INDUSTRIAL LINEAR ELECTRICALLY ACTUATED

STEEL BODY, GENERAL PURPOSE, GLOBE CONTROL VALVES

PRODUCT SPECIFICATION

5800 E PRODUCT SPEC

SERIES **5800** **ILEA**

SIZES: 1/2 TO 4 INCHES

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

5800E_PS_RevF_1121

WARREN CONTROLS

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

DEPENDABLE, RUGGED, PRECISION CONTROL VALVES AND ACCESSORIES

Actuator: ILEA_F

Actuator: ILEA_A

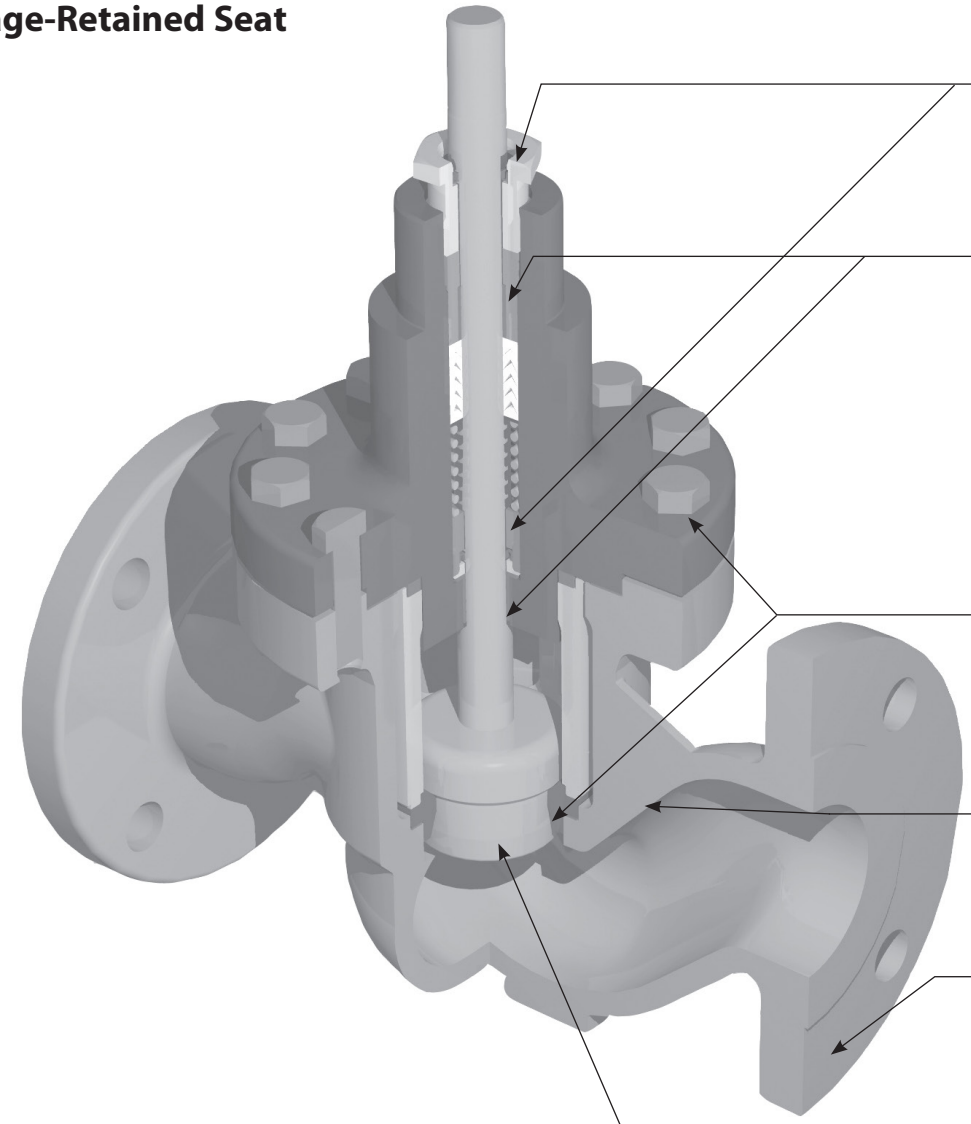
WARREN CONTROLS INC.
A VETERAN OWNED, PRIVATELY HELD, SMALL BUSINESS
WARREN CONTROLS INC.

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

5840

Two-Way Single Seat Unbalanced Valve with Cage-Retained Seat



Stem Wipers
provide outstanding packing protection and stem stability.

Dual Point PEEK or Z PEEK Bearing Plug Guiding
provides both stability and low friction, resulting in lowest hysteresis and precision control. Graphalloy Bearings are available for added durability in high temperature applications.

Bolted Bonnet and Cage-Retained Seat
make the 5800 ideal for easy access, maintenance, and trim inspection.

Rugged Body
with a selection of port reductions.

Low Profile Design
offers footprint minimizing valuable space consumption, yet conforms to ANSI/ISA standards for NPT, Flanged and Socket Weld ends.

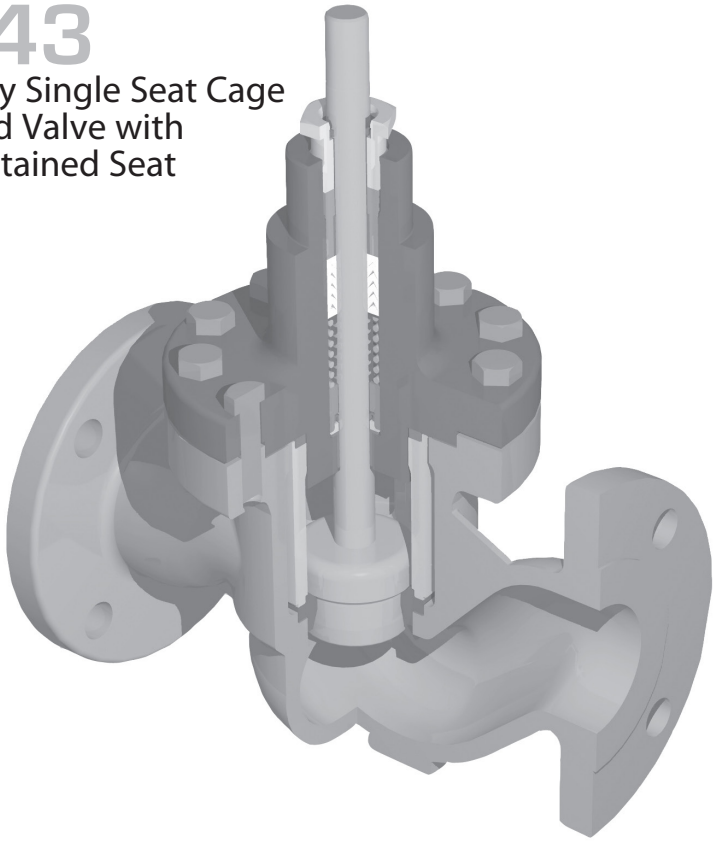
Std. Trim Choices Available
include 316SS, 400SS, Alloy 6, PEEK and PTFE.

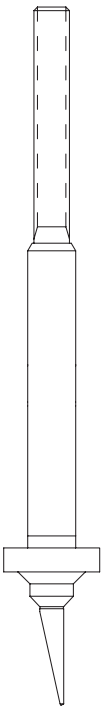
DESCRIPTION

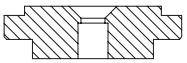
Warren Controls Series 5800 Compact Globe Control Valves feature rugged high efficiency bodies of steel or stainless steel, with cage-retained seats for ease of maintenance, and a variety of trim materials and port sizes. The equal percentage, linear and modified linear plugs provide excellent modulating control of a wide variety of fluids. The Series 5800 is ideally suited where value and long life are important objectives for applications including but not limited to the Chemical, Food & Beverage, General Service, Marine, Pulp & Paper, Refining, District Energy and Pharmaceutical Industries with temperatures from -20 to 800°F, severe service, dirty fluids (5840 only), high pressure drops, and corrosive fluids. Mated with ILEA Electrical Actuators the 5800 E Series are ideally suited industrial Linear Actuated Control Valve Solutions for these applications.

5843

Two-Way Single Seat Cage Balanced Valve with Cage-Retained Seat







5848

Low Flow Trim Choices Available Include 316SS, PEEK and PTFE

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RUGGEDNESS AND HIGH PERFORMANCE	
Features	Advantages
Compact rugged valve body	Reduces envelope size and weight without sacrificing pressure boundary integrity or high Cv's.
Precision manufactured valve components	Valve bodies machined in single operation in 4 axis computer numerical controlled horizontal machining centers. Bodies and trim components held to exacting geometric tolerances ensuring smooth reliable operation of finished valve.
Body materials	Standard body materials are WCB steel and CF8M stainless steel. Bodies available custom cast in other specialized alloys.
Trim components	Durable rugged plug and seat construction shuts off tightly.
Equal % or Linear plug	Provides exceptional modulating control with 50:1 rangeability.
Modified Linear plug	Provides exceptional modulating control with up to 40:1 rangeability.
Reduced ports	Match valve size to line size and capacity to flow requirements. Maximizes performance. Prevents oversized valves. Simplifies piping. Reduces need for reducers or expanders. 1, 2, & 3 sizes reduced trim available.
Trim materials	Alloy 6 wrapped stainless steel trim promotes long dependable service life in applications controlling hard to handle fluids. 316 & 400 stainless steel trim, PEEK & TFE soft seat trim available for ANSI Class VI shut-off in non-corrosive non-erosive service.
Oversized bearings and shafts	Ideal for high pressure drops.
Valve stem to plug connection	Rigid connection provides zero backlash. Assures minimum dead band and hysteresis.
Threaded valve stem connection and split stem connector	Solid actuator interface. Provides zero backlash. Assures minimum dead band and hysteresis.
Factory lubricated packing and valve stem	Minimizes hysteresis from packing friction .
Extension bonnet	Allows for wide range of temperature applications.

INCREASED SERVICEABILITY AND REDUCED MAINTENANCE	
Features	Advantages
Integral valve body flanges	Promote secure valve installations and piping integrity. Easy installation. Eliminate exposed line flange bolting. Shorten alignment and installation time. Many different classes of pipe flanges.
ANSI Standard valve body face to face dimensions and bolt patterns	Simplifies piping designs and layouts for new installations. Minimizes need to change piping in existing installations.
Easy actuator and accessory mounting	Facilitates removal and installation for service and maintenance.
Roller burnished valve stem	Ultra smooth finish minimizes packing wear and maximizes life. Smooth function and minimum stick/slip.
Bonnet and packing nut bearings and stem wiper	Prevent external particles from infiltrating and damaging packing.
Bolted bonnet and cage retained seat	Provides fast easy access to trim. Speeds inspection and maintenance.

ESTABLISHED FEATURES & QUALITY	
Features	Advantages
Linear Control Valve	Combines reciprocating globe valve ruggedness with linear actuators to produce heavy duty automatic throttling control valve which dependably controls fluids in process industries.
Quality valve design & engineering	Components and materials designed and selected to meet or exceed demanding applications, specifications, functional and chemical and temperature compatibility requirements. Product quality built on tried and tested designs and engineering.
Pneumatic diaphragm actuators	Powerful direct or reverse acting spring and diaphragm actuators. Top mounted handwheels available for manual override. Supply pressures to 40 PSIG. Combine actuators with pneumatic accessories to allow for wide variety of control actions.
Pneumatic cylinder actuators	Powerful direct or reverse acting spring and piston actuators. Supply pressures to 120 PSIG. Combine actuators with pneumatic accessories to allow for wide variety of control actions.
Wide variety of accessories	Pneumatic and electro-pneumatic positioners for intrinsically safe, explosion proof, or fail freeze operation. Hart, Profibus PA, and foundation fieldbus inputs available. Position indication switches, I/P's, air filter regulators, and solenoids also available.
Factory testing and set-up	Each control valve undergoes careful set-up and thorough testing by our highly skilled and experienced factory assembly personnel to ensure it is pre-set for its specified service.

2-WAY VALVES
(Control Of Liquids, Gases, And Steam)

5840 2-Way Single Seat Unbalanced Valve with Cage Retained Seat

The 5840 Valve is particularly effective for the control of liquids, gases, and steam. It is a suitable solution for applications with dirty fluids and high pressure drops. ANSI Class IV and VI leakage ratings standard. Available with Warren Class IV+ leakage rating. (See Allowable Seat Leakage Class table on page 7).
See Table on page 40 for Fluid Temperature Limits

Sizes:	1/2, 3/4, 1, 1-1/2, 2, 2-1/2, 3, 4 inch
Body:	WCB Steel or CF8M Stainless Steel 300 NPT or 300 Socketweld (1/2 thru 2), 150LB Flange or 300LB Flange (1/2 thru 4)
Trim:	EQ% or Linear: 316 Stainless Steel, Alloy 6 Wrapped 316 SS, 400 Stainless Steel, or Alloy 6 Wrapped 400 SS; TFE or PEEK
Leakage Ratings:	ANSI Class IV (Stainless Steel and Alloy 6 Trim), Warren Class IV+ (Stainless Steel and Alloy 6 Trim, SPECIAL ORDER - Consult Factory) ANSI Class VI (TFE and PEEK Trim)
Packing, Type & Bonnet Construction:	LS EPDM Lip w/ PEEK Bearings L8 EPDM Lip w/ Z PEEK Bearings TS TFE V-Ring, Spring Loaded, w/ PEEK Bearings T8 TFE V-Ring, Spring Loaded, w/ Z PEEK Bearings GS Adjustable Graphite w/ PEEK Bearings G8 Adjustable Graphite w/ Z PEEK Bearings GG Adjustable Graphite w/ Graphite Gaskets, ***Copper Based*** Graphalloy Bearings & Extension Bonnet (*For NON-Oxidizing Media ONLY, Best Suited for Hot Water & Steam*) GL Adjustable Graphite w/ Graphite Gaskets, ***Nickel Based*** Graphalloy Bearings & Extension Bonnet (*For NON-Oxidizing Media ONLY, Best Suited for Heat Transfer Oils*) G7 Adjustable Graphite w/ Graphite Gaskets, ***Oxidation Resistant*** Graphalloy Bearings & Extension Bonnet (*For Oxidizing Media ONLY*) ***Note: PEEK Bearings are best suited for water and chemical applications. Z-PEEK Bearings are best suited for steam applications.***
Rangeability:	50:1

