

# B2...VB Series, 2-Way, VBall Control Valve

## Carbon Steel Body, Hardened Chrome Plated, Stainless Steel Ball and Stem



- Fast quarter turn open or closed operation
- Stainless steel ball and stem
- Positive shut-off
- Two-piece body construction

### Application

- Water-side control of air handling apparatus in ventilation and air-conditioning system
- Water/Steam control in heating systems
- 300:1 rangeability

The dimensions and drilling of end flanges conform to the American cast iron flange standard, Class 150 (ANSI B16.1).

### Technical Data

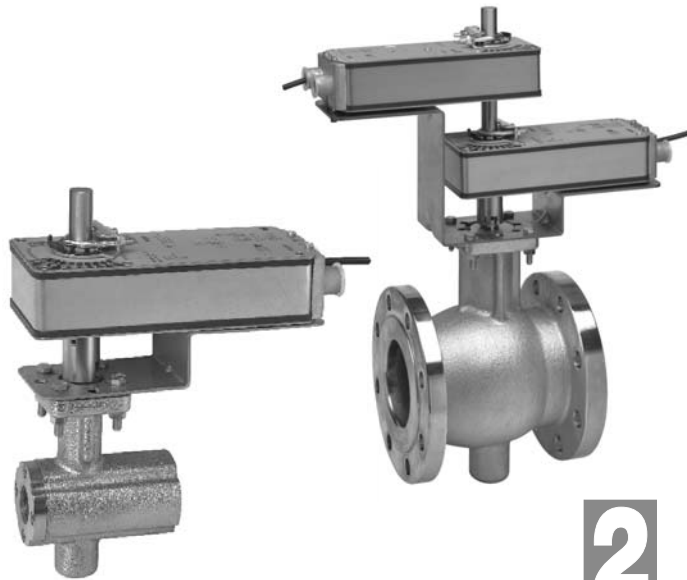
Media	chilled or hot water, glycol, 250# steam
Flow characteristic	equal percentage
Action	90% rotation valve open CW, valve closed CCW
Sizes	1", 1½", 2"
Type of end fittings	NPT

### Materials:

Body	Carbon Steel
Ball	Stainless Steel with Hardened Chrome Plating
Seats	Teflon
Stem	Stainless Steel
Packing	Spring-loaded Teflon

Pressure rating	ANSI 300
Media temp. range	-22°F to 400°F (-30°C to 204°C)
Close-off pressure	150 psig @ 400°F
Maximum differential pressure (ΔP)	steam: 100psi water: 150psi

Cv	Valve Nominal Size		Type	Suitable Actuators		
	Inches	DN [mm]	2-way NPT	Spring	Non-Spring	
24	1"	25	B2100VB-024	NF Series	AM Series	SY Series
55	1½"	40	B2150VB-055			
77	2"	50	B2200VB-077	AF Series		



