

2900 PRODUCT SPEC



**PNEUMATIC ACTUATED  
INDUSTRIAL VALVES**  
HIGH CAPACITY, GENERAL PURPOSE,  
GLOBE CONTROL VALVES

*PRODUCT SPECIFICATION*

**SERIES 2900**  
SIZES: 2-1/2 TO 10 INCHES

Two-Way and Three Way, Linear Iron Body  
Valves for Process and Utility Applications

2900\_PS\_RevUa\_1022

**WARREN CONTROLS**

2600 EMRICK BLVD • BETHLEHEM, PA 18020 • USA • 800-922-0085 • [WWW.WARRENCONTROLS.COM](http://WWW.WARRENCONTROLS.COM)  
DEPENDABLE, RUGGED, PRECISION CONTROL VALVES AND ACCESSORIES

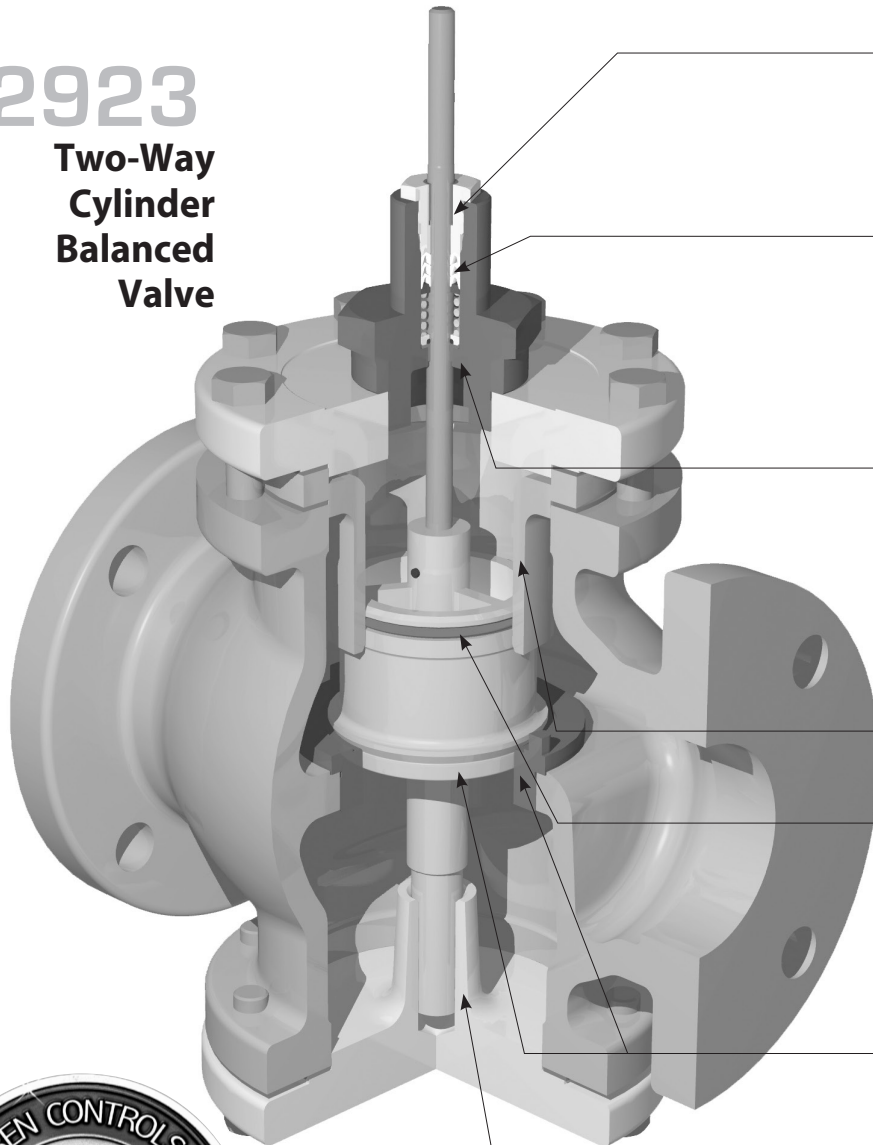
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## 2923

### Two-Way Cylinder Balanced Valve



**Peek Bearing**  
for low friction provides stem guiding and protects packing box from external debris.

**Robust Spring-Loaded PTFE V-Ring Packing**  
has low friction and is self adjusting for zero maintenance.

**Peek Bearing in Lower Bonnet Assembly**  
provides stem guiding and protects packing box from entrained solids for longer packing life.

**Thick Balancing Chamber**  
in bronze, 300 SS, or 17-4pH.

**EPDM O-Ring or Fluoraz O-Ring**  
(for higher temperatures) maintains pressure balance seal.

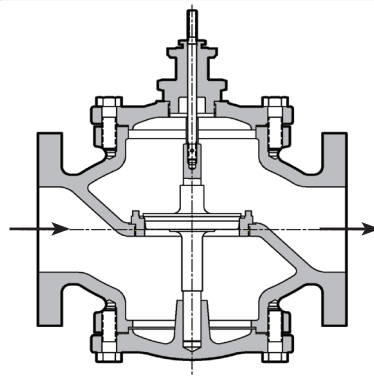
**Plug and Seat**  
in choice of Bronze, 300 SS, 17-4pH, or Alloy 6 provide Class IV leakage rating.

**Bottom Post Guide**  
for additional stability, allowing higher pressure drop.

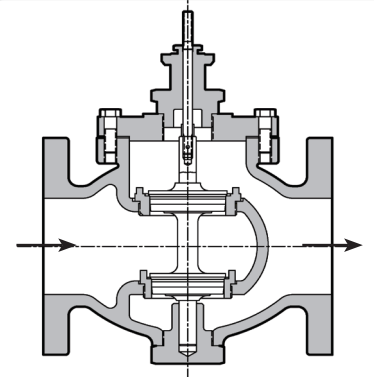




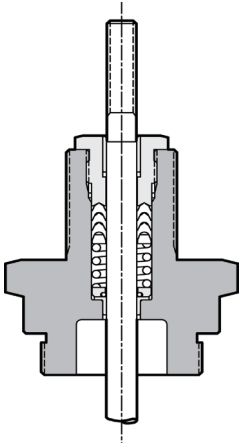
**SERIES: 2900**  
**High Capacity**  
**General Purpose Globe**  
**Control Valves**



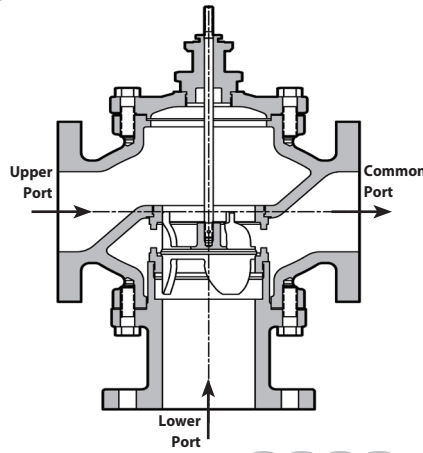
**2920**  
**Two-Way Single Seat**  
**Unbalanced Valve**



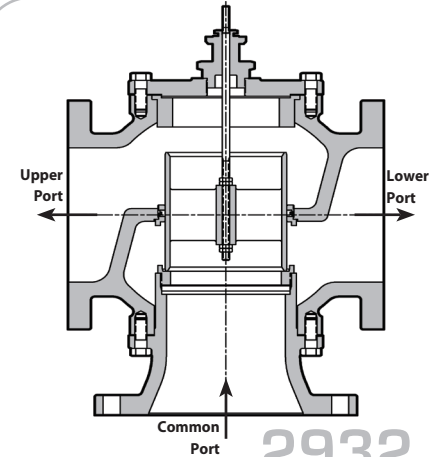
**2922**  
**Two-Way Double Seat**  
**Balanced Valve**



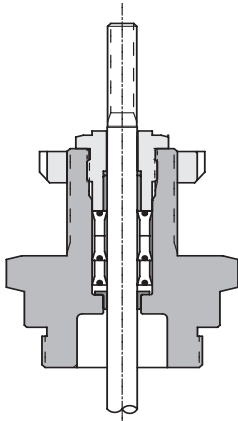
**Guided Low-Friction TFE**  
**V-Ring Packing Spring Loaded**



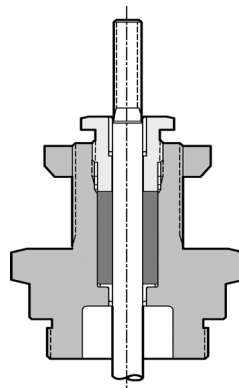
**2930**  
**Three-Way Mixing Valve**



**2932**  
**Three-Way**  
**Diverting/Mixing Valve**



**Long-Life Multi-Stack**  
**EPDM Lip Packing**



**Adjustable Graphite Packing**



**Description:** Warren Controls Series 2900 High Capacity General Purpose Globe Control Valves feature rugged iron bodies with a variety of trim materials. The equal percentage plugs in the 2-way valves and linear plugs in the 3-way valves provide excellent modulating control of a wide variety of fluids. The Series 2900 is ideally suited where value and long life are important objectives for applications including but not limited to: Food & Beverage, Packaged Water Heaters, Pharmaceutical, General Service, and Waste Water having moderate pressure drops and temperatures from -20° to 400°F.

# BODY STYLE VERSUS APPLICATION

## 2-Way Valves (Control of Liquids, Gases, and Steam)

### 2920 2-Way Single Seat Unbalanced Valve

The most commonly applied solution for sizes 3" and under with ANSI Class IV leakage rating. **See Table on page 25 for Fluid Temperature Limits.**

<b>Sizes:</b>	2-1/2, 3, 4, 5, 6 inch
<b>Body:</b>	ANSI B16.1 Iron 125LB Flange or 250LB Flange
<b>Trim:</b>	Linear: 300 Series Stainless Steel (2-1/2 thru 4 only) EQ%: Bronze, 300 Series Stainless Steel or 17-4 pH Hardened Stainless Steel
<b>Packing:</b>	Long-Life Multi-Stack, EPDM Lip Packing (EPDM Lip Packing is <u>not</u> suitable for use with oils, hydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded Packing, Adjustable Graphite Packing,
<b>Rangeability:</b>	50:1



### 2922 2-Way Double Seat Balanced Valve

A balanced valve that is an effective solution for sizes over 3" and for higher pressures. Its double seat design allows for dirtier fluids and requires less force to operate than unbalanced valves so smaller actuators can be used. It is limited to ANSI Class III leakage rating. **See Table on page 25 for Fluid Temperature Limits**

<b>Sizes:</b>	2-1/2, 3, 4, 5, 6, 8, 10 inch
<b>Body:</b>	ANSI B16.1 Iron 125LB Flange or 250LB Flange
<b>Trim:</b>	EQ%: Bronze or 300 Series Stainless Steel
<b>Packing:</b>	Long-Life Multi-Stack, EPDM Lip Packing (EPDM lip packing is <u>not</u> suitable for use with oils, hydrocarbons, or acids) Guided Low-Friction TFE V-Ring, Spring Loaded Packing, Adjustable Graphite Packing
<b>Rangeability:</b>	50:1



### 2923 2-Way Cylinder Balanced Valve

A balanced valve that is an effective solution for sizes over 3" and for higher pressures. It requires less force to operate than unbalanced valves so smaller actuators can be used. Its single seat o-ring seal design facilitates ANSI Class IV leakage rating. It is limited to cleaner fluids. **See Table on page 25 for Fluid Temperature Limits.**

<b>Sizes:</b>	2-1/2, 3, 4, 5, 6, 8 inch
<b>Body:</b>	ANSI B16.1 Iron 125LB Flange or 250LB Flange
<b>Trim:</b>	Linear: 300 Series Stainless Steel Only EQ%: 300 Series Stainless Steel, 17-4 pH Hardened Stainless Steel, or Alloy 6
<b>Packing:</b>	Long-Life Multi-Stack, EPDM Lip Packing (EPDM lip packing is <u>not</u> suitable for use with oils, hydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded Packing, Adjustable Graphite Packing
<b>O-Ring:</b>	EPDM (BRZ) *Fluoraz 797 (300 SS Trim, 17-4 pH or Alloy 6 Trim)
<b>Rangeability:</b>	50:1

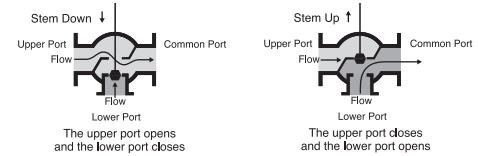


## 3-Way Valves (Control of Liquids)

### 2930 3-Way Mixing Valve

This valve has two inlets and one outlet, and is the simplest solution for mixing or bypass applications with an ANSI Class IV leakage rating. In normal applications the inlet pressures are near equal and control is possible from 5% to 95% of travel with inlet pressures up to 100 PSI. **See Table on page 25 for Fluid Temperature Limits.**

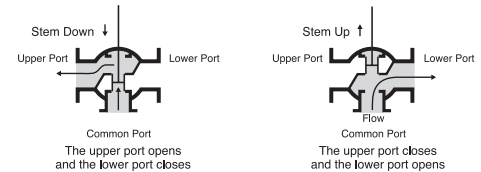
<b>Sizes:</b>	2-1/2, 3, 4, 5, 6, 8 inch
<b>Body:</b>	ANSI B16.1 Iron 125LB Flange or 250LB Flange
<b>Trim:</b>	Linear: Bronze (2-1/2 thru 6) or 300 Series Stainless Steel (2-1/2 thru 8)
<b>Packing:</b>	Long-Life Multi-Stack, EPDM Lip Packing, (EPDM lip packing is <u>not</u> suitable for use with oils, hydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded Packing, Adjustable Graphite Packing
<b>Rangeability:</b>	50:1



### 2932 3-Way Diverting/Mixing Valve

Designed as a diverting valve with one inlet and two outlets with ANSI Class II leakage rating. However, flow can be reversed for mixing if this port configuration is desirable. The difference between the upper port and lower port pressure must not exceed 50PSID. **See Table on page 25 for Fluid Temperature Limits.** (See piping note on page 11.)

<b>Sizes:</b>	2-1/2, 3, 4, 5, 6, 8 inch
<b>Body:</b>	ANSI B16.1 Iron 125LB Flange or 250LB Flange
<b>Trim:</b>	Linear: Bronze or 300 Series Stainless Steel
<b>Packing:</b>	Long-Life Multi-Stack, EPDM Lip Packing, (EPDM lip packing is <u>not</u> suitable for use with oils, hydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded Packing, Adjustable Graphite Packing
<b>O-Ring:</b>	EPR
<b>Rangeability:</b>	50:1



Body Pressure-Temperature Ratings:		
Temp. (°F)	125 FLG	250 FLG
-20° To 150	175	400
175	170	385
200	165	370
225	157	355
250	150	340
275	145	325
300	140	310
350	125	280
375	-	265
400	-	250

Trim Materials	Flowing Differential Pressure Limit
Bronze	50 PSID
300 Series Stainless Steel	100 PSID
17-4 pH Hardened Steel	200 PSID
Alloy 6	300 PSID

**NOTE:** Approaching limits for continuous use will reduce trim life. For continuous use, stay within half of rated maximum.

