PNEUMATIC ACTUATED INDUSTRIAL VALVES

HEAVY GLOBE CONTROL VALVES

PRODUCT SPECIFICATION

SERIES

1800

SIZES: 1/2 TO 12 INCHES

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

1800_PS_RevPb_0422

1800 PRODUCT SPEC

WARREN CONTROLS

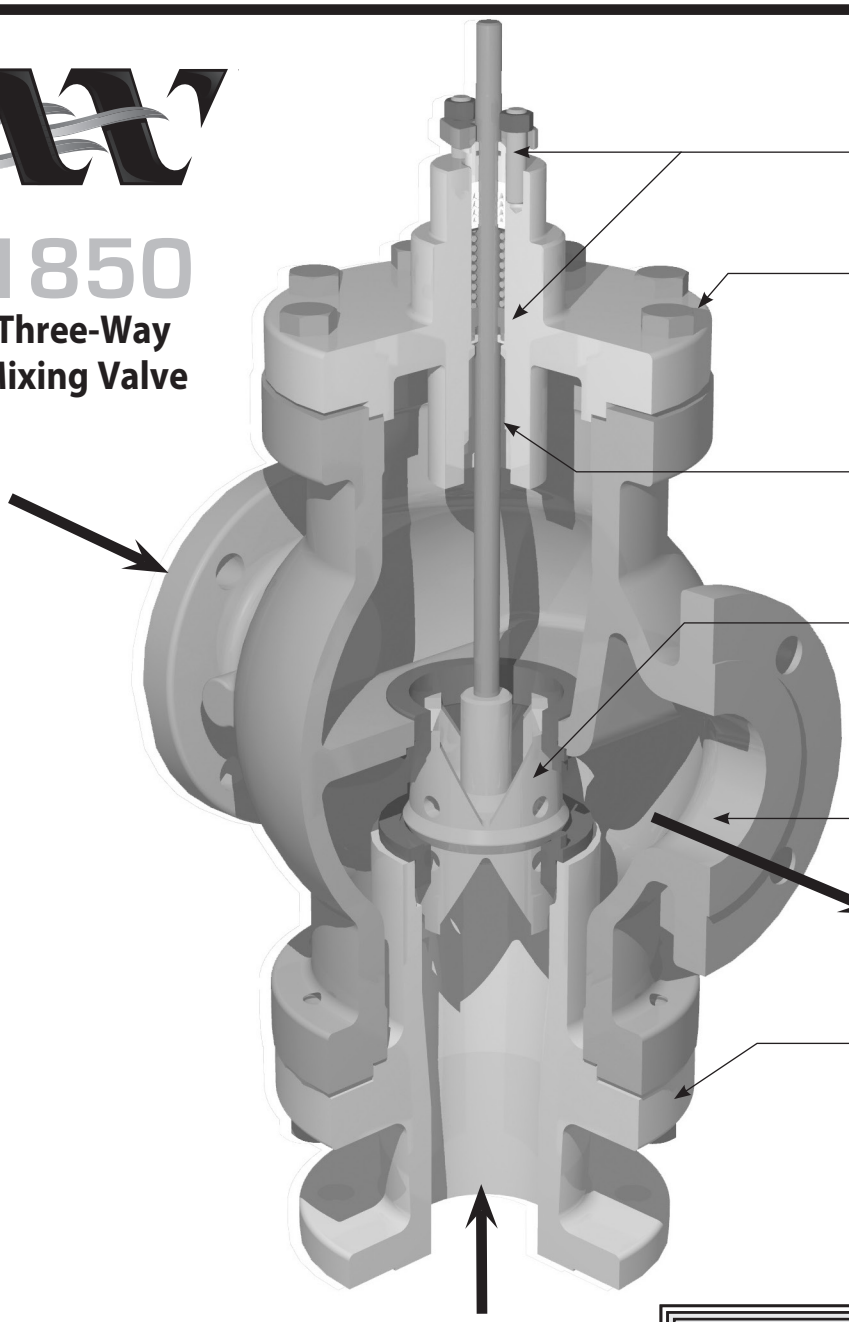
2600 EMRICK BLVD • BETHLEHEM, PA 18020 • USA •800-922-0085 • WWW.WARRENCONTROLS.COM

DEPENDABLE, RUGGED, PRECISION CONTROL VALVES AND ACCESSORIES

TABLE OF CONTENTS

Body Style Versus Application 3-4
Body Pressure-Temperature Rating 4
Flowing Differential Pressure Limits 4
Construction Attribute Selection 4
Flow Coefficients (Cv) Versus Travel 5
Sizing Reference and Load Sizing Calculations 6
Shut-Off ΔP Ratings 7-11
Dimensions and Weights 12-13
Heat/Sound Pressure Levels Guidelines 14-17
Actuators, Positioners, and Accessories 18-22
Factory Default Settings 23-24
Configurations 25-26

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.

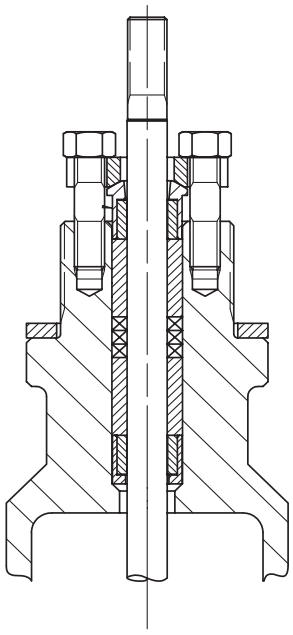
Lower Unit
disassembles for easy trim replacement or debris removal.

Common Port in Side

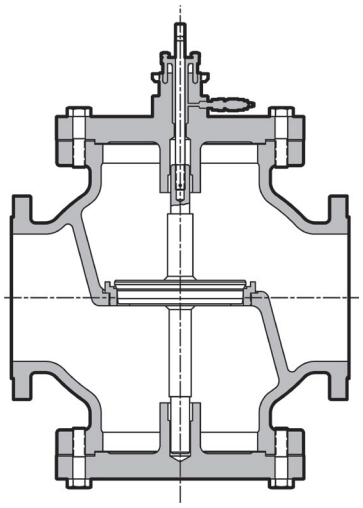
AGENCY APPROVALS

QAS INTERNATIONAL
ISO 9001:2008
REGISTERED FIRM

WARREN CONTROLS INC
A VETERAN OWNED, PRIVATELY HELD, SMALL BUSINESS

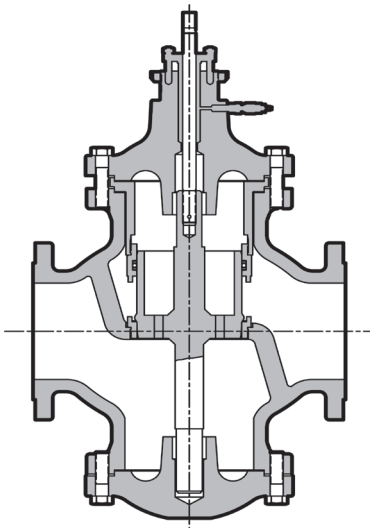


Extension Bonnet with Adjustible Graphite Packing 800F Max



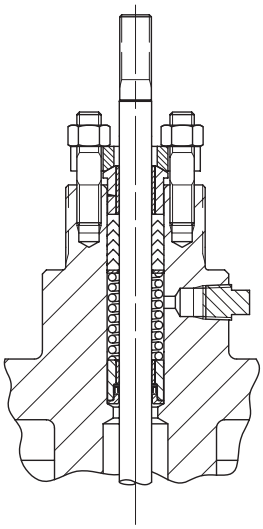
1840

Two-Way Single Seat Unbalanced Valve



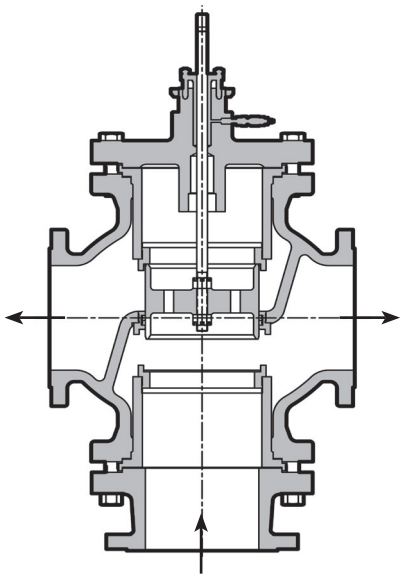
1843

Two-Way Single Seat Balanced Valve



TFE V-Ring Packing Spring-Loaded 450F Max

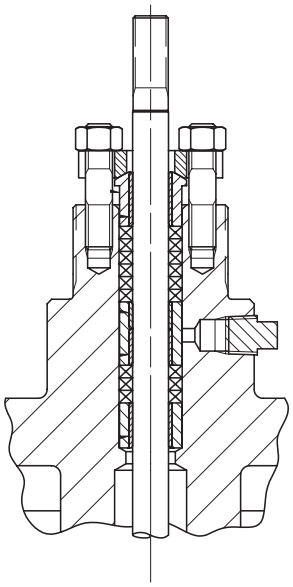
Stem lubricator is available as an option, but is not required for standard packing sets.



