

# Model TS-7. TS-8

## BY-PASS STEAM TRAP

### Instruction Manual

We thank you very much for using the Yoshitake Products. In order to put in use our product correctly and safely, please make sure to read this manual thoroughly prior to the installation. Also we kindly request you to keep this manual with care at your hand.

—————The following safety symbols are used in this manual. —————

#### **⚠ Warning**

This symbol indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

#### **⚠ Caution**

This symbol indicates a hazardous situation that, if not avoided, may result in minor or moderate injury. (“Caution” may also be used to indicate other unsafe practices or risks of property damage.)

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# YOSHITAKE

## 1. Application of the product

The TS-7 and TS-8 models are thermostatic type steam traps which introduces welded bellows. These meet a variety of requirements. Thanks to a built-in by-pass, costs required for piping and installation can be substantially reduced.

## 2. Specifications and Performances

Model	TS-7	TS-8
Connection	JIS Rc Screwed	JIS 10K FF Flanged
Nominal size	15A 20A 25A	
Fluid	Condensate	
Max. pressure	1.0MPa	
Max. temperature	183°C	
Body	Cast Iron	
Cock(seat)	Stainless Steel	
Bellows(valve)	Stainless Steel	
Strainer	Stainless Steel	
Hydraulic test	Steam:1.5 MPa	
	Water:0.5 MPa	

- (1) Four functions; STOP, BY-PASS, TRAP, and TEST can be switched with a monkey wrench.
- (2) The TS-7 and TS-8 are actuated even at temperatures 12°C below the saturation temperature, and live steam is not discharged.
- (3) The trap can be checked without being affected by the back-pressure.
- (4) A strainer is built-in.

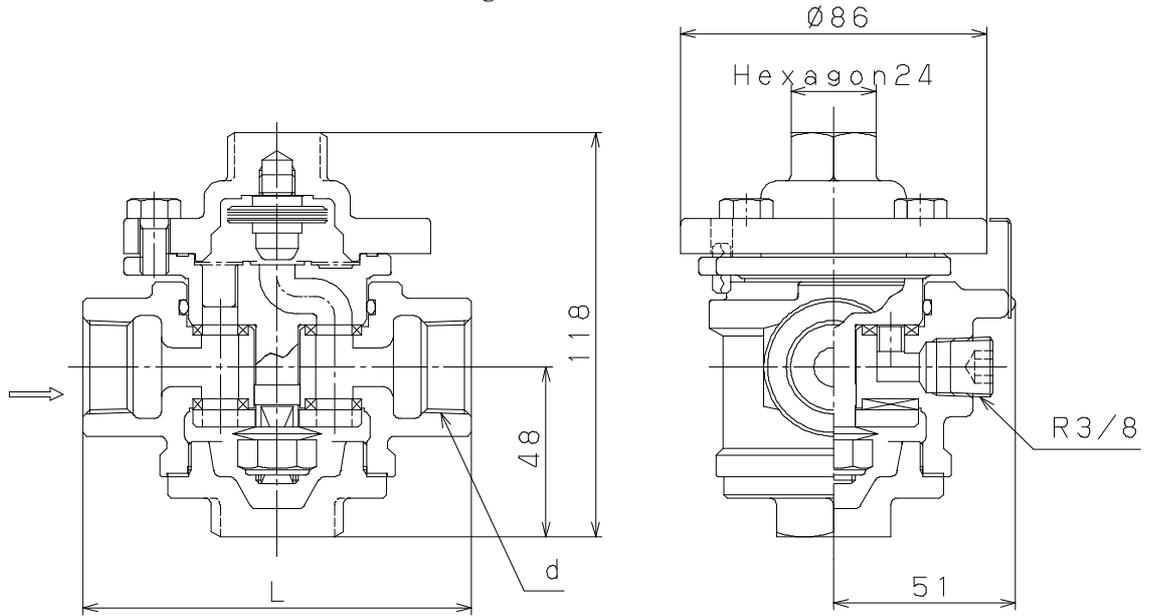
## ⚠ Caution

- |   |
|---|
| <ol style="list-style-type: none"><li>(1) Check the contents of name plates on products with contents of specifications what your ordered.<br/>※In case of wrong, please inform us before using.</li><li>(2) Do not use it to the machinery or units like a solenoid valve which repeat flow and stop steam quit often.<br/>※With sudden pressure changing, durability of bellows will be deteriorated.</li><li>(3) Do not install where water hammer occur.<br/>※Bellows can be damaged.</li></ol> |
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### 3. Dimensions and Weights