Flow direction is reversed when used with Cylinder Actuator Failed Closed

5843 2-Way Single Seat Caged Balanced Valve with Cage Retained Seat

The 5843 is a balanced valve that is an effective solution for the control of liquids, gases, and steam at 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. (See Allowable Seat Leakage Classes table on page 7).
See Table on page 40 for Fluid Temperature Limits

Sizes:	2-1/2, 3, 4 inch
Body:	WCB Steel, CF8M Stainless Steel 150LB Flange or 300LB Flange
Trim:	EQ% or Linear: 316 Stainless Steel, 400 Stainless Steel, or Alloy 6 Wrapped 400 SS
Leakage Ratings:	ANSI Class IV (Fluoraz Seal) ANSI Class III (SPECIAL ORDER - Consult Factory) Warren Class IV+ (Fluoraz Seal, SPECIAL ORDER - Consult Factory)
Packing	**LS** EPDM Lip w/ PEEK Bearings and Fluoraz Seal
Type & Bonnet Construction:	**L8** EPDM Lip w/ Z PEEK Bearings and Fluoraz Seal **TS** TFE V-Ring, Spring Loaded, w/ PEEK Bearings and Fluoraz Seal **T8** TFE V-Ring, Spring Loaded, w/ Z PEEK Bearings and Fluoraz Seal **GS** Adjustable Graphite w/ PEEK Bearings and Fluoraz Seal **G8** Adjustable Graphite w/ Z PEEK Bearings and Fluoraz Seal **GG** (***Special Order***) Adjustable Graphite w/ Graphite Gaskets, ***Copper Based*** Graphalloy Bearings, Metal Seal, & Extension Bonnet (*For NON-Oxidizing Media ONLY, Best Suited for Hot Water and Steam* - Consult Factory **GL** (***Special Order***) Adjustable Graphite w/ Graphite Gaskets, ***Nickel Based*** Graphalloy Bearings, Metal Seal, & Extension Bonnet (*For NON-Oxidizing Media ONLY, Best Suited for Heat Transfer Oils* - Consult Factory) **G7** (***Special Order***) Adjustable Graphite w/ Graphite Gaskets, ***Oxidation Resistant*** Graphalloy Bearings, Metal Seal, & Extension Bonnet (*For Oxidizing Media ONLY* - Consult Factory) ***Note: PEEK Bearings are best suited for water and chemical applications. Z-PEEK Bearings are best suited for steam applications.***
Rangeability:	50:1

Note: Fluoraz Seal in Type 5843 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 seal selection.

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

5848 2-Way Single Seat Low-Flow Unbalanced Valve with Cage Retained Seat

The 5848 Valve is particularly effective for the control of clean, very low flow liquids, gases, and steam. ANSI Class IV and VI leakage ratings standard.
See Table on page 40 for Fluid Temperature Limits

Sizes:	1/2, 3/4, 1 inch
Body:	WCB Steel or CF8M Stainless Steel 300 NPT, 300 Socketweld, 150LB Flange or 300LB Flange
Trim:	Modified Linear: 316 Stainless Steel; TFE or PEEK
Leakage Rating:	ANSI Class IV (Stainless Steel Trim), ANSI Class VI (TFE and PEEK Trim)
Packing, Type & Bonnet Construction:	**LS** EPDM Lip w/ PEEK Bearings **L8** EPDM Lip w/ Z PEEK Bearings **TS** TFE V-Ring, Spring Loaded, w/ PEEK Bearings **T8** TFE V-Ring, Spring Loaded, w/ Z PEEK Bearings **GS** Adjustable Graphite w/ PEEK Bearings **G8** Adjustable Graphite w/ Z PEEK Bearings **GG** Adjustable Graphite w/ Graphite Gaskets, ***Copper Based*** Graphalloy Bearings & Extension Bonnet (*For NON-Oxidizing Media ONLY, Best Suited for Hot Water and Steam*) **GL** Adjustable Graphite w/ Graphite Gaskets, ***Nickel Based*** Graphalloy Bearings & Extension Bonnet (*For NON-Oxidizing Media ONLY, Best Suited for Heat Transfer Oils*) **G7** Adjustable Graphite w/ Graphite Gaskets, ***Oxidation Resistant*** Graphalloy Bearings & Extension Bonnet (*For Oxidizing Media ONLY*) ***Note: PEEK Bearings are best suited for water and chemical applications. Z-PEEK Bearings are best suited for steam applications.***
Rangeability:	40:1 for Cv 0.75 30:1 for Cv 0. 50 20:1 for Cv 0.25

Flow direction is reversed when used with Cylinder Actuator Failed Closed

BODY PRESSURE-TEMPERATURE RATINGS (PSIG):				
Temperature (F)	150 FLG Steel	300 NPT, SWE, or FLG Steel	150 FLG St Steel	300 NPT, SWE, or FLG St Steel
-20° To 100°F	285	740	275	720
150°	272	710	255	670
175°	266	695	245	645
200°	260	680	235	620
225°	252	673	230	605
250°	245	667	225	590
275°	237	661	220	575
300°	230	655	215	560
325°	222	650	210	548
350°	215	645	205	537
375°	207	640	200	526
400°	200	635	195	515
450°	185	620	182	497
500°	170	605	170	480
550°	155	587	155	465
600°	140	570	140	450
650°	125	550	125	440
700°	110	530	110	435
750°	95	505	95	425
800°	80	410	80	420

Pressure ratings are PSIG
For applications below 32° consult factory

Body Pressure - Temperature Ratings conform to ANSI based on body flange rating and body material. As the fluid temperature increases, the maximum allowable internal pressure decreases. Verify maximum pressures and temperatures prior to selecting body material and body/ flange rating.

TRIM MATERIALS	FLOWING DIFFERENTIAL PRESSURE LIMIT
316 Stainless Steel	100 PSID
TFE	15 PSID
PEEK	100 PSID
400 Stainless 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 or Z PEEK Bearings should not be used for temperatures above 450ºF or flowing differential pressure above 300 PSIG.

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
ANSI Class V**	0.0005 ml /min/inch of trim size/ ΔP(PSI)	Water	Max Operating ΔP	300,000
ANSI Class VI	Class VI about 0.9 ml/min *	Air	50 PSI	600,000

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.
* Leakage rate varies by valve size, Refer to the ANSI/FCI Standard 70.2.
**NOT AVAILABLE IN THE 5800 SERIES.

Class IV + is not an ANSI/FCI Designation, but a proprietary classification invented and used by Warren Controls, achievable with Metal (5800) or Ceramic (3800) seats. It is available as a SPECIAL ORDER. Consult Factory with fluid, shut-off pressure, and temperature.

Class IV+ requires special factory set up and as such there is an up charge. Contact Warren Controls Sales Department for pricing and ordering instructions.

5800 ATTRIBUTE SELECTION CRITERIA

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.

MODIFIED LINEAR
Trim style describes how the plug's shape (style) changes a valve's capacity as the plug moves (travels) inside it. With the Modified Linear Trim Style, the shape of the plug produces an incremental change in capacity that falls between that of the EQ% and Linear Trim Styles. This results in 5% of capacity at 10% of travel, 11% of capacity at 20% of travel, 17% of capacity at 30% of travel, on up to 100% of capacity at 100% of travel. This makes the Modified Linear Trim Style suitable for flows ranging from a small to large a percentage of its total capacity.

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 packing. EPDM lip packing is good from -20°F to 400°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 800°F and is required for temperatures above 450°F to the valve's limit of 800°F. 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.

VACUUM SERVICE
Vacuum service packing is teflon v-ring packing that is designed for use when the pressure inside the valve is lower than the atmospheric pressure outside the valve. Like teflon v-ring packing, vacuum service packing is good from 60°F to 450°F. Vacuum service packing is not suitable for service below 60°F.

TRIM MATERIAL

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

TFE SOFT SEAT
TFE is our most common choice for a resilient trim material. TFE soft seat trim is suitable for flowing differential pressures up to 15 PSIG and temperatures to 250ºF, is capable of our tightest Class VI leakage rating, is corrosion resistant to many fluids, but is much less erosion resistant than other trim materials. TFE soft seat trim is not recommended for use in valves with socket weld end connections. When the valve is being installed in the piping, the heat generated by the welding process may damage the soft seat. Consult the factory if the application requires a soft seat in a valve with a socket weld end connection.

PEEK SOFT SEAT
PEEK remains harder than TFE at higher temperatures making it our most durable choice for a resilient trim material. PEEK soft seat trim is suitable for
flowing differential pressures up to 100 PSIG and temperatures to 450F, is capable of our tightest Class VI leakage rating, is corrosion resistant to many
fluids, but is much less erosion resistant than other trim materials. PEEK soft seat trim is not recommended for use in valves with socket weld end connections. When the valve is being installed in the piping, the heat generated by the welding process may damage the soft seat. Consult the factory if the application requires a soft seat in a valve with a socket weld end connection.

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

400 STAINLESS STEEL
400 stainless steel is our most durable stainless steel trim material choice. 400 stainless steel trim is suitable for flowing differential pressures up to 200 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. 400 stainless steel contains a greater amount of carbon, so it can be heat treated, making it harder and more erosion resistant than 316 stainless steel.

ALLOY 6 WRAPPED 400 STAINLESS STEEL
Alloy 6 wrapped 400 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 and Class IV+ leakage ratings. While somewhat corrosion resistant, Alloy 6 wrapped trim is particularly well suited to wear longer in a cavitation prone environment. Alloy 6 wrapped 400 stainless steel is more erosion resistant, but less corrosion resistant, than alloy 6 wrapped 316 stainless steel trim.

BONNET CONSTRUCTION

PEEK BEARINGS
Bonnet constructions using PEEK Bearings are our most common and lowest cost choices for water and chemical applications. PEEK bearings are good to 450ºF. PEEK Bearings are used with EPDM lip, teflon v-ring, graphite, or vacuum service packing.

Z PEEK BEARINGS
Bonnet constructions using Z PEEK Bearings are our most common and lowest cost choices for steam applications. Z PEEK bearings are good for temperatures up to 450°F. Z PEEK bearings are used with EPDM lip, teflon v-ring, graphite, or vacuum service packing.

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

BODY MATERIALS

CODE W ***WCB BODY***

Item	Part Nomenclature	Materials
4	YOKE LOCKNUT	PLATED STEEL
10	HEX HEAD CAPSCREW	ALLOY STEEL GR B7
12	BONNET	STEEL A216 WCB
22	VALVE BODY	STEEL A216 WCB

CODE F ***CF8M BODY***

Item	Part Nomenclature	Materials
4	YOKE LOCKNUT	300 SERIES SST
10	HEX HEAD CAPSCREW	SST GR B8M CLASS 2
12	BONNET	SST A351 CF8M
22	VALVE BODY	SST A351 CF8M

TRIM MATERIALS

CODE S ***316 STAINLESS STEEL TRIM***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
19	PLUG	316 SST
20	SEAT RING	316 SST

CODE T ***TFE SOFT SEATS***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
20	SEAT RING	316 SST
29	DISC HOLDER	316 SST
30	DISC	REINFORCED PTFE
31	DISC RETAINER	316 SST
32	SELF-LOCKING NUT	18-8 SST
33	INSERT	REINFORCED PTFE
34	RETAINER	316 SST

CODE P ***PEEK SOFT SEATS***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
20	SEAT RING	316 SST
29	DISC HOLDER	316 SST
30	DISC	REINFORCED PEEK
31	DISC RETAINER	316 SST
32	SELF-LOCKING NUT	18-8 SST
33	INSERT	REINFORCED PEEK
34	RETAINER	316 SST

CODE 6 ***ALLOY 6 WRAPPED 316 STAINLESS STEEL TRIM***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
19	PLUG	316 SST/ ALLOY 6 INLAY
20	SEAT RING	316 SST/ ALLOY 6 INLAY

CODE 7 ***400 STAINLESS STEEL TRIM***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
19	PLUG	400 SST
20	SEAT RING	400 SST

CODE 8 ***ALLOY 6 WRAPPED 400 STAINLESS STEEL TRIM***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
19	PLUG	400 SST/ ALLOY 6 INLAY
20	SEAT RING	316 SST/ ALLOY 6 INLAY

PACKING TYPE

CODE T ***TEFLON V-RING PACKING &***
V ***TEFLON V-RING PACKING VACUUM SERVICE***

Item	Part Nomenclature	Materials
7	V-RING PACKING SET	PTFE
8	LOAD WASHER	316 SST
9	PACKING SPRING	316 SST

CODE L ***EPDM LIP PACKING***

Item	Part Nomenclature	Materials
37	LIP PACKING SET	EPDM

CODE G ***GRAPHITE PACKING***

Item	Part Nomenclature	Materials
24	PACKING CARTRIDGE	DIE-FORMED GRAPHITE
25	SPACER	316 SST
26	PACKING RING	BRAIDED GRAPHITE
27	PACKING RING	DIE-FORMED GRAPHITE

BONNET CONSTRUCTION

CODE S ***PEEK BEARINGS***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
3	STEM WIPER	GRAPHITE FILLED TFE/ SST
5	PACKING RETAINER	316 SST
6	SLEEVE BEARING	REINFORCED PEEK
11	BOX RING	316 SST
13	WIPER RETAINER	316 SST
14	BONNET GASKET	NONASBESTOS
15	CAGE SPRING	316 SST/ PTFE
16	FLANGED BEARING	REINFORCED PEEK
21	SEAT GASKET	NONASBESTOS

CODE 8 ***Z PEEK BEARINGS***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
3	STEM WIPER	GRAPHITE FILLED TFE/ SST
5	PACKING RETAINER	316 SST
6	SLEEVE BEARING	REINFORCED PEEK
11	BOX RING	316 SST
13	WIPER RETAINER	316 SST
14	BONNET GASKET	NONASBESTOS
15	CAGE SPRING	316 SST/ PTFE
16	FLANGED BEARING	Z PLASTIC (PEEK BASE)
21	SEAT GASKET	NONASBESTOS

CODE G ***COPPER BASED GRAPHALLOY BEARINGS W/ EXTENSION BONNET***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
11	BOX RING	316 SST
12	EXTENSION BONNET	AS SPECIFIED
14	BONNET GASKET	GRAPHITE
15	CAGE SPRING	INCONEL/ GRAPHITE
21	SEAT GASKET	GRAPHITE
23	BEARING	GRAPHALLOY GRADE GM 320.3
26	PACKING RING	BRAIDED GRAPHITE
28	RETAINING RING	316 SST
35	RETAINER WASHER	316 SST
36	UPPER BEARING AND RETAINER SUBASSY	316 SST/ GRAPHALLOY GRADE GM 320.3

