INDUSTRIAL LINEAR ELECTRICALLY ACTUATED

THREADED BODY, GENERAL PURPOSE, GLOBE CONTROL VALVES

PRODUCT SPECIFICATION

SERIES **2800** **ILEA**

SIZES: 1/2 TO 2 INCHES

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

2800E_PS_RevH_1121

2800 E 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

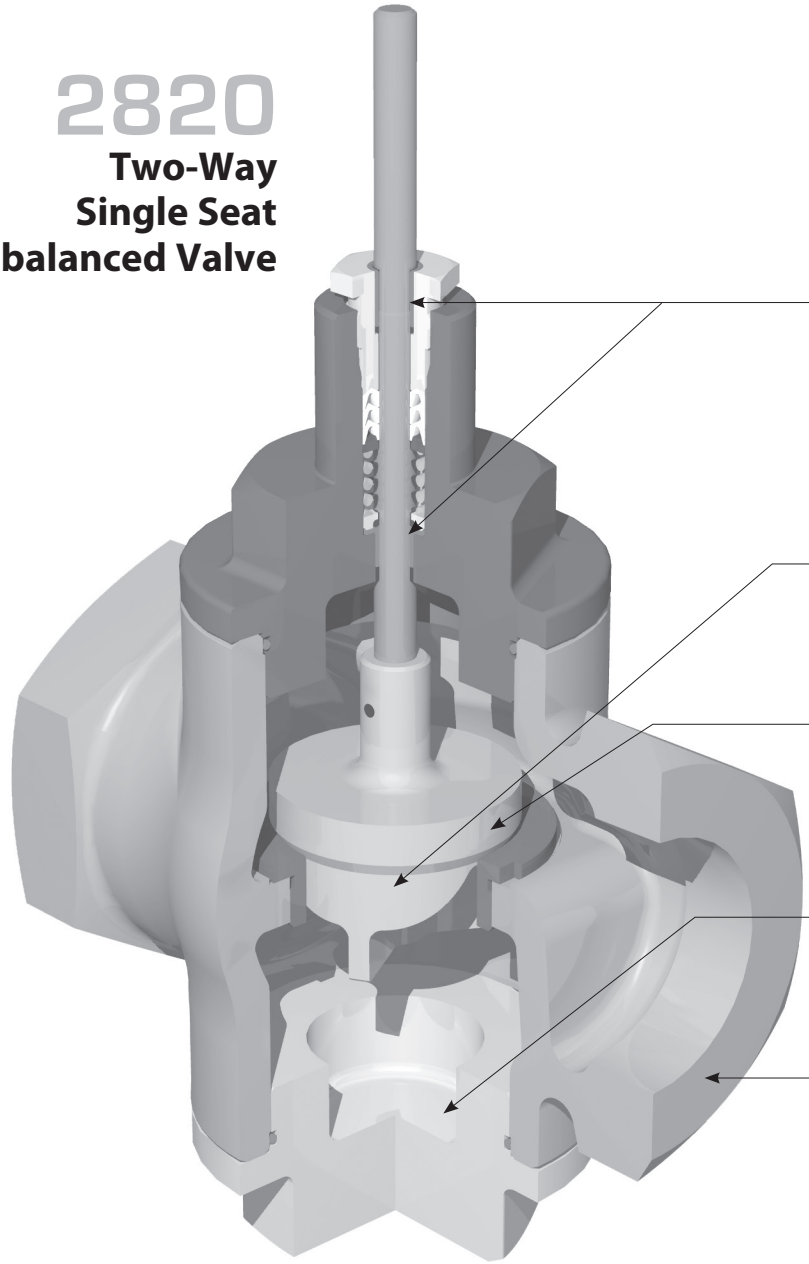
THE ILEA SERIES OF INDUSTRIAL, LINEAR, ELECTRIC ACTUATORS OFFER CONFIDENCE AND RELIABILITY WITH BEST IN CLASS PERFORMANCE SPECIFICATIONS IN TWO FRAME SIZES.

ILEA F-Series 450 LBF
ILEA A-Series 1011 LBF

Actuator: ILEA_F

Actuator: ILEA_A

2820
Two-Way Single Seat Unbalanced Valve



Flexible Design Options
provide optimum performance and extended reliability in a cost effective, application specific package.

Dual Point PEEK Bearing Stem Guiding
provides both stability and low friction, yielding reduced hysteresis and optimum control.

Trim
available in 316SS, 17-4 pH, Alloy 6, PEEK, and PTFE.

Port Guided Plug Assembly
provides stability and desired equal percentage flow characteristic.

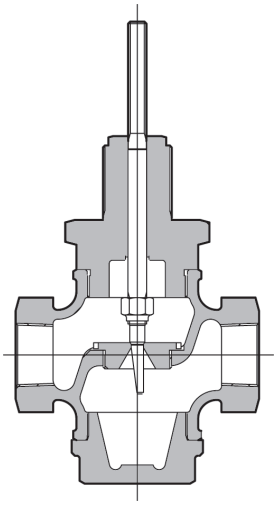
Lower Plug
offers easy access for inspection and clean out.

Rugged Body
with a selection of port reductions.

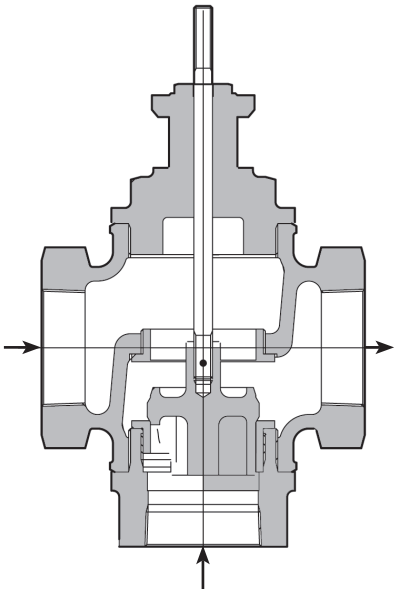
WARREN CONTROLS INC. A VETERAN OWNED, PRIVATELY HELD, SMALL BUSINESS

SERIES: 2800

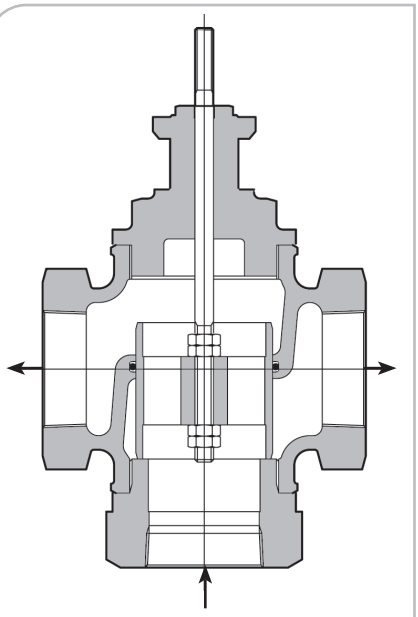
Precision Globe Control Valves



2828
Two-Way Single Seat Low Flow Unbalanced Valve



2830
Three-Way Mixing Valve



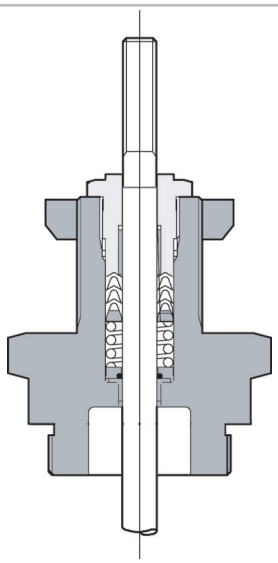
2832
Three-Way Diverting Valve

Description: Warren Controls Series 2800 Precision Globe Control Valves feature rugged bronze or stainless steel bodies 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 for pressure, temperature, level, and flow applications from -20 to 500ºF. The Series 2800 is ideally suited where value and long life are important objectives for applications including but not limited to the Chemical, Food & Beverage, General Service, Refining, District Energy, and pharmaceutical Industries.

SERIES: 2800

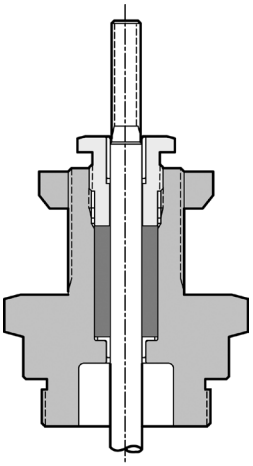
Packing & Seal Arrangements

Bronze or Stainless Steel Body

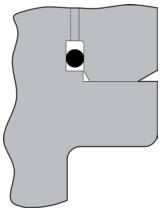


Guided Low-Friction TFE V-Ring Packing Spring Loaded

Stainless Steel Body Only

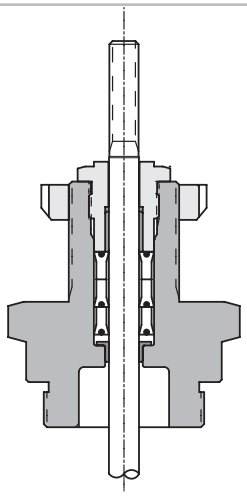


Adjustable Graphite Packing



Fluoraz O-Ring Upper and Lower Body Seals in Stainless Steel Body Valves

Bronze Body Only



Long-Life Multi-Stack EPDM Lip Packing

BODY STYLE VERSUS APPLICATION

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

2820 2-Way Single Seat Unbalanced Valve

The most commonly applied solution with ANSI Class IV and VI leakage rates. ***See Table on page 25 for Fluid Temperature Limits***

Sizes:	1/2, 3/4, 1, 1-1/4, 1-1/2, 2 inch
Body:	ANSI B16.15 Bronze 250LB Threaded (NPT), or 316 Stainless Steel 300LB Threaded (NPT), or 316 Stainless Steel 300LB SCH 40 Buttweld (BWE) Stainless Steel body valves contain Fluoraz 797 O-Ring upper and lower body seals.*
Trim:	EQ% or Linear, 316 Stainless Steel, Alloy 6, TFE, PEEK, or 17-4 pH Hardened Stainless Steel
Leakage Rates:	ANSI Class IV (Stainless Steel and Alloy 6 Trim), ANSI Class VI (TFE and PEEK Trim)
Packing:	Long-Life Multi-Stack EPDM Lip Packing Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing
Rangeability:	50:1

2828 2-Way Single Seat Low Flow Unbalanced Valve

Low Flow Trim with ANSI Class IV and VI leakage rates.

