

ISO 9001
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Manufacturer

TLV CO., LTD.

Kakogawa, Japan

is approved by LRQA Ltd. to ISO 9001:2001



Instruction Manual

Micro Air Vent

Featured Model: SA3

172-65168M-07

Publication date 3 December 2025

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Table of Contents

Introduction	3
Safety Considerations	4
Features	6
Operation	7
Specifications	8
Configuration	9
Installation	10
Maintenance	11
Disassembly/Reassembly	12
Troubleshooting	14
TLV EXPRESS LIMITED WARRANTY	15
Service	17

Introduction

Thank you for purchasing the TLV micro air vent.

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 micro air vent is designed to automatically discharge/release gases (such as air) trapped in water-carrying pipes during water transport. It also automatically discharges the air that was entrained in the water during operation and has subsequently been separated and collected in specific locations in the piping.

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.

Cautionary items and definitions



Danger

Indicates an urgent situation which poses a threat of death or serious injury



Warning

Indicates that there is a potential threat of death or serious injury



Caution

Indicates that there is a possibility of injury or equipment/product damage

Safety Considerations for the Product



Warning

DO NOT use for toxic, flammable or otherwise hazardous fluids. This product is an air vent that discharges air from water piping system. Use only for water and/or air. 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.



Warning

NEVER apply direct heat to the float. The float may explode due to increased internal pressure, causing accidents leading to serious injury or damage to property and equipment.



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 that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.



Caution

DO NOT use this product in excess of the maximum operating pressure differential. Such use could make discharge impossible (blocked).



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**

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.

**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.

**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.

**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.

**Caution**

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.

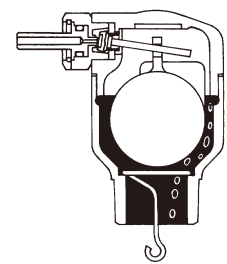
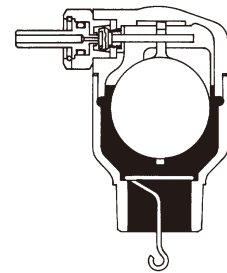
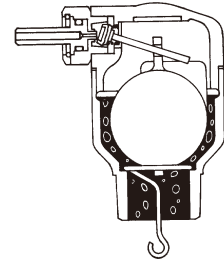
Features

1. This product is designed to be compact and lightweight.
2. In case of a water leak, water can be drained to a drain pan, etc. by connecting a vinyl tube.

Operation

Principles of air discharge:

1. Upon start-up, the float is in the lowest position due to gravity and the valve is fully open, allowing for the rapid discharge of initial air.
2. When initial air has been completely discharged, the water level rises in the body. This causes the float to rise, closing the valve. The coil spring pushes the valve against the valve seat, keeping the valve closed, providing a tight seal.
3. When air enters, the water level falls lowering the float. This causes the valve to open and air to be automatically discharged through the valve orifice. In this manner, the air vent constantly responds to the amount of liquid flow by automatically adjusting discharge.



Specifications



Warning

DO NOT use for toxic, flammable or otherwise hazardous fluids. This product is an air vent that discharges air from water piping system. Use only for water and/or air. 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 that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.

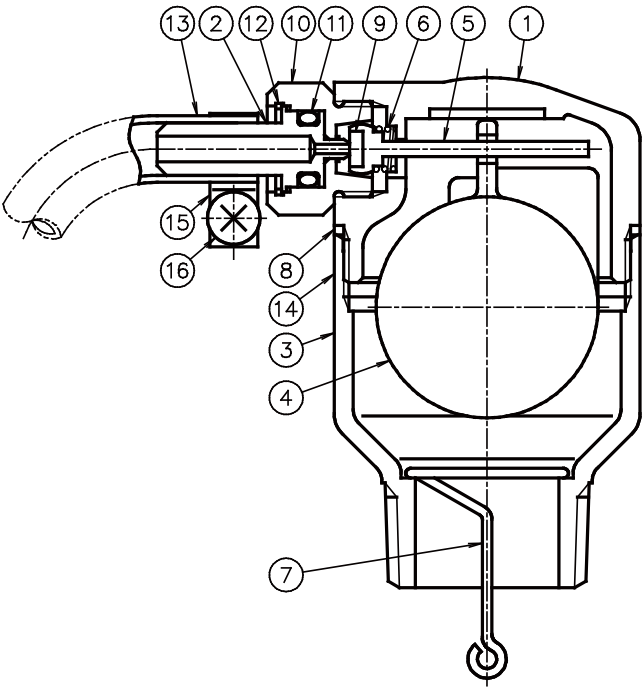
DO NOT use this product in excess of the maximum operating pressure differential. Such use could make discharge impossible (blocked).

