

HB Control Valves

3-Way Valve with Pneumatic Actuator

PNEUMATIC ACTUATORS

for MIXING & DIVERTING • Water & Other Liquids

3-Way • 1/2" – 4"

Valve Design conforms to ANSI/ASME B 16.34

Models	HB 3-Way Valve with Pneumatic Actuator
Service	Steam, Air, Water
Sizes	1/2" - 4"
Connections	NPT, 150# FLG, 300# FLG
Body Material	316 Stainless Steel
Plug and Seat Material	Stainless Steel (Std.)
PMO Max. Operating Pressure	720 PSIG @ 100°F
TMO Max. Operating Temperature	450°F @ 497 PSIG
Min Operating Temperature	-20°F
Max Air Supply Pressure	50 PSIG
Max Ambient Temperature	280°F
Min Ambient Temperature	-20°F

DESIGN PRESSURE/TEMPERATURE RATING – PMA/TMA

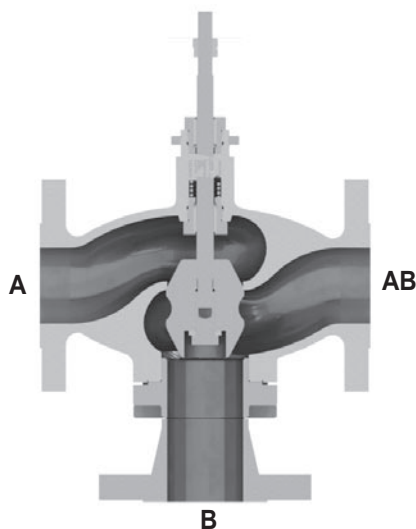
NPT	497 PSIG @ 450°F
150# FLG	182 PSIG @ 450°F
300# FLG	497 PSIG @ 450°F

Typical Applications

The **HB Series 3-Way** valves are used for **mixing** two separate liquid streams, or for **diverting** the flow of a single liquid stream (bypass). In order to produce a consistent flow for stable operation, the pressure drop across both flow paths (inlet to outlet) must be nearly equal. The valve plug is constructed of stainless steel for extended service life. A Teflon plug option is available for increased shut-off tightness or for water or glycol type service, up to a maximum of 450°F.

Description & Operation

A control valve is comprised of an actuator mounted to a valve. The valve modulates flow through movement of a valve plug in relation to the port(s) located within the valve body. The valve plug is attached to a valve stem, which, in turn, is connected to the actuator. The pneumatic actuator directs the movement of the stem as dictated by the external control device.



Mixing:

Ports "A" and "B" are Inlets
Port "AB" is Outlet

Diverting:

Port "AB" is Inlet
Ports "A" and "B" are Outlets



3-WAY VALVES ARE NOT FOR USE WITH STEAM

TECHNICAL INFORMATION

Seat Type	Metal Seat
	Soft-Seat
Leakage Rating	ANSI/FCI-70-2 Class IV, VI
Rangeability	50:1
Travel (1/2" - 2" Body)	3/4"
(2 1/2" - 4" Body)	1 1/8"
Body Design Rating	ASME 150/300
Diaphragm Design	Semi-rolling, Multi-spring
Action Options	Fail Open
	Fail Closed
	Field Reversible
Positioner Mounting	IEC 60534-6-1 (NAMUR)



3-Way Valve

2 1/2" – 4"

shown
with Optional
Positioner
and
Filter/Regulator

3-Way Valve with Pneumatic Actuator

3-Way • 1/2" – 4"

I/P = Close-Off Pressures using I/P Transducer Only
 w/Pos. = Close-Off Pressures with Positioner

