

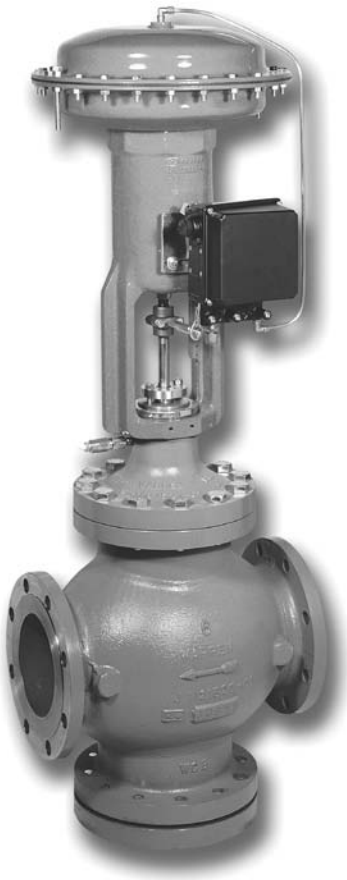
PRODUCT SPECIFICATION

June 2006

PNEUMATIC ACTUATED INDUSTRIAL VALVES

SERIES: 1800 SIZES 1/2 to 12 INCHES

Heavy Globe Control Valves



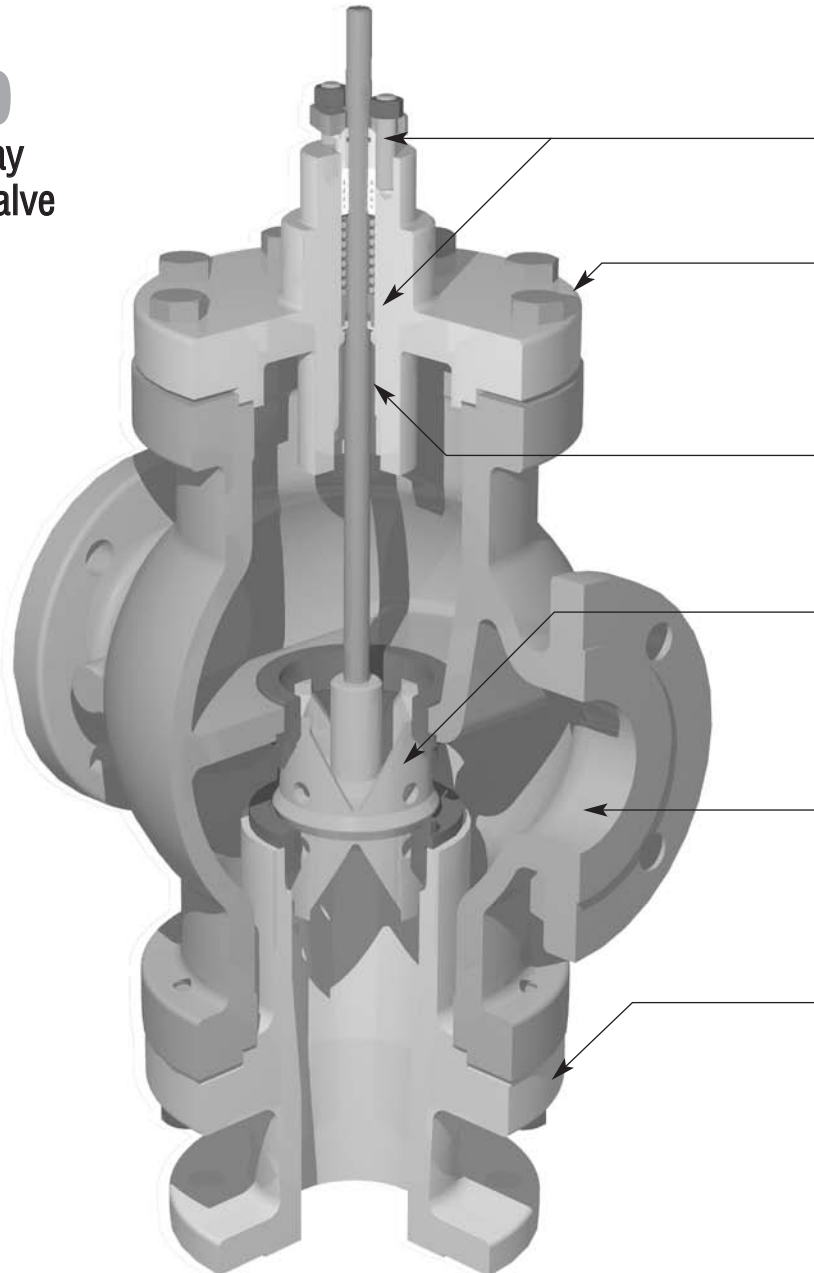
WARREN CONTROLS

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

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1850 Three-Way Mixing Valve



Stem Wipers
provide outstanding packing protection.

Heavy Bolted Bonnet Construction
provides added durability and easy maintenance.

Large Guiding Surfaces
ensure smooth operation and stem stability.

Skirt Guided Plug Assembly
provides stability and precision linear flow characteristic.

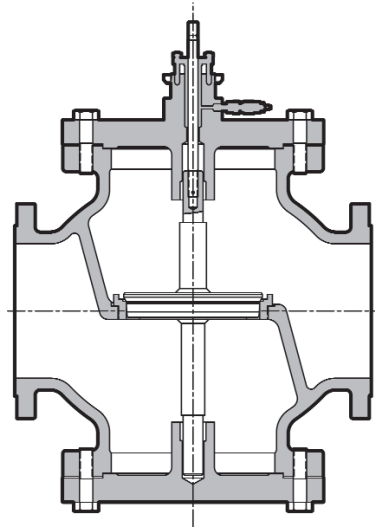
Large Internal Flow Patterns maximize CV capacities.
Greater flow with smaller sizes reduces cost.

Lower Unit
disassembles for easy trim replacement or debris removal.

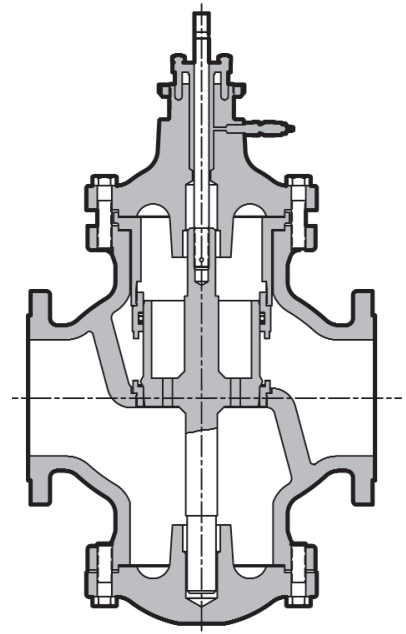


SERIES: 1800

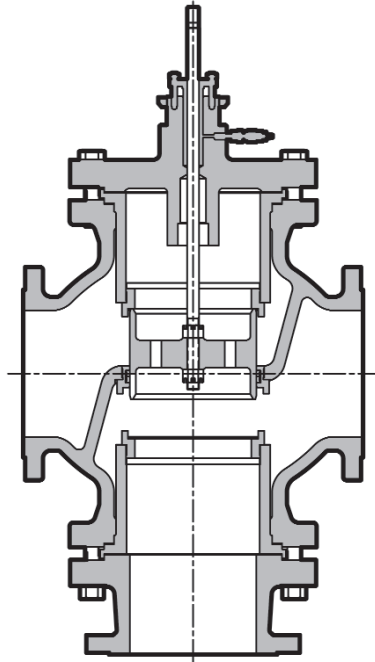
Heavy Globe
Control Valves



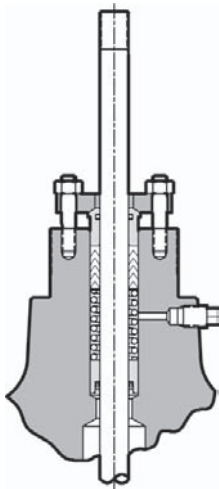
1840
Two-Way Single Seat
Unbalanced Valve



1843
Two-Way Single Seat
Balanced Valve

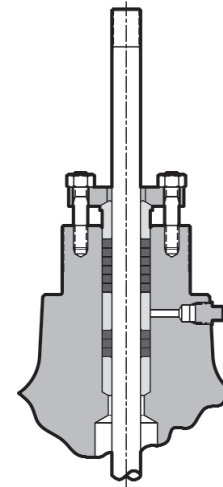


1852
Three-Way
Diverting Valve



**TFE V-Ring Packing
Spring-Loaded**

Stem lubricator is available as an option, but is not required for standard packing sets.



