

ISO 9001  
ISO14001



Manufacturer

**TLV** CO., LTD.

Kakogawa, Japan

is approved by LRQA Ltd. to ISO 9001:2001



# Instruction Manual

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**Thermodynamic Steam Trap**  
**PowerDyne.**

Featured Models: HR150A/HR260A

172-65166M-08

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# Introduction

Thank you for purchasing the TLV PowerDyne steam trap.

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.

These thermodynamic steam traps can be used without adjustment, from 1.6 to 15 MPaG for the HR150A and from 1.6 to 26 MPaG for the HR260A, on medium-load applications. They are suitable for discharge of condensate at a temperature slightly lower than saturation temperature from steam mains, tracers, etc.

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



### 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

**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.



### 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

**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.

# Checking the Piping



## 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.

Check to make sure that the pipes to be connected to the product have been installed properly.

1. Is the pipe diameter suitable?
2. Has sufficient space been secured for maintenance?
3. Have isolation valves been installed at the inlet and outlet? If the outlet is subject to back pressure, has a check valve (TLV-CK) been installed?
4. Is the inlet pipe as short as possible, with as few bends as possible, and installed so the liquid will flow naturally down into the product?
5. Has the piping work been done correctly, as shown in the figures below?

| Requirement   | Correct | Incorrect   |
|---|---------|---|
| Install catchpot with the proper diameter.  |         | <br>Diameter is too small.  |
| Make sure the flow of condensate is not obstructed.   |         | <br>Diameter is too small and inlet protrudes into pipe interior. |
| To prevent rust and scale from flowing into the product, the inlet pipe should be connected 25 to 50 mm above the base of the T-pipe. |         | <br>Rust and scale flow into the trap with the condensate.        |
| When installing on the blind end, make sure the flow of condensate is not obstructed.   |         | <br>Condensate collects in the pipe.                              |

# Specifications

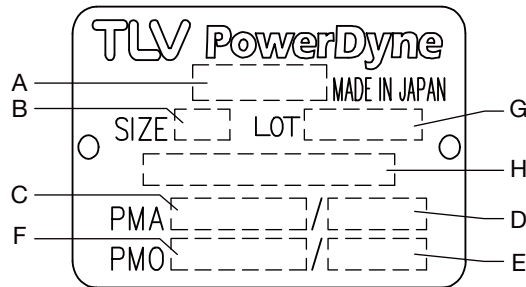


## Caution

**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.

**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.



|   |   |   |                                     |
|---|---|---|-------------------------------------|
| A | Model   | E | Maximum Operating Temperature (TMO) |
| B | Nominal Diameter                                  | F | Maximum Operating Pressure (PMO)    |
| C | Maximum Allowable Pressure (PMA) <sup>01</sup>    | G | Production Lot No.                  |
| D | Maximum Allowable Temperature (TMA) <sup>01</sup> | H | Valve No. <sup>02</sup>             |

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

<sup>02</sup>Valve No. is displayed for products with options. This item is omitted from the nameplate when there are no options.

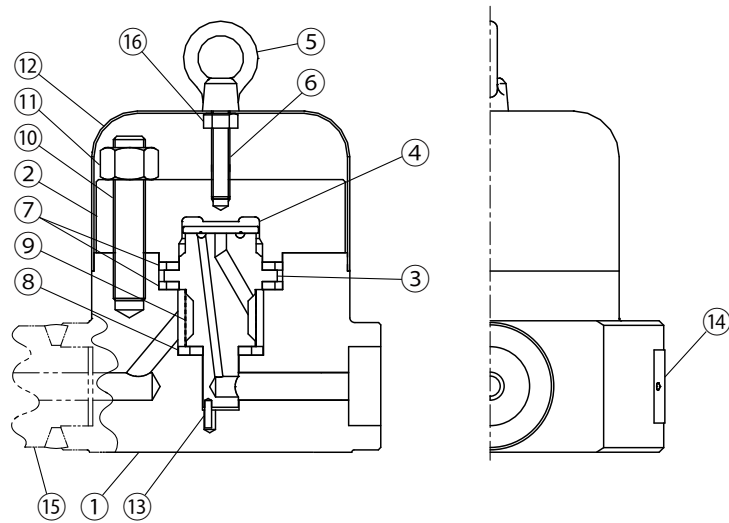


## Note

Minimum Operating Pressure: 1.6 MPaG

Maximum Allowable Back Pressure: 50% of the inlet pressure

# Configuration



| No. | Part Name             | M <sup>01</sup> | R <sup>01</sup> | No. | Part Name   | R <sup>01</sup> |
|-----|-----------------------|-----------------|-----------------|-----|-------------|-----------------|
| 1   | Body                  |                 |                 | 9   | Screen      | ✓               |
| 2   | Cover                 |                 | ✓               | 10  | Body Bolt   |                 |
| 3   | Module Valve Seat     |                 | ✓               | 11  | Cover Nut   |                 |
| 4   | Disc                  |                 | ✓               | 12  | Cap         |                 |
| 5   | Eye Nut               |                 |                 | 13  | Guide Pin   | ✓               |
| 6   | Spacer                |                 |                 | 14  | Nameplate   |                 |
| 7   | Module Gasket (Large) | ✓               | ✓               | 15  | Flange      |                 |
| 8   | Module Gasket (Small) | ✓               | ✓               | 16  | Hexagon Nut |                 |