CODE L ***NICKEL BASED GRAPHALLOY BEARINGS W/ EXTENSION BONNET***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
11	BOX RING	316 SST
12	EXTENSION BONNET	AS SPECIFIED
14	BONNET GASKET	GRAPHITE
15	CAGE SPRING	INCONEL/ GRAPHITE
21	SEAT GASKET	GRAPHITE
23	BEARING	GRAPHALLOY GRADE GM 111.3
26	PACKING RING	BRAIDED GRAPHITE
28	RETAINING RING	316 SST
35	RETAINER WASHER	316 SST
36	UPPER BEARING AND RETAINER SUBASSY	316 SST/ GRAPHALLOY GRADE GM 111.3

CODE 7 ***OXIDATION RESISTANT GRAPHALLOY BEARINGS W/ EXTENSION BONNET***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
11	BOX RING	316 SST
12	EXTENSION BONNET	AS SPECIFIED
14	BONNET GASKET	GRAPHITE
15	CAGE SPRING	INCONEL/ GRAPHITE
21	SEAT GASKET	GRAPHITE
23	BEARING	GRAPHALLOY GRADE GM GDG-2
26	PACKING RING	BRAIDED GRAPHITE
28	RETAINING RING	316 SST
35	RETAINER WASHER	316 SST
36	UPPER BEARING AND RETAINER SUBASSY	316 SST/ GRAPHALLOY GRADE GM GDG-2

BODY MATERIALS

CODE W ***WCB BODY***

Item	Part Nomenclature	Materials
4	YOKE LOCKNUT	PLATED STEEL
10	HEX HEAD CAPSCREW	ALLOY STEEL GR B7
12	BONNET	STEEL A216 WCB
22	VALVE BODY	STEEL A216 WCB

CODE F ***CF8M BODY***

Item	Part Nomenclature	Materials
4	YOKE LOCKNUT	300 SERIES SST
10	HEX HEAD CAPSCREW	SST GR B8M CLASS 2
12	BONNET	SST A351 CF8M
22	VALVE BODY	SST A351 CF8M

TRIM MATERIALS

CODE S ***316 STAINLESS STEEL TRIM***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
19	PLUG	316 SST
20	SEAT RING	316 SST

CODE 7 ***400 STAINLESS STEEL TRIM***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	400 SST
19	PLUG	400 SST
20	SEAT RING	400 SST

CODE 8 ***ALLOY 6 WRAPPED 400 STAINLESS STEEL TRIM***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	400 SST
19	PLUG	400 SST/ALLOY 6 INLAY
20	SEAT RING	316 SST/ALLOY 6 INLAY

PACKING TYPE

CODE T ***TEFLON V-RING PACKING &***
V ***TEFLON V-RING PACKING VACUUM SERVICE***

Item	Part Nomenclature	Materials
7	V-RING PACKING SET	PTFE
8	LOAD WASHER	316 SST
9	PACKING SPRING	316 SST

CODE L ***EPDM LIP PACKING***

Item	Part Nomenclature	Materials
37	LIP PACKING SET	EPDM

CODE G ***GRAPHITE PACKING***

Item	Part Nomenclature	Materials
24	PACKING CARTRIDGE	DIE-FORMED GRAPHITE
25	SPACER	316 SST
26	PACKING RING	BRAIDED GRAPHITE
27	PACKING RING	DIE-FORMED GRAPHITE

BONNET CONSTRUCTION

CODE S ***PEEK BEARINGS***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
3	STEM WIPER	GRAPHITE FILLED TFE/ SST
5	PACKING RETAINER	316SST
6	SLEEVE BEARING	REINFORCED PEEK
11	BOX RING	316 SST
13	WIPER RETAINER	316 SST
14	BONNET GASKET	NONASBESTOS
15	CAGE SPRING	316 SST/ PTFE
16	FLANGED BEARING	REINFORCED PEEK
17	O-RING	FLUORAZ
21	SEAT GASKET	NONASBESTOS

CODE 8 ***Z PEEK BEARINGS***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
3	STEM WIPER	GRAPHITE FILLED TFE/ SST
5	PACKING RETAINER	316SST
6	SLEEVE BEARING	REINFORCED PEEK
11	BOX RING	316 SST
13	WIPER RETAINER	316 SST
14	BONNET GASKET	NONASBESTOS
15	CAGE SPRING	316 SST/ PTFE
16	FLANGED BEARING	Z PLASTIC (PEEK BASE)
17	O-RING	FLUORAZ
21	SEAT GASKET	NONASBESTOS

CODE * ***COPPER BASED GRAPHALLOY BEARINGS W/ EXTENSION BONNET***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
11	BOX RING	316 SST
12	EXTENSION BONNET	AS SPECIFIED
14	BONNET GASKET	GRAPHITE
15	CAGE SPRING	INCONEL/ GRAPHITE
17	PISTON RING	METAL
21	SEAT GASKET	GRAPHITE
23	BEARING	GRAPHALLOY GRADE GM 320.3
26	PACKING RING	BRAIDED GRAPHITE
28	RETAINING RING	316 SST
35	RETAINER WASHER	316 SST
36	UPPER BEARING AND RETAINER SUBASSY	316 SST/ GRAPHALLOY GRADE GM 320.3

** SPECIAL ORDER – CONSULT FACTORY*

CODE * ***NICKEL BASED GRAPHALLOY BEARINGS W/ EXTENSION BONNET***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
11	BOX RING	316 SST
12	EXTENSION BONNET	AS SPECIFIED
14	BONNET GASKET	GRAPHITE
15	CAGE SPRING	INCONEL/ GRAPHITE
17	PISTON RING	METAL
21	SEAT GASKET	GRAPHITE
23	BEARING	GRAPHALLOY GRADE GM 111.3
26	PACKING RING	BRAIDED GRAPHITE
28	RETAINING RING	316 SST
35	RETAINER WASHER	316 SST
36	UPPER BEARING AND RETAINER SUBASSY	316 SST/ GRAPHALLOY GRADE GM 111.3

** SPECIAL ORDER – CONSULT FACTORY*

CODE * ***OXIDATION RESISTANT GRAPHALLOY BEARINGS W/ EXTENSION BONNET***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
11	BOX RING	316 SST
12	EXTENSION BONNET	AS SPECIFIED
14	BONNET GASKET	GRAPHITE
15	CAGE SPRING	INCONEL/ GRAPHITE
17	PISTON RING	METAL
21	SEAT GASKET	GRAPHITE
23	BEARING	GRAPHALLOY GRADE GM GDG-2
26	PACKING RING	BRAIDED GRAPHITE
28	RETAINING RING	316 SST
35	RETAINER WASHER	316 SST
36	UPPER BEARING AND RETAINER SUBASSY	316 SST/ GRAPHALLOY GRADE GM GDG-2

** SPECIAL ORDER – CONSULT FACTORY*

BODY MATERIALS

CODE W ***WCB BODY***

Item	Part Nomenclature	Materials
4	YOKE LOCKNUT	PLATED STEEL
10	HEX HEAD CAPSCREW	ALLOY STEEL GR B7
12	BONNET	STEEL A216 WCB
22	VALVE BODY	STEEL A216 WCB

CODE F ***CF8M BODY***

Item	Part Nomenclature	Materials
4	YOKE LOCKNUT	300 SERIES SST
10	HEX HEAD CAPSCREW	SST GR B8M CLASS 2
12	BONNET	SST A351 CF8M
22	VALVE BODY	SST A351 CF8M

TRIM MATERIALS

CODE S ***316 STAINLESS STEEL TRIM***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
19	PLUG	316 SST
20	SEAT RING	UNS S21800

CODE T ***TFE SOFT SEATS***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
19	PLUG	316 SST
20	SEAT RING	316 SST
33	INSERT	REINFORCED PTFE
34	RETAINER	UNS S21800

CODE P ***PEEK SOFT SEATS***

Item	Part Nomenclature	Materials
1	VALVE STEM	316 SST
18	CAGE	316 SST
19	PLUG	316 SST
20	SEAT RING	316 SST
33	INSERT	REINFORCED PEEK
34	RETAINER	UNS S21800

PACKING TYPE

CODE T ***TEFLON V-RING PACKING &***
V ***TEFLON V-RING PACKING VACUUM SERVICE***

Item	Part Nomenclature	Materials
7	V-RING PACKING SET	PTFE
8	LOAD WASHER	316 SST
9	PACKING SPRING	316 SST

CODE L ***EPDM LIP PACKING***

Item	Part Nomenclature	Materials
37	LIP PACKING SET	EPDM

CODE G ***GRAPHITE PACKING***

Item	Part Nomenclature	Materials
24	PACKING CARTRIDGE	DIE-FORMED GRAPHITE
25	SPACER	316 SST
26	PACKING RING	BRAIDED GRAPHITE
27	PACKING RING	DIE-FORMED GRAPHITE

BONNET CONSTRUCTION

CODE S ***PEEK BEARINGS***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
3	STEM WIPER	GRAPHITE FILLED TFE/ SST
5	PACKING RETAINER	316 SST
6	SLEEVE BEARING	REINFORCED PEEK
11	BOX RING	316 SST
13	WIPER RETAINER	316 SST
14	BONNET GASKET	NONASBESTOS
15	CAGE SPRING	316 SST/ PTFE
16	FLANGED BEARING	REINFORCED PEEK
21	SEAT GASKET	NONASBESTOS

CODE 8 ***Z PEEK BEARINGS***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
3	STEM WIPER	GRAPHITE FILLED TFE/ SST
5	PACKING RETAINER	316 SST
6	SLEEVE BEARING	REINFORCED PEEK
11	BOX RING	316 SST
13	WIPER RETAINER	316 SST
14	BONNET GASKET	NONASBESTOS
15	CAGE SPRING	316 SST/ PTFE
16	FLANGED BEARING	Z PLASTIC (PEEK BASE)
21	SEAT GASKET	NONASBESTOS

CODE G ***COPPER BASED GRAPHALLOY BEARINGS W/ EXTENSION BONNET***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
11	BOX RING	316 SST
12	EXTENSION BONNET	AS SPECIFIED
14	BONNET GASKET	GRAPHITE
15	CAGE SPRING	INCONEL/ GRAPHITE
21	SEAT GASKET	GRAPHITE
23	BEARING	GRAPHALLOY GRADE GM 320.3
26	PACKING RING	BRAIDED GRAPHITE
28	RETAINING RING	316 SST
35	RETAINER WASHER	316 SST
36	UPPER BEARING AND RETAINER SUBASSY	316 SST/ GRAPHALLOY GRADE GM 320.3

CODE L ***NICKEL BASED GRAPHALLOY BEARINGS W/ EXTENSION BONNET***

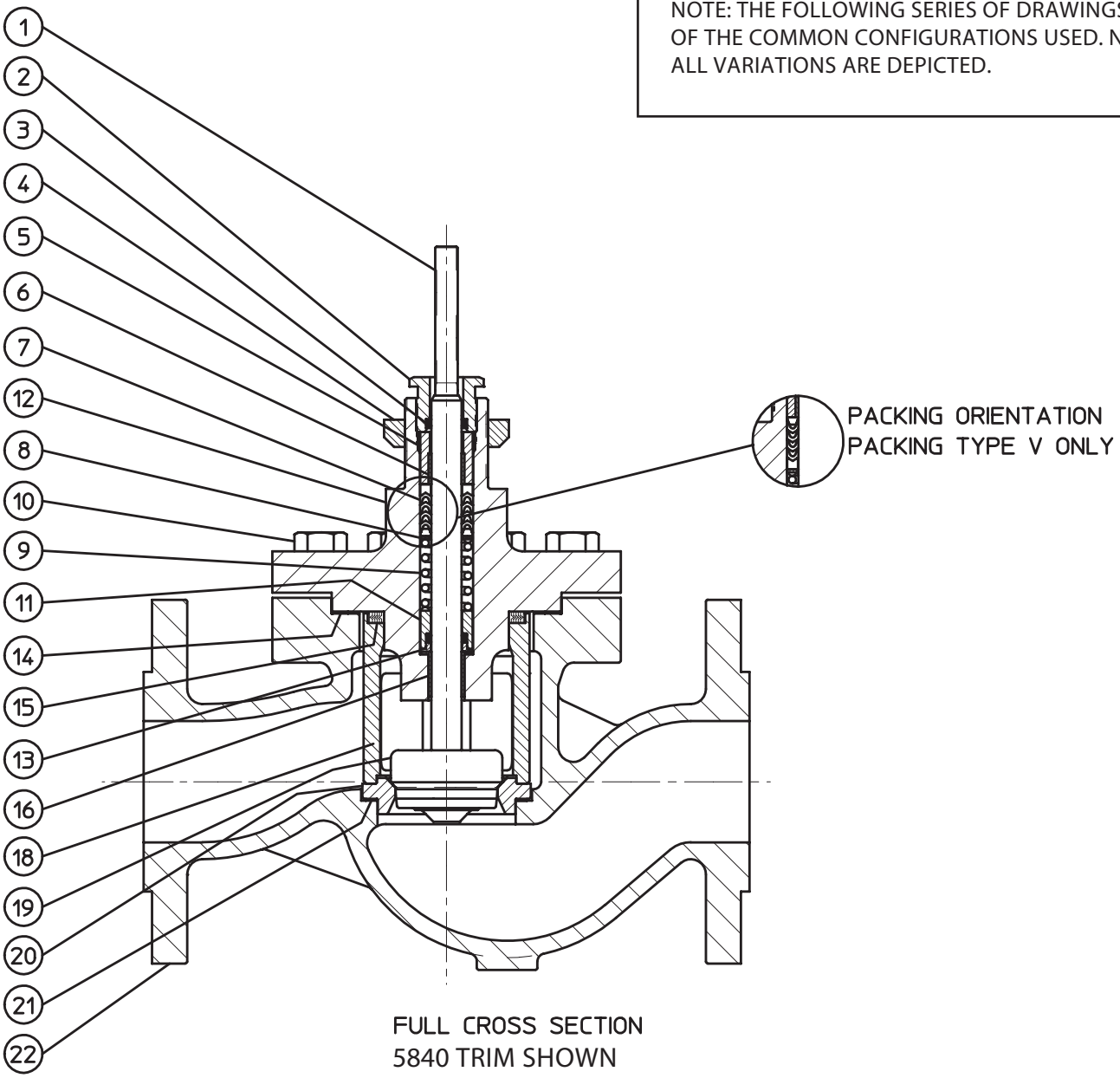
Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
11	BOX RING	316 SST
12	EXTENSION BONNET	AS SPECIFIED
14	BONNET GASKET	GRAPHITE
15	CAGE SPRING	INCONEL/ GRAPHITE
21	SEAT GASKET	GRAPHITE
23	BEARING	GRAPHALLOY GRADE GM 111.3
26	PACKING RING	BRAIDED GRAPHITE
28	RETAINING RING	316 SST
35	RETAINER WASHER	316 SST
36	UPPER BEARING AND RETAINER SUBASSY	316 SST/ GRAPHALLOY GRADE GM 111.3

CODE 7 ***OXIDATION RESISTANT GRAPHALLOY BEARINGS W/ EXTENSION BONNET***

Item	Part Nomenclature	Materials
2	PACKING NUT	316 SST
11	BOX RING	316 SST
12	EXTENSION BONNET	AS SPECIFIED
14	BONNET GASKET	GRAPHITE
15	CAGE SPRING	INCONEL/ GRAPHITE
21	SEAT GASKET	GRAPHITE
23	BEARING	GRAPHALLOY GRADE GM GDG-2
26	PACKING RING	BRAIDED GRAPHITE
28	RETAINING RING	316 SST
35	RETAINER WASHER	316 SST
36	UPPER BEARING AND RETAINER SUBASSY	316 SST/ GRAPHALLOY GRADE GM GDG-2

CONSTRUCTION DETAILS

NOTE: THE FOLLOWING SERIES OF DRAWINGS ARE OF THE COMMON CONFIGURATIONS USED. NOT ALL VARIATIONS ARE DEPICTED.

