VSI

SERIES 7300
3-WAY DIVERT VALVE ASSEMBLY
2”-4”

DOC-00000496(A)
JUN 2021

Electric DC Motor is rated for 100% duty cycle and never requires maintenance

Electrical housings are fully explosion-proof rated:

Ex II 2 G ExdellCT4 Gb

Fully mechanical spring provides fail-safe function with no risk of hydraulic leaks. Bypass function is guaranteed on loss of power, regardless of actuator state.

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The gear assembly comes standard with NAMUR mount, allowing the direct mounting of the VSI explosion-proof switch box or other NAMUR mount accessories

The heavy duty full cast carbon steel gear assembly transmits the force to the valve efficiently and reliably.

Standardized ISO 5211 valve bonnet mount allows for the direct installation of a wide range of actuation types.

Full shock proof carbon steel body features interchangeable flanged or grooved end connections

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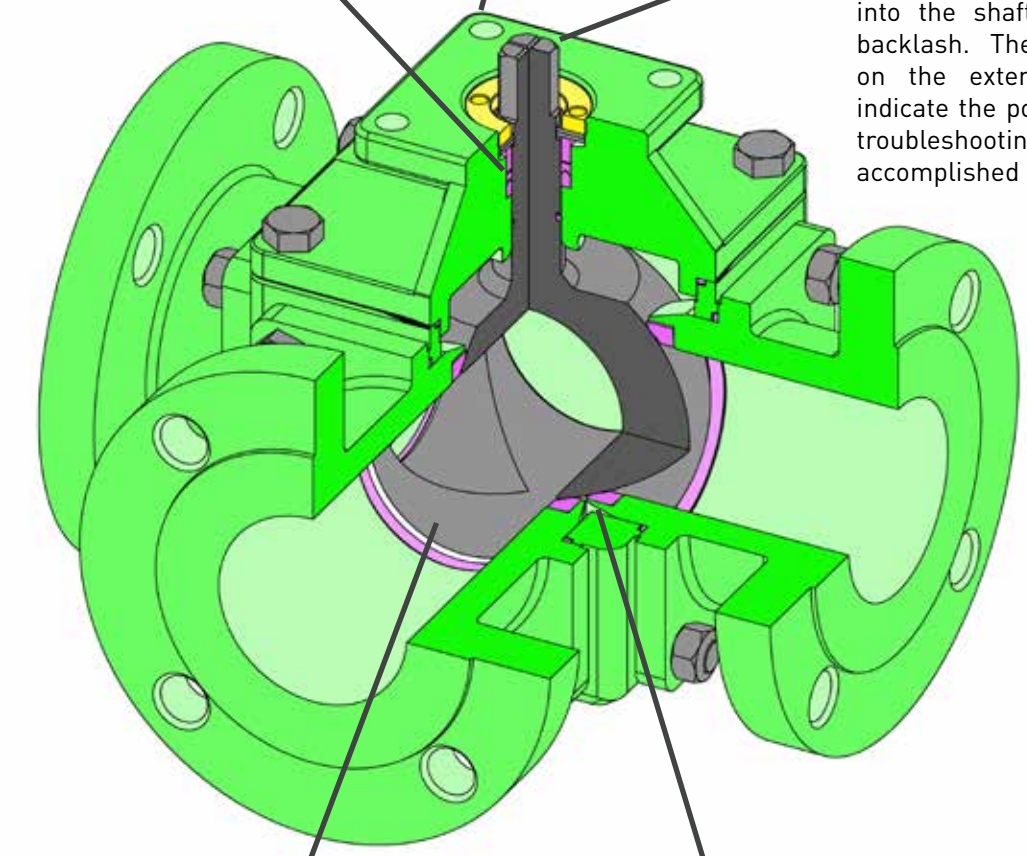
UNIVERSAL ACTUATION
The ISO 5211 top mount allows VSI to offer a wide range of electric, pneumatic, hydraulic, failsafe, and other actuation packages

LIVE LOADED PACKING
The spring loaded Teflon V-ring type packing provides maintenance free service

POSITIVE POSITIONING
Shaft and ball are forged and machined as one piece. The square drive machined directly into the shaft ensures minimal backlash. The stem is machined on the exterior with slots to indicate the port locations should troubleshooting need to be accomplished in the future.



MULTIPLE FLOW PATHS
With both T type and L type port balls available, almost any imaginable flow path configuration is available with the Series 7300

THREE SEATS
Each of the three end connections feature separate resilient seats to ensure no cross flow even in the event one or even two of the seats are damaged

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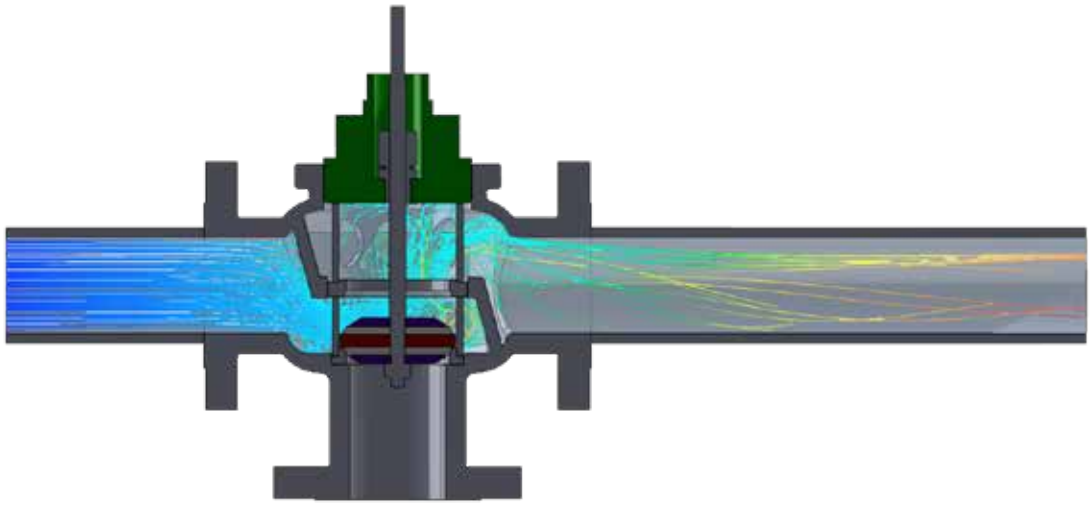
EFFICIENT FLOW THROUGH DESIGN

