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Water Piping Illustration

Pressure sustaining valve is utilized in the piping for users. It primarily matches up with the minimum working pressure inside the tap water pipe and maintains minimum standard working pressure at any point inside the pipeline during peacetime and emergency.

Pressure Sustaining Valve



Water meter

Ground Level

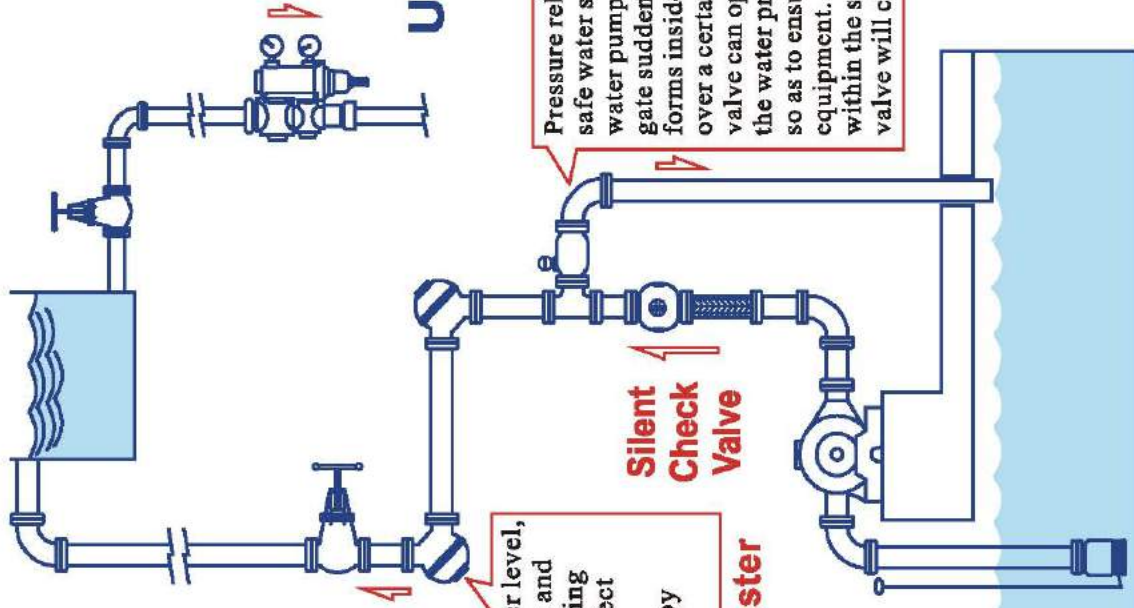
When the water approaches full water level, float valve will switch between open and close state due to fluctuation of floating ball, which means water hammer effect is generated (vibration and noise). This phenomenon can be prevented by using a water hammer arrester.

Water Hammer Arrester

Filter

Float Valve

When using float valve, in order to save pool space and for easy maintenance, the valve should be placed outside the pool, with the float ball switch placing at the lowest point in pipeline, consequently impurities deposited and cause to malfunction. It's recommended that a filter should be installed to prevent pipe blocking.



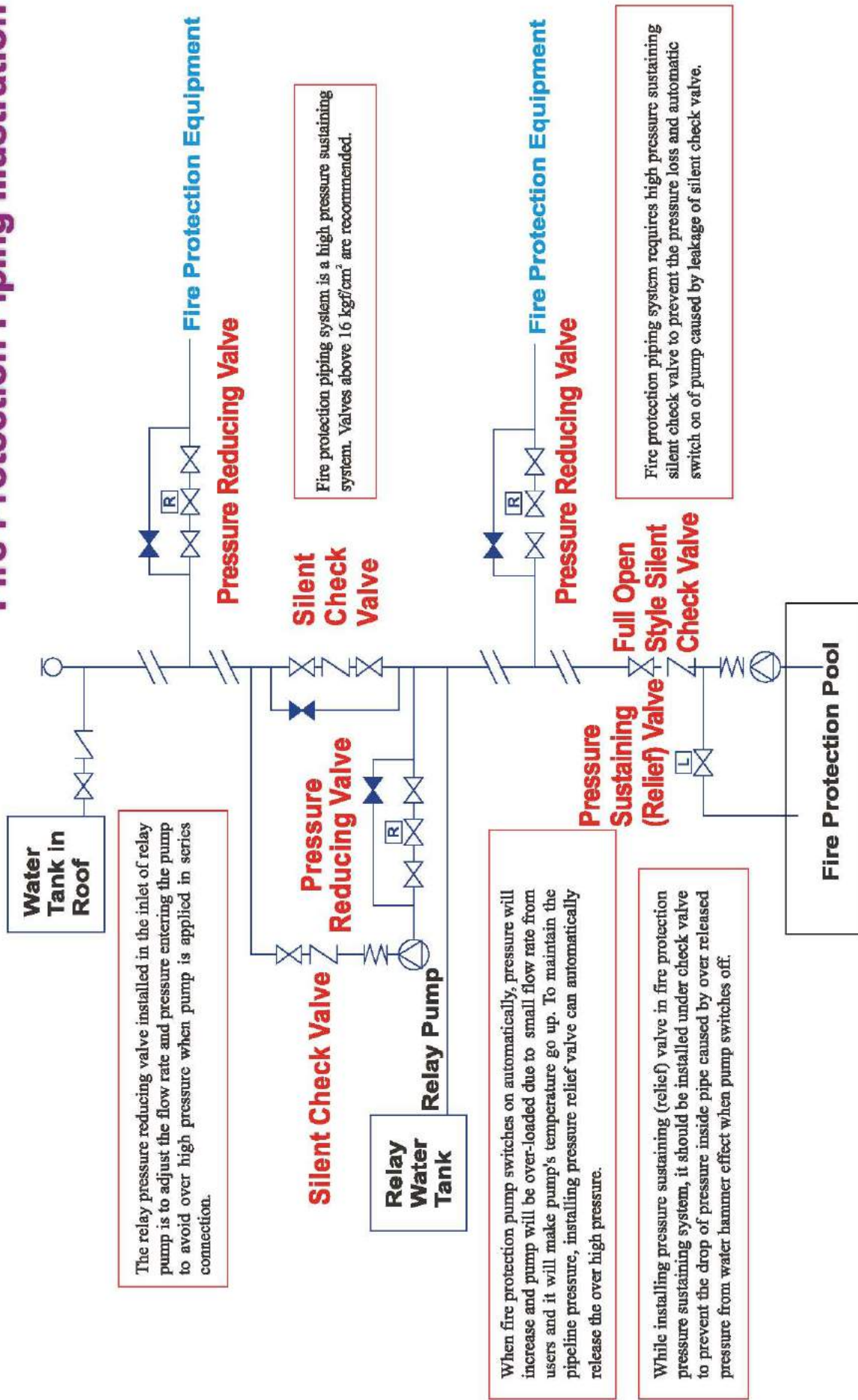
Pressure Reducing Valve Set

User

Pressure Relief Valve

Pressure relief valve is mainly for sustaining safe water supply pressure in the pipe. When water pump stops functioning or pipeline gate suddenly closes, abnormal pressure forms inside the pipe. As the pressure gets over a certain safety limit, pressure relief valve can open automatically and releases the water pressure above the safety limit, so as to ensure the safety of pipeline and equipment. When the pressure turns back within the safety limit, the pressure relief valve will close slowly.

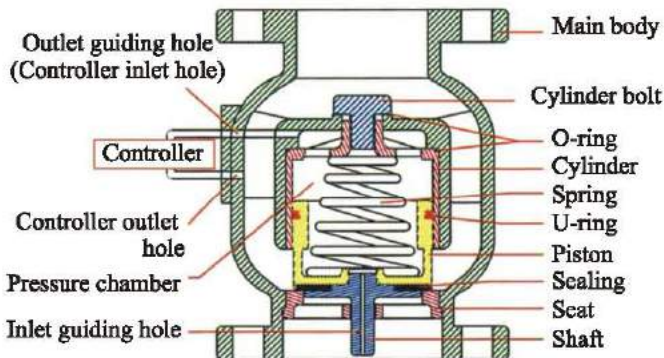
Fire Protection Piping Illustration





MULTI-FUNCTION AUTO-CONTROL VALVE

- ▶ Controller is fixed directly and designed of non-controller conduit. It reduces the damage of the controller conduit while transporting the equipment.
- ▶ Controller is designed to be quickly screw fastened, enabling fast and easy installation.
- ▶ The valve body can match with all types of controller without technical conversion, and all kinds of control valves can be formed.
- ▶ Cylinder design is adopted for the valve body structure, making the valve applicable to low and high pressure in both vertical and horizontal positions.
- ▶ Straight flow path is designed inside valve body. The large flow can reduce the malfunctions caused by impure water and effectively decrease turbulence and related bad effects.
- ▶ The valve body is shaped and formed as whole. Small volume, lightweight, and easy installation. Simple and elegant appearance.
- ▶ Professional manufacturers, best quality, and reasonable price.



▶ Patent Number : 135517

Part Name	Materials				
	Cast Iron	Ductile Iron	Bronze	SS 304	SS 316
Main body	Cast Iron	Ductile Iron	Bronze	SS 304	SS 316
Cylinder bolt	Cast Iron	Ductile Iron	Brass	SS 304	SS 304
O-ring	NBR	NBR	NBR	NBR	NBR / Viton
Cylinder	Bronze	Bronze	Bronze	SS 304	SS 316
Spring	SS 304	SS 304	SS 304	SS 304	SS 304
U-ring	NBR	NBR	NBR	NBR	NBR / Viton
Piston	Bronze	Bronze	Bronze	SS 304	SS 316
Sealing	NBR	NBR	NBR	NBR	NBR / Viton
Seat	Bronze	Bronze	Bronze	SS 304	SS 316
Shaft	Bronze	Bronze	Bronze	SS 304	SS 316
Controller	Brass	Brass	Brass	SS 304	SS 304

1. Applied conditions: Fluid & Air

2. Applied temperature: -15° ~ 80°C

3. Connection ends: Available for all international standards

4. Materials of valve body: Cast Iron, Ductile Iron, Bronze & Stainless Steel

The valve body of main valve becomes functional by an inlet-guiding hole. This hole transfers pressure to pressure chamber. When enough pressure accumulates in the pressure chamber, it generates pushing force that makes the piston close to valve seat and generates the closing motion. There is another outlet guiding hole inside the pressure chamber. When the hole is open, pressure in pressure chamber dissipates and valve gate is pushed open by incoming water pressure.

● Stock Items

Size	Flange End			
	Cast Iron	Ductile Iron	Bronze	Stainless Steel
2"	●	●	●	●
2.5"	●	●	●	●
3"	●	●	●	●
4"	●	●	●	●
5"	●	●	●	●
6"	●	●	●	●
8"	●	●	●	●
10"	●	●	●	●
12"	●	●	●	●
14"		●	●	●

(1 kgf/cm² = 14.2 psi)

Working Pressure		Test Pressure	
Cast Iron	: 16 kgf/cm ²	Cast Iron	: 24 kgf/cm ²
Ductile Iron	: 20 kgf/cm ²	Ductile Iron	: 30 kgf/cm ²
Bronze	: 16 kgf/cm ²	Bronze	: 24 kgf/cm ²
Stainless Steel	: 25 kgf/cm ²	Stainless Steel	: 38 kgf/cm ²

● Stock Items

Size	Thread End		
	Cast Iron	Bronze	Stainless Steel
1.5"		●	●
2"	●	●	

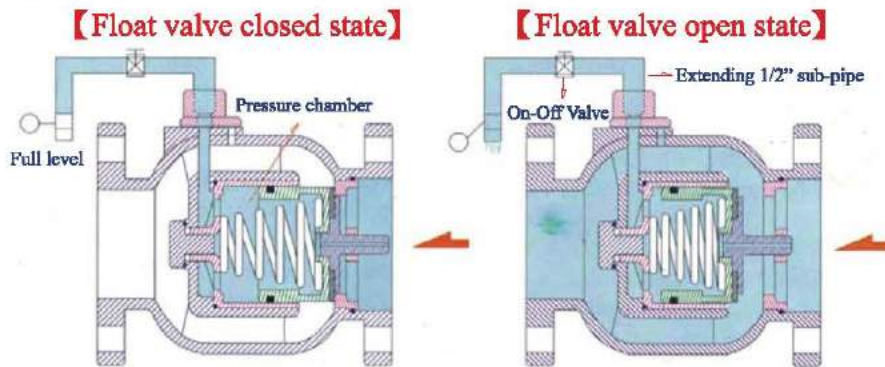
◎Production Size: 1.5"~ 56"



FLOAT VALVE



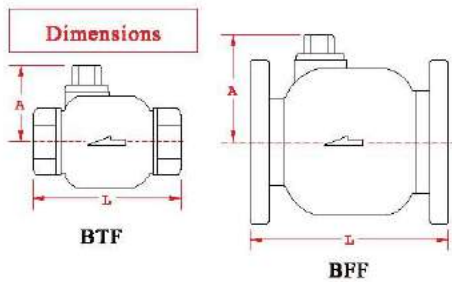
Float valve uses a sub-valve (float valve switch) to control the main valve. When the water level elevates to the full water level set by sub-valve (float valve switch), the sub-valve (float valve switch) closes and the back pressure chamber inside the main valve accumulates pressure rapidly, which reversely pushes the piston valve to close. By this mechanism, the float valve can thus control the water level. In order to save space inside the pool and for easy maintenance, it is recommended to install the float valve outside the pool.



⊙ At full water level, pressure accumulates in the pressure chamber and pushes the gate reversibly.

⊙ At low water level, pressure in pressure chamber dissipates, and water pressure inside the pipe pushes the gate open.

- ▶ The working pressure should be greater than 0.3 kgf/cm² and gate fully open with 1.5 kgf/cm², please check the pressure before installation.
- ▶ Please remove impurities or metal dusts inside the pipe thoroughly. If possible, please add filter to prevent pipe blocking.
- ▶ Vertical and horizontal installation is acceptable. Avoid upside-down installation under insufficient flow.
- ▶ Float ball size is 4", and the connection end is 1/2" PT Thread (Max. Pressure 10 kgf/cm²).



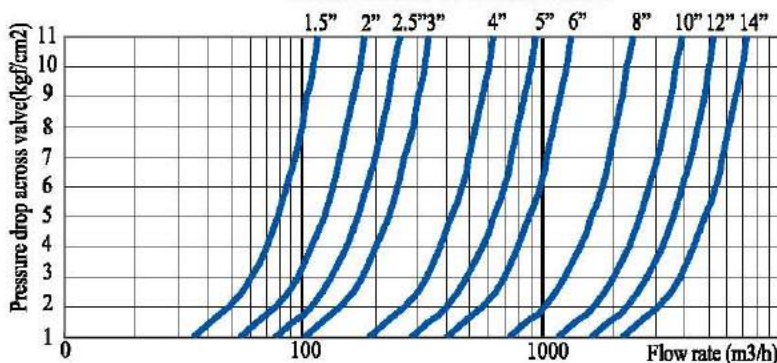
(Thread end)

Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BTF-40	1.5"	120	75	3	48
BTF-50	2"	200	95	8	75

(Flange end)

Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BFF-50	2"	190	95	12	75
BFF-65	2.5"	210	100	14	105
BFF-80	3"	225	115	19	140
BFF-100	4"	250	127	26	260
BFF-125	5"	280	150	37	390
BFF-150	6"	310	165	50	550
BFF-200	8"	420	205	94	1000
BFF-250	10"	470	240	150	1600
BFF-300	12"	530	275	200	2200
BFF-350	14"	600	320	280	3000

Flow Chart of Float Valve



⊙ Production Size: 1.5" ~ 56"

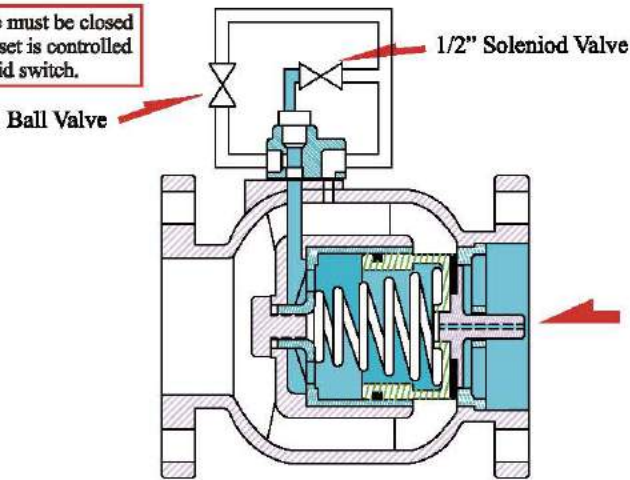


SOLENOID CONTROL VALVE



▶ Solenoid control valve is a kind of isolation valve, which can substitute traditional gate valves, ball valves and butterfly valves. The gate functioning is easily controlled by electrical power. The valve can be installed in fire control facility, water supply, or distant location where it's difficult to control the gate opening. The controller is directly fixed and can be easily installed on piping site. Interchangeable between manual and solenoid control.

