

PRESSURE REDUCING VALVE
FOR STEAM

RE20

(DN50 – DN100)

INSTALLATION, OPERATION
and MAINTENANCE MANUAL



SAFETY

The MIYAWAKI – pressure reducing valve RE20 is a direct acting ductile cast iron pressure regulator for use in steam lines. The valve is available in the pressure class PN16 & PN25.

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).

Main technical specification of the product:

(Check each item to avoid misuse of the product.)

PN16

- Maximum allowable pressure (PMA): 1,6 MPa, 16 bar, 232 psig (@150°C, 302°F)
- Maximum allowable temperature (TMA): 350°C, 662°F (@ 1,1 MPa, 11 bar, 160 psig)
- Maximum operating (inlet) pressure (PMO): 1,5 MPa, 15 bar, 218 psig (@200°C, 392°F)
- Maximum operating temperature (TMO): 350°C, 662°F (@ 1,1 MPa, 11 bar, 160 psig)
- Adjustable Secondary (Outlet) Pressure: 0,05 to 1,6 MPa / 0,5 to 16,0 bar / 7.25 to 232 psig

PN25

- Maximum allowable pressure (PMA): 2,5 MPa, 25 bar, 363 psig (@100°C, 212°F)
- Maximum allowable temperature (TMA): 350°C, 662°F (@ 1,8 MPa, 18 bar, 261 psig)
- Maximum operating (inlet) pressure (PMO): 2,2 MPa, 22 bar, 319 psig (@250°C, 482°F)
- Maximum operating temperature (TMO): 350°C, 662°F (@ 1,8 MPa, 18 bar, 261 psig)
- Adjustable Secondary (Outlet) Pressure: 0,05 to 1,6 MPa / 0,5 to 16,0 bar / 7.25 to 232 psig

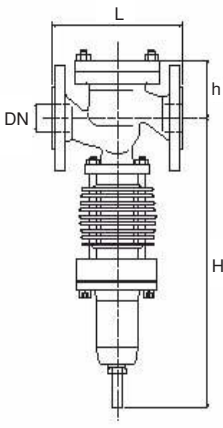
(For lower or higher secondary pressure setting than indicated contact our office or local representative)

- Maximum Pressure Reducing Ratio: 25 : 1
- Minimum Differential Pressure: 0,05 MPa / 0,5 bar / 7.25 psi
- Connection & Size: Flanged DIN-EN 1092-1 and ASME B16.5 – DN15 – DN200 (½” – 8”)
(For socket weld, butt-weld or screwed connections contact our office or local representative)
- Flow direction: Shown by an arrow.
- Body material: Ductile cast iron 0.7040

**Check the Pressure-Temperature Rating of the product.
Don't use it beyond the pressure and temperature limits of the table !!**

PN	Body material	Temperature °C										
		-10 ...+50	100	150	200	250	300	350	400	450	500	530
		Pressure MPa										
16	0.7040	1,6	1,6	1,6	1,5	1,4	1,3	1,1				
25	0.7040	2,5	2,5	2,4	2,3	2,2	2,0	1,8				
40	1.0619	4,0	3,7	3,5	3,1	2,8	2,6	2,4	2,3			
	1.4408	4,0	3,7	3,4	3,1	2,9	2,8	2,7	2,6			
63	1.0619	6,3	5,9	5,5	4,9	4,5	4,1	3,8	3,6			
	1.7357	6,3	6,3	6,3	6,3	6,2	5,7	5,3	5,0	4,8	3,8	2,2
100	1.0619	10,0	9,3	8,7	7,8	7,1	6,4	6,0	5,8			
	1.7357	10,0	10,0	10,0	10,0	9,8	9,1	8,4	8,0	7,6	6,1	3,5

