## SPECIFICATIONS

### SPECIFICATIONS

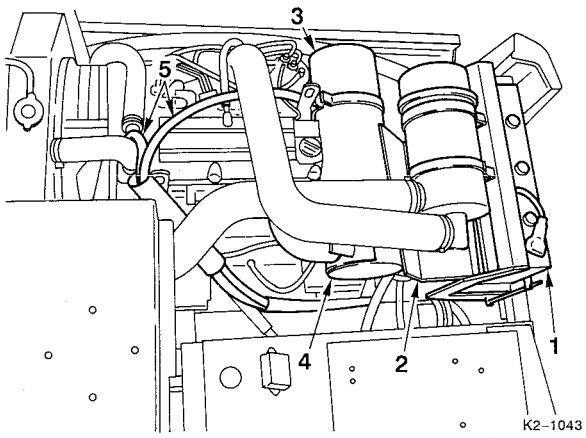
| Serial Number | | 1453001~ | |
|---|---|---|---|
| Type | | Cabin | |
| | | Steel Crawler | Rubber Crawler |
| **Bucket Capacity (SAE Rated)** | $m^3(yd^3)$ | 0.141 (0.185) | ← |
| **Weight in Transport Condition** | kg(lb) | 4,540 (10,009) | 4,510(9,943) |
| **Dimensions** | mm(in) | | |
| Overall Length | | 5,595 (220.3) | ← |
| Overall Width | | 1,840 (72.4) | ← |
| Overall Height | | 2,635 (103.7) | 2,640 (103.9) |
| Minimum Ground Clearance | | 340 (13.4) | 350 (13.8) |
| Minimum Height of Upper Machinery | | 620 (24.4) | 630 (24.8) |
| Overall Width of Upper Machinery | | 1,690 (66.5) | ← |
| Overall Width of Crawler | | 1,820 (71.7) | 1,840 (72.4) |
| Overall Length of Crawler | | 2,420 (95.3) | 2,490 (98.0) |
| Minimum Slew Radius | | 2,255 (88.8) | ← |
| Maximum Height of Hoe at Minimum Slew Radius | | 4,220 (166.1) | 4,225 (166.3) |
| Tail Swing Radius | | 1,495 (58.9) | ← |
| Dozer Blade Width | | 1,840 (72.4) | ← |
| Dozer Blade Height | | 410 (16.1) | ← |
| **Working Range** | mm(in) | | |
| Maximum Digging Height | | 5,380 (211.8) | 5,390 (212.2) |
| Maximum Digging Depth | | 3,490 (137.4) | 3,510 (138.1) |
| Vertical Digging Depth | | 2,700 (106.3) | 2,725 (107.3) |
| Maximum Digging Reach | | 5,835 (229.7) | ← |
| Maximum Reach at Ground | | 5,705 (224.6) | 5,700 (224.4) |
| Maximum Dumping Height | | 3,780 (148.8) | 3,790 (149.2) |
| Bucket Offset : Right/Left | | 710 (28.0)/640 (25.2) | ← |
| Dozer Blade Lift : Above/ Below ground | | 440 (17.3)/350 (13.8) | ← |
| **Performance** | | | |
| Digging Force : Arm/Bucket | kg(lb) | 3,160 (6,967)/2,390 (5,269) | ← |
| Slew Speed | rpm(rpm) | 11.3(11.3) | ← |
| Travel Speed | km/h(mph) | Low : 2.7(1.68)/High : 4.7(2.92) | Low : 2.9(1.80)/High : 5.1(3.17) |
| Traction Force | kg(lb) | 5,000 (11,023) | ← |
| Gradeability | deg(deg) | 30(30) | ← |
| Ground Pressure (JIS) | $kgf/cm^2(psi)$ | 0.28(3.91) | 0.27 (3.80) |

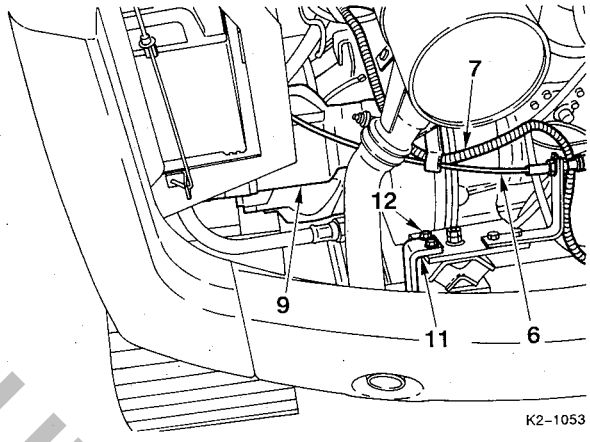
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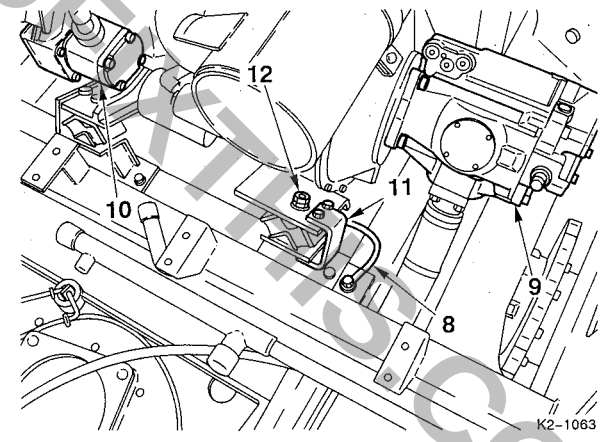
DISASSEMBLY AND ASSEMBLY

