WVL-02, 02CN Type Level Control Valve (for Water)

Large capacity level control valve for water receiving tank of water supply pipeline, water receiving tank of farm-land irrigation pipeline, and pressure reducing tank etc.

SPECIFICATIONS

Type		Standard		Nylon coating
Model name		WVL-02		WVL-02CN
Code name		WVL02-B	WVL02-L	WVL02CN-B
Size		80~400(3″~16″)	80~200(3″~8″)	80~200(3″~8″)
Applicable fluid		Water		
Fluid temperature		5~60℃		
Applicable pressure		Size 80~200mm:0.03~0.75MPa, Size 250~400mm:0.05~0.75MPa		
Min. press differential across the disc		Size 80~200mm:0.03MPa, Size 250~400mm:0.05MPa		
End connection		Flanged JIS 10KRF		
Materials	Body	Cast iron	Ductile cast iron	Cast iron
	Trim	Diaphragm & disc(Synthetic rubber), Seat ring(Cast bronze)		
Painting or coating for Body		Interior:Epoxy resin		Nylon 11 coating
Valve body pressure test		Hydraulic 1.75MPa		
Installation		Vertically in horizontal pipe line.		
Accessories ball tap		Body Size 80~200mm:Size 20mm(Polyethylene ball) Body Size 250~400mm:Size 25mm(Polyethylene ball)		

＊ Refer to Page 101 for value size selecting chart.

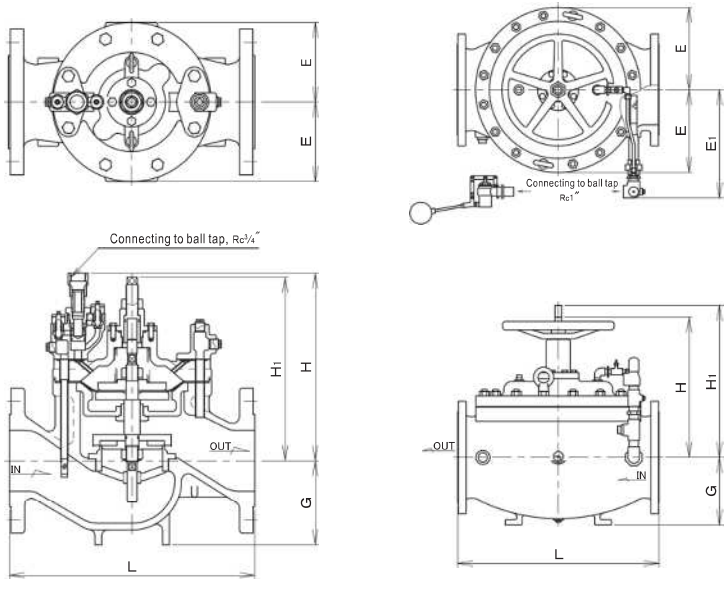
DIMENSIONS (Body: Cast iron)

(mm)

Size	L	G	H	H_1	E	E_1	Cv value	Mass(kg)
80(3″)	350	110	277	261	117	—	90	43
100(4″)	400	130	303	300	130	—	160	60
125(5″)	440	140	334	371	145	—	250	70
150(6″)	500	165	367	416	173	—	360	125
200(8″)	600	200	418	522	218	—	640	200
250(10″)	720	240	490	560	295	390	1000	470
300(12″)	820	280	540	620	328	400	1440	524
400(16″)	1040	370	690	800	440	490	2560	1400

＊Please contact our local agent for the dimensions of the main valve whose body is made of ductile cast iron. Flanged code JIS 10KRF

