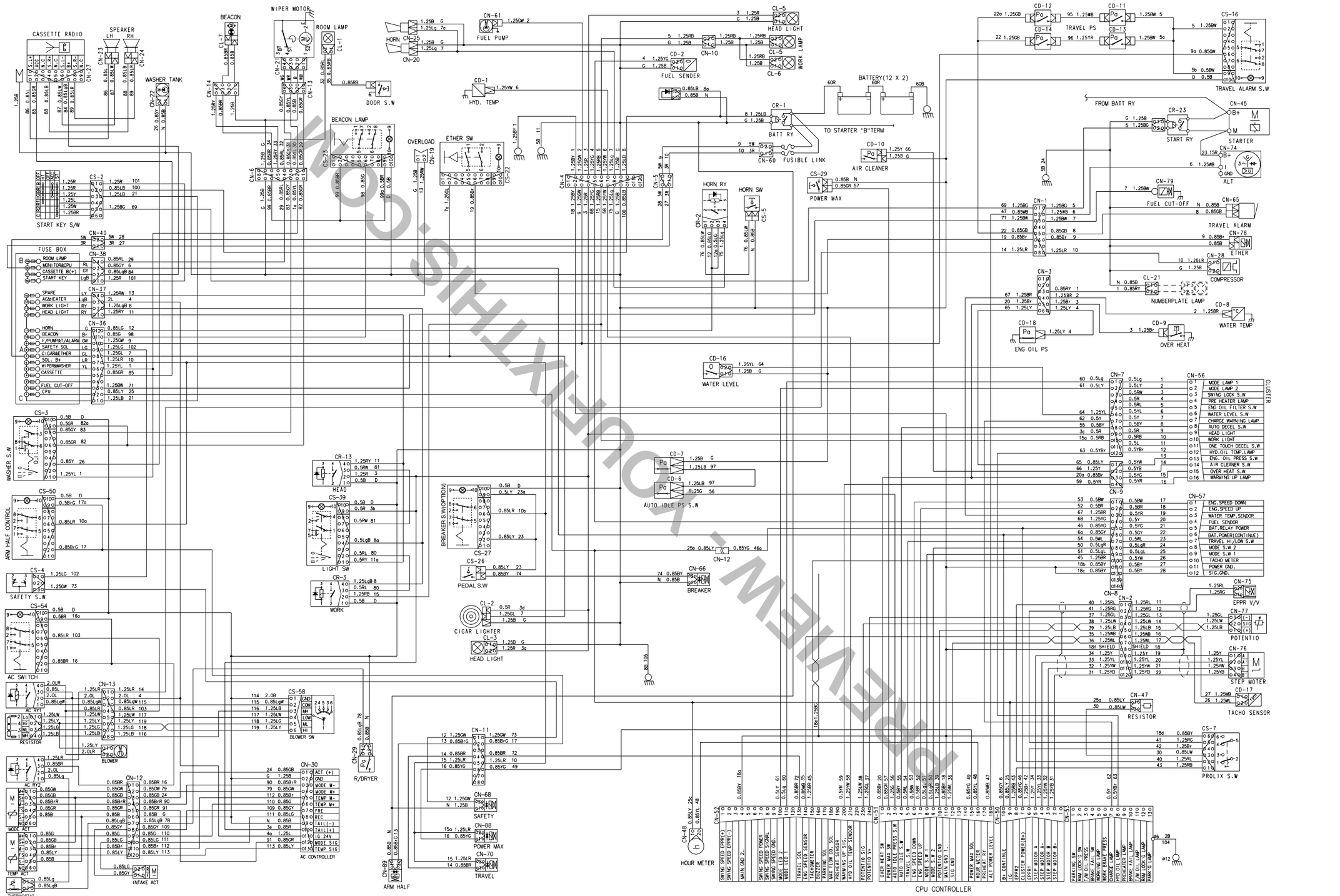
GROUP 2 ELECTRICAL CIRCUIT(up to #138)

