

## PB-Series Pump Protection

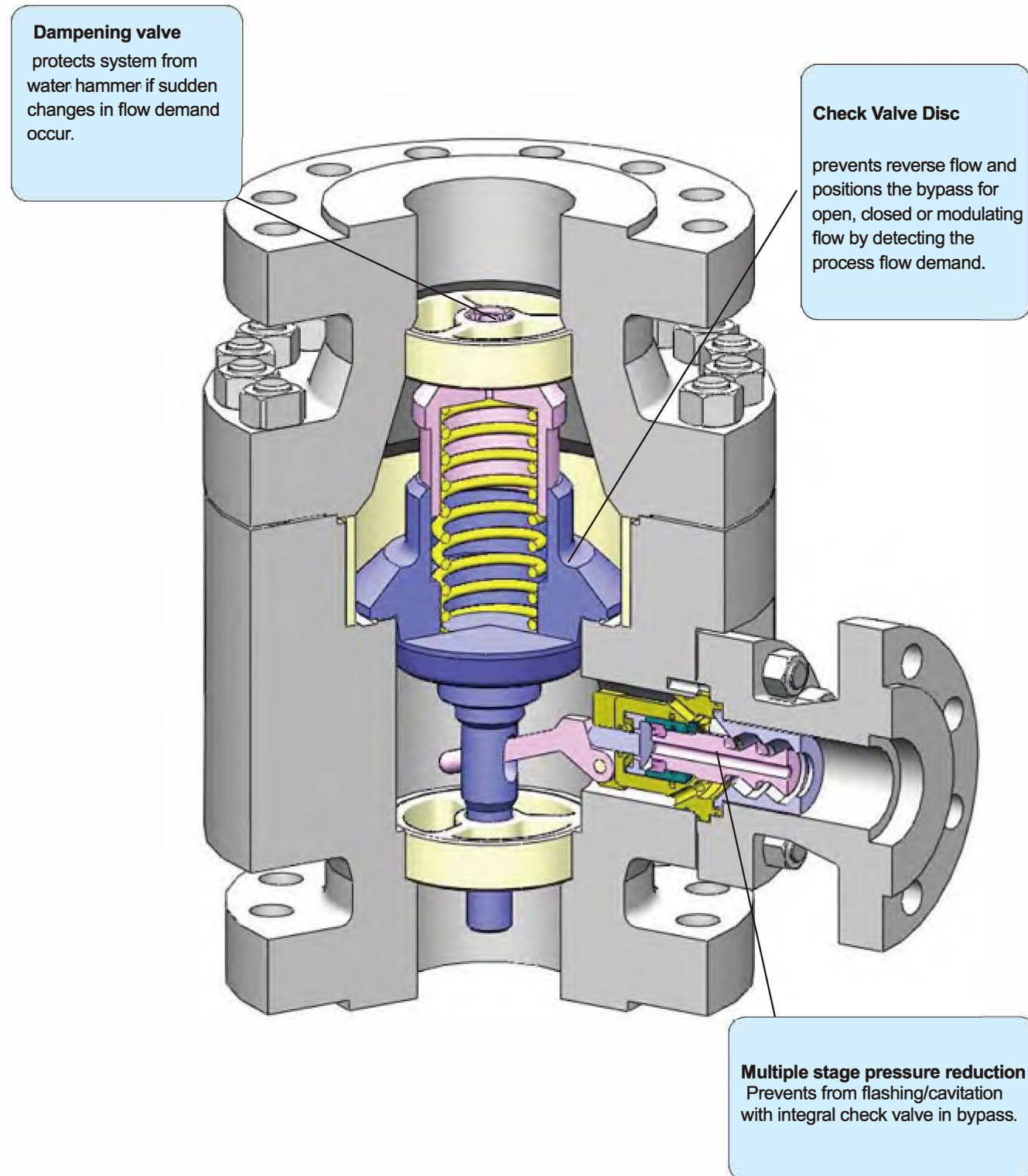
Automatic Recirculation valve



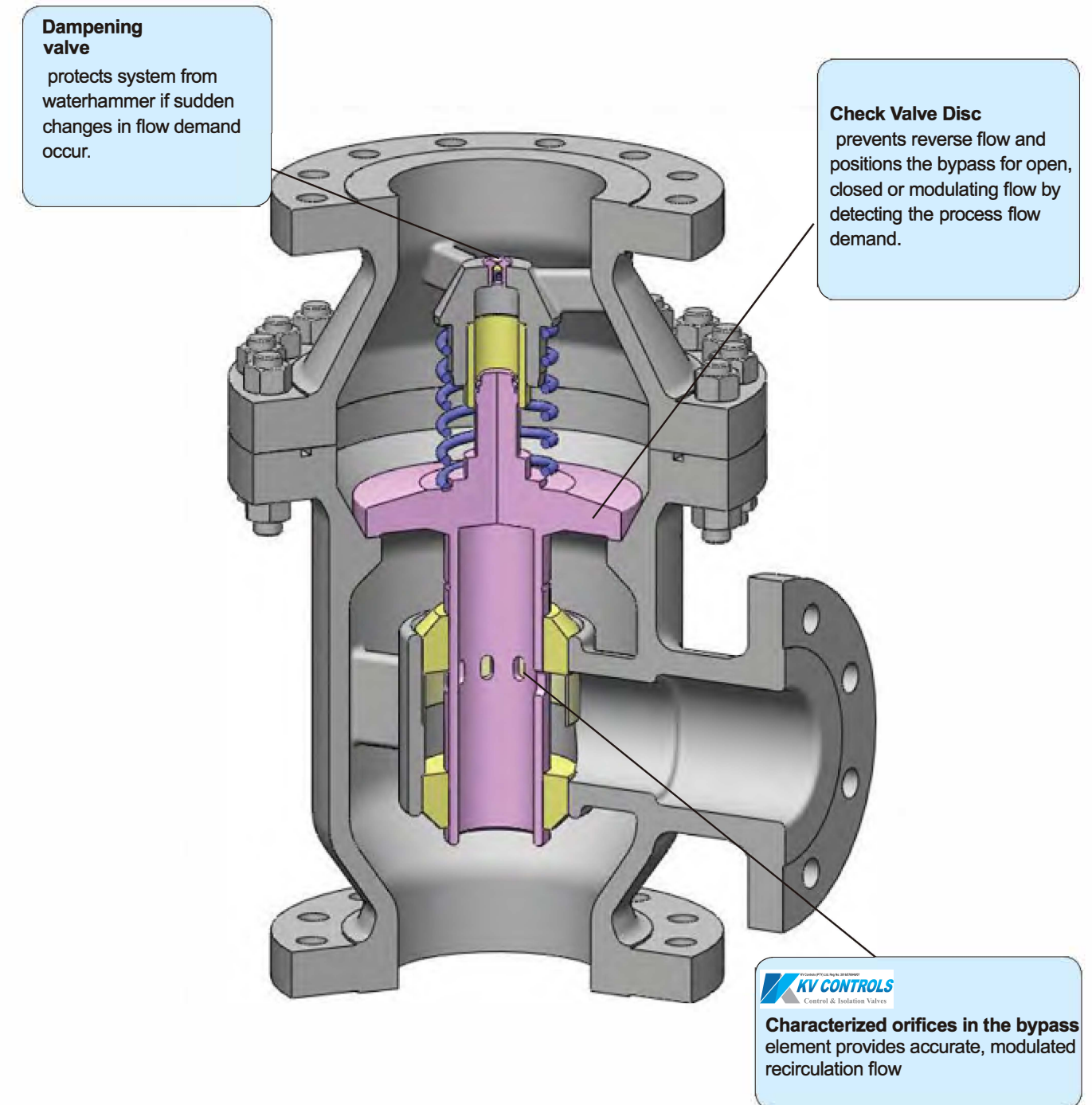
**Minimum Flow Protection**



## PBH Series

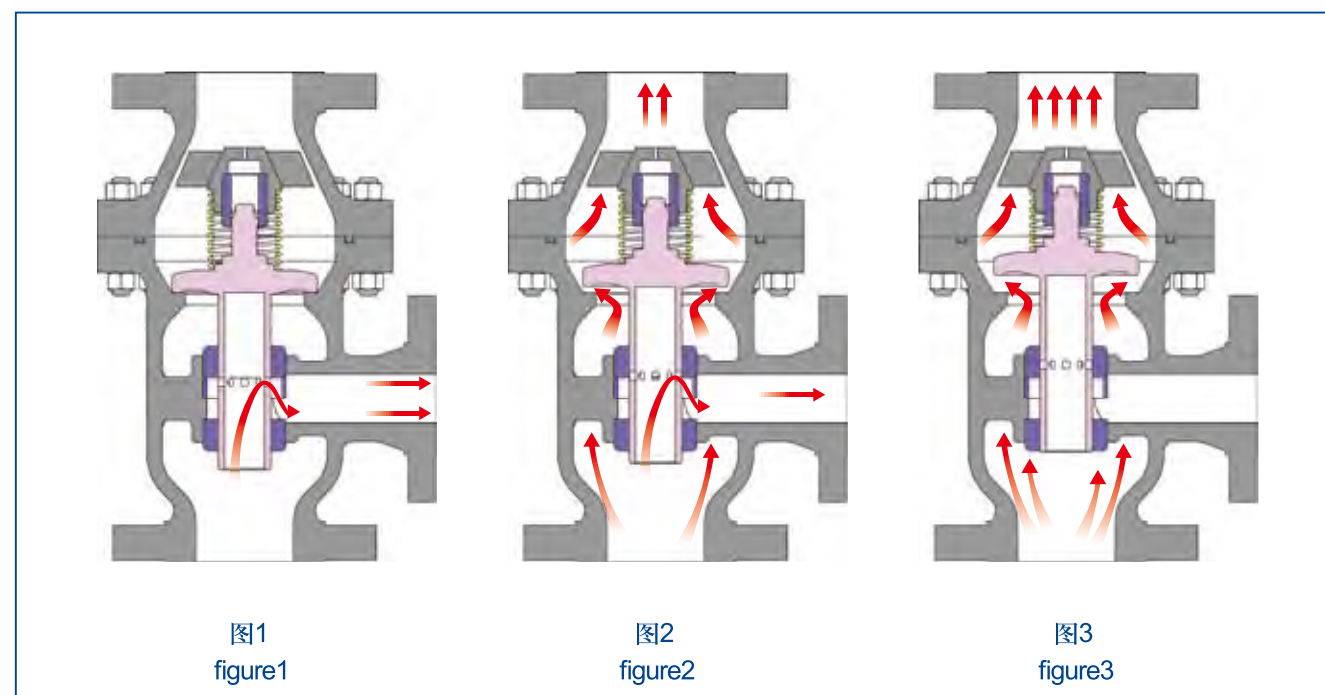


## PBL Series



## Automatic recirculation valve mechanism introduced

The heart of the ARC valve is a main flow sensing check valve disc, which is flow sensitive but pressure sensitive. The disc modulates to the demand for process flow while assuring a minimum flow through the pump. This modulating characteristic results in a consistent, stable, and repeatable performance over full pressure range. The disc is shown in the closed position in Figure 1. In this position there is no process flow and the bypass is full open. The valve provides for single phase flow in the bypass eliminating the possibility of flashing or cavitation. As the disc lifts (Figure 2) in response to an increase in flow to the process, the bypass element which is integral to the disc, closes the bypass flow orifices reducing recirculation flow. Recirculation flow is controlled with disc position. This modulation feature assures that the total of process flow and recirculation flow exceeds the minimum flow through the pump as specified by the pump manufacturer; When the disc is full open, as in Figure 3, the bypass is closed.