1852

Three-Way Diverting Valve

Common Port in Bottom



Adjustable Graphite Packing 500F Max

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 800ºF, severe service, high pressure drops, and corrosive fluids.

BODY STYLE VERSUS APPLICATION

2-WAY VALVES
(Control of Liquids, Gases, and Steam)

1840 2-Way Single Seat Unbalanced Valve

The most commonly applied solution with ANSI Class IV leakage rating standard. Available with Warren Class IV+ leakage rating for less leakage than ANSI Class IV (See Allowable Seat Leakage Classes table on page 4). **See Table on page 25 for Fluid Temperature Limits.**

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 Adjustable Graphite Adjustable Graphite w/Extension Bonnet (WCB or CF8M Bodies)
Rangeability:	50:1

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

1843 2-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 leakage rating standard. It is limited to cleaner fluids. Available with Warren Class IV+ leakage rating for less leakage than ANSI Class IV (See Allowable Seat Leakage Classes table on page 4).
See Table on page 25 for Fluid Temperature Limits.

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 Adjustable Graphite
O-Ring:	*Fluoraz 797
Rangeability:	50:1

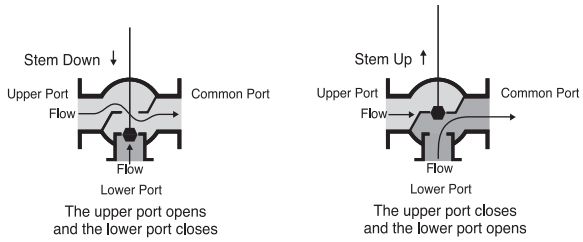
Flow direction is reversed when used with Cylinder Actuator Fail Closed.

3-WAY VALVES
(Control of Liquids)

1850 3-Way Mixing Valve

This valve has two inlets and one outlet, and is the simplest solution for mixing or bypass applications with an ANSI Class IV leakage rating. In normal applications the inlet pressures are near equal and control is possible from 5% to 95% of travel with inlet pressures up to 300 PSI. In the 1/2 through 2 inch sizes, the flow can be reversed for diverting if this port configuration is desirable. **See Table on page 25 for Fluid Temperature Limits.**

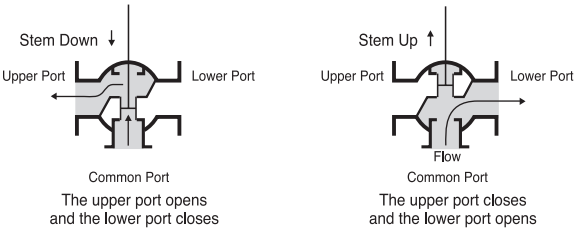
Sizes:	1/2, 3/4, 1, 1-1/2, 2, 2-1/2, 3, 4, 6, 8, 10, 12 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange (8 thru 12) WCB Steel or CF8M Stainless Steel 150LB Flange or 300LB Flange (1/2 thru 12)
Trim:	Linear, 316 Stainless Steel
Packing:	TFE V-Ring, Spring Loaded Adjustable Graphite Adjustable Graphite w/Extension Bonnet (WCB or CF8M Bodies)
Rangeability:	30:1 (sizes 1/2 thru 2) 50:1 (sizes 2-1/2 thru 12)



1852 3-Way Diverting/Mixing Valve

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

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 Adjustable Graphite
O-Ring:	*Fluoraz 797 (2-1/2 thru 4); EPR (6 thru 12)
Rangeability:	50:1



***NOTE**: Fluoraz O-Ring in Type 1843 and 1852 is **NOT** compatible with the following solvents: acetates, acetone, benzene, carbon tetracholide, ethers, Freons, ketones, lacquers, methyl ethyl ketone, tolune. Contact factory with service conditions for alternative O-Ring selection.

RATINGS & ALLOWABLE LIMITS

BODY PRESSURE-TEMPERATURE RATINGS:

Temp (F)	125 FLG Iron	250 FLG Iron	150 FLG Steel	300 FLG Steel	150 FLG St Steel	300 FLG St Steel
-20° To 100°	175	400	285	740	275	720
150°	175	400	272	710	255	670
175°	170	385	266	695	245	645
200°	165	370	260	680	235	620
225°	155	355	252	673	230	605
250°	150	340	245	667	225	590
275°	145	325	237	661	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	620	182	497
500°	-	-	170	605	170	480
550°	-	-	155	587	155	465
600°	-	-	140	570	140	450
650°	-	-	125	550	125	440
700°	-	-	110	530	110	435
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

ALLOWABLE SEAT LEAKAGE CLASSES

Leakage Class	Maximum Seat Leakage	Test Fluid	Test Pressure	Relative Seat Tightness
ANSI Class II	0.5% of rated CV	Water	45 to 60 PSI	1
ANSI Class III	0.1% of rated CV	Water	45 to 60 PSI	5
ANSI Class IV	0.01% of rated CV	Water	45 to 60 PSI	50
Warren Class IV+ (linear)	0.02 ml /min/ inch of trim size/ ΔP(PSI)	Water	Max Operating ΔP	6,000
Warren Class IV + (rotary)	0.005 ml /min/ inch of trim size/ ΔP(PSI)	Water	Max Operating ΔP	30,000
Class V	0.0005 ml /min/ inch of trim size/ ΔP(PSI)	Water	Max Operating ΔP	300,000
Class VI	Class VI about 0.9 ml/min *	Air	50 PSI	600,000

* Leakage rate varies by valve size, Refer to the ANSI/FCI Standard 70.2.

Class IV + is not an ANSI/FCI Designation, but a proprietary classification invented and used by Warren Controls, achievable with Metal or Ceramic seats. It is available as a SPECIAL ORDER. Consult Factory with fluid, shut-off pressure, and temperature.

ANSI Class V is a standard reserved for metal seated valves. Warren Controls does not offer this class. ANSI Class VI is reserved for soft seated valves, available with PTFE or PEEK seat inserts on Series 2800, 3800 & 5800 Valves.

ATTRIBUTE CRITERIA SELECTION

TRIM MATERIAL

316 STAINLESS STEEL
316 stainless steel is our most common and lowest cost trim material choice. 316 stainless steel trim is suitable for flowing differential pressures up to 100 psig, is capable of tight Class IV and Class IV+ leakage ratings, is corrosion resistant to many fluids, but is less erosion resistant than Alloy 6 wrapped trims. It contains nickel and molybdenum, and a greater amount of chromium, making it more corrosion resistant than 400 series stainless steel

ALLOY 6 WRAPPED 316 STAINLESS STEEL
Alloy 6 wrapped 316 stainless steel is an extremely durable choice for trim material. Alloy 6 wrapped trim is suitable for flowing differential pressures up to 300 psig, is capable of tight Class IV leakage rating. While somewhat corrosion resistant, Alloy 6 wrapped trim is particularly well suited to wear longer in a cavitation prone environment. Alloy 6 wrapped 316 stainless steel is more corrosion resistant, but less erosion resistant, than Alloy 6 wrapped 400 stainless steel trim.

