Inlet/outlet check valves and motive medium intake valve unit are removable while connected to the piping. The unit can be disconnected by removing only two bolts. The body can be disassembled by removing six bolts while still connected to the piping. Only motive medium intake pipe—no exhaust pipe necessary. Inlet/outlet piping is linear, streamlined and efficient. Built-in air vent and check valves minimize external installation. Usable with low condensate outlet heat exchangers.* Actual installation differs depending on the desired discharge capacity and operating conditions, etc. See product specifications data sheet (SDS) for details.

Easy Maintenance
Simple Installation

Condensate Outlet Height of 170 mm

CAUTION
To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.
Effective Condensate Processing Improves Plant Efficiency

Increased productivity and product quality, plus reduced energy consumption and water treatment are some of the many benefits of condensate drainage and recovery.

The TLV GP/GT PowerTrap series provides the perfect solution for optimizing condensate processing in many applications.

1. **Prevention of Heat Exchanger “Stall”**
   - Stabilized temperature control improves product quality
   - Elimination of water hammer prevents equipment damage and improves safety
   - Prevention of corrosion caused by condensate accumulation
   - Some models are designed for installation with a lower filling head (min. 155 mm, 300 mm, etc.)

2. **Effective Condensate Recovery**
   - Energy recovered from condensate reduces boiler fuel costs
   - Reusing water reduces water treatment costs
   - Reduces effluent treatment and disposal costs

3. **No Cavitation**
   - Recovery of hot condensate up to 220 °C possible without cavitation
   - Low filling head allows use with equipment situated at low levels
   - Eliminates the seal, bearing and impeller damage that can occur in standard centrifugal pumps

4. **No Electricity Required**
   - Ideal for use in areas requiring explosion-proof equipment, and areas with no electrical supply
   - Reliable mechanical operation eliminates the need for complex level controls
   - Quick and easy to install and maintain
TLV's PowerTrap Series—
The Total Solution to Heat Exchanger “Stall”

■ Importance of “Stall” Prevention

“Stall” prevents condensate from being discharged from heating equipment. It results in:

- **Process Temperature Swings**
  As the “stall” cycle repeats, the steam pressure in the equipment varies above and below the back pressure, causing product temperature and quality fluctuations.

- **Water Hammer Damage**
  Water hammer can occur when backed-up condensate re-evaporates, or as incoming hot steam hits cooler backed-up condensate and instantly condenses.

- **Tube Corrosion and Damage**
  Backed-up condensate in the equipment can form carbonic acid, which results in tube corrosion. Equipment temperature fluctuations can cause thermal shock and fatigue damage to tubes.

TLV’s PowerTrap series provides complete condensate drainage, the key to eliminating “stall” and its related problems. Optimum performance can now be yours with the PowerTrap.

■ A Closer Look at the “Stall” Cycle

1. When the demand for heating energy is high, the control valve is wide open, $P_i$ is greater than $P_b$ and condensate is discharged from the trap.
2. When the demand decreases, the control valve throttles in order to reduce the heating energy, and $P_i$ drops.
3. If $P_i$ drops to $P_b$ or below, the trap can no longer discharge condensate against the back pressure. Condensate then backs up in the heat exchanger, and the equipment becomes condensate logged. This condition is known as “stall”.
4. When condensate is backed-up inside the equipment, the product temperature falls. The system compensates by opening the control valve again. $P_i$ increases and, when it becomes greater than $P_b$, condensate is forced out through the trap, and the cycle begins again.
**PowerTrap Benefits**

### 1 Built-in Steam Trap Improves Performance (GT Series)
- Automatically switches between pump and trap operation, in response to process conditions
- Internal trap mechanism always matches pump output, with no damage to trap, and eliminates need for sizing
- No need for external steam trap means simplified compact design and lowered installation costs
- Trap body and plug are both stainless steel for minimum leakage and maximum life

### 2 Snap-action Mechanism Maximizes Life
- Heat-treat hardened stainless steel internals
- Durable nickel-based alloy compression coil spring*
- The instantaneous snap-action mechanism simultaneously opens or closes motive medium inlet and exhaust valves, preventing erosion and resultant leakage