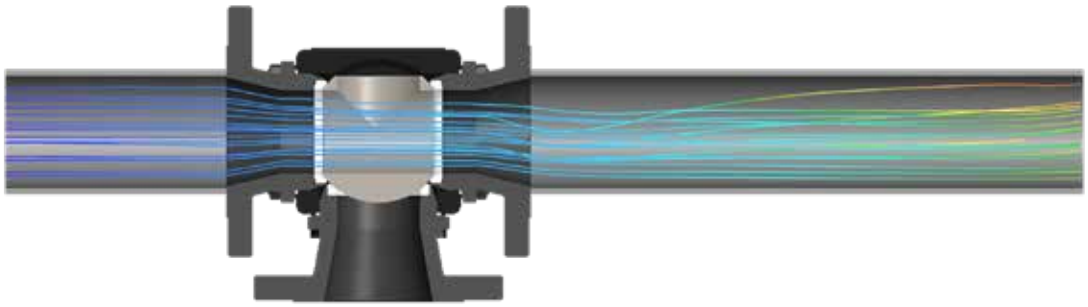
The Series 7300 offers 3-way flow control in either L or T port configurations. The interchangeable end connections allow the use of many different end configurations, even allowing the use of mixed connections on a single valve. The use of a standardized main body means many of the parts are fully interchangeable between models, reducing downtime and eliminating excessive spares inventory. The cost effective Series 7300 offers multi-directional flow control and zero leak shutoff capacity in one valve - effectively eliminating the need for separate shutoff valve.

ALL SERIES 7300 VALVES:

- Tested in accordance with ASME B16.34
- Blow-out proof 1-piece ball/stem for maximum safety
- Trunnion mounted ball for low torque and reduced actuation costs



Competition's Typical Globe Valve Flow Turbulence



Series 7300 Ball Valve Flow Streamlines

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ENERGY SAVINGS AND CALCULATIONS

The use of the VSI Series 7300 Ball Valve can provide significant energy savings over the life of a typical skids life. The low restriction round port provides a significantly reduced headloss compared to globe valves that can be converted into direct energy savings using the equation below:

$$A = 1.306 * \frac{(Q^3 * S_G * C * U)}{(E * Cv^2)}$$

Where:

A	Annual energy cost, dollars per year
Q	Flow rate, barrels per hour
S_G	Specific Gravity of media (Water=1.0)
C	Cost of electricity, dollars per kilowatt-hr ($/kWhr)
U	Usage or duty cycle (1.0 equals 24 hours a day use)
E	Efficiency of pump and motor set

An example is given below comparing two 3" valves, the Series 7300 ball valve and a competitor's globe valve. In this case the expected conditions are 500 barrels/hour flow, crude oil at 0.86 specific gravity, an energy cost of $0.12 per kWhr, the system running at 80% duty, and a pump efficiency of 75%:

Q =	500 barrels per hour
S_G =	0.86 (crude oil)
C =	$0.12 per kWhr
U =	0.8 (80% duty)
E =	0.75 (75% efficiency)

For the VSI Series 7300 the valve Cv value is 528. As shown below the calculated pumping cost for this valve is $64.46/year.

$$A = 1.306 * \frac{(500^3 * 0.86 * 0.12 * 0.8)}{(0.75 * (528)^2)} = \$64.46/year$$

For a competitors globe valve the valve Cv value is 189. As shown below the calculated pumping cost for this valve is $503.08/year.

$$A = 1.306 * \frac{(500^3 * 0.86 * 0.12 * 0.8)}{(0.75 * (189)^2)} = \$503.08/year$$

In this example the energy savings amounts to $438/year, a savings of 87% compared to the competitor's globe valve. These savings multiply when you begin to consider the increased barrels/hour capacity and other factors.

This example uses representative numbers, savings may vary. External factors such as the cost of electricity, specific gravity, pump pressure, and efficiency can effect savings

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ADVANTAGES

STEM SEALS

All Series 7300 3-way ball valves feature a live-loaded stem packing assembly for positive stem sealing. The Belleville washers automatically adjust to packing wear and compensate for changes in temperature. All valves feature the primary packing stem seal as well as a secondary o-ring stem seal between the stem and body to guarantee no external leakage.

TRUNNION BALL

The ball of the Series 7300 is integrally cast with the stem as one single piece with a lower stub shaft. The assembly is machined as a single whole concentric and polished to a mirror finish. The ball/stem is then supported centrally in the body by large bushings. Compared to floating ball designs, this reduces operating torque and seat wear to ensure bidirectional bubble-tight sealing throughout the entire life of the valve.

