



# Instruction Manual

## Free Float Gas Trap **GAS1N/GAS2N/GAS3N**

**Manufacturer**



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**TLV CORPORATION**

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## Introduction

Thank you for purchasing the TLV free float gas trap.

This product has been thoroughly inspected and tested before being shipped from the factory. When the product is delivered, before doing anything else, check the specifications and external appearance to make sure nothing is out of the ordinary. Also be sure to read this manual carefully before use and follow the instructions to be sure of using the product properly.

**This gas trap is designed, manufactured, and inspected for use with air, nitrogen, carbon dioxide, and inert gases (helium, neon, argon, krypton, xenon, and radon). (Hereinafter, when these fluids are described in this instruction manual they will be referred to as "non-Hazardous Fluids". Fluids other than the above will be referred to as "Hazardous Fluids".)**

**When this gas trap is used with Hazardous Fluids:**

- **It is the responsibility of the customer to select and confirm a material for the components coming into contact with the fluid to be used that is the most suitable for the characteristics of the fluid.**
- **All responsibility for regulatory compliance, product selection, handling, safety measures, sensing methods in case of fluid leaks, decisions about when the parts should be replaced, etc. must be borne by the customer.**
- **TLV does not receive, store, repair and/or dispose of used products, and our personnel will not carry out inspections, maintenance, repair, and/or replacement work on the product at the customer's site.**
- **Repair shall be carried out by the customer with the maintenance kit or the repair kit in accordance with this instruction manual.**

This free float gas trap employs a precision-ground float and three-point seat. With no hinges or levers, the trap automatically and continuously discharges condensate as it forms in the air/gas system, helping prevent it from backing up in the system. The three-point seat supports the precision-ground float at three points, ensuring an air/gas-tight seal even under extremely low condensate loads. This free float gas trap is also inline repairable, facilitating repair and maintenance, resulting in considerable time savings.







If detailed instructions for special order specifications or options not contained in this manual are required, please contact TLV for full details.

This instruction manual is intended for use with the model(s) listed on the front cover. It is necessary not only for installation but for subsequent maintenance, disassembly/reassembly and troubleshooting. Please keep it in a safe place for future reference.



## Safety Considerations

- Read this section carefully before use and be sure to follow the instructions.
- Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by maintenance personnel adequately trained for the product and fluid service in which the product is to be used.
- The precautions listed in this manual are designed to promote safety and help prevent equipment damage and personal injury. For situations that may occur as a result of erroneous handling, installation, operation or maintenance, three different types of cautionary items are used to indicate the degree of urgency and the scale of potential damage and danger: DANGER, WARNING and CAUTION.
- The three types of cautionary items above are very important for safety: be sure to observe all of them as they relate to installation, use, maintenance, and repair. Furthermore, TLV accepts no responsibility for any accidents or damage occurring as a result of failure to observe these precautions.

## Symbols

	<b>Indicates a DANGER, WARNING or CAUTION item.</b>
 <b>DANGER</b>	Indicates an urgent situation which poses a threat of death or serious injury
 <b>WARNING</b>	Indicates that there is a potential threat of death or serious injury
 <b>CAUTION</b>	Indicates that there is a possibility of injury or equipment / product damage
 <b>DANGER</b>	<b>Handling and safety measures for the product must be in accordance with the characteristics of the fluid in use.</b> Failure to do so may result in discharge of fluids leading to serious accidents resulting in death or serious injury.
 <b>WARNING</b>	<b>NEVER apply direct heat to the float.</b> The float may explode due to increased internal pressure, leading to serious accidents such as injuries, burns or chemical burns.

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 <b>WARNING</b>	<ul style="list-style-type: none"> <li>• Follow ALL necessary site safety precautions and measures to ensure the proper handling of fluids discharged from product outlets.</li> <li>• Before disassembling or removing the product, release pressure from the piping and the product so that internal pressure equals atmospheric pressure and wait until the surface of the product has cooled to room temperature. Especially when dealing with Hazardous Fluids, pay special attention as to whether there are any fluids remaining inside the product and eliminate such fluids before removing the product.</li> <li>• When fluids contacting trap internals are toxic, flammable or otherwise hazardous, use extreme care and follow all site safety procedures before opening the main line or balance line, installing, inspecting or removing the trap from the line or opening the trap or any part or connection of the trap.</li> <li>• DO NOT take any product outside of the plant if there is a possibility of Hazardous Fluids remaining inside. Make sure to clean the product thoroughly before taking it outside of the plant.</li> <li>• If loosening bolts and screws connecting the parts of the product's body, make sure to do so after the product is removed from the piping. Please follow the steps in this instruction manual for reassembly.</li> <li>• Take measures to prevent people from coming into direct contact with product outlets or fluids discharging from product outlets.</li> <li>• If the product should require repair, it may result in improper product functioning.</li> <li>• For products with a metal orifice, a minimum required condensate load is required to maintain a liquid seal. There is a chance of air/gas leak if the condensate load falls below this rate.</li> </ul> <p>Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
 <b>CAUTION</b>	<p><b>DO NOT use this product in excess of the maximum operating pressure differential.</b> Such use could make discharge impossible (blocked), and may damage the equipment.</p> <p><b>Use hoisting equipment for heavy objects (weighing approximately 20 kg (44 lb) or more).</b> Failure to do so may result in back strain, injury or damage to property if the object should fall.</p>



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 **CAUTION**

- Install properly and **DO NOT** use this product outside the recommended operating pressure, temperature and other specification ranges. This product is for intended use only.
- Use **ONLY** TLV replacement parts designed for the specific product in use when repairing the product. **DO NOT** modify the product.
- It is important that only vapor is present at the connection point on the receiver tank or gas main. If liquid is present, the trap may not function properly.
- The pressure-balancing line must freely drain to the trap. If there is any low point **BETWEEN** the upper and lower connections, pressure balancing can be hindered and the trap may not drain properly.
- **DO NOT** use excessive force when connecting threaded pipes to the product.
- To ensure tight sealing of the cover gasket, cover bolts/nuts should be tightened crosswise to intermediate torques, repeating the process three times or more until the proper final torque is reached.
- Use only under conditions in which no freeze-up will occur.
- Use only under conditions in which no water hammer will occur.

