Actuated Globe Valves

for two way and three way control of hot water, chilled water and low pressure steam systems

Description

The **Actuated Globe Valve** is comprised of the valve body, the linkage assembly and the actuator. The valve size, Cv rating and close-off pressure determine the type of linkage and actuator series used. This correlation is in the Valve Selection Chart on page 3.

The Maxi Bonnet is a medium duty linkage for up to 4 inch, 2 and 3 way valves that may be used with any model from the **TT/TM** or **RT/RM** series actuators.

The Ultra Bonnet and the **MM** series actuator are a complete unit. The linkage is a heavy duty linkage for 4 to 6 inch valves both 2 and 3 way.

ACTUATION

Once the actuator series, **TT/TM**, **RT/RM** or **MM**, has been determined, the actual model that meets the requirements may be selected. The **TT/TM** and **RT/RM** motors accept digital, analog, or, in the case of microprocessor units, both digital and analog control signals. Power supply may be low or line voltage depending upon the model.

The **MM** motors are microprocessor based, multi-turn actuators that accept digital or analog control and operate on 24VAC/VDC nominal power supply. Refer to the individual data sheets on the actuators for the exact specifications on each model.

EMERGENCY POSITIONING SYSTEMS

The patented ***Enerdrive System*, The Electronic Spring,*** is available on selected **TT/TM** or **RT/RM** models. This emergency positioning device utilizes the inherent properties of super capacitors to power the unit at full rated torque to its safety position, either fully open or fully closed, in the event of power failure.

Fail Safe is an option for the **MM** actuator. This emergency positioning system relies upon a captive electrolytic battery pack to power the unit to a “fail safe position”, either fully open or fully closed, at full rated torque.

LINKAGE SYSTEMS

The motor to valve linkage kit translates the rotary motion of the actuator to a linear motion. This is done with a rack and pinion system that produces a linear relationship between motor rotation and valve lift. This is important because the equal percentage characteristic of the globe valve is not compromised. The assemblies are constructed of heavy zinc plated steel with heavy-duty cold rolled machined zinc plated gears. The bearing surfaces are a combination of Teflon and oil impregnated sintered bronze.

Fig. i Pictured are the Ultra Bonnet Assembly, top left, and the Maxi Bonnet Assembly, center and bottom left .

VALVE BODIES

Valves up to 2 inches, two and three way, feature a bronze body with brass trim in standard models (ANSI B16.15 Class 250). Stainless steel trim is available for 2 way valves only by special order. Connections are NPT female standard; however, metric sizing is available.

Valves from 2-1/2 to 4 inches, two and three way are cast iron with a black lacquer finish with brass trim (ANSI B16.1 Class 125). Connections are raised face flanges. All valves are equal percentage flow type. Three way standard models are for mixing service; however, valves for diverting service are available by special order.

* U.S.A. Patent #5,278,454

Actuated Globe Valves

Model Descriptions

Valve Size Selection:
2 WAY: 1", 1-1/4", 1-1/2" & 2"
3 WAY: 1", 1-1/4", 1-1/2" & 2"
Actuator Selection:
DIGITAL: TT Series
ANALOG: TM Series
Linkage: Maxi Bonnet
Specifications on Page: 4
Dimensions on Page: 5
Wiring on Page: 13-15

Valve Size Selection:
2 WAY: 2-1/2" & 3"
3 WAY: 2-1/2" & 3"
Actuator Selection:
DIGITAL: TT Series
ANALOG: TM Series
Linkage: Maxi Bonnet
Specifications on Page: 6
Dimensions on Page: 7
Wiring on Page: 13-15

Valve Size Selection:
2 WAY: 2-1/2", 3" & 4"
3 WAY: 2-1/2", 3" & 4"
Actuator Selection:
DIGITAL: RT Series
ANALOG: RM Series
Linkage: Maxi Bonnet
Specifications on Page: 8
Dimensions on Page: 9
Wiring on Page: 13-15

Valve Size Selection:
2 WAY: 4", 5" & 6"
3 WAY: 4", 5" & 6"
Actuator Selection:
ANALOG: MM Series
Linkage: Ultra Bonnet
Specifications on Page: 10
Dimensions on Page: 11
Wiring on Page: 14-15

Model Nomenclature

In the diagram below, the valve nomenclature for this series of actuated valve is segmented into its components as an aid to comprehending Neptronic's new method of labelling. This departure from previous model numbers will greatly assist the user in identifying the exact valve and its characteristics once it has been installed.

GS	J	1450	W	B	4	M	M	0	10
Valve Series	Pipe Size	Cv: (Unit column is a decimal)	Valve Body	Valve Trim	Valve Ends	Motor Series	Control Signal	Supply Voltage	Motor Features
GD: Globe, 3 Way Diverting **GM:** Globe, 3 Way Mixing **GS:** Globe, 2 Way Single Seat	**C:** 1" **D:** 1-1/4" **E:** 1-1/2" **F:** 2" **G:** 2-1/2" **H:** 3" **J:** 4" **K:** 5" **L:** 6"	**0100:** 10 **0140:** 14 **0200:** 20 **0280:** 28 **0400:** 40 **0560:** 56 **0850:** 85 **1450:** 145 **2350:** 235 **3500:** 350	**W:** Cast Iron Class 125 **Y:** Brass/ Bronze Class 250	**B:** Brass **S:** Stainless Steel	**1:** NPT Female **4:** Flanged	**M:** 1500 lb. **R:** 360 in.lb. 576 lb. **T:** 180 in.lb. 288 lb.	**L:** Lon **M:** Analog **T:** Digital	**0:** 24VAC/30VDC **1:** 115V **2:** 230V	**00:** Basic Motor **10:** Battery Back-up **20:** Mechanical Switches **60:** Enerdrive **80:** Enerdrive & Switches

Actuated Globe Valves

Model Selection Tables

In Table 1, the various models listed designate the size, flow rate and close off pressure of each valve. Select the appropriate valve model. Select an appropriate actuator model from Table 2 based upon the close off pressures in Table 1. The actuator model selected from Table 2, is added as a suffix to the valve model selected from Table 1 to form a complete actuated valve model. Refer to the formula in Table 3.

