

Y-Type Globe



Up-right Globe Type



Patents • Patented to Korea.

Robocon Valve (BALEM 130)

Special Features

- Double chamber structure performing safe control.
- Seat structure keeping perfect airtight and closing.
- Easy to repair and maintain.
- Globe and Angle type according to pipeline structure.
- Excellent flow rate features taken by the efficient inside flow way design.
- All products are delivered after self test/inspection.
- It is coated by NSF/ANSI Standard 61 with epoxy powder coating or Rilsan nylon coating approved by FDA.

Robocon Valve (Balem 130) can perform as a multi-functional valve such as pressure reducing, pressure relief, constant flow, constant level, remotely On/Off, check, altitude, and pump control by selecting types of pilot valve to bring the best efficient outcome in water works & sewerage, industrial plant, chemical, fire service, shipbuilding sites. This valve can be used in various industries with 10kgf/cm², ANSI 150 class, and pattern of globe and angle type. Robocon Valve (Balem 130) as the difference pressure action diaphragm valve efficiently using difference of pipeline pressure and is operated by diaphragm action according to pressure inside of the chamber and is designed to embody a various, accurate control. Robocon Valve (Balem 130) consists of 4 compartments. They are body assembly, diaphragm assembly, intermediate chamber and cover.

Especially, the diaphragm is built with N.B.R, which is highly excellent intensity of nylon fabric, makes it safe to use. Also, theoretically calculated design, computer simulation, repeated test approval guarantee it's ability and safety. All products are coated with epoxy powder coating of NSF/ANSI Standard 61 or Rilsan nylon coating approved by FDA provides hygiene and extends it's life. Adapting flow adjusting assembly, valve position indicator, limit switch assembly such as additional features, can apply the system efficiently as performs a various functions with one valve.

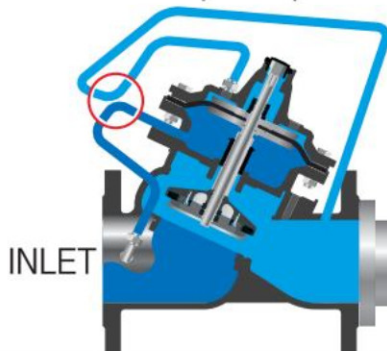
Components	Materials		
	Standard		Optional
	50~350A	400~1000A	
Body & Cover	Ductile Iron	Cast Steel	SSC 13
Diaphragm Washer & Disc	Ductile Iron	Cast Steel	SSC 13
Cover Plug & Bearing	SSC 13		
Shaft & Seat	STS 304		
Diaphragm	N.R / C.R / N.B.R		
Disc Seal	N.R / C.R / N.B.R		

- ⊙ NSF/ANSI Standard 61 Epoxy Powder Coating Standard
- ⊙ Nylon 11 Coating available (Rilsan Coating) : Optional

Size	Pattern	Operating Pressure	Media	End Connection
50A~300A	Up-right Globe Type Angle Type	10, 16, 20, 25kgf/cm ²	Water, Oil Temperature : 0°C ~ 80°C	According to Customer Request
50A~1000A	Y-type Globe			

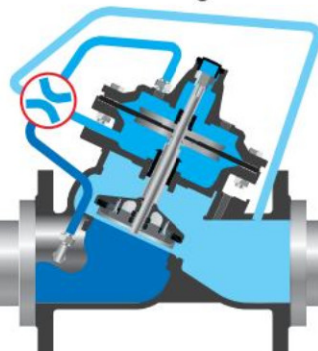
Principle of Operation

▼ Full Open Operation



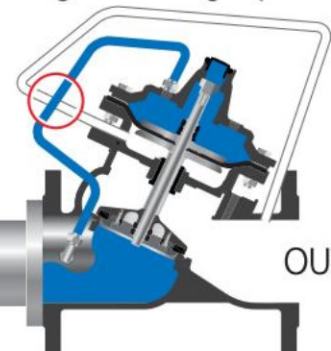
▲ Diaphragm Lower Chamber :
Upstream pressure
Diaphragm Up Chamber :
Downstream pressure

