# 2. TECHNICAL DATA

| Item | | Unit | V3-5 | V4-5 | V4-5HL |
|---|---|---|---|---|---|
| Transmission | | | | | |
| | H.S.T. pump type | | Swash plate type axial piston pump | | |
| | Pump displacement | cu.in. /rev (cu.cm/rev) | 2.13 (34.9) | | |
| | Number of pump pistons | pcs. | 9 | | |
| | H.S.T. motor type | | Inclined shaft type axial piston motor | | |
| | Motor displacement (Large/Small) | cu.in. /rev | 3.06/1.19 | 3.06/1.28 | |

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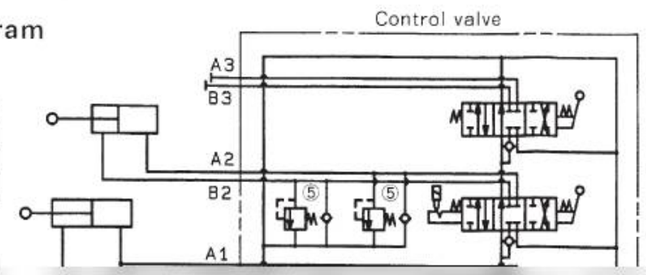
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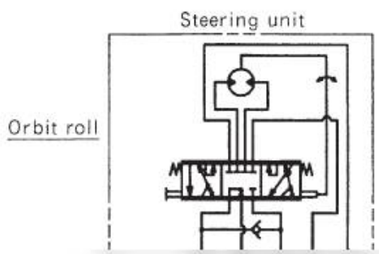
## 2-3 Hydraulic Circuit Diagram

Dump cylinder Unit: in. (mm)

| | |
|---|---|
| V3-5 | φ2.36 (60) × φ1.38 (35) × 15.43 (392) |
| V4-5 | φ2.76 (70) × φ1.57 (40) × 14.57 (370) |
| V4-5HL | φ2.95 (75) × φ1.77 (45) × 15.08 (383) |

Lift cylinder × 2 Unit: in. (mm)



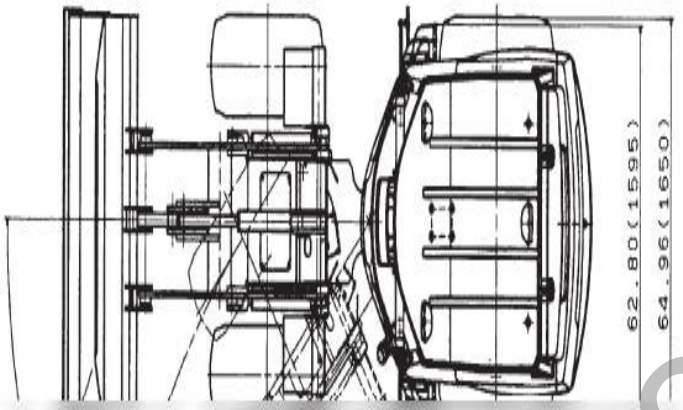

| Model | Engine model | KW/min⁻¹ (PS/min⁻¹) HP/min⁻¹ |
|---|---|---|
| V3-5 | 3TNE84-EKAH | 21.3/2500 (29/2500) 28.59/2500 |
| V4-5<br>V4-5HL | 3TNE84T-EKAH | 27.2/2500 (37/2500) 36.48/2500 |

Relief valve set pressure

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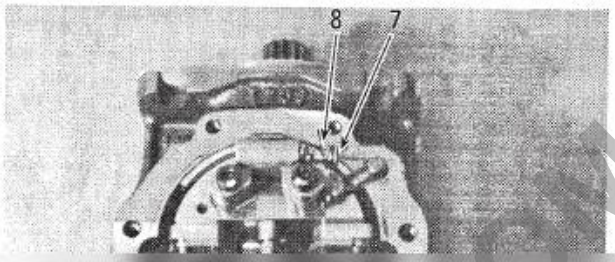



V4-5HL

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| Procedure | |
|---|---|
| (4) Remove spool **7** and spring **8**. |   |

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**2. Theory of operation**

1) Neutral state of steering wheel

(1) The hydraulic oil discharged from the pump flows as follows:
Pump → P ring groove in VP valve → CF ring groove → Orifice Cdy → Pressure chamber B → Orifice Cls → LS line check valve → LS port of orbit roll → Hydraulic oil tank

Cdy (dynamic orifice), and the force of the control spring. This causes almost all volume of the hydraulic oil discharged from the pump to flow into the EF port, from which the oil is supplied to the implement.