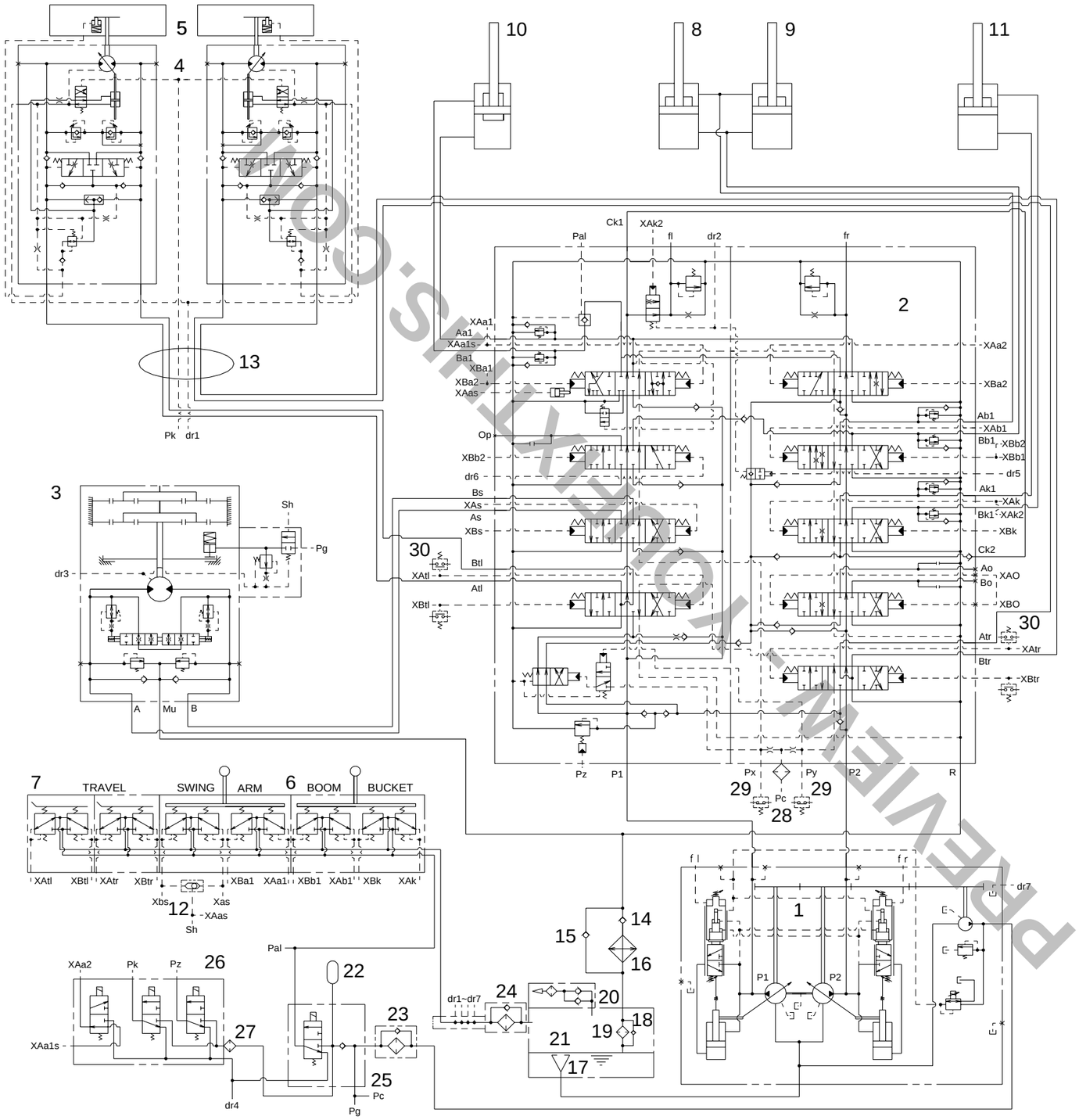


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GROUP 1 HYDRAULIC CIRCUIT

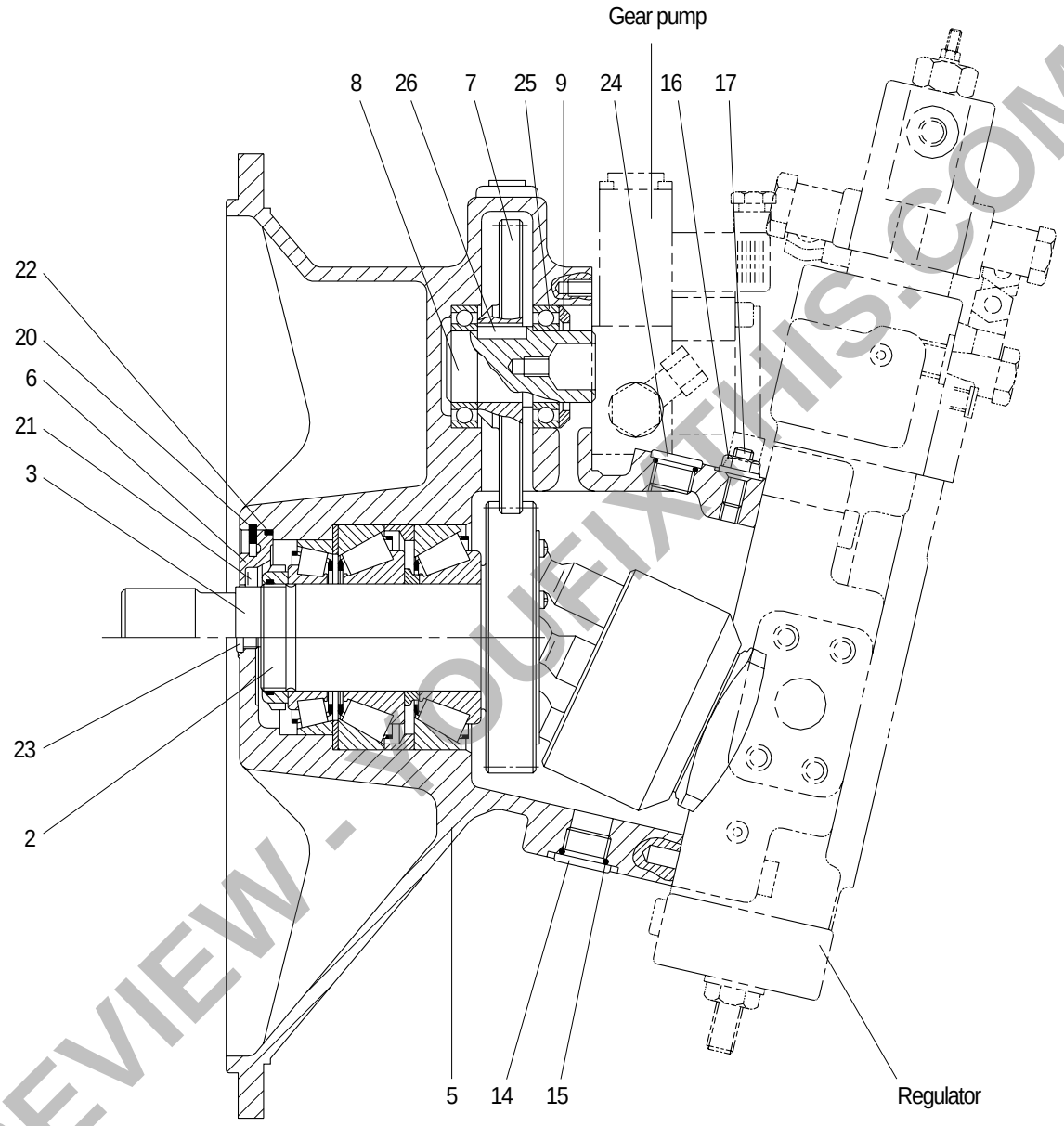


1 MAIN PUMP
2 MAIN CONTROL VALVE
3 SWING MOTOR
4 TRAVEL MOTOR
5 GEAR BOX
6 RCV LEVER
7 RCV LEVER
8 BOOM CYLINDER(RH)
9 BOOM CYLINDER(LH)
10 ARM CYLINDER
11 BUCKET CYLINDER
12 SHUTTLE VALVE
13 TURNING JOINT
14 CHECK VALVE
15 CHECK VALVE
16 OIL COOLER
17 STRAINER
18 RETURN FILTER
19 BYPASS VALVE
20 AIR BREATHER
21 HYDRAULIC TANK
22 ACCUMULATOR
23 LINE FILTER
24 SPIN FILTER
25 1 SOLENOID VALVE
26 2 SOLENOID VALVE
27 LAST GUARD FILTER
28 LAST GUARD FILTER
29 PRESSURE SWITCH
30 PRESSURE SWITCH

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1) MAIN PUMP(1/2)

Variable double pump with two axial tapered piston rotary groups of bent axis design in open circuit.



2	Rotary group	9	Spacer	21	Shaft seal ring
3	Rotary group	14	Locking screw	22	O-ring
5	Pump housing	15	O-ring	23	Locking screw
6	Cover	16	Seal lock nut	24	Locking screw
7	Gear	17	Threaded pin	25	Ball bearing
8	Stub shaft	20	Retaining ring	26	Shaft key

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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	M12 × 1.75	10.0 ± 0.5	72.3 ± 3.6
2		Radiator mounting bolt, nut	M12 × 1.75	9.3 ± 1.9	67.3 ± 13.7
3		Coupling mounting bolt	M16 × 2.0	22 ± 1.0	159 ± 7.2
4	Hydraulic system	Main pump mounting bolt	M10 × 1.5	4.8 ± 0.3	34.7 ± 2.2
5		Main control valve mounting bolt	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
6		Fuel tank mounting bolt	M20 × 2.5	46.0 ± 5.1	333 ± 36.9
7		Hydraulic oil tank mounting bolt	M20 × 2.5	46.0 ± 5.1	333 ± 36.9
8		Turning joint mounting bolt, nut	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
9	Power train system	Swing motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
10		Swing bearing upper mounting bolt	M20 × 2.5	57.8 ± 6.4	418 ± 46.3
11		Swing bearing lower mounting bolt	M20 × 2.5	57.8 ± 6.4	418 ± 46.3
12		Travel motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
13		Sprocket mounting bolt	M20 × 2.5	44.0 ± 4.0	318 ± 28.9
14	Under carriage	Upper roller mounting bolt	M16 × 2.0	29.6 ± 3.2	214 ± 23.1
15		Lower roller mounting bolt	M18 × 2.5	41.3 ± 5.0	299 ± 21.7
16		Track adjuster cylinder bolt	M16 × 2.0	21.9 ± 3.3	158 ± 23.9
17		Track chain and shoe mounting bolt, nut	9/16-18UNF	40.0 ± 3.0	289 ± 21.7
18		Track guard mounting bolt	M18 × 2.5	41.3 ± 5.0	290 ± 36.2
19	Others	Counter weight mounting bolt	M30 × 3.5	146 ± 21.9	1056 ± 158
20		Cab mounting bolt, nut	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
21		Operator's seat mounting bolt	M 8 × 1.25	1.17 ± 0.1	8.5 ± 0.7

※ For tightening torque of engine and hydraulic components, see each components disassembly and assembly.

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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) 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 : 220 ℓ

(5) Remove bolts(7) and disconnect hoses (1,2).

(6) Disconnect pilot line hoses(4,5,6).

(7) Remove bolts(8) and disconnect pump suction tube (3).

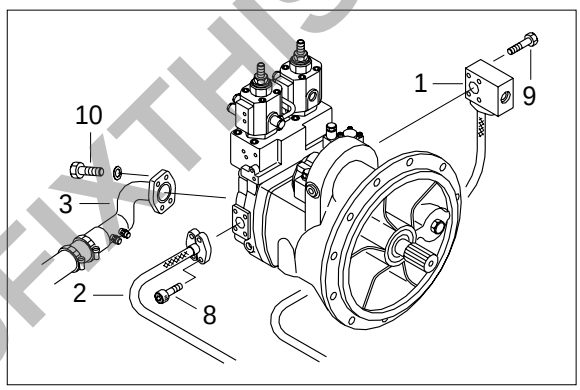
※ When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.

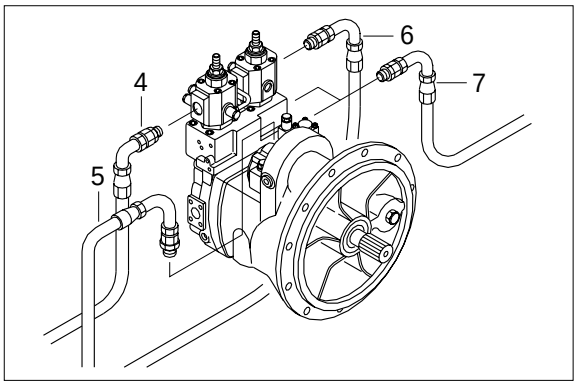
(8) Sling the pump assembly and remove the pump mounting bolts.

