SERVICE DATA 2

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SAFETY ALERT SYMBOL



This symbol represents the safety alert. The message that follows the symbol contains important information regarding human safety.
Read and understand the message to avoid personal injury or death.

Safety label

Safety labels are used to alert operators or other people exposed to the risks of injury or damage. There are the following three types of labels.
Read the labels carefully as they are important for your safety.

⚠ DANGER

The word "DANGER" indicates an imminently hazardous situation which, if not avoided, is likely to result in serious injury or death.

⚠ WARNING

The word "WARNING" indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.

⚠ CAUTION

The word "CAUTION" indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT: The word "IMPORTANT" is used to alert operators and maintenance personnel about situations which could result in damage to the machine and its components.

This manual is intended for trained and qualified personnel only. Warnings or cautions described in this manual do not necessarily cover all safety measures. It is also impossible to cover all hazards and risks which may be associated with the maintenance of the machine in every environment. For maintenance work, each person must take adequate safety precautions against possible hazards in the respective working environment.

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SPECIFICATIONS TABLES

Performance

Bucket type			Standard bucket
Bucket capacity		m^3	0.579
Tipping load		kg	3400
Rated loading mass		kg	1190
Breakout force		kN	38.5
Raising time (load)		s	4.6
Lowering time		s	2.8
Bucket forward tilting time		s	3.1
Travel speed	Forward 1st	km/h	7.8
	Forward 2nd	km/h	12.0
	Reverse 1st	km/h	7.8
	Reverse 2nd	km/h	12.0
Maximum tractive force		kN	61.2
Gradeability		degree (°)	30
Minimum turning radius	Bucket outside	m	2.435

Dimensions

Overall length in transport condition	Without teeth		mm	3985
	With teeth		mm	—
Overall width (body)			mm	1860
Bucket width			mm	1960
Overall height	Bucket on ground	Canopy	mm	2320
		Cab	mm	2215
	Max. raised height of bucket		mm	4245
Crawler bearing length			mm	1595
Track gauge			mm	1410
Shoe width			mm	450
Crawler bearing area			m^2	1.269
Ground clearance of undercarriage			mm	345
Bucket hinge pin height			mm	3205
Dumping clearance (at 45-degree forward tipping)	Without teeth		mm	2430
	With teeth		mm	—
Dumping reach (at 45-degree forward tipping)	Without teeth		mm	985
	With teeth		mm	—
Bucket roll back angle	On ground		degree (°)	31.4
Bucket dumping angle	Maximum height position		degree (°)	38.7
Maximum digging depth			mm	0

Mass

Gross machine mass	Canopy	kg	6120
	Cab	kg	6230
Operating mass	Canopy	kg	5200
	Cab	kg	5300
Machine mass	Canopy	kg	5120
	Cab	kg	5230
Shipping mass	Canopy	kg	5040
	Cab	kg	5150

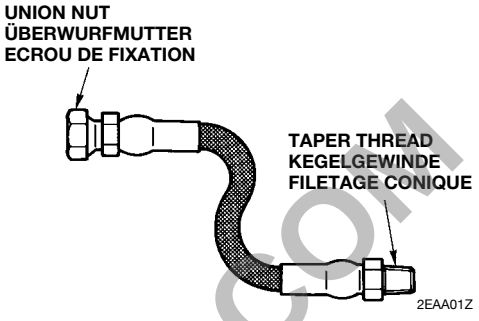
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TIGHTENING TORQUE

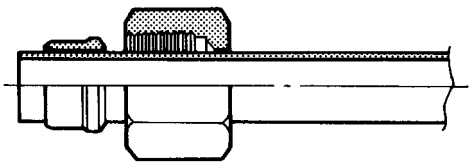
Hydraulic hose

Hose fitting size	Tightening torque	
	Union nut (G)	Taper thread (R)
	N·m	N·m
1/8	$9.8^{+4.9}_{0}$	11.8 ±1.2
1/4	$24.5^{+4.9}_{0}$	29.4 ±2.9
3/8	$49.0^{+4.9}_{0}$	53.9 ±5.4
1/2	$58.8^{+4.9}_{0}$	88.3 ±8.8
3/4	$117.7^{+4.9}_{0}$	147.1 ±14.7
1	$137.3^{+4.9}_{0}$	196.1 ±19.6



Bite-type pipe fitting for steel pipe

Pipe outer diameter (mm)	Tightening torque
	N·m
8	34.3 ±4.9
10	41.7 ±2.5
12	58.8 ±4.9
15	88.3 ±4.9
16	93.2 ±4.9
18	132.4 ±4.9
22	205.9 ±9.8
27.2	245.2 ±9.8
28	313.8 ±19.6
32	313.8 ±19.6
35	411.9 ±19.6

