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PREVENT ACID BURNS

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 10-15 minutes. Get medical attention immediately.

If acid is swallowed:

1. Drink large amounts of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.

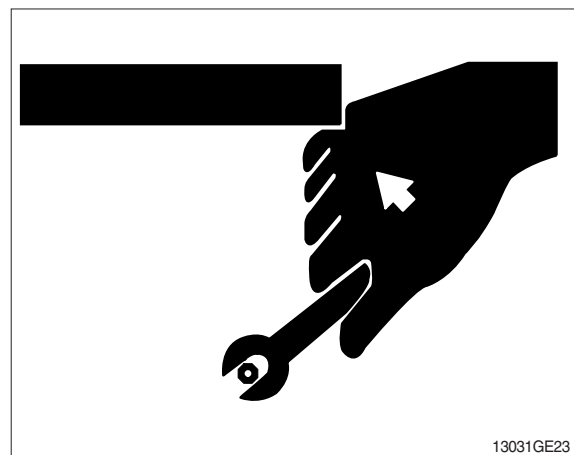
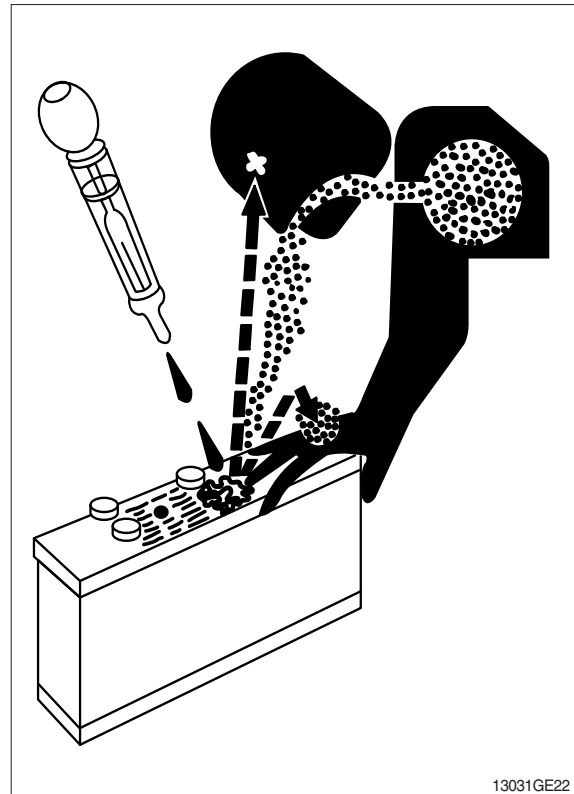
USE TOOLS PROPERLY

Use tools appropriate to the work. Makeshift tools, parts, and procedures can create safety hazards.

Use power tools only to loosen threaded tools and fasteners.

For loosening and tightening hardware, use the correct size tools. **DO NOT** use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only recommended replacement parts. (See Parts catalogue.)



7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	∅ 160 × ∅ 110 × 1500 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	∅ 170 × ∅ 120 × 1760 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	∅ 150 × ∅ 105 × 1295 mm
	Cushion	Extend only

※ Discoloration of cylinder rod can occur when the friction reduction additive of lubrication oil spreads on the rod surface.

※ Discoloration does not cause any harmful effect on the cylinder performance.

8) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
HX380 L	Standard	600 mm (24")	0.70 kgf/cm ² (9.95 psi)	51	3340 mm (10' 11")
	Option	700 mm (28")	0.61 kgf/cm ² (8.67 psi)	51	3440 mm (11' 3")
		750 mm (30")	0.57 kgf/cm ² (8.11 psi)	51	3490 mm (11' 5")
		800 mm (32")	0.54 kgf/cm ² (7.68 psi)	51	3540 mm (11' 7")
		900 mm (36")	0.48 kgf/cm ² (6.83 psi)	51	3640 mm (11' 11")
HX380 NL	Standard	600 mm (24")	0.70 kgf/cm ² (9.95 psi)	51	2990 mm (9' 10")

9) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped			
HX380L HX380NL	Standard	1.62 m ³ (2.12 yd ³)	1.42 m ³ (1.86 yd ³)	5	1480 mm (58")	
			1.46 m ³ (1.91 yd ³)	1.28 m ³ (1.67 yd ³)	4	1370 mm (54")
			1.90 m ³ (2.49 yd ³)	1.65 m ³ (2.16 yd ³)	5	1665 mm (66")
			2.10 m ³ (2.75 yd ³)	1.84 m ³ (2.41 yd ³)	5	1800 mm (71")
			2.32 m ³ (3.03 yd ³)	2.02 m ³ (2.64 yd ³)	6	1950 mm (77")
			◆1.46 m ³ (1.91 yd ³)	1.28 m ³ (1.67 yd ³)	4	1370 mm (54")
			◆1.62 m ³ (2.12 yd ³)	1.42 m ³ (1.86 yd ³)	5	1480 mm (58")
			◆1.90 m ³ (2.49 yd ³)	1.65 m ³ (2.16 yd ³)	5	1665 mm (66")
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			◆1.90 m ³ (2.49 yd ³)	1.65 m ³ (2.16 yd ³)	5	1665 mm (66")