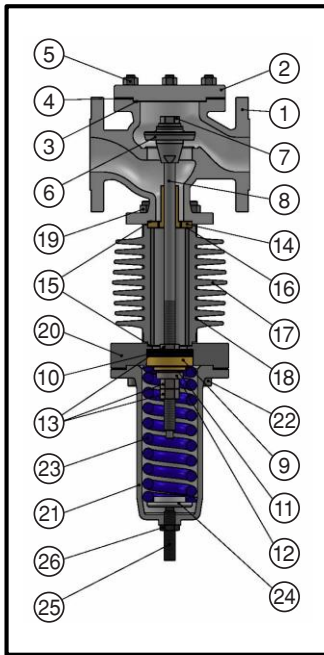
2 DIMENSIONS



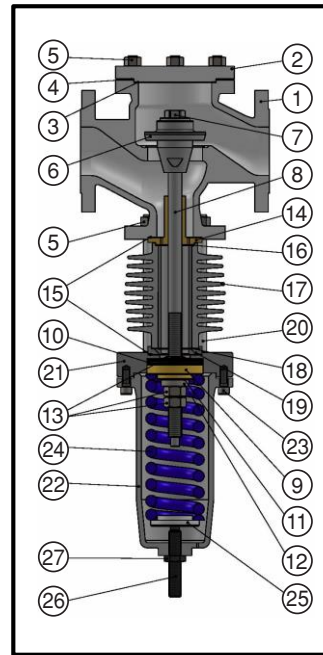
Dimensions & Weights								
Size DN	Dimensions (mm)			Kvs value	Weight (kg)			
	L		H		h	0.7040	1.0619	1.4408
15	130	210	410	82	1,8	11,4	12,0	12,0
20	150	230		66	3,2	11,4	12,0	12,0
25	160	230		66	5,0	12,5	13,0	13,0
32	180	260		81	7,9	14,5	16,0	16,0
40	200	260		83	13,0	16,0	18,0	18,0
50	230	300	586	100	20,0	35,0	37,5	37,5
65	290	340	615	113	34,0	39,5	43,0	43,0
80	310	380	733	140	51,0	52,5	58,0	58,0
100	350	430	762	154	80,0	68,0	77,0	77,0
125	400		715	210	130,0	150,0	155,0	155,0
150	480		720	235	180,0	180,0	190,0	190,0
200	600		950	285	320,0	330,0	385,0	385,0

3 CONSTRUCTION DETAILS

DN50-DN65



DN80-DN100



Parts-No.	Description	Parts-No.	Description	Parts-No.	Description
DN50 – DN100		DN50 – DN65		DN80 – DN100	
1	Body	18	Bolt	18	Gasket
2	Valve cover	19	Hexagon nut	19	Intermediate Ring
3	Gasket	20	Control housing	20	Bolt
4	Stud bolt	21	Bonnet	21	Control housing
5	Hexagon nut	22	Socket head screw	22	Bonnet
6	Cone	23	Pressure spring	23	Socket head screw
7	Locking screw	24	Spring plate	24	Pressure spring
8	Cone rod	25	Adjusting screw	25	Spring plate
9	Control piston	26	Hexagon nut	26	Adjusting screw
10	O-Ring			27	Hexagon nut
11	Gasket				
12	Gasket ring				
13	Hexagon nut				
14	Guide sleeve				
15	Gasket				
16	Gasket				
17	Cooling cylinder				

4 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.



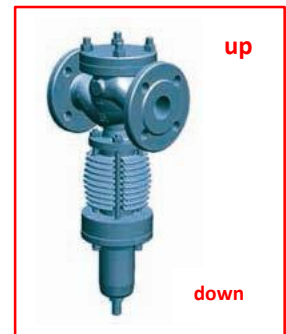
CAUTION

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.

Installation Process

- ❖ Remove the dustproof seals covering both connections (if existing).
- ❖ Check the flow direction indicated on the side of the body.
- ❖ The pressure reducing valve should be installed in a **horizontal pipe line with the cooling cylinder (No. 17) turned downwards**, with suitable bypass and isolating valves.
- ❖ To prevent water hammer and vibrations caused by incoming condensate it is necessary to install a steam trap before the pressure reducing valve.
- ❖ If you expect the average flow velocity to rise above 30m/sec, it is recommended to increase the size of the pipe on the downstream side.
- ❖ In case the pressure reducing ratio exceeds 25 : 1 , the pressure reduction is to be made in two steps. In that case, a distance of at least 3 meters has to be kept between the two pressure reducing valves.
- ❖ The distance between the pressure reducing valve and a solenoid valve must be of at least 3 meters, if a solenoid valve with on/off function is installed upstream or downstream of the pressure reducing valve. Otherwise, the pressure reducing valve may not function in a stable way while the valve is opening or closing.
- ❖ If a control valve is installed downstream of the pressure reducing valve, the distance between the pressure reducing valve and the control valve must be of at least 2 meters. The disregard of this recommendation may cause an unstable function of the pressure reducing valve as well.
- ❖ To prevent an unusual rise of the secondary pressure a safety valve has to be installed to protect the steam consuming equipment.