PACKING TYPE:

TEFLON V-RING
Teflon v-ring packing is the most common choice for steam and most chemical applications. Teflon v-ring packing is good from 60°F to 450°F. TFE v-ring packing is not suitable for service below 60°F.

GRAPHITE
Graphite packing is our most durable packing material choice. Graphite packing is good from -20°F to 550°F and is required for temperatures above 450°F to the valve's limit of 550°F. For applications from 32°F to -20°F when condensation on the stem can turn to ice (consult factory) an optional stem heater may also be recommended.

TRIM STYLE:

EQUAL % VS. LINEAR
Trim style describes how the plug's shape (style) changes a valve's capacity as the plug moves (travels) inside it. With the Equal % Trim Style, the shape of the plug produces an equal percentage change in capacity for each equal incremental change in travel. As a typical case this results in 3% of capacity at 10% of travel, 4.4% of capacity at 20% of travel, 6.7% of capacity at 30% of travel, on up to 100% of capacity at 100% of travel. With the Linear Trim Style, the shape of the plug produces a linear incremental change in capacity for each incremental change in travel. This results in 10% of capacity at 10% of travel, 20% of capacity at 20% of travel, 30% of capacity at 30% of travel, on up to 100% of capacity at 100% of travel. Compared to the Linear Trim Style, the Equal % Trim Style produces smaller capacities for equal travels. This makes the Equal % Trim Style better suited for flows that are a small percentage of its total capacity, which may occur if the valve is not operating near full capacity, or when flows vary widely over time. The Linear Trim Style is better suited for flows that are a larger percentage of its total capacity which may occur if the valve is operating near full capacity and flows are more steady over time.

BONNET TYPE:

STANDARD:
For most applications when fluid temperature are between 60°F to 450°F. A thermaguard thermal blanket may still be required for fluid temperatures above 250°F.

GRAPHALLOY BEARINGS WITH EXTENSION BONNET
Bonnet constructions using Graphalloy bearings with an extension bonnet are the preferred choice for applications greater than 450°F. Three kinds of Graphalloy bearings are available. Copper based Graphalloy bearings are good from -20°F to 750°F for non-oxidizing media ONLY and are best suited for hot water and steam. Nickel based Graphalloy bearings are good from -20°F to 750°F for non-oxidizing media ONLY and are best suited for heat transfer oils. Oxidation resistant Graphalloy bearings are good from -20°F to 800°F for oxidizing media. Bonnet constructions using Graphalloy bearings with an extension bonnet are used with graphite packing and graphite gaskets. This construction is commonly selected for higher temperature applications where it is necessary to have space between the actuator and valve.

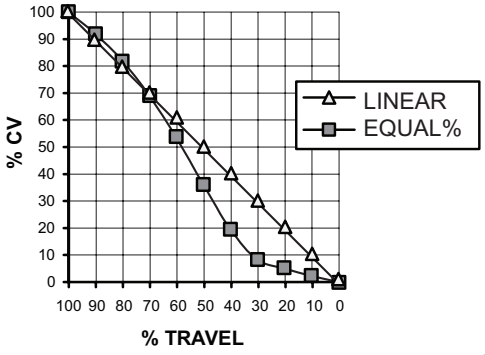
FLOW COEFFICIENTS (CV) VERSUS TRAVEL

2-WAY VALVES (Control of Liquids, Gases, and Steam)

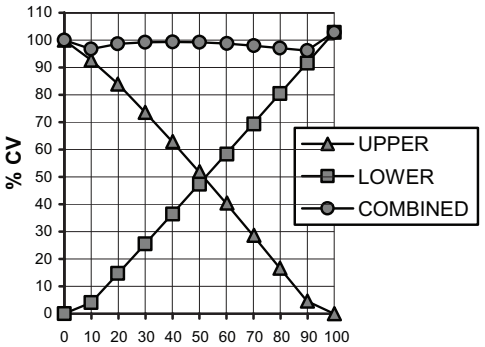
VALVE			1840 FLOW COEFFICIENTS (CV) 2-WAY SINGLE SEAT UNBALANCED VALVE									
Valve Size (IN)	Trim Style	Port Size	%Travel									
			100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
6	EQ%	Full	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
		1SR	178	158	130	93.5	51.8	22.4	13.5	10.3	7.16	3.99
		2SR	98.0	80.8	56.8	31.9	20.7	13.2	8.96	7.01	5.04	3.06
	Linear	Full	375	362	322	276	228	188	145	102	60.3	15.8
8	EQ%	Full	600	528	427	293	142	60.7	38.1	23.4	16.3	9.23
		1SR	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
		2SR	178	158	130	93.5	51.8	22.4	13.5	10.3	7.16	3.99
	Linear	Full	594	541	479	413	353	292	230	171	107	39.9
10	EQ%	Full	1000	926	762	572	362	159	67.1	37.9	26.0	14.1
		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
	Linear	Full	1000	900	800	700	600	500	400	300	200	100
12	EQ%	Full	1360	1228	1022	772	498	293	152	54.0	36.2	18.4
	Linear	Full	1360	1261	1119	968	821	683	542	397	261	119

VALVE			1843 FLOW COEFFICIENTS (CV) 2-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
	Linear	Full	375	362	322	276	228	188	145	102	60.3	15.8
8	EQ%	Full	600	528	427	293	142	60.7	38.1	23.4	16.3	9.23
		1SR	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
		2SR	178	158	130	93.5	51.8	22.4	13.5	10.3	7.16	3.99
	Linear	Full	594	541	479	413	353	292	230	171	107	39.9
10	EQ%	Full	1000	926	762	572	362	159	67.1	37.9	26.0	14.1
		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
	Linear	Full	1000	900	800	700	600	500	400	300	200	100
12	EQ%	Full	1360	1228	1022	772	498	293	152	54.0	36.2	18.4
	Linear	Full	1360	1261	1119	968	821	683	542	397	261	119

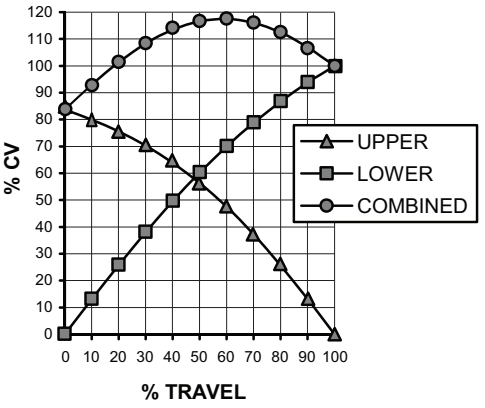
2-Way VALVE TYPICAL FLOW CURVES



1850 TYPICAL FLOW CURVE



1852 TYPICAL FLOW CURVE



3-WAY VALVES (Control of Liquids)

Valve				1850 FLOW COEFFICIENTS (CV) 3-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	1.126	Full	7.20
		0.876	1SR	4.90
		0.876	2SR	3.20
		0.626	3SR	2.00
1	Linear	1.126	Full	12.0
		1.126	1SR	7.20
		0.876	2SR	4.90
		0.876	3SR	3.20
1-1/2	Linear	1.676	Full	20.0
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

In the 1/2 through 2 inch sizes, the flow can be reversed for diverting if this port configuration is desirable.

VALVE		1852 FLOW COEFFICIENTS (CV) 3-WAY DIVET./ 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

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

or

Gallons = H x W x L (Ft.) x 7.5

Circular Tank Storage Capacity in Gallons

Storage = $6D^2$ x L (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

$$GPM_1 = GPM_2 \times \frac{\text{°F water}^2 \text{ temp. rise or drop}}{\text{°F water}^1 \text{ temp. rise or drop}}$$

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

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

Heating Liquids with Steam

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

Heating Liquids in Steam Jacketed Kettles

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

General Liquid Heating

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

Heating Air with Steam

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

SHUT-OFF ΔP RATINGS

VALVE		ACTUATOR		1840 SHUT-OFF ΔP 2-WAY SINGLE SEAT UNBALANCED							
				Maximum Shut-off ΔP in PSI							
				Fail Closed Reverse Acting				Fail Open Direct Acting			
				Air Signal to Actuator See "Pneumatic Ranges"... bottom right				Air Signal to Actuator See "Pneumatic Ranges"... bottom right			
Valve Size (IN)	Plug Travel (IN)	Pneu-matic Actuator	Spring Range	Range 1	Range 2	Range 3	Range 4	Range 1	Range 2	Range 3	Range 4
6	2	DL115	Low	NA	NA	NA	NA	8	17	69	110
			Full	N/A	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	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	53
		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	36
		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

NOTES:

1) 1840 leakage rating is ANSI Class IV. Warren Class IV+ leakage rating is available for less leakage than ANSI Class IV (See Allowable Seat Leakage Classes table on page 4).

