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3-WAY CONTROL VALVE

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General

The 3-way control valve uses a structure with double plug, upper and lower guide. According to the path, it is divided into three-way diffidence valve (one inlet two outlet) and three-way confluence valve (two inlet one outlet) in order to achieve the fluid mixing heating or cooling, or not equivalent diffidence which would meet the requirements of users. It is especially suitable for fluid temperature regulation in the petroleum industry heat exchanger.

Working principle

The equipped smart positioner will convert to valve required settings when receive normal signal of electricity or signal of computer. Then the pneumatic actuator linear displacement will change to angular displacement by valve special connections and tested by position transducer then feedback to microprocessor.

The microprocessor will compare the actual valve feedback with original settings and tested if there is any deviation. It will output pulse width modulation command (PWM) to piezoelectric valve according to the the size and direction of deviation. The piezoelectric valve will regulate the input or exhaust gas under the control command.

Control Mode

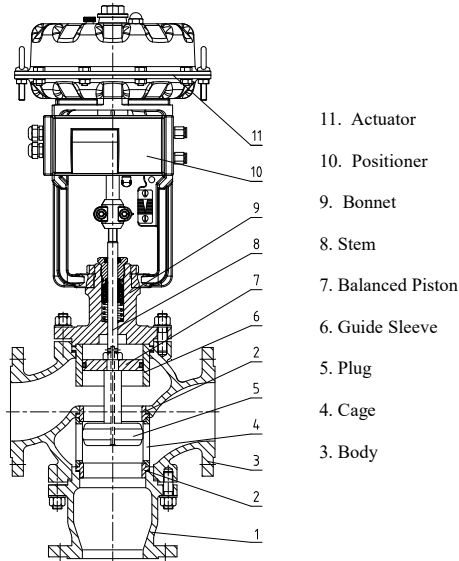
Control mode apply PWM (Pulse Width Modulation) to actuator:

- Full speed: when control deviation is big, positioner output link signal.
- Mid-speed: when control deviation is normal, output impulse signal.
- Slow speed: when control deviation is small, output smaller impulse signal.
- Keep orientation: when control deviation is smaller than valve control precision range, no output command signal.



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Structure Chart



Main Parts Materials

Table 1

Item	Part Name		Material			
			WCB	WC6	CF8	CF8M
1	Body		WCB	WC6	CF8	CF8M
2	Seat		304, 316 / Partial Stellite			316 / Partial Stellite
3	Plug	Metal Sealing	304, 316 / Partial Stellite			316 / Partial Stellite
		Soft Sealing	304, 316+PTFE			316+PTFE
4	Cage		304, 316			316
5	Guide Sleeve		304, 316			316
6	Stem		304, 316			316
7	Bonnet		WCB	WC6	CF8	CF8M
8	Balanced Piston		HT200, Al			
9	Balanced Piston Ring		Fluorine Rubber, SS+Reinforced PTFE, Flexible Graphite Ring			

* Above is the common materials, the specific grades take the contract as a standard.

Specification&Technical Parameter

Table 2

Type	3-Way (DN & ASME Standard)
Nominal Diameter	DN25 to DN250 / 1" to 10"
Nominal Pressure	PN16, 25, 40, 64, 100 / 150lb, 300lb, 600lb
Flow Characteristic	Equal Percentage, Linear
Rangeability	50:1
Up Bonnet From	Standard Type: Cast Steel -20 to 250°C / Stainless Steel -40 to 250°C
	Fin- Extension Type: Cast Steel: -29 to 425°C / Stainless Steel-40 to 450°C
Seat Leakage	IV, V (Soft Sealing)

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Flow Characteristic

Table 3

Seat Diameter DN(mm)	25	32	40	50	65	80	100	125	150	200	250
Rated Kv	8.5	13	21	34	53	85	135	210	340	535	800

Fluid Flow Direction

Table 4

Type	BOIQ50 / BOID50 (Confluence)				BOIQ51 / BOID51 (Difffluence)			
Nominal Diameter	DN25 to 250				DN25 to 250			
Actuator	Direct action		Reverse action		Direct action		Reverse action	
	Air Fail	Full Travel	Air Fail	Full Travel	Air Fail	Full Travel	Air Fail	Full Travel
Flow direction	C→B	A→B	A→B	C→B	A→B	A→C	A→C	A→B
Fluid flow direction								

