

STENLESS STEEL DIRECT ACTING
PRESSURE REDUCING VALVE

REC1

USER'S MANUAL



 **MIYAWAKI INC.**

SAFETY GUIDE

The model REC1 pressure reducing valve is a stainless steel direct-action pressure reducing valve that has superior durability.

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 operating pressure (PMO) or at temperatures higher than the specified maximum operating temperature (TMO).

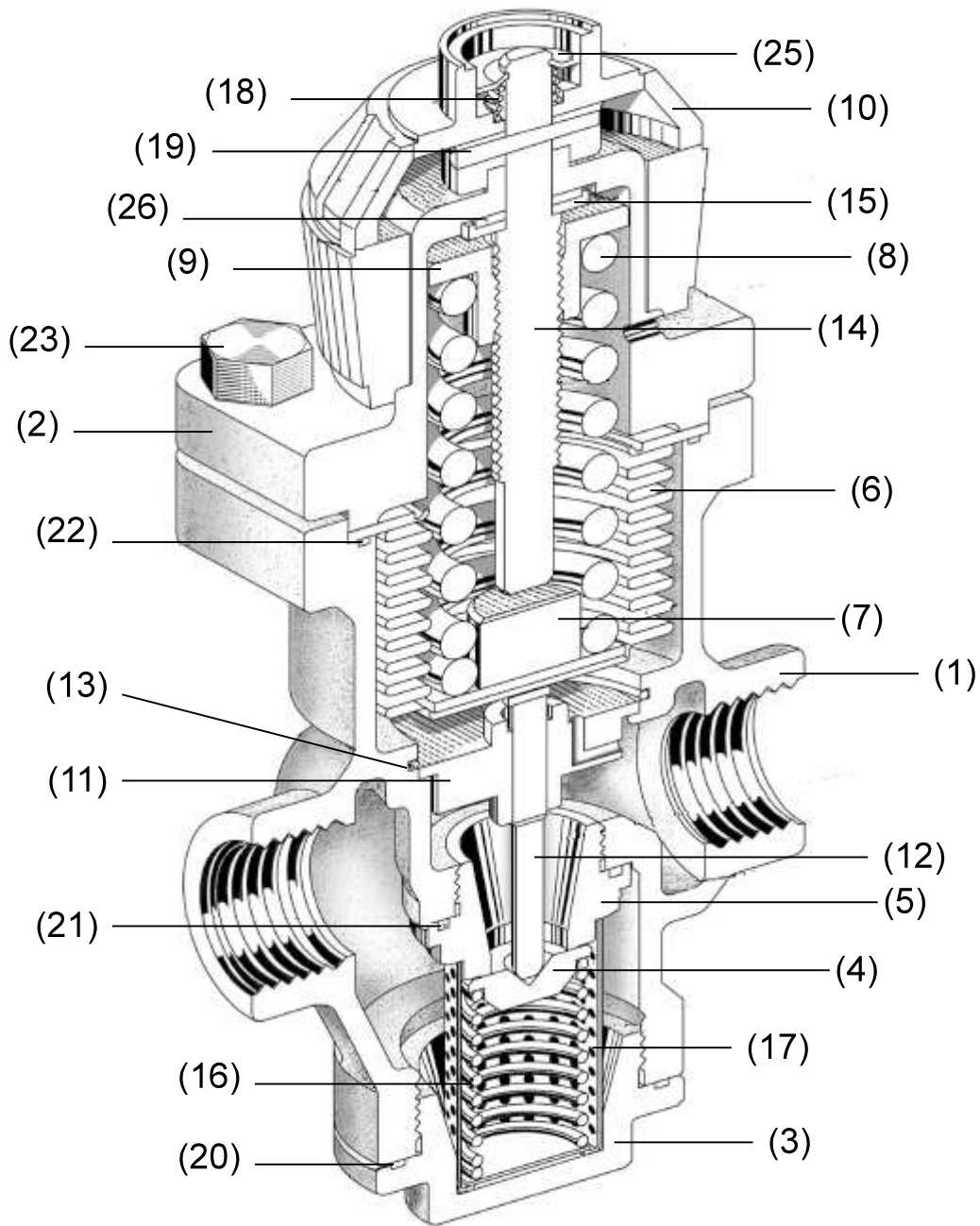
The following items are displayed on the name label or the side of the product.

Check each item to avoid misuse of the product.

- 1) Primary pressure range (PRIMARY P.): Range of the pressure in the primary side at which the pressure reducing valve will operate properly.
- 2) Secondary pressure range (SECONDARY P.): The range of reduced pressure on the secondary side that can be set.
- 3) Maximum operating temperature (TMO): Maximum temperature at which the pressure reducing valve will operate properly.
204°C (399°F)
- 4) Size: 15mm (1/2"), 20mm (3/4"), 25mm (1")
- 5) Fluid: The fluid that the product was designed for is written here. The correct fluid for this product is steam.
- 6) Year of production: The two leftmost digits in the four-digit or nine-digit "S. No." are the last two digits of the year of production.
- 7) Flow direction: Shown by an arrow
- 8) Body material: SCS14
- 9) Model symbol: Showing the product model name

Some pictures and illustrations in this manual are that of the representative model of REC1 models. For more details regarding dimensions and other specifications, please refer to the catalog.