CONSTRUCTION



Size 80~200mm

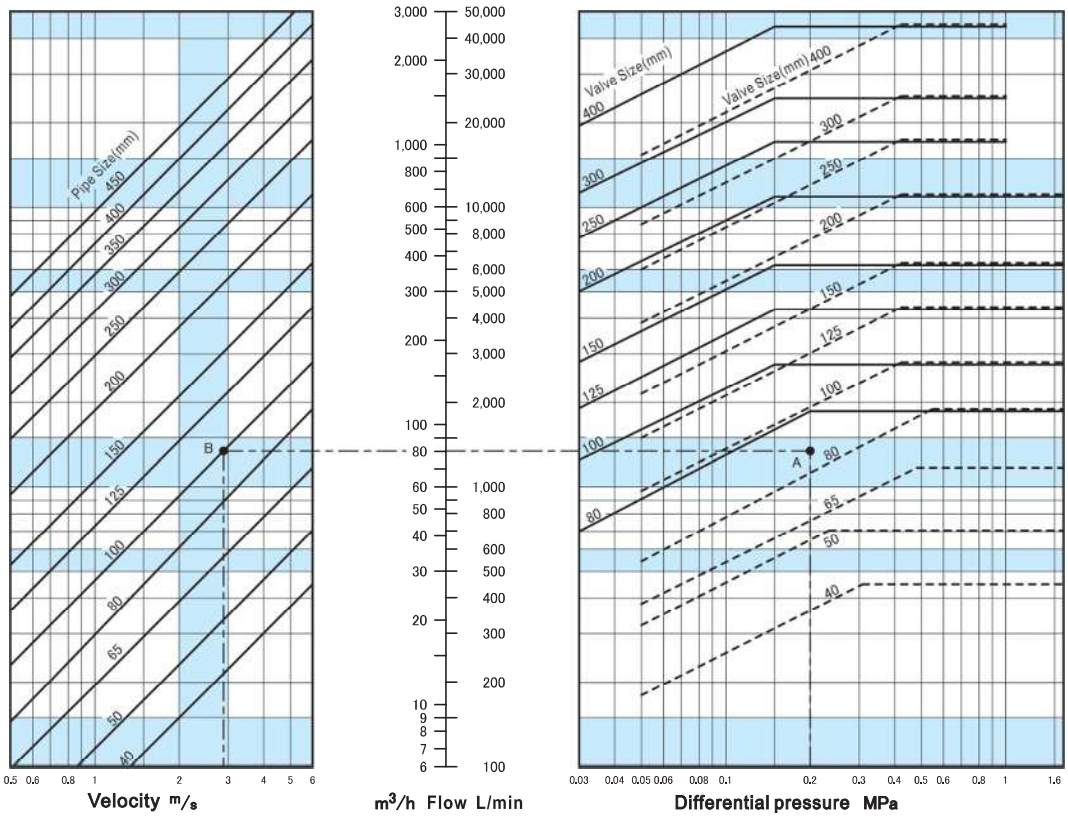
Size 250~400mm

DATA/WV Type Regulating Valve (for Water or Hot Water)

SIZE SELECTION CHART (for Water)

■ VELOCITY RATE LINE CHART

■ SIZE SELECTION CHART



● **PRODUCTS WHOSE SIZES CAN BE DETERMINED**
------ (dashed line) in the size selection chart
Pressure reducing valve WVR-02 Type, primary pressure regulating valve WVM-02 Type.

● **VALVES APPLICABLE TO**
——— (solid line) in size selection chart
Solenoid valve WVE-02 Type, level control valve WVL-02 Type

Note 1: In the size selection chart, the horizontal position of the valve size line represents the maximum flow.
Note 2: Use velocity line of less than 3m/s in velocity line chart with obtained pipe size, if not for any special case.
Note 3: Size 40~65mm is for WVR and WVM Types only.
Note 4: For sizes 40,50mm, in case of the larger differential pressure,please contact our local agent in your area.

● HOW TO USE THE CHART

Example: Select the size of valve for the following conditions:
Primary pressure: 0.5MPa; Secondary pressure: 0.3MPa; Flow: 80m³/h
1.Calculate differential pressure between inlet and outlet of valve: 0.5−0.3=0.2MPa
2.Follow the 80m³/h flow line horizontally until it intersects with the 0.2MPa differential pressure line. The intersection point is named A.
3.Since point A is between the lines representing size 80mm and 100mm, select the larger size, which is size 100mm.

● CONFIRMING PIPE FLOW RATE

1. Assume the pipe and valve are of the same diameter. Follow the 80m³/h flow line horizontally until it intersects with the 100mm size line to obtain cross point B.
2. Draw a vertical line from point B and find out the pipe flow rate 2.8m/s.
3. Since the flow rate is less than 3m/s, the pipe size should be size 100mm. If flow rate is larger than 3m/s, select a larger size to make the flow rate less than 3m/s.

● REFERENCE

■To select the size for pressure reducing valve or primary pressure regulating valve with considering dynamic water pressure:
For pressure reducing valve, add the largest offset pressure to the secondary pressure. For primary pressure regulating valve, deduct the minimum accumulation from the primary pressure. The size can be determined using the differential pressure between primary side and secondary side of the valve.

