



INDUSTRIAL PRODUCTS DIVISION

## Models VC-300A & VC-301A Multi-Spring Diaphragm Actuators

### GENERAL DESCRIPTION

The VC-300A direct-acting model and the VC-301A reverse-acting model are the large frame version of the VC-230A/VC-231A spring opposed diaphragm actuators. They are designed to provide dependable On-Off or Throttling operation of control valves. They may be actuated by pneumatic signals from any suitable temperature or pressure controller.

### SPECIFICATIONS

**Diaphragm Area:** 29 sq. inches (0.02m<sup>2</sup>) nominal

**Service Connection:** ..... 1/4" - 18 NPT

**Pattern:** ..... Enclosed Spring

**Type Ranges:** ..... 3-15 psi (0.2-1.0 bar) standard.  
Other ranges available.

**Diaphragm Pressure:**

100 psi (6.9 bar) max. test  
40 psi (4.8 bar) max. working

**Maximum Stroke:** ..... 1" (25.4mm)

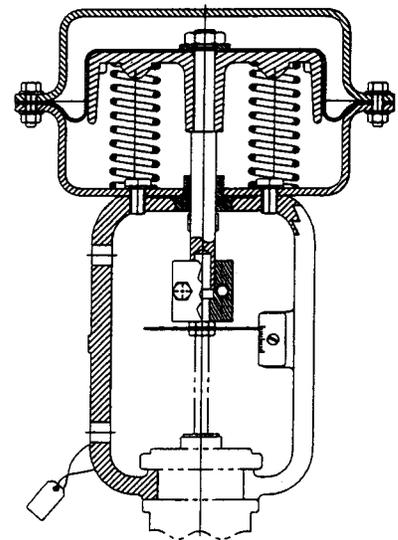
**Ambient Temperature:** ..... 200°F (93°C)

**Actuator Action:**

VC-300A - Air-to-push-down  
VC-301A - Air-to-push-up

**Materials:**

Diaphragm Housing ..... Steel, painted with polyurethane enamel  
Diaphragm ..... Buna-N Nylon reinforced  
Diaphragm Plate ..... Aluminum casting  
Springs ..... Tempered MB wire, zinc plated  
Actuator Stem ..... Stainless Steel  
Actuator Stem Guide .... Bronze, Self-lubricating  
Frame ..... Cast Iron  
Stem Connector ..... Stainless Steel  
Stroke Indicator ..... Aluminum



### FEATURES

- Molded Buna-N diaphragm, nylon reinforced
- Steel Diaphragm Cases.
- Multiple Steel Springs.
- Sturdy Cast Iron Lower Frame.
- Split-Block Valve Stem Connector
- Valve Position Indicator

### ACTUATOR OPERATION

**Model VC-300A** - Air pressure from the controller is applied to the top of the diaphragm. As this pressure increases within the range of the loading springs, the actuator stem moves down.

**Model VC-301A** - Air pressure from the controller is applied underneath the diaphragm. Increasing pressure, within the range of the loading springs, causes the actuator stem to move upward.



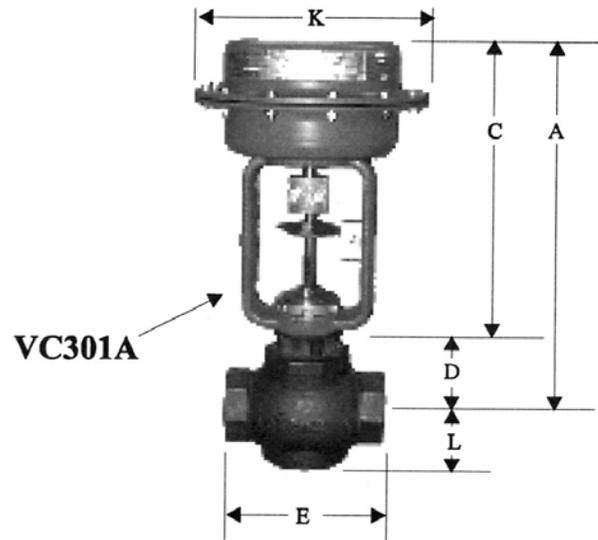
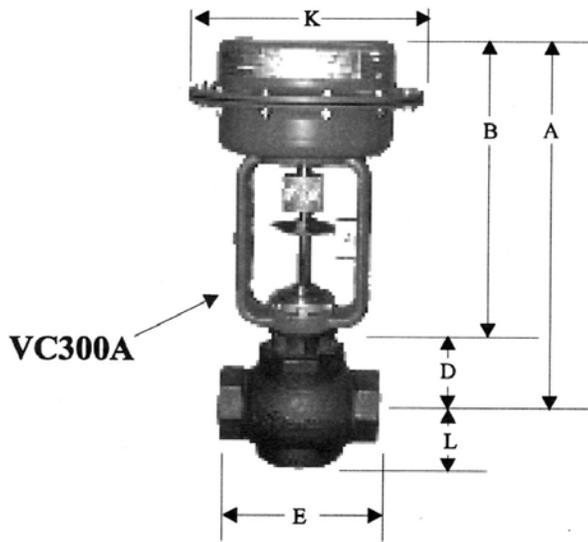
The following table illustrates valve action. Robertshaw valve styles listed below can be furnished with either of these actuators for air-to-close or air-to-open operation.