Pressure ratings are PSIG • For applications below 32° consult factory

**\*Note: Fluoraz o-ring in Type 2923 is not compatible with the following solvents: acetates, acetone, benzene, carbon tetrachloride, ethers, Freons, ketones, lacquers, methyl ethyl ketone, and toluene - Consult Factory with service conditions for alternate o-ring selection.**

# FLOW COEFFICIENTS (Cv) VERSUS TRAVEL

2-Way Valves (Control of Liquids, Gases, and Steam)

VALVE		2920 FLOW COEFFICIENTS (Cv) 2-WAY SINGLE SEAT UNBALANCED VALVE									
Valve Size (IN)	Trim Style	%Travel									
		100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
2-1/2	EQ%	65.0	55.6	43.8	29.8	15.4	8.07	5.67	4.11	2.81	1.49
	Linear	65.0	58.5	52.0	45.5	39.0	32.5	26.0	19.5	13.0	6.50
3	EQ%	90.0	83.6	75.1	63.8	49.2	31.6	12.9	4.75	3.37	1.99
	Linear	90.0	81.0	72.0	63.0	54.0	45.0	36.0	27.0	18.0	9.00
4	EQ%	170	159	143	122	95.1	62.9	31.3	15.6	9.89	4.11
	Linear	170	153	136	119	102	85	68.0	51.0	34.0	17.0
5	EQ%	280	258	230	194	150	102	54.7	23.1	14.0	6.40
6	EQ%	360	333	298	255	203	144	83.6	34.1	14.6	7.10

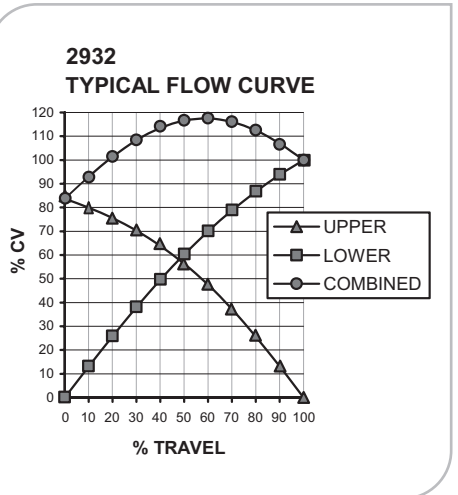
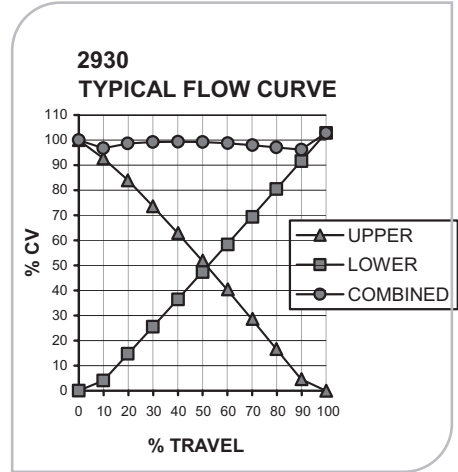
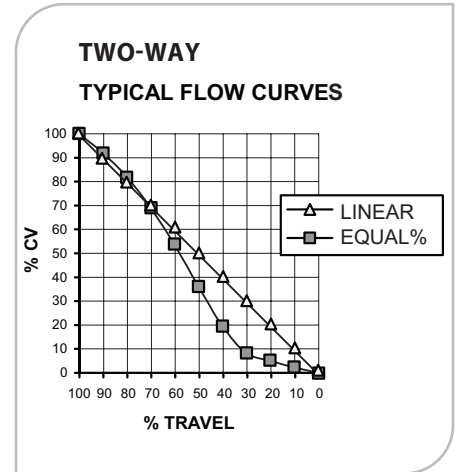
VALVE		2922 FLOW COEFFICIENTS (Cv) 2-WAY DOUBLE SEAT BALANCED VALVE									
Valve Size (IN)	Trim Style	%Travel									
		100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
2-1/2	EQ%	70.0	59.5	45.9	30.2	15.7	8.60	6.36	4.12	3.44	2.75
3	EQ%	100	87.6	71.2	50.8	28.7	12.2	8.54	6.58	4.60	3.27
4	EQ%	200	180	155	126	91.0	53.3	17.8	8.36	6.07	4.54
5	EQ%	260	239	212	178	138	100	74.3	53.8	32.2	9.86
6	EQ%	350	323	286	238	178	113	63.2	44.8	27.5	9.83
8	EQ%	680	619	557	475	370	246	118	43.9	29.0	14.2
10	EQ%	960	859	737	593	431	263	127	86	57	27.6

VALVE		2923 FLOW COEFFICIENTS (Cv) 2-WAY CYLINDER BALANCED VALVE									
Valve Size (IN)	Trim Style	%Travel									
		100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
2-1/2	EQ%	65.0	55.6	43.8	29.8	15.4	8.07	5.67	4.11	2.81	1.49
	Linear	65.0	58.5	52.0	45.5	39.0	32.5	26.0	19.5	13.0	6.50
3	EQ%	90.0	83.6	75.1	63.8	49.2	31.6	12.9	4.75	3.37	1.99
	Linear	90.0	81.0	72.0	63.0	54.0	45.0	36.0	27.0	18.0	9.00
4	EQ%	170	159	143	122	95.1	62.9	31.3	15.6	9.89	4.11
	Linear	170	153	136	119	102	85	68.0	51.0	34.0	17.0
5	EQ%	280	258	230	194	150	102	54.7	23.1	14.0	6.40
	Linear	280	252	224	196	168	140	112	84.0	56.0	28.0
6	EQ%	360	333	298	255	203	144	83.6	34.1	14.6	7.10
	Linear	360	324	288	252	216	180	144	108	72.0	36.0
8	EQ%	680	643	590	513	407	267	115	50.3	31.1	17.1
	Linear	680	612	544	476	408	340	272	204	136	68.0

3-Way Valves (Control of Liquids)

VALVE		2930 FLOW COEFFICIENTS (Cv) 3-WAY MIXING VALVE	
Valve Size (IN)	Trim Style	Travel	
		100%	
2-1/2	LINEAR	69	
3	LINEAR	86	
4	LINEAR	156	
5	LINEAR	270	
6	LINEAR	347	
8	LINEAR	590	

VALVE		2932 FLOW COEFFICIENTS (Cv) 3-WAY DIVERTING/MIXING VALVE	
Valve Size (IN)	Trim Style	Travel 100%	
		Upper Port	Lower Port
2-1/2	LINEAR	68	75
3	LINEAR	85	95
4	LINEAR	160	180
5	LINEAR	195	220
6	LINEAR	270	300
8	LINEAR	425	510



# -sizing reference

STEAM TABLE

Steam Pressure PSIG	Temp. °F	Temp. °C	Sensible Heat BTU/Lb.	Latent Heat BTU/Lb.	Total Heat BTU/Lb.
0	212	100	180	971	1151
10	239	115	207	952	1159
25	266	130	236	934	1170
50	297	147	267	912	1179
75	320	160	290	896	1186
100	338	170	309	881	1190
125	353	178	325	868	1193
150	365	185	339	858	1197
200	387	197	362	838	1200
250	406	208	381	821	1202
300	422	217	399	805	1204
400	448	231	438	778	1216
500	470	243	453	752	1205
600	489	254	475	729	1204

### Rectangular Tank Capacity in Gallons

$$\text{Gallons} = \frac{\text{Height} \times \text{Width} \times \text{Length (inches)}}{230}$$

or

$$\text{Gallons} = H \times W \times L (\text{Ft.}) \times 7.5$$

### Circular Tank Storage Capacity in Gallons

$$\text{Storage} = 6D^2 \times L (\text{Gallons})$$

Where:

D = Tank Diameter in Feet  
L = Length in Feet

## LOAD SIZING CALCULATIONS

### Glossary of Terms

t = Time in Hours  
Cp = Specific Heat of Liquid  
S = Specific Gravity of Fluid  
W = Weight in Lbs.  
ΔT = Temperature Rise or Fall in °F  
h<sub>fg</sub> = Latent Heat of Steam

### Conversion Factors

1 Lb. Steam / Hr. = 1000 BTU / Hr.  
1 Cubic Meter = 264 U.S. Gallons  
1 Cubic Foot Water = 62.4 Lbs.  
1 PSI = 2.04 Inches of Mercury  
1 PSI = 2.3 Feet of Water  
1 PSI = 27.7 Inches of Water  
1 U.S. Gallon Water = 231 Cubic Inches  
1 U.S. Gallon Water = 8.33 Lbs.

### Heating Water with Steam

Quick Method

$$\text{Lbs./Hr.} = \frac{\text{GPM}}{2} \times \Delta T$$

Accurate Method

$$\text{Lbs./Hr.} = \frac{\text{GPM} \times 500 \times \Delta T}{h_{fg}}$$

### Heating or Cooling Water with Water

$$\text{GPM}_1 = \text{GPM}_2 \times \frac{^{\circ}\text{F water}_2 \text{ temp. rise or drop}}{^{\circ}\text{F water}_1 \text{ temp. rise or drop}}$$

### Heating or Cooling Water

$$\text{GPM} = \frac{\text{BTU / Hr.}}{(^{\circ}\text{F water temp. rise or drop}) \times 500}$$

### Heating Oil with Steam

$$\text{Lbs./Hr.} = \frac{\text{GPM}}{4} \times (^{\circ}\text{F oil temp. rise})$$

### Heating Air with Water

$$\text{GPM} = 2.16 \times \frac{\text{CFM} \times (^{\circ}\text{F air temp. rise})}{1000 \times (^{\circ}\text{F water temp. drop})}$$

### Heating Liquids with Steam

$$\text{Lbs./Hr.} = \frac{\text{GPM} \times 60 \times \text{Cp} \times \text{W}}{h_{fg}} \times \Delta T$$

### Heating Liquids in Steam Jacketed Kettles

$$\text{Lbs./Hr.} = \frac{\text{Gallons} \times \text{Cp} \times \text{S} \times 8.33}{h_{fg} \times t} \times \Delta T$$

### General Liquid Heating

$$\text{Lbs./Hr.} = \frac{\text{W} \times \text{Cp}}{h_{fg} \times t} \times \Delta T$$

### Heating Air with Steam

$$\text{Lbs./Hr.} = \frac{\text{CFM}}{900} \times \Delta T$$

# SHUT-OFF ΔP AND Cv RATINGS

**NOTES:**

- 1) 2920 leakage rating is ANSI Class IV.
- 2) Inlet pressure exceed Body Pressure-Temperature Rating.
- 3) The 3-15 and 1-17 columns of the table apply to valves with control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 columns apply to valves with a positioner or an I/P transducer of suitable range.
- 4) N/A indicates that the air signal is not capable of providing any shut-off or it exceeds the actuator's maximum air pressure.  
  
Maximum air pressure  
DL49 & 49XR...30PSIG  
DL84 & 84XR...30PSIG  
DL115 & 115XR...40PSIG
- 5) Do Not Use DL115 OR 115XR Actuators on Valves With Bronze Trim.
- 6) See Actuators, Positioners, and Accessories section for explanation of spring ranges.

VALVE			ACTUATOR		2920 SHUT-OFF ΔP 2-WAY SINGLE SEAT UNBALANCED										
Valve Size (IN)	Cv Rating	Plug Travel (IN)	Pneumatic Actuator	Spring Range	Maximum Shut-off ΔP in PSI										
					Fail Closed Reverse Acting				Fail Open Direct Acting						
					Air Signal to Actuator				Air Signal to Actuator						
					3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI	3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI			
2 1/2	65	3/4	DL49	Low	N/A	N/A	N/A	N/A	20	40	170	N/A			
				Full	N/A	N/A	10	N/A	N/A	N/A	130	N/A			
				High	30	50	60	N/A	N/A	10	140	N/A			
			DL49XR	Xtra-High	N/A	N/A	100	N/A	N/A	N/A	N/A	N/A			
				Low	N/A	N/A	12	N/A	63	97	319	N/A			
				Full	N/A	N/A	12	N/A	N/A	N/A	217	N/A			
			DL84	High	63	97	114	N/A	N/A	N/A	217	N/A			
				DL84XR	Xtra-High	N/A	N/A	165	N/A	N/A	N/A	N/A			
				Low	N/A	5	28	28	98	145	400	400			
			DL115	Full	N/A	5	28	28	N/A	5	309	400			
				High	98	145	169	169	N/A	5	309	400			
				DL115XR	Xtra-High	N/A	N/A	400	400	N/A	N/A	N/A			
3	90	3/4	DL49	Low	N/A	N/A	N/A	N/A	10	23	113	N/A			
				Full	N/A	N/A	3	N/A	N/A	N/A	86	N/A			
				High	16	30	37	N/A	N/A	3	93	N/A			
			DL49XR	Xtra-High	N/A	N/A	65	N/A	N/A	N/A	N/A	N/A			
				Low	N/A	N/A	4	N/A	39	63	217	N/A			
				Full	N/A	N/A	4	N/A	N/A	N/A	146	N/A			
			DL84	High	39	63	75	N/A	N/A	N/A	146	N/A			
				DL84XR	Xtra-High	N/A	N/A	110	N/A	N/A	N/A	N/A			
				Low	N/A	N/A	15	15	64	96	308	400			
			DL115	Full	N/A	N/A	15	15	N/A	N/A	210	373			
				High	64	96	113	113	N/A	N/A	210	373			
				DL115XR	Xtra-High	N/A	N/A	285	285	N/A	N/A	N/A			
4	170	1 1/4	DL84	Low	N/A	N/A	N/A	N/A	17	30	117	NA			
				Full	N/A	N/A	N/A	N/A	N/A	N/A	77	N/A			
				High	17	30	37	N/A	N/A	N/A	77	N/A			
			DL115	Low	N/A	N/A	3	3	31	49	168	260			
				Full	N/A	N/A	3	3	N/A	N/A	113	205			
				High	31	49	58	58	N/A	N/A	113	205			
			DL115XR	Xtra-High	N/A	N/A	140	140	N/A	N/A	N/A	N/A			
			5	280	1 1/2	DL84	Low	N/A	N/A	N/A	N/A	8	16	72	NA
							Full	N/A	N/A	N/A	N/A	N/A	N/A	46	N/A
High	8	16					21	N/A	N/A	N/A	46	N/A			
DL115	Low	N/A				N/A	N/A	N/A	17	29	105	163			
	Full	N/A				N/A	N/A	N/A	N/A	N/A	70	128			
	High	17				28	34	34	N/A	N/A	70	128			
DL115XR	Xtra-High	N/A	N/A	81	81	N/A	N/A	N/A	N/A						
6	360	1 1/2	DL84	Low	N/A	N/A	N/A	N/A	3	9	48	NA			
				Full	N/A	N/A	N/A	N/A	N/A	N/A	30	N/A			
				High	3	9	12	N/A	N/A	N/A	30	N/A			
			DL115	Low	N/A	N/A	N/A	N/A	9	17	70	111			
				Full	N/A	N/A	N/A	N/A	N/A	N/A	46	87			
				High	9	17	21	21	N/A	N/A	46	87			
			DL115XR	Xtra-High	N/A	N/A	54	54	N/A	N/A	N/A	N/A			

Shut-off values are for valves with TFE or EPDM packing.  
For valves with graphite packing contact factory for shut-offs.

