

## Diaphragm Control Valves VC-210 Series Mini-Max

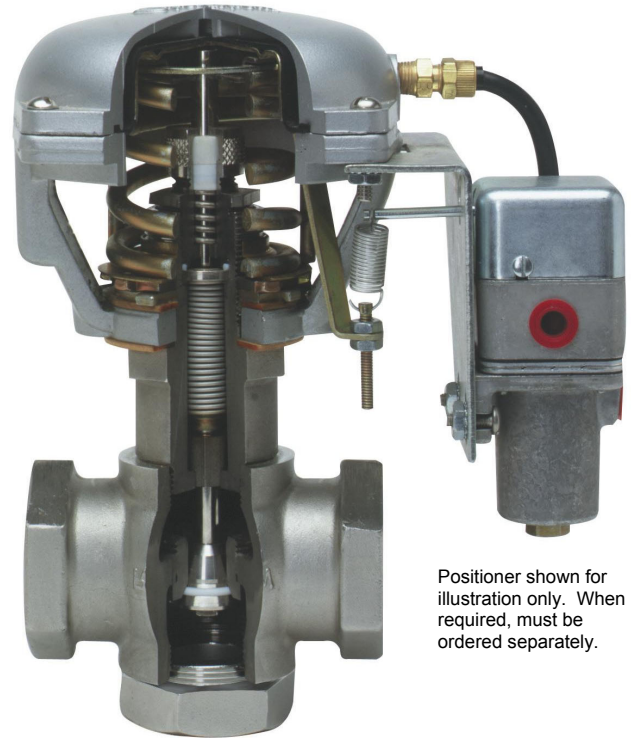
### GENERAL DESCRIPTION

Model VC-210 Mini-Max Control Valves are built with stainless steel investment castings and especially designed for the control of water, steam, gas, vacuum etc. Valves are single seated, bellows sealed to prevent stem leakage, and may be selected to have the valve action, seating materials and flow characteristics needed for most control applications.

The pneumatic actuator consists of a molded 10 sq. in. Buna-N 2-ply Dacron reinforced diaphragm enclosed in a die-cast aluminum housing and frame. The readily accessible spring adjusting nut provides easy field adjustment of the starting point within the selected spring range. Synthane gaskets located between the valve bonnet and the actuator frame reduce heat transfer to the diaphragm.

### OUTSTANDING FEATURES

- Full Ported or Low Flow Designs
- Direct and Reverse-Acting Valve Styles 1/2" 3/4" 1"
- Molded Diaphragms - Reinforced
- "Packless" Stem Seal
- Two-Way and Three-Way Valves
- Stainless Steel Investment Castings



Positioner shown for illustration only. When required, must be ordered separately.

