



# Instruction Manual

## Forged Steel Manifold **M4/M8/M12**

## Contents

Introduction .....	1
Safety Considerations .....	2
Specifications .....	4
Configuration .....	5
Installation .....	6
Maintenance.....	7
Disassembly/Reassembly .....	8
Troubleshooting .....	9
TLV EXPRESS LIMITED WARRANTY.....	10
Service .....	12

## Introduction

Thank you for purchasing the TLV forged steel manifold.

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.

The TLV forged steel manifold incorporates maintenance-free bellows-sealed valves at each station connection. When used as a condensate collection manifold, this product consolidates steam trap locations at lower installation heights, making traps more accessible, easier to install, isolate, test and troubleshoot.

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.

If steam traps and valves were supplied with this manifold as part of a package unit, please refer to the separate product manuals for the proper instructions for each product.


## 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</b> , <b>WARNING</b> or <b>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>Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges.</b> 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>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 if the object should fall.</p> <p><b>Take measures to prevent people from coming into direct contact with product outlets.</b> Failure to do so may result in burns or other injury from the discharge of fluids.</p> <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>

Continued on the next page

	<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>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 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 stand on or apply body weight to the handwheel.</b> The handwheel may break, resulting in injury or other accidents.</p>
	<p><b>Do not carry the product by its handwheel.</b> The handwheel may turn causing the balance to shift and the product to be dropped, resulting in injury or other accidents.</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>

## Specifications



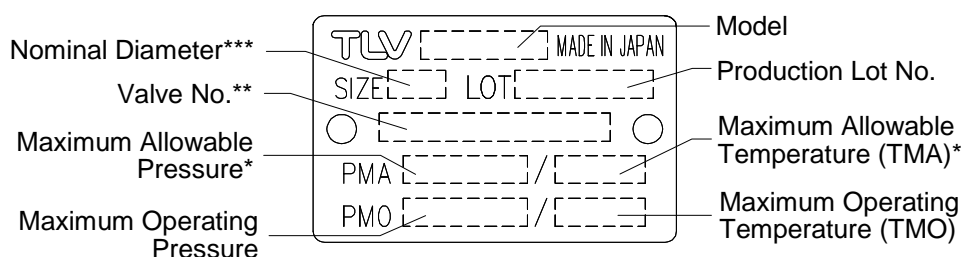
Install properly and **DO NOT** use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions which may lead to serious accidents. Local regulations may restrict the use of this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

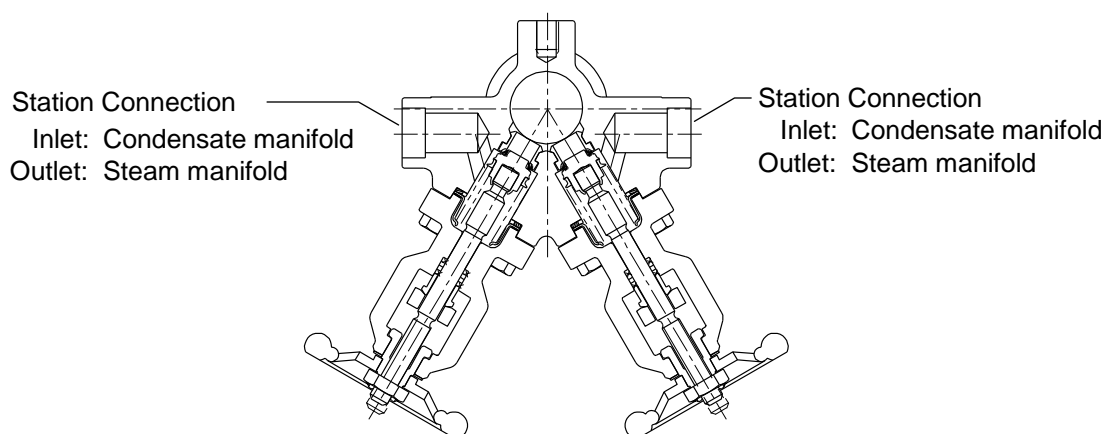
NOTE: Specifications given on the nameplate are for the forged steel manifold only; refer to the nameplates on any attached steam traps or valves for each unit's specifications.