2 CONSTRUCTION DETAILS



- | | | |
|----------------|-------------------------|---------------|
| 1. Body | 10. Handle | 18. Spring |
| 2. Cover | 11. Orifice Plate | 19. Taper Pin |
| 3. Plug | 12. Shaft | 20. Gasket |
| 4. Valve | 13. Stop Ring | 21. Gasket |
| 5. Valve Seat | 14. Adjust Bolt | 22. Gasket |
| 6. Bellows | 15. Washer | 23. Bolt |
| 7. Spring Stay | 16. Valve Return Spring | 25. Push Nut |
| 8. Main Spring | 17. Screen | 26. Seat |
| 9. Sleeve | | |

3 INSTALLATION



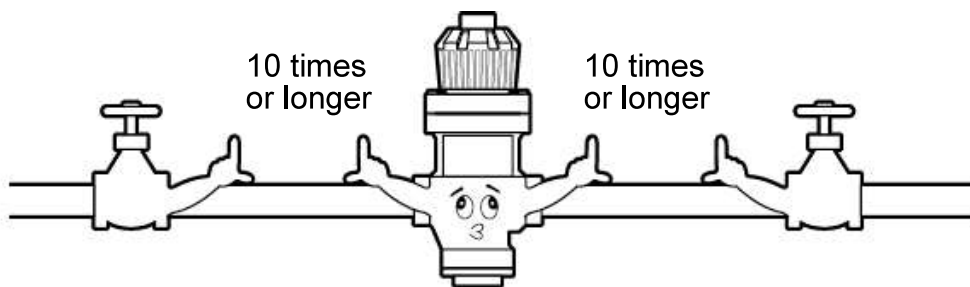
WARNING

- Do not touch the pressure reducing valve, safety valve (relief valve) or the opening section on the pipe outlet side with your bare hand.
If there is steam present, you may be seriously injured.
- Before supply of steam, check whether there will be any danger if the steam reaches the end of the pipe and whether all the pipe joints have been connected.



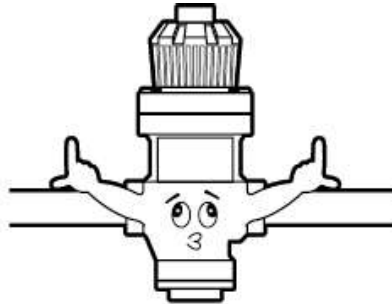
CAUTION

- Before installing the pressure reducing valve on a pipe, discharge all the steam in the pipe and remove any dirt or scale that may keep the pressure reducing valve from operating properly.
- Pay attention to the following items when installing the pipes.
 - 1) Remove the dustproof seals covering the inlet/outlet connecting sections of the pressure reducing valve body.
 - 2) Check the flow direction indicated on the side of the pressure reducing valve body.
 - 3) Be sure to install sections of straight pipe that are at least 10 times longer than the pipe diameter just before and after the pressure reducing valve (behind the reducer).

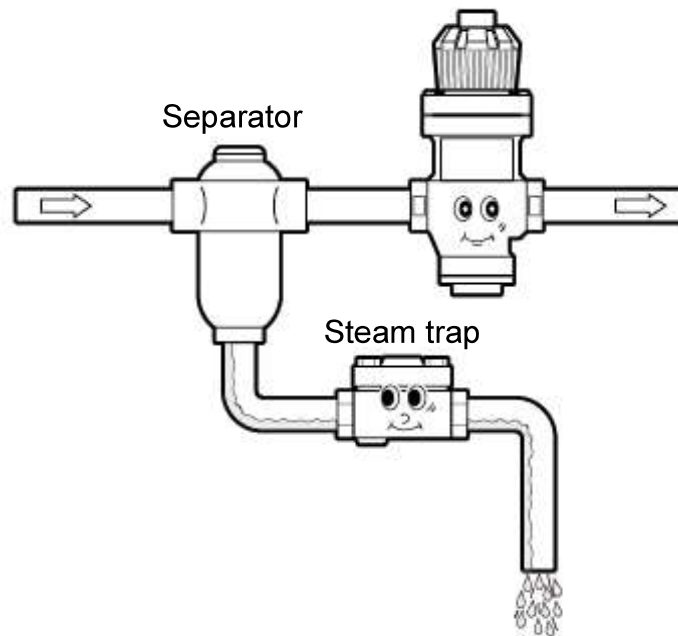


- 4) To avoid reducing the pressure before it reaches the valve, do not install pipes that reduce the pipe size on the primary side.
- 5) Install a pressure gauge and a stop valve both before and after the pressure reducing valve, and always install a bypass line.
Be sure to install a strainer on the primary side (normally 60 - 80 mesh, or 100 mesh in places where there are lots of scale or dirt present). The strainer should be installed in such a way that the screen will point sideways to avoid the accumulation of condensate in the area of the screen. (Refer to the plumbing example described later.)

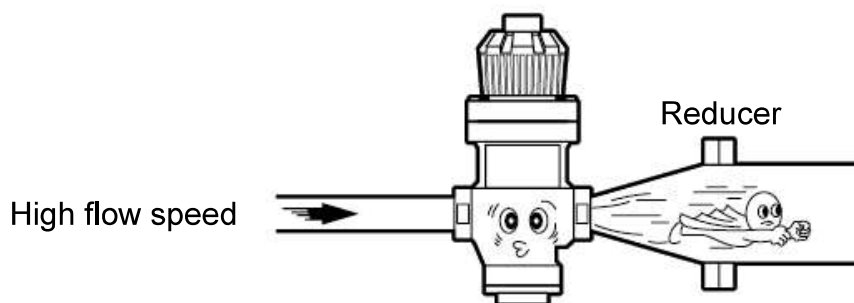
- 6) Install a steam trap on the secondary side of the pressure reducing valve so that the condensate can be discharged when equipment or systems stop being used.
- 7) The pressure reducing valve should be installed in a horizontal pipe with the operating part including the adjust unit turned upward.



