OIL PUMP

HANSUNG LUBRICATION SYSTEM

HANS LUBE®

OIL PUMP
The concentrated lubricating oil supply device drives and maintains all the oil supply sites from one device, increasing system life expectancy and reducing running and maintenance costs.

Applied to various machine tools, textile machines, injection machines, presses, packaging machines and other general industrial machines, and is classified into a fixed quantity oil supply type and a proportional oil supply type according to the methods of use. In order to fully make use of the concentrated oil supply type, a suitable oil supply system for the machine fueling part needs to be selected and designed.

Prior to system design, precise oil supply sites, oil supply methods and oil supply quantities for each machine need to be selected, and pipe size and discharge quantities need to be calculated. Then, the quantity of oil supplied calculated with pump capacity, efficiency and pipe loss in consideration, is multiplied by 1.25~1.5 to calculate the final quantity of oil supplied.

Also, control methods such as examination and protection devices are set, and then the pipe layout and components are selected.

### Design Method for Required Oil Supply Quantity

The quantity of oil supplied for each oil supply site is calculated based on experience and actual values as follows:

- Oil quantity (Q) : required quantity of oil supplied for each hour (m³/h)
- Diameter, Length, Width : Unit - cm
- Application examination : Normal use oil viscosity (120rpm as standard)

- If the rate of viscosity increase is 10, the oil quantity increases twofold.

- But, the quantity of oil supplied is influenced by friction surface material, surface viscosity, drive condition/velocity, revolution load, drive and surrounding temperature, surrounding toxic materials, etc, and lubricating oil type. Therefore, the calculated values need to be used as standards, and the actual fueling quantity needs to be controlled with the conditions of each fueling site taken into consideration.

### Calculation Method for Oil Supply Quantity

- **Bearing (Ball Bearing, Roller Bearing, Needle Bearing)**
  
  $Q = 0.04 \times \text{diameter} \times \text{number of rows}$

- **Sliding Bearing**
  
  $Q = 0.003 \times \text{rotating shaft diameter} \times \text{shaft region length}$

- **Plain Sliding**
  
  $Q = 0.0017 \times \text{length x width (horizontal direction)}$

- **Cylinder Sliding**
  
  $Q = 0.006 \times \text{length x width (vertical direction)}$

- **CAM**
  
  $Q = 0.013 \times \text{contact circumference x width}$

- **Gear**
  
  $Q = 0.046 \times \text{pitch circle diameter x gear width}$

- **Chain**
  
  $Q = 0.008 \times \text{length x width}$
Fixed Quantity Oil Supply System

**System Summary**

The concentrated lubricating system uses the lubricating oil from the pump to operate the piston and the piston inside the valve, and delivers the precise quantity of oil supplied (0.01~0.6 cc/st) to each valve. The valve is automatically operated by the pump discharge pressure, and can be used for long distances of up to 20m and for 50 separate oil supply sites. A system used widely from small machines to large machines.

**Feature**

1. Fixed quantities of lubricating oil can be delivered precisely using the fixed quantity valve.
2. Discharge amounts and number of discharge outlets can be chosen freely to suit oil supply sites, and allows reasonable combinations.
3. The pump control is divided into an internal and an external one, and the operating time can be adjusted depending on operational environments.
4. Safety devices such as the valve pressure switch and the float switch can be installed to detect errors in advance.

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Proportional Oil Supply System

**System Summary**

The concentrated lubricating system makes the pipes connected to the lubricating oil supply sites to have resistance against the flow of lubricating oil delivered from the pump, this suppressing the quantity of oil discharge, and distributes the lubricating oil to each of oil supply site. The used proportional oil supply valve discharges little under small pressure, and is classified into a continuous oil supply type and an intermittent oil supply type.

Also, it uses a single pipe with an external diameter of 4mm from the pump to every oil supply site, and can be used across a wide range of viscosities. It is the most suitable concentrated lubricating system for precision machine tools that require high-viscosity processing even in small sizes, and for die casting machines.

