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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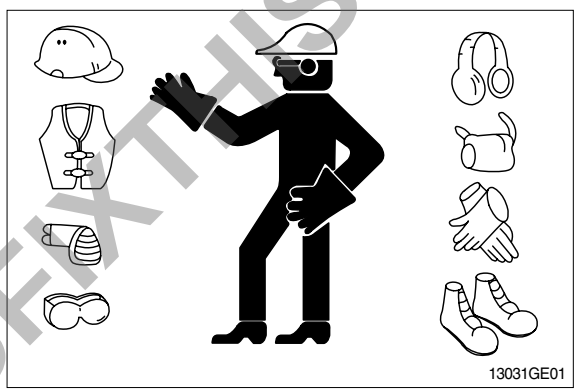
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

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

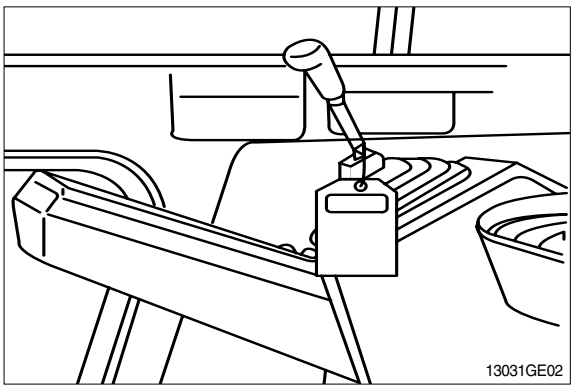
WEAR PROTECTIVE CLOTHING

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



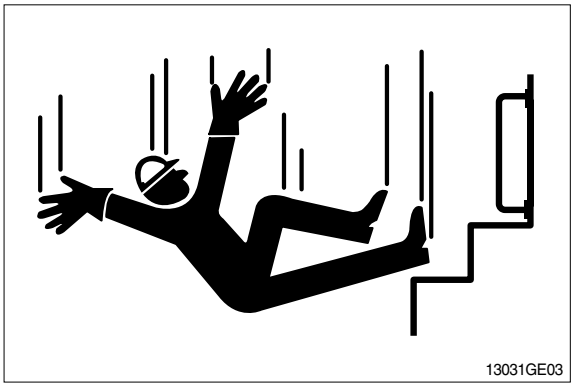
WARN OTHERS OF SERVICE WORK

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

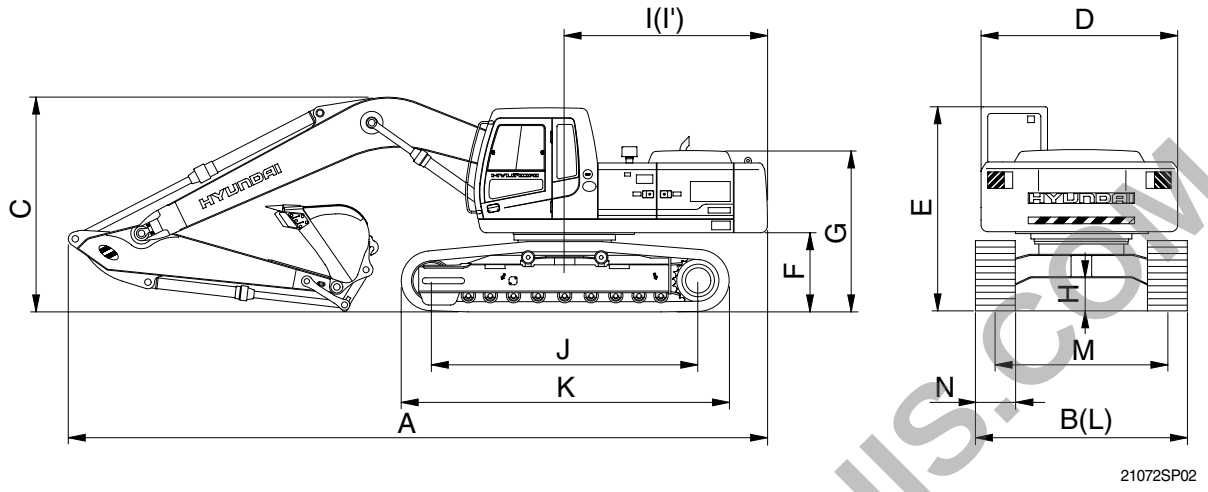
Falling is one of the major causes of personal injury.
When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.
Never jump on or off the machine. Never mount or dismount a moving machine.
Be careful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



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2. SPECIFICATIONS

1) ROBEX 210LC-7H / 220LC-7H



Description		Unit	Specification
Operating weight		kg(lb)	21500(47400)
Bucket capacity(SAE heaped), standard		$m^3(yd^3)$	0.92(1.20)
Overall length	A	mm(ft-in)	9520(31' 3")
Overall width, with 600mm shoe	B		2990(9'10")
Overall height	C		2990(9'10")
Superstructure width	D		2700(8'10")
Overall height of cab	E		2920(9' 7")
Ground clearance of counterweight	F		1060(3' 6")
Engine cover height	G		2320(7' 7")
Minimum ground clearance	H		480(1' 7")
Rear-end distance	I		2770(9' 1")
Rear-end swing radius	I'		2830(9' 3")
Distance between tumblers	J		3650(12' 0")
Undercarriage length	K		4440(14' 7")
Undercarriage width	L		2990(9'10")
Track gauge	M		2390(7'10")
Track shoe width, standard	N		600(24")
Travel speed(Low/high)		km/hr(mph)	3.4/5.3(2.1/3.3)
Swing speed		rpm	12.5
Gradeability		Degree(%)	35(70)
Ground pressure(600mm shoe)		$kgf/cm^2(psi)$	0.46(6.54)