●Pressure reducing valve
Find out the maximum offset pressure 0.1MPa from the specifications. The differential pressure is 0.5−(0.3+0.1)=0.1MPa. Use the method described in the example in “HOW TO USE THE CHART” to select the size.

●Primary pressure regulating valve
Find out the minimum accumulation 0.03MPa from specifications. The differential pressure is (0.5−0.03)−0.3=0.17MPa. Use the method described in the example in “HOW TO USE THE CHART” to select the size.

LEVEL CONTROL VALVE ADJUSTMENT (LP Type series)

VALVE CLOSING TIME

LP-8HN, 8AHN, 9HN

Although valve closing time has been adjusted at factory before delivery, it needs to be adjusted when there is an abnormal situation.

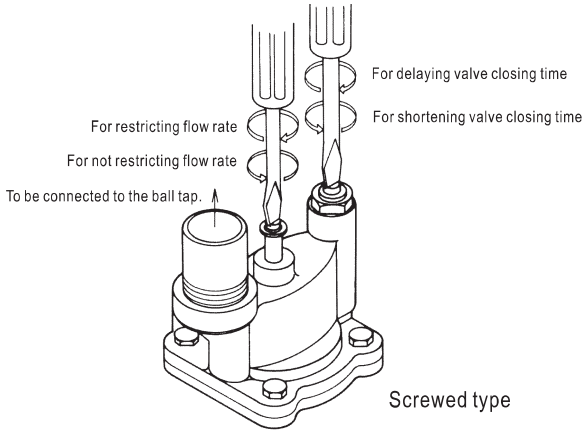
- **Delaying valve closing time**

  Water hammer may occur if the interval between closing of ball tap and closing of level control valve is too short. To delay valve closing, loosen the lock nut and turn the needle valve to the right (clockwise) to reduce the opening degree of needle valve.

- **Shortening valve closing time**

  The closing water level may be too high or overflow may occur if the interval between closing of ball tap and closing of level control valve is too long. To solve such problems, loosen the lock nut and turn the needle valve to the left (counterclockwise) to increase the opening degree of needle valve.

Adjustment of valve closing time and flow



FLOW ADJUSTMENT

LP-8HN, 8AHN, 9HN
LP-8RN, 8ARN, 9RN

The flow of water will be extremely large and there will be excessive vibration and noise if the water pressure or the head drop pressure is excessively large. To solve such problems, turn the adjustment screw to the right (clockwise). By doing this, the stroke of the valve is shortened and the flow amount and velocity are limited (do not close the screw completely).

WATER DRAINING AND RE-FEEDING FOR LEVEL CONTROL VALVE FOR APPLICATIONS IN COLD DISTRICT

DRAINING

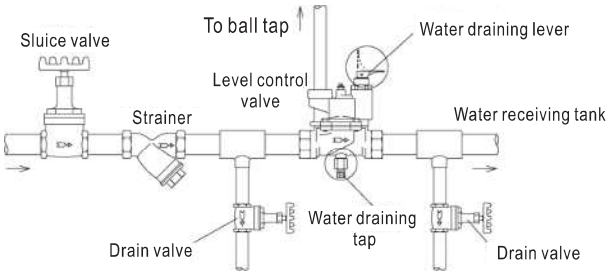
① Close the valve controlling water supply to reduce water level of water receiving tank, and then open the ball tap.

② Raise the water draining lever of level control valve (In case of straight type LP-8RN,9RN Type, open water draining tap) to drain water. Close the tap after water is drained completely.

RE-FEEDING (resuming water supply)

Open the water supply valve and start water supply. After 2~3 minutes, check if water is supplied by secondary valve and level control valve, and then pull down the water draining lever to allow normal water supply.