**MFT**



**Models**

AF24-MFT US  
 AF24-MFT-S US  
 AF24-MFT95 US

w/built-in Aux. Switches

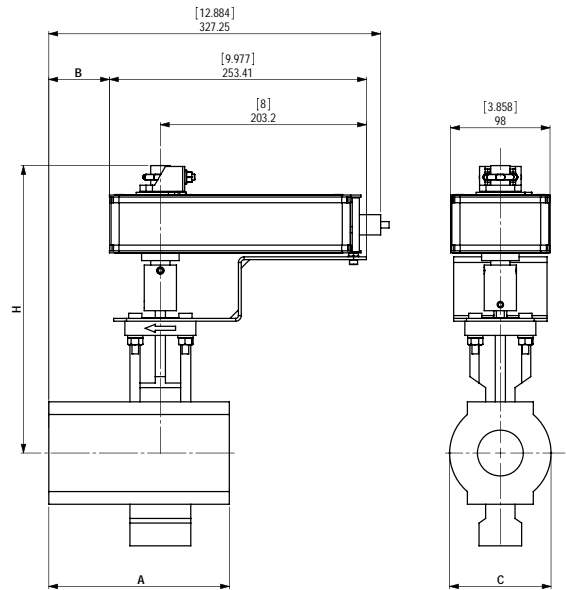


Technical Data		
Control		MFT
Control signal		2 to 10 VDC, (4 to 20 mA with 500 Ω resistor) 0-135 Ω (MFT95)
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	6 W
	holding	2.5 W
Transformer sizing		10 VA, class 2 power
Electrical connection		½" conduit connector
(-S model has 2 cables)		3 ft [1m], 18 GA appliance cable
Overload protection		electronic throughout rotation
Input impedance		100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 750 Ω for PWM 1500 Ω for on/off and floating point
Feedback output		2 to 10 VDC, 0.5 mA max
Angle of rotation		95°
Direction of rotation	spring	reversible with CW/CCW mounting
	motor	reversible with built-in  switch
Position indication		visual indicator
Manual override		hex crank
Running time	control	150 seconds independent of load
	spring	<20 seconds
Ambient temperature		-22° F to 122° F [-30° C to 50° C]
Housing		NEMA 2 / IP54
Agency listings		UL 873, CSA C22.2 No. 24 certified, CE
Noise level		max. 45 dB(A)

AF24-MFT-S US		
Auxiliary switches		2 x SPDT, 7A (2.5A) @ 250 VAC, UL listed, one switch is fixed at +5°, one is adjustable 25° to 85° (double insulated)

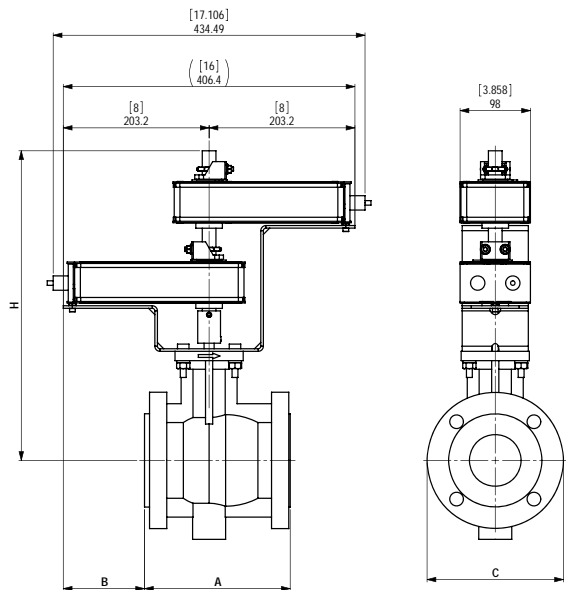
\* Dual Mounted Actuators

**Dimensions with 2-Way Valve**



Valve Body	COP	Valve Nominal Size		Dimensions (Inches)			
		Inches	DN [mm]	A	B	C	H
B2200VB-077	150	2"	50	7.00	2.35	3.94	11.16

**Dual AF Actuators**



Valve Body	COP	Valve Nominal Size		Dimensions (Inches)			
		Inches	DN [mm]	A	B	C	H
B6300VB-207	150	3"	80	8.00	4.46	7.48	431.4

M40025 - 05/10 - Subject to change. © Belimo Aircontrols (USA), Inc.

### Wiring Diagrams

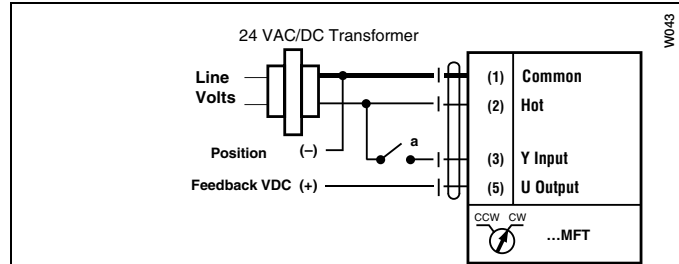
#### INSTALLATION NOTES

- 2 **CAUTION Equipment damage!**  
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 IN4004 or IN4007 diode (IN4007 supplied, Belimo part number 40155).
- 5 Triac A and B can also be contact closures.
- 6 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.
- 7 Position feedback cannot be used with Triac sink controller. The actuators internal common reference is not compatible.