# SHUT-OFF ΔP AND Cv RATINGS

VALVE			ACTUATOR		2922 SHUT-OFF ΔP 2-WAY DOUBLE SEAT BALANCED							
Valve Size (IN)	Cv Rating	Plug Travel (IN)	Pneumatic Actuator	Spring Range	Maximum Shut-off ΔP in PSI							
					Fail Closed				Fail Open			
					Reverse Acting				Direct Acting			
					Air Signal to Actuator				Air Signal to Actuator			
				3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI	3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI	
2 1/2	70	3/4	DL49	Low	N/A	N/A	113	N/A EXCEEDS DL49 AND DL84 ACTUATORS' MAXIMUM AIR PRESSURE	388	400	400	N/A EXCEEDS DL49 AND DL84 ACTUATORS' MAXIMUM AIR PRESSURE
				Full	N/A	113	250		N/A	113	400	
				High	400	400	400		N/A	250	400	
			DL84	Low	N/A	34	270		400	400	400	
				Full	N/A	34	270		N/A	34	400	
				High	400	400	400		N/A	34	400	
3	100	3/4	DL49	Low	N/A	N/A	39		267	400	400	
				Full	N/A	39	153		N/A	39	400	
				High	381	400	400		N/A	153	400	
			DL84	Low	N/A	N/A	169		400	400	400	
				Full	N/A	N/A	169		N/A	N/A	400	
				High	400	400	400		N/A	N/A	400	
4	200	3/4	DL49	Low	N/A	N/A	N/A	117	287	400		
				Full	N/A	N/A	32	N/A	N/A	400		
				High	202	372	400	N/A	32	400		
			DL84	Low	N/A	N/A	44	400	400	N/A		
				Full	N/A	N/A	44	N/A	N/A	400		
				High	400	400	400	N/A	N/A	400		
5	260	1 1/4	DL84	Low	N/A	N/A	N/A	340	400	400		
				Full	N/A	N/A	N/A	N/A	N/A	400		
				High	340	400	400	N/A	N/A	400		
6	350	1 1/4	DL84	Low	N/A	N/A	N/A	242	400	400		
				Full	N/A	N/A	N/A	N/A	N/A	400		
				High	242	400	400	N/A	N/A	400		
8	680	1 1/2	DL84	Low	N/A	N/A	N/A	85	232	400		
				Full	N/A	N/A	N/A	N/A	N/A	400		
				High	85	232	305	N/A	N/A	400		
10	960	1 1/2	DL84	Low	N/A	N/A	N/A	13	134	400		
				Full	N/A	N/A	N/A	N/A	N/A	400		
				High	13	134	195	N/A	N/A	400		

Shut-off values are for valves with TFE or EPDM packing.  
For valves with graphite packing contact factory for shut-offs.

## NOTES:

- 1) 2922 leakage rating is ANSI Class III.
- 2) Inlet pressure **cannot** exceed Body Pressure-Temperature Rating.
- 3) The 3-15 and 1-17 columns of the table apply to valves with control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 columns apply to valves with a positioner or an I/P transducer of suitable range.
- 4) N/A indicates that the air signal is not capable of providing any shut-off or it exceeds the actuator's maximum air pressure.

Maximum air pressure  
DL49...30PSIG  
DL84...30PSIG

- 5) Do Not Use DL115 Actuators on Valves With Bronze Trim.
- 6) See Actuators, Positioners, and Accessories section for explanation of spring ranges.



# SHUT-OFF ΔP AND Cv RATINGS

VALVE			ACTUATOR		2923 SHUT-OFF ΔP 2-WAY CYLINDER BALANCED								
Valve Size (IN)	Cv Rating	Plug Travel (IN)	Pneumatic Actuator	Spring Range	Maximum Shut-off ΔP in PSI								
					Fail Closed Reverse Acting				Fail Open Direct Acting				
					Air Signal to Actuator				Air Signal to Actuator				
					3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI	3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI	
2 1/2	65	3/4	DL49	Low	N/A	N/A	N/A	N/A	124	288	400	N/A	
				Full	N/A	N/A	42	N/A	N/A	N/A	400	N/A	
				High	206	370	400	N/A	N/A	42	400	N/A	
			DL49XR	Xtra-High	N/A	N/A	400	N/A	N/A	N/A	N/A	N/A	N/A
				DL84	Low	N/A	N/A	53	N/A	400	400	400	N/A
					Full	N/A	N/A	53	N/A	N/A	N/A	400	N/A
3	90	3/4	DL49	Low	N/A	N/A	N/A	N/A	53	193	400	N/A	
				Full	N/A	N/A	N/A	N/A	N/A	N/A	400	N/A	
				High	123	263	333	N/A	N/A	N/A	400	N/A	
			DL49XR	Xtra-High	N/A	N/A	400	N/A	N/A	N/A	N/A	N/A	N/A
				DL84	Low	N/A	N/A	N/A	N/A	353	400	400	N/A
					Full	N/A	N/A	N/A	N/A	N/A	N/A	400	N/A
4	170	1 1/8	DL84	Low	N/A	N/A	N/A	N/A	182	369	400	N/A	
				Full	N/A	N/A	N/A	N/A	N/A	N/A	400	N/A	
				High	182	369	400	N/A	N/A	N/A	400	N/A	
			DL115	Low	N/A	N/A	N/A	N/A	343	400	400	400	
				Full	N/A	N/A	N/A	N/A	N/A	N/A	400	400	
				High	343	400	400	400	N/A	N/A	400	400	
5	280	1 1/8	DL84	Low	N/A	N/A	N/A	N/A	79	230	400	N/A	
				Full	N/A	N/A	N/A	N/A	N/A	N/A	400	N/A	
				High	79	230	306	N/A	N/A	N/A	400	N/A	
			DL115	Low	N/A	N/A	N/A	N/A	219	400	400	400	
				Full	N/A	N/A	N/A	N/A	N/A	N/A	400	400	
				High	219	400	400	400	N/A	N/A	400	400	
6	360	1 1/8	DL84	Low	N/A	N/A	N/A	N/A	N/A	127	400	N/A	
				Full	N/A	N/A	N/A	N/A	N/A	N/A	400	N/A	
				High	N/A	127	192	N/A	N/A	N/A	400	N/A	
			DL115	Low	N/A	N/A	N/A	N/A	124	290	400	400	
				Full	N/A	N/A	N/A	N/A	N/A	N/A	400	400	
				High	124	290	373	373	N/A	N/A	400	400	
DL115XR	Xtra-High	N/A	N/A	400	400	N/A	N/A	N/A	N/A				
	DL115	Low	N/A	N/A	N/A	N/A	52	400	400	400			
		Full	N/A	N/A	N/A	N/A	N/A	N/A	400	400			
High		52	400	400	400	N/A	N/A	400	400				
DL115XR	Xtra-High	N/A	N/A	400	400	N/A	N/A	N/A	N/A				

Shut-off values are for valves with TFE or EPDM packing.  
For valves with graphite packing contact factory for shut-offs.

**NOTES:**

- 2923 leakage rating is ANSI Class IV.
- Inlet pressure **cannot** exceed Body Pressure-Temperature Rating.
- The 3-15 and 1-17 columns of the table apply to valves with control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 columns apply to valves with a positioner or an I/P transducer of suitable range.
- N/A indicates that the air signal is not capable of providing any shut-off or it exceeds the actuator's maximum air pressure.  
Maximum air pressure  
DL49 & 49XR...30PSIG  
DL84...30PSIG  
DL115 & 115XR...40PSIG
- Do Not Use DL115 OR 115XR Actuators on Valves With Bronze Trim.
- See Actuators, Positioners, and Accessories section for explanation of spring ranges.

# SHUT-OFF ΔP AND Cv RATINGS

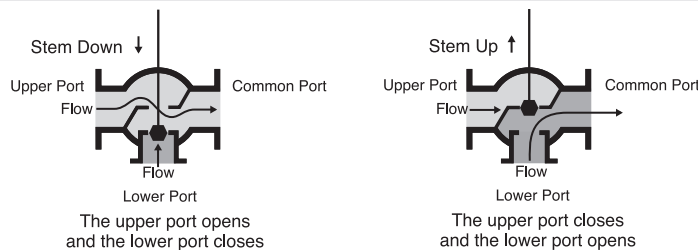
VALVE			ACTUATOR		2930 SHUT-OFF ΔP 3-WAY MIXING							
Valve Size (IN)	Cv Rating	Plug Travel (IN)	Pneumatic Actuator	Spring Range	Maximum Shut-off ΔP in PSI							
					Upper Port Closed Direct Acting				Lower Port Closed Direct Acting			
					Air Signal to Actuator				Air Signal to Actuator			
					3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI	3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI
2 1/2	69	3/4	DL49	Low	N/A	N/A	N/A	N/A	11	31	161	N/A
				Full	N/A	N/A	N/A	N/A	N/A	N/A	121	N/A
				High	10	30	40	N/A	N/A	N/A	131	N/A
			DL84	Low	N/A	N/A	12	N/A	54	88	310	N/A
				Full	N/A	N/A	12	N/A	N/A	N/A	208	N/A
				High	63	97	114	N/A	N/A	N/A	208	N/A
			DL84XR	Xtra-High	N/A	N/A	165	N/A	N/A	N/A	208	N/A
			DL115	Low	N/A	5	28	28	82	129	400	400
				Full	N/A	5	28	28	N/A	N/A	293	400
				High	98	145	169	169	N/A	N/A	293	400
DL115XR	Xtra-High	N/A	N/A	400	400	N/A	N/A	129	363			
3	86	3/4	DL49	Low	N/A	N/A	N/A	N/A	3	17	107	N/A
				Full	N/A	N/A	N/A	N/A	N/A	N/A	79	N/A
				High	3	16	23	N/A	N/A	N/A	86	N/A
			DL84	Low	N/A	N/A	4	N/A	33	57	211	N/A
				Full	N/A	N/A	4	N/A	N/A	N/A	140	N/A
				High	39	63	75	N/A	N/A	N/A	140	N/A
			DL84XR	Xtra-High	N/A	N/A	110	N/A	N/A	N/A	140	N/A
			DL115	Low	N/A	N/A	15	15	53	85	296	400
				Full	N/A	N/A	15	15	N/A	N/A	199	362
				High	64	96	113	113	N/A	N/A	199	362
DL115XR	Xtra-High	N/A	N/A	285	285	N/A	N/A	85	248			
4	156	1 3/8	DL84	Low	N/A	N/A	N/A	N/A	14	27	114	N/A
				Full	N/A	N/A	N/A	N/A	N/A	N/A	74	N/A
				High	17	30	37	N/A	N/A	N/A	74	N/A
			DL115	Low	N/A	N/A	3	3	25	43	162	253
				Full	N/A	N/A	3	3	N/A	N/A	107	198
				High	31	49	58	58	N/A	N/A	107	198
			DL115XR	Xtra-High	N/A	N/A	136	136	N/A	N/A	43	134
5	270	1 3/8	DL84	Low	N/A	N/A	N/A	N/A	5	14	70	N/A
				Full	N/A	N/A	N/A	N/A	N/A	N/A	44	N/A
				High	8	16	21	N/A	N/A	N/A	44	N/A
			DL115	Low	N/A	N/A	N/A	N/A	13	24	100	159
				Full	N/A	N/A	N/A	N/A	N/A	N/A	65	124
				High	17	28	34	34	N/A	N/A	65	124
DL115XR	Xtra-High	N/A	N/A	84	84	N/A	N/A	24	83			
6	347	1 3/8	DL84	Low	N/A	N/A	N/A	N/A	2	8	46	N/A
				Full	N/A	N/A	N/A	N/A	N/A	N/A	28	N/A
				High	3	9	12	N/A	N/A	N/A	28	N/A
			DL115	Low	N/A	N/A	N/A	N/A	7	15	67	108
				Full	N/A	N/A	N/A	N/A	N/A	N/A	43	84
				High	9	17	21	21	N/A	N/A	43	84
			DL115XR	Xtra-High	N/A	N/A	56	56	N/A	N/A	15	55
8	590	2 1/2	DL115	Low	N/A	N/A	N/A	N/A	1	6	35	58
				Full	N/A	N/A	N/A	N/A	N/A	N/A	22	45
				High	3	7	10	10	N/A	N/A	22	45
			DL115XR	Xtra-High	N/A	N/A	20	20	N/A	N/A	6	29

## NOTES:

- 2930 Mixing Valves have two inlets and one outlet. Published shut-off values are with respect to worst case conditions with zero downstream pressure on the outlet port and zero upstream pressure on the opposing inlet port. Pneumatic Actuators used with the 2930 are direct acting. The upper port fails closed on loss of air pressure to the actuator.
- 2930 leakage rating is ANSI Class IV.
- Inlet pressure **cannot** exceed Body Pressure-Temperature Rating.
- The 3-15 and 1-17 columns of the table apply to valves with control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 columns apply to valves with a positioner or an I/P transducer of suitable range.
- N/A indicates that the air signal is not capable of providing any shut-off or it exceeds the actuator's maximum air pressure.  
  
Maximum air pressure  
DL49...30PSIG  
DL84 & 84XR...30PSIG  
DL115 & 115XR...40PSIG
- Do Not Use DL115 OR 115XR Actuators on Valves With Bronze Trim.
- See Actuators, Positioners, and Accessories section for explanation of spring ranges.

Shut-off values are for valves with TFE or EPDM packing.  
For valves with graphite packing contact factory for shut-offs.