* Except GP/GT5C

### 3 Low-maintenance Design Reduces Labor
- Easy inline maintenance, without removal of piping*
- Fast and easy cleaning of intake valve by simply opening a plug to remove (GP/GT14, GP/GT10, GP10F, GP/GT5C)
- Non-cavitating design eliminates the seal, bearing and impeller damage that can occur in standard centrifugal pumps

*GP10F, GP/GT5C: motive medium piping must be removed

### 4 Stainless Steel Check Valves* for Durability
- Center guided check valves CK3MG and CKF3MG are used for maximum reliability even with dirty condensate (GP/GT14, GP/GT10, GP/GT10L, GP10F)
- Newly developed swing type check valve CKF5M enables use with a filling head as low as 300 mm (GP/GT14L, GP/GT10L), 350 mm (GP/GT14M)
- Lasts longer than bronze check valves
- Quiet operation

*GP/GT5C are equipped with internal stainless steel check valves

### 5 Economical Unit with Retrofitable Mechanism
(Only available in some countries)
- One-piece pump assembly for easy installation and maintenance and retrofit to pump bodies of certain other manufacturers
- Lighter-weight model, with straight-through connection for easy installation
### Construction

**GT14/GT14M/GT14L**
Mechanical pump with built-in trap

**GT10/GT10L**
Mechanical pump with retrofitable mechanism

**GP10/GP10L**
Mechanical pump with built-in trap

**GP14/GP14M/GP14L**
Mechanical pump with built-in trap

- **Materials**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body (except GP10F, GP/GTSC)</td>
<td>Cast Iron or Cast Steel*</td>
</tr>
<tr>
<td>1</td>
<td>Body (GP10F)</td>
<td>Fabricated Carbon Steel**</td>
</tr>
<tr>
<td>1</td>
<td>Body (GP/GTSC)</td>
<td>Cast Iron or Cast Stainless Steel</td>
</tr>
<tr>
<td>2</td>
<td>Cover (except GP10F, GP/GTSC)</td>
<td>Cast Iron or Cast Stainless Steel</td>
</tr>
<tr>
<td>2</td>
<td>Cover (GP10F)</td>
<td>Cast or Cast Steel*</td>
</tr>
<tr>
<td>2</td>
<td>Cover (GP/GTSC)</td>
<td>Cast Iron or Cast Stainless Steel</td>
</tr>
<tr>
<td>3</td>
<td>Cover Gasket (GP/GT14, GP/GT14L, GP/GT10, GP/GT10L, GP10F)</td>
<td>Graphite/Stainless Steel</td>
</tr>
<tr>
<td>3</td>
<td>Cover Gasket (GP/GT14)</td>
<td>Graphite/Stainless Steel</td>
</tr>
<tr>
<td>3</td>
<td>Cover Gasket (GP/GTSC)</td>
<td>Fluorine Resin</td>
</tr>
</tbody>
</table>

*Cast stainless steel available as option  **Stainless steel available as option  ***Not shown

### Operation

**Pump/Trap: GT10**

1. **GT Trapping/Filling Cycle**
   - When GT inlet pressure is greater than back pressure, the GT acts as a trap, continuously discharging condensate. When inlet pressure is less than back pressure, condensate cannot be discharged, so it accumulates in the body, causing the float to rise. As the float rises, the trap opens, although condensate still cannot be discharged.

2. **GT Discharge Cycle**
   - When the float reaches its highest position, the trap is fully open and the snap-action mechanism actuates, instantly both opening the motive medium intake valve and closing the exhaust valve. The motive medium pressure forces out the condensate, and the float falls. The snap-action mechanism re-sets, instantly opening the exhaust valve and closing the intake valve. The cycle then repeats.

**Pump: GP10**

1. **GP Filling Cycle**
   - The pump body is equalized to the inlet receiver (usually atmospheric) by the open exhaust valve. This allows condensate to drain by gravity into the pump, where it accumulates and causes the float to rise.

2. **GP Discharge Cycle**
   - When the float reaches its highest position, the snap-action mechanism actuates, instantly both opening the motive medium intake valve and closing the exhaust valve. The motive medium pressure forces out the condensate, and the float falls. The snap-action mechanism re-sets, instantly opening the exhaust valve and closing the intake valve. The cycle then repeats.
**Systems for Many Different Applications**

The TLV PowerTrap series meets a variety of condensate processing needs.