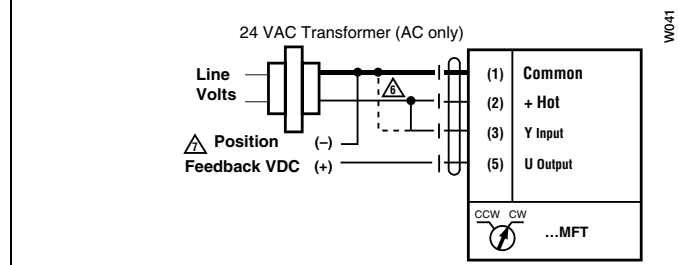
#### APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.
- ◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

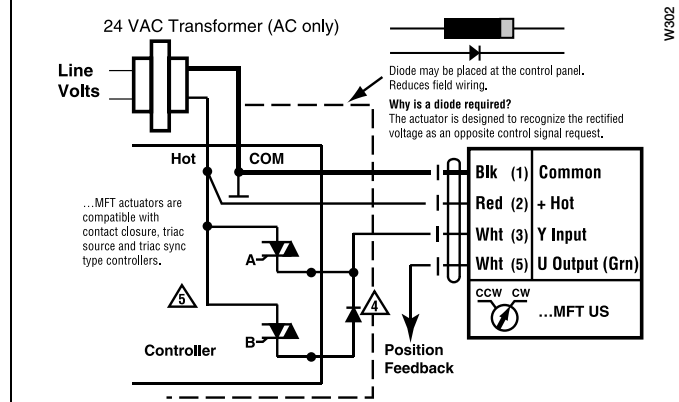
**WARNING Live Electrical Components!**  
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



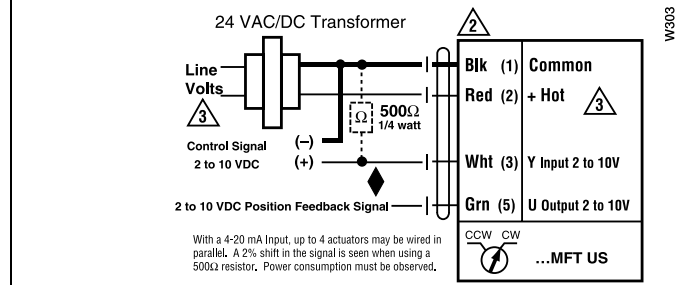
#### On/Off control



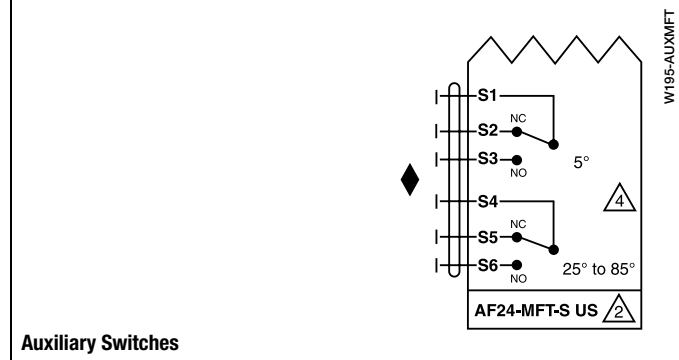
#### PWM, triac source and sink



#### Floating Point control



#### Proportional 2 to 10 or 4 to 20 mA control signal



#### Auxiliary Switches



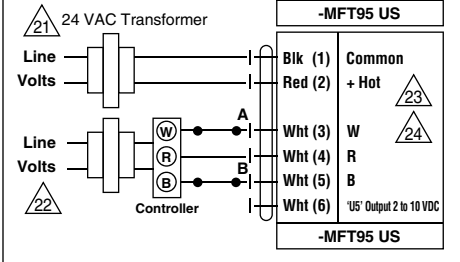
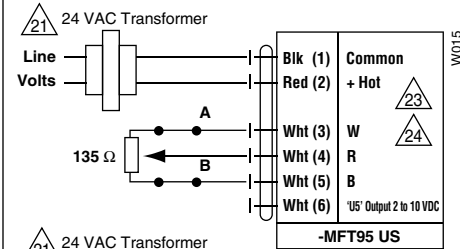
## INSTALLATION NOTES