Size	Connection	Partial Valve Model Code †		Actuator in ²	Max Close-Off Pressure (PSI△P)						Weight lbs
					Standard Actuator Range (PSIG)		Optional Actuator Range (PSIG)				
		Full Port	Cv		3-15 PSIG Signal 6-11 PSIG Bench		3-22 PSIG Signal 13-22 PSIG Bench		3-22 PSIG Signal 13-22 PSIG Bench		
					I/P	w/ Positioner	I/P	w/ Positioner	I/P	w/Positioner	
1/2"	NPT	HB1300F-12N	5	50	220	425	-	-	-	-	23
3/4"	NPT	HB1300F-13N	6.5		220	425	-	-	-	-	23
1"	NPT	HB1300F-14N	10		220	425	-	-	-	-	25
1 1/2"	NPT	HB1300F-16N	22		110	215	-	-	-	-	29
2"	NPT	HB1300F-17N	42		55	110	-	-	-	-	36
1/2"	150# FLG	HB1300F-121	5	50	220	275*	-	275*	-	-	25
3/4"	150# FLG	HB1300F-131	6.5		220	275*	-	275*	-	-	25
1"	150# FLG	HB1300F-141	10		220	275*	-	275*	-	-	29
1 1/2"	150# FLG	HB1300F-161	22		110	215	-	275*	-	-	36
2"	150# FLG	HB1300F-171	42		55	110	-	220	-	-	43
2 1/2"	150# FLG	HB1300F-181	70	100	59	118	-	-	245	245	100
3"	150# FLG	HB1300F-191	110		44	90	-	-	185	185	124
4"	150# FLG	HB1300F-201	170		22	47	-	-	100	100	156
1/2"	300# FLG	HB1300F-123	5	50	220	425	-	720	-	-	26
3/4"	300# FLG	HB1300F-133	6.5		220	425	-	720	-	-	26
1"	300# FLG	HB1300F-143	10		220	425	-	720	-	-	31
1 1/2"	300# FLG	HB1300F-163	22		110	215	-	430	-	-	39
2"	300# FLG	HB1300F-173	42		55	110	-	220	-	-	52
2 1/2"	300# FLG	HB1300F-183	70	100	59	118	-	-	-	245	108
3"	300# FLG	HB1300F-193	110		44	90	-	-	-	185	138
4"	300# FLG	HB1300F-203	170		22	47	-	-	-	100	186

* Shut-off pressure limited by flange class rating.

† To complete Full Model Code, Must Specify: Trim, Packing, Actuator and Control Signal Type

CONTROL VALVES

Model Code Configuration Chart

Example (Fail-Closed A-Port): HB1300F-12N-PA1-31

Example (Fail-Closed B-Port): HB1300F-12N-PA2-31

3-Way VALVE BODY									CONNECTION				ACTUATOR - 50 in ² (PSIG)				
Model	Code	Trim Style	Code	Seat Type	Code	Packing	Code	Port Type	Code	Size	Code	Connection	Code	Actuator	Code	Control Signal	Bench Set
HB1	3	3-Way	0	Metal Seat Stainless	0	Teflon Graphite	F	Full Port	12	1/2"	N	NPT	PA1	Fail-Closed "A" Port	31	3-15	6-11
									13	3/4"	1	150# FLG					
									14	1"	3	300# FLG					
									16	1 1/2"	6	600# FLG					
									17	2"	B	BSP					
			1	Soft Seat Teflon					18	2 1/2"	P	PN16	PA2	Fail-Closed "B" Port		3-22	13-22
									19	3"	Q	PN25					
									20	4"							
									ACTUATOR - 100 in ²								
									PB1	Fail-Closed "A" Port	31	3-15	6-11	PB2	Fail-Closed "B" Port	11	3-23
Options									Code								
Other Elastomer Trim						C.F.											

Options	Code
Other Elastomer Trim	C.F.
Positioner Mounting Kit:	W-KIT-NP-HB-ATO/ATC
Direct Mount I/P Transducer	TA901
Direct Mount Air Filter/Regulator	TA987
Air Filter/Regulator Mounting Kit:	W-KIT-TA987-HB (50in ² act.) W-KIT-TA987-HB-L (100in ² act.)
Stainless Steel 50 in ² Actuator	C.F.
Solenoid valve for pneumatic On/Off operation.	C.F.
Handwheel for Actuator	C.F.

