GENERAL SPECIFICATIONS

COMPONENT			SPECIFICATION			
			STANDARD (1.20m ARM)	1.20m ARM+Q/C	1.33m ARM	1.33m ARM+Q/C
Bucket capacity	SAE (CECE)		0.11 m^3 (0.094 m^3)			
Operating weight			3.7 tons			
Engine	Model		3TNV88-SDB			
	Displacement (Total dis. Volume)		1,642 cc			
	Rated power		27.7 hp @ 2,200 rpm			
			28.1 ps @2,200 rpm			
Front Attachment	Boom length		2,500 mm			
	Arm length (Standard)		1,250 mm			
	Arm length (Option)		1,330 mm			
Transport Dimension	Length		4,644 mm			
	Height		2,515 mm			
	Height (Boom)		1,720 mm			
	Width		1,700 mm			
Performance	Max.digging force	Bucket	3,010 kgf	2,380 kgf	3,010 kgf	2,380 kgf
		Arm	2,140 kgf	1,960 kgf	1,960 kgf	1,790 kgf
	Traveling speed	1-speed	2.6 km/h			
		2-speed	4.6 km/h			
	Swing speed		9.53 rpm			
	Drawbar pull		3,110 kg			
Hydraulic pump	Type		Variable displacement axial piston pump			
	Max. flow rate		38.5 x 2 liters/min + 23.5 liters/min (Gear pump: 11.2 liters/min)			
	Main relief set pressure		230 kg/cm^2			
Track	Shoe width		300 mm			
	Tumbler distance		1,700 mm			
Control	Lever control type		Hydraulic pilot			
	Lever pattern		SAE			
Tank	Fuel tank		42 liters			
	Hydraulic tank		40 liters			
Ground pressure			0.32 kg/cm^2			

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REMOVAL

CAUTION!

Avoid disassembling cabin if there are strong wind gusts, which could catch large surface area of cabin shell and push it sideways during lift.

1. Park on firm and level ground.
2. Lower front attachment (bucket) to ground.
3. Shut down engine.
4. Set safety lever on "RELEASED" position.
5. Turn starter switch to "I" (ON) position.

WARNING!

If engine must be run while performing maintenance, use extreme care. Always have one person in the cabin at all times. Never leave the cabin with the engine running.

6. Fully stroke work levers (joysticks) in all directions to relieve pressure from accumulators.
7. Set safety lever on "LOCK" position.
8. Turn key to "O" (OFF) position and remove from starter switch.
9. Hang maintenance warning tag on controls.
10. Disconnect the battery cable from the negative (-) battery terminal.
11. Remove floor mat.
12. Disconnect main harness connector after removing cup holder (1, Figure 2).
13. Remove heater cover.

    Disconnect harness connector for switches and heater hoses before removing heater cover (2, Figure 2).

