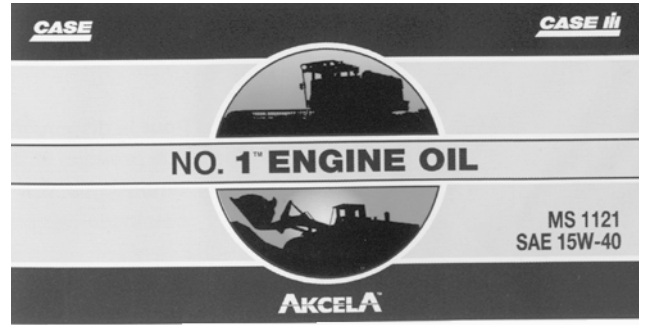


Engine Oil

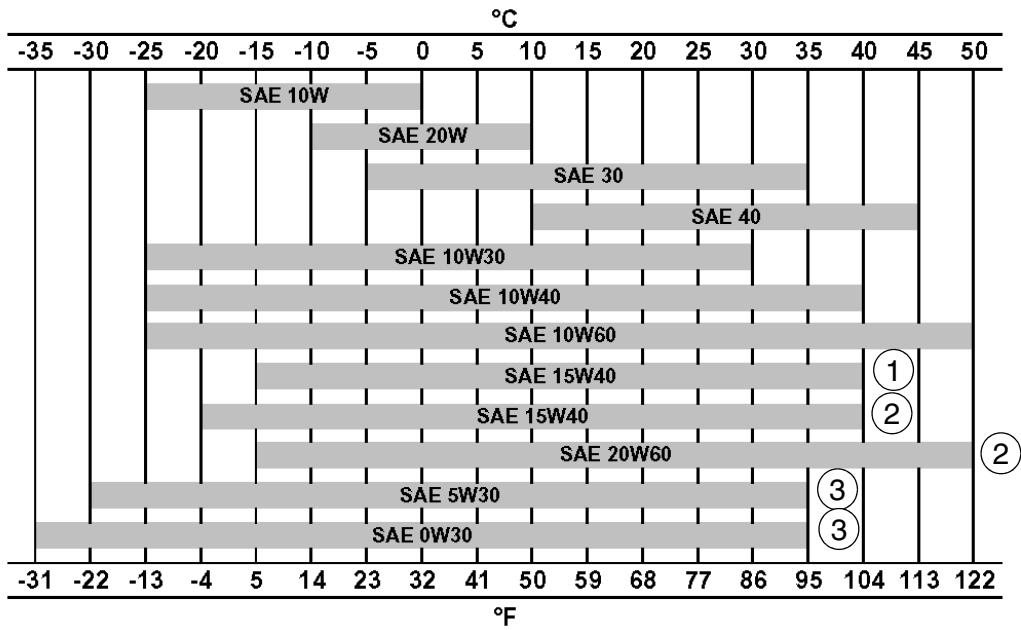
THE CASE/AKCELA No. 1 engine oil is recommended for your engine. This oil ensures proper lubrication of your engine for all operating conditions.

If the CASE/AKCELA Multigrade "No. 1 ENGINE OIL" cannot be obtained, use the oil corresponding to one of the following categories: ACEA E7. API CI-4.