#### 3.1 Model TS-7

Fig.1

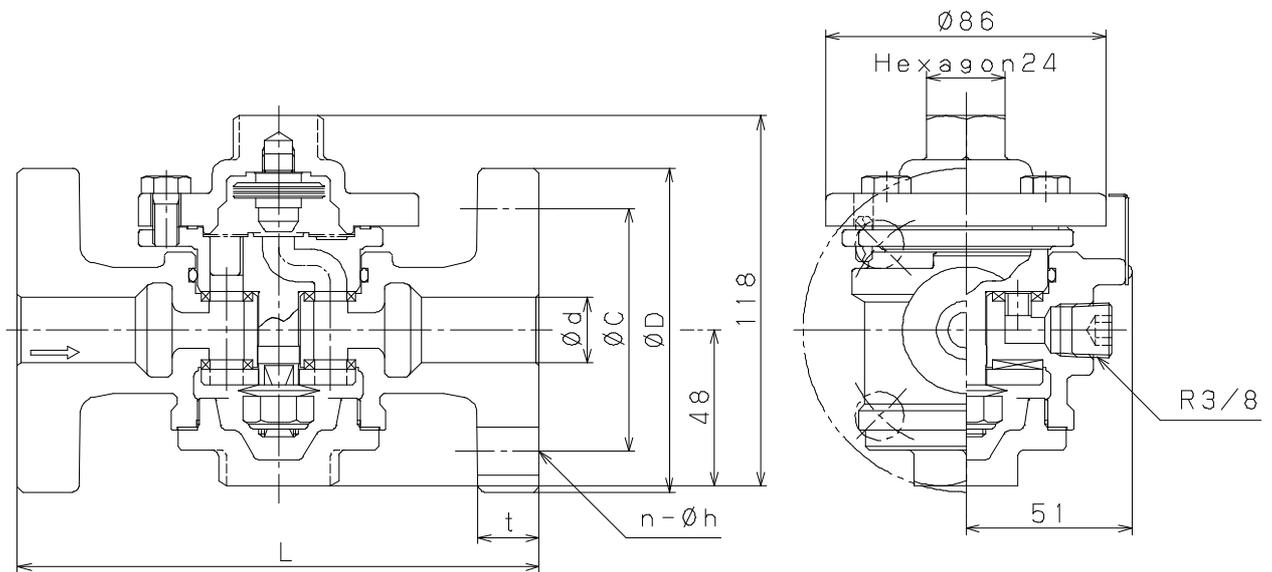


(mm)

Size	d	L	Weight (kg)
15A	Rc 1/2	107	2.3
20A	Rc 3/4	109	2.4
25A	Rc 1	115	2.5

#### 3.2 Model TS-8

Fig.2



(mm)

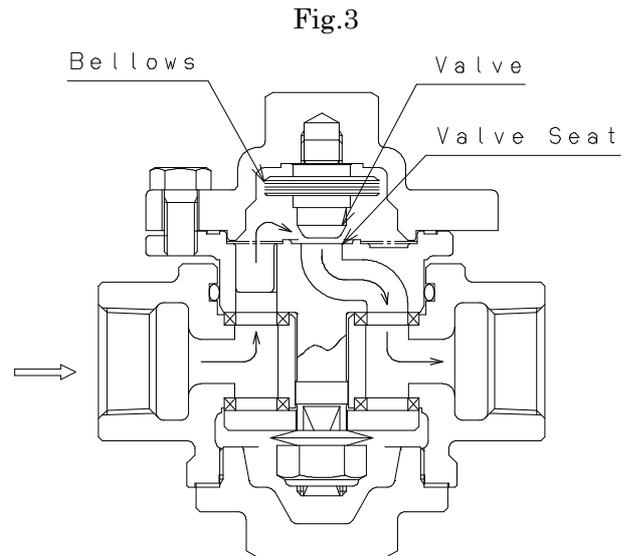
Size	L	JIS B 2238 10KFF					Weight (kg)
		d	D	C	t	n-h	
15A	156	15	95	70	16	4-15	3.9
20A	160	20	100	75	18	4-15	4.4
25A	160	25	125	90	18	4-19	5.5

#### 4. Operation

##### 4.1 Trap mechanism

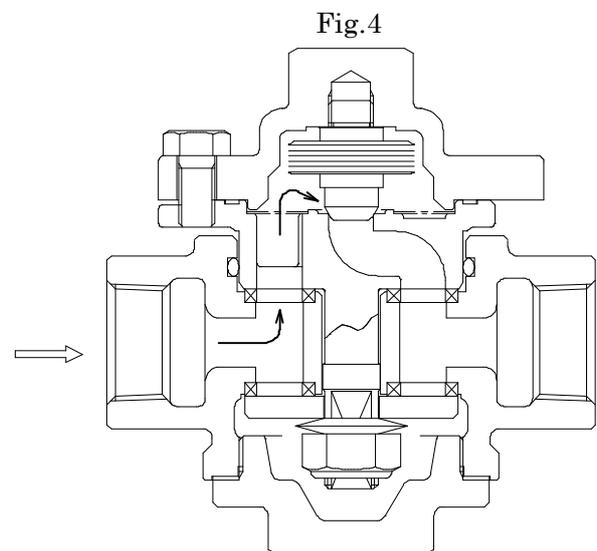
###### 1) When initially passing air (Fig.3)

When initially passing air, the bellows is contracted and the entire valve is fully opened. Discharge air and low temperature condensate swiftly.