## 2930 Three-Way Mixing Valve



VALVE			ACTUATOR		2932 SHUT-OFF ΔP 3-WAY DIVERTING/MIXING								
Valve Size (IN)	Cv Rating	Plug Travel (IN)	Pneumatic Actuator	Spring Range	Maximum Shut-off ΔP in PSI								
					Upper Port Closed Direct Acting				Lower Port Closed Direct Acting				
					Air Signal to Actuator				Air Signal to Actuator				
					3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI	3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI	
2 1/2	68/75	3/4	DL49	HIGH	N/A	106	108	N/A	N/A	N/A	N/A	110	N/A
			DL84	HIGH	106	108	110	N/A	N/A	N/A	N/A	115	N/A
3	85/95	3/4	DL49	HIGH	N/A	104	106	N/A	N/A	N/A	N/A	108	N/A
			DL84	HIGH	104	106	108	N/A	N/A	N/A	N/A	113	N/A
4	160/180	3/4	DL49	HIGH	N/A	N/A	104	N/A	N/A	N/A	N/A	106	N/A
			DL84	HIGH	102	104	106	N/A	N/A	N/A	111	N/A	
			DL115	HIGH	106	108	111	111	N/A	N/A	113	115	
5	195/220	1 1/4	DL84	HIGH	99	102	104	N/A	N/A	N/A	108	N/A	
			DL115	HIGH	104	106	108	108	N/A	N/A	111	113	
6	270/300	1 3/8	DL84	HIGH	97	99	102	N/A	N/A	N/A	106	N/A	
			DL115	HIGH	101	104	106	106	N/A	N/A	108	110	
8	425/510	1 1/2	DL115	HIGH	99	101	104	104	N/A	N/A	106	118	

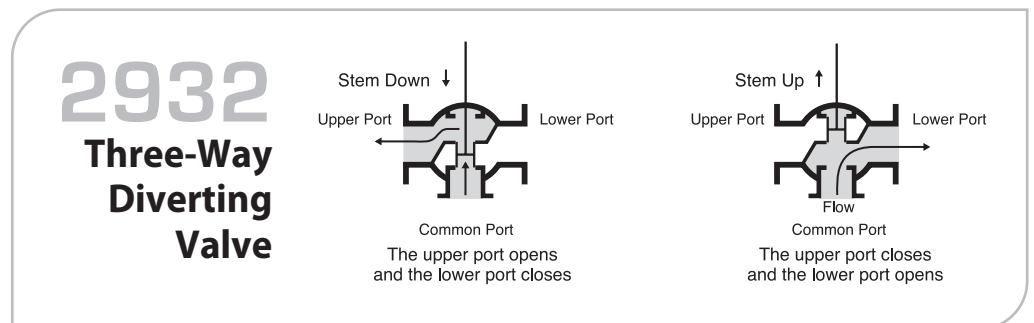
Shut-off values are for valves with TFE or EPDM packing.  
For valves with graphite packing contact factory for shut-offs.

**NOTES:**

- 1) Published shut-off values are for diverting applications. The values are worst case and based on the pressure difference between the inlet and the outlet that is closed. Consult the factory if the required shut-off exceeds the published value and the pressure at the inlet and both outlets is known. For proper operation in diverting applications, the pressure difference between both outlets must not exceed 50 psi. Consult the factory for shut-off values for 2932 mixing applications. Pneumatic Actuators used with the 2932 are direct acting. The upper port fails closed on loss of air pressure to the actuator.
- 2) 2932 leakage rating is ANSI Class II.
- 3) Inlet pressure **cannot** exceed Body Pressure-Temperature Rating.
- 4) The 3-15 and 1-17 columns of the table apply to valves with control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 columns apply to valves with a positioner or an I/P transducer of suitable range.
- 5) N/A indicates that the air signal is not capable of providing any shut-off or it exceeds the actuator's maximum air pressure.

Maximum air pressure  
DL49...30PSIG  
DL84...30PSIG  
DL115...40PSIG

- 6) See Actuators, Positioners, and Accessories section for explanation of spring ranges.



**\*PIPING NOTE:** The 2932 is **NOT** compatible with an elbow directly connected or in close proximity to the common port without the use of a flow straightener. Otherwise a minimum of 10 diameters of straight pipe are required for the common port connection.

## Fluid Temperature Limit Thresholds

The engineering data within our product specification will share information about MAX fluid temperature limits as if it is an absolute for any configurable valve assembly. It is not. The MAX fluid temperatures listed, sometimes as high as 800 Deg. F depending on the valve is only an absolute one for the valve body itself. It does not take into consideration the actuation or accessories. Actuators and accessories each have their own MAX ambient temperature limits that may be anywhere from 122 °F to 250°F depending on the items for the electronics or softs goods these items contain. ***It is nearly impossible to correlate JUST fluid temperature to determine when any of these actuators or accessories will have their ambient exceeded.***

### THERE ARE SEVERAL FACTORS THAT INCLUDE BUT ARE NOT LIMITED TO:

- valve size
- actuator orientation
- room ambient temperature
- distance from the valve body to the components of interest
- bonnet style/size
- conducted heat versus radiated heat
- ventilation

With all of these variables it is a challenge to come up with some guidelines.

However, we have attempted to do that in the tables that follow on page 15. Realize these are only guidelines.

## Actuator Mounting **VS** Insulating Blankets

When working with higher fluid temperatures thermal insulating blankets can ***dramatically reduce surface temperatures on pipes, valves and other fixtures*** in a fluid control system such that the ambient room temperatures in these environments are dramatically reduced as well. This is often required in for valve actuators and accessories to reliably survive when fluid temperatures rise well above the safe ambient temperatures of the devices. Radiant heat and convected heat are the major sources for damage to these actuators and accessories. When a valve actuator is mounted to the side of a valve there is still radiant heat but convected heat is mostly eliminated. ***For globe control valves, having the actuator mounted vertically above the valve is best for optimum valve packing life but will then suffer the most with both radiant and convected heat to deal with.*** Alternatives to blankets and the mounting orientation listed include longer yoke actuators and extension bonnets on valves. These put distance between the heat sources and the components you are trying to protect from heat.

## Choose the right blanket



ACOUSTIGUARD™

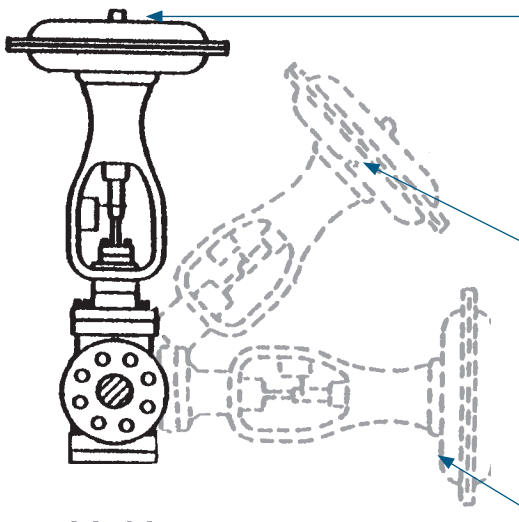
VS



THERMIGUARD™

At Warren Controls our **AcoustiGuard™ & ThermiGuard™** blankets are nearly identical. In fact they have identical thermal properties. The **AcoustiGuard™** has an additional layer of high density barium sulfate vinyl reflector for sound reflection. Each blanket is specifically designed in a one or two piece design that is made to be easily removable for valve servicing. When used in conjunction with high temperature fluids, significant energy savings, lower surface & ambient temperatures and a **safer environment for employees are just some of the benefits.**

## Predicting Safe Fluid Temperatures for Actuators & Accessories



### VERTICAL ABOVE PIPING

This is the recommended position for mounting as it is the best position to ensure the service life of the equipment; however this is where it will encounter the most heat and sound vibrations.

### 45° FROM VERTICAL ABOVE PIPING ON EITHER SIDE

You may mount in this position to try to reduce the heat in high temperature applications; however this will reduce the life of the packing.

**Actuators mounted in any position other than vertical MUST be supported independent of the valve.**

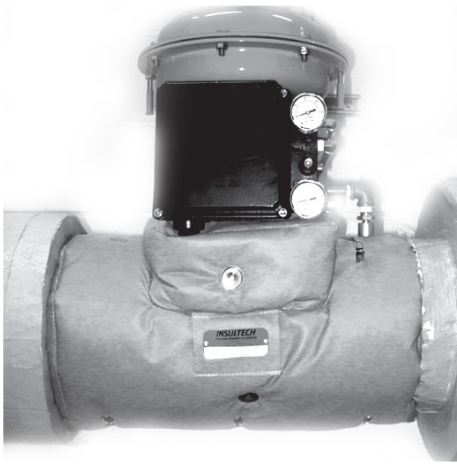
### 90° TO PIPING HORIZONTAL ON EITHER SIDE

This is the worst possible position and creates great strain and limits the life of the internal components of the valve.

**Actuators mounted in any position other than vertical MUST be supported independent of the valve.**

The tables that follow on page 15 will identify temperature ranges, valve size ranges, actuator orientation and use of thermal blankets to determine what is required to get longevity out of your actuators and accessories.

# HEAT/SOUND PRESSURE LEVELS GUIDELINES



Whether you need to lower your mechanical room temperature, avoid getting burned, reduce harmful noise or save energy our blanket wraps are your solution!

**AcoustiGuard™ & ThermiGuard™** are custom fit high quality insulation blanket systems pre-engineered to either reduce harmful noise, or save energy by retaining radiant heat. Both are designed to improve the surrounding work environment. While **AcoustiGuard™** is designed to act as a “sound attenuation” and thermal barrier, **ThermiGuard™** is capable of withstanding weather conditions and chemical environments. Both are capable of withstanding maximum service temperatures of 450°F (**AcoustiGuard™ & ThermiGuard™**) or up to 800°F with the High Temperature option. Any piece will not exceed 40 pounds. **AcoustiGuard™** comes with 2 fastening options: Lacing Pins & Metal “D” Ring Strap with Velcro Tab. In addition to these fastening options, **ThermiGuard™** comes with 2 additional fastening options: Velcro Flaps & Side Release Buckles. The **AcoustiGuard™ & ThermiGuard™** products are designed to be flexible and easier to install, easy to remove and reinstall, allowing quick access and easy equipment serviceability.

- **EASY TO INSTALL & REINSTALL**
- **CAN WITHSTAND UP TO 450°F OR 800°F**
- **MULTIPLE FASTENING OPTIONS**

## Sound Pressure Levels

107 dBA Source	A-Weighted Measurements	Linear Weighted Measurements
Test Frequency (In Hz)	1 1/2" Noise Reduction (In dBA)	1 1/2" Insertion Loss (In dBA)
100	13	13
125	14	13
160	13	13
200	13	13
250	13	12
315	15	15
400	19	19
500	25	25
630	26	33
800	39	39
1000	38	39
1250	42	42
1600	43	43
2000	43	43
2500	44	44
3150	45	44
4000	44	45
5000	46	45

## Fluid Temperature Limit Guidelines

### 2900 DL 49 DIAPHRAGM ACTUATOR

Ensures reliable, long-term performance of diaphragm, seals and any included instrumentation.

#### STANDARD BONNET

<i>Valves: 2 1/2" - 10"</i>	
<b>ACTUATOR ORIENTATION</b>	<b>FLUID TEMPERATURE LIMIT</b>
Above the Valve	338°F
35° - 45° To the Side of the Valve	400°F

*\*Assumes no valve and pipe insulation. Check for availability of ThermiGuard blanket insulation for vertical actuator orientation good to 400°F.*

### 2900 DL 84 DIAPHRAGM ACTUATOR

Ensures reliable, long-term performance of diaphragm, seals and any included instrumentation.

#### STANDARD BONNET

<i>Valves: 2 1/2" - 10"</i>	
<b>ACTUATOR ORIENTATION</b>	<b>FLUID TEMPERATURE LIMIT</b>
Above the Valve	353°F
35° - 45° To the Side of the Valve	400°F

*\*Assumes no valve and pipe insulation. Check for availability of ThermiGuard blanket insulation for vertical actuator orientation good to 400°F.*

These are simply rough guidelines and not absolute thresholds.

# DIMENSIONS & WEIGHTS

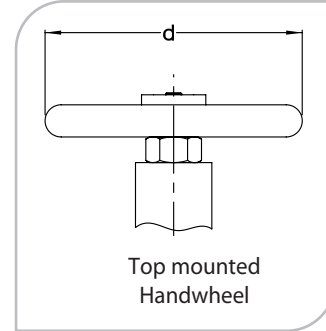
DIMENSION (IN) <b>2920</b>		VALVE SIZE (IN)				
		2-1/2	3	4	5	6
A	125FLG	9	10	13	15-3/4	17-3/4
	250FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8
B		4-3/4	5-3/8	6-3/8	5-3/4	6-1/2
C		5-1/2	6-1/8	7-1/8	7-3/4	8-3/8
Weight (LB)	125FLG	55	72	119	134	175
	250FLG	64	77	131	166	233

Consult factory for drawings, weights, and dimensions of configurations not shown.