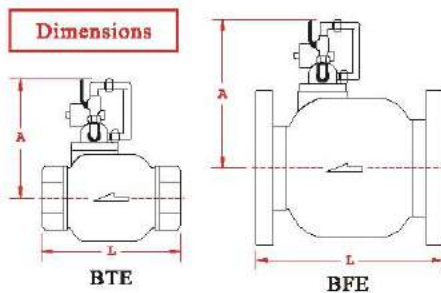
Ball valve must be closed when the set is controlled by solenoid switch.



※ Specification of Solenoid Control Switch

- ▶ Working Voltage : DC12V, DC24V, AC110V/220V, 50/60Hz
- ▶ Electrifying Time Range : 1 year continuously for 10,000 hours
- ▶ Allowable Voltage Range : $\pm 10\%$
- ▶ Applied Temperature : $-15 \sim 80^{\circ}\text{C}$
- ▶ Durability : 500,000 Cycles
- ▶ Applied Pressure Range : $0.3 \sim 10 \text{ kgf/cm}^2$
- ▶ Generally NC type (open when switch on), special order is needed for NO type (close when switch off) .

- ▶ The working pressure should be greater than 0.3 kgf/cm^2 and gate fully open with 1.5 kgf/cm^2 , please check the pressure before installation.
- ▶ Please remove impurities or metal dusts inside the pipe thoroughly. If possible, please add filter to prevent pipe blocking.
- ▶ Avoid upside-down installation under insufficient flow. (Valve's inlet should face up when it is installed)



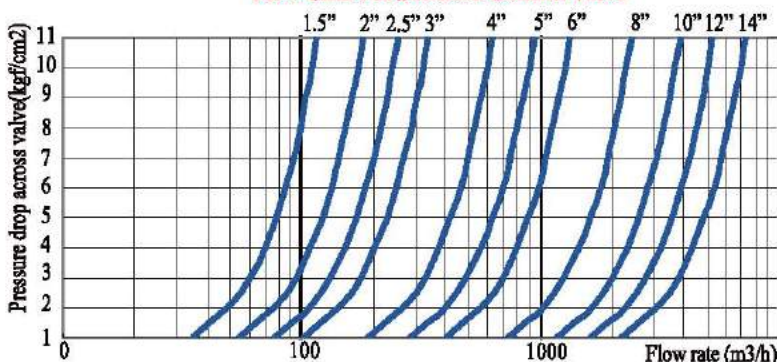
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Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BTE-40	1.5"	120	170	4	48
BTE-50	2"	200	190	10	75

(Flange end)

Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BFE-50	2"	190	190	13	75
BFE-65	2.5"	210	195	15	105
BFE-80	3"	225	210	20	140
BFE-100	4"	250	222	26	260
BFE-125	5"	280	245	38	390
BFE-150	6"	310	260	51	550
BFE-200	8"	420	300	95	1000
BFE-250	10"	470	335	152	1600
BFE-300	12"	530	370	202	2200
BFE-350	14"	600	415	285	3000

Flow Chart of Solenoid Control Valve



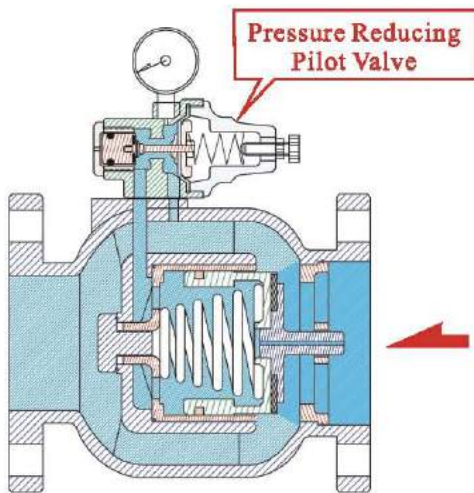
©Production Size: 1.5" ~ 56"



PRESSURE REDUCING VALVE



- ▶ Pressure reducing valve can prevent pipeline breakage due to high pressure.
- ▶ Pressure reducing valve is installed in water supply pipeline and maintains the setting outlet pressure in main valve, regardless of the different inlet pressure.
- ▶ Pressure reducing valve can be installed in water supply, air conditioning and fire control systems to maintain the setting outlet pressure.

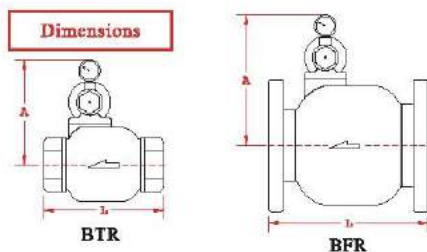


The pressure reducing valve uses a sub-valve (pressure reducing pilot valve) to control the main valve. When the outlet pressure reaches the setting range of pressure reducing pilot valve, the pilot valve will automatically sense the outlet pressure and adjust the pressure of the back pressure chamber in the main valve, so the valve gate can be opened and consequently maintains the outlet pressure.

- ▶ Pressure Adjusting Range : 1 ~ 7 kgf/cm²
(1 kgf/cm² = 14.2 psi) 4 ~ 12 kgf/cm²

◎Special order can be arranged for higher pressure adjustment range.

- ▶ The pressure meter on the pilot valve shows the outlet pressure. When the outlet opens, the value of the pressure meter is lower.
- ▶ When the outlet is used for large flow and the gate generates quick-close motion, the pilot valve will slowly respond to the main valve to close the gate. Under this situation, the outlet pressure gets a little higher, and a tiny pressure reducing valve can be added.



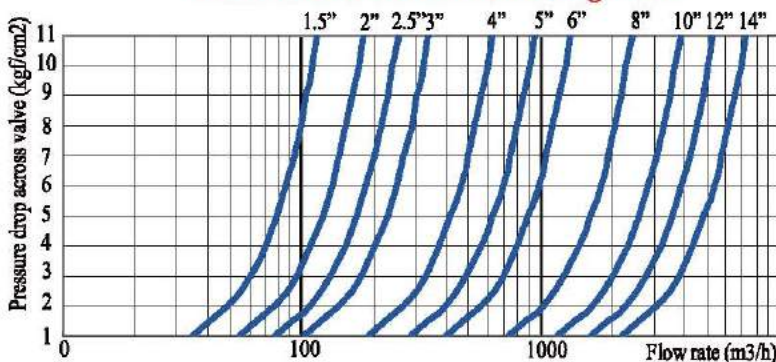
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Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BTR-40	1.5"	120	170	3	48
BTR-50	2"	200	190	9	75

(Flange end)

Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BFR-50	2"	190	180	12	75
BFR-65	2.5"	210	185	14	105
BFR-80	3"	225	200	19	140
BFR-100	4"	250	222	26	260
BFR-125	5"	280	235	37	390
BFR-150	6"	310	260	50	550
BFR-200	8"	420	300	94	1000
BFR-250	10"	470	335	152	1600
BFR-300	12"	530	370	202	2200
BFR-350	14"	600	415	285	3000

Flow Chart of Pressure Reducing Valve



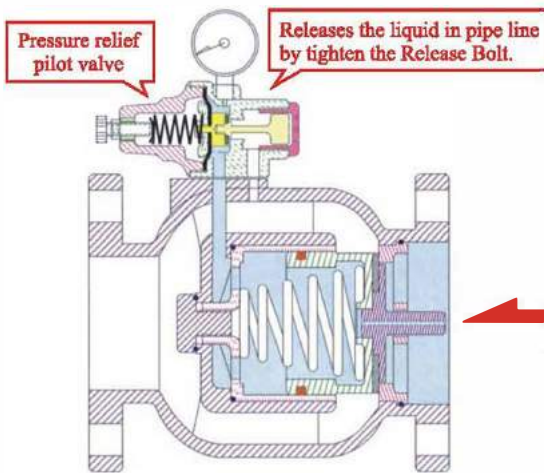
◎Production Size: 1.5" ~ 56"



PRESSURE RELIEF VALVE



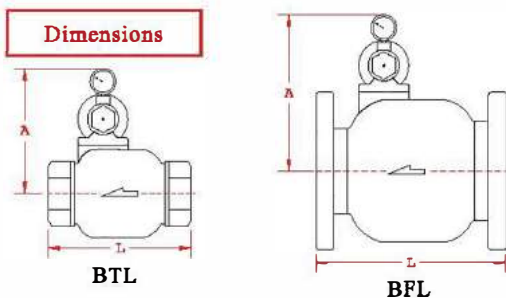
- ▶ Pressure relief valve is installed on the outlet pipe of water supply pipeline. It can maintain safe water supply pressure inside the pipe and prevent pipeline and equipment damage caused by accidental escalation of water pressure.
- ▶ When water pump stops functioning or pipeline gate suddenly closes, abnormal pressure forms inside the pipe. As the pressure gets over a certain safety limit, pressure relief valve can open automatically and releases the water pressure above the safety limit, so as to ensure the safety of pipeline and equipment. When the pressure turns back within the safety limit, the pressure relief will close slowly.



- ▶ Pressure Adjusting Range : 0.3~4 kgf/cm²
(1 kgf/cm² = 14.2 psi) 2 ~8 kgf/cm²
5 ~13 kgf/cm²

- ▶ The working pressure should be greater than 0.3 kgf/cm² and gate fully open with 1.5 kgf/cm², please check the pressure before installation.

◎Special order can be arranged for higher pressure adjustment range.



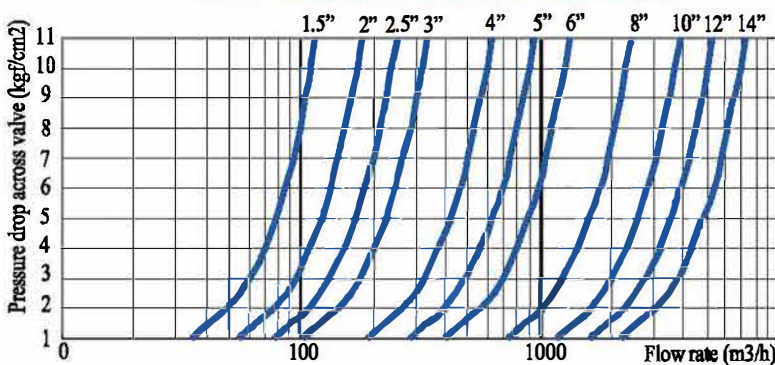
(Thread end)

Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BTL-40	1.5"	120	160	3	48
BTL-50	2"	200	180	9	75

(Flange end)

Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BFL-50	2"	190	180	12	75
BFL-65	2.5"	210	185	14	105
BFL-80	3"	225	200	19	140
BFL-100	4"	250	222	26	260
BFL-125	5"	280	235	37	390
BFL-150	6"	310	260	50	550
BFL-200	8"	420	300	94	1000
BFL-250	10"	470	335	152	1600
BFL-300	12"	530	370	202	2200
BFL-350	14"	600	415	285	3000

Flow Chart of Pressure Relief Valve



◎Production Size: 1.5\" ~ 56\"

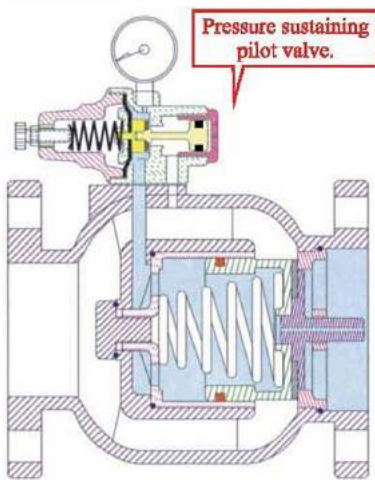


PRESSURE SUSTAINING VALVE

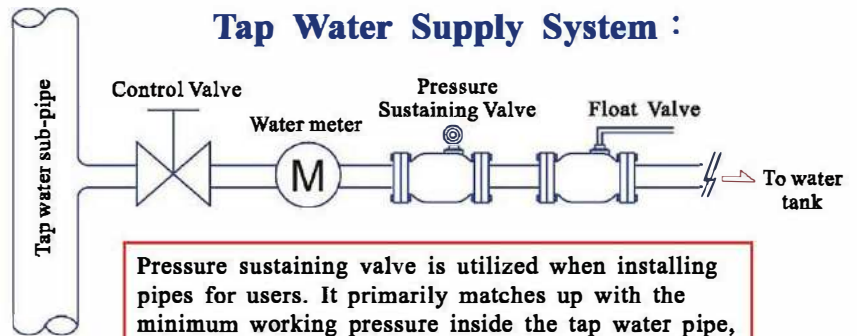


- ▶ Pressure sustaining valve is utilized when installing pipes for users. It primarily matches up with the minimum working pressure inside the tap water pipe, balancing up-stream and down-stream pressure during normalcy and emergency, and maintains constant pressure inside the pipe.
- ▶ Pressure sustaining valve can sustain the maximum working pressure inside the pipe when installed in water supply areas.
- ▶ Pressure adjusting range : $0.3 \sim 4 \text{ kgf/cm}^2$
($1 \text{ kgf/cm}^2 = 14.2 \text{ psi}$) $3 \sim 10 \text{ kgf/cm}^2$

- ▶ The working pressure should be greater than 0.3 kgf/cm^2 and gate fully open with 1.5 kgf/cm^2 , please check the pressure before installation.

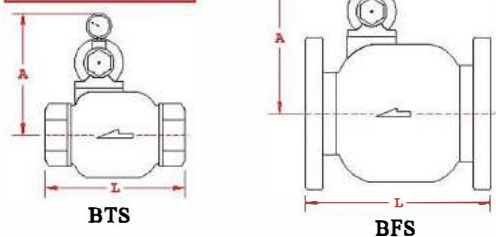


Tap Water Supply System :



Pressure sustaining valve is utilized when installing pipes for users. It primarily matches up with the minimum working pressure inside the tap water pipe, balancing up-stream and down-stream pressure during normalcy and emergency, and maintains constant pressure inside the pipe.