**Feature**

1. A single pipe system that allows simple spraying and easy connections.
2. The pump is produced in various types (manual, automatic, pneumatic type), allowing the selection of suitable pumps for the machines in use.
3. Every pump is equipped with a suction filter to prevent the entry of foreign substances and to allow safe oil supply.
4. The valve’s discharge size and assembly method (for machine, for line, for distributor) can be chosen to allow suitable oil supply for different oil supply sites.
**Features**

1. A Gear type volumetric pump that allows precise delivery across a wide range of viscosities.
2. It can be applied to long distances of more than 20m, and can also be used in small, large machines, and high-precision machines.
3. To make full use of the fixed quantity oil supply system, the HMV Series needs to be used for the Valve.
4. It has an internal control, and therefore does not require separate control devices.
5. It has a built-in ullage decrease detector (float switch).

**Pump Spec.**

<table>
<thead>
<tr>
<th>Spec</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUMP TYPE</strong></td>
<td>GEAR PUMP</td>
</tr>
<tr>
<td><strong>DISCHARGE PRESSURE</strong></td>
<td>17kg/cm²</td>
</tr>
<tr>
<td><strong>PRESSURE GAUGE</strong></td>
<td>0~30kg/cm²</td>
</tr>
<tr>
<td><strong>USING OIL</strong></td>
<td>32~1300(cSt)</td>
</tr>
<tr>
<td><strong>FILTER</strong></td>
<td>80 Mesh</td>
</tr>
<tr>
<td><strong>TANK CAPACITY</strong></td>
<td>4liter(10, 12, 20, 30, 55liter)</td>
</tr>
<tr>
<td><strong>WIGHT</strong></td>
<td>4kg</td>
</tr>
<tr>
<td><strong>DISCHARGE AMOUNT</strong></td>
<td>150cc/minute</td>
</tr>
<tr>
<td><strong>FLOAT S/W</strong></td>
<td>Contact type: A contact (NO) ON at low level</td>
</tr>
<tr>
<td><strong>PRESSURE S/W</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>OIL SUPPLY CONTROL DEVICE</strong></td>
<td>Built-in</td>
</tr>
<tr>
<td><strong>MOTOR SPEC.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>OUTPUT</strong></td>
<td>57W</td>
</tr>
<tr>
<td><strong>PHASE</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>VOLTAGE</strong></td>
<td>110V / 200 / 220V</td>
</tr>
<tr>
<td><strong>CURRENT</strong></td>
<td>1.54A, 0.77A</td>
</tr>
<tr>
<td><strong>FREQUENCY</strong></td>
<td>50 / 60Hz</td>
</tr>
</tbody>
</table>

1) The pump operates once power is connected and electricity is supplied. You can set the pause time using the Internal (T) on the front of the pump, and Discharge (F) to set the operating time (seconds). Afterwards, the pump will repeatly operate and pause.

2) Minimum pause time of the pump is 3 minutes, and the minimum discharge time can be set to 3 seconds.

3) When operating the pump, the DIS, lamp ⑤ switches on, and during the pause, the INT lamp ④ switches on. When ullage inside the tank decreases, the ENG, lamp ③ switches on. When ullage inside the tank decreases, the ENG, lamp ③ switches on.

4) The MAN. button (⑥) can be used for test operations and to let air out from the pipes. (But, do not operate this for more than 5 minutes, as it can cause Motor damage.)

5) The pump is set at 17kg/cm² when released from the factory, but this may differ depending on the changes in the viscosities of the oils used (oil viscosity, surrounding viscosity).
1. A highly reliable externally controlled fixed quantity oil supply pump.
2. It is used across a wide range of fields, and is especially suitable as a fixed quantity oil supply pump for high-precision, large machine tools.
3. The pump's main drive connection parts are made of single die casting pieces to ensure excellent durability.
4. An external control type that allows free pump control.
5. It has a built-in usage decrease detector and a pressure decrease detector.

**Pump Spec.**

<table>
<thead>
<tr>
<th>PUMP SPEC.</th>
<th>HMGP-303S</th>
<th>HMGP-303M</th>
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<tbody>
<tr>
<td>PUMP TYPE</td>
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<td>GEAR PUMP</td>
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<tr>
<td>DISCHARGE PRESSURE</td>
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<td>17kg/cm²</td>
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<tr>
<td>PRESSURE GAUGE</td>
<td>0–59kg/cm²</td>
<td>0–59kg/cm²</td>
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<tr>
<td>USING OIL</td>
<td>32–1500(cSt)</td>
<td>32–1500(cSt)</td>
</tr>
<tr>
<td>FILTER</td>
<td>60 Mesh</td>
<td>60 Mesh</td>
</tr>
<tr>
<td>TANK CAPACITY</td>
<td>2L</td>
<td>2L</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>4kg</td>
<td>2kg</td>
</tr>
<tr>
<td>DISCHARGE AMOUNT</td>
<td>190cc/min</td>
<td>190cc/min</td>
</tr>
<tr>
<td>FLOAT S/W</td>
<td>Contact type : A contact (NO)</td>
<td>Contact type : A contact (NO)</td>
</tr>
<tr>
<td>PRESSURE S/W</td>
<td>Contact type : A contact (NO)</td>
<td>Contact type : A contact (NO)</td>
</tr>
<tr>
<td>OIL SUPPLY CONTROL DEVICE</td>
<td>External control</td>
<td>External control</td>
</tr>
</tbody>
</table>

