# 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_Revl_0424

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

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

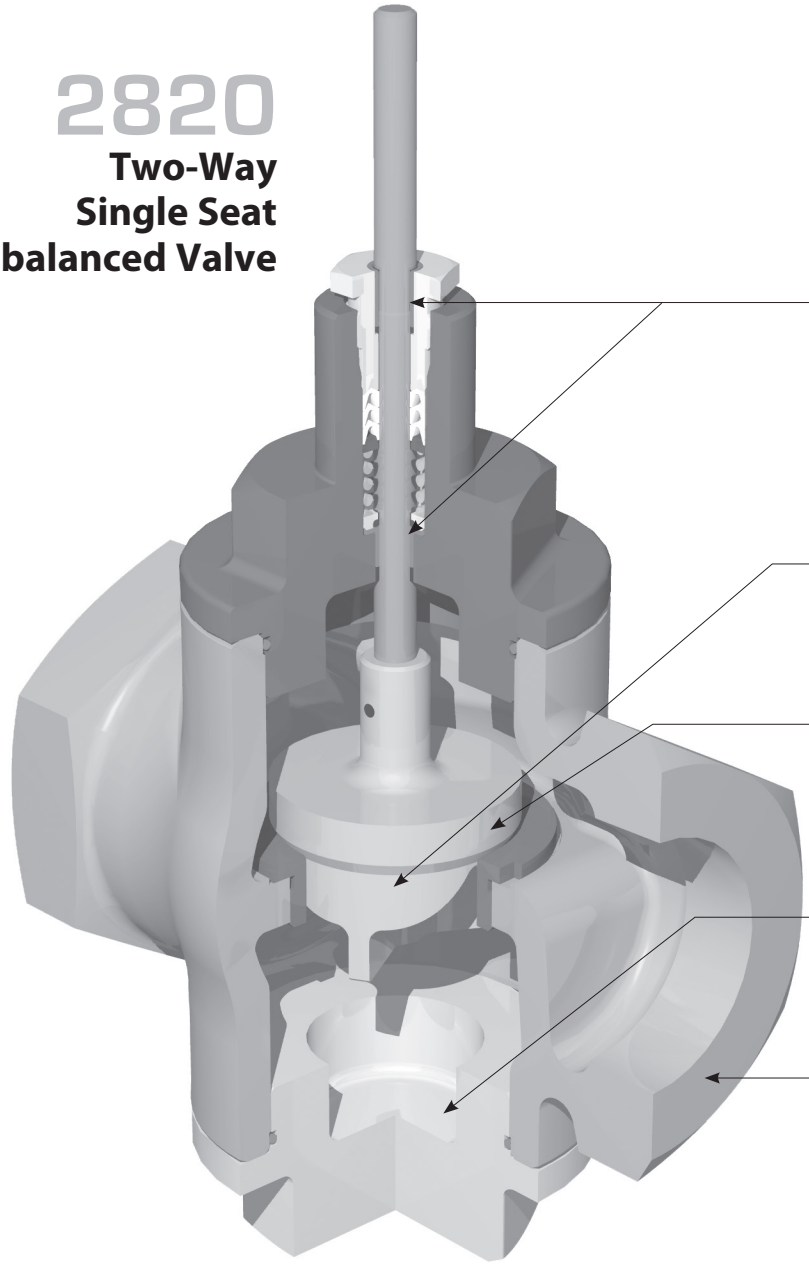
ILEA F-Series 450 LBF
ILEA A-Series 1011 LBF

**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.

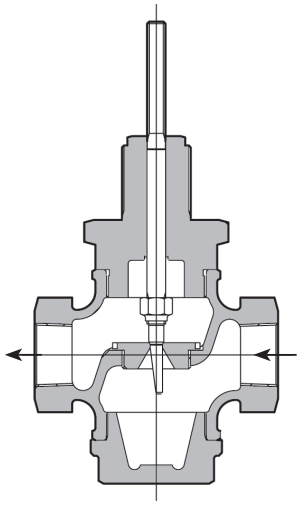
**Port Guided Plug Assembly**
provides stability and desired equal percentage flow characteristic.

**Lower Plug**
offers easy access for inspection and clean out.

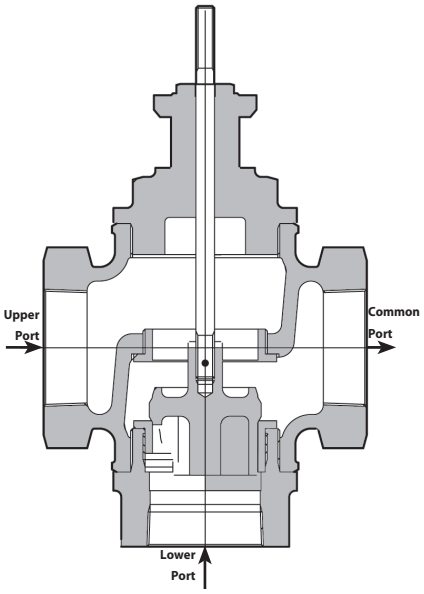
**Rugged Body**
with a selection of port reductions.