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.

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

NOTES:

1) 1843 leakage rating is ANSI Class IV. Warren Class IV+ leakage rating is available for less leakage than ANSI Class IV (See Allowable Seat Leakage Classes table on page 4).

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		1843 SHUT-OFF ΔP 2-WAY SINGLE SEAT CYLINDER BALANCED							
				Maximum Shut-off ΔP in PSI							
				Fail Closed Reverse Acting				Fail Open Direct Acting			
				Air Signal to Actuator See "Pneumatic Ranges"... bottom right				Air Signal to Actuator 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	N/A	N/A	N/A	N/A
			Full	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			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
		Cylinder 8"		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	N/A	N/A	N/A
			Full	N/A	N/A	N/A	N/A	N/A	N/A	NA	NA
			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
		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	NA	NA
			Full	N/A	N/A	N/A	N/A	N/A	N/A	NA	NA
			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
		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	NA	NA
			Full	N/A	N/A	N/A	N/A	N/A	N/A	NA	NA
			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

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 values are for valves with TFE Packing.
For valves with graphite packing contact factory for shut-offs.

SHUT-OFF ΔP RATINGS

1/2 THRU 2 THREE-WAY MIXING

VALVE			ACTUATOR		1850 SHUT-OFF ΔP 3-WAY MIXING							
					Maximum Shut-off ΔP in PSI							
					Upper Port Closed Direct Acting				Lower Port Closed Direct Acting			
					Air Signal to Actuator				Air Signal to Actuator			
Trim Size (IN)	Valve Size (IN)	Plug Travel (IN)	Pneumatic Actuator	Spring Range	3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI	3-15 PSI	1-17 PSI	0-30 PSI	0-40 PSI
0.626	1/2 and 3/4	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	N/A	N/A	740		N/A	N/A	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	N/A	N/A	740		N/A	N/A	740	
1.126	3/4 and 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	N/A	N/A	740		N/A	N/A	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	N/A	N/A	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	N/A	N/A	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

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

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 leakage rating is 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.

1850
Three-Way Mixing Valve

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 leakage rating is 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.

2-1/2 THRU 12 THREE-WAY MIXING

1850 SHUT-OFF ΔP 3-WAY MIXING

VALVE		ACTUATOR		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			
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
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	N/A
			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	N/A
			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	104
			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	N/A
8	2-1/2	DL115	Low	N/A	N/A	N/A	N/A	N/A	N/A	33	56
			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	82
		Cylinder 12″		127	171	N/A	N/A	97	142	187	N/A
10	2-1/2	DL115	Low	N/A	N/A	N/A	N/A	N/A	N/A	20	34
			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	51
		Cylinder 12″		80	108	N/A	N/A	60	89	118	N/A
12	3	DL115	Low	N/A	N/A	N/A	N/A	N/A	N/A	12	23
			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	34
		Cylinder 12″		53	73	N/A	N/A	41	61	81	N/A

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

1850 Three-Way Mixing Valve See Flow Diagrams Page 9

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		1852 SHUT-OFF ΔP 3-WAY DIVERTING/MIXING							
				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			
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
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

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

1852
Three-Way Diverting Valve

PIPING NOTE*: The 1852 is **NOT compatible with an elbow directly connected or in close proximity to the bottom port w/o the use of a flow straighter. Otherwise a minimum of 10 diameters of straight pipe are required for the bottom port connection.

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 leakage rating is ANSI Class II.

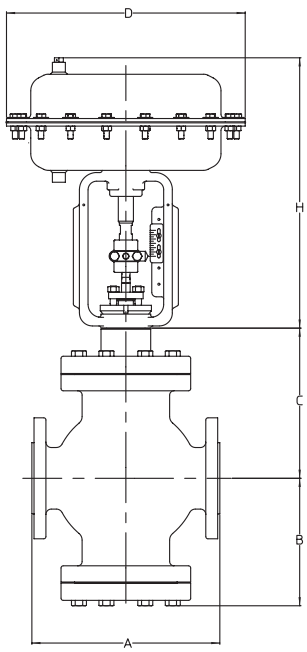
3) Inlet pressure **cannot** exceed Body Pressure- Temperature Rating.

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.

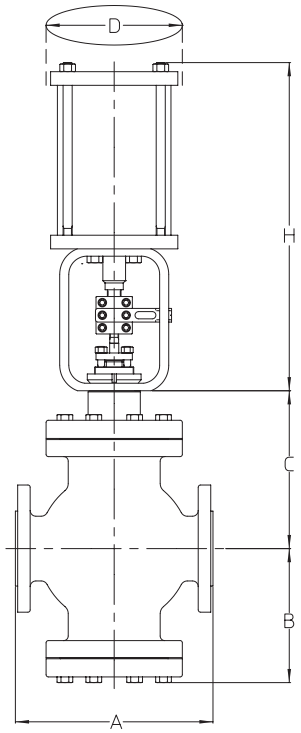
5) N/A indicates that the air signal is not capable of providing any shut-off or it exceeds the actuator's maximum air pressure.

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

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

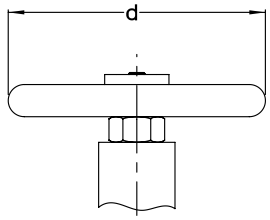


2-WAY w/ DL84

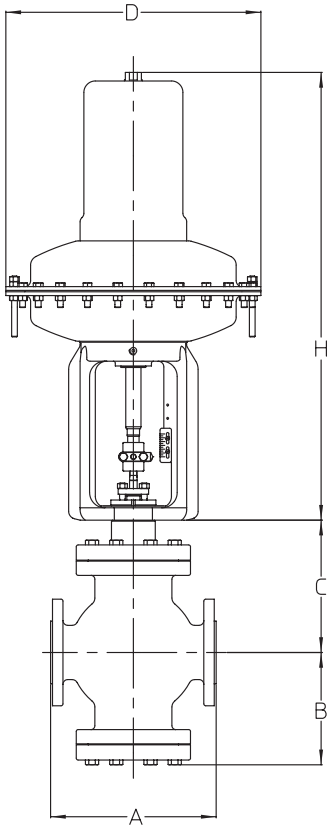


2-WAY w/ 8" or 12" Cylinder

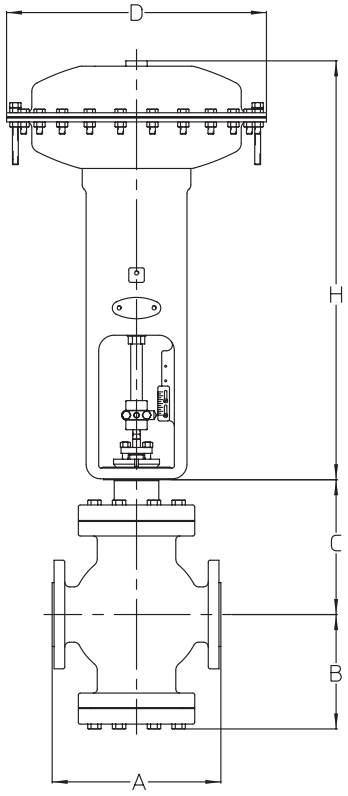
DIMENSION (IN) 1840		VALVE SIZE (IN)			
		6	8	10	12
A	125 or 150FLG	17-3/4	21-3/8	26-1/2	29
	250 or 300FLG	18-5/8	22-3/8	27-7/8	30-1/2
B		11-7/8	13-3/4	15-1/4	15-1/4
C	Standard	13-7/8	15-1/4	16-1/8	17
	Extension Bonnet	17-5/8	CF	CF	CF
Weight (LB)	Standard	390	650	1160	CF
	Extension Bonnet	400	CF	CF	CF