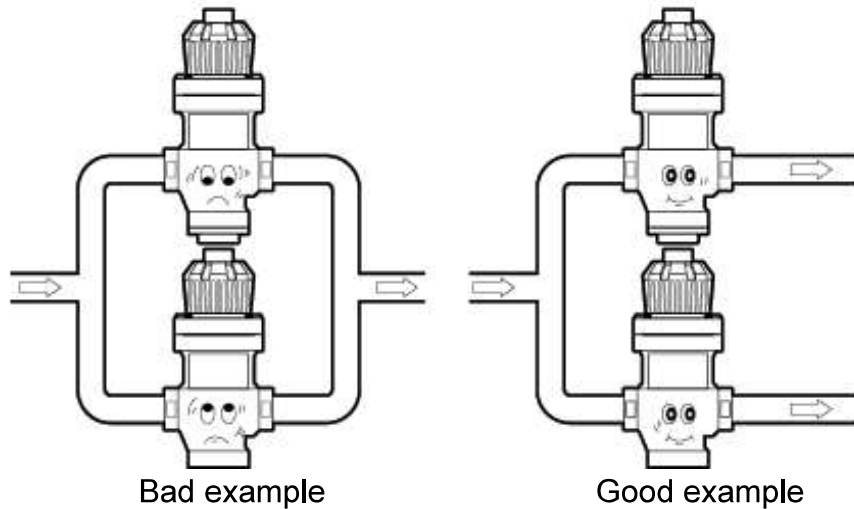
- 8) When condensate flows into the pressure reducing valve, hunting or vibration may occur. Therefore, be sure to install a steam trap just before the pressure reducing valve.



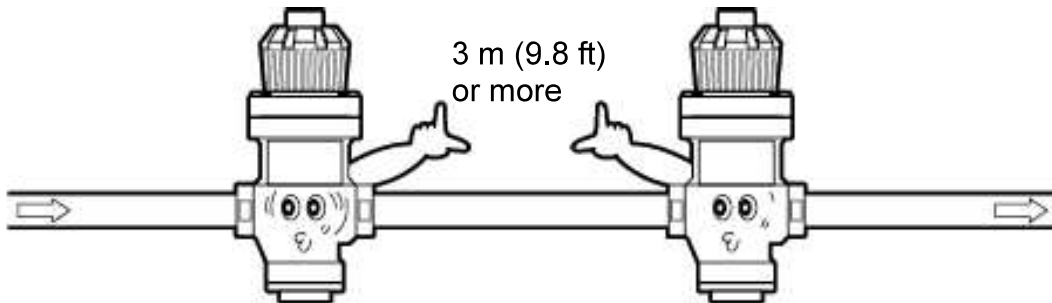
- 9) A reducer is recommended when the flow speed (30 m/sec) is likely to exceed standard (30 m/sec).



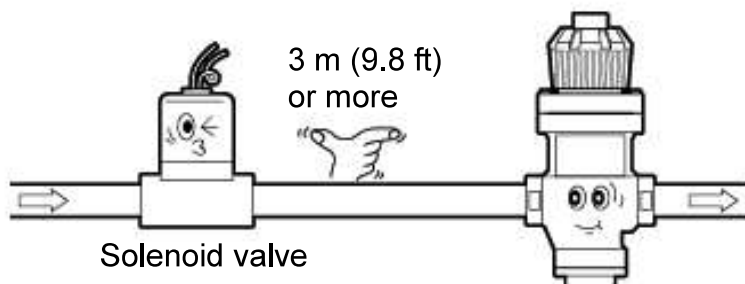
- 10) Avoid using the pressure reducing valves in parallel. The pressure reducing valve is self-actuated type, and each has its own variation in sensitivity and responsiveness to pressure. Therefore, since two pressure reducing valves cannot be activated exactly in the same way, only one valve would actually be doing the work. That's why they need to be used independently.



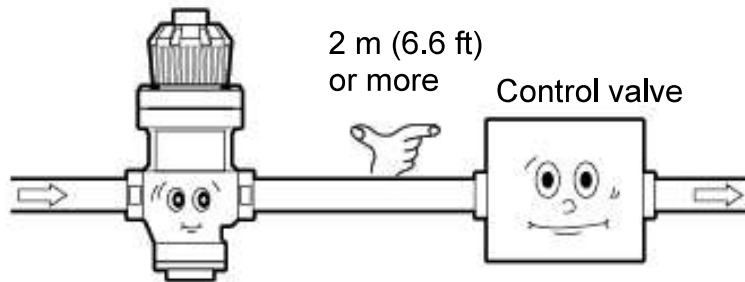
- 11) When the pressure reducing ratio exceeds the maximum pressure reducing ratio, perform a double pressure reduction. Stay 3 m (9.8 ft) or more away from any pressure reducing valve.



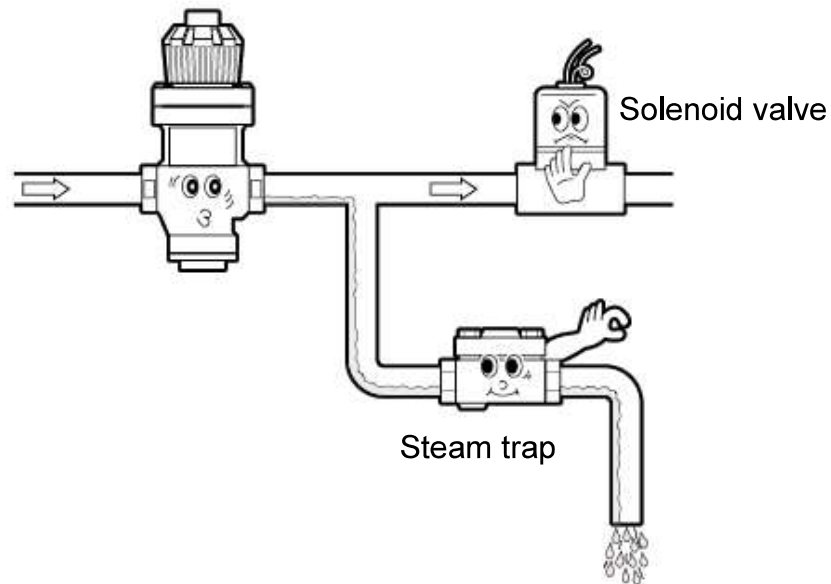
- 12) When installing a solenoid valve (ON-OFF valve) on the primary or secondary side of the pressure reducing valve, install the solenoid valve so that the distance between the pressure reducing valve and the solenoid valve is 3 m (9.8 ft) or more. (Otherwise, the pressure reducing valve operation may be unstable.)



