

ISO 9001  
ISO14001



Manufacturer

**TLV** CO., LTD.

Kakogawa, Japan

is approved by LRQA Ltd. to ISO 9001:2001



# Instruction Manual

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**Vibration Sensor**  
Model: VL1-LE-VMS

172-65908M-00  
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# Introduction

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.

To ensure safe and correct use of this product, be sure to observe the safety precautions listed in this manual as they relate to installation, operation, maintenance and repair of the product. Please keep it in a safe place for future reference.

TLV accepts no responsibility for incorrect use of the product by the customer or any third-party, malfunction occurring during use, other defects and any damage caused by this product, excluding cases in which it is under obligation to pay reparations by law.

This product has undergone strict quality management and product inspection before being shipped from the factory. However, in the event of malfunction or defects, please contact your local TLV representative or the TLV customer service center.

This instruction manual and product are subject to modification without notice, for the purpose of improvement.

Unauthorized reprinting or reproduction, in whole or in part, of this instruction manual or contents of the hardware/software of the product is strictly prohibited.

This instruction manual contains information for use in hazardous locations. Be sure to read this instruction manual carefully before installing in hazardous locations. Please use correctly and safely.

# 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

## General Precautions



### Danger

**DO NOT disassemble or modify.** Failure to observe this precaution could result in personal injury, electrocution, ignition or fire.



### Danger

**DO NOT open when an explosive atmosphere is present.** The cover is not intended to be opened when an explosive atmosphere is present. The cover must be opened when an explosive atmosphere is not present or it must be opened in a non-hazardous location.



### Danger

**DO NOT use batteries other than those specified.** Failure to observe this precaution could result in failure, ignition, or explosions.



### Danger

**DO NOT wipe/rub the surfaces of this product with a dry cloth etc.** There is the danger of electrostatically charging the unit, which may result in ignition or explosions, especially in hazardous locations.



### Danger

**DO NOT use this product in hospitals or airplanes.** Failure to observe this precaution could result in malfunction of medical equipment, instrumentation, etc.



### Danger

**Ensure the specifications for the intrinsically safe structure of this product meet the requirements for installation in hazardous locations.** Specifications for the intrinsically safe structure of this product are described in the "Specifications" section.

**Danger**

**Aluminum is used in this product. Do not expose the product to impact or friction.** Exposure to impact or friction may result in ignition or accidental explosions.

**Danger**

**When installing or working at high elevations, take measures to ensure against dropping the product or parts.** Failure to take such measures could result in personal injury if persons passing below are struck by a falling object, or other accidents.

**Danger**

**Check to make sure that no wireless instrumentation other than the product is being used.** Failure to observe this precaution could lead to interference of important transmissions or accidents.

**Danger**

**The equipment contains non-metallic materials and that the user should consider the performance of these materials with respect to chemicals which may be present in the hazardous area. If in doubt, please contact the manufacturer.**

**Warning**

**As this is an industrial product, it is not to be used on consumer applications nor in residential areas.**

**Warning**

**DO NOT substitute components, as this may impair the intrinsic safety of the product.**

**Warning**

**DO NOT install this product on objects exceeding maximum allowable operating temperature.** Overheating could result in damage to internal parts, excessive heat generation, rupture or ignition.

**Warning**

**DO NOT subject the unit to strong shocks or throw it against anything.** Failure to observe this precaution could result in damage to internal parts, excessive heat generation, rupture, ignition or personal injury.

**Warning**

**DO NOT place device in microwave ovens or high-pressure vessels, or in the vicinity of electromagnetic devices.** Such handling could result in excessive heat generation, smoke, damage to circuitry, battery fluid leakage, rupture or ignition.

**Caution**

**Do not allow any foreign matter to enter the unit. In areas with small foreign matter such as metal dust, use the product after taking measures to prevent foreign matter entering the unit.** Failure to observe this precaution could result in fire or malfunction.

**Caution**

**Do not let the unit become immersed in water.** If liquid gets inside the unit, it may result in excessive heat generation, electrical shock or unit malfunction. Be mindful of the location of use and handling.