LOW FLOW RESTRICTION

Compared to functionally similar globe valves, the characteristics of the Series 7300 creates an exceptionally low turbulence design flow path as shown in Figure 2 and 3 on Page 4. There are no tortuous flow paths or sharp edges to create turbulence. By nature the design of the valve has a minimal pressure drop to increase system efficiency.

One-piece Ball and Stem

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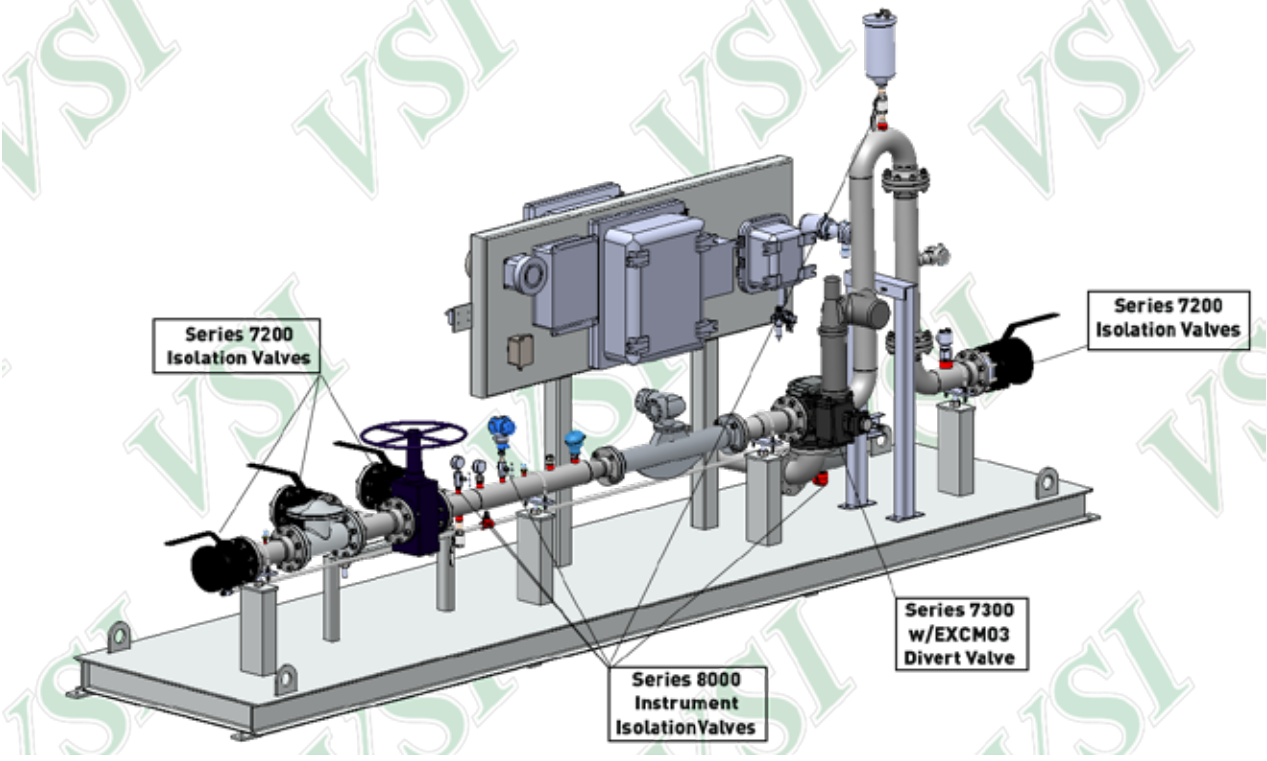
LACT SKID VALVE PACKAGE

The Series 7300 Divert Valve assembly is the cornerstone of VSI's entire product offering for LACT Skid processes. From the Series 7300 Divert Valve to the Series 7200 process isolation valves and the Series 8000 instrument isolation valves - skid manufacturers know the highly competitive market requires affordable reliable solutions that VSI delivers.

- Full two year warranty on all products
- Zero leakage valves for both isolation and flow control, including divert valve in straight through and bypass flow positions
- Fast action fail-safe electric actuator ensures the divert valve bypasses in less than 2 seconds for reliable process control
- Mechanical spring fail safe unit has no hydraulic unit to leak or fail
- Face to face lengths are identical to most major 3-way LACT globe valves, allowing for direct drop in replacement of leaky, slow, and outdated globe valves.
- All steel body construction is not susceptible to the shock failures experienced in some cast iron valves.



Design provided by S&S Technical, https://www.skidsolutions.com

Typical LACT Skid Installation

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DESIGN STANDARDS

Size Range	2"-4" Flanged 2" Grooved
Connections	ANSI B16.1 Class 125/ANSI B16.5 Class 150 Victaulic™ Groove
Body Material	Carbon Steel WCB Stainless Steel CF8M
Port Configurations	T or L Port
Port Size	Full Port (2"-3") Standard Port (4")
Pressure Rating	275 PSIG WOG
Leakage	ANSI FCI 70-2 Class VI
Testing	ASME B16.34, 100% Unit Tested API 598[1]
Bonnet	ISO 5221

(1) CF8 valves require preproduction notification of API 598 requirement on purchase order. WCB valves comply as standard