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

Model	Maximum Operating Pressure (PMO)	Minimum Operating Pressure	Maximum Operating Temperature (TMO)	Maximum Allowable Pressure (PMA) ⁰¹	Maximum Allowable Temperature (TMA) ⁰¹
Unit	MPaG	MPaG	°C	MPaG	°C
SA3-3	0.3	0.01	100	1.0	100
SA3-10	1.0	0.1	100	1.0	100

⁰¹Maximum allowable pressure (PMA) and maximum allowable temperature (TMA) are PRESSURE SHELL DESIGN CONDITIONS, NOT OPERATING CONDITIONS.

Configuration



No.	Part Name	No.	Part Name
1	Body	9	Valve
2	Valve Seat	10	Valve Seat Holder
3	Base	11	O-ring
4	Float	12	Snap Ring
5	Valve Holder	13	Vinyl Tube
6	Coil Spring	14	Nameplate
7	Siphon Rod	15	Worm Drive Clamp
8	Body Gasket	16	Clamp Screw

Installation



Warning

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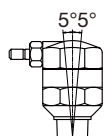
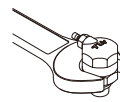
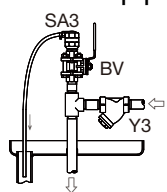
Caution

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 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.

Do not use excessive force when connecting threaded pipes to the unit. 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 from the product.
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. This product must be installed vertically, with the inlet at the bottom and the outlet at the side, and should be inclined no more than 5° vertically and front-to-back.
4. When installing or removing the product, place the spanner on the hexagonal section of the base. If the spanner is applied to the hexagonal section of the body, excessive torque may cause damage or loosening of the product, which could result in fluid leakage.
5. Install the product in a location where air is likely to collect, such as a bend in the piping.
6. To prepare for the unlikely event of a water leak, be sure to run the vinyl tube installed on the outlet to a catch pan or a drain pipe. Make sure the end of the pipe is above the waterline, so that dirt and water cannot be sucked up by vacuum when the system shuts down.
7. Inlet piping with no horizontal portion is recommended for water/air displacement. If there is a horizontal portion, make the pipe diameter of the horizontal portion larger than the vertical portion or make the horizontal portion as short as possible.
8. Make sure the inlet piping diameter is at least as large as the product's inlet diameter.
9. Installation of an isolation valve just before the product's main connection is recommended as it enables maintenance during operation. A full-bore ball valve is recommended.
10. Make sure to take measures to prevent foreign matter from flowing into the product.

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

Maintenance



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.

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.

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.

If the product should fail, it may cause water leakage or hindrance to water flow.

Normal: Air is discharged as it accumulates, with the product closing (with no leakage) when no air is present in the piping.

Blocked (Discharge Impossible): No air is discharged though air accumulates in the product.

Leakage: Water is discharged or leaks through the product outlet during closed position.

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.

Gasket(s): Check for warping and damage

O-ring: Check for warping and damage

Valve: Check for scratches or wear

Valve Seat: Check for scratches or wear

Disassembly/Reassembly



Warning

NEVER apply direct heat to the float. The float may explode due to increased internal pressure, causing accidents leading to serious injury or damage to property and equipment.



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.

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.

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.)