**Motor Spec.**

| OUTPUT | 57W |
| PHASE | 1p |
| VOLTAGE | 110V |
| CURRENT | 1.54A |
| FREQUENCY | 50/60Hz |

**Operating Guide**

1) It does not have a separate control device, and the pump operates automatically once power is connected and electricity is supplied. The pause and operation times can be set in the same way as for HMGP-303.
2) Maximum operation time of the pump is 4 minutes, and the pause time needs to be set at 4 times the operation time.
3) The manual button can be used for test operations and to take out air from the pipes.
4) The pump is set at 17kg/cm² when released from the factory, but this may differ depending on the changes in the viscosities of the oils used (oil viscosity, surrounding viscosity).
5) The pressure switch can operate the pump and detect whether or not the set pressure has been reached within a given time, and send contact signals to the machine control device during normal operation to check for errors.

**Wiring Diagram**

[Diagram of wiring connections for HMGP-303S/303M]
1. A large capacity fixed quantity supply pump suitable for multiple oil supply sites and large machines.
2. An external control type that allows various pump controls according to operational environments.
3. Main drive parts of the pump are inside the AL body to ensure superior durability.
4. The pump part can be used separately, and can be attached to other tanks for use.

**Specifications**

- **Pump Type**: Gear Pump
- **Discharge Pressure**: 15~30 kg/cm²
- **Pressure Gauge**: 0~35 kg/cm²
- **Using Oil**: 32~1300 (cSt)
- **Filter**: 80 Mesh
- **Tank Capacity**: 5L (12, 20, 30, 55L)
- **Weight**: 5kg
- **Discharge Amount**: 300 cc/min
- **Float S/W**: Contact type: A contact (NO) ON at low level
- **Pressure S/W**: Contact type: A contact (NO) Operation pressure: ±1 bar ON
- **Oil Supply Control Device**: External control
- **Motor Spec.**: Output: 60W, Phase: 1, Voltage: 110V, Current: 1.2A, Frequency: 50Hz

**Operating Guide**

1. It does not have a separate control device, and the pump operates automatically once power is connected and electricity is supplied. The pause and operation times can be set in the same way as for HMGP-322.
2. Minimum pause time of the pump is 4 minutes, and the pause time needs to be set at 4 times the operation time. Time needs to be followed for precise fixed quantity valve operation.
3. This motor is not a continuous operation pump, so please refrain from operating for more than 5 minutes.
4. The pump is set at 17 kg/cm² when released from the factory, but this may differ depending on the changes in the viscosities of the oils used (oil viscosity, surrounding viscosity).
5. The pressure switch can operate the pump and detect whether or not the set pressure has been reached within a given time, and send contact signals to the machine control device during normal operation to check for errors. (option)
6. The pump is used separately. It can be attached freely inside the tank for use.
1. It is the most suitable pump for proportional oil supply, and can be applied to a wide range of industrial fields.
2. It has a simple structure and excellent durability.
3. An internal control type that can be used by simply supplying power.
4. It is equipped with an oil leak detection mechanism to increase reliability.
5. It is equipped with a dustproof device and can be used in processes that are subject to vibrations and impacts.
6. A wire filter and a drain filter are used side by side, allowing oil reuse.
7. To fully utilize the proportional oil supply system, you must use the HJ Series Valve.

