



# Instruction Manual

Sight Glass  
**T8N/TF8N/T10N/TF10N**

(Optional Models)  
**T8NL/TF8NL/T10NL/TF10NL**

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## Introduction

Thank you for purchasing the TLV sight glass.

This product has been thoroughly inspected 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 sight glass is for installation in fluid piping to check the line flow and at the outlet side of steam traps to monitor trap performance.





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 trained maintenance personnel.
- The precautions listed in this manual are designed to ensure safety and prevent equipment damage and personal injury. For situations that may occur as a result of erroneous handling, 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

	Indicates a <b>DANGER, WARNING or CAUTION</b> item.
	Indicates an urgent situation which poses a threat of death or serious injury
	Indicates that there is a potential threat of death or serious injury
	Indicates that there is a possibility of injury or equipment / product damage

	<p><b>As glass parts will wear and deteriorate in quality, they should be replaced annually.</b></p> <p><b>Be careful not to damage the glass by striking it with objects or inflicting any other shocks.</b></p> <p><b>Use only under conditions in which no water hammer will occur.</b></p> <p><b>Avoid rapid cooling of the glass by pouring water on it, etc.</b></p> <p><b>Be sure to observe the proper tightening torque for the glass holder.</b></p> <p>If the glass becomes damaged, subsequent fluid discharge could result in injury or other damage.</p>
	<p><b>Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges.</b></p> <p>Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.</p> <p><b>Take measures to prevent people from coming into direct contact with product outlets.</b></p> <p>Failure to do so may result in burns or other injury from the discharge of fluids.</p>

Continued on the next page

 <b>CAUTION</b>	<p><b>When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature.</b> Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.</p>
	<p><b>Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way.</b> Failure to observe these precautions may result in damage to the product and burns or other injury due to malfunction or the discharge of fluids.</p>
	<p><b>Use only under conditions in which no freeze-up will occur.</b> Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.</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 burns or other injury.</p>
	<p><b>Use only under conditions in which no water hammer will occur.</b> The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.</p>

## Checking the Piping



Use only under conditions in which no water hammer will occur. If the glass becomes damaged, subsequent fluid discharge could result in injury or other damage.

Check to make sure that the piping to which the product is to be connected has been installed properly.

1. Is the pipe diameter suitable?
2. Has sufficient space been secured for maintenance?
3. Have maintenance valves been installed at the inlet and outlet?

## Specifications



As glass parts will wear and deteriorate in quality, they should be replaced annually. If the glass becomes damaged, subsequent fluid discharge could result in injury or other damage.

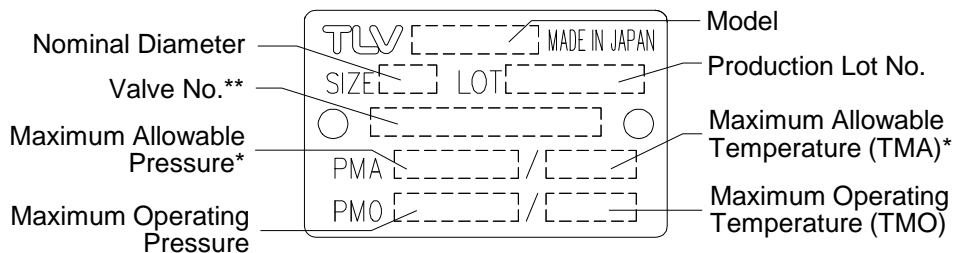


Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions which may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.



Use only under conditions in which no freeze-up will occur. Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.

Refer to the product nameplate for detailed specifications.

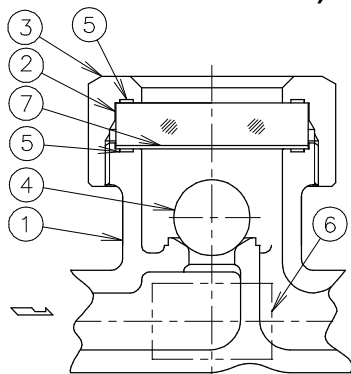


\* Maximum allowable pressure (PMA) and maximum allowable temperature (TMA) are PRESSURE SHELL DESIGN CONDITIONS, **NOT** OPERATING CONDITIONS.

