1800E PRODUCT SPEC

INDUSTRIAL LINEAR ELECTRICALLY ACTUATED

HIGH CAPACITY, GENERAL PURPOSE, GLOBE CONTROL VALVES

PRODUCT SPECIFICATION

SERIES

ILEA 1800

SIZES: 2-1/2 TO 10 INCHES

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

1800E_PS_RevF_0924

WARREN CONTROLS

A company of the ARI-Armaturen Group

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

DEPENDABLE, RUGGED, PRECISION CONTROL VALVES AND ACCESSORIES

Actuator: ILEA_A/B

Actuator: ILEA_G

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

ILEA A-Series 1011 LBF
ILEA B-Series 1798 LBF
ILEA G-Series 4496 LBF

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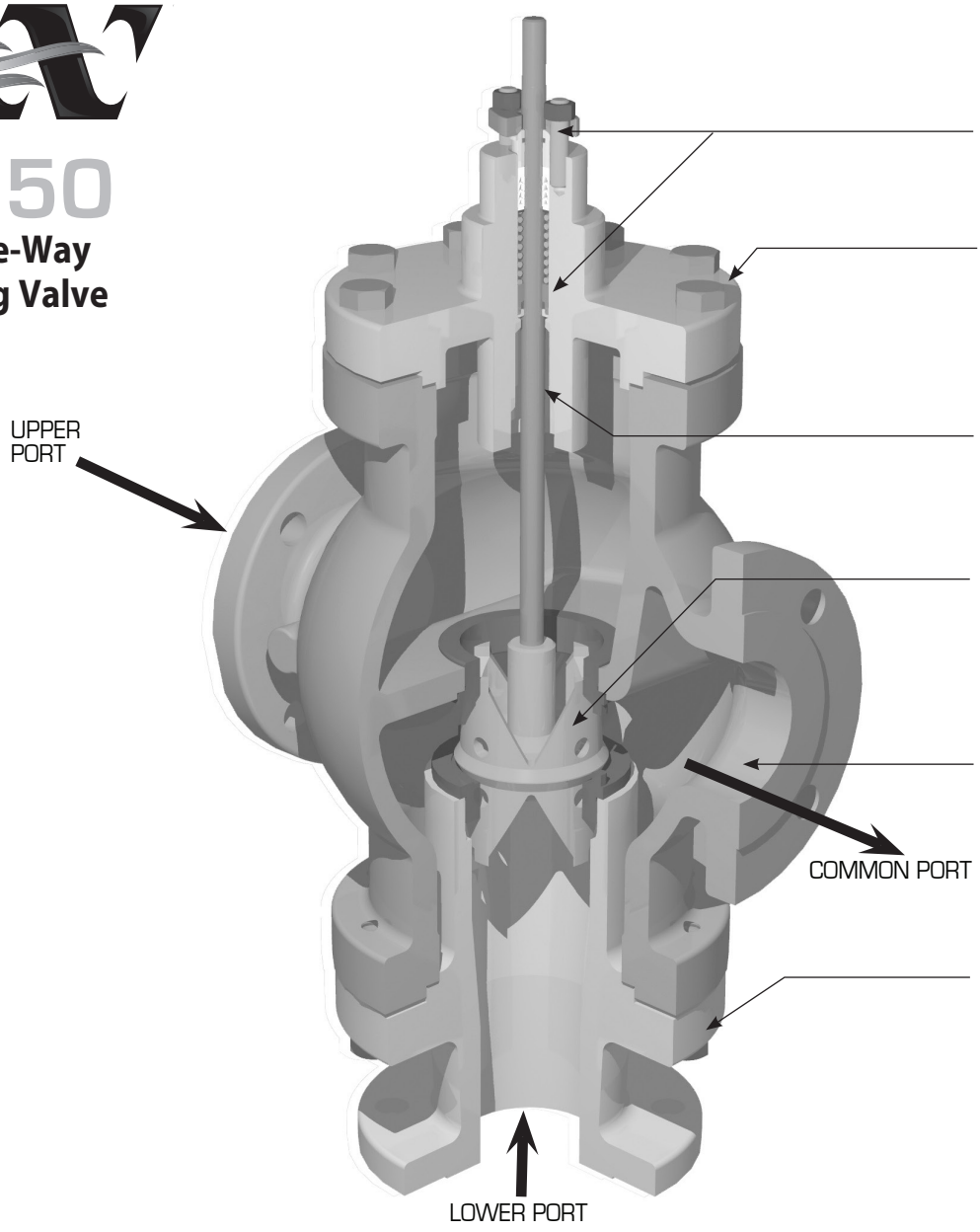
1850
Three-Way Mixing Valve



Stem Wipers
provide outstanding packing protection.

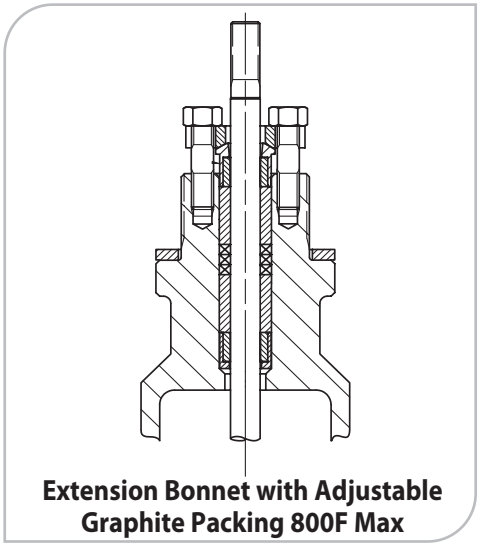
Heavy Bolted Bonnet Construction
provides added durability and easy maintenance.

Large Guiding Surfaces
ensure smooth operation and stem stability.

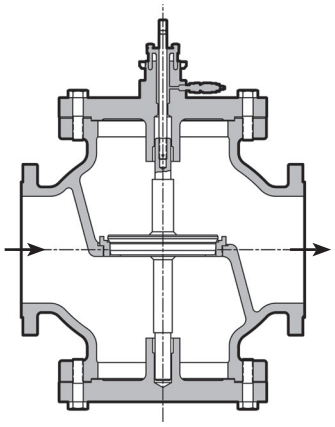
Skirt Guided Plug Assembly
provides stability and precision linear flow characteristic.