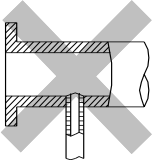
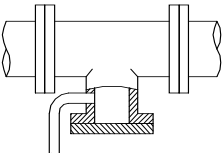
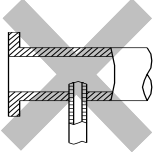
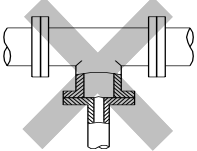
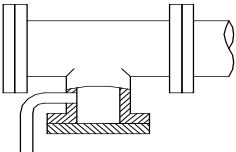
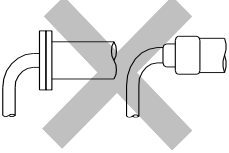
Failure to do so may result in discharge of fluid, leading to injuries, burns, chemical burns, as well as fires or other damage to / destruction of property. Local regulations may restrict the use of this product to below the conditions quoted.

## Checking the Piping

	<p>When fluids contacting trap internals are toxic, flammable or otherwise hazardous, use extreme care and follow all site safety procedures before opening the main line or balance line, installing, inspecting or removing the trap from the line or opening the trap or any part or connection of the trap. Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p>Use only under conditions in which no water hammer will occur. The impact of water hammer may damage the product, leading to fluid discharge, which may cause injuries, burns, chemical burns, as well as fires or other damage to/destruction of property.</p>

Check to make sure that the pipes to be connected to the trap have been installed properly.

1. Has the piping where the product is to be installed been designed to meet all required standards for the service for which it will be used?
2. Is the piping where the trap is to be installed horizontal?
3. Has sufficient space been secured for maintenance?
4. Have isolation valves and a strainer (40 mesh or finer) been installed at the inlet and outlet? If the outlet is subject to back pressure, has a check valve been installed?
5. Is the inlet pipe as short as possible, with as few bends as possible, and installed so the liquid to be discharged will flow naturally down into the trap?
6. Has the piping work been done correctly, as shown in the figures below?

Requirement	Correct	Incorrect
Install catchpot with the proper diameter and length to achieve necessary internal volume to collect and hold liquid before and during discharge.		 <p>Diameter is too small.</p>
Make sure the flow of condensate is not obstructed.		 <p>Diameter is too small and inlet protrudes into pipe interior.</p>
To prevent rust and scale from flowing into the trap, the inlet pipe should be connected 25 to 50 mm (1 to 2 in) above the base of the T-pipe.		 <p>Rust and scale flow into the trap with the condensate.</p>
When installing on the blind end, make sure the flow of condensate is not obstructed.		 <p>Condensate collects in the pipe.</p>

## Operation



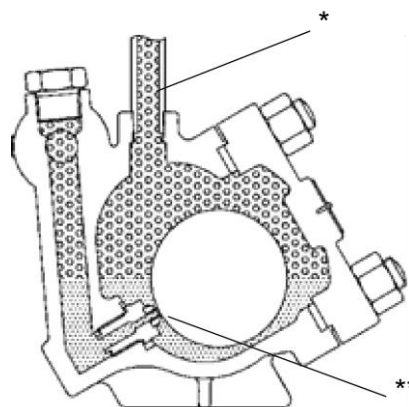
**WARNING** When fluids contacting trap internals are toxic, flammable or otherwise hazardous, use extreme care and follow all site safety procedures before opening the main line or balance line, installing, inspecting or removing the trap from the line or opening the trap or any part or connection of the trap. Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.

Principles of condensate discharge:

### 1. Start-up

At startup, a small amount of condensate will have accumulated in the body. The float and the orifice will form a water-seal.

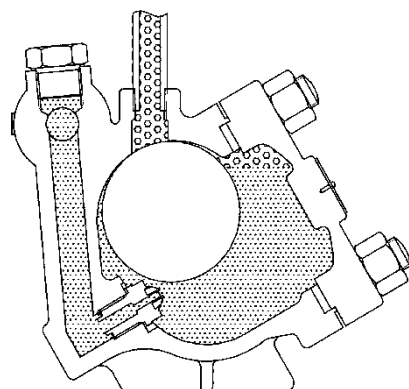
NOTE: When there is no condensate in the body, it will be necessary to prime the trap with a small amount of water through the pressure-balancing port or line to ensure a seal (after initial installation and after disassembly or maintenance).



\* Pressure-balancing Line  
\*\* Orifice

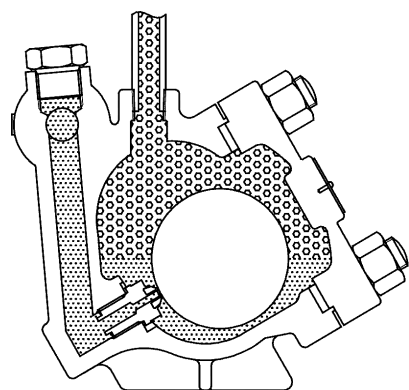
### 2. Condensate Discharge

As condensate enters the trap, the float rises due to buoyancy, opening the orifice and allowing condensate to be discharged. Increasing condensate inflow causes the float to rise more further enlargening the opening. In this manner, continuous condensate discharge occurs while the opening size of the orifice varies depending on the condensate flow rate.



### 3. Closed Position



When the condensate flow rate decreases, the float falls, closing off the orifice opening. A water seal is maintained at all times over the orifice to help prevent air/gas loss.



 Condensate  
 Air/Gas

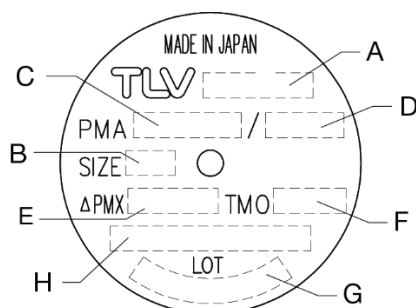


## Specifications

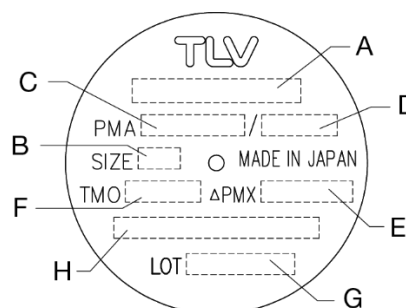
 <b>WARNING</b>	<p>When fluids contacting trap internals are toxic, flammable or otherwise hazardous, use extreme care and follow all site safety procedures before opening the main line or balance line, installing, inspecting or removing the trap from the line or opening the trap or any part or connection of the trap. Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
 <b>CAUTION</b>	<p>Install properly and <b>DO NOT</b> use this product outside the recommended operating pressure, temperature and other specification ranges. This product is for intended use only.</p> <p>Failure to do so may result in discharge of fluid, leading to injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p> <p><b>DO NOT</b> use this product in excess of the maximum operating pressure differential.</p> <p>Such use could make discharge impossible (blocked), and may damage the equipment.</p> <p><b>Use only under conditions in which no freeze-up will occur.</b></p> <p>Freezing may damage the product, leading to fluid discharge, which may cause injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p>

Refer to the product nameplate for detailed specifications.