## Minimum Flow Protection Methods

### Continuous recirculation valve

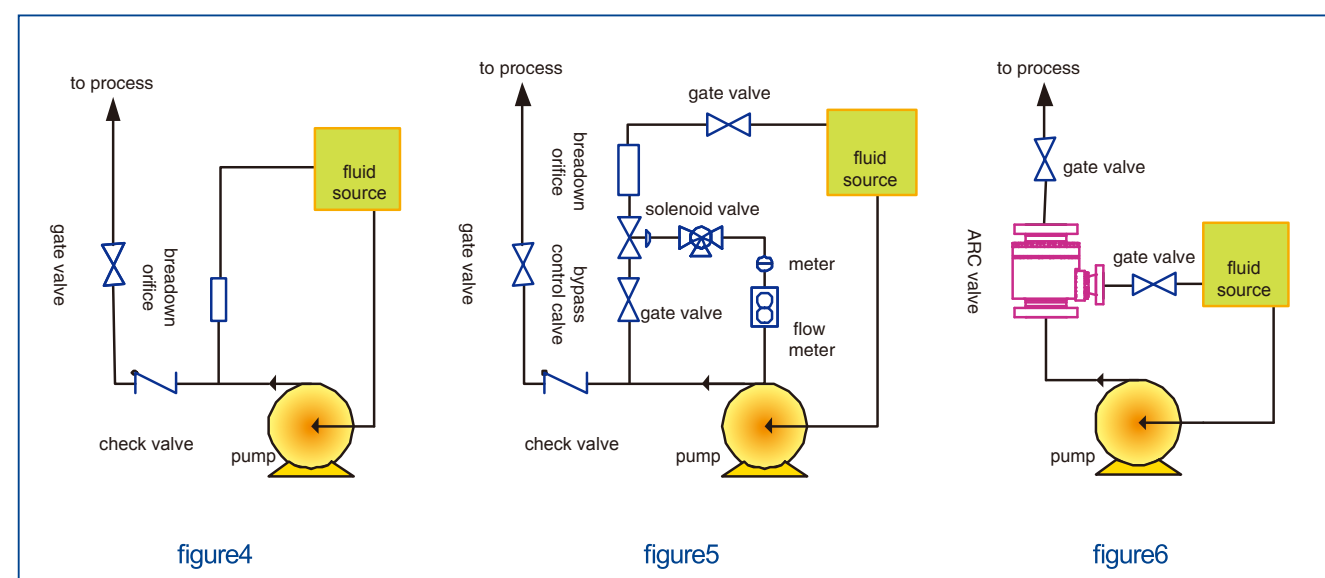
The desired minimum flow volume is recirculated regardless of the system demand for fluid. Fixed orifices reduce the pressure before discharging. Continuous recirculating provides reliable pump protection, however, it is very inefficient and costly. The pump and driver must be sized to allow for the additional flow that is recirculating even when the flow demand rate exceeds the required minimum flow. See Figure 4.

### Control Loop System

Recirculating occurs only when the process flow demand drops below the required minimum flow rate. Instrument controlled systems eliminate the inefficient and costly to operate constant recirculating systems. However, the necessary system components; check valve, flow meter, pressure reducing valve and related piping result in a considerable expense to purchase, install and maintain. See Figure 5.

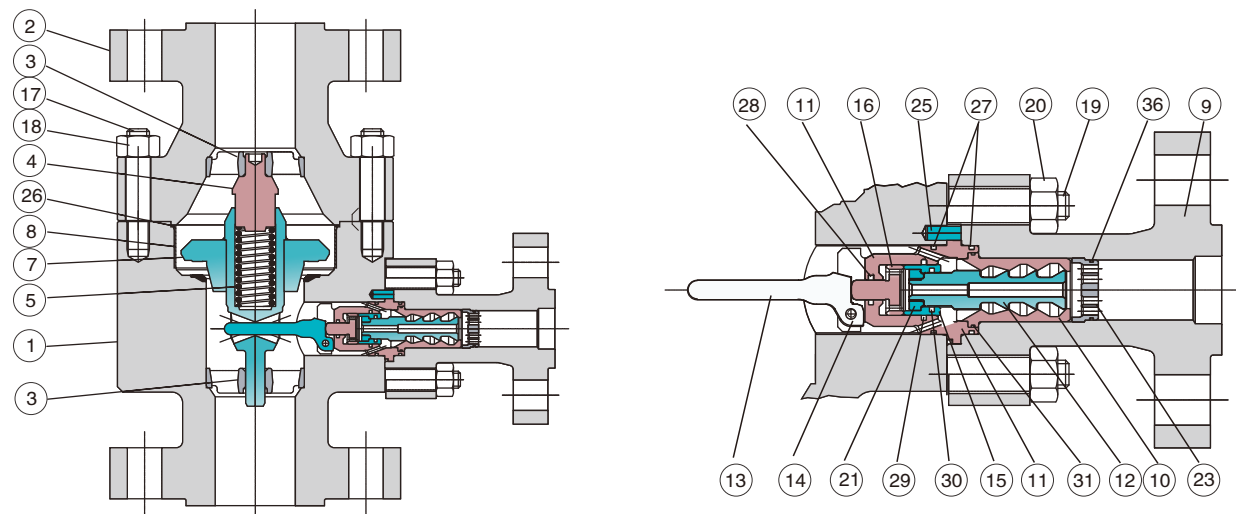
### Automatic Recirculation Valve System

The automatic recirculating valve performs all flow sensing, bypass pressure reduction, reverse flow protection and modulating recirculating flow in an integral three port valve. The valve performs the same function of an instrumented system without the multitude of components, piping connections and system design expense. The valve is flow operated and does not require any air or electricity to operate. See Figure 6.