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### Reassembly

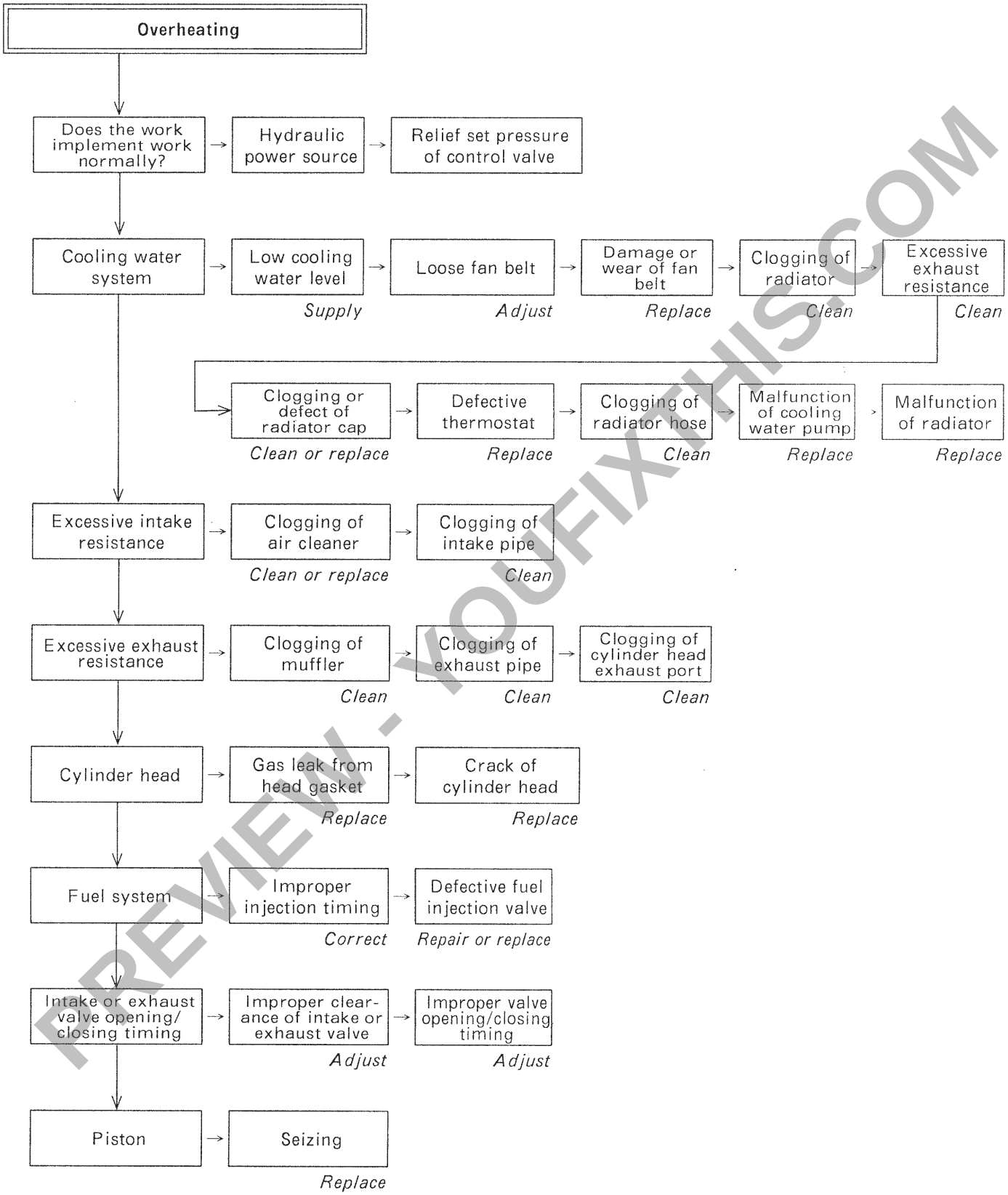
Check the contact faces of all the parts. Replace any part with scratches or burrs which cause oil leak, with a new one.
Wash all the metallic parts are cleaned with a clean solvent and dry them by air blow. Do not wipe the parts with cloth or paper because small pieces from them might get into the orbit roll body and pollute the hydraulic system, which finally causes trouble. Do not polish them with a file or sandpaper.