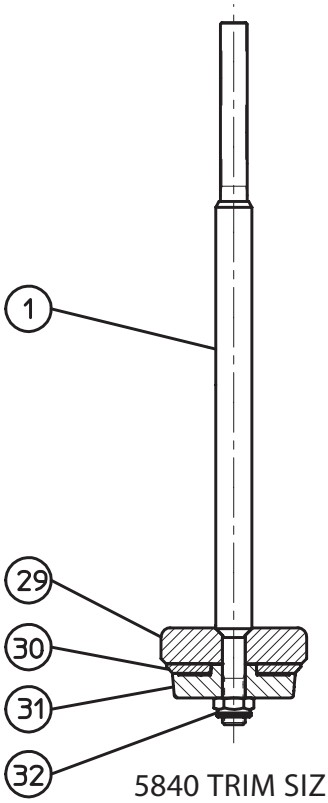


FULL CROSS SECTION
5840 TRIM SHOWN

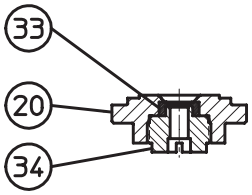
BODY MATERIAL CODE W & F
TRIM MATERIALS CODE S, 6, 7, 8 (5840) & S (5848)
PACKING TYPE & BONNET CONSTRUCTION CODES TS, VS, T8 & V8

SEE PAGE 9 FOR 5840 AND PAGES 12 & 13 FOR 5848 PART NOMENCLATURE AND MATERIALS

CONSTRUCTION DETAILS

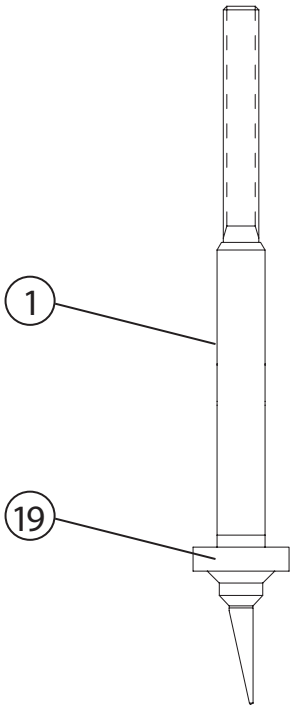


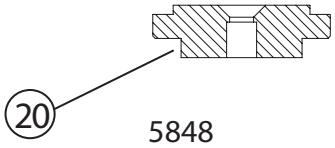
5840 TRIM SIZE
0.876 – 3.376



5840 TRIM SIZE
0.251 – 0.501
& 5848

TRIM MATERIALS
CODES T & P



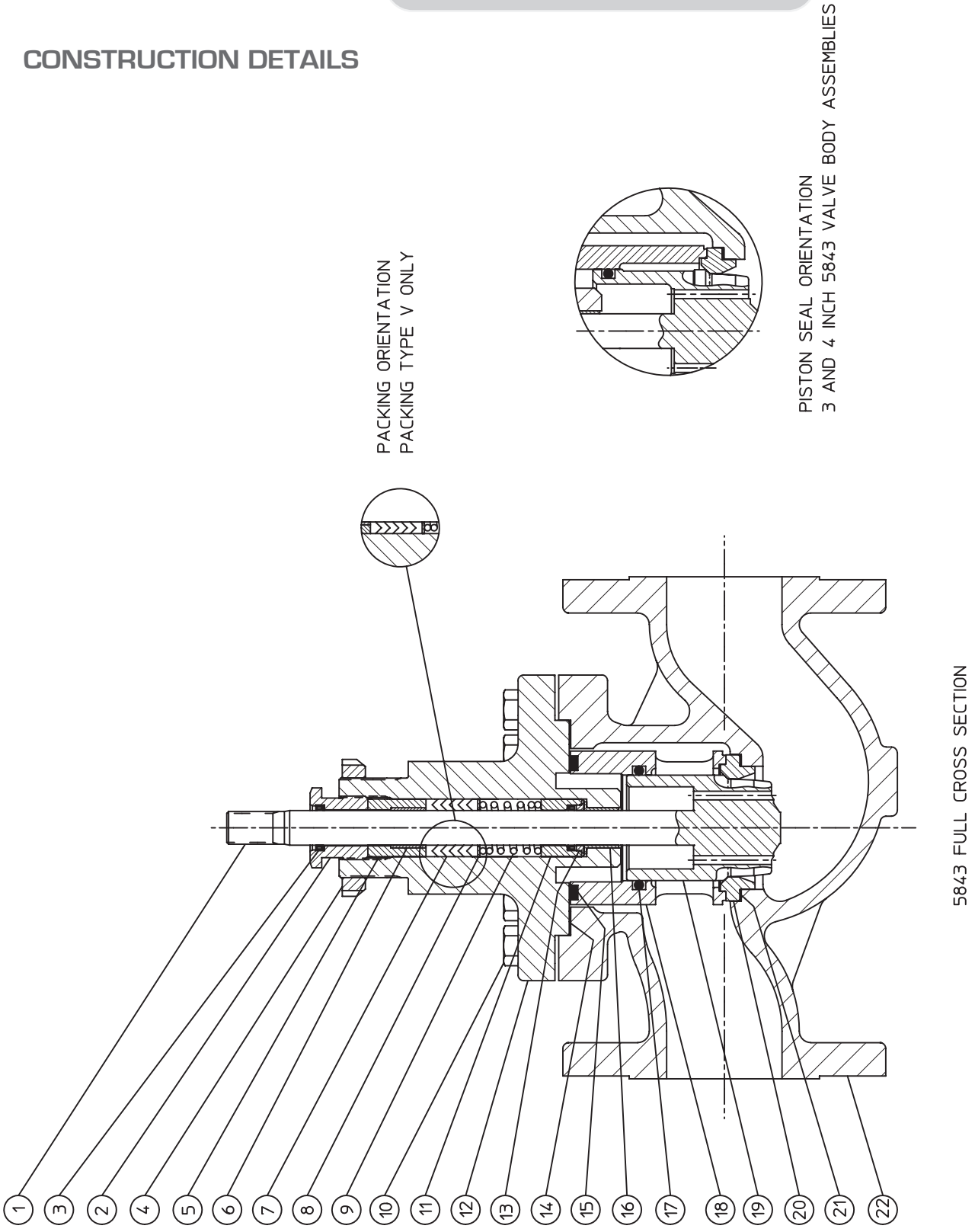


5848

TRIM MATERIALS
CODE S

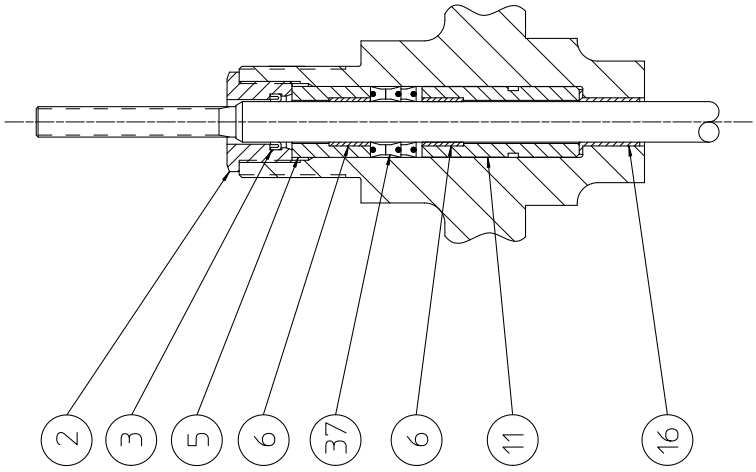
SEE PAGE 9 FOR 5840 AND PAGES 12 & 13 FOR 5848 PART NOMENCLATURE AND MATERIALS

CONSTRUCTION DETAILS

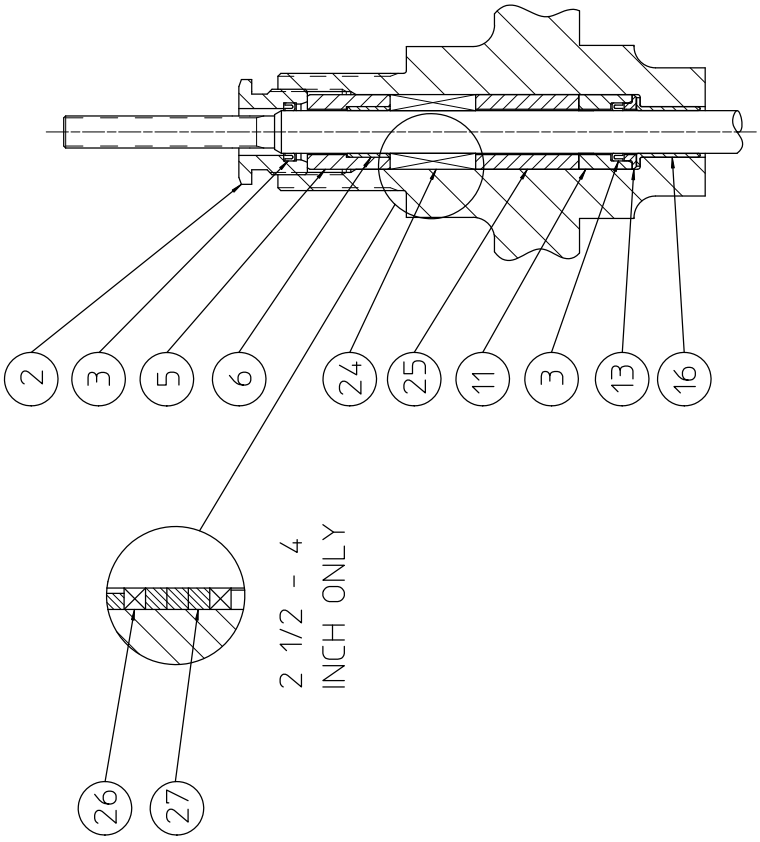


SEE PAGES 10 & 11 FOR 5843 PART NOMENCLATURE AND MATERIALS

CONSTRUCTION DETAILS



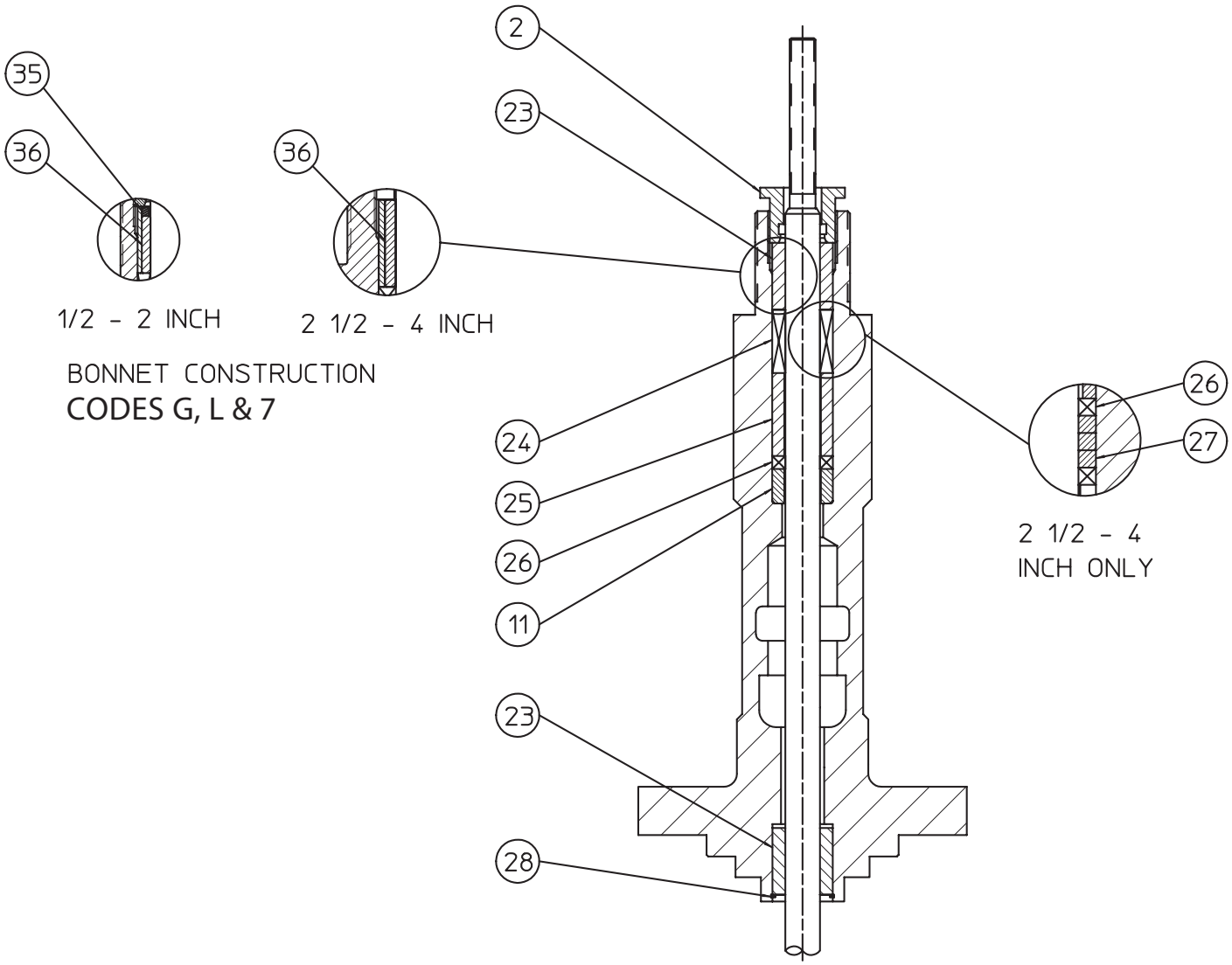
PACKING TYPE AND BONNET CONSTRUCTION
CODES LS & L8