- 21 Provide overload protection and disconnect as required.
- 22 Actuators and controller must have separate transformers.
- 23 Consult controller instruction data for more detailed information.
- 24 Resistor value depends on the type of controller and the number of actuators. No resistor is used for one actuator. Honeywell® resistor kits may also be used.
- 25 To reverse control rotation, use the reversing switch.

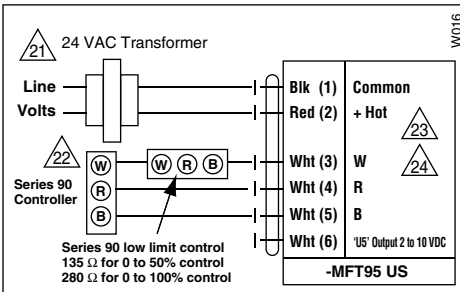
### Override

Switch A	Switch B	Damper Position
		Damper Open
		Damper Closed

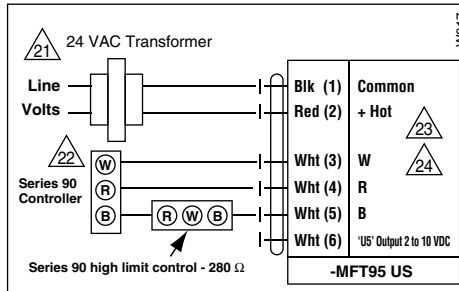
The direction of rotation switch is set so that the fail safe position and the position of the damper is closed with no signal at wire R.



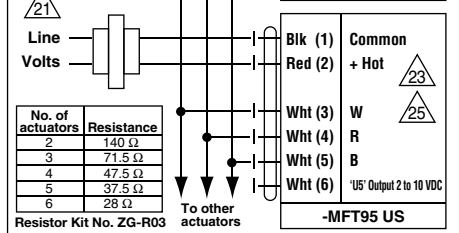
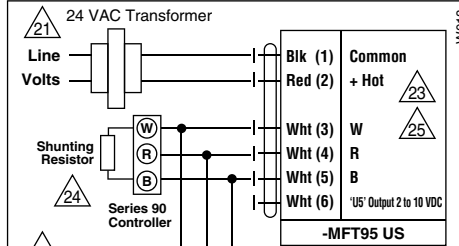
### Low Limit Control



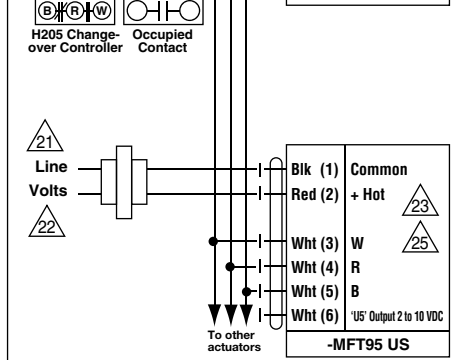
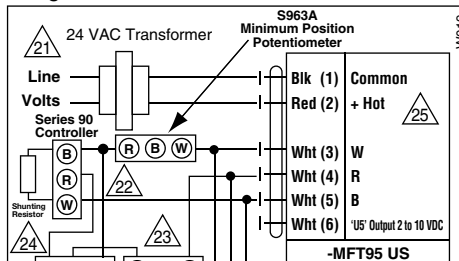
### High Limit Control