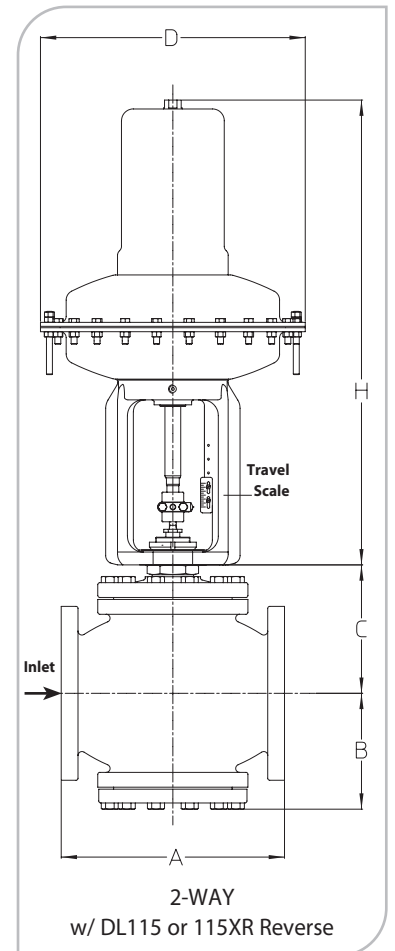
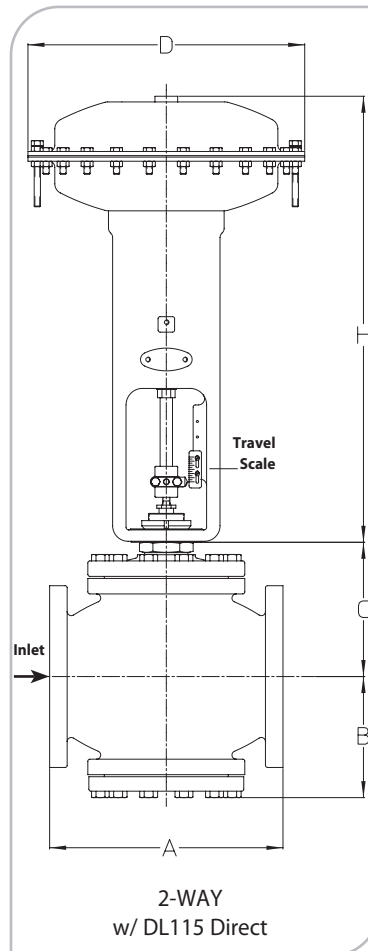
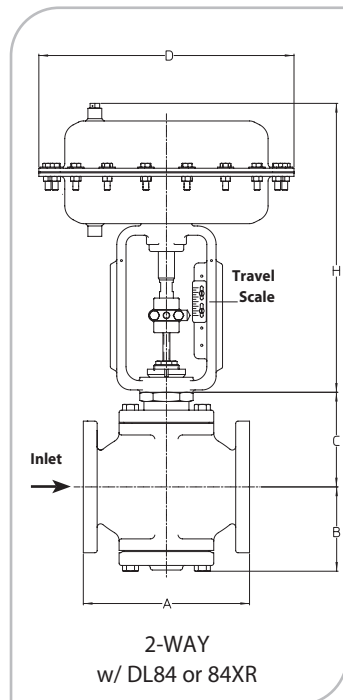
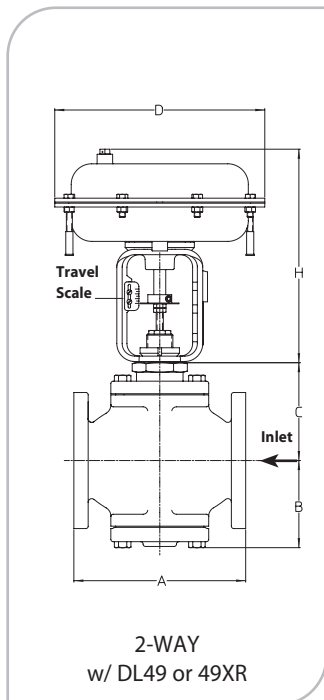
Face to face dimensions conform to historical Warren Controls standard and are **NOT** ANSI/ISA compatible.

CF = Consult Factory

DIMENSION (IN) <b>2922</b>		VALVE SIZE (IN)						
		2-1/2	3	4	5	6	8	10
A	125FLG	7-3/4	9	11-3/8	12	14-1/8	16-1/4	20
	250FLG	8-3/8	9-3/4	12	12-7/8	14-1/2	16-1/4	21-3/8
B		4-1/8	4-3/8	5	6-7/8	7-5/8	8-7/8	10-7/8
C		4-7/8	5-3/8	6-5/8	7-5/8	8-1/2	9-5/8	11-1/4
Weight (LB)	125FLG	32	42	77	124	169	290	CF
	250FLG	42	54	96	162	220	380	CF



DIMENSION (IN) <b>2923</b>		VALVE SIZE (IN)					
		2-1/2	3	4	5	6	8
A	125FLG	9	10	13	15-3/4	17-3/4	21-3/8
	250FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8	22-3/8
B		4-3/4	5-3/8	6-3/8	5-3/4	6-1/2	9
C		6	6-5/8	7-3/4	8-1/4	8-7/8	11-1/2
Weight (LB)	125FLG	57	75	127	149	197	CF
	250FLG	66	80	139	181	256	CF



## Default Actuator Orientation Shown



# DIMENSIONS & WEIGHTS

Consult factory for drawings, weights, and dimensions of configurations not shown.

Actual shipping weights may vary.

Face to face dimensions conform to historical Warren Controls standard and are **NOT** ANSI/ISA compatible.

DIMENSION (IN)	2930	VALVE SIZE (IN)					
		2-1/2	3	4	5	6	8
A	125FLG	9	10	13	15-3/4	17-3/4	21-3/8
	250FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8	22-3/8
B	125FLG	7-1/16	7-15/16	9-7/8	9-1/4	9-7/8	14-1/2
	250FLG	7-3/8	8-5/16	10-3/16	10-3/8	11	14-1/2
C		5-1/2	6-1/8	7-1/8	6	6-3/4	8-3/4
Weight (LB)	125FLG	64	83	139	157	202	343
	250FLG	73	94	157	211	283	CF

DIMENSION (IN)	2932	VALVE SIZE (IN)					
		2-1/2	3	4	5	6	8
A	125FLG	9	10	13	12	14-1/8	16-1/4
	250FLG	9-5/8	10-3/4	13-5/8	12-7/8	14-1/2	16-1/4
B	125FLG	7-1/16	7-15/16	9-7/8	10-1/2	11-1/16	11-13/16
	250FLG	7-3/8	8-5/16	10-3/16	10-15/16	11-1/2	12-5/16
C		5-1/2	6-1/8	6-7/8	7-1/2	8-1/8	9-1/4
Weight (LB)	125FLG	59	78	140	154	203	316
	250FLG	73	94	166	215	284	407

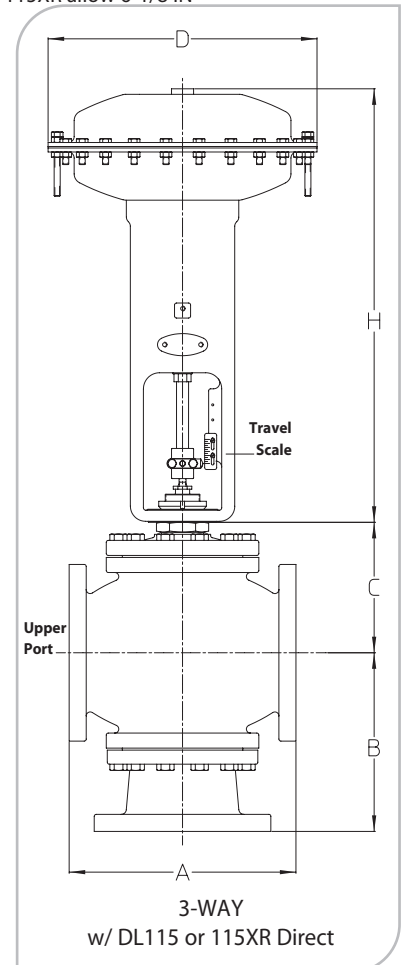
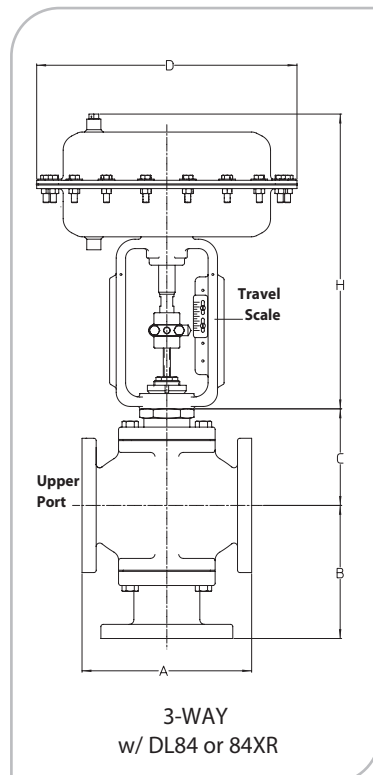
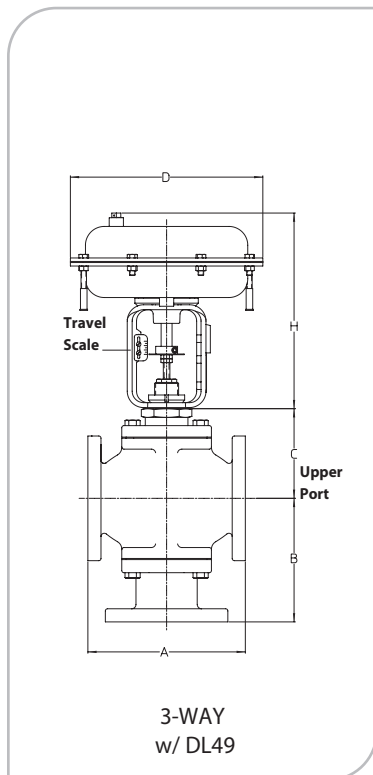
ACTUATOR	D (in) ACTUATOR	d (in) HAND-WHEEL	H MAX (IN)		WEIGHT (LB)	
			STD*	WITH HAND-WHEEL	STD	WITH HAND-WHEEL
DL49 Direct	11	6-3/8	12-1/4	16	25	CF
DL49 49XR Reverse	11	6-3/8	11-1/4	13-3/4	25	CF
DL84 84XR Direct	13-7/8	8-1/8	16-3/4	24-1/8	48-1/2	CF
DL84 84XR Reverse	13-7/8	8-1/8	15-3/4	24	48-1/2	CF
DL115 Direct	16-3/4	10-1/8	28-7/8	37-7/8	84	CF
DL115XR Direct	16-3/4	10-1/8	28-7/8	37-7/8	92	CF
DL115 Reverse	16-3/4	10-1/8	30	45-1/2	115	CF
DL115XR Reverse	16-3/4	10-1/8	30	45-1/2	CF	CF

\* Includes 1-3/8 inch for air fitting on direct acting diaphragm actuators.

CF = Consult factory

### Actuator Removal Clearance

Above DL49, 49XR, 84, or 84XR allow 5-5/8 IN  
Above DL115 or 115XR allow 6-1/8 IN



**Default Actuator Orientation Shown**

## ACTUATORS

ACTUATOR		SPRING RANGE (PSI)			
Size	Action	Low	Full	High	Xtra-High
DL49	Direct	3-9	4-13	8-12	N/A
DL49	Reverse	4-10	5-14	10-14	N/A
DL84 & DL115	Direct	3-9	3-15	9-15	N/A
DL84 & DL115	Reverse	3-9	3-15	9-15	N/A
DL84XR & DL115XR	Direct	N/A	N/A	N/A	See Note
DL49XR, DL84XR & DL115XR	Reverse	N/A	N/A	N/A	See Note

**Note:** The spring range of XR (eXtended Range) actuators varies with travel. These actuators require positioners or I/P's for modulating control

Effective Area:	DL49 & 49XR (49 Sq In), DL84 & 84XR (84 Sq In) DL115 & 115XR (115 Sq In)
Springs:	DL49, 49XR, 84 & 84XR Multiple DL115 & 115XR Single
Max Air Supply:	DL49, 49XR, 84 & 84XR 30PSIG DL115 & 115XR 40PSIG
Air Connections:	1/4 NPT
Diaphragm:	Buna-N Fabric Reinforced
Diaphragm Chambers:	Steel
Yoke:	DL49, DL49X, 84 & 84XR Ductile Iron DL115 & 115XR Direct Aluminum DL115 & 115XR Reverse Ductile Iron
Stem:	300 Series Stainless Steel
Finish:	DL49 & 49XR Epoxy-Coated DL84, 84XR, 115, & 115XR Acrylic Enamel
Ambient Temperature:	DL49 & 49XR -20 to 160°F DL84, 84XR, 115 & 115XR -40 to 180°F
Mounting:	Vertical Above or Below Valve
Handwheel:	Available on DL49, 49XR, 84, 84XR, 115 & 115XR

## POSITIONERS

### Split Ranging with Positioners

Positioners are sometimes used to "Split-Range" two control valves in a parallel configuration within a piping scheme. This technique is used to obtain higher rangeability than could otherwise be achieved with a single control valve. Typically one smaller valve supplying 15% to 35% of total flow is mated with a larger valve supplying 65% to 85% of total flow.

The best-matched pair will each be providing similar rangeability for each respective flow contribution to the manifold. Calculated as maximum flow /minimum controllable flow, the smaller valve should not be attempting to control flow below 5% of stroke. Estimate Cv from Cv tables vs. stroke to calculate this.

The chosen positioners would then have a Low Range signal for the smaller valve and a High Range Signal for the larger valve. With this, a single control signal can be used and serially applied to each valve. At mid-signal range, the little valve is completely open while the larger valve is just starting to open. Controllability for wide process set point ranges is dramatically improved.

## VAC V200 Models:

### VAC V200 Pneumatic



Models:	2FP_: Full Range Signal (3-15 PSIG) 2LP_: Low Range Signal (3-9 PSIG) 2HP_: High Range Signal (9-15 PSIG)
Options:	2SPDT Limit Switches, 4-20 mA Feedback
Ingress & Corrosion Protection:	NEMA, 4X, IP66
Supply Pressure:	20 to 145 PSIG Max <b>Not to Exceed Actuator Rating</b>
Linearity error:	<0.7% f.s.
Hysteresis:	<0.4% f.s.
Repeatability:	<0.3% f.s.
Weight:	3.2 lbs

### VAC V200 Electro-Pneumatic

Models:	2FE_: Full Range Signal (4-20 mA) 2LE_: Low Range Signal (4-12 mA) 2HE_: High Range Signal (12-20 mA)
Options:	2SPDT Limit Switches, 4-20 mA Feedback
Ingress & Corrosion Protection:	NEMA, 4X, IP66
Supply Pressure:	20 to 145 PSIG <b>Not to Exceed Actuator Rating</b>
Linearity error:	<1.0% f.s.
Hysteresis:	<0.6% f.s.
Repeatability:	<0.5% f.s.
Weight:	3.8 lbs

### VAC V200 Electro-Pneumatic Intrinsically Safe

Models:	2FI_: Full Range Signal (4-20 mA) 2LI_: Low Range Signal (4-12 mA) 2HI_: High Range Signal (12-20 mA)
Ingress & Corrosion Protection:	NEMA, 4X, IP66
Supply Pressure:	20 to 145 PSIG <b>Not to Exceed Actuator Rating</b>
Linearity error:	<1.0% f.s.
Hysteresis:	<0.6% f.s.
Repeatability:	<0.5% f.s.
Weight:	3.8 lbs

### VAC V200 Electro-Pneumatic Explosion Proof

Models:	2FX_: Full Range Signal (4-20 mA) 2LX_: Low Range Signal (4-12 mA) 2HX_: High Range Signal (12-20 mA)
Ingress & Corrosion Protection:	NEMA, 4X, IP66
Supply Pressure:	20 to 145 PSIG <b>Not to Exceed Actuator Rating</b>
Linearity error:	<0.8% f.s.
Hysteresis:	<0.5% f.s.
Repeatability:	<0.4% f.s.
Weight:	5.3 lbs

### VAC V200 Electro-Pneumatic Fail Freeze \*


Models:	2FF_: Full Range Signal (4-20 mA) 2LF_: Low Range Signal (4-12 mA) 2HF_: High Range Signal (12-20 mA)
Options:	2SPDT Limit Switches, 4-20 mA Feedback
Ingress & Corrosion Protection:	NEMA, 4X, IP66
Supply Pressure:	20 to 100 PSIG <b>Not to Exceed Actuator Rating</b>
Linearity error:	<1.2% f.s.
Hysteresis:	<0.9% f.s.
Repeatability:	<0.8% f.s.
Weight:	5.4 lbs