Note: Failed position defined subject to the location of the main valve plug position (horizontal)

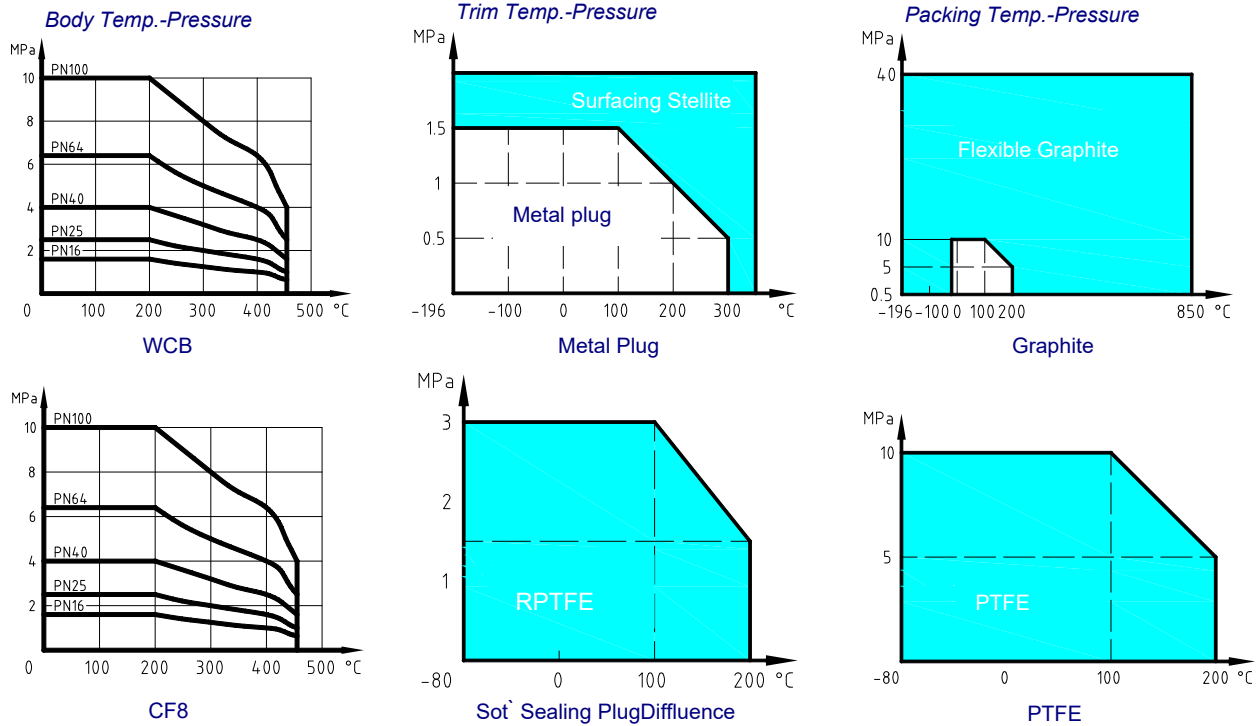
Main Performance Index

Table 5

No.	Item	Standard Type	Fin-Extension Type
1	Basic Error < (%)	±1	±2.5
2	Backlash < (%)	1	2.5
3	Dead Zone < (%)	0.4	1
4	Beginning And Ending Point Deviation < (%)	±1	±2.5
5	Rated Travel Deviation < (%)	+2.5	+2.5

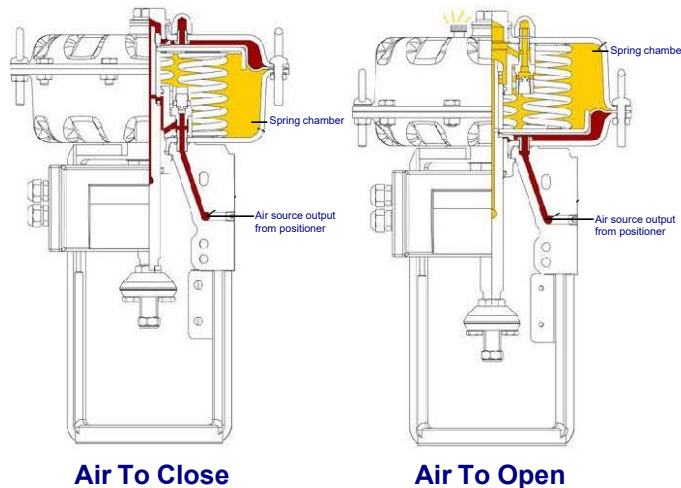
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Body, Trim, Packing Material Operating Temperature-Pressure Range