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**Pump Spec.**

<table>
<thead>
<tr>
<th>PUMP SPEC.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMP TYPE</td>
<td>GEAR PUMP</td>
</tr>
<tr>
<td>DISCHARGE PRESSURE</td>
<td>8kg/cm²</td>
</tr>
<tr>
<td>PRESSURE GAUGE</td>
<td>0 - 35kg/cm²</td>
</tr>
<tr>
<td>USING OIL</td>
<td>32 - 800(cSt)</td>
</tr>
<tr>
<td>FILTER</td>
<td>80 Mesh</td>
</tr>
<tr>
<td>TANK CAPACITY</td>
<td>4.4L(10, 12, 20, 30, 55Liter)</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>3.5kg</td>
</tr>
<tr>
<td>DISCHARGE AMOUNT</td>
<td>4 - 113cc</td>
</tr>
<tr>
<td>INTERVAL</td>
<td>1 - 120min/1 - 60min</td>
</tr>
<tr>
<td>FLOAT S/W</td>
<td>Contact type: A contact (NO) On at low level</td>
</tr>
<tr>
<td>OIL RECOVERY</td>
<td>Attachable</td>
</tr>
<tr>
<td>OIL WARNING</td>
<td>BUZZER / LAMP</td>
</tr>
</tbody>
</table>

**Operating Guide**

1) The pump operates once power is connected and electricity is supplied. You can set the pause time using the Interval (①) on the front of the pump, and Discharge (②) to set the operating time (seconds). Afterwards, the pump will repeatedly operate and pause.
2) Minimum pause time of the pump is 1 minute, and the lowest discharge can be set to 4cc.
3) When operating the pump, the DIS lamp (③) switches on, and during the pause, the INT lamp (④) switches on. When ullage inside the tank decreases, the ENG lamp (⑤) switches on.
4) The MAN button (⑥) can be used for test operations and to let air out from the pipes. (But, do not operate this for more than 5 minutes, as it can cause Motor damage.)
5) The pump is set at 8kg/cm² when released from the factory, but this may differ depending on the changes in the viscosities of the oils used (oil viscosity, surrounding viscosity).
1. It is the most suitable pump for proportional oil supply. It can be applied to a wide range of industrial machines.

2. The compact design reduces installation space limitations, and the simple use means easy installation and repairs.

3. During reduced ullage, selections can be made to suit user environments using contact output and buzzer.

4. Every model is attached with a suction filter to prevent the entry of alien substances in the pipe.

5. Increased pressure settings are available according to operational environments.

- **Features**

   - **Proportional Oil Supply**
   - **Compact Design**
   - **Easy Installation and Repairs**
   - **Suitable for Various Environments**

- **Specifications**

   - **Pump Type**
     - HMGP-105N
     - HMGP-105M
     - HMGP-105C
     - HMGP-103

   - **Discharge Pressure**
     - 8 kg/cm²

   - **Interval Time**
     - 3~30/30~120 min

   - **Using Oil**
     - 32~800 (cSt)

   - **Filter**
     - 80 Mesh

   - **Tank Capacity**
     - 2 Liter

   - **Weight**
     - 2.5 kg

   - **Float S/W**
     - Contact type: A
     - Contact (NO)

   - **Discharge Amount**
     - 3~30/4~45 cc

   - **Oil Warning**
     - Buzzer

   - **Motor SPEC.**
     - **Output**
       - 36W
     - **Voltage**
       - 110V
     - **Current**
       - 0.85A
     - **Frequency**
       - 50/60Hz

   - **Control Features**
     - Pump operates once power is connected and electricity is supplied.
     - You can set the pause time using the Interval ① on the front of the pump, and Discharge ② to set the operating time (seconds).
     - Afterward, the pump will repeatedly operate and pause.
     - Minimum pause time of the pump is 3 minutes, and the minimum discharge time can be set to 3cc.

   - **Lubrication System**

   - **Hydraulic Circuit Drawing**

   - **Wiring Diagram**
A product identical in shape to HMGP-105, but with the control box made out of die-casting AL to ensure superior durability and resistance against external impacts.

2. It is separated into HMGP-303D for fixed quantity oil supply or HMGP-105D for proportional oil supply ensuring varied applicability.

3. The main parts of the pump are integrated to ensure easy repairs and maintenance.

4. HMGP-105W can be used as an external control type.

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### Operating Guide

1) The pump operates once power is connected and electricity is supplied. You can set the pause time using the Interval [①] on the front of the pump, and discharge [②] to set the operating time (seconds). Afterwards, the pump will repeatedly operate and pause.

2) Minimum pause time of pump is 3 minutes, and the discharge time can be set to 3cc (HMGP-105D) - (HMGP-303D)(minimum pause time 3 minutes (minimum discharge time 3 seconds)

3) When operating the pump, the DIS. lamp [③] switches on, and during the pause, the IN. lamp [④] switches on.