◆ : Heavy duty bucket

◆ : Rock-heavy duty bucket

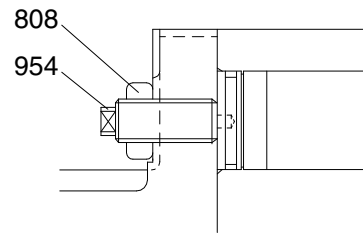
(4) Adjustment of maximum and minimum flows

① Adjustment of maximum flow

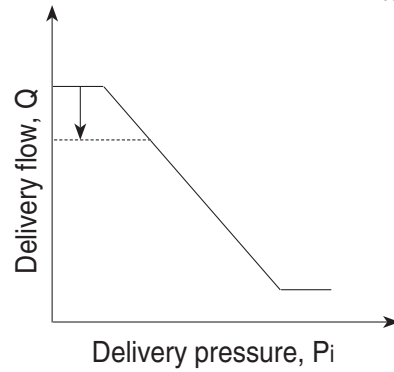
Adjust it by loosening the hexagon nut (808) and by tightening (or loosening) the set screw (954).

The maximum flow only is adjusted without changing other control characteristics.

Speed	Adjustment of max flow spring	
	Tightening amount of adjusting screw (954)	Flow change amount
(min ⁻¹)	(Turn)	(l /min)
1800	+1/4	-6.9



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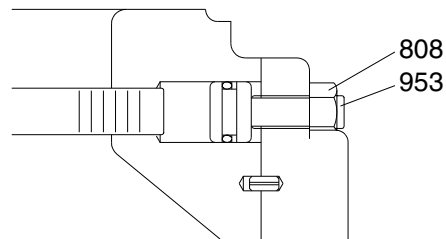


② Adjustment of minimum flow

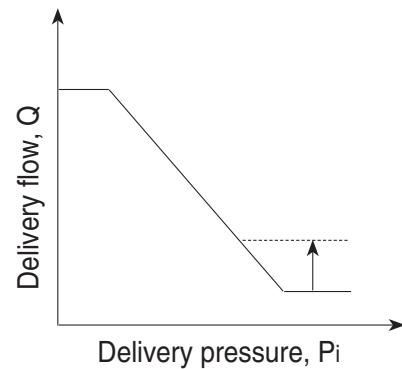
Adjust it by loosening the hexagon nut (808) and by tightening (or loosening) the hexagonal socket head set screw (953). Similarly to the adjustment of the maximum flow, other characteristics are not changed.

However, remember that, if tightened too much, the required horsepower during the maximum delivery pressure (or during relieving) may increase.

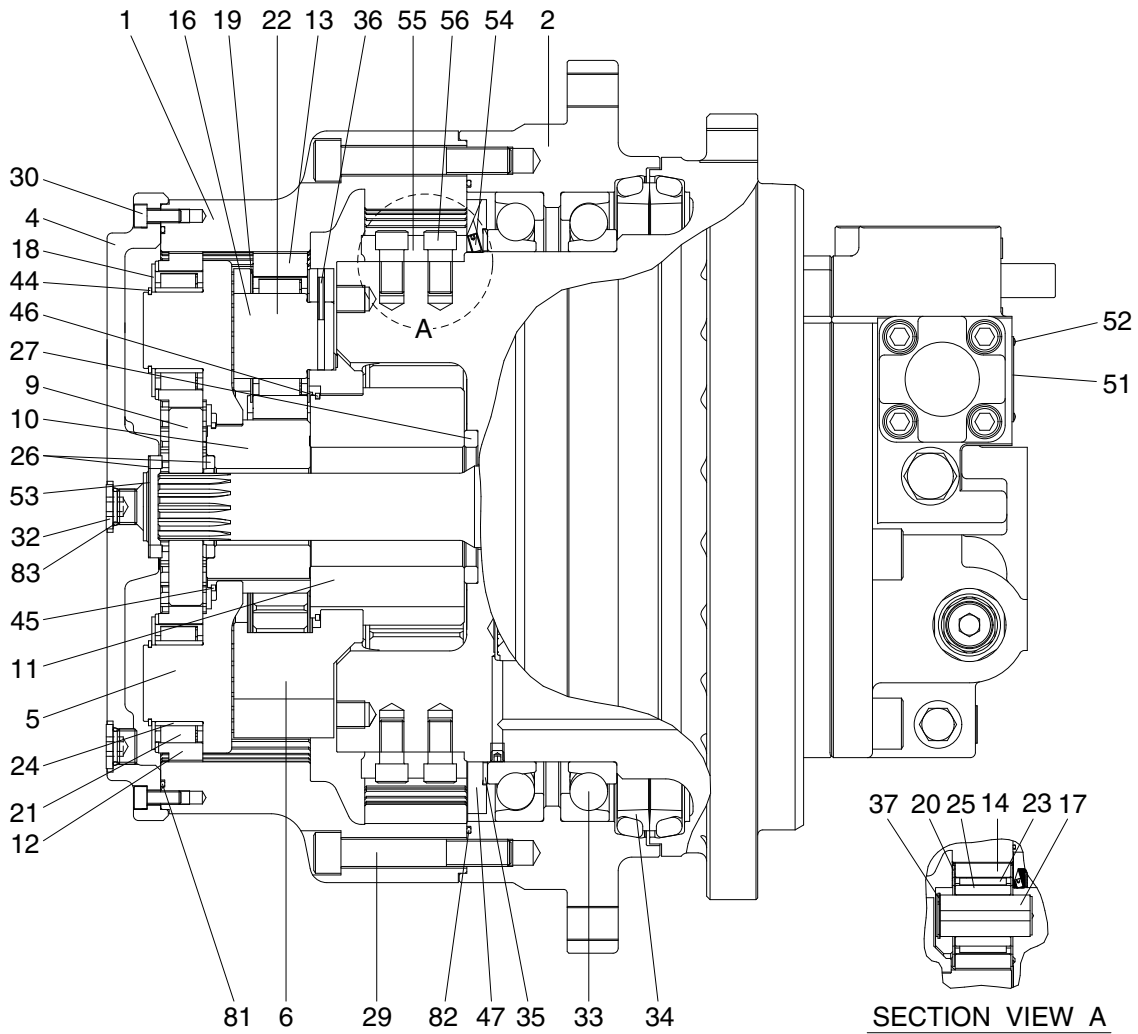
Speed	Adjustment of min flow spring	
	Tightening amount of adjusting screw (953)	Flow change amount
(min ⁻¹)	(Turn)	(l /min)
1800	+1/4	+6.9