▼ Modulating Action



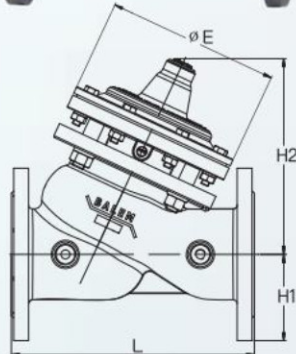
▲ Diaphragm Lower Chamber
= Diaphragm Up Chamber

▼ Tight Closing Operation

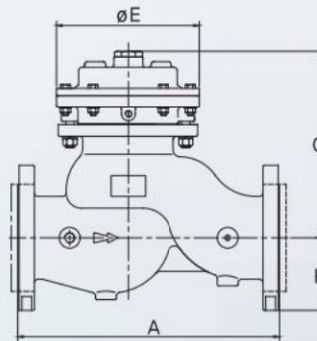


▲ Diaphragm Lower Chamber :
Downstream pressure
Diaphragm Up Chamber :
Upstream pressure

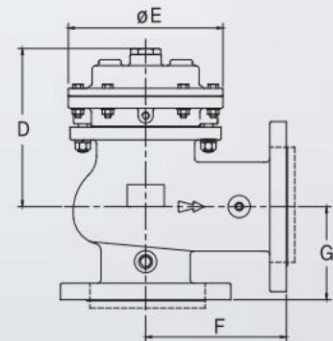
Dimensions



▲ Y-type Globe



▲ Up-right Globe Type



▲ Angle Type

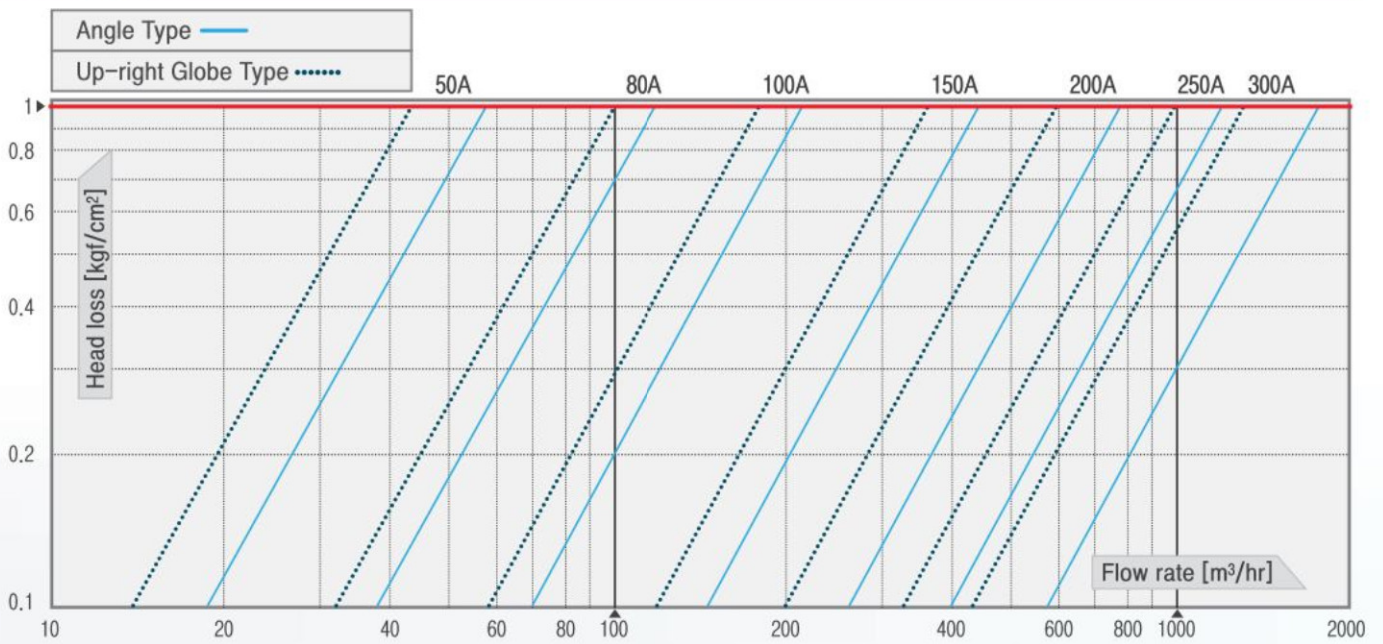
▼ Up-right Globe Type & Angle Type

Valve Size (mm)	50	80	100	150	200	250	300
A	238	305	381	508	645	756	864
B	78	93	105	140	165	200	223
Cmax	200	240	275	375	470	535	625
Dmax	157	179	206	284	360	420	465
ØE	140	165	208	326	408	497	562
F	119	152	191	254	322	378	432
G	83	102	127	152	203	219	349

