

2-Way Valve with Pneumatic Actuator

for HEATING • COOLING • FLUID TRANSFER • Steam, Air, & Water

2-Way • 1/2" – 4"

Valve Design conforms to ANSI/ASME B 16.34

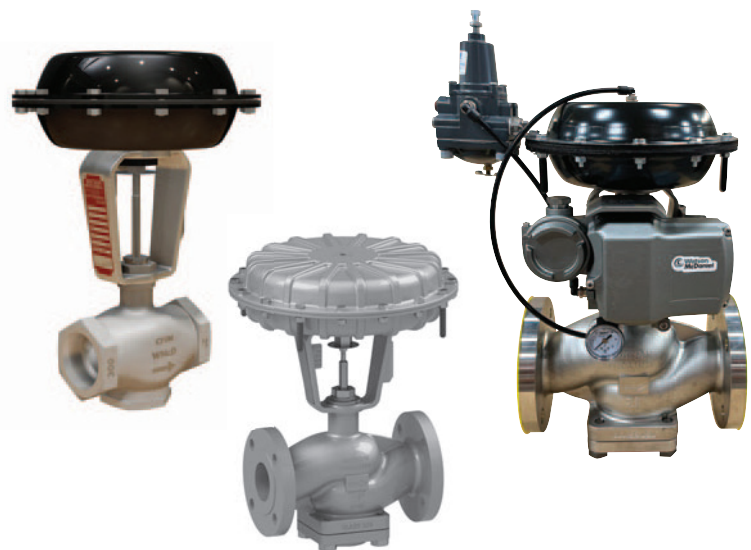
Models	HB 2-Way Valve with Pneumatic Actuator
Service	Steam, Air, Water
Sizes	1/2" - 4"
Connections	NPT, 150# FLG, 300# FLG
Body Material	316 Stainless Steel
Plug and Seat Material	Stainless Steel (Std.)
PMO Max. Operating Pressure	720 PSIG @ 100°F
TMO Max. Operating Temperature	450°F @ 497 PSIG
Min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

The HB Series Stainless Steel 2-Way Control Valves are made to withstand the rigorous nature of steam service and are compatible with air, water, and other fluids as well. These stainless steel valves are a cost-effective alternative when compared to valves with bronze, cast iron or cast steel bodies. The standard configuration has an equal percentage flow characteristic with metal-to-metal seating, spring-loaded Teflon V-ring stem packing and Pneumatic Actuator. The Pneumatic Actuator is controlled by a 3-15 PSIG standard instrument air signal that will modulate the position of the valve.

The Actuator can be specified to operate the valve for either **Air-to-Open (Normally Closed)**, typically for "HEATING" applications) or **Air-to-Close (Normally Open)**, typically for "COOLING" applications), but can also be re-configured in the field if needed.



TECHNICAL INFORMATION

Plug Design	Equal Percentage
	Linear
	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)

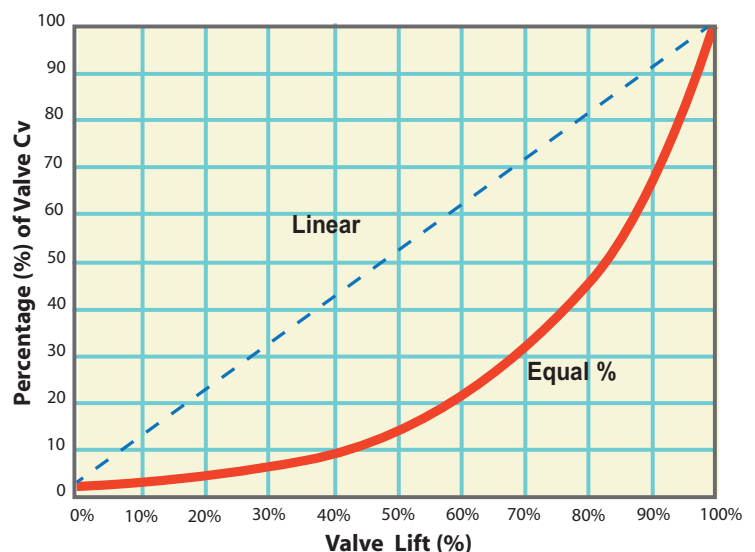
Description & Operation

A control valve is a device capable of modulating flow at varying degrees between minimal flow and full capacity in response to a signal from an external control device. 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 actuator, which can be pneumatically or electrically operated, directs the movement of the stem as dictated by the external control device.