PACKING TYPE AND BONNET CONSTRUCTION
CODES GS & G8

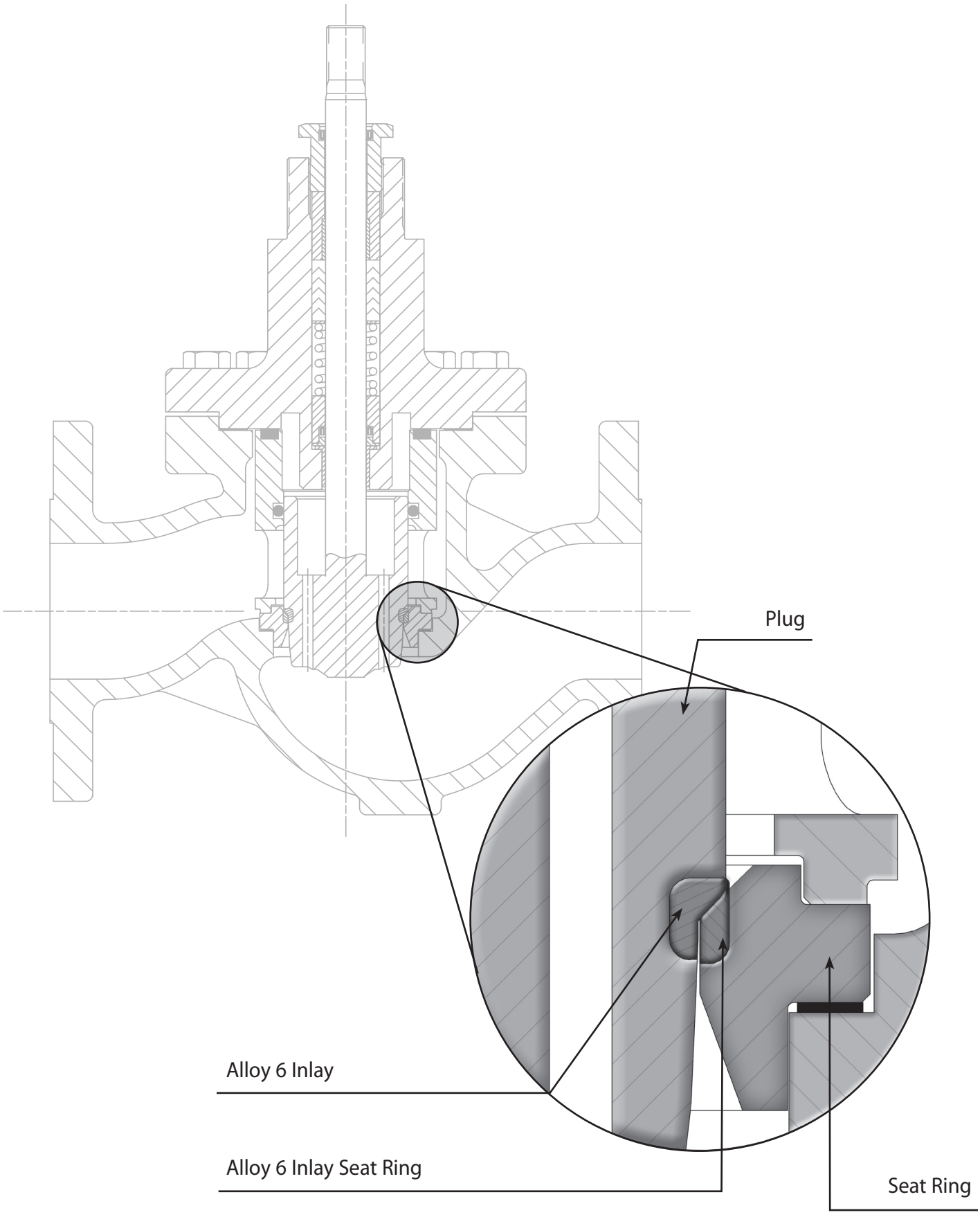
SEE PAGE 9 FOR 5840; 10 & 11 FOR 5843; AND 12 & 13FOR 5848 PART NOMENCLATURE AND MATERIALS

CONSTRUCTION DETAILS



SEE PAGE 9 FOR 5840, 10 & 11 FOR 5843, & 12 & 13 FOR 5848 PART NOMENCLATURE AND MATERIALS

ALLOY 6 WRAPPING

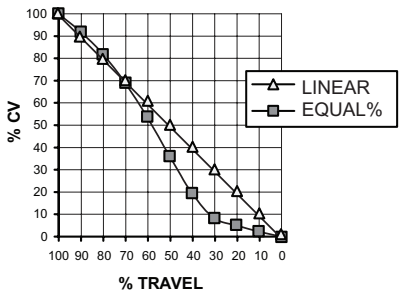


FLOW COEFFICIENTS (CV) VERSUS TRAVEL

VALVE				5840 FLOW COEFFICIENTS (Cv) 2-WAY SINGLE SEAT UNBALANCED VALVE WITH CAGE-RETAINED SEAT									
Valve Size (IN)	Trim Size(IN)	Trim Style	Port Size	%Travel									
				100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
1/2	0.501	EQ%	FULL	4.34	3.89	3.21	2.24	1.15	0.69	0.47	0.34	0.23	0.13
		LINEAR	FULL	4.34	3.91	3.47	3.04	2.60	2.17	1.74	1.30	0.87	0.43
	0.376	EQ%	1SR	2.50	2.24	1.85	1.29	0.66	0.40	0.27	0.20	0.14	0.07
		LINEAR	1SR	2.50	2.25	2.00	1.75	1.50	1.25	1.00	0.75	0.50	0.25
	0.251	EQ%	2SR	1.25	1.12	0.93	0.65	0.33	0.20	0.14	0.10	0.07	0.04
		LINEAR	2SR	1.25	1.13	1.00	0.88	0.75	0.63	0.50	0.38	0.25	0.13
3/4	0.876	EQ%	FULL	11.4	10.2	8.44	5.89	3.02	1.81	1.24	0.89	0.62	0.33
		LINEAR	FULL	11.4	10.3	9.12	7.98	6.84	5.70	4.56	3.42	2.28	1.14
	0.501	EQ%	1SR	5.00	4.48	3.70	2.59	1.33	0.80	0.55	0.39	0.27	0.15
		LINEAR	1SR	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50
	0.376	EQ%	2SR	2.50	2.24	1.85	1.29	0.66	0.40	0.27	0.20	0.14	0.07
		LINEAR	2SR	2.50	2.25	2.00	1.75	1.50	1.25	1.00	0.75	0.50	0.25
	0.251	EQ%	3SR	1.25	1.12	0.93	0.65	0.33	0.20	0.14	0.10	0.07	0.04
		LINEAR	3SR	1.25	1.13	1.00	0.88	0.75	0.63	0.50	0.38	0.25	0.13
1	0.876	EQ%	FULL	12.0	10.8	8.88	6.20	3.18	1.91	1.31	0.94	0.65	0.35
		LINEAR	FULL	12.0	10.8	9.60	8.40	7.20	6.00	4.80	3.60	2.40	1.20
	0.501	EQ%	1SR	5.00	4.48	3.70	2.59	1.33	0.80	0.55	0.39	0.27	0.15
		LINEAR	1SR	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50
	0.376	EQ%	2SR	2.50	2.24	1.85	1.29	0.66	0.40	0.27	0.20	0.14	0.07
		LINEAR	2SR	2.50	2.25	2.00	1.75	1.50	1.25	1.00	0.75	0.50	0.25
	0.251	EQ%	3SR	1.25	1.12	0.93	0.65	0.33	0.20	0.14	0.10	0.07	0.04
		LINEAR	3SR	1.25	1.13	1.00	0.88	0.75	0.63	0.50	0.38	0.25	0.13
1.5	1.251	EQ%	FULL	24.0	21.5	17.8	12.4	6.36	3.82	2.62	1.87	1.30	0.70
		LINEAR	FULL	24.0	21.6	19.2	16.8	14.4	12.0	9.60	7.20	4.80	2.40
	0.876	EQ%	1SR	12.0	10.8	8.88	6.20	3.18	1.91	1.31	0.94	0.65	0.35
		LINEAR	1SR	12.0	10.8	9.60	8.40	7.20	6.00	4.80	3.60	2.40	1.20
	0.501	EQ%	2SR	5.00	4.48	3.70	2.59	1.33	0.80	0.55	0.39	0.27	0.15
		LINEAR	2SR	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50
2	1.688	EQ%	FULL	43.0	38.5	31.8	22.2	11.4	6.84	4.69	3.35	2.32	1.25
		LINEAR	FULL	43.0	38.7	34.4	30.1	25.8	21.5	17.2	12.9	8.60	4.30
	1.251	EQ%	1SR	24.0	21.5	17.8	12.4	6.36	3.82	2.62	1.87	1.30	0.70
		LINEAR	1SR	24.0	21.6	19.2	16.8	14.4	12.0	9.60	7.20	4.80	2.40
	0.876	EQ%	2SR	12.0	10.8	8.88	6.20	3.18	1.91	1.31	0.94	0.65	0.35
		LINEAR	2SR	12.0	10.8	9.60	8.40	7.20	6.00	4.80	3.60	2.40	1.20
2.5	2.126	EQ%	FULL	65.0	58.2	48.1	33.6	17.2	10.3	7.09	5.07	3.51	1.89
		LINEAR	FULL	65.0	58.5	52.0	45.5	39.0	32.5	26.0	19.5	13.0	6.50
	1.688	EQ%	1SR	43.0	38.5	31.8	22.2	11.4	6.84	4.69	3.35	2.32	1.25
		LINEAR	1SR	43.0	38.7	34.4	30.1	25.8	21.5	17.2	12.9	8.60	4.30
3	2.501	EQ%	FULL	100	89.6	74.0	51.7	26.5	15.9	10.9	7.80	5.40	2.90
		LINEAR	FULL	100	90.0	80.0	70.0	60.0	50.0	40.0	30.0	20.0	10.0
	2.126	EQ%	1SR	65.0	58.2	48.1	33.6	17.2	10.3	7.09	5.07	3.51	1.89
		LINEAR	1SR	65.0	58.5	52.0	45.5	39.0	32.5	26.0	19.5	13.0	6.50
4	3.376	EQ%	FULL	170	152	126	87.9	45.1	27.0	18.5	13.3	9.18	4.93
		LINEAR	FULL	170	153	136	119	102	85.0	68.0	51.0	34.0	17.0
	2.501	EQ%	1SR	100	89.6	74.0	51.7	26.5	15.9	10.9	7.80	5.40	2.90
		LINEAR	1SR	100	90.0	80.0	70.0	60.0	50.0	40.0	30.0	20.0	10.0

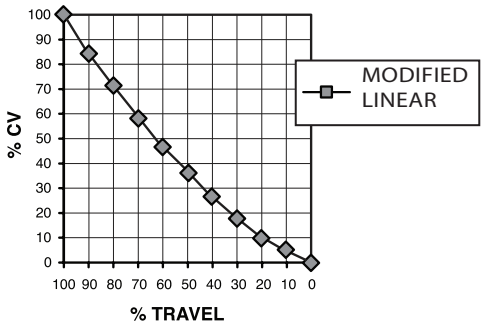
5840 & 5843

TYPICAL FLOW CURVES



VALVE				5843 FLOW COEFFICIENTS (Cv) 2-WAY SINGLE SEAT CAGED BALANCED VALVE WITH CAGE-RETAINED SEAT									
Valve Size (IN)	Trim Size(IN)	Trim Style	Port Size	%Travel									
				100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
2.5	2.126	EQ%	FULL	65.0	58.2	48.1	33.6	17.2	10.3	7.09	5.07	3.51	1.89
		LINEAR	FULL	65.0	58.5	52.0	45.5	39.0	32.5	26.0	19.5	13.0	6.50
		EQ%	1SR	43.0	38.5	31.8	22.2	11.4	6.84	4.69	3.35	2.32	1.25
3	2.501	EQ%	FULL	100	89.6	74.0	51.7	26.5	15.9	10.9	7.80	5.40	2.90
		LINEAR	FULL	100	90.0	80.0	70.0	60.0	50.0	40.0	30.0	20.0	10.0
		EQ%	1SR	65.0	58.2	48.1	33.6	17.2	10.3	7.09	5.07	3.51	1.89
4	3.376	EQ%	FULL	170	152	126	87.9	45.1	27.0	18.5	13.3	9.18	4.93
		LINEAR	FULL	170	153	136	119	102	85.0	68.0	51.0	34.0	17.0
		EQ%	1SR	100	89.6	74.0	51.7	26.5	15.9	10.9	7.80	5.40	2.90