FLOW COEFFICIENTS AND DATA

SIZE	VALVE FLOW	
	90⁰	180⁰
2"	142	321
3"	233	528
4"	243	544

Cv - Valve Flow Coefficient, calculated using SCH 40 pipe with water at 60F
Q - Flow in GPM
SG - Specific Gravity (Water=1)
P1 - Inlet Pressure
P2 - Downstream Pressure

$$Cv = Q\sqrt{\frac{SG}{P_2 - P_1}}$$

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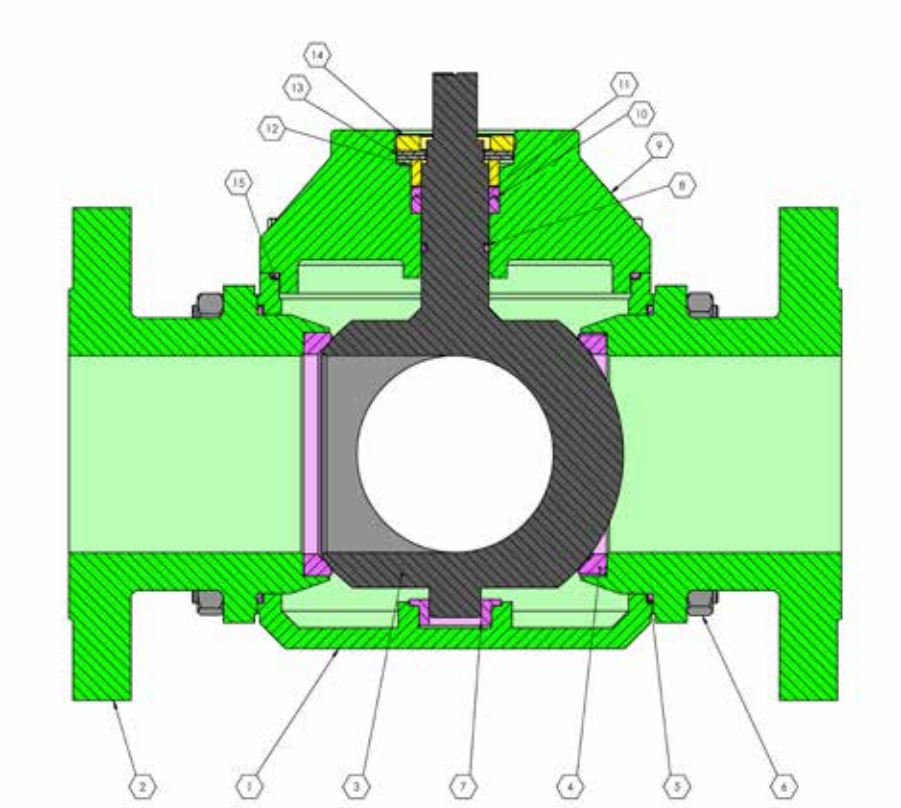
MATERIALS OF CONSTRUCTION



Item	Description	Materials Available	Standard	QTY
1	Body	Carbon Steel	ASTM A216 WCB[1]	1
		Stainless Steel 304	ASTM A351 CF8	
2	End Segments	Same as Body		3
3	Ball/Stem	Stainless Steel 304	ASTM A351 CF8	1
4	Seats	PTFE	Commercial	3
5	End Segment Seal	PTFE	Commercial	3
6	Bolts	Carbon Steel	Commercial	16
7	Stem Bushing	50%PTFE - 50%SS316	Commercial	1
8	O-Ring	Viton	Commercial	1
9	Top Cover	Same as Body		1
10	Stem Packing	PTFE	Commercial	1 Set
11	Packing Washer	50%PTFE - 50%SS316	Commercial	1
12	Gland Ring	Stainless Steel 304	ASTM A276 304	1
13	Spring Washers	Stainless Steel 304	ASTM A276 304	2
14	Gland Nut	Stainless Steel 304	ASTM A276 304	1
15	Top Cover Seal	PTFE	Commercial	1
NS	Tag	Aluminum	UV Screen Printed	1

(1) Black Oxide coated per MIL-DTL-13924

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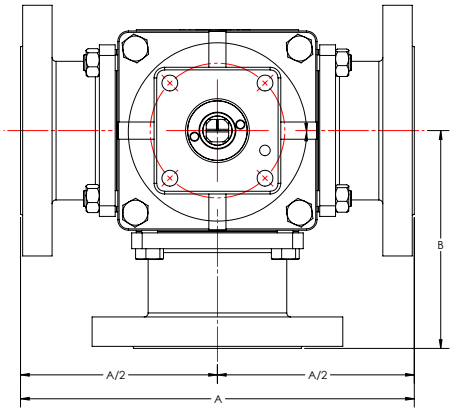
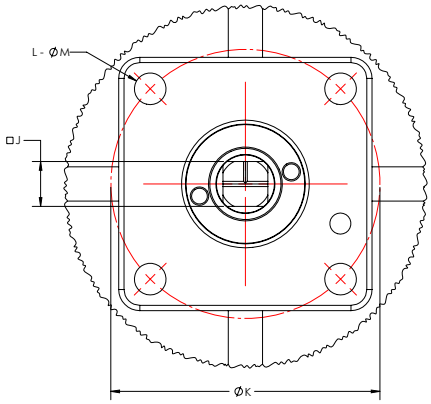
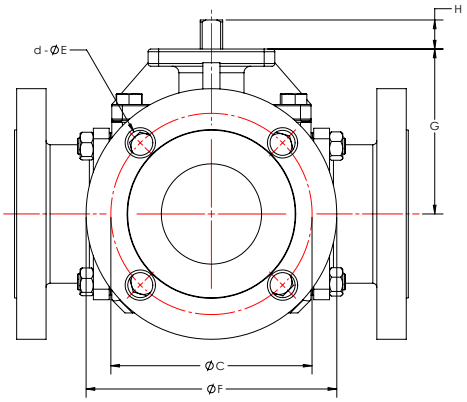
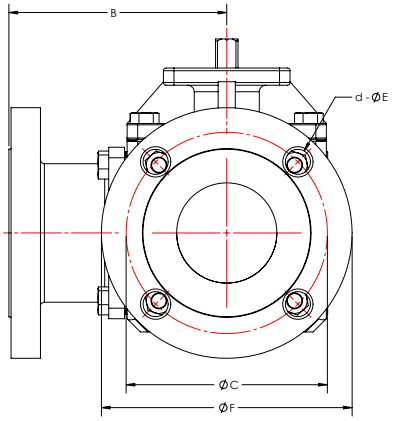
DIMENSIONS 2”-4” BARESTEM FLANGED CL150