**Adjustable Graphite
Packing**

Description

Warren Controls Series 1800 Heavy Globe Control Valves feature rugged high capacity bodies of iron, steel, or stainless steel with a variety of trim materials and port sizes. The equal percentage and linear 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 1800 is ideally suited where value and long life are important objectives for applications including but not limited to the Chemical, District Energy, Food & Beverage, General Service, Marine, Power, and Refining industries with temperatures from -20 to 800°F, severe service, high pressure drops, and corrosive fluids.

Body Style Versus Application

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

1840 Two-Way Single Seat Unbalanced Valve

The most commonly applied solution with ANSI Class IV shut-off.

Sizes:	6, 8, 10, 12 inch (See 5840 for smaller sizes)
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange (6 thru 10) WCB Steel or CF8M Stainless Steel 150LB Flange or 300LB Flange (6 thru 12)
Trim:	EQ% or Linear, 316 Stainless Steel or Alloy 6
Packing:	TFE V-Ring, Spring Loaded (+32 to 450°F) Adjustable Graphite (+32 to 500°F) Adjustable Graphite w/Extension Bonnet (+32 to 800°F)
Temperature:	+32 to 350°F (125 FLG) +32 to 400°F (250 FLG) +32 to 800°F (150 or 300 FLG)
Rangeability:	50:1



Flow direction is reversed when used with Cylinder Actuator Fail Closed.

1843 Two-Way Single Seat Cylinder Balanced Valve

A balanced valve that is an effective solution 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:	6, 8, 10, 12 inch (See 5843 for smaller sizes)
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange WCB Steel or CF8M Stainless Steel 150LB Flange or 300LB Flange
Trim:	EQ% or Linear, 316 Stainless Steel or Alloy 6
Packing:	TFE V-Ring, Spring Loaded (+32 to 450°F) Adjustable Graphite (+32 to 500°F)
O-Ring:	Fluoraz 797
Temperature:	+32 to 350°F (125 FLG) +32 to 400°F (250 FLG) +32 to 500°F (150 or 300 FLG)
Rangeability:	50:1



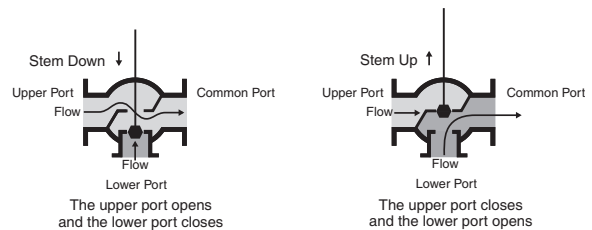
Flow direction is reversed when used with Cylinder Actuator Fail Closed.

3-Way Valves (Control of Liquids)

1850 Three-Way Mixing/Diverting 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 300 PSI. In the 1/2 through 2 inch sizes, the flow can be reversed for diverting if this port configuration is desirable.

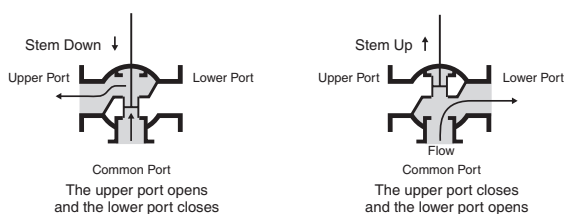
Sizes:	1/2, 3/4, 1, 1-1/2, 2, 2-1/2, 3, 4, 6, 8, 10, 12 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange (8 thru 12) WCB Steel or CF8M Stainless Steel 150LB Flange or 300LB Flange (1/2 thru 12)
Trim:	Linear, 316 Stainless Steel
Packing:	TFE V-Ring, Spring Loaded (+32 to 450°F) Adjustable Graphite (+32 to 500°F) Adjustable Graphite w/Extension Bonnet (+32 to 800°F)
Temperature:	+32 to 350°F (125 FLG) +32 to 400°F (250 FLG) +32 to 800°F (150 or 300 FLG)
Rangeability:	30:1 (sizes 1/2 thru 2) 50:1 (sizes 2-1/2 thru 12)



1852 Three-Way Diverting/Mixing Valve

Designed as a diverting valve with one inlet and two outlets with ANSI Class II shut-off. 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, 6, 8, 10, 12 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange (8 thru 12) WCB Steel or CF8M Stainless Steel 150LB Flange or 300LB Flange (2-1/2 thru 12)
Trim:	Linear, 316 Stainless Steel or Alloy 6
Packing:	TFE V-Ring, Spring Loaded (+32 to 450°F) Adjustable Graphite (+32 to 500°F)
O-Ring:	Fluoraz 797 (2-1/2 thru 4) EPR (6 thru 12)
Temperature:	+32 to 150°F (125 or 250 FLG, 8 thru 12) +32 to 500°F (150 or 300 FLG, 2-1/2 thru 4) +32 to 150°F (150 or 300 FLG, 6 thru 12)
Rangeability:	50:1



Body Style Versus Application

Body Pressure-Temperature Ratings:						
Temperature (F)	125 FLG Iron	250 FLG Iron	150 FLG Steel	300 FLG Steel	150 FLG St Steel	300 FLG St Steel
+32° To 100°	175	400	285	740	275	720
150°	175	400	272	707	255	670
175°	170	385	266	691	245	645
200°	165	370	260	675	235	620
225°	157	355	252	670	230	605
250°	150	340	245	665	225	590
275°	145	325	237	660	220	575
300°	140	310	230	655	215	560
325°	130	295	222	650	210	548
350°	125	280	215	645	205	537
375°	-	265	207	640	200	526
400°	-	250	200	635	195	515
450°	-	-	185	617	182	497
500°	-	-	170	600	170	480
550°	-	-	155	575	155	465
600°	-	-	140	550	140	450
650°	-	-	125	535	125	445
700°	-	-	110	520	110	430
750°	-	-	95	505	95	425
800°	-	-	80	410	80	420

Pressure ratings are PSIG

For applications below 32° consult factory

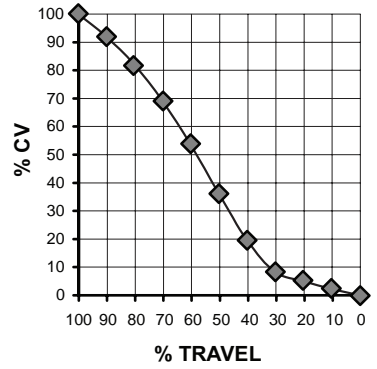
Trim Materials	Flowing Differential Pressure Limit
316 Stainless Steel	100 PSID
Alloy 6	300 PSID

Flow Coefficients (Cv) Versus Travel

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

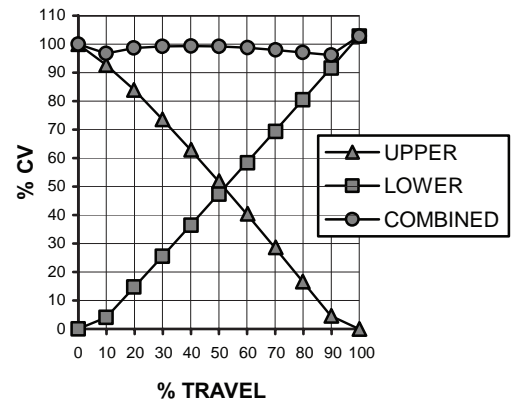
Valve			1840 Flow Coefficients (Cv) Two-Way Single Seat Unbalanced Valve									
Valve Size (IN)	Trim Style	Port Size	%Travel									
			100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
6	EQ%	Full	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
		1SR	178	158	130	93.5	51.8	22.4	13.5	10.3	7.16	3.99
		2SR	98.0	80.8	56.8	31.9	20.7	13.2	8.96	7.01	5.04	3.06
8	EQ%	Full	375	362	322	276	228	188	145	102	60.3	15.8
		1SR	600	528	427	293	142	60.7	38.1	23.4	16.3	9.23
		2SR	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
10	EQ%	Full	594	541	479	413	353	292	230	171	107	39.9
		1SR	1000	926	762	572	362	159	67.1	37.9	26.0	14.1
		2SR	600	528	427	293	142	60.7	38.1	23.4	16.3	9.23
12	EQ%	Full	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
		1SR	1360	1228	1022	772	498	293	152	54.0	36.2	18.4
		2SR	1360	1261	1119	968	821	683	542	397	261	119