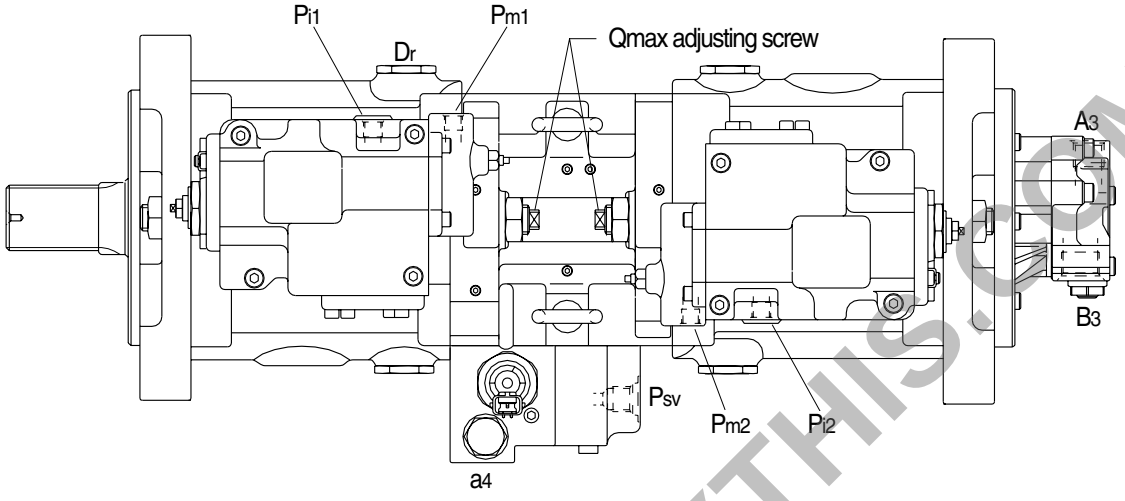
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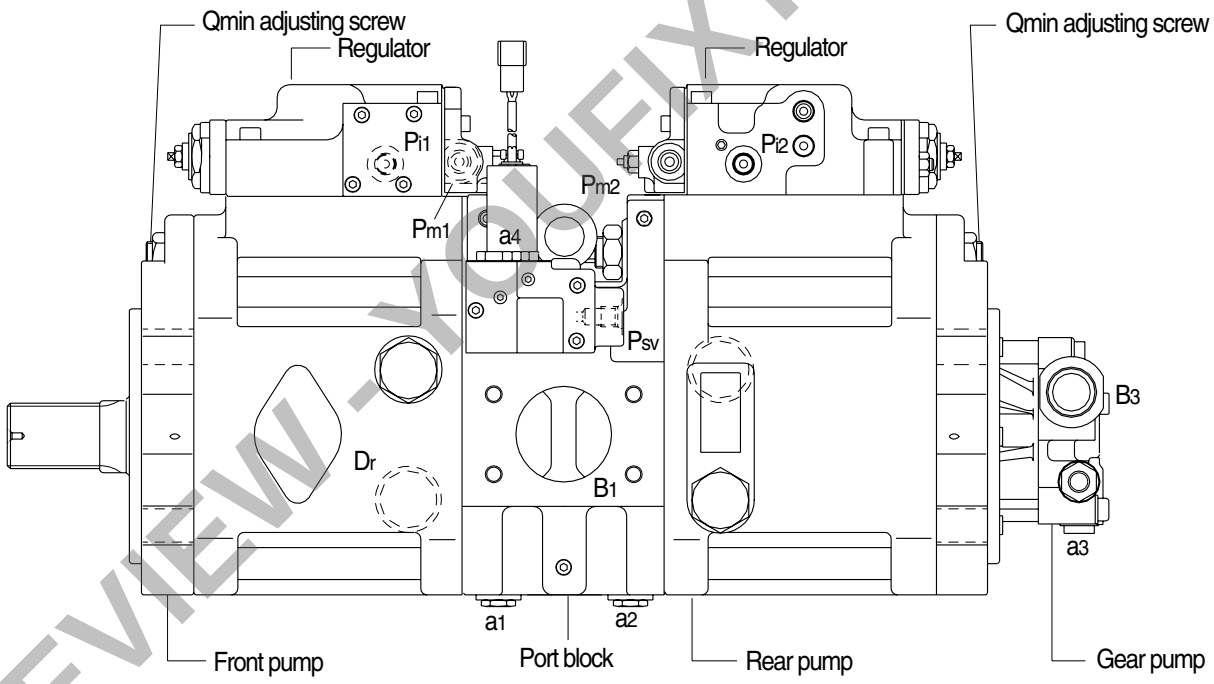
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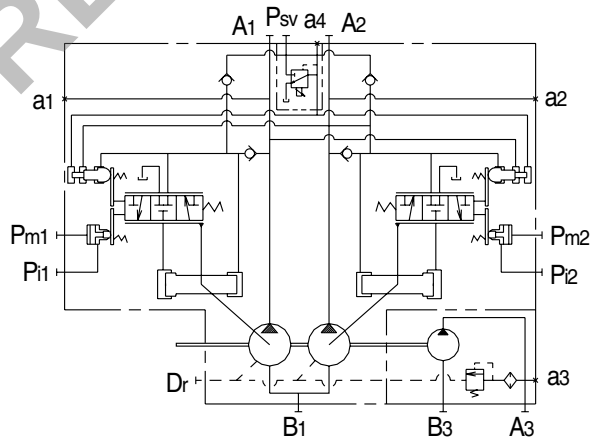
GROUP 1 PUMP DEVICE