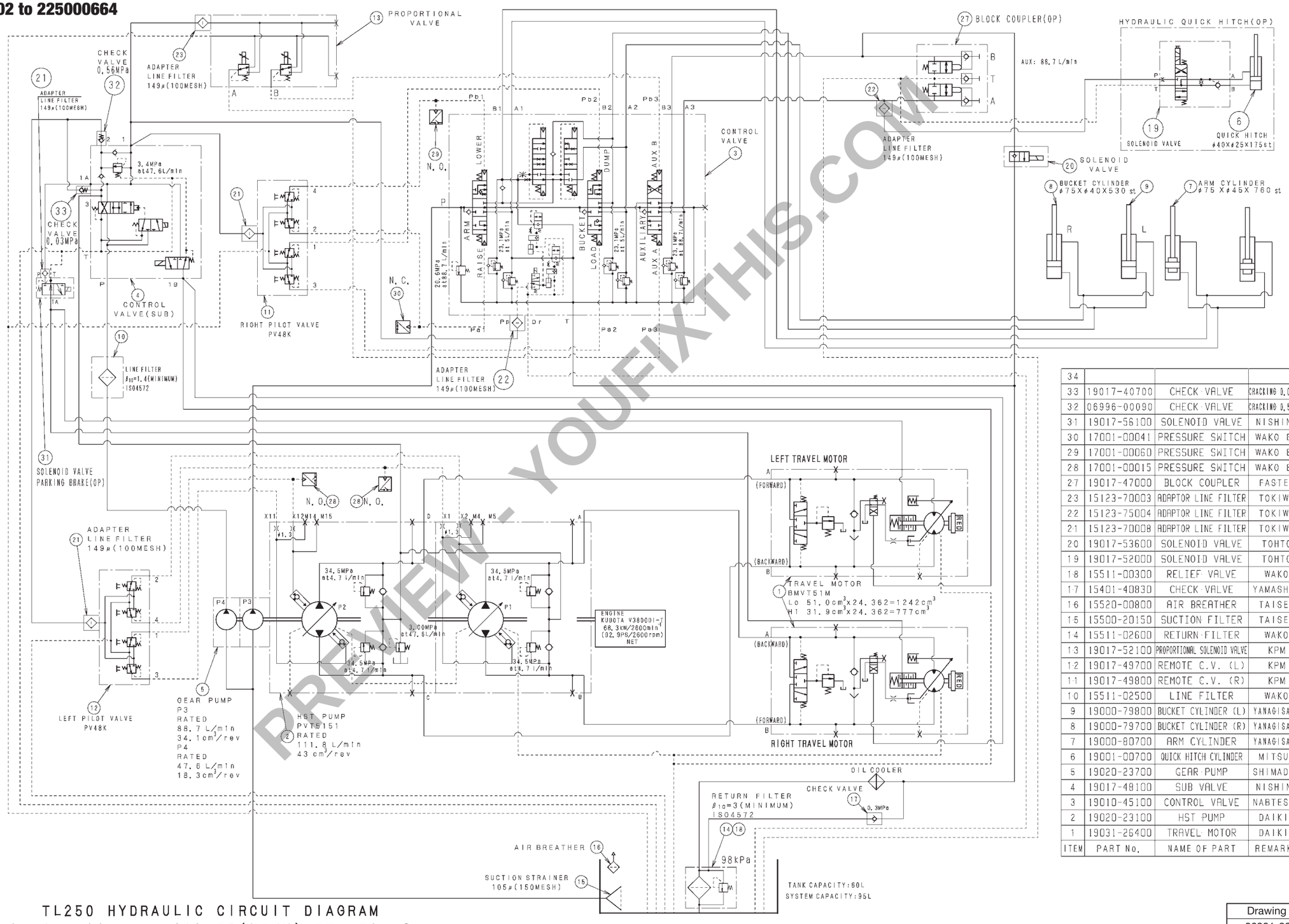


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HYDRAULIC CIRCUIT DIAGRAM

Standard
Serial No. 225000002 to 225000664



ITEM	PART No.	NAME OF PART	REMARKS
34			
33	19017-40700	CHECK VALVE	CRACKING 0.03MPa
32	06996-00090	CHECK VALVE	CRACKING 0.56MPa
31	19017-56100	SOLENOID VALVE	NISHINA
30	17001-00041	PRESSURE SWITCH	WAKO E.
29	17001-00060	PRESSURE SWITCH	WAKO E.
28	17001-00015	PRESSURE SWITCH	WAKO E.
27	19017-47000	BLOCK COUPLER	FASTER
23	15123-70003	ADAPTOR LINE FILTER	TOKIWA
22	15123-75004	ADAPTOR LINE FILTER	TOKIWA
21	15123-70008	ADAPTOR LINE FILTER	TOKIWA
20	19017-53600	SOLENOID VALVE	TOHTO
19	19017-52000	SOLENOID VALVE	TOHTO
18	15511-00300	RELIEF VALVE	WAKO
17	15401-40830	CHECK VALVE	YAMASHIN
16	15520-00800	AIR BREATHER	TAISEI
15	15500-20150	SUCTION FILTER	TAISEI
14	15511-02600	RETURN FILTER	WAKO
13	19017-52100	PROPORTIONAL SOLENOID VALVE	KPM
12	19017-49700	REMOTE C.V. (L)	KPM
11	19017-49800	REMOTE C.V. (R)	KPM
10	15511-02500	LINE FILTER	WAKO
9	19000-79800	BUCKET CYLINDER (L)	YANAGISAWA
8	19000-79700	BUCKET CYLINDER (R)	YANAGISAWA
7	19000-80700	ARM CYLINDER	YANAGISAWA
6	19001-00700	QUICK HITCH CYLINDER	MITSUO
5	19020-23700	GEAR PUMP	SHIMADZU
4	19017-48100	SUB VALVE	NISHINA
3	19010-45100	CONTROL VALVE	NABTESCO
2	19020-23100	HST PUMP	DAIKIN
1	19031-26400	TRAVEL MOTOR	DAIKIN

