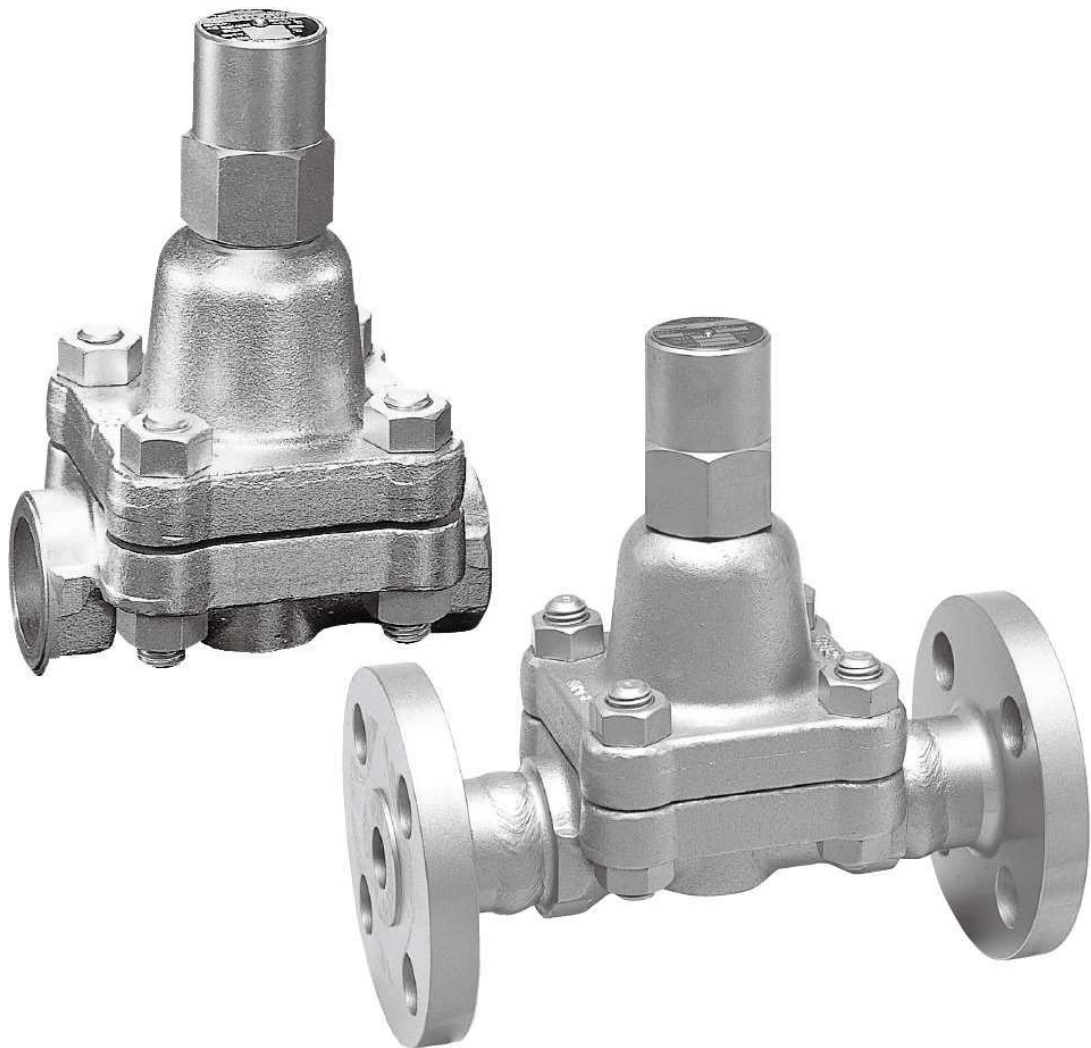


TEMPERATURE CONTROL STEAM TRAP

# TB51/52

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USER'S MANUAL



 **MIYAWAKI INC.**

# SAFETY GUIDE

**The model TB51/52 is a bimetal temperature control steam trap that has superior durability and essentially doesn't allow steam to leak.**

**In order to get maximum benefit from this product, be sure to read this manual before installing it.**

The following warnings and cautions are shown at appropriate places in this manual.



Failure to observe this type of precaution may lead to serious injury or death.



Failure to follow this type of precaution can lead to injury or damage to equipment and property.

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# 1 SPECIFICATIONS AND MARKINGS

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## WARNING

Be sure not to use this product at higher pressures than the specified maximum allowable pressure (PMA) or at temperatures higher than the specified maximum allowable temperature (TMA).