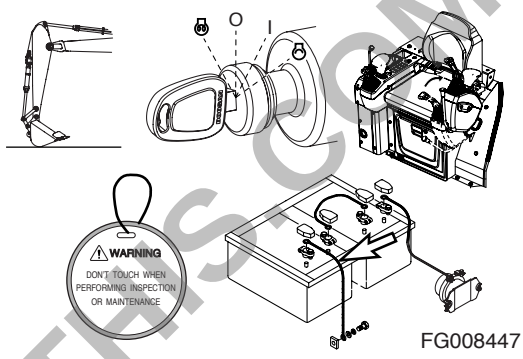


Figure 1

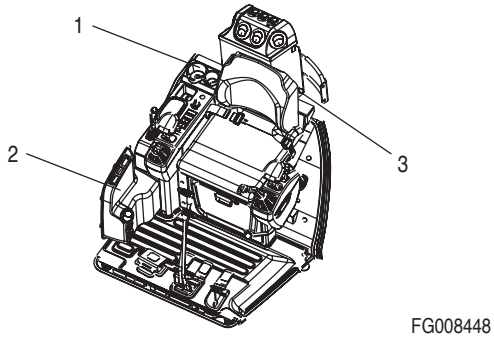


Figure 2

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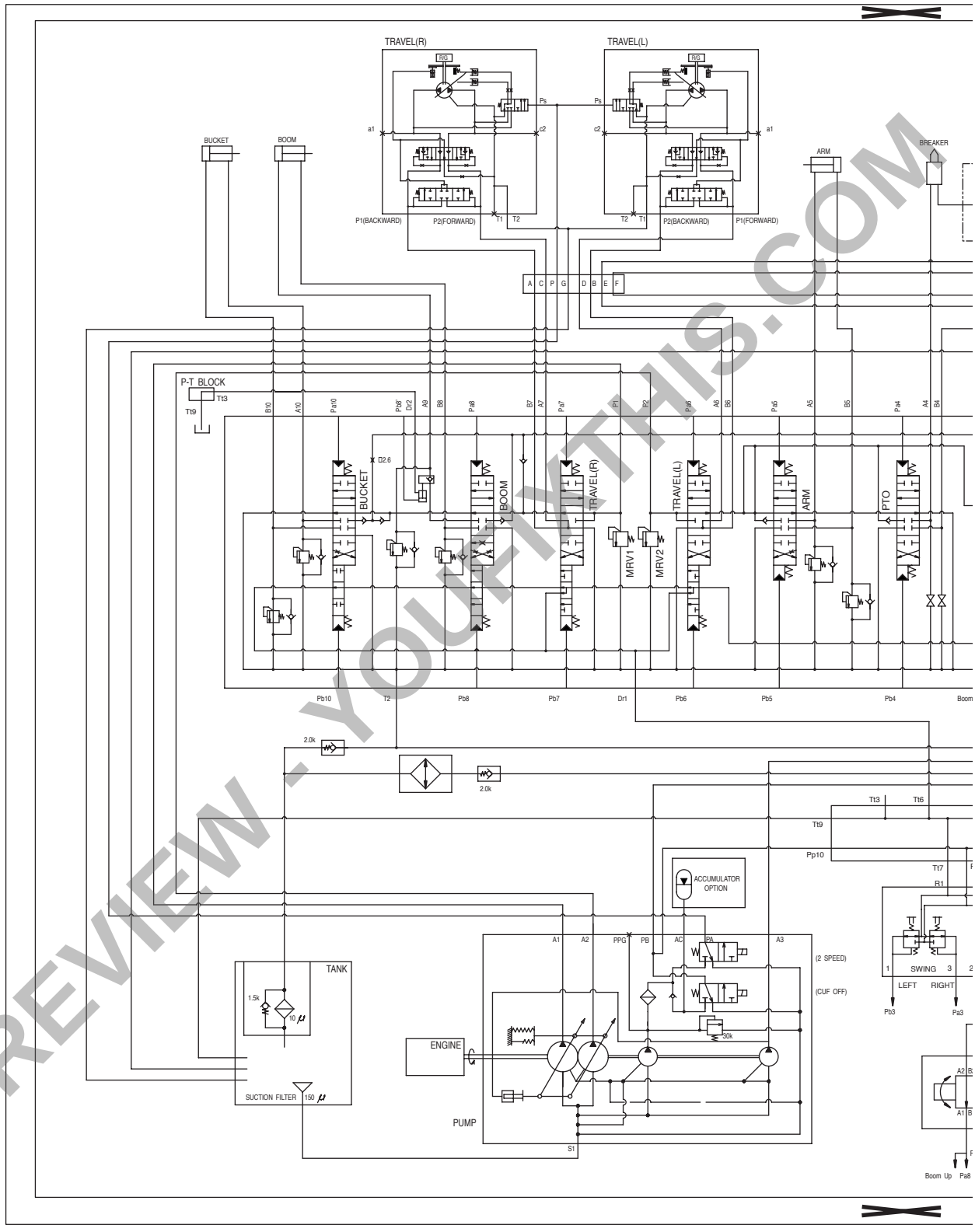
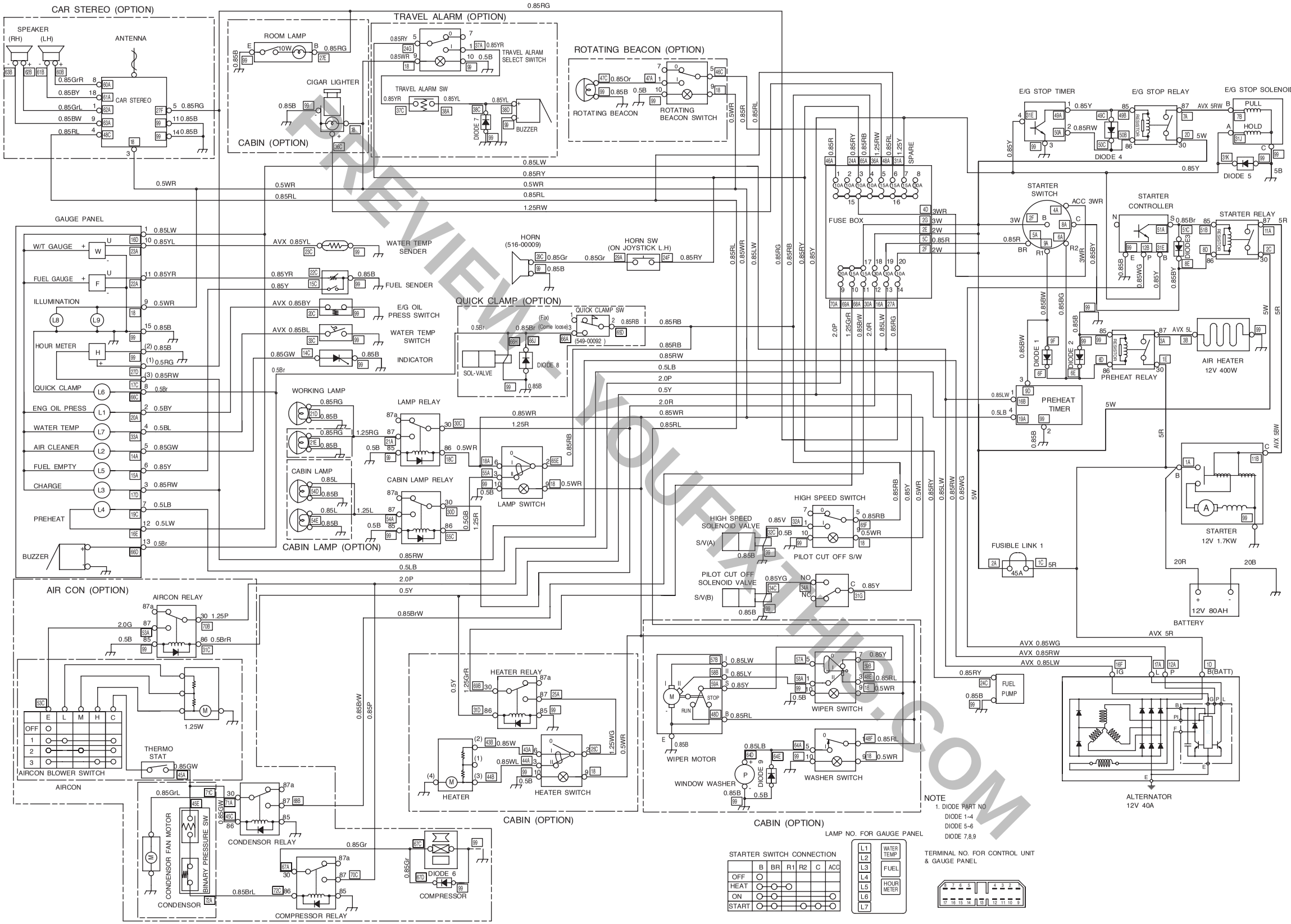