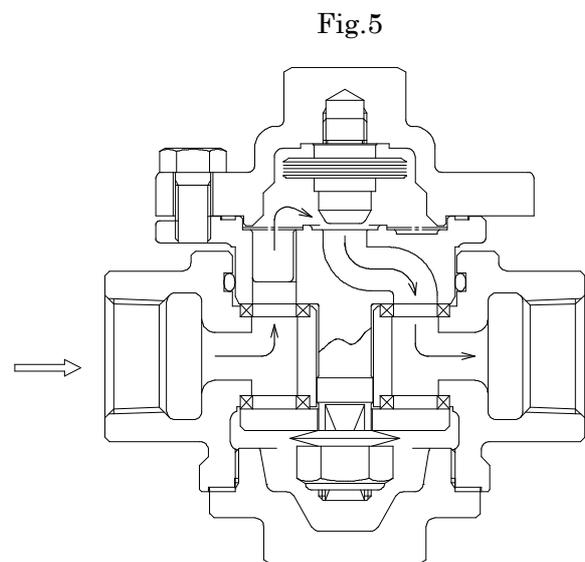
###### 2) When closing the valve (Fig.4)

When the condensate temperature has increased, sealing liquid inside the bellows evaporates, inner pressure increases, the bellows expands, and the valve is closed.