### GAS1N



### GAS2N/ GAS3N




A	Model
B	Nominal Diameter
C	Maximum Allowable Pressure (PMA) *
D	Maximum Allowable Temperature (TMA) *
E	Maximum Differential Pressure (PMX)
F	Maximum Operating Temperature (TMO)
G	Production Lot No.
H	Valve No.**

\* Maximum allowable pressure (PMA) and maximum allowable temperature (TMA) are PRESSURE SHELL DESIGN CONDITIONS, **NOT** OPERATING CONDITIONS.

\*\* Valve No. is displayed for products with options. This item is omitted from the nameplate when there are no options.

## Minimum Required Condensate Load, Minimum Specific Gravity

 <b>WARNING</b>	<p>For products with a metal orifice, a minimum required condensate load is required to maintain a liquid seal. There is a chance of air/gas leak if the condensate load falls below this rate. Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
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Model		GAS1N	GAS2N	GAS3N
Minimum Required Condensate Load	kg/h	1	5	20
	lb/h	2.2	11	44
Minimum Specific Gravity		0.60	0.55	

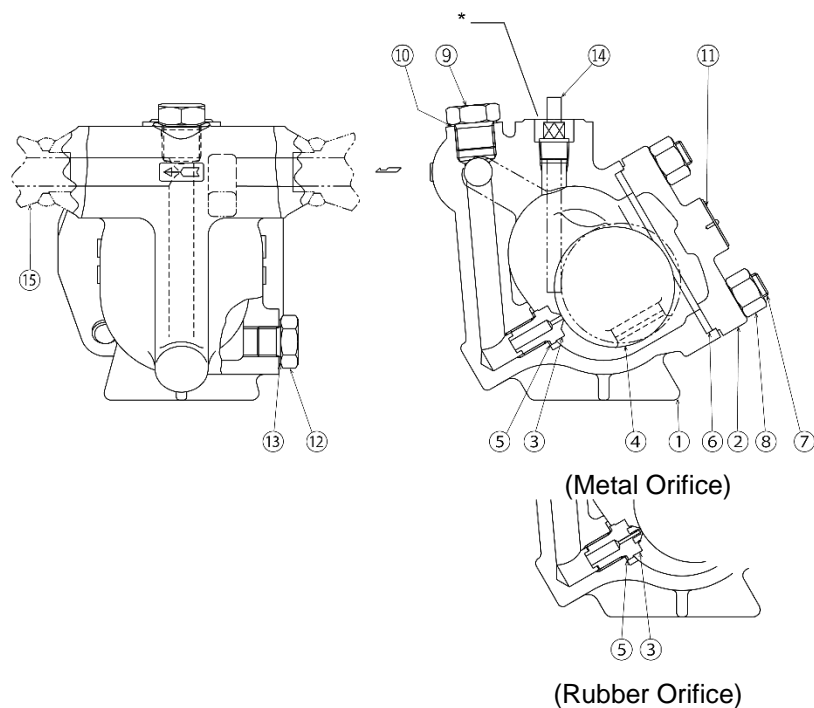
## Configuration



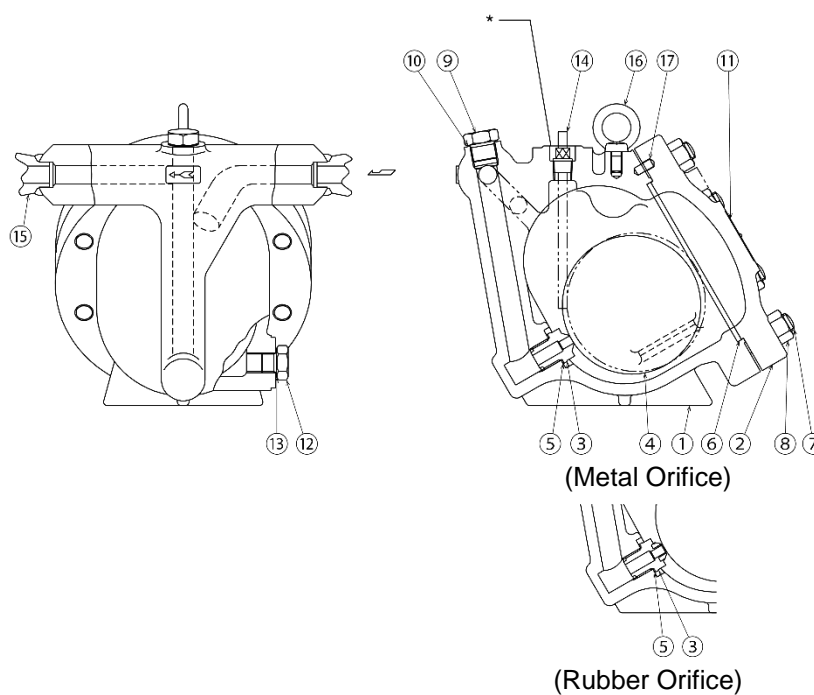
**WARNING**

When fluids contacting trap internals are toxic, flammable or otherwise hazardous, use extreme care and follow all site safety procedures before opening the main line or balance line, installing, inspecting or removing the trap from the line or opening the trap or any part or connection of the trap. Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.