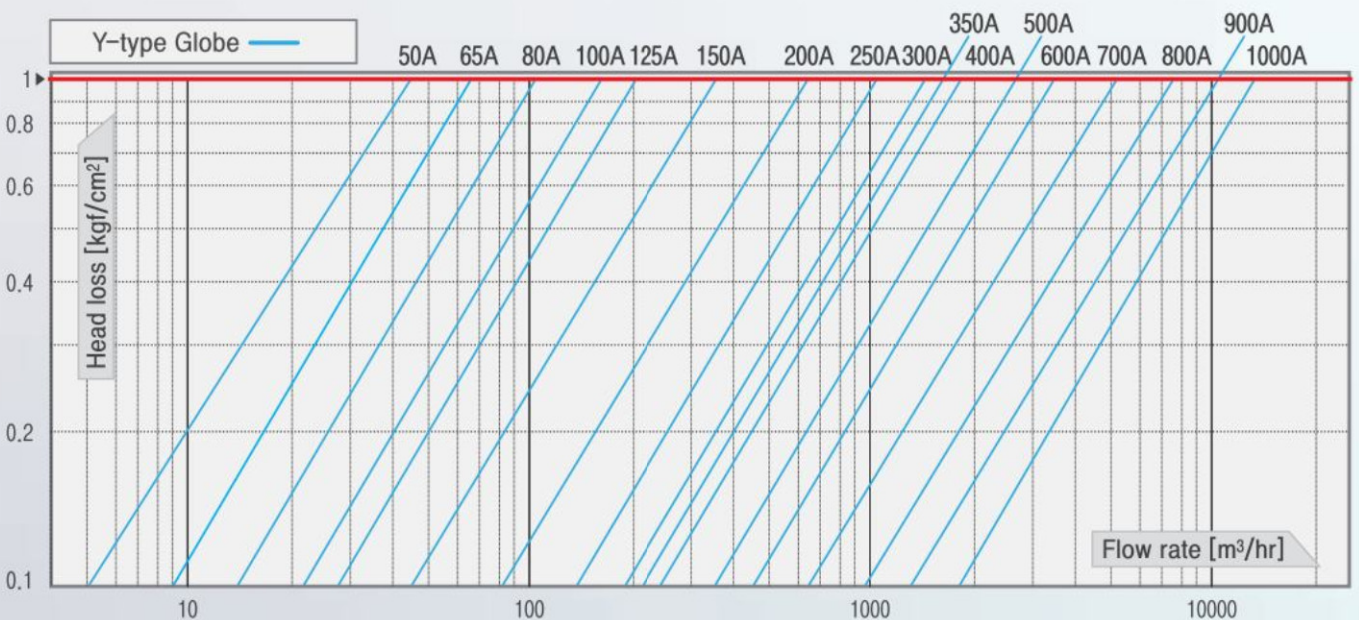
▼ Y-type Globe

Valve Size (mm)	50	65	80	100	125	150	200	250	300	350	400	500	600	700	800	900	1000
L	230	290	310	350	375	480	600	610	700	730	910	1010	1200	1400	1480	1650	1800
H1	78	88	100	110	125	143	175	205	230	265	300	380	420	500	565	590	640
H2	188	211	236	270	313	353	461	519	615	629	753	893	1030	1255	1412	1461	1584
ØE	135	154	180	220	260	305	380	455	545	545	705	794	934	1160	1215	1315	1400

Flow Chart



Valve Size(mm)		mm	50	80	100	150	200	250	300
		inch	2	3	4	6	8	10	12
Flow factor	Up-right Globe	Cv	54	113	207	422	722	1133	1610
		Kv	46	97	177	361	618	970	1378
	Angle Type	Cv	67	141	257	536	910	1461	2060
		Kv	57	121	220	459	779	1251	1764