1. STRUCTURE

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





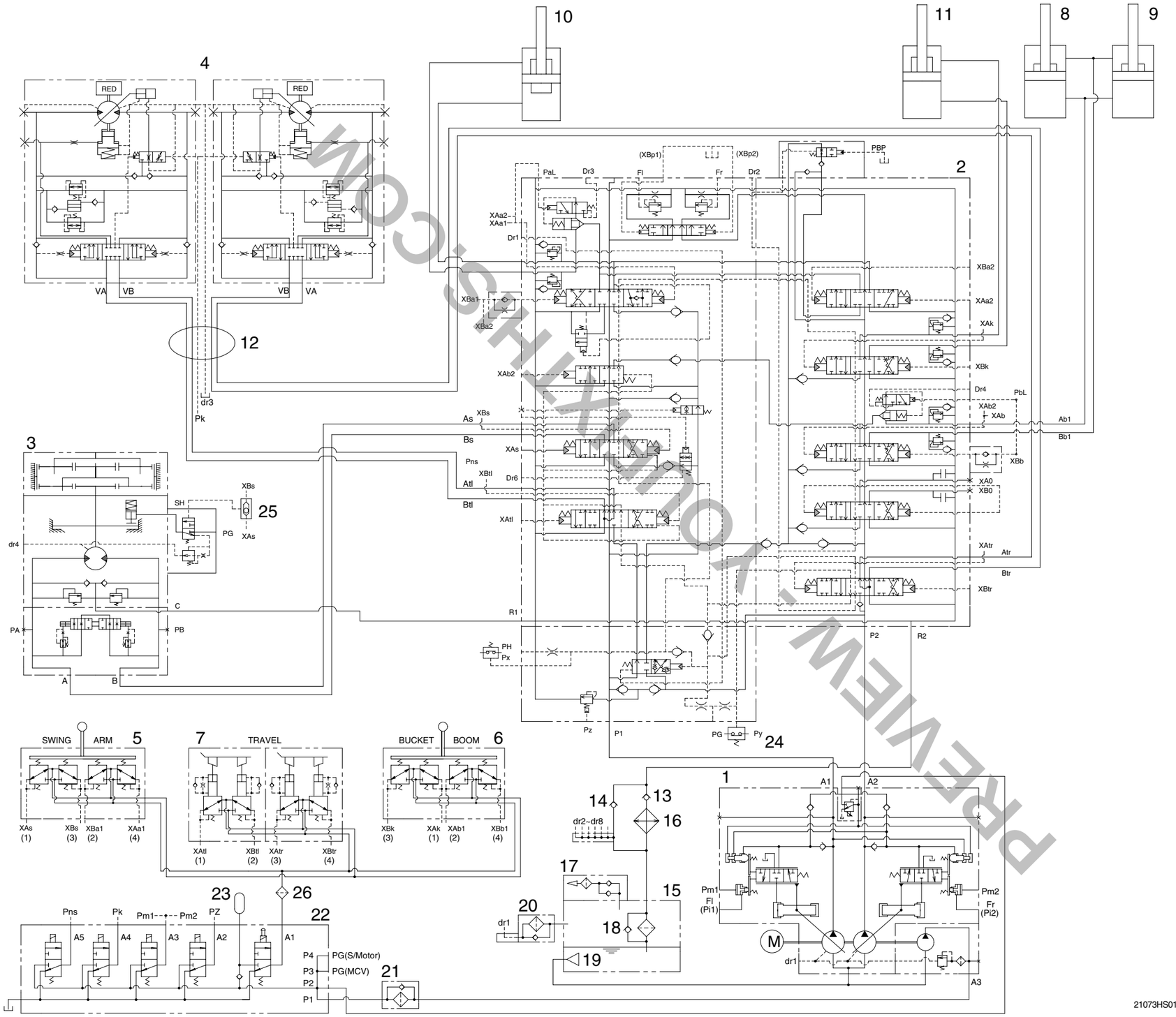


Port	Port name	Port size
A1,2	Delivery port	SAE6000psi 3/4"
B1	Suction port	SAE2500psi 2 1/2"
Dr	Drain port	PF 3/4 - 20
Pi1,i2	Pilot port	PF 1/4 - 15
Pm1,m2	Qmax cut port	PF 1/4 - 15
Psv	Servo assist port	PF 1/4 - 15
a1,2,4	Gauge port	PF 1/4 - 15
a3	Gauge port	PF 1/4-14
A3	Gear pump delivery port	PF 1/2 - 19
B3	Gear pump suction port	PF 3/4 - 20

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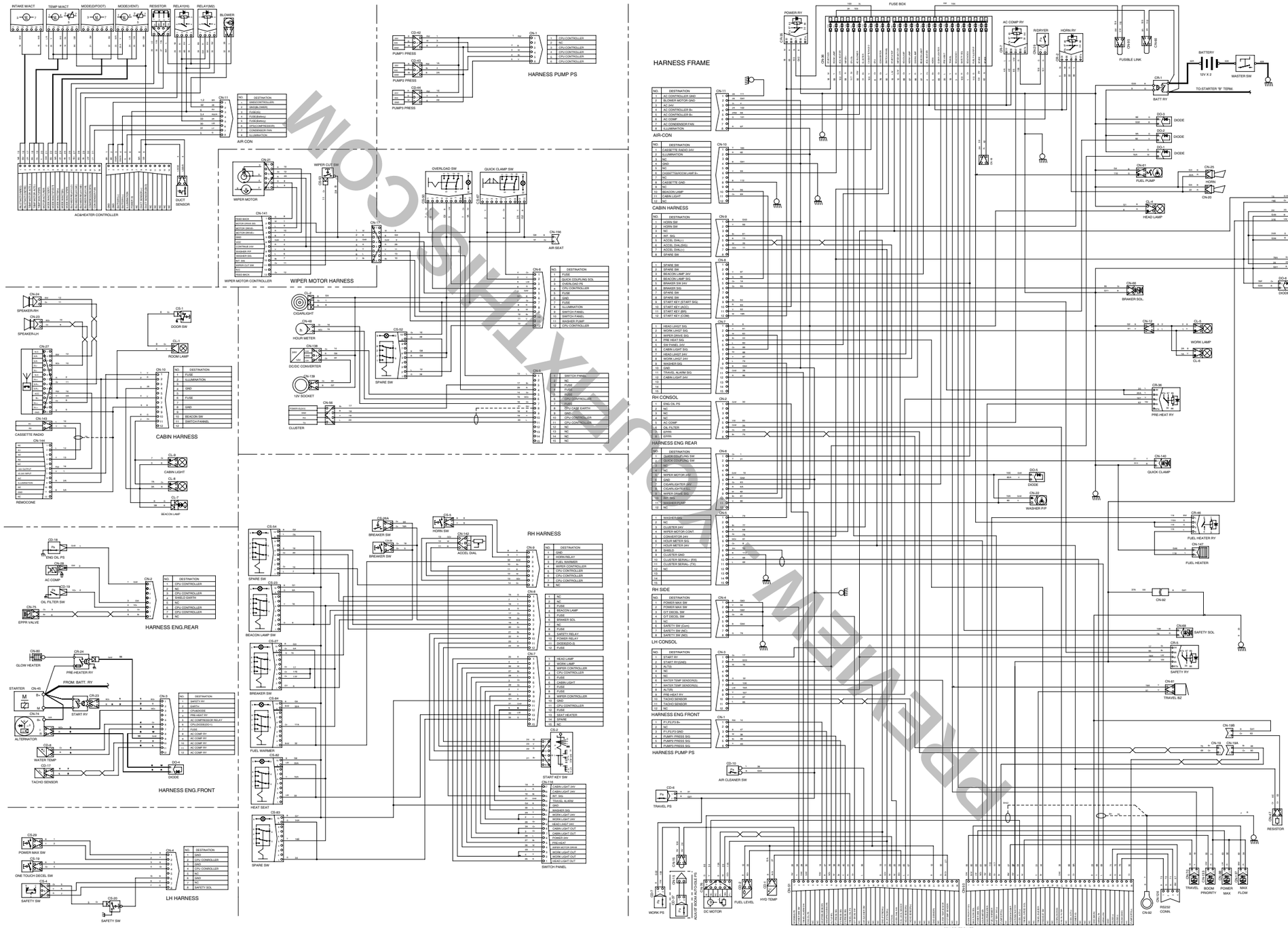
GROUP 1 HYDRAULIC CIRCUIT