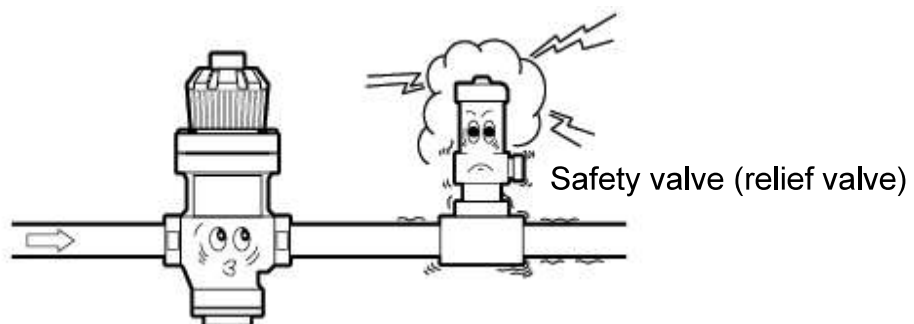
- 13) When using a control valve on the secondary side of the pressure reducing valve, install the control valve so that the distance between the pressure reducing valve and the control valve is 2 m (6.6 ft) or more. (Otherwise, the pressure reducing valve operation may be unstable.)



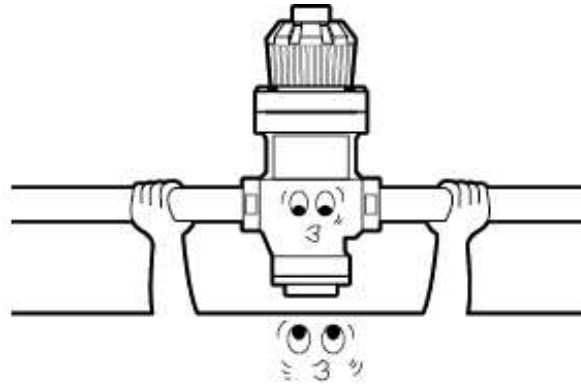
- 14) The steam pressure reducing valve does not close fully. Therefore, when the amount of steam used is close to zero (at the end of service for example), install a steam trap on the secondary side of the pressure reducing valve.



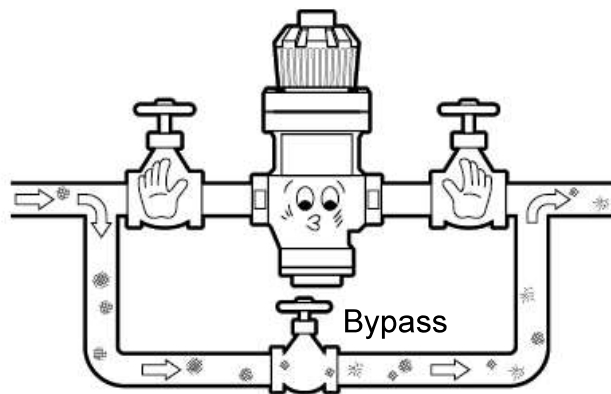
- 15) To keep the secondary pressure from rising abnormally, install a safety valve. If regulations cover the place that the safety valve is installed, use a safety valve which vents as specified in the regulations. A warning safety valve (relief valve) that is used to warn of an abnormal pressure rise should be able to blowoff at least 10% more than the rated flow of the pressure reducing valve.



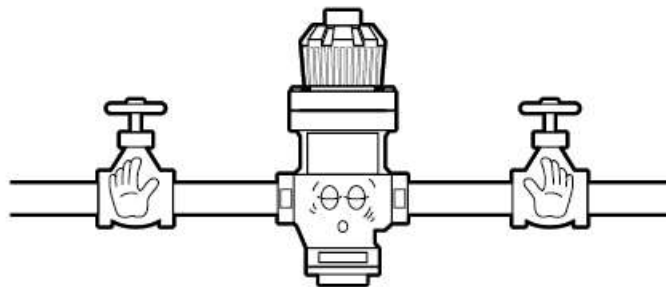
- 16) Secure or support the pipe so that any load, bending or vibration in the pipe is not transmitted directly to the pressure reducing valve.