### Buna-N2 Ply Dacron Reinforced Diaphragm Packing

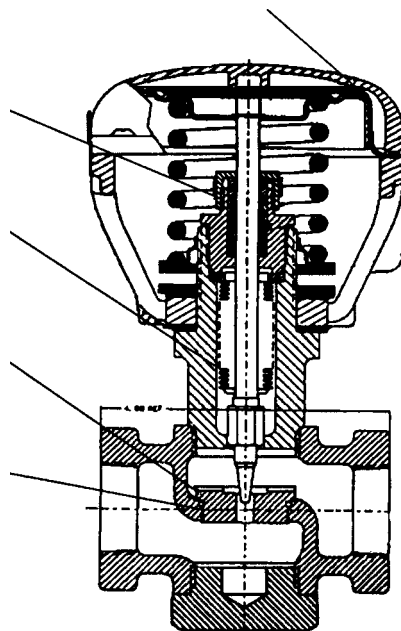
Secondary Teflon\*  
 V-Ring Stem Seals

Primary Seamless  
 Bellows Stem Seal  
 with Anti-Twist  
 Device

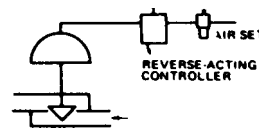
Stainless Steel Trim

Teflon or Metal-  
 to-Metal Seating

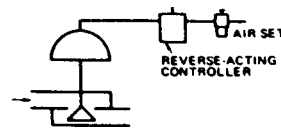
BR with Reduced  
 Trim



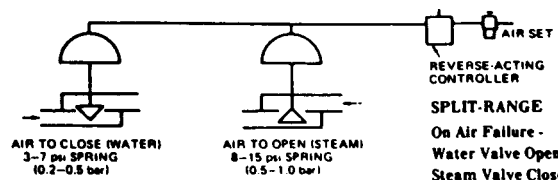
### TYPICAL APPLICATIONS



**COOLING**  
 Control Valve Action: Air-to-Close.  
 Action on Air Failure: Valve Opens.  
 Controller Action: Output decreases with increasing temperature.



**HEATING**  
 Control Valve Action: Air-to-Open  
 Action on Air Failure: Valve Closes  
 Controller Action: Output decreases with increasing temperature



**SPLIT-RANGE**  
 On Air Failure -  
 Water Valve Opens;  
 Steam Valve Closes.

Note: Above configurations provide fail-safe action, i.e., on air failure a cooling valve will open and heating valve will close. If this valve action is not desired, then reverse above applications and use a direct-acting controller where a reverse-acting type is specified

## SPECIFICATIONS

### ACTUATOR ASSEMBLY

**Nominal Size:** .....10 sq. in.

**Action:** Direct acting ..... Increasing air pressure moves stem downward.

**Nominal Travel:** .....3/8" (9.6 mm)

**Maximum Air Pressure:** ..... 30 psi (2.0 bar)

**Maximum Ambient Temperature:** ..... 180°F (82°C)

**Air Connection:** ..... 1/8" NPT, female

### Materials of Construction:

**Diaphragm** ..... Molded Buna-N 2 ply reinforced

**Housing & Frame** ..... Die cast aluminum, irridite finished for corrosion resistance, painted bronzeless gold.

**Spring** ..... Zinc plated alloy steel

### VALVE ASSEMBLY

#### Action:

**Direct** ..... (Provides air-to-close action with actuator)

**Reverse** ..... (Provides air-to-open action with actuator)

**3-way** ..... (Top port normally closed)

#### Valve Body Assembly Ratings:

200 psig for stainless steel bodies at 350°F (13.8 bar at 177°C)

**End Connections:** ..... Female NPT inlet and outlet

**Seat Ring:** ..... 316 Stainless Steel, replacement in 2-way and 3-way bodies

#### Materials of Construction:

**Body** ..... 316 Stainless Steel, for 2-way valves and 3-way valves

**Trim** ..... 316 Stainless Steel in 2-way valves and 3-way valves

**Primary Packing** ..... 316 Stainless Steel bellows in Stainless bodies.

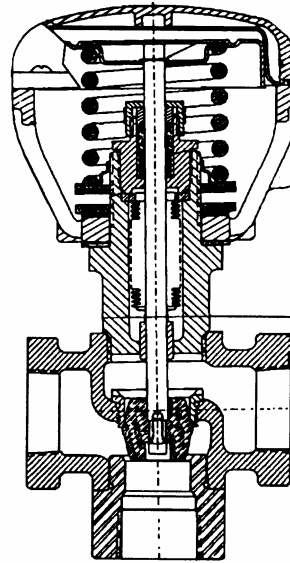
**Secondary Packing** ..... Spring loaded teflon chevrons in Stainless Steel bodies.

## ACCESSORIES

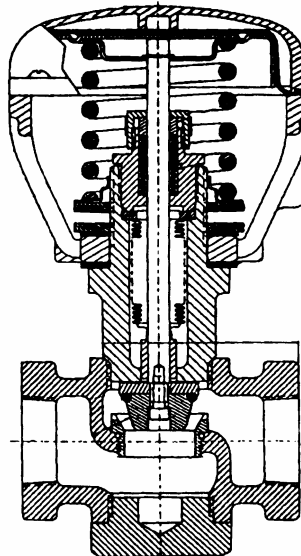
VC-210 Control Valves are available with the Model P-2 positioner or No. 84589-A2, 110 VAC solenoid valve mounted on the valve and prepiped to the actuator.