## VAC V200 All Models:

**Construction:** Aluminum Housing with Polyester Coating  
**Action:** Direct or Reverse  
**Media:** Clean Dry Oil Free Air Filtered to 5 micron  
**Air Connections:** 1/4 NPT  
**Electrical Connection:** 1/2 NPT  
**Gauges:** Input 0-30 PSIG,  
 Output 0-60 PSIG, Supply 0-60 PSIG,  
 (Diaphragm Actuator),  
 Output 0-100 PSIG, Supply 0-100PSIG (Cylinder  
 Actuator),  
 Housing Black Steel Case with Chrome Ring  
**Ambient Temperature:** -40 to 185°F (Except Fail Freeze - 20 to 158°F)  
**Mounting:** Yoke Mounted

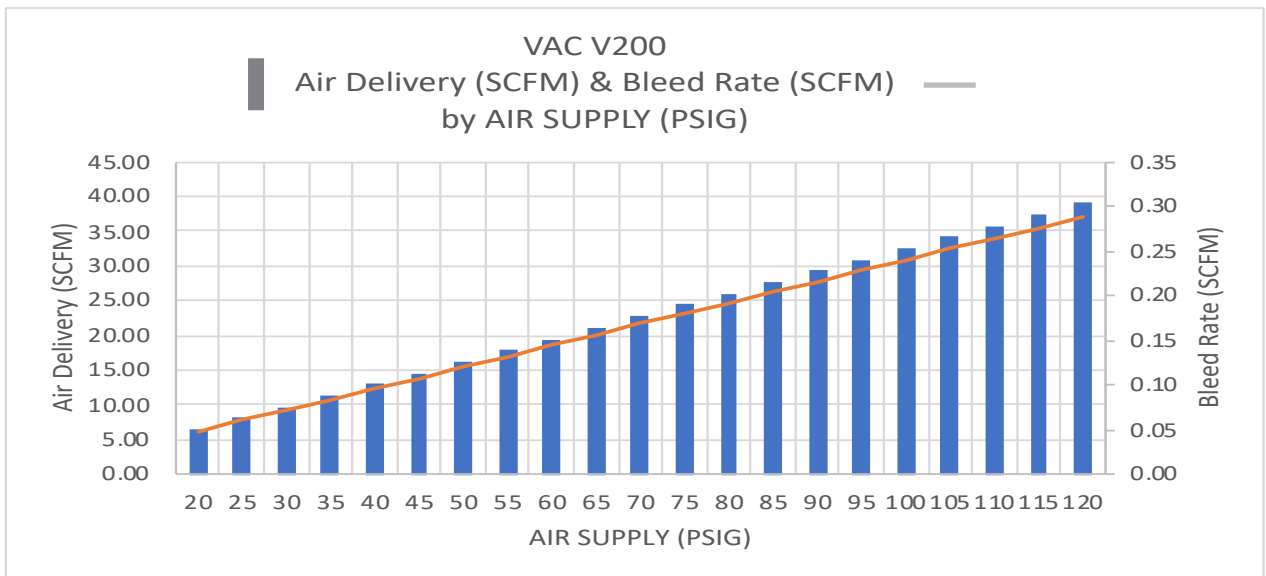
Limit Switches and Feedback Options are NEMA 4X, IP66 only, and are not suitable for hazardous locations.

\* For positioner code 2xF\_, the VAC V200 Positioner with the Fail Freeze module, check first with the factory for approval due to the space considerations on certain valve assembly combinations.

APPROVALS - VAC V200 POSITIONERS ONLY			
Ratings for hazardous locations:	V200-EX - Explosion Proof		
	ATEX - Explosion Protection 1487X, intrinsically safe EEx ia IIC T4/T5/T6		
FM and CSA: Explosions Proof	CL I, II Div 1 Grp B-G		
Intrinsically Safe: FM, CSA	CL I-II-III Div 1 Grp A-G; CL II Div 1&2 Grp E-G; CL III		
Non Incendive: FM	CL 1 Div2 Grp A-C		
Temperature Class			
	Short Circuit	Current-max	Ambient Temp max
	T6	50 mA	140 F (60 C)
	T5	60 mA	158 F (70 C)
	T4	60 mA	185 F (85 C)
Intrinsically Safe			
V200-IS • ATEX: EEx ia IIcT4/T6			
FM: CL1 Div1 Grp A B C D			
CSA: EX ia CL1 Grp A B C D EX ia CL 1 Div2 Grp A B C D			

VAC V200		
AIR SUPPLY (PSIG)	Bleed Rate (SCFM)	Air Delivery (SCFM)
20	0.05	6.50
25	0.06	8.13
30	0.07	9.75
35	0.08	11.38
40	0.10	13.00
45	0.11	14.63
50	0.12	16.25
55	0.13	17.88
60	0.14	19.50
65	0.16	21.13
70	0.17	22.75
75	0.18	24.38
80	0.19	26.00
85	0.20	27.63
90	0.22	29.25
95	0.23	30.88
100	0.24	32.50
105	0.25	34.13
110	0.26	35.75
115	0.28	37.38
120	0.29	39.00

Bleed: 0.0024 scfm per psig  
 Delivery: 0.325 scfm per psig



# ACTUATORS, POSITIONERS, & ACCESSORIES

## Siemens 760 Models: 760P Pneumatic



Models: 76P\_: Full Range Signal (3-15 PSIG)  
Options: Limit Switches, 4-20 mA Feedback (*Reduced feedback span for valves with less than 1 inch travel — Call factory for details.*)

### 760E Electro-Pneumatic

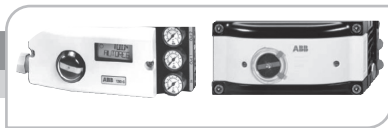
Models: 76E\_: Full Range Signal (4-20 mA)  
Options: Limit Switches, 4-20 mA Feedback (*Reduced feedback span for valves with less than 1 inch travel — Call factory for details.*)

Approvals & Ratings:  
FM Intrinsically Safe: Class I, Div 1, Groups A,B,C,D.  
Class II, Div 1, Groups E,F,G.  
Class III, Div 1.  
Non-Incendive: Class I, Div 2, Groups A,B,C,D.  
Suitable for: Class II, Div 2, Groups F,G.  
Class III, Div 2.  
CSA Intrinsically Safe: Class I, Div 1, Groups A,B,C,D.  
Class II, Div 1, Groups E,F,G.  
Class III, Div 1.  
Suitable for: Class I, Div 2, Groups A,B,C,D.  
Class II, Div 2, Groups E,F,G.  
Class III, Div 2.

### 760 All Models:

Construction: Aluminum Housing with Epoxy/Polyester Powder Coat  
Ingress & Corrosion Protection: NEMA 4, 4X, IP65  
Action: Direct or Reverse  
Supply Pressure: 150 PSIG Max **Not to Exceed Actuator Rating**  
Media: Clean Dry Oil Free Air Filtered to 3 micron  
Flow Capacity: 9.0 SCFM  
Air Consumption: 0.5 SCFM Typical  
Air Connections: 1/4 NPT  
Electrical Connection: 3/4 NPT  
Gauges: Input 0-30 PSIG, Output 0-60 PSIG,  
Housing Black Steel Case with Chrome Ring  
Ambient Temperature: 760P -40 to 180°F, 760E —40 to 167°F  
Mounting: Yoke Mounted

## VAC D400 Models: 4-20mA



Models: T0Z0: Full Range Signal (2-Wire, 4-20 mA),  
Explosion Protection: None  
Calibration: Single-Button Auto-adjust Commissioning or Customized Auto-adjust  
Operator Panel: 4 Push-Buttons and Two-Line LCD  
Position Indicator: Mechanical  
Options: None

### 4-20mA w/HART

Models: THN\_: Full Range Signal (2-Wire, 4-20 mA), HART Protocol 5.1  
Explosion Protection: Intrinsically Safe & Non-Incendive  
Calibration: Single-Button Auto-adjust Commissioning or Customized Auto-adjust  
Operator Panel: 4 Push-Buttons and Two-Line LCD  
Position Indicator: Mechanical  
Options: 4-20 mA Feedback Module, Digital Position Feedback Module, Proximity Switches NC.

Models: THX\_: Full Range Signal (2-Wire, 4-20 mA), HART Protocol 5.1  
Explosion Protection: Explosion Proof  
Calibration: Single-Button Auto-adjust Commissioning or Customized Auto-adjust  
Operator Panel: 4 Push-Buttons and Two-Line LCD  
Position Indicator: Mechanical  
Options: 4-20 mA Feedback Module, Digital Position Feedback Module, 24VDC/AC Micro-switches, Proximity Switches NC.

### PROFIBUS PA

Models: TPN\_: Communication PROFIBUS PA Profile for Process Devices, Electro-Pneumatic Actuators, V3.0, In Compliance with IEC 61158-2  
Explosion Protection: Intrinsically Safe & Non-Incendive  
Calibration: Single-Button Auto-adjust Commissioning or Customized Auto-adjust  
Operator Panel: 4 Push-Buttons and Two-Line LCD  
Position Indicator: Mechanical  
Options: Proximity Switches NC.  
Models: TPX\_: Communication PROFIBUS PA Profile for Process Devices, Electro-Pneumatic Actuators, V3.0, In Compliance with IEC 61158-2

Explosion Protection: Explosion Proof  
Calibration: Single-Button Auto-adjust Commissioning or Customized Auto-adjust  
Operator Panel: 4 Push-Buttons and Two-Line LCD  
Position Indicator: Mechanical  
Options: 24VDC/AC Microswitches, Proximity Switches NC.

### FOUNDATION FIELDBUS™

Models: TFN\_: Communication Foundation Fieldbus™ Version 1.4, In Compliance with IEC 61158-2  
Explosion Protection: Intrinsically Safe & Non-Incendive  
Calibration: Single-Button Auto-adjust Commissioning or Customized Auto-adjust  
Operator Panel: 4 Push-Buttons and Two-Line LCD  
Position Indicator: Mechanical  
Options: Proximity Switches NC

Models: TFX\_: Communication Foundation Fieldbus™ Version 1.4, In Compliance with IEC 61158-2  
 Explosion Protection: Explosion Proof  
 Calibration: Single-Button Auto-adjust Commissioning or Customized Auto-adjust  
 Operator Panel: 4 Push-Buttons and Two-Line LCD  
 Position Indicator: Mechanical  
 Options: 24VDC/AC Micro-switches, Proximity Switches NC

## APPROVALS & RATINGS:

### D400 Intrinsically Safe & Non-Incendive Models

#### FM

Intrinsically Safe: Class I, II, III, Div. 1, Grp. A-B-C-D-E-F-G  
 T6, T5, T4, Ta = 40 °C, 55 °C, 85 °C  
 901265 Entity, FISCO

Non-Incendive: Class I, Div. 2, Grp. A-B-C-D  
 T6, T5, T4, Ta = 40 °C, 55 °C, 85 °C

Suitable: Class II, III, Div. 2, Grp. E-F-G  
 T6, T5, T4, Ta = 40 °C, 55 °C, 85 °C

#### CSA

Intrinsically Safe: Class I, Div. 1 Grp. A-B-C-D  
 Class II, Div. 1 Grp. E-F-G  
 Class III, Div. 1

### APPROVALS & RATINGS: D400 Explosion-Proof Models

#### FM

Explosion Proof: Class I; Div 1; Grp. C-D  
 T5, max. 82 °C

Dust Ignition-Proof: Class II, III, Div 1 Grp. E-F-G  
 T5; max. 82 °C

#### CSA

Explosion Proof: Class I; Div 1; Grp. C-D  
 Class II; Div 1; Grp. E-F-G  
 Class III

Temperature range: -40 ... 85 °C  
 T5, max. 85 °C ; T6, max. 70 °C

### D400 All Models:

Construction: Aluminum Case with Electrostatic Dipping Varnish with Epoxy Resin Stove Hardened.

Ingress & Corrosion Protection: IP65 / NEMA 4X  
 Action: Direct or Reverse  
 Supply Pressure: 20 to 90PSIG **Not to Exceed Actuator Rating**  
 Media: Clean Dry Oil Free Air acc.to DIN / ISO 8573-1  
 Pollution and Oil Content According to Class 3 (Purity: Max. Particle Size: 5 µm, Max. Particle Density: 5 mg / m3; Oil Content: Max. Concentration: 1mg / m3; Pressure Dew Point: 10, K Below Operating Temperature

Output Flow Capacity: 2.3 SCFM at 20 PSIG,  
 6.0 SCFM at 90 PSIG  
 Air Consumption: <0.015 SCFM (Independent of Supply Pressure)  
 Air Connections: 1/4-18 NPT  
 Electrical Connections: 1/2-14 NPT  
 Gauges: Supply, Output  
 Ambient Temperature: -40 to 185°F

Mounting: Yoke Mounted  
 Available as Specials: **(Contact Factory for Details and Available Models)**  
 Fail Freeze Function  
 Safety Integrity Level SIL2  
 ATEX, GOST, IECEx Approvals  
 Shutdown Module

## OPTIONS:

### F) 4-20 mA Feedback Module

Range 4-20mA (Configurable)Two-Wire circuitry, Power Supply 24VDC  
**NOTE: For 4-20mA w/HART Models ONLY**

### K) Digital Position Feedback Module

Two Switches For Digital Position Feedback (Position Adjustable Within The Range Of 0 ... 100%, Ranges Cannot Overlap)  
**NOTE: For 4-20mA w/HART Models ONLY**

### L) 24VDC/AC Micro-switches

Two Micro-switches For Independent Position Signaling. Switching Points Adjustable Between 0 ... 100%  
**NOTE: For Explosion Proof Models ONLY**

### P) Proximity Switches NC

Two Proximity Switches For Independent Position Signaling. Switching Points Adjustable Between 0 ... 100%  
 Switch Type SJ2-SN (NC)

### ACCEPTABLE OPTION COMBINATIONS

w/	F*	K*	L‡	P
F*	■	Yes	Yes	Yes
K*	Yes	■	Yes	Yes
L‡	Yes	Yes	■	No
P	Yes	Yes	No	■

\* For 4-20mA w/HART Models Only

‡ For Explosion Proof Models ONLY

## ACCESSORIES

### Position Indication Switches

#### Proximity Mark 1

Models:  
 PX11: 2 SPDT Switches  
 Ambient Temperature: -58 to 176°F Continuous  
 (Rated to 350°F for 600 hours)

PX12: 2 SPDT Switches w/ 2K Potentiometer  
 Ambient Temperature: -40 to 176°F  
 Power Rating: 1.5 Watt Maximum