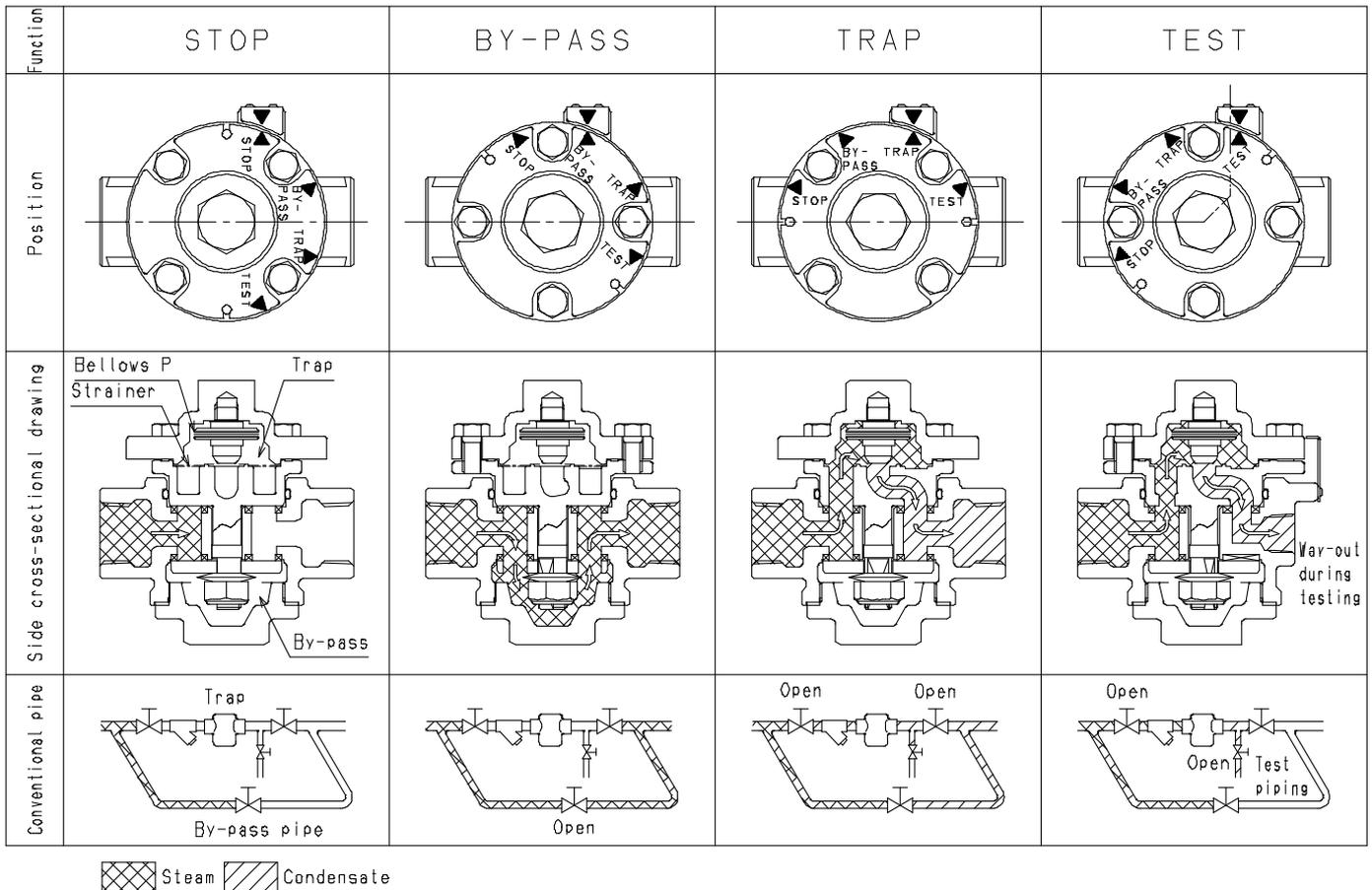


###### 3) When opening the valve (Fig.5)

When the condensate has stopped flowing and the temperature has decreased, sealing liquid inside the bellows becomes condensed, inner pressure decreases, the bellows contracts, and the condensate is discharged.



## 4. 2 Function changeover of cock



### 1) STOP

Valves at the way-in, way-out, and by-pass are closed. The strainer can be cleaned and the bellows P can be inspected without any condensate flow to the trap or from the by-pass.

### 2) BY-PASS

The condensate runs from the way-in to the way-out directly through the by-pass. This function is used when blowing the pipes when connected or discharging a large amount of condensate when passing air initially.

Since the condensate does not flow to the trap, the strainer can be cleaned and the bellows P can be inspected.

### 3) TRAP

This is a normal trap operation and the condensate flow the way-in runs through the trap and is discharged from the way-out.

### 4) TEST

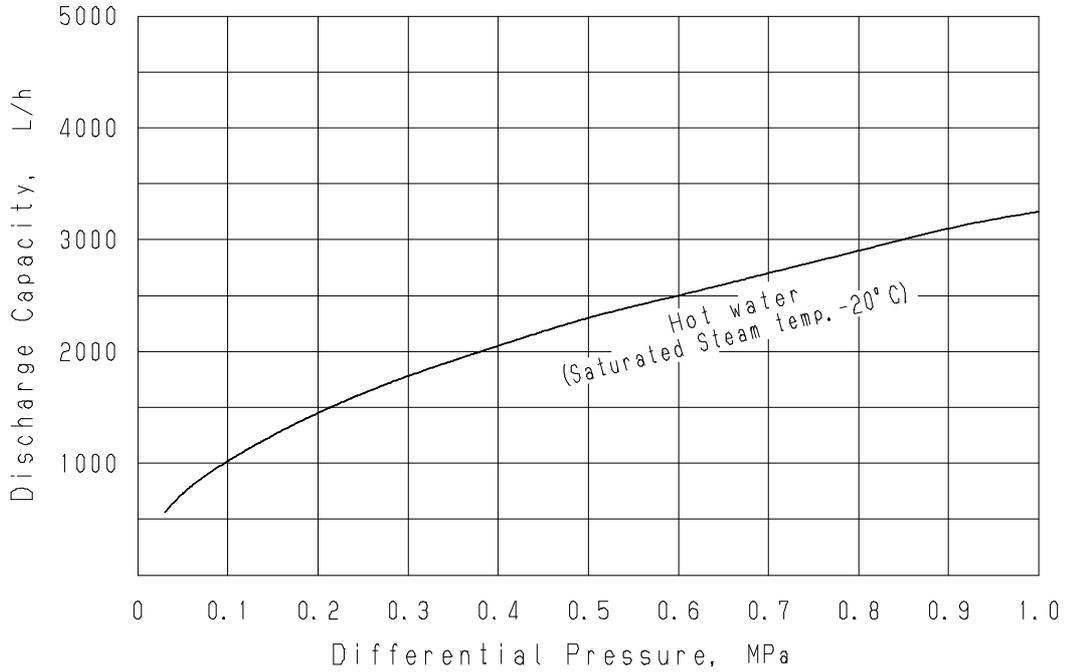
The condensate from the way-in runs through the trap and is discharged to the way-out for testing so that the trap operation can be checked without being affected by the back pressure. The condensate does not flow out from the by-pass.

Note : When using the TEST function, refer to 8. Maintenance procedures.

5. Selection of Nominal Size

This chart and table are Maximum condition. Be sure to have enough safety factor(not less than 3 times) on design.