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

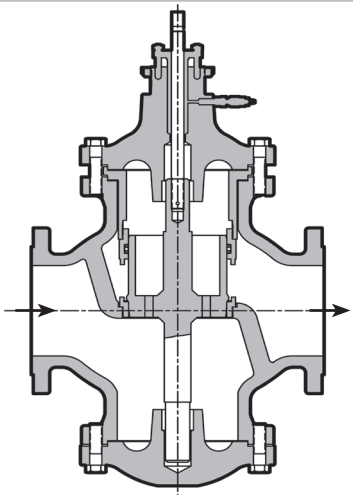
Lower Unit
disassembles for easy trim replacement or debris removal.



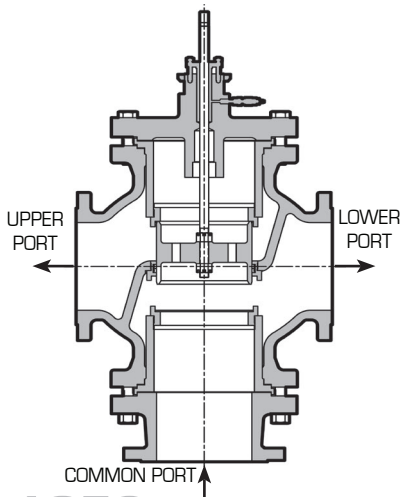
Extension Bonnet with Adjustable Graphite Packing 800F Max



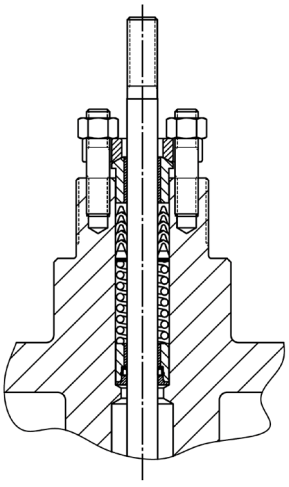
1840 Two-Way Single Seat Unbalanced Valve



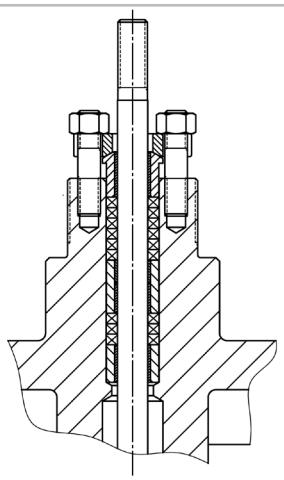
1843 Two-Way Single Seat Balanced Valve



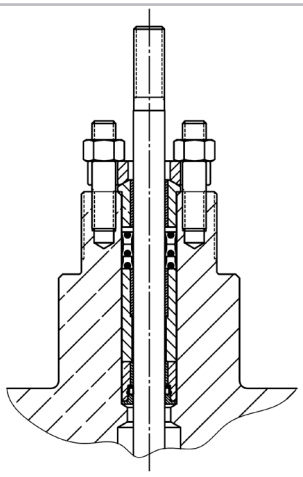
1852 Three-Way Diverting Valve



TFE V-Ring Packing Spring-Loaded 450F Max



Adjustable Graphite Packing 500F Max



Long-Life Multi-Stack EPDM Lip Packing 450F Max

AGENCY APPROVALS

QAS INTERNATIONAL
ISO 9001:2015
REGISTERED FIRM

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.

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 (Special order consult with factory) (See Allowable Seat Leakage Classes table on page 6).

See Table on page 21 for Fluid Temperature Limits.

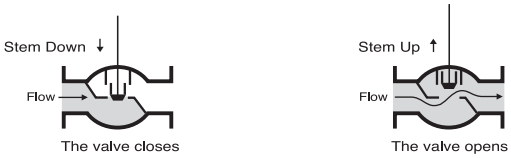
Sizes:	6, 8, 10, 12 inch (See 5840 for smaller sizes)
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange (6 thru 10) WCB Steel or CF8M Stainless Steel 150LB Flange or 300LB Flange (6 thru 12)
Trim:	EQ% or Linear, 316 Stainless Steel or Alloy 6
Packing Type & Bonnet Construction:	**LS** EPDM Lip w/ PEEK Bearings & 17-4 Guide Bushing **TS** TFE V-Ring, Spring Loaded, w/ PEEK Bearings & 17-4 Guide Bushings **GS** Adjustable Graphite w/ PEEK Bearings & 17-4 Guide Bushing **GG** Adjustable Graphite w/ Graphite Gaskets, **Copper Based** Graphalloy Guide Bushings & Extension Bonnet (For NON-Oxidizing Media ONLY, Best Suited for Hot Water & Steam) **For WCB or CF8M Bodies Only** **GL** Adjustable Graphite w/ Graphite Gaskets, **Nickel Based** Graphalloy Guide Bushings & Extension Bonnet (For NON-Oxidizing Media ONLY, Best Suited for Heat Transfer Oils) **For WCB or CF8M Bodies Only** **G7** Adjustable Graphite w/ Graphite Gaskets, **Oxidation Resistant** Graphalloy Guide Bushings & Extension Bonnet (For Oxidizing Media ONLY) **For WCB or CF8M Bodies Only**
Rangeability:	50:1

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 (Special order consult with factory) (See Allowable Seat Leakage Classes table on page 6).

See Table on page 21 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 Type & Bonnet Construction:	**LS** EPDM Lip w/ PEEK Bearings & 17-4 Guide Bushing **TS** TFE V-Ring, Spring Loaded, w/PEEK Bearings & 17-4 Guide Bushing **GS** Adjustable Graphite w/ PEEK Bearings & 17-4 Guide Bushing
O-Ring:	*Fluoraz 797
Rangeability:	50:1



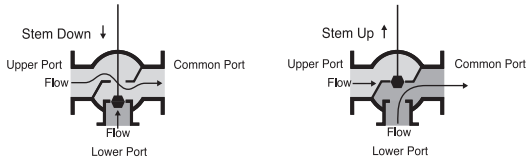
3-WAY VALVES
(Control of Liquids)

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 21 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 Type & Bonnet Construction:	**LS** EPDM Lip w/ PEEK Bearings & 17-4 Guide Bushing **TS** TFE V-Ring, Spring Loaded, w/ PEEK Bearings & 17-4 Guide Bushings **GS** Adjustable Graphite w/ PEEK Bearings & 17-4 Guide Bushing **GG** Adjustable Graphite w/ Graphite Gaskets, **Copper Based** Graphalloy Guide Bushings & Extension Bonnet (For NON-Oxidizing Media ONLY, Best Suited for Hot Water & Steam) **For WCB or CF8M Bodies Only** **GL** Adjustable Graphite w/ Graphite Gaskets, **Nickel Based** Graphalloy Guide Bushings & Extension Bonnet (For NON-Oxidizing Media ONLY, Best Suited for Heat Transfer Oils) **For WCB or CF8M Bodies Only** **G7** Adjustable Graphite w/ Graphite Gaskets, **Oxidation Resistant** Graphalloy Guide Bushings & Extension Bonnet (For Oxidizing Media ONLY) **For WCB or CF8M Bodies Only**
Rangeability:	30:1 (sizes 1/2 thru 2) 50:1 (sizes 2-1/2 thru 12)