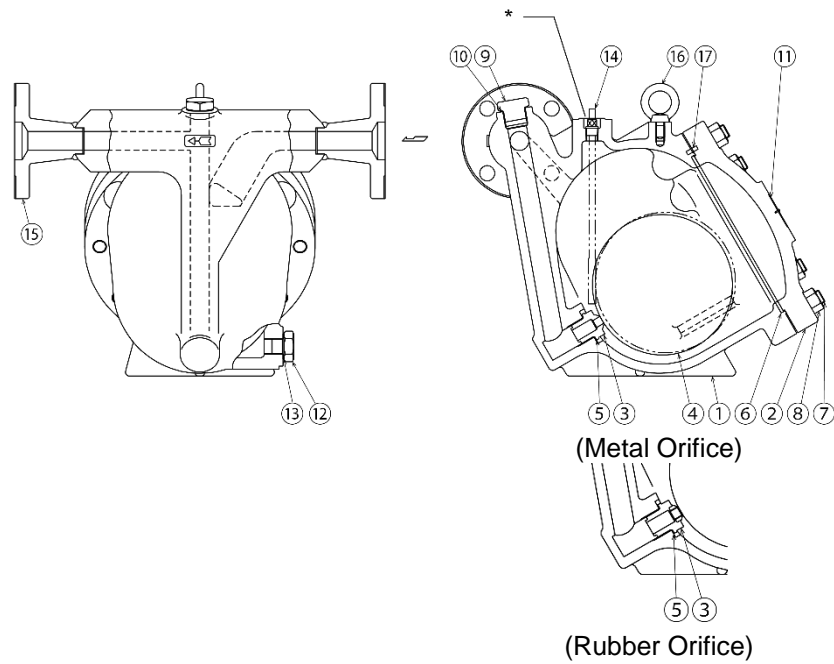
### GAS1N



### GAS2N



## GAS3N





No.	Part Name	No.	Part Name
1	Body	10	Plug Gasket
2	Cover	11	Nameplate
3	Orifice	12	Drain Plug
4	Float	13	Drain Plug Gasket
5	Orifice Gasket	14	Holder Rod
6	Cover Gasket	15	Flange/Socket **
7	Cover Bolt	16	Eye Bolt
8	Cover Nut	17	Guide Pin
9	Plug		

\* Pressure-balancing Line Connection  
(Optional flange-type balancing-line connection also available)

\*\*Socket connection is for GAS1N,GAS2N only

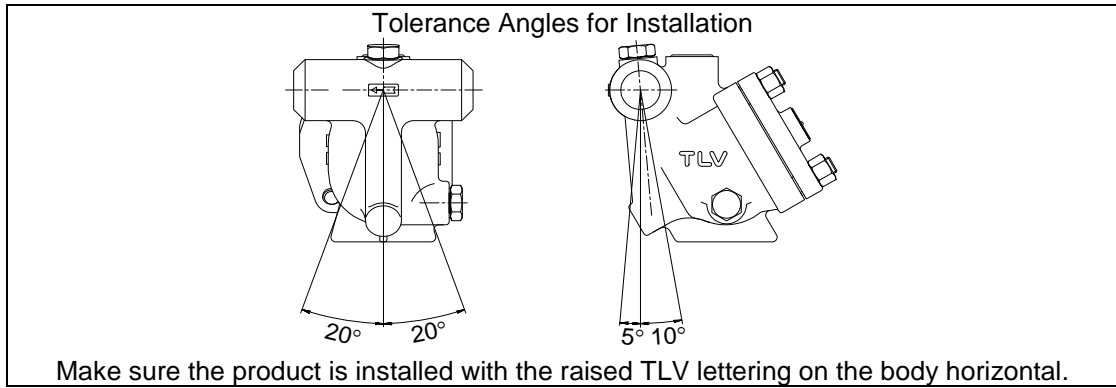
## Installation

 <b>WARNING</b>	<p><b>When fluids contacting trap internals are toxic, flammable or otherwise hazardous, use extreme care and follow all site safety procedures before opening the main line or balance line, installing, inspecting or removing the trap from the line or opening the trap or any part or connection of the trap.</b> Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p><b>Take measures to prevent people from coming into direct contact with product outlets or fluids discharging from product outlets.</b> Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
 <b>CAUTION</b>	<p><b>Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. This product is for intended use only.</b> Failure to do so may result in discharge of fluid, leading to injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p>
	<p><b>Use hoisting equipment for heavy objects (weighing approximately 20 kg (44 lb) or more).</b> Failure to do so may result in back strain, or other injury or damage to property if the object should fall.</p>
	<p><b>DO NOT use excessive force when connecting threaded pipes to the product.</b> Over-tightening may cause breakage leading to fluid discharge, which may cause injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p>


Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by maintenance personnel adequately trained for the product and fluid service in which the product is to be used.

1. Before installation of a new product, be sure to remove all protective seals.
2. Before installing the product, open the inlet valve and blow out the piping to remove any piping scraps, dirt and oil. Close the inlet valve after blowdown.
3. Install the product so the arrow on the body is pointing in the direction of flow.
4. The product should be installed within the allowable angles of inclination, shown on the following page.
5. Install valves, strainers and other pipe components per site safety standards.
6. Remove holder rod and its associated parts (see "Configuration"). The holder rod can be discarded after it is taken out. (The holder rod attached to the product is to protect the valve seat and the float from scratches during transportation.)
7. To ensure proper condensate flow into the product, install a pressure-balancing line. Connect one end of it to the pressure-balancing line port on the product, and connect the opposite end to an air/gas space above any possible condensate accumulation in the system. For more details, see the section "The Need for a Pressure-balancing Line".
8. Prime the product with a small amount of water through the pressure-balancing port or line to ensure a seal. After priming and connecting the pressure-balancing line, open the inlet and outlet valves and check to make sure that the product functions properly.

If there is a problem, determine the cause using the "Troubleshooting" section in this manual.

