



Instruction Manual

Ball Butterfly Pneumatic Valve **PB11**

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Introduction

Thank you for purchasing the TLV ball butterfly pneumatic valve.

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 ball butterfly pneumatic valve incorporates a ball butterfly valve, which offers a combination of the superior sealing properties of the ball valve and the smooth rotary movement of the butterfly valve, with a pneumatic actuator.





For products with special order specifications or options, if detailed instructions for the special order specifications or options are not be contained in this manual, please contact TLV for full details.


This instruction manual is intended for use with the models 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 DANGER , WARNING or CAUTION 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

	DO NOT use for toxic, flammable or otherwise hazardous fluids. Use only for fluids listed in the specification table. This product is for intended use only. Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents.
	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 that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.
	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.
	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.

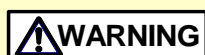
Continued on the next page

 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 and 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.
	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.
	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 burns or other injury.
	When using this product, be sure NEVER to stand close to, or leave tools anywhere near, moving parts such as a shaft. Contact with moving parts or objects becoming caught in moving parts could lead to injury, damage or other accidents.

Special Features

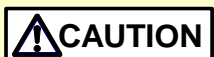
1. Combination of the superior sealing properties of the ball valve and the smooth rotary movement of the butterfly valve.
2. Valve seat securely held by flexible belleville washer; the washer prevents the fluorine resin (PTFE) valve seat from heat expansion and deformation, providing tight sealing over an extended period.
3. Double-sealed gland; packing + flexible seal prevents leakage from spindle even under heat-cycle
4. High-speed valve opening and closing. (Automatic pneumatic ON-OFF control.)
5. Easy manual override possible if air supply-pressure is cut-off.
6. Can determine from the outside if valve is open or closed.
7. Design is small and compact.

Specifications



WARNING

DO NOT use for toxic, flammable or otherwise hazardous fluids. Use only for fluids listed in the specification table. This product is for intended use only. Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents.



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

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.

Model	PB11A · PB11AF		PB11B · PB11BF	
Size (mm)	10*1, 15, 20, 25, 32, 40, 50			
Connection	Screwed	Flanged	Screwed	Flanged
Max. Operating Press. PMO	1.0 MPaG			
Max. Operating Temp. TMO	90 °C		185 °C	
Applicable Fluid	Hot and cold water, air		Steam, Hot water	
Max. Allowable Press. PMA*2	1.0 MPaG			
Max. Allowable Temp. TMA*2	185 °C			
Air Supply Pressure	Diameter: 10 - 25 mm		0.4 - 1.0 MPaG	
	Diameter: 32 - 50 mm		0.5 - 1.0 MPaG	
Air Supply Port Size	Diameter: 10 - 25 mm		Rc 1/8	
	Diameter: 32 - 50 mm		Rc 1/4	
Control System	ON-OFF reciprocating			
Ambient Temperature Range	5 to 60 °C (-20 to 60°C)*3			
Manual Override	Possible in absence of motive pressure			
Weather Resistance	Rain-resistant			
Open/Close Time	Diameter: 10 - 25 mm		0.08 - 0.8 seconds (open → close)	
	Diameter: 32 - 50 mm		0.12 - 1.2 seconds (open → close)	
Cycle Frequency	Diameter: 10 - 25 mm		10800 times/hr or less	
	Diameter: 32 - 50 mm		7200 times/hr or less	
Actuator Capacity	Diameter: 10 - 25 mm		42 cc	
	Diameter: 32 - 50 mm		127 cc	
Open/Closed Confirmation	Visual			

*1 No 10 mm PB11F (flanged) model available

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

*3 When there is a possibility that the water inside the actuator may freeze, apply freeze-prevention measures.

NOTE: Information regarding products with a size of 10 mm is for customers who have purchased the product before it was discontinued in November 2003.