SIZE	A	B	C	d	E	F	G
2”	9.00	4.50	4.75	4	0.75	6.0	4.08
3”	11.75	6.50	6.00	4	0.75	7.5	4.92
4”	11.00	6.12	7.50	8	0.75	9.0	4.92

SIZE	H	J	ISO	K	L	M	WEIGHT (LBS)
2”	0.866	0.669	F10	4.02	4	0.47	37
3”	0.870	0.669	F10	4.02	4	0.47	79
4”	0.870	0.669	F10	4.02	4	0.47	91

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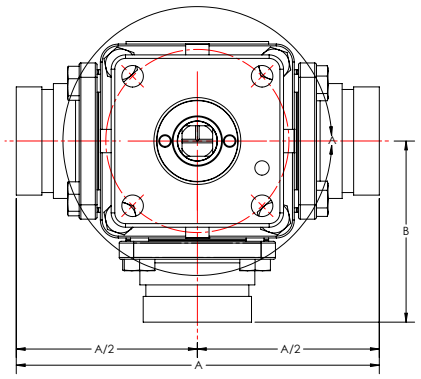
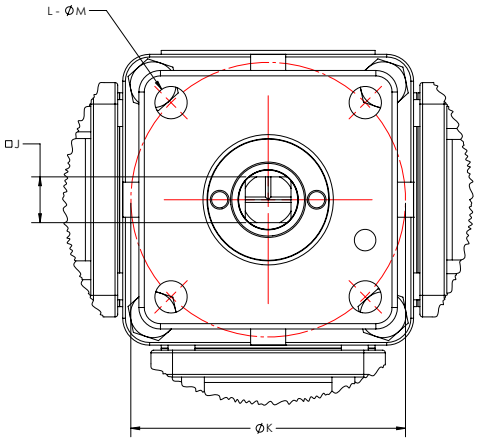
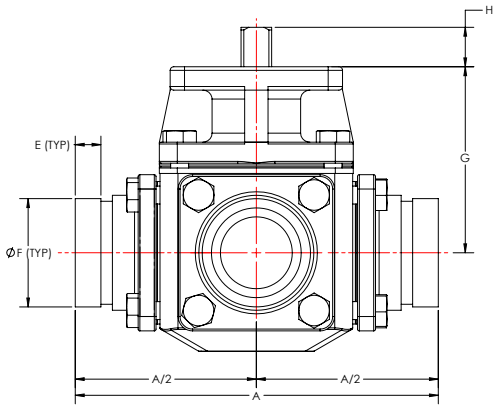
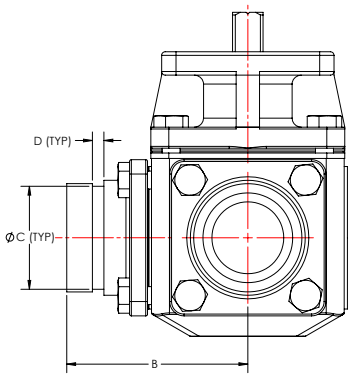
DIMENSIONS 2” BARESTEM GROOVED









