

# INSTRUCTION MANUAL

**TLV** FREE BALL-BUCKET STEAM TRAP  
**UFO SERIES**

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**UFO3-BN • UFO3F-BN  
UFO3-CN**



 **TLV**® **CO., LTD.**

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# Introduction

Before beginning installation or maintenance, please read this manual to ensure correct use of the product. Keep the manual in a safe place for future reference.

The UFO Series steam traps with thermostatic air vent strip are suitable for applications up to 1.57 MpaG (230 psig) where there is a possibility of steam-locking, or for batch operation process equipment, such as heat exchangers, heaters, cylinder dryers and pressing machines. The traps discharge condensate continuously and automatically, at a temperature slightly lower than saturation temperature.

1 MPa = 10.197 kg/cm<sup>2</sup>, 1 bar = 0.1 MPa

For products with special specifications or with options not included in this manual, contact TLV for instructions.

The contents of this manual are subject to change without notice.

# 1. 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.

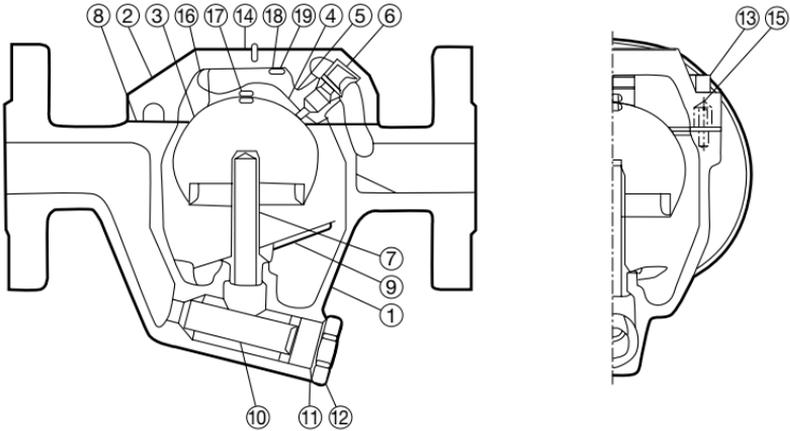
 <b>DANGER</b>	 <b>WARNING</b>	 <b>CAUTION</b>
Indicates an urgent situation which poses a threat of death or serious injury.	Indicates that there is a potential threat of death or serious injury.	Indicates that there is a possibility of injury or equipment/product damage.

 <b>CAUTION</b>	<b>DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges.</b> Improper use may result in such hazards as damage to the product or malfunctions, which may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.
	<b>DO NOT use this product in excess of the maximum operating pressure differential.</b> Such use could make discharge impossible.
	<b>DO NOT subject this product to condensate loads that exceed its discharge capacity.</b> Failure to observe this precaution may lead to condensate accumulation upstream of the trap, resulting in reduced equipment performance or damage to the equipment.
	<b>Take measures to prevent people from coming into direct contact with product outlets.</b> Failure to do so may result in burns or other injury from the discharge of fluids.
	<b>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.</b> Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.
	<b>Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way.</b> Failure to observe these precautions may result in damage to the product or burns or other injury due to malfunction or the discharge of fluids.
	<b>Do not use excessive force when connecting threaded pipes to the product.</b> Overtightening may cause breakage leading to fluid discharge, which may cause burns or other injury.
	<b>Use only under conditions in which no freeze-up will occur.</b> Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.
<b>Use under conditions in which no water hammer will occur.</b> The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.	