Valve Cv Values and Weight	<table border="1"> <thead> <tr> <th colspan="2">Size</th> <th>10</th> <th>15</th> <th>20</th> <th>25</th> <th>32</th> <th>40</th> <th>50</th> </tr> </thead> <tbody> <tr> <td rowspan="2">PB11 A,B</td> <td>Cv (US)</td> <td>5.5</td> <td>9.6</td> <td>18.4</td> <td>29.0</td> <td>50.2</td> <td>81.5</td> <td>135.0</td> </tr> <tr> <td>Wt.(kg)</td> <td>1.4</td> <td>1.6</td> <td>1.8</td> <td>2.3</td> <td>5.8</td> <td>7.0</td> <td>8.7</td> </tr> <tr> <td rowspan="2">PB11 AF,BF</td> <td>Cv (US)</td> <td>—</td> <td>8.0</td> <td>15.5</td> <td>26.0</td> <td>47.0</td> <td>78.0</td> <td>135.0</td> </tr> <tr> <td>Wt.(kg)</td> <td>—</td> <td>3.6</td> <td>4.4</td> <td>6.0</td> <td>11.0</td> <td>13.0</td> <td>15.0</td> </tr> </tbody> </table>								Size		10	15	20	25	32	40	50	PB11 A,B	Cv (US)	5.5	9.6	18.4	29.0	50.2	81.5	135.0	Wt.(kg)	1.4	1.6	1.8	2.3	5.8	7.0	8.7	PB11 AF,BF	Cv (US)	—	8.0	15.5	26.0	47.0	78.0	135.0	Wt.(kg)	—	3.6	4.4	6.0	11.0	13.0	15.0
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Relationship of Air Supply Pressure to Air Consumption	<p>Graph represents consumption during one cycle (reciprocating)</p> <p style="text-align: center;">* Air at 20 °C under atmospheric pressure</p>																																																		

1 MPa = 10.197 kg/cm²

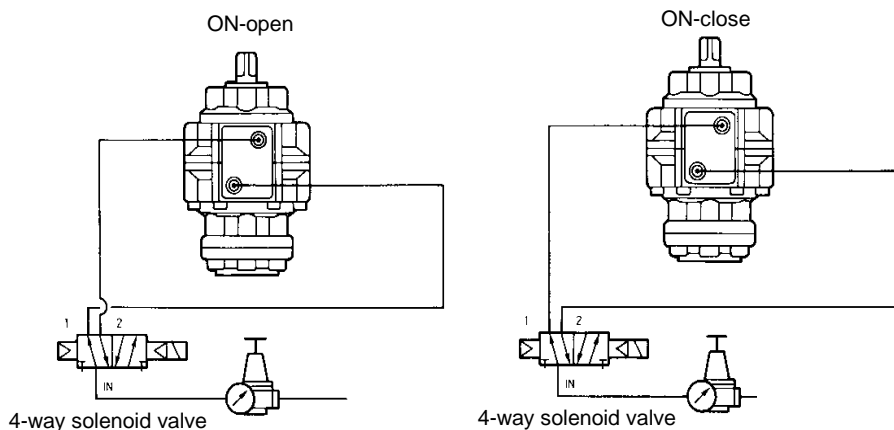
Proper Operation



When using this product, be sure NEVER to stand close to, or leave tools anywhere near, moving parts such as a shaft. Contact with moving parts or objects becoming caught in moving parts could lead to injury, damage or other accidents.

1. Make sure there is no foreign matter, such as dirt or sealing tape, in the actuator air supply piping.
2. When the temperature of the medium being used is 90 °C or less, use model PB11A or PB11AF. When the temperature of the medium being used is 90 - 185 °C, use model PB11B or PB11BF.
3. The air supply shall be clean air, such as that which has been run through an air trap filter.
4. Before installation, blow out the piping thoroughly.
5. When checking operation before installation, keep fingers well clear of the valve section.
6. There are no inlet and outlet installation restrictions.
7. When installing, secure a maintenance space of at least 25 mm above actuator, to facilitate detaching the actuator from the valve section.
8. For screwed models, install a union at the outlet to facilitate valve unit replacement.
9. Do not use with slurries.
10. Use within specification ranges.
11. Where there is the possibility of freezing, apply insulation or freeze-prevention measures. If the product freezes, cease operation.
12. The table below shows the relationship between air supply and valve opening/closing.
(See "Configuration" on p. 7 for the location of "Air Supply: A" and "Air Supply: B".)

Air Supply: A	Air Supply: B	Valve
Supply	Exhaust	Open
Exhaust	Supply	Closed



13. When the valve has not been in operation for a long period (30 days or more), a larger initial torque may be required.

In such cases, after confirming the absence of air supply, either manually operate the valve a turn or two, or set the air supply pressure to 0.5 MPaG or greater.

14. Perform manual operation only after first shutting off the air supply and making sure there is no pressure remaining inside the actuator.

Manual operation is possible if the air pressures being supplied to both "Air Supply: A" and "Air Supply: B" are identical. However care must be taken, as the occurrence of a pressure differential would be dangerous.

Manual operation is performed by turning the manual operation key, on the top of the actuator, with a wrench.