5848 FLOW CURVE



VALVE				5848 FLOW COEFFICIENTS (Cv) 2-WAY SINGLE SEAT, LOW FLOW UNBALANCED VALVE WITH CAGE-RETAINED SEAT									
Valve Size (IN)	Trim Size(IN)	Trim Style	Port Size	%Travel									
				100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
1/2	0.250	MODIFIED LINEAR	FULL	0.75	0.64	0.54	0.44	0.35	0.27	0.20	0.13	0.08	0.04
			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	0.250	MODIFIED LINEAR	FULL	0.75	0.64	0.54	0.44	0.35	0.27	0.20	0.13	0.08	0.04
			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	0.250	MODIFIED LINEAR	FULL	0.75	0.64	0.54	0.44	0.35	0.27	0.20	0.13	0.08	0.04
			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

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

$$\text{GPM}_1 = \text{GPM}_2 \times \frac{\text{°F water}_2 \text{ temp. rise or drop}}{\text{°F water}_1 \text{ temp. rise or drop}}$$

Heating or Cooling Water

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

Heating Oil with Steam

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

Heating Air with Water

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

Heating Liquids with Steam

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

Heating Liquids in Steam Jacketed Kettles

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

General Liquid Heating

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

Heating Air with Steam

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

VALVE				ILEA ACTUATOR	5840 SHUT-OFF ΔP 2-WAY (PSIG) UNBALANCED WITH CAGE-RETAINED SEAT
Trim Size (IN)	Valve Size (IN)	Cv Rating	Plug Travel (IN)	Model Code Prefix	Fail Open, Closed or In Place
0.251	1/2" thru 1"	See Tables	3/4	F18, F1A	720
				A2x	720
				A3x, P3x	720
0.376	1/2" thru 1"	See Tables	3/4	F18, F1A	720
				A2x	720
				A3x, P3x	720
0.501	1" thru 1-1/2"	See Tables	3/4	F18, F1A	720
				A2x	720
				A3x, P3x	720
0.876	3/4" thru 2"	See Tables	3/4	F18, F1A	527
				A2x	638
				A3x, P3x	720
1.251	1-1/2" and 2"	See Tables	3/4	F18, F1A	230
				A2x	284
				A3x, P3x	539
1.688	2"	See Tables	3/4	F18, F1A	108
				A2x	138
				A3x, P3x	278
				A4x, P4x	710
1.688	2-1/2"	See Tables	1-1/2"	A2x	126
				A3x, P3x	223
				A4x, P4x	699
2.126	2-1/2" and 3"	See Tables	1-1/2"	A2x	68
				A3x, P3x	129
				A4x, P4x	429
				A5x, P5x	556
				A6x, P6x	720
2.501	3" and 4"	See Tables	1-1/2"	A3x, P3x	86
				A4x, P4x	303
				A5x, P5x	394
				A6x, P6x	577
3.376	4"	See Tables	1-1/2"	A3x, P3x	38
				A4x, P4x	157
				A5x, P5x	207
				A6x, P6x	308

NOTES:

1) 5840 leakage ratings are ANSI Class IV (Stainless Steel or Alloy 6 Trim), ANSI Class VI (TFE or PEEK Trim.) Warren Class IV + leakage rating is available for Stainless Steel or Alloy 6 Trim for less leakage than ANSI Class IV (See Allowable Seat Leaking Classes table on Page 7)

2) 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.

SHUT-OFF ΔP RATINGS

VALVE				ILEA ACTUATOR	5843 SHUT-OFF ΔP (PSIG) 2-WAY CYLINDER BALANCED
Trim Size (IN)	Valve Size (IN)	Cv Rating	Plug Travel (IN)	Model Code Prefix	Fail Open, Closed or In Place
2.126	2-1/2"	See Tables	1-1/2"	A2x	204
				A3x, P3x	600
				A4x, P4x	720
2.501	3"	See Tables	1-1/2"	A2x	136
				A3x, P3x	469
				A4x, P4x	720
3.376	4"	See Tables	1-1/2"	A2x	52
				A3x, P3x	372
				A4x, P4x	720

NOTES:

1) 5843 leakage ratings are ANSI Class IV (Stainless Steel or Alloy 6 Trim w/Fluoraz Seal), ANSI Class III (Stainless Steel or Alloy 6 Trim w/Metal Seal.) Warren Class IV + leakage rating is available for Stainless Steel or Alloy 6 Trim w/Fuoraz Seal for less leakage than ANSI Class IV (See Allowable Seat Leaking Classes table on Page 7)

2) 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.

VALVE				ILEA ACTUATOR	5848 SHUT-OFF ΔP (PSIG) 2-WAY, LOW FLOW,UNBALANCED WITH CAGE-RETAINED SEAT
Trim Size (IN)	Valve Size (IN)	Cv Rating	Plug Travel (IN)	Model Code Prefix	Fail Open, Closed or In Place
0.250	1/2" thru 1"	See Tables	3/4	F18, F1A	720
				A2x	720
				A3x, P3x	720

NOTES:

1) 5848 leakage ratings are ANSI Class IV (Stainless Steel Trim), ANSI Class VI (TFE or PEEK Trim.)

2) 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-F SERIES: small frame actuators

High Quality, Modulating, Linear, Industrial Electric Valve Actuator

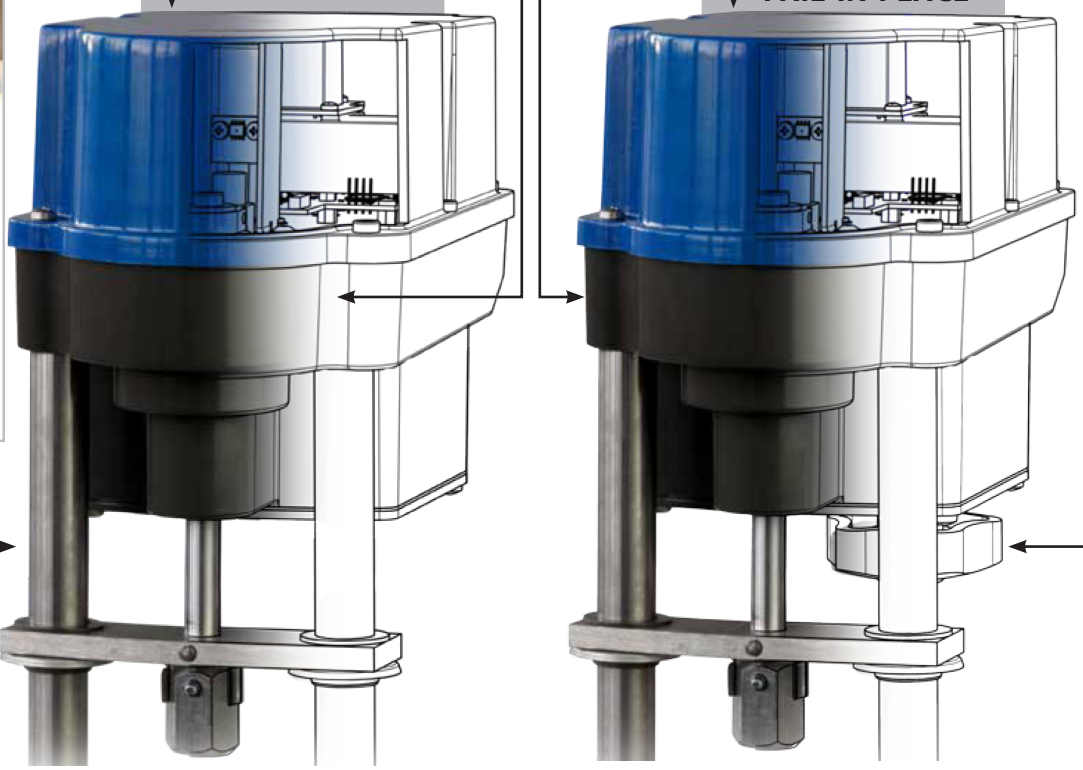
For smaller sized control valves, this compact design packs a nice set of features at an economical price point. The Brushless DC motor ensures long life.

Robust industrial design with polycarbonate cover, enclosure IP65

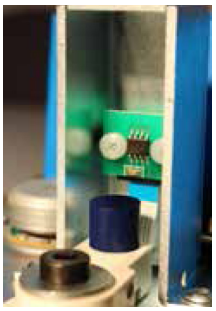
Compact design with low installation height, durable aluminium gearbox

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

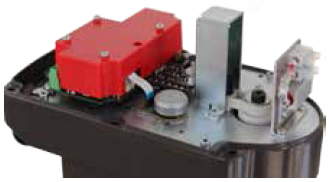
Manual operation with handwheel or push buttons .Parameter setting via DIP switches



FOR SPRING FAIL & FAIL-IN-PLACE

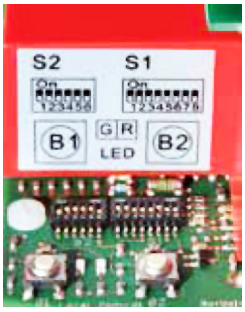


Contactless, non-wearing travel detection with Hall sensor for exact positioning



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

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



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

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

Power Supply:	24 VAC/DC, optionally wide range PS (100-240 VAC)
Motor protection:	Electronic motor current monitoring with safety cut-off
Duty cycle as per IEC 60034-1,8:	S2 30 min/ S4 1200c/h-50% ED
Permitted ambient temperature:	-4ºF to 140ºF (-20ºC to +60ºC)
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, protection class IP67 is optional

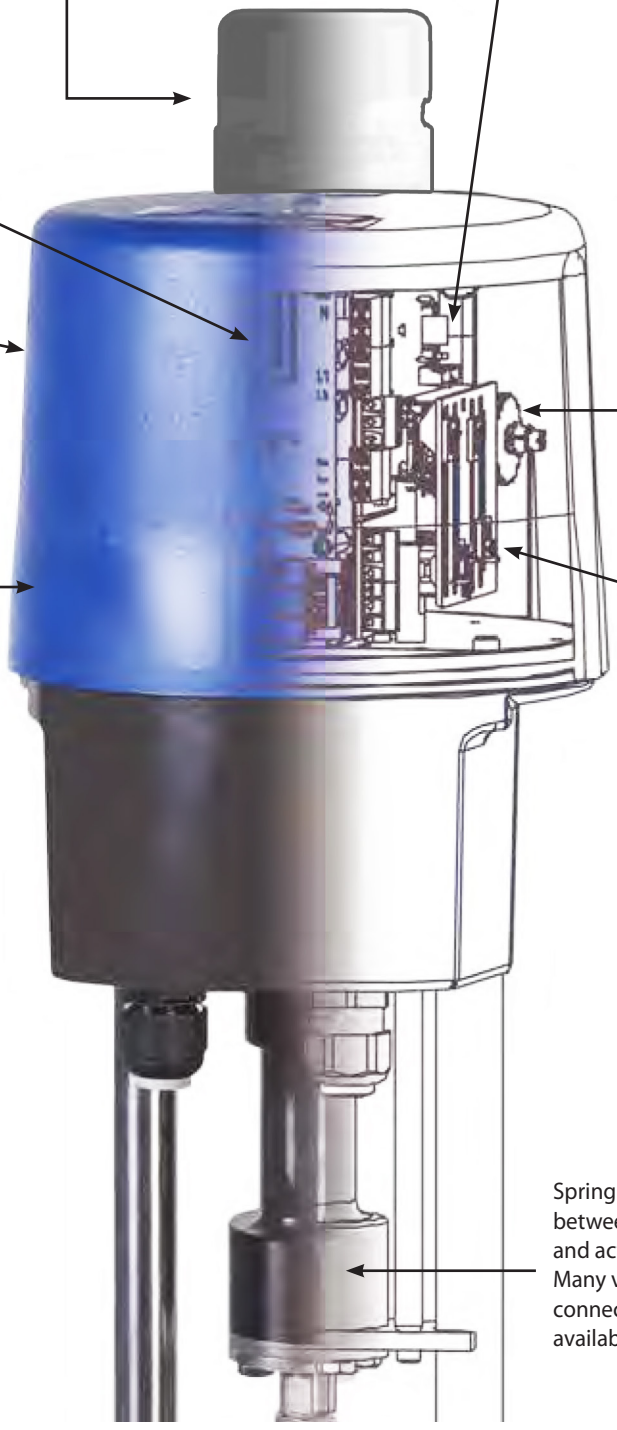
No switching-over to manual operation needed. The hand wheel serves as an operation indicator and is always ready for operation

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 light-weight due to high-quality aluminum alloys



IP67 ENCLOSURE METAL COVER

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	0.66	3.15
MAX Current	(Amps)	2.6	4.1	0.86	4.1
Power Consumption	(Watts)	48	53	57	53
Fail Mode, Loss of Power		Fail-Safe, Capacitive, Selectable			Fail-In-Place
Pillar distance, C to C	(Inches)	4			
Weight, approx. kg 5.6	(Lbs.)	17.6			
Stroke Speed	(Secs / Inch)	6 to 11 (Default is 11)			
Approximate Height	(Inches)	19			
Approx.clearance above to remove cover	(Inches)	4			

GLOBAL SPECIFCATIONS for ILEA-A/B/G	
Manual override	Handwheel (For use when unpowered)
Duty Cycle & Motor Protection: (Per IEC 60034-1,8)	The motor has electronic current monitoring and temperature monitoring with a safety cutoff. Per IEC, the actuator is rated for S2 30 Min / S4 1200 Cycles/Hr. – 50% ED. In lab testing, duty cycle is potentially 100% and a function of motor load. At no inlet pressure to the valve it can run 100% moving for months w/o problem. Even with mild differential pressure on the valve plug it can run near continuously. At some point though, the motor will begin to heat up. The motor has a built in temperature sensor and when motor temperature exceeds 65°C, the motor's speed is reduced by 50%, in theory it should allow the motor temperature to then drop below 65°C, at which time the motor would go back to normal speed. Should the motor keep rising to exceed 70°C. then the motor would stop and the fail-safe circuit would take the valve to the designated FAIL-SAFE position.
Permitted ambient temperature	-4°F to 140°F (-20 to +60°C)
Binary Control	24 V for ON/OFF control (min. duration of pulse 1s)
Internal Fault Monitoring	Torque, set value, temperature, power supply, positioning deviation etc., adjustable
Duty cycle as per IEC 60034-1,8	S2 30 min S4 50% ED @ 25°C
Permitted ambient temperature	-4°F to 140°F (-20 to +60°C)
Automatic Startup	Recognizing the end position(s) and auto-scaling control and feedback values
Internal fault monitoring	Thrust, control signal, temperature, power supply
Diagnostics Function	Stores cumulated operation data (motor and total running time, number of motor starts) and data sets of current values (set value, feedback value, torque, temperature and error messages)
Communication Interface	Optional umbilical cable with USB Connection and software that allows for data reading and parameterization
Control Signal and Feedback	0 (4)..20 mA or 0 (2)..10 V selectable, split range operation
Valve Positioner Function	Integrated, deadband adjustable from 0.5 .. 5%, shut-off MIN
Mounting Position	Any position, except below horizontal
Conduit entries	2 pcs. M 20 x 1.5 / 1 pc. M 16 x 1.5 / Optional 1/2"Female NPT, NEMA4X (as an accessory)
Enclosure Rating	IP 67, according to EN 60529
Cover material	Powder Coated Aluminum
Optional Local Controls	Illuminated display to show the actuator status and lockable selector to switch between modes: automatic, manual process ON/OFF, STOP and parameter menu. Control buttons for manual movement, menu operation
Optional User Limit Switches	Potential-free additional position switches with silver contacts (0.1 A - 5 A switching current)
Fault Indication Relay	Standard, potential-free opening contact provides a freely definable (programmable) collective fault signal and doubles for indication for when optional Local Controls is NOT in remote mode.
Heating Resistor	Optional, primarily to prevent condensation
Additional Special Order Options	Profibus, Foundation Fieldbus

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

ILEA ACTUATOR STOCKED MODELS

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

Small Frame Size ILEA-F Model

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

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

Model #'s

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

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

Medium Frame Size ILEA-A Model

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

Warren Controls factory stocked options include:Limit Switches, Heater, IP67 Enclosure, 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 model

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 Options 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.