PX13: 2 SPDT Switches w/ 4-20 mA Feedback  
 Ambient Temperature: -40 to 176°F  
 Power Requirement: 5 to 30 Vdc  
 Current Consumption: 50 mA

PX14: 4 SPDT Switches  
 Ambient Temperature: -58 to 176°F Continuous (Rated to 350°F for 600 hours)

PX15: 6 SPDT Switches  
 Ambient Temperature: -58 to 176°F Continuous (Rated to 350°F for 600 hours)

#### All Models:

Locations: NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, 9, 12, 13  
 Approvals: & Ratings:  
 UL: Class I, Div. 1 & 2, Groups B, C, D; Class II, Div. 1 & 2, Groups E, F, & G  
 CSA: Class I, Div. 1 & 2, Groups A, B, C, D; Class II, Div. 1 & 2, Groups E, F, & G  
 Construction: Aluminum Housing, Hard Anodized  
 Electrical Connection: Screw Terminal  
 Conduit Connection: 3/4 NPT  
 Mounting: Yoke Mounted



### I/P's

#### Type 500X

Locations: NEMA 4X (IP65)  
 Construction: Zinc Alloy Base with Aluminum Bonnet, Epoxy Painted  
 Ranges: 3-9, 9-15, 3-15, 1-17, or 6-30 PSI  
 Supply Pressure: Minimum 3 PSIG Above Maximum Output  
 Maximum 100 PSIG **Not to Exceed Actuator Rating**

Flow Capacity: 4.5 SCFM at 25 PSIG  
 Air Consumption: 0.05 SCFM Midrange Typical  
 Ambient Temperature: -20 to 140°F



#### Type 550X

Locations: NEMA 4X (IP65)  
 Construction: Chromate-treated Aluminum with Epoxy Paint  
 Ranges: 0-30 PSI  
 Supply Pressure: Minimum 5 PSIG Above Maximum Output  
 Maximum 100 PSIG **Not to Exceed Actuator Rating**

Flow Capacity: 12 SCFM at 100 PSIG  
 Air Consumption: 6.0 SCFH Midrange Typical  
 Ambient Temperature: -20 to 150°F



### Type 950X

Locations: NEMA 4X (IP65), Explosion proof  
 Construction: Chromate-treated Aluminum with Epoxy Paint  
 Ranges: 3-15 PSI  
 Supply Pressure: Minimum 5 PSIG Above Maximum Output  
 Maximum 100 PSIG **Not to Exceed Actuator Rating**

Flow Capacity: 4.5 SCFM at 25 PSIG  
 Air Consumption: 3.0 SCFH Midrange Typical  
 Ambient Temperature: -40 to 160°F  
 I/P's All Models:

Input: 4-20 mA  
 Field Reversible

Air Connections: 1/4 NPT  
 Electrical Connection: 1/2 NPT, Pigtail Leads  
 Media: Clean Dry Oil Free Air Filtered to 40 micron  
 Mounting: Yoke Mounted



### Air Filter Regulators

Models: Type 300, Type 350SS  
 Output Ranges: Type 300, 0-30, 0-60 PSIG  
 Type 350SS, 0-100 PSIG  
 Supply Pressure: Type 300, 250 PSIG Maximum  
 Type 350SS, 290 PSIG Maximum  
 Construction: Type 300, Die-Cast Aluminum with Irridite and Baked Epoxy Paint  
 Type 350SS, 316 Stainless Steel  
 Gauge: Type 300, Output, Housing Steel Painted  
 Type 350SS, Output, Housing Stainless Steel  
 Air Connections: 1/4 NPT  
 Filter: Type 300, 5 micron (D400 Positioners Require 5 micron Filter). Type 350SS, 25 micron Chamber Mounted  
 Mounting: Chamber Mounted



### Solenoids

Models: 8320G184, EF8320G184, 8320G202, EF8320G202  
 Construction: (EF)8320G184, 3-Way Brass  
 (EF)8320G202, 3-Way Stainless Steel  
 Locations: 8320G184 & 8320G202, Watertight, Types 1, 2, 3, 3S, 4 & 4X  
 EF8320G184 & EF8320G202, Explosion proof and Watertight, Types 3, 3S, 4, 4X 6, 6P, 7 & 9  
 120VAC (All), 24Vdc (8320G184)  
 Supply: Ambient Temperature: +32 to 125°F  
 Air Connections: 1/4 NPT  
 Electrical Connection: 1/2 NPT, Pigtail Leads  
 Approvals: CSA, UL, CE  
 Mounting: Chamber Mounted



### Air Tubing

Standard: Copper  
 Optional: Stainless Steel

POSITIONERS									
Valve Type	Actuator Action	Input Signal					Failure Modes		
		Pneumatic	Electro-Pneumatic	PROFIBUS PA	Foundation Fieldbus	Increasing Signal	Loss of Signal Valve Fails... <sup>1</sup>	Loss of Power Valve Fails... <sup>2</sup>	Loss of Air Supply Valve Fails...
2920, 22 & 23	Direct	3-15 PSI	4-20 mA	PROFIBUS Protocol	Fieldbus Protocol	Closes Valve	Open	Open	Open
	Reverse	3-15 PSI	4-20 mA	PROFIBUS Protocol	Fieldbus Protocol	Opens Valve	Closed	Closed	Closed
2930 & 32	Direct	3-15 PSI	4-20 mA	PROFIBUS Protocol	Fieldbus Protocol	Closes Lower Port/ Opens Upper Port	Upper Port Closed/ Lower Port Open	Upper Port Closed/ Lower Port Open	Upper Port Closed/ Lower Port Open

<sup>1</sup> Valves with Fail Freeze Positioners Fail in Last Position on Loss of Signal.

<sup>2</sup> PROFIBUS PA or Foundation Fieldbus ONLY

POSITIONER LIMIT SWITCHES			
Valve Type	Position	Settings	
		Switch 1	Switch 2
2920, 22 & 23	Valve Closed	Closed	Open
	Valve Open	Open	Closed
2930 & 32	Upper Port Closed	Closed	Open
	Lower Port Closed	Open	Closed

POSITIONER FEEDBACK			
Valve Type	Actuator Action	Feedback Signal <sup>3</sup>	Signal Increases as
2920, 22 & 23	Direct	4-20 mA	Valve Closes
	Reverse	4-20 mA	Valve Opens
2930 & 32	Direct	4-20 mA	Lower Port Closes/ Upper Port Opens

<sup>3</sup> Reduced feedback span for valves with 760 and less than 1 inch travel.

AIR FILTER REGULATORS	
Actuator	Output Pressure
DL49, 49XR, 84, 84XR	30 PSIG
DL 115 & 115XR	40 PSIG

I/P'S					
Valve Type	Actuator Action	Input Signal	Increasing Signal	Failure Modes	
				Loss of Signal Valve Fails...	Loss of Air Supply Valve Fails...
2920, 22 & 23	Direct	As Required For Shut-off	Closes Valve	Open	Open
	Reverse	As Required For Shut-off	Opens Valve	Closed	Closed
2930 & 32	Direct	As Required For Shut-off	Closes Lower Port/ Opens Upper Port	Upper Port Closed/ Lower Port Open	Upper Port Closed/ Lower Port Open

SOLENOIDS (WITHOUT POSITIONERS OR I/P'S )					
Valve Type	Actuator Action	Solenoid Energized	Failure Modes		
			Loss of Signal Valve Fails...	Loss of Air Supply Valve Fails...	Solenoid De-energized Valve Fails...
2920 22 & 23	Direct	Closes Valve	Open	Open	Open
	Reverse	Opens Valve	Closed	Closed	Closed
2930 & 32	Direct	Closes Lower Port/ Opens Upper Port	Lower Port Open/ Upper Port Closed	Lower Port Open/ Upper Port Closed	Lower Port Open/ Upper Port Closed

If the Solenoid is used with a Positioner or an I/P, refer to the Positioner or I/P listings for factory default settings and failure modes with the solenoid not failed.

PROXIMITY MARK 1 POSITION INDICATION SWITCHES FEEDBACK				
Valve Type	Actuator Action	Feedback Signal		Feedback Signal Increases as
		Potentiometer <sup>4</sup>	mA	
2920 22 & 23	Direct	0-350 ohm	4-20 mA	Valve Closes
	Reverse	0-350 ohm	4-20 mA	Valve Opens
2930 & 32	Direct	0-350 ohm	4-20 mA	Lower Port Closes/ Upper Port Opens

<sup>4</sup> Span varies from approx 155 to 350 ohm depending on actuator and travel.

LIMIT SWITCHES			
Valve Type	Position	Settings	
		Switch 1, 3, 5	Switch 2, 4, 6
2920 22 & 23	Valve Closed	Closed	Open
	Valve Open	Open	Closed
2930 & 32	Upper Port Closed	Closed	Open
	Lower Port Closed	Open	Closed

# CONFIGURATIONS

1. SELECTIONS Please make a selection from each table of OPTIONS below to make a complete model number string.

29  -     R

## VALVE BODY

Model	Valve Type	Size	Body Material	End Connection	Trim Style	Trim Material	Trim Cv	Packing Type
29N 49" or 84" Pneumatic	20 2-Way Single Seat	250 2-1/2 inch	R Cast Iron	F 125 lb. Flanged	E Equal % Types 20/22/23	B Bronze	F Full Port	T Teflon
	22 2-Way Double Seat	300 3 inch						G Graphite
291 115" Pneumatic	23 2-Way Cylinder Bal.	400 4 inch	G 250 lb. Flanged	L Linear Types 20 Stainless Steel 2.5"-4" only. 23/30/32 Full Product Line*	H 17-4 PH**	V Vacuum Service	L EDPM Lip	V Vacuum Service
	30 3-Way Mixing	500 5 inch						H 17-4 PH**
	32 3-Way Diverting	600 6 inch						6 Alloy 6 Wrapped***
	800 8 inch	6 Alloy 6 Wrapped***						
		010 10 inch						

*\*\*Only available in Type 20 & 23*  
*\*\*\*Only available in Type 20*

		CRN REGISTERED (Canadian Registration Number)						
Valve	FLG	Size (inch)						
		2-1/2	3	4	5	6	8	10
2920	125	Y	Y	Y	Y	Y	Y	---
	250	Y	Y	Y	Y	Y	Y	---
2922	125	Y	Y	Y	Y	Y	Y	Y
	250	N	N	N	N	N	N	N
2923	125	Y	Y	Y	Y	Y	Y	---
	250	Y	Y	Y	Y	Y	Y	---
2930	125	Y	Y	Y	Y	Y	Y	---
	250	Y	Y	Y	Y	Y	Y	---
2932	125	Y	Y	Y	Y	Y	Y	---
	250	N	N	N	N	N	N	---

Y = Yes, currently registered - CRN # CSA - OC20496  
N = No, not currently registered



FLUID TEMPERATURE LIMITS						
Valve Type	Body Material & Code	End Conn. & Code	Trim Material & Code	Packing Type & Code	T MAX	T MIN
20 2-Way Single Seat	Cast Iron R	125 lb F	Bronze B, 300 SS S, 17-4 pH H	Teflon T, Vacuum Service V	350°F	60°F
	Cast Iron R	125 lb F	Bronze B, 300 SS S, 17-4 pH H	Graphite G, EPDM L	350°F	-20°F
	Cast Iron R	250 lb G	Bronze B, 300 SS S, 17-4 pH H	EPDM L	400°F	-20°F
	Cast Iron R	250 lb G	Bronze B, 300 SS S, 17-4 pH H	Teflon T, Vacuum Service V	400°F	60°F
	Cast Iron R	250 lb G	Bronze B, 300 SS S, 17-4 pH H	Graphite G	400°F	-20°F
22 2-Way Double Seat	Cast Iron R	125 lb F	Bronze B, 300 SS S	Teflon T, Vacuum Service V	350°F	60°F
	Cast Iron R	125 lb F	Bronze B, 300 SS S	Graphite G, EPDM L	350°F	-20°F
	Cast Iron R	250 lb G	Bronze B, 300 SS S	EPDM L	400°F	-20°F
	Cast Iron R	250 lb G	Bronze B, 300 SS S	Teflon T, Vacuum Service V	400°F	60°F
	Cast Iron R	250 lb G	Bronze B, 300 SS S	Graphite G	400°F	-20°F
23 2-Way Cylinder Balanced	Cast Iron R	125 lb F	Bronze B	Teflon T, Vacuum Service V	300°F	60°F
	Cast Iron R	125 lb F	Bronze B	Graphite G, EPDM L	300°F	-20°F
	Cast Iron R	125 lb F	300 SS S, 17-4 pH H, Alloy 6 Wrapped 6	Teflon T, Vacuum Service V	350°F	60°F
	Cast Iron R	125 lb F	300 SS S, 17-4 pH H, Alloy 6 Wrapped 6	Graphite G, EPDM L	350°F	23°F
	Cast Iron R	250 lb G	Bronze B	Teflon T, Vacuum Service V	300°F	60°F
	Cast Iron R	250 lb G	Bronze B	Graphite G, EPDM L	300°F	-20°F
	Cast Iron R	250 lb G	300 SS S, 17-4 pH H, Alloy 6 Wrapped 6	EPDM L	400°F	23°F
	Cast Iron R	250 lb G	300 SS S, 17-4 PH H, Alloy 6 Wrapped 6	Teflon T, Vacuum Service V	400°F	60°F
30 3-Way Mixing	Cast Iron R	125 lb F	Bronze B, 300 SS S	Teflon T, Vacuum Service V	350°F	60°F
	Cast Iron R	125 lb F	Bronze B, 300 SS S	Graphite G, EPDM L	350°F	-20°F
	Cast Iron R	250 lb G	Bronze B, 300 SS S	EPDM L	400°F	-20°F
	Cast Iron R	250 lb G	Bronze B, 300 SS S	Teflon T, Vacuum Service V	400°F	60°F
	Cast Iron R	250 lb G	Bronze B, 300 SS S	Graphite G	400°F	-20°F
32 3-Way Diverting (2-1/2 thru 5)	Cast Iron R	125 lb F, 250 lb G	Bronze B, 300 SS S	Teflon T, Vacuum Service V	300°F	60°F
	Cast Iron R	125 lb F, 250 lb G	Bronze B, 300 SS S	Graphite G, EPDM L	300°F	-20°F
32 3-Way Diverting (6 & 8)	Cast Iron R	125 lb F, 250 lb G	Bronze B, 300 SS S	Teflon T, Vacuum Service V	150°F	60°F
	Cast Iron R	125 lb F, 250 lb G	Bronze B, 300 SS S	Graphite G, EPDM L	150°F	-20°F

**Note:** -20°F T MIN temperature limit is for indoor applications with low humidity where ice will not form on the valve stem.