Configuration

Air Supply: A

10-25 mm: Rc 1/8
32-50 mm: Rc 1/4
(Air-to-open)

Diameter	Motive Air Press. (MPaG)
10-25 mm	0.4 - 1.0
32-50 mm	0.5 - 1.0

10-25 mm: 10 mm
32-50 mm: 13 mm

10~25A: 10mm
32~50A: 13mm

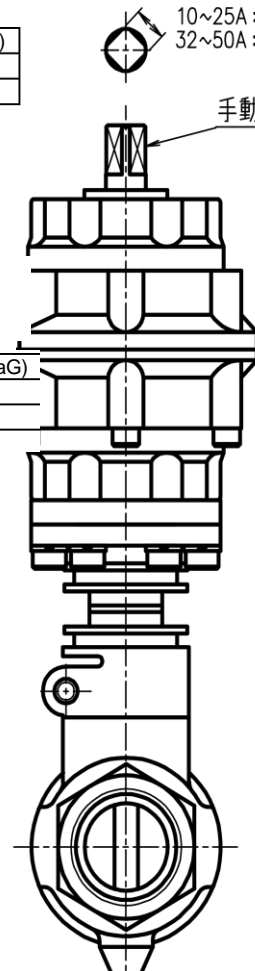
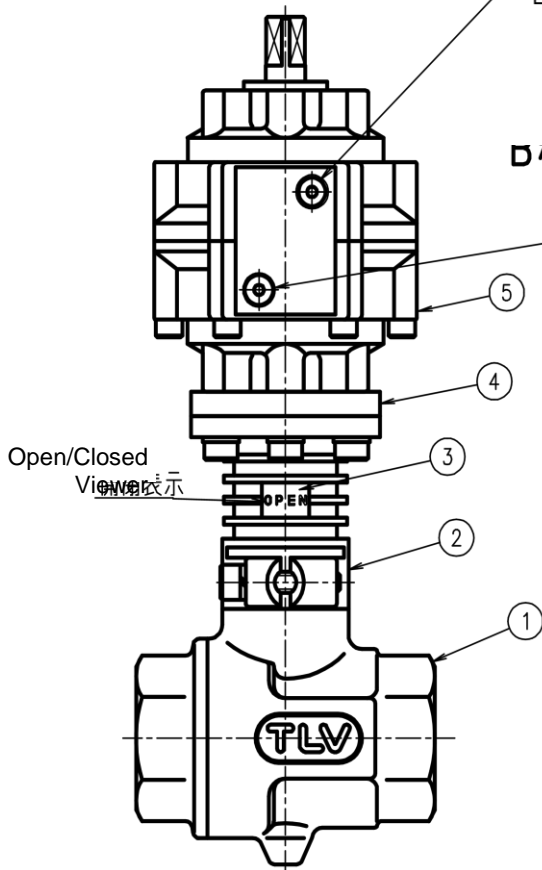
Manual Operation Key

手動操作鍵

Air Supply: B

10-25 mm: Rc 1/8
32-50 mm: Rc 1/4
(Air-to-closed)

Diameter	Motive Air Press. (MPaG)
10-25 mm	0.4 - 1.0
32-50 mm	0.5 - 1.0



No.	Name	No.	Name
1.	Valve Unit	4.	Insulator Plate
2.	Mounting Bracket	5.	Actuator
3.	Connector		

No.	Name	No.	Name
1.	Valve Unit	4.	Insulator Plate
2.	Mounting Bracket	5.	Actuator
3.	Connector		

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.



When using this product, be sure NEVER to stand close to, or leave tools anywhere near, moving parts such as a shaft. Contact with moving parts or objects becoming caught in moving parts could lead to injury, damage or other accidents.

Operational Check

An operational check shall be performed at least once every 3 months.

- Check the flow of air supply to the PB11 (angle of rotation, sound, open/close time elapse).
- After shutting off the air supply, manually operate the valve and check for foreign matter in the valve and confirm torques.

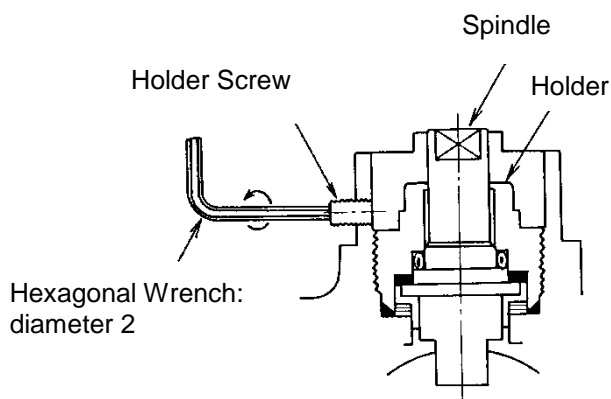
NOTE: Do not disassemble further than detaching the valve unit from the actuator unit.
TLV CO., LTD. will not be liable for the malfunctions caused by disassembly and reassembly implemented by user.

