

PRODUCT SPECIFICATION

March 2005

PNEUMATIC ACTUATED INDUSTRIAL VALVES

SERIES: 2900 SIZES 2-1/2 to 10 INCHES

High Capacity, General Purpose, Globe Control Valves



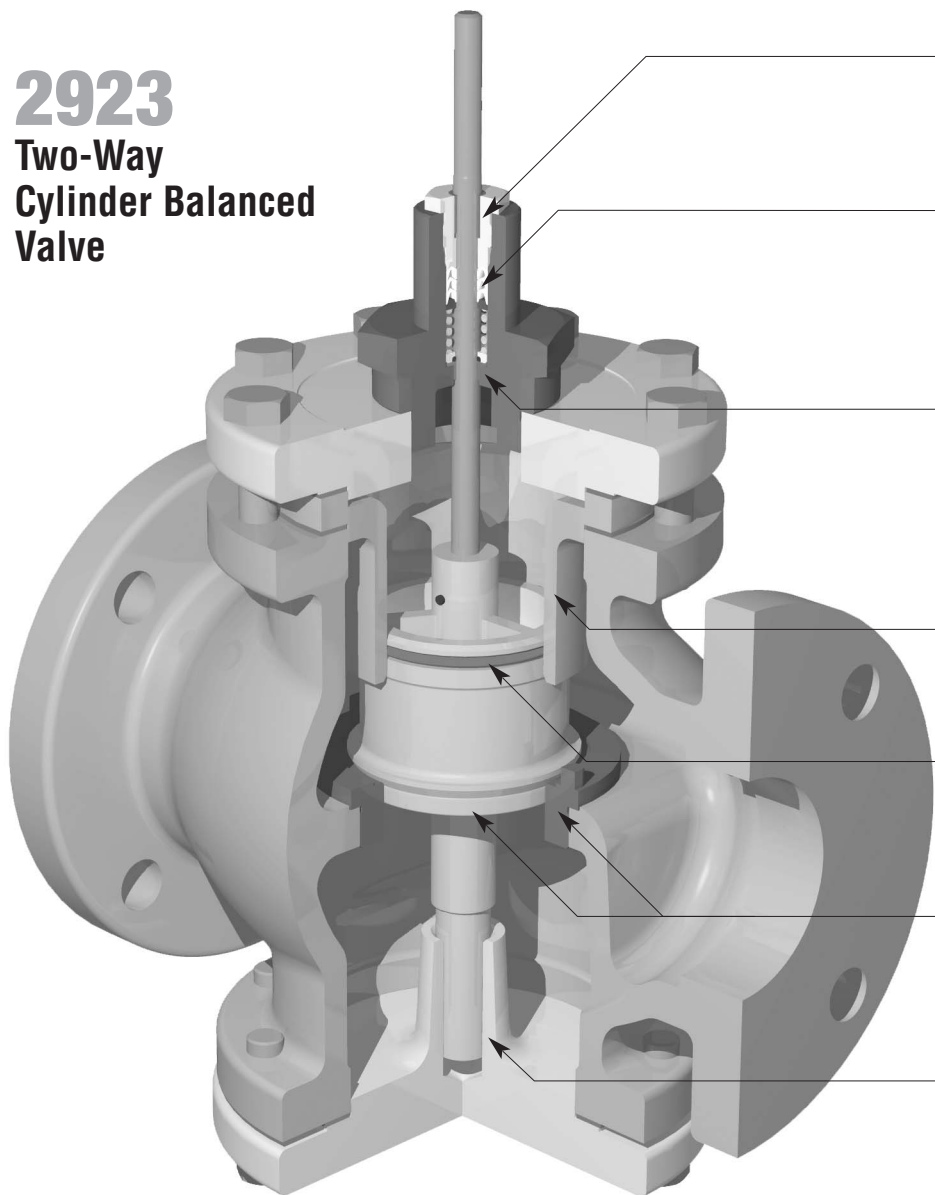
WARREN CONTROLS

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

Table of Contents

Body Style Versus Application	3
Body Pressure-Temperature Rating	3
Flowing Differential Pressure Limits	3
Flow Coefficients (Cv) Versus Travel	4
Sizing Reference and Load Sizing Calculations	5
Shut-Off ΔP and Cv Ratings	6-10
Dimensions and Weights	11-12
Actuators, Positioners, and Accessories	13-15
Factory Default Settings	16
Configurations	17-18

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 shut off.

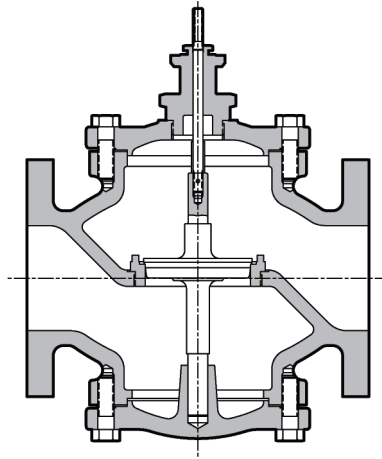
Bottom Post Guide

for additional stability, allowing higher pressure drop.