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

For ILEA-G models

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

HEAT/SOUND PRESURE LEVEL GUIDELINES

Fluid Temperature Limit Thresholds

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

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

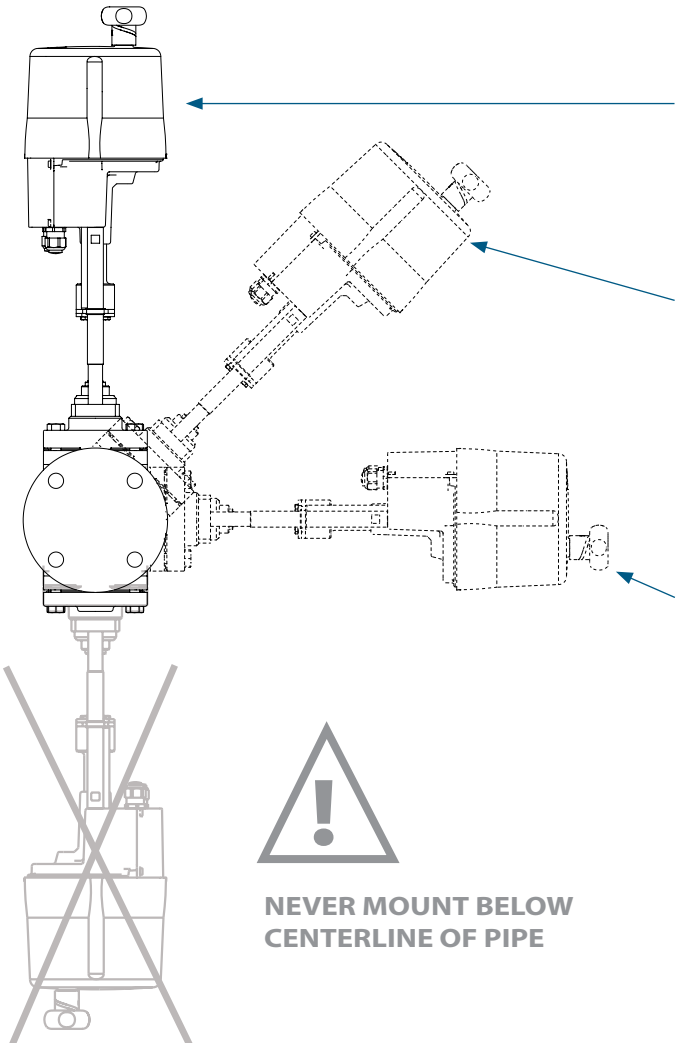
With all of these variables it is a challenge to come up with some guidelines.

However, we have attempted to do that in the tables that follow on page 35. 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.

NEVER MOUNT BELOW CENTERLINE OF PIPE

The tables that follow on page 35 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.

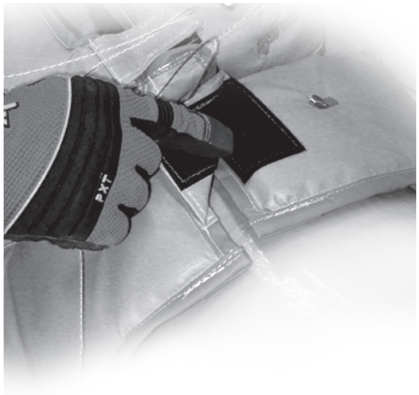
Choose the right blanket

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***.

HEAT/SOUND PRESSURE LEVEL GUIDELINES

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

5800 ILEA-F

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

STANDARD BONNET		
ACTUATOR ORIENTATION	***Valves: 1/2" - 2"***	***Valves: 2.5" - 4"***
	FLUID TEMPERATURE LIMIT	
Above the Valve	300°F	N/A
45° To the Side of the Valve	325°F	N/A
Either way w/ ThermiGuard*	450°F	N/A
EXTENSION BONNET		
ACTUATOR ORIENTATION	***Valves: 1/2" - 2"***	***Valves: 2.5" - 4"***
	FLUID TEMPERATURE LIMIT	
Above the Valve	325°F	N/A
45° To the Side of the Valve	425°F	N/A
Either way w/ ThermiGuard*	800°F	N/A

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

5800 ILEA-A

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

STANDARD BONNET		
ACTUATOR ORIENTATION	***Valves: 1/2" - 2"***	***Valves: 2.5" - 4"***
	FLUID TEMPERATURE LIMIT	
Above the Valve	300°F	300°F
45° To the Side of the Valve	350°F	325°F
Either way w/ ThermiGuard*	450°F	450°F
EXTENSION BONNET		
ACTUATOR ORIENTATION	***Valves: 1/2" - 2"***	***Valves: 2.5" - 4"***
	FLUID TEMPERATURE LIMIT	
Above the Valve	350°F	325°F
45° To the Side of the Valve	450°F	425°F
Either way w/ ThermiGuard*	800°F	800°F

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

These are simply rough guidelines and not absolute thresholds.

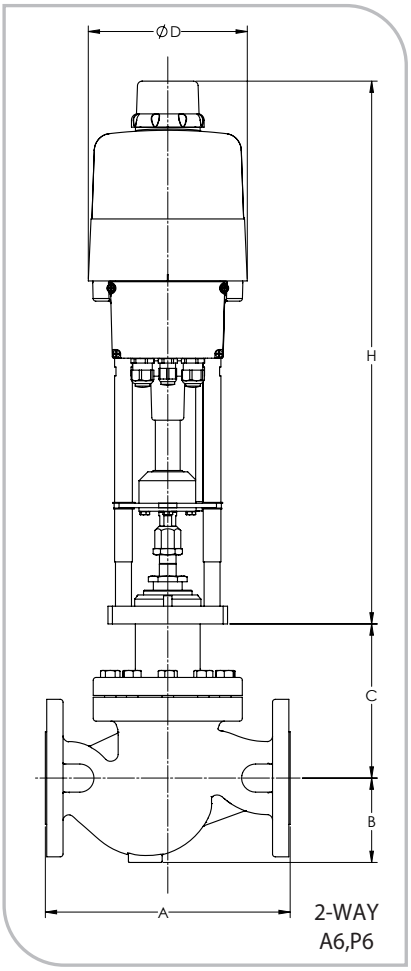
DIMENSIONS & WEIGHTS

DIMENSION (IN) 5840		VALVE SIZE (IN)							
		1/2	3/4	1	1-1/2	2	2-1/2	3	4
A	300THD	7-1/2	7-5/8	7-3/4	9-1/4	10-1/2	N/A	N/A	N/A
	300SWE	7-1/2	7-5/8	7-3/4	9-1/4	10-1/2	N/A	N/A	N/A
	150FLG	7-1/4	7-1/4	7-1/4	8-3/4	10	10-7/8	11-3/4	13-7/8
	300FLG	7-1/2	7-5/8	7-3/4	9-1/4	10-1/2	11-1/2	12-1/2	14-1/2
B		2	2-3/8	2-1/2	3-1/4	3-3/8	4	4-3/8	5-1/4
C	Standard	5	5	5	4-7/8	4-7/8	7	7	7
	Extension Bonnet	10	10	10	9-7/8	9-7/8	14	14	14

VALVE SIZE (IN)	WEIGHT (LB)							
	Standard				With Extension Bonnet			
	300THD	300SWE	150FLG	300FLG	300THD	300SWE	150FLG	300FLG
1/2	23	23	25	27	27	27	29	31
3/4	23	23	26	30	27	27	30	34
1	24	24	25	29	29	29	29	33
1-1/2	31	31	33	39	35	35	37	43
2	36	36	40	44	40	40	44	48
2-1/2	N/A	N/A	64	74	N/A	N/A	74	84
3	N/A	N/A	77	90	N/A	N/A	87	100
4	N/A	N/A	120	140	N/A	N/A	130	150

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

Actual shipping weights may vary.



2-WAY
A6,P6

DIMENSION (IN) 5843		VALVE SIZE (IN)		
		2-1/2	3	4
A	150FLG	10-7/8	11-3/4	13-7/8
	300FLG	11-1/2	12-1/2	14-1/2
B		4	4-3/8	5-1/4
C	Standard	7	7	7
	Extension Bonnet	14	14	14

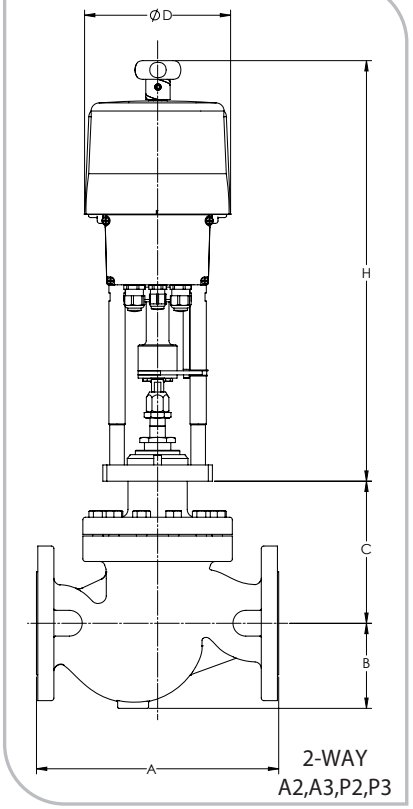
VALVE SIZE (IN)	WEIGHT (LB)			
	Standard		With Extension Bonnet	
	150FLG	300FLG	150FLG	300FLG
2-1/2	65	75	75	85
3	79	92	89	102
4	123	143	133	153

DIMENSION (IN) 5848		VALVE SIZE (IN)		
		1/2	3/4	1
A	300THD	7-1/2	7-5/8	7-3/4
	300SWE	7-1/2	7-5/8	7-3/4
	150FLG	7-1/4	7-1/4	7-1/4
	300FLG	7-1/2	7-5/8	7-3/4
B		2	2-3/8	2-1/2
C	Standard	5	5	5
	Extension Bonnet	10	10	10

VALVE SIZE (IN)	WEIGHT (LB)							
	Standard				With Extension Bonnet			
	300THD	300SWE	150FLG	300FLG	300THD	300SWE	150FLG	300FLG
1/2	23	23	25	27	27	27	29	31
3/4	23	23	26	30	27	27	30	34
1	24	24	25	29	29	29	29	33

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

Actual shipping weights may vary.



2-WAY
A2,A3,P2,P3

Face to face dimensions for NPT & SWE conform to ANSI/ISA S75.03 300# (Sizes 1/2 and 3/4 inch) and S75.12 Short 300# (Sizes 1 thru 2 inch) 150 & 300FLG conform to ANSI/ISA S75.03

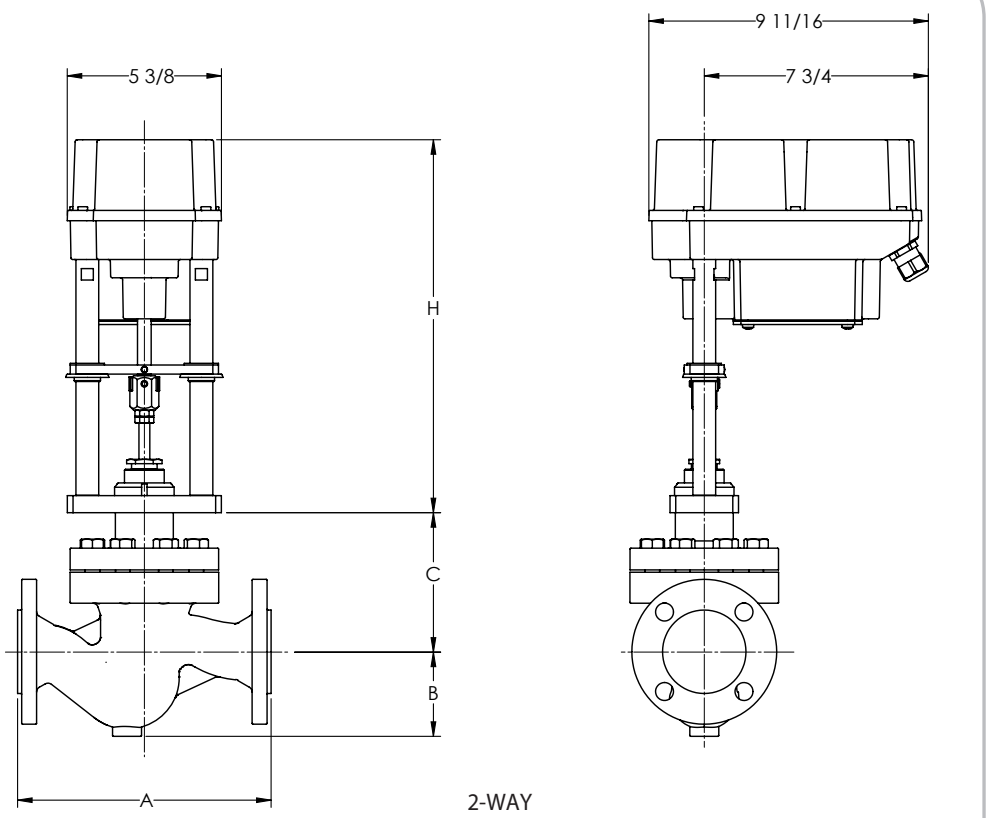
ACTUATOR	DIMENSIONS		WEIGHT (LBS)
	D (in)	H (in)	
F1	**NOTE 1	13	12.5
P2,P3	7.125	20.25	10
A2, A3	7.125	20.25	17.6
P4, P5	7.125	21.75	16
A4, A5	7.125	21.75	22
P6	7.125	24.75	17.6
A6, B4, B5	7.125	24.75	26.5

**NOTE 1: Please see the diaghrams below for dimensions.

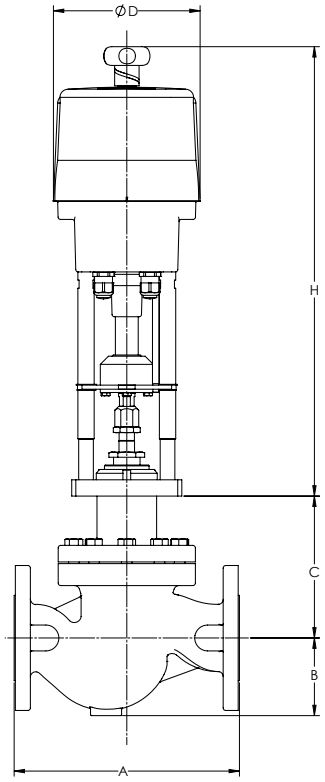
Consult factory for drawings, weights, and dimensions of configurations not shown.