- Weight : 80kg(176lb)

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





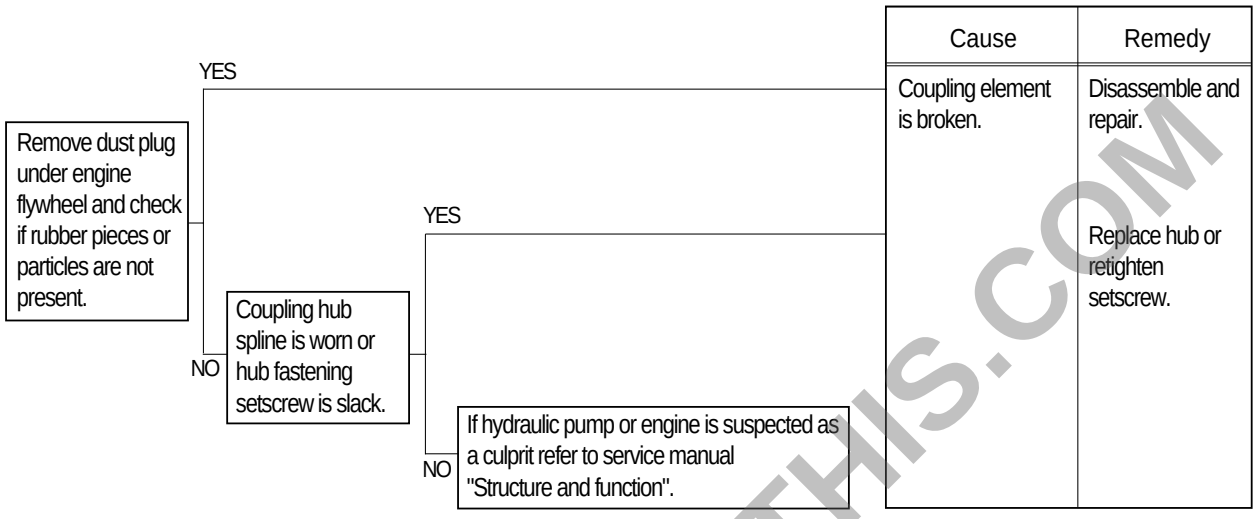


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2. DRIVE SYSTEM

1) UNUSUAL NOISE COMES OUT OF PUMP CONNECTION



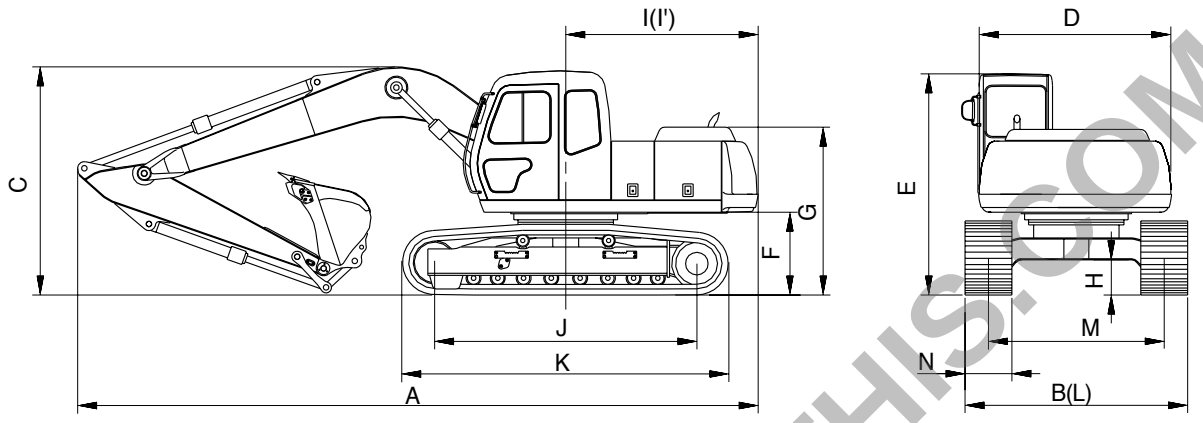
Cause	Remedy
Coupling element is broken.	Disassemble and repair.
	Replace hub or retighten setscrew.

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2. SPECIFICATIONS

1) 5.2m(17'1") ONE PIECE BOOM AND 2.6m(8'6") ARM



Description		Unit	Specification
Operating weight		kg(lb)	17800(39240)
Bucket capacity(PCSA heaped), standard		m^3(yd^3)	0.70(0.92)
Overall length	A	mm(ft-in)	8720(28' 7")
Overall width, with 600mm shoe	B		2850(9' 4")
Overall height	C		2970(9' 9")
Superstructure width	D		2450(8' 0")
Cab height	E		2870(9' 5")
Ground clearance of counterweight	F		1050(3' 5")
Engine cover height	G		2110(6' 11")
Minimum ground clearance	H		450(1' 6")
Rear-end distance	I		2450(8' 0")
Rear-end swing radius	I'		2530(8' 4")
Distance between tumblers	J		3360(11' 0")
Undercarriage length	K		4150(13' 7")
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)	3.2/5.2(2.0/3.2)
Swing speed		rpm	11.5
Gradeability		Degree(%)	35(70)
Ground pressure(600mm shoe)		kg/cm^2(psi)	0.41(5.83)

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SECTION 7 MAINTENANCE STANDARD

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**.

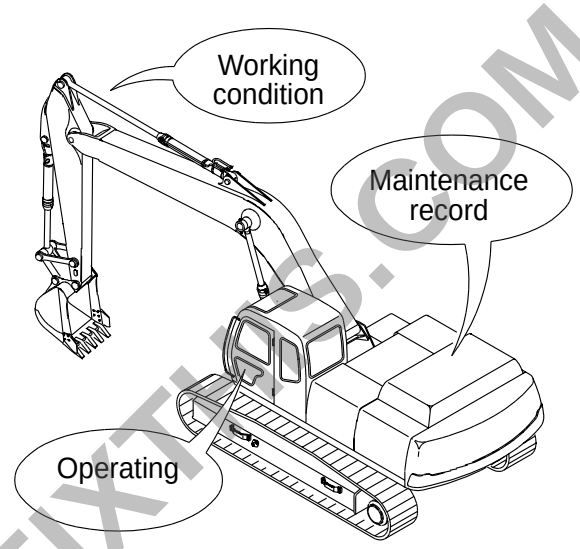
2) OPERATIONAL PERFORMANCE OF A WORKING MACHINE

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.



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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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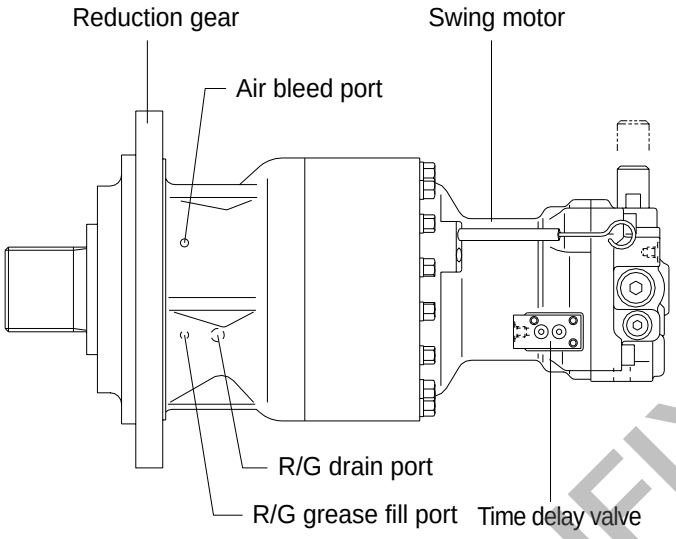
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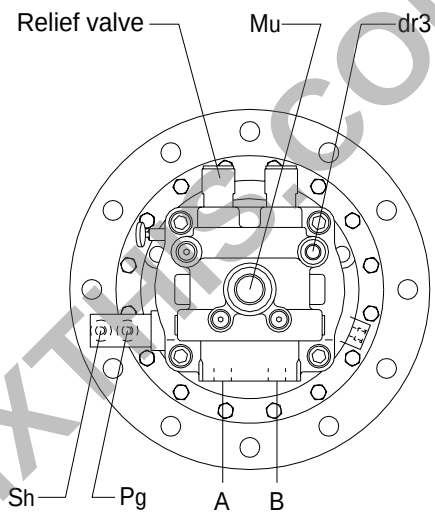
GROUP 3 SWING DEVICE

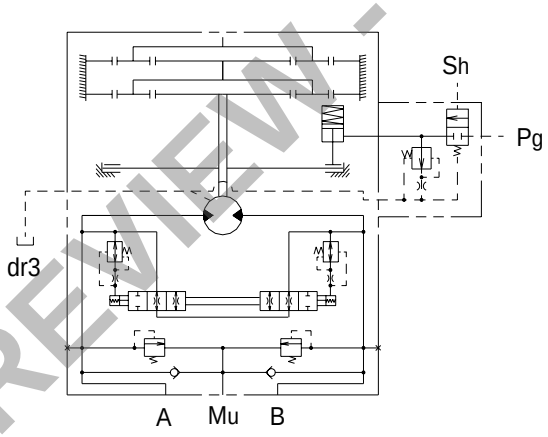
1. STRUCTURE

Swing device consists swing motor, swing reduction gear.