TL250 HYDRAULIC CIRCUIT DIAGRAM
In Compliance with EC(NRMM) EPA Tier3

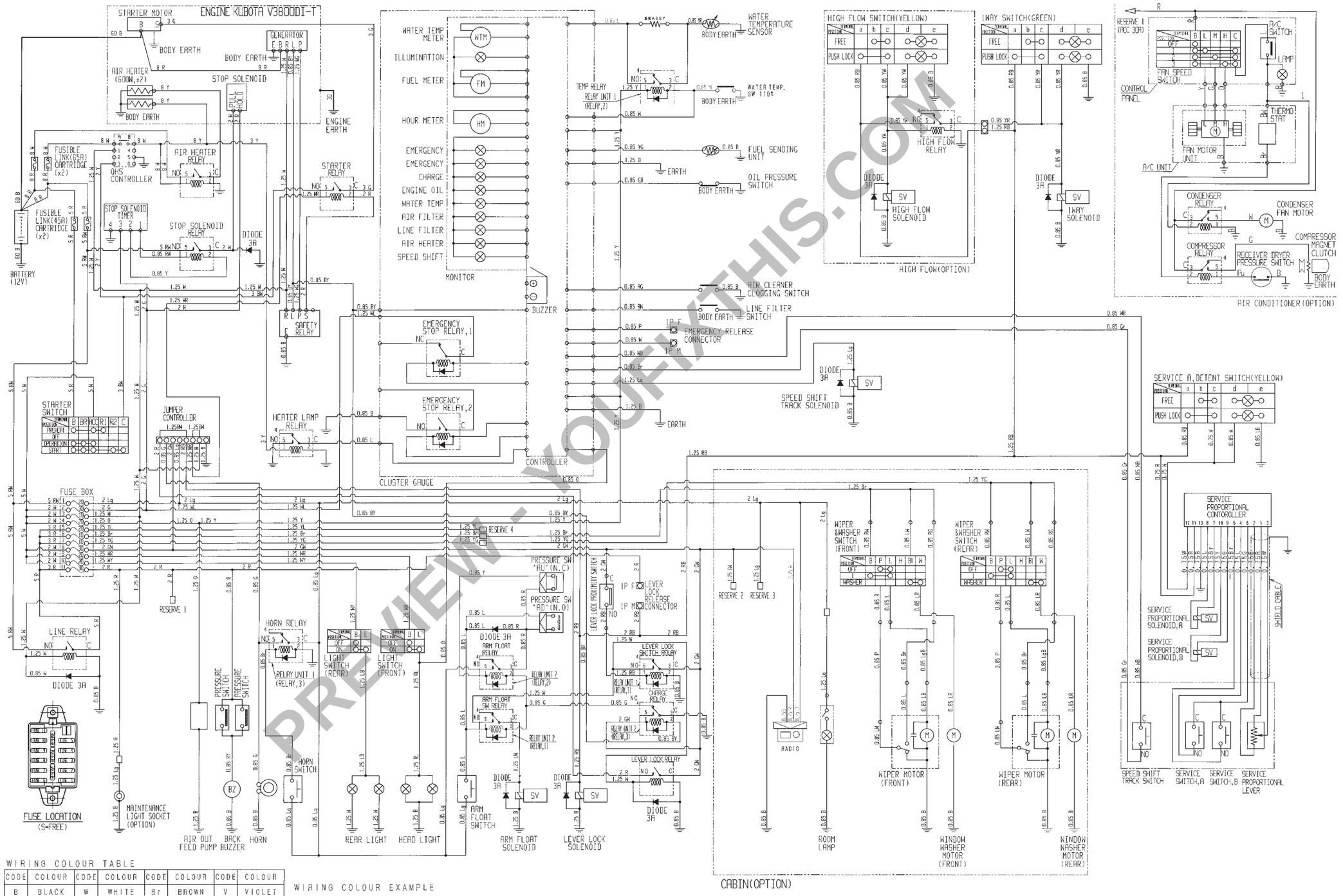
Drawing No. 06901-00200 1/1

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ELECTRICAL WIRING DIAGRAM

Serial No. 225000001 to 225000608



WIRING COLOUR TABLE

CODE	COLOUR	CODE	COLOUR	CODE	COLOUR	CODE	COLOUR
B	BLACK	W	WHITE	Br	BROWN	V	VIOLET
G	GREEN	Y	YELLOW	Lg	LIGHT GREEN	Dg	DARK GREEN
L	BLUE	P	PINK	Gr	GREY	Ch	CHOCOLATE
R	RED	O	ORANGE	Sb	SKY BLUE		

WIRING COLOUR EXAMPLE

W L
- WIRING COLOUR(BLUE)
- GROUND COLOUR(WHITE)

Drawing No.	1/1
06901-00011	

2GAB04Z

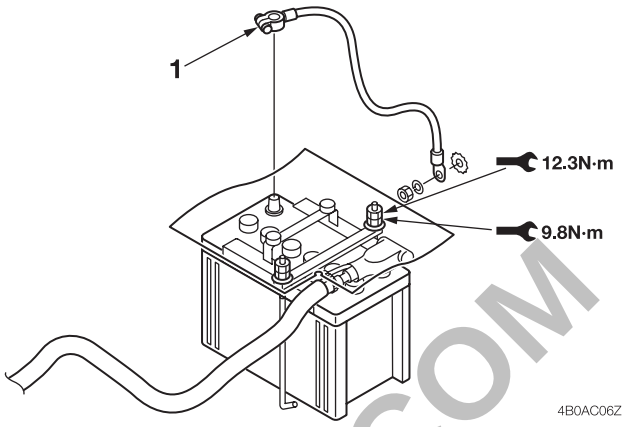
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DRIVE SYSTEM

Removing the engine

1. Disconnect the battery ground cable (1) from the battery terminal.



2. Remove the canopy.
   ☞ "Removing the canopy"

3. Remove the floor frame.
   ☞ "Removing the floor frame"

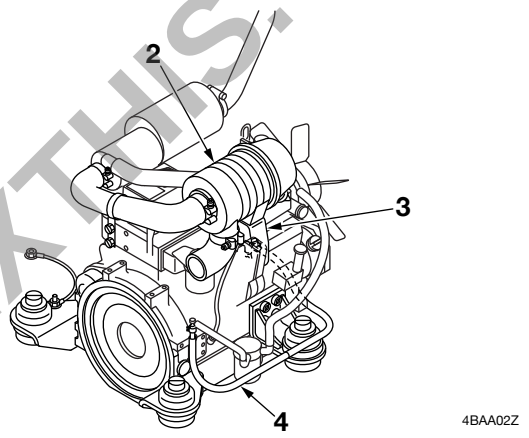
4. Disconnect the electrical wiring to the air cleaner (2).

5. Remove the bracket (3) together with the air cleaner (2).

6. Remove the radiator.
   ☞ "Removing the radiator"

7. Remove the drain hose (4).

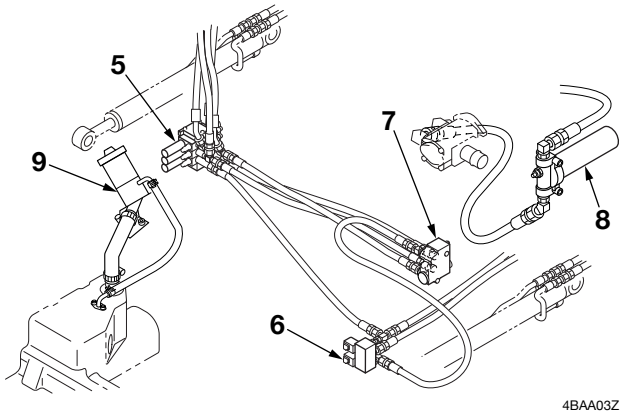
8. Remove the hydraulic pump.
   ☞ "Removing the hydraulic pump"



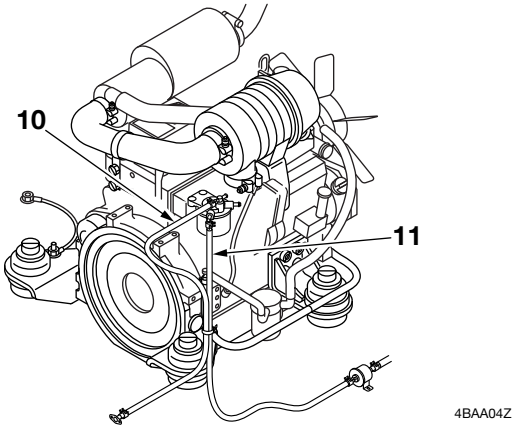
9. Remove the control valve (5), the solenoid valve (6) and the sub valve (7).