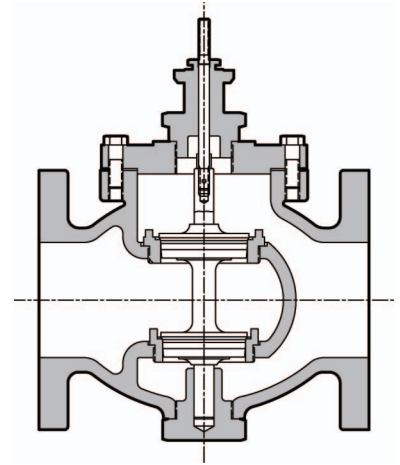


SERIES: 2900

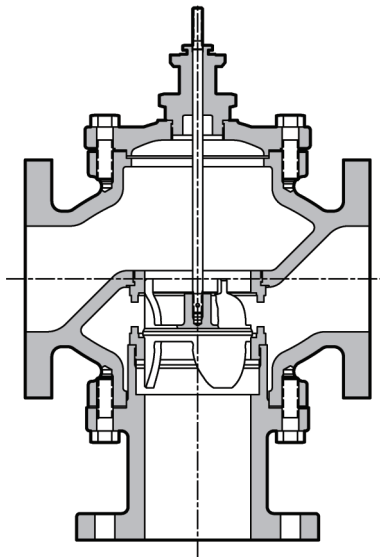
*High Capacity
General Purpose Globe
Control Valves*



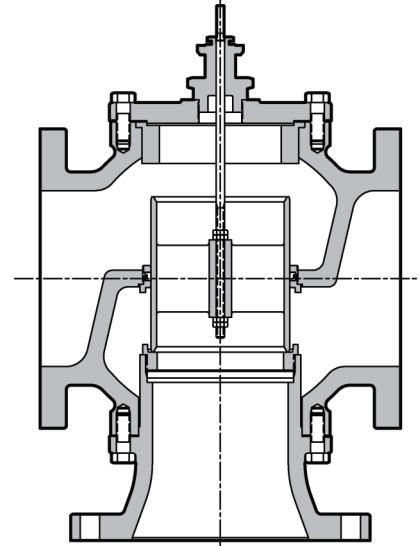
2920
Two-Way Single Seat
Unbalanced Valve



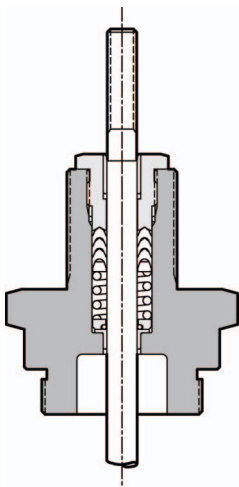
2922
Two-Way Double Seat
Balanced Valve



2930
Three-Way
Mixing Valve



2932
Three-Way Diverting/Mixing
Valve



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

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 Two-Way Single Seat Unbalanced Valve

The most commonly applied solution for sizes 3" and under with ANSI Class IV shut-off.

Sizes:	2-1/2, 3, 4, 5, 6, 8, 10 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	EQ%, Bronze (2-1/2 thru 6), 300 Series Stainless Steel (2-1/2 thru 10), or 17-4 PH Hardened Stainless Steel (2-1/2 thru 6)
Packing:	Guided Low-Friction TFE V-Ring, Spring Loaded
Temperature:	+32 to 350°F (125 FLG) +32 to 400°F (250 FLG)
Rangeability:	50:1



2922 Two-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 shut-off.

Sizes:	2-1/2, 3, 4, 5, 6, 8, 10 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	EQ%, Bronze or 300 Series Stainless Steel
Packing:	Guided Low-Friction TFE V-Ring, Spring Loaded
Temperature:	+32 to 350°F (125 FLG) +32 to 400°F (250 FLG)
Rangeability:	50:1



2923 Two-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 shut-off. It is limited to cleaner fluids.

Sizes:	2-1/2, 3, 4, 5, 6 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	EQ%, Bronze, 300 Series Stainless Steel, 17-4 PH Hardened Stainless Steel, or Alloy 6.
Packing:	Guided Low-Friction TFE V-Ring, Spring Loaded
O-Ring:	EPDM (BRZ) Fluoraz 797 (300 SSTrim, 17-4 pH or Alloy 6 Trim)
Temperature:	+32 to 300°F (BRZ) +32 to 350°F (125 FLG w/ 300 SSTrim, 17-4 PH or Alloy 6 Trim) +32 to 400°F (250 FLG w/ 300 SSTrim, 17-4 PH or Alloy 6 Trim)
Rangeability:	50:1

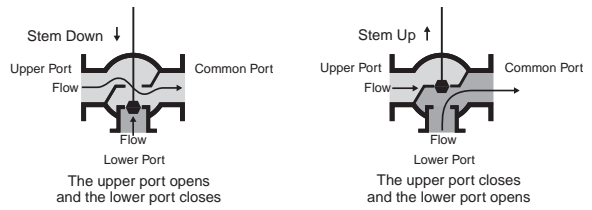


3-Way Valves (Control of Liquids)

2930 Three-Way Mixing Valve

This valve has two inlets and one outlet, and is the simplest solution for mixing or bypass applications with ANSI Class IV shut-off. 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.

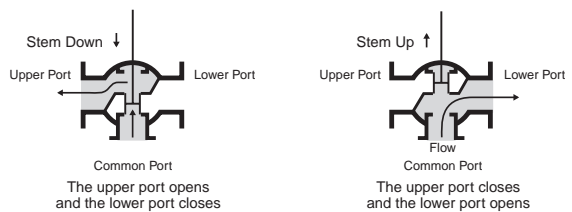
Sizes:	2-1/2, 3, 4, 5, 6, 8 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	Linear, Bronze (2-1/2 thru 6) or 300 Series Stainless Steel (2-1/2 thru 8)
Packing:	Guided Low-Friction TFE V-Ring, Spring Loaded
Temperature:	+32 to 350°F (125 FLG) +32 to 400°F (250 FLG)
Rangeability:	50:1



2932 Three-Way Diverting/Mixing Valve

Designed as a diverting valve with one inlet and two outlets with ANSI Class II shutoff. 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.