21073HS01

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
24 Pressure switch
25 Shuttle valve
26 Last guard filter

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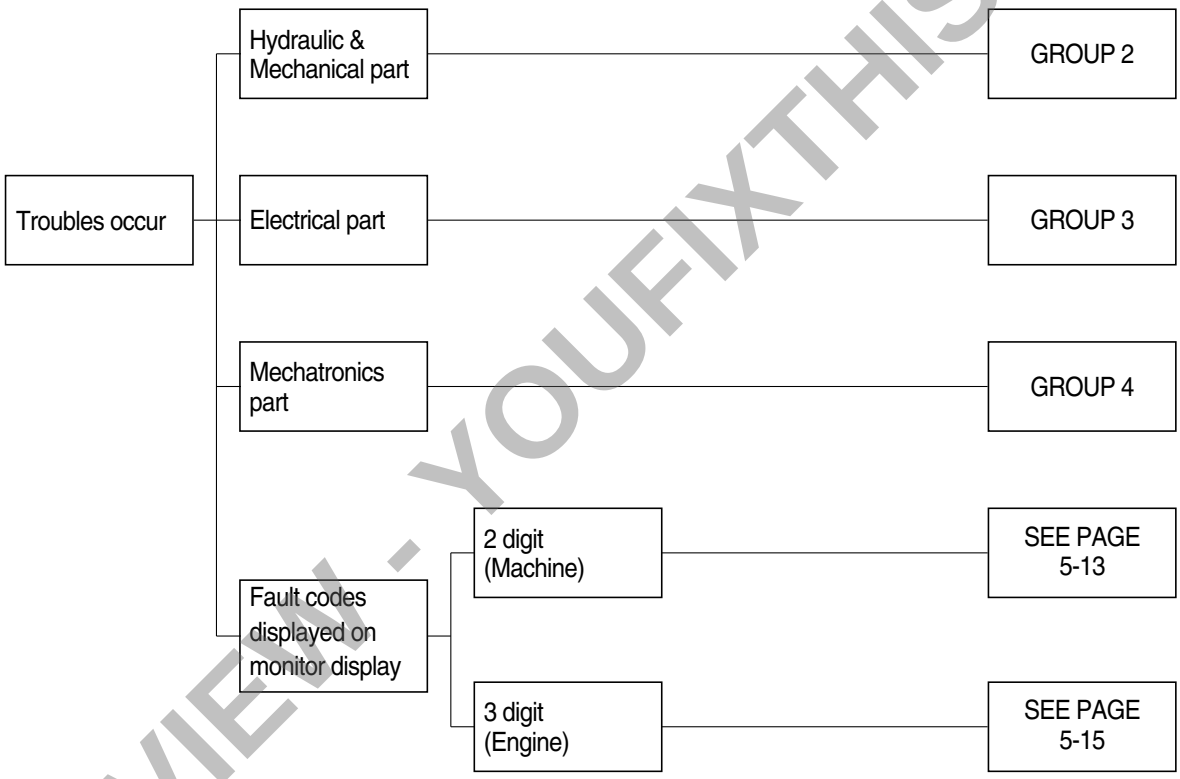
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GROUP 1 BEFORE TROUBLESHOOTING

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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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 : 180 ℓ

(5) Remove socket bolts(74) and disconnect pipe(1, 2).

(6) Disconnect pilot line hoses(4, 5, 6, 7, 8, 9, 10, 11).

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

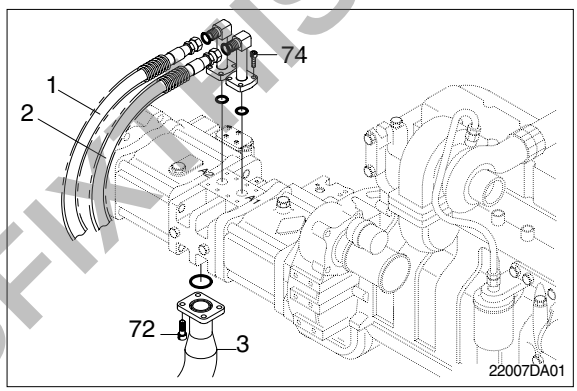
※ When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.

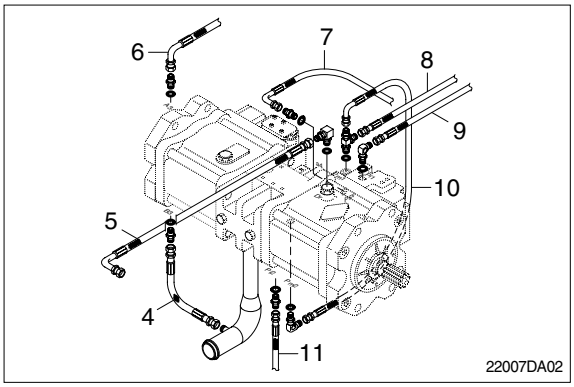
(8) Sling the pump assembly and remove the pump mounting bolts.

- Weight : 120kg(265lb)

※ 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	M24 × 3.0	90 ± 7.0	651 ± 51
2		Radiator mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
3		Coupling mounting socket bolt	M18 × 2.5	32 ± 1.0	231 ± 7.2
4		Main pump housing mounting bolt	M10 × 1.5	4.8 ± 0.3	34.7 ± 2.2
5	Hydraulic system	Main pump mounting socket bolt	M20 × 2.5	42 ± 4.5	304 ± 32.5
6		Main control valve mounting nut	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
7		Fuel tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.9
8		Hydraulic oil tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.9
9		Turning joint mounting bolt, nut	M12× 1.75	12.3 ± 1.3	88.9 ± 9.4
10	Power train system	Swing motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
11		Swing bearing upper part mounting bolt	M20 × 2.5	57.8 ± 6.4	418 ± 46.3
12		Swing bearing lower part mounting bolt	M20 × 2.5	57.8 ± 6.4	418 ± 46.3
13		Travel motor mounting bolt	M16 × 2.0	23 ±2.5	166 ± 18.1
14		Sprocket mounting bolt	M16 × 2.0	26 ±4.0	188 ± 28.9
15	Under carriage	Carrier roller mounting bolt, nut	M16 × 2.0	23 ±2.5	166 ± 18.1
16		Track roller mounting bolt	M20 × 2.5	54.7 ± 5.0	396 ± 36.2
17		Track tension cylinder mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
18		Track shoe mounting bolt, nut	M20 × 1.5	78 ± 8.0	564 ± 57.9
19		Track guard mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
20	Others	Counter weight mounting bolt	M36 × 3.0	297 ± 33	2148 ± 239
21		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
22		Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8