TABLE 1: VALVE SELECTION

GS - 2 WAY SINGLE SEAT VALVES			GM - 3 WAY MIXING VALVES			GS & GM VALVES		
SIZE IN.	FLOW Cv	VALVE MODEL	SIZE IN.	FLOW Cv	VALVE MODEL	CLOSE OFF PRESSURES TT/TM	RT/RM	MM
1	10	GS C0100YB1				250		
1	14	GS C0140YB1	1	14	GM C0140YB1	250		
1-1/4	20	GS D0200YB1	1-1/4	20	GM D0200YB1	215		
1-1/2	28	GS E0280YB1	1-1/2	28	GM E0280YB1	150		
2	40	GS F0400YB1	2	41	GM F0410YB1	84		
2-1/2	56	GS G0560WB4	2-1/2	74	GM G0740WB4	54	108	
3	85	GS H0850WB4	3	101	GM H1010WB4	37	80	
4	145	GS J1450WB4	4	170	GM J1700WB4		32	110
5	235	GS K2350WB4	5	290	GM K2900WB4			80
6	350	GS L3500WB4	6	390	GM L3900WB4			50

TABLE 2: ACTUATOR SELECTION

ACTUATOR CAPABILITY	ACTUATOR MODELS						
288 LB. FORCE	TT000	TT020	TT060	TT080	TM000	TM060	
576 LB. FORCE	RT000	RT020	RT060	RT080	RM000	RM060	
1500 LB. FORCE					MM000		MM010
CONTROL SIGNAL	2 Position 3 Pt. Fltng.	2 Position 3 Pt. Fltng.	2 Position 3 Pt. Fltng.	2 Position 3 Pt. Fltng.	3 Pt. Floating 2-10VDC 4-20mA PWM	3 Pt. Floating 2-10VDC 4-20mA PWM	3 Pt. Floating 2-10VDC 4-20mA PWM
FEEDBACK	No	No	No	No	Conditioned	Conditioned	Conditioned
ENERDRIVE SYSTEM	No	No	Yes	Yes	No	Yes	No
FAIL SAFE OPTION	No	No	No	No	No	No	Yes
AUXILIARY SWITCHES	No	Yes	No	Yes	No	No	No

TABLE 3: ACTUATED VALVE FORMULA

FORMULA:	GLOBE VALVE	+	ACTUATOR	=	ACTUATED VALVE
Specification Requirements :	4 inch Line Size, 2 Way 145 Cv, 110 PSIG Close Off Cast Iron Class 125, Brass Trim Flanged Connections	+	4-20mA Control Signal 2-10VDC Output Feedback Fail Safe	=	Modulating 4 inch 2 Way Flanged Globe Valve with Fail Safe and Feedback
Selected from the Tables :	GS J1450WB4	+	MM010	=	GS J1450WB4 MM010

Actuated Globe Valves

Specifications

*for valves sized 1 inch to 2 inch with the **TT** or **TM** actuators*

Valve Specifications:

Valve Flow Type:	2 Way Valves: Equal Percentage; 3 Way Valves: Linear
Fluid Temperature:	Water: +40°F to +281°F (+4°C to +60°C); Steam +230°F (+110°C) Maximum
Static Pressure:	Water: 250 PSIG Maximum; Steam: 250 PSIG Maximum
Inlet Pressure:	Steam: 20 PSIG Maximum
Differential:	Water: 10 PSIG Recommended, 35 PSIG Maiximum; Steam: 15 PSIG Maximum
Body & Seat:	Bronze ANSI B16.15 Class 250
Stem Material:	Stainless Steel
Valve Plug:	Brass
Packing:	Spring Loaded Teflon Cone
Disc:	Composition
End Connections:	NPT Female Standard, Metric (BSP) Available upon Request

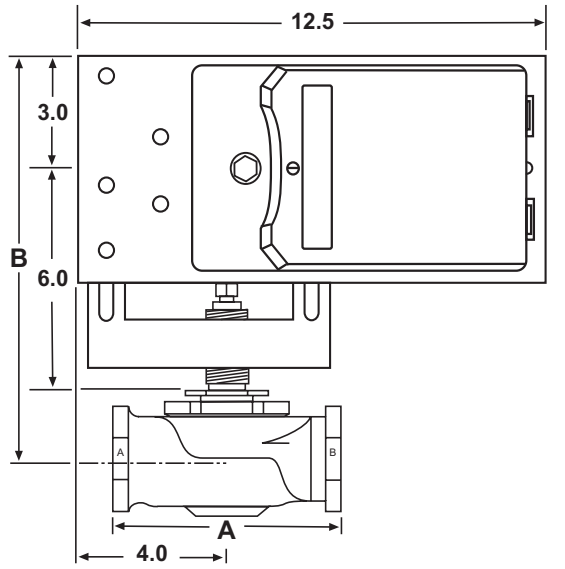
Actuator Specifications:

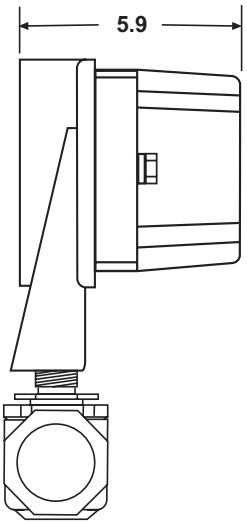
Power Supply:	22-26VAC or 28-32VDC
Maximum Power Consumption:	**TT000, TT020 & TM000:** 8VA at 26VAC at Full Load **TT060, TT080 & TM060:** Peak at Start-up: 30VA at 26VAC Operating at Full Load: 8VA at 26VAC
Wire Size & Length:	18 AWG Minimum, 25 ft./7.6 m. Maximum per Actuated Valve
Electrical Connections:	Two 7/8 in./ 22.2 mm. Knock Outs, Screw Terminals
Control Signals:	**TT000 & TT020:** 3 Wire 2 Position, 4 Wire 3 Point Floating **TT060 & TT080:** 2 Wire 2 Position, 4 Wire 3 Point Floating **TM000 & TM060:** **ANALOG:** A) 2-10VDC; or B) May be Externally Wired with a 500 Ohm Resistor which is Supplied for 4-20mA, Zero & Span Adjustable **PULSE WIDTH MODULATION:** Time Base of 0.1 - 5 Seconds/20mS Resolution or 0.1 - 25 Seconds/100mS Resolution Selected by Dip Switch Position SWITCH HOT: Triac or Dry Contact, 40mA Max. Switching Current SWITCH NEUTRAL: NPN Transistor, SCR, Triac or Dry Contact 75mA Maximum Switching Current **DIGITAL:** 4 Wire/3 Point Floating
Stroke/Lift:	**288 lb. or 130 kg. at Rated Voltage**
Direction of Stroke/Lift:	Reversible
Stroke/Lift Time:	0-288 lb. or 0-130 kg.: 60-85 Seconds
Actuator Ambient Temperature:	0°F to +140°F or -18°C to +60°C
Fluid Temperature:	-22°F to +212°F or -32°C to +100°C
Feedback Potentiometer:	**TM000 & TM060:** 4-20mA Output (May be Externally Wired for a 2-10VDC Signal)
Enerdrive Rating:	**TT060, TT080 & TM060: 288 lb. or 130 kg.**
Enerdrive Response Time:	**TT060, TT080 & TM060: 135 Seconds Maximum**
Auxiliary Switches:	**TT020 & TT080:** 2 Mechanical, Fixed at 10° & 80°
Auxiliary Switch Rating:	1 Amp Resistive, 24VAC
Enclosure:	UL Recognized QMFZ2 Fire Rated 94V-5 and Steel