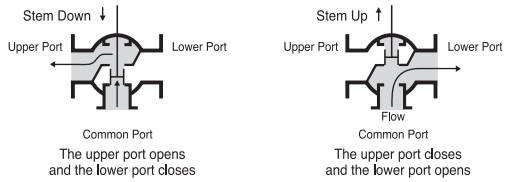


1852 3-Way Diverting/Mixing Valve

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 consult factory. The difference between the upper port and lower port pressure must not exceed 50PSID. (See piping note on page 13.)

See Table on page 21 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
Packing Type & Bonnet Construction:	**LS** EPDM Lip w/ PEEK Bearings & 17-4 Guide Bushing **TS** TFE V-Ring, Spring Loaded, w/PEEK Bearings & 17-4 Guide Bushing **GS** Adjustable Graphite w/ PEEK Bearings & 17-4 Guide Bushing
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

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.
** NOT AVAILABLE IN THE 1800 SERIES

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.

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.

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.

EPDM LIP
EPDM lip packing is commonly used for water service. EPDM lip packing is good from -20°F to 450°F. EPDM lip packing is not suitable for fluids containing or contaminated with oil. For applications from 32°F to -20°F when condensation on the stem can turn to ice (consult factory) an optional stem heater is also recommended.

GRAPHITE
Graphite packing is our most durable packing material choice. Graphite packing is good from -20°F to 550°F with a standard bonnet, >500°F to 800°F with an extension bonnet and is required for temperatures above 450°F to the valve's limit of 800°F with an extension bonnet. 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 BONNET WITH PEEK BEARINGS & 17-4 GUIDE BUSHING:
For most applications when fluid temperature are between -20°F to 500°F. A thermaguard thermal blanket may still be required for fluid temperatures above 300°F.

GRAPHALLOY GUIDE BUSHINGS WITH EXTENSION BONNET
Bonnet constructions using Graphalloy guide bushings with an extension bonnet are the preferred choice for applications greater than 450°F. Three kinds of Graphalloy guide bushings are available. **Copper based Graphalloy** guide bushings 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** guide bushings are good from -20°F to 750°F for non-oxidizing media ONLY and are best suited for heat transfer oils. **Oxidation resistant Graphalloy** guide bushings are good from -20°F to 800°F for oxidizing media. Bonnet constructions using Graphalloy guide bushings 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.

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

1840 FLOW COEFFICIENTS (CV) 2-WAY SINGLE SEAT UNBALANCED VALVE

VALVE			%Travel									
Valve Size (IN)	Trim Style	Port Size	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

1843 FLOW COEFFICIENTS (CV) 2-WAY SINGLE SEAT CYLINDER BALANCED VALVE

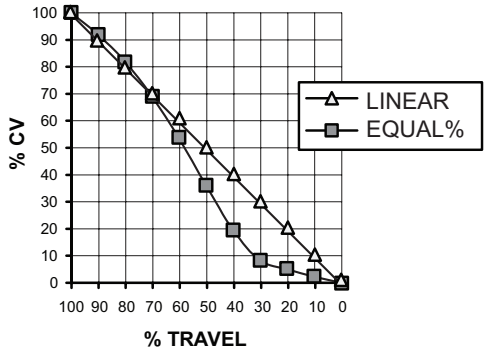
VALVE			%Travel									
Valve Size (IN)	Trim Style	Port Size	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
6	EQ%	Full	375	358	303	228	136	49.1	30.5	18.0	9.57	5.33
		1SR	178	158	130	93.5	51.8	22.4	13.5	10.3	7.16	3.99
		2SR	98.0	80.8	56.8	31.9	20.7	13.2	8.96	7.01	5.04	3.06
	Linear	Full	375	362	322	276	228	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

3-WAY VALVES (Control of Liquids)

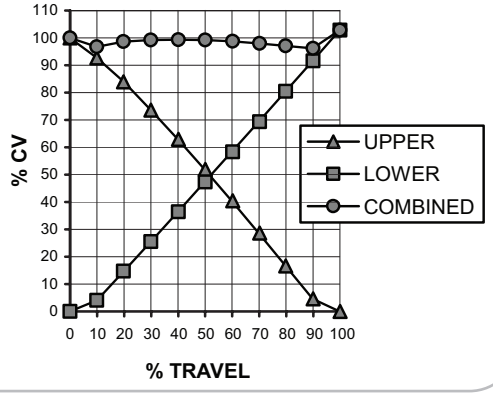
1850 FLOW COEFFICIENTS (CV) 3-WAY MIXING/BYPASS VALVE

Valve				
Valve Size (IN)	Trim Style	Trim Size (IN)	Port Size	%Travel 100%
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

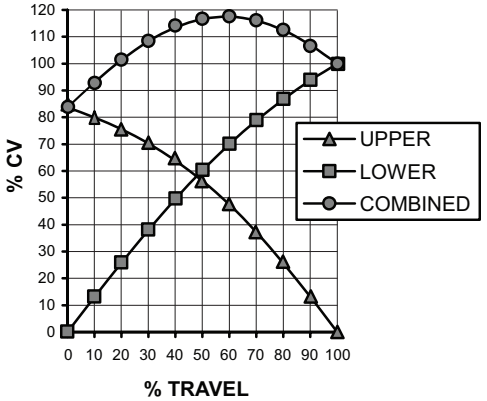
2-Way VALVE TYPICAL FLOW CURVES



1850 TYPICAL FLOW CURVE



1852 TYPICAL FLOW CURVE



1852 FLOW COEFFICIENTS (CV) 3-WAY DIVERTING VALVE

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

ILEA-A/B SERIES: medium frame actuators
ILEA-G SERIES: large 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 is standard IP67.