Swing motor include mechanical parking valve, relief valve, make up valve and time delay valve.







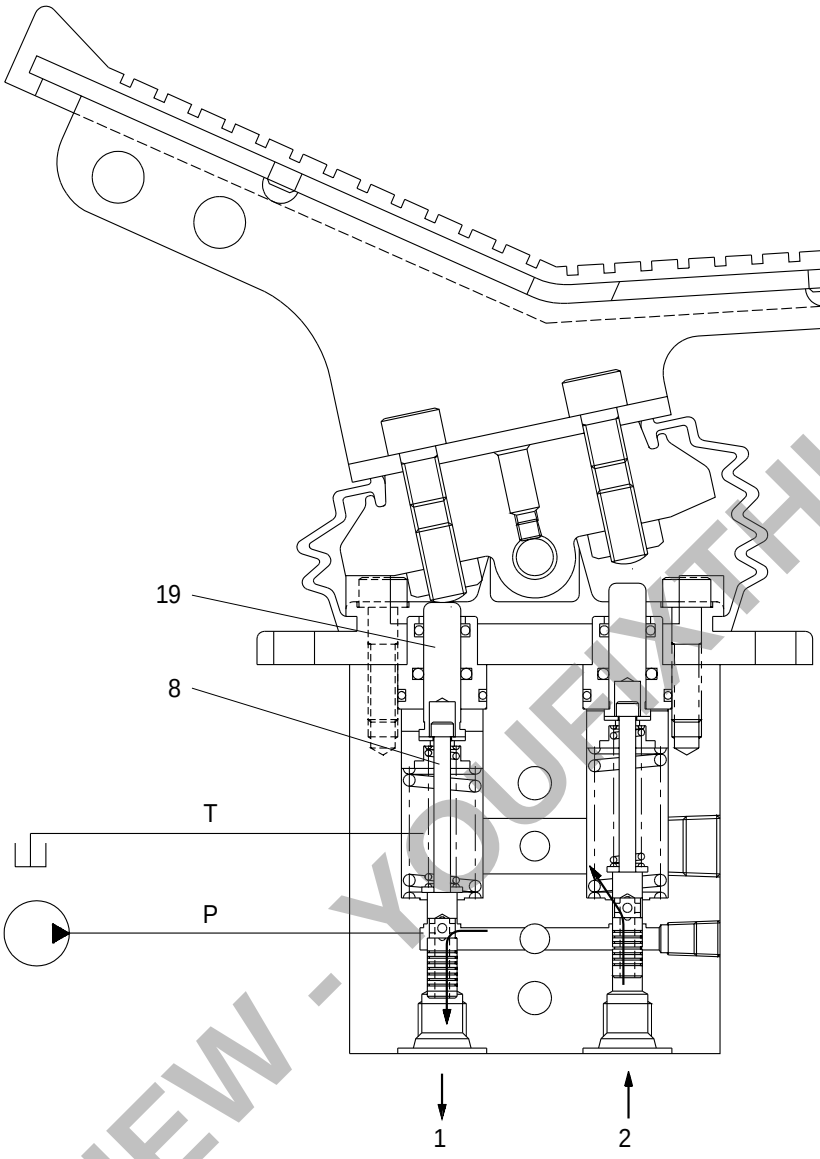
Hydraulic circuit

Port	Port name	Port size
A	Main port	PF 3/4
B	Main port	PF 3/4
dr3	Drain port	PF 3/8
Mu	Make up port	PF 1
Sh	Brake release port	PF 1/4
Pg	Stand by port	PF 1/4

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(2) Case where pedal is tilted



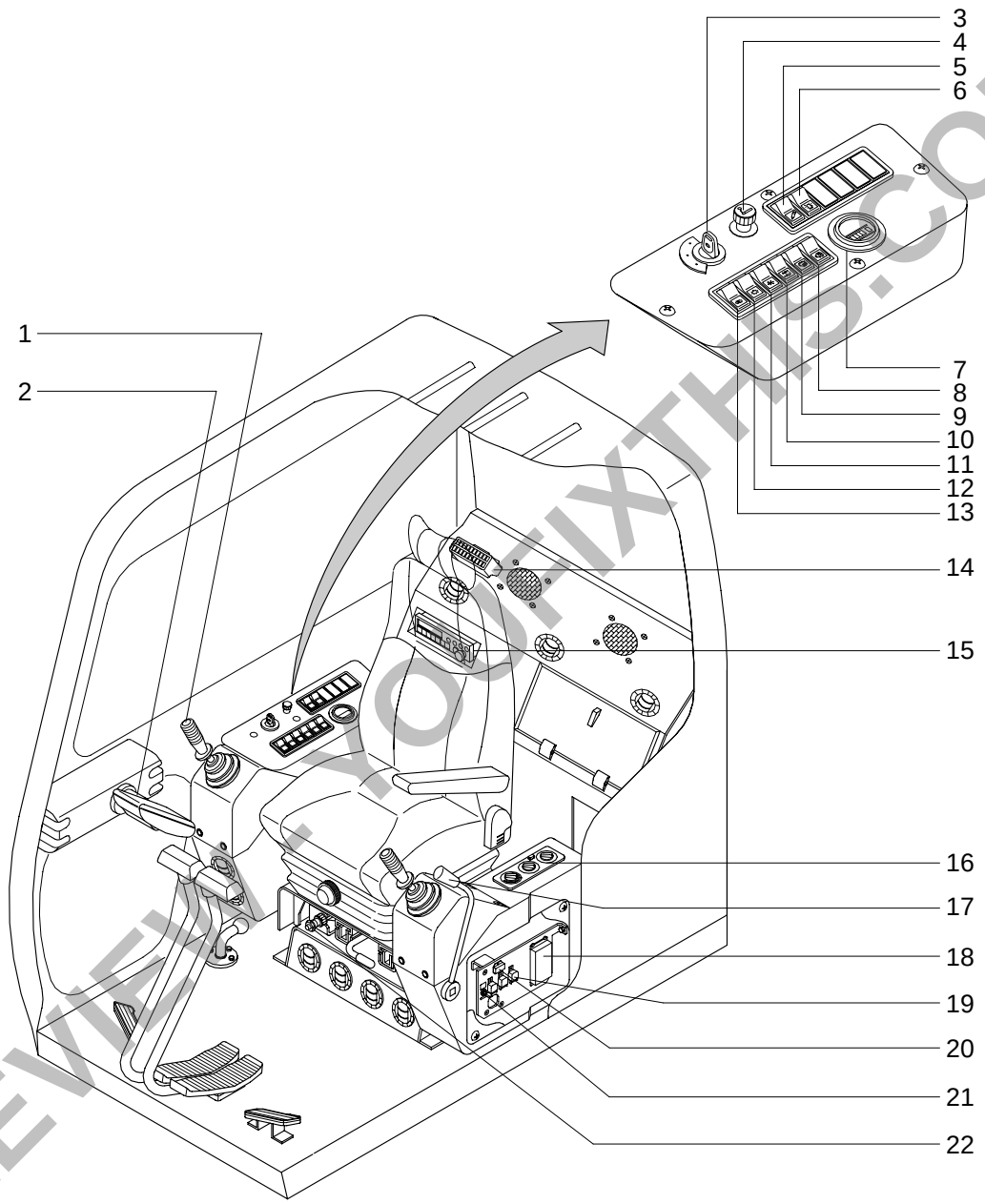
When the push rod(19) is stroked, the spool(8) moves downwards.
Then port P is connected with port 1, and the oil supplied from the pilot pump flows through port 1 to generate the pressure.
When the pressure at port 1 increases to the value corresponding to the spring force set by tilting the handle, the hydraulic pressure force balances with the spring force. If the pressure at port 1 increases higher than the set pressure, port P is disconnected from port 1 and port T is connected with port 1. If it decreases lower than the set pressure, port P is connected with port 1 and port T is disconnected from port 1.
In this manner the secondary pressure is kept at the constant value.
Besides, in some type, when the handle is tilted more than a certain angle, the upper end of the spool contacts with inside bottom of the push rod and the output pressure is left to be connected with port P.

