BALANCED PRESSURE THERMOSTATIC STEAM TRAP WITH A BYPASS VALVE

USER'S MANUAL

DV1

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The DV1 is a diaphragm-type balanced pressure thermostatic steam trap with a bypass valve that has superior durability and effectively allows no steam to leak. The bypass valve can discharge a large quantity of condensate, which saves a great deal of start-up time.
In order to get maximum benefit from this product, be sure to read this manual before installation.

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

WARNING	Failure to observe this type of precaution may lead to serious injury or death.
CAUTION	Failure to follow this type of precaution can lead to injury or damage to equipment and property.

1 Specifications and markings

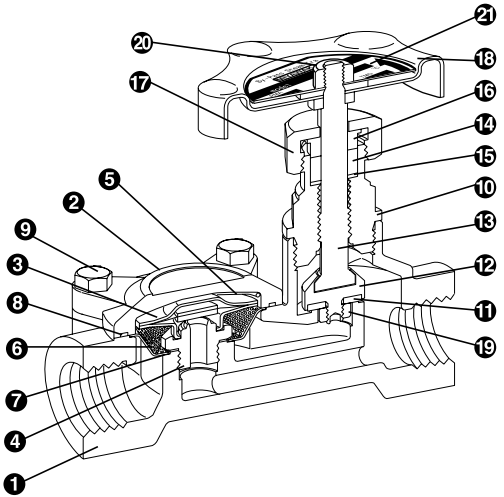
WARNING	Be sure not to use this product at higher pressures than the specified maximum allowable pressure (PMA) or at temperatures higher than the specified maximum allowable temperature (TMA).

The following items are displayed on the nameplate or the side of the body. Check each item to avoid misuse of the product.

(1) Maximum allowable pressure (PMA): 1.0 MPa (145 psig)
(2) Maximum allowable temperature (TMA): 185°C (365°F)
(3) Maximum Operating pressure (PMO): 1.0 MPa(145psig)
(4) Maximum Operating temperature (TMO): 185°C(365°F)
(5) Size: 15 mm(1/2”), 20mm(3/4”)
(6) Year of production: The two leftmost digits in the four-digit 'S No.' on the nameplate are the last two digits of the year of production.
(7) Flow direction: Shown by an arrow.
(8) Body material: SCS13A

* Refer to the leaflet for details about dimensions and other specifications.

2 Construction details



1. Body
2. Cover
3. Dia-thermo
4. Valve seat
5. Stop spring
6. Screen
7. Seat gasket
8. Cover gasket
9. Bolt
10. Bonnet
11. Disc
12. Valve
13. Spindle
14. Gland packing
15. Plate
16. Gland bushing
17. Gland nut
18. Handle
19. Nut
20. Nut
21. Nameplate

3 Installation

WARNING	• Pay very careful attention when working in hazardous environments such as this.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 the isolation valves, if one exists, to blow out any debris or dust 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.

◯Remove the dustproof seals covering both connections.
◯Check the flow direction indicated on the side of the body.
◯The DV1 can be used in both horizontal and vertical lines. In horizontal lines, install the DV1 so that the handle faces up or at least sideways (If the DV1 is installed so that the handle faces down, it will cause the trap to malfunction). Make sure to maintain a slight slope to the line, so that any condensate will flow smoothly.

4 How to use

⚠ CAUTION	・In normal operation, use the DV1 with the bypass valve closed (with the handle turned fully clockwise). ・If the DV1 is used for a long time with the bypass valve open, there is a possibility that parts such as the disc may be damaged.

◯When the handle is turned counterclockwise (in the direction indicated by the BLOW arrow on the nameplate), the bypass valve will open and any air, condensate or steam in the unit will be discharged quickly. Scale that has accumulated in the screen can also be discharged.
◯When the handle is turned fully clockwise (in the direction indicated by the TRAP arrow on the nameplate), the bypass valve will close and it will operate as a steam trap. In normal operation, the DV1 should be used with the bypass valve closed.