SIZE	A	B	C	D	E	F	G
2”	7.58	3.79	2.26	0.57	0.25	2.38	4.08

SIZE	H	J	ISO	K	L	M	WEIGHT (LBS)
2”	0.866	0.669	F10	4.02	4	0.47	29

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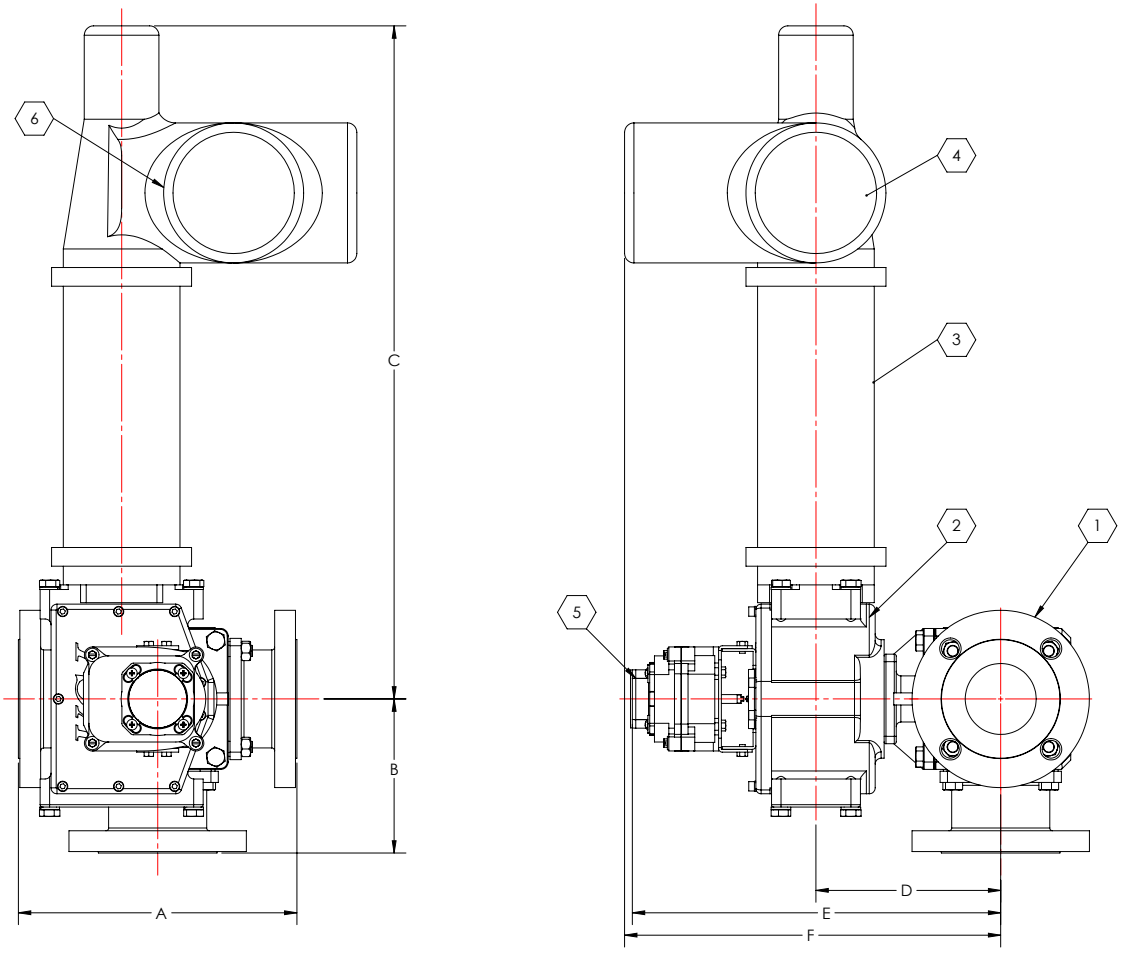
SERIES 7300 & EXCM SPRING RETURN ACTUATOR ASSEMBLY
EXPLOSION PROOF Ex II 2 G T4



SIZE	A	B	C	d	E	F	WEIGHT (LBS)
2"	9.00	4.50	28.3	7.8	11.0	12.5	159
3"	11.75	6.50	28.3	7.8	11.0	12.5	201
4"	11.00	6.12	28.3	7.8	11.0	12.5	213

Item	Component	Description
1	7300 Valve	Carbon Steel 3-Way Valve
2	Gear Unit	Carbon Steel A216 WCB
3	Spring Return	Mechanical Spring Return
4	Motor Unit	120V Motor Unit & Logic
5	Switch Box	EOT Limit Switch Box, Optional
6	Wiring Connection	1" NPT Conduit Entry

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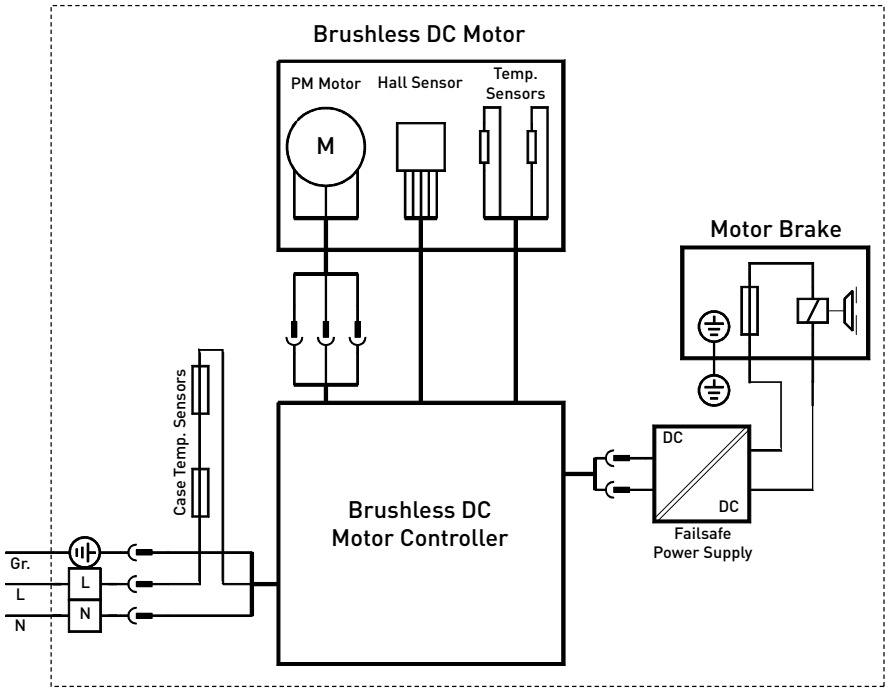
EXCM SPRING RETURN ACTUATOR WIRING
EXPLOSION PROOF Ex II 2 G T4



EXCM03 CHARACTERISTICS

Protection Class	Ex II 2 G Exdell CT4 Gb Explosion-Proof
Power Supply Range	115-240VAC +/-10% 60Hz
Duty	S2 -15 minutes
Power	250W
Run Current	2.25A
Max Torque	2,023 inlbs
Run Time	Adjustable 13-384 seconds
Spring Return Time	1-2 seconds
Wiring Entry	1x 1" NPTF