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2) REDUCTION GEAR



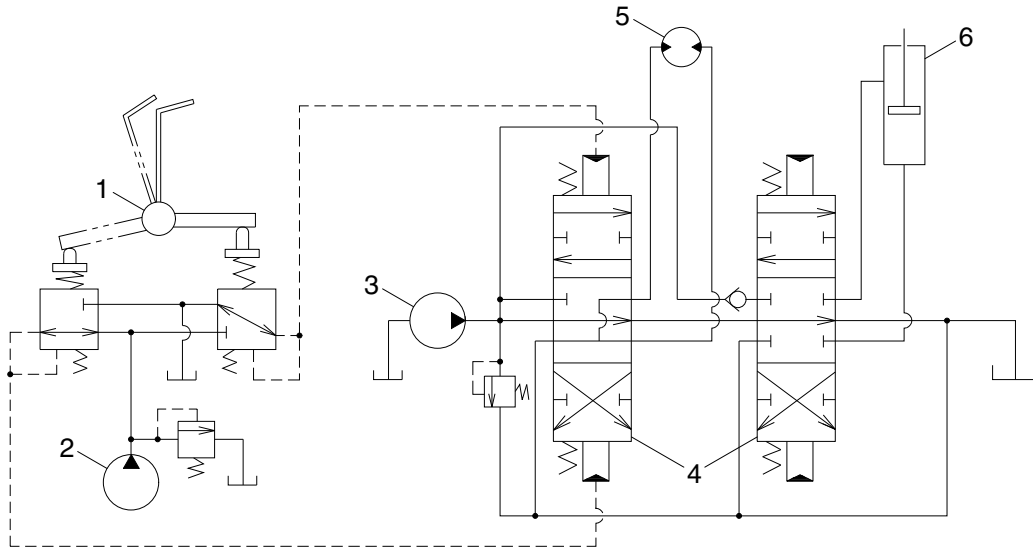
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1	Ring gear	20	Side plate	37	Snap ring
2	Housing	21	Needle cage	44	Snap ring
4	Side cover	22	Needle cage	45	Clip
5	Carrier 1	23	Needle cage	46	W clip
6	Carrier 2	24	Inner ring	47	Nutring
9	Sun gear 1	25	Floating bushing	51	Name plate
10	Sun gear 2	26	Thrust ring	52	Rivet
11	Sun gear 3	27	Thrust ring	53	Washer
12	Planetary gear 1	29	Socket bolt	54	Set screw
13	Planetary gear 2	30	Socket bolt	55	Nutring stopper
14	Planetary gear 3	32	RO plug	56	Hex socket bolt
16	Pin 2	33	Angular bearing	81	O-ring
17	Pin 3	34	Floating seal	82	O-ring
18	Side plate	35	Shim	83	O-ring
19	Side plate	36	Spring pin		

3) OPERATION

The operation of the pilot valve will be described on the basis of the hydraulic circuit diagram shown below and the attached operation explanation drawing.

The diagram shown below is the typical application example of the pilot valve.