4) The MAN. button [⑥] can be used for test operations and to let air out from the pipes. (But, do not operate this for more than 5 minutes, as it can cause motor damage.)

5) The pump is set at 8kg/cm² when released from the factory, but this may differ depending on the change in the viscosities of the oils used (oil viscosity, surrounding viscosity).
1. It can be applied to large capacity proportional oil systems.
2. It is suitable for lubricating oil supply devices, as well as for a small number of lubricating oil recovery devices.
3. An externally controlled pump, and is capable of various applications according to the user's operational environments.
4. It is equipped with an oilage decrease detector.
5. Applied broadly from HJBSeries to HJCSeries. (continuous type)
6. Piston Manual pump with a specially processed cylinder interior to raise the pump discharge pressure to 7kg/cm² for a smooth supply of lubricating oil. Also compact and lightweight, requiring little installation space, and is therefore very economical.

**Pump Spec.**

**HMGP-205C**
- **Discharge Pressure:** 5~10kg/cm²
- **Discharge Amount:** 100cc/min
- **Using Oil:** 32~220cSt
- **Filter:** 80 Mesh
- **Tank Capacity:** 5Liter
- **Weight:** 5kg

**HMGP-6A/6MA**
- **Discharge Pressure:** 10kg/cm²
- **Discharge Amount:** 0~6cc/st
- **Using Oil:** 32~220cSt
- **Filter:** 80 Mesh
- **Tank Capacity:** 2Liter
- **Weight:** 1.5kg

**Features**

1. **HMGP-6A**
   - Easy lubricating oil supply through supplying compressed air
   - The pump drive parts are produced with die casting molds for superior durability
   - Easy control bar operation for free control of the quantity of discharge
   - The attached suction filter on every model prevents suction of foreign substances
2. **HMGP-6MA**
   - A fixed quantity oil supply pump used with the HMV Series fixed quantity valves
   - It is capable of long distance delivery

**Pump Spec.**

**HMGP-6A/6MA**
- **Discharge Pressure:** 18kg/cm² / 20kg/cm²
- **Discharge Amount:** 0~6cc/st
- **Using Oil:** 32~220cSt
- **Filter:** 80 Mesh
- **Tank Capacity:** 2Liter
- **Weight:** 5kg

**External Figure**

- **R-type:** Type of spray: TY Wall spray
- **L-type:** Type of spray: TY Wall spray

**Hals**

**HALS-33**
- **Pump Type:** Piston
- **Discharge Pressure:** 7kg/cm²
- **Discharge Amount:** 7cc/st
- **Tank Capacity:** 1Liter
- **Weight:** 1.5kg

**Features**

A piston manual pump with a specially processed cylinder interior to raise the pump discharge pressure to 7kg/cm² for a smooth supply of lubricating oil. Also compact and lightweight, requiring little installation space, and is therefore very economical.
### RESIN TANK

<table>
<thead>
<tr>
<th>Type</th>
<th>1 Liter</th>
<th>2 Liter</th>
<th>4 Liter</th>
<th>5 Liter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>110 x 160</td>
<td>110 x 160</td>
<td>110 x 160</td>
<td>110 x 160</td>
</tr>
<tr>
<td>B</td>
<td>170 x 220</td>
<td>170 x 220</td>
<td>170 x 220</td>
<td>170 x 220</td>
</tr>
<tr>
<td>C</td>
<td>230 x 280</td>
<td>230 x 280</td>
<td>230 x 280</td>
<td>230 x 280</td>
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<tr>
<td>D</td>
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<td>E</td>
<td>350 x 400</td>
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### STEEL TANK