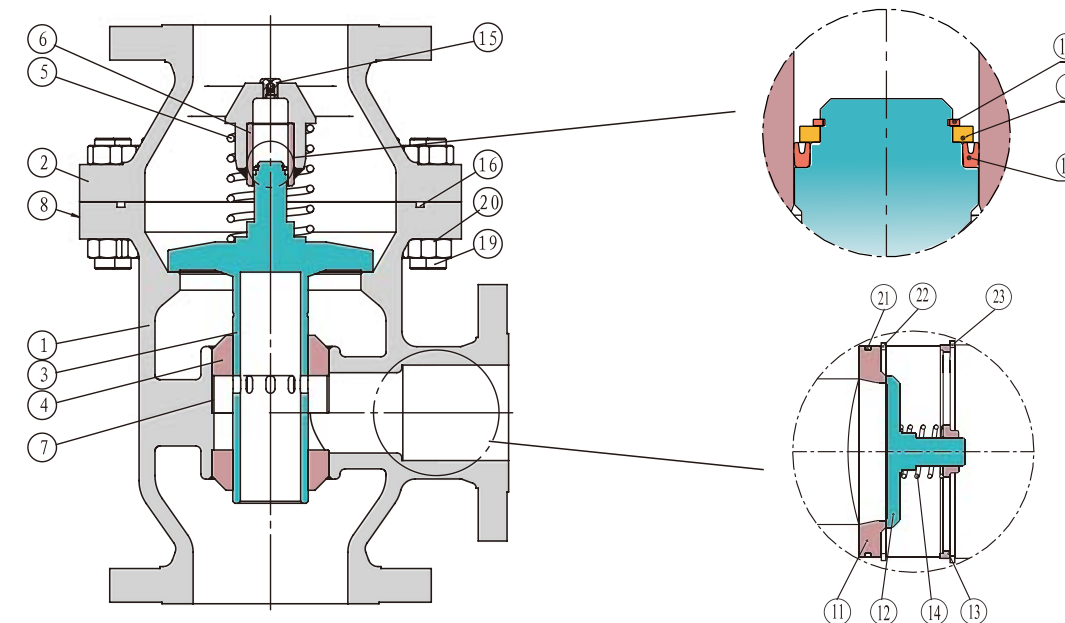
## PBH main Dimensions and materials



### PBH main materials

Ref.No	Part Name	Sign of materials	
		01	02
1	Body	ASTM A105	ASTM A182 F304
2	Bonnet	ASTM A105	ASTM A182 F304
3	Stem Guide	ASTM A276 304	ASTM A276 304
4	Guide Bolt	ASTM A276 304	ASTM A276 304
5	Spring	ASTM A276 304	ASTM A276 304
6	Name Plate	ASTM A276 304	ASTM A276 304
7	Check Valve	ASTM A276 304	ASTM A276 304
8	Protection Sleeve	ASTM A276 304	ASTM A276 304
9	Bypass Branch	ASTM A105	ASTM A182 F304
10	Vortex Housing	ASTM A564 630	ASTM A564 630
11	Holder	ASTM A564 630	ASTM A564 630
12	Vortex Plug	ASTM A564 630	ASTM A564 630
13	Lever	ASTM A564 630	ASTM A564 630
14	Pivot Pin	ASTM A564 630	ASTM A564 630
15	Vortex Bushing	ASTM A564 630	ASTM A564 630
16	Piston	ASTM A564 630	ASTM A564 630
17	Stud	ASTM A193 B7	ASTM A194 8
18	Hex Nut	ASTM A194 2H	ASTM A193 B8
19	Stud	ASTM A193 B7	ASTM A194 8
20	Hex Nut	ASTM A194 2H	ASTM A193 B8
26	O-Ring	Elastomer	Elastomer
27	O-Ring	Elastomer	Elastomer
28	O-Ring	Elastomer	Elastomer
29	Glide Ring	Elastomer+PTFE	Elastomer+PTFE
30	Glide Ring	Elastomer+PTFE	Elastomer+PTFE
31	Glide Ring	Elastomer+PTFE	Elastomer+PTFE
32	O-Ring	Elastomer	Elastomer