Note: 3-Way Valve Actuator action is as follows:
 PA1/PB1- Fails with Stem Retracted
 PA2/PB2- Fails with Stem Extended

3-Way Valve with Pneumatic Actuator

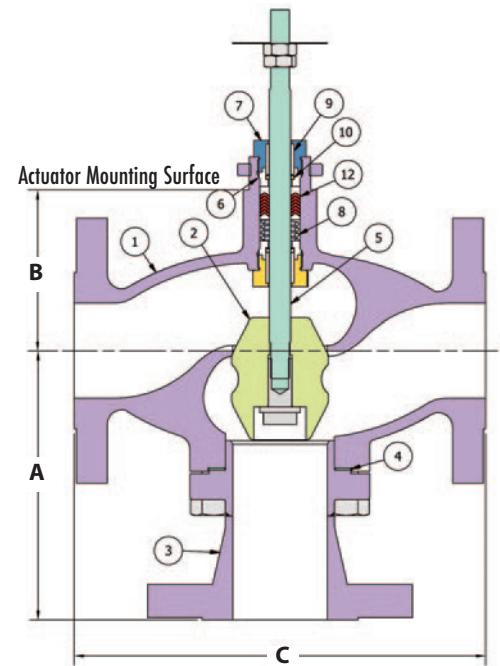
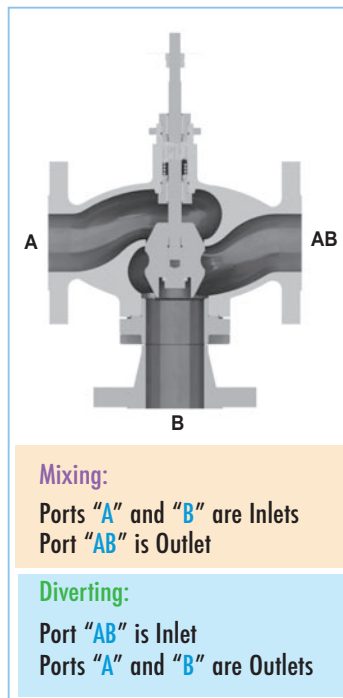
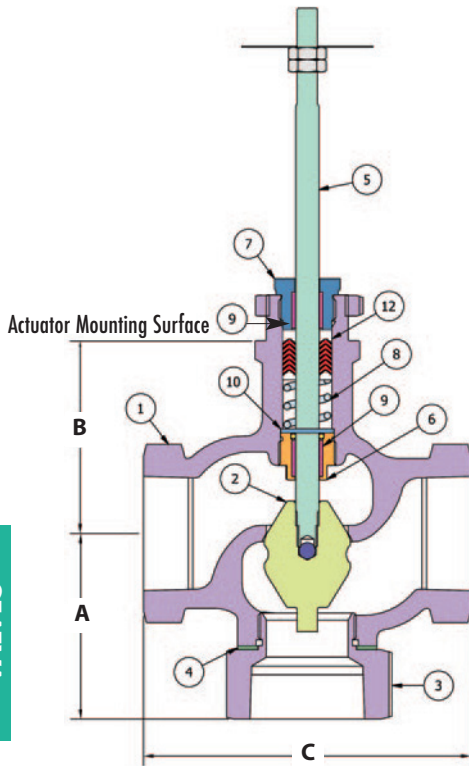
for MIXING & DIVERTING • Water & Other Liquids

3-Way • 1/2" – 4"

3-Way for Mixing or Diverting

1/2" to 2"
Threaded & Flanged

2 1/2" to 4"
Flanged



Item	Description	Material
1	Body	316 Stainless Steel
2	Valve Plug*	Hardened Stainless Steel
4	Body Gasket*	303 Stainless Steel
5	Stem*	316 Stainless Steel
6	Lower Seal Bushing	303 Stainless Steel
7	Gland Nut	303 Stainless Steel
8	Stem Seal Spring*	302 Stainless Steel
9	Guide Bushing*	Rulon 641 / PTFE
10	Washer	303 Stainless Steel
12	V-ring Stem Seals*	PTFE