Figure 2

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DX35Z



FG008607

Figure 1

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TORQUE VALUES FOR STANDARD METRIC FASTENERS

NOTE: *The units for the torque values are kg•m (ft lb).*

Dia. x Pitch (mm)	Grade										
	3.6 (4A)	4.6 (4D)	4.8 (4S)	5.6 (5D)	5.8 (5S)	6.6 (6D)	6.8 (6S)	6.9 (6G)	8.8 (8G)	10.9 (10K)	12.9 (12K)
M5 x Std.	0.15 (1.08)	0.16 (1.15)	0.25 (1.80)	0.22 (1.59)	0.31 (2.24)	0.28 (2.02)	0.43 (3.11)	0.48 (3.47)	0.50 (3.61)	0.75 (5.42)	0.90 (6.50)
M6 x Std.	0.28 (2.02)	0.30 (2.16)	0.45 (3.25)	0.40 (2.89)	0.55 (3.97)	0.47 (3.39)	0.77 (5.56)	0.85 (6.14)	0.90 (6.50)	1.25 (9.04)	1.50 (10.84)
M7 x Std.	0.43 (3.11)	0.46 (3.32)	0.70 (5.06)	0.63 (4.55)	0.83 (6.00)	0.78 (5.64)	1.20 (8.67)	1.30 (9.40)	1.40 (10.12)	1.95 (14.10)	2.35 (16.99)
M8 x Std.	0.70 (5.06)	0.75 (5.42)	1.10 (7.95)	1.00 (7.23)	1.40 (10.12)	1.25 (9.04)	1.90 (13.74)	2.10 (15.18)	2.20 (15.91)	3.10 (22.42)	3.80 (27.48)
M8 x 1	0.73 (5.28)	0.80 (5.78)	1.20 (8.67)	1.00 (7.23)	1.50 (10.84)	1.35 (9.76)	2.10 (15.18)	2.30 (16.63)	2.40 (17.35)	3.35 (24.23)	4.10 (29.65)
M10 x Std.	1.35 (9.76)	1.40 (10.12)	2.20 (15.91)	1.90 (13.74)	2.70 (19.52)	2.35 (19.99)	3.70 (26.76)	4.20 (30.37)	4.40 (31.18)	6.20 (44.84)	7.20 (52.07)
M10 x 1.25	1.50 (10.84)	1.60 (11.57)	2.50 (18.08)	2.10 (15.18)	3.10 (22.42)	2.80 (20.25)	4.30 (31.10)	4.90 (35.44)	5.00 (36.16)	7.00 (50.63)	8.40 (60.75)
M12 x Std.	2.40 (17.35)	2.50 (18.08)	3.70 (26.76)	3.30 (23.86)	4.70 (33.99)	4.20 (30.37)	6.30 (45.56)	7.20 (52.07)	7.50 (54.24)	10.50 (75.94)	12.50 (90.41)
M12 x 1.25	2.55 (18.44)	2.70 (19.52)	4.00 (28.93)	3.50 (25.31)	5.00 (36.16)	4.50 (32.54)	6.80 (49.18)	7.70 (55.69)	8.00 (57.86)	11.20 (81.00)	13.40 (96.92)
M14 x Std.	3.70 (26.76)	3.90 (28.20)	6.00 (13.23)	5.20 (37.61)	7.50 (54.24)	7.00 (50.63)	10.00 (72.33)	11.50 (83.17)	12.00 (86.79)	17.00 (122.96)	20.00 (144.66)
M14 x 1.5	4.10 (29.65)	4.30 (31.10)	6.60 (47.73)	5.70 (41.22)	8.30 (60.03)	7.50 (54.24)	11.10 (80.28)	12.50 (90.41)	13.00 (94.02)	18.50 (133.81)	22.00 (159.12)
M16 x Std.	5.60 (40.50)	6.00 (43.39)	9.00 (65.09)	8.00 (57.86)	11.50 (83.17)	10.50 (75.94)	15.50 (112.11)	17.90 (129.47)	18.50 (133.81)	26.00 (188.05)	31.00 (224.22)
M16 x 1.5	6.20 (44.84)	6.50 (47.01)	9.70 (70.16)	8.60 (62.20)	12.50 (90.41)	11.30 (81.73)	17.00 (122.96)	19.50 (141.04)	20.00 (144.66)	28.00 (202.52)	35.50 (256.77)
M18 x Std.	7.80 (56.41)	8.30 (60.03)	12.50 (90.41)	11.00 (79.56)	16.00 (115.72)	14.50 (104.87)	21.00 (151.89)	27.50 (198.90)	28.50 (206.14)	41.00 (296.55)	43.00 (311.01)
M18 x 1.5	9.10 (65.82)	9.50 (68.71)	14.40 (104.15)	12.50 (90.41)	18.50 (133.81)	16.70 (120.79)	24.50 (177.20)	27.50 (198.90)	28.50 (206.14)	41.00 (296.55)	49.00 (354.41)
M20 x Std.	11.50 (83.17)	12.00 (86.79)	18.00 (130.19)	16.00 (115.72)	22.00 (159.12)	19.00 (137.42)	31.50 (227.83)	35.00 (253.15)	36.00 (260.38)	51.00 (368.88)	60.00 (433.98)
M20 x 1.5	12.80 (92.58)	13.50 (97.64)	20.50 (148.27)	18.00 (130.19)	25.00 (180.82)	22.50 (162.74)	35.00 (253.15)	39.50 (285.70)	41.00 (296.55)	58.00 (419.51)	68.00 (491.84)
M22 x Std.	15.50 (112.11)	16.00 (115.72)	24.50 (177.20)	21.00 (151.89)	30.00 (216.99)	26.00 (188.05)	42.00 (303.78)	46.00 (332.71)	49.00 (354.41)	67.00 (484.61)	75.00 (542.47)
M22 x 1.5	17.00 (122.96)	18.50 (133.81)	28.00 (202.52)	24.00 (173.59)	34.00 (245.92)	29.00 (209.75)	47.00 (339.95)	52.00 (44.76)	56.00 (405.04)	75.00 (542.47)	85.00 (614.80)
M24 x Std.	20.50 (148.27)	21.50 (155.50)	33.00 (238.68)	27.00 (195.29)	40.00 (289.32)	34.00 (245.92)	55.00 (397.81)	58.00 (419.51)	63.00 (455.67)	82.00 (593.10)	92.00 (655.43)
M24 x 2.0	23.00 (166.35)	35.00 (253.15)	37.00 (267.62)	31.00 (224.22)	45.00 (325.48)	38.00 (202.52)	61.00 (441.21)	67.00 (484.61)	74.00 (535.24)	93.00 (672.66)	103.00 (744.99)

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SAFETY PRECAUTIONS

CAUTION!

Follow all safety recommendations and safe shop practices outlined in the front of this manual or those contained within this section.

Always use tools and equipment that are in good working order.

Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

The contents of this section apply to the following models and serial number ranges.

MODEL	SERIAL NUMBER RANGE
DX35Z	5001 and Up

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Avoid High Voltage Cables

Serious injury or death can result from contact or proximity to high voltage electric lines. The bucket does not have to make physical contact with power lines for current to be transmitted.

Use a spotter and hand signals to stay away from power lines not clearly visible to the operator.

Voltage	Minimum Safe Distance
6.6 kV	3 m (9' 10")
33.0 kV	4 m (13' 1")
66.0 kV	5 m (16' 5")
154.0 kV	8 m (26' 3")
275.0 kV	10 m (32' 10")

Use these minimum distances as a guideline only. Depending upon the voltage in the line and atmospheric conditions, strong current shocks can occur with the boom or bucket as far away as 4 - 6 m (13 - 20 ft.) from the power line. Very high voltage and rainy weather could further decrease that safety margin.

NOTE: *Before starting any type of operation near power lines (either above ground or buried cable type), you should always contact the power utility directly and work out a safety plan with them.*

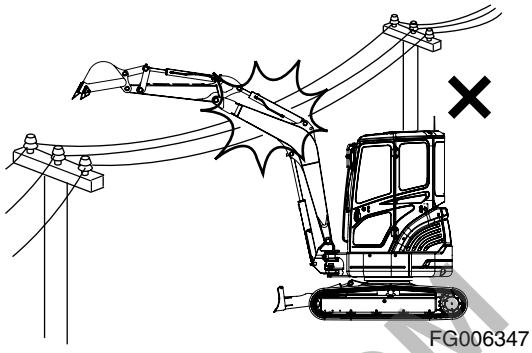

FG006347

Figure 23

Operate Carefully on Snow, Ice and in Very Cold Temperatures

In icy cold weather avoid sudden travel movements and stay away from even slight slopes. The machine could skid off to one side very easily.