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

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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

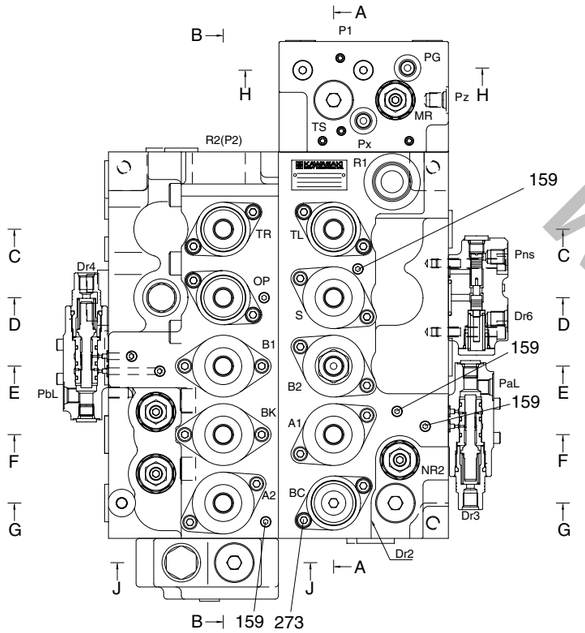
Kilogram to Pound

1kg = 2.2046lb

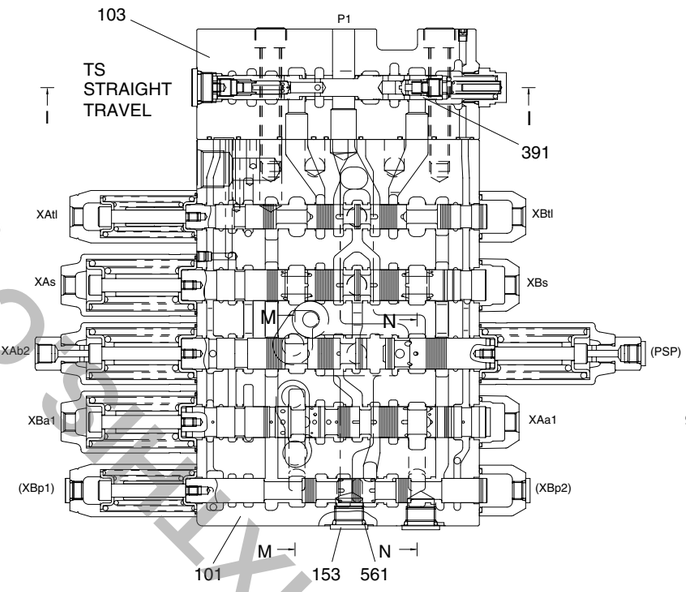
	0	1	2	3	4	5	6	7	8	9
0		2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.5.	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	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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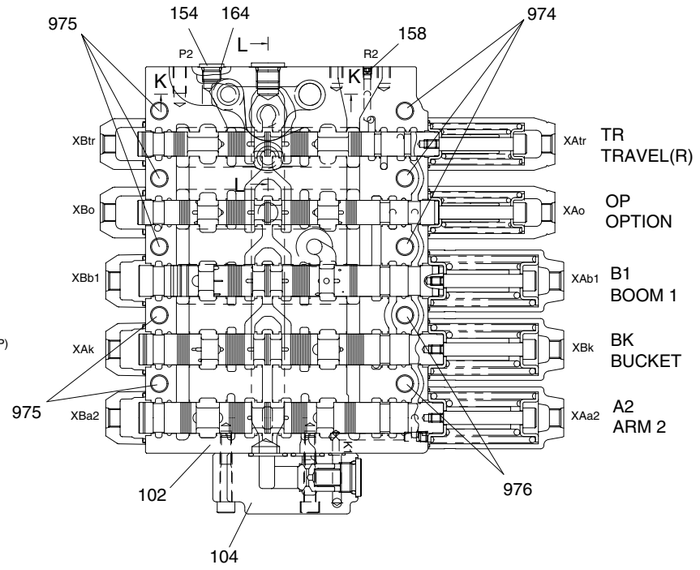
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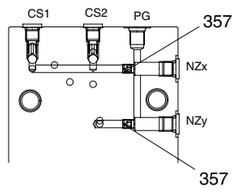