Additional Tightening of the Valve Unit Gland Section

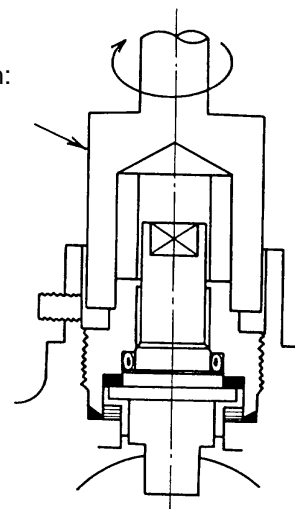
It is possible to further tighten the gland section in the valve unit. Where there is leakage from the gasket or seal, tighten the gland section further using the following instructions:

1) Loosen the holder screw

2) Tighten the holder further in with a socket wrench, and retighten the holder screw



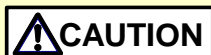
Socket Wrench:
10-25 mm= dia.
17
22.50 mm dia.



Cautions when applying additional tightening:

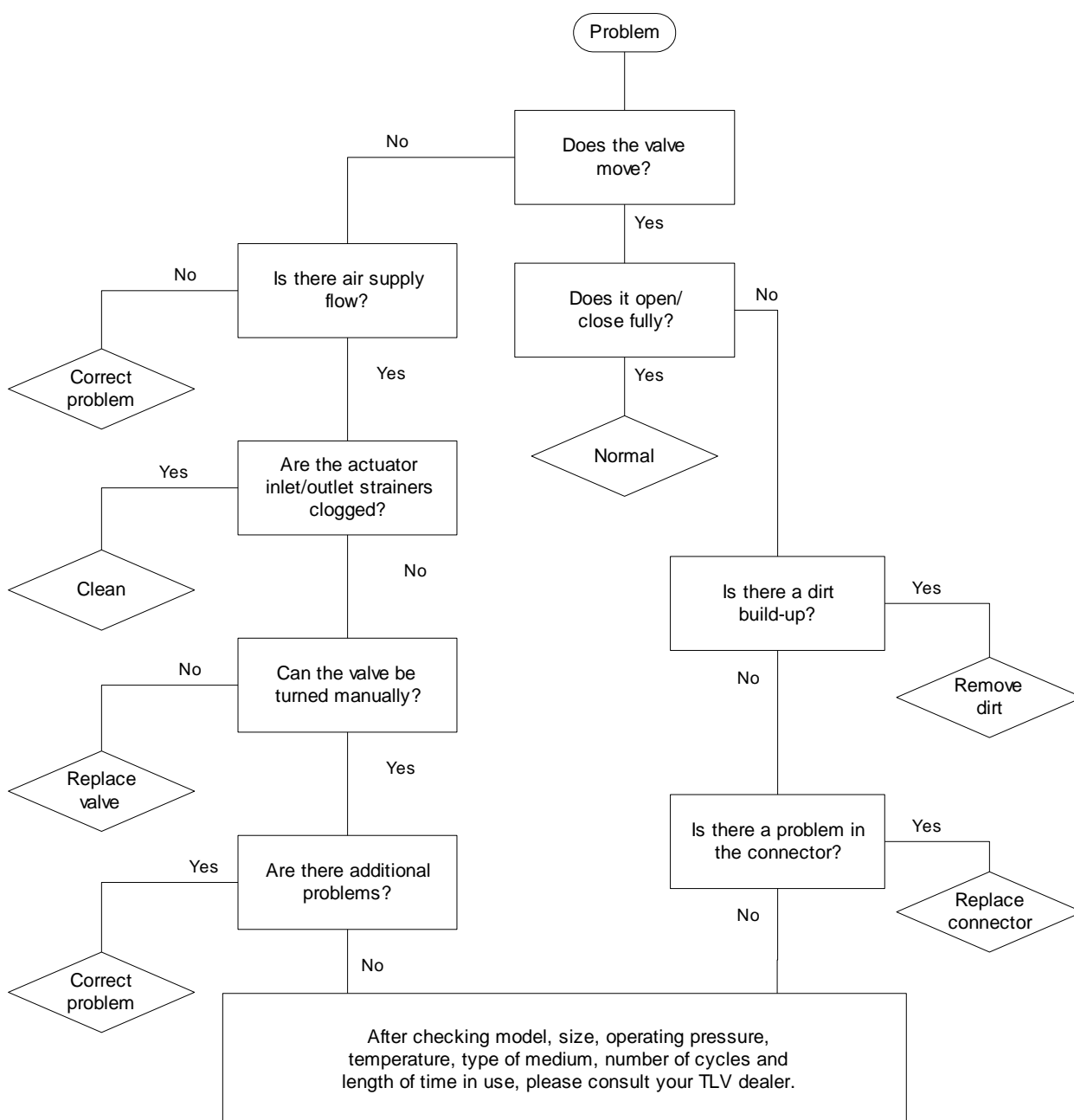
- Do not tighten the holder completely the first time. Do not tighten the holder any more than is necessary to stop leakage.
- If leakage continues even after the holder has been tightened, replace worn parts (gland section or valve unit).