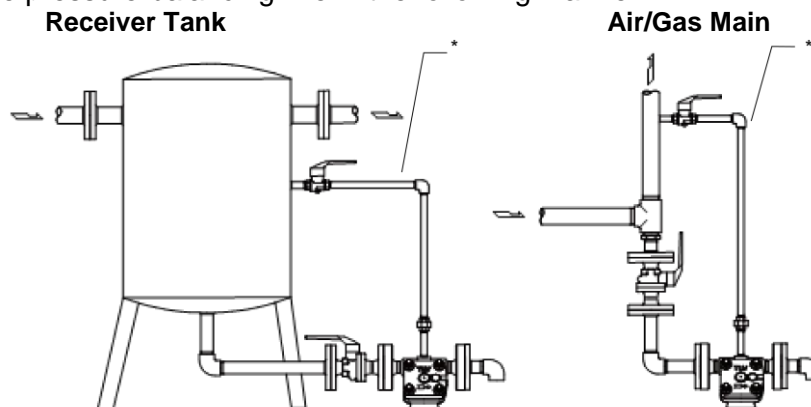


## The Need for a Pressure-balancing Line

 <b>CAUTION</b>	<p>It is important that only vapor is present at the connection point on the receiver tank or gas main. If liquid is present, the trap may not function properly. Failure to do so may result in discharge of fluid, leading to injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p>
	<p><b>The pressure-balancing line must freely drain to the trap. If there is any low point BETWEEN the upper and lower connections, pressure balancing can be hindered and the trap may not drain properly.</b></p> <p>Failure to do so may result in discharge of fluid, leading to injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p>

This product is designed to automatically discharge inflowing condensate. However, if the condensate completely fills the inlet path of the product, air/gas in the product body will not be able to escape, preventing displacement by condensate, and thus preventing condensate from entering the product. This phenomenon is called vapor binding. Vapor binding occurs more often in piping with long horizontal lengths, smaller diameters or multiple bends. To help prevent vapor binding so that air/gas can be displaced by incoming condensate, a pressure-balancing line should be installed between the trap cover and the vapor-only space of the receiver tank or air/gas main.


Connect the pressure-balancing line in the following manner:



\* Pressure-balancing Line



A pressure balancing line must be connected to an air/gas space above any possible condensate accumulation in the system.

## Safety Measures to be Taken at Outlet Side

 <b>WARNING</b>	<p>Follow ALL necessary site safety precautions and measures to ensure the proper handling of fluids discharged from product outlets. Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p>Be sure to take appropriate safety measures according to the characteristics of the fluids on the outlet side at your own responsibility.</p>

Be sure to take appropriate safety measures according to the characteristics of the fluids on the outlet side at your own responsibility.

## Maintenance

 <b>WARNING</b>	<p><b>Before disassembling or removing the product, release pressure from the piping and the product so that internal pressure equals atmospheric pressure and wait until the surface of the product has cooled to room temperature. Especially when dealing with Hazardous Special Kind of Fluids, pay special attention as to whether there are any fluids remaining inside the product and eliminate such fluids before removing the product.</b>                      Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p><b>When fluids contacting trap internals are toxic, flammable or otherwise hazardous, use extreme care and follow all site safety procedures before opening the main line or balance line, installing, inspecting or removing the trap from the line or opening the trap or any part or connection of the trap.</b>                      Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p><b>DO NOT take any product outside of the plant if there is a possibility of Hazardous any other than Special Kind of Applicable Fluids remaining inside. Make sure to clean the product thoroughly before taking it outside of the plant.</b>                      Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p><b>Take measures to prevent people from coming into direct contact with product outlets or fluids discharging from product outlets.</b>                      Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p><b>If the product should require repair, it may result in improper product functioning, causing severe injury and other damage due to the discharge of Hazardous Fluids.</b></p>
 <b>CAUTION</b>	<p><b>Use ONLY TLV replacement parts designed for the specific product in use when repairing the product. DO NOT modify the product.</b>                      Failure to do so may result in discharge of fluid, leading to injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p>

### Operational Check

A visual inspection of the following items should be done on a daily basis to determine whether the product is operating properly or requires repair. Periodically the operation should also be checked by using appropriate diagnostic equipment such as a stethoscope or thermometer.



- Normal : Condensate is discharged continuously and the sound of flow can be heard. If there is very little condensate, there is almost no sound of flow.
- Blocked (Discharge Impossible) : No condensate is discharged.
- Blowing : Air/gas continually flows from the outlet and there is a continuous metallic sound.
- Air/gas Leakage : Air/gas is discharged through the product outlet together with condensate, accompanied by a high-pitched hissing sound.

### Parts Inspection

When parts have been removed, or during periodic inspections, use the following procedures to inspect the parts and replace any that are found to be defective.

Procedure	
Gasket(s):	Check for warping or scratches
Orifice:	Check for warping or scratches
Orifice Opening:	Check for dirt, oil film, wear or scratches
Float:	Check for scratches or dents
Body Interior:	Check for build-up

## Disassembly/Reassembly

 <b>WARNING</b>	<p><b>NEVER apply direct heat to the float.</b> The float may explode due to increased internal pressure, leading to serious accidents such as injuries, burns or chemical burns.</p>
	<p><b>Follow ALL necessary site safety precautions and measures to ensure the proper handling of fluids discharged from product outlets.</b> Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p><b>Before disassembling or removing the product, release pressure from the piping and the product so that internal pressure equals atmospheric pressure and wait until the surface of the product has cooled to room temperature. Especially when dealing with Hazardous Special Kind of Fluids, pay special attention as to whether there are any fluids remaining inside the product and eliminate such fluids before removing the product.</b> Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p><b>If loosening bolts and screws connecting the parts of the product's body, make sure to do so after the product is removed from the piping. Please follow the steps in this instruction manual for reassembly.</b> Failure to do so may result in discharge of fluids leading to serious accidents, burns, chemical burns or fire.</p>
 <b>CAUTION</b>	<p><b>Use hoisting equipment for heavy objects (weighing approximately 20 kg (44 lb) or more).</b> Failure to do so may result in back strain, or other injury or damage to property if the object should fall.</p>
	<p><b>DO NOT use excessive force when connecting threaded pipes to the product.</b> Over-tightening may cause breakage leading to fluid discharge, which may cause injuries, burns, chemical burns, as well as fires, explosions, or other injuries or damage to / destruction due to the discharge of property fluids.</p>
	<p><b>To ensure tight sealing of the cover gasket, cover bolts/nuts should be tightened in crosswise to intermediate torques, repeating the process three times or more until the proper final torque is reached.</b> Uneven tightening of bolts/nuts can cause insufficient sealing leading to fluid discharge, which may cause injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p>
	<p><b>Use ONLY TLV replacement parts designed for the specific product in use when repairing the product. DO NOT modify the product.</b> Failure to do so may result in discharge of fluid, leading to injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p>

Use the following procedures to remove components. Use the same procedures in reverse to reassemble. (Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by maintenance personnel adequately trained for the product and fluid service in which the product is to be used.)

### Removing/Reattaching the Drain Plug

Before removing other parts, be sure to drain the condensate from inside the trap body.