# SERIES: 2800

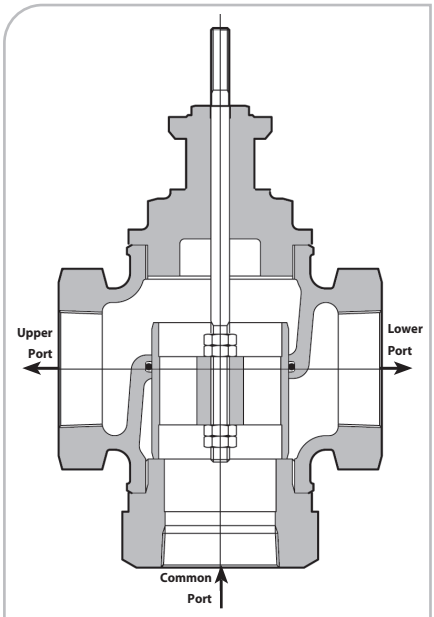
## Precision Globe Control Valves



## 2828
**Two-Way Single Seat Low Flow Unbalanced Valve**




## 2830
**Three-Way Mixing Valve**

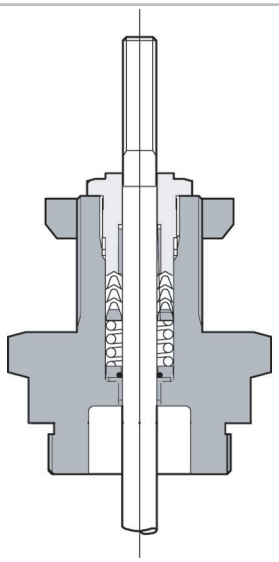



## 2832
**Three-Way Diverting Valve**

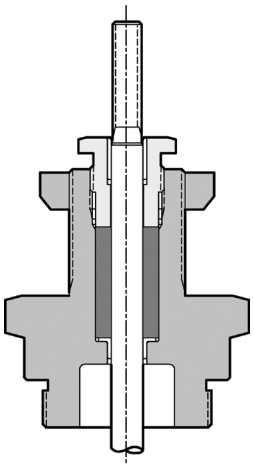
**Description**: Warren Controls Series 2800 Precision Globe Control Valves feature rugged bronze or stainless steel bodies with a variety of trim materials and port sizes. The equal percentage and linear plugs in the 2-way valves and linear plugs in the 3-way valves provide excellent modulating control 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

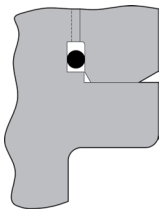
## Packing & Seal Arrangements



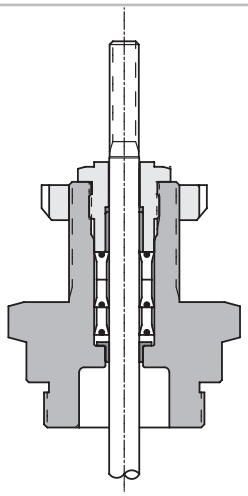
**Guided Low-Friction TFE V-Ring Packing Spring Loaded**



**Adjustable Graphite Packing**



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



**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)<br>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),<br>ANSI Class VI (TFE and PEEK Trim) |
| **Packing**: | Long-Life Multi-Stack EPDM Lip Packing.<br>(EPDM Lip Packing is not suitable for use with oils, hydrocarbons, or acids)<br>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)<br>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),<br>ANSI Class VI (TFE and PEEK Trim) |
| **Packing:** | Long-Life Multi-Stack EPDM Lip Packing<br>(EPDM Lip Packing is not suitable for use with oils, hydrocarbons, or acids)<br>Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing |
| **Rangeability:** | 40:1 for Cv 1.00 and 0.50<br>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.***

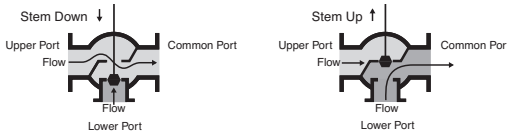
## 3-WAY VALVES
(Control of Liquids)

### 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)<br>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<br>(EPDM Lip Packing is not suitable for use with oils, hydrocarbons, or acids)<br>Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing |
| **Rangeability:** | 50:1 |