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

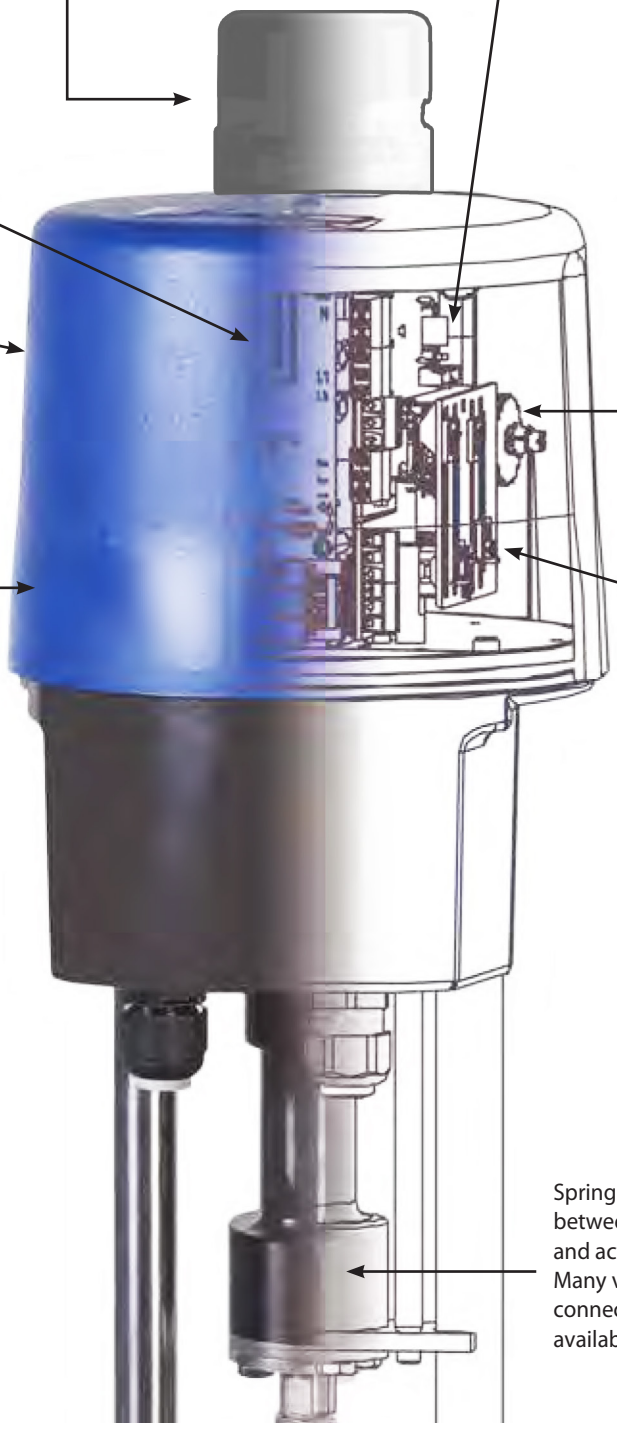
Vibration-proof potentiometer suspension.

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

Friction clutch prevents damage.

Compact, corrision resistant, sturdy and lightweight due to high-quality aluminum alloys with Metal cover.

IP67 ENCLOSURE METAL COVER, SHOWN W/ LOCAL CONTROL STATION



IP67 ENCLOSURE POWDER COAT ALUMINUM

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

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

Electronic board

	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	0.53	3.15
MAX Current	(Amps)	2.6	4.1	0.70	4.1
Power Consumption	(Watts)	48	53	46	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	Force / torque, set value, temperature, power supply, positioning deviation etc., adjustable
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
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 and adjustment of parameters, display of diagnostic information
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 ACTUATORS 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
- Capacitive Fail Safe and Fail-In-Place
- Handwheel Override
- Fast or Slow, Fixed or Adjustable speed ranges
- Profibus, Foundation Fieldbus, others
- IP67 Enclosures
- Heaters
- Limit & Fault Switches
- Integral Local Control Station
- Multiple forces from 1011 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.

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

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

SHUT-OFF ΔP AND Cv RATINGS

VALVE			1840 ACTUATOR SHUT-OFF ΔP 2-WAY SINGLE SEAT UNBALANCED	
Valve Size (IN)	**Cv Rating**	**Plug Travel (IN)**	**Model Code Prefix**	**Fail Open, Closed, or In Place**
6	375	2	B46	48
			B5C	63
			B6B	95
			G72	143
8	600	2-1/2	G72	78
10	1000	2-1/2	G72	48
12	1360	3	G72	32

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

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.

VALVE			1843 ACTUATOR SHUT-OFF ΔP 2-WAY SINGLE SEAT CYLINDER BALANCED	
Valve Size (IN)	**Cv Rating**	**Plug Travel (IN)**	**Model Code Prefix**	**Fail Open, Closed, or In Place**
6	375	2	B46	740
			B5C	740
			B6B	740
			G72	740
8	600	2-1/2	B46	740
			B5C	740
			B6B	740
			G72	740
10	1000	2-1/2	B46	740
			B5C	740
			B6B	740
			G72	740
12	1360	3	G72	740

Shut-off values are for valves with TFE or EPDM 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.

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.

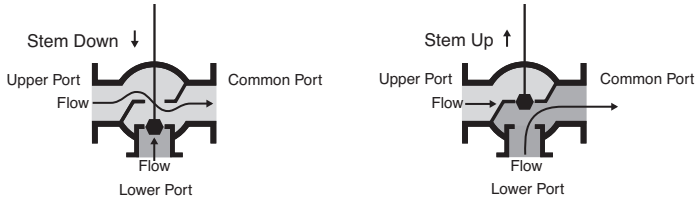
   Consult the factory for shut-off values for 1850 diverting applications.

2) 1850 leakage rating is ANSI Class IV.

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.

1850
Three-Way Mixing Valve



VALVE			1850 ACTUATOR SHUT-OFF ΔP 3-WAY MIXING		
Valve Size (IN)	**Cv Rating**	**Plug Travel (IN)**	**Model Code Prefix**	**Lower Seat Closed**	**Upper Seat Closed**
2 1/2	60	1-1/2	A3D	131	147
			A46	308	324
			A5C	399	415
3	95	1-1/2	A3D	87	98
			A46	209	220
			A5C	273	284
4	175	1-1/2	A3D	44	50
			A46	113	119
			A5C	149	155
6	360	2	B46	41	48
			B5C	57	63
			B6B	89	95
			G72	137	143
8	560	2-1/2	G72	74	78
10	800	2-1/2	G72	46	48
12	1360	3	G72	31	32

NOTES:

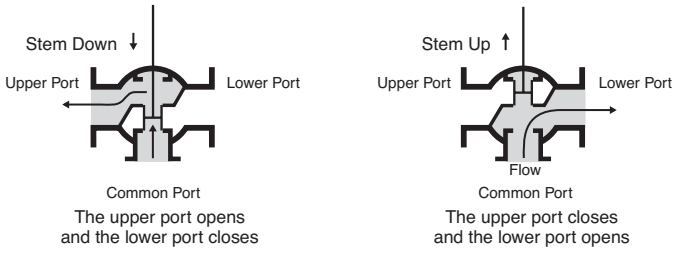
1) 1852 Diverting Valves have one inlet and two outlets. Published shut-off values are for diverting applications. The values are worst case and based on the pressure difference between the inlet and the outlet that is closed. Consult the factory if the required shut-off exceeds the published value and 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.