Valve Size(mm)		mm	50	65	80	100	125	150	200	250	300	350	400	500	600	700	800	900	1000
		inch	2	2½	3	4	5	6	8	10	12	14	16	20	24	28	32	36	40
Flow factor	Y-type	Cv	56	84	119	208	258	450	784	1137	1614	1881	2142	3344	4457	6203	8769	10664	15283
	Globe	Kv	48	72	102	178	221	385	672	973	1382	1610	1834	2863	3816	5311	7508	9130	13085

※ Flow Coefficient Kv or Cv = $\frac{Q}{\sqrt{\Delta P}}$, Cv = 1.168Kv

• Kv : Flow factor ; Q(m³/hr) at 1(kgf/cm²) pressure drop

• ΔP : Pressure drop ; kgf/cm² or PSI

• Cv : Flow factor ; Q(Gal/min) at 1(Psi) pressure drop

Technical Information

• Rilsan Coating

Rilsan is a polyamide thermoplastic derived from vegetable oil of castor beans. Rilsan powder(Nylon 11), approved by FDA is used to coat metal surface by hot-dipping, which is nontoxic to human body and provides excellent hygienic conditions and chemical resistances against various acids and alkalis, grease, oil, industrial solvent, LPG, natural gas, milk, fruits and etc.

Also, it is the best coating method, showing excellent anti-corrosion to sea water and abrasion resistance with low surface coefficient of friction.

- Surface hardness : Shore D 75
- Impact resistance : No damage on coating surface at 50cm drop of 20N sphere metal (Thickness of coating 0.3mm)
- Tread wear : At "Taber" abrasimeter(Type CS 17, load 9.81N) loss of weight after 1000 turns 5~8mg. ("Excellent") 30~40kV/mm(generally required satisfactory valve : 10kV/mm, min)
- Melting temperature : 184~186 °C
- Flammability : "Self extinguishing"acc

Notice for Order

1. Product selection guide

1-1. Select a proper diameter considering the product flow performance.

Too small diameter cannot secure an adequate flow, but too large diameter causes chattering in the pipe line.

1-2. We have many different products for different functions. If you have any specific requirement, please contact us.

2. Specify When Ordering

Model No.	Size	Pattern	Main Material	End Connection	Operating Pressure	Main Valve Accessory
※ Check the model number	50A	G : Up-right Globe Type	GCD : Ductile Iron	According to Customer Request	10kgf/cm ²	N : None
	~300A	A : Angle Type	STS : Stainless Steel		16kgf/cm ²	CL : Model CL-01
	50A ~1000A	Y : Y-type Globe	WCB: Cast Steel		20kgf/cm ²	ID : Model ID-01
					25kgf/cm ²	SW : Model SW-01 VOR : Model VOR-01

3. Additional notice

3-1. Please specify the power supply and IP Code required. (ex. 220V AC, 24V DC, 12V DC / IP65)

3-2. Please specify the pressure setting for relief valve and pressure reducing valve.(ex: Set-3K)

3-3. Please specify the liquid to be used. All our products are for water handling. In case the valve is to be used for oil, aviation gas or sea water, the following information must be indicated.

Example | 132-010, 100A, G, GCD, ANSI #150, N, Pressure setting 5

- ▶ Pressure Reducing Valve 100A, Up-right Globe Type, Main Material : Ductile Iron, Operating Pressure 10K, Flange ANSI #150, Pressure setting 5kgf/cm²



Installation!

1. Before installation, flush to clean pipeline.
2. Provide adequate clearance for servicing.
3. Arrow on valve body must match actual flow direction in pipe.
4. It is recommended to install the valve horizontally to ensure proper running of the valve, But the other position is also acceptable
5. Install isolation valves on both sides of control valve.
6. For assistance, please contact our office or factory for specific recommendations.



Technical data

Consideration on cavitation and application of functional disc

【 Cavitation 】

If a valve is operated in almost closed position when the pressure reduction ratio is great or liquid flow velocity is too high, an excessive pressure reduction is created at the valve seat area due to the drastic velocity increase. At this moment, if the pressure is decreased to lower than the saturated vapor pressure of water, air bubble is created and it is called cavitation.