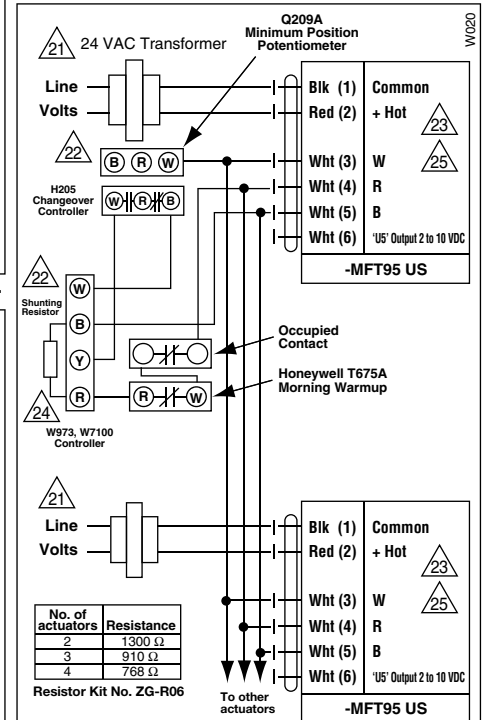
### Wiring Multiple Actuators to a Series 90 Controller



### Wiring Multiple Actuators to a Series 90 Controller using a Minimum Position Potentiometer



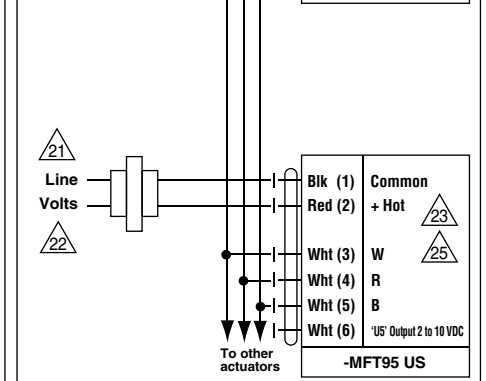
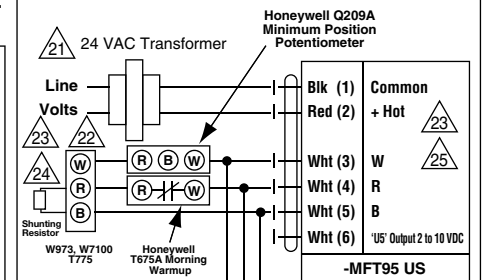
### Typical wiring diagrams for multiple actuators used with the W973, W7100 and T775 controllers



No. of actuators	Resistance
2	1300 Ω
3	910 Ω
4	768 Ω

Resistor Kit No. ZG-R06

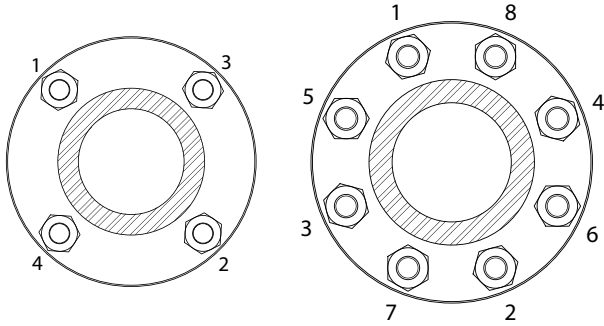
Used with the W973 and W7100 controllers



## Valve Installation Procedure

### 3", 4" & 6" Valves - Flanged Installation

1. Valve must be in the closed position for installation.
2. **Figure 1 illustrates a flanged valve installation.**
3. Use hex bolts & nuts to secure valve to flange.
4. Ensure proper gaskets are used between the valve flange and pipe flange.
5. Tighten bolts & nuts in alternating opposite sides until completely tightened. Please see torque requirements below. Torque wrench is required.



3" Bolt Tightening Sequence

4" & 6" Bolt Tightening Sequence



**WARNING:** Exceeding the Maximum Torque Can Damage the Valve and Void the Warranty!

- 3" ANSI 150 Flange - 65 ft/lbs
- 4" ANSI 150 Flange - 70 ft/lbs
- 6" ANSI 150 Flange - 100 ft/lbs