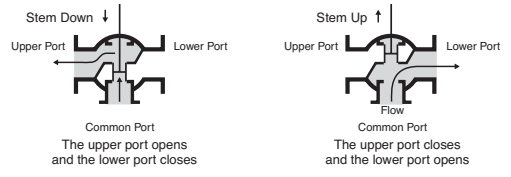

### 2832 3-Way Diverting/Mixing Valve

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 15.)

| | |
|---|---|
| **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)<br>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<br>(EPDM Lip Packing is not suitable for use with oils, hydrocarbons, or acids)<br>Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing |
| **O-Ring:** | EPR (Bronze 250LB Threaded),<br>Fluoraz 797 (316 Stainless Steel 300LB Threaded or Buttweld)* |
| **Rangeability:** | 50:1 |

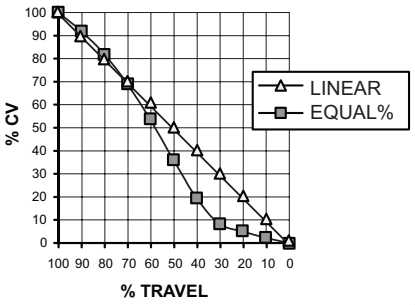


2-Way Valves (Control of Liquids, Gases, and Steam)

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

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

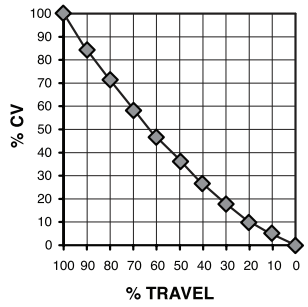
**2820 TYPICAL FLOW CURVES**




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

| VALVE | | | | %Travel | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Valve Size (IN) | Trim Style | Trim Size(N) | Port Size | 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

CRN REGISTERED — SEE TABLE ON PAGE 24

QAS INTERNATIONAL ISO 9001:2015 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 |

***NOTE***: Approaching limits for continuous use will reduce trim life. For continuous use, stay within half of rated maximum.

***NOTE ON BEARINGS***: PEEK Bearings should not be used for temperatures above 450°F or flowing differential pressure above 300 PSIG.

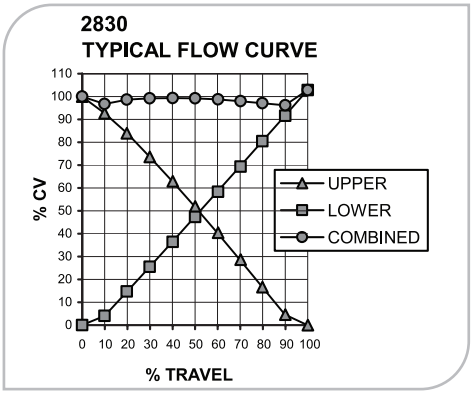
# FLOW COEFFICIENTS (Cv) VERSUS TRAVEL

**3-Way Valves** (Control of Liquids)

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

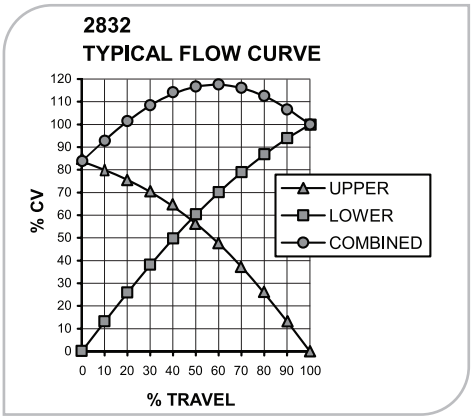
| Valve Size (N) | Trim Style | Trim Size(N) | Port Size | Travel 100% |
|---|---|---|---|---|
| 1/2 | LINEAR | 1.126 | FULL | 6.30 |
| | | 0.876 | 1SR | 4.00 |
| | | 0.626 | 2SR | 2.00 |
| | | 0.626 | 3SR | 1.00 |
| 3/4 | LINEAR | 1.126 | FULL | 8.20 |
| | | 0.876 | 1SR | 4.00 |
| | | 0.626 | 2SR |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




## 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

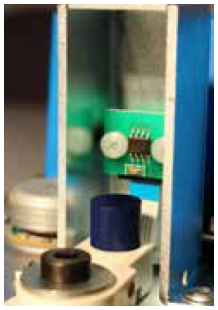
Integrated power spring for fail safe function in case of loss of power supply, either extending or retracting actuator stem