2) 1852 leakage rating 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.

1852
Three-Way Diverting Valve



VALVE			1852 ACTUATOR SHUT-OFF ΔP 3-WAY DIVERTING/MIXING		
Valve Size (IN)	**Cv Rating**	**Plug Travel (IN)**	**Model Code Prefix**	**Lower Seat Closed**	**Upper Seat Closed**
2 1/2	75	1-1/2	A3D	100	100
3	105	1-1/2	A3D	100	100
4	185	1-1/2	A3D	100	100
6	410	2	B46	100	100
8	670	2-1/2	G72	100	100
10	1280	2-1/2	G72	100	100
12	1649	3	G72	100	100

****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.

SIZING REFERENCE

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

Rectangular Tank Capacity in Gallons

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

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

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

Heating or Cooling Water

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

Heating Oil with Steam

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

Heating Air with Water

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

Heating Liquids with Steam

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

Heating Liquids in Steam Jacketed Kettles

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

General Liquid Heating

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

Heating Air with Steam

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

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° 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 122ºF 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

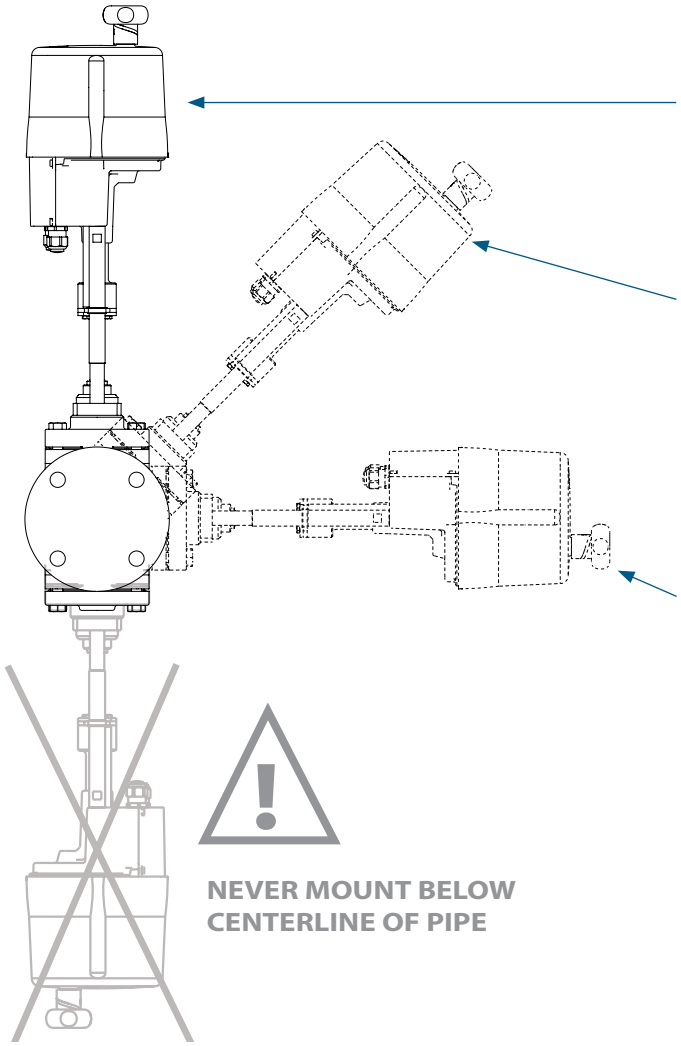
With all of these variables it is a challenge to come up with some guidelines.

However, we have attempted to do that in the tables that follow on page 18. 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.

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.

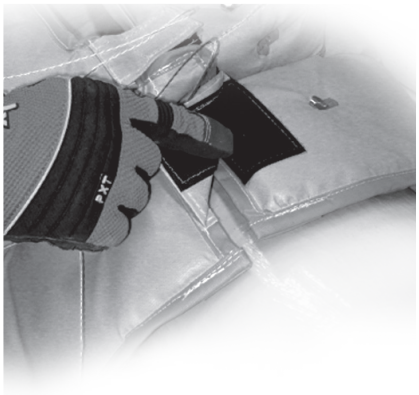
The tables that follow on page 18 will identify temperature ranges, valve size ranges, actuator orientation and use of thermal blankets to determine what is required to get longevity out of your actuators and accessories.

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

HEAT/SOUND PRESSURE LEVELS GUIDELINES

ILEA - A/B SERIES

STANDARD BONNET	
ACTUATOR ORIENTATION	*Valve Size 2″ - 4″*
	FLUID TEMPERATURE LIMIT
Above the Valve	300°F
45° To the Side of the Valve	400°F
Either way w/ThermiGuard*	450°F
EXTENSION BONNET	
ACTUATOR ORIENTATION	*Valve Size 2″ - 4″*
	FLUID TEMPERATURE LIMIT
Above the Valve	600°F
45° To the Side of the Valve	675°F
Either way w/ ThermiGuard*	800°F

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

Fluid Temperature Limit Guidelines

ILEA - G SERIES

STANDARD BONNET	
ACTUATOR ORIENTATION	*Valve Size 6″ - 12″*
	FLUID TEMPERATURE LIMIT
Above the Valve	350°F
45° To the Side of the Valve	N/A
Either way w/ ThermiGuard*	450°F
EXTENSION BONNET	
ACTUATOR ORIENTATION	*Valve Size 6″ - 12″*
	FLUID TEMPERATURE LIMIT
Above the Valve	675°F
45° To the Side of the Valve	N/A
Either way w/ThermiGuard*	800°F

** Custom Fit Insulating Blankets*

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 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.