Water draining and re-feeding (resuming water supply)



DATA/Level Control Valve

■ PIPING EXAMPLE

Fig.1: Straight type

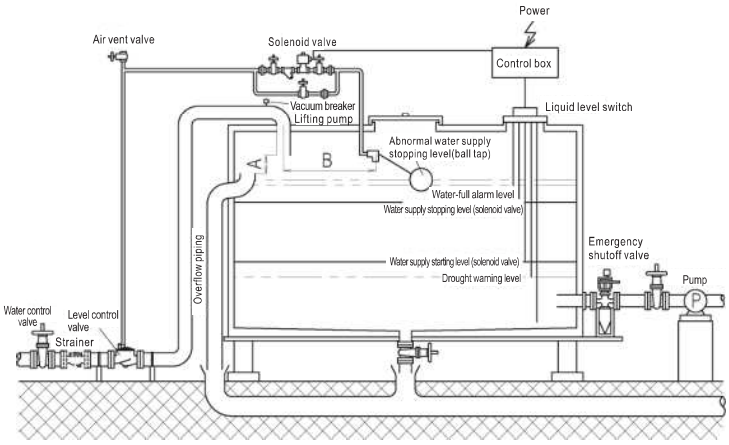
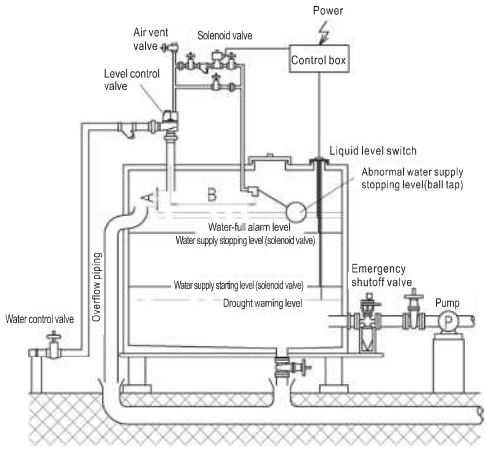


Fig.2: Angular type



Please note that local governments may have their own regulations on the mounting position and size of level control valve.

■ APPLICATION EXAMPLE

Control based on ball tap and solenoid valve

In this method, level control is realized by opening/closing the main valve through actuation of pilot solenoid valve according to water level detected by level switch.

In the event of abnormal water level due to failure of pilot solenoid valve, the ball tap (which works as a safety device) closes and so does the main valve.

■ INSTALLATION POINT

1. Make sure interval A is minimum “pipe size×1.7 + 5 (mm)”. (The interval should be adjusted according to the area of water receiving tank.)
2. To avoid fluctuation of the float of ball tap, interval B should be as large as possible (at least 1m) or measures are taken to prevent fluctuation.
3. Install water control valve (sluice valve) and strainer at the primary side of level control valve. Although some products have embedded strainer, the mesh of the embedded strainer may not satisfy the needs. Therefore, you may need to install strainer with appropriate mesh.
   ※ Mesh: Japanese regulation of the Land, Infrastructure and Transportation Ministry requires minimum 40 mesh and minimum 80 mesh for the primary side of pilot solenoid respectively.
4. For the secondary piping of level control valve that is very long or has many bents, please install VD-2N Type vacuum breaker (see Page 127) right after the secondary side.
5. Before installing level control valve, please remove foreign matter from the pipeline, flush it completely, and then install the valve on horizontal pipe uprightly.
6. Screw type level control valves with size 20~50mm should be connected to pipe using union joint or flange joint.
7. To allow easy maintenance, install level control valve in the proximity of pilot pipe using union joint and install stop valve between union joint and ball tap.
8. The nominal diameter of pilot pipe should not be smaller than that of the connection port of level control valve.
9. Install ball tap in a place that is near to manhole for easy maintenance.
10. Take measures to prevent freezing or damage of level control valve if it is used in cold area.
11. Depending on the position of water receiving tank, there may be noise due to water flowing from the pipe at the outlet of level control valve. Therefore, if the tank is near to places where people are living, sound insulation measures need to be taken to reduce noise.

PILOT-OPERATING SOLENOID VALVE (to be ordered separately)

During water feeding to tank, pilot type solenoid valve in pilot piping line is possibly uncontrollable due to pressure drops, this select the corrent direct type solenoid valve according to table of suitable solenoid valve.

■ TABLE OF SUITABLE SOLENOID VALVES

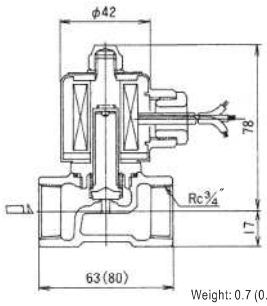
○:Good ×:Bad

Level control valve		DS-11N,11LN (Normally closed)	WS-22 (Normally closed)	WS-22C (Normally open)
Model name	Size			
LP-8N,8HN	20~50mm	○	○	○
	65~100mm	×	○	○
LP-8AN, 8AHN	20~50mm	○	○	○
LP-9N, 9HN	65~100mm	×	○	○
WVL-02	80~400mm	×	○	○
LP-8RN,8ARN,9RN Other level control valves		×	○	○

＊For WVL-02 Type above 250mm in size, please use size 25mm product of WS-22, 22C Type.
Please select WS Type if the valve is to be used with level control valve provided by other manufacturers or those for cold region. In the case of application in cold region, please apply sufficient insulation to avoid freezing and damage. However, insulation is not necessary for coil.