**2-WAY VALVE
TYPICAL FLOW CURVE**

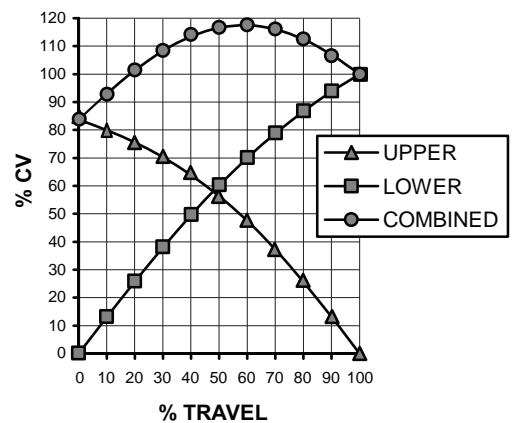


Valve			1843 Flow Coefficients (Cv) Two-Way Single Seat Cylinder Balanced Valve									
Valve Size (IN)	Trim Style	Port Size	%Travel									
			100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
6	EQ%	Full	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
		1SR	178	158	130	93.5	51.8	22.4	13.5	10.3	7.16	3.99
		2SR	98.0	80.8	56.8	31.9	20.7	13.2	8.96	7.01	5.04	3.06
8	EQ%	Full	375	362	322	276	228	188	145	102	60.3	15.8
		1SR	600	528	427	293	142	60.7	38.1	23.4	16.3	9.23
		2SR	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
10	EQ%	Full	594	541	479	413	353	292	230	171	107	39.9
		1SR	1000	926	762	572	362	159	67.1	37.9	26.0	14.1
		2SR	600	528	427	293	142	60.7	38.1	23.4	16.3	9.23
12	EQ%	Full	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
		1SR	1360	1228	1022	772	498	293	152	54.0	36.2	18.4
		2SR	1360	1261	1119	968	821	683	542	397	261	119

**1850
TYPICAL FLOW CURVE**



**1852
TYPICAL FLOW CURVE**



3-Way Valves
(Control of Liquids)

Valve 1850 Flow Coefficients (Cv) Three-Way Mixing/Diverting Valve				
Valve Size (IN)	Trim Style	Trim Size (IN)	Port Size	Travel 100%
1/2	Linear	0.876	Full	4.90
		0.876	1SR	3.20
		0.626	2SR	2.00
3/4	Linear	0.876	Full	7.20
		0.876	1SR	4.90
		0.876	2SR	3.20
1	Linear	0.626	3SR	2.00
		1.126	Full	12.0
		0.876	1SR	7.20
1	Linear	0.876	2SR	4.90
		0.876	3SR	3.20
		1-1/2	Linear	1.676
2	Linear	2.126	Full	40.0
2-1/2	Linear		Full	60.0
3	Linear		Full	95.0
4	Linear		Full	175
6	Linear		Full	360
8	Linear		Full	560
10	Linear		Full	800
12	Linear		Full	1360

Valve 1852 Flow Coefficients (Cv) Three-Way Diverting/Mixing Valve		
Valve Size (IN)	Trim Style	Cv 100%
2-1/2	Linear	75
3	Linear	105
4	Linear	185
6	Linear	410
8	Linear	670
10	Linear	1280
12	Linear	1649

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

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

Heating Liquids in Steam Jacketed Kettles

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

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 Ratings

NOTES:

1) 1840 Seat closure ANSI Class IV.

2) Inlet pressure **cannot** exceed Body Pressure-Temperature Rating.

3) The 3-15 and 1-17 ranges apply to valves with diaphragm actuators and control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 ranges apply to valves with diaphragm actuators and a positioner or an I/P transducer of suitable range. The 0-60, 0-80, 0-100, and 0-120 ranges apply to valves with cylinder actuators and a positioner.

4) N/A indicates that the air signal is not capable of providing any shut-off or it exceeds the maximum air pressure.

Maximum air pressure
DL115 & 115XR...40PSIG
CL8 & 12...120PSIG

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

Valve		Actuator		Shut-Off ΔP Two-Way Single Seat Unbalanced								1840
Valve Size (IN)	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 <i>See "Pneumatic Ranges"...bottom right</i>				Air Signal to Actuator <i>See "Pneumatic Ranges"...bottom right</i>				
				Range 1	Range 2	Range 3	Range 4	Range 1	Range 2	Range 3	Range 4	
6	2	DL115	Low	N/A	N/A	N/A	N/A	8	17	69	110	
			Full	N/A	N/A	N/A	N/A	N/A	45	86		
			High	8	17	21	21	N/A	N/A	45	86	
		DL115XR	Xtra-High	N/A	N/A	45	45	N/A	N/A	N/A	N/A	
		Cylinder 8"		41	58	72	86	50	85	121	156	
		Cylinder 12"		101	131	N/A	N/A	160	229	N/A	N/A	
8	2-1/2	DL115	Low	N/A	N/A	N/A	N/A	2	7	37	59	
			Full	N/A	N/A	N/A	N/A	N/A	23	46		
			High	2	7	9	9	N/A	N/A	23	46	
		DL115XR	Xtra-High	N/A	N/A	19	19	N/A	N/A	N/A	N/A	
		Cylinder 8"		19	33	41	48	26	46	66	86	
		Cylinder 12"		57	74	N/A	N/A	90	129	N/A	N/A	
10	2-1/2	DL115	Low	N/A	N/A	N/A	N/A	N/A	3	22	36	
			High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			DL115XR	Xtra-High	N/A	N/A	11	11	N/A	N/A	N/A	N/A
				Cylinder 8"		12	21	26	31	15	28	40
		Cylinder 12"		36	47	N/A	N/A	58	83	N/A	N/A	
12	3	DL115	Low	N/A	N/A	N/A	N/A	N/A	N/A	14	24	
			High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
			DL115XR	Xtra-High	N/A	N/A	5	5	N/A	N/A	N/A	N/A
				Cylinder 8"		7	15	18	21	9	18	27
		Cylinder 12"		25	33	N/A	N/A	42	62	N/A	N/A	

Pneumatic Ranges		
	Diaphragm	Cylinder
Range 1	3-15	0-60
Range 2	1-17	0-80
Range 3	0-30	0-100
Range 4	0-40	0-120

Shut-Off ΔP Ratings

Valve		Actuator		Shut-Off ΔP Ratings								
				Two-Way Single Seat Cylinder Balanced								
				1843								
				Maximum Shut-off ΔP in PSI								
				Fail Closed				Fail Open				
				Reverse Acting				Direct Acting				
				Air Signal to Actuator				Air Signal to Actuator				
				See "Pneumatic Ranges"...bottom right				See "Pneumatic Ranges"...bottom right				
Valve Size (IN)	Plug Travel (IN)	Pneumatic Actuator	Spring Range	Range 1	Range 2	Range 3	Range 4	Range 1	Range 2	Range 3	Range 4	
6	2	DL115	Low	N/A	N/A	N/A	N/A	196	610	740	740	
			Full	N/A	N/A	N/A	N/A	N/A	N/A	740	740	
			High	196	610	740	740	N/A	N/A	740	740	
		DL115XR	Xtra-High	N/A	N/A	740	740	N/A	N/A	N/A	N/A	N/A
			Cylinder 8"	740	740	740	740	740	740	740	740	740
			Cylinder 12"	740	740	N/A	N/A	740	740	N/A	N/A	
8	2-1/2	DL115	Low	N/A	N/A	N/A	N/A	N/A	290	740	740	
			Full	N/A	N/A	N/A	N/A	N/A	N/A	740	740	
			High	N/A	290	484	484	N/A	N/A	740	740	
		DL115XR	Xtra-High	N/A	N/A	740	740	N/A	N/A	N/A	N/A	N/A
			Cylinder 8"	740	740	740	740	229	740	740	740	
			Cylinder 12"	740	740	N/A	N/A	740	740	N/A	N/A	
10	2-1/2	DL115	Low	N/A	N/A	N/A	N/A	N/A	N/A	740	740	
			Full	N/A	N/A	N/A	N/A	N/A	N/A	740	740	
			High	N/A	N/A	189	189	N/A	N/A	740	740	
		DL115XR	Xtra-High	N/A	N/A	740	740	N/A	N/A	N/A	N/A	N/A
			Cylinder 8"	740	740	740	740	N/A	740	740	740	
			Cylinder 12"	740	740	N/A	N/A	740	740	N/A	N/A	
12	3	DL115	Low	N/A	N/A	N/A	N/A	N/A	N/A	740	740	
			Full	N/A	N/A	N/A	N/A	N/A	N/A	740	740	
			High	N/A	N/A	N/A	N/A	N/A	N/A	740	740	
		DL115XR	Xtra-High	N/A	N/A	433	433	N/A	N/A	N/A	N/A	
			Cylinder 8"	N/A	560	740	740	N/A	740	740	740	
			Cylinder 12"	740	740	N/A	N/A	740	740	N/A	N/A	

NOTES:

- 1) 1843 Seat closure ANSI Class IV.
- 2) Inlet pressure **cannot** exceed Body Pressure-Temperature Rating.
- 3) The 3-15 and 1-17 ranges apply to valves with diaphragm actuators and control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 ranges apply to valves with diaphragm actuators and a positioner or an I/P transducer of suitable range. The 0-60, 0-80, 0-100, and 0-120 ranges apply to valves with cylinder actuators and a positioner.
- 4) N/A indicates that the air signal is not capable of providing any shut-off or it exceeds the maximum air pressure.