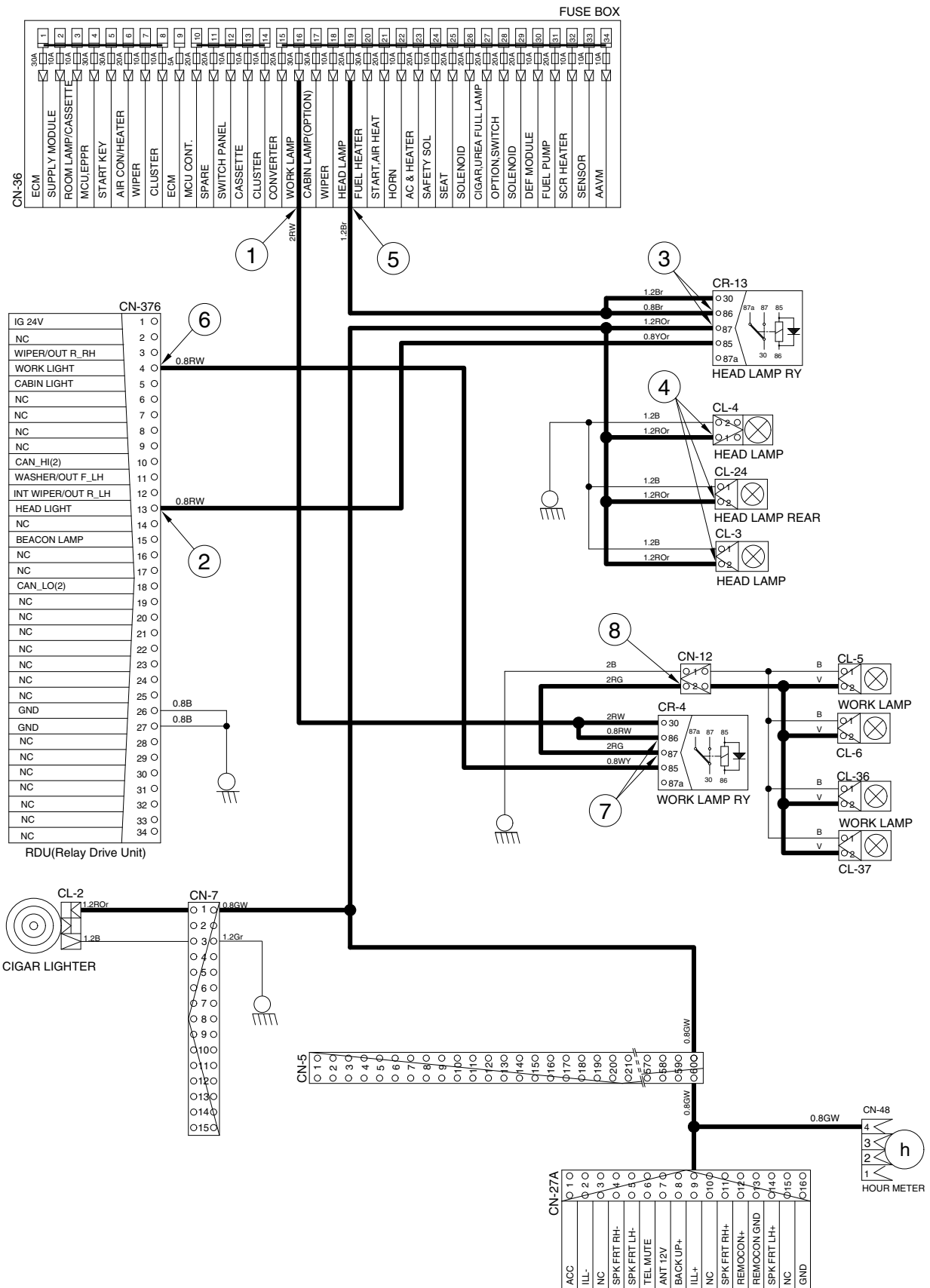
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1 Pilot valve
2 Pilot pump