Dimensions



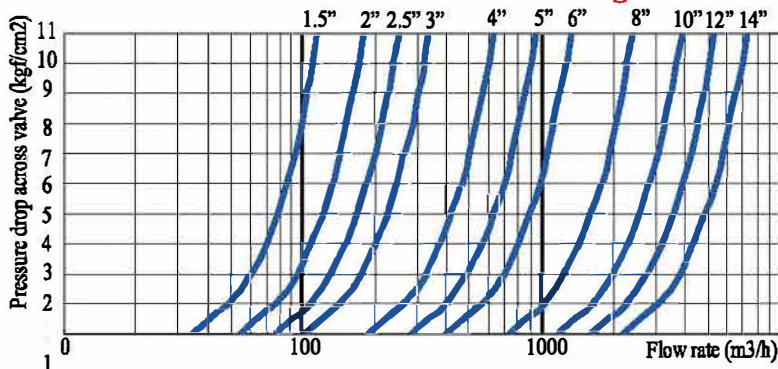
(Thread end)

Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BTS-40	1.5"	120	160	3	48
BTS-50	2"	200	180	9	75

(Flange end)

Item No	Size	L(mm)	A(mm)	Weight(kg)	CV
BFS-50	2"	190	180	12	75
BFS-65	2.5"	210	185	14	105
BFS-80	3"	225	200	19	140
BFS-100	4"	250	222	26	260
BFS-125	5"	280	235	37	390
BFS-150	6"	310	260	50	550
BFS-200	8"	420	300	94	1000
BFS-250	10"	470	335	152	1600
BFS-300	12"	530	370	202	2200
BFS-350	14"	600	415	285	3000

Flow Chart of Pressure Sustaining Valve



©Production Size: 1.5" ~ 56"

Corrosion Rate of Titanium, Stainless Steel & Bronze

Media	Percentage (%)	Temp (°C)	Titanium	S.S.304	S.S.316	Bronze
Hydrochloric acid (HCl)	1	RT	◎	○	◎	×
	10	RT	○	×	×	×
Sulfuric acid (H ₂ SO ₄)	1	RT	◎	◎	◎	○
	10	RT	○	○	○	○
Nitric acid (NO ₃)	10	RT	◎	◎	◎	×
	65	BT	◎	○	○	×
Acetic Acid (CH ₃ COOH)	60	BT	◎	○	○	×
Sodium hydroxide (NaOH)	40	RT	◎	◎	◎	◎
		BT	×	○	○	○
(C ₁₂)	100	RT	◎	×	×	×
	wet					
Hydrogen sulfide (H ₂ S)	100	RT	◎	○	◎	×
	wet					
Sulfur dioxide (SO ₂)	wet	30-90	◎	○	○	×
Sea water	Normal	BT	◎	×	○	×

RT: Room Temperature BT: Boil Temperature

◎: Very Good

○: Good (0.125-0.5mm/year)

×: No Good (1.25mm/year)



DIRECT-ACTIVATED PRESSURE REDUCING VALVE (Titanium - Offshore)

- ▶ Valve Body is made by Titanium, suitable for chemical, oil & gas, sea water, drink water, food, air, steam ...etc.
- ▶ The gate is balanced-pressure designed, which will not influence the outlet pressure caused by unstable inlet pressure.
- ▶ When the outlet pressure responds directly to the pressure control chamber and adjusts the setting pressure , it responds quickly and adjusts the pressure accurately.
- ▶ Design of piston and diaphragm improves the inability of sustaining pressure and leakage.



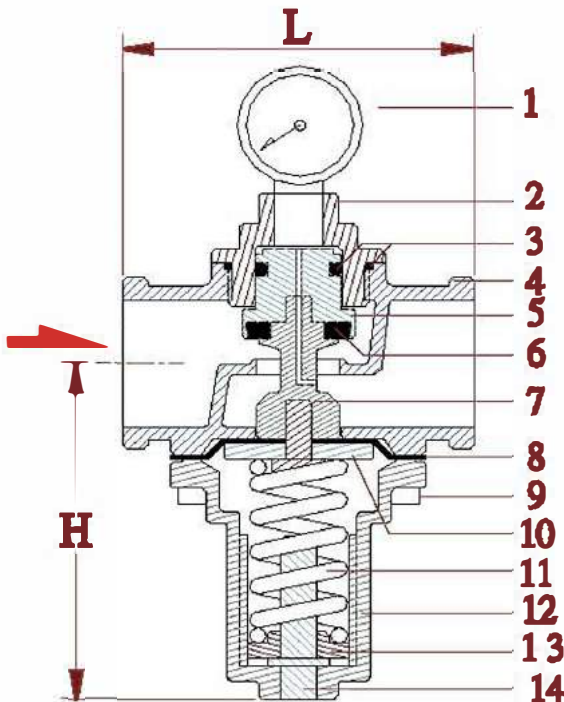
▶ **Body Testing Pressure : 24 kgf/cm²**

▶ **Max Applied Pressure : 16 kgf/cm²**

▶ **Adjusting Range : 1 ~ 5 kgf/cm²
4 ~ 9 kgf/cm²**

▶ **Applied Temperature : -15 ~ 180 c°**

No	Part Name	Material
1	Pressure Gauge	Stainless Steel
2	Upper Cover	Titanium
3	U-Ring	Viton(Teflon Coating)
4	Main Body	Titanium
5	Piston	Titanium
6	Sealing Spacer	Viton / Teflon
7	Shaft	Titanium
8	Diaphragm	CR Rubber(Teflon Coating)
9	Fixed Bolt	Titanium
10	Washer	Stainless Steel 304
11	Spring	Spring Steel
12	Spring Cover	Titanium/SS316
13	Washer	Stainless Steel 304
14	Adjusting Stem	Stainless Steel 304



(Thread End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RDT-15	1/2"	70	60	0.32	2
RDT-20	3/4"	70	70	0.40	6
RDT-25	1"	80	80	0.64	8
RDT-32	1.25"	85	90	1.20	16
RDT-40	1.5"	110	110	2.00	18
RDT-50	2"	115	115	2.40	21



DIRECT-ACTIVATED PRESSURE REDUCING VALVE (Stainless Steel 316)

- ▶ Valve Body is made by Stainless Steel #316, suitable for fluid, air and steam.
- ▶ The gate is balanced-pressure designed, which will not influence the outlet pressure caused by unstable inlet pressure. Pressure needed from fully-closed gate to fully-opened gate : 1.5 kgf/cm².
- ▶ When the outlet pressure responds directly to the pressure control chamber and adjusts the setting pressure, it responds quickly and adjusts the pressure accurately.
- ▶ Design of piston and diaphragm improves the inability of sustaining pressure and leakage.

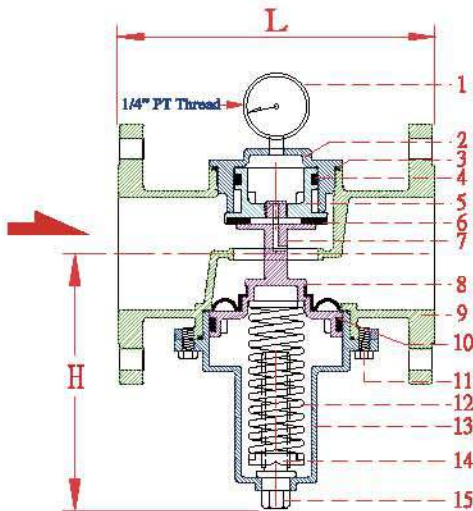


- ▶ Pressure Adjusting Range : 1~6 kgf/cm²
(1 kgf/cm² = 14.2 psi) 4~10 kgf/cm²
8~13 kgf/cm²

- ▶ Applied Temperature : -15~100°C
100~180°C (For steam)

- ▶ Valve Body Testing Pressure : 35 kgf/cm²
- ▶ Maximum Applied Pressure : 25 kgf/cm²
- ▶ Please cover steam pipelines with thermal materials

©Special order can be arranged for higher pressure adjustment range.



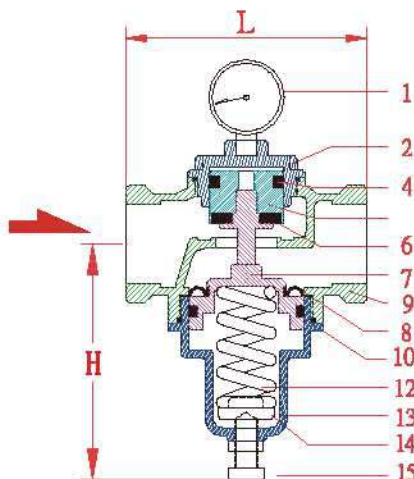
No	Part Name	Material
1	Pressure Gauge	Stainless Steel
2	Upper Cover	Stainless Steel 316
3	O-ring	NBR / Viton / Teflon
4	U-ring	NBR / Viton
5	Piston	Stainless Steel 316
6	Sealing Spacer	NBR / Viton / Teflon
7	Shaft	Stainless Steel 316
8	Diaphragm	NBR / Viton
9	Main Body	Stainless Steel 316
10	UH-ring	NBR / Viton
11	Fixed Bolt	Stainless Steel 304
12	Spring	Spring Steel
13	Lower Cover	Stainless Steel 316
14	Washer	Brass
15	Adjusting Stem	Stainless Steel 304

(Thread End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RET15-S	1/2"	80	70	0.8	2.4
RET20-S	3/4"	105	85	1.0	9.0
RET25-S	1"	105	92	1.1	11.0
RET40-S	1.5"	130	115	2.2	21.0
RET50-S	2"	130	120	3.1	25.0

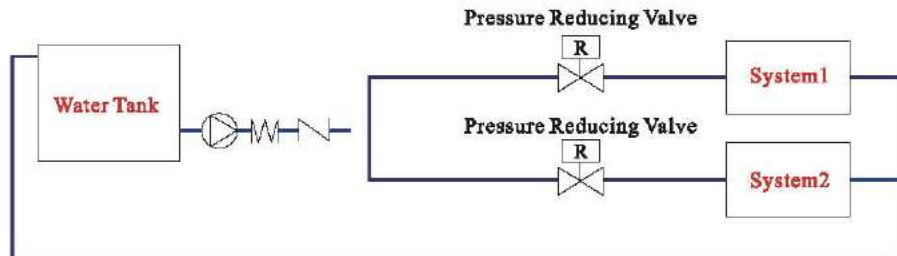
(Flange End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RBF15-S	1/2"	85	150	2.0	2.4
RBF20-S	3/4"	105	150	2.8	9
RBF25-S	1"	105	150	3.5	11
RBF40-S	1.5"	130	190	5.9	21
RBF50-S	2"	130	190	6.5	25
RBF65-S	2.5"	185	210	11.5	75
REF80-S	3"	185	225	12.0	80
REF100-S	4"	230	250	19.0	120
REF150-S	6"	290	310	45.0	250



Applied condition of Direct-activated Pressure Reducing Valve :

- ▶ Installing pressure reducing valve directly in sub-pipe can reduce fluid pressure inside the pipe.
- ▶ Installing a filter in the inlet of pressure reducing valve can prevent block of valve gate caused by impurities and limescale.
- ▶ Installing pressure relief valve downstream pressure reducing valve can protect the system.
- ▶ While using screws to connect pressure reducing valve, joints should be installed in the inlet and outlet to make maintenance easy.



Pressure Setting and Flow Rate of Direct-activated Pressure Reducing Valve :

- ▶ Direct-activated pressure reducing valve directly opens and closes the valve gate by the outlet pressure. When outlet pressure is under setting pressure, valve gate automatically opens. To make valve gate fully open, adjustable pressure range and setting pressure are relative points.
- ▶ A : Pressure drop needed for fully-opened valve gate = $\frac{B}{4}$, B =Adjustable Pressure Range Maximum-Minimum
- B : Adjustable Pressure Range (= Maximum Minimum Adjustable Pressure Rang)
- C : Setting Pressure of Outlet
- P : Pressure of fully-opened outlet valve gate, $P=C-A$

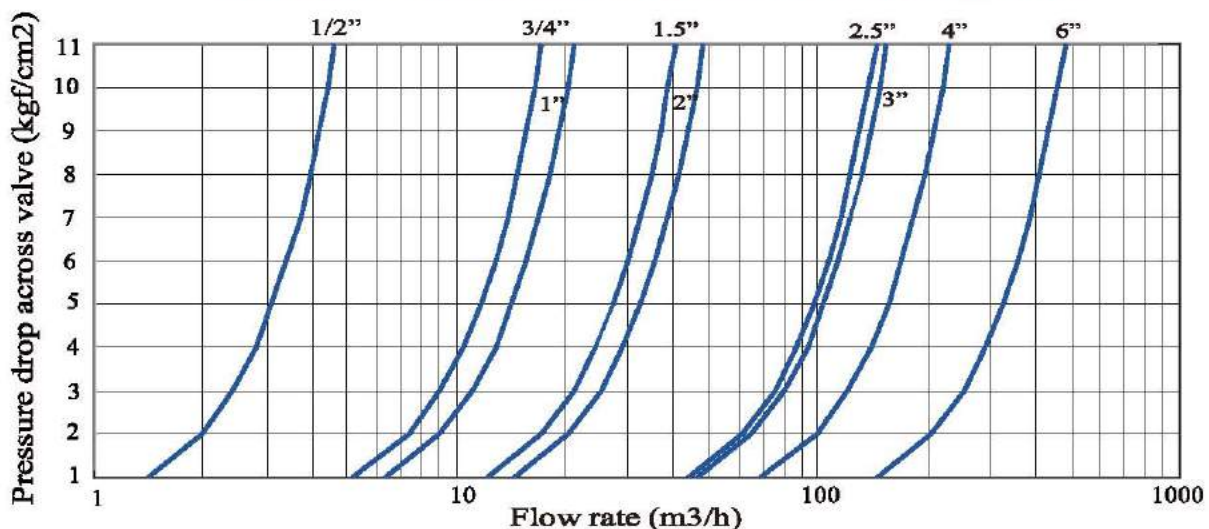
Example :

Pressure drop needed for fully-opened valve gate for adjusting pressure range 3~9 kgf/cm² of direct-activated pressure reducing valve. $A = \frac{B}{4} = \frac{9-3}{4} = 1.5 \text{ kgf/cm}^2$

If the setting pressure of outlet is 6 kgf/cm², pressure of fully-opened valve gate will be

$P = 6 - 1.5 = 4.5 \text{ kgf/cm}^2$ (Outlet pressure should go down under 4.5 kgf/cm² to make valve gate fully open)

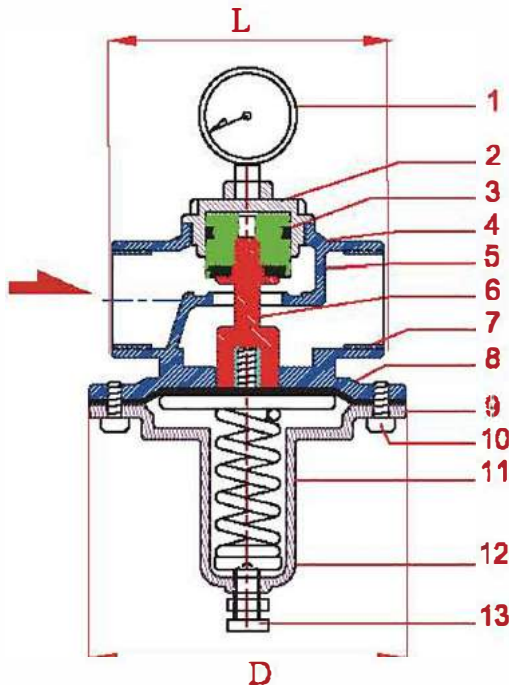
Flow Chart of Direct-activated Pressure Reducing Valve





LOW PRESSURE TYPE DIRECT-ACTIVATED PRESSURE REDUCING VALVE (Stainless Steel 316)

- ▶ Valve Body is made by Stainless Steel #316, suitable for fluid, air and oil.
- ▶ Larger diaphragm is more sensitive to pressure.



Thread / Flange Type

© Thread type does not have Part No. 10.

