140LCM-7)	M 20× 2.5	41.3 ± 5.0	299 ± 36.2
19		Track tension cylinder mounting bolt	M16 × 2.0	21.9 ± 3.3	158 ± 23.9
20		Track shoe mounting bolt, nut	5/8 - 18UNF	42 ± 4	304± 28.9
21	Others	Counter weight mounting bolt	M27 × 3.0	140 ± 15	1013 ± 108
22		Cab mounting bolt	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
23		Operator's seat mounting bolt	M 8 × 1.25	2.5 ± 0.5	18.1 ± 3.6

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6. 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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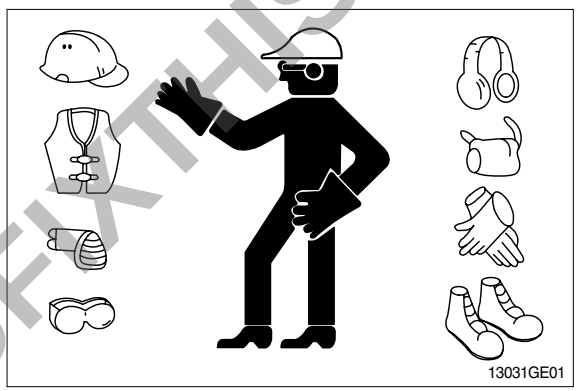
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

Unsafe work practices are dangerous. Understand service procedure before doing work; Do not attempt shortcuts.

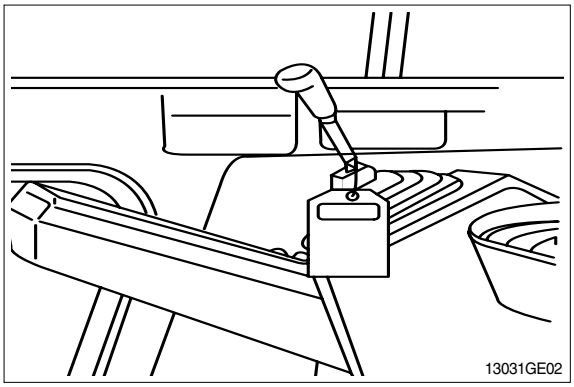
WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.



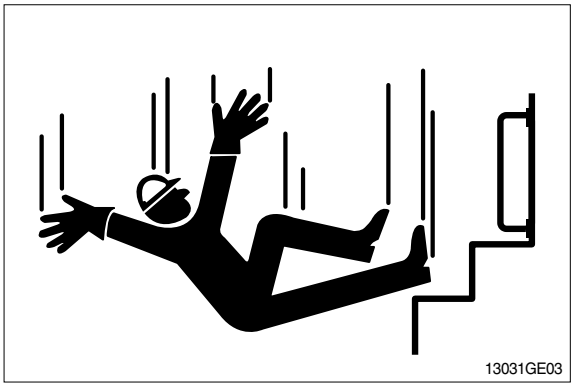
WARN OTHERS OF SERVICE WORK

Unexpected machine movement can cause serious injury.
Before performing any work on the excavator, attach a 「**Do Not Operate**」 tag on the right side control lever.



USE HANDHOLDS AND STEPS

Falling is one of the major causes of personal injury.
When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.
Never jump on or off the machine. Never mount or dismount a moving machine.
Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.



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2. HOW TO READ THE SERVICE MANUAL

Distribution and updating

Any additions, amendments or other changes will be sent to HYUNDAI distributors.
Get the most up-to-date information before you start any work.

Filing method

1. See the page number on the bottom of the page.
   File the pages in correct order.
2. Following examples shows how to read the page number.
   Example 1

   2 - 3
   - 2 : Item number(2. Structure and Function)
   - 3 : Consecutive page number for each item.

3. Additional pages : Additional pages are indicated by a hyphen(-) and number after the page number. File as in the example.

   10 - 4
   10 - 4 - 1 ┐
   10 - 4 - 2 ┘ Added pages
   10 - 5

Revised edition mark(①②③…)

When a manual is revised, an edition mark is recorded on the bottom outside corner of the pages.