Maximum air pressure
DL115 & 115XR...40PSIG
CL8 & 12...120PSIG

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

Pneumatic Ranges		
	Diaphragm	Cylinder
Range 1	3-15	0-60
Range 2	1-17	0-80
Range 3	0-30	0-100
Range 4	0-40	0-120

Shut-Off ΔP Ratings

NOTES:

1) 1850 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.

Consult the factory for shut-off values for 1850 diverting applications.

Diaphragm actuators used with the 1850 are direct acting. The upper port fails closed on loss of air pressure to the actuator.

2) 1850 Seat closure ANSI Class IV.

3) Inlet pressure **cannot** exceed Body Pressure- Temperature Rating.

4) The 3-15 and 1-17 ranges apply to valves with diaphragm actuators and control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 ranges apply to valves with diaphragm actuators and 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
DL84 & 84XR ...30PSIG
DL115 & 115XR ...40PSIG

6) See Actuators, Positioners, and Accessories Section for explanation of Spring Ranges.

Valve			Actuator		Shut-Off ΔP Three-Way Mixing				1850				
Trim Size (IN)	Valve Size (IN)	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	
1/2 thru 2 Three-Way Mixing	0.626	1/2 and 3/4	DL84	Low	N/A	295	568	N/A Exceeds DL49 and DL84 Actuator's Maximum Air Pressure	740	740	740	N/A Exceeds DL49 and DL84 Actuator's Maximum Air Pressure	
				Full	N/A	295	568		N/A	151	740		
				High	740	740	740		N/A	151	740		
				DL84XR	Xtra-High	740	740		740	N/A	151		740
	0.876	1/2 thru 1	3/4	DL84	Low	N/A	124		264	609	740		740
					Full	N/A	124		264	N/A	51		740
					High	682	740		740	N/A	51		740
				DL84XR	Xtra-High	740	740		740	N/A	51		740
	1.126	1	3/4	DL84	Low	N/A	60		144	353	521		740
					Full	N/A	60		144	N/A	15		740
					High	397	566		650	N/A	15		740
				DL84XR	Xtra-High	650	740		740	N/A	15		740
1.676	1-1/2	3/4	DL84	Low	N/A	11	49	143	220	715			
				Full	N/A	11	49	N/A	N/A	486			
				High	163	240	278	N/A	N/A	486			
			DL84XR	Xtra-High	278	354	392	N/A	N/A	486			
2.126	2	3/4	DL84	Low	N/A	N/A	23	81	129	436			
				Full	N/A	N/A	23	N/A	N/A	294			
				High	94	141	165	N/A	N/A	294			
			DL84XR	Xtra-High	165	212	236	N/A	N/A	294			

Pneumatic Ranges	
	Diaphragm
Range 1	3-15
Range 2	1-17
Range 3	0-30
Range 4	0-40

Valve		Actuator		Shut-Off ΔP Ratings Three-Way Mixing								
Valve Size (IN)	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 <i>See "Pneumatic Ranges"...bottom right</i>				Air Signal to Actuator <i>See "Pneumatic Ranges"...bottom right</i>				
				Range 1	Range 2	Range 3	Range 4	Range 1	Range 2	Range 3	Range 4	
2-1/2	1-1/2	DL84	Low	N/A	N/A	9	N/A	44	79	301	N/A	
			Full	N/A	N/A	9	N/A	N/A	N/A	198	N/A	
			High	60	95	112	N/A	N/A	N/A	198	N/A	
		DL115	Low	N/A	5	28	28	82	129	433	668	
			Full	N/A	5	28	28	N/A	N/A	293	527	
			High	98	145	169	169	N/A	N/A	293	527	
	Cylinder 6"			319	429	539	650	180	295	410	526	
		Cylinder 8"		590	740	N/A	N/A	439	644	740	N/A	
	3		1-1/2	DL84	Low	N/A	N/A	2	N/A	26	50	204
		Full			N/A	N/A	2	N/A	N/A	N/A	133	N/A
		High			38	61	73	N/A	N/A	N/A	133	N/A
DL115		Low		N/A	N/A	15	15	53	85	296	459	
		Full		N/A	N/A	15	15	N/A	N/A	199	362	
		High		64	96	113	113	N/A	N/A	199	362	
Cylinder 6"				217	294	370	447	121	201	281	360	
		Cylinder 8"		405	543	N/A	N/A	301	443	585	N/A	
4			1-1/2	DL84	Low	N/A	N/A	N/A	N/A	10	23	110
		Full			N/A	N/A	N/A	N/A	N/A	N/A	70	N/A
		High			16	29	36	N/A	N/A	N/A	70	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	
	Cylinder 6"			117	160	203	246	63	108	153	198	
		Cylinder 8"		223	301	N/A	N/A	164	244	324	N/A	
	6		2	DL115	Low	N/A	N/A	N/A	N/A	2	10	63
		Full			N/A	N/A	N/A	N/A	N/A	N/A	39	79
		High			8	17	21	21	N/A	N/A	39	79
DL115XR		Xtra-High		N/A	N/A	45	45	N/A	N/A	10	51	
		Cylinder 8"			108	142	177	212	44	79	115	150
				Cylinder 12"		233	311	N/A	N/A	176	256	336
8		2-1/2	DL115		Low	N/A	N/A	N/A	N/A	N/A	N/A	33
				Full	N/A	N/A	N/A	N/A	N/A	N/A	19	42
				High	2	7	9	9	N/A	N/A	19	42
			DL115XR	Xtra-High	N/A	N/A	19	19	N/A	N/A	3	26
				Cylinder 8"		56	76	95	115	22	42	62
	Cylinder 12"					127	171	N/A	N/A	97	142	187
		10	2-1/2	DL115	Low	N/A	N/A	N/A	N/A	N/A	N/A	20
	Full				N/A	N/A	N/A	N/A	N/A	N/A	11	25
	High				N/A	3	4	4	N/A	N/A	11	25
	DL115XR			Xtra-High	N/A	N/A	11	11	N/A	N/A	N/A	15
				Cylinder 8"		34	47	59	72	13	25	38
Cylinder 12"						80	108	N/A	N/A	60	89	118
	12		3	DL115	Low	N/A	N/A	N/A	N/A	N/A	N/A	12
Full					N/A	N/A	N/A	N/A	N/A	N/A	6	17
High					N/A	N/A	2	2	N/A	N/A	6	17
DL115XR				Xtra-High	N/A	N/A	5	5	N/A	N/A	N/A	9
				Cylinder 8"		22	30	39	48	8	16	25
		Cylinder 12"				53	73	N/A	N/A	41	61	81

NOTES:

1) 1850 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.

Diaphragm actuators used with the 1850 are direct acting. The upper port fails closed on loss of air pressure to the actuator.

Cylinder actuators used with the 1850 are double acting. Failure Position is a function of a variety of variables, including but not limited to fluid pressures, proximity of valve stroke to seat, flow rates, and flow turbulence. Contact factory with complete application information for details.

2) 1850 Seat closure ANSI Class IV.

3) Inlet pressure **cannot** exceed Body Pressure- Temperature Rating.

4) The 3-15 and 1-17 ranges apply to valves with diaphragm actuators and control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 ranges apply to valves with diaphragm actuators and a positioner or an I/P transducer of suitable range. The 0-60, 0-80, 0-100, and 0-120 ranges apply to valves with cylinder actuators and a positioner.

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
DL84 & 84XR ...30PSIG
DL115 & 115XR ...40PSIG
CL6, 8, & 12 ... 120PSIG

6) See Actuators, Positioners, and Accessories Section for explanation of Spring Ranges.

Pneumatic Ranges		
	Diaphragm	Cylinder
Range 1	3-15	0-60
Range 2	1-17	0-80
Range 3	0-30	0-100
Range 4	0-40	0-120

Shut-Off ΔP Ratings

NOTES:

1) 1852 Diverting Valves have one inlet and two outlets. 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 1852 mixing applications.

Diaphragm actuators used with the 1852 are direct acting. The upper port fails closed on loss of air pressure to the actuator.

Cylinder actuators used with the 1852 are double acting. Failure Position is a function of a variety of variables, including but not limited to fluid pressures, proximity of valve stroke to seat, flow rates, and flow turbulence. Contact factory with complete application information for details.

2) 1852 Seat closure ANSI Class II.

3) Inlet pressure cannot exceed Body Pressure- Temperature Rating.

4) The 3-15 and 1-17 ranges apply to valves with diaphragm actuators and control signals coming directly from I/P transducers with matching ranges. The 0-30 and 0-40 ranges apply to valves with diaphragm actuators and a positioner or an I/P transducer of suitable range. The 0-60, 0-80, 0-100, and 0-120 ranges apply to valves with cylinder actuators and a positioner.

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.