	Model VC-300A Actuator (Air-to-Push-Down)		Model VC-301A Actuator (Air-to-Push-Up)	
	Increasing Air Pressure	Air Failure	Increasing Air Pressure	Air Failure
Direct-Acting Valve (Push down to close)	Closes	Opens	Opens	Closes
Reverse-Acting Valve (Push down to close)	Opens	Closes	Closes	Opens

## VALVE ASSEMBLIES USED WITH VC-300A AND VC-301A ACTUATORS

### Valve Body Assembly Characteristics and Shipping Weights

Valve Type	Body Material and <u>Rating</u>	Trim	Valve Size and Type of Ends	Port Size In. (mm)	Full Open Cv	Shipping Weight Lb. ( <u>Kg.</u> )	Max. ΔP with 3-15 psi (0.2-1.0 bar) range
BG Percentage Direct Acting <u>Only</u>	Brass 250 psi	316 Stainless Steel	2" Screwed	2 (50.8)	52	33 (15.0)	35 (2.3)
BC Percentage Direct or Reverse	Cast Iron 125 psi	Brass w/Teflon Seat Disc	2 1/2" flanged	2.5 (63.5)	72		15 (1.0)
			3" flanged	3 (76.2)	102		10 (.67)
			4" flanged	4 (101.6)	164		5 (.33) VC300A <u>only</u>
WE Linear 3-way	Cast Iron 125 psi	Brass	2 1/2" flanged	2.5 (63.5)	72		20 (1.33)
			3" flanged	3 (76.2)	94		20 (1.33)
			4" flanged	4 (101.6)	170		5 (.33)
WESS Linear 3-way	316 Stainless Steel	316 Stainless Steel	1 1/2" screwed	1.5 (38.1)	20		50 (3.45)
			2" screwed	2 (50.8)	40		40 (2.76)



DIMENSIONS						
All dimensions in inches (millimeters)						
Dim.	Valve Size In.	VALVE STYLES				
		BC	BCR	BG	WE	WESS
D	1 1/2"					3 3/8 (86)
	2"			3 7/8 (98)		3 11/16 (94)
	2 1/2"	4 3/8 (111)	3 5/8 (92)		3 5/8(92)	
	3"	5 1/4 (133)	4 (102)		4 15/16 (125)	
	4"	5 3/4 (146)	4 3/4 (121)		6 9/16 (167)	
E	1 1/2"					6 1/8 (156)
	2"			6 3/4 (171)		6 1/2 (165)
	2 1/2"	10 7/8(276)	10 7/8(276)		10 7/8 (276)	
	3"	11 3/4 (298)	11 3/4 (298)		11 3/4 (298)	
	4"	13 7/8 (352)	13 7/8 (352)		13 7/8 (352)	
L	1 1/2"					3 7/16 (87)
	2"			2 3/16 (56)		3 11/16 (94)
	2 1/2"	3 5/8 (92)	4 5/8 (117)		6 9/16 (167)	
	3"	4 (102)	5 3/4 (146)		8 1/16 (205)	
	4"	4 3/4 (120)	6 1/4 (158)		9 3/16 (233)	
A	VC-300A = B+D, VC-301A=C+D					
B	VC-300A= 12 1/4 (311)					
C	VC-301A= 12 3/4 (329)					
K	VC-300A= 9 1/2 (241), VC-301A= 9 1/2 (241)					

## VALVE SIZING

All Robertshaw valve capacities are stated in terms of Cv. Use of the flow coefficient Cv offers a standard approach for valve sizing regardless of type. Cv ratings for Robertshaw valves are determined experimentally in accordance with procedures recommended by the Fluid Controls Institute.

Valve sizes may be calculated using Cv formulas or Robertshaw's Flo-Rule (valve sizing slide rule) for any set of flow conditions.

When capacity requirements (pounds of steam per hour, gallons of water per minute, cubic feet of gas per hour, etc.), the supply pressures, pressure drops, and nature of the fluid are known, the numerical Cv value can be obtained. This can be compared with the Cv ratings tabulated for the various valve styles in the "Valve Characteristics" tables in this product specification or on the Cv tables furnished with the Flo-Rule.

## MODEL IDENTIFICATION

**Control Valve Identification** - The identification scheme used by Robertshaw shows size, actuator type, valve style, plug characteristics, and whether direct- or reverse-acting. Viz., 2 1/2", VC-300A-BC. This is a 2 1/2" air-to-close control valve using air-to-push-down actuator and a direct acting BC valve which has = % flow characteristics. Similarly, a 2 1/2", VC-300A-BCR is a 2 1/2" air-to-open control valve using an air-to-push-down actuator and a reverse-acting BC valve, (BCR). "R" on the suffix indicates a reverse-acting body.

## ORDERING INFORMATION

When ordering specify:

1. Quantity.
2. Control Valve model number. (See "Control Valve Identification" above)
3. Range required.
4. Valve type, size, and action (See "Control Valve Identification")
5. Medium through the valve.
6. Supply pressure to the valve.
7. Pressure drop.
8. Any special characteristics of the flowing medium.
9. Shipping and invoicing instructions.

# Robertshaw

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