See Table on page 25 for Fluid Temperature Limits

Sizes:	1/2, 3/4, 1 inch
Body:	ANSI B16.15 Bronze 250LB Threaded (NPT), 316 Stainless Steel 300LB Threaded (NPT), or 316 Stainless Steel 300LB SCH 40 Buttweld (BWE) Stainless Steel body valves contain Fluoraz 797 O-Ring upper and lower body seals.*
Trim:	Modified Linear, 316 Stainless Steel, TFE, or PEEK
Leakage Rates:	ANSI Class IV (Stainless Steel Trim), ANSI Class VI (TFE and PEEK Trim)
Packing:	Long-Life Multi-Stack EPDM Lip Packing Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing
Rangeability:	40:1 for Cv 1.00 and 0.50 20:1 for Cv 0.25

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

3-WAY VALVES
(Control of Liquids)

2830 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 rate. In normal applications the inlet pressures are near equal and control is possible from 5% to 95% of travel with inlet pressures up to 100 PSI.

See Table on page 25 for Fluid Temperature Limits

Sizes:	1/2, 3/4, 1, 1-1/4, 1-1/2, 2 inch
Body:	ANSI B16.15 Bronze 250LB Threaded (NPT), or 316 Stainless Steel 300LB Threaded (NPT), or 316 Stainless Steel 300LB SCH 40 Buttweld (BWE) Stainless Steel body valves contain Fluoraz 797 O-Ring upper and lower body seals.*
Trim:	Linear, 316 Stainless Steel
Packing:	Long-Life Multi-Stack EPDM Lip Packing Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing
Rangeability:	50:1

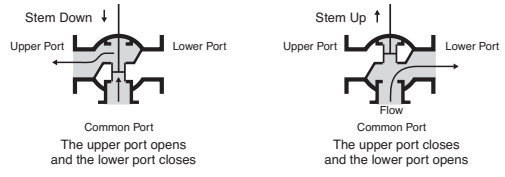
2832 3-Way Diverting/Mixing Valve

Designed as a diverting valve with one inlet and two outlets with ANSI Class III leakage rate. 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 50 PSID.

See Table on page 25 for Fluid Temperature Limits

(See Piping note on Page 8.)

Sizes:	1, 1-1/2, 2 inch
Body:	ANSI B16.15 Bronze 250LB Threaded (NPT), or 316 Stainless Steel 300LB Threaded (NPT), or 316 Stainless Steel 300LB SCH 40 Buttweld (BWE) Stainless Steel body valves contain Fluoraz 797 O-Ring upper and lower body seals.*
Trim:	Linear, Bronze (Bronze 250LB Threaded), or 316 Stainless Steel (316 Stainless Steel 300LB Threaded or Buttweld)
Packing:	Long-Life Multi-Stack EPDM Lip Packing Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing
O-Ring:	EPR (Bronze 250LB Threaded), Fluoraz 797 (316 Stainless Steel 300LB Threaded or Buttweld)*
Rangeability:	50:1

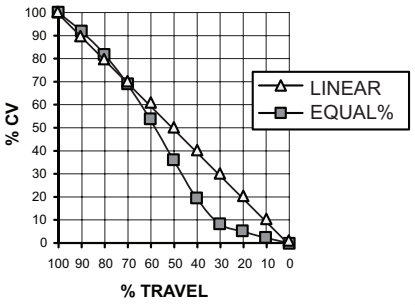


2-Way Valves (Control of Liquids, Gases, and Steam)

VALVE 2820 FLOW COEFFICIENTS (Cv) 2-WAY SINGLE SEAT UNBALANCED VALVE

Valve Size (IN)	Trim Style	Trim Size (IN)	Port Size	%Travel 100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
1/2	EQ%	0.876	FULL	4.90	4.78	3.53	2.57	1.92	1.20	0.95	0.69	0.43	0.17
		0.876	1SR	3.20	3.16	2.29	1.61	1.19	0.75	0.51	0.39	0.26	0.13
		0.626	2SR	1.50	1.44	0.96	0.72	0.52	0.42	0.31	0.21	0.10	0.06
	LINEAR	0.876	FULL	6.00	5.40	4.80	4.20	3.60	3.00	2.40	1.80	1.20	0.60
3/4	EQ%	0.876	FULL	7.20	7.09	5.53	3.51	2.53	1.73	1.24	0.88	0.52	0.27
		0.876	1SR	5.50	5.31	3.73	2.64	1.95	1.21	0.96	0.70	0.43	0.17
		0.876	2SR	3.30	3.30	2.34	1.63	1.20	0.75	0.51	0.39	0.26	0.13
		0.626	3SR	1.50	1.45	0.96	0.73	0.52	0.42	0.31	0.21	0.10	0.06
	LINEAR	0.876	FULL	7.20	6.48	5.76	5.04	4.32	3.60	2.88	2.16	1.44	0.72
1	EQ%	1.126	FULL	10.0	9.70	6.52	4.40	2.82	2.04	1.36	0.81	0.55	0.30
		0.876	1SR	8.60	8.38	6.09	3.64	2.58	1.74	1.25	0.89	0.52	0.27
		0.876	2SR	6.00	5.79	3.88	2.70	1.97	1.22	0.96	0.70	0.43	0.17
		0.876	3SR	3.40	3.41	2.38	1.64	1.20	0.75	0.51	0.39	0.26	0.13
		0.626	4SR	1.50	1.46	0.97	0.73	0.53	0.42	0.31	0.21	0.10	0.06
	LINEAR	1.126	FULL	10.0	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00
1-1/4	EQ%	1.438	FULL	16.0	15.5	10.4	7.04	4.51	3.26	2.18	1.30	0.88	0.48
		1.126	1SR	10.0	9.70	6.52	4.40	2.82	2.04	1.36	0.81	0.55	0.30
		0.876	2SR	8.60	8.38	6.09	3.64	2.58	1.74	1.25	0.89	0.52	0.27
		0.876	3SR	6.00	5.79	3.88	2.70	1.97	1.22	0.96	0.70	0.43	0.17
		0.876	4SR	3.40	3.41	2.38	1.64	1.20	0.75	0.51	0.39	0.26	0.13
	LINEAR	1.676	FULL	17.2	15.5	13.8	12.0	10.3	8.60	6.88	5.16	3.44	1.72
1-1/2	EQ%	1.676	FULL	24.0	22.5	19.7	15.1	10.3	7.30	4.90	3.20	1.90	0.90
		1.438	1SR	16.0	15.5	10.4	7.04	4.51	3.26	2.18	1.30	0.88	0.48
		1.126	2SR	10.0	9.70	6.52	4.40	2.82	2.04	1.36	0.81	0.55	0.30
		0.876	3SR	8.60	8.38	6.09	3.64	2.58	1.74	1.25	0.89	0.52	0.27
		0.876	4SR	6.00	5.79	3.88	2.70	1.97	1.22	0.96	0.70	0.43	0.17
	LINEAR	1.676	FULL	18.0	16.2	14.4	12.6	10.8	9.00	7.20	5.40	3.60	1.80
2	EQ%	2.126	FULL	40.0	37.1	33.1	27.3	19.8	13.2	8.50	5.30	2.80	1.10
		1.676	1SR	24.0	22.5	19.7	15.1	10.3	7.30	4.90	3.20	1.90	0.90
		1.438	2SR	16.0	15.5	10.4	7.04	4.51	3.26	2.18	1.30	0.88	0.48
		1.126	3SR	10.0	9.70	6.52	4.40	2.82	2.04	1.36	0.81	0.55	0.30
		0.876	4SR	8.60	8.38	6.09	3.64	2.58	1.74	1.25	0.89	0.52	0.27
	LINEAR	2.126	FULL	37.0	33.3	29.6	25.9	22.2	18.5	14.8	11.1	7.40	3.70

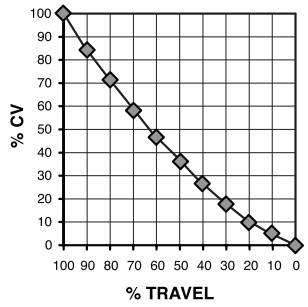
2820 TYPICAL FLOW CURVES



VALVE 2828 FLOW COEFFICIENTS (Cv) 2-WAY SINGLE SEAT LOW FLOW UNBALANCED VALVE

Valve Size (IN)	Trim Style	Trim Size(N)	Port Size	%Travel 100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
1/2	MODIFIED LINEAR	0.250	FULL	1.00	0.85	0.72	0.58	0.47	0.36	0.26	0.17	0.10	0.05
			1SR	0.50	0.43	0.36	0.29	0.23	0.18	0.13	0.09	0.05	0.03
			2SR	0.25	0.21	0.18	0.15	0.12	0.09	0.07	0.04	0.03	0.01
3/4	MODIFIED LINEAR	0.250	FULL	1.00	0.85	0.72	0.58	0.47	0.36	0.26	0.17	0.10	0.05
			1SR	0.50	0.43	0.36	0.29	0.23	0.18	0.13	0.09	0.05	0.03
			2SR	0.25	0.21	0.18	0.15	0.12	0.09	0.07	0.04	0.03	0.01
1	MODIFIED LINEAR	0.250	FULL	1.00	0.85	0.72	0.58	0.47	0.36	0.26	0.17	0.10	0.05
			1SR	0.50	0.43	0.36	0.29	0.23	0.18	0.13	0.09	0.05	0.03
			2SR	0.25	0.21	0.18	0.15	0.12	0.09	0.07	0.04	0.03	0.01

2828 TYPICAL FLOW CURVE



Pressure ratings are PSIG
For applications below 32°F consult factory.
For applications above 375°F, 300 THD Stainless Steel Body is recommended.