* Recommended Spare Parts

Size	A	B	A	A	C	C	C	Weight (lbs)		
	NPT		150	300	NPT	150#	300#	NPT	150#	300#
1/2"	2.31	2.95	4	4	4.50	7.25	7.75	4	8.5	9
3/4"	2.31	2.95	4	4	4.50	7.25	7.75	4	8.5	9
1"	2.31	2.95	4	4	4.50	7.25	7.75	5.5	12	13.5
1 1/2"	2.84	2.95	4.3	4.3	5.00	8.75	9.25	7	18.5	22
2"	3.19	2.95	5	5	6.00	10	10.5	11	26	35
2 1/2"	-	4.25	7.13	7.38	-	10.88	11.5	-	50	58
3"	-	4.25	8.32	8.5	-	11.75	12.5	-	74	88
4"	-	4.25	9.19	9.5	-	13.88	14.5	-	106	136

MAXIMUM FLOW COEFFICIENT (C_v)

Valve Body Size	1/2" (Reduced Port)	1/2"	3/4"	1"	1 1/2"	2"	2 1/2"	3"	4"
	3.5	5	6.5	10	22	42	70	110	170

HB Control Valves

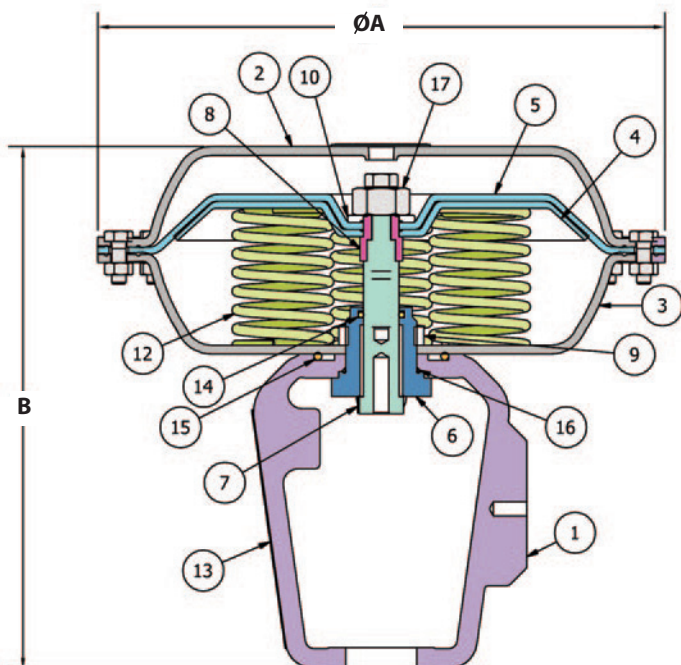
3-Way Valve with Pneumatic Actuator

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3-Way • 1/2" – 4"