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

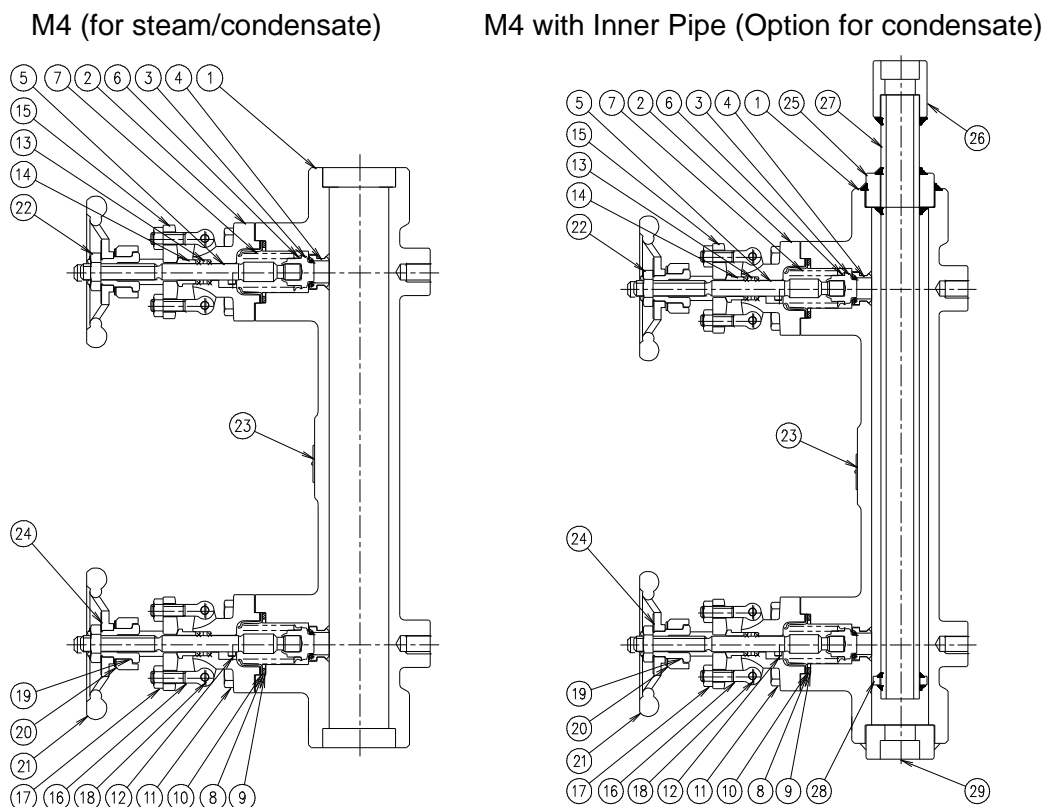
\*\* Valve No. is displayed for products with options. This item is omitted from the nameplate when there are no options.

\*\*\* The size is for the station connection (condensate inlet/steam outlet) as indicated below.



## Configuration

The M4 is the 4-way manifold (with four station connections, each with an individual valve unit). The model name reflects the amount of connections: the M8 is an 8-way, and the M12 is a 12-way manifold.



No.	Name	R**	No.	Name	R**
1	Body		16	Gland Eye Bolt*	✓
2	Valve Bonnet*	✓	17	Gland Nut*	✓
3	Valve Plug*	✓	18	Gland Eye Bolt Pin*	✓
4	Valve Seat		19	Handwheel Yoke*	✓
5	Valve Stem*	✓	20	Handwheel Washer*	✓
6	Bellows Ring*	✓	21	Handwheel*	✓
7	Bellows*	✓	22	Handwheel Nut*	✓
8	Bellows Flange*	✓	23	Nameplate	
9	Lower Bonnet Gasket*	✓	24	Design Plate*	✓
10	Upper Bonnet Gasket*	✓	25	Siphon Tube Spacer	
11	Bonnet Bolt*	✓	26	Siphon Tube Ring	
12	Bonnet Pin*	✓	27	Siphon Tube	
13	Gland Packing*	✓	28	Siphon Tube Guide	
14	Gland Bushing*	✓	29	Socket	
15	Gland Flange*	✓			

\* Valve Unit

\*\* Repair parts are only available together as part of a repair parts kit.

NOTE: The repair kit contains parts for repairing only one valve unit. Repair kits equal to the number of valve units needing repair are required.

## Installation



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 hoisting equipment for heavy objects (weighing approximately 20 kg (44 lb) or more). Failure to do so may result in back strain or other injury if the object should fall.



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.



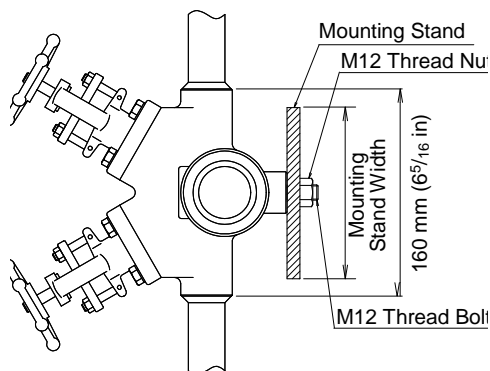
Do not use excessive force when connecting threaded pipes to the product. Over-tightening may cause breakage leading to fluid discharge, which may cause burns or other injury.