Actuated Globe Valves

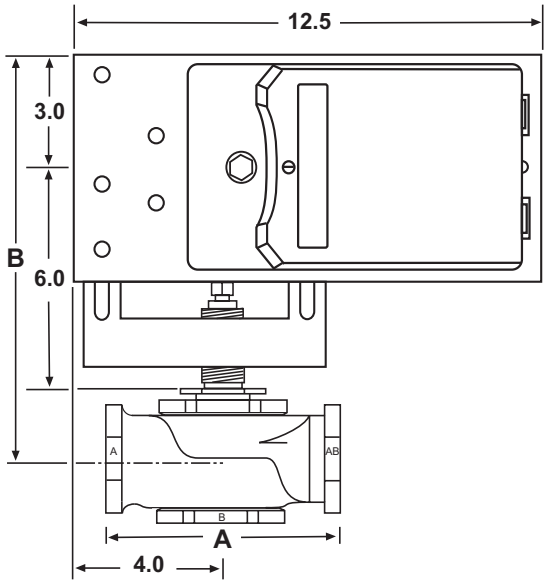
*The drawings and dimensions below are for 1", 1-1/4", 1-1/2" 2" Way Valves with either a **TT** or **TM** actuator and Maxi Bonnet linkage. All dimensions are in inches.*

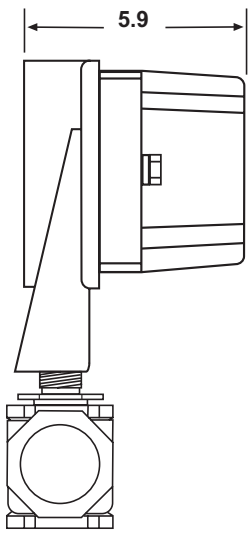
GS Two Way Single Seat Valves





GM Three Way Mixing Valves





VALVE SIZE	2 WAY VALVES		3 WAY VALVES		STROKE TIME (SECONDS)	CLOSE OFF	VALVE DIMENSIONS				
	MODEL	Cv	MODEL	Cv			A	B 2 WAY	B 3 WAY	C 2 WAY	C 3 WAY
1"	GS C0100YB1	10			60	250	4.6	10.8		1.2	
1"	GS C0140YB1	14	GM C0140YB1	14	60	250	4.6	10.8	10.35	1.2	1.6
1-1/4"	GS D0200YB1	20	GM D0200YB1	20	60	215	4.6	10.9	10.60	1.4	1.65
1-1/2"	GS E0280YB1	28	GM E0280YB1	28	60	150	5.4	11.1	10.65	1.55	1.7
2"	GS F0400YB1	40	GM F0410YB1	41	60	84	6.1	11.3	10.75	1.65	1.9

Actuated Globe Valves

Specifications

*for valves sized 2-1/2 inch to 3 inch with **TT** or **TM** actuators*

Valve Specifications:

Valve Flow Type:	Equal Percentage
Stem Lift:	1" Stroke
Maximum Working Temperature:	281°F
Max. Recommended Differential:	Water Application: 10 PSIG; Steam Application: 20 PSIG
Maximum Close-Off Pressure:	Refer to Valve Selection Chart, Page 6
Maximum Working Pressure:	175 PSIG up to 150°F Decreasing to 125 PSIG at 281°F
Body:	Cast Iron with Black Lacquer Finish ANSI B16.1 Class 125
Stem Material:	Stainless Steel
Valve Plug:	Brass
Packing:	Spring Loaded TFE
End Connections:	Raised Face Flanges

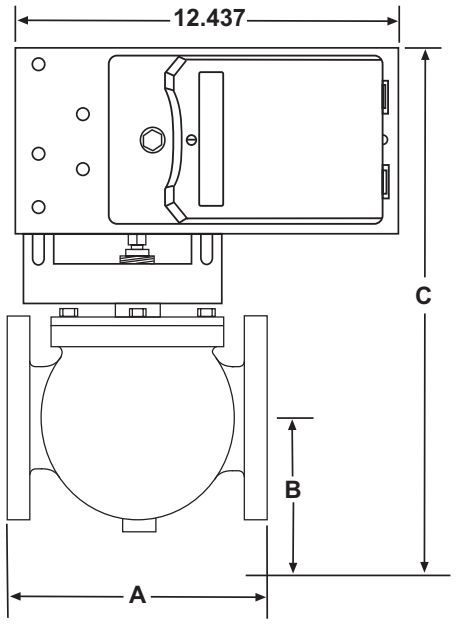
Actuator Specifications:

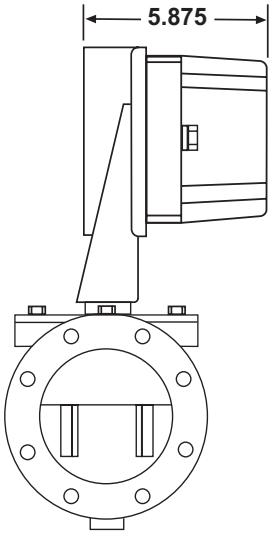
Power Supply:	22-26VAC or 28-32VDC
Maximum Power Consumption:	**TT000, TT020 & TM000:** 8VA at 26VAC at Full Load **TT060, TT080 & TM060:** Peak at Start-up: 30VA at 26VAC Operating at Full Load: 8VA at 26VAC
Wire Size & Length:	18 AWG Minimum, 25 ft./7.6 m. Maximum per Actuated Valve
Electrical Connections:	Two 7/8 in./ 22.2 mm. Knock Outs, Screw Terminals
Control Signals:	**TT000 & TT020:** 3 Wire 2 Position, 4 Wire 3 Point Floating **TT060 & TT080:** 2 Wire 2 Position, 4 Wire 3 Point Floating **TM000 & TM060:** **ANALOG:** A) 2-10VDC; or B) May be Externally Wired with a 500 Ohm Resistor which is Supplied for 4-20mA, Zero & Span Adjustable **PULSE WIDTH MODULATION:** Time Base of 0.1 - 5 Seconds/20mS Resolution or 0.1 - 25 Seconds/100mS Resolution Selected by Dip Switch Position SWITCH HOT: Triac or Dry Contact, 40mA Max. Switching Current SWITCH NEUTRAL: NPN Transistor, SCR, Triac or Dry Contact 75mA Maximum Switching Current **DIGITAL:**4 Wire/3 Point Floating
Stroke/Lift:	**288 lb. or 130 kg. at Rated Voltage**
Direction of Stroke/Lift:	Reversible
Stroke/Lift Time:	0-288 lb. or 0-130 kg.: 60-85 Seconds
Actuator Ambient Temperature:	0°F to +140°F or -18°C to +60°C
Fluid Temperature:	-22°F to +212°F or -32°C to +100°C
Feedback Potentiometer:	**TM000 & TM060:** 4-20mA Output (May be Externally Wired for a 2-10VDC Signal)
Enerdrive Rating:	**TT060, TT080 & TM060: 288 lb. or 130 kg.**
Enerdrive Response Time:	**TT060, TT080 & TM060: 135 Seconds Maximum**
Auxiliary Switches:	**TT020 & TT080:** 2 Mechanical, Fixed at 10° & 80°
Auxiliary Switch Rating:	1 Amp Resistive, 24VAC
Enclosure:	UL Recognized QMFZ2 Fire Rated 94V-5 and Steel