Body Pressure-Temperature Ratings (PSIG):		
Temp. (F)	250 THD Bronze	300 THD& BWE SS
-20° To 100°F	400	720
150°	400	670
175°	392	645
200°	385	620
225°	375	605
250°	365	590
275°	350	575
300°	335	560
325°	317	548
350°	300	537
375°	275	526
400°	250	515
450°	-	497
500°	-	480

AGENCY APPROVALS

QAS INTERNATIONAL
ISO 9001:2008
REGISTERED FIRM

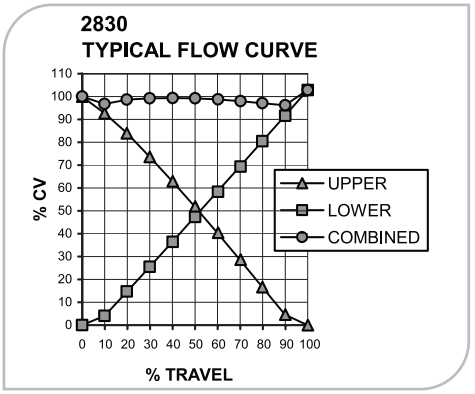
TRIM MATERIALS	FLOWING DIFFERENTIAL PRESSURE LIMIT
Bronze	50 PSID
316 Stainless Steel	100 PSID
TFE	15 PSID
PEEK	100 PSID
17-4 pH Hardened Steel	200 PSID
Alloy 6	300 PSID

FLOW COEFFICIENTS (Cv) VERSUS TRAVEL

3-Way Valves (Control of Liquids)

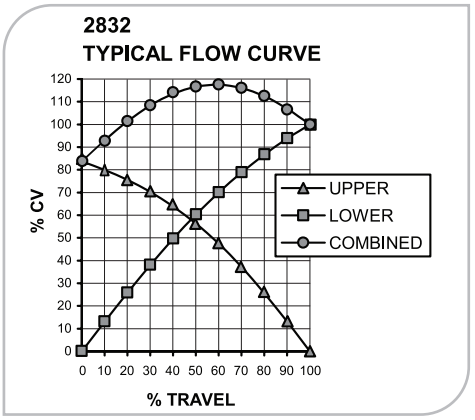
VALVE 2830 FLOW COEFFICIENTS (Cv) 3-WAY MIXING VALVE

Valve Size (N)	Trim Style	Trim Size(N)	Port Size	Travel 100%	Valve Size (IN)	Trim Style	Trim Size (IN)	Port Size	Travel 100%
1/2	LINEAR	1.126	FULL	6.30	1-1/4	LINEAR	1.676	FULL	18.5
		0.876	1SR	4.00			1.126	1SR	10.0
		0.626	2SR	2.00	1-1/2	LINEAR	1.676	FULL	20.0
		0.626	3SR	1.00			1.126	1SR	10.0
3/4	LINEAR	1.126	FULL	8.20	2	LINEAR	2.126	FULL	40.0
		0.876	1SR	4.00			1.676	1SR	20.0
		0.626	2SR	2.00					
		0.626	3SR	1.00					
1	LINEAR	1.126	FULL	10.0					
		0.876	1SR	4.00					
		0.626	2SR	2.00					
		0.626	3SR	1.00					



VALVE 2832 FLOW COEFFICIENTS (Cv) 3-WAY DIVERTING/MIXING VALVE

Valve Size (N)	Trim Style	Travel 100% Upper	Travel 100% Lower
1	LINEAR	12	15
1-1/2	LINEAR	22	26
2	LINEAR	40	47



SIZING REFERENCE & LOAD SIZING CALCULATIONS

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

Heating Water with Steam

Quick Method

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

Accurate Method

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

Heating or Cooling Water with Water

$$GPM_1 = GPM_2 \times \frac{°F\ water_2\ temp.\ rise\ or\ drop}{°F\ water_1\ temp.\ rise\ or\ drop}$$

Heating or Cooling Water

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

Heating Oil with Steam

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

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 Air with Water

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

Heating Liquids with Steam

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

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

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

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

ILEA-F SERIES: small frame actuators

High Quality, Modulating, Linear, Industrial Electric Valve Actuator

For smaller sized control valves, this compact design packs a nice set of features at an economical price point. The Brushless DC motor ensures long life.

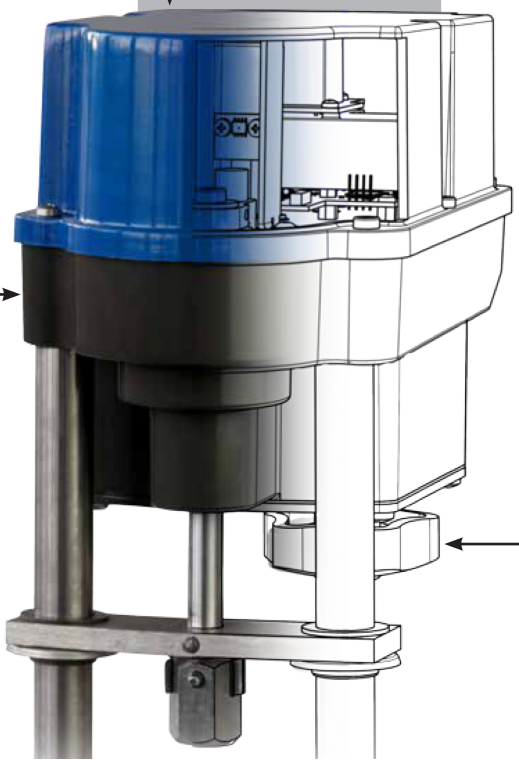
Robust industrial design with polycarbonate cover, enclosure IP65

Compact design with low installation height, durable aluminium gearbox

Integrated power spring for fail safe function in case of loss of power supply, either extending or retracting actuator stem

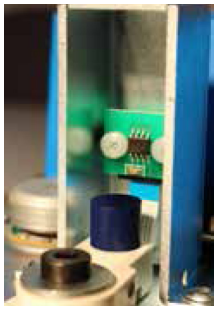
SPRING FAIL

FAIL-IN-PLACE



Manual operation with handwheel or push buttons. Parameter setting via DIP switches

FOR SPRING FAIL & FAIL-IN-PLACE



Contactless, non-wearing travel detection with Hall sensor for exact positioning

Brushless DC motor (BLDC). Controller with integrated positioner function. Status display and automatic commissioning

Manual operation with push buttons or handwheel. Parameter setting via DIP switches

	UNITS	SPRING-FAIL	FAIL-IN-PLACE	
		ILEA-F18-U/D	ILEA-F1A-M	
Thrust / Force	(Lbf)	450	450	
MAX Stroke	(Inches)	1.57	1.57	
Pillar distance, C to C	(Inches)	4	4	
Weight, approx. kg 5.6	(Lbs.)	12.3	11	
Stroke Speed	(Secs / Inch)	28	21	
Approximate Height	(Inches)	11	11	
Approx.clearance above to remove cover	(Inches)	3.25	3.25	
Manual Override		Electrically via 2 push buttons	Electrically via 2 push buttons or Handwheel	
What happens under the condition of Overvoltage/ Undervoltage on the power supply or loss of power.		Actuator engages Spring Fail, to Open or Closed, Depending on model.	Actuator Stops in Position when event occurs.	
What happens under the condition of Loss of Control Signal.		Actuator engages Spring Fail, to Open or Closed, Depending on model.	**4-20mA or 2-10 VDC**	**0-20mA or 0-10 VDC**
			Actuator Stops in Position when event occurs.	Actuator Assumes Lower Control Signal when event occurs.