**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

# ILEA-F SERIES ACTUATORS SPECIFICATIONS

| | UNITS | Spring -Fail | Fail-In-Place |
|---|---|---|---|
| | | ILEA-F18-U/D | ILEA-FIA-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) | Motor Operation 28 | 21 |
| | | Fail-Safe Operation 23 | |
| 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 Analog Control Signal. | | Actuator engages Spring Fail, to Open or Closed, Depending on model. | **4-20mA or 2-10 VDC**: Actuator Stops in Position when event occurs. **0-20mA or 0-10 VDC**: Actuator Assumes Lower Control Signal when event occurs. |
| Loss of Binary Inputs Control Signal | | Actuator stops in position when event occurs | Actuator stops in position when event occurs |
| Loss of Binary Override | | Actuator responds to Analog Control Signal | Actuator responds to Analog Control Signal |

## 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.

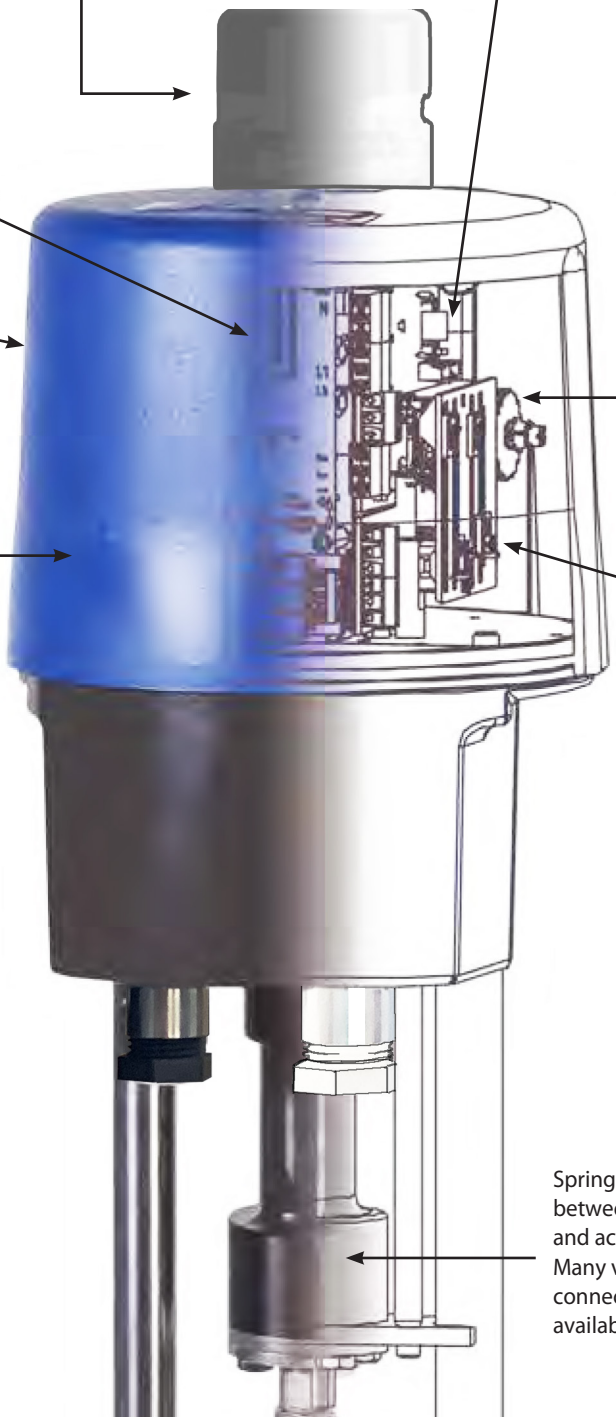
No switching-over to manual operation needed. The hand wheel serves as an operation indicator and is always ready for operation

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 | 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 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 24Vac/Vdc or Universal 115 – 230 Vac Supply

***Warren Controls factory stocked options include:***
Limit Switches, Heater, High Voltage Power Supply and IP67 enclosure

### 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).

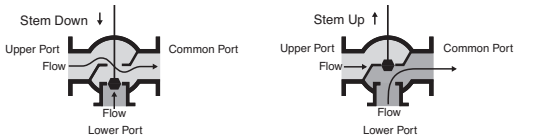
2) Inlet pressure **cannot** exceed Body Pressure-Temperature Rating.