Snow accumulation could hide or obscure potential hazards. Use care while operating or while using the machine to clear snow.

Warming up the engine for a short period may be necessary, to avoid operating with sluggish or reduced working capacity. The jolting shocks and impact loads caused by bumping or bottoming the boom or attachment are more likely to cause severe stress in very cold temperatures. Reducing work cycle rate and work load may be necessary.

When the temperature rises, frozen road surfaces become soft, so the machine travel becomes unstable.

In cold weather, do not touch metal surfaces with your bare hands. If you touch a metal surface in extremely cold weather, your skin may freeze to the metal surface.

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Material	Low Weight or Density 1,100 kg/m^3 (1,850 lb/yd^3), or Less	Medium Weight or Density 1,600 kg/m^3 (2,700 lb/yd^3), or Less	High Weight or Density 2,000 kg/m^3 (3,370 lb/yd^3), or Less
Earth, WET, muddy	----------	----------	1,762 kg/m^3 (2,970 lb/yd^3)
Gypsum, calcined, (heated, powder)	961 kg/m^3 (1,620 lb/yd^3)	----------	----------
Gypsum, crushed to 3 inch size	----------	1,522 kg/m^3 (2,565 lb/yd^3)	----------
Gravel, DRY, packed fragments	----------	----------	1,810 kg/m^3 (3,051 lb/yd^3)
Gravel, WET, packed fragments	----------	----------	1,922 kg/m^3 (3,240 lb/yd^3)
Limestone, graded above 2	----------	1,282 kg/m^3 (2,160 lb/yd^3)	----------
Limestone, graded 1-1/2 or 2	----------	1,362 kg/m^3 (2,295 lb/yd^3)	----------
Limestone, crushed	----------	1,522 kg/m^3 (2,565 lb/yd^3)	----------
Limestone, fine	----------	----------	1,602 kg/m^3 (2,705 lb/yd^3)
Phosphate, rock	----------	1,282 kg/m^3 (2,160 lb/yd^3)	----------
Salt	929 kg/m^3 (1,566 lb/yd^3)	----------	----------
Snow, light density	529 kg/m^3 (891 lb/yd^3)	----------	----------
Sand, DRY, loose	----------	1,522 kg/m^3 (2,565 lb/yd^3)	----------
Sand, WET, packed	----------	----------	1,922 kg/m^3 (3,240 lb/yd^3)
Shale, broken	----------	1,362 kg/m^3 (2,295 lb/yd^3)	----------
Sulphur, broken	529 kg/m^3 (1,620 lb/yd^3)	----------	----------

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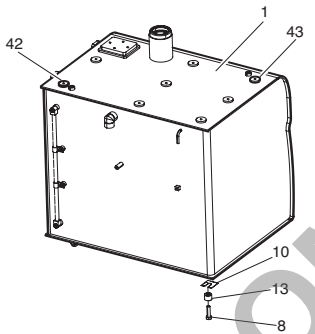
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INSTALLATION

1. Install two 12 mm eyebolts in threaded holes (42 and 43, Figure 13). Using a suitable lifting device, sling eyebolts.
2. Set fuel tank (1, Figure 13) into position. Install six bolts and spacers (8 and 13, Figure 13) finger tight, to secure tank to frame.

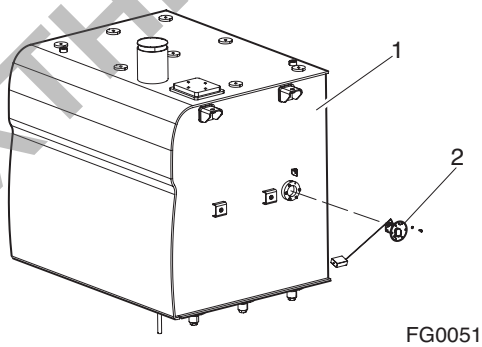
   NOTE: *The clear level gauge on the side of the tank is easily damaged. Be careful of obstacles and wind gusts.*
3. Install shims (10, Figure 13) as needed to prevent tank (1) from rocking or stress from mounting bolts (8).
4. Tighten mounting bolts (8, Figure 13) after shims are installed.

   NOTE: *Bolt torque is 27 kg•m (200 ft lb).*
5. Connect wires as tagged to fuel sender (2, Figure 14) on side of fuel tank (1).



FG005136

Figure 13



FG005135

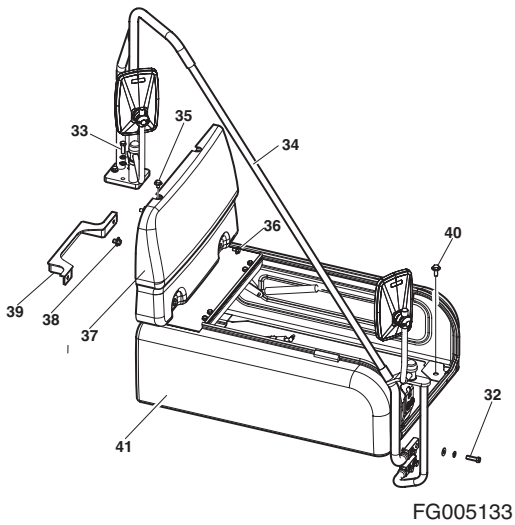
Figure 14

6. Install four bolts (40, Figure 15) and battery cover (41) on frame.

   Install two bolts (38) and bracket (39) on fuel tank.

   Install four bolts (35 and 36) and fuel tank cover on fuel tank.

   Install eight bolts (32 and 33) and stay (34) on fuel tank and frame.