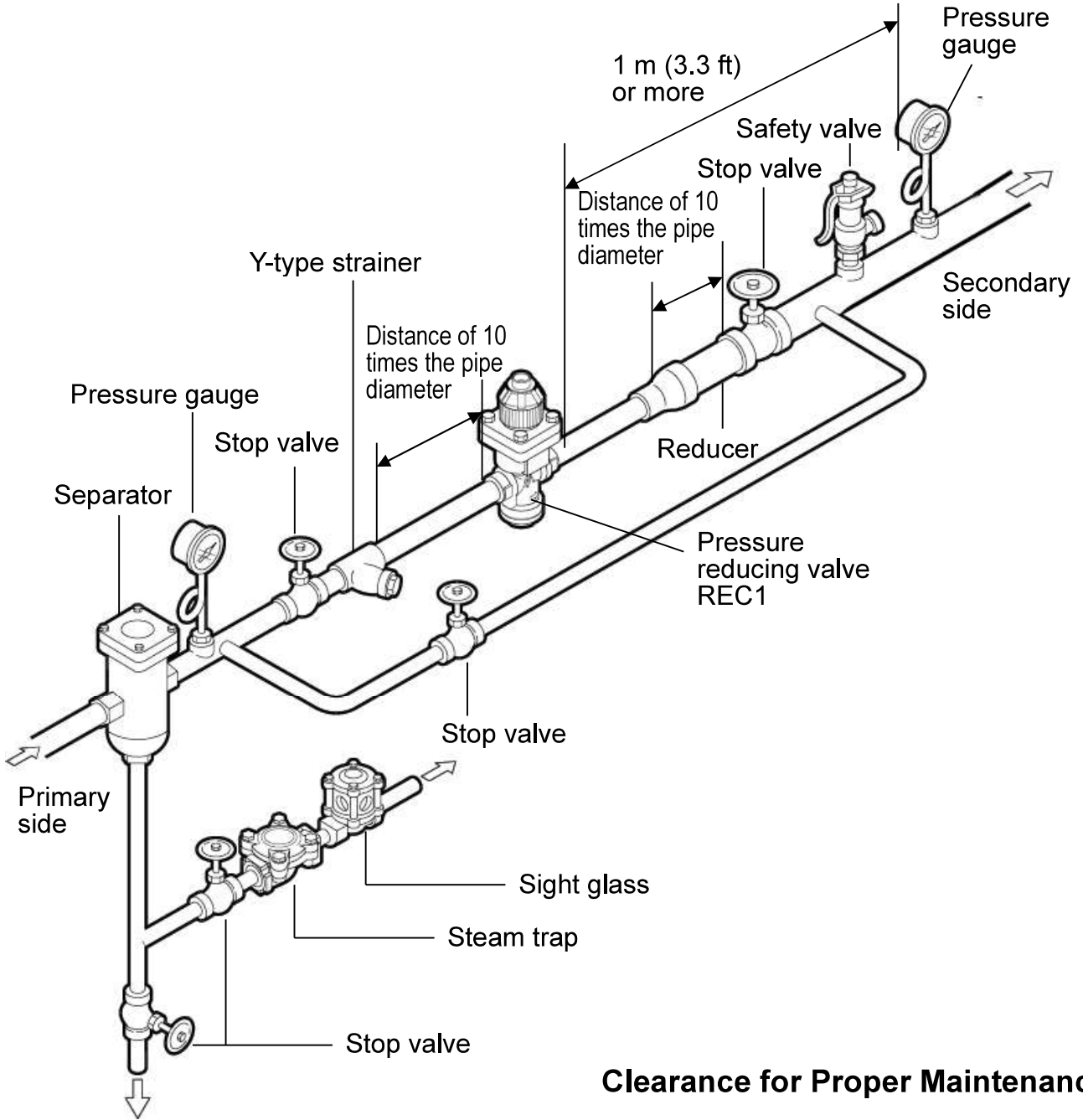
- 17) Most complaints about direct acting pressure reducing valves installed in new pipes or in pipes that have not been used for a long time are due to dirt and scale in the pipes. Therefore, before sending steam into the pressure reducing valve, blow off the piping to remove any dirt or scale.



- 18) When the pressure reducing valve will not be used for a long time, the remaining pressure in the pipe should be released. Discharge all the condensate from the pipe, and close the stop valves before and after the pressure reducing valve.



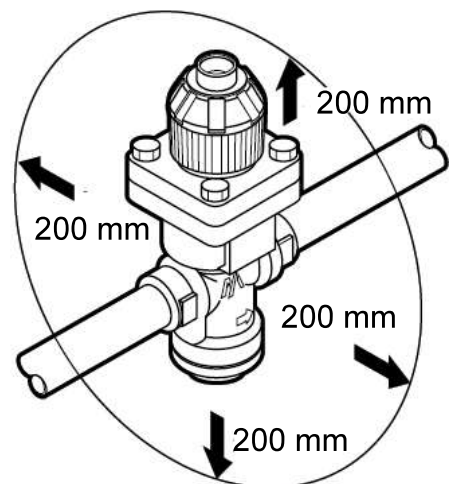
Plumbing example



Clearance for Proper Maintenance

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

Clearance distance shows the distance from the centerline of the piping connection.



4 PRESSURE ADJUSTMENT METHOD



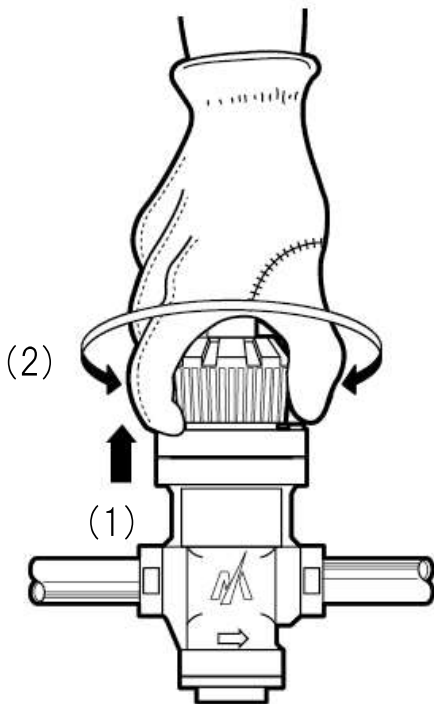
WARNING

- Since the handle gets hot when the pressure is adjusted, wear work gloves or leather gloves. Otherwise, you may be burned.
- Do not touch the pressure reducing valve, the safety valve (relief valve) or the opening section on the pipe outlet side with your bare hand. If there is steam present, you may be seriously injured.



CAUTION

- After installing the pressure reducing valve, open the bypass valve before adjusting the pressure and blow all the initial low-temperature condensate, dirt, scale, etc. out of the pipe.



- 1) After making sure that each of the stop valves and bypass valves before and after the pressure reducing valve are closed:
 - (1) Pull up gently on the pressure reducing valve adjusting handle. (2) Turn it clockwise (in the direction indicated by arrow L) to free the adjusting spring. (When the spring is free, the handle will turn easily.)
- 2) After opening the secondary-side stop valve a little, open the primary-side stop valve slowly all the way.
- 3) (1) Pull up gently on the handle.
(2) Turn it counterclockwise (in the direction indicated by arrow H). While looking at the pressure gauge, turn the handle slowly until the required pressure is attained.

- 4) When the handle is released, it will be locked in position.
- 5) Open the secondary-side stop valve fully, and check again the adjusted pressure.
- 6) In case of a shut-down of the equipment, close the secondary-side stop valve and then close the primary-side stop valve.

