

AIR VENT

AT9N

USER'S MANUAL



 **MIYAWAKI INC.**

SAFETY GUIDE

The model AT9N is an air vent for steam to discharge large quantities of air quickly, thereby greatly reducing equipment start-up time.

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



WARNING

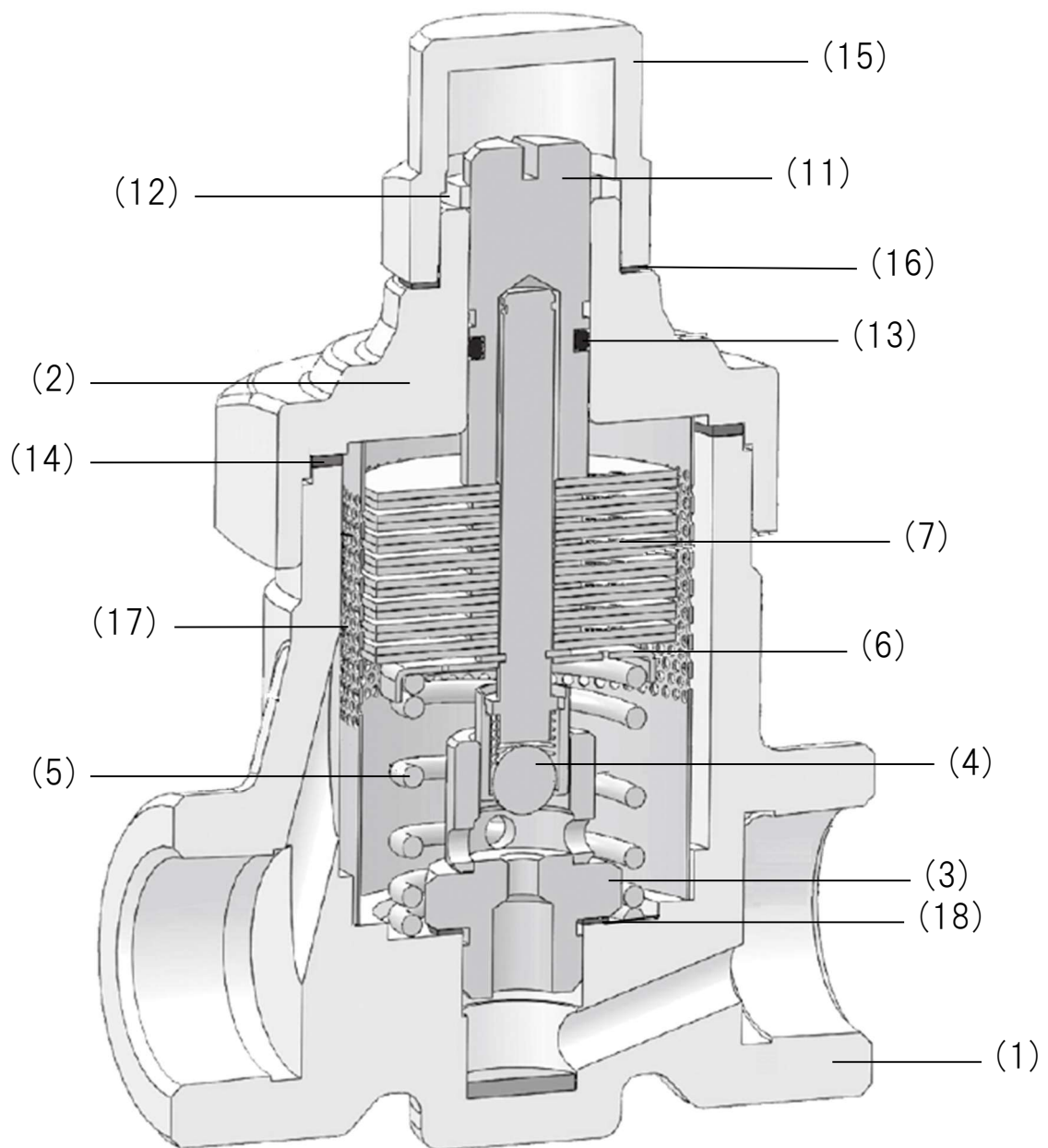
Be sure not to use this product at higher pressures than the specified maximum allowable pressure (PMA) or at temperatures higher than the specified maximum allowable temperature (TMA).

