

ISO 9001
ISO14001



Manufacturer

TLV CO., LTD.

Kakogawa, Japan

is approved by LRQA Ltd. to ISO 9001:2001



Instruction Manual

Radiator Trap

Featured Model: RT3A

172-65191M-05

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Introduction

Thank you for purchasing the TLV radiator 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.

The RT3A radiator trap is used in buildings such as schools, hotels, hospitals and offices, to discharge only low temperature condensate generated in steam-using equipment used for space heating.

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 needed 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

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.

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.

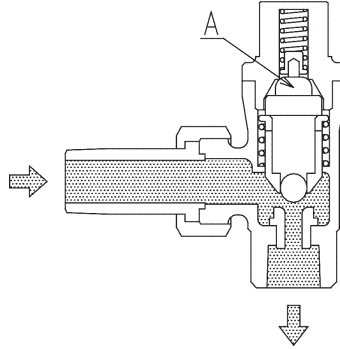
Check to make sure that the pipes to be connected to the product have been installed properly.

1. Is the pipe diameter suitable?
2. Has sufficient space been secured for maintenance?
3. 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?
4. 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?

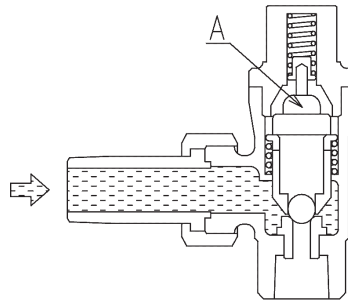
Operation

Principles of air and condensate discharge:

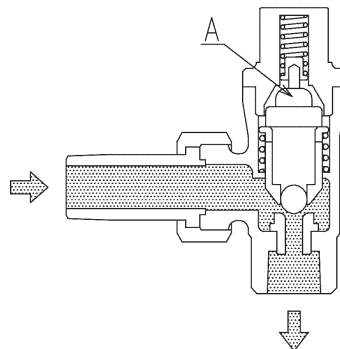
1. At start-up, temperatures are low so the thermo-element (A) is contracted, holding the valve open and allowing the rapid discharge of initial air and condensate.



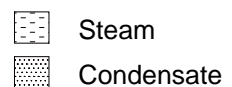
2. After the discharge of initial condensate, the temperature of the condensate rises. When it reaches approximately 100 °C, the thermo-element (A) expands, causing the valve to close.



3. After the valve closes, condensate at approximately 95 °C and below accumulates, causing the thermo-element (A) to contract again, opening the valve and discharging the accumulated condensate.



4. When the condensate temperature rises to over approximately 100 °C again, the valve closes as in step 2 above.



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.

Size (mm)	15	20
Maximum Operating Pressure (PMO) (MPaG)	0.3	
Maximum Operating Temperature (TMO) (°C)	144	
Maximum Allowable Pressure (PMA) ⁰¹ (MPaG)	0.3	
Maximum Allowable Temperature (TMA) ⁰¹ (°C)	144	
Weight (kg)	0.6	0.7

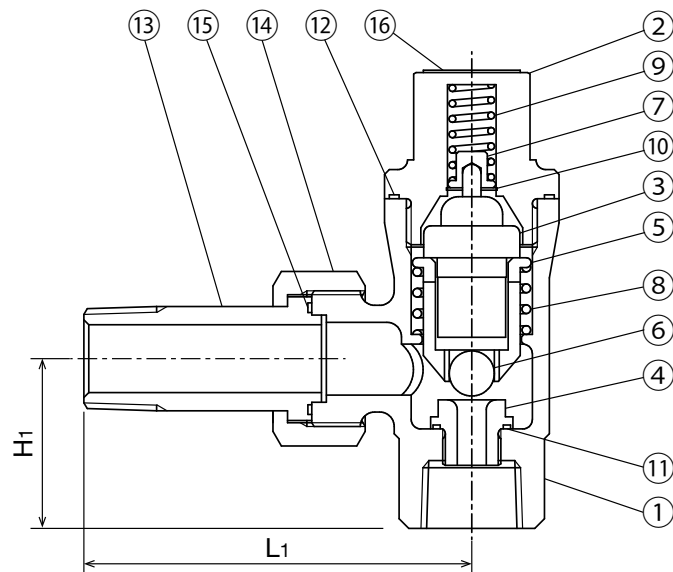
⁰¹Maximum allowable pressure (PMA) and maximum allowable temperature (TMA) are PRESSURE SHELL DESIGN CONDITIONS, **NOT** OPERATING CONDITIONS.