## PBL main Dimensions and materials



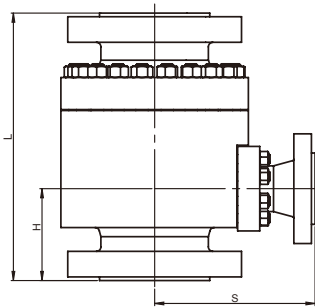
### PBL main materials

Ref.No	Part Name	Sign of materials	
		01	02
1	Body	ASTM A216 WCB	ASTM A351 GR.CF8M
2	Bonnet	ASTM A216 WCB	ASTM A351 GR.CF8M
3	Check Valve	ASTM A276 316	ASTM A276 316
4	Bypass Ring	ASTM A564 630	ASTM A564 630
5	Main Spring	ASTM A276 316	ASTM A276 316
6	Slide Ring	ASTM A564 630	ASTM A564 630
7	Lower Slide Ring	ASTM A564 630	ASTM A564 630
8	Name Plate	ASTM A276 304	ASTM A276 304
9	Baffle	ASTM A276 316	ASTM A276 316
15	Damping Valve	ASTM A276 304	ASTM A276 316
16	O-ring	Elastomer	Elastomer
17	Vari Seal ring	Elastomer	Elastomer
18	Retaining Ring	ASTM A276 316	ASTM A276 316
19	Stud	ASTM A193 B7	ASTM A193 B8
20	Nut	ASTM A194 2H	ASTM A194 8

### Bypass Options

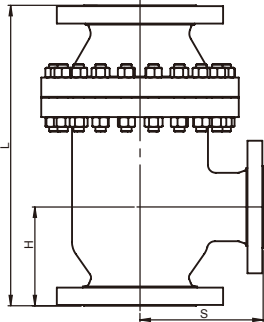
11	Valve Seat	ASTM A276 316
12	Disc	ASTM A276 316
13	Stem Guide	ASTM A276 316
14	Bypass Spring	ASTM A276 316
21	O-Ring	Elastomer
22	Retaining Ring	ASTM A276 316
23	Retaining Ring	ASTM A276 316