**Removing the Engine**

1. Remove the cover, hydraulic tank and radiator.
   - Refer to the respective procedures for removing each unit
2. Remove the hydraulic tank.
   - Refer to the item "Removing the Hydraulic Tank"
3. Tilt the cabin up.
4. Remove the battery (1).
5. Remove the bracket (2) and air cleaner (3).
6. Remove the silencer (4).
7. Disconnect the heater hose (5) and the hoses connected to the engine.
8. Disconnect the accelerator wire (6).
9. Disconnect the electrical wiring (7) and engine ground wire (8).
   - Attach identifying labels to each wire.
10. Disconnect the piping to the hydraulic pump (main) (9) and hydraulic pump (sub) (10)
11. Remove the stopper (11).
12. Remove the cushion rubber installation nuts (12) and remove the engine assembly.
    - Engine Weight : Approx. 220 kg




**Installing the Engine**

Follow the procedure used to remove the engine in reverse order.

- Cushion Rubber Installation Nut Tightening Torque : 4.8 kgfm

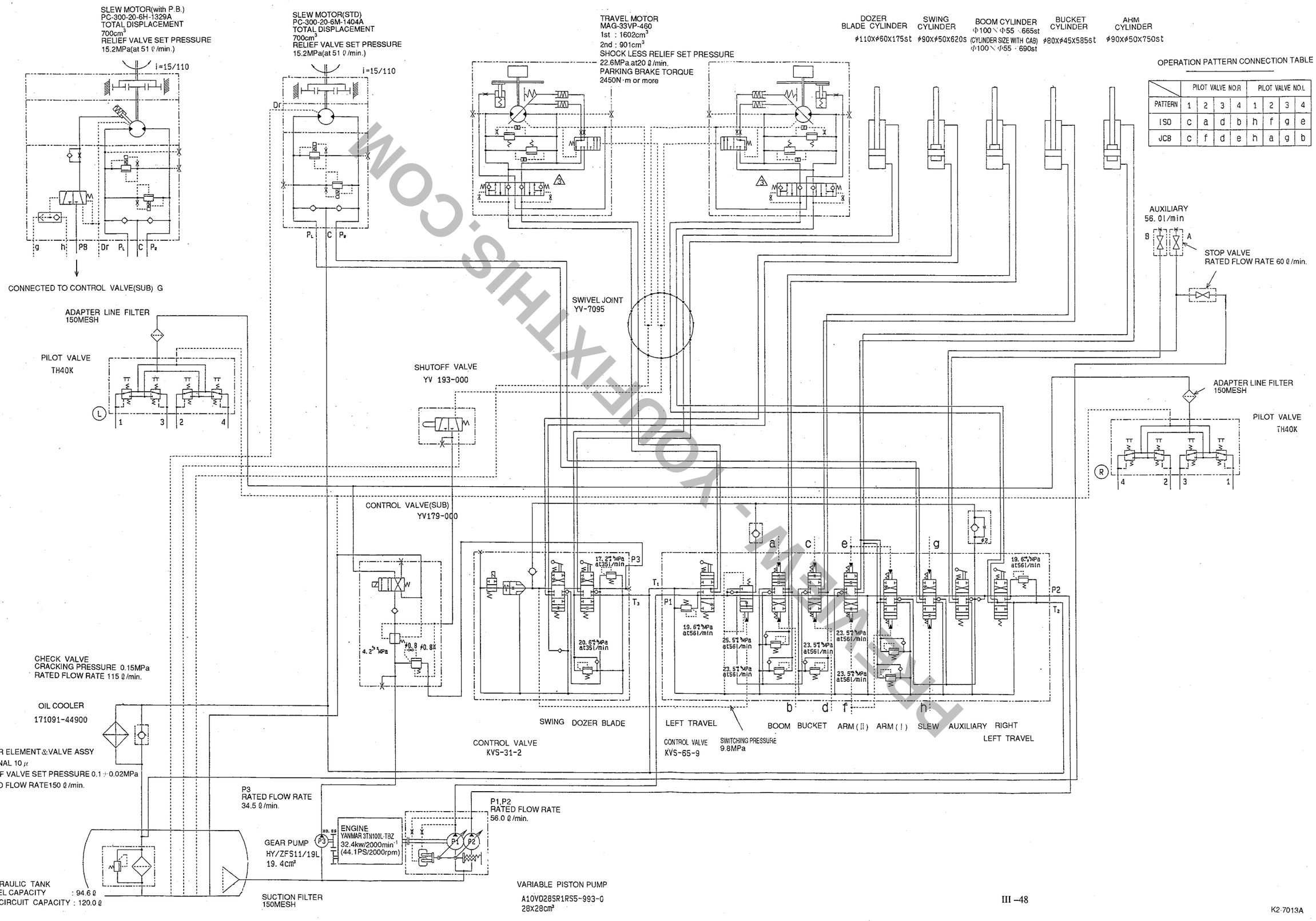
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## TROUBLESHOOTING