SECTION A-A

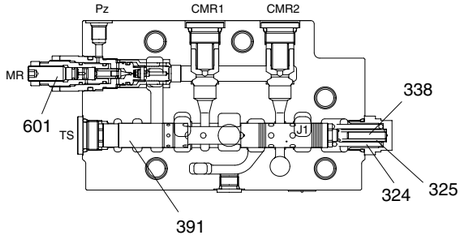


SECTION B-B

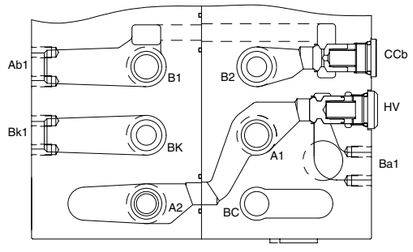




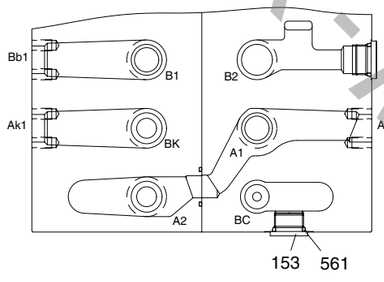
SECTION H-H



SECTION I-I



SECTION M-M



SECTION N-N

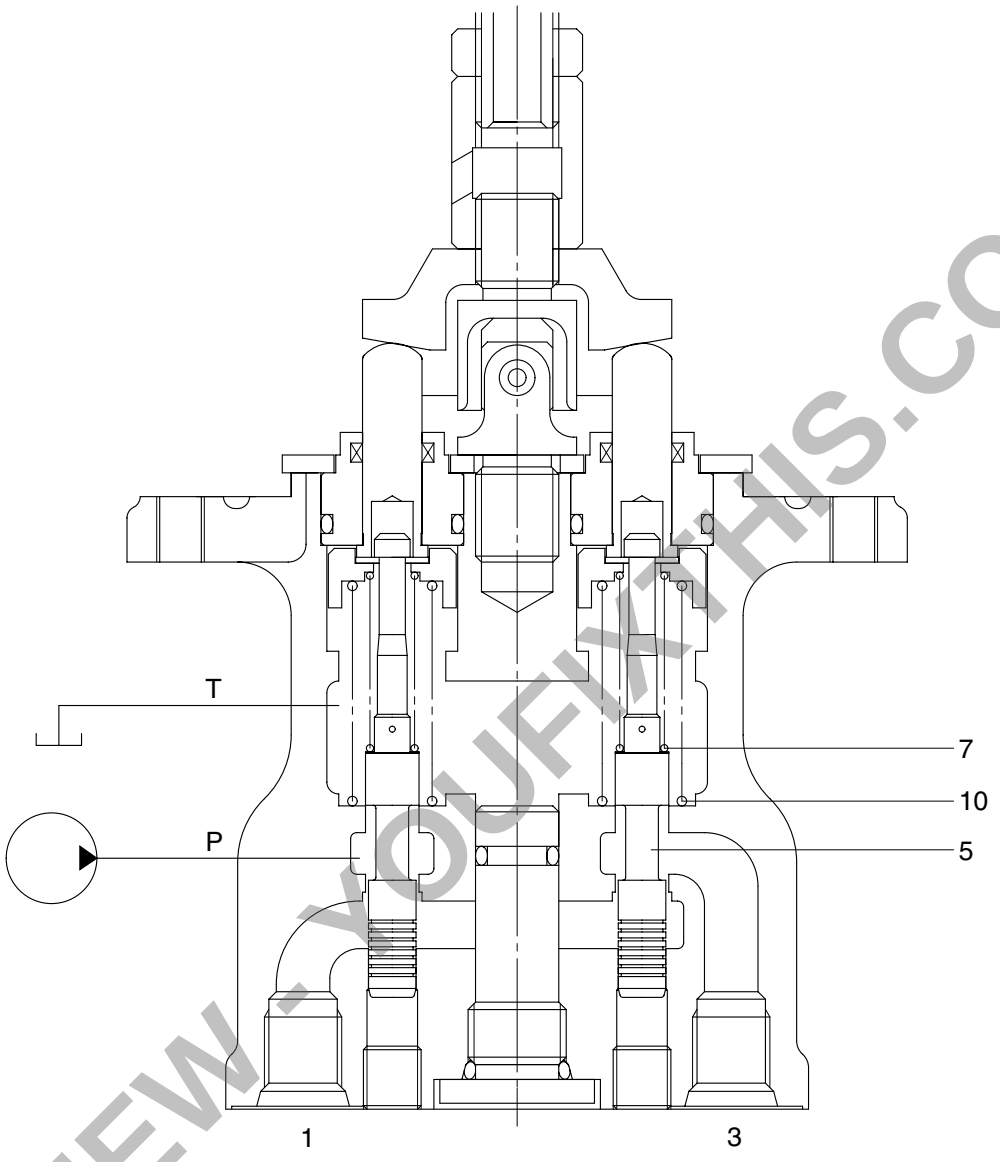
21072MC07

101	Casing A	273	Socket screw	377	Spring
102	Casing B	301	Travel spool	378	Spring
103	Straight travel valve	302	Arm 1 spool assy	379	Spring
104	Boom priority valve	303	Boom 1 spool assy	391	Straight travel spool
153	Plug	304	Bucket spool	392	Bypass cut spool
154	Plug	305	Swing spool	395	Swing priority spool
155	Plug	306	Arm 2 spool	401	Spool
156	Plug	307	Boom 2 spool	424	Spring
158	Plug	309	Spool(Option)	425	Spring
159	Plug	310	Travel spool	438	Rod
163	O-ring	324	Spring	511	Poppet
164	O-ring	325	Spring	515	Poppet
165	O-ring	328	Spring	516	Poppet
166	O-ring	329	Spring	521	Spring
167	O-ring	331	Spring seat	523	Spring
168	O-ring	332	Spring seat	551	Plug
169	O-ring	333	Bolt	552	Plug
201	Cover	334	Stopper	553	Plug
202	Cover	335	Stopper	556	Plug
203	Cover	336	Bolt	561	O-ring
204	Cover	337	Stopper	601	Main relief valve
209	Flange	338	Stopper	602	Port relief valve
251	Control valve assy	339	Stopper	611	Nega-con relief valve
252	Lock valve assy	357	Orifice	971	Socket screw
254	Swing logic valve assy	370	Spring	974	Socket screw
261	O-ring	372	Spring	975	Socket screw
262	O-ring	374	Spring	976	Socket screw
264	O-ring	376	Spring		

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(1) Case where handle is in neutral position