10. Remove the line filter (8).

11. Remove the filler opening (9).



12. Disconnect the fuel hoses (10) and (11).

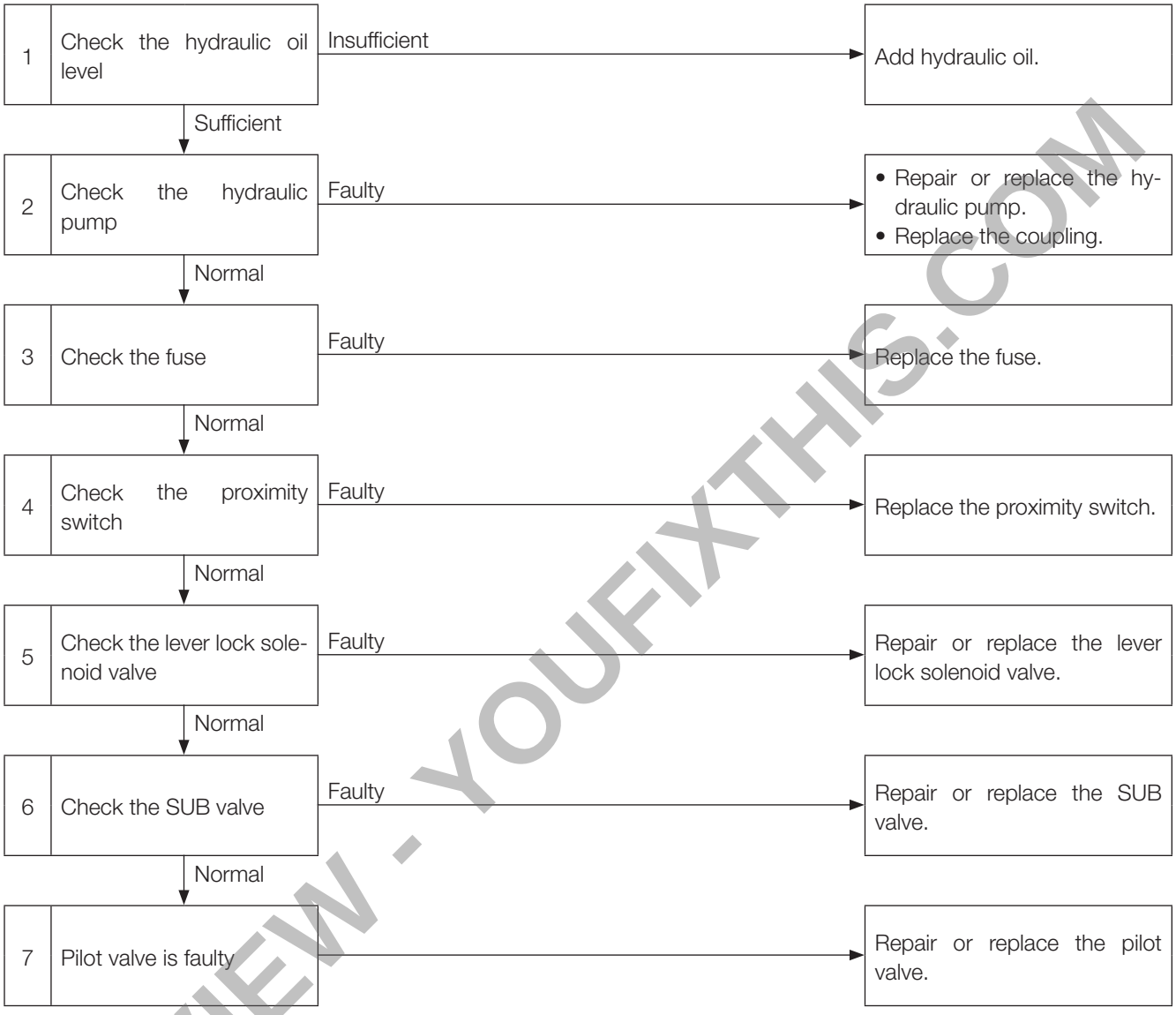


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OVERALL MACHINE

No operation is possible.



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Bleeding air from the HST pump

⚠ WARNING

Before reassembling the HST, be sure to bleed the air from it. Failure to do so may cause an unexpected movement of the machine, resulting in personal injury or death.

1. Before installing the HST pump on the machine, fill the servo control chambers with hydraulic oil.
   a. Attach the plugs to the pilot ports (X1), (X2), (X11) and (X12).
   b. Fill the servo control chambers with hydraulic oil through the pressure detection ports (M4), (M5), (M14) and (M15), and tighten the plugs.

2. Install the HST pump on the machine.

3. Fill the hoses to be connected to the pilot ports (X1) and (X11) with hydraulic oil.
   - Fill the hoses with oil by holding the opening of the hose at the same height as the pilot valve. If the hose is held at a lower height than the pilot valve, air bleeding fails. If the hose is held at a higher height than the pilot valve, the filled oil runs into the tank.

4. Remove the plugs of the pilot ports (X1) and (X11), and then connect the hoses to the plugs to prevent the oil from running out.

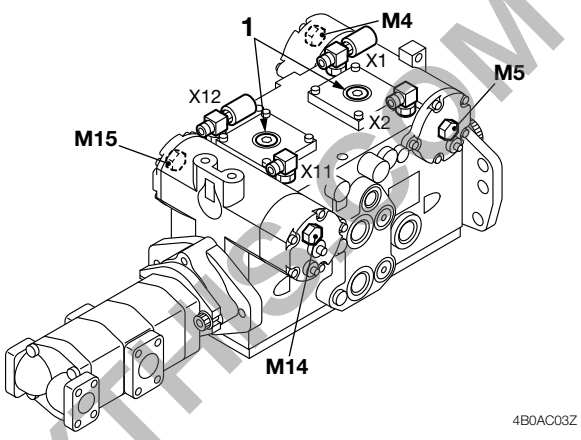
5. Remove the plugs of the pilot ports (X2) and (X12), and then connect the hoses to these ports.

6. Connect the rest of the hoses to the pump.

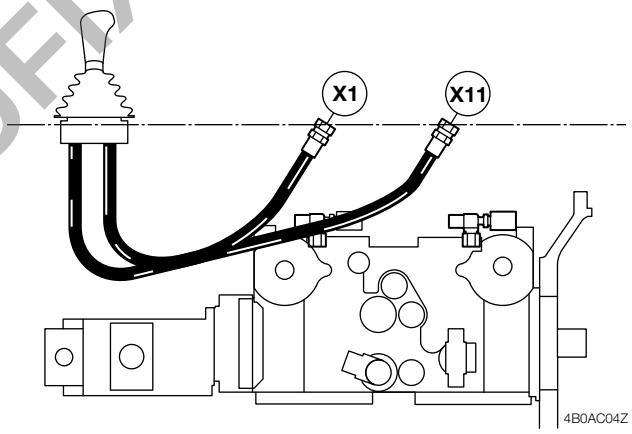
7. Fill up the pump with oil through the plug hole (1) and the pressure detection ports (M5) and (M15), and then tighten the plugs.

8. Start the engine, and let it run at an idling speed for five minutes to bleed air out of the pump casing.

9. Bleed air from the main circuit and the pilot circuit by slowly operating the pilot valve.



4B0AC03Z



4B0AC04Z

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The following AC components are discussed in detail in this section:

1. Compressor/Clutch Assembly
2. Condenser
3. Receiver-Drier
4. Expansion Valve
5. Evaporator Coil

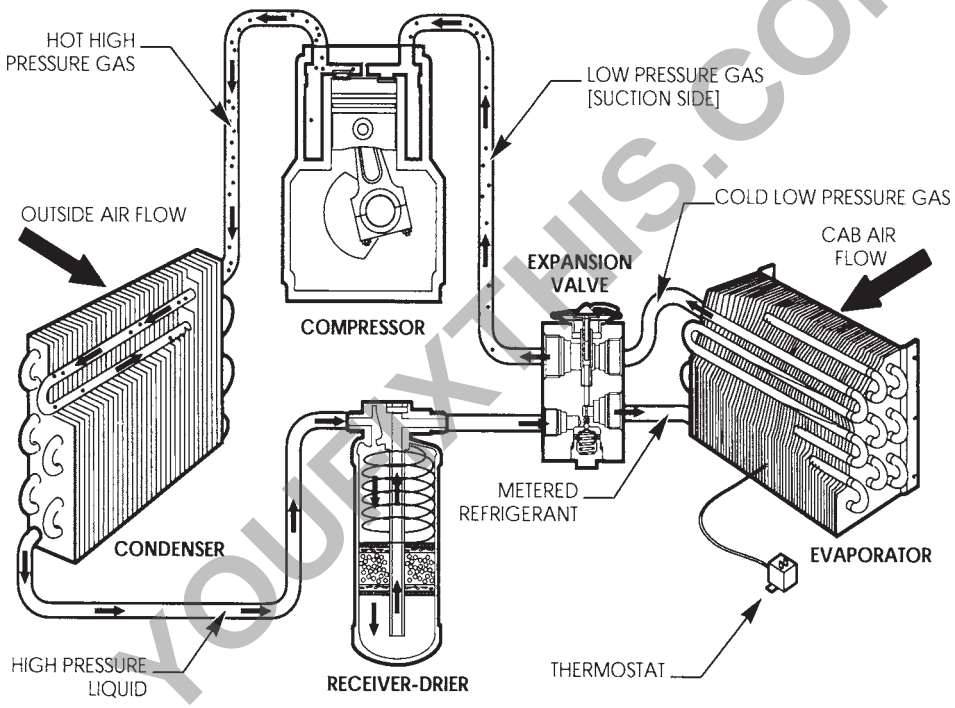


Figure 2-2
Air Conditioner components are connected together to illustrate system operation. The components shown are not to scale. The refrigerant and refrigerant oil are clear in color and not visible in this drawing. The small arrows inside the components and connecting hoses show the direction of refrigerant flow (refrigerant circuit).

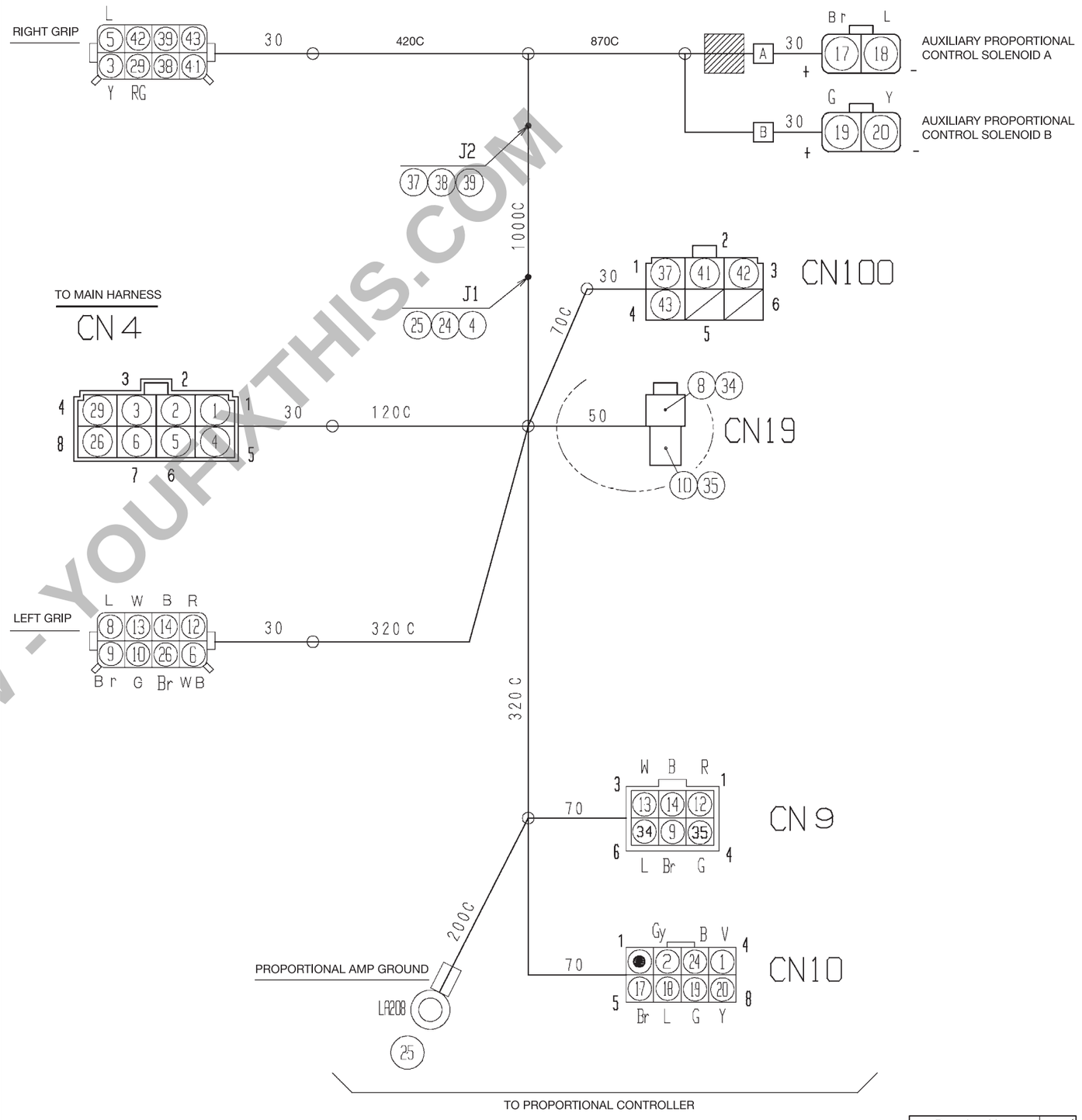
1. Compressor/Clutch Assembly

The compressor/clutch assembly is the heart of the system. When the clutch is engaged, the compressor pumps refrigerant and oil around the system. It raises the temperature and pressure of the refrigerant gas, and forces it to the condenser where it changes state and becomes a liquid. The compressor also sucks the vaporized refrigerant out of the evaporator and back inside itself in the form of gas. One way valves inside the compressor separate the compressed gas (high pressure) side of the system from the suction (low pressure) side. Figure 2-3 shows a cutaway view of a compressor with the high and low pressure sides noted.