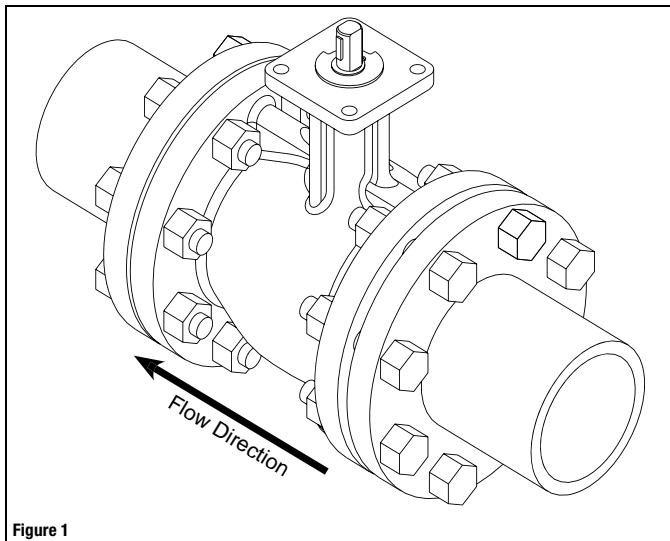


Figure 1

## Seat Replacement Procedure

### 3", 4" & 6" Valves

1. Remove valve from pipe
2. Remove 2 cap retaining washers (1)
3. Using 2 wrenches/flat-head screwdrivers, pry cap assembly (2) out of valve
4. Rotate valve to fully open position
5. Using hands, pull seat (3) out of the valve
6. Replace seat and reverse procedure to reassemble
7. Reinstall valve per installation instructions

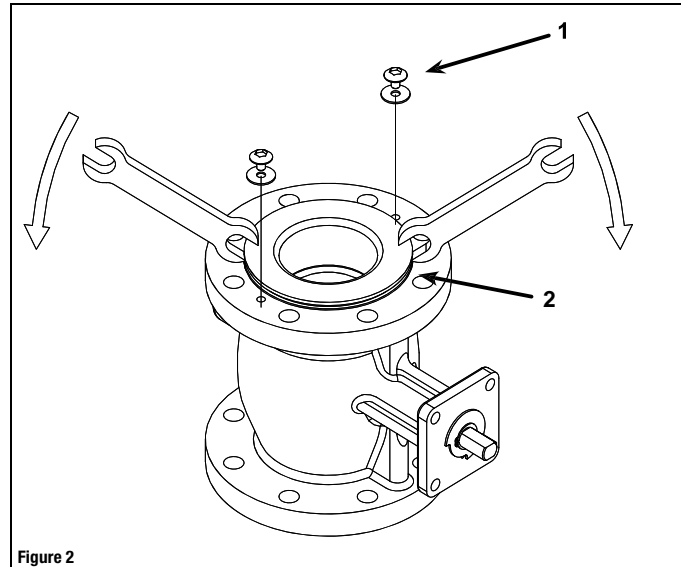


Figure 2

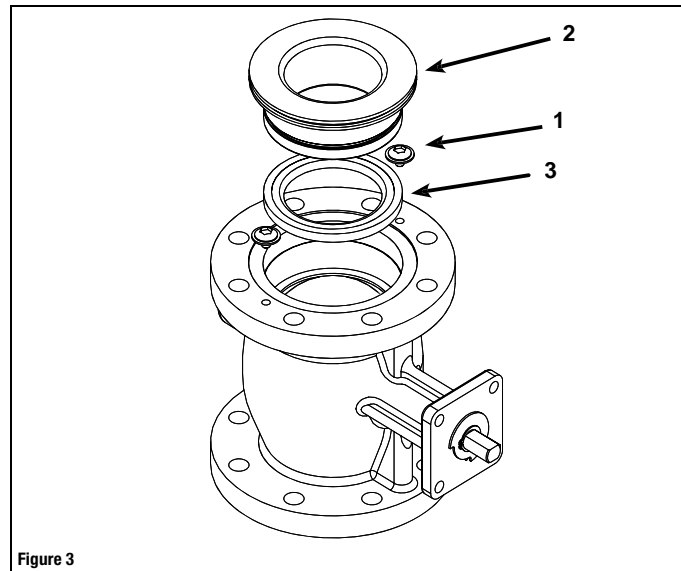


Figure 3