PBH Dimensions , Weights and Flow Ratings



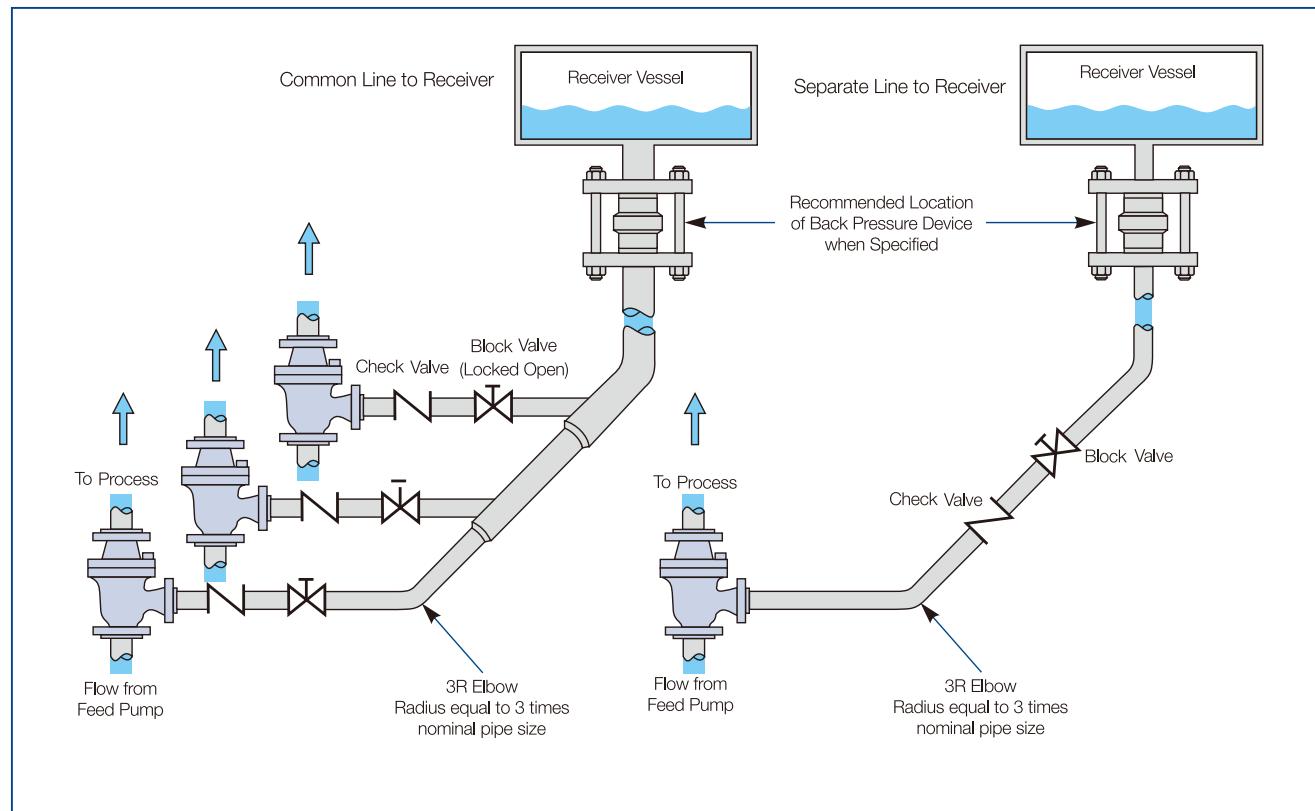
Valve size		ANSI	Max. Main Flow (M³/h)	Max. Bypass Flow (M³/h)	Bypass Max. Cv	Weight (Kg)	Dimensions mm		
Main mm(In)	Bypass mm(In)						L (mm)	H (mm)	S (mm)
40 (1.5)	25 (1)	600	34	14	1.3	32	260	90	190
		900			1.1	42	300	110	200
		1500			0.9	57	310	120	215
50 (2)	25 (1)	600	50	14	2.7	48	300	110	193
		900			1.7	76	340	130	203
		1500			1.6	95	350	130	233
65 (2.5)	40 (1.5)	600	75	34	3.5	68	340	125	220
		900			2.6	88	380	140	230
		1500			2.4	103	400	145	250
80 (3)	40 (1.5)	600	114	34	5.2	100	380	140	240
		900			4	113	410	150	250
		1500			3.5	140	450	165	275
100 (4)	50 (2)	600	204	57	8.5	149	430	155	266
		900			5.6	176	450	160	280
		1500			5.2	222	520	190	300
125 (5)	65 (2.5)	600	250	91	11	205	500	175	310
		900			9.5	272	525	185	310
		1500			6.5	278	650	235	341
150 (6)	80 (3)	600	454	125	14	375	550	190	335
		900			12	430	585	200	350
		1500			10	496	700	250	405
200 (8)	100 (4)	600	749	204	22	545	650	215	405
		900			20	640	675	225	405
		1500			16	786	850	295	475
250 (10)	150 (6)	600	999	279	35	822	800	270	520
		900			25	1155	800	270	520
		1500			22	1483	975	330	568
300 (12)	150 (6)	600	1498	431	55	1710	1051	360	649
		900			35	1978	1051	360	649
		1500			30	2665	1149	400	700

PBL Dimensions , Weights and Flow Ratings