5 MAINTENANCE



WARNING

- Before removing the pressure reducing valve from the pipe or disassembling it, be sure to close the stop valves at the inlet and outlet of the pressure reducing valve. Then, release the remaining pressure in the pressure reducing valve body (check whether the pressure in the body has reached 0 MPa (0 bar)), and let it cool down completely (check whether the surface temperature of the body is at room temperature). Then, make a safety check and start the maintenance operation. If there is any pressure or temperature in the pressure reducing valve body, you may be seriously burned due to the venting of steam or condensate.



CAUTION

- When replacing parts, use maintenance parts supplied by us.

When disassembling the pressure reducing valve body for inspection, refer to section “Repairs” described later, and work with due care.

Inspection

Inspecting the parts inside the pressure reducing valve

Since it is always necessary to keep the valve, valve seat, sliding section, and the surface of the screen clean, we recommend that the inside of the pressure reducing valve should be cleaned regularly. If parts are damaged, replace them with new ones.

- Parts to be inspected:
 - Valve section
 - Surface of the area between the valve (4) and the valve seat (5)
 - Surface of the screen (17)
 - Shaft section
 - Sliding section between the shaft (12) and the orifice plate (11)

Cleaning the screens in the strainers installed around the pressure reducing valve

We recommend regularly cleaning the screens in the strainers installed around the pressure reducing valve.

- Y-type strainers on the primary side of the pressure reducing valve
- Screens in the steam traps or strainers on the inlet side of the pressure reducing valve

Repairs

Replacing the valve section

● Disassembling

- 1) When the plug (3) is removed from the bottom of the body (1) using a tool, the screen (17) can be taken out with the plug (3).
- 2) The valve return spring (16) and the valve (4) can be removed at this time, together with the screen (17). (There is a plate on the bottom of the screen (17).)
- 3) Remove the valve seat (5) from the body (1) using a tool.

● Reassembling

- 1) After replacing the valve seat (5) with a new one, secure the new valve seat (5) in the body (1).
- 2) After replacing the valve (4) with a new one, put the valve return spring (16) into the screen (17), from the large diameter end portion of the return spring. Then, put the new valve (4) on the small diameter end portion of the return spring, and reinstall them in the plug (3).
- 3) Secure the plug (3) in the body (1).

The valve may be misaligned during assembly. Therefore, after tightening the plug, remove the handle unit according to the procedure described in the next Step "Disassembling and reassembling the bellows and shaft sections".

To center the valve (4), push lightly on the end of the shaft (12) several times.

Replace the plug gasket (20) and the valve seat gasket (21) with new ones. (Before reassembly, put new gaskets (20) and (21) in the gasket grooves in the valve seat (5) and plug (3)).

Note)

- Check whether the surface and sealing face of each part are clean, and then attach them.
- Clean the surface of the screen (17), and attach it. If the screen is deformed or has flaws, replace it with a new one.

Replacing the bellows and shaft sections

● Disassembling

- 1) Lift the handle (10) gently, turn it clockwise (in the direction indicated by arrow L) to free the main spring (8) and then remove the four bolts (23) using a tool.
- 2) Remove the cover (2) (handle unit), and take out the main spring (8).
- 3) Remove the bellows (6) from the body (1), and take out the shaft (12).
- 4) Take out the spring stay (7) inside the bellows (6).
- 5) Remove the stop ring (13) from the groove in the body (1) using the tip of a flat-blade screwdriver.
- 6) Remove the stop ring (13) and the orifice plate (11) from the body (1).

● Reassembling

- 1) When replacing the orifice plate (11) with a new one, reinstall it so that the small hole of the orifice plate is on the outlet side of the body (1).
- 2) Put the bottom of the fold on the stop ring (13) on the face of the orifice plate (11). Then, push the five edges into the grooved section on the body (1) using the tip of a flat-blade screwdriver, to secure the orifice plate (11). Do not allow the small hole in the orifice plate (11) to be blocked by the stop ring (13).
- 3) After replacing the shaft (12) with a new one, insert the spherical surface of the new shaft into the sliding section of the orifice plate (11). Make sure the shaft (12) moves smoothly by pushing the end of the shaft (12) lightly several times.
- 4) After replacing the bellows (6) with a new one, reinstall the spring stay (7) (the curved side faces up), and the adjustment spring (8) in the new bellows (6). Then, reinstall the bellows in the body (1).
The cover (2) has a hole on its side (the lower part of the handle). Therefore, install the cover so that the position of the hole is in parallel to the pipe. Then tighten the bolts (23). Be careful to tighten the bolts evenly.
Replace the bellows gasket (22) with new one. Put the new bellows gasket (22) in the gasket groove in the body (1).

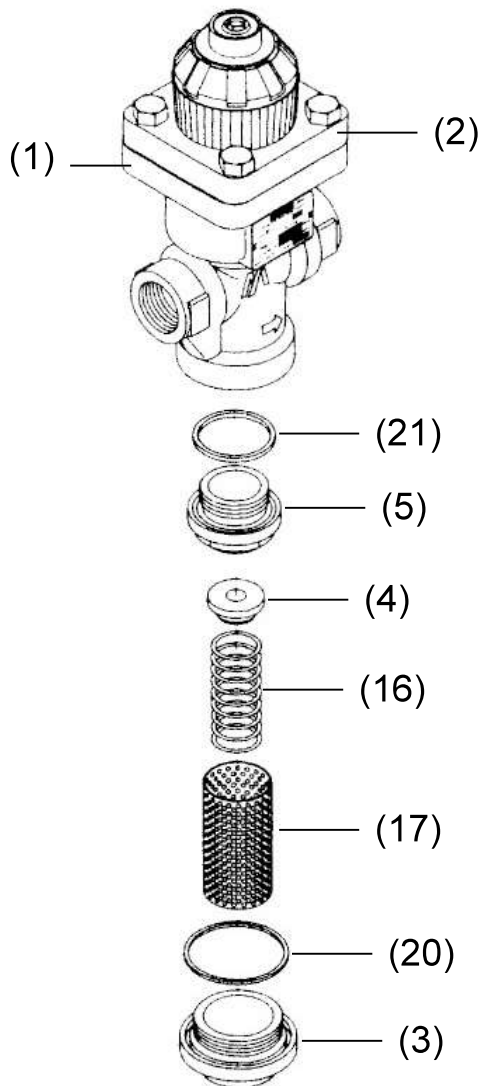
Note)

- Check whether the surface and sliding face of each part are clean, and then attach them.