CP02N001

Oil viscosity / Oil range

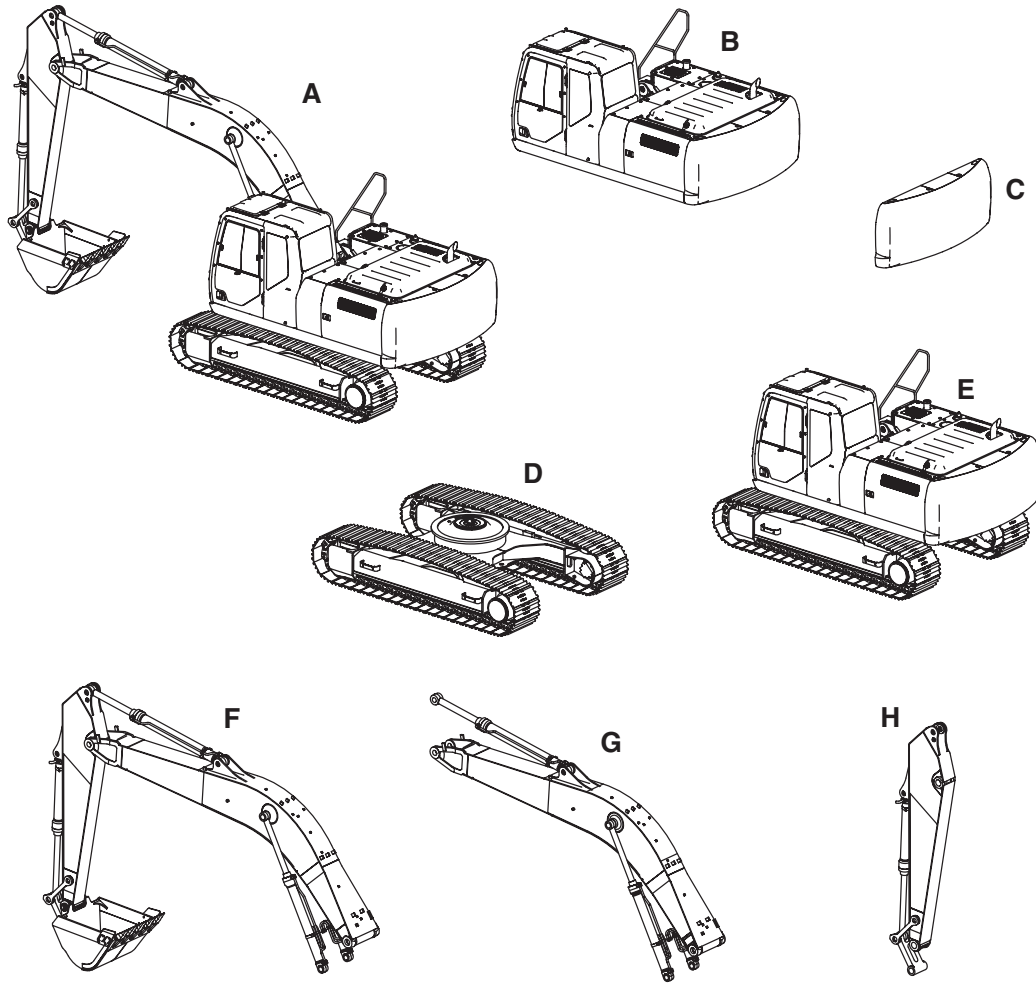


CT02M001

- 1) With mineral base
- 2) With semi-synthetic base
- 3) With synthetic base

COMPONENT WEIGHT

Major component weight



RST-11-01-001A

Weight information is approximate

A) Operating weight	
CX210B (LC type).....	21200 kg (46738 lbs)
CX210B (NLC type).....	21350 kg (47069 lbs)
CX210B (LR type).....	22300 kg (49163 lbs)
CX230B	22700 kg (50045 lbs)
CX240B (LC type).....	24500 kg (54013 lbs)
CX240B (NLC type).....	24400 kg (53793 lbs)
CX240B (LR type).....	28000 kg (61730 lbs)
B) Upper mechanism (including counterweight and turntable bearing)	
CX210B (LC type).....	9630 kg (21231 lbs)
CX210B (NLC type).....	10420 kg (22972 lbs)
CX210B (LR type).....	10700 kg (23589 lbs)
CX230B	10740 kg (23678 lbs)
CX240B (LC type).....	11280 kg (24868 lbs)
CX240B (NLC type).....	11360 kg (25045 lbs)
CX240B (LR type).....	13600kg (29983 lbs)
C) Counterweight	
CX210B (LC type).....	4120 kg (9083 lbs)
CX210B (NLC type).....	4560 kg (10053 lbs)
CX210B (LR type).....	5120 kg (11288 lbs)
CX230B	4900 kg (10803 lbs)
CX240B (LC, NLC type)	5270 kg (11618 lbs)
CX240B (LR type).....	7520 kg (16579 lbs)

FUEL-COOLER, ENGINE INTER-COOLER, RADIATOR AND OIL-COOLER

Before carrying out any operation on the machine, perform the following operations in the order shown:

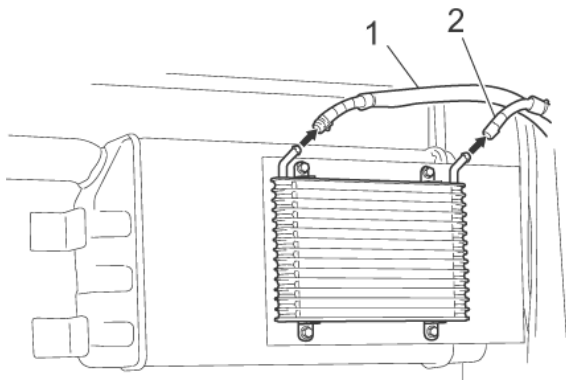
- Park the machine on hard, flat ground.
- Lower the attachment to the ground.
- Shut down the engine.
- Remove the starter switch key.
- Make sure that pressure in the hydraulic system has been completely released (see Operator's Manual).



WARNING: When the machine is working, the engine components and the hydraulic pump reach a high temperature. To avoid being burnt by hot metal or scalded by high temperature water or oil, allow the machine to cool down before starting any servicing operation.

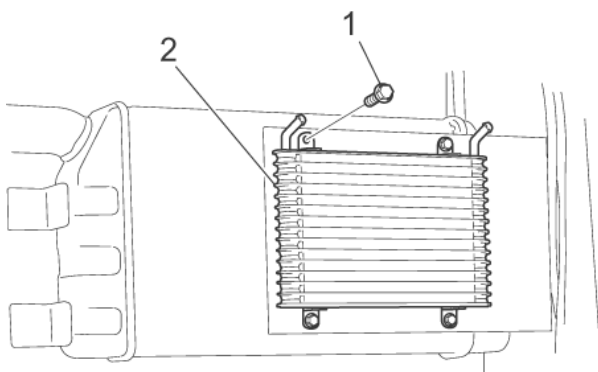
Removing the Fuel-Cooler

STEP 1



After removing the hosebands with pliers, use a flathead screw driver to pull out the hoses (1) and (2). Mark the fuel cooler and hoses so that the connectors match at the time of assembly. Attach caps or plugs to the fuel cooler and hoses to prevent any entry of water, dust or dirt.

STEP 2



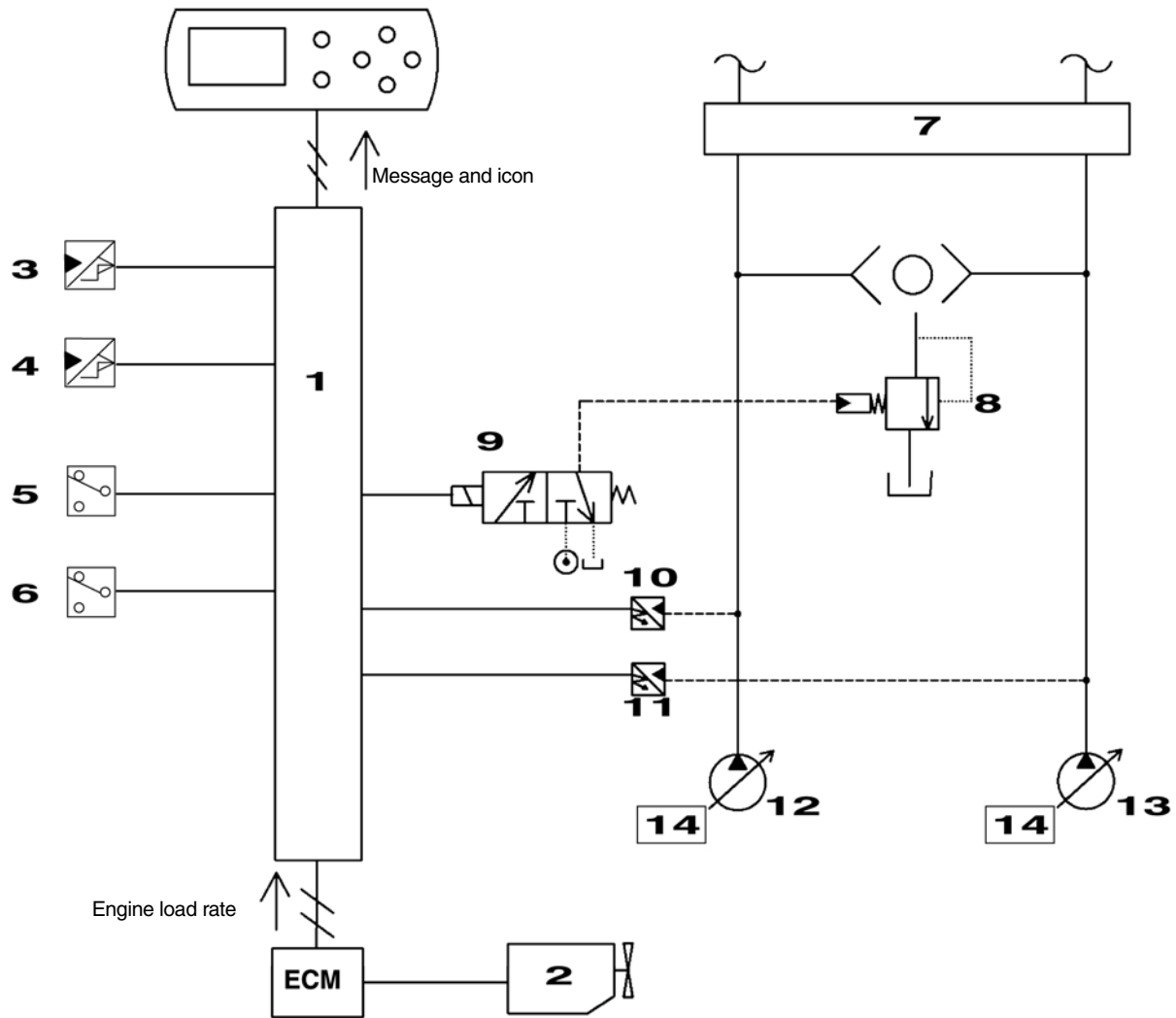
Disassemble the retaining screws (1), and then remove the fuel cooler unit (2).