3 Main pump
4 Main control valve

5 Hydraulic motor
6 Hydraulic cylinder

HEAD AND WORK LIGHT CIRCUIT

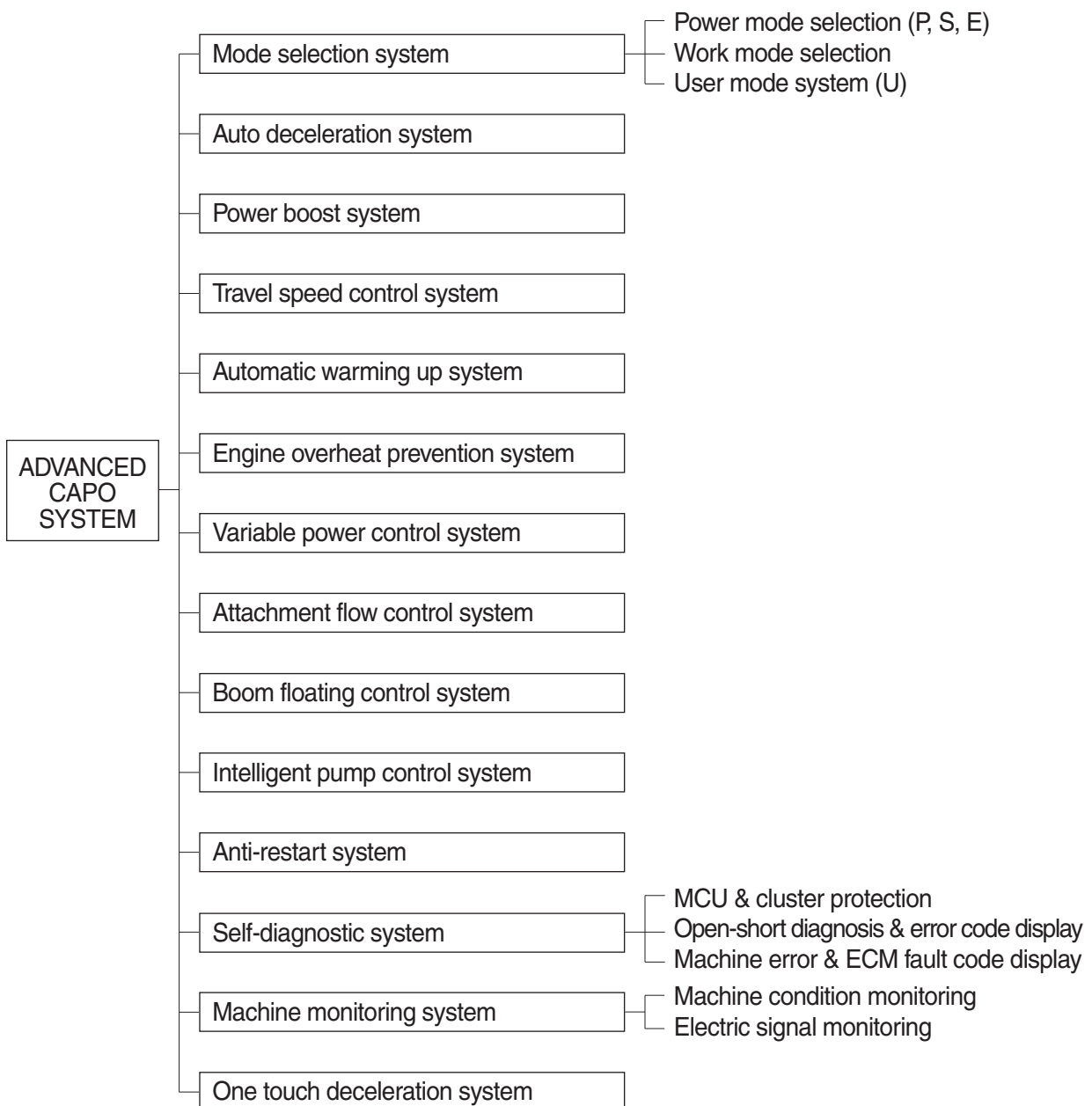


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SECTION 5 MECHATRONICS SYSTEM

GROUP 1 OUTLINE

The ADVANCED CAPO (Computer Aided Power Optimization) system controls engine and pump mutual power at an optimum and less fuel consuming state for the selected work by mode selection, auto-deceleration, power boost function, etc. It monitors machine conditions, for instance, engine speed, coolant temperature, hydraulic oil temperature, and hydraulic oil pressure, etc. It consists of a MCU, a cluster, an ECM, EPPR valves, and other components. The MCU and the cluster protect themselves from over-current and high voltage input, and diagnose malfunctions caused by short or open circuit in electric system, and display error codes on the cluster.



DTC		Diagnostic Criteria	Application		
HCESPN	FMI		G	C	W
164	4	(Detection) (When Working Cutoff Relay is Off) 10 seconds continuous, Working Cutoff Relay drive unit Measurement Voltage $\leq 3.0V$ (Cancellation) (When Working Cutoff Relay is Off) 3 seconds continuous, Working Cutoff Relay drive unit Measurement Voltage $> 3.0V$			●
	6	(Detection) (When Working Cutoff Relay is On) 10 seconds continuous, Working Cutoff Relay drive current $> 6.5 A$ (Cancellation) (When Working Cutoff Relay is On) 3 seconds continuous, Working Cutoff Relay drive current $\leq 6.5 A$			●
(Results / Symptoms) 1. Control Function – (Wheel Excavator) In driving mode, attachment hydraulic pilot pressure cut off failure (Checking list) 1. CR-47 (#85) – CN-54 (#9) Checking Open/Short 2. CR-47 (#30, #86) – CN-45 (#B+ term) Checking Open/Short					
166	4	(Detection) (When Power Max Solenoid is Off) 10 seconds continuous, Power Max Solenoid drive unit Measurement Voltage $\leq 3.0V$ (Cancellation) (When Power Max Solenoid is Off) 3 seconds continuous, Power Max Solenoid drive unit Measurement Voltage $> 3.0V$	●		
	6	(Detection) (When Power Max Solenoid is On) 5 seconds continuous, Power Max Solenoid drive current $> 4.5 A$ (Cancellation) (When Power Max Solenoid is On) 3 seconds continuous, Power Max Solenoid drive current $\leq 4.5 A$	●		
(Results / Symptoms) 1. Control Function – Voltage increase operation failure (Checking list) 1. CN-88 (#1) – CN-52 (#2) Checking Open/Short 2. CN-88 (#2) – CN-45 (#B+ term) Checking Open/Short					

※ Some error codes are not applied to this machine.