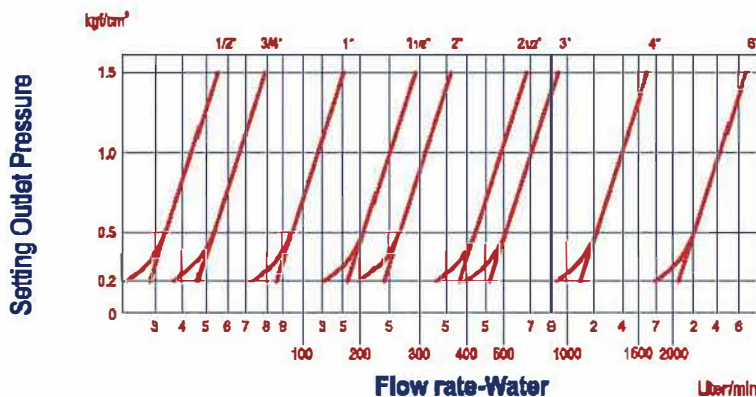
- ▶ Pressure Adjusting Range : 0.2 ~ 1.5 kgf/cm²
- ▶ Applied Temperature : -15 ~ 80°C
- ▶ Valve Body Testing Pressure : 16 kgf/cm²
- ▶ Maximum Applied Pressure : 10 kgf/cm²
- ▶ Horizontal installation (Adjusting stem points down) is obligatory

No	Part Name	Material
1	Pressure Gauge	Stainless Steel
2	Upper Cover	Stainless Steel 316
3	U-ring	NBR / Viton
4	Piston	Stainless Steel 316
5	Sealing Spacer	NBR / Viton
6	Shaft	Stainless Steel 316
7	Main Body	Stainless Steel 316
8	Diaphragm	Nylon-CR/Nylon-Viton
9	Lower Cover	Stainless Steel 316
10	Fixed Bolt	Stainless Steel 304
11	Spring	Spring Steel
12	Washer	Brass
13	Adjusting Stem	Stainless Steel 304

(Thread End)

Item No	Size	H(mm)	L(mm)	D(mm)	Weight(kg)	CV
RELT15-S	1/2"	110	70	105	1.3	2.4
RELT20-S	3/4"	125	85	105	1.5	9.0
RELT25-S	1"	125	90	105	1.6	11.0
RELT40-S	1.5"	155	115	145	3.0	21.0
RELT50-S	2"	155	120	145	4.0	25.0

Flow Chart of Direct-activated Pressure Reducing Valve



(Flange End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RELF15-S	1/2"	110	150	2.5	2.4
RELF20-S	3/4"	125	150	3.5	9.0
RELF25-S	1"	125	150	5.6	11.0
RELF40-S	1.5"	155	190	8.7	21.0
RELF50-S	2"	155	190	13.5	25.0

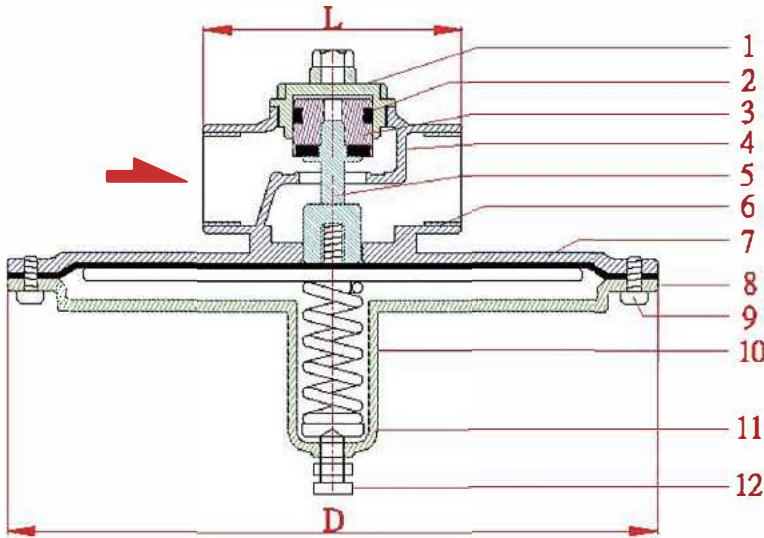


MICRO PRESSURE TYPE DIRECT-ACTIVATED PRESSURE REDUCING VALVE (STAINLESS STEEL 316)

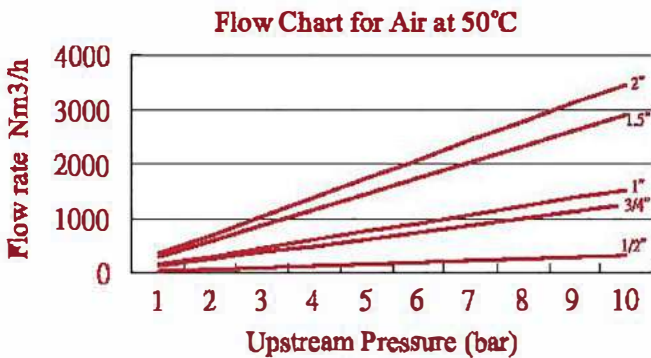
- ▶ Valve Body is made by Stainless Steel #316, suitable for fluid, air and oil.
- ▶ Larger diaphragm is more sensitive to pressure.



- ▶ Pressure Adjusting Range : 0.03 ~ 0.15 kgf/cm²
- ▶ Applied Temperature : -15 ~ 80°C
- ▶ Valve Body Testing Pressure : 16 kgf/cm²
- ▶ Maximum Applied Pressure : 10 kgf/cm²
- ▶ Horizontal installation (Adjusting stem points down) is obligatory



No	Part Name	Material
1	Cover	Stainless Steel 316
2	UH-Ring	NBR
3	Piston	Stainless Steel 316
4	Sealing	NBR
5	Shaft	Stainless Steel 316
6	Main Body	Stainless Steel 316
7	Diaphragm	Nylon-CR/Nylon-Viton
8	Spring Cover	Stainless Steel 316
9	Stem	Stainless Steel 304
10	Spring	Spring Steel
11	Washer	Brass
12	Stem	Stainless Steel 304



(Thread End)

ITEM NO.	SIZE	L	D	Weight(kg)	CV
RELT-15-SLP	1/2"	70	310	12	2.4
RELT-20-SLP	3/4"	85	310	12	9.0
RELT-25-SLP	1"	90	310	12	11.0
RELT-40-SLP	1.5"	115	310	14	21.0
RELT-50-SLP	2"	120	310	16	25.0



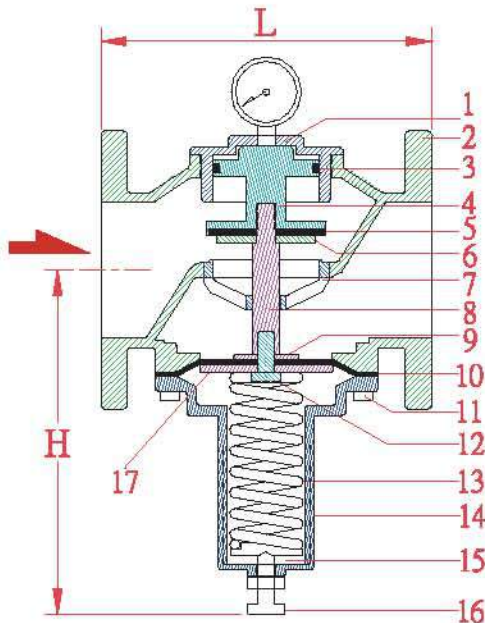
DIRECT-ACTIVATED PRESSURE REDUCING VALVE (Ductile Iron / Flange Type)



- ▶ The gate is designed for opening status, which will not influence the water supply function under unstable inlet pressure condition.
- ▶ When the outlet pressure responds directly to the pressure control chamber and adjusts the setting pressure, it responds quickly and adjusts the pressure accurately.

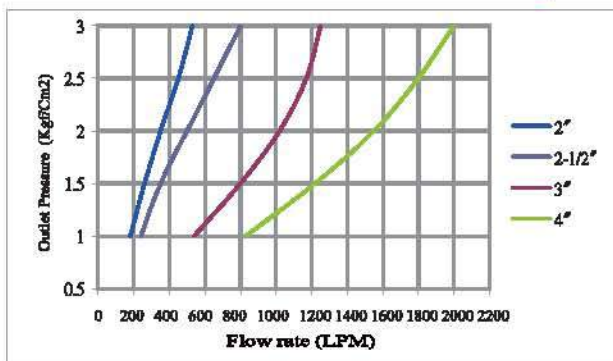
- ▶ **Pressure Adjusting Range : 1~5 kgf/cm²**
(1 kgf/cm²=14.2 psi) 3 ~ 8 kgf/cm²
- ▶ **Valve Body Testing Pressure : 21 kgf/cm²**
- ▶ **Maximum Applied Pressure : 16 kgf/cm²**
- ▶ **Applied Temperature : -15~80°C**
- ▶ **Applied Condition : Fluid & Air**

◎Special order is needed for other material and specification.



No	Part Name	Material	No	Part Name	Material
1	Upper Cover	Bronze	11	Fixed Bolt	SS 304
2	Main Body	Ductile Iron	12	Fixed Bolt	SS 304
3	U-ring	NBR	13	Spring	Spring Steel
4	Piston	Bronze	14	Lower Cover	Ductile Iron
5	Sealing Spacer	NBR	15	Washer	Brass
6	Sealing Washer	Brass	16	Adjusting Stem	SS 304
7	Shaft Guiding Seat	Bronze	17	Disk	SS 304/Cast Iron
8	Center Shaft	Brass			
9	Diaphragm Washer	SS 304			
10	Diaphragm	EPDM			

Flow Chart of Direct-activated Pressure Reducing Valve



(Flange End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RDF-50-F	2"	150	190	12	17.2
RDF-65-F	2.5"	165	210	17	27.5
RDF-80-F	3"	200	225	19	42.1
RDF-100-F	4"	220	250	24	66.7

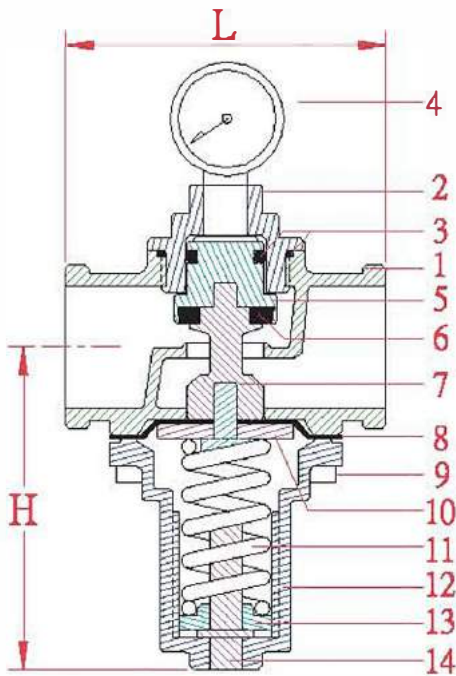


DIRECT-ACTIVATED PRESSURE REDUCING VALVE

- ▶ The gate is designed for opening status, which will not influence the water supply function under unstable inlet pressure condition.
- ▶ When the outlet pressure responds directly to the pressure control chamber and adjusts the setting pressure, it responds quickly and adjusts the pressure accurately.



- ▶ Pressure Adjusting Range : 1~3 kgf/cm²
2~5 kgf/cm²
4~9 kgf/cm²
(special order is needed for other range)
- ▶ Valve Body Testing Pressure : 21 kgf/cm²
- ▶ Maximum Applied Pressure : 12 kgf/cm²
- ▶ Pressure needed from fully-closed gate to fully-opened gate : 1 kgf/cm² (1 kgf/cm²=14.2 psi)
- ▶ Applied Temperature : -15~80°C
- ▶ Applied Condition : Fluid & Air



No	Part Name	Material	
1	Body	Bronze	SS304
2	Upper Cover	Bronze	SS304
3	O-ring	NBR	NBR
4	Gauge	Iron	SS304
5	Piston	Brass	SS304
6	Sealing	NBR	NBR
7	Shaft	Brass	SS304
8	Diaphragm	NBR	
9	Fixed Bolt	SS304	
10	Diaphragm Washer	SS304	
11	Spring	Spring Steel	
12	Spring Cover	Polyamide 66	
13	Spring Washer	Electroplated Iron	
14	Adjusting Bolt	Brass	

(Thread End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RDT-15	1/2"	70	60	0.4	2.2
RDT-20	3/4"	70	70	0.5	3.8
RDT-25	1"	80	80	0.8	6.4
RDT-32	1.25"	85	90	1.5	10.3
RDT-40	1.5"	110	110	2.5	12.6
RDT-50	2"	115	115	3	17.2

$$CV = \frac{Q}{\sqrt{\Delta P/S}}$$

Q=GPM (gallon/min)

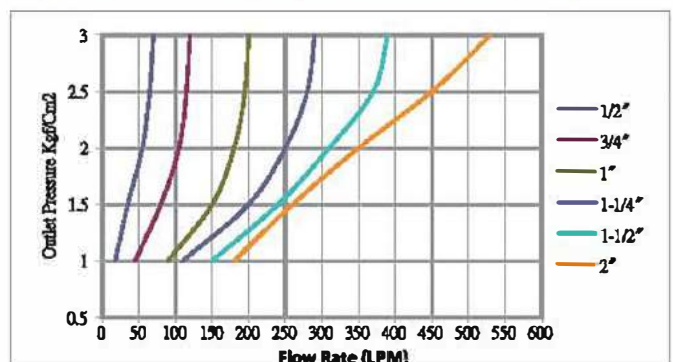
$\Delta P = P1 - P2$ (p.s.i)

P1=Inlet absolute pressure

P2=Outlet absolute pressure

S=Fluid Density (Water=1)

1 gallon=3.785 liter





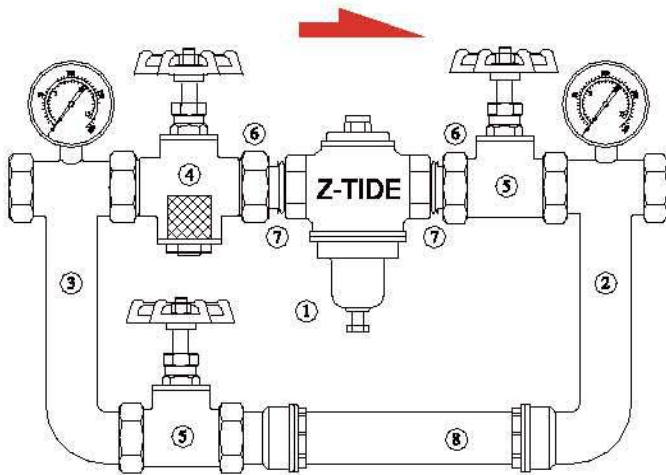
PRESSURE REDUCING VALVE SET (Advanced Traditional Design)



- ▶ Whole Stainless Steel Model.
- ▶ Simple structure, precise tuning and easy operation.
- ▶ Designing for drinking water, Clearing System & Industrial Application.
- ▶ Equipped with strainer, saving space, easy to install & saving cost. Pressure needed from fully-closed gate to fully-opened gate : 1.5 kgf/cm² (1 kgf/cm² = 14.2 psi)

Maximum Applied Pressure : 16 kgf/cm²

Testing Pressure : 21 kgf/cm²



No	Part Name	Material
1	Direct-Activated Pressure Reducing Valve	Stainless Steel
2	Compression Tee	Stainless Steel 304
3	Compression Tee	Stainless Steel 304
4	Globe Valve (with Strainer)	Stainless Steel 304
5	Globe Valve	Stainless Steel 304
6	Union	Stainless Steel 304
7	Coupling	Stainless Steel 304
8	Joint	Stainless Steel 304

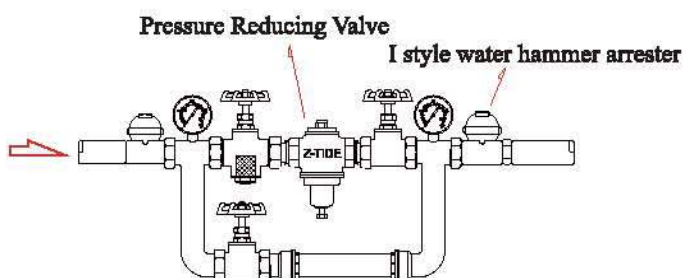
▶ Pressure Adjusting Range : 1~7 kgf/cm²
4~10 kgf/cm²

▶ Applied Temperature : -15~100°C

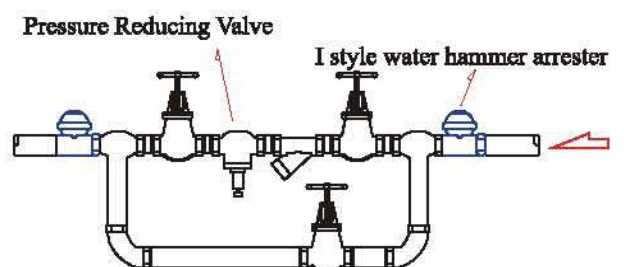
▶ The inlet pressure gauge indicates pressure before reducing, and outlet pressure gauge indicates pressure after reducing.