5. 1 Max. Continuous Discharge Capacity Chart

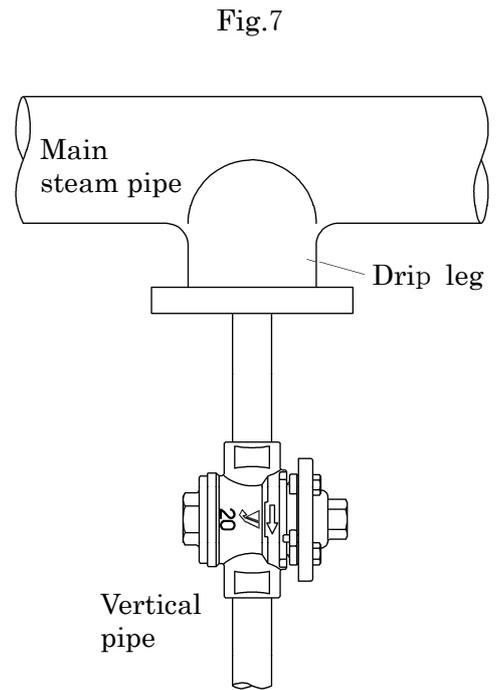
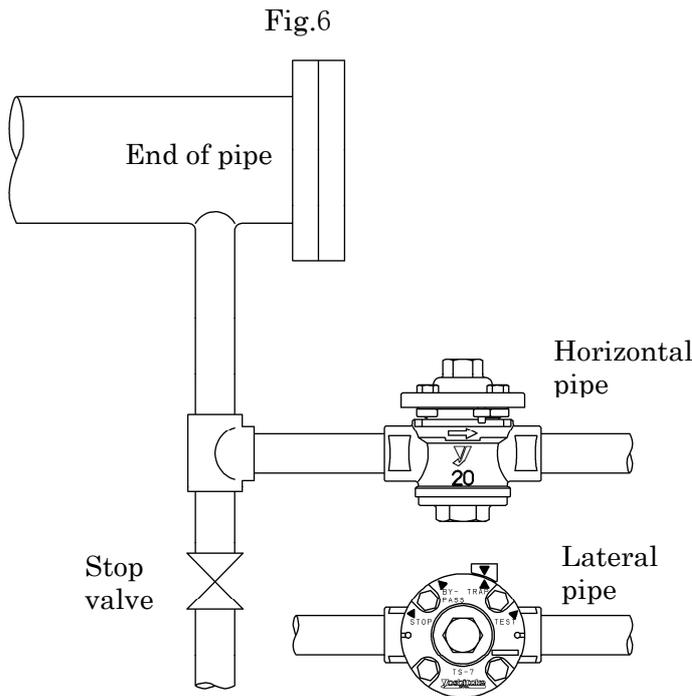


5. 2 Max. Continuous Discharge Capacity Table

Differential Pressure MPa	0.03	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Hot water (Saturated Steam temp -20°C)	560	730	1020	1450	1780	2050	2300	2500	2700	2900	3100	3250

6. Installation procedures

6. 1 Example of piping



## 6. 2 Warnings/Cautions during installation

### **⚠ Warning**

- (1) When discharging in the air, be sure the condensate shall be discharged into the safety place, failure to do so resulting in injure.  
※When condensate blows off, it may result in burn or injure.

### **⚠ Caution**

- (1) Before installing valve, clean internal pipe and remove foreign matter and scales.  
※Operation will not be run correctly due to dust, if pipe is not clean enough. When connecting valve to pipe, be sure the quantity of seal, place of application and seal tape is correct, so that it may not make seal or seal tape go into pipe.
- (2) Before installing valve to pipe, be sure to remove the body output cap to prevent not to foreign matter enters.  
※Product function would not work correctly.
- (3) Install valve so that the arrow on the valve body coincides with the direction of the fluid flow.  
※Failure to do so may prevent the valve from functioning.
- (4) Install product right position.  
※Failure to do so may affect the original performance.
- (5) Support and fix piping security.  
※With large stress on pipe, product function can be damaged.
- (6) Do not disassembly unreasonably.  
※Disassembling the valve at your discretion may affect the original performance.
- (7) When installing valve, be sure to have enough space for maintenance, inspection and mending, such a cock function changeover, clean strainer, disassembly for examine bellows.  
※Maintenance, inspection and mending would not be available.
- (8) For piping connection with screw, fasten the second side of the end of body tightly with wrench.  
※Failure to do so may leak out or deform, then it becomes not to open or close.
- (9) Prevent from freezing condensate.  
※Failure to do so may damage bellows.
- (10) Connect to pipe correctly.  
※If connection is not tight, fluid may be leaked due to vibration, and be burned.
- (11) When examining airtight with water or air with more than 0.5MPa stress, do not turn cock to TRAP or TEST.  
※Temperature does not go up, so internal stress can not be generated, resulting bellows may be damaged.
- (12) Do not use sudden opening and closing valve in front and behind of trap not to occur water hammer.  
※Bellows can be damaged.
- (13) Please avoid use to the equipment to repeat ventilation and the stop of steam with the electromagnetic valve etc. frequently like **【 Figure 8 】** and the device, etc.  
※The durability of the bellows decreases remarkably by a rapid pressure fluctuation.
- (14) Please do not screw in too much when you install the product in piping.  
※The product is damaged when screwing in too much because the resistance of screwing in is reduced according to the kind of the seal material.

(1) Install lower position as possible to condensate be able to flow to trap by itself.

And keep piping slope.