Revisions

Revised pages are shown at the **list of revised pages** on the between the contents page and section 1 page.

Symbols

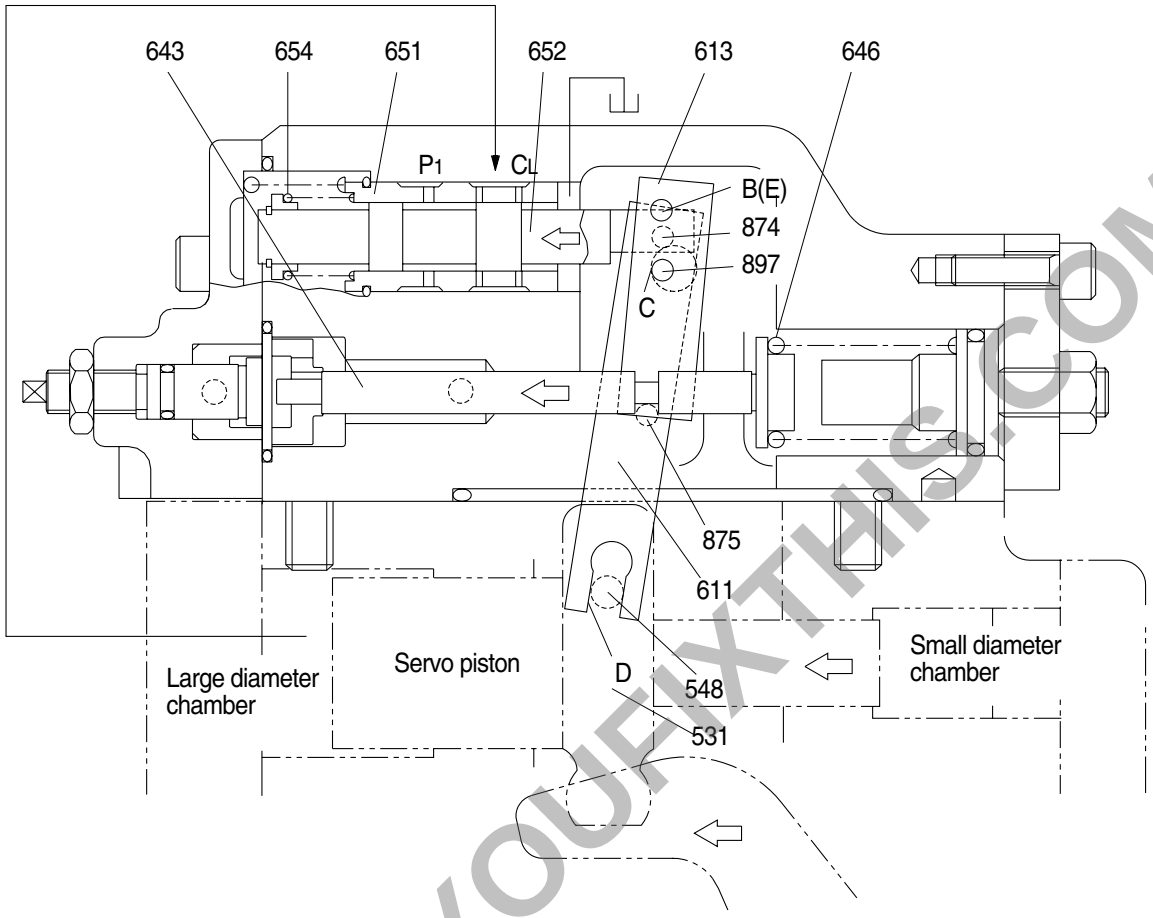
So that the shop manual can be of ample practical use, important places for safety and quality are marked with the following symbols.

Symbol	Item	Remarks
⚠	Safety	Special safety precautions are necessary when performing the work.
		Extra special safety precautions are necessary when performing the work because it is under internal pressure.
※	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.