Options & Associated Control Loop Accessories

- Positioner: Pneumatic, Electro-Pneumatic or Explosion-Proof
- PID Electronic Controllers (TR890 Series)
- I/P converters (Model TA901)
- Air Filter Regulators (Air Sets-Model TA987)
- Thermocouples
- RTD's
- Pressure Transmitters

Flow Characteristic Curve



2-Way Valve with Pneumatic Actuator

2-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)						
					Air-to-Open (Fail Close)				Air-to-Close (Fail Open)		
					Standard Actuator Range (PSIG)		Optional Actuator Range (PSIG)			Standard Actuator Range (PSIG)	
		Full Port	Cv		3-15 PSIG Signal 8-15 PSIG Bench	3-15 PSIG Signal 5-15 PSIG Bench	3-21 PSIG Signal 12-21 PSIG Bench	3-15 PSIG Signal 13-23 PSIG Bench	3-15 PSIG Signal 3-8 PSIG Bench		
					I/P	w/Pos.	I/P	with Positioner	I/P	w/Pos.	
1/2"	NPT	HB1000F-12N	5	50	315	515	145	720	-	430	720
3/4"	NPT	HB1000F-13N	6.5		315	515	145	720	-	430	720
1"	NPT	HB1000F-14N	10		315	515	145	720	-	430	720
1 1/2"	NPT	HB1000F-16N	22		170	270	75	430	-	220	665
2"	NPT	HB1000F-17N	42		85	140	40	225	-	115	350
1/2"	150# FLG	HB1000F-121	5	50	275*	275*	145	275*	-	275*	275*
3/4"	150# FLG	HB1000F-131	6.5		275*	275*	145	275*	-	275*	275*
1"	150# FLG	HB1000F-141	10		275*	275*	145	275*	-	275*	275*
1 1/2"	150# FLG	HB1000F-161	22		170	270	75	275*	-	220	275*
2"	150# FLG	HB1000F-171	42		85	120	40	225	-	115	275*
2 1/2"	150# FLG	HB1000F-181	70	100	35	60	15	100	-	50	160
2 1/2"	150# FLG	HB1000F-181	70		100	160	-	-	245	140	435
3"	150# FLG	HB1000F-191	110		75	120	-	-	185	106	331
4"	150# FLG	HB1000F-201	170		40	65	-	-	100	56	180
1/2"	300# FLG	HB1000F-123	5	50	315	515	145	720	-	430	720
3/4"	300# FLG	HB1000F-133	6.5		315	515	145	720	-	430	720
1"	300# FLG	HB1000F-143	10		315	515	145	720	-	430	720
1 1/2"	300# FLG	HB1000F-163	22		170	270	75	430	-	220	665
2"	300# FLG	HB1000F-173	42		85	140	40	225	-	115	350
2 1/2"	300# FLG	HB1000F-183	70	100	100	160	-	-	245	140	435
3"	300# FLG	HB1000F-193	110		75	120	-	-	185	106	331
4"	300# FLG	HB1000F-203	170		40	65	-	-	100	56	180

* Shut-off pressure limited by flange class rating.

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

CONTROL
VALVES

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

Model Code Configuration Chart

Example (Air-to-Open): HB1000F-12N-PA1-00
 Example (Air-to-Close): HB1000F-12N-PA2-00

2-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	0	Equal Percentage	0	Metal Seat Stainless	0	Teflon Graphite	F	Full Port Reduced	12	1/2"	N	NPT	PA1	Air-to-Open- (Fail-Closed)	00	3-15	8-15								
									13	3/4"	1	150# FLG						05	3-15	5-15					
									14	1"	3	300# FLG						10	3-21	12-21					
									16	1 1/2"	6	600# FLG						PA2	Air-to-Close- (Fail-Open)	00	3-15	3-8			
									17	2"	B	BSP													
	1	Linear	1	Soft Seat Teflon Elastomers EPDM Viton	C.F. C.F.	18	2 1/2"	P	PN16	PB1	Air-to-Open- (Fail-Closed)	00	3-15	8-15											
						19	3"	Q	PN25						11	3-23	13-23								
						20	4"								PB2	Air-to-Close- (Fail-Open)	00	3-15	3-8						
						ACTUATOR - 100 in ²																			
Options									Code																
Other Elastomer Trim						C.F.																			
Positioner Mounting Kit:						W-KIT-NP-HB-AT0/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.																			