| Symtom | Main Causes | Remedy |
|---|---|---|
| Noise is loud. Abnormal noise is generated. | • The suction hose is pinched or the suction filter is clogged.<br>• The suction side joint is loose and air is being sucked in.<br>• The hydraulic oil's viscosity is too high and cavitation is occurring.<br>• The pump is off center with respect to the engine.<br>• There are bubbles in the hydraulic oil.<br>• The engine's speed is higher than the specified speed.<br>• The drain back pressure is higher than the specified pressure.<br>• The bearing, etc. is mechanically damaged. | • Remove the dirt or eliminate the pinched condition of the hose.<br>• Retighten each joint.<br>• Replace the hydraulic oil with oil of the proper viscosity.<br>• Center the pump with respect to the engine.<br>• Investigate the cause of the bubbles and repair it.<br>• Operate the engine at the specified speed.<br>• Check and replace the drain piping.<br>• Replace the damaged parts or replace the pump. |
| Discharge is insufficient. | • The engine's speed is too low.<br>• The oil temperature is abnormally high.<br>• The hydraulic oil's viscosity is too high.<br>• The pump's volumetric efficiency has dropped.<br>• The horsepower setting adjustment screw is loose.<br>• The oil level in the tank is low.<br>• The suction side pipe or the suction filter is clogged.<br>• The amount of leakage from hydraulic devices other than the pump is increasing. | • Operate the engine at the specified speed.<br>• Stop the machine and let the oil cool off, then check again.<br>• Replace the hydraulic oil with oil of the proper viscosity.<br>• Replace the pump.<br>• Reset the screw and lock it.<br>• Replenish the tank with hydraulic oil to the specified level.<br>• Clean the piping.<br>• Repair the hydraulic device or replace it. |
| Pressure doesn't rise. | • The relief valve setting has dropped.<br>• The amount of leakage from hydraulic devices other than the pump is increasing.<br>• The pump's volumetric efficiency has dropped. | • Reset the relief valve setting.<br>• Repair the hydraulic device or replace it.<br>• Replace the pump. |
| Overload occurs when there is a static load. | • The pump's horsepower setting is rising.<br>• Foreign matter is caught in the control equipment's sliding parts, causing faulty operation.<br>• The bearings, etc. are mechanically damaged. | • Reset the horsepower setting.<br>• Repair the scratches caused by the caught foreign matter or replace the pump.<br>• Replace the damaged parts or replace the pump. |
| The rotational speed drops when there is a dynamic load. | • The peak pressure is generated due to a drop in the relief valve's response.<br>• There is foreign matter trapped in the pilot line or foreign matter is caught in the sliding parts of the control equipment. | • Repair the relief valve or replace it.<br>• Remove the foreign matter and repair or replace the scratched parts. |
| Abnormal heat is generated. | • Leakage from the pump is increasing.<br>• The bearings, etc. are mechanically damaged.<br>• There is seizing of sliding parts. | • Replace the pump.<br>• Replace the damaged parts or replace the pump.<br>• Replace the damaged parts or replace the pump. |
| Hydraulic oil is leaking. | • Seals are damaged.<br>• The shaft surface which slides against the oil seal is worn.<br>• The plug or bolts are loose. | • Replace the seals.<br>• Replace the shaft or replace the pump.<br>• Tighten them or replace the seals. |