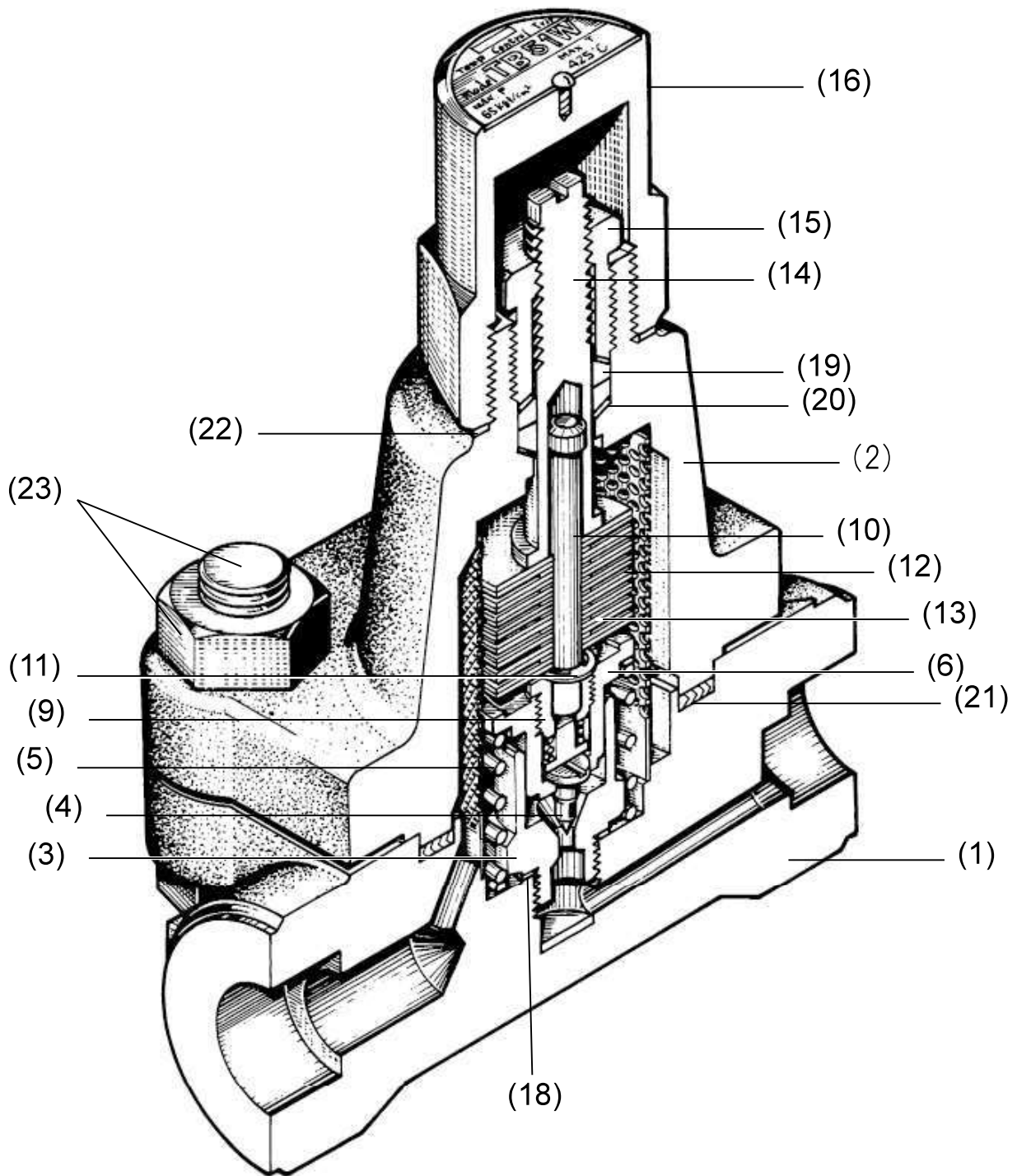
The following items are displayed on the name label or the side of the product.

Check each item to avoid misuse of the product.

- 1) Maximum Operating pressure (PMO): TB51-45/TB52-45: 4.5MPa (653psig)  
{However, for the TB51-65/TB52-65: 6.5MPa (943psig)}
  - 2) Maximum operating temperature (TMO): TB51: 425°C (797°F)  
{However, for the TB52:475°C (887°F)}
  - 3) Size: 15 mm (1/2"), 20 mm (3/4") or 25 mm (1")
  - 4) Set temperature: The temperature at which the condensate will be discharged from the steam trap.
  - 5) Year of production: The first 2 digits of S.No. represents the last 2 digits of year of production.
  - 6) Flow direction: Shown by an arrow
  - 7) Body material: TB51:A105, TB52:A182 F22
  - 8) Model symbol: Showing the product model name
- Some pictures and illustrations in this manual are that of the representative model of TB51/52 models. For more details regarding dimensions and other specifications, please refer to the catalog.