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.

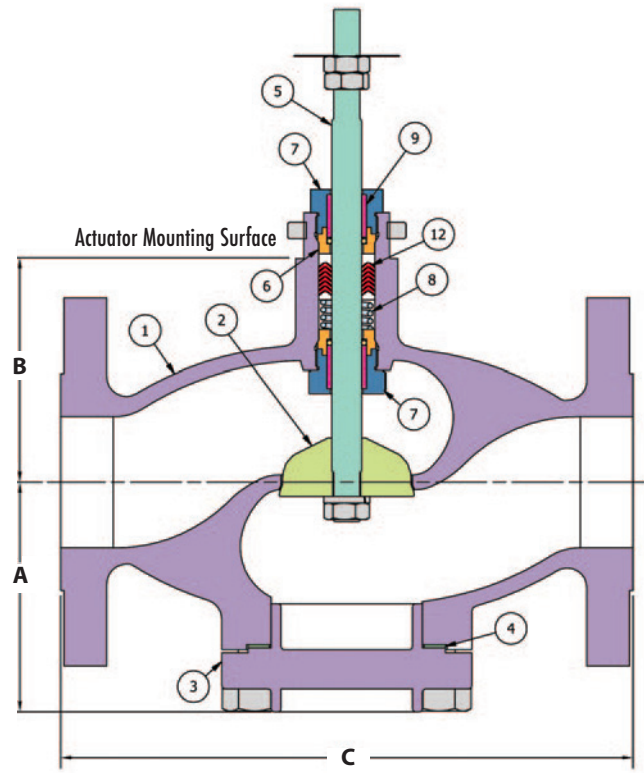
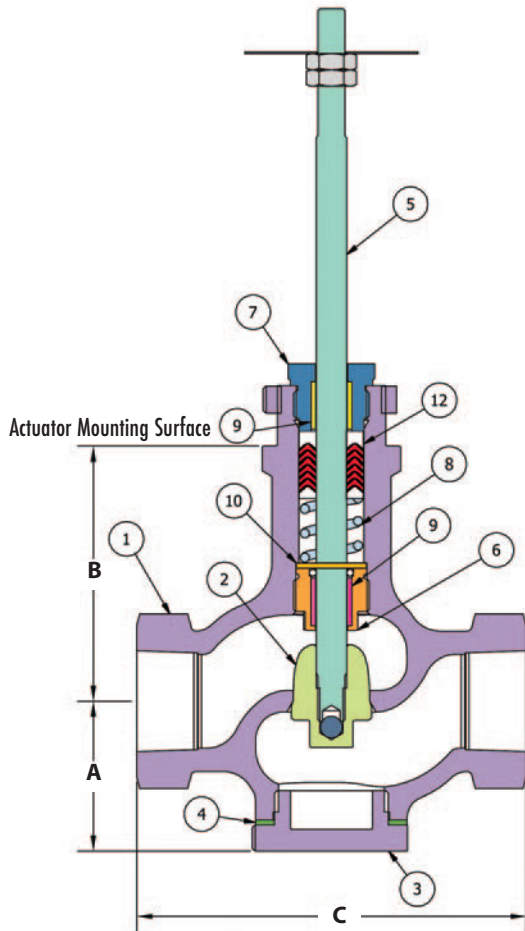
2-Way Valve with Pneumatic Actuator

for HEATING • COOLING • FLUID TRANSFER • **Steam, Air, & Water**

2-Way • 1/2" – 4"