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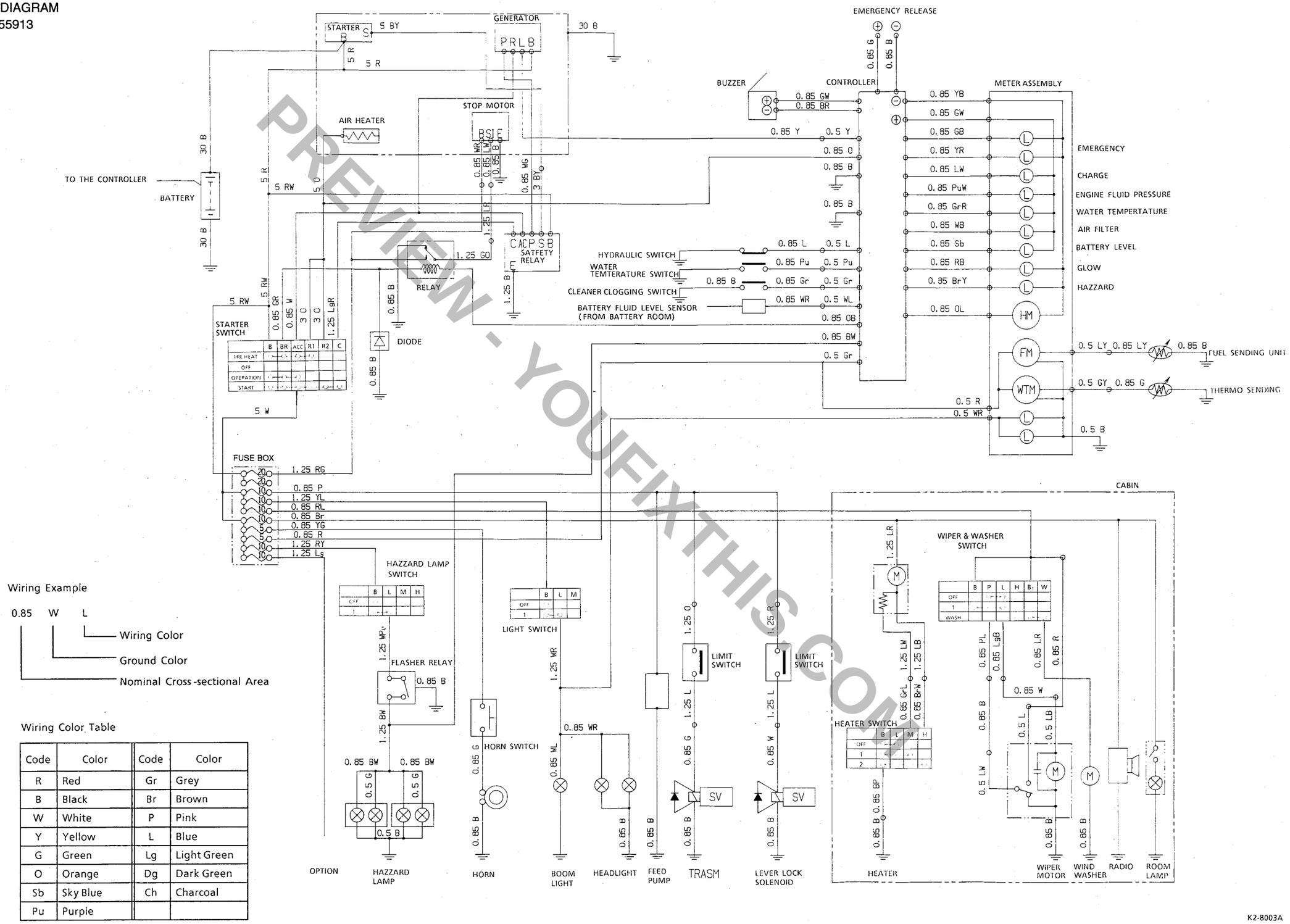
## HYDRAULIC CIRCUIT DIAGRAM




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## ELECTRICAL SYSTEM

ELECTRICAL WIRING DIAGRAM
Serial No. 1453001~1455913




Wiring Example

0.85 W L

- L — Wiring Color
- W — Ground Color
- 0.85 — Nominal Cross-sectional Area

Wiring Color Table

| Code | Color | Code | Color |
|---|---|---|---|
| R | Red | Gr | Grey |
| B | Black | Br | Brown |
| W | White | P | Pink |
| Y | Yellow | L | Blue |
| G | Green | Lg | Light Green |
| O | Orange | Dg | Dark Green |
| Sb | Sky Blue | Ch | Charcoal |
| Pu | Purple | | |

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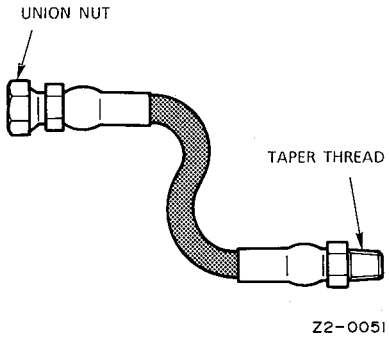
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## TIGHTENING TORQUES

### Hydraulic Hoses

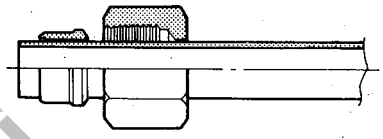
| Hose Fitting Size | Torque | | | |
|---|---|---|---|---|
| | Union Nut (PF) | | Taper Threads (PT) | |
| | kgf·m | ft-lb | kgf·m | ft-lb |
| 1/8 | $1.0^{+0.5}_{0}$ | $7.3^{+3.5}_{0}$ | $1.2^{\pm 0.12}$ | $8.7^{\pm 0.8}$ |
| 1/4 | $2.5^{+0.5}_{0}$ | $18.1^{+3.5}_{0}$ | $3.0^{\pm 0.30}$ | $21.7^{\pm 2.1}$ |
| 3/8 | $5.0^{+0.5}_{0}$ | $36.2^{+3.5}_{0}$ | $5.5^{\pm 0.55}$ | $39.8^{\pm 3.9}$ |
| 1/2 | $6.0^{+0.5}_{0}$ | $43.4^{+3.5}_{0}$ | $9.0^{\pm 0.90}$ | $65.1^{\pm 6.4}$ |
| 3/4 | $12.0^{+0.5}_{0}$ | $86.8^{+3.5}_{0}$ | $15.0^{\pm 1.50}$ | $108.5^{\pm 10.7}$ |
| 1 | $14.0^{+0.5}_{0}$ | $101.3^{+3.5}_{0}$ | $20.0^{\pm 2.00}$ | $144.7^{\pm 14.3}$ |