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

DIMENSIONS AND WEIGHTS

DIMENSION (IN) 1850		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	Standard	8-7/8	9-5/8	10-3/8	13-7/8	15-1/4	16-1/8	17
	Extension Bonnet	CF	14-5/8	CF	17-5/8	CF	CF	CF
Weight (LB)	Standard	140	210	390	545	900	1600	CF
	Extension Bonnet	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

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

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

ACTUATOR	D (in) Actuator	H MAX (IN)	WEIGHT (LB)
ILEA - A3	7-1/8	20-3/4	17-3/4
ILEA - A4 & A5	7-1/8	22	22
ILEA - B4 & B5	8-3/8	22-3/4	26-1/2
ILEA - B6	8-3/8	25-1/8	26-1/2
ILEA - G7*	8-3/4	30-3/4	50-3/4 (60-1/4 w/Failsafe Capcitors)
* See additional dimensional views for location of manual override and failsafe capacitors			

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

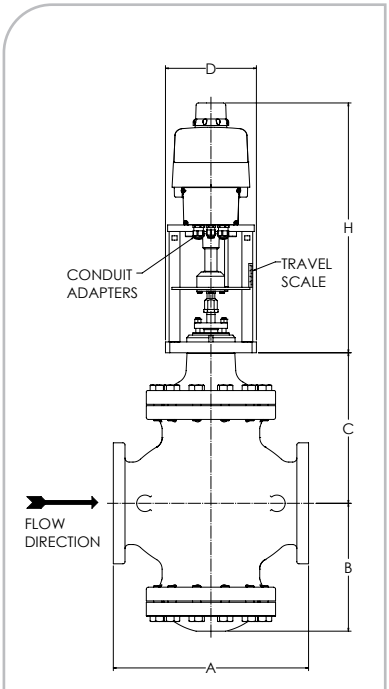
CF = Consult factory N/A = Not Available

Actual Shipping Weights May Vary

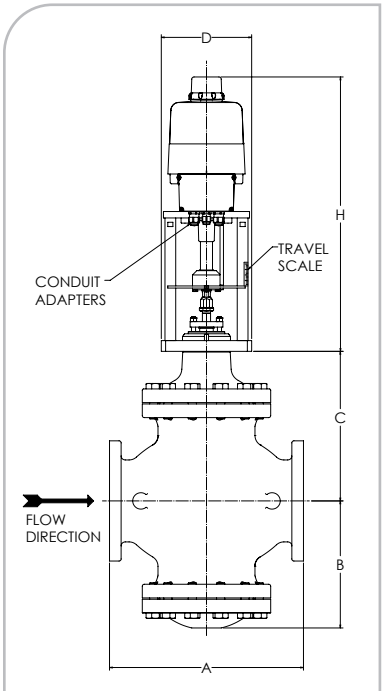
Actuator Removal Clearance
Above 2-1/2 thru 4 inch valve allow 5-5/8 inch
Above 6 inch valve allow 6-5/8 inch
Above 8 & 10 inch valve allow 7-1/8 inch
Above 12 inch valve allow 7-5/8 inch

Above ILEA-A/B
Allow 2-1/16 inch to remove manual override cover.
Allow 4-3/4 inch to remove actuator cover.

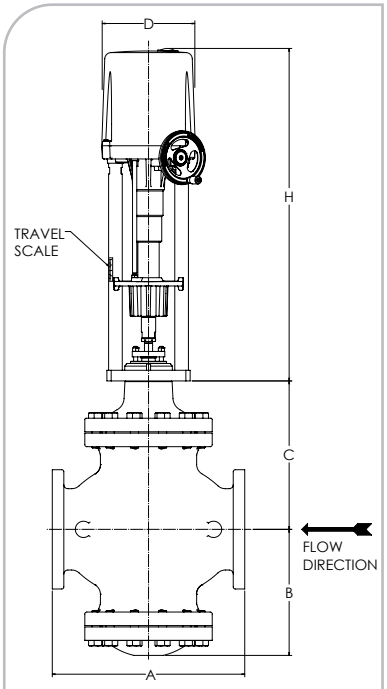
Above ILEA-G
Allow 9-1/8 inch to remove actuator cover.