## INNER VALVE CONSTRUCTION

These illustrations represent 3-way and direct-acting body styles. The Teflon O-ring construction is also available in reverse-acting styles (See Table 1)



**BNS**  
**3-Way**  
**Metal to Metal**  
**Seating**



**BR**  
**Direct Acting**  
**Soft Seating**

**TABLE I**  
**2-Way Valves**

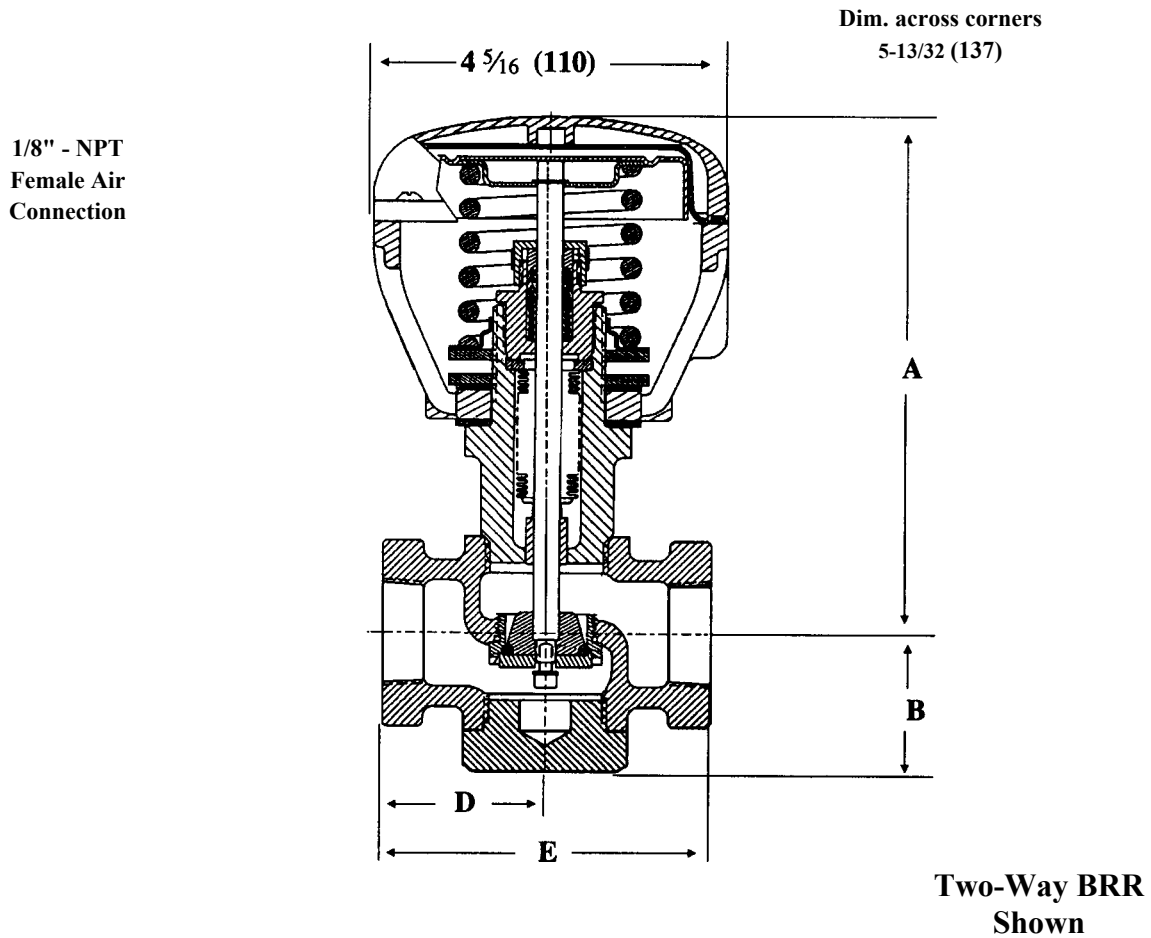
Valve Style		Valve Body Material	Flow Characteristics		Seating Style	Trim Material	Valve Size, In.	Cv (%)		Cv (Q.O.)	
Direct Acting	Reverse Acting							DA	RA	DA	RA
BR	BRR	316 St. St.	%	Q.O.	Teflon O-Ring	316 St. St.	1/2	2.3 *	2.5	4	4
							3/4	7.3	7.2	8	8
							1	9.5	9.5	10	10
3-Way BNS		St. St.	Linear		St. St. Seat Ring/Plug	316 St. St.	1/2	2.2			
							3/4	4.6			
							1	9.0			