## 2 CONSTRUCTION DETAILS

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1. Body	9. Bush	14. Adjust Bolt	19. Packing
2. Cover	10. Shaft	15. Gland	20. Spacer
3. Valve Seat	11. E-Ring	16. Cap	21. Gasket
4. Valve	12. Bimetal	17. Screen	22. Gasket
5. Spring	13. Washer	18. Gasket	23. Bolt, Nut
6. Holder			

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### 3 INSTALLATION

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#### **WARNING**

**Pay very careful attention when working in hazardous environments. There is a risk of explosion and the possibility of dangerous gases leaking. Always check whether the pipeline contains flammable, high pressure or high temperature materials before starting to work.**

- **Make sure that isolation valves are installed on both the upstream and downstream lines.**



#### **CAUTION**

**Before installing the product, open both isolation valves and the bypass valve, if one exists, to blow out any debris or dirt inside the pipeline. After blowing out the line, before starting to work, close the isolation valves and allow time for the temperature to drop to a safe working temperature.**

**When installing the product, be sure to leave clearance for maintaining it.**

- 1) Remove the dustproof seals covering both connections.
- 2) Check the flow direction indicated on the side of the body.
- 3) The TB51/52 can be used for both horizontal and vertical lines. However, when installing a TB51/52 in a horizontal line, be sure to maintain a slight slope to the line, so that any condensate will flow smoothly.
- 4) Open the isolation valve on the upstream line and make sure the product works normally.



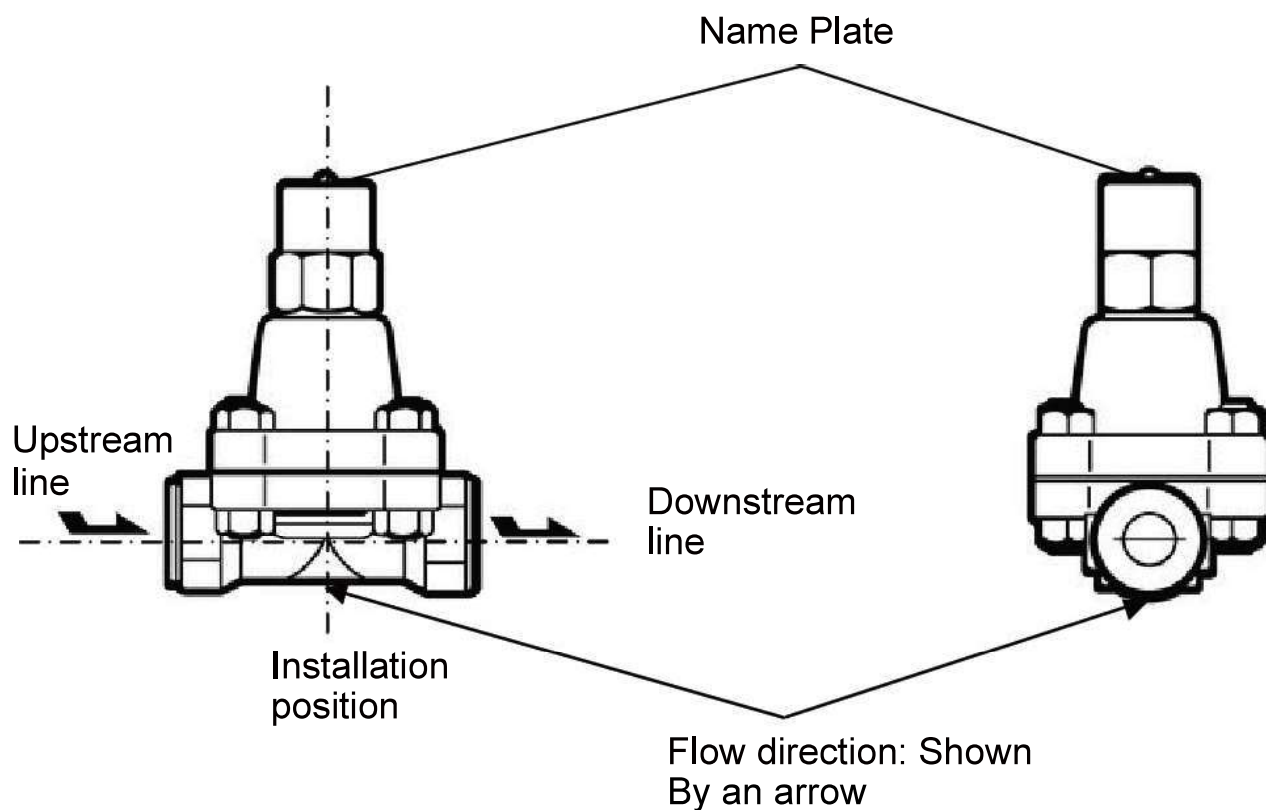
## CAUTION

### Installation instructions for welding :

When welding a socket weld type to the pipe, heat buildup that can damage internal parts of the trap must be avoided. After welding one side of the socket weld ends quickly, leave it to cool. After the trap's temperature has returned to normal, weld the other side quickly.