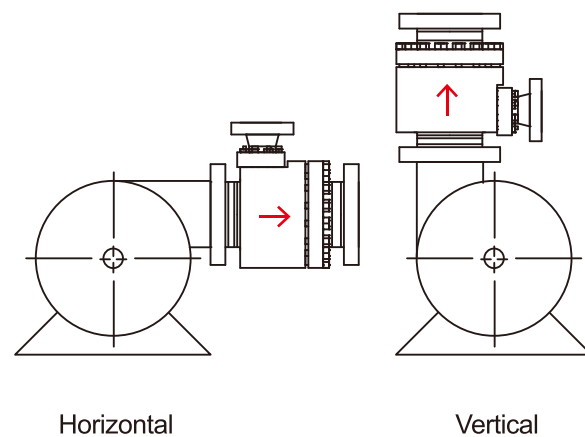
Valve Size			Max. Main Flow (M³/h)				Weight (Kg)	Dimensions mm		
Main mm(In)	Bypass mm(In)	ANSI		( m³/h)	Max CV	Min CV		L (mm)	H (mm)	S (mm)
25 (1)	20 (3/4)	150 300 600	14	8	6.1	0.5	10 15 22	244 244 258	87 87 94	120 120 120
40 (1-12)	20 (3/4)	150 300 600	28	8	6.1	0.5	12 17 22	244 244 258	87 87 94	120 120 145
50 (2)	40 (1-1/2)	150 300 600	60	17	8.5	1.0	18 22 26	278 278 294	101 101 109	140 450 165
80 (3)	50 (2)	150 300 600	114	38	17	2.0	30 42 54	358 393 414	118 130 135	142 153 167
100 (4)	80 (3)	150 300 600	205	73	36.4	3.0	49 72 100	401 462 499	137 158 168	172 185 205
150 (6)	100 (4)	150 300 600	455	148	91	5.0	100 143 206	534 578 636	175 190 206	214 237 259
200 (8)	150 (6)	150 300 600	750	284	169.8	7.0	199 272 354	750 796 856	245 258 275	275 295 320
250 (10)	200 (8)	150 300 600	1250	545	425	25.0	430 610 875	900 950 1100	300 320 365	340 360 414
300 (12)	250 (10)	150 300 600	1650	950	830	42.0	520 790 1300	920 1015 1050	305 340 375	370 400 450
350 (14)	250 (10)	150 300 600	consult factory					1350 1330 1442	400 420 476	410 450 533
400 (16)	300 (12)	150 300 600	consult factory					1440 1522 1630	475 504 538	525 565 602
450 (18)	350 (14)	150 300 600	consult factory					1620 1710 1825	535 564 602	590 620 674
500 (20)	400 (16)	150 300 600	consult factory					1800 1885 2012	595 622 664	655 696 744