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

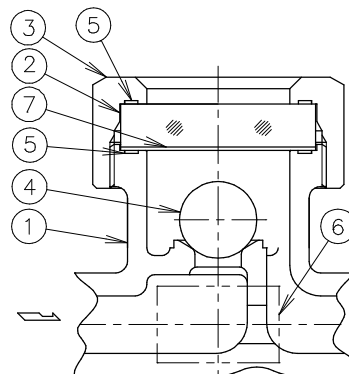
## Configuration

### T8N/TF8N (Optional Models: T8NL/TF8NL)



No.	Name	R
1	Body	
2	Sight Glass	✓
3	Glass Holder	

### T10N/TF10N (Optional Models: T10NL/TF10NL)



No.	Name	R
4	Ball	✓
5	Gasket	✓

No.	Name	R
6	Nameplate	
7	Guard Plate	✓

R: Part included in repair kit; parts not available separately

NOTE: Construction of the T10N/TF10N/T10NL/TF10NL differs from that of the T8N/TF8N/T8NL/TF8NL only in that there is a through-hole in the partition between the inlet and outlet, making them suitable for use with large flow rates.

## Installation



**WARNING**

As glass parts will wear and deteriorate in quality, they should be replaced annually. If the glass becomes damaged, subsequent fluid discharge could result in injury or other damage.



**CAUTION**

Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions which may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.



**CAUTION**

Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.



**CAUTION**

Do not use excessive force when connecting threaded pipes to the product. Over-tightening may cause breakage leading to fluid discharge, which may cause burns or other injury.

Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.

1. Before installation, 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. Install on horizontal piping with the glass portion facing up.
5. Open the inlet valve and check to make sure that the product functions properly.
6. As sight glasses deteriorate with use, they should be replaced annually to ensure safety.

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

## Maintenance



**WARNING**

As glass parts will wear and deteriorate in quality, they should be replaced annually. Be careful not to damage the glass by striking it with objects or inflicting any other shocks. If the glass becomes damaged, subsequent fluid discharge could result in injury or other damage.



**CAUTION**

Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.



**CAUTION**

Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product or burns or other injury due to malfunction or the discharge of fluids.

## 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 has failed. Periodically (at least biannually) the operation should also be checked visually or by using diagnostic equipment, such as a stethoscope.

If the product should fail, it may cause damage to piping and equipment, resulting in faulty or low quality products or losses.

**Normal** : When flowing fluid is present, the ball moves. (The sound of flow can be heard.) (For T10N/TF10N/T10NL/TF10NL, when the flow of condensate is light, the sound of flow can be heard but the ball may not float.)

**Failure** : - Fluid leaks to the outside of the product.  
 - The ball is not visible.  
 - The ball does not move.

## Parts Inspection

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

Procedure	
Gaskets:	Check for warping or damage
Glass:	Check for fractures or cracks
Guard Plate:	Check for fractures or cracks
Ball:	Check for deformation

## Disassembly/Reassembly



**WARNING** As glass parts will wear and deteriorate in quality, they should be replaced annually. Be careful not to damage the glass by striking it with objects or inflicting any other shocks. If the glass becomes damaged, subsequent fluid discharge could result in injury or other damage.



**CAUTION** When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature. Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.

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 trained maintenance personnel.)

### Disassembly/Reassembly

Part	During Disassembly	During Reassembly
Glass Holder	Remove with a wrench	Consult the table of tightening torques and tighten to the proper torque
Gasket	Remove the gasket and clean sealing surfaces	Replace with a new gasket if warped or damaged
Sight Glass	Remove, being careful not to scratch the surface	Reinsert, being careful not to scratch the surface
Guard Plate	Remove the guard plate	Replace with a new guard plate
Gasket	Remove the gasket and clean sealing surfaces	Replace with a new gasket if warped or damaged
Ball	Remove the ball	Replace with a new ball if badly worn