Z2-0051

### Bite Type Pipe Fitting For Steel Pipe

| Pipe Outer Diameter (mm) | Torque | |
|---|---|---|
| | kgf·m | ft-lb |
| 8 | $3.5^{\pm 0.5}$ | $25.3^{\pm 3.5}$ |
| 10 | $4.25^{\pm 0.25}$ | $30.7^{\pm 1.7}$ |
| 12 | $6.0^{\pm 0.5}$ | $43.4^{\pm 3.5}$ |
| 15 | $9.0^{\pm 0.5}$ | $65.1^{\pm 3.5}$ |
| 16 | $9.5^{\pm 0.5}$ | $68.7^{\pm 3.5}$ |
| 18 | $13.5^{\pm 0.5}$ | $97.6^{\pm 3.5}$ |
| 22 | $21.0^{\pm 1.0}$ | $151.8^{\pm 7.2}$ |
| 27.2 | $25.0^{\pm 1.0}$ | $181.0^{\pm 7.2}$ |
| 28 | $32.0^{\pm 2.0}$ | $231.4^{\pm 14.3}$ |
| 32 | $32.0^{\pm 2.0}$ | $231.4^{\pm 14.3}$ |
| 35 | $42.0^{\pm 2.0}$ | $303.7^{\pm 14.3}$ |


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## WEIGHTS

### UNIT DRY WEIGHT

Units : kg (lb)

| Serial Number | 1453001~ | |
|---|---|---|
| Type | Cabin | |
| | Steel Crawler | Rubber Crawler |
| **Upper Machinery** | 2,030 (4,475) | ← |
| Engine | 220 (485) | ← |
| Radiator | 11.4 (25.1) | ← |
| Hydraulic Pump | 39 (86) | ← |
| Hydraulic Pump (Sub) | 4 (8.8) | ← |
| Hydraulic Tank | 71 (157) | ← |
| Fuel Tank | 38 (84) | ← |
| Control Valve (9 Circuits) | 28 (62) | ← |
| Control Valve (2 Circuits) | 8.5 (18.7) | ← |
| Control Valve (Sub) | 6.8 (15.0) | ← |
| Pilot Valve | 4.6 (10.1) | ← |
| Slew Motor | 56 (123) | ← |
| Cabin | 205 (452) | ← |
| Counter Weight (C) | 130 (287) | ← |
| Counter Weight (R) | 65 (143) | ← |
| Counter Weight (L) | 65 (143) | ← |
| Swing Bracket | 111 (245) | ← |
| Swing Cylinder | 45 (99) | ← |
| **Lower Machinery** | 1,754 (3,867) | 1,748 (3,854) |
| Swivel Joint | 22 (49) | ← |
| Slew Bearing | 84 (185) | ← |
| Crawler Belt | 259 (571) | 245 (540) |
| Track Motor | 55 (121) | ← |
| Carrier Roller | 4 (8.8) | ← |
| Track Roller | 11 (24) | ← |
| Idler | 25 (55) | 28 (62) |
| Sprocket | 4.8 (10.6) | ← |
| Track Tension | 22 (49) | ← |
| Dozer Blade | 183 (403) | ← |
| Dozer Blade Cylinder | 44 (97) | ← |
| **Hoe Attachment** | 595 (1,312) | ← |
| Boom | 186 (410) | ← |
| Arm | 85 (187) | ← |
| Bucket : Standard 630mm | 115 (254) | ← |
| Boom Cylinder | 55 (121) | ← |
| Arm Cylinder | 49 (108) | ← |
| Bucket Cylinder | 32 (70) | ← |