- ❖ The pipe in which the pressure reducing valve is installed, must be fixed so that the weight and the vibration of the pipe do not directly influence the pressure reducing valve.
- ❖ Blow down the piping that leads to the PRV's inlet from any dirt and scale before the first start-up of the pressure reducing valve. This is particularly important in case of the start-up of the pressure reducing valve after a long time of shut-down.
- ❖ Before a long shut-down of the pressure reducing valve the condensate must be completely discharged from the pipe. Furthermore the stop valves before and behind the pressure reducing valve have to be closed.
- ❖ The distance between the pressure reducing valve and a downstream pressure gauge should be of at least 1 meter.
- ❖ The length of the straight section of the upstream piping and the length of the straight section of the downstream piping should be each at least 10 pipe diameters.
- ❖ The steam trap and the pressure reducing valve should both be protected with a strainer. 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.
- ❖ If you insulate the pressure reducing valve, do not insulate the cooling cylinder !!! The insulation of the cooling cylinder prevents the built-up of condensate inside the cooling cylinder, which is protecting the O-Rings. If there will be no condensate inside the cooling cylinder, the O-Rings may be damaged !

Adjustment

The pressure reducing valve is usually preadjusted at the factory in accordance with the instructions of the customer. As the real steam consumption and operating pressure may differ a readjustment after installation under operating conditions is recommendable.

- After the installation and before the adjustment of the pressure reducing valve close the stop valves before and behind the pressure reducing valve and open the bypass to remove all condensate and dirt from the pipe.
- Close the bypass valve.
- Open the stop valve downstream slightly. Then open the stop valve upstream slowly.
- Now, open the stop valve downstream completely and check the set pressure.
- To readjust the downstream pressure release the locking nut (No. 26 for DN50-65; No.27 for DN80-100). To increase the downstream pressure turn the adjusting screw (No. 25 for DN50-65; No.26 for DN80-100) clockwise until the required pressure is reached. To reduce the downstream pressure turn the adjusting screw counterclockwise until the required pressure will be reached. After setting the downstream pressure, tighten the locking nut again.
- In case of a shut-down of the equipment the stop valve downstream must be closed at first. The stop valve upstream is to be closed as a second step. When the equipment will start up again open the stop valve downstream at first and then open the stop valve upstream slowly.

5 MAINTENANCE



CAUTION

- When replacing parts, make sure the replacement parts are supplied by Miyawaki.
- Assemble and disassemble the valve after the internal pressure becoming the same as the atmospheric pressure, and the surface temperature of the valve dropping enough to prevent burning and serious injuries.

5.1. Remove the PRV from the pipe line

5.2. Fix the valve in a vice with the spring bonnet and adjust screw showing upwards.

5.3. Untighten the locking nut (No.26 DN50-65; No.27 DN80-100). Then turn the adjusting screw (No.25 DN50-65; No.26 DN80-100) counterclockwise until the screw is moving easily (no pressure exerting to the spring).

5.4. Untighten the socket head screws (4 pcs.- No.22 DN50-65; 6 pcs.- No.23 DN80-100) and remove them. Now take off the bonnet (No.21 DN50-65; No.22 DN80-100) from the valve.

5.5. Remove the spring plate (No.24 DN50-65; No.25 DN80-100) and the pressure spring (No.23 DN50-65; No.24 DN80-100) from the valve.



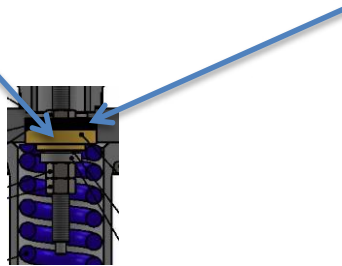
5.6. Remove the valve from the vice and fix it again so that the valve cover (2) is showing upwards. Untighten the hexagon nuts (No.5 – DN50-65:M12 wrench size 19 mm; DN80-100: M16 wrench size 24mm) and remove the valve cover (2) from the body. Remove also the cover gasket (3). At the time of assembly replace it by a new one.



5.7. Now again turn the valve to the former position when the cooling cylinder is showing upwards. Untighten the hexagon nuts (13 – 2 pcs. ; DN50: M16 wrench size 24mm; DN65-100: M22 wrench size 32mm). To untighten the hexagon nuts fix the end of the cone rod (8) with a different wrench.

Then remove the gasket ring (12) and the gasket (11). When reassembling replace them by new ones.

- 5.8. Remove the control piston (9) from the control housing (No.20 DN50-65; No.21 DN80-100). Replace the O-Ring (10) by a new one.



If it is too difficult to remove the control piston, proceed with point 5.11. and remove the body and cooling cylinder from the control housing. Then the control piston can be pressed out from the control housing.

- 5.9. After removal of the control piston untighten the hexagon nut (No.13 DN50: M16 wrench size 24mm; DN65-100: M22 wrench size 32mm) located above the control piston. Remember the position of the nut to place it correctly on the cone rod when reassembling the valve.

- 5.10. Now remove the cone rod (8) from the valve body.