Actuator Specification

BO10-Series Multi-Springs Pneumatic Actuator, makes the valve realize the conversion of normal close and normal open on site easily, the spring can be effectively protected from the corrosion to prolong the service life of actuator and convenient for customers operation. The actuator and the intelligent valve positioner are connected pipeless to strengthen the anti-seismic performance, stability and precision adjustment, to meet to exactly control of the working conditions.



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Air To Open (FC): When the air supply is failed, the actuator spring close the valve

Table 6

Type	Diaphragm Area (cm ²)	Spring Quantity	Travel (mm)	Spring Range (KPa)	Thrust (KN)
BO10-1	210	3	20	75 to 150	1.6
		6		150 to 300	3.2
BO10-2	320	3	30	75 to 150	2.4
		6		150 to 300	4.8
BO10-3	720	3	60	75 to 150	5
		6		150 to 300	10
		9		180 to 370	13
		12		220 to 440	16

Air To Close (FO): When the air supply is failed, the actuator spring open the valve

Table 7

Type	Diaphragm Area cm ²	Spring Quantity	Travel (mm)	Spring Range (KPa)	Thrust (KN)					Air Supply Pressure (MPa)					
					0.2	0.3	0.4	0.5	0.6	0.2	0.3	0.4	0.5	0.6	
BO10-1	210	3	20	75 to 150	1.0	3.2	5.2	7.2	9.4	-	-	-	-	-	-
		6		150 to 300	-	-	2.1	4.2	6.3	-	-	-	-	-	-
BO10-2	320	3	30	75 to 150	1.6	4.8	8.0	11.2	14.4	-	-	-	-	-	-
		6		150 to 300	-	-	3.2	6.4	9.6	-	-	-	-	-	-
BO10-3	720	3	60	75 to 150	3.6	10.8	18.0	25.2	32.4	-	-	-	-	-	-
		6		150 to 300	-	-	7.2	14.4	21.6	-	-	-	-	-	-

Flow Characteristic

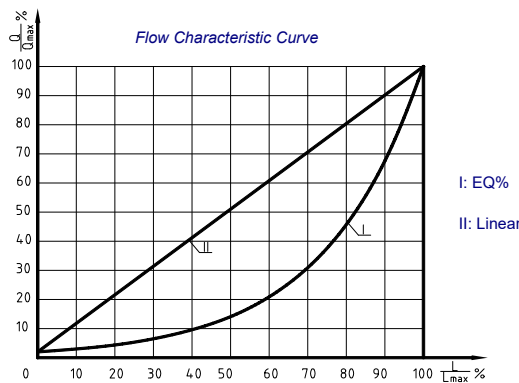


Table 8

Relative Travel Relative Flow Value R50

Unit: %

L / L_{max} Q / Q_{max} Char.	0	10	20	30	40	50	60	70	80	90	100
Linear	2	11.8	21.6	31.4	41.2	51	60.8	70.6	80.4	90.2	100
EQ%	2	3	4.37	6.5	9.6	14.1	20.9	30.9	45.7	67.6	100

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Remark

- Packing Material PTFE
- Value is limited by PN, Pressure-Temperature Sheet
- Flow direction is different with the Plug close direction
- Bellow sealing type P2≠0, it must be rechecked.
- Metal sealing leakage is IV