Sizes:	2-1/2, 3, 4, 5, 6, 8 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	Linear, Bronze or 300 Series Stainless Steel
Packing:	Guided Low-Friction TFE V-Ring, Spring Loaded
O-Ring:	EPR
Temperature:	+32 to 300°F (2-1/2 through 6) +32 to 150°F (6 & 8)
Rangeability:	50:1



Body Pressure-Temperature Ratings:

Temperature (F)	125 FLG	250 FLG
+32° 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

Pressure ratings are PSIG
For applications below 32° consult factory

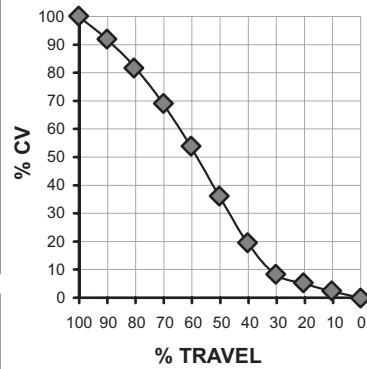
Trim Materials	Flowing Differential Pressure Limit
Bronze	50 PSID
300 Series Stainless Steel	100 PSID
17-4 pH Hardened Steel	200 PSID
Alloy 6	300 PSID

Flow Coefficients (Cv) Versus Travel

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

Valve		2920 Flow Coefficients (Cv) Two-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
3	EQ%	90.0	83.6	75.1	63.8	49.2	31.6	12.9	4.75	3.37	1.99
4	EQ%	170	159	143	122	95.1	62.9	31.3	15.6	9.89	4.11
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
8	EQ%	450	386	318	250	186	130	81.9	44.6	18.3	2.92
10	EQ%	650	556	457	359	267	186	117	64.1	26.5	4.87

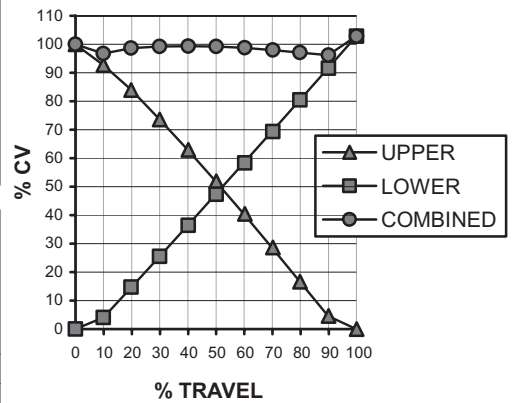
2-WAY VALVE
TYPICAL FLOW CURVE



Valve		2922 Flow Coefficients (Cv) Two-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	886	796	689	574	474	383	285	181	72.3

Valve		2923 Flow Coefficients (Cv) Two-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
3	EQ%	90.0	83.6	75.1	63.8	49.2	31.6	12.9	4.75	3.37	1.99
4	EQ%	170	159	143	122	95.1	62.9	31.3	15.6	9.89	4.11
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

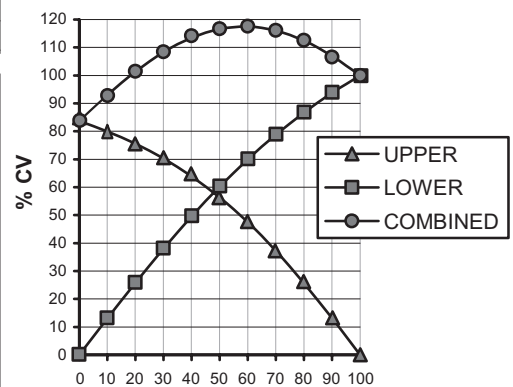
2930
TYPICAL FLOW CURVE



3-Way Valves (Control of Liquids)

Valve		2930 Flow Coefficients (Cv) Three-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	450		

2932
TYPICAL FLOW CURVE



Valve		2932 Flow Coefficients (Cv) Three-Way Diverting/Mixing Valve		
Valve Size (IN)	Trim Style	Travel 100%		
		Upper	Lower	
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	

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_{fg} = 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

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

Heating or Cooling Water

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

Heating Oil with Steam

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

Heating Air with Water

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

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

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

General Liquid Heating

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

Heating Air with Steam

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

Shut-Off ΔP and Cv Ratings

Valve			Actuator		Shut-Off ΔP Two-Way Single Seat Unbalanced 2920								
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	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	
			DL84	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	
				High	63	97	114	N/A	N/A	N/A	217	N/A	
			DL84XR	Xtra-High	114	148	165	N/A	N/A	N/A	N/A	N/A	
				DL115	Low	N/A	5	28	28	98	145	400	400
					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	N/A	
				3	90	3/4	DL49	Low	N/A	N/A	N/A	N/A	10
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	
DL84	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				
	High	39	63	75	N/A	N/A	N/A	146	N/A				
DL84XR	Xtra-High	75	99	110	N/A	N/A	N/A	N/A	N/A				
	DL115	Low	N/A	N/A	15	15	64	96	308	400			
		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	N/A				
	4	170	1 1/4	DL84	Low	N/A	N/A	N/A	N/A	17	30	117	N/A
					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	N/A
					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	N/A
					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				
	8	450	2	DL115	Low	N/A	N/A	N/A	N/A	9	16	67	106
					Full	N/A	N/A	N/A	N/A	N/A	N/A	44	83
High					9	16	20	20	N/A	N/A	44	83	
DL115XR	Xtra-High	N/A	N/A	44	44	N/A	N/A	N/A	N/A				
	10	650	2 1/2	DL115	Low	N/A	N/A	N/A	N/A	3	7	37	60
					Full	N/A	N/A	N/A	N/A	N/A	N/A	23	46
High					3	7	10	10	N/A	N/A	23	46	
DL115XR	Xtra-High	N/A	N/A	20	20	N/A	N/A	N/A	N/A				

NOTES:

- 1) 2920 Seat closure ANSI Class IV.
- 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 & 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.