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 allowable pressure (PMA): 4.0MPa (580psig)
 - 2) Maximum allowable temperature (TMA): 400°C (752°F)
 - 3) Maximum Operating pressure (PMO): 1.6MPa (230psig)
 - 4) Maximum operating temperature (TMO): 350°C (662°F)
 - 5) Size: 15 mm(1/2"), 20mm(3/4") or 25mm(1")
 - 6) Year of production: The two leftmost digits in the four-digit or nine-digit 'S No.' on the name plate are the last two digits of the year of production.
 - 7) Flow direction: Shown by an arrow
 - 8) Body material: A105
 - 9) Model symbol: Showing the product model name
- Some pictures and illustrations in this manual are that of the representative model of AT9N models. For more details regarding dimensions and other specifications, please refer to the catalog.

2 CONSTRUCTION DETAILS



-
- | | | |
|---------------|-----------------|------------------|
| 1. Body | 6. Spring Plate | 14. Cover Gasket |
| 2. Cover | 7. Bimetal | 15. Cap |
| 3. Valve Seat | 11. Adjust Bolt | 16. Cap Gasket |
| 4. Valve | 12. Adjust Nut | 17. Screen |
| 5. Spring | 13. O-Ring | 18. Seat Gasket |

3 INSTALLATION



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.

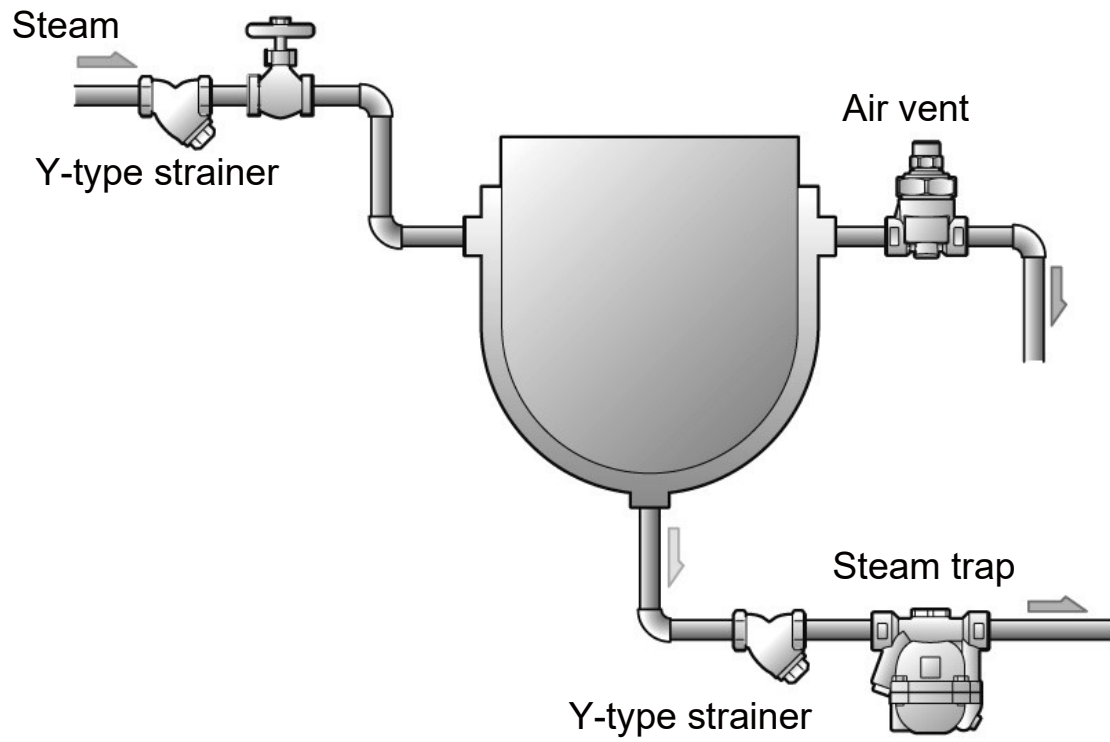
When installing the product, be sure to leave clearance for maintaining it.