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NO.	WIRING STYLE	SIZE, WIRE COLOR	FROM	TO
1	AVSS	0.85V	CN4-1 FUSE 9	CN10-4 PROPORTIONAL CONTROLLER (POWER SUPPLY)
2	AVSS	0.5Gy	CN4-2 AUXILIARY CIRCUIT A, DETENT SWITCH, C	CN10-2 PROPORTIONAL CONTROLLER (DETENT)
3	AVSS	0.5Y	CN4-3 HORN RELAY, +	RIGHT GRIP HORN SWITCH
4	AVSS	2B	CN4-5 BODY GROUND	JOINT-1 (GROUND)
5	AVSS	0.5L	CN4-6 ARM FLOAT SWITCH RELAY, +	RIGHT GRIP ARM FLOAT SW
6	AVSS	0.5WB	CN4-7 CLUSTER-RUNNING 2ND SPEED SWITCH INPUT	LEFT GRIP TRAVEL SPEED SHIFT SW
7				
8	AVSS	0.5L	LEFT GRIP AUXILIARY SWITCH A NO TERMINAL	CN19
9	AVSS	0.5Br	LEFT GRIP AUXILIARY SWITCH B NO TERMINAL	CN9-5 PROPORTIONAL CONTROLLER
10	AVSS	0.5G	LEFT GRIP AUXILIARY SWITCH AB, COM	CN19
11				
12	MVVS 0.5	R	LEFT GRIP (+)	CN9-1 PROPORTIONAL CONTROLLER
13	MVVS 0.5	W	(OUT PUT)	CN9-3 PROPORTIONAL CONTROLLER
14	MVVS 0.5	B	(-)	CN9-2 PROPORTIONAL CONTROLLER
15	MVVS 0.5	SH	(SH)	(14) WITH JOINT
16				
17	AVSS	0.5Br	CN10-5 PROPORTIONAL CONTROLLER	AUXILIARY PROPORTIONAL CONTROL SOLENOID A, +
18	AVSS	0.5L	CN10-6 PROPORTIONAL CONTROLLER	AUXILIARY PROPORTIONAL CONTROL SOLENOID A, -
19	AVSS	0.5G	CN10-7 PROPORTIONAL CONTROLLER	AUXILIARY PROPORTIONAL CONTROL SOLENOID B, +
20	AVSS	0.5Y	CN10-8 PROPORTIONAL CONTROLLER	AUXILIARY PROPORTIONAL CONTROL SOLENOID B, -
21				
22				
23				
24	AVSS	0.5B	CN10-3 PROPORTIONAL CONTROLLER (GROUND)	JOINT-1 (GROUND)
25	AVSS	2B	PROPORTIONAL AMP GROUND	JOINT-1 (GROUND)
26	AVSS	0.5Br	LEFT GRIP TRAVEL SPEED SHIFT SW	CN4-8 CLUSTER-RUNNING 2ND SPEED SWITCH INPUT
27				
28				
29	AVSS	0.5RG	CN4-4 FUSE 17	RIGHT GRIP ARM FLOAT, HORN SW COM
30				
31				
32				
33				
34	AVSS	0.5L	CN19	CN9-6 PROPORTIONAL CONTROLLER
35	AVSS	0.5G	CN19	CN9-4 PROPORTIONAL CONTROLLER
36				
37	AVSS	0.5R	CN100-1	JOINT-2
38	AVSS	0.5R	JOINT-2	RIGHT GRIP SW C COM
39	AVSS	0.5R	JOINT-2	RIGHT GRIP SW D,E COM
40	AVSS			
41	AVSS	0.5YL	RIGHT GRIP SW C, NO	CN100-2
42	AVSS	0.5WL	RIGHT GRIP SW D, NO	CN100-3
43	AVSS	0.5RL	RIGHT GRIP SW E, NO	CN100-4
44				
45				



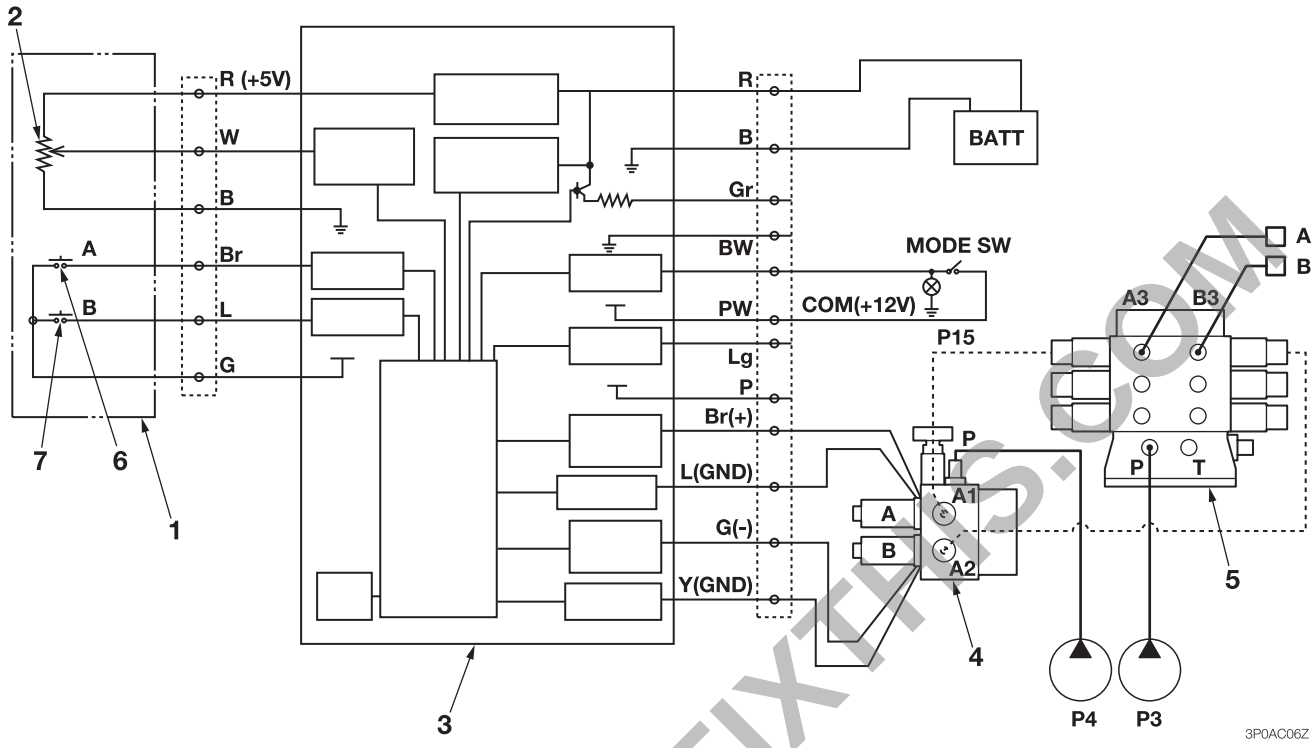
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Proportional controller (SPK)

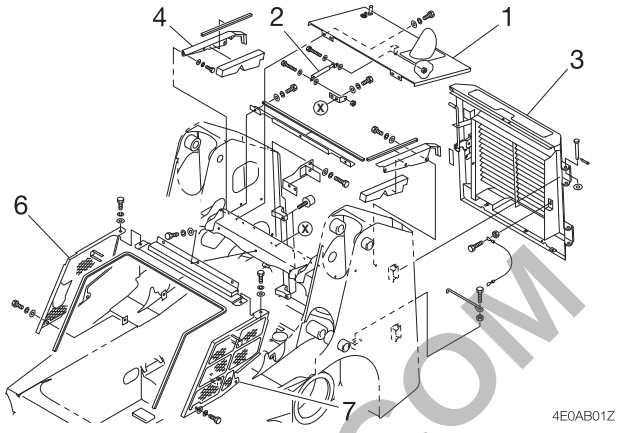


The proportional lever (2) of the left pilot valve (1) and the proportional controller (3) control the solenoid drive current flowing in the proportional control solenoid valve (4) to actuate it. This allows the proportional control solenoid valve (4) to control the pilot pressure to the control valve (auxiliary) (5) and to change the hydraulic oil flowing into the auxiliary lines.