GLOBAL SPECIFCATIONS for ILEA-F18-U/D and ILEA-F1A-M

Power Supply:	24 VAC/DC, optionally wide range PS (100-240 VAC)
Motor protection:	Electronic motor current monitoring with safety cut-off
Duty cycle as per IEC 60034-1,8:	S2 30 min/ S4 1200c/h-50% ED
Permitted ambient temperature:	-4°F to 140°F (-20°C to +60°C)
Internal fault monitoring:	Thrust, Control Signal, Temperature, Power Supply
Binary control:	24-230- VAC for ON/OFF service
Control Signal and Feedback:	0-20 mA, 4-20 mA, 0-10 V, 2-10 V selectable
Mounting Position:	Any position, except cover pointing downwards
Conduit entries:	2 pcs. M 20 x 1.5 /1 pc. M 16 x15 / Optional 1/2"Female NPT, NEMA4X (as an accessory)
Cover material:	Polycarbonate
Gear case material:	High quality aluminium die casting, powder-coated (60 µm thickness)
Enclosure Rating. to EN 60529:	IP65: Standard, IP67: Optional
Fuse - HV Power Supply:	1 AMP, 5 x 20 mm, 250 VAC, Slow Blow

ENERGY CONSUMPTION

ELECTRIC PARAMETER	UNITS	POWER SUPPLY VOLTAGE			
		115 VAC	*230 VAC*	*24 VAC*	*24 VDC*
Nominal Current	(Amps)	0.12	0.24	1.2	0.6
Max Current	(Amps)	0.12	0.24	1.2	0.6
Power Consumption	(Watts)	16.5	16.5	16.5	14.5

ILEA-A SERIES: medium frame actuators

High Quality, Modulating, Linear, Industrial Electric Valve Actuator

Feature rich and proven design with robust construction provides reliable, trouble free service.

All common power supplies: single phase,and d.c. voltage. Suitable for control operations. Protection class IP67 is standard.

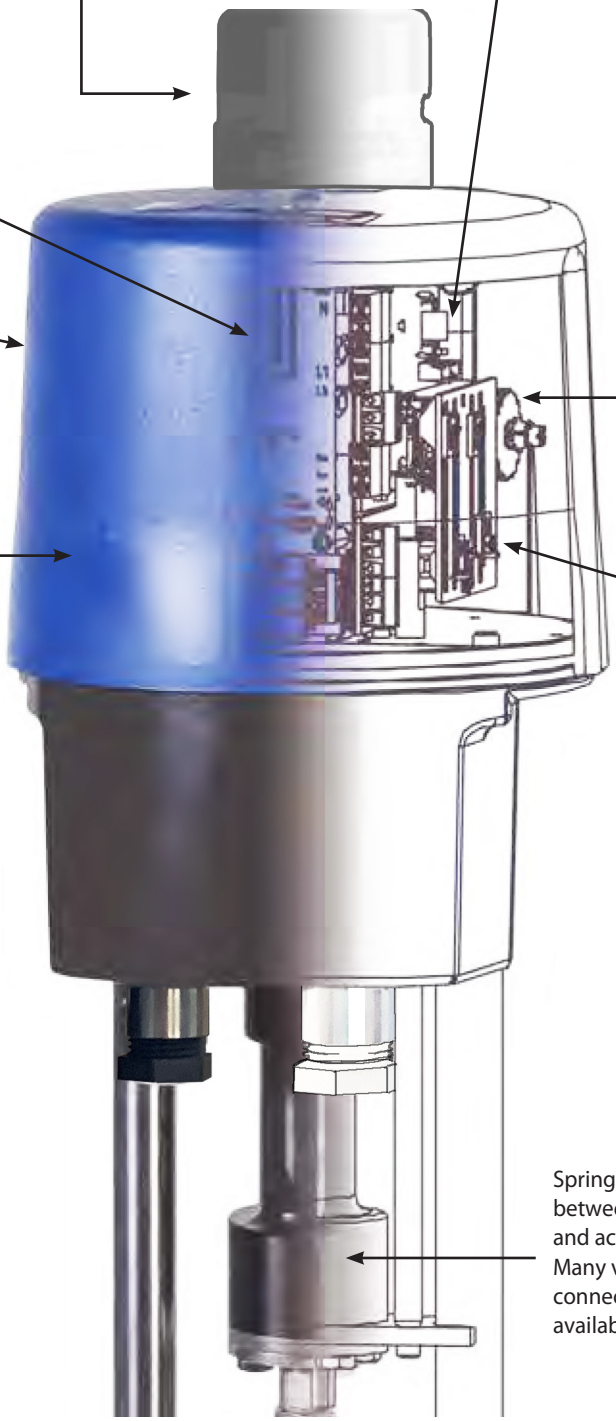
No switching-over to manual operation needed. The hand wheel serves as an operation indicator and is always ready for operation

Vibration-proof potentiometer suspension

Efficient motor for precise positioning and controlling with a long duty cycle

Friction clutch prevents damage

Compact, corrosion resistant, sturdy and light-weight due to high-quality aluminum alloys



IP67 ENCLOSURE METAL COVER

Precise valve setting:
- with fine adjustment of cams
- with stroke scale

Spring clutch between valve and actuator. Many valve connections are available

Electronic board

IP67 ENCLOSURE POWDER COAT ALUMINUM

ILEA-A SERIES ACTUATORS SPECIFICATIONS

	UNITS	ILEA-A3D-S			ILEA-A3D-M
Thrust / Force	(Lbf)	1,010			1,010
MAX Stroke	(Inches)	2			2
POWER SUPPLY	***VOLTAGE***	***24 VDC***	***24 VAC***	***115 VAC***	***24 VAC***
Nominal Current	(Amps)	2	3.15	0.66	3.15
MAX Current	(Amps)	2.6	4.1	0.86	4.1
Power Consumption	(Watts)	48	53	57	53
Fail Mode, Loss of Power		Fail-Safe, Capacitive, Selectable			Fail-In-Place
Pillar distance, C to C	(Inches)	4			
Weight, approx. kg 5.6	(Lbs.)	17.6			
Stroke Speed	(Secs / Inch)	6 to 11 (Default is 11)			
Approximate Height	(Inches)	19			
Approx.clearance above to remove cover	(Inches)	4			

GLOBAL SPECIFCATIONS for ILEA-A/B/G	
Manual override	Handwheel (For use when unpowered)
Duty Cycle & Motor Protection: (Per IEC 60034-1,8)	The motor has electronic current monitoring and temperature monitoring with a safety cutoff. Per IEC, the actuator is rated for S2 30 Min / S4 1200 Cycles/Hr. – 50% ED. In lab testing, duty cycle is potentially 100% and a function of motor load. At no inlet pressure to the valve it can run 100% moving for months w/o problem. Even with mild differential pressure on the valve plug it can run near continuously. At some point though, the motor will begin to heat up. The motor has a built in temperature sensor and when motor temperature exceeds 65°C, the motor's speed is reduced by 50%, in theory it should allow the motor temperature to then drop below 65°C, at which time the motor would go back to normal speed. Should the motor keep rising to exceed 70°C. then the motor would stop and the fail-safe circuit would take the valve to the designated FAIL-SAFE position.
Permitted ambient temperature	-4°F to 140°F (-20 to +60°C)
Binary Control	24 V for ON/OFF control (min. duration of pulse 1s)
Internal Fault Monitoring	Torque, set value, temperature, power supply, positioning deviation etc., adjustable
Duty cycle as per IEC 60034-1,8	S2 30 min S4 50% ED @ 25°C
Permitted ambient temperature	-4°F to 140°F (-20 to +60°C)
Automatic Startup	Recognizing the end position(s) and auto-scaling control and feedback values
Internal fault monitoring	Thrust, control signal, temperature, power supply
Diagnostics Function	Stores cumulated operation data (motor and total running time, number of motor starts) and data sets of current values (set value, feedback value, torque, temperature and error messages)
Communication Interface	Optional umbilical cable with USB Connection and software that allows for data reading and parameterization
Control Signal and Feedback	0 (4)..20 mA or 0 (2)..10 V selectable, split range operation
Valve Positioner Function	Integrated, deadband adjustable from 0.5 .. 5%, shut-off MIN
Mounting Position	Any position, except below horizontal
Conduit entries	2 pcs. 1/2" Female NPT, NEMA4X
Enclosure Rating	IP 67, according to EN 60529
Cover material	Powder Coated Aluminum
Optional Local Controls	Illuminated display to show the actuator status and lockable selector to switch between modes: automatic, manual process ON/OFF, STOP and parameter menu. Control buttons for manual movement, menu operation
Optional User Limit Switches	Potential-free additional position switches with silver contacts (0.1 A - 5 A switching current)
Fault Indication Relay	Standard, potential-free opening contact provides a freely definable (programmable) collective fault signal and doubles for indication for when optional Local Controls is NOT in remote mode.
Heating Resistor	Optional, primarily to prevent condensation
Additional Special Order Options	Profibus, Foundation Fieldbus

ILEA ACTUATOR SPECIFICATIONS

The Industrial Linear Electric Actuators (ILEA Series) is a best-in-class, robust and proven design with features and options not available elsewhere and now available at an attractive price point.

Depending on model with the ILEA Series, here is a listing of the possible features, attributes and options
(not all available on every model)

- 24Vac/Vdc, 115 Vac, 230 Vac, 320 - 575 Vac / 3-Phase / 60 Hz
- Spring Fail Safe, Capacitive Fail Safe and Fail-In-Place
- Handwheel Override
- Fast or Slow, Fixed or Adjustable speed ranges
- Profibus, Foundation Fieldbus, others
- IP65 or IP67 Enclosures
- Heaters
- Limit & Fault Switches
- Integral Local Control Station
- Multiple forces from 450 Lbf to 5620 Lbf.
- Modulating Control or ON/OFF
- Control & Feedback signals mA or Vdc
- Tested for EMC conducted and radiated emissions to EN55014-1, EN55022 and EN61000 specifications
- Software programmable settings with umbilical cord to fine tune operating parameters

ILEA ACTUATOR STOCKED MODELS

Warren Controls has ready stock on 11 popular models and a handful of the most popular configurable options, with dozens of other models available with only a 4-week delay on the order cycle.