- 1) Remove the dustproof seals covering both connections.
- 2) Check the flow direction indicated on the side of the body.
- 3) The AT9N can be used for both horizontal and vertical lines. However, be sure not to install the air vent on upper part of line where air is easy to accumulate. And also, be sure not install it upside-down in a horizontal line, as it will cause the air vent to malfunction.

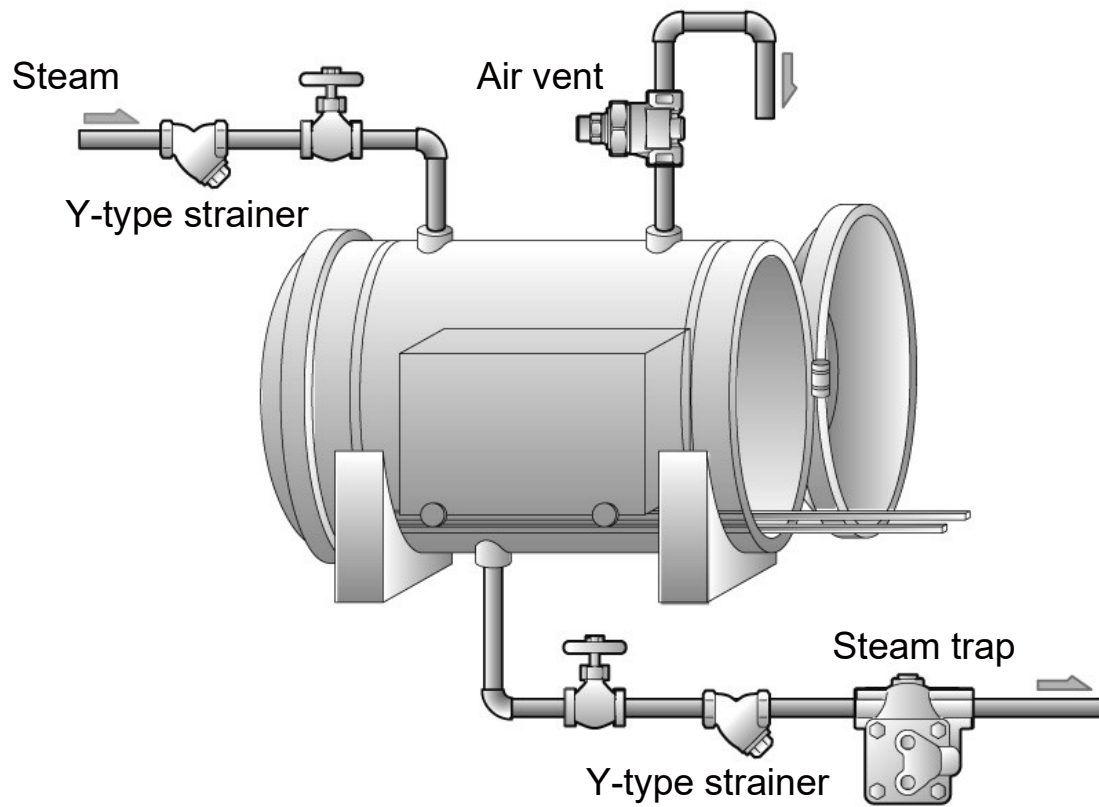
When installing an AT9N in a horizontal line, be sure to maintain a slight slope to the line, so that any condensate will flow smoothly.

- 4) Open the isolation valve on the upstream line slowly and make sure the product works normally.

Jacketed Kettle



Steam Autoclave



4 SETTING THE TEMPERATURE

WARNING

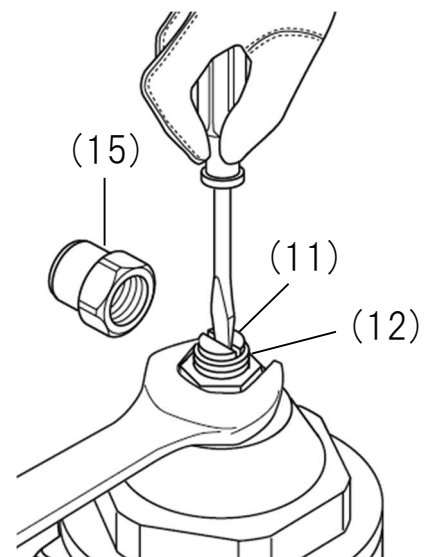
Only set the temperature when the bimetals in the body are flat, before any steam is flowing. Be sure not to set the temperature while the steam is in operation.