G : General

C : Crawler Type

W : Wheel Type

Fault code J1939 SPN J1939 FMI	Reason	Effect (only when fault code is active)
4249 4337 10	Aftertreatment diesel exhaust fluid dosing temperature - Abnormal rate of change. The aftertreatment diesel exhaust fluid dosing unit temperature is stuck.	None on performance.
4251 5798 10	Aftertreatment 1 diesel exhaust fluid dosing unit heater temperature - Abnormal rate of change. The aftertreatment diesel exhaust fluid dosing unit heater temperature sensor reading is stuck.	None on performance.
4252 1081 31	Engine wait to start lamp - Condition exists. The received signal does not match the commanded signal.	None on performance.
4259 5742 11	Aftertreatment diesel particulate filter temperature sensor module - Root cause not known. Intermittent battery voltage supply detected at the aftertreatment diesel particulate filter temperature sensor module.	Possible reduced engine performance.
4261 5743 11	Aftertreatment selective catalytic reduction temperature sensor module - Root cause not known. Intermittent battery voltage supply detected at the aftertreatment SCR temperature sensor module.	Possible reduced engine performance.
4279 5848 21	Aftertreatment 1 SCR Intermediate NH3 - Data not rational - Drifted low. An in range low failure has been detected.	Possible reduced engine performance.
4281 5848 2	Aftertreatment SCR Intermediate NH3 - Data erratic, intermittent or incorrect. The aftertreatment SCR intermediate NH3 sensor reading is stuck.	None on performance.
4284 5793 9	Desired engine fueling state - Abnormal update rate. A valid message from the transmission ECU has NOT been received.	Engine may not start or may be difficult to start.
4289 91 8	Accelerator pedal or lever position sensor 1 circuit frequency - Abnormal frequency or pulse width or period. The accelerator pedal position sensor reading is out of range.	The engine will operate in limp home mode.
4293 5097 3	Engine brake active lamp - Voltage above normal, or shorted to high source. High signal voltage detected at the brake lamp relay driver circuit.	None on performance.
4294 5097 4	Engine brake active lamp - Voltage below normal, or shorted to low source. Low signal voltage detected at the brake lamp relay driver circuit.	None on performance.
4452 520668 31	Aftertreatment outlet NOx sensor closed loop operation - Condition exists. The maximum dosing adjustment has been reached.	Possible reduced engine performance.
4453 520669 31	Aftertreatment intermediate NH3 sensor closed loop operation - Condition exists. The maximum dosing adjustment has been reached.	None on performance.

※ Some fault codes are not applied to this machine.

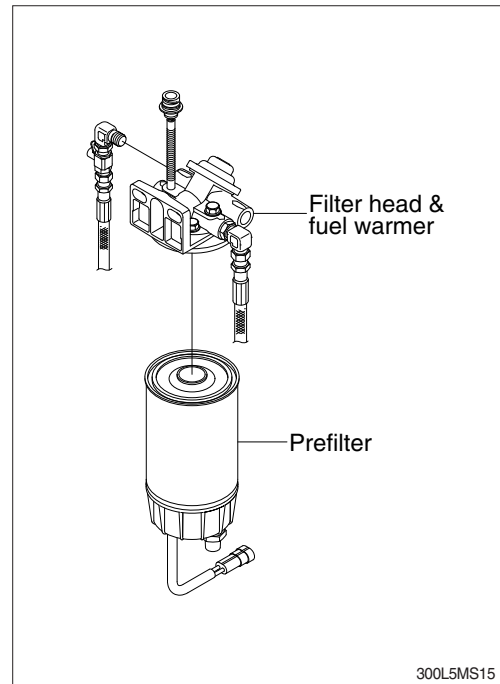
GROUP 17 FUEL WARMER SYSTEM

1. SPECIFICATION

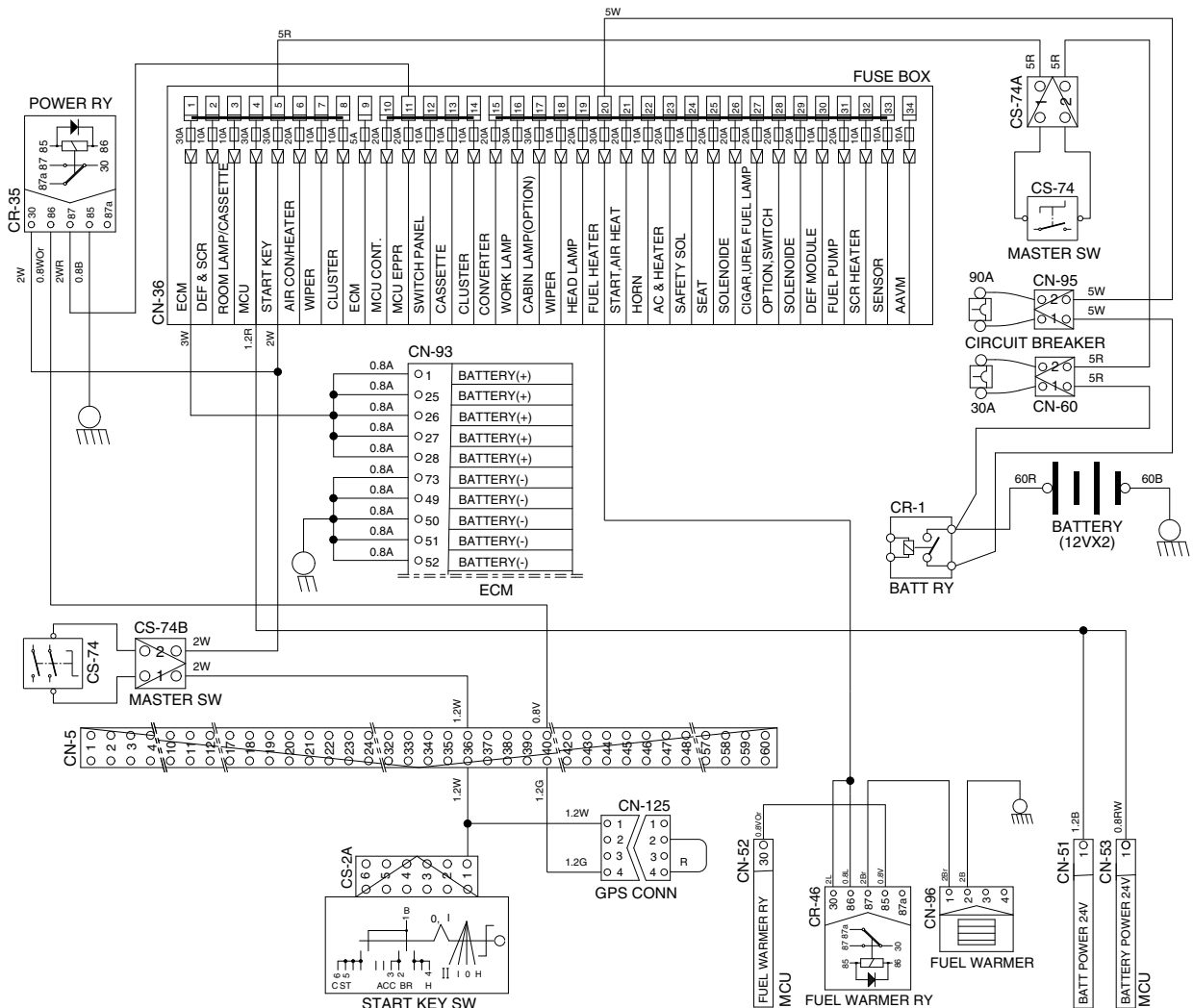
- 1) Operating voltage : 24 ± 4 V
- 2) Power : 350 ± 50 W
- 3) Current : 15 A