Installing the Fuel-Cooler

When installing, proceed in the reverse order from that of removal.

3. Pressure Boost Control

a) Configuration



1	Computer A	6	2nd option line pressure switch	11	P2 pressure sensor
2	Engine	7	Control valve	12	Pump 1
3	Upper pressure sensor	8	Main relief valve	13	Pump 2
4	Travel pressure sensor	9	Boost solenoid	14	Regulator
5	Option line pressure switch	10	P1 pressure sensor		

b) During upper operation (upper pressure sensor = ON), the next time the high-load conditions are met, the boost solenoid valve on the 5 stack solenoid valve comes ON, and the main relief valve pressure rises from 34.3 MPa (343 bar / 4975 psi) to 36.8 MPa (369 bar / 5337 psi).

Conditions:

When the engine load ratio rises and the P1 or P2 pump pressure is boosted.

c) Auto power boost (ended by time restriction)

When the work mode is SP or H, the boost continues a maximum of 8 seconds, then is automatically ended (boost solenoid = OFF). When the work mode is A, this time restriction is eliminated and the pressure boost is always available.

d) Auto power boost (ended by operation stop)

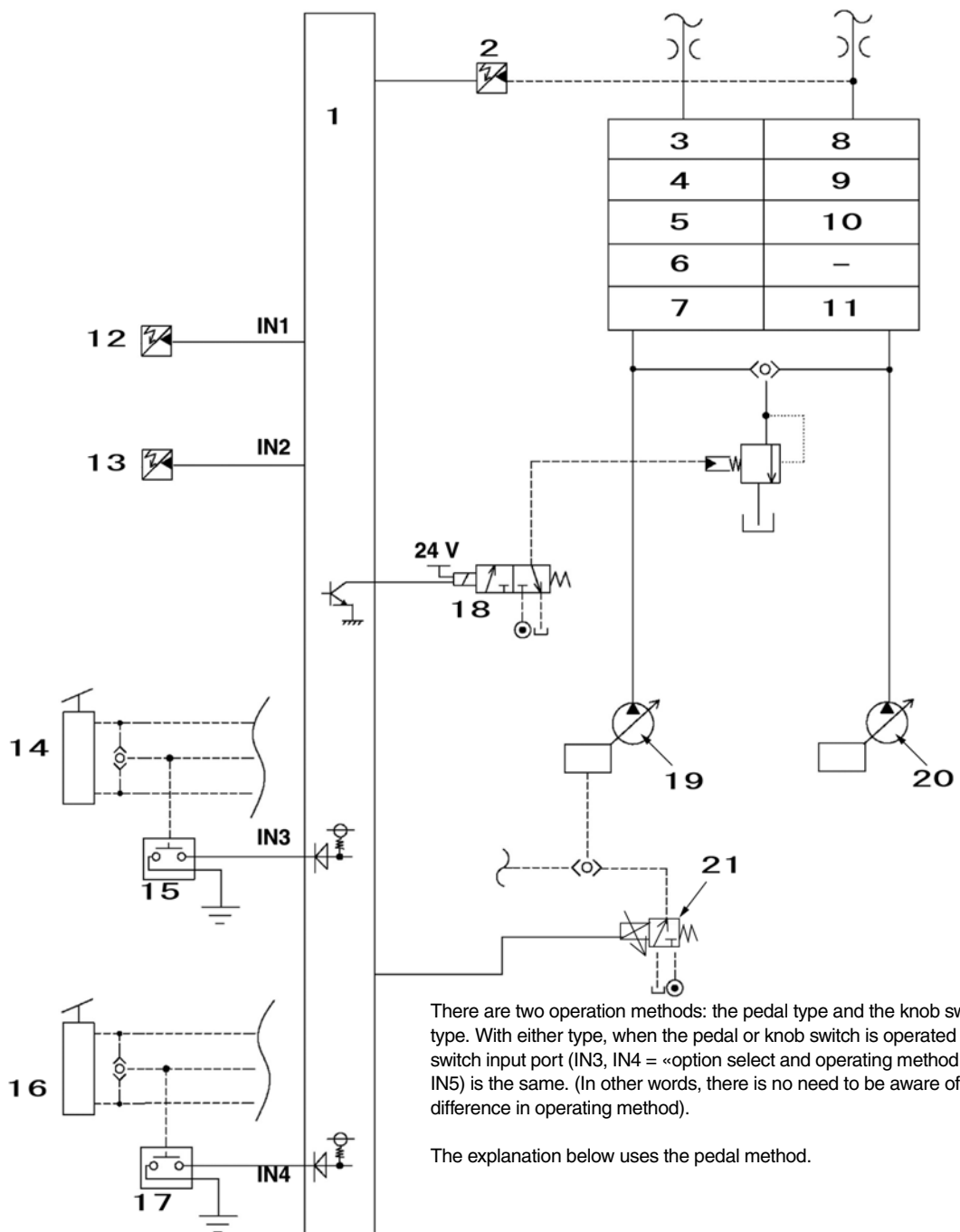
Even before the time limit for auto power boost, if the upper pressure sensor goes OFF, the boost is ended.

e) Boost prohibition

During travel (travel pressure sensor = ON) or the breaker is in use (option line pressure switch = ON and breaker mode), the boost is not used (Actuator protection).

2. Option Line Control

a) Configuration [Multipurpose circuit with 2nd option line (pedal type)]



1	Computer A	12	Swing pressure sensor
2	N2 pressure sensor	13	Travel pressure sensor
3	Arm (1)	14	Option pedal
4	Boom (2)	15	Option pressure switch
5	Swing	16	2nd option pedal
6	Option 1	17	2nd option pressure switch
7	Travel (left)	18	Boost solenoid
8	Arm (2)	19	P1 pump
9	Boom (1)	20	P2 pump
10	Bucket	21	P1 flow control proportional valve
11	Travel (right)		

8. Anti-theft Setting

A) Anti-theft setting and password registration

1) Enabling the anti-theft function

With the key OFF, connect the anti-theft knob terminal.

When the male and female knob terminals are connected on the cab main harness in the rear cover, the anti-theft function is enabled. The factory setting is for these knob terminals to be disconnected.