| 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 | 720 |
| 0.876 | 1/2 thru 2" | See Tables | 3/4 | F18, F1A | 519 |
| | | | | A2x | 627 |
| | | | | A3x | 720 |
| 1.126 | 1" thru 2" | See Tables | 3/4 | F18, F1A | 298 |
| | | | | A2x | 364 |
| | | | | A3x | 720 |
| 1.438 | 1-1/4" thru 2" | See Tables | 3/4 | F18, F1A | 171 |
| | | | | A2x | 211 |
| | | | | A3x | 453 |
| 1.676 | 1-1/4" thru 2" | See Tables | 3/4 | F18, F1A | 119 |
| | | | | A2x | 148 |
| | | | | A3x | 327 |
| 2.126 | 2" | See Tables | 3/4 | F18, F1A | 66 |
| | | | | A2x | 84 |
| | | | | A3x | 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 | |

## 2830 Three-Way Mixing Valve

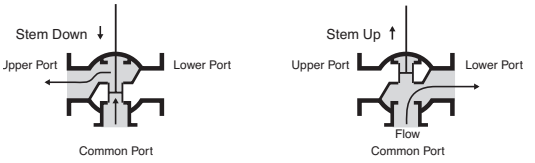



**NOTES:**

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 | 720 | 720 |
| 0.876 | 1/2" thru 1" | See Tables | 9/16 | F18, F1A | 519 | 592 |
| | | | | A2x | 627 | 700 |
| | | | | A3x | 720 | 720 |
| 1.126 | 1/2" thru 2" | See Tables | 9/16 | F18, F1A | 298 | 343 |
| | | | | A2x | 364 | 408 |
| | | | | A3x | 720 | 720 |
| 1.676 | 1-1/4" thru 2" | See Tables | 3/4 | F18, F1A | 119 | 139 |
| | | | | A2x | 148 | 168 |
| | | | | A3x | 327 | 347 |
| 2.126 | 2" | See Tables | 3/4 | F18, F1A | 66 | 78 |
| | | | | A2x | 84 | 97 |
| | | | | A3x | 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 | | |
| 1-1/2" | 22 / 26 | 3/4 | F18, F1A | 100 | 100 |
| | | | A2x | | |
| | | | A3x | | |
| 2" | 40 / 47 | 3/4 | F18, F1A | 100 | 100 |
| | | | A2x | | |
| | | | A3x | | |

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 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 models (Now Standard)

***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.

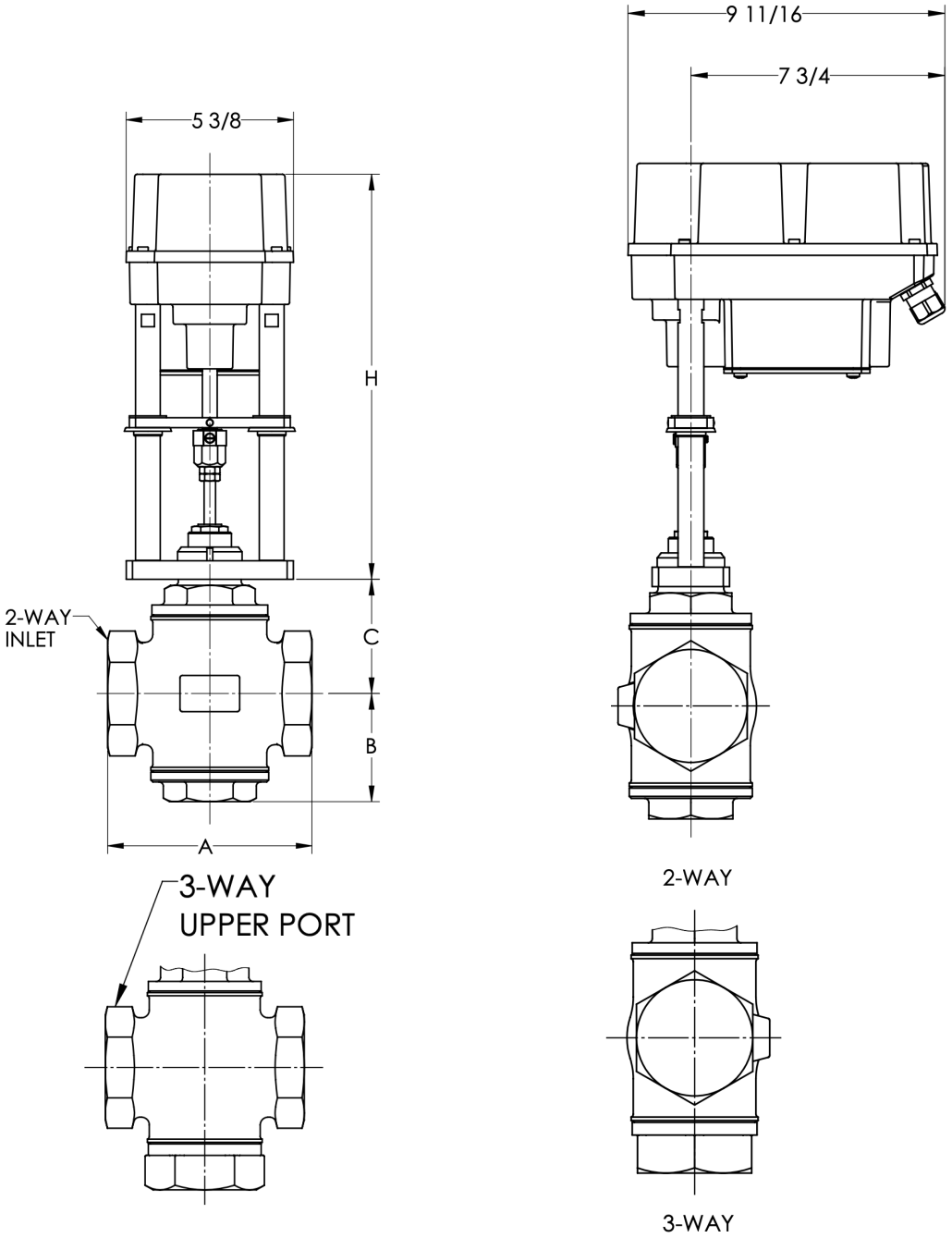
## Additional options for for ILEA-A models:

- 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.

## Additional options 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
- IP67 Enclosure

MEASUREMENT IN INCHES




2-WAY or 3-WAY
F1

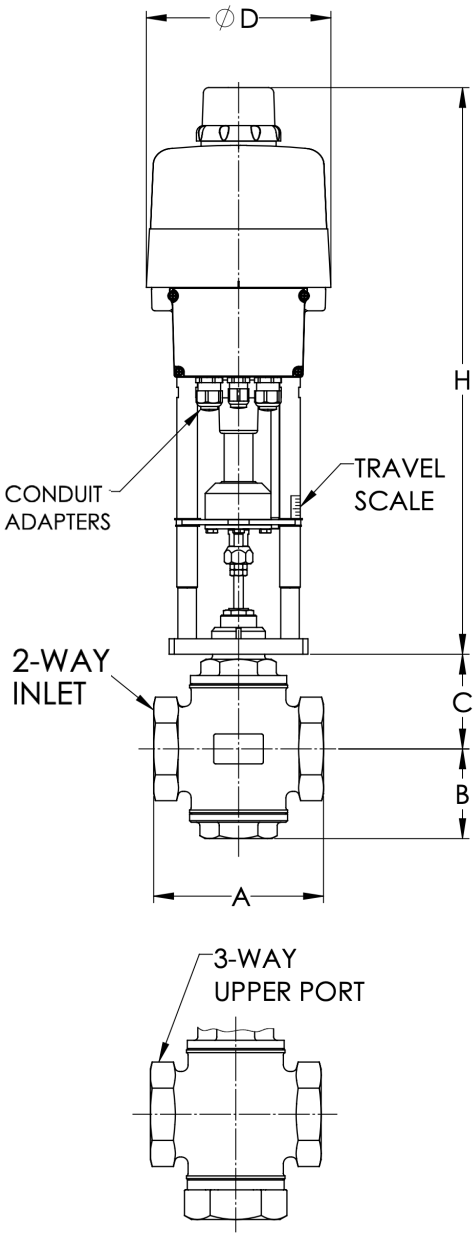
**Default Actuator Orientation Shown**

| ACTUATOR | DIMENSIONS | | WEIGHT (lb) |
|---|---|---|---|
| | D (in) | H (in) | |
| F1 | N/A | 13 | 12-1/2 |

**ILEA-F Actuator Removal Clearance**
Above actuator on 1/2 thru 1 inch type 30 valve allow 5-7/8 inch
Above actuator on all other valves allow 6-1/8 inch
**Above ILEA-F**
Allow 3-1/4 inch abover actuator for cover removal

# DIMENSIONS & WEIGHTS

MEASUREMENT IN INCHES




2-WAY or 3-WAY
A2, A3

**Default Actuator Orientation Shown**

| ACTUATOR | DIMENSIONS | | WEIGHT |
|---|---|---|---|
| | D (in) | H (in) | (lb) |
| A2, A3 | 7 | 20-1/2 | 17-3/4 |

**ILEA-A Actuator Removal Clearance**
Above actuator on 1/2 thru 1 inch type 30 valve allow 4-3/4 inch
Above actuator on all other valves allow 4-7/8 inch
**Above ILEA-A**
Allow 2-1/16 inch to remove manual override cover
Allow 4-3/4 inch to remove actuator cover

| 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 |

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.