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② Flow increasing function



As the pilot pressure Pn decreases, the pilot piston(643) moves to the left by the action of the pilot spring(646) and causes lever 2(613) to rotate around the fulcrum of point B. Since the pin(897) is pressed against the large hole section(C) of lever 2 by the action of the return spring(654) via the spool(652), pin(874), and feedback lever(611), the feedback lever rotates around the fulcrum of point D as lever 2 rotates, and shifts the spool to the left. Port CL opens a way to the tank port as the spool moves. This deprives the large diameter section of the servo piston of pressure, and shifts the servo piston to the left by the discharge pressure P1 in the small diameter section, resulting in an increase in the flow rate.

As the servo piston moves, point D also moves to the left, the feedback lever rotates around the fulcrum of point C, and the spool moves to the right till the opening between the spool and sleeve is closed.

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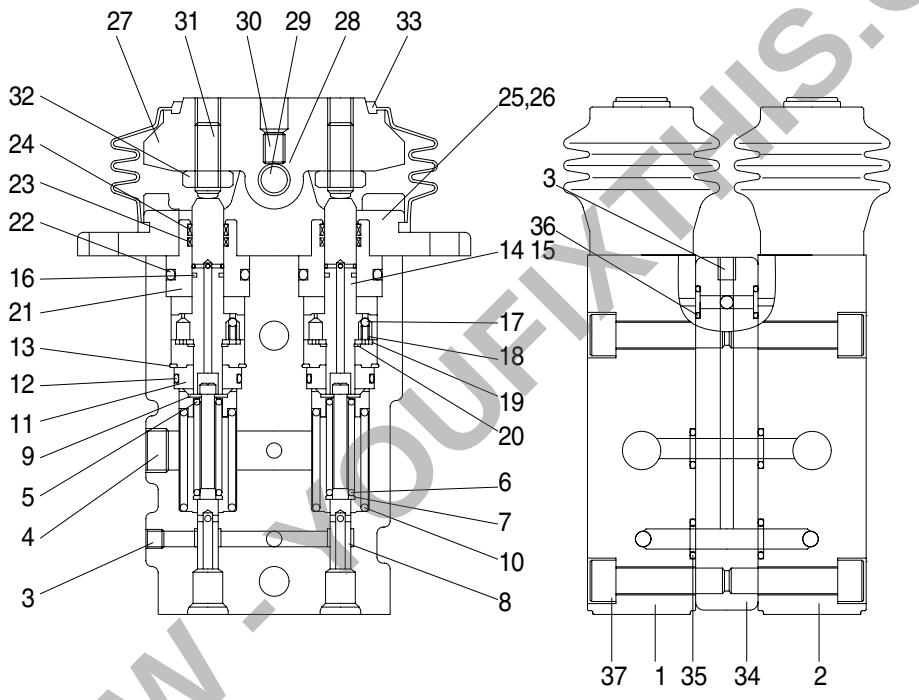
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CROSS SECTION

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(6) for setting secondary pressure, return spring(10), stopper(9), and spring seat(7). 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(14) 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.

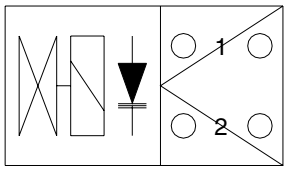
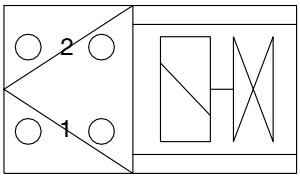
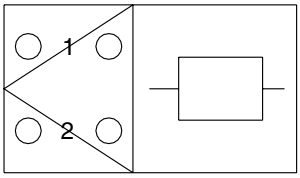
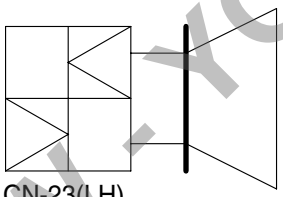
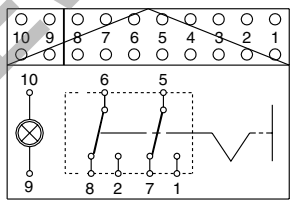
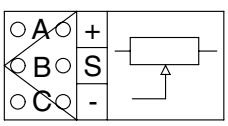