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Removing the cover



1. Remove the battery ground cable from the battery terminal.
2. Tilt up the canopy.
   ☞ "Tilting up the canopy"
3. Open the engine hood (1) and suspend it with a cable.
4. Take out the bolt holding the gas spring (2), and remove it.
5. Take out the bolts holding the engine hood (1), and remove it.
6. Open the rear door (3) and remove the fuel hose, water separator and feed pump from it.
   ☞ "Removing the fuel tank"
7. Lift up the rear door (3) with cables, remove the pin, and then take out the rear door (3).
8. Take out the bolts holding the right plate (4) and remove it.
9. Take out the bolts holding the left plate (5) and remove it.
10. Take out the bolts holding the side cover R (6) and remove it.
11. Take out the bolts holding the side cover L (7) and remove it.

Installing the cover

For installation, follow the same procedure as for removal in the reverse order.

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SAUER DANFOSS

4T Tandem Piston Pump
Repair Instructions
Inspection

Genuine Parts

HOUSING

Inspect the housing to ensure that it is clean and free of foreign material. Inspect the swashplate bearing surfaces.

Inspect housing





SIDECOVER

Inspect the side cover to ensure that it is clean and free of foreign material. Inspect the swashplate bearing surfaces.

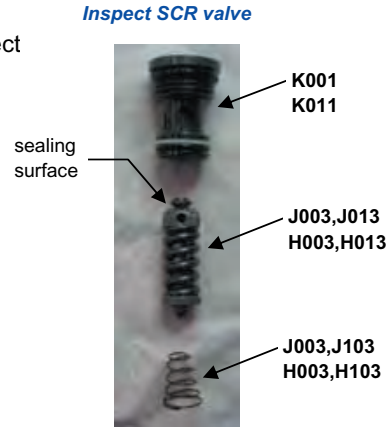
Inspect sidecover



SYSTEM CHECK/RELIEF (SCR)VALVE

Clean and inspect the SCR valves. Inspect the springs. Check the sealing surfaces of the poppet and seat-plug for wear or scratches. Replace as necessary.

Inspect SCR valve



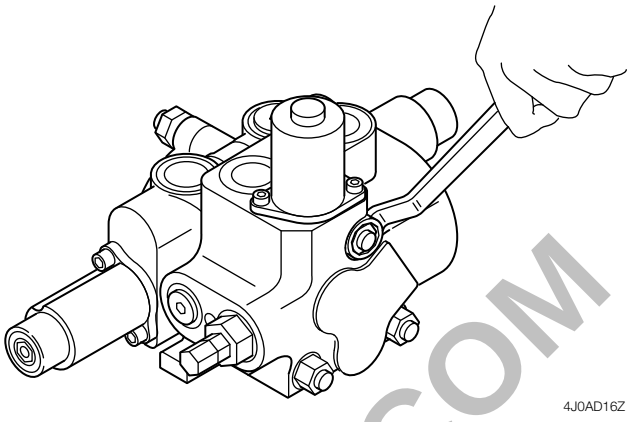
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Disassembly

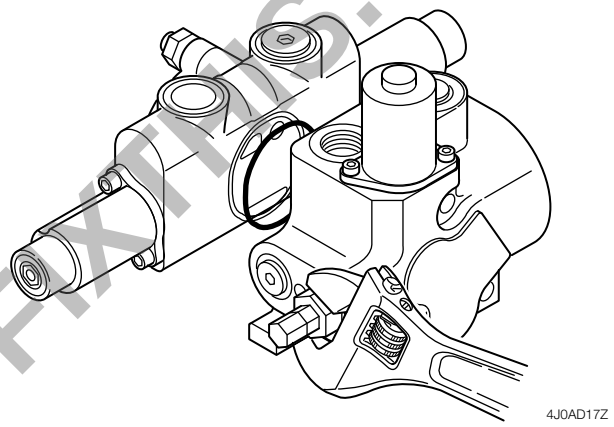
Following is an explanation of the control valve disassembly procedure.
Follow the procedure used to disassemble the control valve in reverse order when reassembling it.

1. Loosen the nuts and remove the tie rods, then remove the sections.
   Nut: 39.23 ±3.92 N·m


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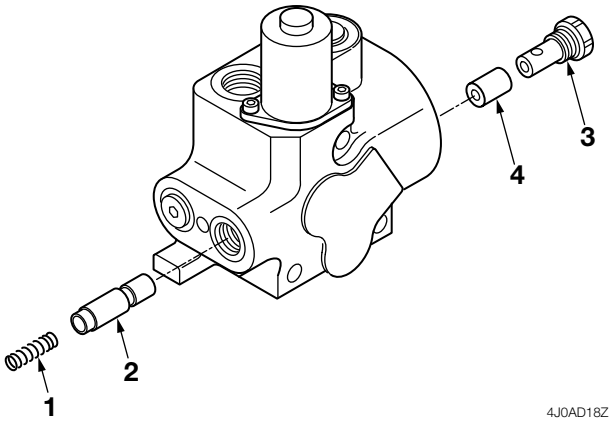
2. Remove the O-ring.
   - The mating surfaces are metal seals, so be careful not to scratch, bruise or otherwise damage them.

3. Remove the relief valve, then remove the O-rings from the relief valve.
   - Do not disassemble the relief valves unless it is necessary.
   - When using a spanner or adjustable wrench, be sure to attach it in the place shown in the figure at right.
   Relief Valve: 65.0 ±6.5 N·m


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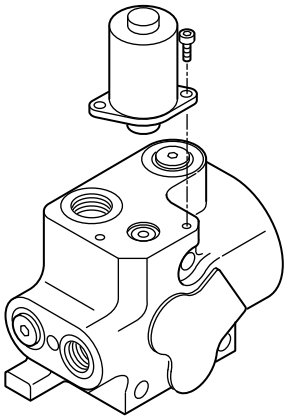
4. Remove the spring (1) and the plunger (2).