Actuated Globe Valves

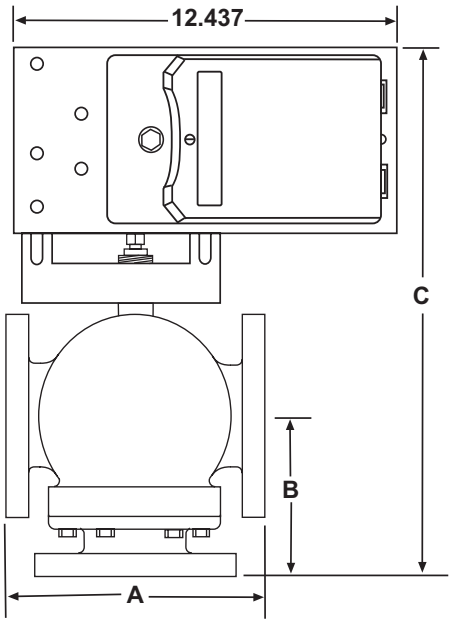
*The drawings and dimensions below are for 2-1/2" and 3" Valves with either a **TT** or **TM** actuator and Maxi Bonnet linkage. All dimensions are in inches.*

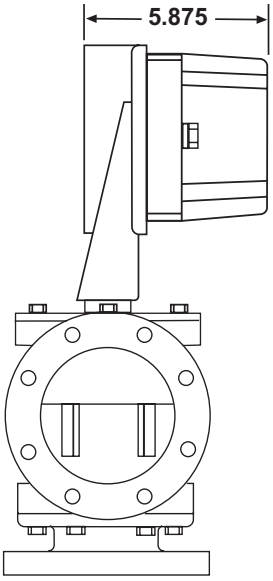
GS Two Way Single Seat Valves





GM Three Way Mixing Valves





VALVE SIZE	2 WAY VALVES		3 WAY VALVES		VALVE DIMENSIONS					FLANGES		BOLT HOLES		BOLTS REQUIRED		
	MODELS	Cv	MODELS	Cv	A	B		C		THCK	DIAM	DIAM	BHC	QTY	DIAM	LGTH
						2 WAY	3 WAY	2 WAY	3 WAY							
2-1/2"	GS G0560WB4	56	GM G0740WB4	74	8.5	3.50	5.375	17.0	18.5	.75	7.0	.75	5.5	4	.625	2.5
3"	GS H0850WB4	85	GM H1010WB4	101	9.5	3.75	6.375	17.5	19.0	.75	7.5	.75	6.0	4	.635	2.5

Specifications

*for valves sized 2-1/2 inch to 4 inch with the **RT** or **RM** actuators*

Valve Specifications:

Valve Flow Type:	Equal Percentage
Stem Lift:	1" Stroke
Maximum Working Temperature:	281°F
Max. Recommended Differential:	Water Application: 10 PSIG; Steam Application: 20 PSIG
Maximum Close-Off Pressure:	Refer to Valve Selection Chart, Page 6
Maximum Working Pressure:	175 PSIG up to 150°F Decreasing to 125 PSIG at 281°F
Body:	Cast Iron with Black Lacquer Finish ANSI B16.1 Class 125
Stem Material:	Stainless Steel
Valve Plug:	Brass
Packing:	Spring Loaded TFE
End Connections:	Raised Face Flanges

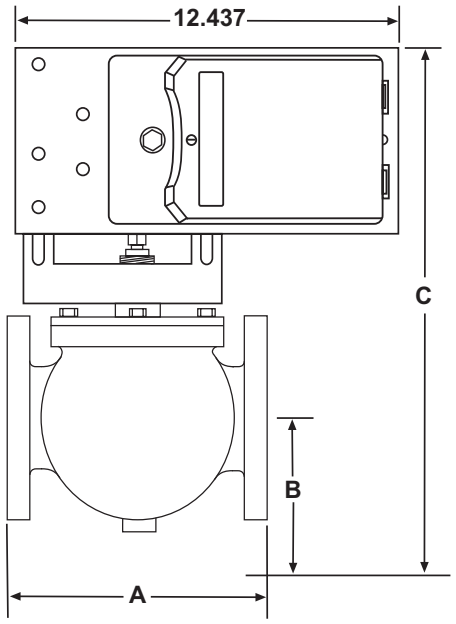
Actuator Specifications:

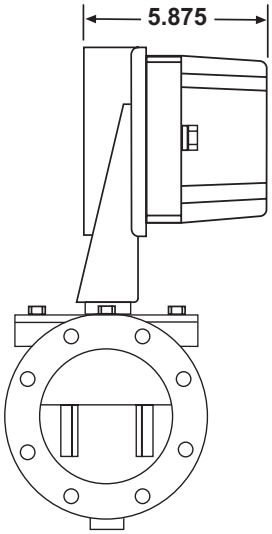
Power Supply:	22-26VAC or 28-32VDC
Maximum Power Consumption:	**RT000, RT020 & RM000:** 8VA at 26VAC at Full Load **RT060, RT080 & RM060:** Peak at Start-up: 30VA at 26VAC Operating at Full Load: 8VA at 26VAC
Wire Size & Length:	18 AWG Minimum, 25 ft./7.6 m. Maximum per Actuated Valve
Electrical Connections:	Two 7/8 in./ 22.2 mm. Knock Outs, Screw Terminals
Control Signals:	**RT000 & RT020:** 3 Wire 2 Position, 4 Wire 3 Point Floating **RT060 & RT080:** 2 Wire 2 Position, 4 Wire 3 Point Floating **RM000 & RM060 :** **ANALOG:** A) 2-10VDC; or B) May be Externally Wired with a 500 Ohm Resistor which is Supplied for 4-20mA, Zero & Span Adjustable **PULSE WIDTH MODULATION:** Time Base of 0.1 - 5 Seconds/20mS Resolution or 0.1 - 25 Seconds/100mS Resolution Selected by Dip Switch Position SWITCH HOT: Triac or Dry Contact, 40mA Max. Switching Current SWITCH NEUTRAL: NPN Transistor, SCR, Triac or Dry Contact 75mA Maximum Switching Current **DIGITAL:**4 Wire/3 Point Floating
Stroke/Lift:	**576 lb. or 261 kg. at Rated Voltage**
Direction of Stroke/Lift:	Reversible
Stroke/Lift Time:	0-576 lb. or 0-261 kg.: 60-85 Seconds
Actuator Ambient Temperature:	0°F to +140°F or -18°C to +60°C
Fluid Temperature:	-22°F to +212°F or -32°C to +100°C
Feedback Potentiometer:	**RM000 & RM060:** 4-20mA Output (May be Externally Wired for a 2-10VDC Signal)
Enerdrive Rating:	**RT060, RT080 & RM060: 576 lb. or 261 kg.**
Enerdrive Response Time:	**RT060, RT080 & RM060: 135 Seconds Maximum**
Auxiliary Switches:	**RT020 & RT080:** 2 Mechanical, Fixed at 10° & 80°
Auxiliary Switch Rating:	1 Amp Resistive, 24VAC
Enclosure:	UL Recognized QMFZ2 Fire Rated 94V-5 and Steel

Actuated Globe Valves

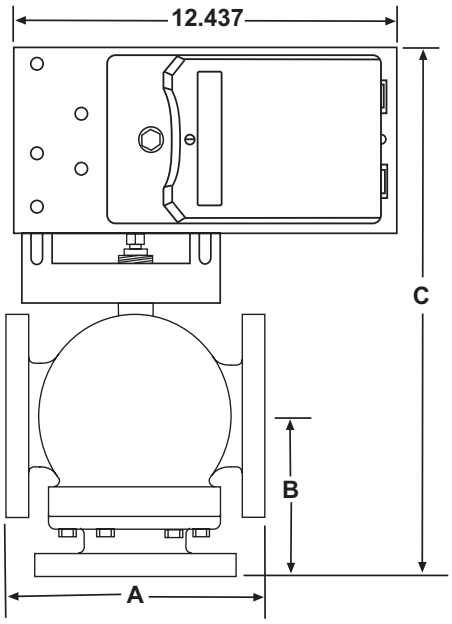
*The drawings and dimensions below are for 2-1/2", 3" and 4" Valves with either an **RT** or **RM** actuator and Maxi Bonnet linkage. All dimensions are in inches.*

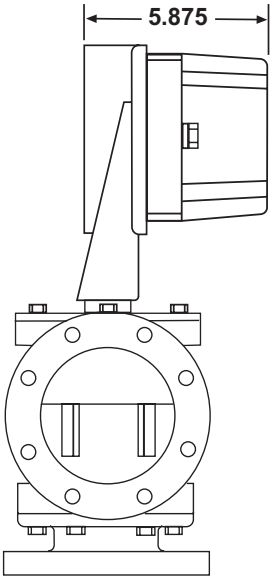
GS Two Way Single Seat Valves





GM Three Way Mixing Valves





VALVE SIZE	2 WAY VALVES		3 WAY VALVES		VALVE DIMENSIONS					FLANGES		BOLT HOLES		BOLTS REQUIRED		
	MODELS	Cv	MODELS	Cv	A	B		C								
						2 WAY	3 WAY	2 WAY	3 WAY	THCK	DIAM	DIAM	BHC	QTY	DIAM	LGTH
2-1/2"	**GS G0560WB4**	56	**GM G0740WB4**	74	8.5	3.50	5.375	17.0	18.5	.75	7.0	.75	5.5	4	.625	2.5
3"	**GS H0850WB4**	85	**GM H1010WB4**	101	9.5	3.75	6.375	17.5	19.0	.75	7.5	.75	6.0	4	.635	2.5
4"	**GS J1450WB4**	145	**GM J1700WB4**	170	11.5	4.50	8.50	19.0	22.5	.94	9.0	.75	7.5	8	.635	3.0

Actuated Globe Valves

Specifications

*for valves sized 4 inch to 6 inch with the **MM** actuators*

Valve Specifications:

Valve Flow Type:	Equal Percentage
Stem Lift:	4” Valves: 1” Stroke; 5” & 6” Valves: 1-1/2” Stroke
Maximum Working Temperature:	281°F
Max. Recommended Differential:	Water Application: 10 PSIG; Steam Application: 20 PSIG
Maximum Close-Off Pressure:	Refer to Valve Selection Chart, Page 6
Maximum Working Pressure:	175 PSIG up to 150°F Decreasing to 125 PSIG at 281°F
Body:	Cast Iron with Black Lacquer Finish ANSI B16.1 Class 125
Stem Material:	Stainless Steel
Valve Plug:	Brass
Packing:	Spring Loaded TFE
End Connections:	Raised Face Flanges

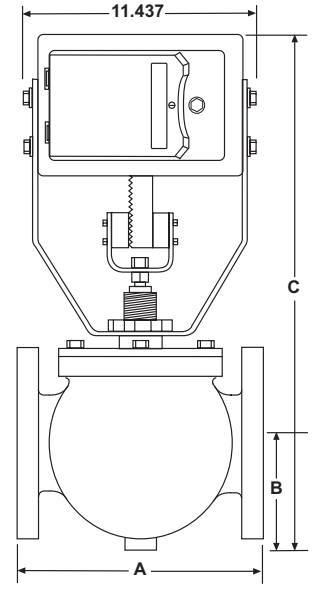
Actuator Specifications:

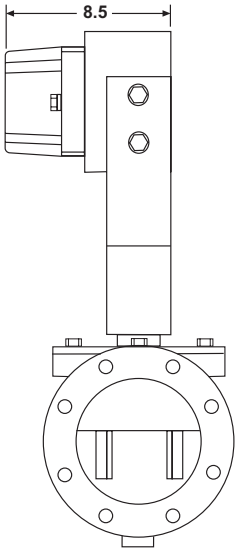
Power Supply:	22-26VAC or 28-32VDC
Maximum Power Consumption:	40VA at 26VAC
Wire Size & Length:	18 AWG Minimum, 25 ft./7.6 m. Maximum per Actuated Valve
Electrical Connections:	Two 7/8 in./ 22.2 mm. Knock Outs Screw Terminals
Control Signals:	**DIGITAL:** 4 Wire/3 Point Floating **ANALOG:** A) 2-10VDC; or B) May be Externally Wired with a 500 Ohm Resistor which is Supplied for 4-20mA, Zero & Span Adjustable **PULSE WIDTH MODULATION:** Time Base of Either 0.5 to 5 Seconds, 20 mS Resolution or 0.5 to 25 Seconds, 100 mS Resolution Selected by Dip Switch Position SWITCH HOT: Triac or Dry Contact 40mA Maximum Switching Current SWITCH NEUTRAL: NPN Transistor,SCR,Triac or Dry Contact 75mA Maximum Switching Current
Stroke/Lift:	**1500 lb. or 680 kg. at Rated Voltage**
Direction of Stroke/Lift:	Reversible
Stroke/Lift Time:	Electronically Adjustable from 1" - 3.5" or 2.54 cm. - 8.89 cm. 2 to 7 Minutes, Depending Upon Stroke, Force Independent
Actuator Ambient Temperature:	0°F to +120°F or -18°C to +50°C
Fluid Temperature:	-22°F to +212°F or -32°C to +100°C
Feedback Potentiometer:	4-20mA Output Which May be Externally Wired with a 500 ohm Resistor (Supplied) to Produce a 2-10VDC Signal
FAIL SAFE Rating:	**MM010**: **1500 lb. or 680 Kg.**
FAIL SAFE Response Time:	**MM010: 4 Minutes Maximum**
Battery:	12 Volt Sealed Gel Type
Battery Rating:	800mA
Enclosure:	UL Recognized QMFZ2 Fire Rated 94V-0, Zinc Plated Steel

Actuated Globe Valves

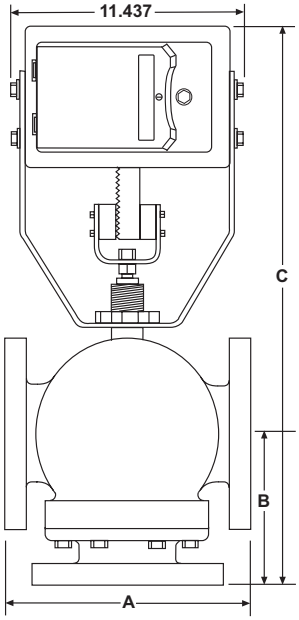
*The drawings and dimensions below are for 4", 5" and 6" Valves with the **MM** actuators and Ultra Bonnet linkage assembly. All dimensions in inches.*

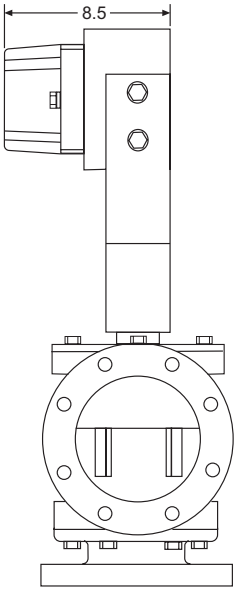
GS Two Way Single Seat Valves





GM Three Way Mixing Valves





VALVE SIZE	2 WAY VALVES		3 WAY VALVES		VALVE DIMENSIONS					FLANGES		BOLT HOLES		BOLTS REQUIRED		
	MODELS	Cv	MODELS	Cv	A	B		C								
						2 WAY	3 WAY	2 WAY	3 WAY	THCK	DIAM	DIAM	BHC	QTY	DIAM	LGTH
4"	**GS J1450WB4**	145	**GM J1700WB4**	170	11.5	4.5	8.50	25	28	.94	9.0	.75	7.5	8	.625	3.25
5"	**GS K2350WB4**	235	**GM K2900WB4**	290	13.0	5.0	8.75	31	34	.84	10.0	.87	8.5	8	.750	3.25
6"	**GS L3500WB4**	350	**GM L3900WB4**	390	14.0	5.5	9.75	32	35	1.0	11.0	.87	9.5	8	.750	3.25

Special Applications

For special application valves, such as for diverting service, double seated bypass, stainless steel seat and disc or high pressure, please consult the factory.

Both the Maxi Bonnet and Ultra Bonnet assemblies may be easily mounted to valves of other manufacture for retrofit installations. Adapter kits are available and are supplied with the motor and linkage assembly specific to each retrofit application. Please consult the factory.

Mechanical & Electrical Installation

The **Actuated Globe Valves** are designed for use in hot or chilled water systems. The installer may proceed when the specifics of the system; i.e., expansions and contractions of the system and its medium as well as operating pressures are within the tolerances of the particular unit.

When plumbing, the motorized valve should be situated in an easily accessible place and sufficient space should be allowed for the removal of the actuator. Use only plumbing copper (not refrigerant copper) for all lines and sweat connections.

Pipe valves with attention to the valve markings and the flow of the system so that the plug seats against the flow. Rotation is clockwise for "OFF" and counterclockwise for "ON". In all cases, verify that the interior and exterior of the pipe is free of metal shavings and dirt.

To prevent moisture from collecting in the motor casing, NEVER install the motorized valve such that the actuator is inferior to the valve! NEVER drill into the motor casing!

NPT FEMALE CONNECTIONS

Verify that the pipe connections to be threaded into the actuated valve are properly and accurately threaded. Clean the threaded connections and apply a joint sealant. Teflon tape is recommended. Pipe the valve according to system specifications.

FLANGED CONNECTIONS

The connecting pipe flanges should be positioned accurately in the line with sufficient space between them to accommodate the valve. Suspend the valve in a sling and using the lug holes as guides, cautiously swing the valve into position. Refer to the schematic for bolting information and attach the valve accordingly and to system specifications. (Gaskets, nuts & bolts are not supplied).

In all cases, do not over torque the fittings or bolts! Do not apply heat directly to the valve!

When the mechanical installation has been completed, read the following requirements and cautionary notes before proceeding with the wiring.

ELECTRICAL INSTALLATION REQUIREMENTS

It is recommended that all NEPTRONIC products be wired to a separate transformer that services only NEPTRONIC products. This precaution will prevent interference with, and/or possible damage to, incompatible equipment of other manufacture.

Caution! When multiple actuators are wired on a single transformer, polarity must be respected! Long wiring runs create voltage drops that may affect the actuator's performance.