(2) Do not insulate the product.

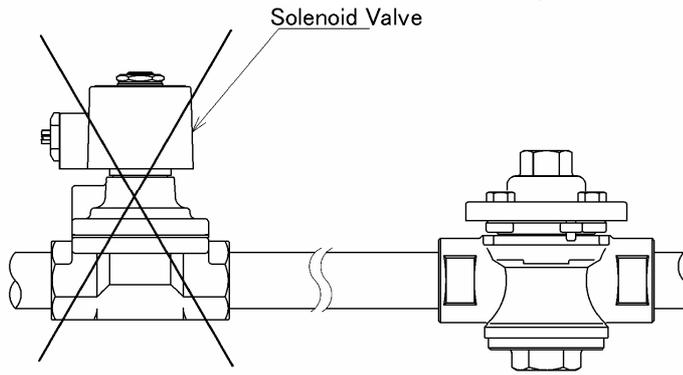
(3) When installing trap on main pipe of steam, prepare drip leg before the trap.

(4) In case of short of discharge capacity with one trap, install another traps.

When installing, be sure to pipe them on the same level on each trap's input high.

(5) Install them where atmosphere temperature is lower than discharging condensate has.

【 Figure 8】



## 7. Operation procedures

### 7. 1 Warnings/Cautions during operation

#### ⚠ Warning

- (1) Before flowing steam, be sure the safety when steam or condensate go to the end of pipe.  
※Steam or condensate blows off, resulting burns.
- (2) When confirming product's operation, do not stand in front of outlet.  
※Blowing out of condensate can burn or injure you.

#### ⚠ Caution

- (1) The first flow air, blow enough with cock on BY-PASS. Turn the cock to TRAP, then operate trap as usual. (When delivering, cock is on STOP.)  
※Bellows can be damaged.

### 7. 2 Cock operation

- 1) To changeover the function, turn the hexagonal top cover using a monkey wrench as shown in Fig.9.
- 2) Align the ▼ symbol marker to the ▲ symbol of the desired function as shown in Fig.10.

Fig.9

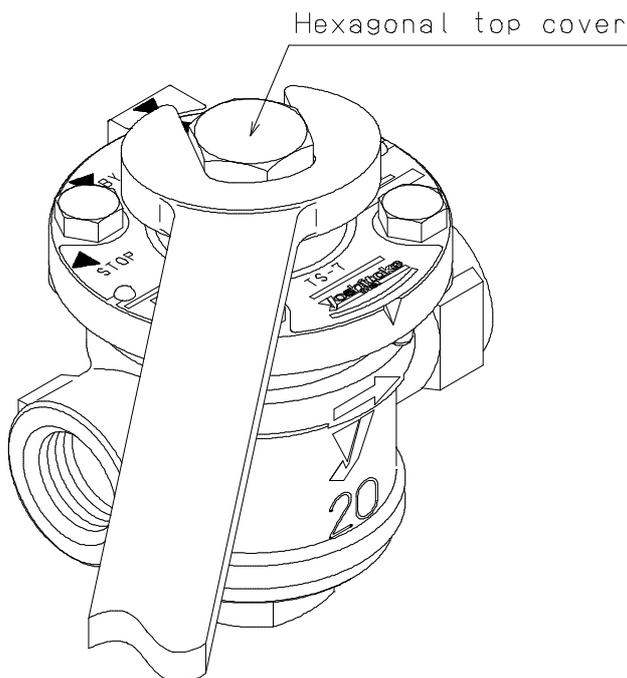
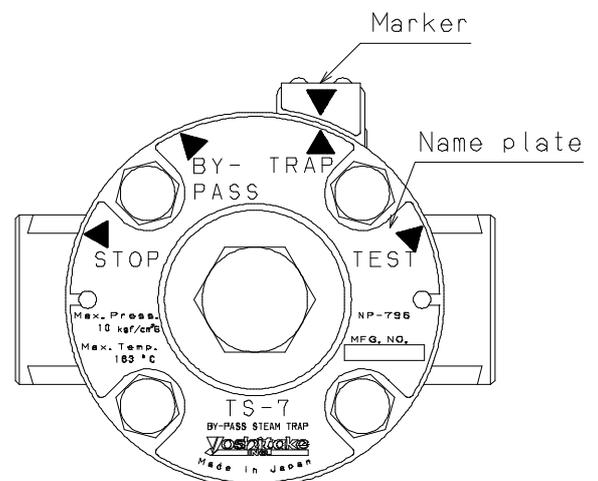


Fig.10

Example: TRAP is elected in the below drawing.