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TROUBLESHOOTING

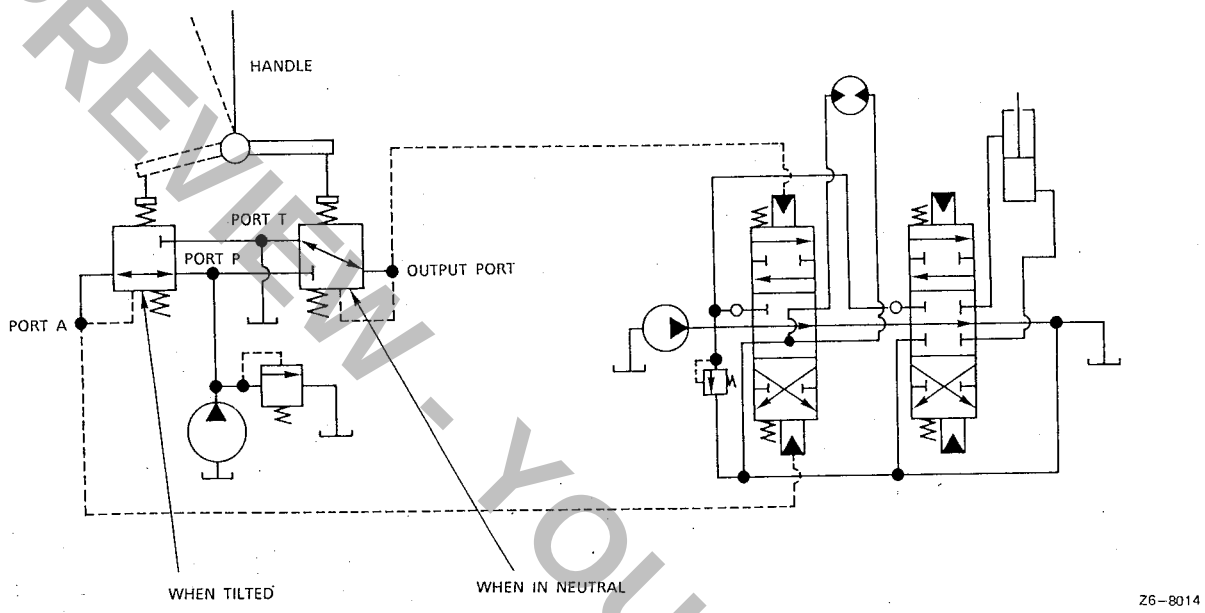
| Symptom | Main Causes | Remedy |
|---|---|---|
| Pump won't discharge. | • Direction of rotation is reversed.<br>• Oil level in the tank is low.<br>• Suction side pipe or suction filter is clogged.<br>• Hydraulic oil's viscosity is too high.<br>• Speed is low. | • Run the pump in the specified direction.<br>• Replenish the oil to the specified level.<br>• Clean the pipes.<br>• Replace the hydraulic oil with oil of the proper viscosity.<br>• Run the pump at the specified speed. |
| Noise level is high.<br>Abnormal noise is generated. | • Suction side hose is pinched or the suction filter is clogged and cavitation is occurring.<br>• Suction side joint is loose and air is being sucked in.<br>• The hydraulic oil's viscosity is too high and cavitation is occurring.<br>• The pump is off center with respect to the engine.<br>• There are bubbles in the hydraulic oil. | • Remove the dirt or eliminate the pinched condition of the hose.<br>• Tighten all the joints.<br>• Replace the hydraulic oil with oil of the proper viscosity.<br>• Center the pump with respect to the engine.<br>• Investigate the cause of the bubbles and correct it. |
| Oil leaks from oil seals. | • Oil seal is worn, damaged or deformed. | • Replace the oil seal. |
| Oil leaks from mating surfaces between housing and flange and between housing and cover. | • Body seal is damaged or worn by rubbing. | • Replace with a new part. |
| Discharge volume is low. | • Bushing seal is damaged.<br>• Cavitation is occurring.<br>• Aeration is occurring.<br>• Viscosity of the hydraulic oil is too low. | • Replace the bushing.<br>• Clean the suction filter and suction side piping.<br>• Check for insufficient tightening of pipes, etc. and repair.<br>• Replace the hydraulic oil with oil of the proper viscosity. |

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## OPERATION

The pilot valve casing contains a vertical shaft hole with a reducing valve incorporated into it. When the handle is tilted, the push rod and spring seat are pushed down changing the secondary pressure spring's pressure.

The casing also contains an inlet port for hydraulic oil port P (primary pressure) and an outlet port, port T (tank) and secondary pressure is taken from 4 ports, port 1, port 2, port 3 and port 4, on the bottom of the vertical shaft hole.




1. When the Handle is in Neutral

In this case, the force of the secondary pressure setting spring, which determines the pilot valve's output pressure, (secondary pressure), is not transmitted to the spool. Therefore, the spool is pushed up by the return spring and is in the output port position shown above, with oil not flowing between port P and the output port but flowing between the T port and output port.

2. If the Handle is Tilted

If the handle is tilted and the push rod is pushed, the spool moves downward and port P and port A are joined. The oil in the pilot valve pump flows out to port A, generating pressure.