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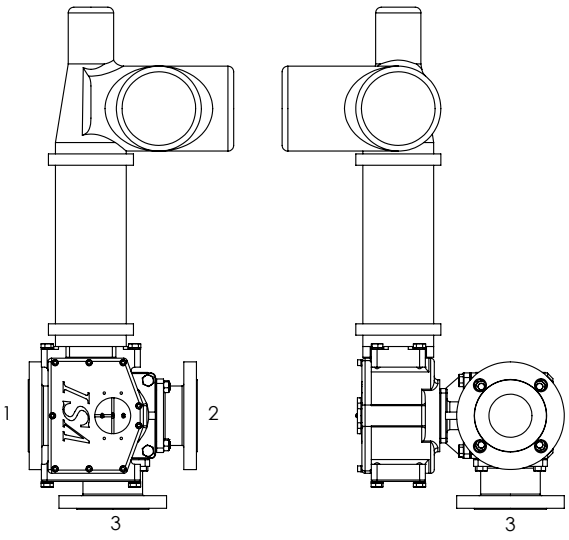
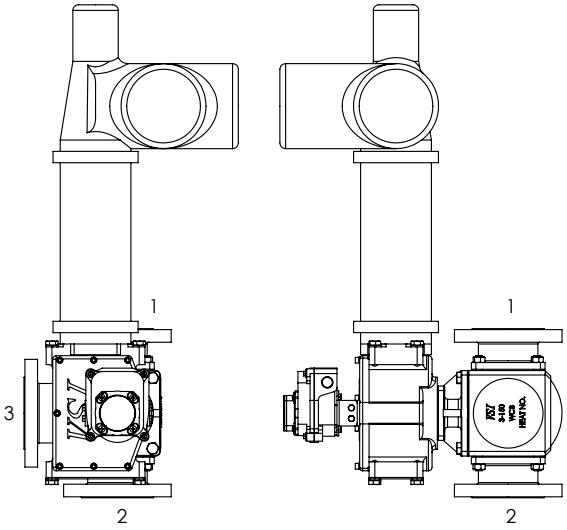
SERIES 7300 & EXCM SPRING RETURN ACTUATOR ARRANGEMENTS

ARRANGEMENT 1



ARRANGEMENT 2



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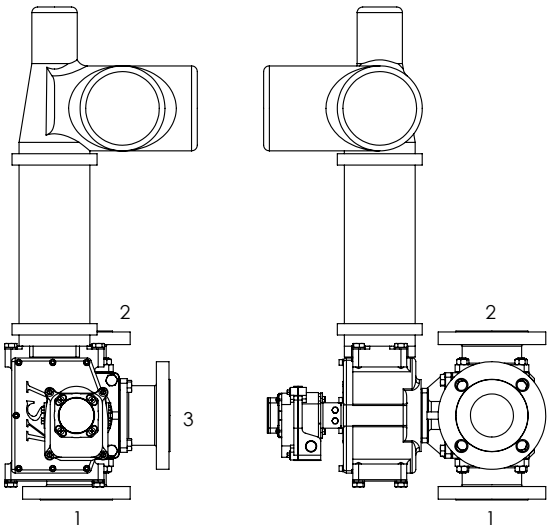
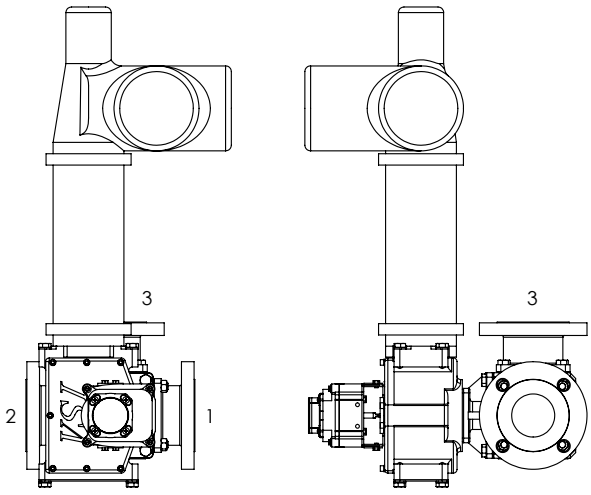