The body and cover of the type TB52W are made of A182 F22 (forged alloy steel). Please, make sure that the welding is performed according to the correct welding instructions.

In case of heat treatment after welding, to prevent damage of the internal parts by excessive heat, open the trap and remove the internal parts from the body. After welding reinstall the parts to the trap.



## 4 SETTING THE TEMPERATURE

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### WARNING

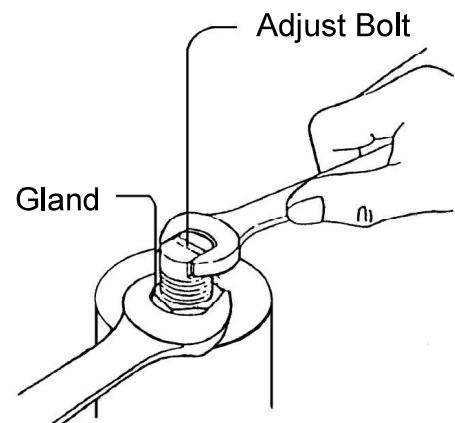
Only set the temperature when the bimetals in the body are flat, before any steam is flowing. Be sure not to set the temperature while the steam is flowing because the steam or condensate may spurt out around the edges in the setting part.

#### 4.1 Set temperature

The set temperature is the temperature at which condensate will be discharged from the temperature control trap. It is set to the temperature specified by the customer when shipped. If the customer doesn't specify a temperature, it is always set to 180°C at a pressure of 2.1 MPa (TB51-45/TB52-45), 220°C at a pressure of 4.4 MPa (TB51-65/TB52-65), as the factory default setting. In this case, the set temperature is not stamped on the name plate attached to the body.

#### 4.2 Setting the temperature

- 1) Remove the cap (16).
- 2) Hold the adjust bolt (14) using a wrench (Across the flats:7mm), and loosen the gland (15) using a wrench (Across the flats:22mm).
- 3) Screw the adjust bolt (14) slowly clockwise until it stops. This position is the starting point to set the temperature.
- 4) See the stroke table in Section 5 to find the number of turns corresponding to the temperature you want.
- 5) Screw the adjust bolt (14) counterclockwise the number of turns specified in the table.
- 6) Hold the adjust bolt (14) using a screwdriver, and then lightly tighten the gland (15).
- 7) Attach the cap (16).



#### 4.3 Precautions for setting the temperature

##### Steam trace

Basically, the set temperature should be the temperature used to control the objects being heated. However, please make sure to consult us if you will use the product in a cold climate.

##### Steam main lines

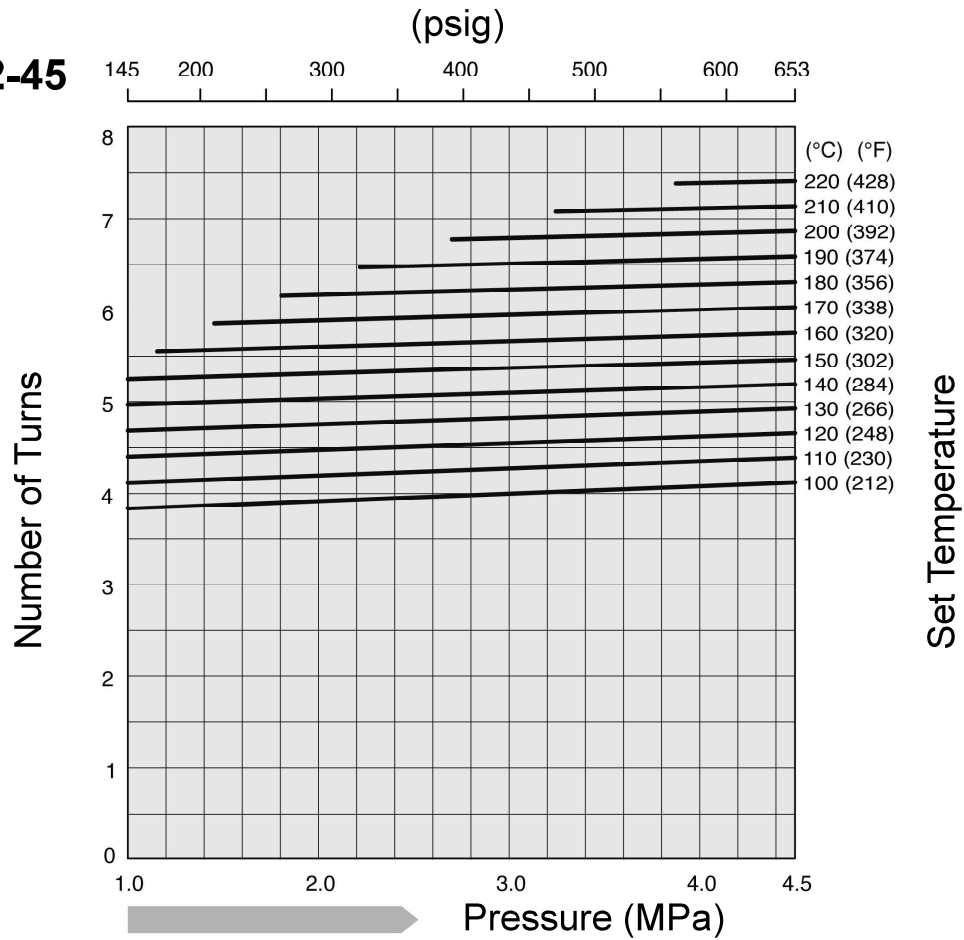
Basically, use a temperature 20 to 30°C lower than the saturated temperature. However, since the appropriate temperature setting will vary with the length of the respective branch pipes, please consult us about our recommendations.