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SECTION 4 ELECTRICAL SYSTEM

GROUP 1 COMPONENT LOCATION

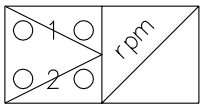
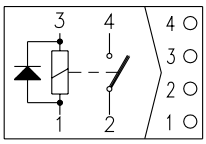
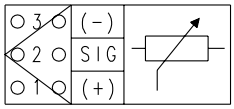
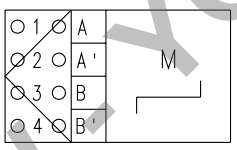
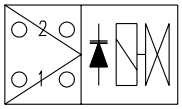
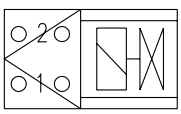
1. LOCATION 1



1	Horn switch	9	Cold start switch(option)	17	Safety lever
2	Cluster	10	Arm half switch	18	CPU controller
3	Starting switch	11	Aircon switch	19	Relay
4	Cigar lighter switch	12	Main light switch	20	Resistor
5	Breaker switch(option)	13	Wiper & washer switch	21	Prolix switch
6	Beacon switch(option)	14	Fuse box	22	Emergency engine acceleration lever
7	Service meter	15	Cassette & radio		
8	Travel alarm switch(option)	16	Aircon & heater switch		

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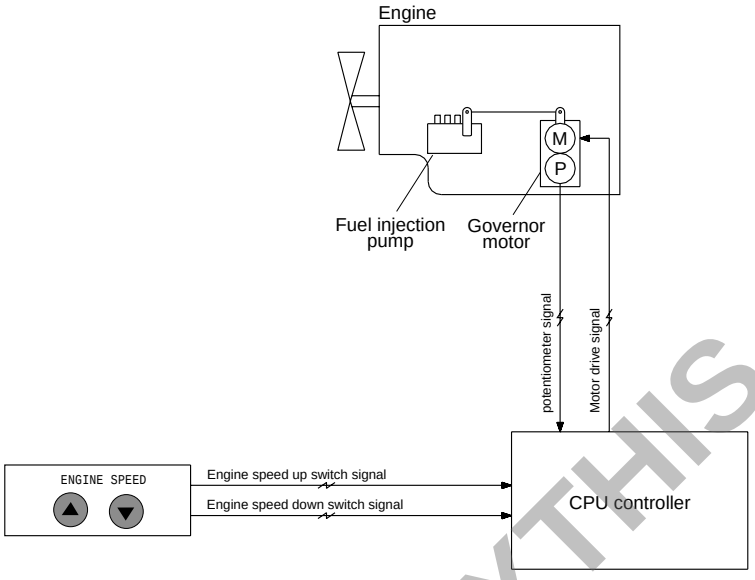
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Part name	Symbol	Specifications	Check
Tacho sensor	 CD-17	-	※ Check resist Normal : 300 Ω
Relay	 CR-2 AC RY1 CR-3 AC RY2 CR-13	-	※ Check resist Normal - About 200 Ω (for terminal 1-3) - ∞Ω (for terminal 2-4)
Potentiometer	 CN-77	-	※ Check resist Normal - About 5kΩ (for terminal 1-3) - 0.6KΩ~5kΩ (for terminal 2-3)
Governor motor	 CN-76	-	※ Check resist Normal - 5~6 Ω (for terminal 1-2) - 5~6 Ω (for terminal 3-4)
Solenoid valve	 CN-66 CN-88 CN-68 CN-89 CN-70	-	※ Check resist Normal - 15~25 Ω (for terminal 1-2)
EPPR valve	 CN-75	24V 1A	※ Check resist Normal - 18~25 Ω (for terminal 1-2)

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GROUP 4 ENGINE SPEED UP/DOWN FUNCTION



1. FUNCTION

Increasing(speed up) or decreasing(speed down) is possible by touching the engine speed up switch or the engine speed down switch on the cluster.

When one of them is touched, CPU controller receives the signal and moves the engine governor motor lever to high or low position a little bit.

2. LOGIC TABLE

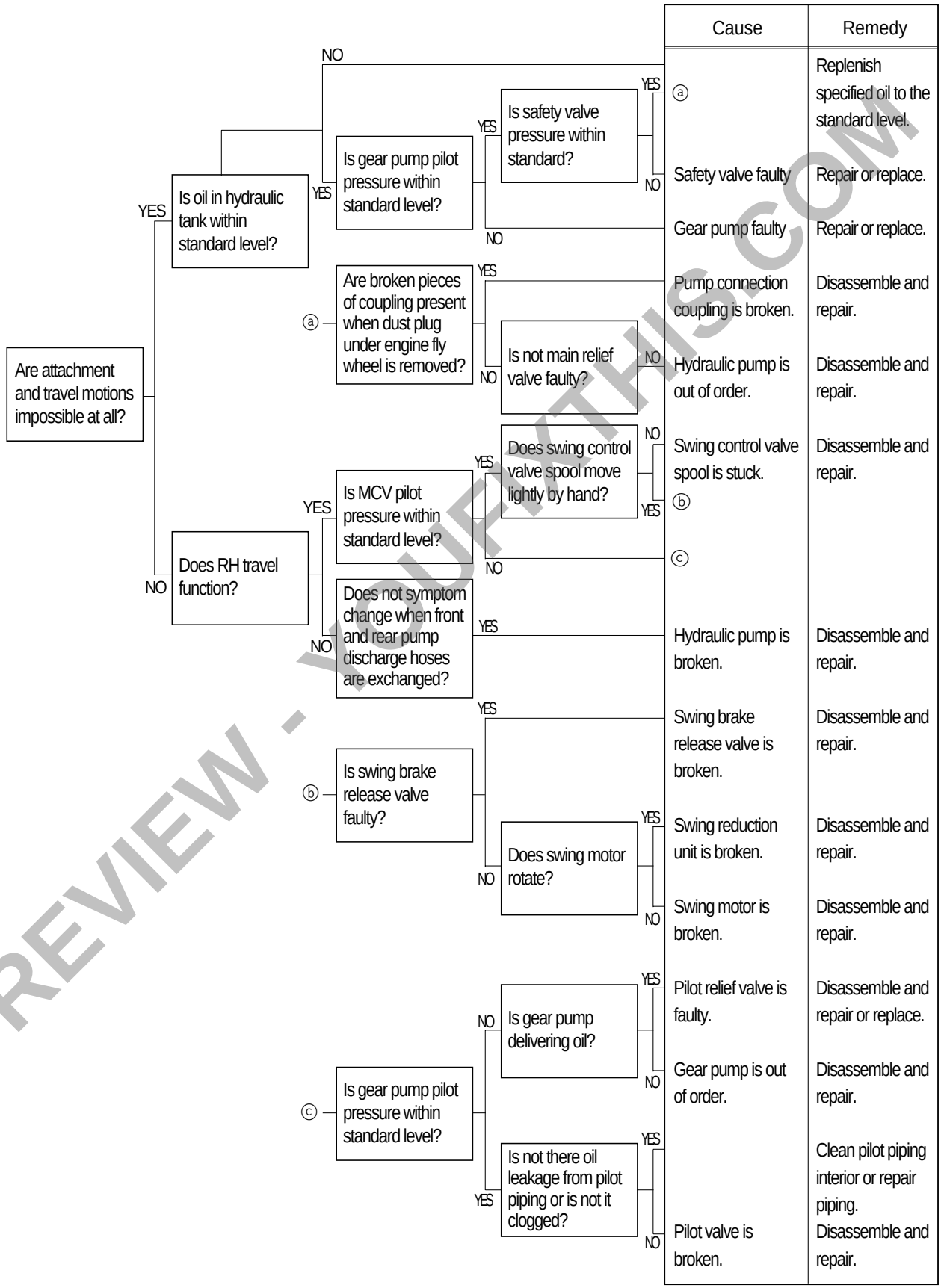
Description	Engine speed UP/DOWN switch	
	ON	OFF
Signal	Low	High
Voltage(V)	0 (GND)	5