MULTIPLE CONNECTIONS

Multiple actuated valves must be wired in parallel. For analog models, a maximum of 10 units for a voltage signal. In the case of 4-20mA, use the 500 ohm resistor (supplied) in parallel with terminals 3 & 1 on the first unit and connect the remaining 9 actuated valves in parallel as for voltage control. The maximum number of digital units that may be connected in parallel is 10.

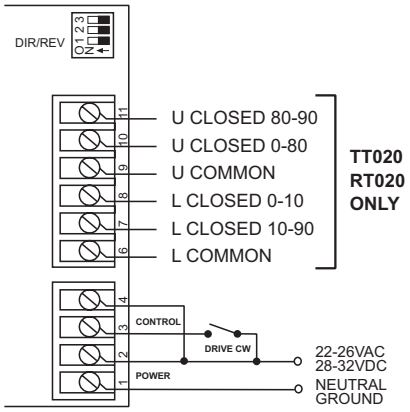
GENERAL WIRING

Remove the cover from the motor. The terminal block is now easily accessible. Wire the terminal block according to the diagram that corresponds to the actuator model, mode of control and feedback signal where applicable. Position the reverse/direct acting switch for the operational direction on all units and the switch for the fail direction on actuators equipped with The ***Enerdrive System***. Apply power and calibrate if necessary. Replace the cover and secure.

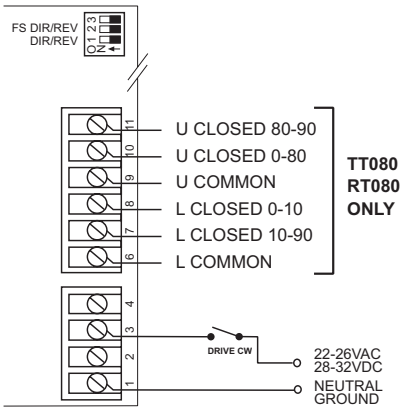
Wiring Schematics

*for all valves with the **TT** or **RT** actuators*

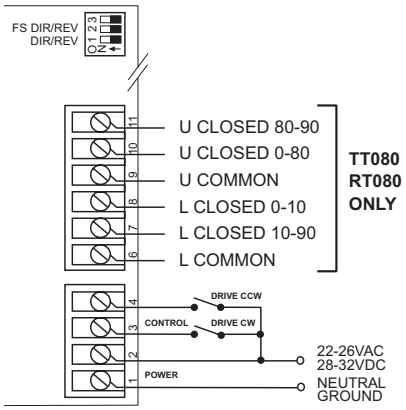
TT000 & **TT020**
RT000 & **RT020**
2 Position Control



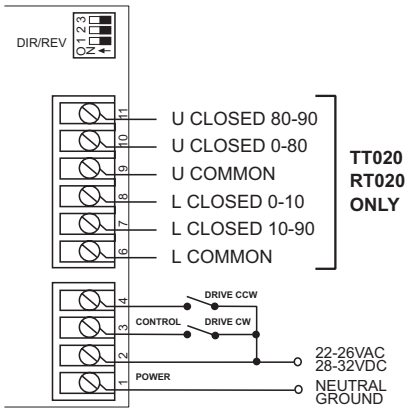
TT060 & **TT080**
RT060 & **RT080**
2 Position Control
Drive CW, *Enerdrive* CCW



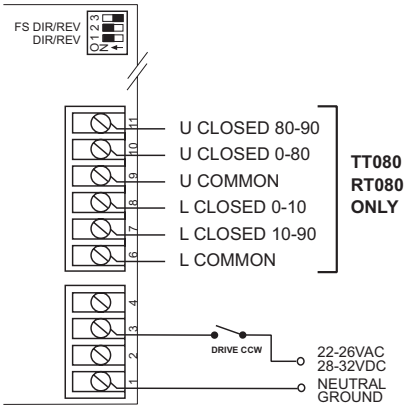
TT060 & **TT080**
RT060 & **RT080**
3 Point Floating Control
Drive CW, *Enerdrive* CCW



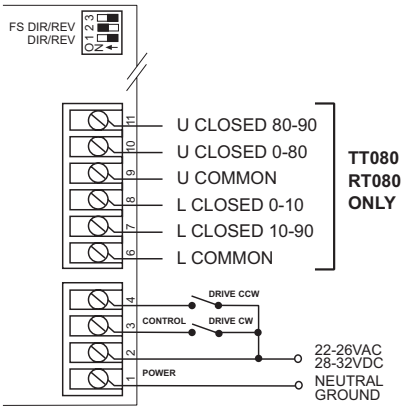
TT000 & **TT020**
RT000 & **RT020**
3 Point Floating Control



TT060 & **TT080**
RT060 & **RT080**
2 Position Control
Drive CCW, *Enerdrive* CW



TT060 & **TT080**
RT060 & **RT080**
3 Point Floating Control
Drive CCW, *Enerdrive* CW



DIP SWITCH POSITIONS

The dip switches are factory set in the **OFF** position.

Dip Switch #1 controls the direction of rotation. For reverse acting, place the switch in the **ON** position; for direct acting, place the switch in the **OFF** position.

Dip Switch #2 controls the ***Enerdrive*** direction for actuator models ending in **060** or **080** only. For ***Enerdrive*** to operate in a CW direction, place the switch in the **ON** position; for a CCW direction, place the switch in the **OFF** position. Refer to the wiring diagrams for the interaction between switch function and ***Enerdrive***.

Dip Switch #3 has no function.

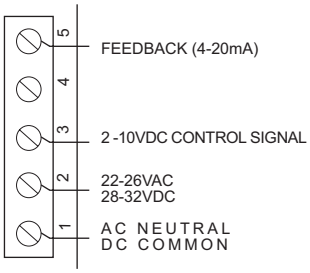
AUXILIARY SWITCHES

For actuators ending in **020** or **080** only. The mechanical switches are fixed at 10° & 80°.

Wiring Schematics

*for all valves with the **TM, RM** & **MM** actuators*

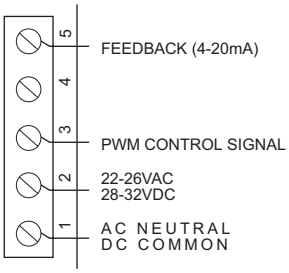
2-10VDC CONTROL



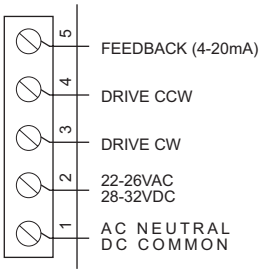
4-20mA CONTROL

Wire the actuated valve according to the diagram at left for 2-10VDC. Connect one of the supplied 500 ohm resistors between terminals 1 and 3. The actuator will now respond to a 4-20mA signal

PWM CONTROL



3 POINT FLOATING



FOR 2-10VDC OUTPUT FEEDBACK: For any of the above wiring configurations, connect one of the supplied 500 ohm resistors between terminals 1 and 5 to change the output feedback from 4-20mA to 2-10VDC.