Shut-Off ΔP and Cv Ratings

NOTES:

1) 2922 Seat closure 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.

Valve			Actuator		Shut-Off ΔP Two-Way Double Seat Balanced 2922							
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	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	400		
				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 ΔP and Cv Ratings

Valve			Actuator		Shut-Off ΔP Two-Way Cylinder Balanced 2923							
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	42	400	N/A
				High	206	370	400	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
				High	400	400	400	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
			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
				High	353	400	400	N/A	N/A	N/A	400	N/A
4	170	1 1/4	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 1/2	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 1/2	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

NOTES:

- 1) 2923 Seat closure ANSI Class IV.
- 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
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.

Shut-Off ΔP and Cv Ratings

NOTES:

1) 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.

2) 2930 Seat closure ANSI Class IV.

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 & 84XR...30PSIG
DL115 & 115XR...40PSIG

6) Do Not Use DL115 OR 115XR Actuators on Valves With Bronze Trim.

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

Valve			Actuator		Shut-Off ΔP Three-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	114	148	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			
			DL115XR	High	98	145	169	169	N/A	N/A	293	400				
				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	75	99				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			
DL115XR	High	64	96				113	113	N/A	N/A	199	362				
	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	450	2 1/2"	DL115	Low	N/A	N/A	N/A	N/A	6	14	64	103
								Full	N/A	N/A	N/A	N/A	N/A	N/A	41	80
High								9	16	20	20	N/A	N/A	41	80	
DL115XR							Xtra-High	N/A	N/A	38	38	N/A	N/A	14	53	

Shut-Off ΔP and Cv Ratings

Valve			Actuator		Shut-Off ΔP Three-Way Diverting/Mixing 2932								
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	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	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	1-1/5"	DL115	HIGH	99	101	104	104	N/A	N/A	106	108	

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 Seat closure 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.

Dimensions & Weights

Component 2920		Dimension (IN) by Valve Size (IN)						
Variable		2-1/2	3	4	5	6	8	10
A	125FLG	9	10	13	15-3/4	17-3/4	16-1/4	20
	250FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8	16-1/4	21-3/8
B		4-3/4	5-3/8	6-3/8	7-3/8	8	8-7/8	9-7/8
C	DL49 Direct*	17-5/8	18-1/2	N/A	N/A	N/A	N/A	N/A
	DL49 Reverse	17	17-7/8	N/A	N/A	N/A	N/A	N/A
	DL84 Direct*	21-5/8	22-1/2	23-1/2	24-1/8	24-3/4	N/A	N/A
	DL84 or 84XR Reverse	21	21-7/8	22-7/8	23-1/2	24-1/8	N/A	N/A
	DL115 or 115XR Direct*	34	34-7/8	35-7/8	36-1/2	37-1/8	38-3/8	39-1/8
	DL115 or 115XR Reverse	CF	CF	CF	CF	CF	CF	CF
H	DL49	4-1/4	5	N/A	N/A	N/A	N/A	N/A
W/760	DL84 or 84XR	6	6-7/8	7-7/8	8-1/2	9	N/A	N/A
	DL115 or 115XR Direct	11-1/8	11-7/8	13	13-5/8	14-1/4	15-1/2	16
	DL115 or 115XR Reverse	CF	CF	CF	CF	CF	CF	CF
Item		Weight (LB) by Valve Size (IN)						
Variable		2-1/2	3	4	5	6	8	10
125FLG		55	72	119	134	175	270	417
250FLG		64	77	131	166	233	360	510

Component 2923		Dimension (IN) by Valve Size (IN)				
Variable		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	6-7/8	7-7/8	8-1/2
C	DL49 Direct*	18-1/8	19	N/A	N/A	N/A
	DL49 Reverse	17-1/2	18-3/8	N/A	N/A	N/A
	DL84 Direct*	22-1/8	23	24-1/8	24-5/8	25-1/4
	DL84 Reverse	21-1/2	22-3/8	23-1/2	24	24-5/8
	DL115 or 115XR Direct*	N/A	N/A	36-1/2	37	37-5/8
	DL115 or 115XR Reverse	N/A	N/A	CF	CF	CF
H	DL49	4-3/4	5-1/2	N/A	N/A	N/A
W/760	DL84	6-1/2	7-3/8	8-1/2	9	9-5/8
	DL115 or 115XR Direct	N/A	N/A	13-1/2	14-1/8	14-3/4
	DL115 or 115XR Reverse	N/A	N/A	CF	CF	CF
Item		Weight (LB) by Valve Size (IN)				
Variable		2-1/2	3	4	5	6
125FLG		57	75	127	149	197
250FLG		66	80	139	181	256

Component 2922		Dimension (IN) by Valve Size (IN)						
Variable		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	9-7/8
C	DL49 Direct*	17-1/4	17-1/2	19	N/A	N/A	N/A	N/A
	DL49 Reverse	16-5/8	16-7/8	18-3/8	N/A	N/A	N/A	N/A
	DL84 Direct*	21-1/4	21-1/2	23	24	24-7/8	26	26-3/4
	DL84 Reverse	20-5/8	20-7/8	22-3/8	23-3/8	24-1/4	25-3/8	26-1/8
H	DL49	3-3/8	4	5-5/8	N/A	N/A	N/A	N/A
W/760	DL84	5-5/8	5-7/8	7-3/8	8-3/8	9-1/4	10-3/8	10-7/8
Item		Weight (LB) by Valve Size (IN)						
Variable		2-1/2	3	4	5	6	8	10
125FLG		32	42	77	124	169	290	435
250FLG		42	54	96	162	220	380	540