### Table of Tightening Torques



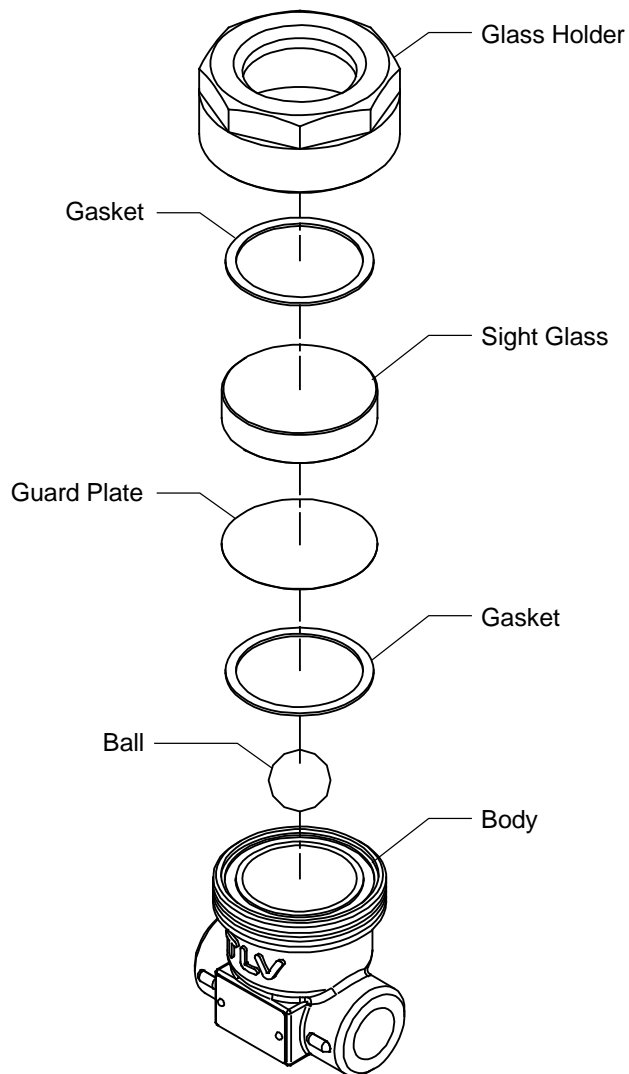
**WARNING** Be sure to observe the proper tightening torque for the glass holder. If the glass becomes damaged, subsequent fluid discharge could result in injury or other damage.

Model	Size mm (in)	Glass Holder	
		Torque N·m (lbf·ft)	Distance Across Flats mm (in)
T8N/TF8N/T10N/TF10N (Optional Models: T8NL/TF8NL/T10NL/TF10NL)	15 – 50 (3/4 – 2)	120 (88)	60 (2 <sup>3</sup> / <sub>8</sub> )

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



Exploded View



## Troubleshooting



As glass parts will wear and deteriorate in quality, they should be replaced annually. Be careful not to damage the glass by striking it with objects or inflicting any other shocks. If the glass becomes damaged, subsequent fluid discharge could result in injury or other damage.



When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature. Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.

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

Problem	Cause	Remedy
Ball is not visible (Glass is dirty)	The glass is dirty	Clean the glass
	The guard plate is dirty	Clean the guard plate
	There is an build-up of dirt inside the body	Clean
Leaks to the outside of the product	Deterioration or damage to gaskets	Replace with new gaskets
	Improper glass holder tightening torque was used	Tighten to the proper torque
	The glass displays wear, cracks or other damage	Replace with a new glass
	The guard plate displays wear, cracks or other damage	Replace with a new guard plate
Sight glass is damaged	The operating pressure or temperature exceed the maximum specified operating conditions	Compare specifications and actual operating conditions
	The glass has outlived its projected service life	Replace with a new glass
Ball does not move* (T8N/TF8N/T8NL/TF8NL)	The body is clogged with dirt, or there is a build-up on the ball	Clean parts

\* For the T10N/TF10N/T10NL/TF10NL, when the condensate load is low, the ball does not move

NOTE: When replacing parts with new, use the parts list for reference, and replace with parts from the repair kit. Please note that replacement parts are only available as part of the repair kit.

## TLV EXPRESS LIMITED WARRANTY

Subject to the limitations set forth below, TLV CO., LTD., a Japanese corporation (“**TLV**”), warrants that products which are sold by it, TLV International Inc. (“**TII**”) or one of its group companies excluding TLV Corporation (a corporation of the United States of America), (hereinafter the “**Products**”) are designed and manufactured by TLV, conform to the specifications published by TLV for the corresponding part numbers (the “**Specifications**”) and are free from defective workmanship and materials. The party from whom the Products were purchased shall be known hereinafter as the “**Seller**”. 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 persons other than TLV, TII or TLV group company personnel, 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 persons other than TLV or TLV group company personnel, 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, TII or TLV group companies; 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 one (1) year after delivery of Products to the first end user. Notwithstanding the foregoing, asserting a claim under this warranty must be brought within three (3) 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 THE SELLER.

### 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 THE SELLER IN WRITING WITHIN THE 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 THE SELLER, FREIGHT AND TRANSPORTATION COSTS PREPAID, UNDER A RETURN MATERIAL AUTHORIZATION AND TRACKING NUMBER ISSUED BY THE SELLER. 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. THE SELLER 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 THE SELLER'S REASONABLE DISCRETION, THAT THE CLAIMED DEFECT IS NOT COVERED BY THIS WARRANTY, THE PARTY ASSERTING THIS WARRANTY SHALL PAY THE SELLER 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 ITS TLV GROUP COMPANIES 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.

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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.

## Service

For Service or Technical Assistance: Contact your TLV representative or your regional TLV office.

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