**1/2" to 2"
Threaded & Flanged**

**2 1/2" to 4"
Flanged**



CONTROL VALVES

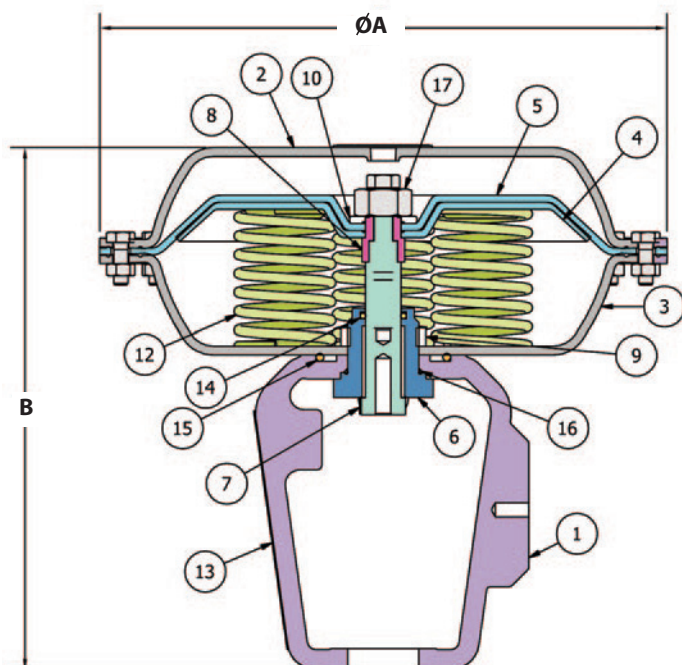
Item	Description	Material
1	Body	316 Stainless Steel
2	Valve Plug*	Hardened Stainless Steel
3	Body Plug	316 Stainless Steel
4	Body Gasket*	303 Stainless Steel
5	Stem*	316 Stainless Steel
6	Lower Seal Bushing	303 Stainless Steel
7	Gland Nut	303 Stainless Steel
8	Stem Seal Spring*	302 Stainless Steel
9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

* Recommended Spare Parts

Size	A	B	C			Weight (lbs)		
			NPT	150#	300#	NPT	150#	300#
1/2"	1.76	2.95	4.50	7.25	7.75	3.5	6	7
3/4"	1.76	2.95	4.50	7.25	7.75	3.5	7	9
1"	1.74	2.95	4.50	7.25	7.75	5.5	10	13
1 1/2"	2.15	2.95	5.00	8.75	9.25	6.8	14	19
2"	2.31	2.95	6.00	10	10.5	10	21	25
2 1/2"	4.38	4.25	-	10.88	11.5	-	41	46
3"	5.56	4.25	-	11.75	12.5	-	65	74
4"	6.19	4.25	-	13.88	14.5	-	92	112

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

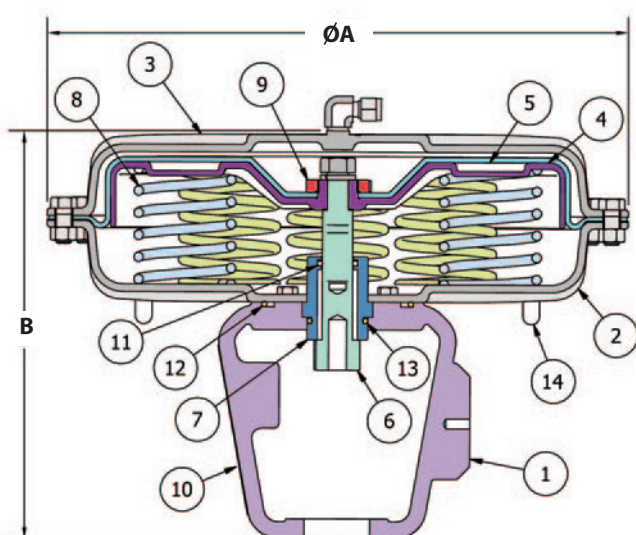
2-Way Valve with Pneumatic Actuatorfor HEATING • COOLING • FLUID TRANSFER • **Steam, Air, & Water****2-Way • 1/2" – 4"****Pneumatic Actuator 50 in²****Pneumatic Actuator 50 in²**

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 100 in²**Pneumatic Actuator 100 in²**

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.