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

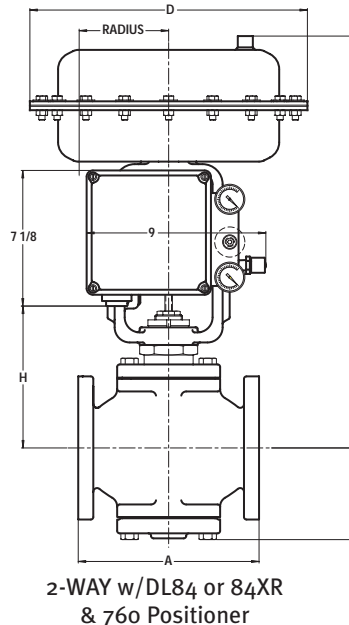
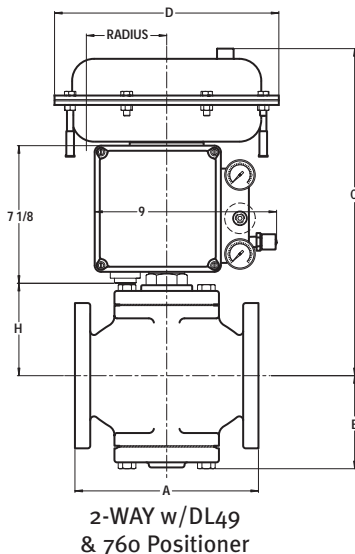
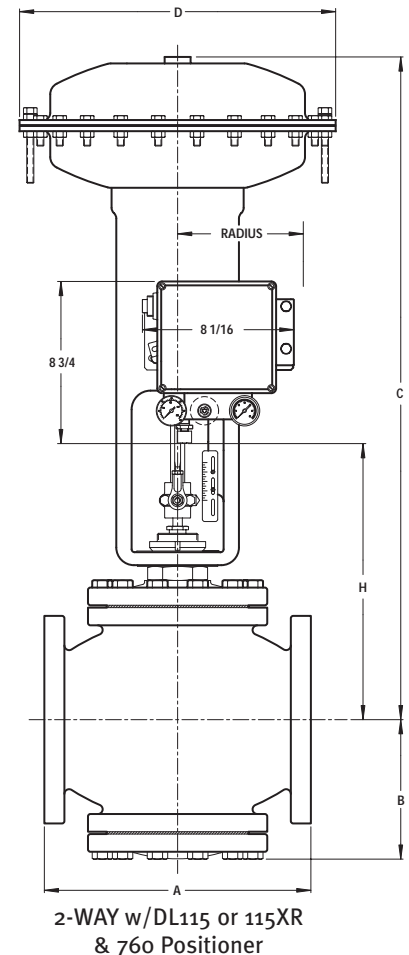
RADIUS is from centerline of actuator to outside edge of positioner.

Positioner Removal Clearance

Allow 3-1/4 Inch beyond 760 for cover removal/service.

* Includes 1-3/8 inch for air fitting
 H = Centerline of pipe to bottom of positioner
 CF = Consult factory
 N/A = Not Available

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



Component 2930		Dimension (IN) by Valve Size (IN)					
Variable		2-1/2	3	4	5	6	8
A	125FLG	9	10	13	15-3/4	17-3/4	16-1/4
	250FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8	16-1/4
B	125FLG	7-1/8	8	9-7/8	9-1/4	9-7/8	11-7/8
	250FLG	7-3/8	8-3/8	10-1/4	10-3/8	11	12-3/8
C	DL49 Direct*	17-5/8	18-1/2	N/A	N/A	N/A	N/A
	DL84 or 84XR Direct*	21-5/8	22-1/2	23-1/2	22-3/8	23-1/8	N/A
	DL115 or 115XR Direct*	34	34-7/8	35-7/8	34-3/4	35-1/2	38-3/8
H	DL49	4-1/4	5	N/A	N/A	N/A	N/A
	W/760 DL84 or 84XR	6	6-7/8	7-7/8	6-3/4	7-1/2	N/A
	DL115 or 115XR Direct	11-1/8	11-7/8	13	11-7/8	12-5/8	15-1/2
Item		Weight (LB) by Valve Size (IN)					
Variable		2-1/2	3	4	5	6	8
125FLG		64	83	139	157	202	306
250FLG		73	94	157	211	283	398

Component 2932		Dimension (IN) by Valve Size (IN)					
Variable		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	7-1/8	8	9-7/8	10-1/2	11-1/8	11-7/8
	250FLG	7-3/8	8-3/8	10-1/4	11	11-1/2	12-3/8
C	DL49 Direct*	17-5/8	18-1/2	19-1/4	N/A	N/A	N/A
	DL84 or 84XR Direct*	21-5/8	22-1/2	23-1/4	23-7/8	N/A	N/A
	DL115 or 115XR Direct*	N/A	N/A	35-5/8	36-1/4	36-7/8	38
H	DL49	4-1/4	5	5-7/8	N/A	N/A	N/A
	W/760 DL84 or 84XR	6	6-7/8	7-7/8	8-1/4	8-7/8	10
	DL115 or 115XR Direct	N/A	N/A	12-3/4	13-5/8	14	15
Item		Weight (LB) by Valve Size (IN)					
Variable		2-1/2	3	4	5	6	8
125FLG		59	78	140	154	203	316
250FLG		73	94	166	215	284	407

* Includes 1-3/8 inch for air fitting
H = Centerline of pipe to bottom of positioner
CF = Consult factory
N/A = Not Available

Actuator		Dimension (IN)
D	DL49	11
	DL84 or 84XR	13-7/8
	DL115 or 115XR	16-3/4
RADIUS	DL49	7-7/8
	DL84 or 84XR	8-1/8
	DL115 or 115XR Direct	10-5/8
	DL115 or 115XR Reverse	CF
Actuator		Weight (LB)
DL49		24-1/2
DL84 or 84XR		48-1/2
DL115 Direct		84
DL115XR Direct		92
DL115 Reverse		CF
DL115XR Reverse		CF
Positioner		Weight (LB)
760		10

Actuator Removal Clearance

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

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

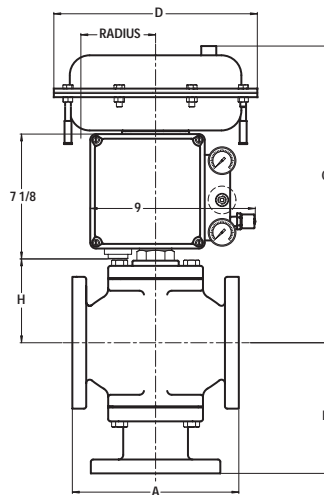
Actual shipping weights may vary.