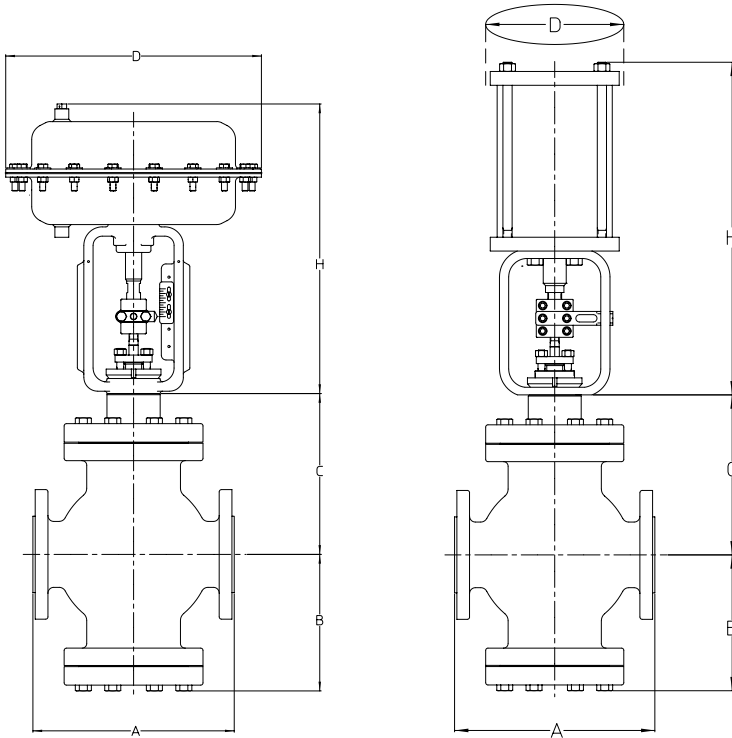
Maximum air pressure
DL84 ...30PSIG
DL115 ...40PSIG
CL6, 8, & 12 ... 120PSIG

6) See Actuators, Positioners, and Accessories Section for explanation of Spring Ranges.

Valve		Actuator		Shut-Off ΔP Ratings Three-Way Diverting/Mixing								1852
Valve Size (IN)	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 See "Pneumatic Ranges"...bottom right				Air Signal to Actuator See "Pneumatic Ranges"...bottom right				
				Range 1	Range 2	Range 3	Range 4	Range 1	Range 2	Range 3	Range 4	
2-1/2	1-1/2	DL84	High	97	99	101	N/A	N/A	N/A	105	N/A	
		DL115	High	99	101	103	103	N/A	N/A	110	113	
		Cylinder 6"		104	108	113	115	99	101	106	110	
		Cylinder 8"		108	113	N/A	N/A	103	106	N/A	N/A	
3	1-1/2	DL84	High	95	97	99	N/A	N/A	N/A	103	N/A	
		DL115	High	97	99	101	101	N/A	N/A	108	110	
		Cylinder 6"		101	106	110	113	97	99	104	108	
		Cylinder 8"		106	111	N/A	N/A	101	103	N/A	N/A	
4	1-1/2	DL84	High	93	95	97	N/A	N/A	N/A	101	N/A	
		DL115	High	95	97	99	99	N/A	N/A	106	108	
		Cylinder 6"		99	104	108	110	95	97	102	106	
		Cylinder 8"		104	108	N/A	N/A	99	101	N/A	N/A	
6	2	DL115	High	91	93	95	95	N/A	N/A	101	104	
		Cylinder 8"		99	104	108	110	95	97	102	106	
		Cylinder 12"		104	108	N/A	N/A	99	101	N/A	N/A	
8	2-1/2	DL115	High	89	91	93	93	N/A	N/A	99	101	
		Cylinder 8"		97	102	106	108	93	95	99	104	
		Cylinder 12"		101	106	N/A	N/A	97	99	N/A	N/A	
10	2-1/2	DL115	High	N/A	89	91	91	N/A	N/A	97	99	
		Cylinder 8"		95	99	103	106	91	93	97	101	
		Cylinder 12"		99	103	N/A	N/A	95	97	N/A	N/A	
12	3	DL115	High	N/A	N/A	89	89	N/A	N/A	95	97	
		Cylinder 8"		93	97	101	103	89	91	95	99	
		Cylinder 12"		97	101	N/A	N/A	92	95	N/A	N/A	

Pneumatic Ranges		
	Diaphragm	Cylinder
Range 1	3-15	0-60
Range 2	1-17	0-80
Range 3	0-30	0-100
Range 4	0-40	0-120

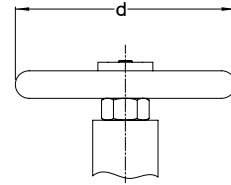
Dimensions & Weights



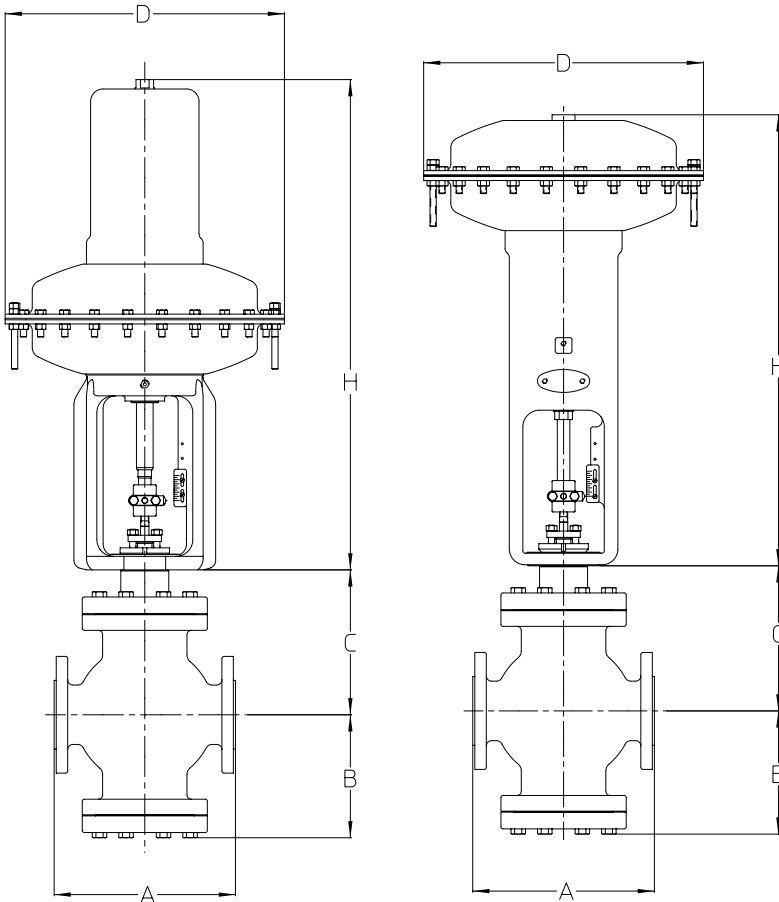
2-WAY w/ DL84

2-WAY w/ 8" or 12" Cylinder

Dimension (IN)		1840 Valve Size (IN)			
		6	8	10	12
A	125 or 150FLG	17-3/4	21-3/8	26-1/2	29
	250 or 300FLG	18-5/8	22-3/8	27-7/8	30-1/2
B		11-7/8	13-3/4	15-1/4	15-1/4
C	Standard	13-7/8	15-1/4	16-1/8	17
	Extension Bonnet	17-5/8	CF	CF	CF
Weight (LB)	Standard	390	650	1160	CF
	Extension Bonnet	400	CF	CF	CF



Top mounted Handwheel



2-WAY w/ DL115 or 115XR Reverse

2-WAY w/ DL115 Direct

Dimension (IN)		1843 Valve Size (IN)			
		6	8	10	12
A	125 or 150FLG	17-3/4	21-3/8	26-1/2	29
	250 or 300FLG	18-5/8	22-3/8	27-7/8	30-1/2
B		11-7/8	13-3/4	15-1/4	15-1/4
C		14-1/2	15-7/8	16-3/4	17-3/4
Weight (LB)		455	760	1360	CF