<table>
<thead>
<tr>
<th></th>
<th>Closed System</th>
<th>Open System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Overview</strong></td>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>● No need for external steam trap (GT model features built-in trap)</td>
<td>● Collection of condensate from multiple equipment possible</td>
</tr>
<tr>
<td></td>
<td>● No flash steam discharge</td>
<td>● Can be used where trap is lower than receiver, such as equipment</td>
</tr>
<tr>
<td></td>
<td>● Small reservoir</td>
<td>situated near grade (providing there is sufficient differential pressure)</td>
</tr>
<tr>
<td></td>
<td>● Use with vacuum equipment possible</td>
<td></td>
</tr>
<tr>
<td><strong>Notes</strong></td>
<td>● Only one piece of equipment possible per system</td>
<td>● Separate steam trap required for each piece of equipment</td>
</tr>
<tr>
<td></td>
<td>● Equipment has minimum height requirement to ensure that condensate flows</td>
<td>● Requires venting pipe to discharge flash steam to atmosphere</td>
</tr>
<tr>
<td></td>
<td>naturally, by gravity [approx.: GP/GT14, GP/GT10 - 0.8 m; GP10F - 1 m;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GP/GT14M - 0.35 m; GP/GT14L - 0.3 m; GP/GT10L - 0.3 or 0.5 m; GT5C - 170 mm]</td>
<td></td>
</tr>
<tr>
<td><strong>Approx. Max. Pump Discharge Capacity</strong></td>
<td>● less than 8 t/h (GT10) &lt;br&gt;● less than 5.5 t/h (GT14) &lt;br&gt;● 8 t/h and greater (install pumps in parallel)</td>
<td>● less than 9 t/h (GT10L) &lt;br&gt;● less than 250 kg/h (GT5C) &lt;br&gt;● 9 t/h and greater (install pumps in parallel)</td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>Mechanical pump with built-in trap GT14/GT10</td>
<td>Mechanical pump</td>
</tr>
<tr>
<td></td>
<td>Mid-size mechanical pump with built-in trap GT14M/GT14L</td>
<td>Mid-size mechanical pump</td>
</tr>
<tr>
<td></td>
<td>Compact mechanical pump with built-in trap GT10L/GT5C</td>
<td>Compact mechanical pump</td>
</tr>
<tr>
<td></td>
<td>Where there is <strong>ALWAYS</strong> a negative pressure differential (e.g. vacuum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>equipment). GP14/GP14M/GP14L/GP10L/GP10F can be used</td>
<td></td>
</tr>
<tr>
<td><strong>Some Application Examples</strong></td>
<td>Large process/flow, such as: re-boilers, large heat exchangers</td>
<td>Large process trap discharges, such as: cylinder dryers, platen presses</td>
</tr>
<tr>
<td></td>
<td>Small to medium process/flow, such as: room heaters, small to medium heat</td>
<td>Small to medium process trap discharges, such as: recovery: trace lines &amp; mains</td>
</tr>
<tr>
<td></td>
<td>exchangers</td>
<td></td>
</tr>
</tbody>
</table>

**Closed System (GT)**

Sample Application: Condensate Drainage & Recovery from Heat Exchanger

- Collection of condensate up to 185 °C possible
- Prevents clouds of steam from affecting the work environment

**Open System (GP)**

Sample Application: Condensate Recovery from an Open Tank

- Collection of condensate up to 100 °C possible
- Makes it easy to design systems that can easily obtain pressure differential

CAUTION: Pipe all atmospheric discharge to a safe area
**Closed System**

- **Check valve**
- **Strainer; 40 mesh or finer**
- **Gate valve or needle valve**
- **Gate valve or ball valve**
- **Air vent**
- **Steam trap**

**CAUTION**

- In closed system applications where steam condensate is pumped, use steam as the motive medium.
- The height of the condensate outlet on the equipment must be at least: filling head + diameter of reservoir.
- Please read the instruction manual to ensure safe usage.