Part name	Tools	Across the flats	Torque
Plug (3)	Torque wrench	32mm (1.26")	80N·m
Valve seat (5)	Torque wrench	27mm (1.06")	60N·m
Bolt (23)	Torque wrench	13mm (0.51")	14N·m

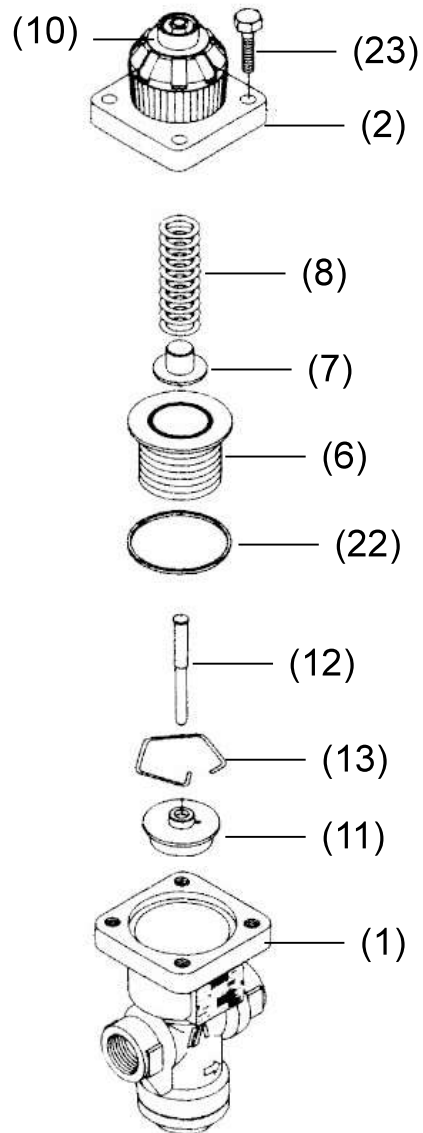
- Apply an anti-seizing agent to the threaded sections.
- Apply a small amount of anti-seizing agent to the threaded sections on the plug (3) and valve seat (5). However, do not cause the anti-seizing agent to squeeze out of the seal face.

Valve section



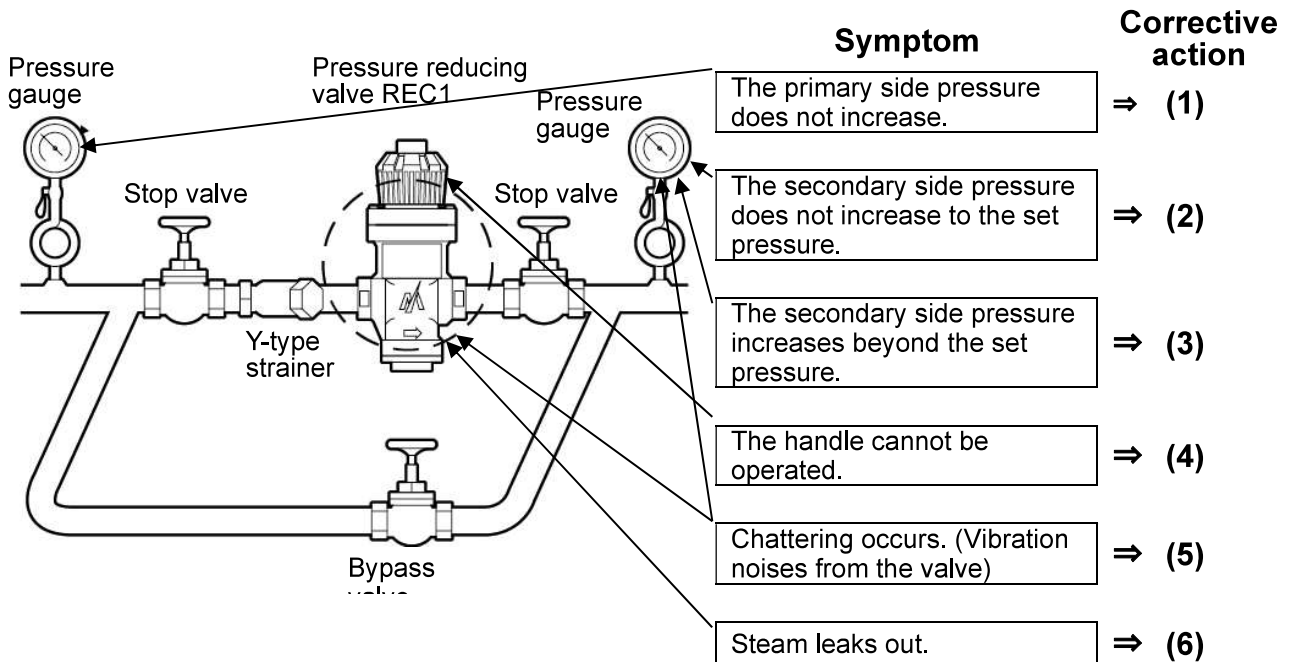
- 1. Body
- 2. Cover
- 3. Plug
- 4. Valve
- 5. Valve Seat
- 16. Valve return Spring
- 17. Screen
- 20. Plug Gasket
- 21. Seat Gasket

Bellows and shaft sections



- 1. Body
- 2. Cover
- 6. Bellows
- 7. Spring Stay
- 8. Main Spring
- 10. Handle
- 11. Orifice Plate
- 12. Shaft
- 13. Stop Ring
- 22. Bellows Gasket

6 TROUBLESHOOTING



(1) Symptom: The primary side pressure does not increase.