<table>
<thead>
<tr>
<th>Type</th>
<th>Total Capacity</th>
<th>Effective Capacity</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Applicable Pump</th>
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<tbody>
<tr>
<td>T6</td>
<td>1.7 l</td>
<td>0.5 l</td>
<td>320</td>
<td>201</td>
<td>129</td>
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<td>T7</td>
<td>3.1 l</td>
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<td>330</td>
<td>203</td>
<td>205</td>
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<table>
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<th>Effective Capacity</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Applicable Pump</th>
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<tbody>
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<td>9.8 l</td>
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<td>243</td>
<td>236</td>
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<tr>
<td>T20</td>
<td>20.5 l</td>
<td>16 l</td>
<td>480</td>
<td>346</td>
<td>327</td>
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<table>
<thead>
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<th>Type</th>
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<th>Effective Capacity</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Applicable Pump</th>
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<tbody>
<tr>
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<td>35 l</td>
<td>18 l</td>
<td>545</td>
<td>406</td>
<td>381</td>
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<tr>
<td>T55</td>
<td>54 l</td>
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<td>690</td>
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<table>
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<th>Effective Capacity</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Applicable Pump</th>
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<tbody>
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<td>18 l</td>
<td>340</td>
<td>203</td>
<td>205</td>
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<tr>
<td>T55</td>
<td>54 l</td>
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<td>392</td>
<td>203</td>
<td>205</td>
<td>200</td>
<td>195</td>
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</tbody>
</table>

**Type**: Resin Tank, Steel Tank

**Dimensions**: Various sizes

**Application**: Various models

**Capacity**: Various liters

**Effective Capacity**: Various liters

**Applicable Pump**: Various models

**Notes**: Various notes
**HMV series**

**Features**

1. A piston-operated bulk distributor used as a distributor in fixed quantity oil supply systems.
2. Simple Nipple changes allows oil supply from 0.01~0.6cc.
3. It is divided into a single, separate, control and an indicator type, secondary pressure type (HMLV type) and can be applied to various environments.

**External Figure**

<table>
<thead>
<tr>
<th>Valve Type</th>
<th>Metered Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMV</td>
<td>0.03 0.05 0.16 0.2 0.3 0.4</td>
</tr>
<tr>
<td>340</td>
<td>0.05 0.06 0.16 0.2 0.3 0.4 0.6</td>
</tr>
<tr>
<td>350</td>
<td>0.16 0.2 0.3 0.4 0.6</td>
</tr>
<tr>
<td>HMLV</td>
<td>0.1 0.2 0.3 0.4 0.6</td>
</tr>
</tbody>
</table>

**Operating Guide**

1) The front of the piston inside the distributor is filled with lubricating oil.
2) When the central lubricating oil begins to operate, the oil is delivered, and the pressure from the main pipe (10~20kg/cm²) moves the piston, which in turn pushes the oil from the front of the piston to the lubricating spot.
3) When the pressure from the main pipe is eliminated, the piston moves back to its original position, and the oil is refilled into the front of the piston.
4) The above process is repeated to provide lubricating oil.

**Assembly Method**

- HMLV Operating
  - This change over valve opens the outlet as soon as the pressure drops in the main line, i.e., when the pressure relief valve of the pump operates.

**Pump Spec.**

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</table>

**Number of outlet**

- Quantity of fixed quantity of supply

---

**Quantity of fixed quantity of supply**

- Number of outlet

**Valve type:** HMV, 340, 350
A fixed quantity valve structurally identical to HMV, but has a separable structure for use in installation spaces where the use of a single-unit valve is difficult. It is separated into a small HMV(0.01~0.1) or a large HMVS(0.16~0.6) valve, depending on the range of the fixed quantity discharge quantity.

A piston-driven fixed quantity valve, attached with an indicator that allows easy visual discrimination, and the valve’s operation can be checked simply by the indicator’s movements, and the attachment of limit S/W allows electricity control checks.

A piston-driven fixed quantity valve used when oil supply quantities need to be controlled and the quantity can be easily set from 0.03 to 0.5cc with the control bar.

A device that mixes the oil, which is delivered evenly from the fixed quantity valve, with compressed air, it is easy to install, and easy to use.
1. The flow unit component of the proportional oil supply system
2. It is separated into an intermittent oil supply valve or a continuous oil supply valve, and is separated into a distributor spray, line spray, or machine spray, depending on the assembly method.
3. Always use the filter to prevent the entry of foreign substances.
**Accessory series**

### Flow Indicator

The FLOW INDICATOR has been designed to enable easy visual checking of oil flow, distribution to different branch pipes and control of oil quantity. It is mainly used in continuous lubricating systems, and the branch pipes can be produced from 4 to 14 outlets. Each branch pipe’s discharge quantity can be controlled from 50 cc/min to 2 liters/min.

But, for use outside the control range, you must consult our technical department.

### HFIS

A small control valve, and by adjusting the CONTROL BAR at the top, it is easy to supply desired quantities of lubricating oil. It is mainly used in oil circulation systems that need continuous controlling.