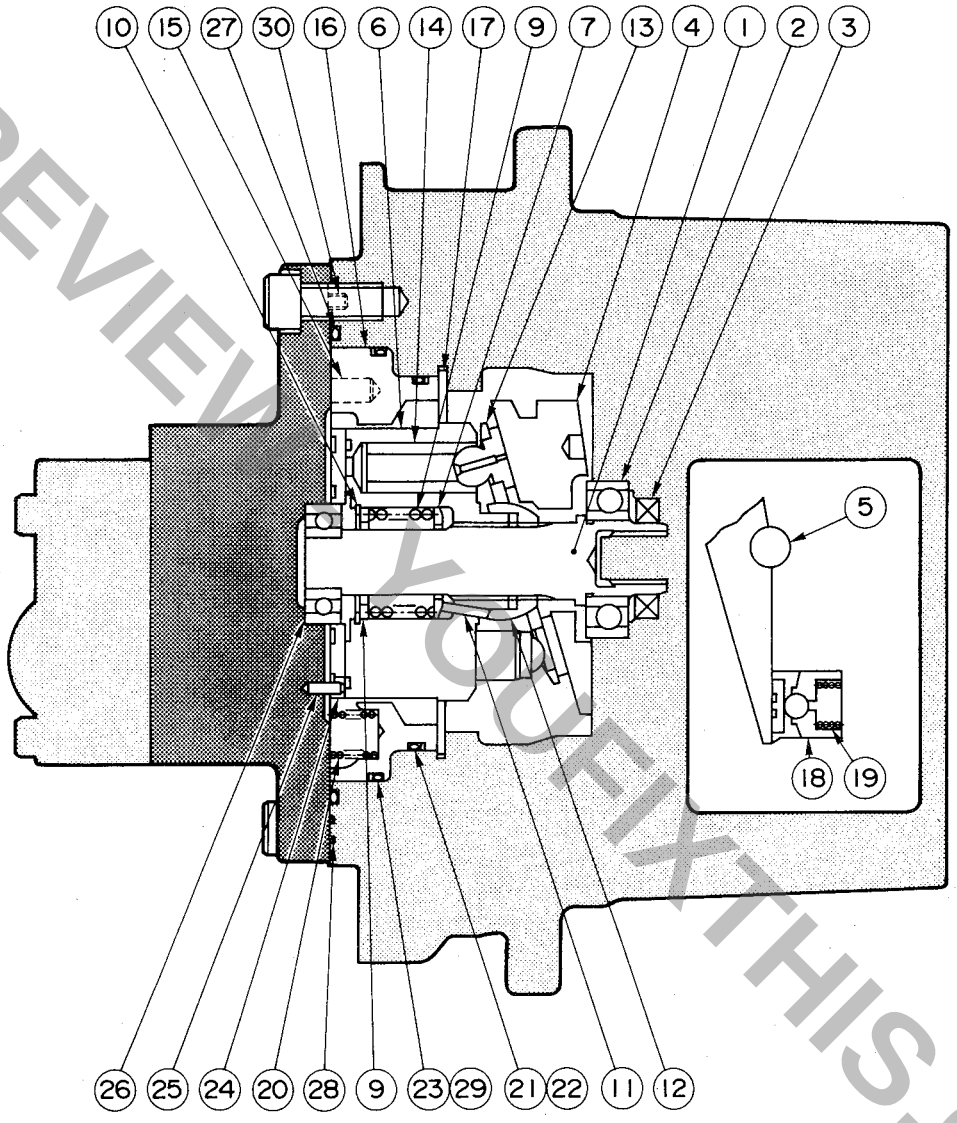
a. When the pressure in port A is the same as the set force of the spring (set pressure), there is a balance between the hydraulic pressure and the spring force.
b. When the pressure in port A is greater than the set pressure, port A and port P close and port A and Port T open.
c. When the pressure at port A is lower than the set pressure, port A and port P open and port A and port T close.

In this way, the secondary pressure is kept constant.

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## TRAVEL MOTOR (PARKING BRAKE)

### STRUCTURE




1. Shaft
2. Ball Bearing
3. Oil Seal
4. Swash Plate
5. Steel Ball
6. Cylinder Block
7. Collar
8. Spring
9. Washer
10. Snap Ring
11. Pin
12. Retainer Holder
13. Retainer Plate
14. Piston Assembly
15. Pin
16. Brake Piston
17. Disc
18. 2-speed Piston Assembly
19. Spring
20. Spring
21. O-ring
22. Backup Ring
23. O-ring
24. Valve Plate
25. Pin
26. Ball Bearing
27. O-ring
28. O-ring
29. Backup Ring
30. Orifice

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## INSPECTION AND ADJUSTMENT