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) Hand-wheel	H MAX (IN)		WEIGHT (LB)	
			STD*	With Hand-wheel	STD	With Hand-wheel
DL84 Direct	13-7/8	8-1/8	16-3/4	24-1/8	48-1/2	CF
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

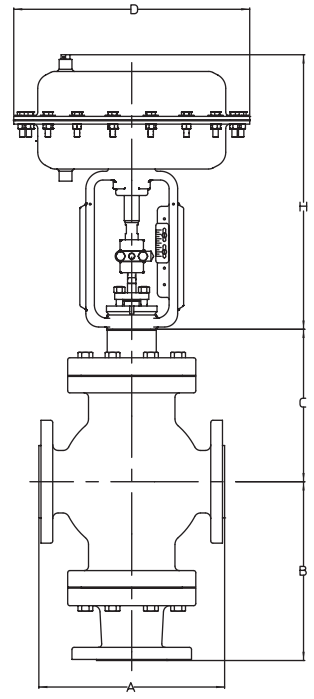
* Includes 1-3/8 inch for air fitting on direct acting diaphragm actuators

Actuator Removal Clearance

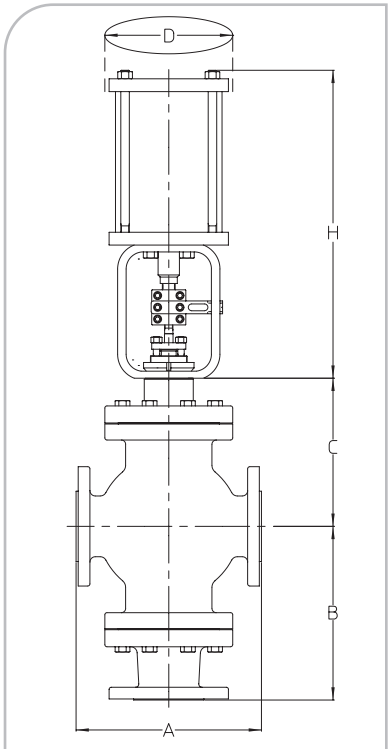
Above DL84 & 84XR on 1/2 thru 2 inch valve allow 5 inch.

Above DL84, 115, 115RX, 6" & 8" Cylinder on 2-1/2 thru 4 inch valve allow 5-5/8 inch.

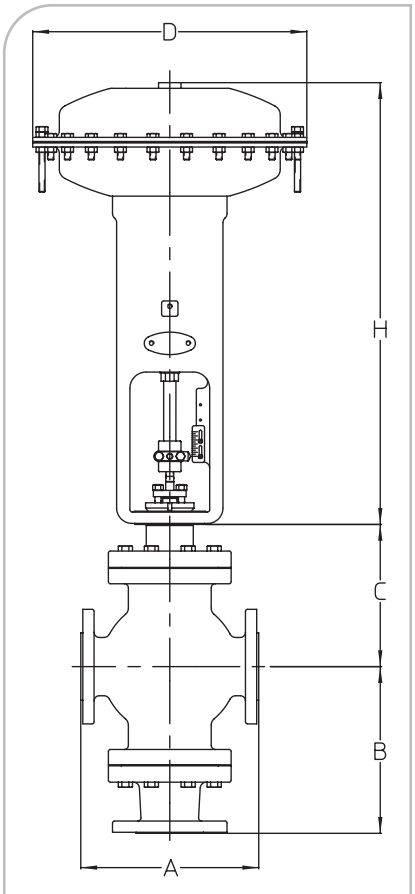
Above DL115, 115XR, 8" & 12" Cylinder on 6 inch valve allow 6-5/8 inch, on 8 inch & 10 inch valve allow 7-1/8 inch, and on 12 inch valve allow 7-5/8 inch.



3-WAY w/ DL84



3-WAY w/ 6", 8", or 12" Cylinder



3-WAY w/ DL115 or 115XR Direct

Fluid Temperature Limit Thresholds

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

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

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

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

However, we have attempted to do that in the tables that follow on page 31. Realize these are only guidelines.

Actuator Mounting VS. *Insulating Blankets*

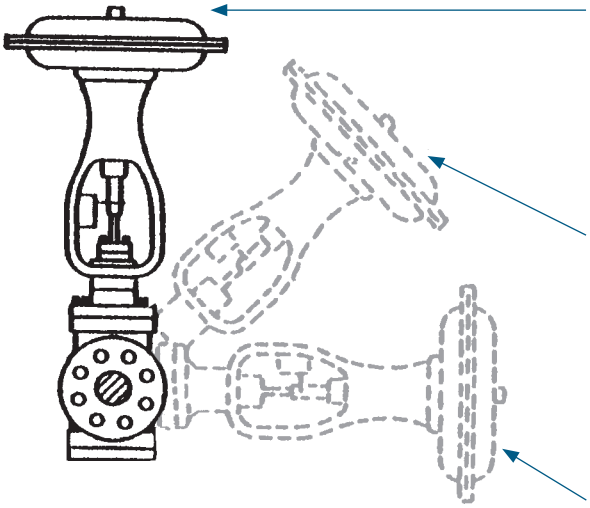
When working with higher fluid temperatures thermal insulating blankets can ***dramatically reduce surface temperatures on pipes, valves and other fixtures*** in a fluid control system such that the ambient room temperatures in these environments are dramatically reduced as well. This is often required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

Choose the right blanket

ACOUSTIGUARD™ VS. THERMIGUARD™

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

Predicting Safe Fluid Temperatures for Actuators & Accessories



VERTICAL ABOVE PIPING

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

45º FROM VERTICAL ABOVE PIPING ON EITHER SIDE

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

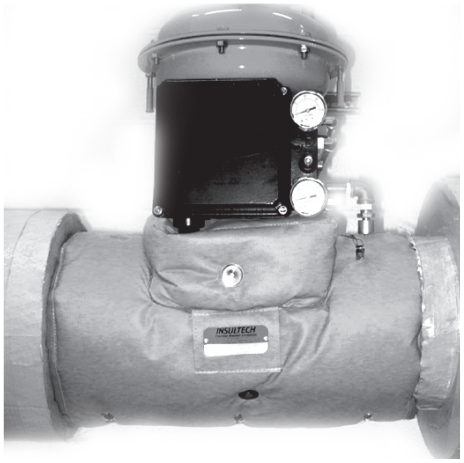
Actuators mounted in any position other than vertical MUST be supported independent of the valve.

90º TO PIPING HORIZONTAL ON EITHER SIDE

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

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

The tables that follow on page 31 will identify temperature ranges, valve size ranges, actuator orientation and use of thermal blankets to determine what is required to get longevity out of your actuators and accessories.



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

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

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

Sound Pressure Levels

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

HEAT/SOUND PRESSURE LEVELS GUIDELINES

Fluid Temperature Limit Guidelines

1800 DL84 DIAPHRAGM ACTUATOR

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

STANDARD BONNET

ACTUATOR ORIENTATION	Valve Size 1/2″ - 2″	Valve Size 2.5″ - 4″	Valve Size 6″ - 12″
	FLUID TEMPERATURE LIMIT		
Above the Valve	375°F	350°F	N/A
45° To the Side of the Valve	500°F	450°F	N/A
Either way w/ ThermiGuard*	450°F	450°F	N/A

EXTENSION BONNET

ACTUATOR ORIENTATION	Valve Size 1/2″ - 2″	Valve Size 2.5″ - 4″	Valve Size 6″ - 12″
	FLUID TEMPERATURE LIMIT		
Above the Valve	725°F	675°F	N/A
45° To the Side of the Valve	800°F	725°F	N/A
Either way w/ ThermiGuard*	800°F	800°F	N/A