- 5.11. *Replacement of the gaskets between the cooling cylinder and body and between the cooling cylinder and control housing*

Untighten the hexagon nuts (No.19 - DN50: M12 wrench size 19mm; DN65: M16 wrench size 24mm; No.5 - DN80-100: M16 wrench size 24mm) and unscrew them. Take off the valve body from the cooling cylinder (17) and remove the cooling cylinder from the control housing (No.20 DN50-65; No.21 DN80-100).

Take off the guide sleeve (14) from the cooling cylinder. Check and clean the openings in the guide sleeve. Remove all gaskets (No.15 – 2 pcs.; No.16 – 1 pc. and No.18 DN80-100) and replace them by new ones.

- 5.12. Now reassemble the valve in the opposite way.

6 TROUBLESHOOTING

Problem	Cause	Solution
The downstream pressure doesn't meet the set value. It is too low.	Pressure was set incorrectly.	Turn the adjusting screw to correct the setting of the secondary pressure.
	The upstream stop valve is closed .	Open the valve.
	The downstream stop valve is closed .	Open the valve.
	The pressure gauge does not work properly.	Replace the pressure gauge.
	The steam amount upstream is too small.	Check the steam amount by using a bypass valve.
	Insufficient capacity of the pressure reducing valve. The size of the valve is too small.	Check the real steam amount and the capacity of the valve.
	The screen of a strainer installed on the inlet side of the pressure reducing valve is plugged.	Clean the screen.
	The O-Ring No.10 is leaking.	Replace by a new one.
	The gasket of the valve cover (3) is leaking.	Replace by a new one.
The downstream pressure exceeds the set pressure.	Pressure was not set correctly.	Turn the adjust screw to correct.
	Inlet and outlet were installed the wrong way round.	Install correctly according to the flow direction.
	The downstream stop valve is closed.	Open the stop valve.
	The surface of the seat and/or valve is damaged. The valve cannot close and regulate the downstream pressure.	Check the valve and seat and judge which parts must be replaced.
	The openings in the guide sleeve (14) are plugged. Steam cannot enter the cooling cylinder.	Disassemble the valve and clean the guide sleeve.
	The gaskets No. 15 and/or No.16 are leaking.	Replace by new ones.
The secondary pressure is fluctuating.	The inlet pressure is fluctuating.	Check the operating conditions on the inlet side.
	The steam consumption is fluctuating strongly.	Check the downstream operating conditions.
	The steam consumption is exceeding the capacity of the valve from time to time.	Check the operating conditions and select another size of the valve, if necessary.

7 WARRANTY

7.1 Warranty period

The warranty period shall last 18 months from the date of product delivery, but not more than 12 months after the date of installation.

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:

- The precautions described in this manual were not observed.
- User's errors or mistakes such as an inappropriate installation or incorrect handling, or an excessively large impact caused by dropping
- Problems caused by devices or equipment other than ours, or a disallowed use environment
- When a repair or modification has been performed by anyone else than us or people who are authorized to make such repairs
- Intrusion of salt or other substances that promote significant rust or corrosion or problems from fluids that contain the same substances
- Extremely worn packing, gaskets, or other parts
- Attachment or accumulation of foreign objects in the pipe, such as dust and scale
- 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.

★ Guidance for reading special product name

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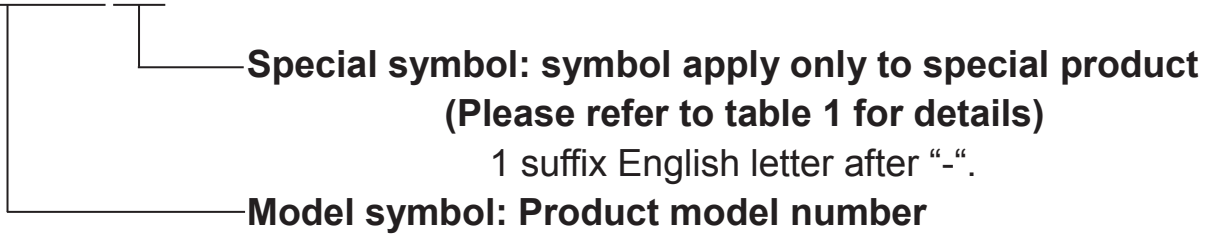


Table 1 Symbol description

Suffix	Special contents
A	Approved high-pressure gas trap
C	Blow valve attached & countermeasure against scale
K	Change of gasket
L	Special face to face dimension
M	Change of parts material
P	Change of operating pressure
R	Change of screen mesh or countermeasure against scale
T	Parts are standards, and the specification (operating temp, press. etc.) is changed
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.
 - © 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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RE20 50-100