Part Name & No.		During Disassembly	During Reassembly
Base	3	Remove with a wrench	Consult the table of tightening torques and tighten to the proper torque
Body Gasket	8	Remove the gasket and clean sealing surfaces	Replace with a new gasket
Siphon Rod	7	Remove the siphon rod	Attach the siphon rod to the base
Vinyl Tube	13	Loosen the clamp screw with a	Reattach the vinyl tube to the
Worm Drive Clamp	15	Phillips screwdriver and remove	valve seat, reattach the worm drive
Clamp Screw	16	the worm drive clamp; remove the	clamp, and then tighten the clamp
		vinyl tube from the valve seat	screw with a Phillips screwdriver
Valve Seat Holder	10	Remove with a wrench	Consult the table of tightening torques and tighten to the proper torque
Valve Holder (Valve)	5	Remove from the body	Replace with a new valve together
Coil Spring	6		with a valve holder if the valve is misshapen or damaged
			Insert the valve holder into the hole in the float
Float	4	Remove, being careful not to scratch the polished surface	Insert, being careful not to scratch the polished surface
Snap Ring	12	Remove with a needle-nose pliers	Insert securely into the slot
Valve Seat	2	Remove from the valve seat retainer	Insert, being careful not to damage the seating surface
			Replace with a new valve seat if damaged
O-ring	11	Remove the O-ring	Replace with a new O-ring; be sure to coat the O-ring with heat-resistant grease

Table of Tightening Torques

Part Name & No.		Torque N·m	Distance Across Flats mm
Body	1	15	32
Base	3		
Valve Seat Holder	10	8	12

Troubleshooting



Warning

NEVER apply direct heat to the float. The float may explode due to increased internal pressure, causing accidents leading to serious injury or damage to property and equipment.



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.

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

Problem	Cause	Remedy
No air is discharged (blocked) or discharge is poor	Air is not reaching the vent because the liquid in the piping is not being displaced by air	Correct the inlet piping
	The valve seat is clogged with dirt or foreign matter	Clean the valve seat
	The inlet or outlet piping is clogged	Clean the piping
Liquid leaks when the valve is closed	There is a build-up of rust or scale on the valve seat or the valve seat is damaged	Clean or replace with a new valve seat
	Improper installation orientation	Correct the installation
The vent does not close and liquid spurts	The specific gravity of the liquid is not suitable for this product (This product is for water systems)	Select a product with suitable specifications for the operating conditions

How to Clean the Valve Seat

Remove the vinyl tube and turn the tip of the valve seat left and right. Remove the snap ring and clean the valve orifice and the valve area with a soft cloth. (The valve is sealed off internally, so there is no need to close the inlet valve.)

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**

TLV EURO ENGINEERING UK LTD.

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

TLV EURO ENGINEERING FRANCE SARL

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

In North America:

TLV CORPORATION

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

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**

In Oceania:

TLV PTY LIMITED

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

In East Asia:

TLV PTE LTD

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

TLV SHANGHAI CO., LTD.

5/F, Building 7, No.103 Caobao Road, Xuhui District, Shanghai,
China 200233

TLV ENGINEERING SDN. BHD.

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

TLV PRIVATE LIMITED

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

TLV INC.

#1121, Seongnam Central Biz Tower 3, 208, Galmachi-ro,
Jungwon-gu, Seongnam-si, Gyeonggi-do, 13216, **Korea**

In the Middle East:

TLV ENGINEERING FZCO

Building 9W, B163, PO Box 371684, Dubai Airport Free Zone,
Dubai, **UAE**

In Other Countries:

TLV INTERNATIONAL, INC.

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

Manufacturer:

TLV CO., LTD.

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

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

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

Tel: [33]-(0)4-72482222

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

Tel: [1]-704-597-9070

Fax: [1]-704-583-1610

Tel: [52]-55-5359-7949

Fax: [52]-55-5359-7585

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

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

Tel: [65]-6747 4600

Fax: [65]-6742 0345

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

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

Tel: [60]-3-8052-2928

Fax: [60]-3-8051-0899

Tel: [66]-2-693-3799

Fax: [66]-2-693-3979

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

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

Email: sales-me@tlv.co.jp

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

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

Tel: [81]-(0)79-427-1800

Fax: [81]-(0)79-422-2277