CAPACITIES – Steam (lbs/hr)											
Inlet Pressure (PSIG)	Outlet Pressure (PSIG)	ΔP PSI	Reduced Port 1/2"	1/2"	3/4"	1"	1 1/2"	2"	2 1/2"	3"	4"
C _v Factors			3.5	5.0	6.5	10	22	42	70	110	170
Orifice Size (in)			0.88	0.88	0.88	0.88	1.25	1.75	2.5	2.88	3.88
5	4	1	48	68	89	136	300	573	955	1501	2320
	0	5	96	137	178	274	602	1149	1915	3009	4650
	-4	9	114	162	211	325	714	1363	2272	3570	5518
	-8	13	119	170	220	339	746	1424	2374	3730	5765
10	9	1	53	76	99	153	336	641	1068	1678	2593
	5	5	110	156	203	313	689	1315	2191	3443	5321
	0	10	138	197	255	393	865	1651	2751	4324	6682
	-7	17	148	211	274	422	929	1773	2955	4643	7176
15	10	5	122	174	226	348	765	1460	2433	3824	5909
	5	10	156	223	290	447	983	1876	3127	4913	7593
	0	15	172	246	320	492	1082	2066	3444	5412	8364
	-5	20	177	252	328	505	1110	2119	3532	5550	8578
20	15	5	133	189	246	379	833	1591	2652	4167	6440
	10	10	173	247	321	494	1088	2076	3460	5438	8404
	5	15	194	277	361	555	1221	2330	3883	6103	9431
	-3	23	205	293	381	587	1291	2464	4106	6453	9972
30	25	5	152	217	282	434	955	1822	3037	4773	7377
	15	15	232	331	431	663	1459	2785	4641	7293	11271
	5	25	260	371	482	742	1631	3115	5191	8157	12606
	0	30	262	375	487	750	1649	3149	5248	8247	12745
50	40	10	250	357	464	714	1570	2997	4995	7850	12132
	30	20	324	463	601	925	2035	3886	6476	10177	15728
	15	35	370	529	687	1057	2326	4440	7399	11628	17970
	7	43	376	537	697	1073	2361	4507	7511	11804	18242
80	70	10	307	438	570	877	1929	3682	6136	9643	14903
	50	30	472	675	877	1350	2970	5670	9450	14850	22950
	30	50	534	763	992	1525	3356	6407	10678	16780	25932
	17	63	544	777	1010	1554	3418	6526	10876	17091	26413
100	85	15	406	580	754	1160	2552	4872	8121	12761	19722
	60	40	586	837	1089	1675	3684	7034	11723	18422	28470
	40	60	643	918	1193	1836	4039	7710	12851	20194	31209
	23	77	655	936	1217	1872	4119	7864	13107	20596	31831
125	110	15	452	645	839	1290	2838	5418	9030	14190	21930
	85	40	668	954	1240	1908	4199	8015	13359	20993	32443
	50	75	782	1117	1452	2233	4913	9380	15634	24567	37968
	31	94	794	1135	1475	2270	4993	9532	15887	24965	38582
150	130	20	560	800	1040	1600	3519	6718	11197	17595	27192
	100	50	800	1143	1485	2285	5027	9598	15996	25137	38847
	70	80	904	1291	1678	2582	5680	10844	18074	28402	43893
	40	110	933	1333	1733	2666	5865	11196	18661	29324	45319
175	150	25	666	952	1237	1903	4187	7994	13323	20936	32356
	115	60	931	1329	1728	2659	5850	11167	18612	29248	45201
	75	100	1052	1503	1953	3005	6612	12622	21037	33058	51089
	48	127	1072	1531	1990	3062	6736	12859	21432	33679	52049
200	175	25	713	1018	1324	2037	4481	8554	14257	22404	34625
	130	70	1061	1515	1970	3031	6668	12730	21216	33340	51425
	90	110	1183	1690	2196	3379	7434	14192	23654	37170	57444
	56	144	1210	1729	2247	3457	7606	14521	24202	38031	58775
250	225	25	798	1140	1482	2281	5017	9578	15964	25086	38770
	170	80	1273	1819	2364	3637	8002	15276	25259	40008	61830
	120	130	1443	2062	2680	4124	9072	17319	28865	45359	70100
	73	177	1487	2125	2762	4249	9348	17846	29744	46740	72235
300	270	30	951	1359	1766	2718	5979	11414	19023	29894	46199
	200	100	1535	2193	2850	4385	9648	18418	30697	48238	74549
	140	160	1723	2461	3199	4922	10828	20672	34454	54142	83674
	89	211	1765	2521	3277	5042	11093	21177	35296	55465	85718

Note: The Steam Capacity Chart is based on ISA Standard 75.01.01-2007 (60534-2-1 Mod). It assumes pipe sizes equal to the size of the valve ports, with no attached fittings.