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

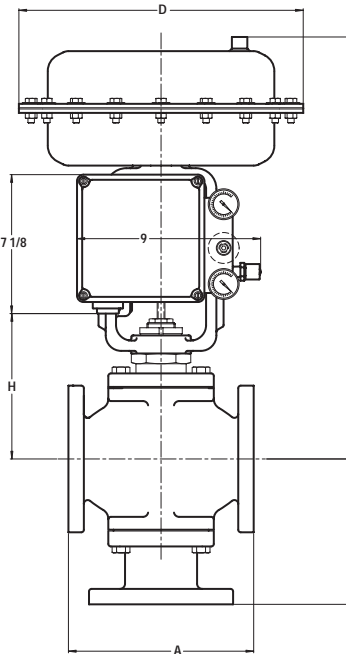
RADIUS is from centerline of actuator to outside edge of positioner.

Positioner Removal Clearance

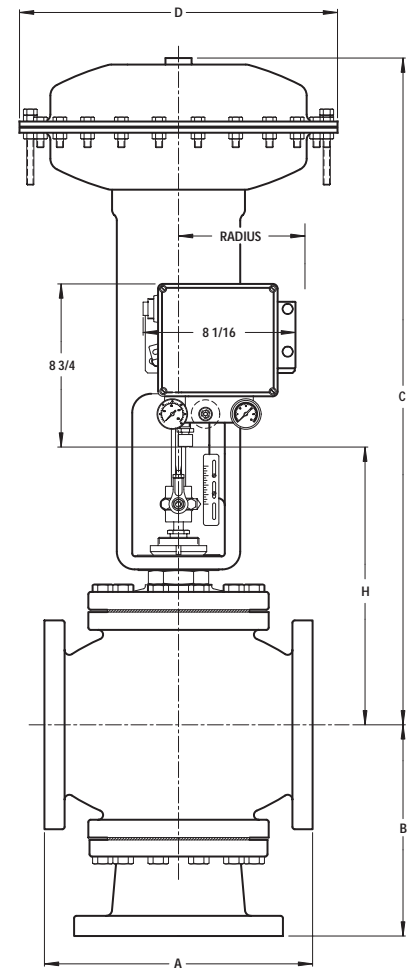
Allow 3-1/4 Inch beyond 760 for cover removal/service.



3-WAY w/ DL49 & 760 Positioner



3-WAY w/ DL84 or 84XR & 760 Positioner



3-WAY w/ DL115 or 115XR & 760 Positioner

Actuators, Positioners, & Accessories

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
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 (49 Sq In), DL84 & 84XR (84 Sq In)
DL115 & 115XR (115 Sq In)

Springs: DL49, 84 & 84XR Multiple
DL115 & 115XR Single

Max Air Supply: DL49, 84 & 84XR 30PSIG
DL115 & 115XR 40PSIG

Air Connections: 1/4 NPT

Diaphragm: Buna-N Fabric Reinforced

Diaphragm Chambers: Steel

Yoke: DL49, 84 & 84XR Ductile Iron
DL115 & 115XR Aluminum

Stem: 300 Series Stainless Steel

Finish: DL49 Epoxy-Coated
DL84, 84XR, 115, & 115XR Acrylic Enamel

Ambient Temperature: DL49 -20 to 160°F
DL84, 84XR, 115 & 115XR -40 to 180°F

Mounting: Vertical Above or Below Valve

Handwheel: Available on DL84, 84XR, 115 & 115XR
Not Available on DL49

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.

BLX Models:



BLX Pneumatic

Models: BFP_: Full Range Signal (3-15 PSIG)
BLP_: Low Range Signal (3-9 PSIG)
BHP_: High Range Signal (9-15 PSIG)

Options 2SPDT Limit Switches, 4-20 mA Feedback

Ingress & Corrosion Protection: NEMA 4X, IP66

Supply Pressure: Pneumatic 145 PSIG Max **Not to exceed actuator rating**

Air Consumption: 0.19 SCFM at 30 PSIG, 0.25 SCFM at 40 PSIG

BLX Electro-Pneumatic

Models: BFE_: Full Range Signal (4-20 mA)
BLE_: Low Range Signal (4-12 mA)
BHE_: High Range Signal (12-20 mA)

Options 2SPDT Limit Switches, 4-20 mA Feedback

Ingress & Corrosion Protection: NEMA 4X, IP66

Supply Pressure: 21.8 to 145 PSIG **Not to exceed actuator rating**

Air Consumption: 0.21 SCFM at 30 PSIG, 0.28 SCFM at 40 PSIG

BLX Electro-Pneumatic Intrinsically Safe

Models: BFI_: Full Range Signal (4-20 mA)
BLI_: Low Range Signal (4-12 mA)
BHI_: High Range Signal (12-20 mA)

Options 2SPDT Limit Switches, 4-20 mA Feedback

Ingress & Corrosion Protection: NEMA 4X, IP66

Approvals & Ratings:

EM Intrinsically Safe: Class I III, Div 1, Groups A,B,C,D,E,F,G.