<sup>01</sup>Replacement parts are available only in the following kits: M = Maintenance Kit, R = Repair Kit



# Installation



## 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.

**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.

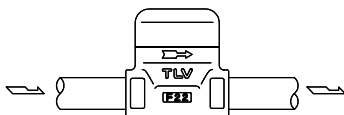
Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.

1. Before installation, be sure to remove all protective seals.
2. Before installing the product, open the inlet valve and blow out the piping to remove any piping scraps, dirt and oil. Close the inlet valve after blowdown.
3. Install the product so the arrow on the body is pointing in the direction of flow.
4. The product may be installed either horizontally or vertically; there are no restrictions on the orientation of installation. (Fix the product securely in place.)
5. Install a condensate outlet valve and outlet piping. Make sure that the outlet piping is large enough to prevent occurrence of excessive backpressure. (Backpressure must not exceed 50% of the inlet steam pressure.)
6. To make sure that the product functions properly, first open the outlet valve fully. Next carefully perform the following start-up procedure:

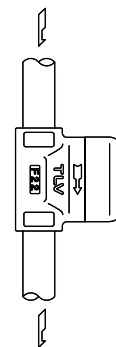
### IMPORTANT START-UP PROCEDURE

To ensure proper operation, slowly open the inlet valve slightly. Initially **OPEN THE VALVE ONLY  $\frac{1}{32}$  TURN** in order to supply steam to the trap very slowly then **WAIT FOR AT LEAST 30 SECONDS** for air to vent before fully opening the inlet valve.

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



Horizontal



Vertical

# 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.

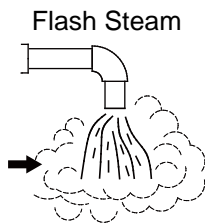
Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product and burns or other injury due to malfunction or the discharge of fluids.

## 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. Periodically (at least biannually) the operation should also be checked by using diagnostic equipment, such as a stethoscope, thermometer, TLV TrapMan or TLV Pocket TrapMan.

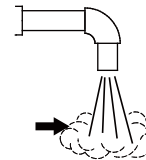
If the product should fail, it may cause damage to piping and equipment, resulting in faulty or low quality products or losses due to steam leakage.

|                                 |  |
|---------------------------------|--|
| Normal:                         | Condensate is discharged intermittently together with flash steam, and the sound of flow can be heard.                   |
| Blocked (Discharge Impossible): | No condensate is discharged. The product is quiet and makes no noise, and the surface temperature of the product is low. |
| Blowing:                        | Live steam continually flows from the outlet and there is a continuous metallic sound.                                   |
| Steam Leakage:                  | Live steam is discharged through the product outlet together with condensate, accompanied by a high-pitched sound.       |



White jet containing water droplets

Live Steam Leakage



Clear, slightly bluish jet

## 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.

Gaskets: Check for warping or scratches

Screen: Check for clogging or corrosion

Disc: Check for scratches or wear. Check dirt, oil film, wear and damage

Module Valve Seat Surface: Check for scratches or wear

Body Interior: Check for build-up of scale

# Disassembly/Reassembly



## Caution

**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.

**When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature.**

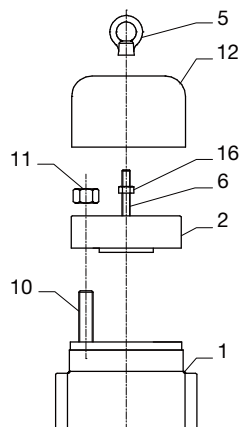
Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.

Use the following procedures to remove components. Use the same procedures in reverse to reassemble.