5 Maintenance

⚠ WARNING	・Before removing the trap from the pipe or disassembling it, be sure to close the isolation valves. Then, release the residual pressure from the trap body (make sure that the pressure in the main body is equal to the atmospheric pressure). After it has fully cooled down (after the temperature of the main body has reached ambient temperature), confirm for safe conditions and then begin work. ・Even when the isolation valves are closed, there may be residual internal pressure due to leaks from the isolation valves. Therefore, be very careful.
⚠ 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 seat. To keep steam control systems and equipment working well, periodic maintenance of steam traps is essential.

○ **Tools for testing steam traps**

In order to test steam traps, ultrasonic testers, sound detectors, and thermometers have been used for years. These tools are relatively easy to use and are useful for making rough estimates of the level of deterioration in a defective trap. However, to determine deterioration levels and steam losses quantitatively, special tools for testing steam traps are required.
Dr. Trap and Dr. Trap Jr. are testing equipment that was developed specifically for diagnosing steam traps and analyzing survey results automatically. Use these tools to avoid tiresome jobs on site and save working time.

○ **Working conditions of a steam trap**

Steam trap failures can be classified as either 'Leaking' or 'Plugged'. The level of steam leaks is generally determined by the intensity of the ultrasonic vibration generated in the valve seat inside of a steam trap. Plugging is diagnosed by measuring the surface temperature. As plugging progresses due to a buildup of dirt in the trap, it finally becomes completely plugged. Then the surface temperature will drop to around 40°C (104°F), or lower.

○ **Trap section**

- Remove the four bolts (9), and remove the cover (2).
- Remove the dia-thermo (3), and remove the valve seat (4) using a socket wrench.
- Remove the seat gasket (7) and the screen (6).

○ **Bypass section**

- Remove the nut (20), and remove the nameplate (21) and the handle (18).
- Loosen the gland nut (17) and the bonnet (10), and then remove both parts.
- Turn the spindle (13) clockwise, and remove it.
- Remove the gland bushing (16), the gland packing (14), and the plate (15).

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

○ **Trap section**

- Reinstall the screen (6) and the seat gasket (7) in the body (1). Tighten the valve seat (4).
- Place the dia-thermo (3) on the valve seat (4).
- Reinstall the stop spring (5) and the cover gasket (8) inside the cover (2).
- Attach the cover (2) to the body (1), and tighten the four bolts (9) uniformly to prevent the cover from being tightened unevenly.

○ **Bypass section**

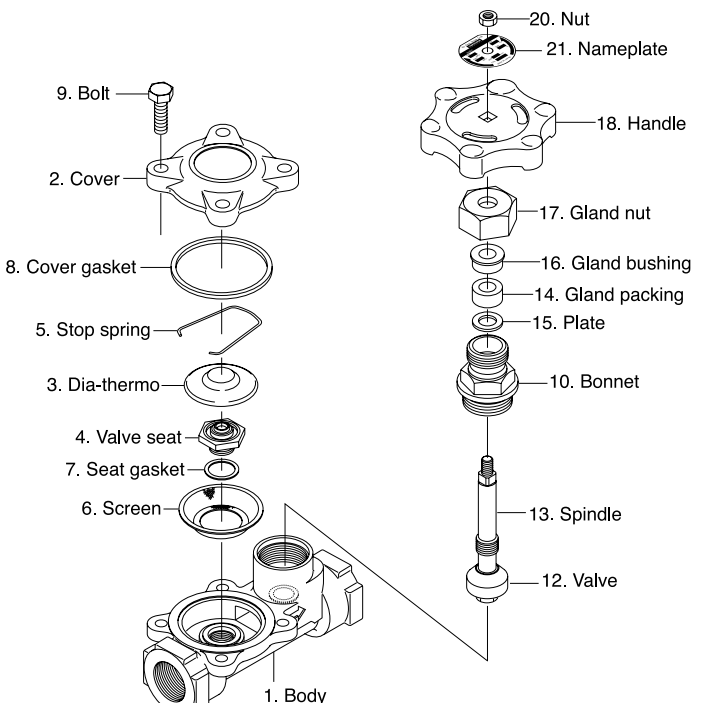
- Screw the spindle (13) into the bonnet (10) until the valve (12) touches the bonnet (10) lightly.
- Screw the bonnet (10) into the body (1).
- Place the plate (15), the gland packing (14), and the gland bushing (16) in the bonnet (10), in that order. Then, tighten the gland nut (17).
- Secure the handle (18) on the spindle (13), and then attach the nameplate(21).