Anti-theft setting knob
Connect VG (purple / green) and BG (black / green)



RST-05-07-001ex

2) Setting the password

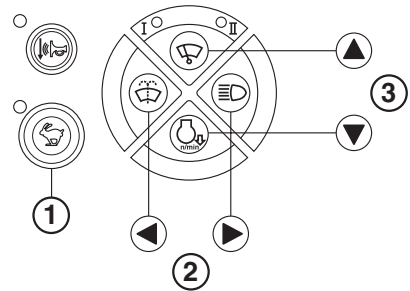
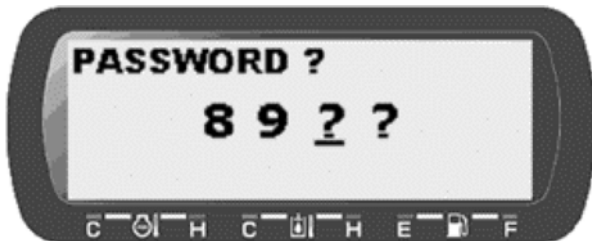
When the knob terminals are connected, then the key switched ON, the following screen is displayed.

Enter any 4-digit number made up of the numbers 1 to 9.

(If all four digits are not input, "ERROR" is displayed).

Input by using the monitor switches as follows.

When the Enter button is pressed, the password is stored into memory and display returns to the normal screen.

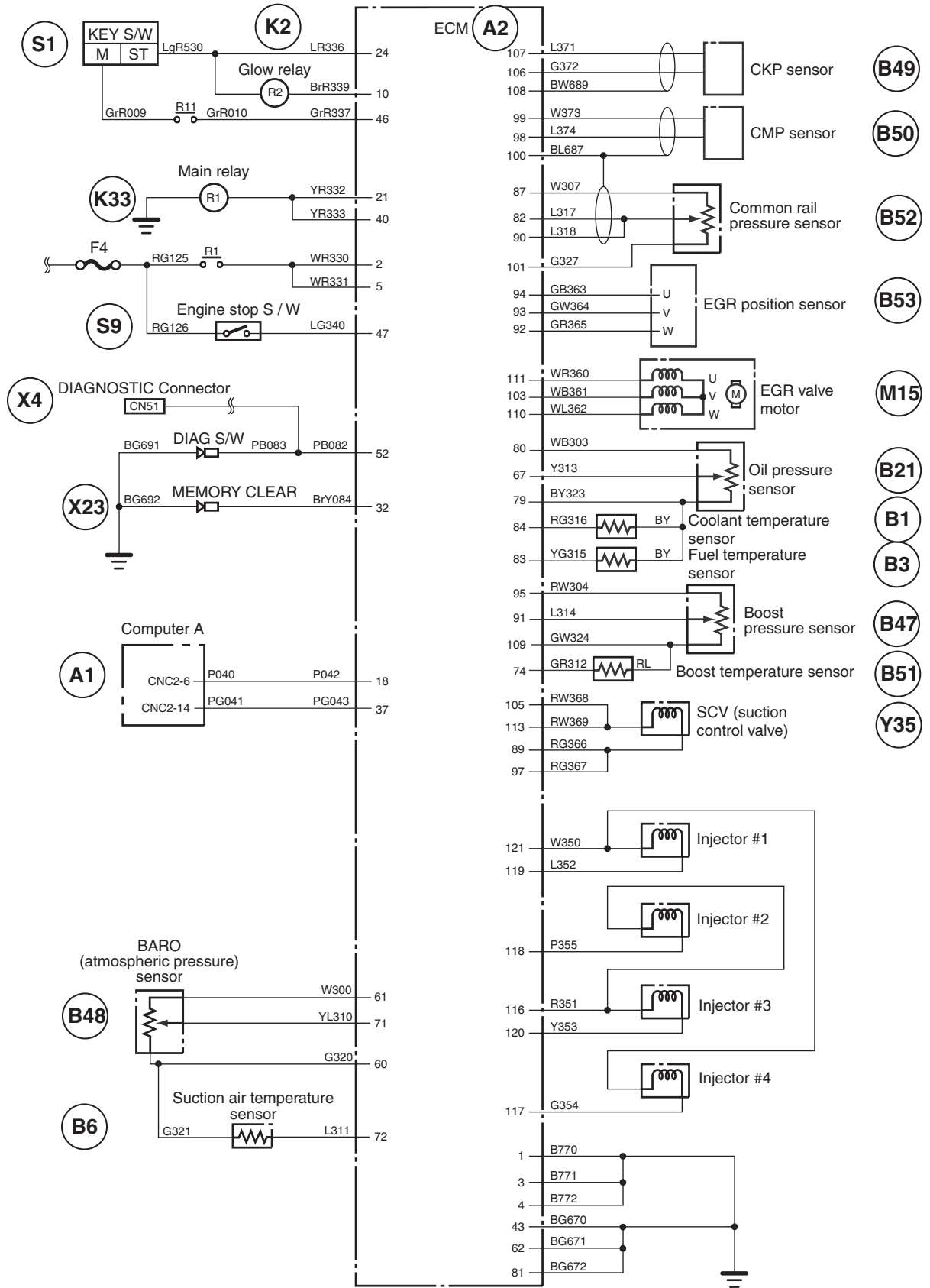


1	Enter	3	Numeric value increase / decrease
2	Cursor movement		

3) Changing the password

If the password has been forgotten or it is desired to change the password, if the knob terminal in **A)1)** is disconnected and the key switched ON, the password is cleared. To re-input the password, repeat the procedure in **b)**.

4) ECM (Engine Control Module) (CX210B-CX230B-CX240B)



RE03003-004

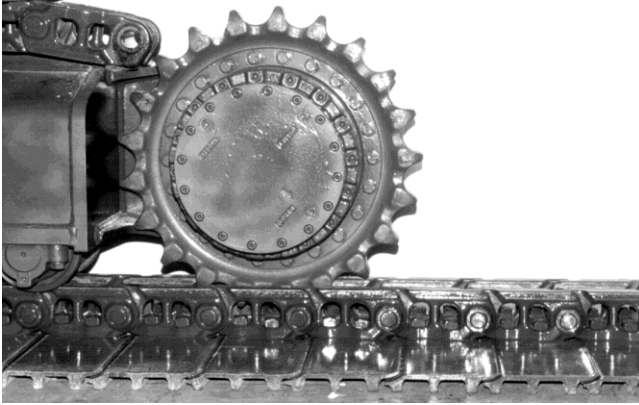
SPROCKET

Removal

STEP 1

See “Removing and installing the tracks” (Section 5001) and removing the sprocket from the chain.