4.1 Set temperature

The set temperature is the temperature at which condensate will be discharged from the air vent. Factory default setting is 100°C at a pressure of 0.5 MPa.

4.2 Setting the temperature

- 1) Remove the cap (15).
- 2) Hold the adjust bolt (11) using a screwdriver, and loosen the adjust nut (12) using a wrench.
- 3) Screw the adjust bolt (11) slowly clockwise until it stops. This position is the starting point to set the temperature.
- 4) Screw the adjust bolt (11) 4 full turns counterclockwise.
- 5) Hold the adjust bolt (11) using a screwdriver, and then lightly tighten the adjust nut (12).
- 6) Attach the cap (15).



5 MAINTENANCE



WARNING

- Before removing the air trap from the pipe or disassembling it, be sure to close the isolation valves. Then, release the residual pressure from the air 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 air vents 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 air vents is essential.

5.1 Repairs

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

5.1.1 Disassembling the air vent

- 1) Loosen the cover (2), and remove the adjustment unit including the cap (15), the adjust bolt (11), the adjust nut (12), the O-ring (13), and the cap gasket (16).
- 2) Remove the bimetal unit (4, 6, 7, 8, 9, 10) and the spring (5) by hand.
- 3) Remove the valve seat (3) using a socket wrench.

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

5.1.2 Reassembling the air vent

- 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 the spring (5) on the valve seat.
- 4) Reinstall the bimetal unit so that the spring plate (6) on the bimetal unit fits into the spring (5).
- 5) After placing the cover gasket (14) in the body (1), screw the cover (2) onto the body (1). Then, reinstall the adjustment unit.

6) When replacing an O-Ring (13), or removing the adjust bolt (11) from the cover (2), perform the steps shown in Section 4, “Setting the temperature” to set the temperature after you have assembled the adjustment unit.

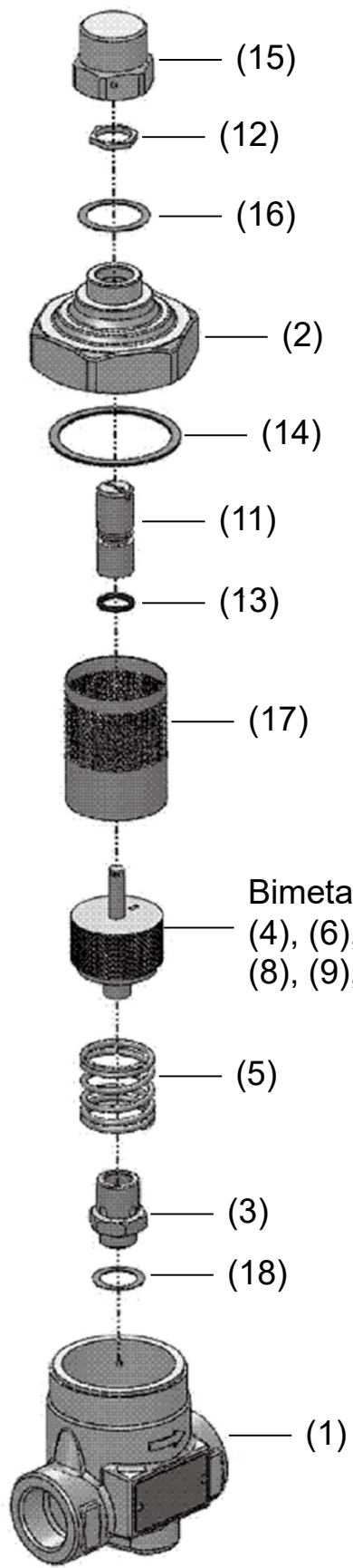


CAUTION

- **When reassembling the trap, make sure to replace the O-ring (13), the cover gasket (14), the cap gasket (16), the seat gasket (18) with a new one.**