DS-11N,11LN Type Solenoid Valve (Normally closed)

■ CONSTRUCTION



Weight: 0.7 (0.8) kg

Values in parentheses are of DS-11LN Type.
Note: The size and weight are those of size 20mm valve.

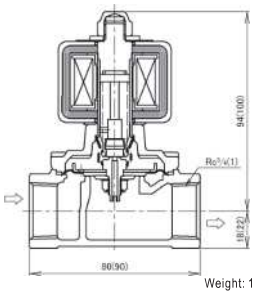
■ SPECIFICATIONS

Type	Standard	Installation of pipe end core is possible*1.
Model	DS-11N	DS-11LN
Code name	**DS11N-J□**	**DS11LN-J**
	※1or 2 for rated voltage is required in □	–
Size	20 or 15 mm (¾″ or ½″)	
Applicable pressure	0~0.75MPa	
Materials	Body(Cast bronze), Disc & seat(Stainless steel)	
Rated voltage	**1: AC100V 50/60Hz**	AC100V 50/60Hz or
	2: AC200V 50/60Hz	AC200V 50/60Hz
Rated current	AC100V:0.19A AC200V:0.10A	
Starting current	AC100V:0.57A AC200V:0.29A	
Protection	Dustproof, drip-proof, for indoor application *2.	
Cv value	0.45	

＊1. DS-11LN Type with pipe end core is available.
＊2. For outdoor application, please use the product with TB-03 Type series terminal box.

WS-22 Type Solenoid Valve (Normally closed)

■ CONSTRUCTION



Weight: 1.1kg (1.6)

Note: The number in ( ) is for size 25mm valve.

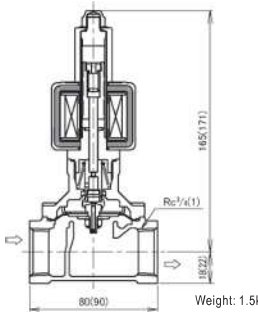
■ SPECIFICATIONS

Model	WS-22	
Code name	**WS22-F**	
Size	20(¾″)	25(1″)
Applicable pressure	0~1.0MPa	
Materials	Body(Cast bronze), Disc & seat(Stainless steel and Synthetic rubber)	
Rated voltage	Common use:AC100V 50/60Hz or AC200V 50/60Hz *1.	
Rated current	AC100V:0.21A AC200V:0.10A	
Starting current	AC100V:0.7A AC200V:0.35A	
Protection	Dustproof, drip-proof, for indoor application *2.	
Cv value	7	10

＊1. For special voltage, please contact our agent in your area.
＊2. For outdoor application, please use the product with TB-03 Type series terminal box.

WS-22C Type Solenoid Valve (Normally open)

■ CONSTRUCTION



Weight: 1.5kg (2)

Note: The number in ( ) is for size 25mm valve.

■ SPECIFICATIONS

Model	WS-22C	
Code name	**WS22C-F**	
Size	20(¾″)	25(1″)
Applicable pressure	0~1.0MPa	
Materials	Body(Cast bronze), Disc & seat(Stainless steel and Synthetic rubber)	
Rated voltage	Common use:AC100V 50/60Hz or AC200V 50/60Hz *1.	
Rated current	AC100V:0.35A AC200V:0.18A	
Starting current	AC100V:1.25A AC200V:0.63A	
Protection	Dustproof, drip-proof, for indoor application *2.	
Cv value	7	10

＊1. For special voltage, please contact our agent in your area.
＊2. For outdoor application, please use the product with TB-03 Type series terminal box.