## ARC Valve installation



## ARC Valve installation

The valve and its components are selected according to specifications supplied by customers. Any change in pressure, temperature, type of fluid and flow condition, may require modification of valve internals. Please Consult with the factory if the aforementioned occurred.



The installation of the ARC valve can be both Vertical (preferred) and Horizontal. The by-pass flow direction may be any but down when installation is horizontal. ARC valve is normal installed near or on the discharge flange of the centrifugal pump. Flow direction must be as indicated by the arrow stamped into the body.

## How to Order

### Required Application Data

#### 1. Main Flow

Maximum ..... m<sup>3</sup>/h  
 Normal ..... m<sup>3</sup>/h  
 Max. Pump Flow ..... m<sup>3</sup>/h

#### 2. Pump discharge pressure

Normal flow ..... MPa  
 Bypass Flow ..... MPa  
 Shut-Off Pressure ..... MPa  
 Bypass Back Pressure ..... MPa

#### 3. Temperature

Normal ..... C  
 Maximum ..... C

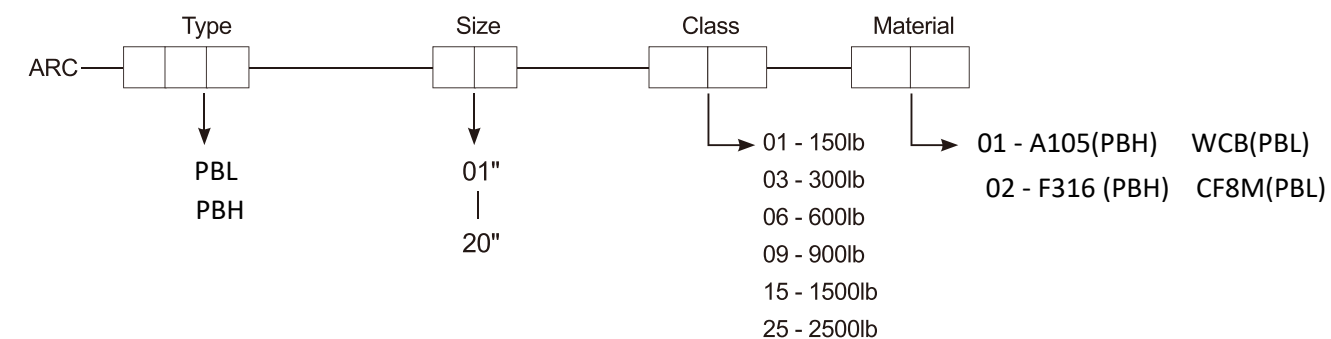
#### 4. Liquid

Density ..... kg/cm<sup>3</sup>  
 Vapour Pressure ..... MPa  
 Viscosity ..... Cp

#### 5. Installation Direction

Horizontal Vertical

### Valve Code



### For Example

300 lbs, 3", CF8M, PBL-03-03-02

Here is a valve with Pressure Class 300Lb, Valve DN 3", material CF8M, so its Valve Model is:  
 PBL- 03-03-02