## 8. Maintenance procedures

### 8. 1 Troubleshooting

Problem	Cause	Solution
Condensate is not discharged.	The cock is set to STOP.	Set the cock to TRAP.
	Bellows is damaged. (Bellows must be contracted at room temperature.)	Disassemble the trap and replace the cover complete set with a new one.
Condensate cannot be discharged smoothly.	The strainer is clogged.	Disassemble the trap and clean the strainer.
	Trap's discharging capacity has become insufficient.	Install multiple traps.
	Differential pressure is insufficient due to high back pressure.	Examine the piping route and the pressure around the way-in and way-out.
Steam leaks.	The cock is set to BY-PASS.	Set the cock to TRAP.
	Foreign matter is stuck to the bellows valve body and valve seat.	Disassemble the trap and clean it.
	The bellows valve and the valve seat are abraded.	Disassemble the trap and replace the bellows valve body and valve seat.
	The packing, O-Ring, gasket is abraded or broken.	Disassemble the trap and replace the packing.

### 8. 2 Warnings/Cautions during maintenance and checking

#### Warning

- (1) Be sure pressure in product or pipe is as same as pressure of atmosphere when disassembly or inspect. Cool product body until to be able to touch with bare hand.  
※Remained pressure of product or pipe can burn or injure you.
- (2) Do not touch the valve directly with bare hand.  
※Doing so may result in burns.
- (3) While disassembly, do not change cock.  
※Blowing out steam or condensate may result in burns.

#### Caution

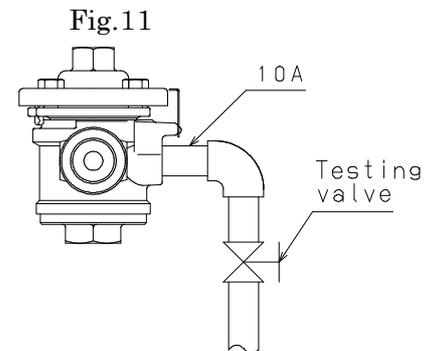
- (1) Inspect daily and periodically.  
※ Necessary to keep product function and performance. For the general user, it is recommendable to entrust specialists the inspection.
- (2) Disassembly and inspection, leave them to specialist or maker.  
※The general public should not disassembly. When the product is in abnormal condition or malfunctioned, contact the specialized dealer for troubleshooting.
- (3) Not using valve for long periods of time, inspect operation again before running.  
※Due to rusted product or inside of pipe, product may not work correctly.
- (4) When disassembling, receive internal condensate with container.  
※Failure to do so may dirty around machine.
- (5) Caution not to fall parts down during the disassembly. Use soft cloth, put disassembled parts on it not to injure them.  
※Failure to do so original performance may be affected.
- (6) Assembly, be sure assembly parts correctly, tighten the nuts evenly.  
※Failure to do so original performance and outside leakage maybe affected.
- (7) When mending product, proper parts must be used. And do not alter product.  
※Failure to do so may damage product, blow steam and condensate off, wrong operation result in burns or injure.
- (8) When assembling, replace gasket, packing, O-ring to new one.

- ※It is expendable supply. It may cause outside leakage.
- (9) If there is much condensate when starting to flow the air, before starting turn cock to BY-PASS to discharge condensate enough.
  - ※Failure to do so may damage bellows.
- (10) When inspecting the operation trap with TEST function, beforehand remove outlet body plug for test, after connecting discharge pipe, turn cock to TEST, then start to inspect the operation.
 

When removing outlet body plug for test while passing air, be sure the cock must be on BY-PASS or TRAP.

  - ※If remove plug while cock is on TEST, condensate or steam may blow off and result in burns.
- (11) When cleaning strainer or inspecting bellows, be sure the cock must be on STOP or BY-PASS, cool trap enough below 80°C, then disassembly.
  - ※Failure to do so may damage bellows.
- (12) While disassembling, do not operate cock.
  - ※Steam may blow off.(Refer to 8.3 Disassembly.)

- (1) When inspecting the operation trap with TEST function, beforehand remove body plug with hexagonal(Rc3/8) hole on outlet for test, after piping as drawing below, turn cock to TEST, then inspect the operation.
- When removing plug with hexagonal hole to the air, be sure the cock must be on BY-PASS or TRAP. If remove valve while cock is on STOP, remained stress in bellows blow off. And if remove valve while it is on TEST, condensate or steam may blow off.



### 8. 3 Disassembly

#### ● Bellows

- 1) Set the cock to STOP or BY-PASS.
- 2) Cool the bellows sufficiently until the cover surface temperature has fallen below 80°C.
- 3) As shown in Fig.12, apply a monkey wrench to the hexagonal top cover (width : 24mm) to hold the cock and remove the four bolts.
- 4) Remove the strainer from the cock and clean the cock.
- 5) Check that the bellows P is contracted at room temperature.
- 6) Never switch the cock during disassembly or steam will be discharged.
- 7) During cleaning and inspection, take utmost care not to scratch the valve body and valve seat.
- 8) Assemble the parts in the reverse order.
- 9) Attach the cover to the cock so that the cock pin is aligned with the cover hole.