LB-2N Type Pilot Ball tap (Standard accessories)

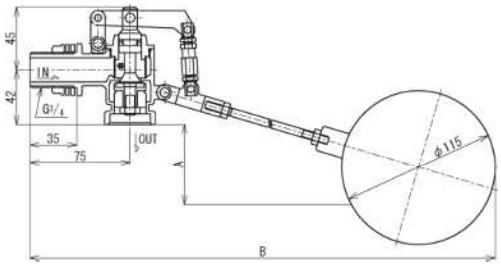
Standard accessory for level control valve. Pilot ball tap works with level control valve and maintains a fixed level of water in the tank.

※ If level control valve is replaced, the ball tap should also be replaced.

SPECIFICATIONS

Size of main body of level control valve	20~50(¾″~2″)	65~150(2½″~6″)	200(8″)
Model name	LB-2N		
Code name	LB2N-F2	LB2N-F5	LB2N-F6
Applicable fluid	Water		
Fluid temperature	1~60℃		
Applicable pressure	0~0.75MPa		
Materials	Body(Cast bronze), Float(Polyethylene)		
Valve body pressure test	Hydraulic 1.75MPa		

CONSTRUCTION



DIMENSIONS

(mm)

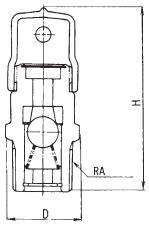
Code name	A	B	Mass(kg)
LB2N-F2	110	450±10	1
LB2N-F5	200	500±10	1.05
LB2N-F6	250	450±10	1.05

VD-2N Type Vacuum Breaker (Optional item) for outlet side of Level control valve

The operation of level control valve may become unstable if the outlet side piping is too long or the piping is a vertical piping. To maintain stable operation of the valve, install vacuum breaker on the pipe right after the outlet side of level control valve.

Note: Select VD-5N Type (see Page 128) for indoor piping of water supply or air conditioning system.

CONSTRUCTION



SPECIFICATIONS

Model name	VD-2N
Code name	VD2N-F
Applicable fluid	Water
Fluid temperature	5~60℃
Applicable pressure	Max. 0.75MPa
Opening operation	98.3kPa · A(-3.0kPa) or less
Closing operation	111.3kPa · A(10kPa) or more
Materials	Body(Brass or Cast bronze), Disc(Synthetic rubber), Ball(Polyethylene), Strainer(Stainless steel)

DIMENSIONS

(mm)

Size	A	D	H	Mass(kg)	Applicable size of level control valve
15(½″)	½″	25.4	65	0.1	20~32(¾″~1¼″)
20(¾″)	¾″	32.3	88	0.16	40~50(1½″~2″)
25(1″)	1″	40.4	100	0.29	65(2½″) or bigger

CAPACITY (Air)

(kg/h)

Size	−0.003MPa	−0.006MPa	−0.01MPa
15(½″)	0.94	1.30	1.65
20(¾″)	1.40	1.95	2.50
25(1″)	1.95	2.70	3.40

- Convert kg/h → m^3/h (Standard state) (for reference only)
  Density of air is 1.226kg/m^3 (15℃, 1atm)

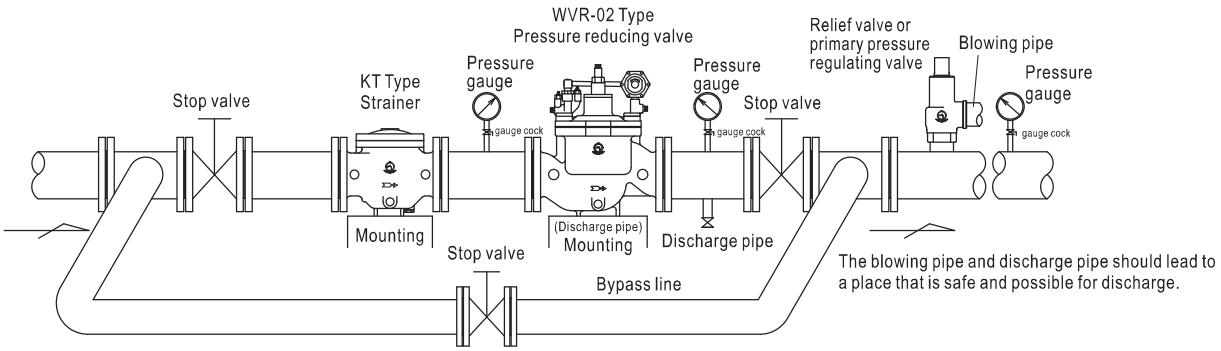
$$m^3/h\ (\text{Standard state}) = \frac{\text{Value in above table (kg/h)}}{1.226\ (kg/m^3)}$$

DATA/WV Type Regulating Valve (for Water or Hot water)

PIPING EXAMPLE (horizontal piping with the size of WVR-02 Type pressure reducing valve is 200mm or smaller)

Water supply system using roof tank in tall/medium height buildings

Install water hammer preventing device closely at the primary side of pressure reducing valve if the pressure is reduced by one and more steps.