** Custom Fit Insulating Blankets*

1800 ALL CYLINDER ACTUATORS

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

STANDARD BONNET

ACTUATOR ORIENTATION	Valve Size 1/2″ - 2″	Valve Size 2.5″ - 4″	Valve Size 6″ - 12″
	FLUID TEMPERATURE LIMIT		
Above the Valve	N/A	300°F	250°F
45° To the Side of the Valve	N/A	400°F	350°F
Either way w/ThermiGuard*	N/A	450°F	450°F

EXTENSION BONNET

ACTUATOR ORIENTATION	Valve Size 1/2″ - 2″	Valve Size 2.5″ - 4″	Valve Size 6″ - 12″
	FLUID TEMPERATURE LIMIT		
Above the Valve	N/A	600°F	550°F
45° To the Side of the Valve	N/A	675°F	625°F
Either way w/ ThermiGuard*	N/A	800°F	800°F

**Custom Fit Insulating Blankets, assumes pipes are insulated as well.*

1800 DL 115 DIAPHRAGM ACTUATOR

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

STANDARD BONNET

ACTUATOR ORIENTATION	Valve Size 1/2″ - 2″	Valve Size 2.5″ - 4″	Valve Size 6″ - 12″
	FLUID TEMPERATURE LIMIT		
Above the Valve	N/A	500°F	450°F
45° To the Side of the Valve	N/A	N/A	N/A
Either way w/ ThermiGuard*	N/A	450°F	450°F

EXTENSION BONNET

ACTUATOR ORIENTATION	Valve Size 1/2″ - 2″	Valve Size 2.5″ - 4″	Valve Size 6″ - 12″
	FLUID TEMPERATURE LIMIT		
Above the Valve	N/A	725°F	675°F
45° To the Side of the Valve	N/A	N/A	N/A
Either way w/ThermiGuard*	N/A	800°F	800°F

** Custom Fit Insulating Blankets*

These are simply rough guidelines and not absolute thresholds.

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.

VAC V200 Models:

VAC V200 Pneumatic

Models:	2FP_: Full Range Signal (3-15 PSIG) 2LP_: Low Range Signal (3-9 PSIG) 2HP_: High Range Signal (9-15 PSIG)
Options:	2SPDT Limit Switches, 4-20 mA Feedback
Ingress & Corrosion Protection:	NEMA, 4X, IP66
Supply Pressure:	20 to145 PSIG Max **Not to Exceed Actuator Rating**
Linearity error:	<0.7% f.s.
Hysteresis:	<0.4% f.s.
Repeatability:	<0.3% f.s.
Weight:	3.2 lbs

VAC V200 Electro-Pneumatic

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

VAC V200 Electro-Pneumatic Intrinsically Safe

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

VAC V200 Electro-Pneumatic Explosion Proof

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

VAC V200 Electro-Pneumatic Fail Freeze *

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

VAC All Models:

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

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

Approvals - V200 Positioners only

Ratings for hazardous locations:

V200-EX - Explosion Proof

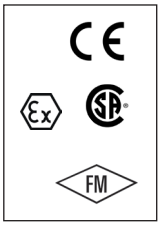
ATEX - Explosion Protection
1487X, instrinsically safe EEx ia llC T4/T5/T6

FM and CSA Explosions Proof	CL I, II Div 1 Grp B-G
Intrinsically Safe FM CSA	 CL I-II-III Div 1 Grp A-G CL II Div 1&2 Grp E-G CL III
Non Incendive FM	CL 1 Div2 Grp A-C

Temperature Class

	Short Circut Current-max	Ambient Temp max
T6	50 mA	140 F (60 C)
T5	60 mA	158 F (70 C)
T4	60 mA	185 F (85 C)

Intrinsically Safe

V200-IS **ATEX** EEX ia llcT4/T6	
FM CL1 Div1 Grp A B C D	
CSA EX is CL1 Grp A B C D EX is CL 1 Div2 Grp A B C D	

Siemens 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

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

All Models:

Construction:	Aluminum Housing with Epoxy/Polyester Powder Coat
Ingress & Corrosion Protection:	NEMA 4, 4X, IP65
Action:	Direct or Reverse
Supply Pressure:	150 PSIG Max **Not to Exceed Actuator Rating**
Media:	Clean Dry Oil Free Air Filtered to 3 micron
Flow Capacity:	9.0 SCFM
Air Consumption:	0.5 SCFM Typical
Air Connections:	1/4 NPT
Electrical Connection:	3/4 NPT
Gauges:	Input 0-30 PSIG Output 0-60 PSIG (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

VAC D400 Models:

4-20mA

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

4-20mA w/HART

Models: THN_:	Full Range Signal (2-Wire, 4-20 mA), HART Protocol 5.1
Explosion Protection:	Intrinsically Safe & Non-Incendive
Calibration:	Single-Button Auto-adjust Commissioning or Customized Auto-adjust
Operator Panel:	4 Push-Buttons and Two-Line LCD
Position Indicator:	Mechanical
Options:	4-20 mA Feedback Module, Digital Position Feedback Module, Proximity Switches NC, Proximity Switches NO.
Models: THX_:	Full Range Signal (2-Wire, 4-20 mA), HART Protocol 5.1
Explosion Protection:	Explosion Proof
Calibration:	Single-Button Auto-adjust Commissioning or Customized Auto-adjust
Operator Panel:	4 Push-Buttons and Two-Line LCD
Position Indicator:	Mechanical
Options:	4-20 mA Feedback Module, Digital Position Feedback Module, 24VDC/AC Micro-switches, Proximity Switches NC, Proximity Switches NO.

PROFIBUS PA

Models: TPN_:	Communication PROFIBUS PA Profile for Process Devices, Electro-Pneumatic Actuators, V3.0, In Compliance with IEC 61158-2
Explosion Protection:	Intrinsically Safe & Non-Incendive
Calibration:	Single-Button Auto-adjust Commissioning or Customized Auto-adjust
Operator Panel:	4 Push-Buttons and Two-Line LCD
Position Indicator:	Mechanical
Options:	Proximity Switches NC, Proximity Switches NO.
Models: TPX_:	Communication PROFIBUS PA Profile for Process Devices, Electro-Pneumatic Actuators, V3.0, In Compliance with IEC 61158-2
Explosion Protection:	Explosion Proof
Calibration:	Single-Button Auto-adjust Commissioning or Customized Auto-adjust
Operator Panel:	4 Push-Buttons and Two-Line LCD
Position Indicator:	Mechanical
Options:	24VDC/AC Microswitches, Proximity Switches NC, Proximity Switches NO.

FOUNDATION FIELDBUS ™

Models: TFN_:	Communication Foundation Fieldbus ™ Version 1.4, In Compliance with IEC 61158-2
Explosion Protection:	Intrinsically Safe & Non-Incendive.
Calibration:	Single-Button Auto-adjust Commissioning or Customized Auto-adjust
Operator Panel:	4 Push-Buttons and Two-Line LCD
Position Indicator:	Mechanical
Options:	Proximity Switches NC, Proximity Switches NO.
Models: TFX_:	Communication Foundation Fieldbus™ Version 1.4, In Compliance with IEC 61158-2
Explosion Protection:	Explosion Proof
Calibration:	Single-Button Auto-adjust Commissioning or Customized Auto-adjust
Operator Panel:	4 Push-Buttons and Two-Line LCD
Position Indicator:	Mechanical
Options:	24VDC/AC Micro-switches, Proximity Switches NC, Proximity Switches NO.