#### ● Cock

- 1) Stop steam and release pressure.
- 2) Remove the cap.
- 3) Apply the monkey wrench to the hexagonal top cover(width : 24mm) and remove the U-nut.
- 4) Remove the disc spring, valve (by-pass valve), and cock.
- 5) Assemble the parts in the reverse order.
- 6) Tighten the U-nut to 2000N-cm.

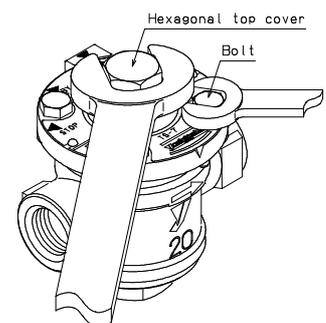
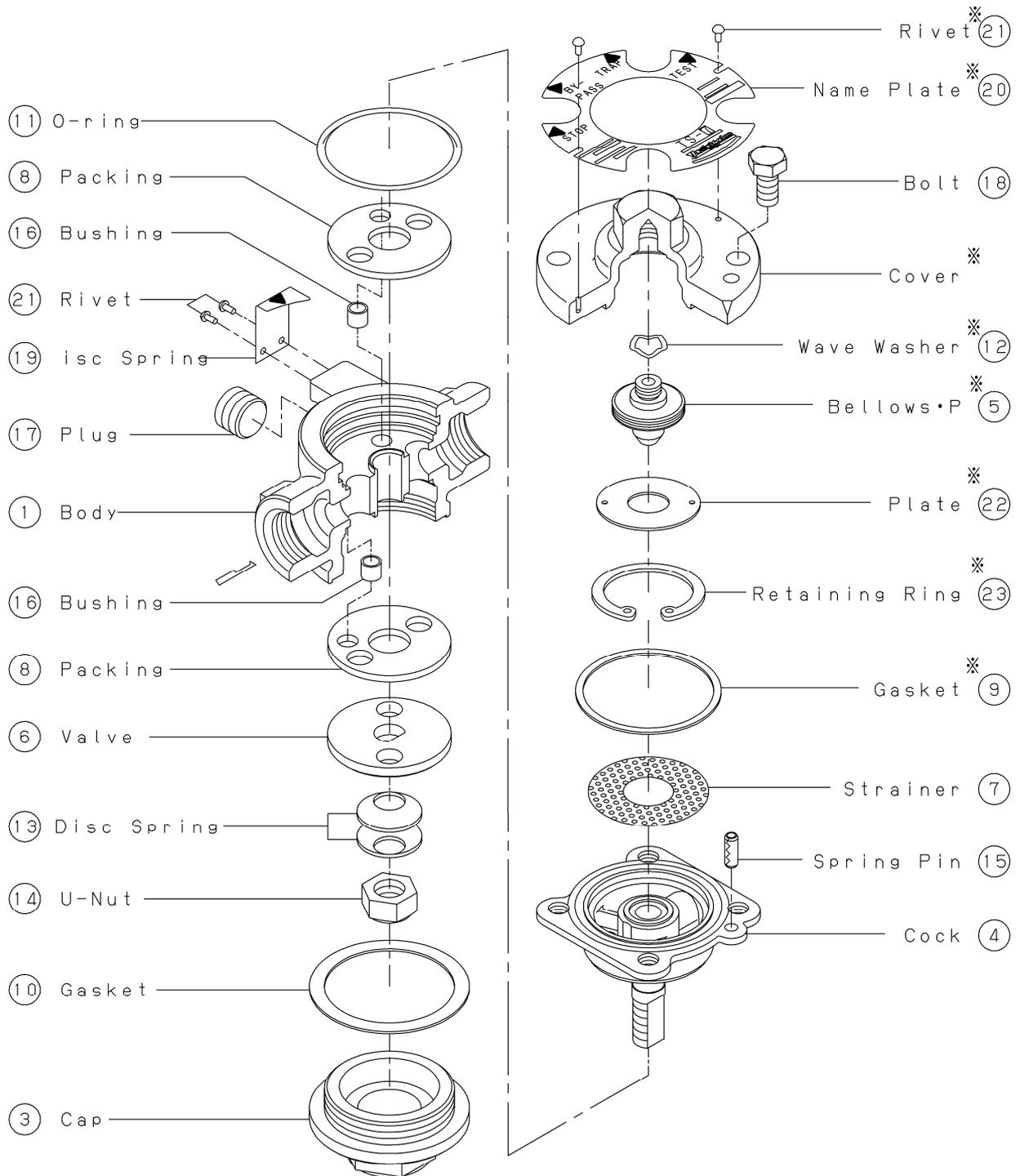


Fig.13

## 8. 4 Disassembly drawing

Fig.14



\* The parts of ②, ⑤, ⑨, ⑫, ⑲, ⑳, ㉑ (except for the rivets inserted transversely on the body), ㉒ and ㉓, should be replaced as the cover complete set.