**VALVE TYPE/ACTUATOR COMPATIBILITY:**

VALVE STYLE	VALVE SIZES	ACTUATORS
Type 20	2-1/2" & 3"	DL49, 49XR & DL84XR
Type 20	2-1/2" — 6"	DL84
Type 20	2-1/2" — 6"	DL115 & DL115XR
Type 22	2-1/2" — 4"	DL49 & DL84
Type 22	5" — 10"	DL84
Type 23	2-1/2" & 3"	DL49, 49XR
Type 23	2-1/2" — 6"	DL84
Type 23	4" — 8"	DL115
Type 23	6" & 8"	DL115XR
Type 30	2-1/2" & 3"	DL49 & DL84XR
Type 30	2-1/2" — 6"	DL84
Type 30	2-1/2" — 8"	DL115 DL115XR
Type 32	2-1/2" — 4"	DL49
Type 32	2-1/2" — 6"	DL84
Type 32	4" — 8"	DL115

**VALVE TYPE/TRIM MATERIAL COMBINATIONS:**

SIZE	TRIM MATERIAL			
	B Bronze	S 300SS	H 17-4 PH	6 Alloy Wrapped
250 2-1/2 in.	20, 22, 23, 30, 32	20, 22, 23, 30, 32	20, 23	23
300 3 inch	20, 22, 23, 30, 32	20, 22, 23, 30, 32	20, 23	23
400 4 inch	20, 22, 23, 30, 32	20, 22, 23, 30, 32	20, 23	23
500 5 inch	20, 22, 23, 30, 32	20, 22, 23, 30, 32	20, 23	23
600 6 inch	20, 22, 23, 30, 32	20, 22, 23, 30, 32	20, 23	23
800 8 inch	22, 32	20, 22, 23, 30, 32	23	23
010 10 inch	22	20, 22	N/A	N/A

# CONFIGURATIONS CONT.

1. SELECTIONS Please make a selection from each table of OPTIONS below to make a complete model number string.

ACTUATOR				ACCESSORIES				
Actuator Series	Action	Spring Range	Hand-wheel	Positioners, I/P's & Limit Switches	x digit spec.	Air Filter Regulators	ASCO Solenoids	Special Options
<b>00</b> None	<b>O</b> None	<b>O</b> None	<b>O</b> None	<b>0000</b> None	<b>F</b> Full Range Signal, 3-15 PSI or 4-20mA (Factory Default)	<b>O</b> None	<b>O</b> None	<b>O</b> None
<b>DIAPHRAGMS:</b>	<b>R</b> Reverse Stem	<b>L</b> Low	<b>R</b> Reverse	<b>POSITIONERS:</b>	<b>L</b> Low of Split Range, 3-9 PSI or 4-12mA	<b>A</b> Type 300, 0-30 PSI	<b>120 Vac Coils:</b>	<b>S</b> Special Opts or Set-Up
<b>49</b> DL49 (49 Sq. In.)	<b>D</b> Direct Stem	4-10 psi 49R; 3-9 psi 49D; 84R/D, 115R/D	<b>D</b> Direct	<b>2xP</b> VAC V200 Pneumatic	<b>H</b> High of Split Range, 9-15 PSI or -20mA	<b>B</b> Type 300, 0-60 PSI	<b>A</b> 8320G184	<b>T</b> SS Tubing
<b>4X</b> DL49XR	Fail Up		<i>Note: Must match action.</i>	<b>2xl</b> VAC V200 ElectroPneu. Intrn. Safe	<b>V200/760 4th digit spec.</b>	<b>D</b> Type 350SS 0-100 PSI	<b>B</b> 8320G202	<b>G</b> SS Tagging
<b>84</b> DL84 (84 Sq. In.)		<b>F</b> Full		<b>2xX</b> VAC V200 ElectroPneu. Exp. Proof	<b>O</b> No Additions		<b>B</b> 8320G202	<b>B</b> SS Tubing and Tagging
<b>8X</b> DL84XR (84 Ext. Ring.)		5-14 psi 49R; 4-13 psi 49D; 3-15 psi 84R/D, 115R/D	<b>BKIT</b> <b>PKIT</b> <b>7KIT</b> WCI parts only positioner mounting kits.	<b>2xF</b> VAC V200 ElectroPneu. Fail Freeze	<b>L</b> w/Mech. Lmt Switch's		<b>L</b> EF8320G184	
<b>15</b> DL115 (115 Sq. In.)		<b>H</b> High		<b>76P</b> Siemens 760 Pneumatic	<b>w/4-20 Feedback</b>		<b>M</b> EF8320G202	
<b>5X</b> DL115XR		9-15 psi 84 & 115 10-14 psi 49R 8-12 psi 49D		<b>76E</b> Siemens 760 Electro-Pneumatic	<b>B</b> w/Switch's & Feedback		<b>3-Way EXP SS</b>	
		<b>X</b> Xtra-High DL49XR, DL84XR & DL115XR		<b>TOZO</b> VAC D400 4-20mA *	<i>NOTE: L,F,B not available for 2xl, 2xX.</i>		<b>24 Vdc Coils:</b>	
				<b>THN</b> VAC D400 4-20mA w/HART Intrn. Safe & Non-Incend *	<b>D400 4th digit spec.</b>		<b>Y</b> EF8320G184	
				<b>TPN</b> VAC D400 PROFIBUS PA Intrn. Safe & Non-Incend.	<b>Individual Options</b>		Explosion Proof 3-Way Brass	
				<b>TFN</b> VAC D400 FOUNDATION Fieldbus Intrn. Safe & Non-Incend.	<b>O</b> No Additions		<b>Z</b> 8320G184	
				<b>THX</b> VAC D400 4-20mA w/HART Exp. Proof *	<b>F</b> w/4-20 Feedback Module (4-20mA w/HART Models ONLY)		3-Way Brass	
				<b>TPX</b> VAC D400 PROFIBUS PA Exp. Proof	<b>K</b> w/Digital Position Feedback Module (4-20mA w/HART Models ONLY)		<b>4</b> EF8320G202	
				<b>TFX</b> VAC D400 FOUNDATION Fieldbus Exp. Proof	<b>L</b> w/24VDC/AC Micro-Switch's (Exp. Proof Models ONLY)		24VDC Coil	
				<b>PROXIMITY SWITCHES:</b>	<b>P</b> w/Proximity Switch's NC		3-Way EXP SS	
				<b>PX11</b> Mark 1 Series-2 ea. SPDT	<b>Option Combinations</b> (For 4-20mA w/HART Models ONLY)		<b>24 Vac Coils:</b>	
				<b>PX12</b> Mark 1 Series-2 ea. SPDT w/2k Pot.	<b>A = F &amp; K</b>		<b>3</b> 8320G184	
				<b>PX13</b> Mark 1 Series-2 ea. SPDT w/4-20 Feedback	<b>B = F &amp; L (Exp. Proof Mod. ONLY)</b>		24 Vac Coil	
				<b>PX14</b> Mark 1 Series-4 ea. SPDT	<b>C = F &amp; P</b>		3-Way Brass	
				<b>PX15</b> Mark 1 Series-6 ea. SPDT	<b>E = K &amp; L (Exp. Proof Mod. ONLY)</b>			
				<b>I/P's - Use with Diaphragm Only</b>	<b>G = K &amp; P</b>			
				<b>MAP1</b> Type 500X I/P, 3-9 PSI	<b>J = F &amp; K &amp; L (Exp. Proof Mod. ONLY)</b>			
				<b>MAP2</b> Type 500X I/P, 9-15 PSI	<b>M = F &amp; K &amp; P</b>			
				<b>MAP3</b> Type 500X I/P, 3-15 PSI	<i>See Actuators, Positioners, &amp; Accessories • Section of Product Specification for details.</i>			
				<b>MAP4</b> Type 500X I/P, 1-17 PSI				
				<b>MAP5</b> Type 500X I/P, 6-30 PSI				
				<b>MAP6</b> Type 550X I/P, 0-30 PSI				
				<b>MAP7</b> Type 550X I/P, 0-60 PSI-for 15 or 5X Only				
				<b>MAP9</b> Type 950X I/P, 3-15 EXP				

**FAILURE MODES:**

MODE	VALVE TYPE	ACTUATOR ACTION
Closed	20/22/23	Reverse
Open	20/22/23	Direct
Upper Closed*	30/32	Direct
Upper Open	30/32	Reverse

\*Standard

**ACTUATOR/BODY COMPATIBILITY:**

DIAPHRAGM	BODY
<b>49</b> 49 Sq.In. (DL49)	For 29N Bodies
<b>4X</b> DL49XR	For 29N Bodies
<b>84</b> 84 Sq.In. (DL84)	For 29N Bodies
<b>8X</b> DL84XR	For 29N Bodies
<b>15</b> 115 Sq.In. (DL115)	For 29I Bodies
<b>5X</b> DL115XR	For 29I Bodies

\* Available with Split Ranges, Select "S" in Special Options

‡ For positioner code 2xF\_, the VAC V200 Positioner with the Fail Freeze module, check first with the factory for approval due to space considerations on certain valve assembly combinations.

**Note:** Standard pneumatic tubing is copper. SS tubing "T" is optional.

SS tagging "G" (Two lines, 24 characters/line) is optional.

SS tubing and tagging together "B" is optional.

Warren Controls does not assume responsibility for the selection, use, or maintenance of any product. Responsibility for proper selection, use, and maintenance of any Warren Controls product remains solely with the purchaser and end-user.



<h2 style="text-align: center;">1800 SERIES</h2> <p style="text-align: center;">Heavy Globe Control Valves</p>	<h2 style="text-align: center;">2800 SERIES</h2> <p style="text-align: center;">Precision Globe Control Valves</p>	<h2 style="text-align: center;">2900</h2> <p style="text-align: center;">High Capacity General Purpose Globe Control Valves</p>	<h2 style="text-align: center;">3800</h2> <p style="text-align: center;">E-Ball Rotary Control Valves</p>	<h2 style="text-align: center;">5800 SERIES</h2> <p style="text-align: center;">Compact Globe Control Valves</p>
<p><b>styles:</b></p> <ul style="list-style-type: none"> <li>• 2-way balanced</li> <li>• 2-way unbalanced</li> <li>• 3-way mixing</li> <li>• 3-way diverting</li> </ul>	<p><b>styles:</b></p> <ul style="list-style-type: none"> <li>• 2-way unbalanced</li> <li>• 2-way low flow</li> <li>• 3-way mixing</li> <li>• 3-way diverting</li> </ul>	<p><b>styles:</b></p> <ul style="list-style-type: none"> <li>• 2-way balanced</li> <li>• 2-way unbalanced</li> <li>• 3-way mixing</li> <li>• 3-way diverting</li> </ul>	<p><b>styles:</b></p> <ul style="list-style-type: none"> <li>• 2-way rotary                             <ul style="list-style-type: none"> <li>- flow to open</li> <li>- flow to close</li> </ul> </li> </ul>	<p><b>styles:</b></p> <ul style="list-style-type: none"> <li>• 2-way unbalanced cage retained seat</li> <li>• 2-way low flow unbalanced cage retained seat</li> <li>• 2-way cage balanced cage retained seat</li> </ul>
<p><b>sizes</b> 1/2 to 12 in.  <b>class</b> 250 &amp; 300  <b>ends</b> 125 FF, 150, 250, 300 RF flg  <b>body</b> Cast Iron, WCB, CF8M, Bronze (ASTM B61)  <b>trim</b> 316 SST, Alloy 6  <b>Cv</b> up to 1649  <b>temp.</b> -20° to 800°F  <b>body limit</b> to 740 psi  <b>leakage rates</b> class III, IV, IV+  <b>rangeability</b> 50:1</p> <ul style="list-style-type: none"> <li>• Heavy Duty</li> <li>• Severe Service</li> <li>• High Pressure Differentials</li> <li>• Corrosive Materials, Liquids, Gases &amp; Steam</li> <li>• Modulating or On/Off Control</li> </ul>	<p><b>sizes</b> 1/2 to 2 in.  <b>class</b> 250 &amp; 300  <b>ends</b> Buttweld, NPT  <b>body</b> Bronze, CF8M  <b>trim</b> Bronze, 316 SST, 17-4pH, Alloy 6, TFE, PEEK  <b>Cv</b> up to 40  <b>temp.</b> -20° to 500°F  <b>body limit</b> to 720 psi  <b>leakage rates</b> class III, IV, VI  <b>rangeability</b> 50:1</p> <ul style="list-style-type: none"> <li>• Economical</li> <li>• Precision Control</li> <li>• Suited for Gases, Steam, or Liquids that are not Viscous or Solids Bearing</li> </ul>	<p><b>sizes</b> 2-1/2 to 10 in.  <b>class</b> 125 &amp; 250  <b>ends</b> 125 FF, 250 RF flg  <b>body</b> Cast Iron  <b>trim</b> Bronze, 300 SS, 17-4pH, Alloy 6  <b>Cv</b> up to 960  <b>temp.</b> -20° to 400°F  <b>body limit</b> to 400 psi  <b>leakage rates</b> class II, III, IV  <b>rangeability</b> 50:1</p> <ul style="list-style-type: none"> <li>• High Capacity</li> <li>• General Purpose</li> <li>• Moderate Pressure Drops</li> <li>• Compatible Liquids and Gas, Steam &amp; Water</li> <li>• Modulating or On/Off Control</li> </ul>	<p><b>sizes</b> 1 to 8 in.  <b>class</b> 300  <b>ends</b> 150,300 RF flg  <b>body</b> WCB, CF8M, Custom Alloys  <b>trim</b> 316 SST, Alloy 6, Ceramic, TFE, PEEK  <b>Cv</b> up to 1420  <b>temp.</b> -20° to 800°F  <b>body limit</b> to 740 psi  <b>leakage rates</b> class IV, IV+, VI  <b>rangeability</b> 100:1</p> <ul style="list-style-type: none"> <li>• Eccentric, Segmented Ball</li> <li>• Well Suited for Erosive Service</li> <li>• Various Trim Options Include Ceramic for Slurries or Gritty Materials &amp; Teflon® for Class VI Shutoff</li> </ul>	<p><b>sizes</b> 1/2 to 4 in.  <b>class</b> 300  <b>ends</b> 150,300 RF flg, Socketweld, NPT  <b>body</b> WCB, CF8M, Bronze (ASTM B61)  <b>trim</b> 316 SST, 400 SST, Alloy 6, TFE, PEEK  <b>Cv</b> up to 170  <b>temp.</b> -20° to 800°F  <b>body limit</b> to 740 psi  <b>leakage rates</b> class IV, IV+, VI  <b>rangeability</b> 50:1</p> <ul style="list-style-type: none"> <li>• Highly Efficient, Compact Design</li> <li>• High Pressure Drops</li> <li>• Typically Suited for High Force Piston Actuators for Steam, Chemicals &amp; Dirty Fluids</li> </ul>

# 2900 PRODUCT SPECIFICATION