(Thread End)

No.	Size	Weight(kg)
RT-20-S	3/4"	2.0
RT-25-S	1"	3.0
RT-40-S	1.5"	7.0
RT-50-S	2"	9.0



New Traditional design



Traditional design



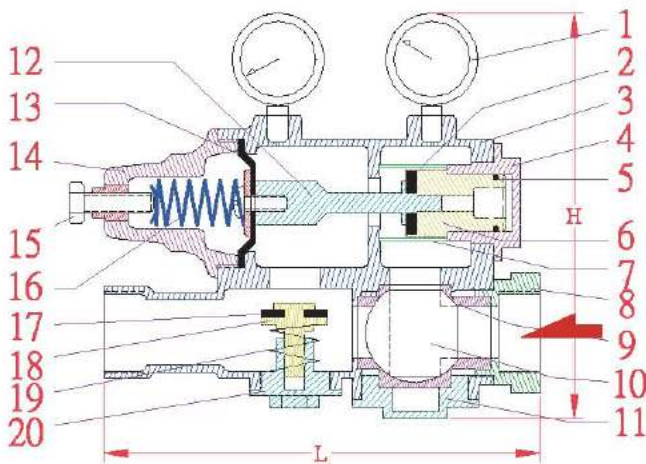
PRESSURE REDUCING VALVE SET



- ▶ Module assembly, which means light structure, space-saving, easy installation and maintenance.
- ▶ Equipped with buffer check valve, unfavorable effect from water impulse can be eliminated.
- ▶ Simple structure, precise tuning and easy operation.
- ▶ Module assembly can decrease leakage coming from assembly connections due to long-term vibration.

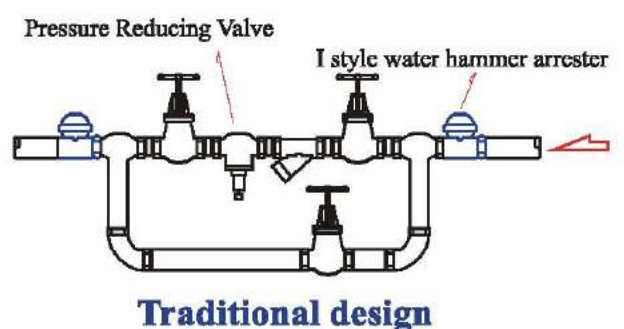
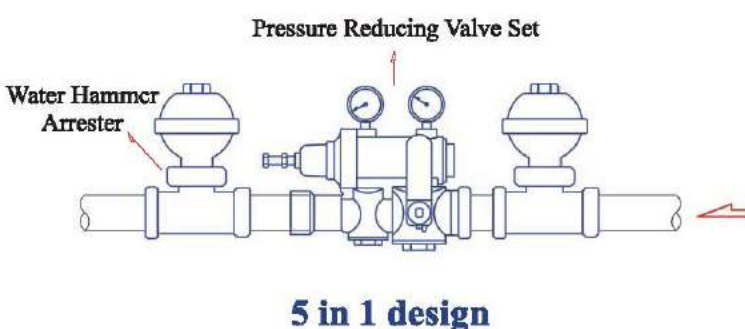
(Thread End)

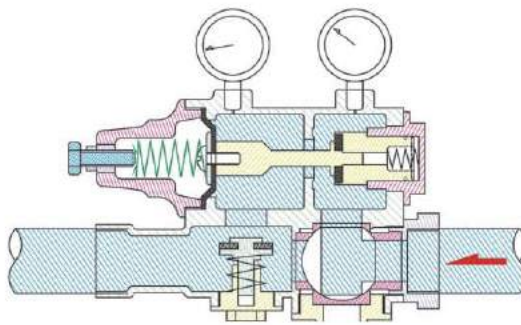
Item No	Type(PT)	L(mm)	H(mm)	Weight(kg)	CV
RS-20	3/4"	140	120	1.5	4
RS-25	1"	170	165	2.2	7.5



- ▶ Adjustment range : $0.5 \sim 5 \text{ kgf/cm}^2$
- ▶ Applied temperature : $-15 \sim 70^\circ\text{C}$
- ▶ Test pressure for valve body : 21 kgf/cm^2
- ▶ The inlet pressure gauge indicates pressure before reducing, and outlet pressure gauge indicates pressure after reducing.
- ▶ When cleaning the impurities on the filter net, just take off the cylinder (component 4), then filter net (component 7) can be unloaded at the same time.

No	Part Name	Material
1	Pressure meter	Upon request
2	Sealing	NBR
3	Main body	Bronze
4	Cylinder	Bronze
5	Buffer spring	SS 304
6	Piston	Brass
7	Filter net	SS 304
8	Pipe connector	Bronze
9	PE washer	PE
10	Three-way ball	Brass
11	Nut	Bronze
12	Shaft	Bronze
13	Diaphragm	Fabrics NBR
14	Spring housing	Polyamide 66
15	Adjusting stem	SS 304
16	Pressure spring	SS 304
17	Sealing	NBR
18	Sealing retainer	Brass
19	Spring	SS 304
20	Orientation seat	Bronze



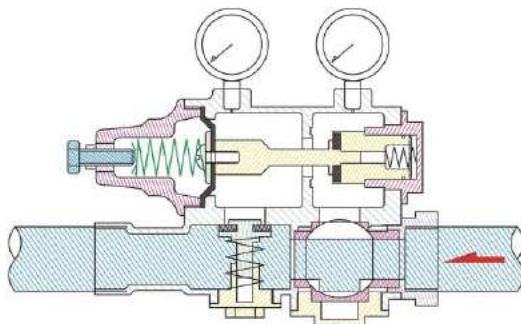


Open state

ON

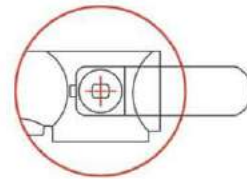


When the handle is rotated upward, pressure reducing valve set becomes pressure reducing open state.

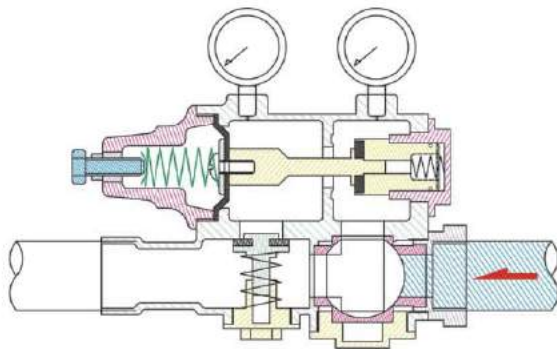


Bypass open state

PASS

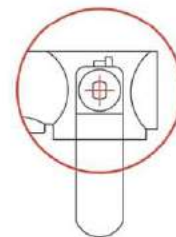


When the handle is rotated to horizontal position, pressure reducing valve set becomes bypass open state.



Closed state

OFF

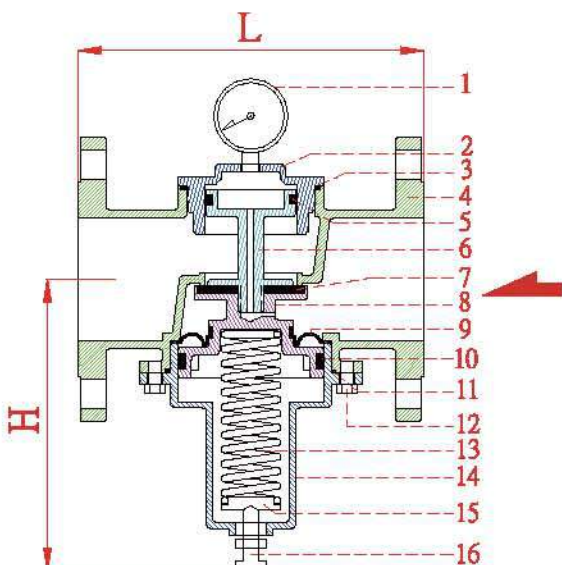
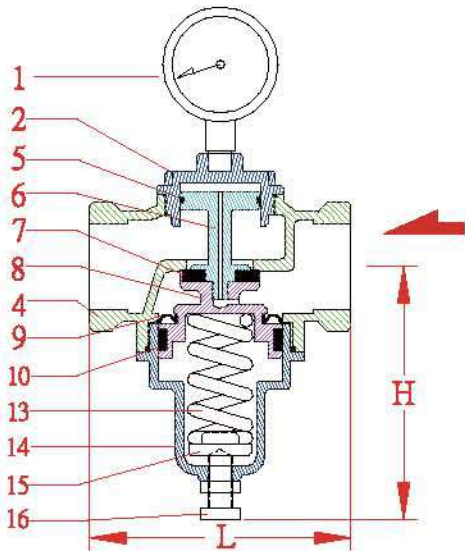


When the handle is rotated downward, pressure reducing valve set becomes pressure reducing closed state.



DIRECT-ACTIVATED PRESSURE SUSTAINING / BACK PRESSURE VALVE

- ▶ The whole set is made by stainless steel #316, and it is suitable for the fluid of pure water, acid & alkaline fluid, steam or air. Pressure needed from fully-closed gate to fully-opened gate: 1.5 kgf/cm².
- ▶ Back pressure valve can maintain required pressure.
- ▶ Design of piston and diaphragm improves the inability of sustaining pressure and leakage.
- ▶ Back pressure chamber controls the valve gate and let gate respond, quickly and adjust pressure accurately.



- ▶ Pressure Adjusting Range : 1~5 kgf/cm²
(1 kgf/cm²=14.2 psi) 4~10 kgf/cm²
- ▶ Applied Temperature : -15~100°C
100~180°C (For steam)
- ▶ Valve Body Testing Pressure : 35 kgf/cm²
- ▶ Maximum Applied Pressure : 25kgf/cm²
- ▶ Pressure gauge indicates the sustaining pressure.
- ▶ Please cover steam pipelines with thermal materials

No	Part Name	Material
1	Gauge	Stainless Steel
2	Upper Cover	Stainless Steel 316
3	O-ring	NBR / Viton
4	Main Body	Stainless Steel 316
5	U-ring	NBR / Viton
6	Shaft	Stainless Steel 316
7	Sealing Spacer	NBR / Viton / Teflon
8	Seat	Stainless Steel 316
9	Diaphragm	CR/ EPDM/ Viton
10	UH-ring	NBR / Viton
11	O-ring	NBR / Viton
12	Fixed Bolt	Stainless Steel 304
13	Spring	Spring Steel
14	Lower Cover	Stainless Steel 316
15	Washer	Brass
16	Adjusting Stem	Stainless Steel 304

(Thread End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RFT15-S	1/2"	80	70	0.8	2.4
RFT20-S	3/4"	105	85	0.9	9.0
RFT25-S	1"	105	92	1.0	11.0
RFT40-S	1.5"	130	115	2.2	21.0
RFT50-S	2"	130	120	3.1	25.0

(Flange End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RFF15-S	1/2"	85	150	2.0	2.4
RFF20-S	3/4"	105	150	2.8	9
RFF25-S	1"	105	150	3.5	11
RFF40-S	1.5"	130	190	5.9	21
RFF50-S	2"	130	190	6.5	25
RFF65-S	2.5"	185	210	11.5	75
RFF80-S	3"	185	225	12.0	80
RFF100-S	4"	230	250	19.0	120
RFF150-S	6"	290	310	45.0	250

► **Back Pressure (Sustaining) Valve:**

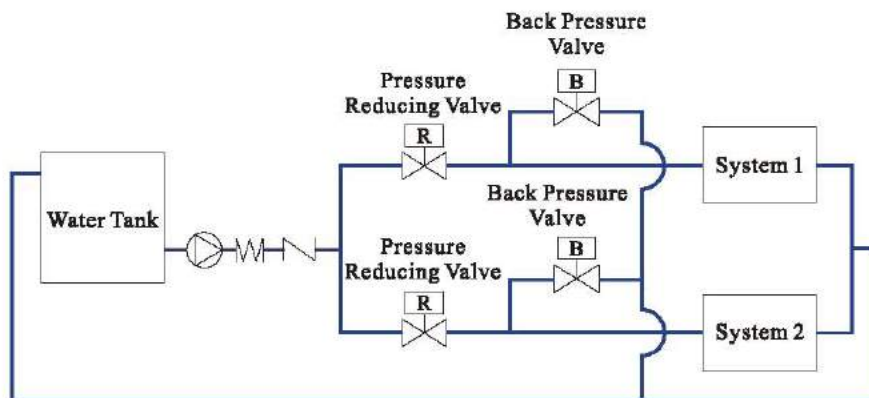
It's installed in branch pipe to maintain the stable pressure of fluid inside pipe. When pressure exceeds setting valve, it will automatically release over high pressure.

► **Pressure Relief Valve:**

It's installed in branch pipe. When pressure exceeds setting valve, valve gate will quickly and fully open to release pressure. As pipeline pressure goes down to certain level, valve gate will close slowly.

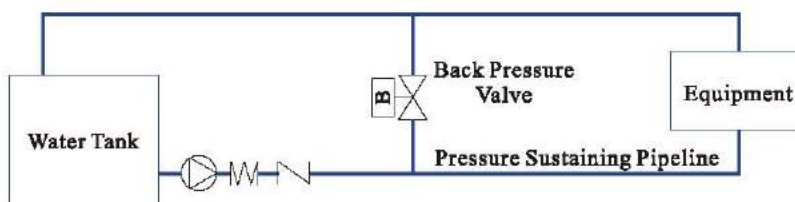
► **Applied condition of Back Pressure Valve:**

Example 1



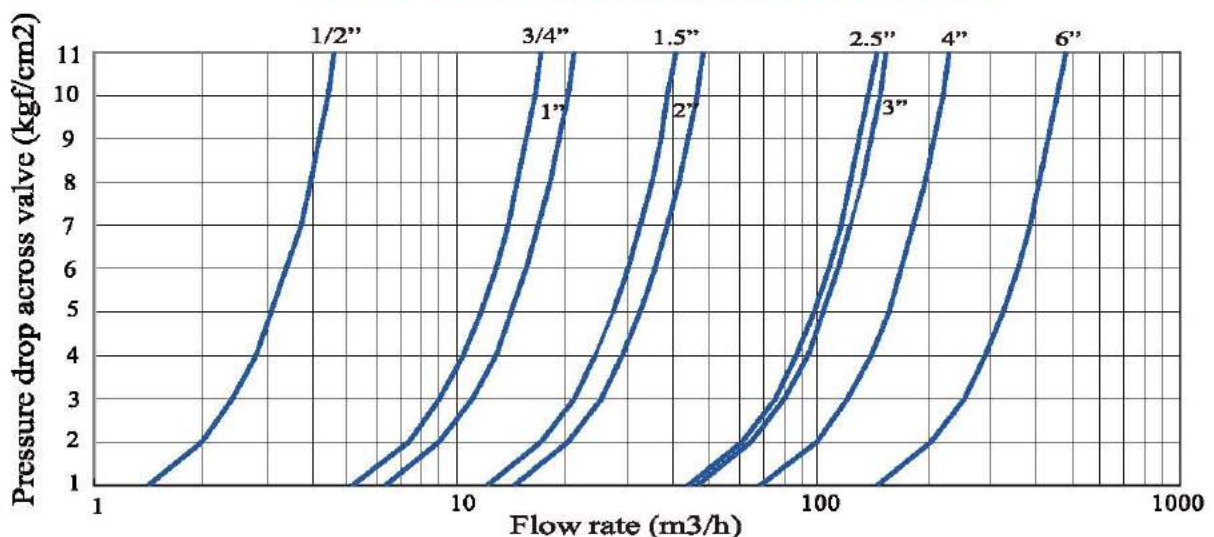
© In different pressure systems of processing pipelines, installing back pressure valve can maintain required pressure of the systems and ensure safe uses of equipments after pressure reducing valve reduces pressure.