##### Other equipment

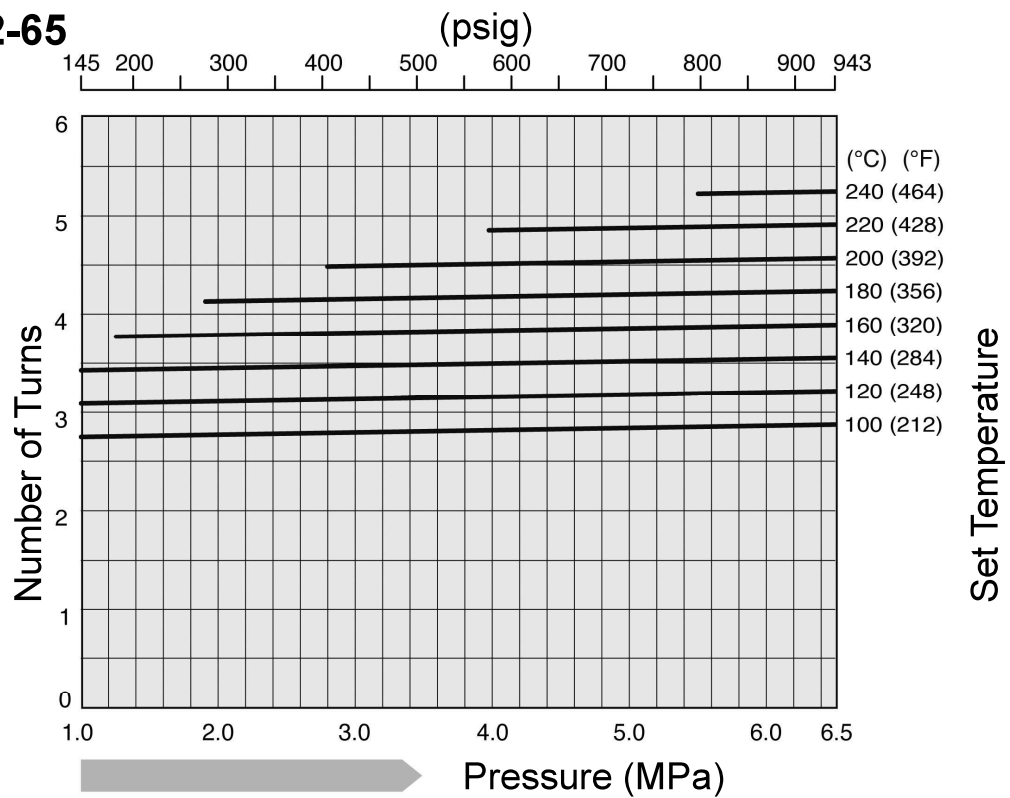
Since the appropriate set temperature depends on the equipment, please consult us.

## 5 STROKE TABLE

**TB51/52-45**



**TB51/52-65**



## 6 MAINTENANCE

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### CAUTION

- **When replacing parts, make sure the replacement parts are supplied by Miyawaki.**

The performance of steam traps deteriorates gradually over time due to wear, corrosion or dirt accumulating around the valve and the valve seat. Please conduct periodic diagnosis of traps in order to keep steam control systems and equipment working well.

### 6.1 Tools for Diagnosis Steam Traps

#### ■ Dr. Trap

It is a diagnostic tool with hardware (diagnostic equipment) that performs automatic diagnosis at high speed (maximum 10 seconds) and exclusive aggregate analysis software from the vibration and temperature information of the trap.

Diagnostic information is recorded in the diagnostic equipment and data can be transferred to the software. As a result, high-speed aggregate analysis, quantitative grasp of steam leakage and loss amount are possible.

#### ■ Dr. Trap Jr.

It is an inexpensive and simple diagnostic tool using hardware (steam trap checker) with vibration sensor, temperature sensor and exclusive aggregate analysis software.

