# 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) |

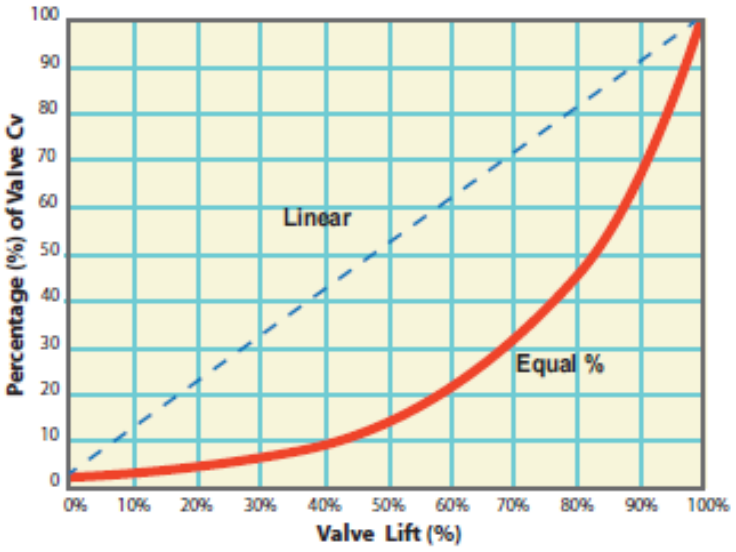
## Description & Operation

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




CONTROL VALVES

# 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 in² | 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 | | 35 | 60 | 15 | 100 | - | 50 | 160 |
| 2 1/2" | 150# FLG | HB1000F-181 | 70 | 100 | 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.

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

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

## Model Code Configuration Chart

**2-Way VALVE BODY**

| Model | Code | Trim Style |
|---|---|---|
| HB1 | 0 | Equal Percentage |
| | 1 | Linear |

| Code | Seat Type |
|---|---|
| 0 | Metal Seat Stainless |
| 1 | Soft Seat Teflon |
| | Elastomers |
| C.F. | EPDM |
| C.F. | Viton |

| Code | Packing |
|---|---|
| 0 | Teflon |
| 1 | Graphite |

| Code | Port Type |
|---|---|
| F | Full Port |
| R | Reduced |

**CONNECTION**

| Code | Size |
|---|---|
| 12 | 1/2" |
| 13 | 3/4" |
| 14 | 1" |
| 16 | 1 1/2" |
| 17 | 2" |
| 18 | 2 1/2" |
| 19 | 3" |
| 20 | 4" |

| Code | Connection |
|---|---|
| N | NPT |
| 1 | 150# FLG |
| 3 | 300# FLG |
| 6 | 600# FLG |
| B | BSP |
| P | PN16 |
| Q | PN25 |

**ACTUATOR - 50 in² (PSIG)**

| Code | Actuator | Code | Control Signal | Bench Set |
|---|---|---|---|---|
| PA1 | Air-to-Open- *(Fail-Closed)* | 00 | 3-15 | 8-15 |
| | | 05 | 3-15 | 5-15 |
| | | 10 | 3-21 | 12-21 |
| PA2 | Air-to-Close- *(Fail-Open)* | 00 | 3-15 | 3-8 |

**ACTUATOR - 100 in²**

| Code | Actuator | Code | Control Signal | Bench Set |
|---|---|---|---|---|
| PB1 | Air-to-Open- *(Fail-Closed)* | 00 | 3-15 | 8-15 |
| | | 11 | 3-23 | 13-23 |
| PB2 | Air-to-Close- *(Fail-Open)* | 00 | 3-15 | 3-8 |

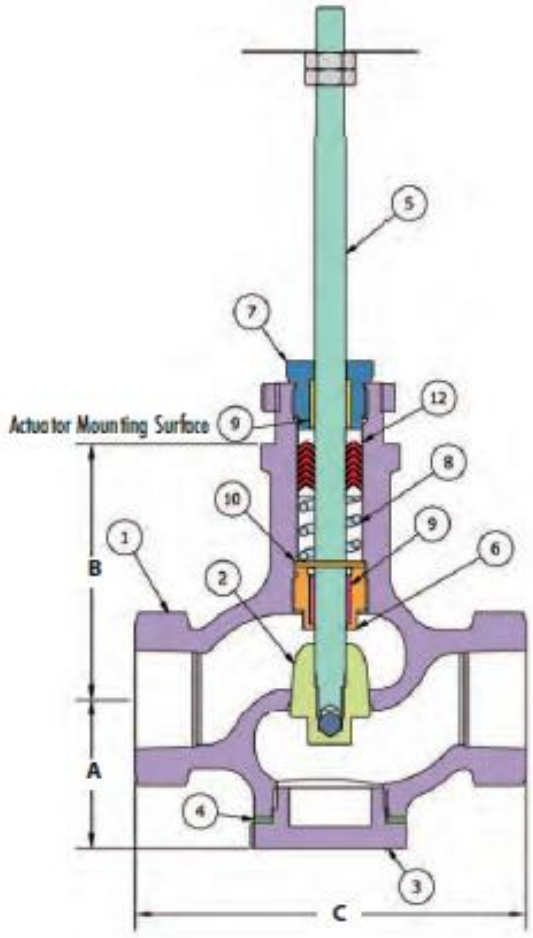
| Options | Code |
|---|---|
| Other Elastomer Trim | C.F. |
| Positioner Mounting Kit: | W-KIT-NP-HB-ATO/ATC |
| Direct Mount I/P Transducer | TA901 |
| Direct Mount Air Filter/Regulator | TA987 |
| Air Filter/Regulator Mounting Kit: | W-KIT-TA987-HB (50in² act.) |
| | W-KIT-TA987-HB-L (100in² act.) |
| Stainless Steel 50 in² Actuator | C.F. |
| Solenoid valve for pneumatic On/Off operation. | C.F. |
| Handwheel for Actuator | C.F. |