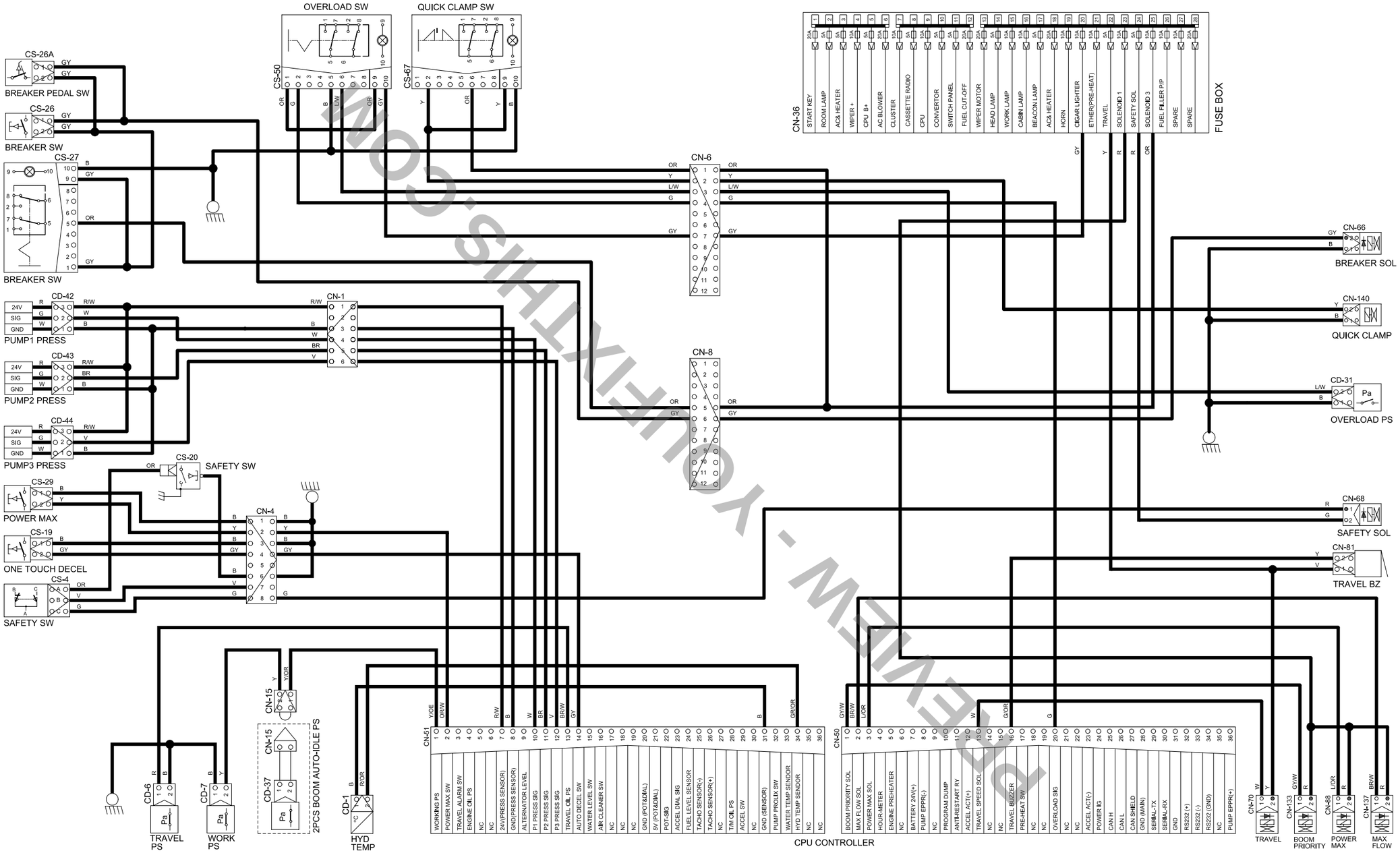


The force of the spring(7) that determines the output pressure of the pilot valve is not applied to the spool(5). Therefore, the spool is pushed up by the spring(10) to the position of port(1, 3) in the operation explanation drawing. Then, since the output port is connected to tank port T only, the output port pressure becomes equal to tank pressure.

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ELECTRIC CIRCUIT FOR HYDRAULIC



21074EL59

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3. EPPR VALVE CHECK PROCEDURE

1) CHECK ELECTRIC VALUE AT EPPR VALVE

(1) Start engine.

(2) Set S-mode and cancel auto decel mode.

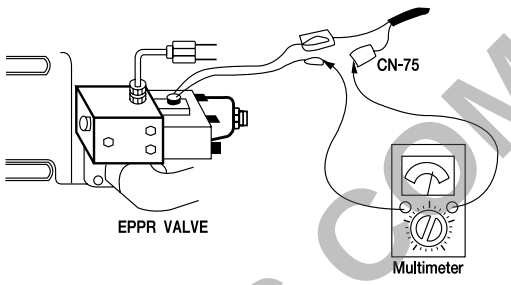
(3) Position the accel dial at 10.

(4) If tachometer show approx 1900±100rpm disconnect one wire harness from EPPR valve.

(5) Install multimeter as figure.

(6) Check electric current at bucket circuit relief position.

Spec : 200~450mA



5-23(1) (290-7)

2) CHECK PRESSURE AT EPPR VALVE

(1) Remove plug and connect pressure gauge as figure.
- Gauge capacity : 0 to 40-50kgf/cm^2 (0 to 580-725psi)

(2) Start engine.

(3) Set S-mode and cancel auto decel mode.

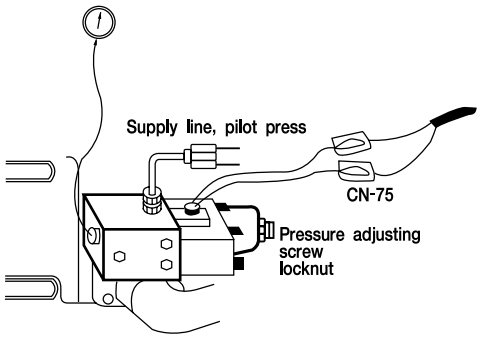
(4) Position the accel dial at 10.

(5) If tachometer show approx 1900±100rpm check pressure at relief position of bucket circuit by operating bucket control lever.

(6) If pressure is not correct, adjust it.

(7) After adjust, test the machine.

Spec : 2~25kgf/cm^2(30~350psi)



5-23(2) (290-7)

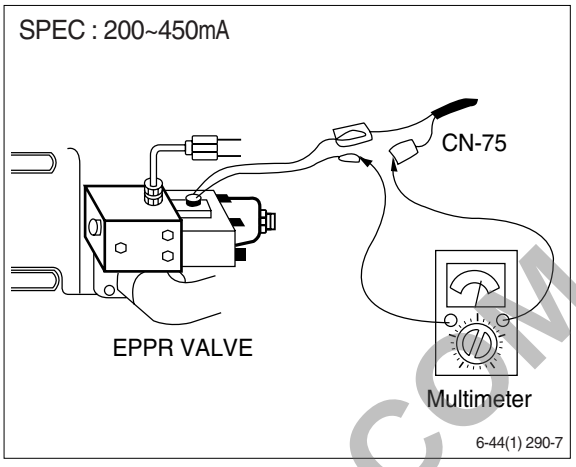
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2) TEST PROCEDURE

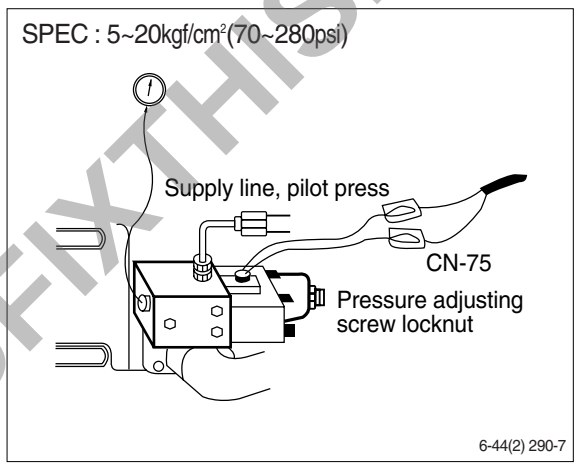
(1) **Test 3 :** Check electric current at EPPR valve at S-mode

① Install multimeter as figure.
② Start engine.
③ Set the accel dial at "10"(max)
④ Set S-mode with 1900±100rpm.
⑤ Check electric current.