From the vibration and temperature information of the trap, the judgment such as good or fail is made by a diagnostician. By inputting the vibration value detected by the steam trap checker to the aggregate analysis software, it is possible to quantitatively grasp the amount of steam leakage and money loss.

#### Caution:

Even if both diagnostic tools are used, accurate diagnosis results may not be obtained depending on the location and installation status of the steam trap, or the type and operating condition of the steam trap.

For details, please contact MIYAWAKI, our local authorized agent, or the place where you purchased.

### 6.2 Repairs

When a trap fails, it is necessary to clean the internal parts and to replace damaged parts. Take the failed trap apart following the steps below.

### 6.2.1 Disassembling the trap

- 1) Remove the cover bolt & cover nut (23), and remove the adjustment part, including the cover (2), the adjust bolt (14), the gland (15), the cap (16), the packing (19), the spacer (20), and the cap gasket (22), all at the same time. If the adjustment part is removed as a unit, it will not be necessary to readjust the temperature setting after reassembly.
- 2) Take out the bimetal unit, the holder unit, spring (5) and the screen (17) by hand.  
\*Do not disassemble the holder part any further than necessary. Since the holder part consists of several small parts, be careful not to lose them if the holder part is disassembled.



#### CAUTION

Do not disassemble the bimetal unit.

If the bimetal discs have come off the bimetal unit, each disc has a mark on one face. Place the marked surfaces facing out and then put the two bimetal discs face to face (unmarked surfaces facing in). Treat the two bimetal discs as one set, put the washer between them, and put the stack into the bimetal unit. If this assembly is wrong, the bimetal unit will not work.

- 3) Remove the valve seat (3) using a socket wrench.
- 4) Remove the seat gasket (18) and the cover gasket (21).
- 5) Clean and inspect the parts thoroughly.