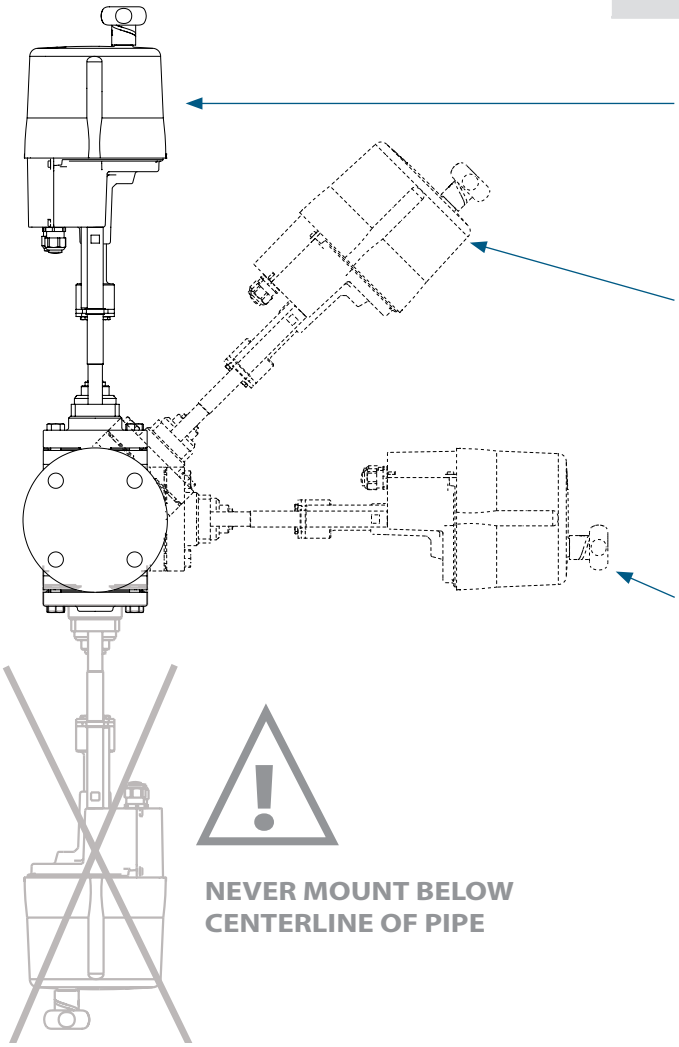
However, we have attempted to do that in the tables that follow on page 22. Realize these are only guidelines.

## *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**

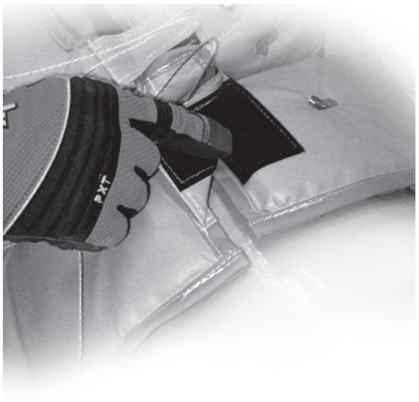
The tables that follow on page 22 will identify temperature ranges, valve size ranges, actuator orientation and use of thermal blankets to determine what is required to get longevity out of your actuators and accessories.

## *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><br>0-20 mA (0-10 Vdc, wiring dependent) |
| Control Action: | Decreasing Signal closes valve (2-way) closes Lower Port (3-Way) <FACTORY DEFAULT><br>Increasing Signal closes valve (2-way) closes Lower Port (3-Way) |
| Feedback Signal: | 4-20 mA (2-10 Vdc, wiring dependent) <FACTORY DEFAULT><br>0-20 mA (0-10 Vdc, wiring dependent) |
| Feedback Action: | Decreasing Signal valve closing (2-way) or closing Lower Port (3-Way) <FACTORY DEFAULT><br>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><br><br>Actuators with Spring Fail will either close Stem Fail up or Stem fail down by model selection.<br><br>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)<br>the following action can occur: 50% Speed <FACTORY DEFAULT>, Actuator Stop,<br>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)<br>the following action can occur:<br>Valve Close on 2-Way Valves, Lower Port Closed on 3-Way Valves <FACTORY DEFAULT>,<br>Actuator Stop, Valve Open, 50% Speed, Specific Position. |
| MAX Speed: | For ILEA-A3D model the Factory default is 50% of the Speed Range.<br>For all other models the factory<br>default is 100% of the Speed Range. |