CONTROL VALVES

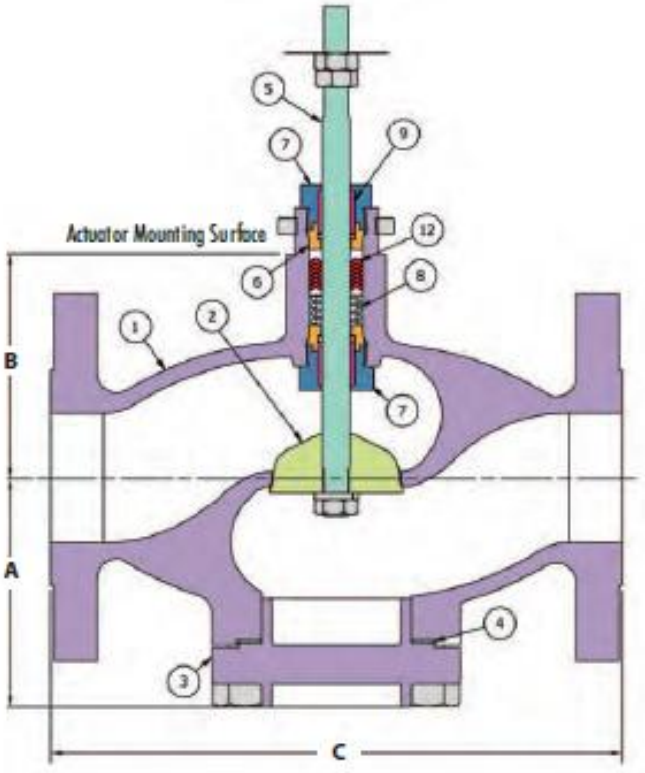
# 2-Way Valve with Pneumatic Actuator

**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




| 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 NPT | C 150# | C 300# | Weight (lbs) 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 ($C_V$)

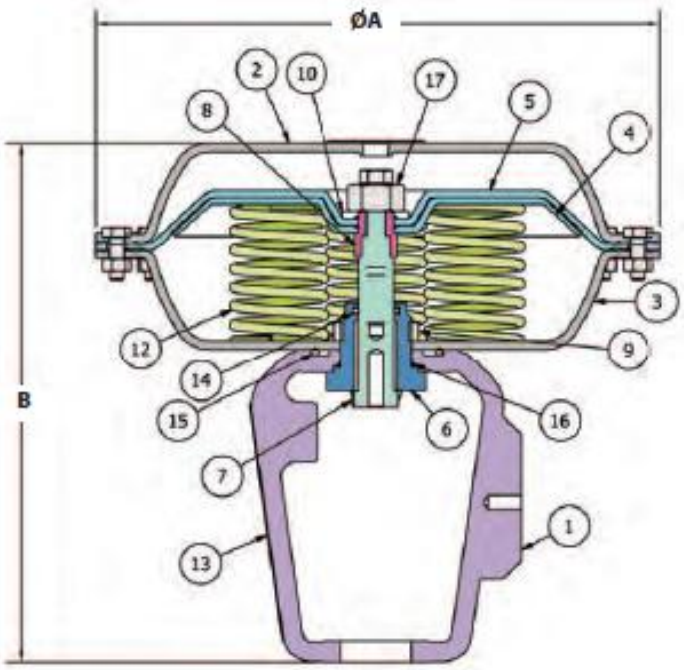
| Valve Body Size | 1/2" (Reduced Port) | 1/2" | 3/4" | 1" | 1 1/2" | 2" | 2 1/2" | 3" | 4" |
|---|---|---|---|---|---|---|---|---|---|
| | 3.5 | 5 | 6.5 | 10 | 22 | 42 | 70 | 110 | 170 |

# 2-Way Valve with Pneumatic Actuator

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

2-Way • 1/2" – 4"

## Pneumatic Actuator 50in²




### Pneumatic Actuator 50 in²

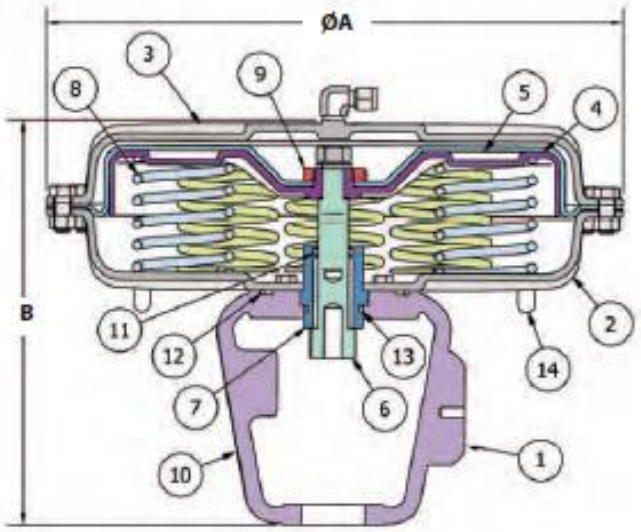
| Item | Description | Material |
|---|---|---|
| 1 | Yoke | Stainless steel |
| 2** | Upper diaphragm case | Epoxy painted steel |
| 3** | Lower diaphragm case | Epoxy painted steel |
| 4 | Diaphragm plate | Nickel plated steel |
| 5* | Diaphragm | Nylon reinforced Neoprene |
| 6 | Upper guide bush | 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 in² | 10.00 | 9.25 | 18 |
| 100 in² | 14.38 | 10.00 | 50 |

**Special High Thrust Actuator available for increased shut-off pressures on 2½" - 4" valve bodies; Consult factory.**