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4. SWING SYSTEM

1) BOTH LH AND RH SWING ACTIONS ARE IMPOSSIBLE

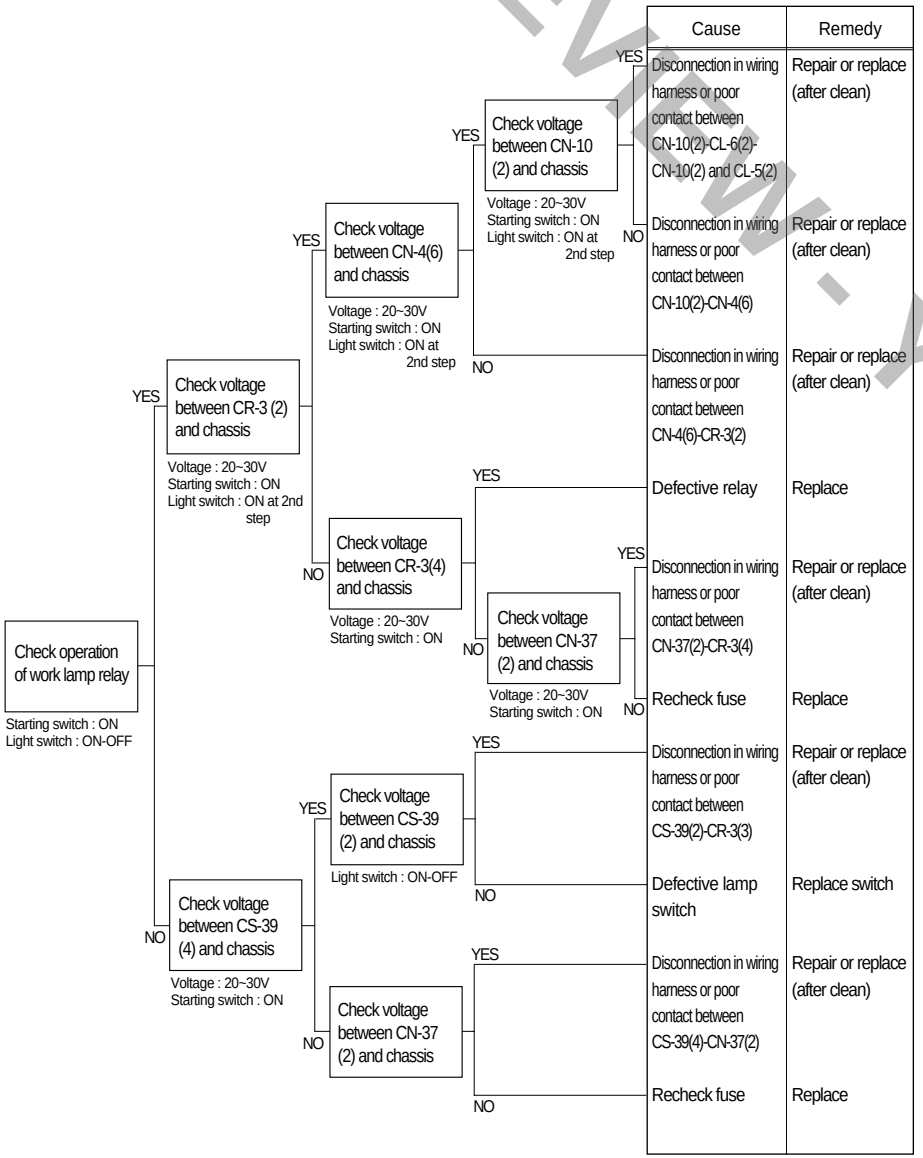


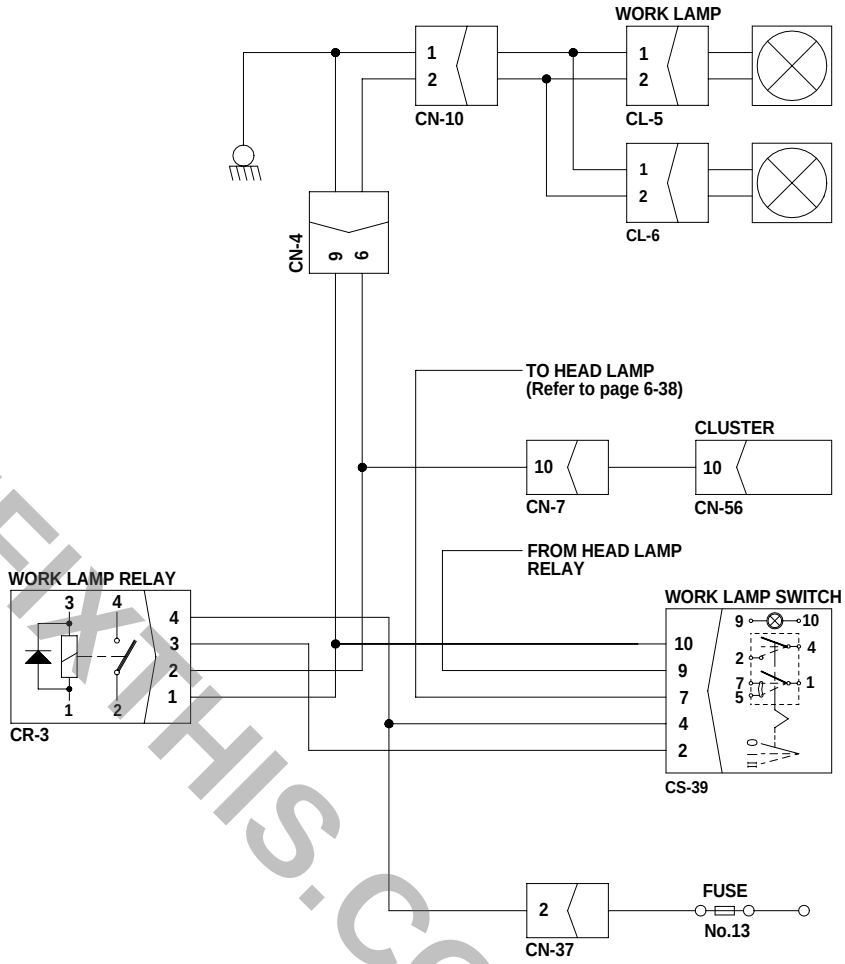
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16. WHEN STARTING SWITCH IS TURNED ON, WORK LAMP DOES NOT LIGHTS UP

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted and the fuse No.15 is not belown out.
- After checking, connect the disconnected connectors again immediately unless otherwise specified.





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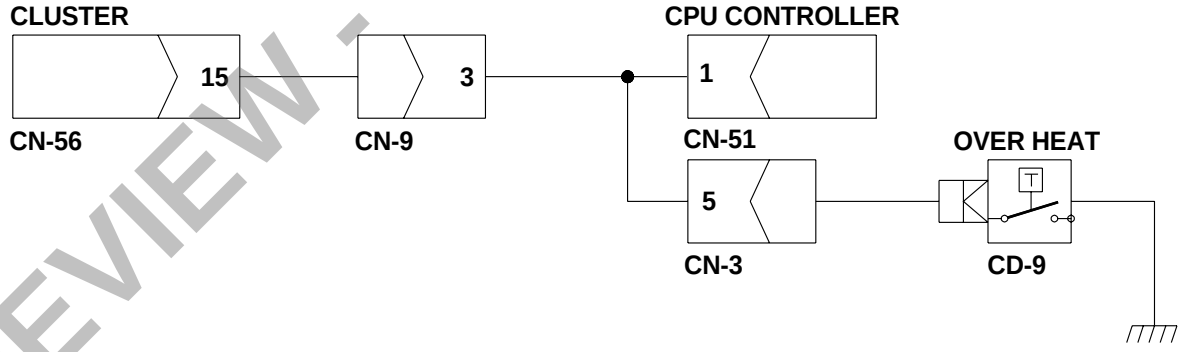
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3. WHEN COOLANT OVERHEAT LAMP LIGHTS UP(Engine is started)

- Before using the HYPER DAT make sure you understand the user's guide of HYPER DAT.
- Before mounting or dismounting the HYPER DAT, always turn the starting switch OFF.
- Before starting switch turn ON or OFF, check all related connectors are properly inserted.



Cause	Remedy
Coolant overheat (110±2℃)	Check engine system
Contact to the ground between CN-51(1) -CN-56(15) or CN-51(1) -CD-9	Repair or replace (after clean)
Defective cluster	Replace



check resistance

YES	MAX 1Ω
NO	MIN 1 MΩ

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(2) **Test 4 :** Check pressure at EPPR valve.

① Remove plug and connect pressure gauge as figure.

· Gauge capacity : 0 to 40~50kgf/cm^2 (0 to 570~710psi)

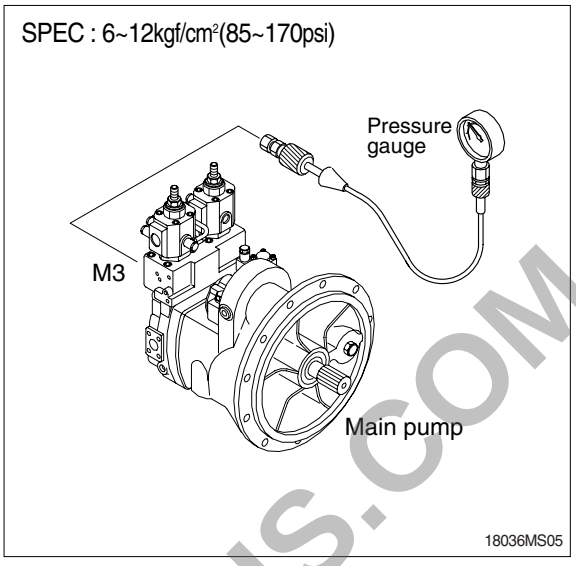
② Start engine.

③ Set S-mode and cancel auto decel mode.

④ If tachometer show approx. 2250+50rpm (~#307), 2300+50rpm(#308~) check pressure at relief position of bucket circuit by operating bucket control lever.

⑤ If pressure is not correct, adjust it.

⑥ After adjust, test the machine.