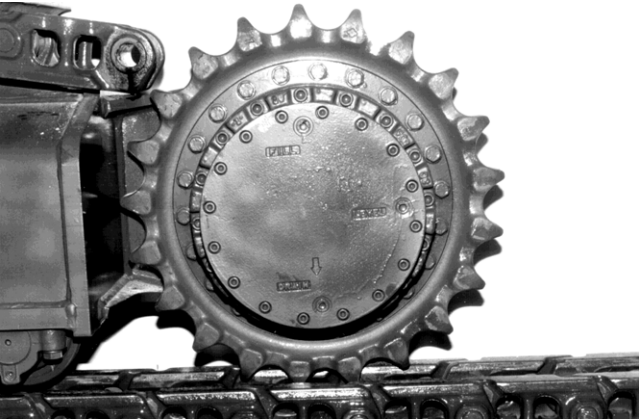
STEP 2



JD00290A

Move the machine so that the track is in the position shown.

STEP 3

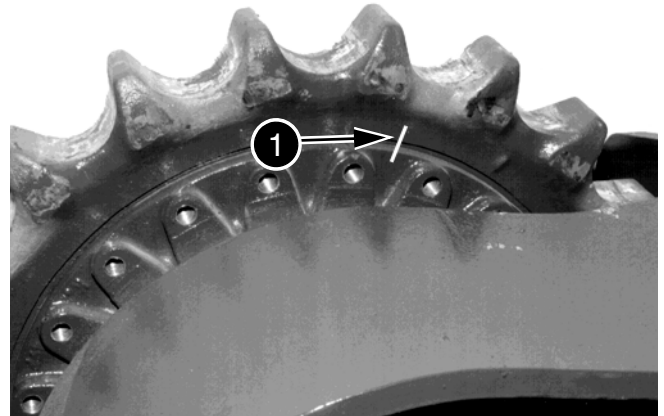


JD00291A

Rotate the upperstructure so that the cab is over the side of the machine where the sprocket to be removed is located. Using the attachment, lift the side of the machine until the teeth of the sprocket are free from the chain.

NOTE: The photos below do not correspond to the machine model, but the procedure is the same.

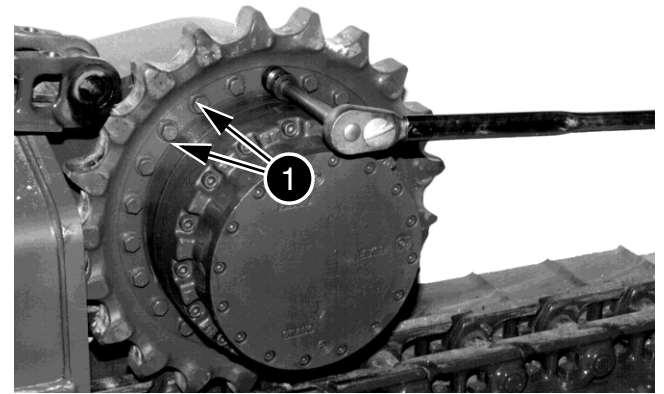
STEP 4



JD00292A

To facilitate reassembly, make alignment marks (1) on the sprocket and the reduction gear.

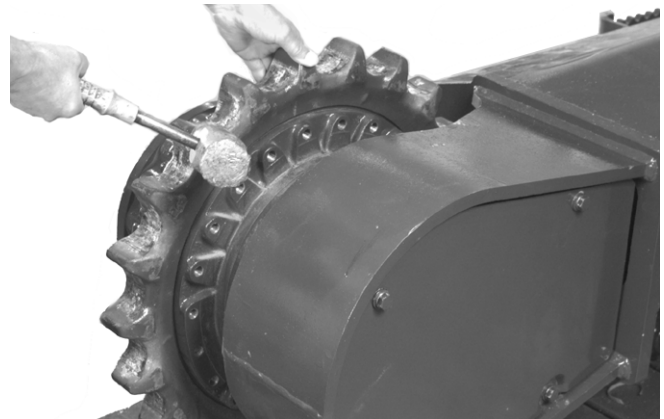
STEP 5



JD00293A

Remove the screws (1) and the hardened washers that attach the sprocket to the reduction gear.

STEP 6



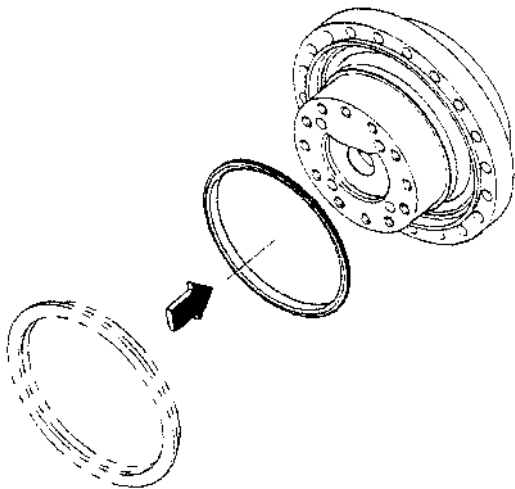
JD00294A

Drive the sprocket from the reduction gear housing using a soft hammer. Remove the sprocket from the machine.

Assembly

NOTE: The numbers within brackets refer to the figures on pages 3, 4 and 5.

STEP 1



Check the following points for the floating seal (2), and then assemble the floating seal (2) onto the flange (1-1), using a floating seal assembly jig.

NOTE:

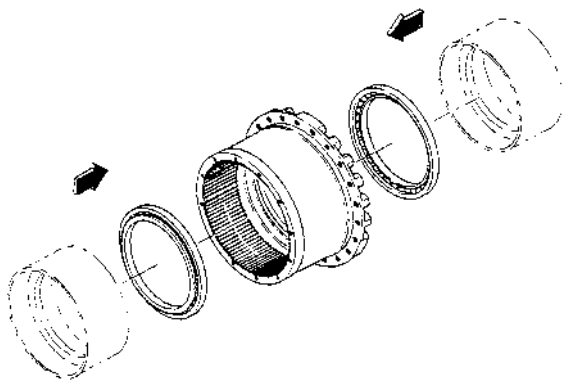
a) Check that the mounting surface of the floating seal (2) on the flange (1-1) is free from soil or dust.

b) Fully degrease the mounting surface of the floating seal (2) on the flange (1-1).

c) Check that the surface of the O-ring of the floating seal (2) is free from soil or dust.

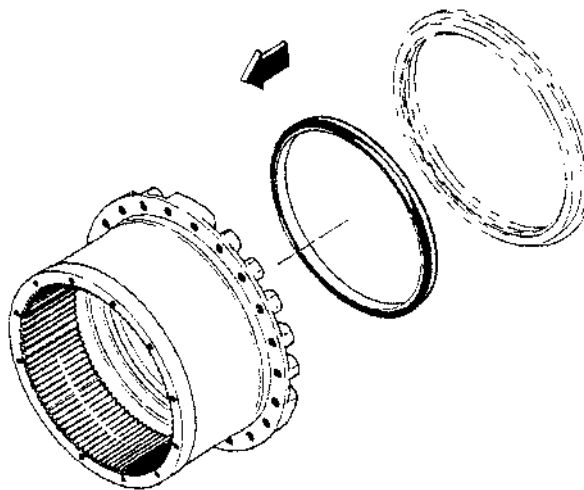
d) Fully degrease the surface of the O-ring of the floating seal (2).