**Open System**

- **Check valve**
- **Strainer; 40 mesh or finer**
- **Gate valve or needle valve**
- **Gate valve or ball valve**
- **Steam trap**

**CAUTION**

- The vent pipe and overflow pipe should discharge to a safe place.
- Please read the instruction manual to ensure safe usage.
**Installation Piping Example for GT5C**

Inlet/outlet check valves and motive medium intake valve unit are removable while connected to the piping. The body can be disconnected by removing only two bolts. The body can be disassembled by removing six bolts while still connected to the piping.

Only motive medium intake pipe - no exhaust pipe necessary.

Inlet/outlet piping is linear, streamlined and efficient.

Built-in air vent and check valves minimize external installation.

Usable with low condensate outlet heat exchangers.

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**Specifications**

Values attained using a TLV CK3MG (screwed) or CKF5M/CKF3MG (flanged) check valve, unless otherwise indicated. GP/GT5C have a built-in check valve.

### Model

<table>
<thead>
<tr>
<th>Model</th>
<th>GT14</th>
<th>GP14</th>
<th>GT10</th>
<th>GP10</th>
<th>GT14M</th>
<th>GP14M</th>
<th>GT14L</th>
<th>GP14L</th>
<th>GT10L</th>
<th>GP10L</th>
<th>GP10F</th>
<th>GT5C</th>
<th>GP5C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx. Max. Pump Discharge Capacity</td>
<td>5.5 t/h</td>
<td>6 t/h</td>
<td>8 t/h</td>
<td>9 t/h</td>
<td>3.4 t/h</td>
<td>4 t/h</td>
<td>2.2 t/h</td>
<td>2.4 t/h</td>
<td>1.4 t/h</td>
<td>1.5 t/h</td>
<td>9 t/h</td>
<td>250 kg/h</td>
<td>260 kg/h</td>
</tr>
<tr>
<td>Approx. Built-in Trap Cap.</td>
<td>36 t/h</td>
<td>—</td>
<td>40 t/h</td>
<td>—</td>
<td>14 t/h</td>
<td>—</td>
<td>13 t/h</td>
<td>—</td>
<td>12 t/h</td>
<td>—</td>
<td>—</td>
<td>1.6 t/h</td>
<td>—</td>
</tr>
</tbody>
</table>

### Dimensions (mm)

#### Connection

- **S**: screwed, **F**: flanged
- **GT**: Saturated Steam
- **GP**: Saturated Steam, Compressed Air, Nitrogen

#### Body Material & Weight

- Cast Iron: 122 — 124 — 127 — 124 — 86 85 56 55 46 45 20 23 20 23
- Cast Steel: 139 149 136 144 139 149 136 146 94 93 61 60 50 49
- Cast Stainless Steel: — — — — — — — — — — — — — — — — 18 21 18 21
- Carbon Steel: 20 23 20 23

#### Size (mm)

- Pumped Med. Inlet: 80 50, 80 80 50, 80 80 50, 80 40 25, 40 25 25, 40 25 80 25
- Pumped Med. Outlet: 50 25
- Motive Med. Inlet: 25
- Pump Exhaust Outlet: 25

#### Max. Oper. Press. (PMO)

- GT Series: 1.4 MPaG
- GP Series: 1.05 MPaG

#### Max. Oper. Temp. (TMO)

- GT Series: 200 °C
- GP Series: 185 °C

#### Motive Medium Press. (MPG)

- GT Series: 1.0 – 1.4 MPaG
- GP Series: 0.03 – 1.05 MPaG

#### Max. Allowable Back Press. (MBP)

- GT Series: 0.05 MPaG
- GP Series: 0.03 – 0.5 MPaG

### Motive Medium

- GT Series: Saturated Steam
- GP Series: Saturated Steam, Compressed Air, Nitrogen

### Filling Head

- **Standard B10**: Minimum /710
- **Std. 630**: Minimum /350
- **Std. 630**: Minimum /350
- **Std. 630**: Minimum /450 (100 w/ CKF5M)
- **Std. 630**: Minimum /350
- **Std. 630**: Minimum /155

### Steam/Air Consumption

- 4.2 kg steam
- 6.5 m³ air

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**CAUTION**

To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

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**ISO 9001**

**ISO 14001**

**Manufactured by TLV CO., LTD. Kakogawa, Japan**

**Approved by PALGA 1961 No. 351**

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**Specifications subject to change without notice.**