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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)

① **Test area**

② Select a hard, flat surface.

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

③ attachment extended.

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

(3)

① **Precautions**

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

② follow them without fail.

Operate the machine carefully and

③ always give first priority to safety.

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

④ full swings.

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)

① **Make precise measurements**

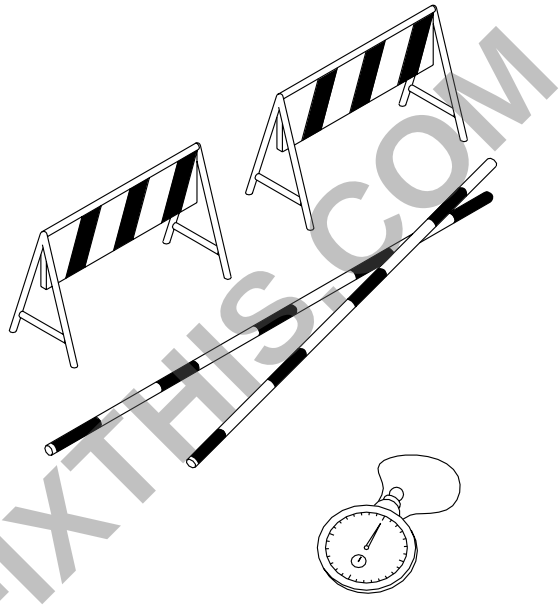
Accurately calibrate test instruments in

② advance to obtain correct data.

Carry out tests under the exact test

③ conditions prescribed for each test item.

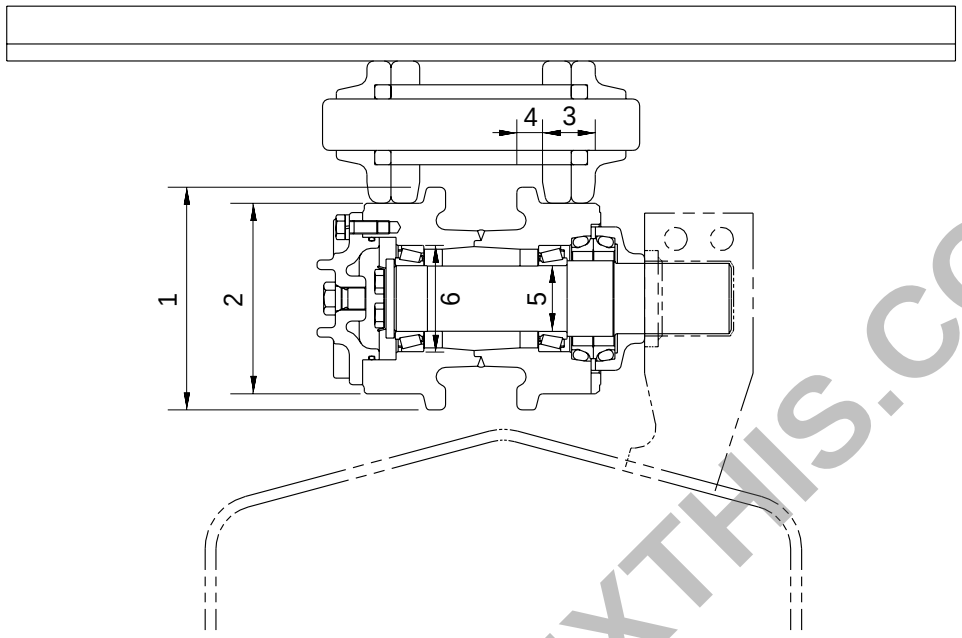
Repeat the same test and confirm that the test data obtained can be procured repeatedly. Use mean values of measurements if necessary.



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2) CARRIER ROLLER



Unit : mm

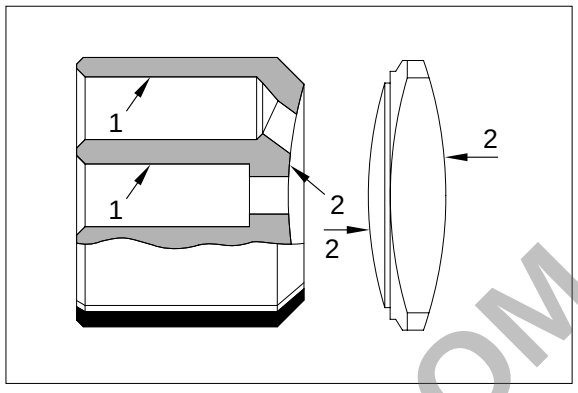
No.	Check item	Criteria			Remedy
1	Outside diameter of flange	Standard size		Repair limit	Rebuild or replace
		ø 169		-	
2	Outside diameter of tread	ø 144		ø 134	
3	Width of tread	45.7		50.7	
4	Width of flange	17		-	
5	Clearance between shaft and bearing	Standard size & tolerance		Standard Interference	Replace
		Shaft	Bearing		
		ø 50 +0.033 +0.017	ø 50 0 -0.012	0.017 to 0.045	
6	Interference between bearing and roller	Bearing	Hole	0.018 to 0.073	Replace
		ø 82 0 -0.020	ø 82 -0.038 -0.073		

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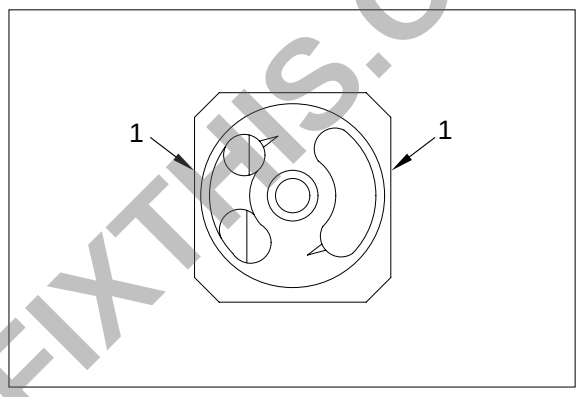
Cylinder block/control lens

Bores free of scoring, no evidence of wear.
Faces smooth an even, free of cracks and scoring.



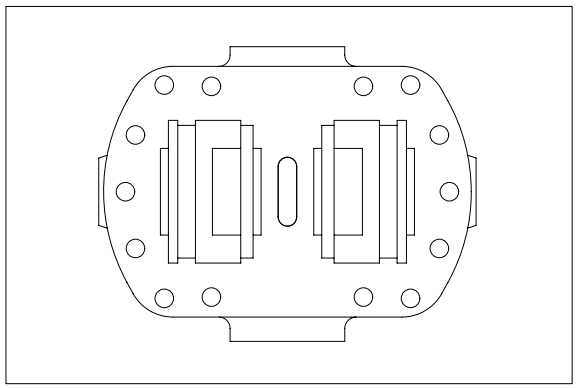
Control lens, side guides

Free of scoring, no evidence of wear.



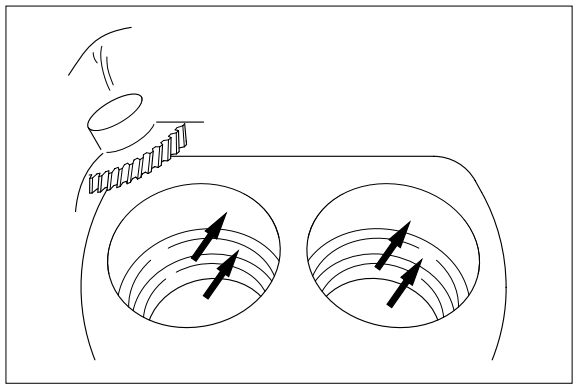
Control housing

Sliding surface and side guides free of scoring and no wear.



Visual check

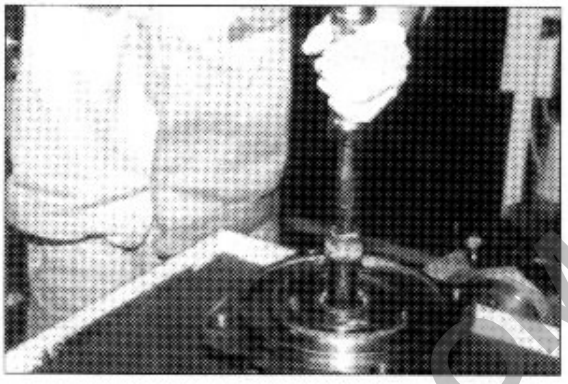
Bearing areas free of scoring and no evidence of wear.