Small Frame Size ILEA-F Model

- 450 Lbf with Spring Fail (up or down), speed range up to 85 seconds/inch of travel
- 450 Lbf with Fail-In-Place, speed range up to 21 seconds/inch of travel & handwheel
- IP65 Enclosure Only, 24Vac/Vdc or Universal 115 – 230 Vac Supply

Warren Controls factory stocked options include:
Limit Switches, Heater and High Voltage Power Supply

Model #'s

ILEA-F18-D400-5000
ILEA-F18-D500-5000
ILEA-F18-U400-5000
ILEA-F18-U500-5000
ILEA-F1A-M400-5000
ILEA-F1A-M500-5000

The optional High Voltage (100-240 Vac) Power Supply is Available and stocked.

Medium Frame Size ILEA-A Model

- 1,011 Lbf with Capacitive Fail-Safe, Speed range up to 6 seconds per inch of travel (Factory default: 11 seconds/inch) 24 Vac, IP67
- 1,011 Lbf with Fail-In-Place, Speed range up to 6 seconds per inch of travel (Factory default: 11 seconds/inch) 24 Vac, IP67
- 1,011 Lbf with Capacitive Fail-Safe, Speed range up to 6 seconds per inch of travel (Factory default: 11 seconds/inch) 115 Vac, IP67

Warren Controls factory stocked options include:Limit Switches, Heater, Local Control Station and Software / Programming umbilical cord.

Model #'s

ILEA-A3D-S100-7000
ILEA-A3D-S400-7000
ILEA-A3D-S500-7000
ILEA-A3D-M400-7000
ILEA-A3D-M500-7000

SHUT-OFF ΔP RATINGS

NOTES:

1) 2820 leakage rates are ANSI Class IV (Stainless Steel Trim and Alloy 6 Trim), ANSI Class VI (TFE and PEEK Trim) 2828 leakage rates are ANSI Class IV (Stainless Steel Trim), ANSI Class VI (TFE and PEEK Trim).

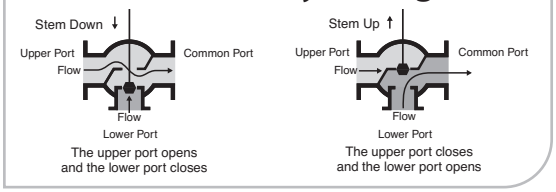
2) Inlet pressure **cannot** exceed Body Pressure-Temperature Rating.

VALVE				ILEA ACTUATOR	2820 SHUT-OFF ΔP (PSIG) 2-WAY SINGLE SEAT UNBALANCED
Trim Size (IN)	**Valve Size (IN)**	**Cv Rating**	**Plug Travel (IN)**	**Model Code Prefix**	**Fail Open, Closed or In Place**
0.626	1/2" thru 1-1/4"	See Tables	3/4	F18, F1A	720
				A2x	720
				A3x, P3x	720
0.876	1/2 thru 2"	See Tables	3/4	F18, F1A	519
				A2x	627
				A3x, P3x	720
1.126	1" thru 2"	See Tables	3/4	F18, F1A	298
				A2x	364
				A3x, P3x	720
1.438	1-1/4" thru 2"	See Tables	3/4	F18, F1A	171
				A2x	211
				A3x, P3x	453
1.676	1-1/4" thru 2"	See Tables	3/4	F18, F1A	119
				A2x	148
				A3x, P3x	327
2.126	2"	See Tables	3/4	F18, F1A	66
				A2x	84
				A3x, P3x	195

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

VALVE			ILEA ACTUATOR	2828 SHUT-OFF ΔP (PSIG) 2-WAY, SINGLE SEAT LOW FLOW, UNBALANCED
ValveSize (IN)	**Cv Rating**	**Plug Travel (IN)**	**Model Code Prefix**	**Fail Open, Closed or In Place**
1/2 thru 1" All Ports	See Cv Tables	3/4	F18, F1A	720
			A2x	
			A3x, P3x	

2830 Three-Way Mixing Valve

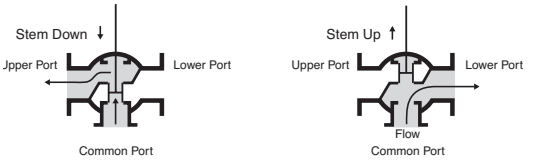


NOTES:

1) 2830 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.
2) 2830 leakage rate is ANSI Class IV.
3) Inlet pressure **cannot** exceed Body Pressure-Temperature Rating.

VALVE				ILEA ACTUATOR	2830 SHUT-OFF (PSIG) ΔP 3-WAY MIXING	
					Fail Open, Closed or In Place	
Trim Size (IN)	Valve Size (IN)	Cv Rating	Plug Travel (IN)	Model Code Prefix	Lower Seat	Upper Seat
0.626	1/2" thru 1"	See Tables	9/16	F18, F1A	720	720
				A2x	720	720
				A3x, P3x	720	720
0.876	1/2" thru 1"	See Tables	9/16	F18, F1A	519	592
				A2x	627	700
				A3x, P3x	720	720
1.126	1/2" thru 2"	See Tables	9/16	F18, F1A	298	343
				A2x	364	408
				A3x, P3x	720	720
1.676	1-1/4" thru 2"	See Tables	3/4	F18, F1A	119	139
				A2x	148	168
				A3x, P3x	327	347
2.126	2"	See Tables	3/4	F18, F1A	66	78
				A2x	84	97
				A3x, P3x	195	208

2832 Three-Way Diverting Valve



****PIPING NOTE***: The 2832 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.

VALVE			ILEA ACTUATOR	2832 SHUT-OFF ΔP (PSIG) 3-WAY DIVERTING/MIXING	
				Fail Open, Closed or In Place	
Valve Size (IN)	Cv Rating	Plug Travel (IN)	Model Code Prefix	Lower Seat	Upper Seat
1"	12 / 15	3/4	F18, F1A	100	100
			A2x		
			A3x, P3x		
1-1/2"	22 / 26	3/4	F18, F1A	100	100
			A2x		
			A3x, P3x		
2"	40 / 47	3/4	F18, F1A	100	100
			A2x		
			A3x, P3x		

1) Published shut-off values are for diverting applications. The values are worst case and based on the pressure difference between the inlet and the outlet that is closed. Consult the factory if the required shut-off exceeds the published value and the pressure at the inlet and both outlets is known. For proper operation in diverting applications, the pressure difference between both outlets must not exceed 50 PSI. Consult the factory for shut-off values for 2832 mixing applications.

2) 2832 leakage rate is ANSI Class II.

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

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

ILEA FACTORY AVAILABLE ACCESSORIES OVERVIEW

For ILEA-A/B models

Local Control Station **-** Switch between the remote analog control signal and a locally generated control signal via Up and Down push buttons. Includes a display indicating stroke percentage and a STOP function. If the local control station is in STOP or LOCAL, the Fault Indication Relay will energize for positive indication back to the central control system.

1 Local control PSC.2 with connection cable.

For ILEA-A/B models

IP67 Rated Metal Enclosure **–** With the IP67 rated enclosure the actuator can be subject to strong and sustained water jets with no water ingress into the enclosure. The epoxied aluminum enclosure offers high strength and integrity while the sealed cap over the manual override offers additional protection. (Now Standard)

Additional Items:

- User Limit switches rated for min. 0,1A / max. 10A @230VAC/DC
- Resistance Heater in outdoor applications to guard against condensation
- Software and USB Umbilical programming and data retrieval cable.
- 1/2" NPT / NEMA 4X conduit fittings.