CSA Intrinsically Safe: Class I, Div 1, Groups A, B, C, D.
Class II, Div 1, Groups E, F, G.
Class III.
Class I, Div 2, Groups A, B, C, D.
Class II, Div 2, Groups E, F, G.

Supply Pressure: 30 to 145 PSIG **Not to exceed actuator rating**

Air Consumption: 0.21 SCFM at 30 PSIG, 0.28 SCFM at 40 PSIG

Positioners (Continued)

BLX Electro-Pneumatic Explosion Proof

Models: BFX_: Full Range Signal (4-20 mA)
 BLX_: Low Range Signal (4-12 mA)
 BHX_: High Range Signal (12-20 mA)

Options 2SPDT Limit Switches, 4-20 mA Feedback

Ingress & Corrosion Protection: NEMA 4X, IP66

Approvals & Ratings:

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

Non-Incendive: Class I, Div 2, Groups A,B,C.

Explosion Proof: Class I, Div 1, Groups B,C,D.
 Class I II III, Div 1, Groups E,F,G.

CSA Intrinsically Safe: Class I, Div 1, Groups A,B,C,D.

Class II, Div 1, Groups E,F,G.

Class III.

Class I, Div 2, Groups A,B,C,D.

Class II, Div 2, Groups E,F,G.

Explosion Proof: Class I, Div 1, Groups B,C,D.

Class II, Div 1, Groups E,F,G.

Supply Pressure: 30 to 145 PSIG **Not to exceed actuator rating**

Air Consumption: 0.21 SCFM at 30 PSIG, 0.28 SCFM at 40 PSIG

BLX Electro-Pneumatic Fail Freeze

Models: BFF_: Full Range Signal (4-20 mA)
 BLF_: Low Range Signal (4-12 mA)
 BHF_: 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 Max **Not to exceed actuator rating**

Air Consumption: 0.21 SCFM at 30 PSIG, 0.28 SCFM at 40 PSIG

All Models:

Construction: Aluminum Housing with Polyester Powder Coat

Action: Direct or Reverse

Media: Clean Dry Oil Free Air Filtered to 5 micron

Air Connections: 1/4 NPT

Flow Capacity: 9.8 SCFM at 30 PSIG, 13.1 SCFM at 40 PSIG

Electrical Connection: 1/2 NPT

Gauges: Input 0-30 PSIG, Output 0-60 PSIG, Supply 0-60 PSIG,
 Housing Black Steel Case with Chrome Ring

Ambient Temperature: -40 to 185°F (Except Fail Freeze -4 to 158°F)

Mounting: Yoke Mounted

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

Moore 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.

760E Electro-Pneumatic (Continued)

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.

All Models:

Construction: Aluminum Housing with Epoxy/Polyester Powder Coat

Ingress & Corrosion

Protection: NEMA 4, 4X, IP66

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

Westlock ICot Models:



Electro-Pneumatic

Models: 510_: Full Range Signal (4-20 mA)

Options 2SPDT Limit Switches

Intelligent with Keypad

Models: 520_: Full Range Signal (4-20 mA)

Calibration 3 Button Keypad

Options 2SPDT Limit Switches, 4-20 mA Feedback

Intelligent with HART

Models: 530_: Full Range Signal (4-20 mA)

Calibration 3 Button Keypad & HART

Options 2SPDT Limit Switches, 4-20 mA Feedback

Intelligent with Foundation Fieldbus

Models: 540_: Full Range Signal (4-20 mA)

Calibration 3 Button Keypad & Foundation Fieldbus

Options 2SPDT Limit Switches, 4-20 mA Feedback

All Models:

Construction: Engineered Resin Housing

Ingress & Corrosion

Protection: NEMA 4, 4X

Approvals & Ratings: Non-Incendive Groups A-G, Div 2

Action: Direct or Reverse

Supply Pressure: 15 to 45 PSIG **Not to exceed actuator rating**

Media: Clean Dry Oil Free Air Filtered to 40 micron

Flow Capacity: 8.0 SCFM at 25 PSIG

Air Consumption: 0.003 SCFM at 20 PSIG

Air Connections: 1/4 NPT

Electrical Connection: 1/2 NPT

Gauges: Supply 0-60 PSIG, Output 0-60 PSIG,
 Housing Black Steel Case with Chrome Ring

Ambient Temperature: -40 to 180°F

Mounting: Yoke Mounted

Actuators, Positioners, & Accessories

Position Indication Switches

Proximity Mark 1



Models: 2 SPDT Switches
4 SPDT Switches
6 SPDT Switches
2 SPDT Switches w/ 2K Potentiometer
2 SPDT Switches w/ 4-20 mA Feedback

Construction: Aluminum Housing, Hard Anodized

Locations: NEMA 1, 2, 3, 3R, 3S

Ambient Temperature: -40 to 180°F

Electrical Connection: 3/4 NPT, Terminal Strip

Mounting: Yoke Mounted

I/P's

Type 500X



Locations: NEMA 3

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, 12 SCFM at 100 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, or 0-60 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 (Continued)

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 or 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, 40 micron. Type 350SS, 25 micron

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

Supply: 120VAC

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	Increasing Signal	Loss of Signal ¹ Valve Fails...	Loss of Supply Valve Fails...
2920, 22 & 23	Direct	3-15 PSI	4-20 mA	Closes Valve	Open	Open
	Reverse	3-15 PSI	4-20 mA	Opens Valve	Closed	Closed
2930 & 32	Direct	3-15 PSI	4-20 mA	Closes Lower Port/ Opens Upper Port	Upper Port Closed/ Lower Port Open	Upper Port Closed/ Lower Port Open

¹ Valves with Fail Freeze Positioners Fail in Last Position on Loss of Signal.