2-WAY - ILEA - A4 B5



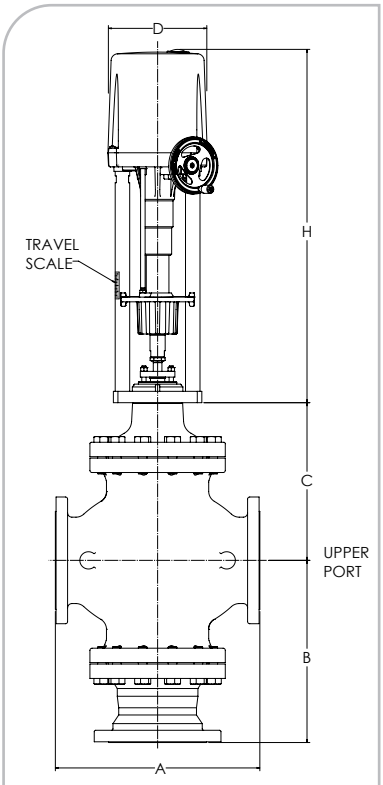
2-WAY - ILEA - B6



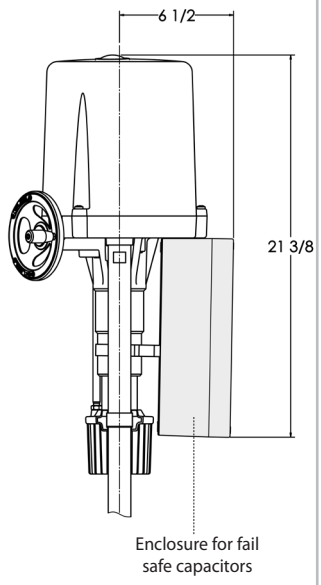
2-WAY - ILEA - G7, G8

Default Actuator Orientation Shown

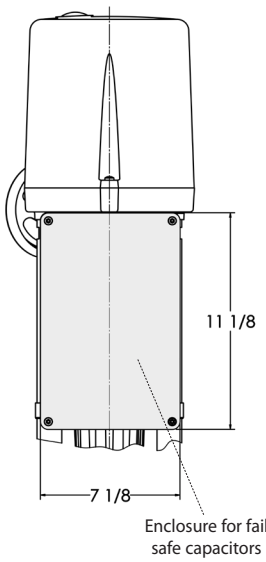
DIMENSIONS AND WEIGHTS



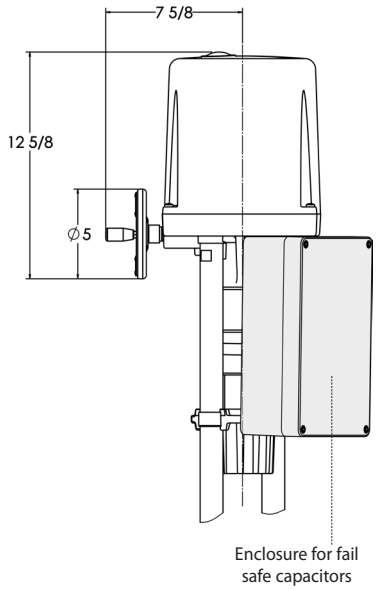
3-WAY
ILEA - G7, G8



ILEA - G7, G8

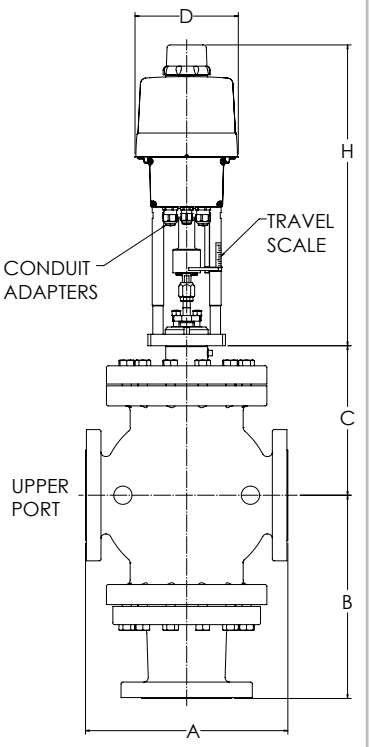


ILEA - G7, G8

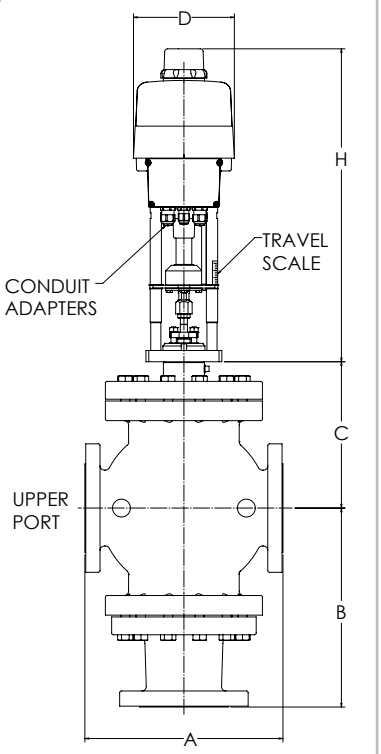


ILEA - G7, G8

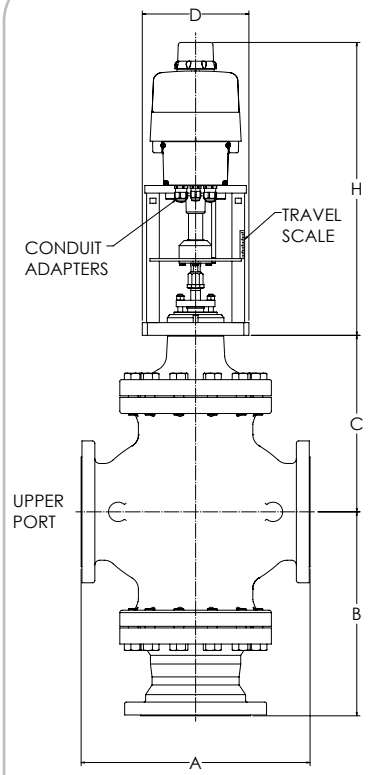
Default Actuator Orientation Shown



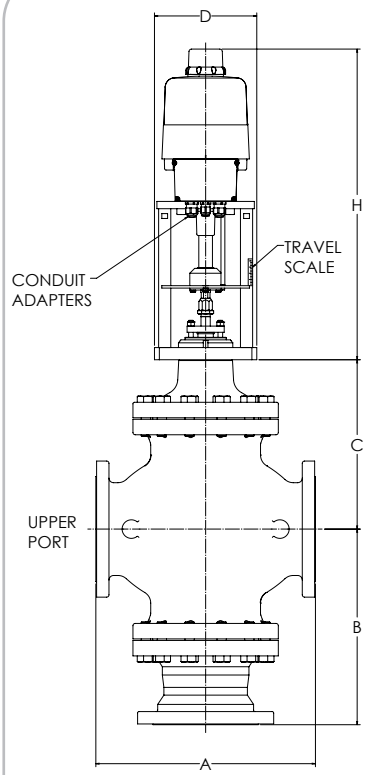
3-WAY
ILEA - A3



3-WAY
ILEA - A4, A5



3-WAY
ILEA - B4, B5



3-WAY
ILEA - B6

Default Actuator Orientation Shown

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**	EPDM **L**	Standard **S**	450ºF	-20ºF
	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**	Copper Based Graphalloy Bushings w/ Ext Bonnet **G**	750ºF	-20ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Nickel Based Graphalloy Bushings w/ Ext Bonnet **L**	750ºF	-20ºF
	WCB **W**, CF8M F	150 lb **F**, 300 lb **G**	Graphite **G**	Oxidation Resistant Graphalloy Bushings w/ Ext Bonnet **7**	800ºF	-20ºF
	Cast Iron **R**	125 lb **F**	EPDM **L**	Standard **S**	350ºF	-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**	EPDM **L**	Standard **S**	400ºF	-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**	EPDM **L**	Standard **S**	450ºF	23ºF
	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**	EPDM **L**	Standard **S**	350ºF	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**	EPDM **L**	Standard **S**	400ºF	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**	EPDM **L**	Standard **S**	450ºF	-20ºF
	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**	Copper Based Graphalloy Bushings w/ Ext Bonnet **G**	750ºF	-20ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Nickel Based Graphalloy Bushings w/ Ext Bonnet **L**	750ºF	-20ºF
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	Graphite **G**	Oxidation Resistant Graphalloy Bushings w/ Ext Bonnet **7**	800ºF	-20ºF
	Cast Iron **R**	125 lb **F**	EPDM **L**	Standard **S**	350ºF	-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**	EPDM **L**	Standard **S**	400ºF	-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**	EPDM **L**	Standard **S**	450ºF	23ºF
	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**	EPDM **L**	Standard **S**	150ºF	-20ºF
	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**	EPDM **L**	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.