14072SF70

1	Body(1)	13	Snap ring	25	Cover
2	Body(2)	14	Push rod	26	Bolt
3	Plug	15	Spring pin	27	Cam
4	Plug	16	Seal	28	Bushing
5	Spring seat	17	Steel ball	29	Cam shaft
6	Spring	18	Spring	30	Set screw
7	Spring seat	19	Plate	31	Set screw
8	Spool	20	Snap ring	32	Nut
9	Stopper	21	Plug	33	Bellows
10	Spring	22	O-ring	34	Space
11	Rod guide	23	Rod seal	35	O-ring
12	O-ring	24	Dust seal	36	O-ring
				37	Bolt

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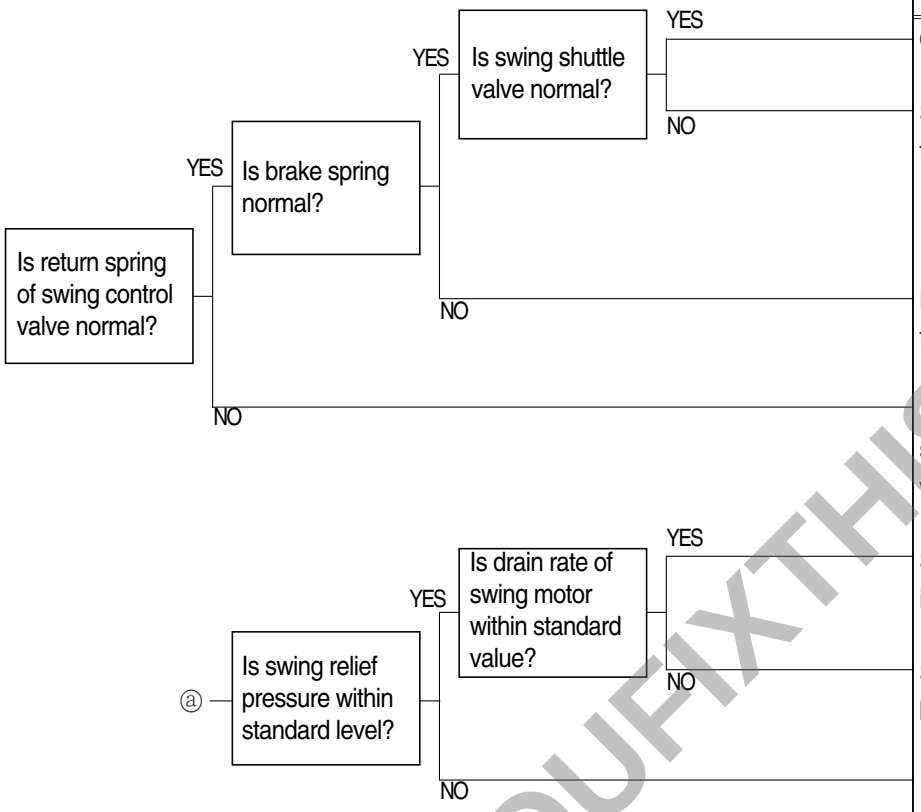
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Part name	Symbol	Specifications	Check
Solenoid valve	 CN-66 CN-68 CN-70 CN-88 CN-133 CN-137	24V 1A	※ Check resistance Normal : 15~25 Ω (For terminal 1-2)
EPPR valve	 CN-75	700mA	※ Check resistance Normal : 15~25 Ω (For terminal 1-2)
Resistor	 CN-47	45 Ω 20W±5%	※Check resistance Normal : 45 Ω
Speaker	 CN-23(LH) CN-24(RH)	20W	※ Check disconnection Normal : A few Ω
Switch (Locking type)	 CS-23 CS-27 CS-50 CS-52 CS-54 CS-82 CS-83 CS-84	24V 8A	※ Check contact Normal ON : 0 Ω (For terminal 1-5, 2-6) ∞ Ω (For terminal 5-7, 6-8) OFF : ∞ Ω (For terminal 1-5, 2-6) 0 Ω (For terminal 5-7, 6-8)
Accel dial	 CN-142	-	※ Check resist Normal : About 5k Ω (For terminal A-C) Normal : About 5V (For terminal A-C) : 2~4.5V (For terminal C-B)