POINTS FOR INSTALLATION AND USE

BYPASS LINE

It is necessary to install a bypass pipe with stop valve, as shown in the figure above, for test before filling water, air purging, cleaning the inside of pipes, or maintenance.

STRAIGHT PIPE

To ensure stable operation of the valve, install straight pipe before and after the valve. The length of the straight pipe depends on the state before and after piping. However, the length should be approximately 10~20 times the nominal diameter (Minimum 500mm).

PIPING SUPPORT

Install piping support to avoid undesired mechanical impact due to the weight of the piping, weight of fluid, or continuous vibration, stress, or bending force.

STRAINER

Install strainer at the primary side of the valve.

SAFETY DEVICE

Considering the rise of secondary pressure, in some cases, it is necessary to install relief valve or primary pressure regulating valve at the secondary side.

See the following table for the approximate set pressure for the relief valve or primary pressure regulating valve. The outlet of the relief valve or primary pressure regulating valve should lead to a drainage that can accept the discharge of the valve.

TABLE OF SET PRESSURE FOR SAFETY RELIEF VALVE AND PRIMARY PRESSURE REGULATING VALVE (MPa)

Set pressure of pressure reducing valve	Set pressure of safety valve ※2.
0.1or less	+0.05 (+0.08)
over 0.1 and less than 0.4	+0.08 (+0.14)
0.4 or more and less than 0.6	+0.12 (+0.2)
0.6 or more and less than 0.8	+0.15 (+0.28)
0.8 or more and 1.0 or less	+0.19

Add above value to set pressure of pressure reducing valve.

※1. The above value is added to the set pressure of pressure-reducing valve.
※2. The values in parentheses are applicable to soft-seated safety relief valve.

THERMO-INSULATION

Cover the valve with insulating material if there is possibility of condensation or freezing. However, no thermo-insulation is to be applied on the coil of pilot-operated solenoid valve.

Note 1: The figure shows an example of WVR-02 Type. The piping for other types of valves are the same. However, for WVM-02 Type, there should be a rising part at the outlet piping. (See the piping example in Page 111)

Note 2: In the case of vertical piping, the piping should be the same as shown in the piping illustration. In addition, the weight of the piping should not be applied on valves, and there should be some space for maintenance purpose.

PRESSURE GAUGE

Install pressure gauge at the primary and secondary sides of the valve, and at locations that can be easily accessed after piping.

LIMITATION ON INSTALLATION LOCATION

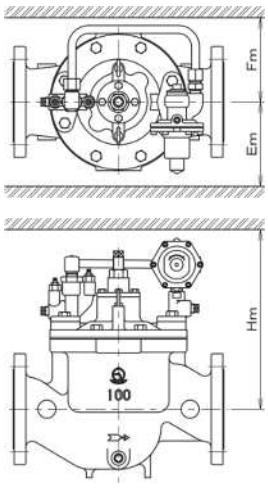
In the case solenoid valve, the valve should not be installed at locations where corrosive or explosive gas may accumulate.

DISCHARGE PIPE

To allow easy maintenance, install discharge pipe before the stop valve at the secondary side. In the case of installation inside buildings, discharge pipe is particularly necessary for locations where there are also wires or electric devices installed. The discharge pipe should be led to a drainage that can accommodate the content of stop valves before and after the drainage.

MAINTENANCE SPACE

Leave some space surrounding the valve for maintenance (see the figures below).



The figure shows an example for WVR-02 Type.
The maintenance space for other types of valves is the same.

TABLE FOR MAINTENANCE SPACE (mm)

Size	Hm	Em	Fm
40(1½″)	550	600	600
50(2″)	550	600	600
65(2½″)	600	600	600
80(3″)	600	600	600
100(4″)	800	680	680
125(5″)	1000	780	780
150(6″)	1200	910	910
200(8″)	1400	1060	1060
250(10″)	1500	1200	1200
300(12″)	1600	1300	1300
400(16″)	1800	1400	1400