Face to face dimensions conform to ANSI/ISA S75.03

CF = Consult factory N/A = Not Available

Actual Shipping Weights May Vary

Dimensions & Weights

Dimension (IN) 1850		Valve Size (IN)											
		1/2	3/4	1	1-1/2	2	2-1/2	3	4	6	8	10	12
A	125 or 150FLG	7-1/4	7-1/4	7-1/4	8-3/4	10	10-7/8	11-3/4	13-7/8	17-3/4	21-3/8	26-1/2	29
	250 or 300FLG	7-1/2	7-5/8	7-3/4	9-1/4	10-1/2	11-1/2	12-1/2	14-1/2	18-5/8	22-3/8	27-7/8	30-1/2
B	125 or 150FLG	6-1/2	6-1/2	6-1/2	6-1/4	10	10-1/4	11-1/4	13-7/8	15-7/8	17-3/4	21-1/8	20-3/8
	250 or 300FLG	6-5/8	6-3/4	6-3/4	6-1/2	10-1/4	10-5/8	11-5/8	14-1/8	16-1/4	18-1/4	21-3/4	21-1/8
C	Standard	5-1/2	5-1/2	5-1/2	6-1/8	8-1/8	8-7/8	9-5/8	10-3/8	13-7/8	15-1/4	16-1/8	17
	Extension Bonnet	CF	CF	CF	CF	CF	CF	14-5/8	CF	17-5/8	CF	CF	CF
Weight (LB)	Standard	CF	CF	CF	CF	CF	140	210	390	545	900	1600	CF
	Extension Bonnet	CF	CF	CF	CF	CF	CF	215	CF	555	CF	CF	CF

Dimension (IN) 1852		Valve Size (IN)						
		2-1/2	3	4	6	8	10	12
A	125 or 150FLG	10-7/8	11-3/4	13-7/8	17-3/4	21-3/8	26-1/2	29
	250 or 300FLG	11-1/2	12-1/2	14-1/2	18-5/8	22-3/8	27-7/8	30-1/2
B	125 or 150FLG	10-1/4	11-1/4	13-7/8	15-7/8	17-3/4	21-1/8	20-3/8
	250 or 300FLG	10-5/8	11-5/8	14-1/8	16-1/4	18-1/4	21-3/4	21-1/8
C		9-1/2	10-1/4	11	14-1/2	15-7/8	16-3/4	17-3/4
Weight (LB)		140	210	390	545	900	1600	CF

Face to face dimensions conform to ANSI/ISA S75.03

CF = Consult factory N/A = Not Available

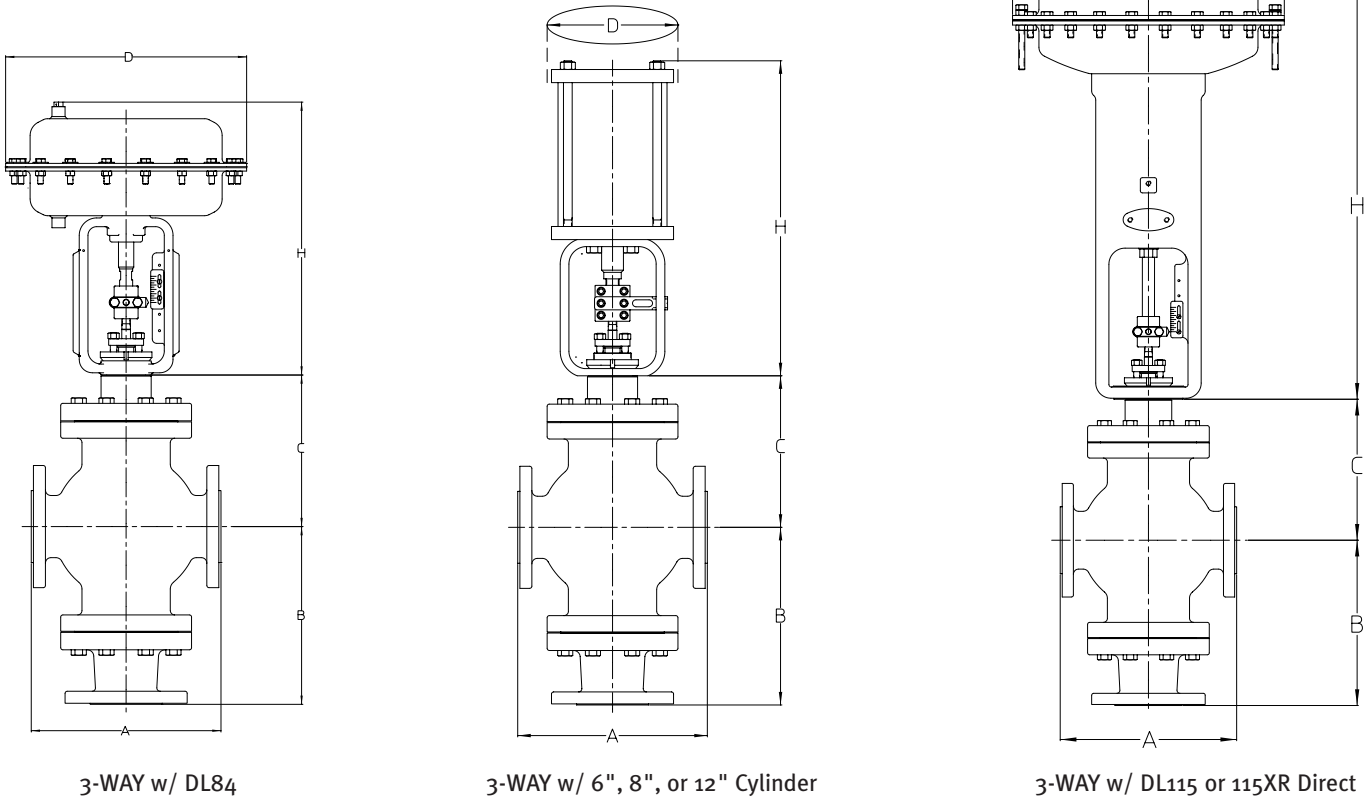
Actual Shipping Weights May Vary

Actuator	D (in) Actuator	d (in) Handwheel	H MAX (IN)		WEIGHT (LB)	
			STD*	With Handwheel	STD	With Handwheel
			DL84 Direct	13-7/8	8-1/8	16-3/4
DL84 Reverse	13-7/8	8-1/8	15-3/4	24	48-3/8	CF
DL115 Direct	16-3/4	10-1/8	28	37	105	CF
DL115XR Direct	16-3/4	10-1/8	28	37	113	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
6" Cylinder	10	N/A	18-1/8	N/A	28	N/A
8" Cylinder (2-1/2 TO 4)	12-3/4	N/A	18-1/4	N/A	41	N/A
8" Cylinder (6 to 12)	12-3/4	N/A	25-3/8	N/A	88	N/A
12" Cylinder	20	N/A	27	N/A	177	N/A

Actuator Removal Clearance

Above DL84 & 84XR on 1/2 thru 2 inch valve allow 5 inch.
 Above DL84, 115, 115RX, 6" & 8" Cylinder on 2-1/2 thru 4 inch valve allow 5-5/8 inch.
 Above DL115, 115XR, 8" & 12" Cylinder on 6 inch valve allow 6-5/8 inch, on 8 inch & 10 inch valve allow 7-1/8 inch, and on 12 inch valve allow 7-5/8 inch.

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



Diaphragm Actuators

Actuator		Spring Range (PSI)			
Size	Action	Low	Full	High	Xtra-High
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
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:	DL84 & 84XR (84 Sq In) DL115 & 115XR (115 Sq In)
Springs:	DL84 & 84XR Multiple DL115 Single DL115XR Dual
Max Air Supply:	DL84 & 84XR 30PSIG DL115 & 115XR 40PSIG
Air Connections:	1/4 NPT
Diaphragm:	Buna-N Fabric Reinforced
Diaphragm Chambers:	Steel
Yoke:	Ductile Iron
Stem:	300 Series Stainless Steel
Finish:	Acrylic Enamel
Ambient Temperature:	-40 to 180°F
Mounting:	Vertical Above or Below Valve
Handwheel:	Yes

Cylinder Actuators

Piston Diameter:	6, 8, & 12 inch
Springs:	Single
Max Air Supply:	120PSIG
Air Connections:	1/4 NPT
Piston:	Aluminum
Cylinder:	Aluminum
Heads:	Aluminum, Black Anodized
Yoke:	Steel, Acrylic Painted
Stem:	416 Series Stainless Steel Hard Chromate Plated
Ambient Temperature:	-25 to 250°F
Mounting:	Vertical Above or Below Valve

Note: Cylinder Actuators require a positioner for modulating control.