* The torques for the parts are shown in the following table.

Parts	Tool	Across the flats	Torque
Valve seat (4)	Torque wrench	17 mm (0.67")	220 kgf-cm (191 lbf-in)
Bolt (9)	Torque wrench	10 mm (0.39")	90 kgf-cm (78 lbf-in)
Bonnet (10)	Torque wrench	21 mm (0.83")	600 kgf-cm (520 lbf-in)
Gland nut (17)	Torque wrench	24 mm (0.95")	200 kgf-cm (174 lbf-in)

Notes:

- When cleaning the internal parts, pay special attention not to damage the valve section (valve, valve seat, disc, and body seating section) or the surfaces where the gaskets are placed.
- The gaskets must be always replaced with new ones, every time the product is disassembled.
- Before retightening the bonnet and the gland nut, turn the handle counterclockwise to open the valve, so that the valve and the disc are separated from the seat. (If they are retightened with the valve closed, the valve section may be damaged.)



6 Troubleshooting

Problem		Possible causes	Solution
Steam leaks or blows through.		Stuck valve or dirt accumulated around the dia-thermo (3) or valve seat (4)	Clean the dia-thermo (3) and the valve seat (4).
		Damage, erosion or corrosion of the dia-thermo (3)	Replace the dia-thermo (3).
		Damage, erosion or corrosion of the valve seat (4)	Replace the valve seat (4).
		The valve seat (4) is loose.	Tighten the valve seat (4). *1
		The handle (18) has been poorly tightened.	Tighten the handle (18) all the way clockwise (TRAP side).
		Dirt accumulated around the disc (11) or body (1)	Clean the disc (11) and the body (1).
		Damage, erosion or corrosion of the disc (11) or body (1) (disc seal area)	Replace the disc (11) and the body (1).
		Improper installation (the handle was installed aiming down.)	Reinstall the trap so that the handle faces up or sideways.
Steam leaks from the body.	Steam leaks from the joint between the body and cover.	The bolt (9) is loose.	Tighten the bolt (9). *2
		The cover gasket (8) is damaged.	Replace the cover gasket (8).
		The body (1) or gasket seal area in the cover (2) is damaged.	Replace the body (1) and/or the cover (2).
	Steam leaks from the joint between the body and the bonnet.	The bonnet (10) is loose.	Tighten the bonnet (10). *3
		The body (1) or seal area in the bonnet (10) is damaged.	Replace the body (1) and/or the bonnet (10).
	Steam leaks from the gland packing section.	The gland nut (17) is loose.	Tighten the gland nut (17). *4
		The gland packing (14) is damaged.	Replace the gland packing (14).
		The bonnet (10) or seal area on the spindle (13) is damaged.	Replace the bonnet (10) and/or the spindle (13).
Insufficient condensate discharged, or no condensate discharged.		The screen (6) is clogged.	Clean the screen (6).
		Stuck valve or dirt accumulated around the dia-thermo (3) or valve seat (4)	Clean the dia-thermo valve and the valve seat (4).
		The dia-thermo (3) is damaged.	Replace the dia-thermo (3).
		Improper installation direction	Reinstall the trap in the correct direction.
		Insufficient condensate capacity	Replace the trap with a larger capacity trap.

*1, *2, *3, and *4: Refer to the torque table in Section 5, “Maintenance”, in order to tighten the bolts to the correct torque.

7 Warranty

Warranty period

The warranty period shall last 12 months from the date of product delivery.

Details of 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 have 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) Extremely worn packing, gaskets, or other parts
7) Attachment or accumulation of foreign objects in the pipe, such as dust and scale
8) Problems from fires, natural disasters, or other force majeure which is not our responsibility

Warranty limitation

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

●お買い上げの製品及びこの取扱説明書内容についてのご質問は下記にお問い合わせください。
また、この取扱説明書を紛失したり、汚損により読めなくなった場合は、同じく下記にご請求ください。

For any questions about the product that you purchased or about the details in this instruction manual, please contact the following.
If you lose this user's manual or can no longer read it due to stains, please make a request to the following.

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