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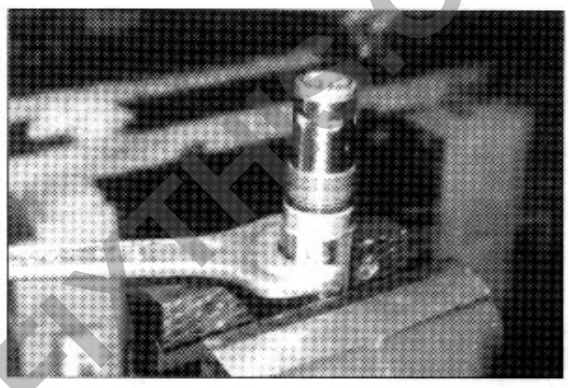
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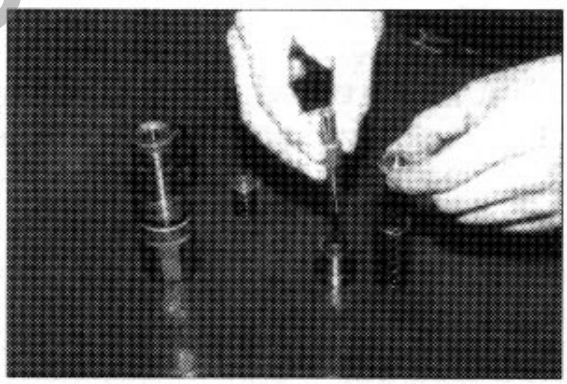
③ Remove the roller bearing(4440 from the valve casing(303) by using slide hammer bearing puller.



④ When disassembling the relief valve, release the plug(201) and remove the bush(343), spring(322), and spring seat(333) from the rod(3030 of the body(101). Remove the piston(302), rod(303), spring(321), spring seat(331) and plunger(301) with the body(101) downward.

※ Do not release the adjust bolt(471) and lock nut(472).





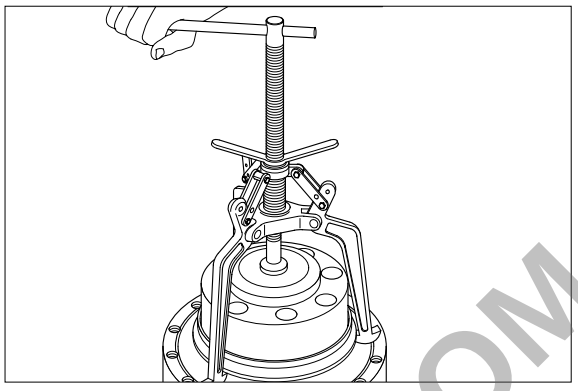
This completes disassembly.

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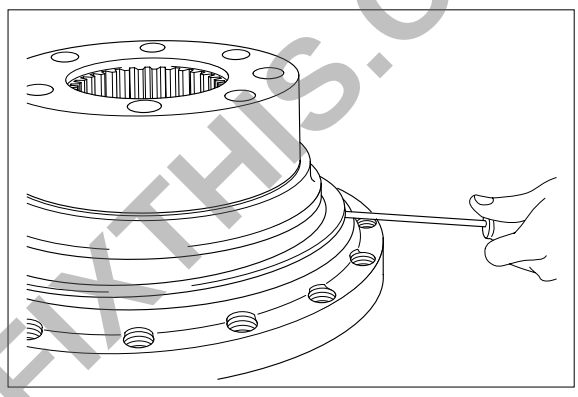
⑯ Remove the inner race of the bearing from the hub.
Check the bearing on the housing(15) as the outer race is machined in the housing itself.

※ In case there is a need to replace the bearing, it will be supplied already preassembled on the housing(15).



(3) Lifetime seal

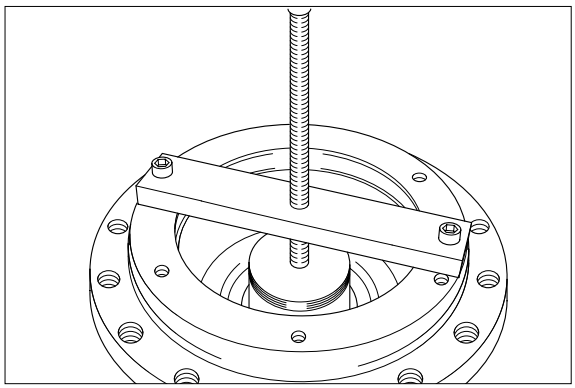
⑰ Disassembling half lifetime seal from the hub(17) and the other half from the housing(15).



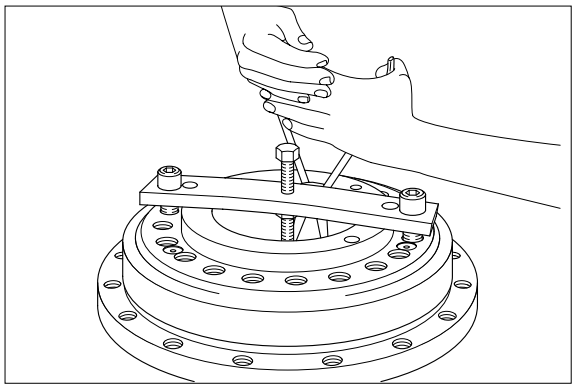
(4) Brake

For disassembling the brake you can work eventually with the gearbox still mounted on the machine.

⑱ Now you can see the brake.
Using the screw press fixed on the motor flange by the two bolts push on the disc pushing(26) in a way to free the circclip (27) from the spring pressure(25).



⑲ Using the proper nippers, take the circlip(27) off the seat.

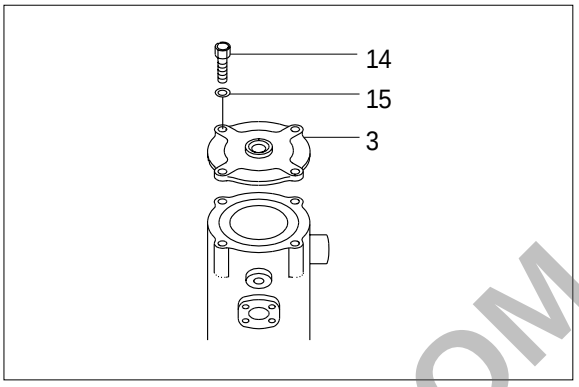


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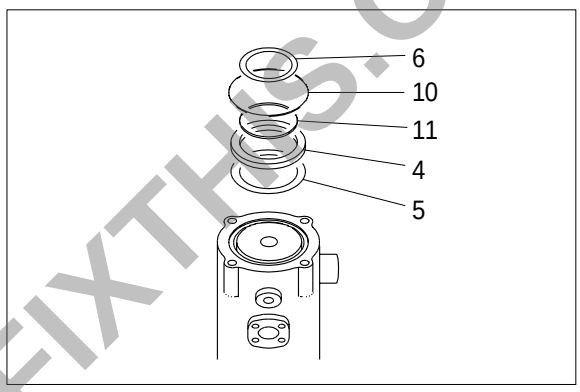
2) DISASSEMBLY

(1) Before the disassembly, clean the turning joint.
Remove bolts(14), washer(15) and cover (3).



(2) Remove shim(6) and O-ring(10).

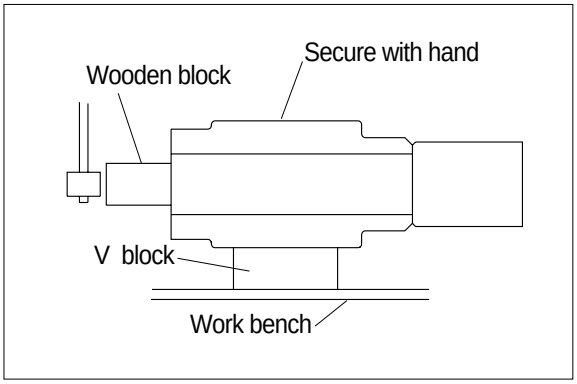
(3) Remove retainer ring(11), spacer(4) and shim(5).



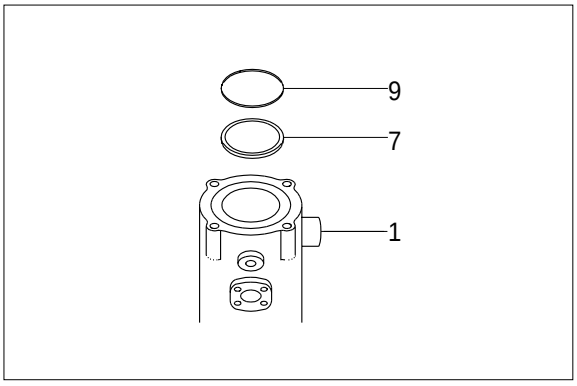
(4) Place hub(1) on a V-block and by using a wood buffer at the shaft end, hit out shaft(2) to about 1/2 from the hub with a hammer.

※ Take care not to damage the shaft(2) when remove hub(1) or rest it sideway.

※ Put a fitting mark on hub(1) and shaft(2).



(5) Remove six slipper seals(7) and O-ring(9) from hub(1).



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