5. Remove the plug (3) and the valve seat (4), then remove the O-ring from the plug (3).
   Plug: 65.0 ±6.5 N·m



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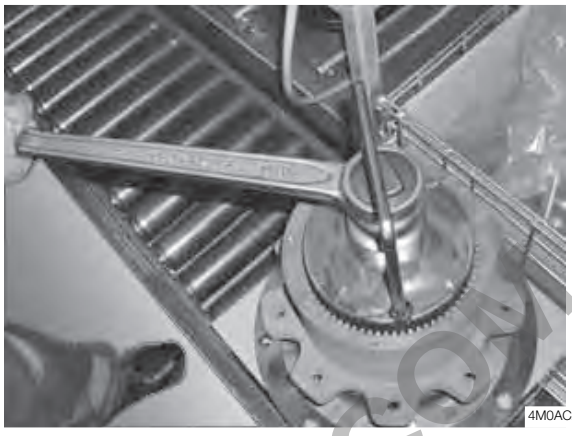
6. Remove the cap screws and the solenoid valve, then remove the O-ring from the solenoid valve.
   Cap Screw: 3.92 ±0.98 N·m


4J0AD19Z

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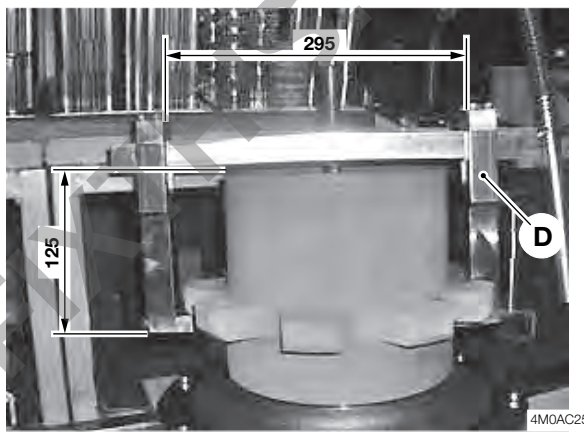
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3. Remove the ring nut (8).
   - Use the jig C.


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4. Remove the housing (1) from the flange holder.
   - Use the jig D.

5. Remove the floating seals (18) from the housing (1) and the flange holder.



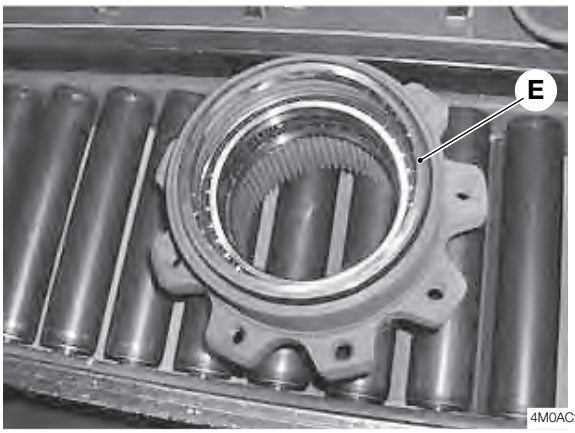
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Assembly

Floating seal

1. Place the floating seal (18) in the housing.
   - Apply gear oil on the O-ring.

2. Place the guide jig E.

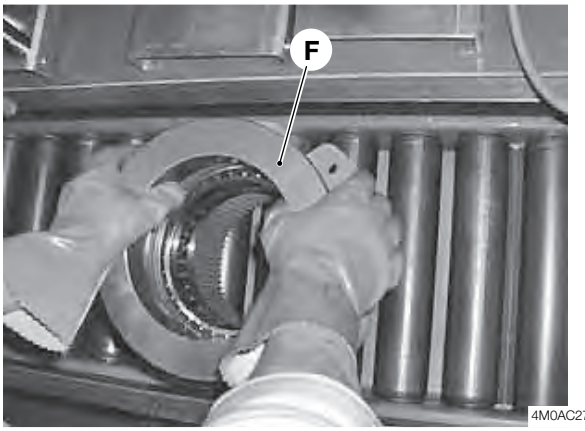


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3. Fit the floating seal (18) by pressing the guide jig E with the jig F.
   - Apply gear oil on the sliding surface.

Important:

- **Be sure not to damage the sliding surface.**
- **The floating seal must be mounted horizontally.**



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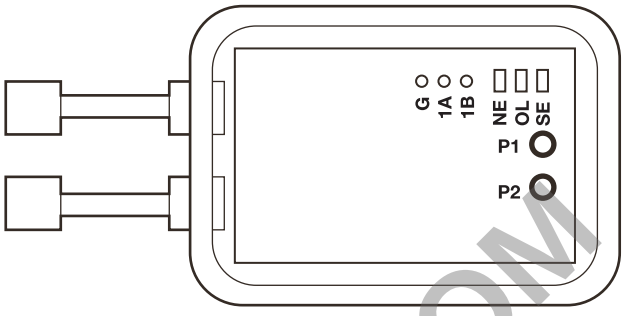
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Adjustment

The adjusting trimmer is set to the maximum flow rate at the factory. When the flow rate should be reduced, use this trimmer and decrease the drive current for the proportional solenoid valve (4). Therefore, it is possible to improve inching by decreasing the pilot pressure of the control valve (auxiliary) (5) and controlling the flow rate of the auxiliary piping A and B.

a. Turn the starter switch to the ON position and release the lever lock.
b. Reduce the drive current for the proportional control solenoid valve (4) by turning the trimmers P1 and P, while checking the voltage of current monitor terminals G-1A and G-1B.
   - The drive current (maximum flow rate) is set to 1.25 A at the factory.
   - The relation between the voltage of the current monitor terminal and the drive current is 1 V = 1 A, where the voltage value and current value are equal.
   - The secondary pressure (pilot pressure) of the proportional control solenoid valve (4) drops by approximately 0.27 MPa per 0.1 A.



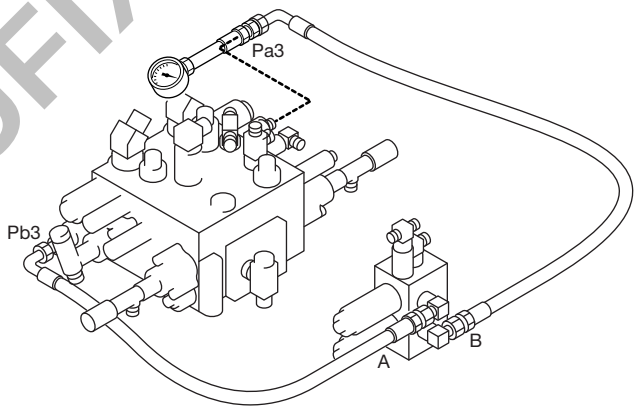
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	Monitor terminal	Trimmer
Auxiliary line A	G-1A	P1
Auxiliary line B	G-1B	P2

3. Check the proportional control solenoid valve.

a. Disconnect the hose connecting the proportional control solenoid valve and the control valve (auxiliary section) from the control valve side.
b. Fit a pressure gauge to the hose just disconnected.
c. Operate the proportional control lever on the left pilot valve to position it at various angles. If the pressure level is between 0 and 3.1 MPa for each angle, the valve is normal.

☞ "5-40"



5G4AD01Z

4. Check the spool operation.

☞ "5-36 and 5-37"

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