FG005133

Figure 15

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UPPER ROLLER

Construction

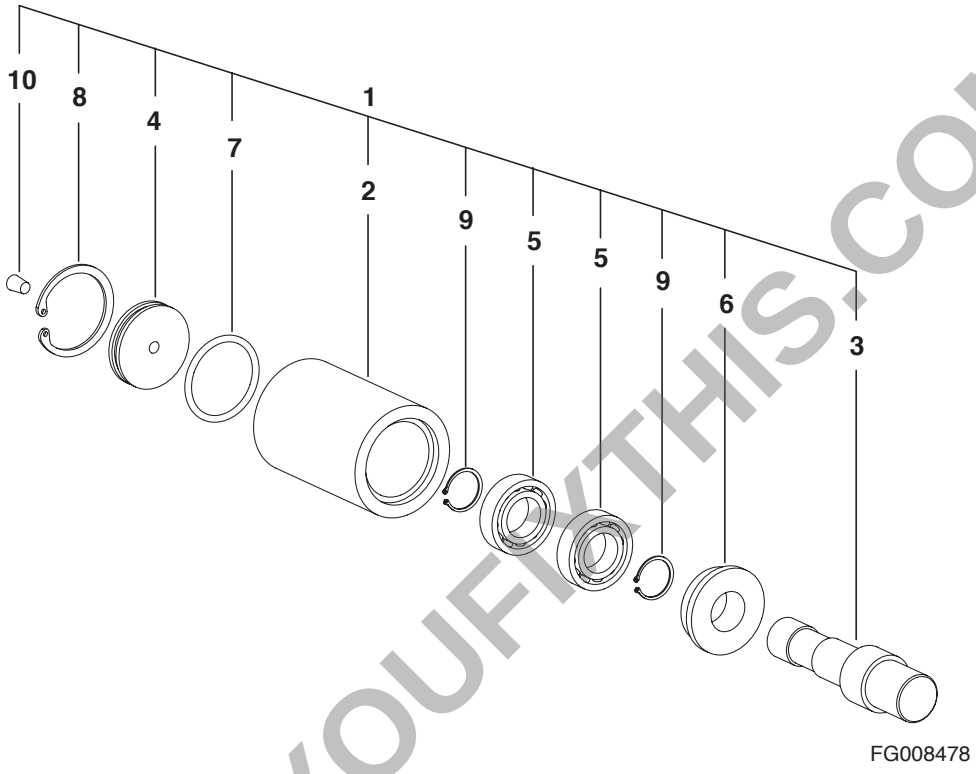


Figure 24

Reference Number	Description
1	Upper Roller Assembly
2	Upper Roller
3	Shaft
4	Cover
5	Bearing (6005)

Reference Number	Description
6	Oil Seal
7	O-ring (P46)
8	C-type Stopper Ring (R52)
9	C-type Stopper Ring (S25)
10	Plug (PT1/8)

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7. Remove foreign substance at every pieces disassembled and wash them out.

8. Replace disassembled O-rings and slipper seals with new ones, for they cannot be reused.

⚠ CAUTION!

The inside of the body should be air washed and rust-proof treated after washing it, as its material is subject to rust.

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Check Before and After Operation

1. a) Prior to start up, fill the piston motor case with clean hydraulic fluid.
2. Bleed air from the every part of the piping.
3. First run the motor at low speed and check for abnormal noise and vibration. Then increase the speed to the specified revolution and apply a load.
4. When the piston motor has started up, check to see if;
   A. Oil is not leaking.
   B. The revolution and the rotating direction are correct.
   C. The oil temperature has not risen abnormally high.
   D. The piston motor case temperature has not risen abnormally high.
   E. No abnormal noise or vibration is present.
   F. There are no other problems.

Pressure Detection Port Location

The pressure detection ports are located as shown in (Figure 12)

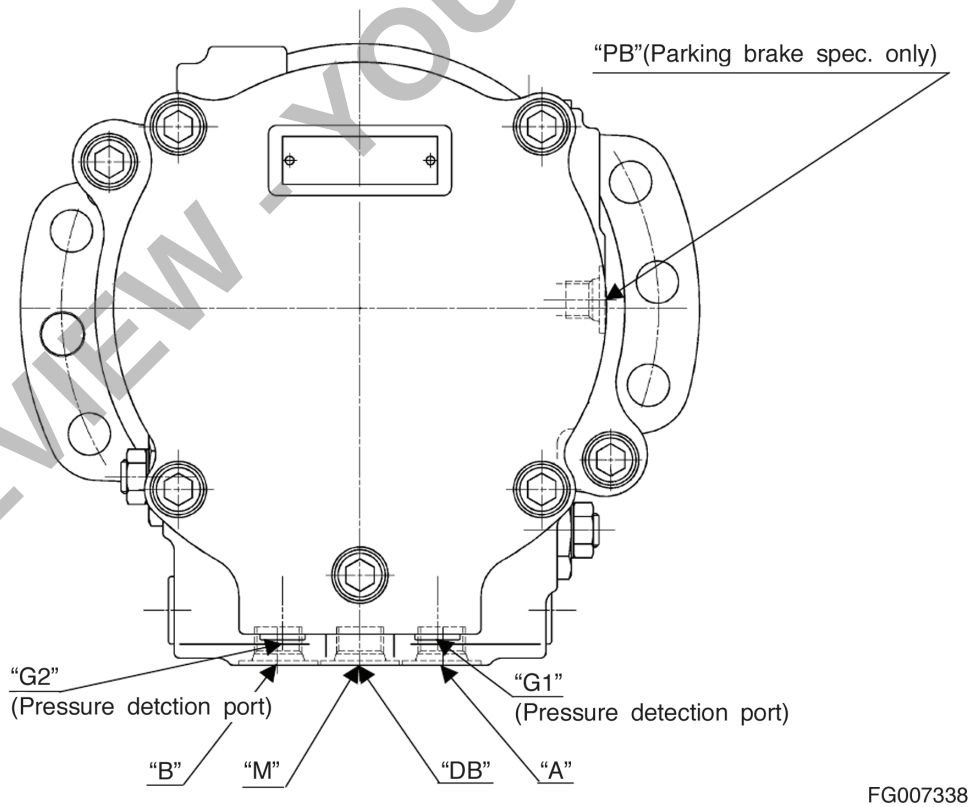


Figure 12 Pressure Detection3 Ports

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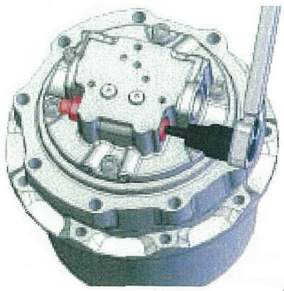
8. Remove plugs.

   Tools required:

   Torque wrench

   Hexagonal bit for torque wrench

   Socket for torque wrench.

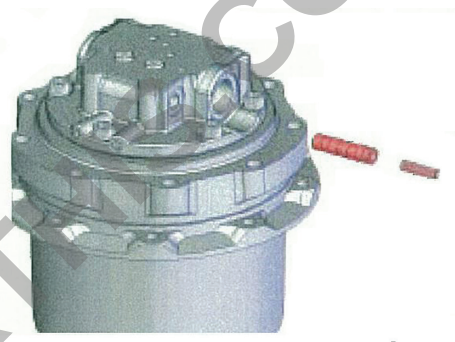


FG006496

Figure 27

9. Remove spring, spool assembly.

   Be careful not to damage around the spool.