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

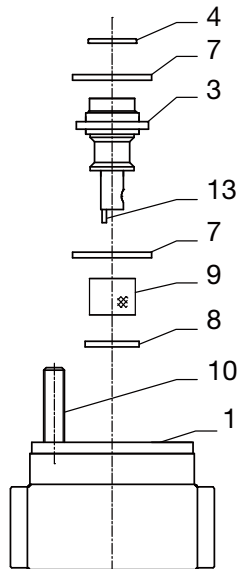
## Removing/Reattaching the Cap

| Part Name & No. | During Disassembly   | During Reassembly   |
|-----------------|--|---|
| Eye Nut 5       | Turn by hand (If the nut cannot be turned the first time, use a tool such as an adjustable wrench) | —   |
| Cap 12          | Lift the cap up and off  | —   |
| Cover Nut 11    | Remove with a socket wrench; loosen the nuts little by little in an alternating crosswise pattern  | Consult the table of tightening torques and tighten to the proper torque; tighten the nuts little by little in an alternating crosswise pattern until the gap between the body and the cover closes; be sure to coat the threads of the body bolt with anti-seize |
| Cover 2         | Lift up and off  | Make sure there are no pieces of the old gasket left on the sealing surfaces  |



## Disassembly/Reassembly of Components Inside the Body

| Part Name & No.     | During Disassembly   | During Reassembly   |
|---------------------|--|---|
| Disc 4              | Remove, being careful not to scratch the lapped surface          | Make sure that the seat surface (lapped side with groove) is facing down, toward the valve seat   |
| Module Gasket 7     | Remove the gasket and clean sealing surfaces                     | Replace with a new gasket   |
| Module Valve Seat 3 | Remove, being careful not to scratch the gasket sealing surfaces | Make sure there are no pieces of the old gasket left on the sealing surfaces; insert the guide pin into the hole on the body and reattach |
| Module Gasket 7     | Remove the gasket and clean sealing surfaces                     | Replace with a new gasket   |
| Screen 9            | Remove without bending   | Reinsert without bending  |
| Module Gasket 8     | Remove the gasket and clean sealing surfaces                     | Replace with a new gasket; make sure there are no pieces of the old gasket left on the sealing surfaces of the body                       |



## Table of Tightening Torques

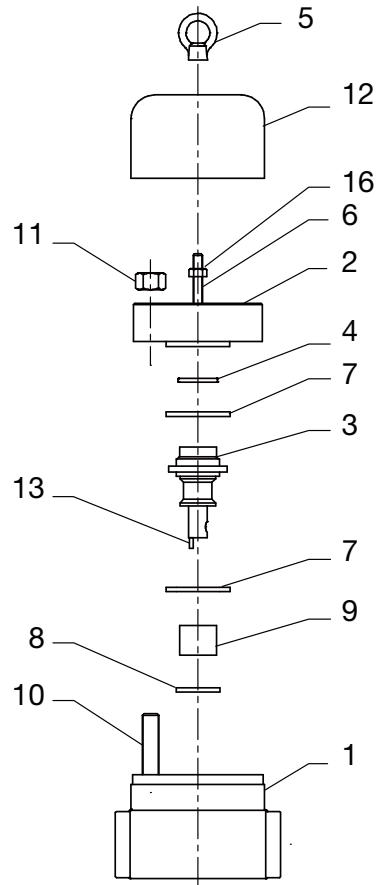
| Model  | Part Name & No. | Torque N·m | Distance Across Flats mm |
|--------|-----------------|------------|--------------------------|
| HR150A | Cover Nut 11    | 130        | 21                       |
| HR260A | Cover Nut 11    | 280        | 27                       |



### 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



| No. | Part Name             | No. | Part Name   |
|-----|-----------------------|-----|-------------|
| 1   | Body                  | 9   | Screen      |
| 2   | Cover                 | 10  | Body Bolt   |
| 3   | Module Valve Seat     | 11  | Cover Nut   |
| 4   | Disc                  | 12  | Cap         |
| 5   | Eye Nut               | 13  | Guide Pin   |
| 6   | Spacer                | 14  | Nameplate   |
| 7   | Module Gasket (Large) | 15  | Flange      |
| 8   | Module Gasket (Small) | 16  | Hexagon Nut |

# Troubleshooting



## 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 condensate is discharged (blocked) or discharge is poor             | Module valve seat, screen or piping are clogged with rust or scale  | Clean parts  |
|  | Disc is stuck to the module valve seat  | Clean parts  |
|  | Air binding has occurred  | Perform a bypass blowdown, or close the inlet valve and allow the product to cool  |
|  | Steam-locking has occurred  | Perform a bypass blowdown, or close the inlet valve and allow the product to cool. Piping correction may also be required. |
|  | The product operating pressure exceeds the maximum specified pressure or there is insufficient pressure differential between the product inlet and outlet | Compare specifications and actual operating conditions   |
| Steam is discharged or leaks from the outlet (blowing) (steam leakage) | Rust or scale on the disc or on the module valve seat   | Clean parts  |
|  | Disc and the module valve seat damage or wear   | Replace with a new disc or module valve seat   |
|  | Gasket (lower module gasket) deterioration or damage  | Replace with a new gasket  |
|  | Improper installation   | Correct the installation   |
|  | Product vibration   | Lengthen the inlet piping and fasten it securely   |
|  | The product operating pressure is less than the minimum specified pressure or the back pressure exceeds the allowable back pressure                       | Compare specifications and actual operating conditions   |
| Steam leaks from a place other than the outlet                         | Gasket (upper or middle module gaskets) deterioration or damage   | Replace with new gasket(s)   |
|  | 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 maintenance kit, repair kit, etc. Please note that replacement parts are only available as part of a replacement parts kit.