### Line Filter

The line filter, designed for use in small capacity lubricating systems, eliminates foreign substances in the oil to expand machine’s lifespan.

1. It has been designed to detach and attach with just the cover when element cleaning or exchanging.
2. It can be reused after cleaning with sintering elements.
3. AL materials have been used to make it lightweight and corrosion proof.

### Pressure Switch

A core component of a pressure-controlled fixed quantity lubricating oil supply method, and has been designed to detect abnormalities such as lubricating oilage caused by pressure loss.

### Drain Filter

The Drain Filter, designed for use in small capacity lubricating systems, eliminates foreign substances in recovered oil to expand machine’s lifespan. Also, by recycling the Oil, Oil consumption can be greatly reduced.

- Drain filter is a semi-permanent product that is reusable after cleaning.

### Float Switch

An oil level switch used to detect oil quantity inside the tank, and has a built-in lead S/W on the float system shaft. There is also a small magnet inside the rotor that detects oil quantity upper and lower limits. Maintenance opening and closing of lead S/W is very small, and therefore a supplementary relay needs to be used.
Operating Instructions & Breakdown Countermeasures

Operating Instructions

Operation preparation
1. Preparation
   ▶ Check the pipes and electrical wiring, and fill the tank with a recommended clean lubricating oil.
   ▶ For electric pumps, check that the motor is operational.
2. Removal of air from main pipe
   ▶ For optimal operation of concentric lubrication systems, the entry of air is to be avoided. Therefore, you must carry out sufficient air removal.
   ▶ To eliminate air, operate the pump continuously until the oil is discharged.
3. Removal of air from fuelling pipe
   ▶ Let air out until oil is discharged at the end of the longest fuel supply pipe.
4. Checking for oil leaks in the pipes
   ▶ Once air has been removed, check for oil leaks in the pipe, and make the necessary repairs.

Test operations
▶ When operating the pump, check that oil is discharged before connecting the pipe.
▶ Connect the pipe once it has been verified that the pump is discharging oil.
▶ Check that the pump operation time has been set according to the specification of the device, and operate normally.
▶ Check that the pump is operating properly during the operation and pause cycles.

Maintenance
▶ All system devices require maintenance. Make sure to check that the system is operating normally every operational cycle.
▶ If the suction filter becomes clogged, clean the suction filter, and clean or exchange the line filter in use.
▶ In the event of malfunctions, refer to the breakdowns and countermeasures section.
▶ Do not use volatile oil, water soluble oil or greases as lubricating oil.

Cause & Remedy of Trouble

<table>
<thead>
<tr>
<th>Status</th>
<th>Cause</th>
<th>Countermeasure</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no oil discharge from pump,</td>
<td>Ullage levels inside the tanks are low.</td>
<td>Refill with oil of the same type and class as the one in use.</td>
</tr>
<tr>
<td></td>
<td>The suction filter hoses have been clogged,</td>
<td>Clean the filter or replace it.</td>
</tr>
<tr>
<td></td>
<td>Exchange damaged pipes of the pump</td>
<td>Exchange</td>
</tr>
<tr>
<td></td>
<td>The oil viscosity is not within the 32~800cS range.</td>
<td>Change to suitable oil.</td>
</tr>
<tr>
<td>Pressure decreases</td>
<td>Oil is not coming up from the pump due to one of the above reasons.</td>
<td>Follow the above instructions.</td>
</tr>
<tr>
<td></td>
<td>The flow unit and control unit are not set to the lubricating points and values.</td>
<td>Check the data carefully.</td>
</tr>
<tr>
<td></td>
<td>The relief valve selection is inadequate.</td>
<td>Adjust the setting to the right value.</td>
</tr>
<tr>
<td></td>
<td>Foreign substances have been mixed into the relief valve ball seat.</td>
<td>Clean the valve and replace the relief valve.</td>
</tr>
<tr>
<td>Oil is leaking from the flow unit</td>
<td>Oil is leaking from the pipe connection parts.</td>
<td>Tighten with the optimal torque (60kg/cm²) or replace the pipe.</td>
</tr>
<tr>
<td>Oil is leaking from outside the pump</td>
<td>Pipes have been damaged.</td>
<td>Replace the damaged pipes.</td>
</tr>
</tbody>
</table>

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HANSUNG LUBRICATION SYSTEM

HALS LUBE® COOLANT PUMP