Example 2-



© Installing back pressure valve enables largest flow application and also stabilize pipeline pressure.

Flow Chart of Direct-activated Back Pressure Valve



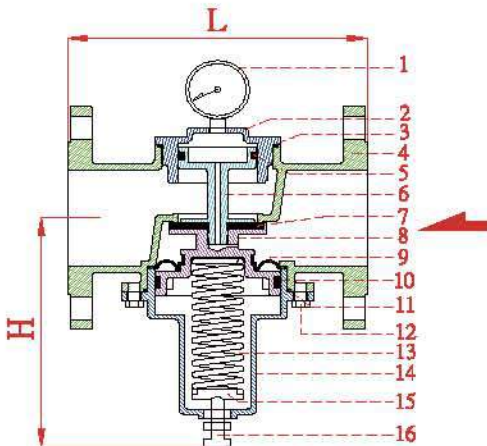
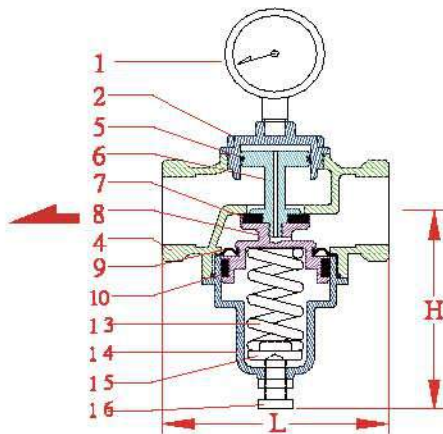


DIRECT-ACTIVATED PRESSURE RELIEF VALVE



- ▶ The whole set is made by stainless steel #316, and it is suitable for water, steam, acid & alkaline fluid, or oil.
- ▶ Pressure Relief Valve is a safety device for pipes and it is normally closed. When pressure increases to setting value, pressure relief valve rapidly releases the over high pressure. When pressure returns to safety value, pressure relief valve will automatically close to ensure the safety of equipment.

- ▶ Pressure Adjusting Range : 0.5 ~ 10 kgf/cm²
(1 kgf/cm² = 14.2 psi) 7 ~ 20 kgf/cm²
- ▶ Applied Temperature : -15 ~ 100°C
100 ~ 180°C (For Steam)
- ▶ Valve Body Testing Pressure : 35 kgf/cm²
- ▶ Maximum Applied Pressure : 25 kgf/cm²



No	Part Name	Material
1	Gauge	Stainless Steel
2	Upper Cover	Stainless Steel 316
3	O-ring	NBR / Viton
4	Main Body	Stainless Steel 316
5	U-ring	NBR / Viton
6	Shaft	Stainless Steel 316
7	Sealing Spacer	NBR / Viton
8	Seat	Stainless Steel 316
9	Diaphragm	NBR / Viton
10	UH-ring	NBR / Viton
11	O-ring	NBR / Viton
12	Fixed Bolt	Stainless Steel 304
13	Spring	Spring Steel
14	Lower Cover	Stainless Steel 316
15	Washer	Brass
16	Adjusting Stem	Stainless Steel 304

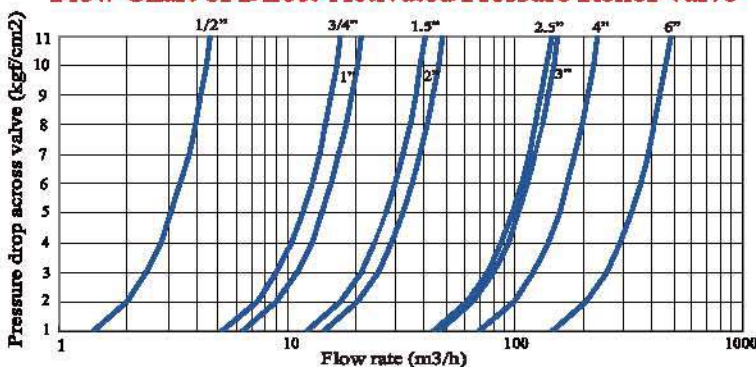
(Thread End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RLT15-S	1/2"	85	70	0.8	2.4
RLT20-S	3/4"	105	85	0.9	9.0
RLT25-S	1"	105	90	1.0	11.0
RLT40-S	1.5"	130	115	2.2	21.0
RLT50-S	2"	130	120	3.1	25.0

(Flange End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RLF15-S	1/2"	85	150	2.0	2.4
RLF20-S	3/4"	105	150	2.8	9.0
RLF25-S	1"	105	150	3.5	11.0
RLF40-S	1.5"	130	190	5.9	21.0
RLF50-S	2"	130	190	6.5	25.0
RLF65-S	2.5"	185	210	11.5	75.0
RLF80-S	3"	185	225	12.0	80.0
RLF100-S	4"	230	250	19.0	120.0
RLF150-S	6"	290	310	45.0	250.0

Flow Chart of Direct-Activated Pressure Relief Valve



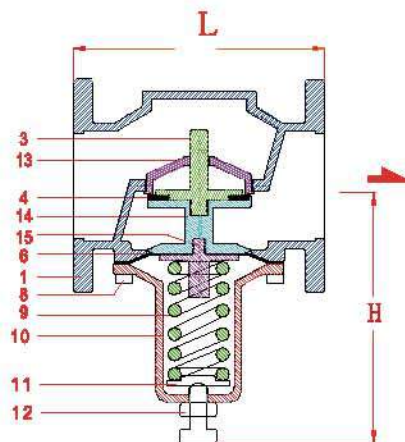
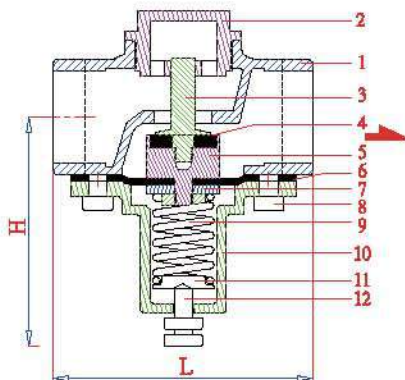


DIRECT-ACTIVATED PRESSURE RELIEF VALVE (Diaphragm Type)



► Pressure Relief Valve is a safety device for pipes and it is normally closed. When pressure increases to setting device value, pressure relief valve rapidly releases the over high pressure. When pressure returns to safety value, pressure relief valve will automatically close to ensure the safety of equipment.

- Pressure Adjusting Range : 2 ~ 8 kgf/cm²
(1 kgf/cm²=14.2 psi) 5 ~ 12 kgf/cm²
- Maximum Valve Body Testing Pressure : 30 kgf/cm²
- Maximum Applied Pressure : 20 kgf/cm²
- Applied Temperature : -15~80°C
- Materials of valve body: Ductile Iron, Bronze
- ◎Special order is needed for other material and specification.
- ◎Pressure gauge shows the set pressure.



No	Item Name	Material	
1	Main Body	Ductile Iron	Bronze
2	Cover	Bronze	Bronze
3	Shaft	Brass	Brass
4	Sealing Spacer	NBR	NBR
5	Piston	Brass	Brass
6	Diaphragm	NBR	NBR
7	Washer	Electroplated Iron	Electroplated Iron
8	Fixed Bolt	Electroplated Iron	Electroplated Iron
9	Spring	Spring Steel	Spring Steel
10	Lower Cover	Bronze	Polyamide 66
11	Spring Positioner	Electroplated Iron	Electroplated Iron
12	Adjusting Bolt	Stainless Steel	Stainless Steel
13	Seat	Bronze	
14	Shaft Guiding Seat	Bronze	
15	Diaphragm Washer	Bronze	

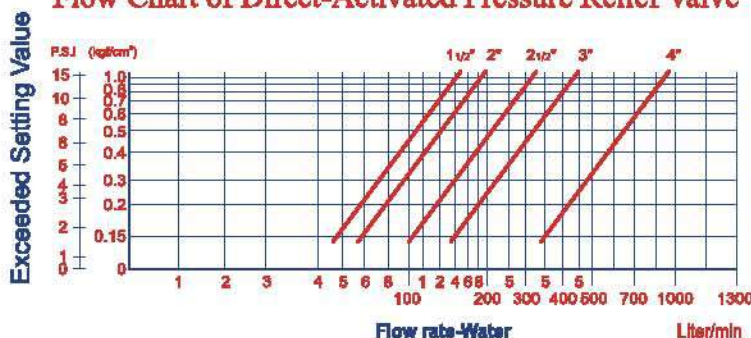
(Thread End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RKT-40	1.5"	110	110	2.5	19
RKT-50	2"	115	115	3	23

(Flange End)

Item No	Size	H(mm)	L(mm)	Weight(kg)	CV
RKF-50	2"	150	190	12	23
RKF-65	2.5"	165	210	17	73
RKF-80	3"	200	225	19	78
RKF-100	4"	220	250	24	118

Flow Chart of Direct-Activated Pressure Relief Valve





AIR RELEASE VALVE

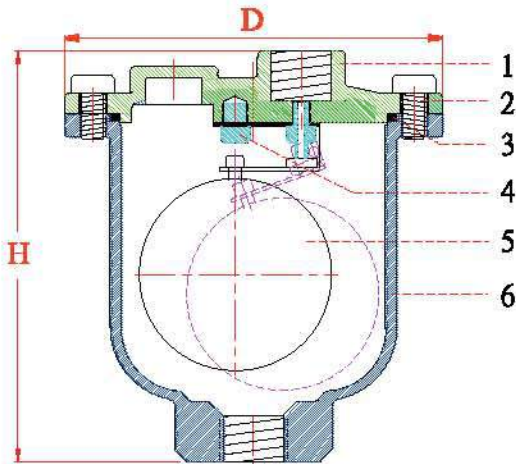


Air release valve can efficiently evacuate the air in the pipe to reduce the noise or the interference which causes by air.

Air release valve can only be installed vertically.

Installing air release valve at the highest part of pipe line will recommend.

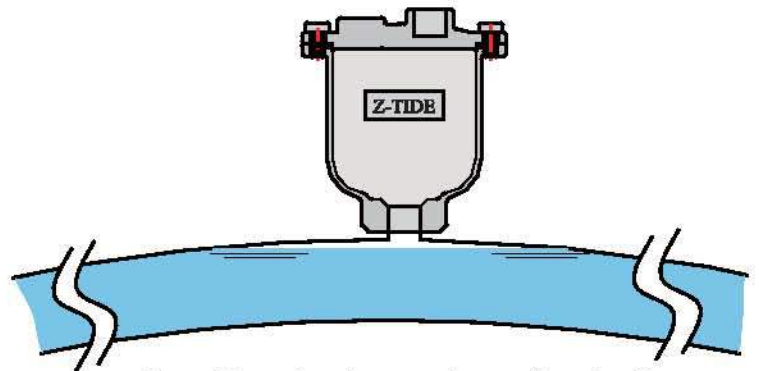
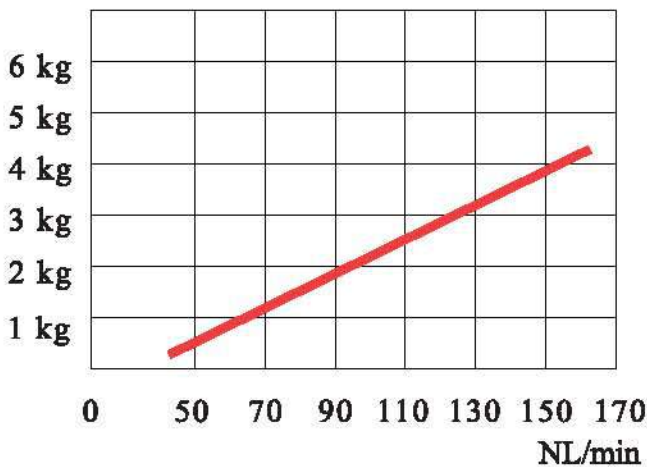
- ▶ Valve Body Testing Pressure: 21 kgf/cm²
- ▶ Valve Seat Testing Pressure: 15 kgf/cm²
- ▶ Maximum Applied Pressure: 10 kgf/cm²
- ▶ Maximum Applied Temperature: 80°C(NBR); 150°C(Silicone)
- ▶ Materials of valve body: Cast Iron, Stainless Steel
- ▶ Applied Conditions: Water



No	Part Name	Material	
1	Cover	Cast Iron	Stainless Steel
2	Fixed Bolt	Cast Iron	Stainless Steel
3	Sealing	NBR	NBR/Silicone
4	Plug	Cast Iron	Stainless Steel
5	Float Ball set	Stainless Steel	Stainless Steel
6	Body	Cast Iron	Stainless Steel

Item No	Size	D(mm)	H(mm)	Weight(kg)
ATR-15-S	1/2"	120	131	2.5
ATR-20-S	3/4"	120	131	2.5
ATR-25-S	1"	120	131	2.5

Gate Full Open, Normal atmospheric temperature



Installing air release valve at the pipe line where gather easily the air.



DIAPHRAGM TYPE WATER HAMMER ARRESTER

The occurrence and prevention of water hammer effect:

When the fluid flows in the pipe, if the gate closes suddenly and stops the flow, the kinetic energy will be changed into elastic resilience and create a serial positive and negative pressure wave vibrating back and forth in the pipe until the energy is lost by friction. Especially when the pump stops, the fluid still flows by inertia and gravity also causes the fluid to flow back, and these two forces will cause the positive and negative pressure waves. The friction caused by the two waves will make the pipe vibrate and create noise. Hence, the life of the pump and the piping accessories will be affected and, at the same time, cause the uncomfortable noise under such situation, to set up one or more sets of water hammer arrester will improve the situation. Our company make use of the airbag principle to design water hammer arresters which will reduce the vibration by pressing air when the in-pipe pressure transfers to air chamber.

The features of water hammer arresters :

- ▶ The airbag adopts the ball-pressing-type design, which without friction, less function progresses, prompt and quick response and has obvious result. In addition, the life of the arrester will be increased several times.
- ▶ The arrester will absorb water hammer directly and has the functions of water hammer prevention and absorption.
- ▶ Special design of the air diaphragm rubber will not release pressure and its life won't be affected by the bad water quality.
- ▶ To prevent the air leakage, the pressed air chamber is covered by permeating prevention rubber.
- ▶ The design of structure is excellent and easy to maintain.

The fluid pressure of the water hammer effect.

The water hammer effect caused by closing the valve should be added at the largest water head in the pipe to calculate the height of the pressure water head and fluid pressure .