# TLV EXPRESS LIMITED WARRANTY

Subject to the limitations set forth below, TLV CO., LTD., a Japanese corporation (“**TLV**”), warrants that products which are sold by it, TLV International Inc. (“**TII**”) or one of its group companies excluding TLV Corporation (a corporation of the United States of America), (hereinafter the “**Products**”) are designed and manufactured by TLV, conform to the specifications published by TLV for the corresponding part numbers (the “**Specifications**”) and are free from defective workmanship and materials. The party from whom the Products were purchased shall be known hereinafter as the “**Seller**”. With regard to products or components manufactured by unrelated third parties (the “**Components**”), TLV provides no warranty other than the warranty from the third party manufacturer(s), if any.

## Exceptions to Warranty

This warranty does not cover defects or failures caused by:

1. improper shipping, installation, use, handling, etc., by persons other than TLV, TII or TLV group company personnel, or service representatives authorized by TLV; or
2. dirt, scale or rust, etc.; or
3. improper disassembly and reassembly, or inadequate inspection and maintenance by persons other than TLV or TLV group company personnel, or service representatives authorized by TLV; or
4. disasters or forces of nature or Acts of God; or
5. abuse, abnormal use, accidents or any other cause beyond the control of TLV, TII or TLV group companies; or
6. improper storage, maintenance or repair; or
7. operation of the Products not in accordance with instructions issued with the Products or with accepted industry practices; or
8. use for a purpose or in a manner for which the Products were not intended; or
9. use of the Products in a manner inconsistent with the Specifications; or
10. use of the Products with Hazardous Fluids (fluids other than steam, air, water, nitrogen, carbon dioxide and inert gases (helium, neon, argon, krypton, xenon and radon)); or
11. failure to follow the instructions contained in the TLV Instruction Manual for the Product.

## Duration of Warranty

This warranty is effective for a period of one (1) year after delivery of Products to the first end user. Notwithstanding the foregoing, asserting a claim under this warranty must be brought within three (3) years after the date of delivery to the initial buyer if not sold initially to the first end user.

ANY IMPLIED WARRANTIES NOT NEGATED HEREBY WHICH MAY ARISE BY OPERATION OF LAW, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY EXPRESS WARRANTIES NOT NEGATED HEREBY, ARE GIVEN SOLELY TO THE INITIAL BUYER AND ARE LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF SHIPMENT BY THE SELLER.

## Exclusive Remedy

THE EXCLUSIVE REMEDY UNDER THIS WARRANTY, UNDER ANY EXPRESS WARRANTY OR UNDER ANY IMPLIED WARRANTIES NOT NEGATED HEREBY (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), IS **REPLACEMENT**; PROVIDED: (a) THE CLAIMED DEFECT IS

REPORTED TO THE SELLER IN WRITING WITHIN THE WARRANTY PERIOD, INCLUDING A DETAILED WRITTEN DESCRIPTION OF THE CLAIMED DEFECT AND HOW AND WHEN THE CLAIMED DEFECTIVE PRODUCT WAS USED; AND (b) THE CLAIMED DEFECTIVE PRODUCT AND A COPY OF THE PURCHASE INVOICE IS RETURNED TO THE SELLER, FREIGHT AND TRANSPORTATION COSTS PREPAID, UNDER A RETURN MATERIAL AUTHORIZATION AND TRACKING NUMBER ISSUED BY THE SELLER. ALL LABOR COSTS, SHIPPING COSTS, AND TRANSPORTATION COSTS ASSOCIATED WITH THE RETURN OR REPLACEMENT OF THE CLAIMED DEFECTIVE PRODUCT ARE SOLELY THE RESPONSIBILITY OF BUYER OR THE FIRST END USER. THE SELLER RESERVES THE RIGHT TO INSPECT ON THE FIRST END USER'S SITE ANY PRODUCTS CLAIMED TO BE DEFECTIVE BEFORE ISSUING A RETURN MATERIAL AUTHORIZATION. SHOULD SUCH INSPECTION REVEAL, IN THE SELLER'S REASONABLE DISCRETION, THAT THE CLAIMED DEFECT IS NOT COVERED BY THIS WARRANTY, THE PARTY ASSERTING THIS WARRANTY SHALL PAY THE SELLER FOR THE TIME AND EXPENSES RELATED TO SUCH ON-SITE INSPECTION.

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THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED.

### **Severability**

Any provision of this warranty which is invalid, prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such invalidity, prohibition or unenforceability without invalidating the remaining provisions hereof, and any such invalidity, prohibition or unenforceability in any such jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction.



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