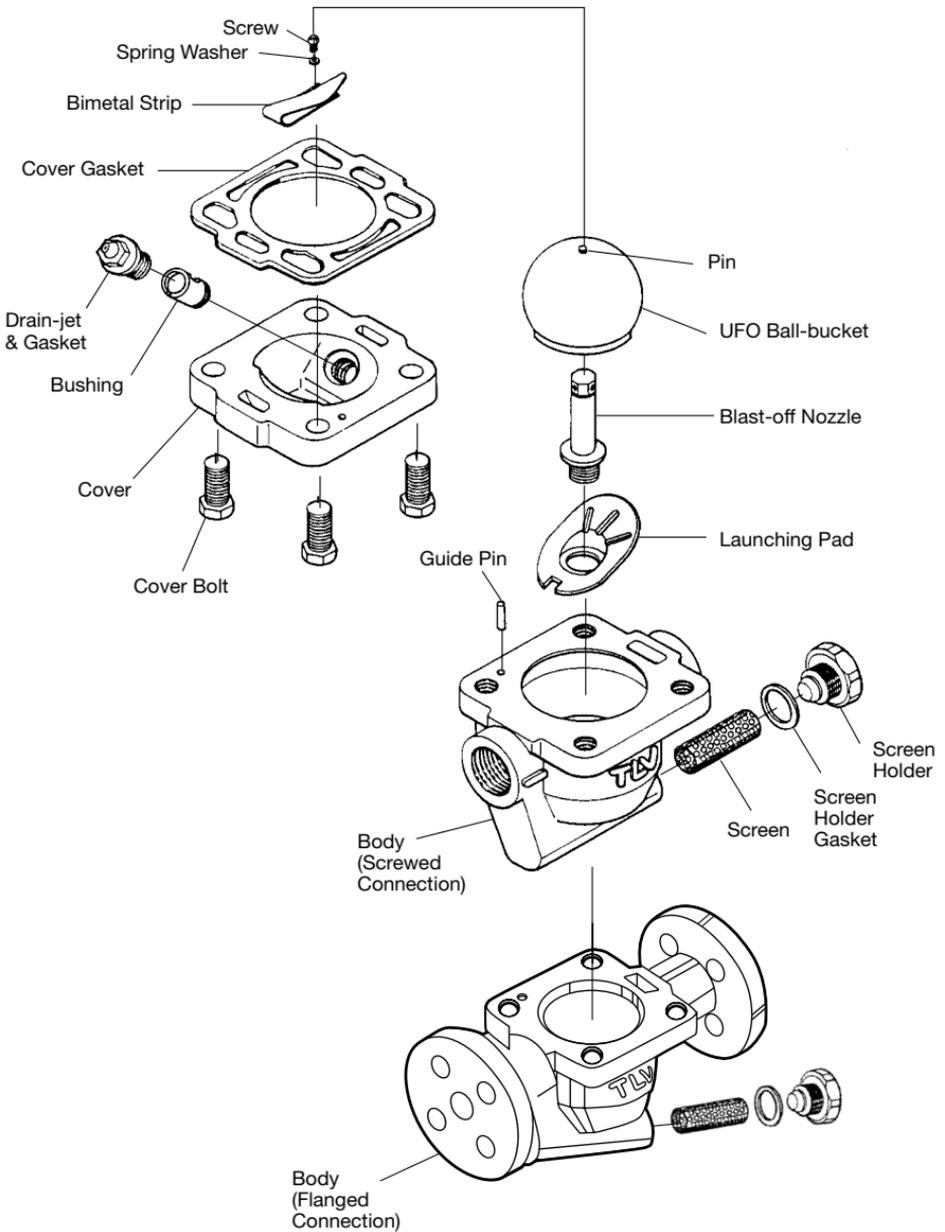
## 2. Configuration

No.	Description	M*	R*	U*	No.	Description	M*	R*	U*
1	Body				12	Screen Holder			
2	Cover				13	Cover Bolt			
3	UFO Ball Bucket			✓	14	Nameplate			
4	Drain-jet		✓		15	Guide Pin			
5	Drain-jet Gasket	✓	✓		16	Bimetal Strip		✓	
6	Drain-jet Bushing				17	Pin			✓
7	Blast-off Nozzle				18	Spring Washer		✓	
8	Cover Gasket	✓	✓		19	Screw		✓	
9	Launching Pad				20	Insulation Cover (Option)**			
10	Screen		✓		21	Binding Strip (Option)**			
11	Screen Holder Gasket	✓	✓						

\* M = Maintenance Kit, R = Repair Kit, U = UFO Kit \*\* See page 10 for details  
 Maintenance parts and repair parts are available only in kits, as shown above.