Note

- The RT3A has a set condensate discharge temperature. (Approximately 95 to 100 °C)
- Specifications for products with customized specifications may differ from those listed above. For further details, please refer to the product drawing.

Configuration



No.	Part Name	No.	Part Name
1	Body	9	Over-expansion Spring
2	Cover	10	Snap Ring
3	Thermo-element	11	Valve Seat Gasket
4	Valve Seat	12	Cover Gasket
5	Element Guide	13	Union Nipple
6	Valve	14	Union Nut
7	Spring Guide	15	Union Gasket
8	Return Spring	16	Nameplate

Diameter mm	L_1 mm	H_1 mm
15	80	35
20	87	41

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.

Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.

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

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

1. 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.
2. Before installation, be sure to remove all protective seals.
3. Install the product so the arrow on the body is pointing in the direction of condensate flow.
4. Install in the piping with the inlet horizontal and the outlet vertical.
5. Install a condensate outlet valve and outlet piping.
6. Open the inlet and outlet valves and check to make sure that the product functions properly.

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.

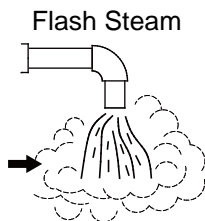
Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product and burns or other injury due to malfunction or the discharge of fluids.

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. 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.

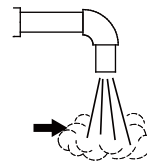
If the product should fail, it may cause damage to piping and equipment, resulting in faulty or low quality products or losses due to steam leakage.

Normal:	Condensate is discharged together with a small amount of flash steam. The trap usually operates intermittently or with continuous dripping.
Blocked (Discharge Impossible):	No condensate is discharged and the surface temperature of the product is low.
Blowing:	Live steam continually flows from the outlet and there is a continuous hissing sound of flow.
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.

Gasket(s): Check for warping and damage

Valve: Check for scratches, warping and wear

Coil Springs: Check for abnormalities

Thermo-element: Check for damage or signs of wax leakage

(After cleaning the inside of the body)

Gasket(s): Check for warping and damage

Valve Seat: Check for scratches, warping and wear

Disassembly/Reassembly



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.

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.)

Disassembly/Reassembly Procedure

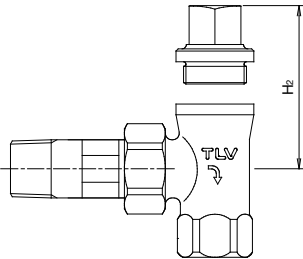
Part Name & No.	During Disassembly	During Reassembly
Union Nut 14	If removing the trap from the piping, first remove the union nut with a wrench	—
Union Nipple 13	Remove from piping only if necessary	—
Union Gasket 15	Remove the gasket and clean sealing surfaces	Replace with a new gasket if warped or damaged
Cover 2	Remove the cover from the body using a wrench (do not disassemble the cover itself)	Consult the table of tightening torques and tighten to the proper torque
Cover Gasket 12	Remove the gasket and clean sealing surfaces	Replace with a new gasket if warped or damaged
Thermo-element 3	Remove, being careful not to bend the push-pin	Replace with a new thermo-element if damaged or leaking wax
Element Guide 5 (Valve 6)	Remove, being careful not to scratch the valve seating surface	Insert into body being careful not to scratch the valve surface
Return Spring 8	Remove from the body	Place inside body
Valve Seat 4	Remove with a box wrench being careful not to scratch seat surface	Insert being careful not to scratch seat surface; consult the table of tightening torques and tighten to the proper torque
Valve Seat Gasket 11	Remove the gasket and clean sealing surfaces	Replace with a new gasket if warped or damaged