Part	During Disassembly	During Reassembly
Drain Plug 12	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Drain Plug Gasket 13	Remove the gasket and clean sealing surfaces	Replace with a new gasket; coat surfaces with anti-seize



### Removing/Reattaching the Plug

Part	During Disassembly	During Reassembly
Plug 9	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Plug Gasket 10	Remove the gasket and clean sealing surfaces	Replace with a new gasket; coat surfaces with anti-seize

### Removing/Reattaching the Cover and its Components

Part	During Disassembly	During Reassembly
Cover Nut 8	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Cover Bolt 7	Remove only if necessary	Screw into holes in body
Cover 2	Remove the cover	Align the arrows on the body and cover and reattach
Cover Gasket 6	Remove the gasket and clean sealing surfaces	Replace with a new gasket

### Disassembling/Reassembling the Parts inside the Body

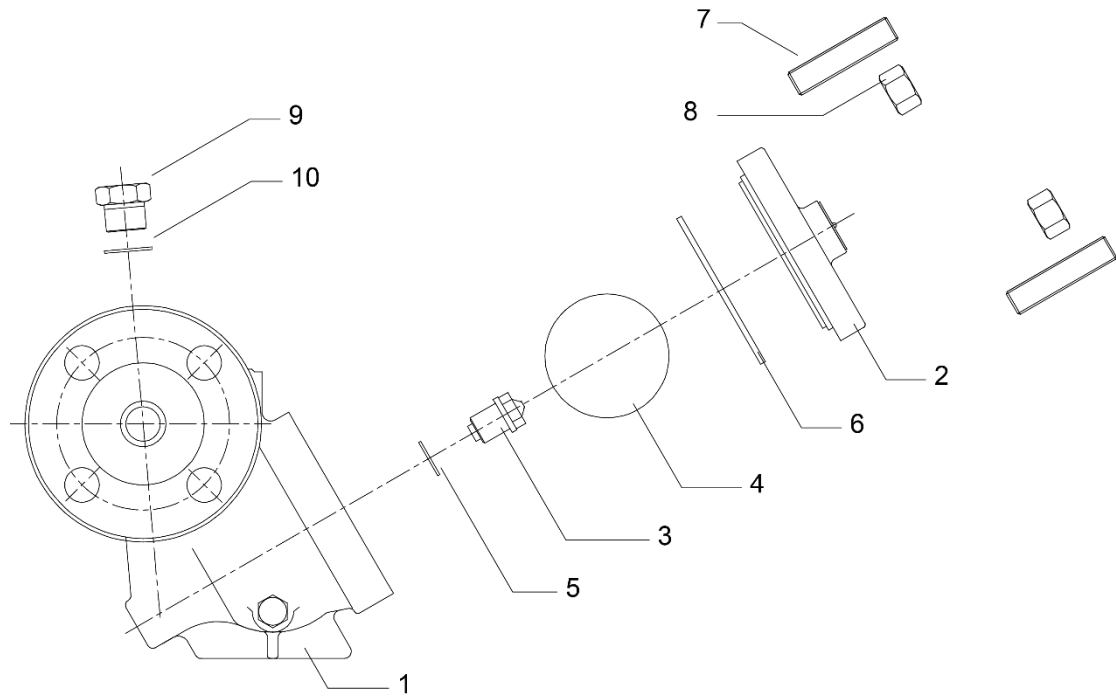
Part	During Disassembly	During Reassembly
Float 4	Remove, being careful not to scratch the polished surface	Insert, being careful not to scratch the polished surface
Orifice 3	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque; be careful not to scratch the surface
Orifice Gasket 5	Remove the gasket and clean sealing surfaces	Replace with a new gasket; coat surfaces with anti-seize

### Table of Tightening Torques

Model	Part Name	Torque		Distance Across Flats	
		N·m	(lbf·ft)	mm	(in)
GAS1N	Cover Nut 8	110	(81)	21	( <sup>13</sup> / <sub>16</sub> )
	Orifice 3	100	(73)	17	( <sup>21</sup> / <sub>32</sub> )
	Plug 9	200	(150)	26	(1)
	Drain Plug 12	100	(73)	26	(1)
GAS2N	Cover Nut 8	200	(150)	24	( <sup>15</sup> / <sub>16</sub> )
	Orifice 3	150	(110)	24	( <sup>15</sup> / <sub>16</sub> )
	Plug 9	200	(150)	26	(1)
	Drain Plug	100	(73)	26	(1)
GAS3N	Cover Nut 8	250	(185)	27	( <sup>11</sup> / <sub>16</sub> )
	Orifice 3	300	(220)	32	( <sup>1</sup> / <sub>4</sub> )
	Plug 9	300	(220)	36	( <sup>113</sup> / <sub>32</sub> )
	Drain Plug 12	150	(110)	30	( <sup>3</sup> / <sub>16</sub> )

NOTE: -Coat all threaded portions with anti-seize. (1 N·m ≈ 10 kg·cm)  
 -The same tightening torque is used for both the metal orifice and the rubber orifice.  
 -If drawings or other special documentation were supplied for the product, any torque given there takes precedence over values shown here.

## Exploded View



No.	Name
1	Body
2	Cover
3	Orifice
4	Float
5	Orifice Gasket
6	Cover Gasket
7	Cover Bolt
8	Cover Nut
9	Plug
10	Plug Gasket

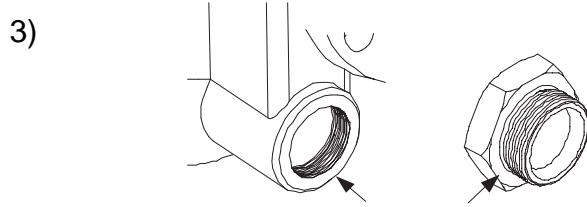
## Instructions for Plug/Holder Disassembly and Reassembly

The seal on the threaded plugs/holders found on TLV products is formed by a flat metal gasket. There are various installation orientations for the gaskets, such as horizontal, diagonal and downward, and the gasket may be pinched in the thread recesses during assembly.