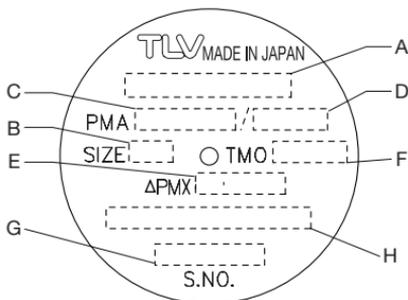
# 3. Exploded View



## 4 Specifications

Refer to the product nameplate for detailed specifications.

- A Model
- B Nominal Diameter
- C Maximum Allowable Pressure\*
- D Maximum Allowable Temperature\*
- E Maximum Differential Pressure
- F Maximum Operating Temperature
- G Serial Number
- H Valve No.\*\*



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

\*\* "Valve No." is displayed for products with options. This item is omitted from the nameplate when there are no options.

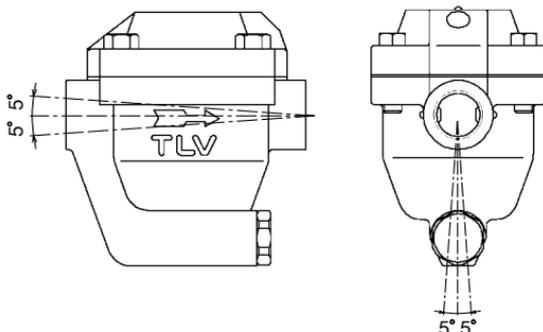
## 5. Proper Installation



- Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.
  - Take measures to prevent people from coming into direct contact with product outlets.
  - Install for use under conditions in which no freeze-up will occur.
  - Install for use under conditions in which no water hammer will occur.
1. Before installation, be sure to remove all protective seals.
  2. Install the steam trap within the allowable inclination, as shown overleaf. Also make sure that the arrow mark on the body corresponds with the direction of flow.
  3. Before installing the trap, blow out the inlet piping to remove all dirt and oil.
  4. Install the trap in the lowest part of the pipeline or equipment so the condensate flows naturally into the trap by gravity. The inlet pipe should be as short and have as few bends as possible.
  5. Support the pipes properly within 800 mm (2.5 ft) on either side of the trap.
  6. Install a bypass valve to discharge condensate, and inlet and outlet valves to isolate the trap in the event of trap failure or when performing maintenance.
  7. Install a check valve at the trap outlet whenever more than one trap is connected to the condensate collection pipeline.
  8. The use of unions is recommended to facilitate connection and disconnection of screwed models.

Continued page 6

## Allowable Inclination



## 6. Piping Arrangement

Requirement	Correct	Incorrect
Install a catchpot with the proper diameter.		Diameter is too small.
Make sure the flow of condensate is not obstructed.		Diameter is too small and inlet protrudes into pipe.
To prevent rust and scale from flowing into the trap, connect the inlet pipe 25 - 50 mm (1 - 2 in) above the base of the T - pipe.		Rust and scale flow into the trap with the condensate.
When installing on the blind end, make sure nothing obstructs the flow of condensate.		Condensate collects in the pipe.

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

1. Is the pipe diameter suitable?
2. Has the trap been installed within the allowable inclination and with the arrow on the body pointing in the direction of flow?
3. Has sufficient space been secured for maintenance?
4. Have maintenance valves been installed at inlet and outlet? If the outlet is subject to back pressure, has a check valve been installed?
5. Is the inlet pipe as short as possible, with as few bends as possible, and installed so that the condensate will flow naturally down into the trap?
6. Has the piping work been done with the proper methods as shown in the table above?

## 7. Inspection and Maintenance

Operational inspections should be performed at least twice per year, or as called for by trap operating conditions. Steam trap failure may result in temperature drop in the equipment, poor product quality or losses due to steam leakage.



- Inspection, disassembly, maintenance and repairs should be done only by trained maintenance personnel.
- Before attempting to open the trap, close the inlet and outlet isolation valves and wait until the trap has cooled completely. Failure to do so may result in burns.
- Be sure to use the proper components and NEVER attempt to modify the product.