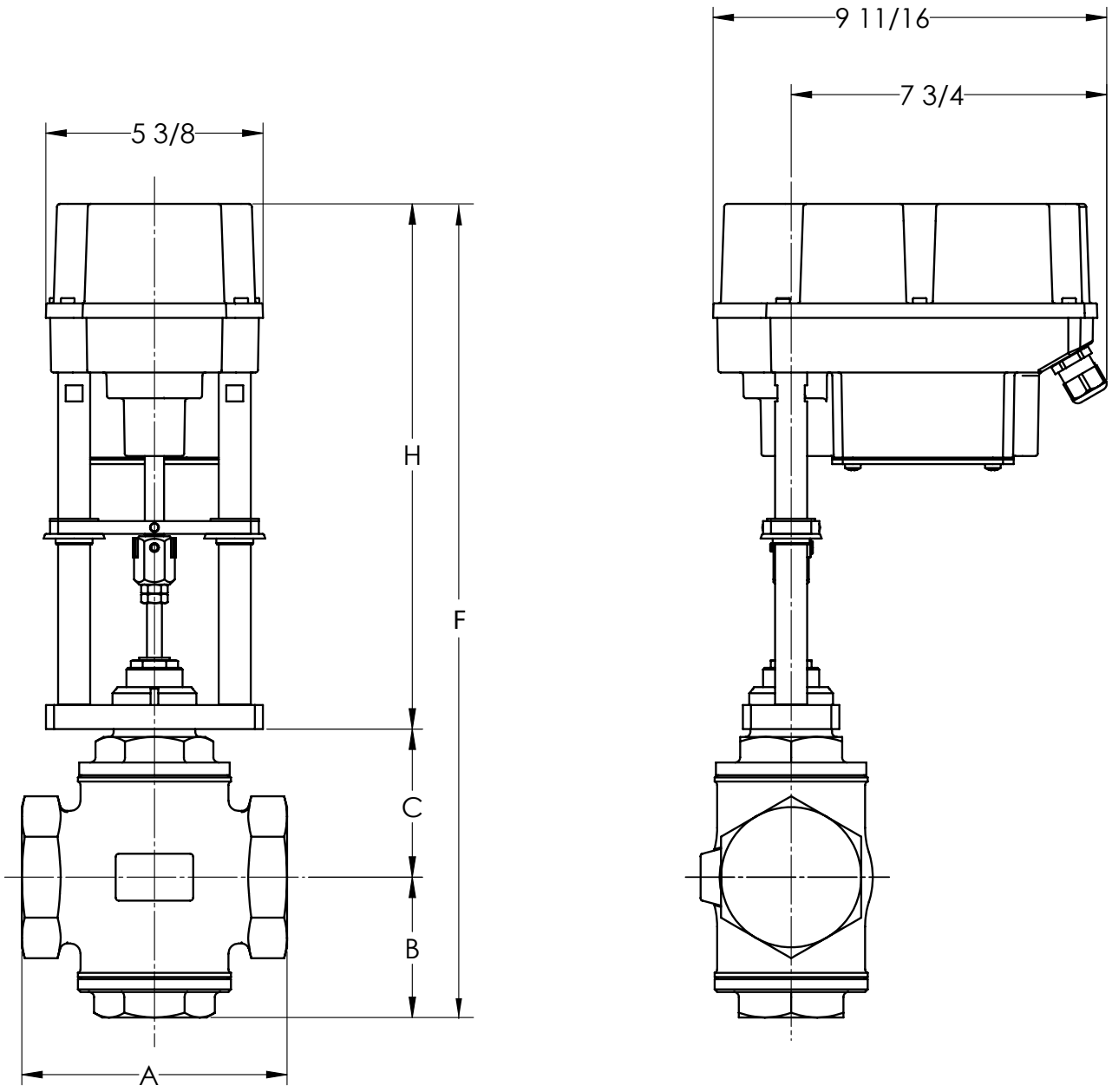
For ILEA-F models:

- Wide Range, Universal Power Supply for 100 – 240 VAC, 50/60 Hz
- User Limit switches rated for min. 0,1A / max. 10A @230 VAC/DC
- Resistance Heater in outdoor applications to guard against condensation

For ILEA-G models

- Case Heater
- Limit Switches
- IP67 Enclosure
- Capacitive Fail-Safe
- Local Control Station
- Multiple Power Options

MEASUREMENT IN INCHES



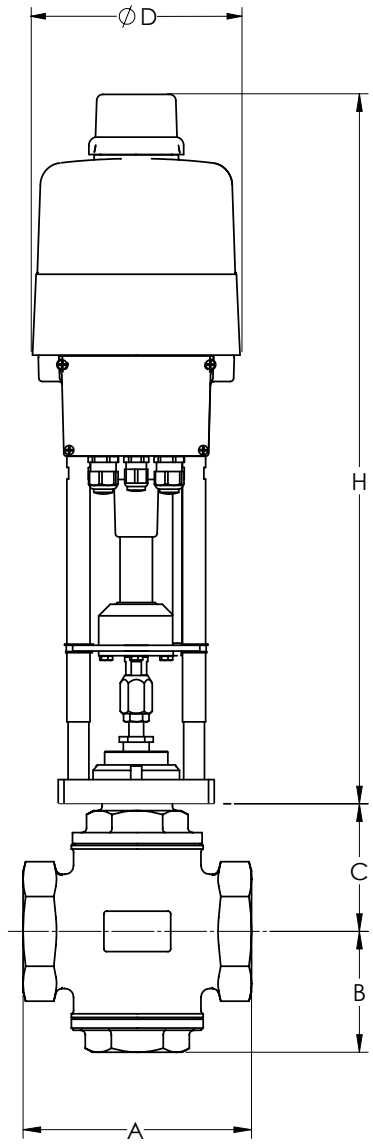
2-WAY or 3-WAY
F1

DIMENSIONS & WEIGHTS

ACTUATOR	DIMENSIONS		WEIGHT
	D (in)	H (in)	
F1	**NOTE 1	13	12.5
A2, A3	7.125	20.25	17.6
A4	7.125	21.75	22

**NOTE 1: Please see the diagrams on the bottom of page 16 for dimensions.

MEASUREMENT IN INCHES



2-WAY or 3-WAY
A2, A3, A4

DIMENSION (IN) 2820		VALVE SIZE (IN)		
		1/2, 3/4, 1	1-1/4 & 1-1/2	2
A	250THD	4-7/8	5-3/4	6-1/2
	300THD	5	6-1/8	6-1/2
	300BWE	15-3/8	16-7/8	17
B	250THD	2-3/4	3-1/4	3-5/8
	300THD & BWE	3	3-1/2	3-7/8
C	250THD	2-7/8	3-1/2	3-3/4
	300THD & BWE	2-7/8	3-1/2	3-3/4
Weight (LB)	250THD	8-1/2	14-1/2	18-1/2
	300THD	8	15-1/2	19
	300BWE	9-1/2	18	22-1/2

DIMENSION (IN) 2828		VALVE SIZE (IN)
		1/2, 3/4, 1
A	250THD	4-7/8
	300THD	5
	300BWE	15-3/8
B	250THD	2-3/4
	300THD & BWE	3
C	250THD	2-7/8
	300THD & BWE	2-7/8
Weight (LB)	250THD	8-1/2
	300THD	8
	300BWE	9-1/2

DIMENSION (IN) 2830		VALVE SIZE (IN)		
		1/2, 3/4, 1	1-1/4 & 1-1/2	2
A	250THD	4-7/8	5-3/4	6-1/2
	300THD	5	6-1/8	6-1/2
	300BWE	15-3/8	16-7/8	17
B	250THD	2-23/32	3-13/16	4
	300THD	2-23/32	3-3/8	3-3/4
	300 BWE	8	8-3/4	9
C	250THD	2-7/8	3-1/2	3-3/4
	300THD & BWE	2-7/8	3-1/2	3-3/4
Weight (LB)	250THD	9	15-1/2	20
	300THD	8	15	18-1/2
	300BWE	10-1/2	19	23-1/2

DIMENSION (IN) 2832		VALVE SIZE (IN)		
		1	1-1/2	2
A	250THD	4-7/8	5-3/4	6-1/2
	300THD	5	6-1/8	6-1/2
	300BWE	15-3/8	16-7/8	17
B	250THD	3-15/32	3-13/16	4
	300THD	2-23/32	3-3/8	3-3/4
	300 BWE	8	8-3/4	9
C	250THD	2-7/8	3-1/2	3-3/4
	300THD & BWE	2-7/8	3-1/2	3-3/4
Weight (LB)	250THD	9	16-1/2	21
	300THD	8	16	19-1/2
	300BWE	10-1/2	20	24-1/2

**NOTE 1: Please see the diagrams on the bottom of page 16 for dimensions.

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

CF = Consult Factory
Actual shopping weights may vary.

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 soft 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.***

Predicting Safe Fluid Temperatures for Actuators & Accessories

THERE ARE SEVERAL FACTORS THAT DETERMINE FLUID TEMPERATURE LIMIT THRESHOLDS WHICH 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.

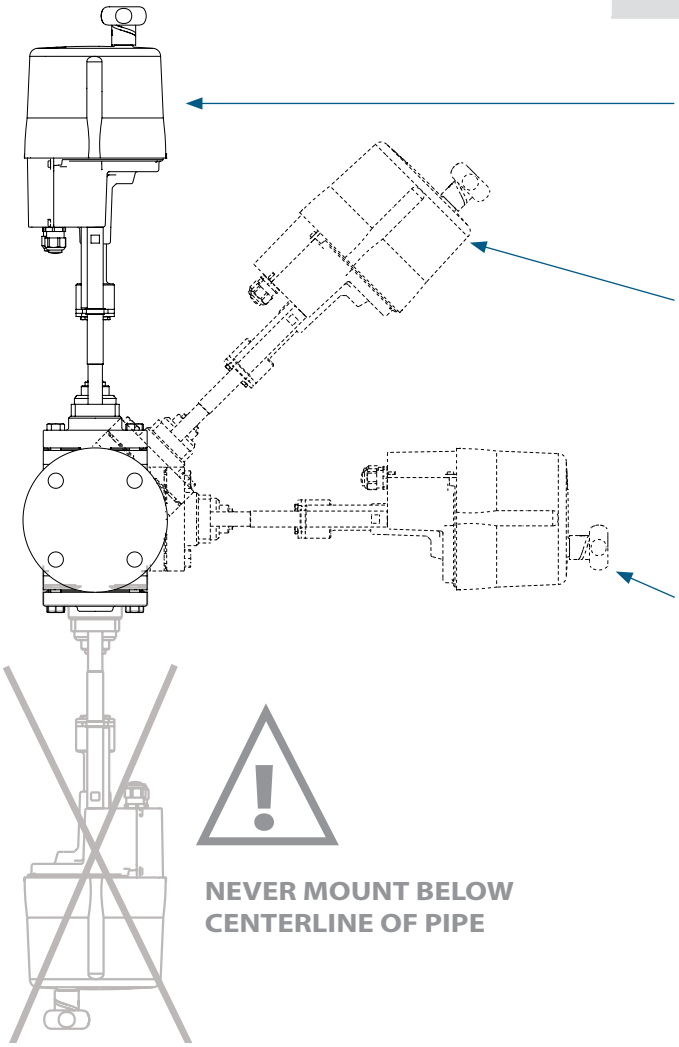
However, we have attempted to do that in the tables that follow on page 21. Realize these are only guidelines.