Pneumatic Actuator 50in²



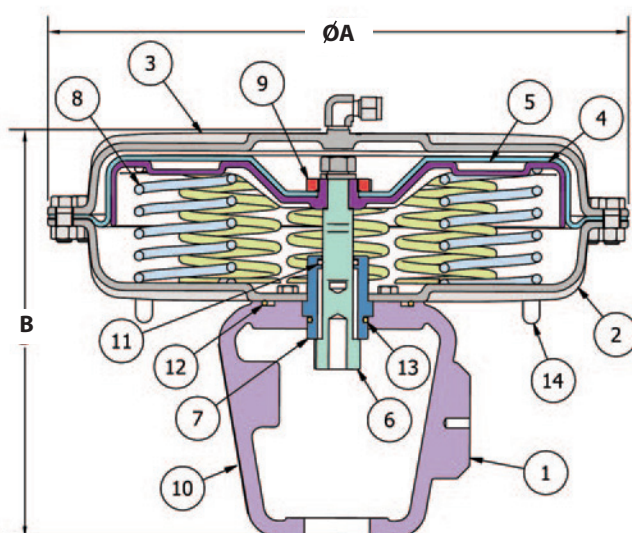
Item	Description	Material
1	Yoke	Stainless steel
2**	Upper diaphragm case	Epoxy painted steel
3**	Lower diaphragm case	Epoxy painted steel
4	Diaphragm plate	Nickel plated steel
5*	Diaphragm	Nylon reinforced Neoprene
6	Upper guide bush	Stainless Steel / Bronze
7	Lower actuator stem	Stainless steel
8	Upper actuator stem	Stainless steel
9*	Ring nut	Stainless steel
10	Diaphragm washer	Stainless steel
11	Position indicator disc	Stainless steel
12*	Spring**	Stainless steel
13	Nameplate	Stainless steel
14*	Stem O-ring	Viton
15*	Yoke O-ring	Viton
16*	Upper guide O-ring	Viton
17	Hex nut Stainless	Steel

* Recommended Spare Parts

** Available in Stainless Steel

Optional Actuator Handwheel for manual Adjustment. C.F.

Pneumatic Actuator 100in²



Item	Description	Material
1	Yoke	Stainless steel
2	Lower diaphragm case	Stainless steel
3	Upper diaphragm case	Stainless steel
4	Diaphragm plate	Stainless steel
5*	Diaphragm	Nylon reinforced Neoprene
6	Spindle	Stainless steel
7	Guide bushing Assembly	Stainless Steel / Bronze
8*	Spring (x8)	Stainless steel
9	Diaphragm nut	Stainless steel
10	Nameplate	Stainless steel
11*	Spindle O-ring	Viton
12*	Yoke O-ring	Viton
13*	Guide O-ring	Viton
14	Thread Protector	Viton

* Recommended Spare Parts

Actuator Size	A	B	Weight (lbs)
50 in ²	10.00	9.25	18
100 in ²	14.38	10.00	50

Special High Thrust Actuator available for increased shut-off pressures on 2-1/2" - 4" valve bodies; Consult factory.

CONTROL
VALVES

HB Series Mixing & Diverting (3-Way Valves)

CAPACITIES – Water (GPM)

3-WAY VALVES

Inlet pressures should be within 5% of each other. Specify if service is for other than water.

Pressure Drop (PSI Δ P)	Size, Body Number & Coefficient (Cv)							
	1/2"	3/4"	1"	1 1/2"	2"	2 1/2"	3"	4"
	Cv = 5	Cv = 6.5	Cv = 10	Cv = 22	Cv = 42	Cv = 70	Cv = 110	Cv = 170
1	5	6.5	10	22	42	70	110	170
3	8.7	11.3	17.3	38	73	121	191	294
5	11.2	15	22	49	94	157	246	380
10	15.8	21	32	70	133	221	348	538
15	19	25	39	85	163	271	426	658
20	22	29	45	98	188	313	492	760
25	25	33	50	110	210	350	550	850
30	27	36	55	120	230	383	602	931
40	32	41	63	139	266	443	696	1075
50	35	46	71	156	297	495	778	1202
60	39	50	77	170	325	542	852	1317
70	42	54	84	184	351	586	920	1422
80	45	58	89	197	376	626	984	1521
90	47	62	95	209	398	664	1044	1613
100	50	65	100	220	420	700	1100	1700
125	56	73	112	246	470	783	1230	1901
150	61	80	122	269	514	857	1347	2082
175	66	86	132	291	556	926	1455	2249
200	71	92	141	311	594	990	1556	2404
225	75	98	150	330	630	1050	1650	2550
250	79	103	158	348	664	1107	1739	2688

- Notes:
- 1) Capacities based on 70°F water (SG = 1.00).
 - 2) Capacities based on 100% of Cv.
 - 3) Maximum capacities are based on pressure drop at constant cavitation at 70°F.
 - 4) Cavitation adapters available to prevent cavitation.