Parts Inspection Procedure	
Body, Cover	Check inside for dirt, grease, oil film, rust or scale
Gaskets	Check for warping or damage
Screen	Check for clogging, corrosion or damage
Ball Bucket	Check for deformation scratches and blockage of the vent hole
Drain-jet, Blast-off Nozzle	Check for clogging, corrosion or damage
Bimetal Strip	Avoid touching or distorting the bimetal strip. Unsew it only if found damaged

Disassembly / Reassembly		
Part & No.	During Disassembly	During Reassembly
Cover Bolt 13	Use a wrench to remove	Coat threads with anti-seize, tighten to the proper torque
Cover 2	Lift up the cover and clean the sealing surface being careful not to scratch its surface	Make sure there are no pieces of old gasket left on the sealing surface and reinstall the cover
Cover Gasket 8	Remove the gasket and clean the sealing surface	Replace with a new gasket, do not apply anti-seize
Bimetal Strip 16	Remove with a screw driver, being careful not to bend the bimetal strip	Consult the table of tightening torques and tighten to the proper torque
Drain-jet 4	Use a wrench to remove	Coat threads with anti-seize, tighten to the proper torque
Drain-jet Gasket 5	Remove the gasket and clean the sealing surface	Replace with a new gasket if warped or damaged
Screen Holder 12	Use a wrench to remove	Coat threads with anti-seize and tighten to the proper torque
Screen Holder Gasket 11	Remove the gasket and clean the sealing surface	Replace with a new gasket, coat surfaces with anti-seize
Screen 10	Remove without bending	Reinsert without bending
UFO Ball Bucket 3	Use needle-nose pliers to grasp the UFO by the pin on the top and lift up to remove	Insert being careful not to misshape the UFO ball bucket

Tightening Torque and Distance Across Flats				
Part & No.	UFO3-BN•UFO3F-BN		UFO3-CN	
	N•m (lbf•ft)	mm (in)	N•m (lbf•ft)	mm (in)
Cover Bolt 13	30 (22)	13 (½)	60 (44)	19 (¾)
Drain-jet 4	15 (11)	13 (½)	40 (29)	17 (⅝)
Screen Holder 12	60 (43)	22 (⅞)	100 (73)	30 (⅜)
Screw for Bimetal Strip 19	0.3 (0.2)	+	0.3 (0.2)	+

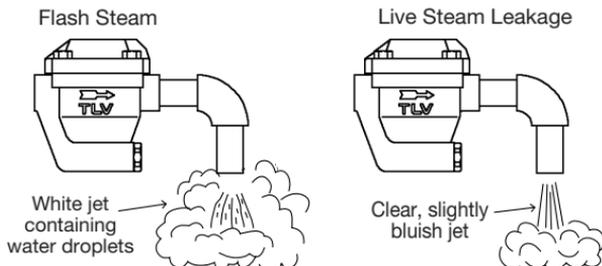
1 N•m ≈ 10 kg•cm

## 8. Operational Check

A visual inspection can be carried out to aid in determining the necessity for immediate maintenance or repair, if the trap is open to atmosphere. If the trap does not discharge to atmosphere, use diagnostic equipment such as TLV TrapMan or TLV PocketTrapman.

Normal:	Condensate is discharged intermittently with flash steam and the sound of flow can be heard. If there is very little condensate, there is almost no sound of flow.
Blocked:	No condensate is discharged. The trap is quiet and makes no noise, and the surface temperature of the trap 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 trap outlet together with the condensate and there is a high-pitched sound.

(When conducting a visual inspection, flash steam is sometimes mistaken for steam leakage. For this reason, the use of a steam trap diagnostic instrument such as TLV TrapMan is highly recommended.)



## 9. Troubleshooting

If the expected performance is unachievable after installation of the steam trap, read chapters 5 and 6 again, and check the following points for the appropriate corrective measures.

Problem	Cause	Remedy
No condensate is discharged (blocked) or discharge is poor	The ball-bucket is stuck to the drain-jet	Clean
	Drain-jet valve port, screen or piping are clogged with rust or scale	Clean
	Steam-locking has occurred	Blowdown through the bypass or close the trap inlet valve and allow the trap to cool
	Flow exceeds trap's rated capacity	Check specifications and reselect trap suitable for actual flow
	The trap 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
Steam is discharged or leaks from the trap outlet (blowing) (steam leakage)	Rust and scale has accumulated on the drain-jet port or on the ball-bucket surface	Clean
	The drain-jacket is damaged	Replace with new drain-jacket
	The ball-bucket is misshapen or damaged	Replace with a new ball-bucket
	Trap is installed above the maximum allowable inclination angle	Correct the installation
	Vibration of trap occurs	Lengthen inlet piping, then fasten it securely
	The bimetal strip is damaged	Replace with a new bimetal strip
Steam leaks from a place other than the trap outlet	Deterioration of or damage to gaskets	Replace with new gaskets
	Improper tightening torques were used	Tighten to the proper torque