* Does not apply to ILEA-F Models

ILEA-A 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** EPDM 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** | 450ºF | -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** | 450ºF | -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** | 450ºF | -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** | 450ºF | -20ºF |
| | CF8M **F** | 316 **S** | Teflon **T**, Vacuum Service **V** | 450ºF | 60ºF |
| | CF8M **F** | 316 **S** | Graphite **G** | 450ºF | -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** | 450ºF | -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** | 450ºF | -20ºF |
| | CF8M **F** | 316 **S** | Teflon **T**, Vacuum Service **V** | 450ºF | 60ºF |
| | CF8M **F** | 316 **S** | Graphite **G** | 450ºF | -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** | 450ºF | 23ºF |
| | CF8M **F** | 316 **S** | Teflon **T**, Vacuum Service **V** | 450ºF | 60ºF |
| | CF8M **F** | 316 **S** | Graphite **G** | 450ºF | 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 |
| | | **3** 1010 | **2** 64 Seconds | **D** Spring Fail Down | **4** 24 Vac | | **C** CANopen | | | | |
| | | | **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 unless 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.**

**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<br>- Limit Switches<br>- 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<br>- Local Control Station<br>- Limit Switches<br>- Programming Umbilical Cord | - Alternate Actuator Forces<br>- Alternate Speed Ranges<br>- Alternate Voltage Supply<br>- Alternate Binary Input Voltage<br>- 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 | | | |

# VALVE SIZING DATA SHEET

WARREN CONTROLS
2600 Emrick Blvd • Bethlehem, PA 18020 • Phone: (800) 922-0085 • Fax: (610) 317-2989
Sales@warrencontrols.com • www.WarrenControls.com

**DATE:**

| | | | | | X | *Check Preferred Contact Method* | |
|---|---|---|---|---|---|---|---|
| **CUSTOMER INFORMATION** | Company | | Phone | | | | |
| | Contact | | Fax | | | | |
| | Address | | Email | | | | |
| | City, State, Zip | | Project | | | | |

**APPLICATION DATA** (**Indicates "Required" Information) (*Indicates Valuable Information)

| | | |
|---|---|---|
| **SYSTEM INFORMATION** | Valve Tag (Name) | |
| | System | * |
| | Fluid | * * |
| | Specific Gravity | |
| | Pipe Size | * * |
| | Pipe Material | * |

| | | *Unit Type* | *Maximum* | *Normal* | *Minimum* |
|---|---|---|---|---|---|
| **PROCESS INFORMATION** | ***Flow Rate*** (GPM)/(Lbs./Hr.) | | * * | | * |
| | ... or, Required Cv | | * | | * |
| | P1 = ***Inlet Pressure*** (PSIG) | | * * | | * |
| | DP= ***Pressure Drop*** (PSIG) | | * * | | * |
| | ... or, P2 = Outlet Pressure (PSIG) | | * * | | * |
| | ***Temperature*** (Degrees F) | | * * | | * |

## VALVE INFORMATION

| | |
|---|---|
| Type *(Globe, Rotary, Any 2-way, 3-way mix, 3-way Divert)* | |
| Size | |
| Pressure Class | |
| Body Material | |
| Trim Materials | |
| Packing & Seals | |
| Operation *(on-off, mix, divert, modulating)* | |
| End Connections | |
| Trim Cv *(FP, 1R, 2R, etc.)* | |
| Flow Direction *(FTO, FTC)* | |
| Bonnet Stem / Shaft | |
| 2 - Position / Modulating | |

## 3–WAY VALVE TYPE REFERENCE

***Mixing*** U → C, ↑L

***Diverting*** U → L, ↑C

## ACTUATOR & CONTROL INFORMATION

| *Pneumatic Type* | | *Electric Type* | |
|---|---|---|---|
| Model / Ratings/ Approvals | | Model / Ratings/ Approvals | |
| Supply Available / Air - *(PSIG)* | | Supply Available / Power - *(VAC/Hz, Vdc)* | |
| Positioner Type /Increasing Signal *(opens/closes)* | | Increasing Signal *(opens/closes)* | |
| Control Signal *(3-15psi. 4-20mA, etc.)* | | Control Signal *(4-20mA, 2-10 Vdc etc.)* | |
| Feedback/ Limit Switches/ or Solenoid | | Limit Switches | |
| Air Filter/ Regulator *(If applicable / Range)* | | Manual Override / or Handwheel | |
| Manual Override w/ Handwheel | | Failure Mode *(open / close / As Is)* Spring / Electric / None | |
| Failure Mode *(open / close / As Is)* | | Special Set ups or Misc. Accessories | |
| Tubing Material *(copper, SS)* | | | |
| Special Set ups or Misc. Accessories | | | |

**SHUT OFF REQ**

## NOTES • SPECIFICATIONS • FURTHER INFORMATION

# 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