Working conditions	Cause of the problem	Corrective action	Reference item
Due to plumbing materials	Shortage of steam volume supplied to the primary side. (The capacity of the boiler may be insufficient.)	Recheck the flow rate using the bypass valve. Review the system.	-
	The stop valve is closed.	Open the stop valve.	
	The pipe on the primary side is too small.	Review the pipe size.	
	There is a throttle section in the primary side pipe.	Remove the throttle section.	

(2) Symptom: The secondary side pressure does not increase to the set pressure.

Working conditions	Cause of the problem	Corrective action	Reference item
Due to plumbing materials	Insufficient pressure reducing valve capacity	Recheck the flow rate using the bypass valve.	-
		Select pressure reducing valve with the proper capacity.	
	The difference between the primary side and secondary side pressures is below the minimum differential pressure.	Increase the primary side pressure.	
		Review the system.	
	Clogging in the inlet side strainer	Disassemble and clean.	
	The secondary side stop valve is closed.	Open the stop valve.	
	The secondary side pipe is too small.	Review the pipe size.	
There is a throttle section in the secondary side pipe.	Remove the throttle section.		

Working conditions	Cause of the problem	Corrective action	Reference item
Due to internal parts	Clogged screen (17)	Clean the screen (17). If it is damaged, replace it with a new one.	Replacing the valve section
	Poor sliding of the shaft (12)	Clean the sliding section between the shaft (12) and the orifice plate (11). If the sliding section is damaged, replace it with a new one.	Replacing the bellows and shaft sections

(3) Symptom: The secondary side pressure increases beyond the set pressure.

Working conditions	Cause of the problem	Corrective action	Reference item
Due to plumbing materials	The consumption on the secondary side is close to zero.	Install a trap or a safety valve on the secondary side of the pressure reducing valve.	-
	The inlet or the outlet is installed incorrectly.	Install them correctly according to the flow direction.	
	The bypass valve is not closed. Pressure is leaking past the bypass valve.	Close the bypass valve. If the pressure is leaking, repair or replace the bypass valve.	
Due to internal parts	Pressure leaks past the valve (4) due to dirt and scale holding the valve open.	Clean the surfaces of the valve (4) and the valve seat (5). If either surface is damaged, replace the parts with new ones.	Replacing the valve section
	Poor sliding of the shaft (12)	Clean the sliding section between the shaft (12) and the orifice plate (11). If the sliding section is damaged, replace it with a new one.	Replacing the bellows and shaft sections
	Broken bellows (6)	Replace the bellows (6) with new ones.	

(4) Symptom: The handle cannot be operated.

Working conditions	Cause of the problem	Corrective action	Reference item
Due to internal parts	Mishandling of the handle (10)	Pull the handle (10) up gently and turn it.	Pressure adjustment pressure
	Sleeve (9) or adjust bolt (14) has seized.	Replace the handle unit with a new one.	Replacing the bellows and shaft sections

(5) Symptom: Chattering occurs. (Vibration noise from the valve)

Working conditions	Cause of the problem	Corrective action	Reference item
Due to plumbing materials and internal parts	Condensate flows in from the primary side	Install a trap on the primary side of the pressure reducing valve.	-
	Used below the minimum adjustable flow rate.	Select a new pressure reducing valve.	Replacing the bellows and shaft sections
	Poor sliding of the shaft (12)	Clean the sliding section between the shaft (12) and the orifice plate (11). If the sliding section is damaged, replace it with a new one.	

(6) Symptom: Steam leaks out.

Working conditions	Cause of the problem	Corrective action	Reference item
Due to internal parts	Loose bolts and nuts	Tighten them to the specified torque.	Replacing the valve section, and Replacing the bellows and shaft sections
	The plug gasket (20) or the bellows gasket (22) is broken.	Replace the plug gasket (20) or bellows gasket (22) with a new one.	
	Bellows (6) is broken.	Replace the bellows (6) with a new one.	Replacing the bellows and shaft sections

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

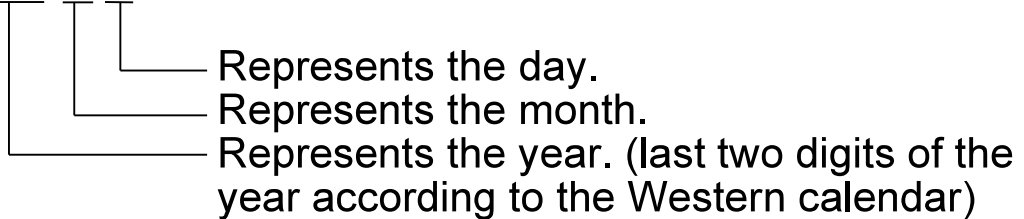
The remedy available under the warranty shall not exceed the sales price of the products delivered, for any cause whatsoever.

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. □□□□

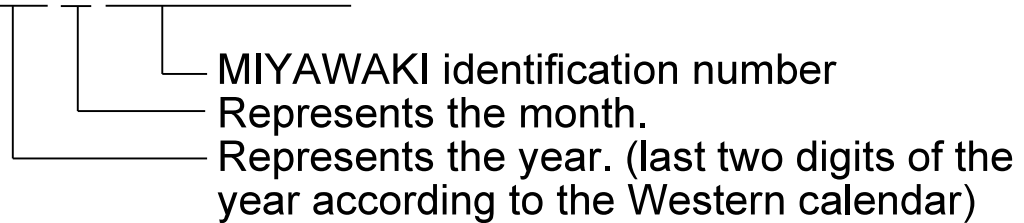


Example of serial number designation

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

-
- For any questions about the product that you purchased or about the details in this user's manual, please contact MIYAWAKI, our local authorized agent, or the place where you purchased.
 - 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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