2. OPERATION

- 1) The current of fuel warmer system is automatically controlled without thermostat according to fuel temperature.
- 2) At the first state, the 15 A current flows to the fuel warmer and engine may be started in 1~2 minutes.
- 3) If the fuel starts to flow, ceramic-disk in the fuel warmer senses the fuel temperature to reduce the current as low as 1.5 A.
So, fuel is protected from overheating by this mechanism.

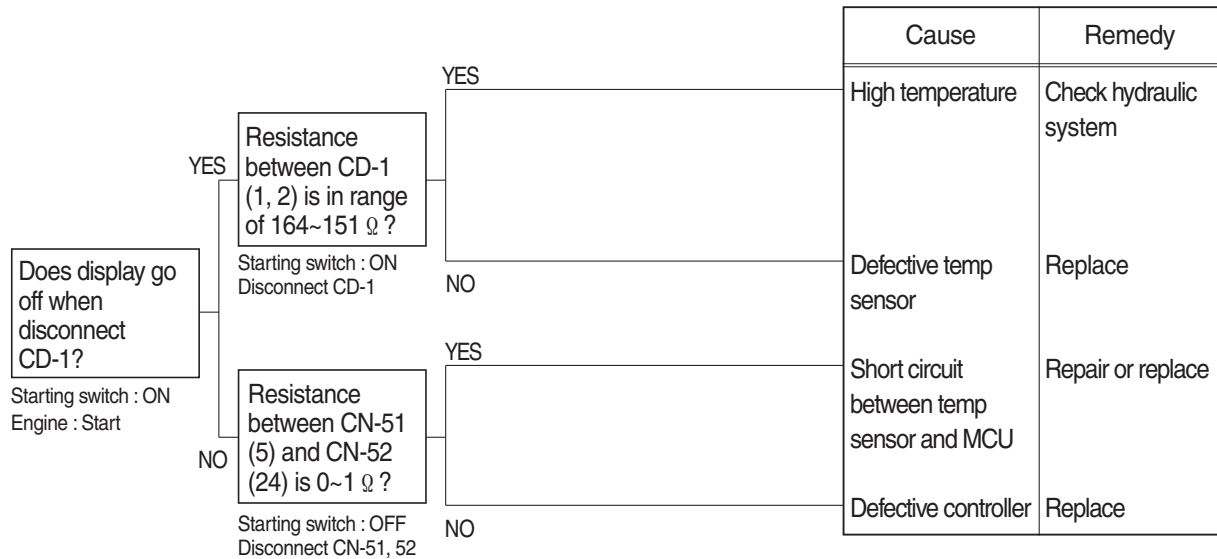


3. ELECTRIC CIRCUIT

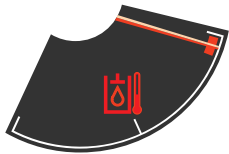


7. WHEN HYDRAULIC OIL TEMPERATURE WARNING LAMP LIGHTS UP (engine is started)

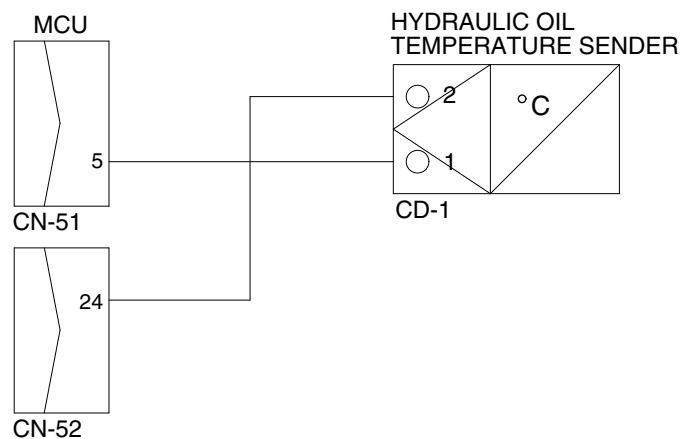
- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