* The proper torque for the cover (2), valve seat (3), and cap (15) are as shown in the following table.

| Parts | Tools | Across the flats | Torque |
|-----------------|---------------|-------------------------|---------------|
| Cover (2) | Torque wrench | 50 mm (1.97") | 160N·m |
| Valve seat (3) | Torque wrench | 17 mm (0.67") | 22N·m |
| Cap (15) | Torque wrench | 24 mm (0.94") | 33N·m |
| Adjust nut (12) | Wrench | 14 mm (0.55") | — |



1. Body
2. Cover
3. Valve Seat
4. Valve
5. Spring
6. Holder
11. Adjust Bolt
12. Adjust Nut
13. O-Ring
14. Cover Gasket
15. Cap
16. Cap Gasket
17. Screen
18. Seat Gasket

Bimetal Unit:
 (4), (6), (7),
 (8), (9), (10)

6 TROUBLESHOOTING

| Problem | | Possible cause | Solution |
|---|---|---|---|
| Steam leaks or blows through. | | Dirt is stuck around the valve (4) or valve seat (3) | Clean the valve (6) and the valve seat (4). |
| | | The valve seat (3) is loose. | Tighten the valve seat (3). *1 |
| | | Damage, erosion or corrosion of the valve seat (3). | Replace the valve unit. |
| | | The seat gasket (18) is damaged. | Replace the seat gasket (18). |
| | | The bimetal (7) is damaged. | Replace the bimetal unit. |
| | | Wrong installation direction | Reinstall the product in the correct direction. |
| Steam leaks from the body. | From the connection between the body and cover or between the body and cap | The cover (2) is loose. | Tighten the cover (2). *2 |
| | | The cover gasket (14) is damaged. | Replace the cover gasket (14). |
| | | The O-ring (13) is damaged. | Replace the O-ring (13). |
| 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 (7) is damaged. | Replace the bimetal unit. |
| | | Insufficient condensate capacity. | Replace the air vent with a larger capacity. |

*1 and *2: Refer to the torque tables in Section 5, "Maintenance" to retighten the parts to the correct torque.

7 WARRANTY

7.1 Warranty period

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

7.2 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

7.3 Warranty limitation

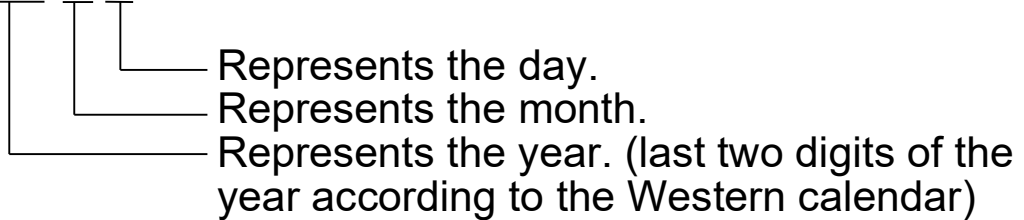
The remedy available under the warranty shall not exceed the sales price of the products delivered, for any cause whatsoever.

8 SERIAL NUMBER (S. No.) DESIGNATION

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

- For 4-digit display

S.No. □□□□



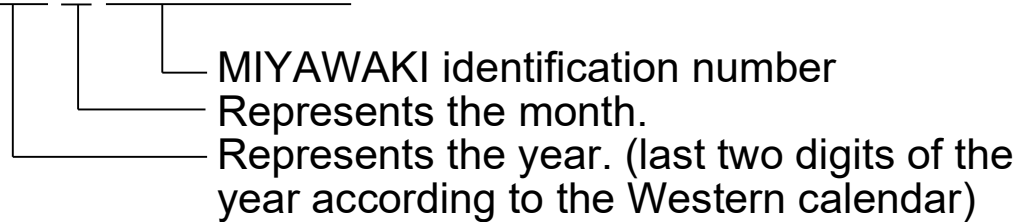
Example of serial number designation

1 7 1 1 → Jan.1, 2017

2 9 X M → Oct. 21, 2029

- For 9-digit display

S.No. □□□□□□□□□



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 |

9 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 |
| 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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- For any questions about the product that you purchased or about the details in this user's manual, please contact the following.
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