CF = Consult Factory

MEASUREMENT IN INCHES



2-WAY
F1



2-WAY
A4,A5

FACTORY DEFAULT SOFTWARE SETTINGS & ALTERNATE SOFTWARE SETTINGS

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

* Does not apply to ILEA-F Models

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

1. SELECTIONS

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

58□- □□ □□□ □ □ □ □ □ □ □ □

VALVE BODY

Model	Valve Type	Size	Body Mat'l.	End Conn.	Trim Style	Trim Material	Trim Cv	Packing Type	Bonnet Construction
E 1/2" - 2" Bodies	**40** Single Seat 2-Way, Unbalanced w/Cage Retained Seat	**050** 1/2 inch	**W** WCB	**F** 150 lb. Flanged	**E** Equal %	**S** 316 Stainless Steel	**F** Full Port	**T** Teflon	**S** PEEK Bearings
T 2-1/2" - 4" Bodies	**43** Single Seat 2-Way, Cage Balanced w/ Cage Retained Seat	**075** 3/4 inch	**F** CF8M	**G** 300 lb. Flanged	**L** Linear	**T** TFE Soft Seats	**1** 1st Port Reduction	**G** Graphite	**8** Z PEEK Bearings
	48 Single Seat 2-Way, Low- Flow Unbalanced w/Cage Retained Seat (1/2"- 1" sizes only)	**100** 1 inch		**S** NPT Screwed	**M** Mod. Lin.	**P** PEEK Soft Seats	**2** 2nd Port Reduction	**V** Vacuum Service	**G** Copper Based Graphalloy Bearings w/Ext Bonnet
		150 1-1/2 inch		**W** Socket Weld	***NOTE:*** *Type 48 Mod. Lin. Only*	**6** Alloy 6 Wrapped 316SS	**3** 3rd Port Reduction	**L** EPDM	**L** Nickel Based Graphalloy Bearings w/Ext Bonnet
		200 2 inch		*NOTE: S and W only available in 1/2" - 2" sizes.*		**7** 400 Stainless Steel	**4** 4th Port Reduction		**7** Oxidation Resistant Graphalloy Bearings w/Ext Bonnet
		250 2-1/2 inch				**8** Alloy 6 Wrapped 400SS	*NOTE: Check Factory for availability of Reduced Trims*		
		300 3 inch				**Type 48, 316 SS trim uses a harder Nitronic 60 seat.*			
		400 4 inch							

TS	Teflon Packing, PEEK Bearings
GS	Graphite Packing, PEEK Bearings
VS	Teflon Packing, PEEK Bearings, Vacuum Service
LS	EPDM Packing, PEEK Bearings
T8	Teflon Packing, Z PEEK Bearings
G8	Graphite Packing, Z PEEK Bearings
V8	Teflon Packing, Z PEEK Bearing, Vacuum Service
L8	EPDM Packing, Z PEEK Bearings
GG	Graphite Packing & Gaskets, Copper Based Graphalloy Bearings, Ext Bonnet
GL	Graphite Packing & Gaskets, Nickel Based Graphalloy Bearings, Ext Bonnet
G7	Graphite Packing & Gaskets, Oxidation Resistant Graphalloy Bearings, Ext Bonnet

APPLICATION SELECTION TIPS

PACKING

- Use Teflon for most fluids below 450°F except water.
- Use EPDM Packing for water service only. Do not use on oils, hydrocarbons and acids.
- Use Graphite Packing for fluids above 450°F.

BONNET CONSTRUCTION

- Use PEEK Bearings for most applications below 450°F that are not steam.
- Use Z PEEK for steam applications below 450°F.
- Use Graphalloy Bearings w/ext. bonnet above 450°F. See page 8 for further selection criteria on Graphalloy Type.

ACID SERVICE

For Acid Service , special rulon bearings are required.
Consult Factory.

VALVE TYPE/ACTUATOR COMPATIBILITY:

MODEL	VALVE STYLE	VALVE SIZES	ACTUATORS
58 E	TYPE 40	1/2" - 2"	ILEA - F
			ILEA - A
58 E	TYPE 48	1/2" - 1"	ILEA - F
			ILEA - A
58 T	TYPE 40	2 1/2" - 4"	ILEA - A
58 T	TYPE 43	2 1/2" - 4"	ILEA - A

See Shut-Off ΔP Ratings for details.

TRIM MATERIAL						
SIZE	S 316 SS	T TFE Soft Seats	P PEEK Soft Seats	6 Alloy 6/316 SS	7 400 SS	8 Alloy 6/400 SS
050 1/2 inch	40, 48	40, 48	40, 48	40	40	40
075 3/4 inch	40, 48	40, 48	40, 48	40	40	40
100 1 inch	40, 48	40, 48	40, 48	40	40	40
150 1-1/2 in.	40	40	40	40	40	40
200 2 inch	40	40	40	40	40	40
250 2-1/2 in.	40, 43	40	40	40	40, 43	40,43
300 3 inch	40, 43	40	40	40	40,43	40,43
400 4 inch	40, 43	40	40	40	40,43	40, 43

VALVE TYPE/TRIM MATERIAL COMBINATIONS:

FLUID TEMPERATURE LIMITS							
Valve Type	Body Material & Code	End Construction & Code	Trim Material & 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,** NPT **S,** Socket Weld **W**	316 **S**, Alloy 6 Wrapped 316 SS **6**, 400 SS **7**, Alloy 6 Wrapped 400 SS **8**	EPDM **L**	PEEK **S**, Z PEEK **8**	400°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**, Socket Weld **W**	316 **S**, Alloy 6 Wrapped 316 SS **6**, 400 SS **7**, Alloy 6 Wrapped 400 SS **8**	Teflon **T**, Vacuum Service **V**	PEEK **S**, Z PEEK 8	450°F	60°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**, Socket Weld **W**	316 **S**, Alloy 6 Wrapped 316 SS **6**, 400 SS **7**, Alloy 6 Wrapped 400 SS **8**	Graphite **G**	PEEK **S**, **Z** PEEK **8**	450°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G,** NPT **S**	Teflon **T**	EPDM **L**	PEEK **S**, **Z** PEEK **8**	250°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	Teflon **T**	Teflon **T**, Vacuum Service **V**	PEEK **S**, **Z** PEEK **8**	250°F	60°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	Teflon **T**	Graphite **G**	PEEK **S**, **Z** PEEK **8**	250°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	PEEK **P**	EPDM **L**	PEEK **S**, **Z** PEEK **8**	400°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	PEEK **P**	Teflon **T**, Vacuum Service **V**	PEEK **S**, **Z** PEEK **8**	450°F	60°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	PEEK **P**	Graphite **G**	PEEK **S**, **Z** PEEK **8**	450°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**, Socket Weld **W**	316 **S**, Alloy 6 Wrapped 316 SS **6**, 400 SS **7**, Alloy 6 Wrapped 400 SS **8**	Graphite **G**	Copper Based Graphalloy Bearings w/ Ext Bonnet **G**	750°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G,** NPT **S**, Socket Weld **W**	316 **S**, Alloy 6 Wrapped 316 SS **6**, 400 SS **7**, Alloy 6 Wrapped 400 SS **8**	Graphite **G**	Nickel Based Graphalloy Bearings w/ Ext Bonnet **L**	750°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G,** NPT **S**, Socket Weld **W**	316 S, Alloy 6 Wrapped 316 SS 6, 400 SS **7**, Alloy 6 Wrapped 400 SS 8	Graphite **G**	Oxidation Resistant Graphalloy Bearings w/ Ext Bonnet **7**	800°F	-20°F
43 2-Way Cage Balanced	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	316 **S**, 400 SS **7**, Alloy 6 Wrapped 400 SS **8**	EPDM **L**	PEEK **S**, **Z** PEEK **8**	400°F	23°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	316 **S**, 400 SS **7**, Alloy 6 Wrapped 400 SS **8**	Teflon **T**, Vacuum Service **V**	PEEK **S**, **Z** PEEK **8**	450°F	60°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**	316 **S**, 400 SS **7**, Alloy 6 Wrapped 400 SS **8**	Graphite **G**	PEEK **S**, **Z** PEEK **8**	450°F	23°F
	WCB **W**, CF8M **F**	For High Temperature Service w/ Balanced Trim, Various Special Seals are used. Call the Factory for Construction Details.			Copper Based Graphalloy Bearings w/ Ext Bonnet **G**	Temperatures Vary Call the Factory for Details.	
	WCB **W**, CF8M **F**				Nickel Based Graphalloy Bearings w/ Ext Bonnet **L**		
	WCB **W**, CF8M **F**				Oxidation Resistant Graphalloy Bearings w/ Ext Bonnet **7**		
48 2-Way Single Seat Low-Flow	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**, Socket Weld **W**	316 **S**	EPDM **L**	PEEK **S**, **Z** PEEK **8**	400°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**, Socket Weld **W**	316 **S**	Teflon **T**, Vacuum Service **V**	PEEK **S**, **Z** PEEK **8**	450°F	60°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**, Socket Weld **W**	316 **S**	Graphite **G**	PEEK **S**, **Z** PEEK **8**	450°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	Teflon **T**	EPDM **L**	PEEK **S**, **Z** PEEK **8**	250°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	Teflon **T**	Teflon **T**, Vacuum Service **V**	PEEK **S**, **Z** PEEK **8**	250°F	60°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT S	Teflon **T**	Graphite **G**	PEEK **S**, **Z** PEEK **8**	250°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	PEEK **P**	EPDM **L**	PEEK **S**, **Z** PEEK **8**	400°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	PEEK **P**	Teflon **T**, Vacuum Service **V**	PEEK **S**, **Z** PEEK **8**	450°F	60°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**	PEEK **P**	Graphite **G**	PEEK **S**, **Z** PEEK **8**	450°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**, Socket Weld **W**	316 **S**	Graphite **G**	Copper Based Graphalloy Bearings w/ Ext Bonnet **G**	750°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**, Socket Weld **W**	316 **S**	Graphite **G**	Nickel Based Graphalloy Bearings w/ Ext Bonnet **L**	750°F	-20°F
	WCB **W**, CF8M **F**	150 lb **F**, 300 lb **G**, NPT **S**, Socket Weld **W**	316 **S**	Graphite **G**	Oxidation Resistant Graphalloy Bearings w/ Ext Bonnet **7**	800°F	-20°F

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

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

1. SELECTIONS

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

ILEA- ☐ ☐ ☐ ☐ - ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

ACTUATOR

ILEA-	Model	Max Force (lbf)	Max Speed *(seconds/inch valve travel @60Hz or DC)*	Failure Mode	Voltage Supply	Binary Input	Comm.	Enclosure Rating	Local Control Station	Heater	Switches
	F Small Frame	**1** 450	**0** 85 Seconds	**M** Fail in Place	**1** 115 Vac	**0** 24V	**0** None	**5** IP65	**0** None	**0** None	**0** None
	A Medium Frame Modulating	**2** 515	**1** 73 Seconds	**U** Spring Fail Up	**2** 230 Vac	**2** 115/230V	**P** Profibus	**7** IP67	**L** Local	**H** Heater	**S** Silver Switch
	P Medium Frame ON - OFF	**3** 1010	**2** 64 Seconds	**D** Spring Fail Down	**4** 24 Vac		**C** CANopen				
		4 1800	**3** 56 Seconds	**S** Capacitive Fail Safe	**5** 24 Vdc		**F** Foundation				
		5 2250	**4** 47 Seconds								
		6 2900	**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 there is a special request this will be shipped at 50%-12 seconds)

1/2" Female NPT, NEMA 4X Conduit Adapter kits (As Accessory)		
QTY	**Description**	**Part Number**
1 EA	Male M20 to 1/2" FNPT	KCONDUITADAPTER00
1 EA	Male M16 to 1/2" FNPT	KCONDUITADAPTER01

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

Warren Controls does not assume responsibility for the selection, use, or maintenance of any product. Responsibility for proper selection, use, and maintenance of any Warren Controls product remains solely with the purchaser and end-user.

STOCKED MODELS:

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

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

VALVE SIZING DATA SHEET

DATE:

Customer Information

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

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

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

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

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

Notes • Specifications • Further Information

5800 PRODUCT SPECIFICATION

1800 SERIES
Heavy Globe Control Valves

styles:

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

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

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

2800 SERIES
Precision Globe Control Valves

styles:

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

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

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

2900 SERIES
High Capacity General Purpose Globe Control Valves

styles:

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

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

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

3800 SERIES
E-Ball Rotary Control Valves

styles:

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

sizes	1 to 8 in.
class	300
ends	150,300 RF flg
body	WCB, CF8M, Custom Alloys
trim	316 SST, Alloy 6, Ceramic, TFE, PEEK
Cv	up to 1420
temp.	-20° to 800°F
body limit	to 740 psi
leakage rates	class III, 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