\* 1/2" DA is Available with 1/4" Reduced Port.

CV= 0.6, 0.3, & 0.1 - Linear Flow

## DIMENSIONS, SHIPPING WEIGHTS

(All dimensions in inches (mm)).



**TABLE II**

Valve	Pattern	Body Material	Dimension	Valve Size In.			
				1/2"	3/4"	1"	
BR BRR	2-Way	316 Stainless Steel	A	6-3/8 (160)	6-3/8 (160)	6 3/8 (160)	
			B	A.T.C. §	1-3/4 (44)	1-3/4 (44)	1-3/4 (44)
				A.T.O. §	1-3/4 (44)	1-3/4 (44)	1-3/4 (44)
			D	2 (50.8)	2 (50.8)	2 (50.8)	
			E	4 (102)	4 (102)	4 (102)	
BNS	3-Way	316 Stainless Steel	A	6-3/8 (160)	6-3/8 (160)	6-3/8 (160)	
			B	2-3/16 (55)	2-3/16 (55)	2-3/16 (55)	
			D	2 (50.8)	2 (50.8)	2 (50.8)	
			E	4 (102)	4 (102)	4 (102)	
All Styles			Shipping Wt. Lbs. (kg)	6.1(2.8)	6.1(2.8)	6.1(2.8)	

§ A.T.C. - Air to Close, A.T.O. - Air to Open

## MAXIMUM ALLOWABLE PRESSURE DROP

When the control valve is required to close off against the full upstream pressure with 0 psig on the downstream side of the valve, the upstream pressure should be considered as the maximum pressure drop. The tabulated maximum pressure drops are for throttling service only. Where rapid cycling or On-Off type service

the application, the pressure differential across a VC-210 control valve should not exceed 50 psi (3.45 bar). In any case the upstream pressure should not exceed 100 psi (6.89 bar). The tabulated ratings are based on 3-15 (0.2 - 1.0 bar) signal.

**TABLE III**

NOMINAL VALVE SIZE	BENCH TEST SPRING RANGES †						
	AIR TO CLOSE		AIR TO OPEN			3-WAY	
	3-12 psi* 0.2-0.8 bar	3-7 psi 0.2-0.5 bar	6-15 psi* 0.4-1.0 bar	8-15 psi 0.55-1.0 bar	11-15 psi 0.75-1.0 bar	5-14 psi* 0.3-0.9bar	9-13 psi 0.6-0.9 bar
MAX. ALLOWABLE PRESSURE DROP							
1/2	90	100	100	100	100	60	100
3/4	50	100	100	100	100	35	80
1	30	90	50	80	100	20	40

\* Standard Springs

† Bench Test with 0 psi in valve body.

## Ordering Information

Specify:

1. Complete Model No.

**Example:** 1/2" VC-210 BR (for air to close control valve).

3/4" VC-210 BRR (for air open control valve).

2. Quantity

3. Bench test spring range required. (If other than standard).  
See Table III.

4. Medium through valve.

5. Upstream Pressure.

6. Pressure drop.

7. Shipping and billing instructions.

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