## Battery Precautions

**Danger**

**DO NOT apply heat to the battery or throw it into a fire.** Failure to observe this precaution could result in leakage of the battery fluid, excessive heat generation, rupture or ignition.

**Danger**

**DO NOT cause the battery to become wet by immersing in water, salt water or liquid chemicals.** Failure to observe this precaution could result in leakage of the battery fluid, excessive heat generation, rupture or ignition.

**Danger**

**DO NOT leave the product where it will be exposed to direct sunlight or in areas that will become very hot, such as interiors of cars, near heating equipment, etc.** Failure to observe this precaution could result in leakage of the battery fluid, excessive heat generation, rupture or ignition.

**Danger**

**DO NOT replace the battery when an explosive atmosphere is present.** The battery pack is not intended to be replaced when an explosive atmosphere is present. The battery pack must be replaced when an explosive atmosphere is not present or it must be replaced in a non hazardous location.

**Danger**

**If fluid leaks from the battery and gets in the eyes, flush it out. There is a danger of loss of vision.** Do not rub the eyes, and after immediately flushing out thoroughly with clean water, see a doctor.

**Warning**

**Cease use of the battery immediately if the product exhibits abnormal operation.** If irregularities such as fluid leakage, an unusual smell, unusual heat generation, discoloration or deformation are noticed, cease use of the product immediately. If use is continued under such conditions, excessive heat generation, ignition or rupture may result.

**Warning**

**If battery fluid leaks and comes into contact with the body, rinse immediately.** There is danger of resultant damage to the skin. Immediately rinse any battery fluid off with clean water and seek medical care.

**Caution**

**Do not dispose of the battery with normal garbage.** If at any time the battery becomes unusable, observe your company regulations for proper disposal in accordance with local laws. If proper disposal is impossible, insulate the contact terminals by covering them with tape and return them to a TLV office.

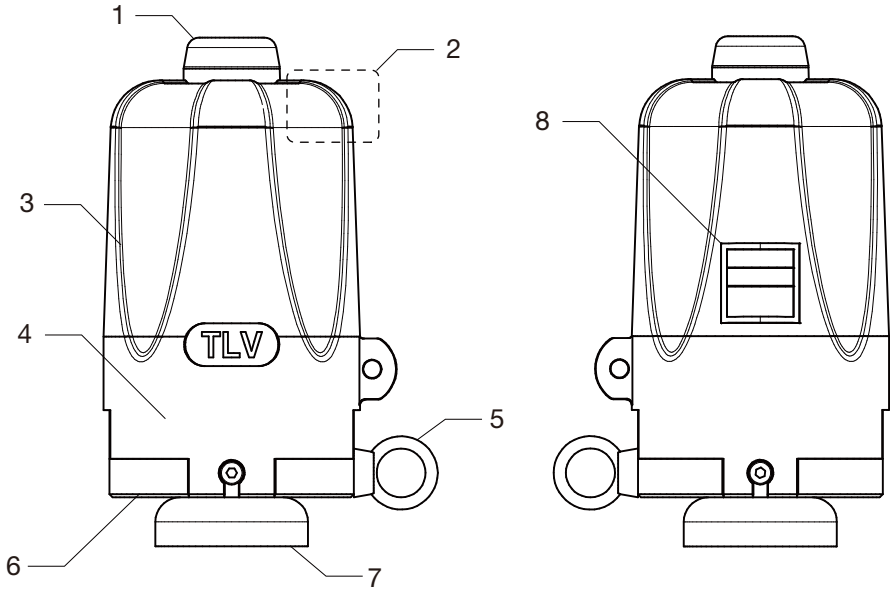
**Caution**

**Always replace with a new battery.** Using a used battery may result in inaccurate calculation of remaining battery life.

**Caution**

**When replacing the battery, do not modify or remove the circuit board.** Always use a new battery, as using a used one may lead to incorrect estimation of the remaining battery life.

# Part Names



No.	Part Name	No.	Part Name
1	Indicator Lamp (Resin)	5	Fall Prevention Eye Bolt (Stainless Steel)
2	Magnetic Start Switch (Internal)	6	Base (Aluminum Alloy)
3	Cover (Resin)	7	Mounting Magnet (Metal)
4	Nameplate Mounting Position	8	Threshold Class Label (I, II, III, or IV)

# Preparation Before First Use

The product is shipped with the power turned OFF. Remove the insulation tab attached to the battery before use.