**After repairing the trap, re-assemble the parts in reverse order as follows.**

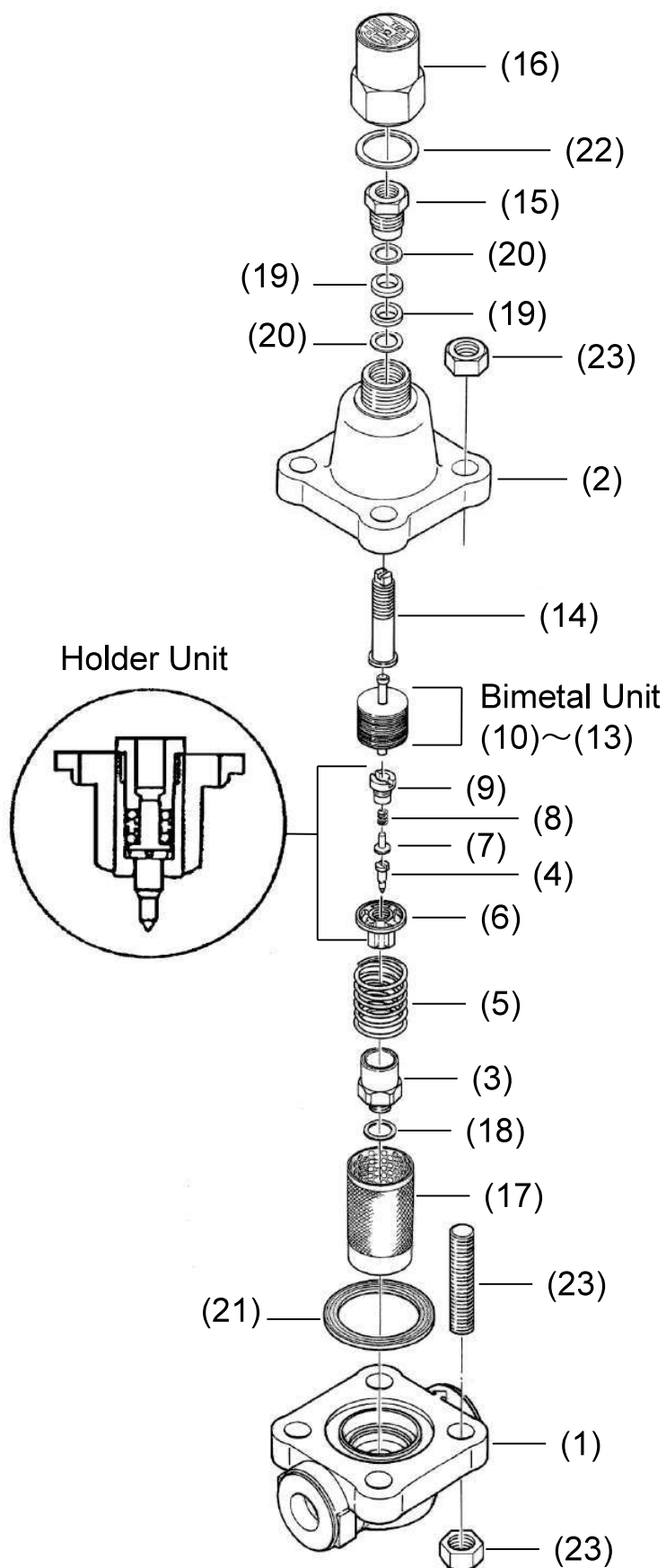
### 6.2.2 Reassembling the trap

- 1) Insert the seat gasket (18), screw the valve seat (3) into the body (1).
- 2) Reinstall the screen (17) in the body (1).
- 3) Reinstall spring (5) at the edge of the valve seat (3).
- 4) Place the holder part on spring (5), so that the holder (6) can be inserted into the hole in the valve seat (3).
- 5) Reinstall the bimetal part so that the tip of the shaft (10) fits into the hole in the bushing (9).
- 6) Reinstall the cover gasket (21) in to the body (1).
- 7) Fit the cover (2) into the gasket groove in the body (1) so that the end of the shaft (10) fits into the opening on the adjust bolt (14).
- 8) Pass the cover bolt (23) through the bolt openings in the body and cover, screw in the cover nut (23), and tighten the bolt.

\* The proper torque for the valve seat (3), gland (15), and cap (16) are as shown in the following table.

Parts	Tools	Across the flats	Torque
Valve seat (3)	Torque wrench	23 mm (0.91")	60N·m
Gland (15)	Torque wrench	22 mm (0.87")	—
Cap (16)	Torque wrench	38 mm (1.50")	147N·m
Cover bolt (23), Cover nut (23)	Torque wrench	22 mm (0.87")	147N·m

\* When the adjustment unit is disassembled, after reassembling it set the temperature again, following the steps shown in the Section 4, "Setting the temperature".



1. Body
2. Cover
3. Valve Seat
4. Valve
5. Spring
6. Holder
7. Spring Plate
8. Spring
9. Bush
10. Shaft
11. E-Ring
12. Bimetal
13. Washer
14. Adjust Bolt
15. Gland
16. Cap
17. Screen
18. Gasket
19. Packing
20. Spacer
21. Gasket
22. Gasket
23. Bolt, Nut

## 7 TROUBLESHOOTING

Problem		Possible cause	Solution
Steam leaks or blows through.		The adjustment may not be correct.	Readjust the temperature setting.
		Dirt is stuck around the valve (4) or valve seat (3).	Clean the valve (4) and the valve seat (3).
		The valve seat (3) is loose.	Tighten the valve seat (3). *1
		The seat gasket (18) is damaged.	Replace the seat gasket (18).
		Damage, erosion or corrosion of the valve (4) or the valve seat (3)	Replace the valve (4) or the valve seat (3).
		A foreign object may be caught in the sliding part.	Clean the sliding part.
		Damage or erosion of the bimetal (12)	Replace the bimetal unit.
		The adjust bolt (14) is backed out too far.	Tighten the adjust bolt (14) to set the correct stroke length.
		Wrong installation direction	Reinstall the product in the correct direction.
Steam leaks from the body.	From the connection between the body and cover	The cover bolt (23) and cover nut (23) are loose.	Tighten the cover nut (23). *2
		Damage or erosion of the cover gasket (21)	Replace the cover gasket (21).
Insufficient condensate discharged, or no condensate discharged.		The screen (17) is clogged.	Clean the screen (17).
		Dirt has built up on or around the valve seat (3).	Clean the valve seat (3).
		Dirt accumulated in the fluid passage of the body (1)	Clean the body (1).
		The bimetal (12) is damaged.	Replace the bimetal unit.
		The adjust bolt (14) is too tight.	The adjust bolt (14) is backed out too far.
		The steam pressure was over the specified maximum operating pressure.	Replace the trap with one that has a higher maximum operating pressure.
		Insufficient condensate capacity.	Replace the trap with a larger capacity trap.
		Discharge condensate capacity of the trap is insufficient.	Replace the trap with a larger capacity.

\*1 and \*2: Refer to the torque tables in Section 6, "Maintenance" to retighten the parts to the correct torque.

## **8 WARRANTY**

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### **8.1 Warranty period**

The warranty period is 18 months after shipment or 12 months after installation, whichever occurs first.

### **8.2 Details of the warranty**

If the product stops working correctly within the warranty period, we will repair or replace the product free of charge if the cause of the trouble is not one of the following items.