### Parts Use Limit

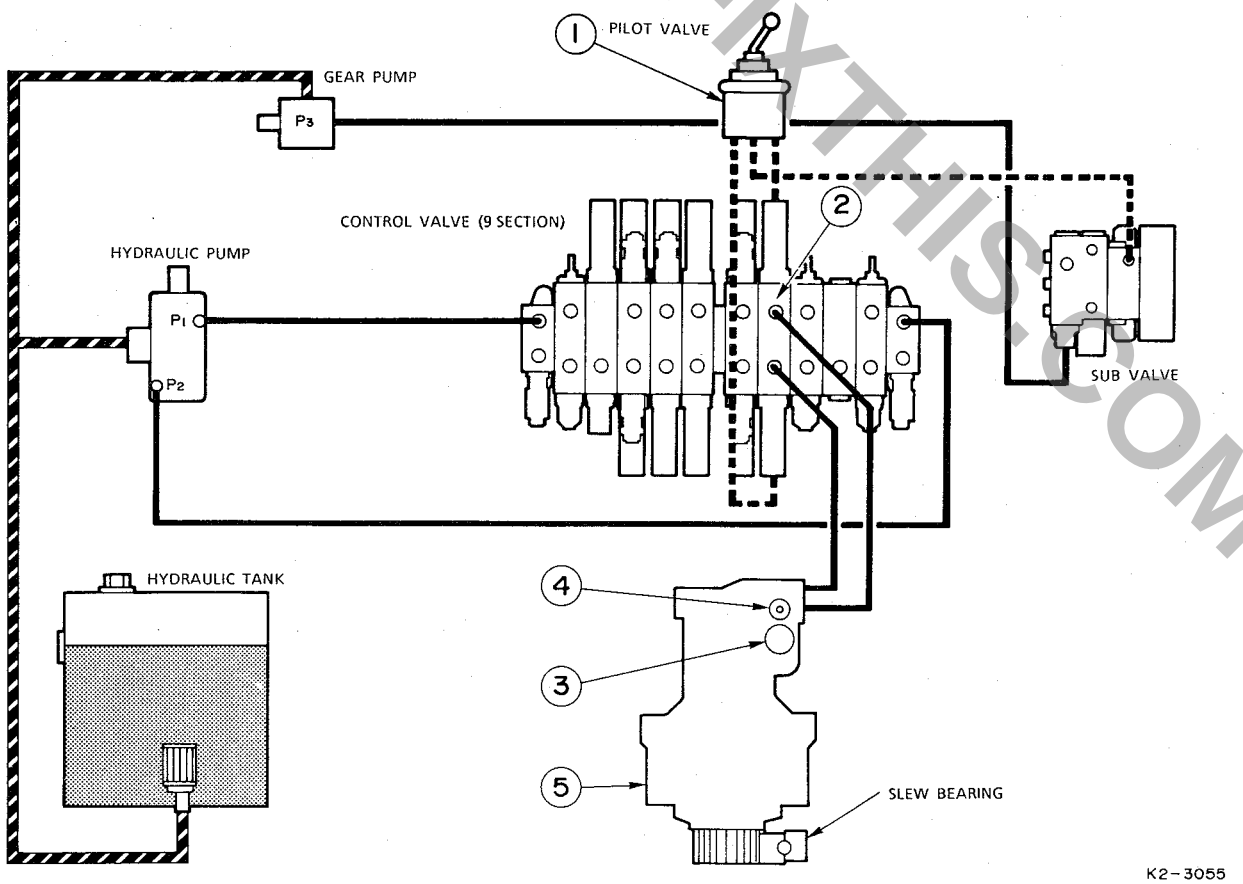
| Part | Area Checked | Judgment Criteria | Treatment |
|---|---|---|---|
| Floating Seal | Sliding Surface | There should be no abnormal scratches, wear or seizing. | Replace |
| Angular Bearing | Sliding Surface | There should be no abnormal scratches, wear, flaking, etc. in the ball or race. | Replace |
| Planetary Gears A, B | Surface of Gear Teeth | There should be no abnormal scratches, wear or flaking of the tooth surfaces (if there has been pitting which covers 5% or more of the engagement portion of the tooth surface). | Replace |
| | Front of cage and roller rotating surface. | There should be no abnormal scratches, wear or flaking of the rotating surface. | Replace |
| Collar | Surface condition of cage and roller rotating surface. | There should be no abnormal scratches, wear or flaking of the rotating surface. | Replace |
| Cage & Roller | Surface of cage & roller. | There should be no abnormal scratches, wear or flaking. | Replace |
| Thrust Washer | Front of sliding surface | There should be no abnormal scratches, wear or seizing. | Replace |
| Housing, Sun Gear, Drive Gear | Front of Gear Tooth Surfaces | There should be no abnormal scratches, wear or flaking in the tooth surfaces (if there has been pitting which covers 5% or more of the engagement portion of the tooth surface). | Replace |
| Thrust Plate | Front of sliding surface. | There should be no abnormal scratches (0.02 mm or greater), wear or seizing, etc. | Replace |
| O-ring | – | – | Replace |
| Shaft | Surface of oil seal. | There should be no scratches or abnormal wear. | Replace |
| Ball Bearing | Front of sliding surface. | There should be no abnormal scratches, wear or flaking in the ball and race. | Replace |
| Oil Seal | – | – | Replace |
| Swash Plate | Front of the surface which slides with the sliding surface of the piston assembly. | There should be no abnormal scratches (0.02 mm or greater), wear or seizing. | Repair with wrap (#1000) or replace. |
| Cylinder Block | Clearance with the piston assembly. | 0.04 mm or greater | Repair with wrap (#1000) or replace the cylinder block and piston assembly at the same time. |
| | Front of the surface which slides with the valve plate. | There should be no abnormal scratches (0.02 mm or greater), wear or seizing. | |
| Piston Assembly | Clearance with cylinder block | 0.04 mm or greater | |
| | Front of the surface which slides with the swash plate. | There should be no abnormal scratches (0.02 mm or greater), wear or seizing. | |
| | Clearance between piston and shoe. | 0.4 mm or greater | Replace |

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## RIGHT OR LEFT SLEWING CANNOT BE DONE.

| | | | |
|---|---|---|---|
| 1 | Inspect the pilot valve. | Faulty → | Repair or replace the pilot valve. |
| | Normal ↓ | | |
| 2 | Inspect the operation of the spool. | Faulty → | Repair or replace the housing block. |
| | Normal ↓ | | |
| 3 | Inspect the relief valve of the slew brake valve. | Faulty → | Repair or replace the relief valve of the slew brake valve. |
| | Normal ↓ | | |
| 4 | Inspect the check valve of the slew brake valve. | Faulty → | Repair or replace the brake valve. |
| | Normal ↓ | | |
| 5 | The slew motor is faulty. | Faulty → | Repair or replace the slew motor. |




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