Positioner Feedback

Valve Type	Actuator Action	Feedback Signal ²	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

² Reduced feedback span for valves with 760 and less than 1 inch travel.

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

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	Upper Port Closed/ Lower Port Open	Upper Port Closed/ Lower Port Open	Upper Port Closed/ Lower Port Open

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 ³	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

³ 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

Air Filter Regulators

Actuator	Output Pressure
DL49, 84 & 84XR	30PSIG
DL115 & 115XR	40PSIG

Configurations

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

29 - **R**

2. OPTIONS

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 300 3 inch	R Cast Iron	F 125 lb. Flanged G 250 lb. Flanged	E Equal % <i>Types 20/22/23</i> L Linear <i>Types 30/32</i>	B Bronze S 300 SS H 17-4 PH 6 Alloy 6 Wrapped	F Full Port	T Teflon G Graphite <i>Graphite Packing Used for Temp up to 500F where Body Pressure/Temp is not Violated!</i>
291 115" Pneumatic	22 2-Way Double Seated 23 2-Way Cylinder Bal. 30 3-Way Mixing 32 3-Way Diverting	400 4 inch 500 5 inch 600 6 inch 800 8 inch 010 10 inch						

NOTE: Valve Type 22 is Only Used with 29N Body & DL49/DL84 Actuators.

VALVE TYPE / TRIM MATERIAL COMBINATIONS:

SIZE	TRIM MATERIAL			
	B Bronze	S 300SS	H 17-4 PH	6 Alloy 6 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, 30, 32	N/A	N/A
010 10 inch	22	20, 22	N/A	N/A

VALVE TYPE / ACTUATOR COMPATIBILITY:

VALVE STYLE	VALVE SIZES	ACTUATORS
Type 20	2-1/2" & 3"	DL49 & DL84XR
Type 20	2-1/2" - 6"	DL84
Type 20	2-1/2" - 10"	DL115 & DL115XR
Type 22	2-1/2" - 4"	DL49 & DL84
Type 22	5" - 10"	DL84
Type 23	2-1/2" & 3"	DL49
Type 23	2-1/2" - 6"	DL84
Type 23	4" - 6"	DL115
Type 23	6"	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

ACTUATOR				ACCESSORIES				
Actuator Series	Action	Spring Range	Handwheel	Positioners, I/P's & Limit Switches	Air Filter Regulators	ASCO Solenoids	Special Options	

00 None DIAPHRAGMS:	O None R Reverse	O None L Low 4-10psi 49R ; 3-9psi 49D, 84R/D, 115R/D	O None R Reverse D Direct <i>NOTE : DL84; DL115; DL84XR & DL115XR only - Must match action.</i>
49 DL49 (49 Sq.In.)	Stem Fail Down		
84 DL84 (84 Sq.In.)	D Direct Stem Fail Up	F Full 5-14psi 49R ; 4-13psi 49D; 3-15psi 84R/D, 115R/D	
8X DL84XR (84 Ext. Rng.)		H High 9-15 psi 84; 115 10-14 psi 49R 8-12 psi 49D	
15 DL115 (115 Sq.In.)		X Xtra-High DL84XR & DL115XR	
5X DL115XR <i>NOTE : 5X & 8X Only in Xtra-High Spring Range, Reverse Acting</i>			

FAILURE MODES:

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

*Standard

ACTUATOR / BODY COMPATIBILITY:

DIAPHRAGM	BODY
49 49 Sq.In. (DL49)	For 29N Bodies
84 84 Sq.In. (DL84)	For 29N Bodies
8X DL84XR	For 29N Bodies
15 115 Sq.In. (DL115)	For 291 Bodies
5X DL115XR	For 291 Bodies

0000 None	0 None A Type 300, 0-30 PSI
POSITIONERS:	O None A 8320G184 3-Way Brass
BxP BLX Pneumatic	B Type 300, 0-60 PSI
BxE BLX ElectroPneumatic	D Type 350SS, 0-100 PSI
BxI BLX ElectroPneu. Intrn. Safe	
BxX BLX ElectroPneu. Exp. Proof	
BxF BLX ElectroPneu. Fail Freeze	
76P Moore760 Pneumatic	
76E Moore760 Electro-Pneumatic	
510 Westlock ICoT Electro-Pneumatic	
520 Westlock ICoT Intelligent-Keypad	
530 Westlock ICoT Intelligent-Hart	
540 Westlock ICoT Found.Fieldbus	
PROXIMITY SWITCHES:	
PX11 Mark 1 Series - 2 ea. SPDT	
PX12 Mark 1 Series - 2 ea. SPDT w/2k Pot.	
PX13 Mark 1 Series - 2 ea. SPDT w/4-20 Feedback	
PX14 Mark 1 Series - 4 ea. SPDT	
PX15 Mark 1 Series - 6 ea. SPDT I/P's Use with Diaphragm Only	
MAP1 Type 500X I/P, 3-9 PSI	
MAP2 Type 500X I/P, 9-15 PSI	
MAP3 Type 500X I/P, 3-15 PSI	
MAP4 Type 500X I/P, 1-17 PSI	
MAP5 Type 500X I/P, 6-30 PSI	
MAP6 Type 550X I/P, 0-30 PSI	
MAP7 Type 550X I/P, 0-60 PSI-For 15 or 5X only	
MAP9 Type 950X I/P, 3-15 EXP	

x digit spec.

F Full Range Signal,
3-15 PSI or 4-20mA

L Low of Split Range,
3-9 PSI or 4-12mA

H High of Split Range,
9-15 PSI or 12-20mA

4th digit spec.

O No Additions

L w/Mech. Lmt Switch's

F w/4-20 Feedback

B w/Switch's & Feedback

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.



ACTUATED INDUSTRIAL VALVES

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

WARREN CONTROLS

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