Do not place a magnet or any other object that generates magnetic force near the product while the product is stored with the power turned ON. Failure to observe this precaution may activate the magnetic switch and drain the battery.

## Removing the insulation tab

1. Loosen the two hex socket head cap screws on the sensor with a 2 mm hex key (distance across flats: 2 mm) to lift off the cover.



### Note

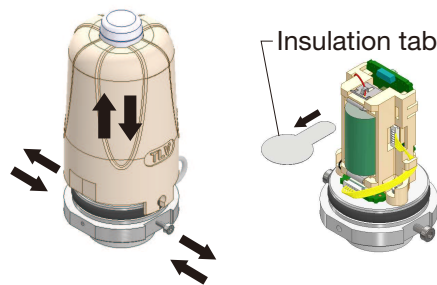
When the cover is removed, do not wipe off all of the grease adhering to the packing or to the inside of the cover. Failure to observe this precaution may hinder reattachment of the cover or impair the dustproof and waterproof performance.

2. Remove the insulation tab.
3. Reattach the cover and tighten the two hex socket head cap screws (distance across flats: 2 mm, tightening torque: 0.43 N·m).
4. After reattaching the cover, place a magnet near the product and confirm that it starts up properly.



### Note

With lithium-thionyl chloride batteries, the voltage may temporarily drop if the product remains unused for an extended period, and the product may not start properly. In such a case, repeat the startup procedure by placing a magnet near the product for approximately five days may allow the voltage to recover.



# Installation



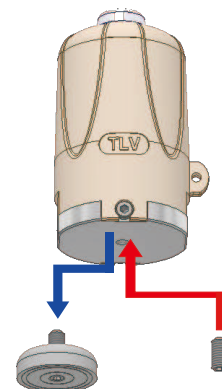
## Danger

Ensure the specifications for the intrinsically safe structure of this product meet the requirements for installation in hazardous locations. Specifications for the intrinsically safe structure of this product are described in the "Specifications" section.

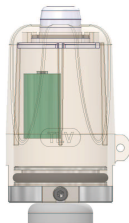
**DO NOT wipe/rub the surfaces of this product with a dry cloth etc.** There is the danger of electrostatically charging the unit, which may result in ignition or explosions, especially in hazardous locations.

**The equipment contains non-metallic materials and that the user should consider the performance of these materials with respect to chemicals which may be present in the hazardous area. If in doubt, please contact the manufacturer.**

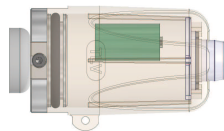
Slowly bring the bottom-side magnet close to a magnetic metal surface, and mount the product. The bottom-side magnet can also be removed and the product can be mounted with M5 screws.



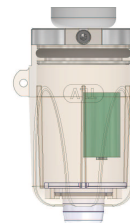
If the product is installed below the horizontal direction of the body, the positive terminal of the battery will face downward and, due to battery characteristics, battery life may be shortened.



Battery (+) facing up



Battery (+) facing sideways



Battery (+) facing down

# Operation



## Danger

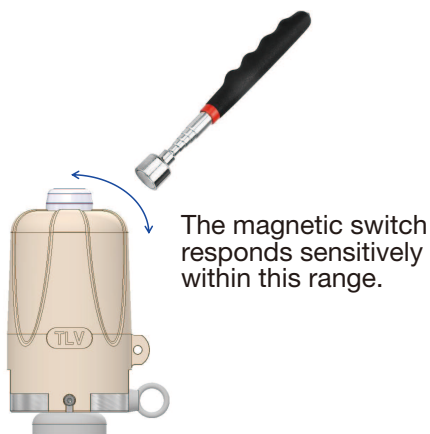
**DO NOT wipe/rub the surfaces of this product with a dry cloth etc.** There is the danger of electrostatically charging the unit, which may result in ignition or explosions, especially in hazardous locations.