(2) **Test 4 :** Check pressure at EPPR valve at S-mode

① Connect pressure gauge at EPPR valve.
② Start engine.
③ Set the accel dial at "10"(max)
④ Set S-mode with 1900±100rpm.
⑤ Operate bucket lever completely push or pull.
⑥ Hold arm lever at the end of stroke.
⑦ Check pressure at relief position.



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3) DISASSEMBLY

(1) Select place suitable to disassembling.

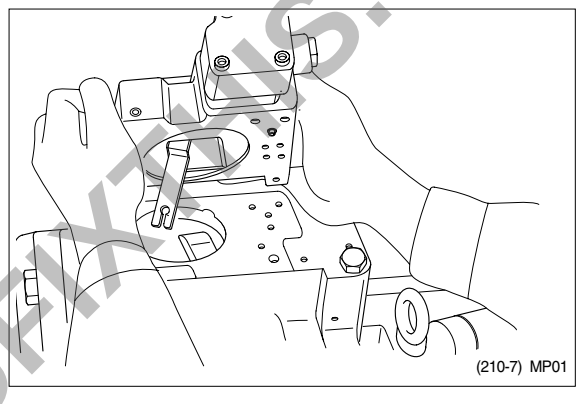
※ Select clean place.

※ Spread rubber sheet, cloth or so on on overhaul workbench top to prevent parts from being damaged.

(2) Remove dust, rust, etc, from pump surfaces with cleaning oil or so on.

(3) Remove drain port plug(468) and let oil out of pump casing(Front and rear pump).

(4) Remove hexagon socket head bolts(412, 413) and remove regulator.



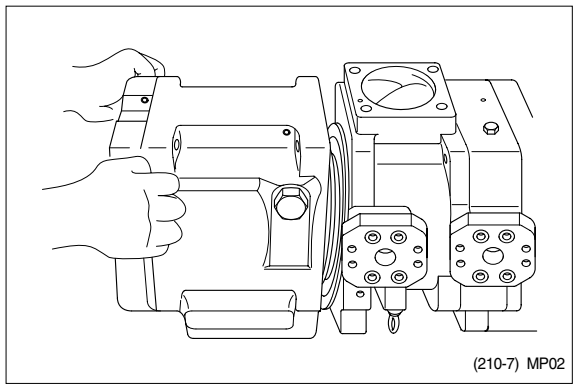
(210-7) MP01

(5) Loosen hexagon socket head bolts(401) which tighten swash plate support(251), pump casing(271) and valve block(312).

※ If gear pump and so on are fitted to rear face of pump, remove them before starting this work.

(6) Place pump horizontally on workbench with its regulator-fitting surface down and separate pump casing(271) from valve block(312).

※ Before bringing this surface down, spread rubber sheet on workbench without fail to prevent this surface from being damaged.

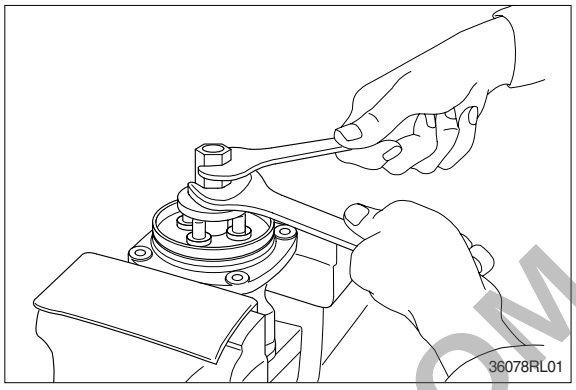


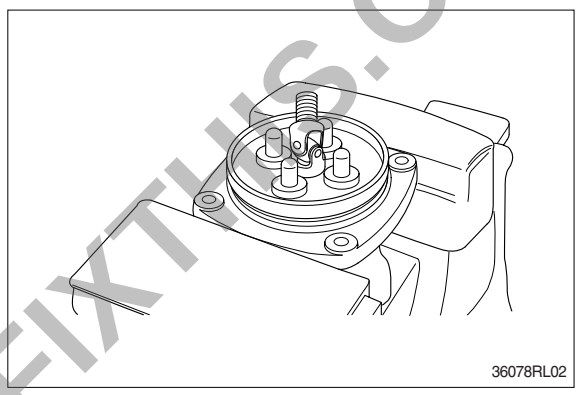
(210-7) MP02

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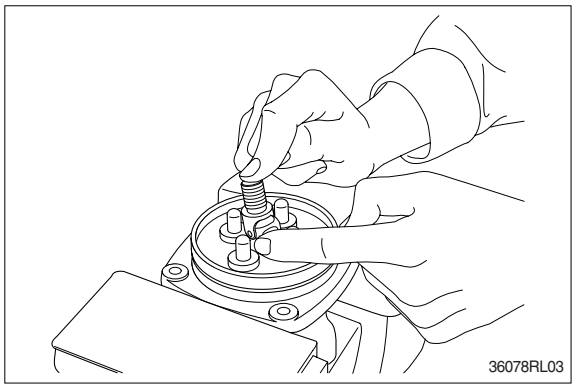
(6) Loosen adjusting nut(19) and plate(18) with spanners on them respectively, and remove them.

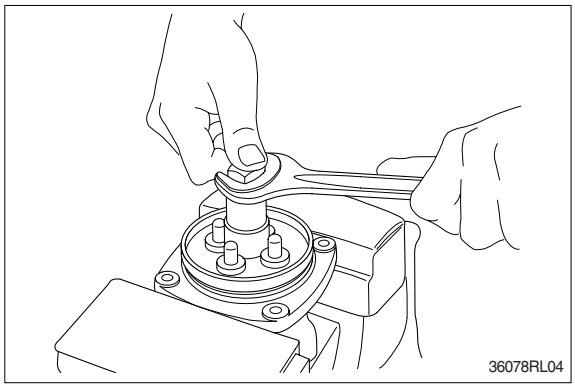




(7) Turn joint anticlockwise to loosen it, utilizing jig(Special tool).

※ When return spring(10) is strong in force, plate(15), plug(11) and push rod(14) will come up on loosening joint.
Pay attention to this.





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