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 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.

HEAT/SOUND PRESSURE LEVEL GUIDELINES

Actuator Mounting Orientations



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.

NEVER MOUNT BELOW CENTERLINE OF PIPE

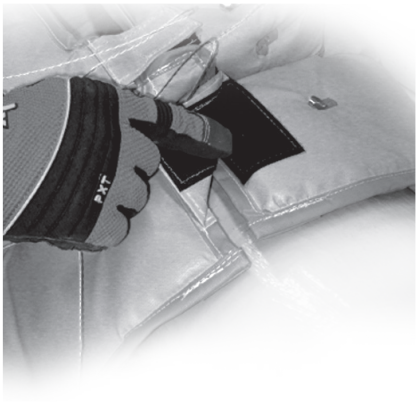
The tables that follow on page 21 will identify temperature ranges, valve size ranges, actuator orientation and use of thermal blankets to determine what is required to get longevity out of your actuators and accessories.

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***.

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



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

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

AcoustiGuard Insertion Loss Sound Pressure Levels

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

Fluid Temperature Limit Guidelines

2800 ILEA-F

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

STANDARD BONNET

ACTUATOR ORIENTATION	***Valves: 1/2" - 2"***
	FLUID TEMPERATURE LIMIT
Above the Valve	300ºF
45º To the Side of the Valve	325ºF
Either way w/ ThermiGuard*	450ºF

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

2800 ILEA-A

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

STANDARD BONNET

ACTUATOR ORIENTATION	***Valves: 1/2" - 2"***
	FLUID TEMPERATURE LIMIT
Above the Valve	300ºF
45º To the Side of the Valve	350ºF
Either way w/ ThermiGuard*	450ºF

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

These are simply rough guidelines and not absolute thresholds.

FACTORY DEFAULT SOFTWARE SETTINGS & ALTERNATE SOFTWARE SETTINGS

Control Signal:	4-20 mA (2-10 Vdc, wiring dependent) <FACTORY DEFAULT> 0-20 mA (0-10 Vdc, wiring dependent)
Control Action:	Decreasing Signal closes valve (2-way) closes Lower Port (3-Way) <FACTORY DEFAULT> Increasing Signal closes valve (2-way) closes Lower Port (3-Way)
Feedback Signal:	4-20 mA (2-10 Vdc, wiring dependent) <FACTORY DEFAULT> 0-20 mA (0-10 Vdc, wiring dependent)
Feedback Action:	Decreasing Signal valve closing (2-way) or closing Lower Port (3-Way) <FACTORY DEFAULT> Increasing Signal valve closing (2-way) or closing Lower Port (3-Way)
Control Signal Fails:	Generally follows power failure mode. Check the IOM or call factory for exceptions & details.
Digital Filtering*:	8 Samples <FACTORY DEFAULT> Range: 1 to 32 Samples
Dead Band*:	0.5% <FACTORY DEFAULT> Range: 0.5% to 5%
Power Failure:	Actuators that are Fail-In-Place actuators will have this as only choice <FACTORY DEFAULT> Actuators with Spring Fail will either close Stem Fail up or Stem fail down by model selection. Actuators with Capacitive Fail-Safe are preselected for Fail-Closed or Fail-Open at time of order, but with a programming umbilical cord and software can reverse this action in the field.
Critical Temperature*:	For ILEA-A/B models, when the ambient temperature is at 140°F (60°C) the following action can occur: 50% Speed <FACTORY DEFAULT>, Actuator Stop, Valve Open, Valve Close, Go to Specific Position.
MAX Temperature*:	For ILEA-A/B models, when the ambient temperature is at 158°F (70°C) the following action can occur: Valve Close on 2-Way Valves, Lower Port Closed on 3-Way Valves <FACTORY DEFAULT>, Actuator Stop, Valve Open, 50% Speed, Specific Position.
MAX Speed:	For ILEA-A3D model the Factory default is 50% of the Speed Range. For all other models the factory default is 100% of the Speed Range.

* Does not apply to ILEA-F Models

ILEA-A/B models allow for an optional Umbilical USB port cord and software to program various parameters and set ups.

CONFIGURATIONS

1. SELECTIONS

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

28□ - □□ □□□ □ □ □ □ □ □ □

VALVE BODY

Model	Valve Type	Size	Body Material	End Conn.	Trim Style	Trim Material	Trim Cv	Packing Type
E Type: 20, 30, 32	**20** 2-Way, Single Seat	**050** 1/2 inch	**B** Bronze	**S** Screwed	**E** Equal %	**S** 316 SS*	**F** Full Port	**T** Teflon
M Type: 28	**28** 2-Way Lo Flow	**075** 3/4 inch	**F** CF8M	**B** Buttweld End	**L** Linear	**B** Bronze	**1** 1st Port Reduction	**G** Graphite
	30 3-Way Mixing	**100** 1 inch			**M** Mod Lin	**6** Alloy 6	**2** 2nd Port Reduction	**V** Vacuum Svs.
	32 3-Way Diverting	**125** 1-1/4 inch			*Types 30/32, Linear Only Types 28 Mod Lin Only*	**H** 17-4 PH	**3** 3rd Port Reduction	**L** EP Lip
		150 1-1/2 inch				**T** Teflon	**4** 4th Port Reduction	*Stainless Steel, Type 20 Bodies come standard with PEEK bearings. Used for temperature up to 500F.*
		200 2 inch				**P** PEEK	*NOTE: Port reductions only available on Type 20/28/30. Check factory for availability.*	
						*NOTE: *Type 28, 316SS trim uses a harder Notronic 60 seat.*		

VALVE TYPE/ACTUATOR COMPATIBILITY

Model	Valve Type	Valve Size	ILEA Actuators
28 E	Type 20	1/2"-2"	IIEA-F
28 E	Types 20	1/2"-2"	IIEA-A
28 M	Types 28	1/2"-1"	IIEA-F
28 M	Types 28	1/2"-1"	IIEA-A
28 E	Types 30	1/2"-2"	IIEA-F
28 E	Types 30	1/2"-2"	IIEA-A
28 E	Types 32	1"-2"	IIEA-F
28 E	Types 32	1"-2"	IIEA-A

See Shut-Off ΔP Ratings for details.

CRN REGISTERED

CRN (Canadian Registration Number)

Valve	Body Mat'l	Size (inch) 1/2	3/4	1	1-1/4	1-1/2	2
2820	BRZ	Y	Y	Y	Y	Y	Y
	SS	P	P	P	P	P	P
2828	BRZ	Y	Y	Y	-	-	-
	SS	P	P	P	-	-	-
2830	BRZ	Y	Y	Y	Y	Y	Y
	SS	P	P	P	P	P	P
2832	BRZ	-	-	Y	-	Y	Y
	SS	-	-	P	-	P	P

Y = Yes, currently registered - CRN # CSA - OC18997
P = Registration pending, Starting Process