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 sequentially 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
0.61 SCFM at 100 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
0.69 SCFM at 100 PSIG

Actuators, Positioners, & Accessories

Positioners (Continued)

BLX Electro-Pneumatic Intrinsically Safe

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

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
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
0.69 SCFM at 100 PSIG

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)

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
0.69 SCFM at 100 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
0.69 SCFM at 100 PSIG

Positioners (Continued)

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
32.5 SCFM at 100 PSIG

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 0-100 PSIG (Cylinder Actuator)
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

760E Electro-Pneumatic

Models: 76E_: Full Range Signal (4-20 mA)

Options Limit Switches, 4-20 mA Feedback

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

Actuators, Positioners, & Accessories

760E Electro-Pneumatic (Continued)

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 0-60 PSIG (Diaphragm Actuator) Output 0-100 PSIG (Cylinder Actuator) Housing Black Steel Case with Chrome Ring
Ambient Temperature:	760P -40 to 180°F, 760E -40 to 167°F
Mounting:	Yoke Mounted

Siemens SIPART PS2 Models:



Electro-Pneumatic

Models:	P24_: Full Range Signal (4-20 mA)
Calibration:	Automatic or Manual Commissioning, 3 Input Keys and Two-Line CD
Options:	Limit Switches (2 Binary Signal Outputs from Solid State Switching; No Dry Contacts), 4-20 mA Feedback

2,3,4 Wire HART

Models:	P2H_: Full Range Signal (2-Wire, 4-20 mA; 3 or 4-Wire, 0/4-20 mA)
Calibration:	Automatic or Manual Commissioning, 3 Input Keys and Two-Line CD, & HART
Options:	Limit Switches (2 Binary Signal Outputs from Solid State Switching; No Dry Contacts), 4-20 mA Feedback

PROFIBUS PA

Models:	P2P_: Signal PROFIBUS PA Protocol Specification IEC 61158-2; Bus Supplied Device
Calibration:	Automatic or Manual Commissioning, 3 Input Keys and Two-Line CD, & PROFIBUS PA
Options:	Limit Switches (2 Binary Signal Outputs from Solid State Switching; No Dry Contacts)

FOUNDATION FIELDBUS

Models:	P2F_: Signal Foundation Fieldbus Protocol Specification IEC 61158-2; Bus Supplied Device
Calibration:	Automatic or Manual Commissioning, 3 Input Keys and Two-Line CD, & Foundation Fieldbus
Options:	Limit Switches (2 Binary Signal Outputs from Solid State Switching; No Dry Contacts)

Siemens SIPART PS2 Models (Continued)

All Models:

Construction:	Glass-Fiber-Reinforced Macrolon Housing
Ingress & Corrosion Protection:	IP65 to EN 60 529 / NEMA 4X
Approvals & Ratings:	
<u>FM</u> Intrinsically Safe:	Class 1, Div 1, Gr. A,B,C,D, T4, T5 and T6, and Class 1 Zone 1, AEx ib, Group IIC Non-Incendive: Class 1, Div 2, Gr. A,B,C,D, T4, T5 and T6, and Class 1 Zone 2, Group IIC Explosion Proof: Class 1, Div 1, Gr. A,B,C,D, T6, and Class 1 Zone 1, Group IIC (Available as a Special, Requires Flameproof Enclosure)
<u>CSA</u> Intrinsically Safe:	Class 1, Div 1, Gr. A,B,C,D, T4, T5 and T6, Class 1, Zone 1, AEx ib, Group IIC Non-Incendive: Class 1, Div 2, Gr. A,B,C,D, T4, T5 and T6, and Class 1 Zone 2, Group IIC
CENELEC replaced by ATEX	
<u>ATEX</u> Intrinsically Safe:	Equipment Group II, Category 2, Atmosphere G, EEx ia/ib, IIC, T6 Explosion Protection: Equipment Group II, Category 3, Atmosphere G, EEx nAL [L], IIC, T6 Explosion Proof: Equipment Group II, Category 2, Atmosphere G, EEx d, IIC, T4, T5 and T6 (Available as a Special, Requires Flameproof Enclosure)
Action:	Direct or Reverse
Supply Pressure:	20.3 to 101.5 PSIG Not to exceed actuator rating
Media:	Clean Dry Oil Free Air Filtered to 1 micron. Pressure Dew Point -40 F Below Lowest Ambient Temperature.
Output Flow Capacity:	4.83 SCFM at 29 PSIG (Diaphragm Actuator), 11.30 SCFM at 87 PSIG (Cylinder Actuator)
Air Consumption:	0.00035 SCFM
Air Connections:	1/4 NPT
Electrical Connection:	1/2 NPT
Gauges:	Supply 0-160 PSIG, Output 0-160 PSIG (Diaphragm Actuator) Output 0-160 PSIG (Cylinder Actuator),
Housing:	Black Steel Case with Chrome Ring
Ambient Temperature:	-22 to 176°F
Mounting:	Yoke Mounted

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 4X

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 SCFH 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

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, or 0-120 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

Actuators, Positioners, & Accessories

Solenoids



Models:	<u>For use with Diaphragm Actuators or Positioners with Cylinder Actuators</u> 8320G184, EF8320G184 8320G202, EF8320G202 <u>For use with Cylinder Actuators without Positioners</u> 8342G1, EF8342G1 8342G701, EF8342G701
Construction:	(EF)8320G184, 3-Way Brass (EF)8320G202, 3-Way Stainless Steel (EF)8342G1, 4-Way Brass (EF)8342G701, 4-Way Stainless Steel
Locations:	8320G184, 8320G202, 8342G1 and 8342G701 Watertight, Types 1, 2, 3, 3S, 4 & 4X EF8320G184 & EF8320G202, EF8342G1 & EF8342G701 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	PROFIBUS PA	Foundation Fieldbus	Increasing Signal	Loss of Signal ¹ Valve Fails...	Loss of Power ² Valve Fails...	Loss of Supply Valve Fails...
1840 & 43	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
1850 & 52	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 ³	Upper Port Closed/ Lower Port Open ³

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

² PROFIBUS PA OR Foundation Fieldbus ONLY.

³ Failure position of 1850 & 52 with cylinder actuator, or 1850 for diverting, is a function of a variety of variables, including but not limited to fluid pressures, proximity of valve stroke to seat, flow rates, and flow turbulence. Contact factory with complete application information for details.

Positioner Feedback

Valve Type	Actuator Action	Feedback Signal ⁴	Signal Increases as
1840 & 43	Direct	4-20 mA	Valve Closes
	Reverse	4-20 mA	Valve Opens
1850 & 52	Direct	4-20 mA	Lower Port Closes/ Upper Port Opens

Positioner Limit Switches

Valve Type	Position	Settings	
		Switch 1	Switch 2
1840 & 43	Valve Closed	Closed	Open
	Valve Open	Open	Closed
1850 & 52	Upper Port Closed	Closed	Open
	Lower Port Closed	Open	Closed

⁴ Reduced feedback span for valves with 760 and less than 1 inch travel.

I/P's

Valve Type	Actuator Action	Input Signal	Increasing Signal	Failure Modes	
				Loss of Signal Valve Fails...	Loss of Air Supply Valve Fails...
1840 & 43	Direct	As Required For Shut-off	Closes Valve	Open	Open
	Reverse	As Required For Shut-off	Opens Valve	Closed	Closed
1850 & 52	Direct	As Required For Shut-off	Closes Lower Port/ Opens Upper Port	Upper Port Closed/ Lower Port Open	Upper Port Closed/ Lower Port Open

Air Filter Regulators

Actuator	Output Pressure
DL84 & 84XR	30PSIG
DL115 & 115XR	40PSIG
6", 8", & 12" Cylinder	100PSIG

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...
1840 & 43	Direct	Closes Valve	Open	Open	Open
	Reverse	Opens Valve	Closed	Closed	Closed
1850 & 52	Direct	Closes Lower Port/ Opens Upper Port	Upper Port Closed/ Lower Port Open	Upper Port Closed/ Lower Port Open ⁵	Upper Port Closed/ Lower Port Open

⁵ Failure position of 1850 & 52 with cylinder actuator, or 1850 for diverting, is a function of a variety of variables, including but not limited to fluid pressures, proximity of valve stroke to seat, flow rates, and flow turbulence. Contact factory with complete application information for details.