SIGNAL INPUT SELECTION

The actuators are factory set to accept the analog mode, i.e. 2-10VDC; however, to accept PWM or 3 point floating control or to reestablish analog control, follow this sequence:

1. Remove power to the actuator.
2. Put the 3 dip switches in the **OFF** position.
3. Apply power and, within 5 seconds, press & release the Reset Button. The LED should be blinking.
4. Perform one of the following:

   A. For Analog Control, turn Dip Switch #3 first **ON** and then **OFF**. The actuator will now accept 2-10VDC control.

   B. For PWM Control, turn Dip Switch #2, first **ON** and then **OFF**. The actuator will now accept PWM control.

   C. For 3 Point Floating Control, turn Dip Switch #1 first **ON** and then **OFF**. The actuator will now accept digital control.

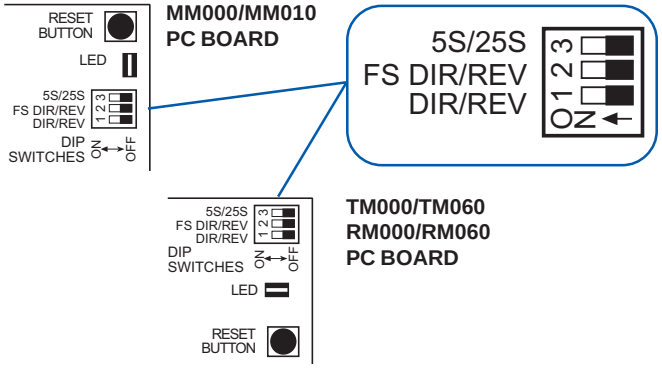
If the actuator has been wired correctly, the motor will now respond to the input signal. The dip switches may now be set to perform the functions described at right.

SPECIAL CONSIDERATION FOR DIGITAL CONTROL

In this mode the actuators are sensitive to induced electrical voltages from other sources. To prevent such interference, wire one 2.2k ohm 0.5W resistor between pin 4 and pin 1 and a second 2.2k ohm 0.5W resistor between pin 3 and pin 1. These resistors are supplied.

THE RESET BUTTON

It is only necessary to press the Reset Button when
A. Reprogramming the control signal.
B. Calibrating or re-calibrating the Auto Stroking
C. Calibrating or re-calibrating the Zero & Span



DIP SWITCH POSITIONS

Dip Switch #1 controls the direction of rotation. For reverse acting, place the switch in the **ON** position; for direct acting, place the switch in the **OFF** position.

Dip Switch #2 determines the fail safe direction either clockwise or counterclockwise. The factory setting is in the **OFF** position to 'fail' CCW to the 0° position. To 'fail' to the 90° position, place the switch in the **ON** position.

Dip Switch #3 determines the Time Base for actuators in the PWM control mode. For 0.1 to 5 sec., place the switch in the **ON** position. For 0.1 to 25 sec., place it in the **OFF** position.

Calibration

*for all valves with the **TM, RM** & **MM** actuators*

The **TM000/TM060**, **RM000/RM060** and **MM000/MM060** are microprocessor based motors with an Auto Stroking feature and memory so that the any of them will not have to re-stroke to find itself in the following circumstances:

(A) upon initial power-up
(B) after a power failure
(C) if the motor is manually repositioned with the clutch.

These motors are also equipped with a Zero and Span feature that allows sequencing of two actuators.

THE AUTO STROKING FEATURE

All Actuated Globe Valves are factory calibrated. If for any reason the actuator/linkage and valve are assembled in the field for example during a retrofit or if the actuator has been removed and replaced, the technician must perform the Auto Stroking calibration.

1) After the actuator has been installed and wired according to the wiring diagram on page 13 that corresponds to the control signal, use a dedicated transformer and apply 24VAC power. The LED will be illuminated.

2) **Once power has been applied, wait a minimum of 10 seconds.** Depress and release the Reset Button on the PC board. This initiates the Auto Stroking feature. Over the next several minutes, the actuator will self stroke fully up and down during which time the LED located on the PC board will remain illuminated.

3) Once the LED is extinguished, the Auto Stroking self test is complete. The valve actuator is now programmed to give a full 2-10 volt resolution for the stroke of the valve.

If a span of less than 2-10VDC is required, complete the Zero & Span procedure which follows.

THE ZERO & SPAN FEATURE

This feature which is only applicable to 2-10VDC installations requires a voltage meter.

1) After the actuated valve has been installed and wired according to the wiring diagram on page 13, use a dedicated transformer and apply 24VAC power. The LED will be illuminated.

2) **Within the first 10 seconds of initiating the power supply**, press and hold the Reset Button, which is located next to the Dip Switches on the PC board, until the small LED blinks once*. This initiates the Zero & Span calibration. Release the Reset Button. The LED is now constantly illuminated.

3) The Zero or start value may be a minimum of 0 volts. To set the Zero value, apply a DC voltage across pins 1 and 3 and adjust the voltage until the desired value is indicated on the test meter. Depress the Reset Button. Wait until the LED blinks once; this single blink indicates that the new Zero value has been accepted by the actuator.

4) The Span or stop value must be at least 3 volts greater than the Zero or start value. To set the Span value, apply a DC voltage across pins 1 and 3 and adjust the voltage until the desired value is indicated on the test meter. Depress the Reset Button. After 2 seconds, the LED will cease to be illuminated indicating that the actuator has accepted the new Span value and has resumed normal operations.

5) Remove the test equipment and replace the cover. Record the Zero & Span values in the spaces provided on the product label for future reference.

** The Zero & Span calibration sequence can only be initiated within the first 10 seconds of power being supplied to the motor. This overrides the Auto Stroking feature and reduces the risk of inadvertent reprogramming.*

RE-CALIBRATION

The actuator may be re-calibrated to accept different Zero and Span values. To accomplish this, remove the power supply for a sufficient length of time for the motor to recognize a power loss (ex. 15 seconds) and then follow steps 2 through 5 in the **ZERO & SPAN FEATURE**.

To erase the Zero & Span, follow the **SIGNAL INPUT SELECTION** directions on page 13 for Analog Control. The actuated valve will then respond to 2-10VDC.

Actuated Globe Valves

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