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5) THE SWING UNIT DRIFTS WHEN THE MACHINE IS AT REST ON A SLOPE



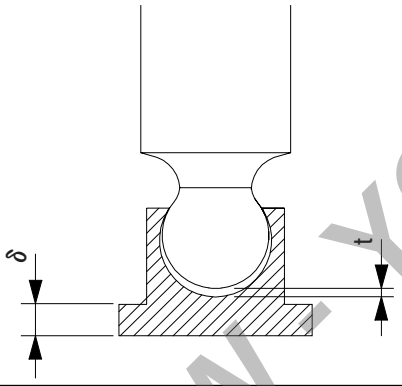
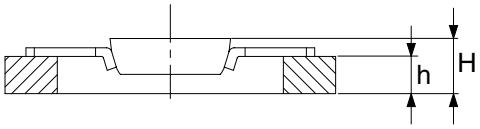
Cause	Remedy
ⓐ Shuttle valve is faulty.	Disassemble and replace.
Brake spring is faulty.	Disassemble and replace.
Return spring of swing control valve is faulty.	Disassemble and replace.
Swing relief valve is faulty.	Disassemble and repair or replace.
Swing motor is broken.	Disassemble and repair.
	Adjust swing relief valve pressure or replace swing relief valve.

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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

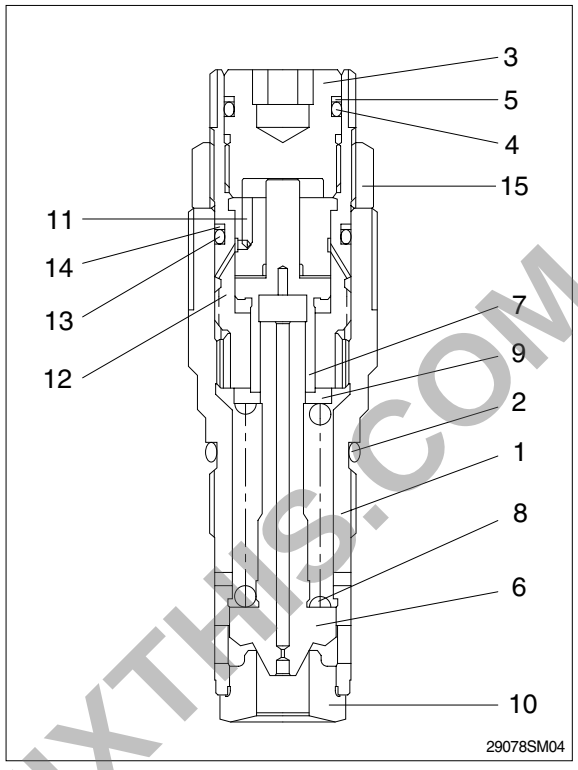
Part name	Standard roughness	Allowable roughness	Remark
Shoe	0.8-Z(Ra=0.2) (LAPPING)	3-Z(Ra=0.8)	
Shoe plate	0.4-Z(Ra=0.1) (LAPPING)	3-Z(Ra=0.8)	
Cylinder	1.6-Z(Ra=0.4) (LAPPING)	12.5-Z(Ra=3.2)	
Valve plate	0.8-Z(Ra=0.2) (LAPPING)	6.3-Z(Ra=1.6)	

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(16) When disassembling the relief valve, release the plug(3).
Remove the piston(7), spring seat(9), spring(8) and plunger(6) with the body(1) downwards.

※ Do not release the lock nut(15).



This completes disassembly.

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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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