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 ⁶	mA	
1840 & 43	Direct	0-350 ohm	4-20 mA	Valve Closes
	Reverse	0-350 ohm	4-20 mA	Valve Opens
1850 & 52	Direct	0-350 ohm	4-20 mA	Lower Port Closes/ Upper Port Opens

⁶ 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
1840 & 43	Valve Closed	Closed	Open
	Valve Open	Open	Closed
1850 & 52	Upper Port Closed	Closed	Open
	Lower Port Closed	Open	Closed

Notes:

Configurations

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

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2. OPTIONS

VALVE BODY

Model	Valve Type	Size	Body Material	End Connection	Trim Style	Trim Material	Trim Cv	Packing Type	Bonnet Construction	
18H 2-1/2" - 4" Bodies Diaphragm: 84" or 115" Cylinder: 6" or 8"	40 2-Way, Single Seat	050 1/2 inch 075 3/4 inch 100 1 inch	W WCB F CF8M	F 125/150 lb. Flanged G 250/300 lb. Flanged	E Equal % L Linear Types 50/52 Linear only	S 316 SS 6 Alloy 6 Wrapped		F Full Port 1 1st Port Reduction 2 2nd Port Reduction 3 3rd Port Reduction <i>Port reductions only available to Type 40, 43 & 50. Check factory for availability of reductions.</i>	T Teflon G Graphite	S 450 Tmax X 800F Tmax w/Ext. Bonnet <i>See Tmax table below.</i>
18J 6" - 12" Bodies Diaphragm: 115" Cylinder: 8" or 12"	43 2-Way Cage-Balanced 50 3-Way Mixing 52 3-Way Diverting	150 1-1/2 inch 200 2 inch 250 2-1/2 inch 300 3 inch 400 4 inch 600 6 inch 800 8 inch 010 10 inch 012 12 inch	R Cast Iron only avail on 6" - 10" 40, 6" - 12" 43, 8" - 12" 50, 8" - 12" 52							
18K 1/2" - 2" Bodies Diaphragm: 84"										

VALVE TYPE/TRIM MATERIAL COMBINATIONS:

TMAX					
Valve Type	Body Material Code	End Connection Code	Bonnet Construction Code	Packing Type Code	Extension Bonnet S
40 2-Way Single Seat	WCB W , CF8M F	150 lb F , 300 lb G	Teflon T	450°F	N/A
	Cast Iron R	125 lb F	Teflon T , Graphite G	500°F	800°F
	Cast Iron R	250 lb G	Teflon T , Graphite G	350°F	N/A
	Cast Iron R	250 lb G	Teflon T , Graphite G	400°F	N/A
43 2-Way Cage-Balanced w/Fluoraz 797 O-Ring	WCB W , CF8M F	150 lb F , 300 lb G	Teflon T	450°F	N/A
	WCB W , CF8M F	150 lb F , 300 lb G	Graphite G	500°F	N/A
	Cast Iron R	125 lb F	Teflon T , Graphite G	350°F	N/A
	Cast Iron R	250 lb G	Teflon T , Graphite G	400°F	N/A
50 3-Way Mixing	WCB W , CF8M F	150 lb F , 300 lb G	Teflon T	450°F	N/A
	WCB W , CF8M F	150 lb F , 300 lb G	Graphite G	500°F	800°F
	Cast Iron R	125 lb F	Teflon T , Graphite G	350°F	N/A
	Cast Iron R	250 lb G	Teflon T , Graphite G	400°F	N/A
52 3-Way Diverting (2-1/2" - 4") w/Fluoraz 797 O-Ring Seal	WCB W , CF8M F	150 lb F , 300 lb G	Teflon T	450°F	N/A
	WCB W , CF8M F	150 lb F , 300 lb G	Graphite G	500°F	N/A
52 3-Way Diverting (6" - 12") w/EPR OCT O-Ring	WCB W , CF8M F	150 lb F , 300 lb G	Teflon T , Graphite G	150°F	N/A
	Cast Iron R	125 lb F , 250 lb G	Teflon T , Graphite G	150°F	N/A

SIZE	TRIM MATERIAL	
	S 316 SS	6 Alloy 6/316 SS
050 1/2 inch	50	N/A
075 3/4 inch	50	N/A
100 1 inch	50	N/A
150 1-1/2 inch	50	40, 43
200 2 inch	50	40, 43
250 2-1/2 inch	50, 52	N/A
300 3 inch	50, 52	N/A
400 4 inch	50, 52	N/A
600 6 inch	40, 43, 50, 52	40, 43
800 8 inch	40, 43, 50, 52	40, 43
010 10 inch	40, 43, 50, 52	40, 43
012 12 inch	40, 43, 50, 52	40, 43

VALVE TYPE/ACTUATOR COMPATIBILITY:

VALVE STYLE	VALVE SIZES	ACTUATORS
Type 40	6" - 12"	DL115, DL115XR, Cylinder 8", & Cylinder 12"
Type 43	6" - 12"	DL115, DL115XR, Cylinder 8" & Cylinder 12"
Type 50	1/2" - 2"	DL84, DL84XR
Type 50	2-1/2" - 4"	DL84, DL115, Cylinder 6", & Cylinder 8"
Type 50	6" - 12"	DL115, DL115XR, Cylinder 8" & Cylinder 12"
Type 52	2-1/2" - 4"	DL84, DL115, Cylinder 6", & Cylinder 8"
Type 52	6" - 12"	DL115, Cylinder 8" & Cylinder 12"

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

00 None
DIAPHRAGMS:
84 DL84 (84 Sq.In.)
8X DL84XR
15 DL115 (115 Sq.In.)
5X DL115XR

O None
R Reverse Stem Fail Down
D Direct Stem Fail Up

O None or Cylinder
L Low 3-9psi R/D
F Full 3-15psi R/D
H High 9-15 psi R/D
X Xtra-High DL115XR

O None
R Reverse
D Direct

NOTE:
DL84; DL84XR; DL115; DL115XR only - Must match action.

CYLINDERS:
C2 6" Spring Fail (for 18H)
C3 8" Spring Fail (for 18H)
C4 8" Spring Fail (for 18J)
C5 12" Spring Fail (for 18J)

NOTE: 5X & 8X Only in Xtra-High Spring Range.
5X Reverse Acting for 2-Way Valves.
5X & 8X Directed Acting for 3-Way Valves.

FAILURE MODES:

MODE	VALVE TYPE	ACTUATOR ACTION
Closed	40/43	Reverse
Open	40/43	Direct
Upper Closed*	50/52	Direct
Upper Open	50/52	Reverse

*Standard

ACTUATOR / BODY COMPATIBILITY:

DIAPHRAGM	BODY
84 84 Sq.In. (DL84)	For 18H Body
8x DL84XR	For 18K Body
15 115 Sq.In. (DL115)	All Bodies
5X DL115XR	All Bodies
CYLINDERS	
C2 6" Spring Fail	For 18H Body
C3 8" Spring Fail	For 18H Body
C4 8" Spring Fail	For 18J Body
C5 12" Spring Fail	For 18J Body

0000 None
POSITIONERS:
BxP BLX Pneumatic
BxE BLX ElectroPneumatic
BxI BLX ElectroPneu. Intrn. Safe
BxX BLX ElectroPneu. Exp. Proof
BxF BLX ElectroPneu. Fail Freeze
76P Moore760 Pneumatic
76E Moore760 Electro-Pneumatic
P24 Siemens PS2 Electro-Pneumatic
P2H Siemens PS2 2,3,4 Wire HART
P2P Siemens PS2 PROFIBUS PA
P2F Siemens PS2 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 Swtch's
F w/4-20 Feedback
B w/Swtch's & Feedback

NOTE:
L,F,B not available for BxI, BxX.

O None
A Type 300, 0-30 PSI
B Type 300, 0-60 PSI
C Type 300, 0-120 PSI
D Type 350SS, 0-100 PSI

O None
A 8320G184 3-Way Brass
B 8320G202 3-Way SS
J 8342G1 4-Way Brass
K 8342G701 4-Way SS
L EF8320G184 3-Way EXP Br.
M EF8320G202 3-Way EXP SS
V EF8342G1 4-Way EXP Br.
W EF8342G701 4-Way EXP SS 120 VAC Coils

O None
S Special Options or Set-up
T SS Tubing
G SS Tagging
B SS Tubing and Tagging

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 • 2-way low flow • 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 unbalanced cage retained seat • 2-way cage balanced cage retained seat
sizes 1/2 to 12 in. class 250 & 300 ends 125 FF, 150, 250, 300 RF flg body Cast Iron, CF8M, WCB, Bronze (ASTM B61) 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 <ul style="list-style-type: none"> • Heavy Duty • Severe Service • High Pressure Differentials • Corrosive Materials, Liquids, Gases & Steam • Modulating or On/Off Control 	sizes 1/2 to 2 in. class 250 & 300 ends Butt weld, NPT body Bronze, CF8M trim 316SST, Alloy 6, Bronze, TFE, PEEK, 17-4pH Cv up to 40 temp. -20° to 500°F body limit to 720 psi shutoff class III, IV, VI rangeability 50:1 <ul style="list-style-type: none"> • Economical • Precision Control • Suited for Gases, Steam, or Liquids that are Not Viscous or Solids Bearing 	sizes 2-1/2 to 10 in. class 125 & 250 ends 125 FF, 250 RF flg 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 <ul style="list-style-type: none"> • High Capacity • General Purpose • Moderate Pressure Drops • Compatible Liquids and Gas, Steam & Water • Modulating or On/Off Control 	sizes 1 to 8 in. class 300 ends 150, 300 RF flg body WCB, CF8M, Custom Alloys 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, IV+, VI rangeability 100:1 <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 	sizes 1/2 to 4 in. class 300 ends 150, 300 RF flg, NPT, Socket weld body WCB, CF8M, Bronze (ASTM B61) trim 316 SST, 400 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"> • Highly Efficient, Compact Design • High Pressure Drops • Typically Suited for High Force Piston Actuators for Steam, Chemicals & Dirty Fluids

WARREN CONTROLS

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