FG006497

Figure 28

10. Remove socket head bolt.

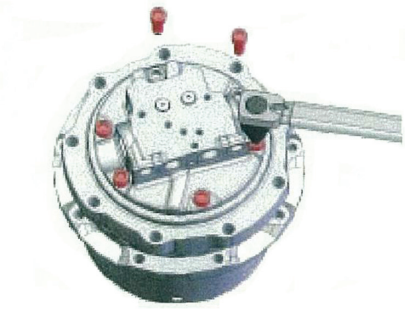
    Tools required:

    Torque wrench

    Hexagonal bit for torque wrench.

IMPORTANT

To disassemble the motor easily, socket bolt should be loosened evenly because base plate lift up by the reactive force of spring.



FG006604

Figure 29

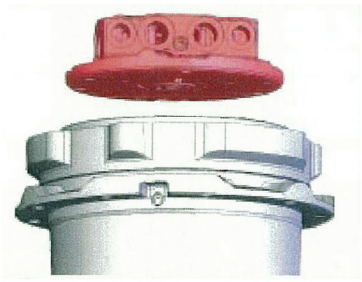
11. Remove base plate.

    Then, pay attention so that cylinder block dose nt come out. When it is difficult to remove, strike it by use of plastic hammer. If it is more difficult to remove, remove it by lightly prying with screwdriver.

    Tools required:

    Plastic hammer

    Screwdriver.



FG006610

Figure 30

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Piston Pump

This is a variable displacement double- piston pump for delivery with two equal displacements from one cylinder block. Because this is one rotary group, there is only one suction port. The oil is divided into two equal flows by the control plate in the port plate and directed to two delivery ports provided in the port plate.

The oil pressure caused by the deliver pressure acts on the swash plate and tilts the swash plate by overcoming the spring force.

Since the piston stroke changes according to the tilting angle of the swash plate, the flow can be changed.

The third pump or pilot pump can be connected to the same shaft via a coupling.

Valve Assembly and Relief Valve

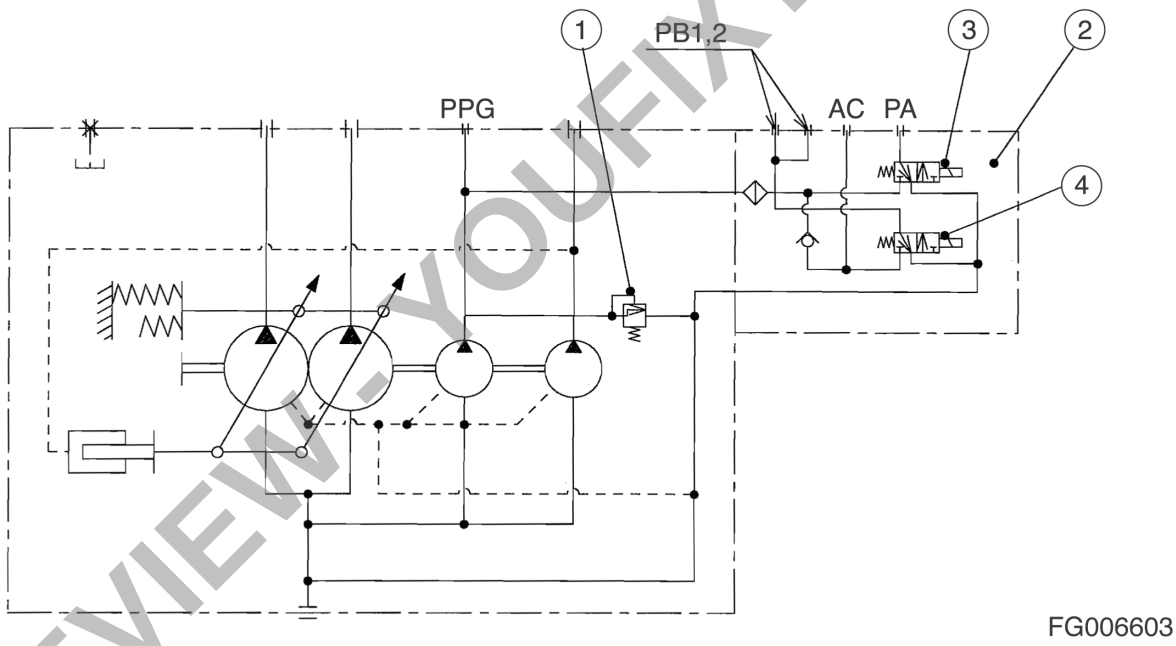


Figure 3

NO.	Name
1	Relief valve
2	Body

NO.	Name
3	Solenoid valve A
4	Solenoid valve B

The relief valve for regulating pilot pressure is included in the port plate of AP2D

The valve assembly consists of the body and solenoid valves A and B.

The valve assembly is stuck on the port plate of AP2D.

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12. Install the retaining ring (For shafts; 20), and install the shim.

    Pliers for retaining rings (For shafts; retaining ring for 20)

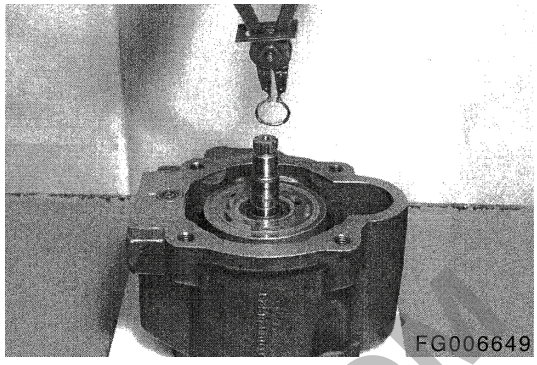


Figure 80

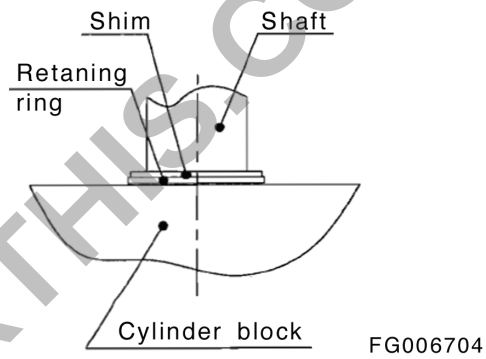


Figure 81

13. Assemble the control spring.

    Apply grease to the spherical portion of the spring seat before assembling.