***Caution:***
*Take care not to get a cut with the edges of the machined parts of the sleeve, the spool and the housing.*

***Notes:***
1. *In principle, install new O-rings and seals after reassembly.*
   *Before installing them, apply grease to them thinly.*
2. *Since the sizes of O-ring ㉒ and O-ring ㉓ are very close to each other, be sure to check their part numbers indicated on the parts list before opening the seal kit to avoid misuse.*

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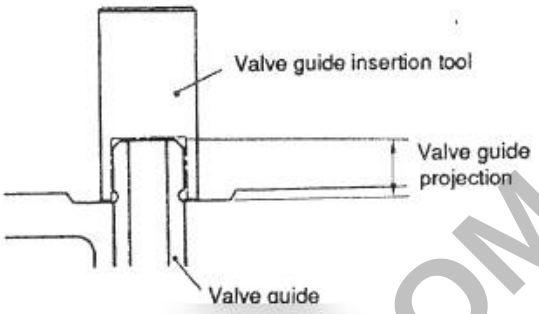
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[Replacing the valve guide]

(1) Extract the valve guide from the cylinder head using a valve guide extractor.

(2) In a container containing liquid nitrogen, ether or alcohol together with dry ice, put the valve guide to cool it. Then hit the sufficiently cooled valve guide to fit it into the cylinder head using a valve guide insertion




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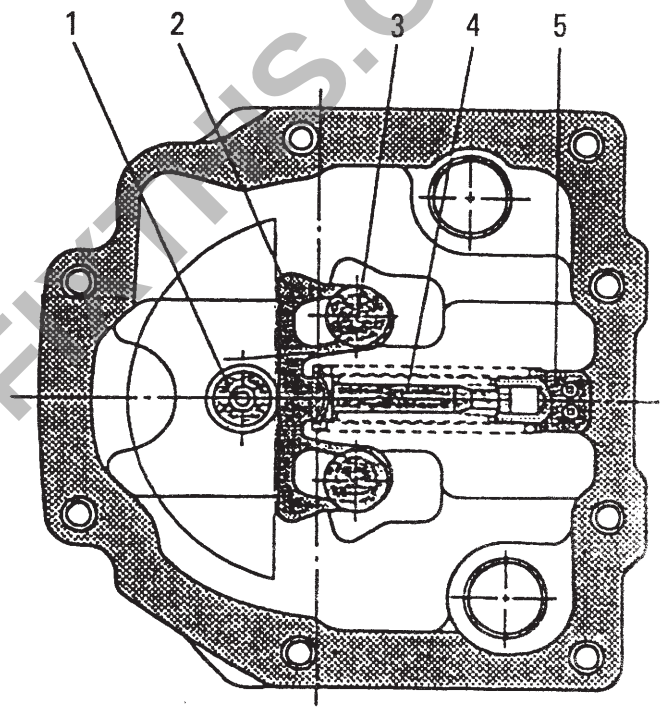
The AU controller incorporates the solenoid assemblies **8** for forward travel and reverse travel. When either the solenoid assemblies **8** is excited, the hydraulic oil is sent to either of the pressure chambers of the control piston **3**. The piston **3** operates the pilot **5** installed on the swash plate via the lever **4**. The oil passage is switched by the operation of the pilot **5** and the swash plate is inclined. The inclination angle of the swash plate is always controlled in the optimal state by the operation of the automotive control and the pressure compensators.

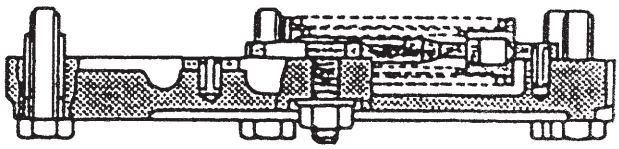
2) Neutral maintainer

The neutral position is maintained by pressing both edges of the yoke **2** against the swash plate with the force of the spring.

The three major purposes of the neutral maintainer are as follows:

- Help the operation of the AU controller to return the swash plate to the neutral position.
- Adjust the swash plate to the neutral position mechanically as the control pressure lowers.
- Set and hold the swash plate in the mechanical neutral position.



| No. | Part |
|---|---|
| 1 | Plate |
| 2 | Yoke |
| 3 | Eccentric bolt |
| 4 | Holder |
| 5 | Holder |

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5) Precautions for handling hydraulic cylinders

(1) Air release

Release air from the hydraulic cylinder according to the following procedure before operating the hydraulic cylinder for the first time after removing the hydraulic cylinder assembly or a part of the circuit including the hydraulic

(3) Hydraulic oil and oil temperature

| Specification | Type of hydraulic oil | Oil temperature range |
|---|---|---|
| Standard | ISO VG46 or its equivalent | −22 to 212 °F (−30 to 100 °C) |

Some types of hydraulic oil may affect the life

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