Vensano's formula :

$$Z_o = \frac{2LV_o}{gT}$$

Ho = the pressure water head before closing the valve

Vo = the flow speed before closing the valve

T = the time needed to close the valve

L = the pipe length between the inlet and outlet of free water surface

Zo = the largest pressure water head increased by water hammer effect

H = full pressure water head after adding water hammer at the end of the pipe

Remark: the transferring speed of in-pipe pressure and acceleration
(about 1000 m / second)

Example : Assume Vo = 5 m/ sec, Ho = 72 m, L = 210 m, if the it takes 3 seconds to close the valve, then, what is the pressure of water hammer?

$$Z_o = \frac{2LV_o}{gT} = \frac{2 \times 210 \times 5}{9.81 \times 3} = \frac{2100}{29.43} = 71.35 \text{ m}$$

The full pressure water head including water hammer is : H=Zo+Ho=71.35+72=143.35 m

Assume the pressure water head 10 m = 1 kgf/cm²

Then, The fluid pressure including water hammer is : 143.35 /10=14.335 kgf/cm²

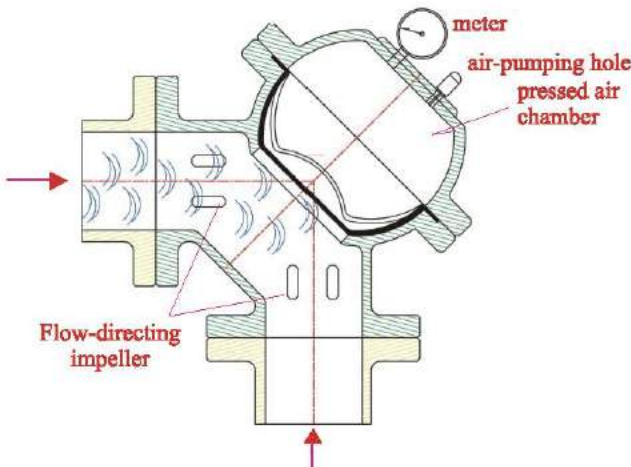


L STYLE WATER HAMMER ARRESTER

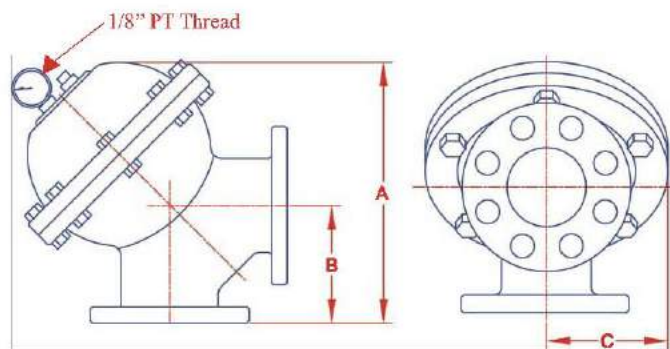


Patent Number : 131907

- ▶ The flow-directing mechanism in the valve can guide the flow and stabilize pressure.
- ▶ In the corner of pipe, the water hammer is the most obvious. The design is for meeting the requirement and set the arrester at the corner directly. This design not only saves the space and is easy to set up, but also can replace the traditional crooked head to reduce the cost of setting up.
- ▶ L style absorbs water hammer effect in two ways and brings excellent result.



- ▶ Applied Conditions: Fluid
- ▶ Applied Temperature: -15 ~ 80°C
- ▶ Diaphragm Material: NBR & Viton
- ▶ Normal air chamber pressure: 2.5 kgf/cm²
- ▶ The test pressure of valve body:
 - Cast Iron & Bronze : 21 kgf/cm²
 - Stainless Steel 304 & 316 : 30 kgf/cm²
- ▶ Maximum Applied pressure:
 - Cast Iron & Bronze : 12 kgf/cm²
 - Stainless Steel 304 & 316 : 20 kgf/cm²
 - (1 kgf/cm²=14.2psi)



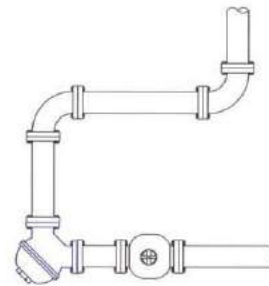
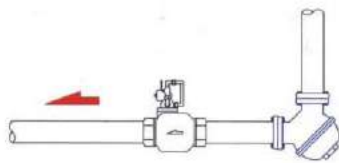
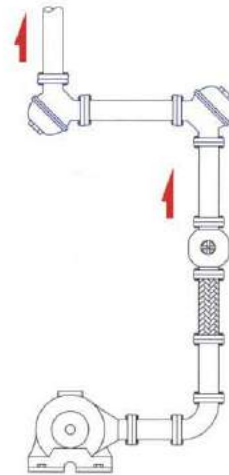
Flange Type (Material: Cast Iron or Stainless 304 or 316)						
Item No	Size	A(mm)	B(mm)	C(mm)	Weight(kg)	Air Chamber(cm ³)
ALF-50	2"	230	110	105	17	1490
ALF-65	2.5"	260	130	115	21	2130
ALF-80	3"	275	140	125	22	2465
ALF-100	4"	345	155	150	34	5535
ALF-150	6"	467	200	200	70	15325
ALF-200	8"	560	235	232	124	27230

THE INSTALLATION CONDITIONS OF L STYLE WATER HAMMER ARRESTER

When pump shuts off, pressure decreases instantly and forms unstable gap of positive and negative pressure that causes water hammer effect and creates noise and pipe vibration. To set up water hammer arrester at the pipe corner upside of the pump (shown as the figure) can prevent the water hammer effect and protect the machine.

► Remark :

When lift is longer than 50m and pressure is above 5 kgf/cm², we suggest to set up arresters each at the downside of the long pipe and the upside corner of the check valve.



► Silent Check valve

It's easy to cause water hammer effect when the gate closes fast. To set up arrester at the first corner away from the fast-shut-down valve can absorb and prevent the water hammer effect directly and eliminate the noise.

When the fluid flows through the serial corner, the change of flow speed and direction and friction effect will cause unstable pressure wave, which will lead to vibration and noise. To set up arrester and silent check valve can eliminate the pressure wave.

Remark

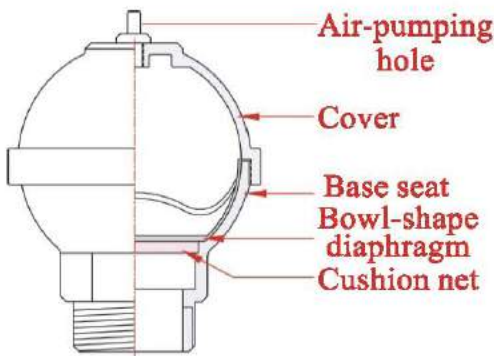
- The pressure meter on the valve shows the air chamber pressure before piping and will show the pipeline pressure after piping.
- To leave a 10 cm opening between valve and wall for easy to maintain.
- Considering the high-pressure situation, cast iron or stainless steel valve body is suggested for the valve which diameter is larger than 2".
- When lift is longer than 50m and pressure is above 5 kgf/cm², we suggest to set up arrester each at the downside of the long pipe and the corner upside of the check valve.
- Before installation, make sure the pressure of water hammer arrester air chamber is lower than pipe pressure.
- When the pressure of the air chamber of the water hammer arrester is maintained at the 30% ~ 50% of pipe pressure, the arrester will have the best water-hammer-preventing result.
- If the water pressure in the pipe is lower or the air pressure of the arrester air chamber is lower, both can be corrected by pumped into air or release air from the air-pumping hole at the top of the arrester.
- When the outlet is under open pressure like float valve, bathroom equipment and faucet, input pressure 1 ~ 1.3 kgf/cm² is preferred.



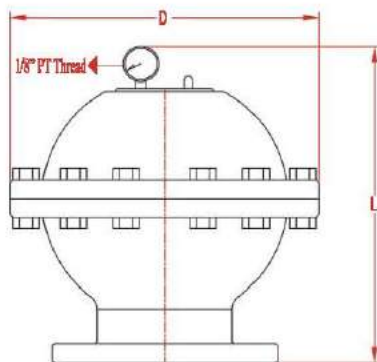
I STYLE WATER HAMMER ARRESTER



Patent Number : 140580



▲ Thread end(AIT)
Without Pressure Gauge



▲ Flang end (AIF)
With Pressure Gauge

- ▶ If the fluid is acid/alkaline or oil, the air bag made of special material should be applied.
- ▶ Vertical, horizontal and upside-down installation is acceptable.
- ▶ Please contact us for special fluid and temperature.
- ▶ Normal air chamber pressure : 2.5 kgf/cm²
- ▶ Diaphragm material : NBR & Viton
- ▶ Applied conditions: Fluid
- ▶ Applied temperature: -15 ~ 80°C
- ▶ Diaphragm material: NBR & Viton
- ▶ Normal air chamber pressure: 2.5 kgf/cm²
- ▶ The test pressure of valve body:
 - Ductile Iron & Bronze : 21 kgf/cm²
 - Stainless Steel 304 & 316 : 30 kgf/cm²
- ▶ Maximum applied pressure:
 - Ductile Iron & Bronze : 12 kgf/cm²
 - Stainless Steel 304 & 316 : 20 kgf/cm²
 (1 kgf/cm²=14.2psi)

(Thread end)

Item No	Thread(PT)	L (mm)	D (mm)	Weight(kg)	Air Chamber(cm ³)
AIT-15	1/2"	74	46	0.3	17
AIT-20	3/4"	82	52	0.4	30
AIT-25	1"	95	62	0.5	65
AIT-40	1.5"	120	110	1.4	250
AIT-50	2"	162	135	3.2	650
AIT-65	2.5"	180	155	3.9	1125
AIT-80	3"	218	188	9	2000
AIT-100	4"	260	238	14	4400

(Flange end)

Item No	Flange	L (mm)	D (mm)	Weight (kg)	Air Chamber(cm ³)
AIF-80	3"	240	155	18	2465
AIF-100	4"	330	330	31	5535
AIF-125	5"	330	330	32	5535
AIF-150	6"	420	400	67	15325
AIF-200	8"	510	460	93	27230
AIF-250	10"	510	460	103	27230
AIF-300	12"	620	625	198	67860



FULL OPEN STYLE SILENT CHECK VALVE

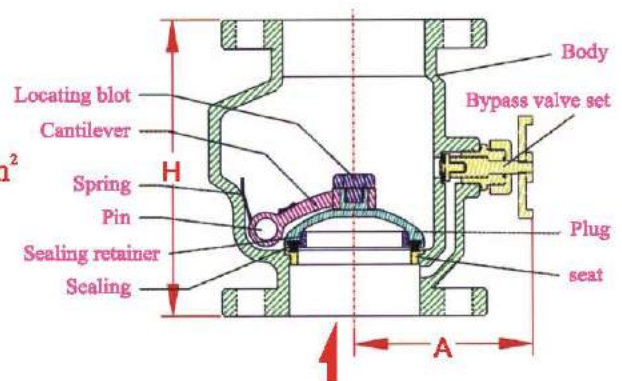
The silent check valve is applied on lift pipe or fluid pipe with pressure. The valve gate, with restoring force, will be closed at suitable speed when pump is shut down to separate the collision and noise between the inertia fluid (positive pressure) and the back flow (negative pressure) caused by power off.

The silent check valve plays an important role on piping, especially applied on the outlet of the pump. The silent check valve applied on the outlet of the pump should be selected carefully, and it must be able to resist the highest pressure, the largest water hammer effect and the biggest fluid impact. If the silent check valve is not good enough, when silent check valve is damaged, it will cause the fluid flowing back and losing pressure or, more serious, the damaged parts will fall on the blades and damage the pump seriously and, hence, loses more money.

To avoid the defects mentioned above, our company manufacture a more practical and economical model, called **" FULL OPEN STYLE SILENT CHECK VALVE"**

Features:

- ▶ The design of the valve is full flow lift type and water flow does not directly push the valve gate. Hence, the valve can work for a long time and have huge flow rate.
- ▶ The design of plug is hang type and automatically locating. It can adjust the close position of the plug no matter high or low pressure.
- ▶ The design of sealing is "U" and it is suitable for high and/or low pressure condition. And the tightness of the valve gate is best.
- ▶ The design of plug is semi-round and can resist higher pressure.
- ▶ When the pressure is high, plug and seat work together to prevent the sealing from being pushed by the high pressure to lengthen the longevity of sealing.
- ▶ Test pressure : Stainless Steel : 35 kgf/cm² ;
Ductile Iron : 35 kgf/cm² ; Cast Iron : 21 kgf/cm²
- ▶ Maximum applied pressure : Stainless Steel : 20 kgf/cm² ;
Ductile Iron : 20 kgf/cm² ; Cast Iron : 16 kgf/cm²
- ▶ Applied temperature : -15~80°C
- ▶ Vertical and horizontal installation is acceptable.



(Flange End)

Item No	Size	Connection type	H(mm)	A(mm)	Weight (kg)	CV
CHF-50	2"	Flange	183	122	9	180
CHF-65	2.5"	Flange	200	132	12	270
CHF-80	3"	Flange	210	147	14	410
CHF-100	4"	Flange	220	160	16	720
CHF-125	5"	Flange	260	180	27	1050
CHF-150	6"	Flange	280	200	32	1615
CHF-200	8"	Flange	370	Upon request	61	2865
CHF-250	10"	Flange	450	Upon request	117	4025
CHF-300	12"	Flange	520	Upon request	138	5700

Part Name	Material	
Body	Cast Iron	Stainless Steel 304
Bypass valve set	Brass	Stainless Steel 304
Plug	Brass	Stainless Steel 304
Seat	Cast Iron	Stainless Steel 304
Locating bolt	Brass	Stainless Steel 304
Cantilever	Brass	Stainless Steel 304
Spring	Stainless Steel	Stainless Steel 304
Pin	Stainless Steel	Stainless Steel 304
Sealing retainer	Brass	Stainless Steel 304
Sealing	NBR	NBR

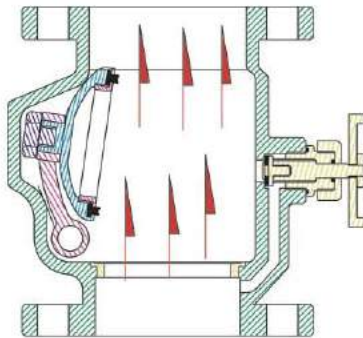
©The bypass valve set won't be attached if the diameter is larger than 6 inches.



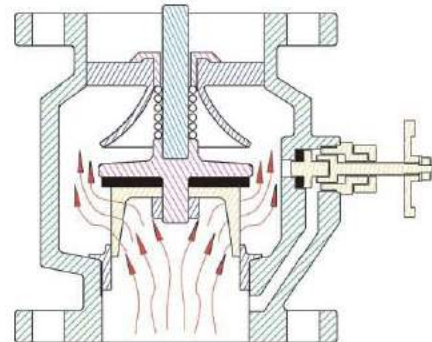
IMPROVEMENT OF THE FLOW OF FULL OPEN STYLE SILENT CHECK VALVE

The Improvement of Full Open Style Silent Check Valve on Flow Rate

The full open style silent check valve adapts the lift open style plug and the plug has hidden bypass design, which will bring the smallest flow resistance inside the valve body. When fluid flow through the valve, and hence, will reduce the loss of pump running effect and improve the power efficiency. Since that, the defects of traditional silent check valve, e.g. Many turning points, large resistance, not smooth flow way and fluid impact the valve directly and shorten the valve life, have been improved.