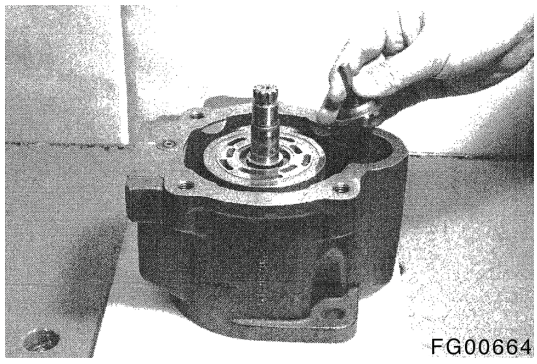


Figure 82

14. Assemble the two springs (inner and outer) and the guide.

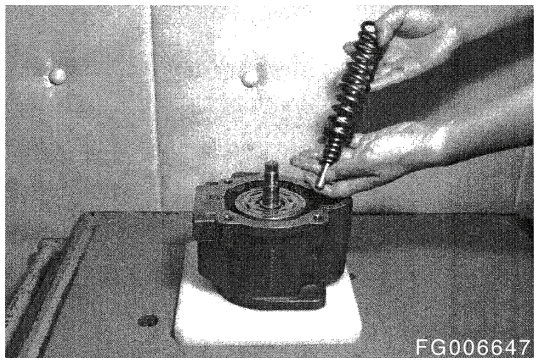


Figure 83

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Boom Down Operation

When the Boom Down operation is carried out, the secondary pressure from the Remote Control Valve is applied to Pb8 port to change over the Boom Spool.

Since Pb8 port is connected to Pb8' port through the customer's piping, the pressure is also applied to Pb8' port (Boom Lock Valve Release port) to release the Boom Lock Valve.

(For the explanation of Boom Lock Valve operation, See “Operation of Boom Lock Valve” on page -22.)

Since the Bypass Passage is shut off at the Boom Comp. after the Spool changeover (some oil flows through the orifice passage provided in the Boom Spool's Bypass Passage to the downstream side of the Bypass Passage), the oil flowed from P1 port flows through the Check Valve provided above the Bypass Passage in the Travel Comp. into the P1 side Parallel Passage.

Also, since a passage between B8 port and the Bridge Passage is opened with the Spool's notch after the Spool changeover, the oil flowed into the P1 side Parallel Passage flows through the Load Check Valve in the Boom Comp. into B8 port via the Bridge Passage and then into the Rod side of the Boom Cylinder.

On the other side, the oil returned from the Head side of the Boom Cylinder flows into A9 port to the Tank Passage that has been opened with the Spool's notch after the Spool changeover through the Boom Lock Valve that has been released by Pb8' port pressure. Then, the Boom Cylinder retracts to lower the Boom.

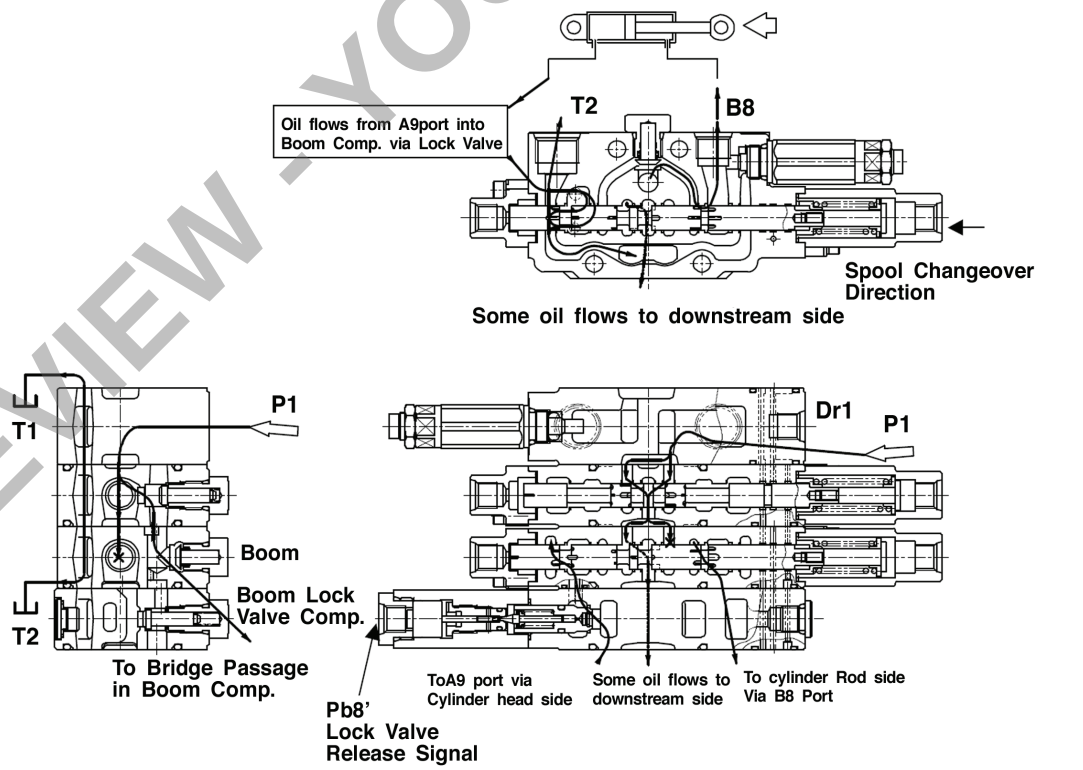


Figure 9

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Disassembling ORV, MRV (for P3)

1. Lightly hold any two surfaces of hexagonal Case (5) in a vise bench, whose intervals are 22 mm.
2. Loosen and remove Lock Nut (8) by using 19 mm Screw Wrench.
3. Loosen and remove Adjustable Screw (7) byusing 4 mm Hexagona lWrench.
4. Take out Spring (9) by using Tweezers or the like.
5. Loosen and remove Valve seat (4) by using 19 mm Screw Wrench.
6. The other parts can also be removed in the following order:

   Socket(1) → Piston(3) → Spring(10) → Valve(2)

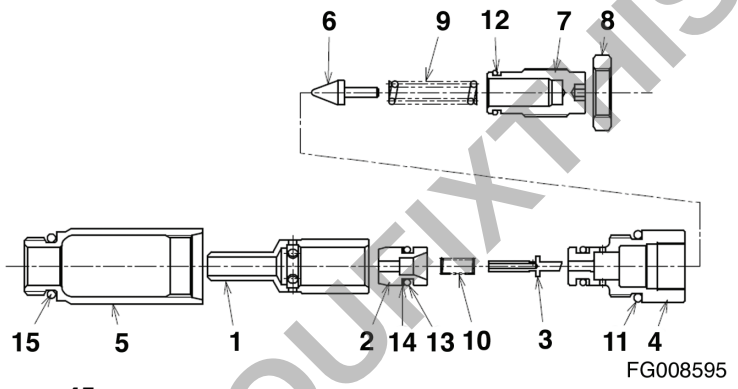


Figure 45

Reference Number	Description
1	Popet
2	Popet-main V
3	Piston
4	Valve Seat Pilot
5	Case
6	Popet Pilot
7	Adjustable Screw
8	Nut M14