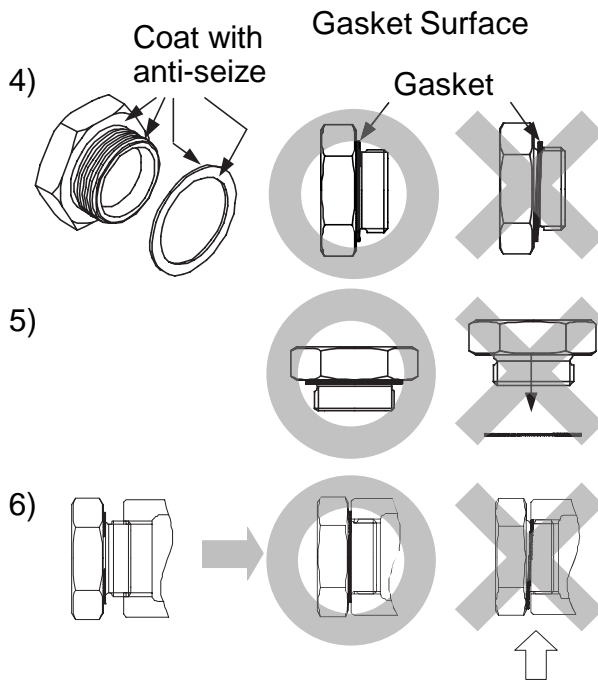
### Instructions for Disassembly and Reassembly

1. Remove the plug/holder using a tool of the specified size (distance across flats).
2. The gasket should not be reused. Be sure to replace it with a new gasket.

3. Clean the gasket surfaces of the plug/holder and the product body using a rag and/or cleaning agents, then check to make sure the surfaces are not scratched or deformed.

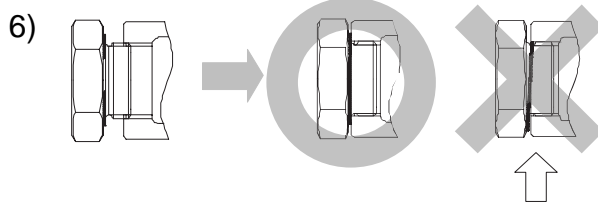


4. Coat both the gasket surface of the plug/holder and the threads of the plug/holder with anti-seize, then press the gasket onto the center of the gasket surface of the plug/holder, making sure the anti-seize affixes the gasket tightly to the plug/holder. Check to make sure the gasket is not caught in the recesses of the threads.



5. Hold the plug/holder upside down to make sure that the anti-seize makes the gasket stick to the plug/holder even when the plug/holder is held upside down.



6. Screw the plug/holder by hand into the product body while making sure that the gasket remains tightly affixed to the center of the gasket surface of the plug/holder. Make sure the entire gasket is making contact with the gasket surface of the product body. It is important at this point to make sure the gasket is not pinched in the thread recesses of the plug/holder.



Do not pinch gasket in threaded recesses

7. Tighten the plug/holder to the proper torque.
8. Next, begin the supply of air/gas and check to make sure there is no leakage from the part just tightened. If there is leakage, immediately close the inlet valve and, if there is a bypass valve, take the necessary steps to release any residual pressure. After the surface of the product cools to room temperature, repeat the procedure beginning from step 1.

## Troubleshooting

 <b>WARNING</b>	<p><b>NEVER apply direct heat to the float.</b> The float may explode due to increased internal pressure, leading to serious accidents such as injuries, burns or chemical burns.</p>
	<p><b>Follow ALL necessary site safety precautions and measures to ensure the proper handling of fluids discharged from product outlets.</b> Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p><b>Before disassembling or removing the product, release pressure from the piping and the product so that internal pressure equals atmospheric pressure and wait until the surface of the product has cooled to room temperature. Especially when dealing with Hazardous Special Kind of Fluids, pay special attention as to whether there are any fluids remaining inside the product and eliminate such fluids before removing the product.</b> Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
	<p><b>If loosening bolts and screws connecting the parts of the product's body, make sure to do so after the product is removed from the piping. Please follow the steps in this instruction manual for reassembly.</b> Failure to do so may result in discharge of fluids leading to serious accidents, burns, chemical burns or fire.</p>
	<p><b>For products with a metal orifice, a minimum required condensate load is required to maintain a liquid seal. There is a chance of air/gas leak if the condensate load falls below this rate.</b> Failure to do so may result in discharge of fluids leading to serious accidents such as injuries, burns, chemical burns or fire.</p>
 <b>CAUTION</b>	<p><b>Use ONLY TLV replacement parts designed for the specific product in use when repairing the product. DO NOT modify the product.</b> Failure to do so may result in discharge of fluid, leading to injuries, burns, chemical burns, as well as fires or other damage to / destruction of property.</p>

When the product fails to operate properly, use the following table to locate the cause and remedy.

Problem	Cause	Remedy
No condensate is discharged (blocked) or discharge is poor	The float is damaged or filled with condensate	Replace with a new float
	The orifice opening, screen or piping are clogged with rust and scale	Clean parts
	The product operating pressure exceeds the maximum specified pressure or there is insufficient pressure differential between the product inlet and outlet	Compare specifications and actual operating conditions
	Vapor binding has occurred	Make sure a pressure-balancing line is installed; if already installed, make sure it has not become dislodged or is not incorrectly installed
	The specific gravity of the fluid is not suitable for this product	Compare the specific gravity when the product is initially selected with actual operating conditions

Continued on the next page

<b>Problem</b>	<b>Cause</b>	<b>Remedy</b>
Air/gas is discharged or leaks from the outlet (blowing) (air/gas leakage)	Build-up on the seating surface of the orifice or rust and scale build-up beneath the float	Clean parts
	The orifice is scratched or damaged	Replace with a new orifice
	The float is misshapen or has surface build-up	Clean or replace with a new float
	Improper installation orientation	Correct the installation
	Trap vibration	Lengthen the inlet piping and fasten it securely
	There is no condensate in the product body, no water seal around the orifice	Prime the trap
Air/gas is leaking from a place other than the outlet	Gasket deterioration or damage	Replace with new gasket(s)
	Improper tightening torques were used	Tighten to the proper torque
	There are scratches on the sealing surfaces	If leaking continues even after replacing the gasket, replace the product
Float frequently becomes damaged	Water hammer has occurred	Study and correct the piping

## TLV EXPRESS LIMITED WARRANTY

Subject to the limitations set forth below, TLV Corporation, a North Carolina corporation (“**TLV**”) warrants that products which are sold by it, TLV CO., LTD., a Japanese corporation (“**TLVJ**”) or TLV International, Inc., a Japanese corporation (“**TII**”), (hereinafter the “**Products**”) are designed and manufactured by TLVJ, conform to the specifications published by TLV for the corresponding part numbers (the “**Specifications**”) and are free from defective workmanship and materials. With regard to products or components manufactured by unrelated third parties (the “**Components**”), TLV provides no warranty other than the warranty from the third party manufacturer(s), if any.