- 1) The precautions described in this manual were not observed.
- 2) User's errors or mistakes such as an inappropriate installation or incorrect handling, or an excessively large impact caused by dropping
- 3) Problems caused by devices or equipment other than ours, or a disallowed use environment
- 4) When a repair or modification has been performed by anyone other than us or people who are authorized to make such repairs
- 5) Intrusion of salt or other substances that promote significant rust or corrosion or problems from fluids that contain the same substances
- 6) Consumable parts such as Packing, Gasket, O-ring, Diaphragm, etc
- 7) Attachment or accumulation of foreign matter in the pipe, such as dust and scale
- 8) Problems from fires, natural disasters, or other force majeure which is not our responsibility

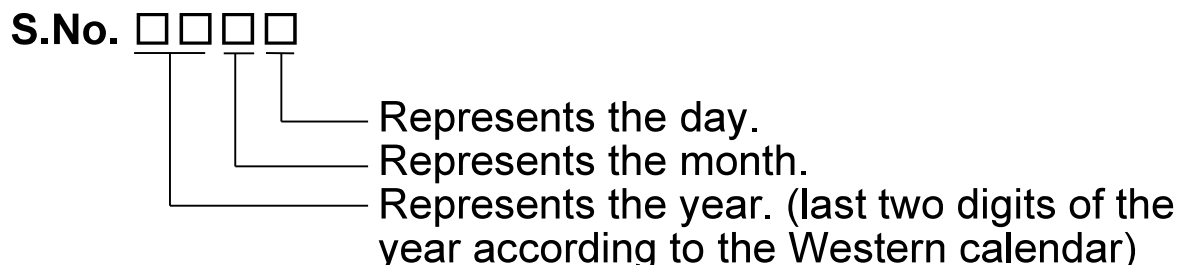
### **8.3 Warranty limitation**

The remedy available under the warranty shall not exceed the sales price of the products delivered, for any cause whatsoever.

## 9 SERIAL NUMBER (S. No.) DESIGNATION

The following 4-digit or 9-digit “S.No.” is displayed on the product.

- For 4-digit display

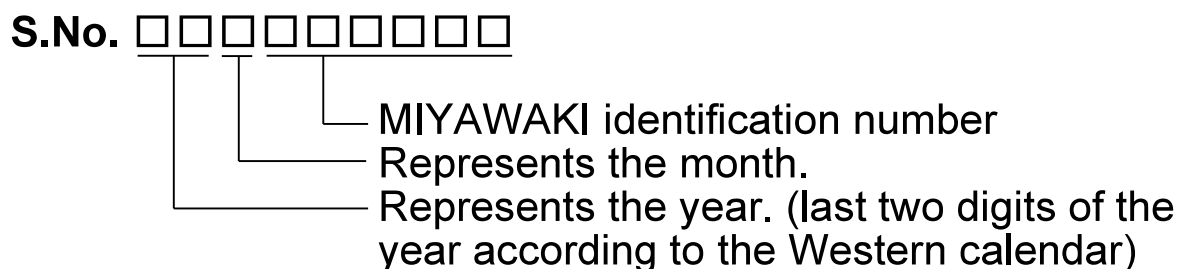


Example of serial number designation

1 7 1 1 → Jan.1, 2017

2 9 X M → Oct. 21, 2029

- For 9-digit display



Example of serial number designation

1 7 1 1 2 C 0 2 0 → Jan., 2017

2 9 X 0 5 M 0 5 0 → Oct., 2029

### Month designation system

Month	1	2	3	4	5	6	7	8	9	10	11	12
Symbol	1	2	3	4	5	6	7	8	9	X	Y	Z

### Day designation system

Day	1	2	3	4	5	6	7	8	9	10	11	12
Symbol	1	2	3	4	5	6	7	8	9	A	B	C

Day	13	14	15	16	17	18	19	20	21	22	23	24
Symbol	D	E	F	G	H	J	K	L	M	N	O	P

Day	25	26	27	28	29	30	31
Symbol	Q	R	S	T	U	V	W

## 10 GUIDANCE FOR READING SPECIAL PRODUCT NAME

○○○-○○-□

**Special symbol:**  
**Symbol apply only to special product**  
**(Please refer to table 1 for details)**  
 English letter after “-“

**Model symbol:**  
**Product model number**

Table 1 Symbol description

Suffix	Special contents
A	Trap for high-pressure gas installed property (only for Gas Trap)
C	Blow valve attached
K	Change of gasket
L	Special face to face dimension
M	Change of parts material
P, T	Change of operating pressure, temperature, condensate capacity, etc
R	Change of screen mesh
V	Change of air vent
X	Other than mentioned above or complex of special contents above

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## MEMO

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- For any questions about the product that you purchased or about the details in this user's manual, please contact the following.
  - © 2017 MIYAWAKI INC.  
This user's manual may not be reproduced or copied in whole or in part, without the written consent of MIYAWAKI INC.
  - Some special specifications of the product you have, may found to be different from the ones in the user's manual. If you have any question, please contact MIYAWAKI, our local authorized agent, or the place where you purchased.
-



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