Bring a magnet close to the startup magnetic switch and then remove the magnet to start the product. The product will not start while the magnet is kept in place. When startup is successful, the indicator lamp flashes blue, yellow and red in that order, and measurement begins. After measurement is complete, the result is indicated by the indicator lamp color: blue for normal, yellow for caution, and red for danger. If the battery voltage is below the threshold at startup, the lamp will not flash blue, yellow and red in order; the lamp will only flash red at short intervals. In this case, measurement is not performed.

Due to the characteristics of lithium-thionyl chloride batteries, the voltage may temporarily drop after long-term storage and the product may fail to start normally. In such a case, the voltage may recover by repeating the startup operation (bring a magnet close to the unit and then remove it) about 5 times.

If the magnetic force is insufficient during startup, or depending on how the magnet is brought close, the product may not start normally. If the indicator lamp does not flash or remains lit continuously, bring the magnet close to the magnetic switch again and start the product correctly. If the product is not started normally, battery consumption increases. If this condition continues for a long time, battery life will be shortened. Always ensure normal startup.

A screw pickup tool or similar magnetic tool can also be used to start the product from a short distance away.



# Replacing the Battery



## Danger

**DO NOT replace the battery when an explosive atmosphere is present.** The battery pack is not intended to be replaced when an explosive atmosphere is present. The battery pack must be replaced when an explosive atmosphere is not present or it must be replaced in a non hazardous location.

**Do not wipe/rub the surfaces of this product with a dry cloth etc.** There is the danger of electrostatically charging the unit, which may result in ignition or explosions, especially in hazardous locations.

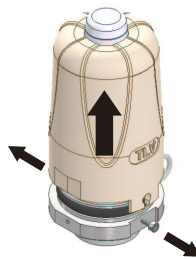


## Caution

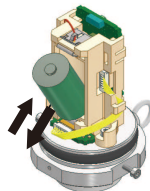
**Always replace with a new battery.** Using a used battery may result in inaccurate calculation of remaining battery life.

**When replacing the battery, do not modify or remove the circuit board.** Always use a new battery, as using a used one may lead to incorrect estimation of the remaining battery life.

1. Loosen the two set screws and remove the cover by pulling it upward.

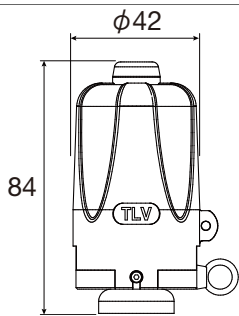


2. Remove the battery.



3. Insert a new battery.
4. Replace the packing and coat surfaces with grease. Place the cover back on and tighten the cover screw with a hex key, clockwise as viewed from above. Follow local regulations when disposing of used battery packs.

# Specifications

Model	VibLight
Type	VL1-LE-VMS
Classification markings of hazardous locations	Ex ic IIC T4 Gc
Power Supply	Lithium-thionyl chloride battery Model: XL-050F (XENO), SB-AA02 (Tekcell) Rated voltage: 3.6 V Size: 1/2AA
Protection Class	IP65 (Intrinsic safety evaluation conducted at IP20)
Ambient Temperature Range	-20 to 60 °C
Measurement Target	RMS velocity (X-, Y-, and Z-axis directions)
Judgment Threshold	In accordance with ISO 20816 Class I: Less than 2.8 mm/s: Blue, 2.8 to 4.5 mm/s: Yellow, 4.5 mm/s or higher: Red Class II: Less than 4.5 mm/s: Blue, 4.5 to 7.1 mm/s: Yellow, 7.1 mm/s or higher: Red Class III: Less than 4.5 mm/s: Blue, 4.5 to 7.1 mm/s: Yellow, 7.1 mm/s or higher: Red Class IV: Less than 7.1 mm/s: Blue, 7.1 to 11.0 mm/s: Yellow, 11.0 mm/s or higher: Red
EMC Standards	Standards: IEC 61326-1:2020, IEC 61326-2-3:2020 EMC environment Emission: Basic electromagnetic environment Immunity: Industrial electromagnetic environment
Materials	Cover: Resin Base: Aluminum alloy
Dimensions (Unit: mm)	
Weight	Approx. 130 g (including battery)

# 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.

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