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, use the following flow chart to locate the cause.



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:

TLV EURO ENGINEERING GmbH

Daimler-Benz-Straße 16-18, 74915 Waibstadt, **Germany**

Tel: [49]-(0)7263-9150-0

Fax: [49]-(0)7263-9150-50

TLV EURO ENGINEERING UK LTD.

Units 7 & 8, Furlong Business Park, Bishops Cleeve, Gloucestershire GL52 8TW, **U.K.**

Tel: [44]-(0)1242-227223

Fax: [44]-(0)1242-223077

TLV EURO ENGINEERING FRANCE SARL

Parc d'Ariane 2, bât. C, 290 rue Ferdinand Perrier, 69800 Saint Priest, **France**

Tel: 33-(0)4-72482222

Fax: [33]-(0)4-72482220

In North America:

TLV CORPORATION

13901 South Lakes Drive, Charlotte, NC 28273-6790, **U.S.A.**

Tel: [1]-704-597-9070

Fax: [1]-704-583-1610

In Mexico and Latin America:

TLV ENGINEERING S. A. DE C. V.

Av. Jesús del Monte 39-B-1001, Col. Hda. de las Palmas, Huixquilucan, Edo. de México, 52763, **Mexico**

Tel: [52]-55-5359-7949

Fax: [52]-55-5359-7585

In Oceania:

TLV PTY LIMITED

Unit 8, 137-145 Rooks Road, Nunawading, Victoria 3131, **Australia**

Tel: [61]-(0)3-9873 5610

Fax: [61]-(0)3-9873 5010

In East Asia:

TLV PTE LTD

36 Kaki Bukit Place, #02-01/02, **Singapore** 416214

Tel: [65]-6747 4600

Fax: [65]-6742 0345

TLV SHANGHAI CO., LTD.

Room 5406, No. 103 Cao Bao Road, Shanghai, **China** 200233

Tel: [86]-(0)21-6482-8622

Fax: [86]-(0)21-6482-8623

TLV ENGINEERING SDN. BHD.

No.16, Jalan MJ14, Taman Industri Meranti Jaya, 47120 Puchong, Selangor, **Malaysia**

Tel: [60]-3-8065-2928

Fax: [60]-3-8065-2923

TLV PRIVATE LIMITED

252/94 (K-L) 17th Floor, Muang Thai-Phatra Complex Tower B, Rachadaphisek Road, Huaykwang, Bangkok 10310, **Thailand**

Tel: [66]-2-693-3799

Fax: [66]-2-693-3979

TLV INC.

#302-1 Bundang Technopark B, 723 Pangyo-ro, Bundang, Seongnam, Gyeonggi, 13511, **Korea**

Tel: [82]-(0)31-726-2105

Fax: [82]-(0)31-726-2195

In the Middle East:

TLV ENGINEERING FZCO

Building 2W, No. M002, PO Box 371684, Dubai Airport Free Zone, Dubai, **UAE**

Email: sales-me@tlv.co.jp

In Other Countries:

TLV INTERNATIONAL, INC.

881 Nagasuna, Noguchi, Kakogawa, Hyogo 675-8511, **Japan**

Tel: [81]-(0)79-427-1818

Fax: [81]-(0)79-425-1167

Manufacturer:

TLV CO., LTD.

881 Nagasuna, Noguchi, Kakogawa, Hyogo 675-8511, **Japan**

Tel: [81]-(0)79-422-1122

Fax: [81]-(0)79-422-0112