【 Problems with cavitation 】

- 1) **Noise and vibration** : When the pressure reduction ratio is great, the main reason of noise and vibration is cavitation. The air bubbles created at the valve seat area do not vanish naturally when the pressure is recovered over the saturated vapor pressure after passing the valve seat, but explode because of the water pressure, which cause shock waves and damages on the surfaces of valve and pipeline.
- 2) **Cavitation corrosion** : A kind of pitting erosion by the shock waves can be progressed where the cavitation is occurred, which can not be solved with anti-corrosion materials or sacrificing corrosion.

【 Disc types 】

We have 3 types of discs, and each of them shows different cavitation index. The recommended pressure reduction ratios and maximum pressure reduction ratios for each disc are as below:

Disc type	Recommended pressure reduction ration	Maximum pressure reduction ration	Remark (Flow volume)
Flat Disc	3 : 1	4 : 1	None
U-Port Disc	4 : 1	5 : 1	30% loss
V-Port Disc	5 : 1	6 : 1	50% loss



▲ Flat Disc



▲ U-Port & V-Port Disc



Caution!

When the pressure reduction ratio requirement is great, 2 consecutive valves are often used in the field for secondary pressure reduction. However, when the sensitivity and accuracy of the valves are decreased after a long term usage, it can be a main reason of pulsation on the pipeline, which tends to be amplified as the time elapses because the pulsation has a constant cycle. Therefore, when using those 2 consecutive valves, it is recommended to maintain the valves properly by substituting the wearing parts periodically.

[Selection by Cv value and fluid velocity]

A proper valve size can be selected easily by comparing the maximum flow rate required against Kv value(Flow factor) provided by Balem, which are flow rate per pressure drop caused by natural pressure loss, not by the pressure reduction.

ex 1) A Robocon valve(Model 130, Up-right Globe type) will be used on a pipe line in which the maximum flow rate will be 220 cubic meters per hour. What will be the most suitable size for the line?

The Kv factors of Robocon(Model 130) valve are as shown in the table below :

Valve size		mm	50	80	100	150	200	250	300
		inch	2	3	4	6	8	10	12
Flow factor	Up-right Globe	Cv	54	113	207	422	722	1133	1610
		Kv	46	97	177	361	618	970	1378
	Angle Type	Cv	67	141	257	536	910	1461	2060
		Kv	57	121	220	459	779	1251	1764

The valve size 150 shows the most similar flow rate performance in this table.

In this case, the fluid flow rate required(Q) is calculated as below:

$$Q=220(m^3/h)/3600(sec)=0.0611(m^3/s)$$

The valve 150 has a cross section area $0.0176625(m^2)=0.15 \times 0.15 \times 3.14$

With these 2 factors, we can calculate the fluid velocity(V).

$$V=Q/A=3.47(m/s)=0.0611/0.0176625$$

As the recommended velocity for city water is 3~4m/s, you can decide to use the size 150 for the case.

ex 2) A Robocon valve(Model 130, Up-right type) will be used on a pipeline in which the maximum flow rate is expected to be 350 cubic meters per hour. What size will be the most suitable for the line?

The Kv factors of Robocon(Medel 130) valve are as shown in the table below :

Valve size		mm	50	80	100	150	200	250	300
		inch	2	3	4	6	8	10	12
Flow factor	Up-right Globe	Cv	54	113	207	422	722	1133	1610
		Kv	46	97	177	361	618	970	1378
	Angle Type	Cv	67	141	257	536	910	1461	2060
		Kv	57	121	220	459	779	1251	1764

The valve size 150 seems to have an adequate flow rate performance in this table.

However, if you calculate the velocity in the same manner as the above, you will find that the fluid velocity will be too fast, of which the details are as below:

$$\text{Flow rate}(Q)=350(m^3/h)/3600(sec)=0.09722(m^3/s)$$

Size 150 cross section area(A)= $0.0176625(m^2)=0.15 \times 0.15 \times 3.14/4$

$$\text{Velocity}(V)=Q/A=5.5(m/s)=0.09722/0.0176625$$

As the recommended velocity for city water is 3~4m/s, the velocity 5.5m/s is too fast against the recommendation. Let us try again with the bigger size 200.

Size 200 cross section area(A)= $0.0314(m^2)=0.2 \times 0.2 \times 3.14/4$

$$V=Q/A=3.096(m/s)=0.09722/0.0314$$

Now, as the recommended velocity for city water is 3~4m/s, you can decide to use the valve size 200 for this case, which may secure the more safe running of the line.