Check Table



Temperature (°C)	~ -30	~ -10	~ 0	~ 40	~ 70	~ 80	~ 90	~ 100	105~
Resistance (k Ω)	22.22 ~31.78	8.16 ~10.74	5.18 ~ 6.6	1.06 ~1.28	0.39 ~0.476	0.322 ~0.298	0.243 ~0.219	0.185 ~0.167	0.164 0.151



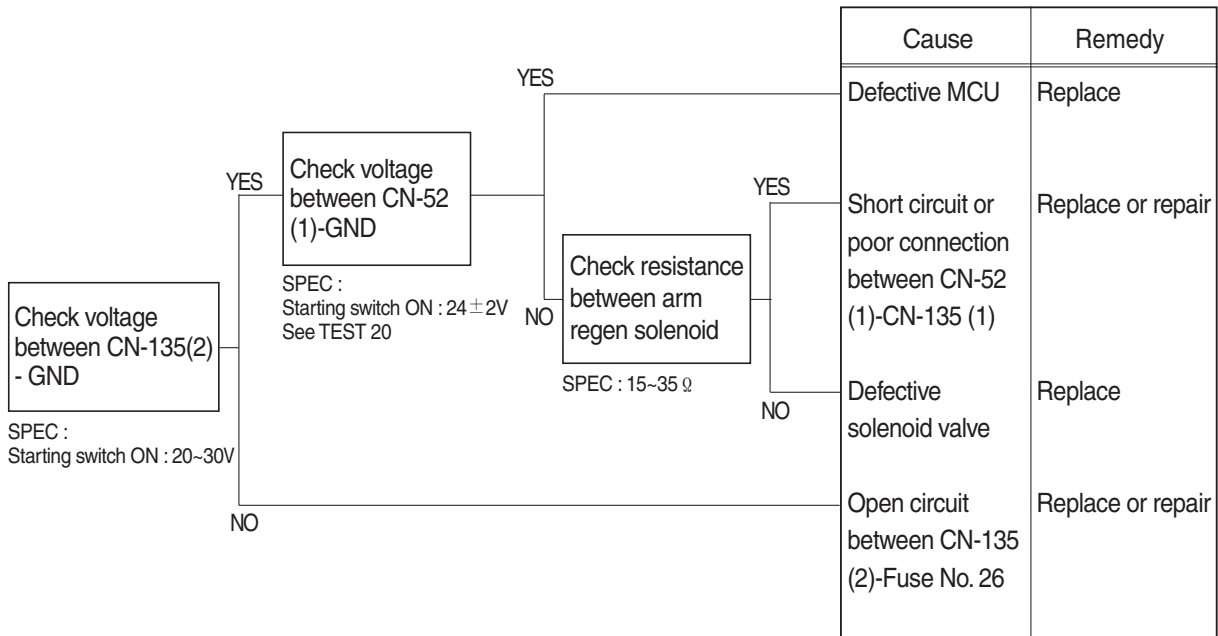
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16. MALFUNCTION OF ARM REGENERATION SOLENOID

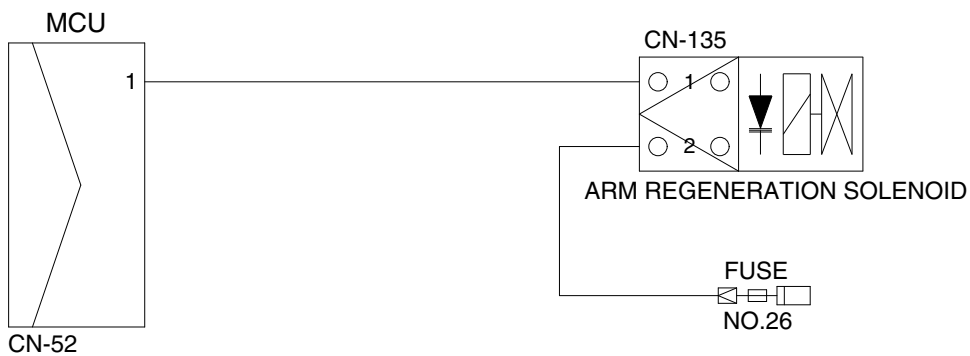
· Fault code : HCESPN 170, FMI 4 or 6

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

1) INSPECTION PROCEDURE



Wiring diagram



380L6MS05

2) DISASSEMBLY

(1) Removal of cover

- ※ Loosen the socket bolt (24) with 16mm hexagonal socket and remove the cover (37).

(2) Removal of sun gear 1 and thrust ring assembly

Remove carrier 1(16), install eye bolt to tap hole (M10) and remove carrier 1 assembly itself.



3607A8SR03

(3) Removal of sun gear 2

Remove sun gear 2 (26), install eye bolt to tap (M10) of carrier 2 (8) and remove carrier 2 assembly itself.



3607A8SR04

(4) Disassembly of 2nd carrier assembly

- ① Insert spring pin (15) into pin assy 2(11) by hammering.
- ※ Do not reuse spring pin after removal.



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