STEP 2



Press fit the angular bearing (3) onto the housing (4), using a press-fit jig and a press.

STEP 3



Check the following points for the floating seal (2), and then assemble the floating seal (2) onto the housing (4), using a floating seal assembly jig.

NOTE:

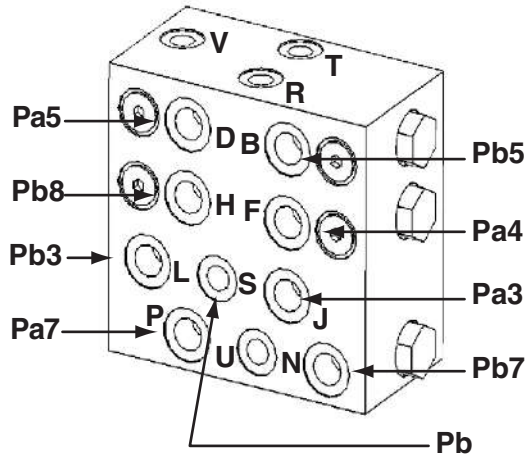
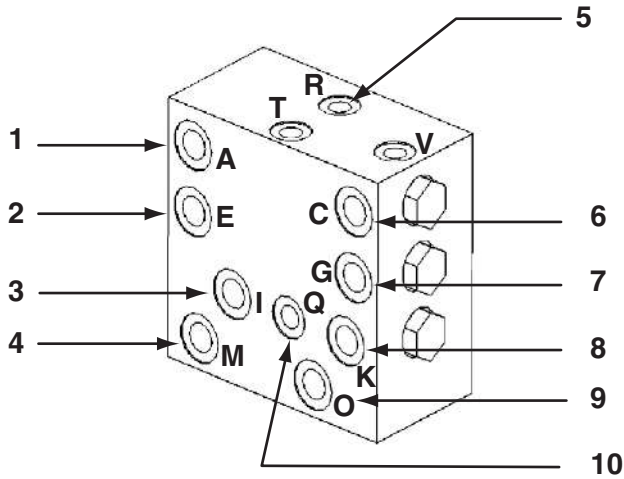
a) Check that the mounting surface of the floating seal (2) on the housing (4) is free from soil or dust.

b) Fully degrease the mounting surface of the floating seal (2) on the housing (4).

c) Check that the surface of the O-ring of the floating seal (2) is free from soil or dust.

d) Fully degrease the surface of the O-ring of the floating seal (2).

Cushion valve



RST-04-06-0001Q

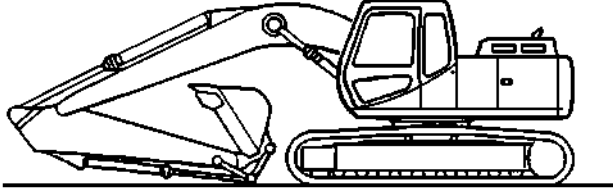
1	2 port (arm-in)
2	4 port (boom up)
3	1 port (swing right)
4	1 port (bucket close)
5	D4 port (filter line)
6	4 port (arm-out)
7	2 port (boom down)
8	3 port (swing left)
9	3 port (bucket open)
10	Pressure sensor

Port	Description	Location
E, F	Boom up	G3/8
G, H	Boom down	G3/8
O, P	Bucket open	G3/8
M, N	Bucket close	G3/8
C, D	Arm-out	G3/8
A, B	Arm-in	G3/8
K, L	Swing left	G3/8
I, J	Swing right	G3/8
Q	Swing pressure sensor signal	G1/4
U	-	G1/4
S	Swing priority metering valve switch	G1/4
V	-	G1/4
T	Return	G1/4
R	Heat circuit	G1/4

MAIN CONTROL VALVE

Removal and installation

STEP 1



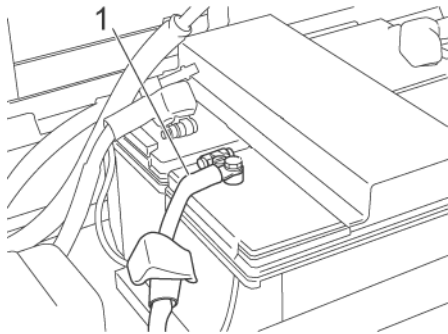
JS00163A

Park the machine on hard, flat ground. Lower the attachment to the ground.

STEP 2

Release pressure in the hydraulic system and in the hydraulic reservoir (see Section 8000).

STEP 3

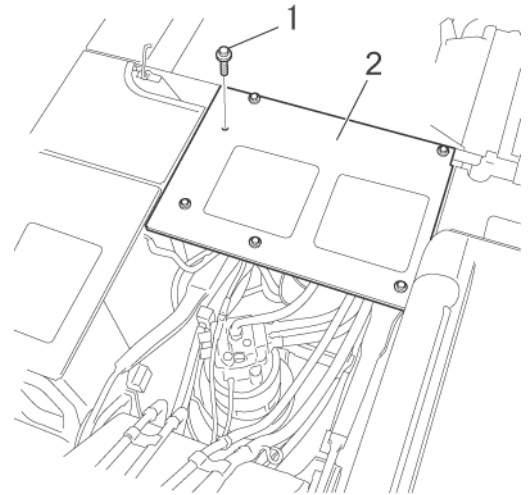


Disconnect the earth cable (1) (-) from the battery.

STEP 4

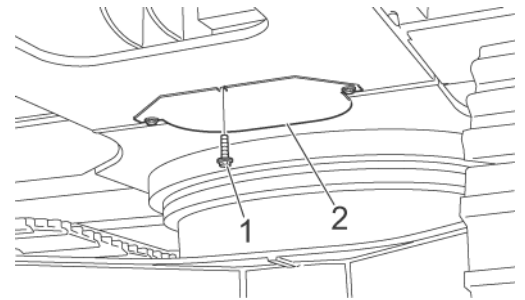
To prevent any fluid leaks when disconnecting hydraulic lines, connect a vacuum pump to the hydraulic reservoir (see Section 8000).

STEP 5



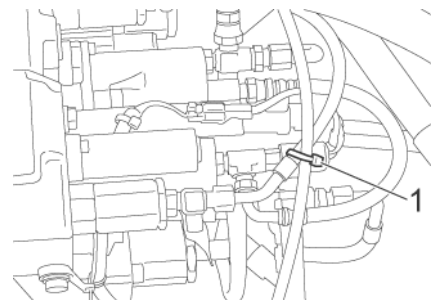
Disassemble the retaining screws (1) and remove the center cover (2).