Do not stand on or apply body weight to the handwheel. The handwheel may break, resulting in injury or other accidents.

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

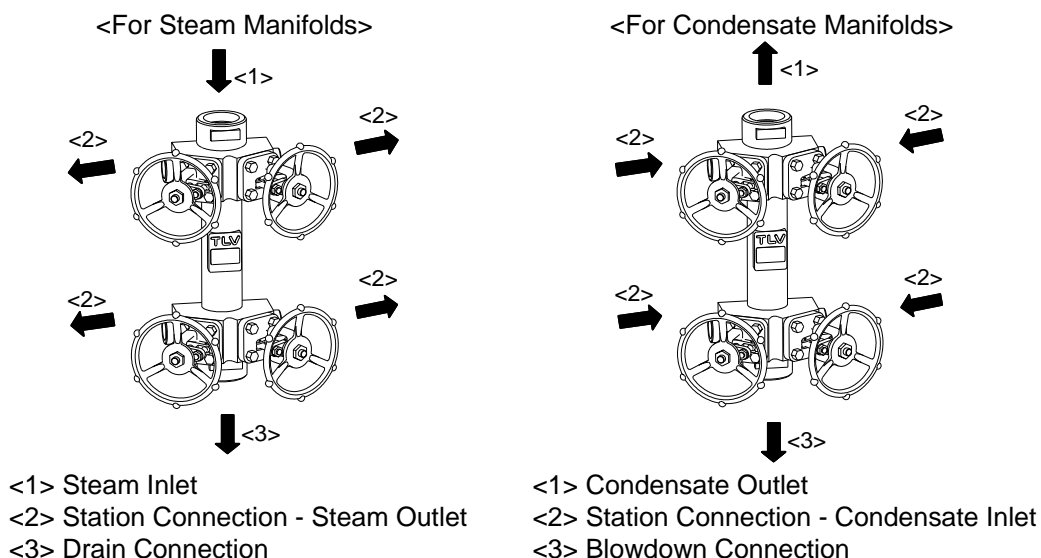
1. Before installation, be sure to remove all protective seals.
2. Before installing the product, blow out the piping to remove any piping scraps, dirt and oil.
3. Prepare a mounting stand. The mounting stand should be less than 160 mm (6 <sup>5</sup>/<sub>16</sub> in) wide (the face-to-face distance between station connections). If a wider mounting stand is used, it may interfere with any steam trap station connected to the manifold.
4. Using M12 bolts, attach the manifold to the mounting stand. Install vertically with the raised TLV lettering on the body right-side up and horizontal.



**NOTE:** If the manifold is to be mounted in some way other than as described here, be sure to consider and secure sufficient space for the installation, operation and maintenance of required steam traps and valves.

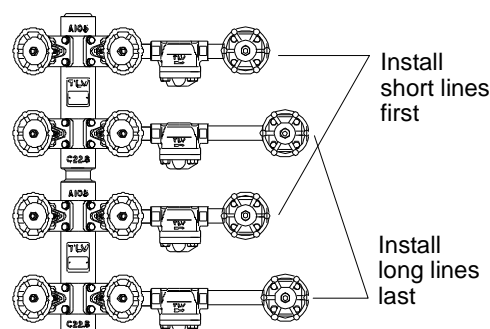
5. Complete the installation by installing the required steam traps and valves. For steam applications, install a stop valve at the steam inlet, and a steam trap and stop valve at the drain connection. For condensate applications, install stop valves at the condensate outlet and blowdown connections, and a steam trap station (steam trap and stop valve) at each station connection. (See the diagram on the next page for details regarding connection locations.)
6. Open the inlet and the outlet valves and verify proper operation.

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



### Note for Screwed Connections

There may be clearance problems when installing traps and valves with threaded connections. To prevent any obstructions, such as valve handles contacting products installed on lines above or below, offset each line slightly. Install all short lines first, then longer lines. Offsetting lines is not necessary when installing products with socket welded connections.



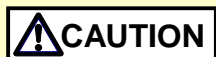
### Maintenance



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.



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.



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.

### 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	
Gasket(s):	Check for warping or damage
Bellows:	Check for cracking, warping or other damage
Valve Seat, Valve Plug:	Check for build-up, scratches or wear
Body Interior:	Check for build-up or scale



## Disassembly/Reassembly



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.