APPROVALS & RATINGS:
D400 Intrinsically Safe & Non-Incendive Models

FM

Intrinsically Safe:	Class I, II, III, Div. 1, Grp. A-B-C-D-E-F-G T6, T5, T4, Ta = 40 °C, 55 °C, 85 °C 901265 Entity, FISCO
Non-Incendive:	Class I, Div. 2, Grp. A-B-C-D T6, T5, T4, Ta = 40 °C, 55 °C, 85 °C
Suitable:	Class II, III, Div. 2, Grp. E-F-G T6, T5, T4, Ta = 40 °C, 55 °C, 85 °C

CSA

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

APPROVALS & RATINGS: D400 Explosion Proof Models

FM

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

CSA

Explosion Proof:	Class I; Div 1; Grp. C-D Class II; Div 1; Grp. E-F-G Class III
Temperature range:	-40 … 85 °C T5, max. 85 °C ; T6, max. 70 °C

All Models:

Construction:	Aluminum Case with Electrostatic Dipping Varnish with Epoxy Resin Stove Hardened.
Ingress & Corrosion Protection:	IP65 / NEMA 4X
Action:	Direct or Reverse
Supply Pressure:	20 to 90PSIG **Not to Exceed Actuator Rating**
Media:	Clean Dry Oil Free Air acc.to DIN / ISO 8573-1 Pollution and Oil Content According to Class 3 (Purity:Max. Particle Size: 5 µm, Max. Particle Density: 5 mg / m^3; Oil Content: Max. Concentration: 1mg / m^3; Pressure Dew Point: 10, K Below Operating Temperature
Output Flow Capacity:	2.3 SCFM at 20 PSIG, 6.0 SCFM at 90 PSIG
Air Consumption:	<0.015 SCFM (Independent of Supply Pressure)
Air Connections:	1/4-18 NPT
Electrical Connections:	1/2-14 NPT
Gauges:	Supply, Output
Ambient Temperature:	-40 to 185°F (Except with SJ2-S1N (NO) Proximity Switches -13 to 185°F)
Mounting:	Yoke Mounted

Available as Specials (Contact Factory for Details and Available Models)

Fail Freeze Function
Safety Integrity Level SIL2
ATEX, GOST, IECEx Approvals
Shutdown Module

OPTIONS:

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

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

L) 24VDC/AC Micro-switches
Two Micro-switches For Independent Position Signaling. Switching Points Adjustable Between 0 ... 10%
NOTE: For Explosion Proof Models ONLY

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

R) Proximity Switches NO
Two Proximity Switches For Independent Position Signaling. Switching Points Adustable Between 0 ... 100%
Switch Type SJ2-S1N (NO)
NOTE: Ambient Temperature -13 to 185°F

ACCEPTABLE OPTION COMBINATIONS

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

*** For 4-20mA w/ HART Models ONLY**

‡ For Explosion Proof Models ONLY

ACCESSORIES

Position Indication Switches

Proximity Mark 1

Models:

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

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

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

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

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

PX16: 4-20mA Transmitter, 2K OHM Pot, No Switches
Ambient Temperature: -40°F to 176°F
Power Requirements: 5 to 30 Vdc
Current Consumption: 50mA

All Models:

Locations: NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, 9, 12, 13
Approvals: & Ratings:
UL: Class I, Div. 1 & 2, Groups B, C, D; Class II, Div. 1 & 2, Groups E, F, & G
CSA: Class I, Div. 1 & 2, Groups A, B, C, D; Class II, Div. 1 & 2, Groups E, F, & G

Construction: Aluminum Housing, Hard Anodized
Electrical Connection: Screw Terminal
Conduit Connection: 3/4 NPT
Mounting: Yoke Mounted

I/P's

Type 500X

Locations:	NEMA 4X
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 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, 5 micron (D400 Positioners Require 5 micron Filter). Type 350SS, 25 micron
Mounting:	Chamber Mounted (Diaphragm Actuators) Remote Mounted (Cylinder Acturators)

Solenoids

Models:	For use with Diaphragm Actuators or Positioners with Cylinder Actuators 8320G184, EF8320G184 8320G202, EF8320G202 For use with Cylinder Actuators without Positioners 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:	83206G184, 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 (All), 24 Vdc (8320G184)
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

FACTORY DEFAULT SETTINGS

POSITIONERS

Valve Type	Actuator Action	Input Signal					Failure Modes		
		Pneumatic	Electro-Pneumatic	PROFIBUS PA	Foundation Fieldbus	Increasing Signal	Loss of Signal Valve Fails…[1]	Loss of Power Valve Fails…[2]	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[3]	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

[4] Reduced feedback span for valves with 760 and less then 1 inch travel.

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

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

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.

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	Lower Port Open/ Upper Port Closed	Lower Port Open/ Upper Port Closed	Lower Port Open/ Upper Port Closed[5]

[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.

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

CONFIGURATIONS

1. SELECTIONS

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

18☐ - ☐☐ ☐☐☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

VALVE BODY

Model	Valve Type	Size	Body Material	End Conn.	Trim Style	Trim Material	Trim Cv	Packing Type	Bonnet Construction
18H 2" - 4" Bodies Diaphragm: 84" or 115" Cylinder: 6" or 8"	**40** 2-Way, Single Seat	**050** 1/2 inch	**W** WCB	**F** 125/150 lb. Flanged	**E** Equal %	**S** 316 SS	**F** Full Port	**T** Teflon	**S** 450 Tmax
18J 6"-12" Bodies Diaphragm: 115" Cylinder: 8" or 12"	**43** 2-Way, Cage Balanced	**075** 3/4 inch	**F** CF8M	**G** 250/300 lb. Flanged	**L** Linear	**6** Alloy 6 Wrapped	**1** 1st Port Reduction	**G** Graphite	**G** Graphalloy Bearings w/Ext Bonnet
18K 1/2" - 1 1/2" Bodies Diaphragm: 84"	**50** 3-Way Mixing	**100** 1 inch	**R** Cast Iron		*Types 50/52 Linear Only*		**2** 2nd Port Reduction		**L** Nickel Based Graphalloy w/Ext Bonnet
	52 3-Way Diverting	**150** 1-1/2 inch	Cast Iron only avail. on 6"-10" 40, 6"-12" 43, 6"-12" 50, 6"-12" 52				**3** 3rd Port Reduction		**7** Oxidation Resistant Graphalloy Bearings w/Ext Bonnet
		200 2 inch					*Port reductions only available on Type 40, 43 & 50. Check factory for availability of reductions.*		*w/Ext. Bonnet 800F requires Graphite packing, only on WCB or CF8M bodies. Use for temp. up to 500F on Types 43 & 52 bodies only.*
		250 2-1/2 inch							
		300 3 inch							
		400 4 inch							
		600 6 inch							
		800 8 inch							
		010 10 inch							
		012 12 inch							

FLUID TEMPERATURE LIMITS

Valve Type	Body Material & Code	End Connection& & Code	Packing Type Code	Bonnet Construction & Code	T MAX	T MIN
40 2-Way Single Seat	WCB **W,** CF8M **F**	150 lb **F**, 300 lb **G**	Teflon **T**	Standard **S**	450ºF	60ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Standard **S**	500ºF	-20ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Ext. Bonnet **G, L, 7**	750ºF	-20ºF
	Cast Iron **R**	125 lb **F**	Teflon **T**	Standard **S**	350ºF	60ºF
	Cast Iron **R**	125 lb **F**	Graphite **G**	Standard **S**	350ºF	-20ºF
	Cast Iron **R**	250 lb **G**	Teflon **T**	Standard **S**	400ºF	60ºF
	Cast Iron **R**	250 lb **G**	Graphite **G**	Standard **S**	400ºF	-20ºF
43 2-Way Cage-Balanced w/Fluoraz 797 O-Ring	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Teflon **T**	Standard **S**	450ºF	60ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Standard **S**	450ºF	23ºF
	Cast Iron **R**	125 lb **F**	Teflon **T**	Standard **S**	350ºF	60ºF
	Cast Iron **R**	125 lb **F**	Graphite **G**	Standard **S**	350ºF	23ºF
	Cast Iron **R**	250 lb **G**	Teflon **T**	Standard **S**	400ºF	60ºF
	Cast Iron **R**	250 lb **G**	Graphite **G**	Standard **S**	400ºF	23ºF
50 3-Way Mixing	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Teflon **T**	Standard **S**	450ºF	60ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Standard **S**	500ºF	-20ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Ext. Bonnet **G, L ,7**	750ºF	-20ºF
	Cast Iron **R**	125 lb **F**	Teflon **T**	Standard **S**	350ºF	60ºF
	Cast Iron **R**	125 lb **F**	Graphite **G**	Standard **S**	350ºF	-20ºF
	Cast Iron **R**	250 lb **G**	Teflon **T**	Standard **S**	400ºF	60ºF
	Cast Iron **R**	250 lb **G**	Graphite **G**	Standard **S**	400ºF	-20ºF
52 3-Way Diverting (2-1/2" - 4") w/Flz. 797 O-Ring Seal	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Teflon **T**	Standard **S**	450ºF	60ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Standard **S**	450ºF	23ºF
52 3-Way Diverting (6" - 12") w/EPR OCT O-Ring	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Teflon **T**	Standard **S**	150ºF	60ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Standard **S**	150ºF	-20ºF
	Cast Iron **R**	125 lb **F**, 250 lb **G**	Teflon **T**	Standard **S**	150ºF	60ºF
	Cast Iron **R**	125 lb **F**, 250 lb **G**	Graphite **G**	Standard **S**	150ºF	-20ºF

NOTE: -20ºF T MIN temperature limit is for indoor applications with low humidity where ice will not form on the stem.