STEP 6



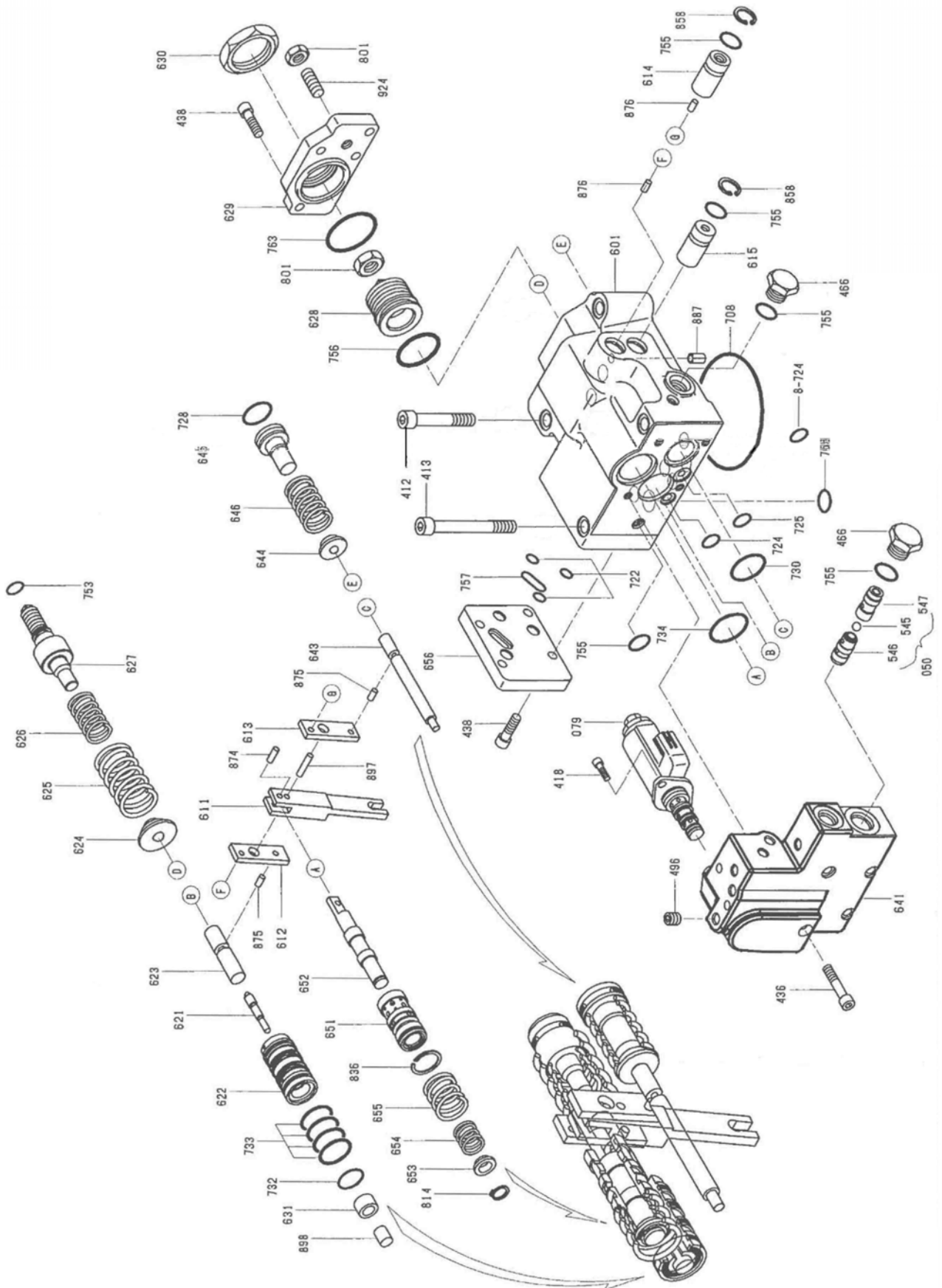
Disassemble the retaining screws (1) and remove the under cover (2).

STEP 7



Cut the hose band (1) using a nipper.

Regulator breakdown (KR3*-9Y**-HV)



TROUBLESHOOTING

Described below are measures to be taken when any abnormalities or malfunctions are found while the hydraulic motor is used.

Details on disassembling/inspection and reassembling are also described later but careful handling is absolutely needed to avoid any damage to the sliding parts of the motor while conducting these procedures.

Table 1

Symptom	Cause	Exterior inspection	Remedy	Repairs
Does not rotate	Motor's internal breakage	Measure drain output.	If motor supply input is equal to the drain output, there is high possibility of breakage in sliding section. Disassembling/inspection is required.	See Table 2.
	Motor's internal breakage	Open the inlet and outlet ports on the motor and apply pilot pressure of 3.2 to 4.9 MPa to the brake relief port. Then attempt to rotate the output shaft with torque of 30 to 40 Nm.	If the output shaft does not rotate smoothly with the torque stated to the left, there is high possibility of internal breakage. Disassembling/inspection is required.	Replace damaged parts or motor assembly.
	Incorrect settings at relief valve in the circuit	Measure load pressure with pressure gauge.	Reset to specified set pressure.	
Excessive slippage	Wear or damage in the sliding part of the motor and in the high pressure seal section	Measure drain output.	If the drain output is more than 2.5 L / min., the leakage is too high. Disassembling/inspection is required.	See Table 2.
	Oil temperature is too high and there is excessive internal leakage inside the motor	Measure oil temperature.	Lower the oil temperature.	
Lack of torque Abnormal noises	Wear or seizure of the motor sliding section	Open the inlet and outlet ports on the motor and apply pilot pressure of 3.2 to 4.9 MPa to the brake relief port. Then attempt to rotate the output shaft with a torque of approx. 30 to 40 Nm.	If the output shaft does not rotate smoothly with the torque stated to the left, there is high possibility of internal breakage. Disassembling/inspection is required.	Inspect parts (a) to (e) listed in Table 2, and also the bearings. Change them if any abnormality is found.
	Incorrect settings at relief valve in the circuit	Measure load pressure with pressure gauge.	Reset to specified set pressure.	

3] Explanation of operation of functions

a) Double counter balance valve

As the roles of the double counter balance valve, there are:

- 1- the overrun prevention function that controls the piston motor speed to match feed quantity in the state of rotation at or higher than the speed determined by the flow feed from the piston motor for the external load (below, pumping action),
- 2- the brake function used together with the crossover relief valve to make up the brake circuit that gradually stops the rotation of the piston motor by applying braking force to the piston motor rotation,
- 3- high-pressure selection shuttle valve function for releasing the parking brake through its own pressure

Figure 3 shows a structural diagram of the standard double counter balance valve.

This section explains the operations of each function using this standard double counter balance valve.