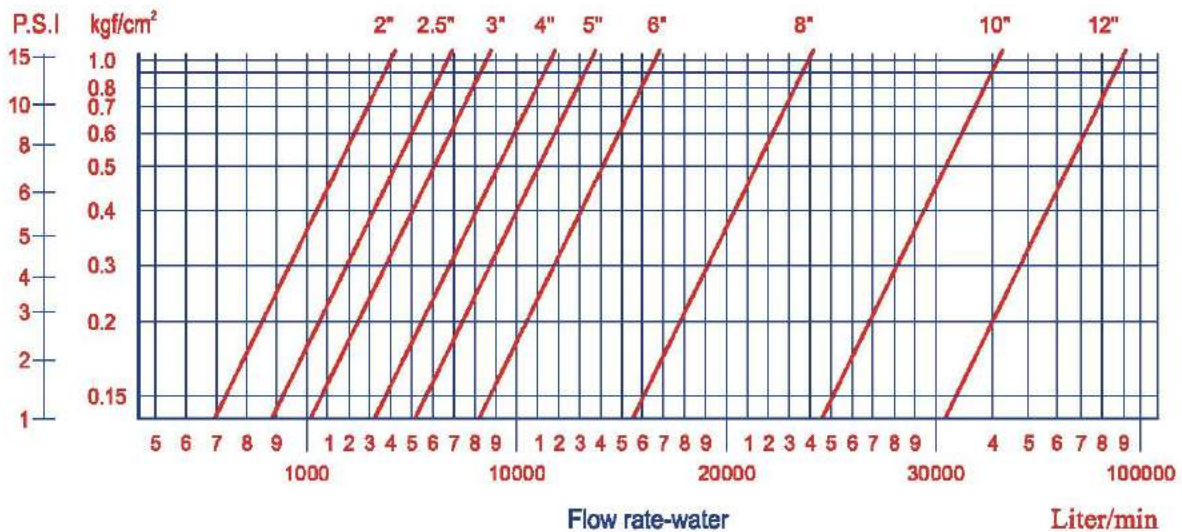


Full Open Style Silent Check Valve



Traditional Silent Check Valve

Full Open Style Silent Check Valve Flow Chart



The comparison of CV values between Full Open Style Silent Check Valve and Traditional Silent Valve

$$CV = \frac{Q}{\sqrt{\Delta P/S}}$$

Q=Rate of flow (GPM)

P=Pressure drop across valve (p.s.i)

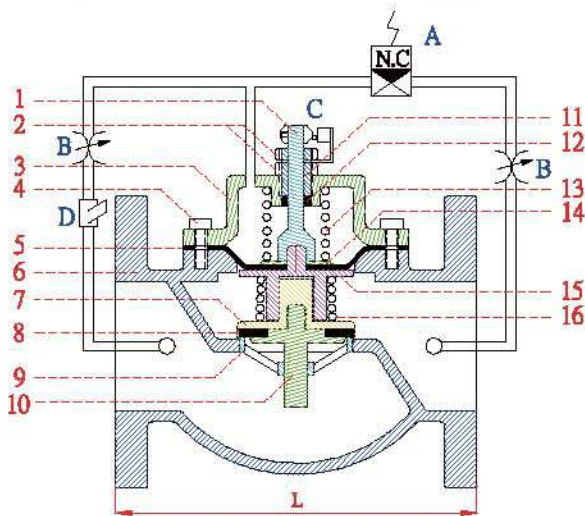
S=Fluid density (1 Gallon=3.785 Liter)

	2"	2.5"	3"	4"	5"	6"	8"	10"	12"
Z-Tide full open type	180	270	410	720	1050	1615	2866	4025	5700
Traditional type	70	105	155	275	435	625	1115	1770	2500



PUMP CONTROL VALVE

- ▶ Perfectly prevents water hammer effect.
- ▶ Pump Control Valve = Pump's Variable Drive + Check Valve + Water Hammer Arrester. No need to use "Inverter Duty Motor" and save costs.
- ▶ Speed of valve opening and closing are adjustable upon request.
- ▶ Simple installation and outstanding function.
- ▶ Piston design structure resists high pressure and makes maintenance & replacement easy.
- ▶ It is convenient to clean the impurities inside valve gate from the cleaning plug.



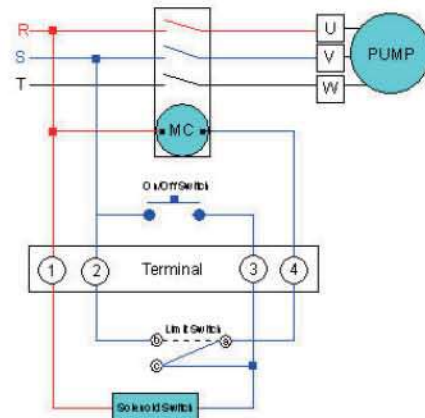
(Flange End)

No.	Size	L	CV	Weight(kg)
RPF-50	2"	190	30	14
RPF-65	2.5"	210	85	18
RPF-80	3"	225	95	19
RPF-100	4"	250	150	26
RPF-150	6"	310	320	52
RPF-200	8"	420	750	115
RPF-250	10"	530	1400	150

▶ Applied temperature: -15° ~ 80°C

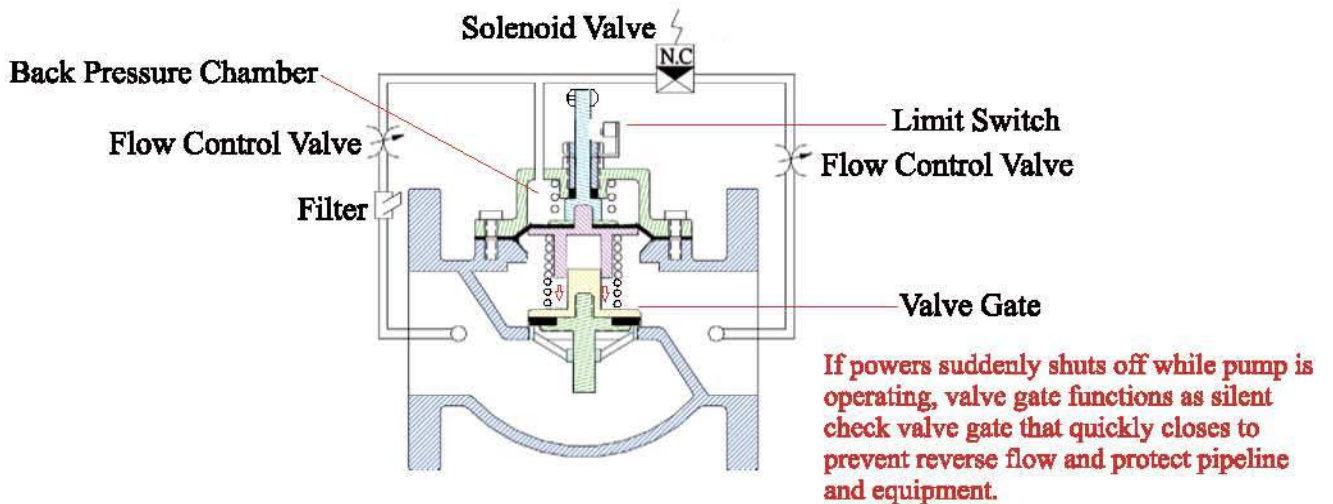
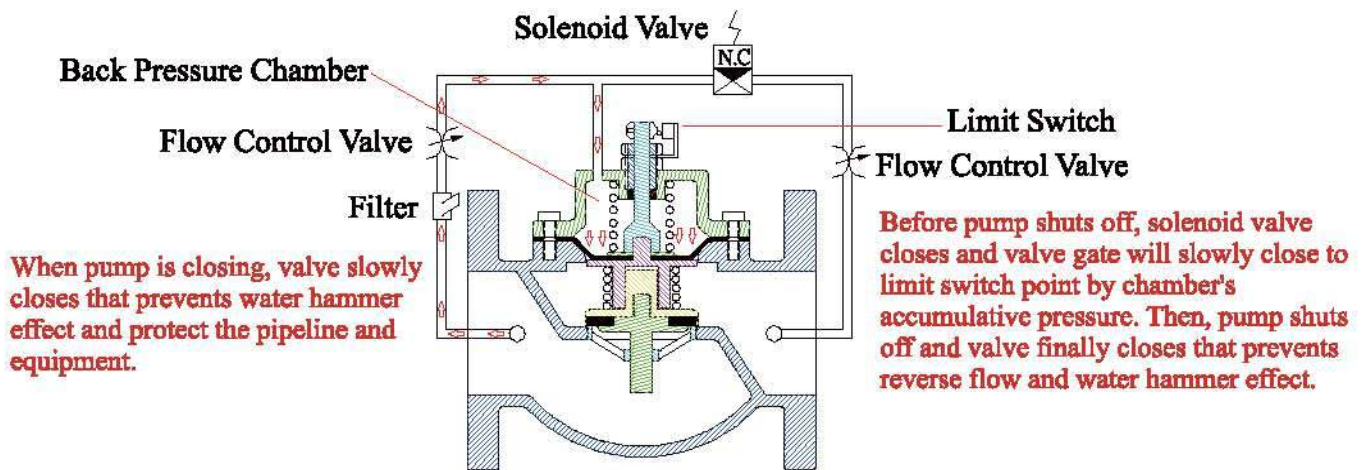
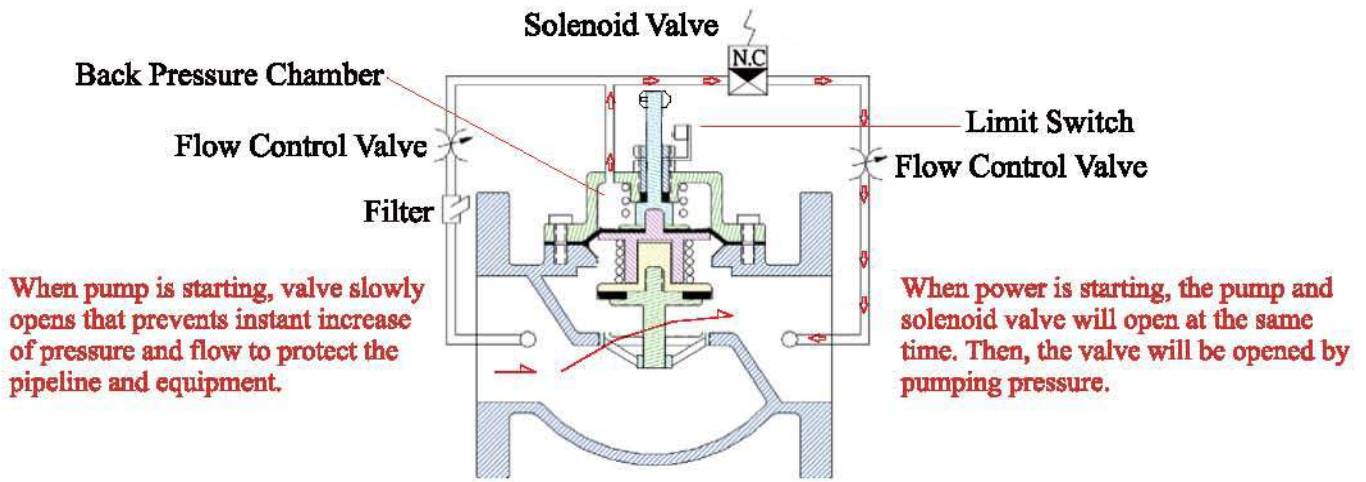
	Cast Iron	Ductile Iron	Bronze	Stainless Steel
Testing Pressure	24 kg/cm ²	30 kg/cm ²	24 kg/cm ²	38 kg/cm ²
Working Pressure	16 kg/cm ²	20 kg/cm ²	16 kg/cm ²	25 kg/cm ²

No	Part Name	Material	
1.	Positioning Shaft	Brass	Stainless Steel 304
2.	Screw Nut	Steel	Stainless Steel 304
3.	Upper Cover	Ductile Iron / Bronze	Stainless Steel 304
4.	Cover Fixing Bolt	Steel	Stainless Steel 304
5.	Diaphragm	CR Rubber + Nylon	CR Rubber + Nylon
6.	Main Body	Ductile Iron / Bronze	Stainless Steel 304
7.	Gate	Ductile Iron / Bronze	Stainless Steel 304
8.	Sealing	NBR	NBR
9.	Seat	Bronze	Stainless Steel 304
10.	Gate Shaft	Bronze	Stainless Steel 304
11.	Fixing Ring	Bronze	Stainless Steel 304
12.	U-ring	NBR / Viton	NBR / Viton
13.	Back Pressure Spring	Stainless Steel 304	Stainless Steel 304
14.	Washer	Brass	Stainless Steel 304
15.	Shaft	Ductile Iron / Bronze	Stainless Steel 304
16.	Gate Spring	Stainless Steel 304	Stainless Steel 304
A.	Solenoid Valve	Bronze	Stainless Steel 304
B.	Needle Valve	Bronze	Stainless Steel 304
C.	Limit Switch	Normal Type	Normal Type
D.	Filter	Bronze	Stainless Steel 304



Power Distribution Chart

Function of Pump Control Valve



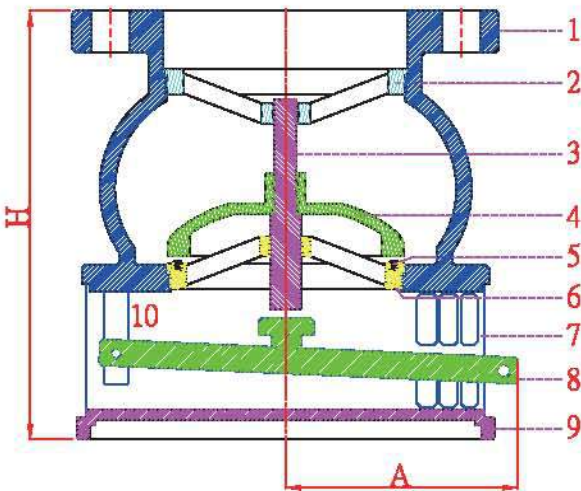


FOOT VALVE (With Clean Lever)

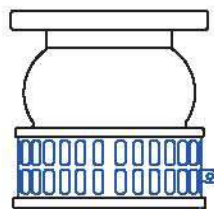


Foot valve is for use as inlet of suction pipe. A modified check valve that has a screen on the suction end to prevent debris from entering the pump or pipe. It protects against loss of prime, aids in priming the pump and protects the pump from large debris. (Only Vertical installation)

- ▶ Fluid : Water
- ▶ Max Working Pressure :
Cast Iron : 12 kg/cm²
Ductile Iron & Stainless Steel : 20 kg/cm²



Part No.	Part Name	Material		
1	Main Body	Cast Iron	Ductile Iron	Stainless Steel
2	Upper Seat	Brass	Brass	Stainless Steel
3	Shaft	Brass	Brass	Stainless Steel
4	Disc	Ductile Iron	Ductile Iron	Stainless Steel
5	Sealing	NBR	NBR	NBR
6	Seat	Brass	Brass	Stainless Steel
7	Screen	Stainless Steel	Stainless Steel	Stainless Steel
8	Clean Lever	Ductile Iron	Ductile Iron	Stainless Steel
9	Screen Seat	Ductile Iron	Ductile Iron	Stainless Steel
10	Lever Stand	Ductile Iron	Ductile Iron	Stainless Steel



Model : FVF

(Flange End)

Item No.	Size	H	A	Weight(kg)
FVF-50	2"	160	95	7
FVF-65	2.5"	165	105	8
FVF-80	3"	210	115	11
FVF-100	4"	215	125	14
FVF-125	5"	240	145	20
FVF-150	6"	275	160	27
FVF-200	8"	380	185	46



Model : FVT

(Thread End)

Item No.	Size	H	A	Weight(kg)
FVT-50	2"	160	95	5
FVT-65	2 1/2"	165	105	6



Final Year 2023

- 1. **Electromagnetic wave phenomena**
- 2. **Interference**
- 3. **Diffraction**
- 4. **Ray optics**
- 5. **Optical instruments**
- 6. **Modern physics**



Order	Wavelength	Intensity	Phase	Path Difference	Phase Difference
0	λ	Max	0	0	0
1	$\frac{\lambda}{2}$	Min	π	$\frac{\lambda}{2}$	π
2	$\frac{\lambda}{3}$	2nd Max	0	0	0
3	$\frac{\lambda}{4}$	2nd Min	π	$\frac{\lambda}{2}$	π
4	$\frac{\lambda}{5}$	3rd Max	0	0	0
5	$\frac{\lambda}{6}$	3rd Min	π	$\frac{\lambda}{2}$	π
6	$\frac{\lambda}{7}$	4th Max	0	0	0
7	$\frac{\lambda}{8}$	4th Min	π	$\frac{\lambda}{2}$	π
8	$\frac{\lambda}{9}$	5th Max	0	0	0
9	$\frac{\lambda}{10}$	5th Min	π	$\frac{\lambda}{2}$	π

Order	Wavelength	Intensity	Phase	Path Difference	Phase Difference
0	λ	Max	0	0	0
1	$\frac{\lambda}{2}$	Min	π	$\frac{\lambda}{2}$	π
2	$\frac{\lambda}{3}$	2nd Max	0	0	0
3	$\frac{\lambda}{4}$	2nd Min	π	$\frac{\lambda}{2}$	π
4	$\frac{\lambda}{5}$	3rd Max	0	0	0
5	$\frac{\lambda}{6}$	3rd Min	π	$\frac{\lambda}{2}$	π
6	$\frac{\lambda}{7}$	4th Max	0	0	0
7	$\frac{\lambda}{8}$	4th Min	π	$\frac{\lambda}{2}$	π
8	$\frac{\lambda}{9}$	5th Max	0	0	0
9	$\frac{\lambda}{10}$	5th Min	π	$\frac{\lambda}{2}$	π

Water Supply System



Fire Protection System



Air Processing System



Air-Conditioning System





A series of horizontal dashed lines for writing, spanning the width of the page.