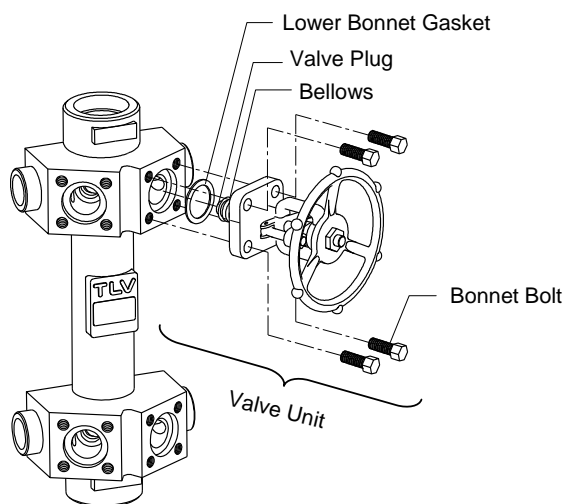


Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product or burns or other injury due to malfunction or the discharge of fluids.

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.)

### Removing/Reinserting the Valve Unit

Part	During Disassembly	During Reassembly
Bonnet Bolt	Remove with a 12 mm ( $15/32$ in) socket wrench	Coat threads with anti-seize; tighten to a torque of 60 N·m (44 lbf·ft)
Valve Unit	Pull straight out being careful not to scratch the valve plug or scratch or dent the bellows	Insert the valve plug into the body, being careful not to scratch or dent the bellows
Lower Bonnet Gasket	Remove the gasket and clean sealing surfaces	Replace with a new gasket



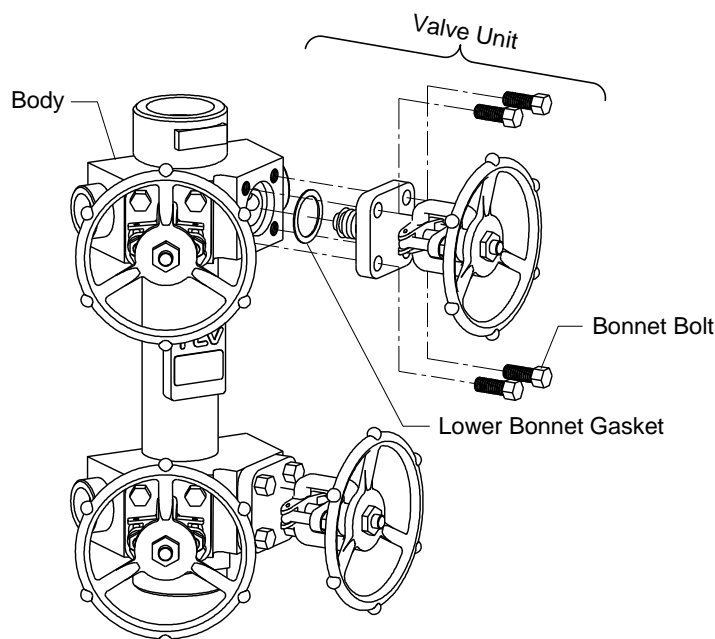
### Table of Tightening Torques

Part	Torque		Distance Across Flats	
	N·m	(lbf·ft)	mm	(in)
Bonnet Bolt	60	(44)	12	( $15/32$ )

(1 N·m  $\approx$  10 kg·cm)

NOTE: - Coat all threaded portions with anti-seize.  
 - If drawings or other special documentation were supplied for the product, any torque given there takes precedence over values shown here.

## Exploded View



## Troubleshooting



**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.**

If the product fails to operate properly after installation, use the following table to locate the cause and remedy.

Problem	Cause	Remedy
Fluid leaks from the outlet when the handwheel is in the valve fully closed position	There is a build-up on the valve seat or valve plug	Clean replace with a new valve unit
	The valve plug is scratched or damaged	Replace with a new valve unit
	The valve seat is scratched or damaged	Recommend disconnect piping and plug the station connection until manifold can be replaced
Fluid leaks from the gland area	There is build-up on the gland packing, or it is scratched or worn, or the bellows is damaged	Further tighten the gland nut, or replace with a new valve unit
The valve does not open/close or is stuck in a partially open position	There is a build-up on the valve seat or the valve plug	Clean or replace each part; apply grease to the stem screw
Fluid leaks from the bonnet flange	Gasket deterioration or damage	Replace with a new gasket
	Improper tightening torques were used	Tighten to the proper torque

**NOTE:** When replacing parts with new, use the parts list for reference, and replace with parts from the replacement kit. Please note that replacement part are only available as part the repair parts kit. Also note that each repair kit contains parts for repairing only one valve unit. Repair kits equal to the number of valve units needing repair are required.

## 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.

**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.

## Service

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

### In Europe:

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