Table of Tightening Torques

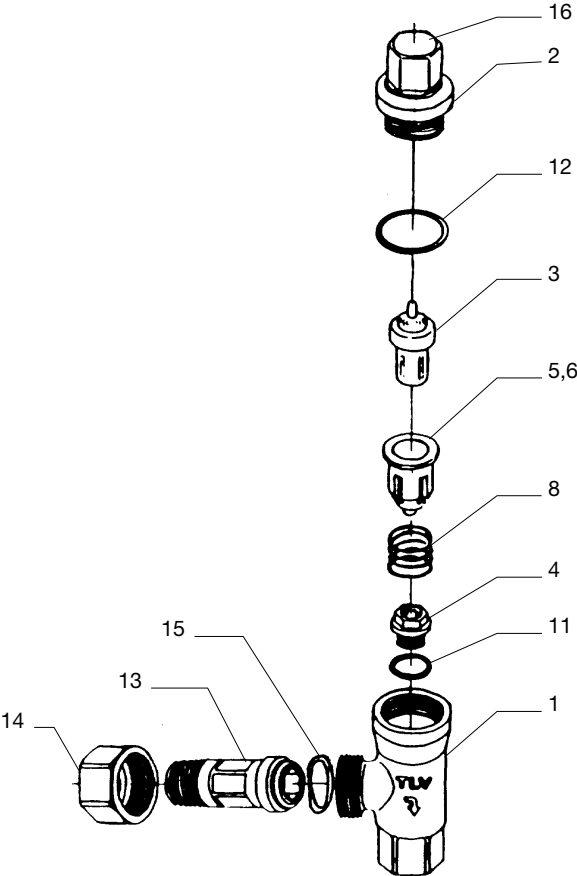
Part Name & No.		Torque N-m	Distance Across Flats mm
Union Nut 14	15 mm	—	32
	20 mm	—	38
Union Nipple 13	15 mm	—	19
	20 mm	—	24
Cover 2		40	24
Valve Seat 4		15	12

Minimum Maintenance Space Required for Disassembly

$H_2 = 80 \text{ mm}$



Exploded View



No.	Part Name	No.	Part Name
1	Body	9	Over-expansion Spring (not shown)
2	Cover ⁰¹	10	Snap Ring (not shown)
3	Thermo-element	11	Valve Seat Gasket
4	Valve Seat	12	Cover Gasket
5	Element Guide	13	Union Nipple
6	Valve	14	Union Nut
7	Spring Guide (not shown)	15	Union Gasket
8	Return Spring	16	Nameplate

⁰¹Cover contains Over-expansion spring, spring guide and snap ring. Do not disassemble the cover.

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 or temperature doesn't rise to the set temperature	There is a build-up of sticky scale between the element guide and the body	Clean the element guide and the inside of the body
	The thermo-element is misshapen	Replace with a new thermo-element
	The product operating pressure exceeds the maximum specified pressure or there is insufficient pressure differential between the trap inlet and outlet	Compare specifications and actual operating conditions
	The capacity of the product is insufficient	Compare specifications and actual operating conditions
	Steam locking has occurred	Study and correct the piping
Steam is discharged or leaks from the outlet (blowing) (steam leakage)	The thermo-element is leaking wax	Replace with a new thermo-element
	There is a build-up of sticky scale between the element guide and the body	Clean the element guide and the inside of the body
	The valve and/or valve seat is worn	Replace with a new valve and/or valve seat
	The valve is catching due to sticky build up	Clean the valve and valve seat surfaces
	The valve seat gasket is damaged	Replace with a new gasket
Steam or condensate is leaking from a place other than the outlet	The cover gasket is damaged	Replace with a new gasket
	Improper cover tightening torque was used	Tighten to the proper torque
	Stress from the piping is exerted on the union	Correct the piping

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.

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