FLUID TEMPERATURE LIMITS					
Valve Type	**Body Material & Code**	**Trim Material & Code**	**Packing Type & Code**	**T MAX**	**T MIN**
20 2-Way Single Seat	Bronze **B**	316 **S**, Alloy 6 **6**, 17-4 PH **H**, PEEK **P**	EPDM **L**	400ºF	-20ºF
	Bronze **B**	316 **S**, Alloy 6 **6**, 17-4 PH **H**, PEEK **P**	Teflon **T**, Vacuum Service **V**	400ºF	60ºF
	Bronze **B**	316 **S**, Alloy 6 **6**, 17-4 PH **H**, PEEK **P**	Graphite **G**	400ºF	-20ºF
	Bronze **B**	Teflon **T**	EPDM **L**	250ºF	-20ºF
	Bronze **B**	Teflon **T**	Teflon **T**, Vacuum Service **V**	250ºF	60ºF
	Bronze **B**	Teflon **T**	Graphite **G**	250ºF	-20ºF
	CF8M **F**	316 **S**, Alloy 6 **6**, 17-4 PH **H**	EPDM **L**	400ºF	-20ºF
	CF8M **F**	316 **S**, Alloy 6 **6**, 17-4 PH **H**	Teflon **T**, Vacuum Service **V**	450ºF	60ºF
	CF8M **F**	316 **S**, Alloy 6 **6**, 17-4 PH **H**	Graphite **G**	500ºF	-20ºF
	CF8M **F**	Teflon **T**	EPDM **L**	250ºF	-20ºF
	CF8M **F**	Teflon **T**	Teflon **T**, Vacuum Service **V**	250ºF	60ºF
	CF8M **F**	Teflon **T**	Graphite **G**	250ºF	-20ºF
	CF8M **F**	PEEK **P**	EPDM **L**	400ºF	-20ºF
	CF8M **F**	PEEK **P**	Teflon **T**, Vacuum Service **V**	450ºF	60ºF
	CF8M **F**	PEEK **P**	Graphite **G**	450ºF	-20ºF
28 2-Way Low Flow	Bronze **B**	316 **S**, PEEK **P**	EPDM **L**	400ºF	-20ºF
	Bronze **B**	316 **S**, PEEK **P**	Teflon **T**, Vacuum Service **V**	400ºF	60ºF
	Bronze **B**	316 **S**, PEEK **P**	Graphite **G**	400ºF	-20ºF
	Bronze **B**	Teflon **T**	EPDM **L**	250ºF	-20ºF
	Bronze **B**	Teflon **T**	Teflon **T**, Vacuum Service **V**	250ºF	60ºF
	Bronze **B**	Teflon **T**	Graphite **G**	250ºF	-20ºF
	CF8M **F**	316 **S**	EPDM **L**	400ºF	-20ºF
	CF8M **F**	316 **S**	Teflon **T**, Vacuum Service **V**	450ºF	60ºF
	CF8M **F**	316 **S**	Graphite **G**	500ºF	-20ºF
	CF8M **F**	Teflon **T**	EPDM **L**	250ºF	-20ºF
	CF8M **F**	Teflon **T**	Teflon **T**, Vacuum Service **V**	250ºF	60ºF
	CF8M **F**	Teflon **T**	Graphite **G**	250ºF	-20ºF
	CF8M **F**	PEEK **P**	EPDM **L**	400ºF	-20ºF
	CF8M **F**	PEEK **P**	Teflon **T**, Vacuum Service **V**	450ºF	60ºF
	CF8M **F**	PEEK **P**	Graphite **G**	450ºF	-20ºF
30 3-Way Mixing	Bronze **B**	316 **S**	EPDM **L**	400ºF	-20ºF
	Bronze **B**	316 **S**	Teflon **T**, Vacuum Service **V**	400ºF	60ºF
	Bronze **B**	316 **S**	Graphite **G**	400ºF	-20ºF
	CF8M **F**	316 **S**	EPDM **L**	400ºF	-20ºF
	CF8M **F**	316 **S**	Teflon **T**, Vacuum Service **V**	450ºF	60ºF
	CF8M **F**	316 **S**	Graphite **G**	500ºF	-20ºF
32 3-Way Diverting	Bronze **B**	Bronze **B**	Teflon **T**, Vacuum Service **V**	300ºF	60ºF
	Bronze **B**	Bronze **B**	Graphite **G**, EPDM **L**	300ºF	-20ºF
	CF8M **F**	316 **S**	EPDM **L**	400ºF	23ºF
	CF8M **F**	316 **S**	Teflon **T**, Vacuum Service **V**	450ºF	60ºF
	CF8M **F**	316 **S**	Graphite **G**	500ºF	23ºF

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

VALVE TYPE/TRIM MATERIAL COMBINATIONS:

SIZE	TRIM MATERIAL					
	S 316 SS	**B Bronze**	**6 Alloy 6**	**H 17-4 PH**	**T Teflon**	**P PEEK**
050 1/2 inch	20, 28, 30	N/A	20	20	20, 28	20, 28
075 3/4 inch	20, 28, 30	N/A	20	20	20, 28	20, 28
100 1 inch	20, 28, 30, 32SS	32 BRZ	20	20	20, 28	20, 28
125 1-1/4 inch	20, 30	N/A	20	20	20	20
150 1-1/2 inch	20, 30, 32SS	32 BRZ	20	20	20	20
200 2 inch	20, 30, 32SS	32 BRZ	20	20	20	20

CONFIGURATIONS

1. SELECTIONS

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

ILEA- □ □ □ □ - □ □ □ □ □ - □ □ □ □

ACTUATOR

ILEA-	Model	Max Force (lbf)	Max Speed *(seconds/ inch valve travel @60Hz or DC)*	Failure Mode	Voltage Supply	Binary Input	Comm.	Enclosure Rating	Local Control Station	Heater	Switches
	F Small Frame	**1** 450	**0** 85 Seconds	**M** Fail in Place	**1** 115 Vac	**0** 24V	**0** None	**5** IP65	**0** None	**0** None	**0** None
	A Medium Frame Modulating	**2** 515	**1** 73 Seconds	**U** Spring Fail Up	**2** 230 Vac	**2** 115/ 230V	**P** Profibus	**7** IP67	**L** Local	**H** Heater	**S** Silver Switch
	P Medium Frame ON - OFF	**3** 1010	**2** 64 Seconds	**D** Spring Fail Down	**4** 24 Vac		**C** CANopen				
		4 1800	**3** 56 Seconds	**S** Capacitive Fail Safe	**5** 24 Vdc		**F** Foundation				
			4 47 Seconds								
			5 42 Seconds								
			6 36 Seconds								
			7 33 Seconds								
			8 28 Seconds								
			9 25 Seconds								
			A 21 Seconds								
			B 20 Seconds								
			C 15 Seconds								
			D 6 Seconds								

(NOTE: FOR D ONLY unlesspecial request this will be shipped at 50%-12 seconds)

1/2" Female NPT, NEMA 4X Conduit Adapter kits (As Accessory)		
QTY	**Description**	**Part Number**
1 EA	Male M16 to 1/2" FNPT	KCONDUITADAPTER01

NOTE:
All attributes combinations are not possible. Stocked Models are listed below. For other available models, refer to the product specification or check with the Warren Controls Factory.

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.

STOCKED MODELS:

ORDERCODE	VOLTAGE	DESCRIPTION	IN STOCK AVAILABLE OPTIONS	SPECIAL ORDER AVAILABLE OPTIONS
ILEA-F18-D400-5000	24 Vac	Small Frame, 450 Lbf, 28 Seconds / Inch, Spring Fail Down, IP65 Enclosure	- 100 - 240 Vac Power Supply - Limit Switches - Case Heater	N/A
ILEA-F18-D500-5000	24 Vdc			
ILEA-F18-U400-5000	24 Vac	Small Frame, 450 Lbf, 28 Seconds / Inch, Spring Fail UP, IP65 Enclosure		
ILEA-F18-U500-5000	24 Vdc			
ILEA-F1A-M400-5000	24 Vac	Small Frame, 450 Lbf, 21 Seconds / Inch, Fail-In-Place w/ manual Override, IP65 Enclosure		
ILEA-F1A-M500-5000	24 Vdc			
ILEA-A3D-S100-7000	115 Vac	Medium Frame, 1012 Lbf, up to 6 Seconds / Inch (factory default 11 seconds), Capacitive Fail-Safe, IP 67 Enclosure	- Case Heater - Local Control Station - Limit Switches - Programming Umbilical Cord	- Alternate Actuator Forces - Alternate Speed Ranges - Alternate Voltage Supply - Alternate Binary Input Voltage - Various Communications Protocols
ILEA-A3D-S400-7000	24 Vac	Medium Frame, 1012 Lbf, up to 6 Seconds / Inch (factory default 11 seconds), Capacitive Fail-Safe, IP 67 Enclosure		
ILEA-A3D-S500-7000	24 Vdc			
ILEA-A3D-M400-7000	24 Vac	Medium Frame, 1012 Lbf, up to 6 Seconds / Inch (factory default 11 seconds), Fail-In-Place, IP 67 Enclosure		
ILEA-A3D-M500-7000	24 Vdc			

WARREN CONTROLS
2600 EMRICK BLVD • BETHLEHEM, PA 18020 • USA •800-922-0085 • WWW.WARRENCONTROLS.COM
DEPENDABLE, RUGGED, PRECISION CONTROL VALVES AND ACCESSORIES

VALVE SIZING DATA SHEET

DATE:

Customer Information			Highlight Preferred Contact Method
Company		Phone	
Contact		Fax	
Address		Email	
City, State, Zip		Project	

Application Data (*Indicates "Valuable" Information) (* * Indicates Required Information)

System Information			
Valve Tag (Name)			
System	* *		
Fluid	*		
Specific Gravity			
Pipe Size	*		
Pipe Material	* *		
Process Information			
	Maximum	Normal	Minimum
Flow Rate (GPM)/(Lbs./Hr.)	* *		*
…or, Required Cv	* *		*
P_1 = Inlet Pressure (PSIG)	* *		*
DP = Pressure Drop (PSIG)	* *		*
…or, P_2 = Outlet Pressure (PSIG)	* *		*
Temperature (Degrees F)	* *		*

Valve Information			
Type (Globe, Rotary, Any 2-way, 3-way Mix, 3-way Divert)		Operation (on-off, mix, divert, modulating)	
Size		End Connections	
Pressure Class		Trim Cv (FP, 1R, 2R, etc.)	
Body Material		Flow Direction (FTO,FTC)	
Trim Materials		Shaft Design	
Packing & Seals		Shut-Off Requirement	

Actuator & Control Information	
	Pneumatic / Electric / Model / Ratings
Type	
Supply Available / Air - (PSIG) Power – (VAC/Hz)	
Positioner Type / Increasing Signal (opens/closes)	
Control Signal (3-15psi, 4-20mA, etc.)	
Solenoid and/or Limit Switches	
Air Filter/Regulator (If Applicable / Range)	
Manual Override w/ Handwheel	
Failure Mode (open / close / As Is) Spring / Electric / None	
Tubing Material (copper, SS)	
Special Set ups or Misc. Accessories	

Notes • Specifications • Further Information

Ted Fischl / Josh Albeck •2600 Emrick Blvd. • Bethlehem, PA 18020
Phone: (800) 922-0085 • Fax: (610) 317-2989
E-mails: tfischl@warrencontrols.com jalbeck@warrencontrols.com

2800E 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 SST17-4pH, 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