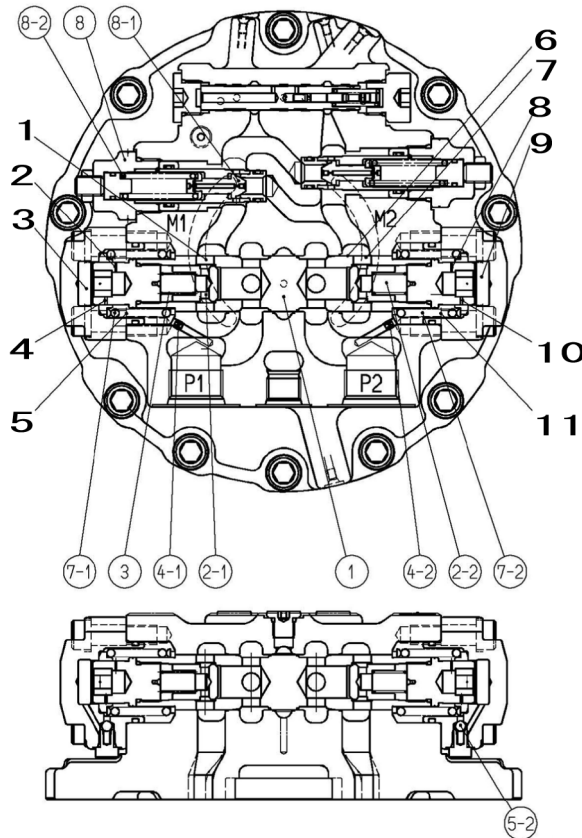


Figure 3 Double counter balance valve structural diagram (stopped state)

1	Oil path C1	5	Spring chamber 1	9	Damper chamber A2
2	Orifice D1	6	Oil path B	10	Orifice D2
3	Damper chamber A1	7	Oil path C2	11	Spring chamber 2
4	Orifice D2	8	Orifice D3		

A. Stopped state (Figure 3)

When the control valve is in neutral (the motor stopped), since pressure is generated at neither the P1 port nor the P2 port, the M1 and M2 ports are locked (hydraulically) with the spool (1) and the check valve (2) and the piston motor does not rotate.

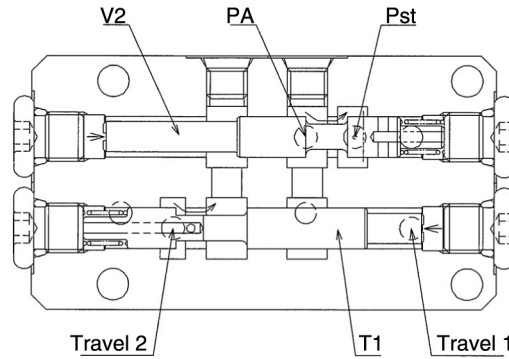
8) Straight travel signal control valve [Fig. 19, Fig. 23]

This valve integrates the pilot pressure for the spool of the front system and travel selected with the plate assembly and is used to switch the straight travel spool.

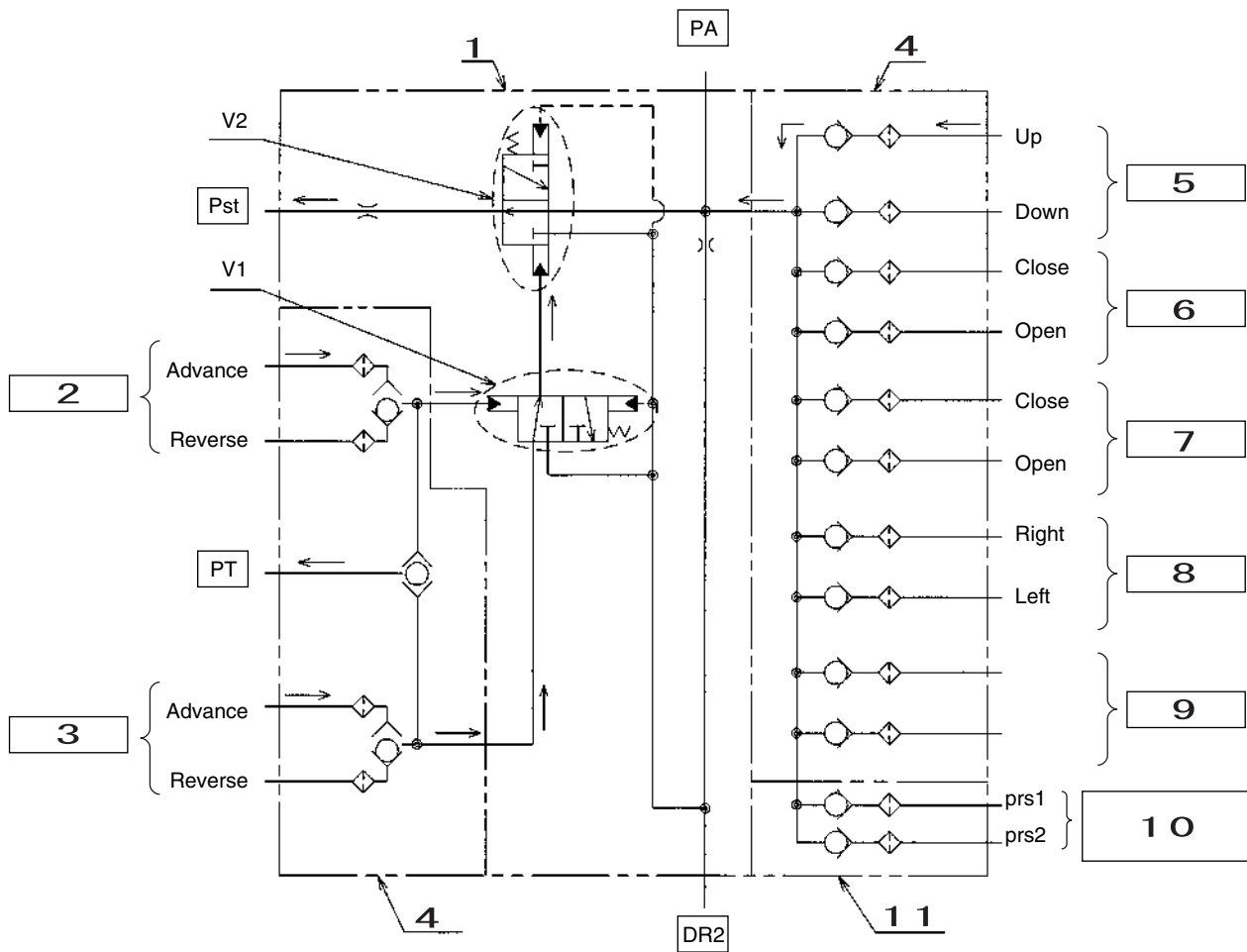
When the Travel 1 pilot pressure is pressurized, the spool [V1] is switched.

When the Travel 2 pilot pressure is pressurized at the same time, the spool [V2] is switched.

Here, when the front system pilot pressure [PA] is pressurized, the PA pressure flows into Pst and is led to the straight travel spool pilot chamber and the spool is switched.



[Fig.23]



[Fig.19]

1	Straight travel signal control valve	7	Bucket
2	Travel 1	8	Swing
3	Travel 2	9	Option
4	Plate assembly	10	Add-on (main pump)
5	Boom	11	Main unit housing section (option)
6	Arm		