Special Requirements

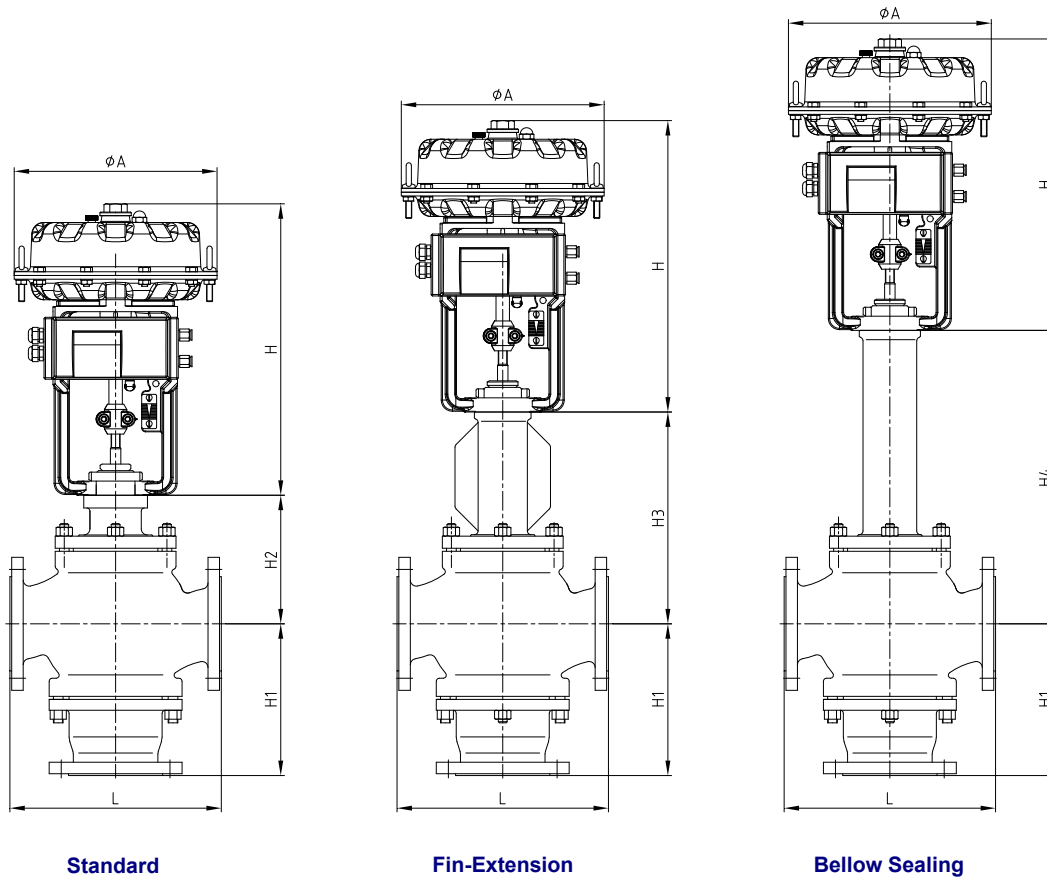
- Special Test
- Service Under Vacuum Conditions
- Complete Degreasing, Water Treatment
- Special Fluid (for Example O₂)
- Forbidden Copper
- With SS Connections
- Special Connection
- Specifies Coating Color

Connection Size & Standard

- Connection, Flange, Length can be manufactured according to client specified standard such as ANSI, DIN, JIS etc.

Size & Weight

PN16, 40 Standard, Fin-Extension, Bellow Sealing Outline Size & Weight



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Table 9
Unit: mm

Nominal Diameter DN	25	32	40	50	65	80	100	125	150	200	250
L	160	180	200	230	290	310	350	400	450	550	650
H1	130		160		185	200	220	280	320	380	440
H2	120		160		185	200	220	280	320	380	440
H3	220		270		290	310	340	420	460	530	580
H4	380		420		470	510	530	680	760	820	880
H	340		390					632			
A	228		272					400			
Weight (Kg)	28	32	41	45	65	76	94	180	223	283	356

Remark:

- The valves are Standard size in the table "PN1.6MPa" (According to the specific parameters of electric actuator to replace H, A size)
- The weight data is without any accessories in the table.

The information and specifications contained in this literature are considered accurate. However, they are supplied for informative purposes and should not be considered certified. The products of BOMAF A Group are continually being improved and the specifications, dimensions and information contained in this catalogue are subject to change without notice.

Quality Management System



ISO 9001-2015

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