ALL GRAPHALLOY BUSHINGS ARE SPECIAL ORDER AT TIME OF ORDER AND MAY IMPACT DELIVERY TIMES.

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
18M 2″ - 4″ Bodies	**40** 2 Way, Single Seat	**250** 2-1/2 inch	**W** WCB	**F** 125/150 lb. Flanged	**E** Equal %	**S** 316 SS	**F** Full Port	**T** Teflon	**S** 450 Tmax
18N 6″ - 12″ Bodies	**43** 2-Way, Cage Balanced	**300** 3 inch	**F** CF8M	**G** 250/300 lb. Flanged	**L** Linear Types 50/52 Linear Only	**6** Alloy 6 Wrapped	**1** 1st Port Reduction	**G** Graphite	**G** Graphalloy Bearings w/ Ext Bonnet
	50 3-Way Mixing	**400** 4 inch	**R** Cast Iron only avail. on 6″-10″ 40, 6″-12″ 43, 8″-12″ 50, 8″-12″ 52				**2** 2nd Port Reduction	**L** EPDM	**L** Nickel Based Graphalloy w/ Ext Bonnet
	52 3-Way Diverting	**600** 6 inch					**3** 3rd Port Reduction		**7** Oxidation Resistant Graphalloy Bearings with Ext Bonnet
		800 8 inch					*Port reductions only available to 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.*
		012 12 inch							

VALVE TYPE/TRIM MATERIAL COMBINATIONS:

Size	Trim Material	
	S 316 SS	**6** Alloy 6/316 SS
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:

Model	Valve Style	Valve Sizes	ILEA Actuators
18N	Type 40	6″	B46, B5C, B6B, G72
18N	Type 40	8″-12″	G72
18N	Type 43	6″- 10″	B46, B5C, B6B, G72
18N	Type 43	12″	G72
18M	Type 50	2-1/2″ - 4″	A3D, A46, A5C
18N	Type 50	6″	B46, B5C, B6B
18N	Type 50	8″ - 12″	G72
18M	Type 52	2-1/2″ - 4″	A3D
18N	Type 52	6″	B46
18N	Type 52	8″ - 12″	G72

-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
	A Medium Frame Modulating	**1** 450	**0** 85 Seconds	**M** Fail in Place	**1** 115 Vac	**0** 24V/ 115/ 230V	**0** None	**5** IP65	**0** None	**0** None	**0** None
	B Medium Frame Modulating (2.5" Stroke)	**2** 515	**1** 73 Seconds	**S** Capacitive Fail Safe	**2** 230 Vac		**P** Profibus	**7** IP67	**L** Local	**H** Heater	**S** Silver Switch
	G Large Frame Modulating (4" Stroke)	**3** 1010	**2** 64 Seconds		**4** 24 Vac		**C** CANopen				
		4 1800	**3** 56 Seconds		**6** 320-575 Vac 3 Phase/60 Hz		**F** Foundation				
		5 2250	**4** 47 Seconds				**M** Modbus				
		6 2900	**5** 42 Seconds								
		7 4492	**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 Unless there is a special request, this will be shipped at 50%-12 seconds.)

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

Note: Actuators have Qty (2) Male M20 to 1/2" FNPT, NEMA 4 Conduit Adapters Standard

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.

STOCKED MODELS:

ORDERCODE	VOLTAGE	DESCRIPTION	IN STOCK AVAILABLE OPTIONS	SPECIAL ORDER AVAILABLE OPTIONS
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 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	2800 SERIES	2900 SERIES	3800 SERIES	5800 SERIES
Heavy Globe Control Valves	Precision Globe Control Valves	High Capacity General Purpose Globe Control Valves	E-Ball Rotary Control Valves	Compact Globe Control Valves
styles:	**styles:**	**styles:**	**styles:**	**styles:**
• 2-way balanced • 2-way unbalanced • 3-way mixing • 3-way diverting	• 2-way unbalanced • 2-way low flow • 3-way mixing • 3-way diverting	• 2-way balanced • 2-way unbalanced • 3-way mixing • 3-way diverting	• 2-way rotary - flow to open - flow to close	• 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 12 in.	sizes 1/2 to 2 in.	sizes 2-1/2 to 10 in.	sizes 1 to 8 in.	sizes 1/2 to 4 in.
class 250 & 300	class 250 & 300	class 125 & 250	class 300	class 300
ends 125 FF, 150, 250, 300 RF flg	ends Buttweld, NPT	ends 125 FF, 250 RF flg	ends 150,300 RF flg	ends 150,300 RF flg, Socketweld, NPT
body Cast Iron, WCB,CF8M, Bronze (ASTM B61)	body Bronze, CF8M	body Cast Iron	body WCB, CF8M, Custom Alloys	body WCB, CF8M, Bronze (ASTM B61)
trim 316 SST, Alloy 6	trim Bronze, 316 SST 17-4pH, Alloy 6, TFE, PEEK	trim Bronze, 300 SS, 17-4pH, Alloy 6	trim 316 SST, Alloy 6, Ceramic, TFE, PEEK	trim 316 SST, 400 SST, Alloy 6, TFE, PEEK
Cv up to 1649	Cv up to 40	Cv up to 960	Cv up to 1420	Cv up to 170
temp. -20° to 800°F	temp. -20° to 500°F	temp. -20° to 400°F	temp. -20° to 800°F	temp. -20° to 800°F
body limit to 740 psi	body limit to 720 psi	body limit to 400 psi	body limit to 740 psi	body limit to 740 psi
leakage rates class III, IV, IV+	leakage rates class III,IV, VI	leakage rates class II, III, IV	leakage rates class IV, IV+, VI	leakage rates class IV, IV+, VI
rangeability 50:1	rangeability 50:1	rangeability 50:1	rangeability 100:1	rangeability 50:1
• Heavy Duty • Severe Service • High Pressure Differentials • Corrosive Materials, Liquids, Gases & Steam • Modulating or On/Off Control	• Economical • Precision Control • Suited for Gases, Steam, or Liquids that are not Viscous or Solids Bearing	• High Capacity • General Purpose • Moderate Pressure Drops • Compatible Liquids and Gas, Steam & Water • Modulating or On/Off Control	• Eccentric, Segmented Ball • Well Suited for Erosive Service • Various Trim Options Include Ceramic for Slurries or Gritty Materials & Teflon® for Class VI Shutoff	• Highly Efficient, Compact Design • High Pressure Drops • Typically Suited for High Force Piston Actuators for Steam, Chemicals & Dirty Fluids