### Exceptions to Warranty

This warranty does not cover defects or failures caused by:

1. improper shipping, installation, use, handling, etc., by other than TLV or service representatives authorized by TLV; or
2. dirt, scale or rust, etc.; or
3. improper disassembly and reassembly, or inadequate inspection and maintenance by other than TLV or service representatives authorized by TLV; or
4. disasters or forces of nature or Acts of God; or
5. abuse, abnormal use, accidents or any other cause beyond the control of TLV; or
6. improper storage, maintenance or repair; or
7. operation of the Products not in accordance with instructions issued with the Products or with accepted industry practices; or
8. use for a purpose or in a manner for which the Products were not intended; or
9. use of the Products in a manner inconsistent with the Specifications; or
10. use of the Products with Hazardous Fluids (fluids other than steam, air, water, nitrogen, carbon dioxide and inert gases (helium, neon, argon, krypton, xenon and radon)); or
11. failure to follow the instructions contained in the TLV Instruction Manual for the Product.

### Duration of Warranty

This warranty is effective for a period of the earlier of: (i) three (3) years after delivery of Products to the first end user in the case of sealed SST-Series Products for use in steam pressure service up to 650 psig; (ii) two (2) years after delivery of Products to the first end user in the case of PowerTrap® units; or (iii) one (1) year after delivery of Products to the first end user in the case of all other Products. Notwithstanding the foregoing, asserting a claim under this warranty must be brought by the earlier of one of the foregoing periods, as applicable, or within five (5) years after the date of delivery to the initial buyer if not sold initially to the first end user.

ANY IMPLIED WARRANTIES NOT NEGATED HEREBY WHICH MAY ARISE BY OPERATION OF LAW, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY EXPRESS WARRANTIES NOT NEGATED HEREBY, ARE GIVEN SOLELY TO THE INITIAL BUYER AND ARE LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF SHIPMENT BY TLV.

### Exclusive Remedy

THE EXCLUSIVE REMEDY UNDER THIS WARRANTY, UNDER ANY EXPRESS WARRANTY OR UNDER ANY IMPLIED WARRANTIES NOT NEGATED HEREBY (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), IS **REPLACEMENT**; PROVIDED: (a) THE CLAIMED DEFECT IS REPORTED TO TLV IN WRITING WITHIN THE APPLICABLE WARRANTY PERIOD, INCLUDING A DETAILED WRITTEN DESCRIPTION OF THE CLAIMED DEFECT AND HOW

AND WHEN THE CLAIMED DEFECTIVE PRODUCT WAS USED; AND (b) THE CLAIMED DEFECTIVE PRODUCT AND A COPY OF THE PURCHASE INVOICE IS RETURNED TO TLV, FREIGHT AND TRANSPORTATION COSTS PREPAID, UNDER A RETURN MATERIAL AUTHORIZATION AND TRACKING NUMBER ISSUED BY TLV. ALL LABOR COSTS, SHIPPING COSTS, AND TRANSPORTATION COSTS ASSOCIATED WITH THE RETURN OR REPLACEMENT OF THE CLAIMED DEFECTIVE PRODUCT ARE SOLELY THE RESPONSIBILITY OF BUYER OR THE FIRST END USER. TLV RESERVES THE RIGHT TO INSPECT ON THE FIRST END USER'S SITE ANY PRODUCTS CLAIMED TO BE DEFECTIVE BEFORE ISSUING A RETURN MATERIAL AUTHORIZATION. SHOULD SUCH INSPECTION REVEAL, IN TLV'S REASONABLE DISCRETION, THAT THE CLAIMED DEFECT IS NOT COVERED BY THIS WARRANTY, THE PARTY ASSERTING THIS WARRANTY SHALL PAY TLV FOR THE TIME AND EXPENSES RELATED TO SUCH ON-SITE INSPECTION.

### **Exclusion of Consequential and Incidental Damages**

IT IS SPECIFICALLY ACKNOWLEDGED THAT THIS WARRANTY, ANY OTHER EXPRESS WARRANTY NOT NEGATED HEREBY, AND ANY IMPLIED WARRANTY NOT NEGATED HEREBY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, DO NOT COVER, AND NEITHER TLV, TII NOR TLVJ WILL IN ANY EVENT BE LIABLE FOR, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST PROFITS, THE COST OF DISASSEMBLY AND SHIPMENT OF THE DEFECTIVE PRODUCT, INJURY TO OTHER PROPERTY, DAMAGE TO BUYER'S OR THE FIRST END USER'S PRODUCT, DAMAGE TO BUYER'S OR THE FIRST END USER'S PROCESSES, LOSS OF USE, OR OTHER COMMERCIAL LOSSES. WHERE, DUE TO OPERATION OF LAW, CONSEQUENTIAL AND INCIDENTAL DAMAGES UNDER THIS WARRANTY, UNDER ANY OTHER EXPRESS WARRANTY NOT NEGATED HEREBY OR UNDER ANY IMPLIED WARRANTY NOT NEGATED HEREBY (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) CANNOT BE EXCLUDED, SUCH DAMAGES ARE EXPRESSLY LIMITED IN AMOUNT TO THE PURCHASE PRICE OF THE DEFECTIVE PRODUCT. THIS EXCLUSION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES, AND THE PROVISION OF THIS WARRANTY LIMITING REMEDIES HEREUNDER TO REPLACEMENT, ARE INDEPENDENT PROVISIONS, AND ANY DETERMINATION THAT THE LIMITATION OF REMEDIES FAILS OF ITS ESSENTIAL PURPOSE OR ANY OTHER DETERMINATION THAT EITHER OF THE ABOVE REMEDIES IS UNENFORCEABLE, SHALL NOT BE CONSTRUED TO MAKE THE OTHER PROVISIONS UNENFORCEABLE.

### **Exclusion of Other Warranties**

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED.

### **Severability**

Any provision of this warranty which is invalid, prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such invalidity, prohibition or unenforceability without invalidating the remaining provisions hereof, and any such invalidity, prohibition or unenforceability in any such jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction.

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