Sizing & Capacity Chart

WATER

CAPACITIES – Water (GPM)											
Inlet Pressure (PSIG)	Outlet Pressure (PSIG)	ΔP PSI	Reduced Port 1/2"	1/2"	3/4"	1"	1 1/2"	2"	2 1/2"	3"	4"
C _v Factors			3.5	5.0	6.5	10	22	42	70	110	170
Orifice Size (in)			0.88	0.88	0.88	0.88	1.25	1.75	2.5	2.88	3.88
5	4	1	3.5	5.0	6.5	10	22	42	70	110	170
	0	5	7.8	11	15	22	49	94	157	246	380
10	7	3	6.1	8.7	11	17	38	73	121	191	294
	5	5	7.8	11	15	22	49	94	198	311	481
	0	10	11	16	21	32	70	133	251	246	380
15	10	5	7.8	11	15	22	49	94	157	246	380
	5	10	11	16	21	32	70	133	221	348	538
	0	15	14	20	26	39	86	165	275	432	668
30	25	5	7.8	11	15	22	49	94	157	246	380
	15	15	14	19	25	39	85	163	271	426	658
	7	23	17	24	31	48	106	203	338	531	821
50	40	10	11	16	21	32	70	133	221	348	528
	30	20	16	22	29	45	98	188	313	492	760
	16	34	20	29	38	58	128	244	407	640	898
80	70	10	11	16	21	32	70	133	221	348	538
	50	30	19	27	36	55	120	230	383	602	931
	30	50	25	35	46	70	155	296	493	775	1198
100	85	15	14	19	25	39	85	163	271	426	658
	65	35	21	30	38	59	130	248	414	651	1006
	40	60	27	39	50	78	171	326	543	853	1319
125	110	15	14	19	25	39	85	163	271	426	658
	85	40	22	32	41	63	139	266	443	696	1075
	52	73	30	43	56	86	188	360	600	492	760
150	130	20	16	22	29	45	98	188	313	492	760
	100	50	25	35	46	71	156	297	495	778	1202
	63	87	33	47	60	93	205	391	651	1023	1581
200	175	25	18	25	33	50	110	210	350	550	850
	130	70	29	42	54	84	184	351	586	920	1422
	87	113	37	53	69	106	234	446	744	1169	1806
250	225	25	18	25	33	50	110	210	350	550	850
	170	80	31	45	58	89	197	376	626	984	1521
	111	139	41	59	77	118	260	495	826	1298	2006
300	270	30	19	27	36	55	120	230	383	602	931
	200	100	35	50	65	100	220	420	700	1100	1700
	134	166	45	64	84	129	283	540	901	1415	2187

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

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.

CE100 Series Electro-Pneumatic Positioners

for 2-Way or 3-Way Pneumatically-Actuated Valves

Valve Positioners (Electro-Pneumatic)

The **CE100 Series Electro-Pneumatic Positioners** improve control accuracy and increase maximum close-off pressure capability of the valve. The Positioner is mounted to the valve's yoke assembly and linked to the valve stem. It receives a transduced air signal or direct electrical signal from the electronic controller and compares the control signal to the actual position of the valve plug. The Positioner then sends a corrected air signal to the valve's actuator, thereby positioning the valve plug for optimum flow modulation.

The **Electro-Pneumatic Positioner** receives an electrical 4-20 mA signal directly from the PID Controller and therefore eliminates the need for a separate I/P Transducer.

	Electro-Pneumatic CE100
Input Signal	4-20 mA
Supply Air Pressure	20 to 100 PSIG
Action	Single-Acting
Air Connection	1/4" NPT (Gauge 1/8" NPT)
Electrical Connection	1/2" NPT
Pressure Gauges	Included
Cam	Linear Characteristics
Ambient Temperature	-4° to 185° F (-20° - 83° C)
Enclosure Material	Die Cast Aluminum
Enclosure Rating	IP65 (dust and drip-proof)
Weight	4.8 lbs. (2.2 kg)
Optional Explosion Protection	ATEX: D = Gas Ex d P = Gas/Dust Ex d E = Gas Ex ia
Linear Error	0.7% full span
Hysteresis	0.4% full span
Repeatability	0.3% full span
Media	Oil-free instrument Air Filtered to 5 micron
Flow Capacity	SCFM
@20 PSI	9.5
@87 PSI	28.3
Air Consumption	SCFM
@20 PSI	0.2
@87 PSI	0.6

**HB-Series Control Valve**

shown with
CE100 Positoner
and TA987 Air/Filter Regulator

CE100 Electro-Pneumatic Positioner Options

Type	Model Code	Features	Weight lbs.	Explosion Protection Options	
				Suffix Code	Description
Standard	CE100	Electro-Pneumatic	5	-D	ATEX: Gas Ex d
				-P	ATEX: Gas/Dust Ex d
				-E	ATEX: Gas Ex ia