Reference Number	Description
9	Spring-pilot
10	Spring-main V
11	O-ring 1B P15
12	O-ring 1B S10
13	O-ring 1A P7
14	Back-up Ring
15	O-ring 1B P14

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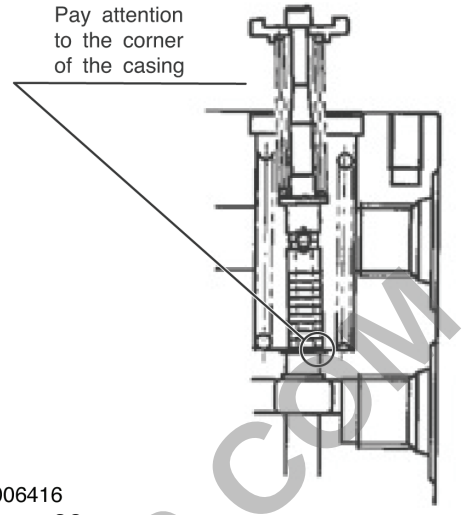
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Reference Number	Description
1	Body
2	Plug
3	O-ring
4	Spring
5	Spring Seat
6	Spring Seat
7	Stopper
8	Spring
9	Spring Seat
10	Spool
11	Push Rod
12	Plug
13	O-ring
14	Rod Seal
15	Plate (A)
16	Bushing

Reference Number	Description
17	Macgine Screw
18	Joint Assembly
19	Swash Plate
20	Hex Nut
21	Connector
22	Nut
23	Nut
24	Insert
25	Boot
26	Handle
27	Switch Assembly
28	Screw
29	Plate (B)
30	Boot
31	Spring
32	Push Rod

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FG006416
Figure 30

5. Install the O-rings (211 and 213) in the casing (101) (Figure 31).

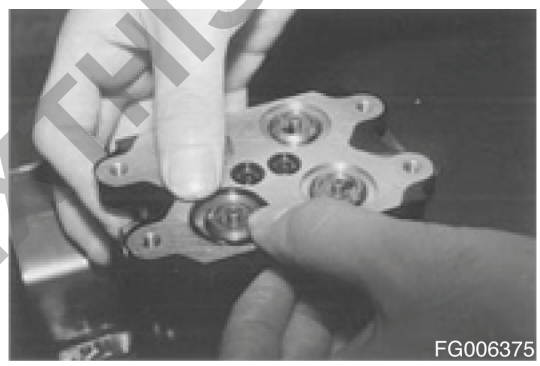


Figure 31

6. Fixing the upper casing (102) in a vice, install the steel ball (225) (Figure 32).

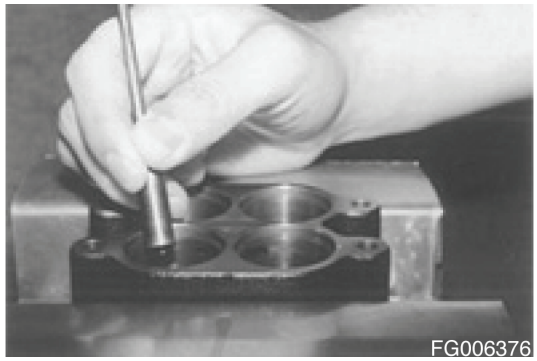


Figure 32

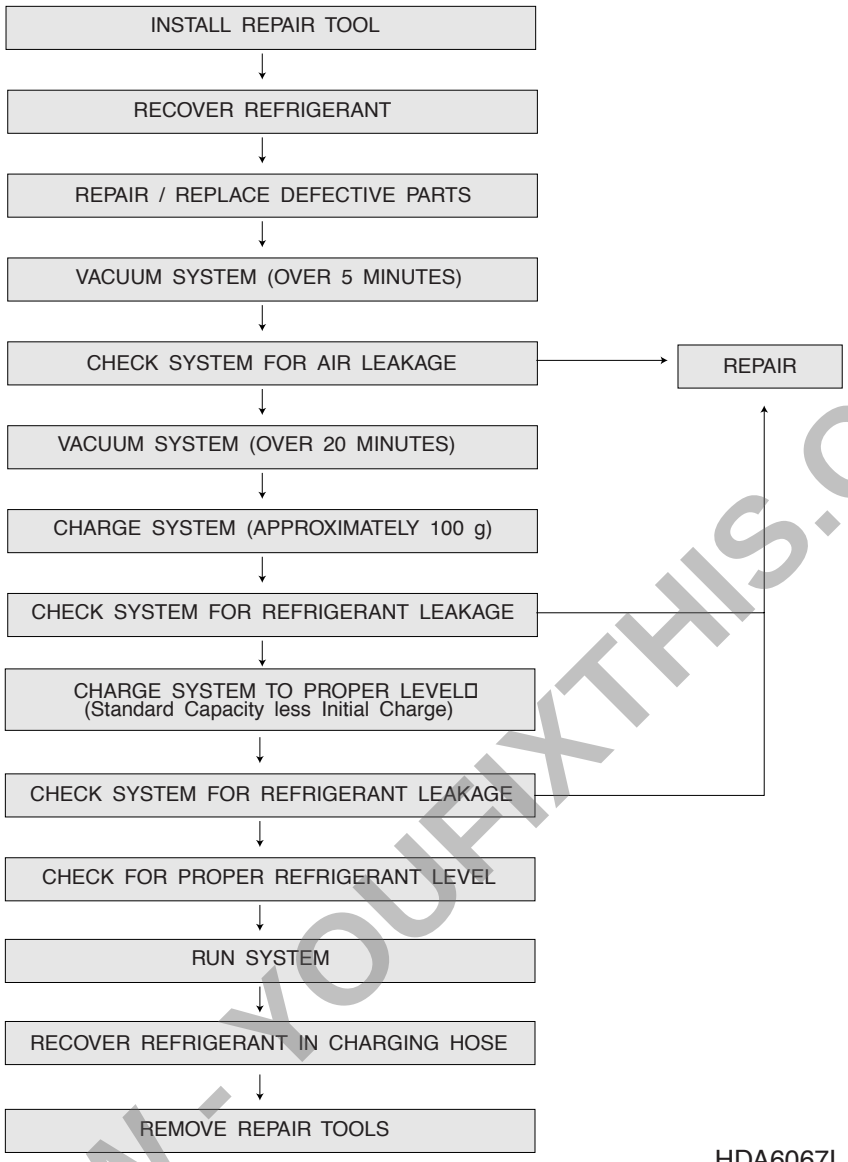
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Electrical System

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Figure 15

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