- NOTE:** 1. Blowing may occur on bucket-type steam traps used at less than 10% of their maximum discharge capacity. Therefore, do not use this trap for applications in which only small quantities of condensate are produced.
2. When replacing parts with new, use the parts list for reference, and replace with parts from the Maintenance Kit, Repair Kit or UFO Kit. Please note that replacement parts are only available as part of a replacement parts kit.

## 10. Product Warranty

- 1) Warranty Period: one year after product delivery.
- 2) TLV CO., LTD. warrants this product to the original purchaser to be free from defective materials and workmanship. Under this warranty, the product will be repaired or replaced at our option, without charge for parts or labor.
- 3) This product warranty will not apply to cosmetic defects, nor to any product whose exterior has been damaged or defaced; nor does it apply in the following cases:
  1. Malfunction due to improper installation, use, handling, etc., by other than TLV CO., LTD. authorized service representatives.
  2. Malfunctions due to dirt, scale, rust, etc.
  3. Malfunctions due to improper disassembly and reassembly, or inadequate inspection and maintenance by other than TLV CO., LTD. authorized service representatives.
  4. Malfunction due to disasters or forces of nature.
  5. Accidents or malfunctions due to any other cause beyond the control of TLV CO., LTD.
- 4) Under no circumstances will TLV CO., LTD. be liable for consequential economic loss or damage or consequential damage to property.

# 11. Optional insulation Cover RK3·RK5

One insulation cover set consists of a soft ceramic fiber case and two binding straps. RK3 is for models UFO3-BN & UFO3F-BN, RK5 is for model UFO3-CN.



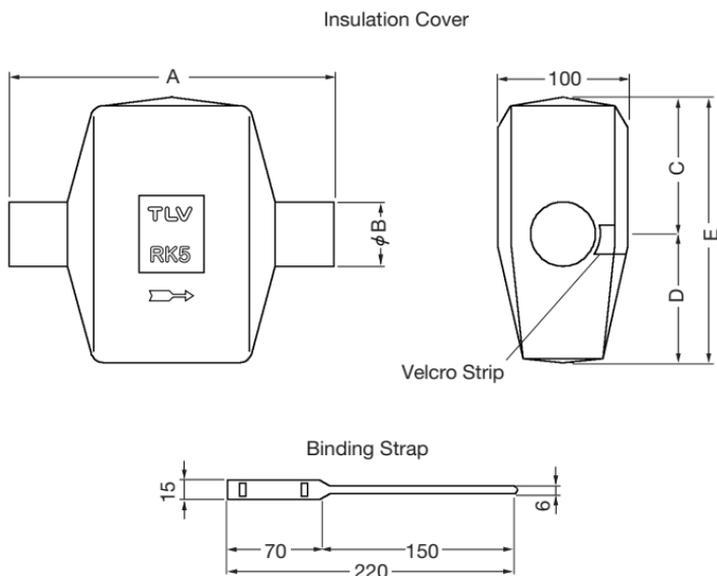
- Inspection, disassembly, maintenance and repairs should be done only by trained maintenance personnel.
- Before installing the insulation cover, close the inlet and outlet isolation valves and wait until the trap has cooled completely. Failure to do so may result in burns.

## Installation

1. Allow the trap to cool to ambient temperature.
2. Open the cover along the Velcro strip.
3. Place cover evenly around the body with the arrow on the cover facing the same direction as the arrow on the trap body.
4. Reattach the Velcro strip.
5. Secure the ends of the cover around the trap inlet and outlet with the binding straps.

## Dimensions

	A	B	C	D	E
RK3	205	40	80	70	150
RK5	250	50	100	100	200



## For Service or Technical Assistance:

Contact your **TLV** representative or your regional **TLV** office.

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