VALVE TYPE/TRIM MATERIAL COMBINATIONS:

Size	Trim Material	
	S 316 SS	**6** Alloy 6/316 SS
050 1/2 in.	50, 52	N/A
075 3/4 in.	50, 52	N/A
100 1 in.	50, 52	N/A
150 1-1/2 in.	50, 52	N/A
200 2 in.	50, 11	N/A
250 2-1/2 in.	50, 52	N/A
300 3 in.	50, 52	N/A
400 4 in.	50, 52	N/A
600 6 in.	40, 43, 50, 52	40, 43
800 8 in.	40, 43, 50, 52	40, 43
010 10 in.	40, 43, 50, 52	40, 43
012 12 in.	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

Actuator Series

00	None
	DIAPHRAGMS:
84	DL84 (84 Sq. In.)
8X	DL84XR (84 Ext Rng) for 58N only
15	DL115 (115 Sq. In)
5X	DL115XR
	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)

Action

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

Spring Range

0	None or Cylinder
L	Low 3-9 psi R/D
F	Full 3-15 psi R/D
H	High 9-15 psi R/D
X	Xtra-High DL84XR & DL115XR

Hand-wheel

0	None
R	Reverse
D	Direct

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

ACCESSORIES

Positioners, I/P's & Limit Switches

0000	None
	POSITIONERS:
2xP_	VAC V200 Pneumatic
2xE_	VAC V200 ElectroPneumatic
2xI_	VAC V200 ElectroPneu. Intrn. Safe
2xX_	VAC V200 ElectroPneu. Exp. Proof
2xF_	VAC V200 ElectroPneu. Fail Freeze
76P_	Moore760 Pneumatic
76E_	Moore 760 Electro-Pneumatic
TOZ0	VAC D400 4-20mA *
THN_	VAC D400 4-20mA w/HART Intrn. Safe & Non-Incend *
TPN_	VAC D400 PROFIBUS PA Intrn. Safe & Non-Incend.
TFN_	VAC D400 FOUNDATION Fieldbus Intrn. Safe & Non-Incend.
THX_	VAC D400 4-20mA w/HART Exp. Proof *
TPX_	VAC D400 PROFIBUS PA Exp. Proof
TFX_	VAC D400 FOUNDATION Fieldbus Exp. Proof
	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 (Factory Default)
L	Low of Split Range, 3-9 PSI or 4-12mA
H	High of Split Range, 9-15 PSI or -20mA

4th digit spec.

0	No Additions
L	w/Mech. Lmt Swtch's
F	w/4-20 Feedback
B	w/Swtch's & Feedbck

NOTE : L,F,B not available for 2xI , 2xX.

4th digit spec.

Individual Options

0	No Additions
F	w/4-20 Feedback Module (4-20mA w/HART Models ONLY)
K	w/Digital Position Feedback Module (4-20mA w/HART Models ONLY)
L	w/ 24VDC/AC Micro-Switch's (Exp. Proof Models ONLY)
P	w/Proximity Switch's NC

Option Combinations
(For 4-20mA w/HART Models ONLY)

A	= **F** & **K**
B	= **F** & **L** (Exp. Proof Mod. ONLY)
C	= **F** & **P**
E	= **K** & **L** (Exp. Proof Mod. ONLY)
G	= **K** & **P**
J	= **F** & **K** & **L** (Exp. Proof Mod. ONLY)
M	= **F** & **K** & **P**

See Actuators, Positioners, & Accessories • Section of Product Specification for details.

Air Filter Regulators

0	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

ASCO Solenoids

0	None
	120 Vac Coils:
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
	24 Vdc Coils:
Y	EF8320G184 Explosion Proof 3-Way Bras
Z	8320G184 3-Way Brass
4	EF8320G202 24VDC Coil 3-Way EXP SS
	24 Vac Coils:
3	8320G184 24 VAC Coil 3-Way Brass

Special Options

0	None
S	Special Opts or Set-Up
T	SS Tubing
G	SS Tagging
B	SS Tubing & 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.

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 18K All & 18H All
8X DL84XR	For 18K All & 18H 2" Body
15 115 Sq.In. (DL115)	For 18H 2 1/2"-4" & 18J All Bodies
5X DL115XR	For 18J All Bodies
Cylinders	
C2 6" Spring Fail	For 18H 2 1/2"-4" Body
C3 8" Spring Fail	For 18H 2 1/2"-4" Body
C4 8" Spring Fail	For 18J All Bodies
C5 12" Spring Fail	For 18J All Bodies

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

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

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.

1800 PRODUCT SPECIFICATION

1800 SERIES
Heavy Globe Control Valves

styles:

- 2-way balanced
- 2-way unbalanced
- 3-way mixing
- 3-way diverting

sizes	1/2 to 12 in.
class	250 & 300
ends	125 FF, 150, 250, 300 RF flg
body	Cast Iron, WCB,CF8M, Bronze (ASTM B61)
trim	316 SST, Alloy 6
Cv	up to 1649
temp.	-20° to 800°F
body limit	to 740 psi
leakage rates	class III, IV, IV+
rangeability	50:1

- Heavy Duty
- Severe Service
- High Pressure Differentials
- Corrosive Materials, Liquids, Gases & Steam
- Modulating or On/Off Control

2800 SERIES
Precision Globe Control Valves

styles:

- 2-way unbalanced
- 2-way low flow
- 3-way mixing
- 3-way diverting

sizes	1/2 to 2 in.
class	250 & 300
ends	Buttweld, NPT
body	Bronze, CF8M
trim	Bronze, 316 SST 17-4pH, Alloy 6, TFE, PEEK
Cv	up to 40
temp.	-20° to 500°F
body limit	to 720 psi
leakage rates	class III,IV, VI
rangeability	50:1

- Economical
- Precision Control
- Suited for Gases, Steam, or Liquids that are not Viscous or Solids Bearing

2900 SERIES
High Capacity General Purpose Globe Control Valves

styles:

- 2-way balanced
- 2-way unbalanced
- 3-way mixing
- 3-way diverting

sizes	2-1/2 to 10 in.
class	125 & 250
ends	125 FF, 250 RF flg
body	Cast Iron
trim	Bronze, 300 SS, 17-4pH, Alloy 6
Cv	up to 960
temp.	-20° to 400°F
body limit	to 400 psi
leakage rates	class II, III, IV
rangeability	50:1

- High Capacity
- General Purpose
- Moderate Pressure Drops
- Compatible Liquids and Gas, Steam & Water
- Modulating or On/Off Control

3800 SERIES
E-Ball Rotary Control Valves

styles:

- 2-way rotary
  - flow to open
  - flow to close

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
leakage rates	class IV, IV+, VI
rangeability	100:1

- Eccentric, Segmented Ball
- Well Suited for Erosive Service
- Various Trim Options Include Ceramic for Slurries or Gritty Materials & Teflon® for Class VI Shutoff

5800 SERIES
Compact Globe Control Valves

styles:

- 2-way unbalanced cage retained seat
- 2-way low flow unbalanced cage retained seat
- 2-way cage balanced cage retained seat

sizes	1/2 to 4 in.
class	300
ends	150,300 RF flg, Socketweld, NPT
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
leakage rates	class IV, IV+, VI
rangeability	50:1

- Highly Efficient, Compact Design
- High Pressure Drops
- Typically Suited for High Force Piston Actuators for Steam, Chemicals & Dirty Fluids