ARRANGEMENT 4



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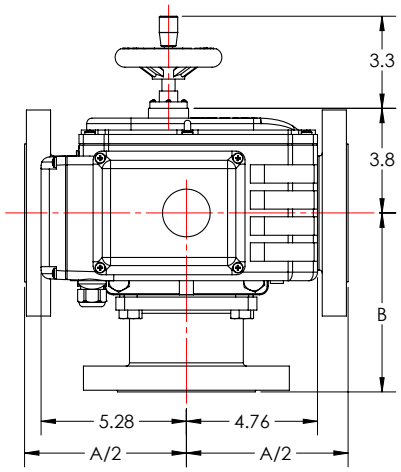
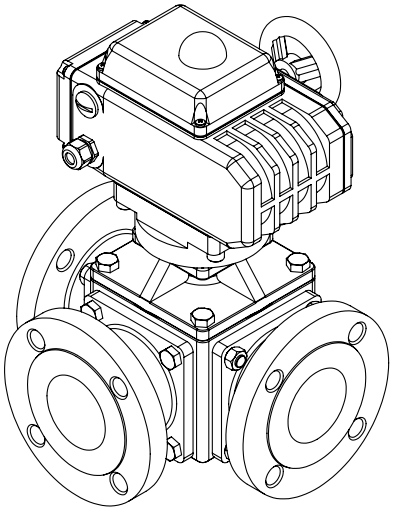
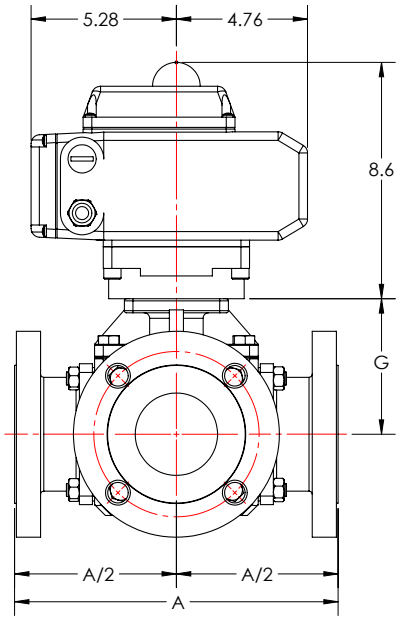
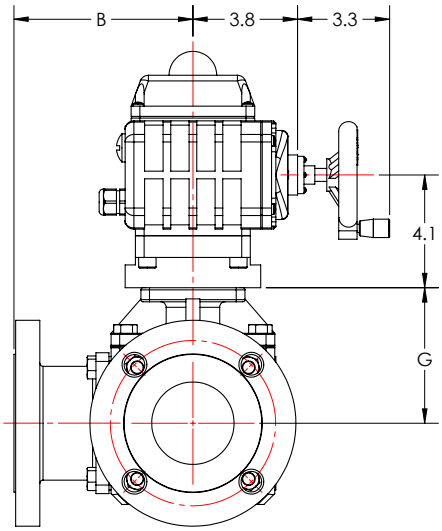
DIMENSIONS WITH SERIES 1000-X ELECTRIC ACTUATOR









SIZE	2-POS ACTUATOR	MODULATING ACTUATOR	A	B	G
2"	1020-X	1020/S-X	9.00	4.50	4.08
3"	1020-X	1020/S-X	11.75	6.50	4.92
4"	1020-X	1020/S-X	11.00	6.12	4.92

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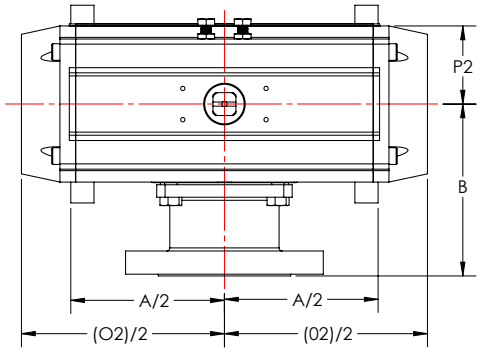
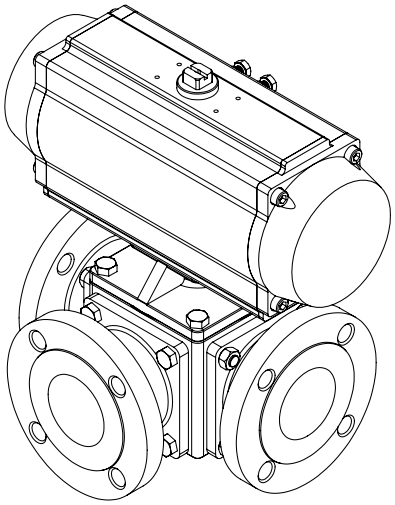
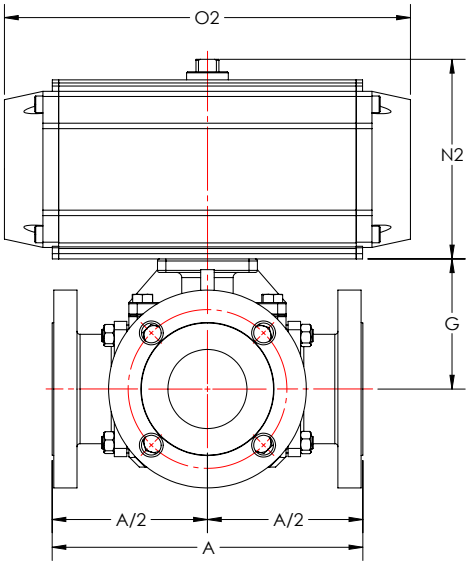
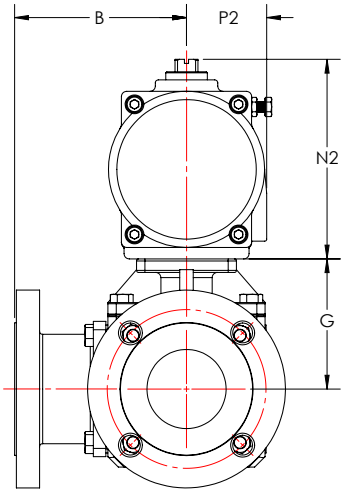
DIMENSIONS WITH SERIES C PNEUMATIC ACTUATOR









SIZE	DOUBLE ACTING	SPRING RETURN	A	B	G	N2	O2	P2
2"	C-DA125	C-SR125	9.00	4.50	4.08	6.9	11.9	2.9
3"	C-DA140	C-SR140	11.75	6.50	4.92	7.6	15.4	3.0
4"	C-DA140	C-SR140	11.00	6.12	4.92	7.6	15.4	3.0

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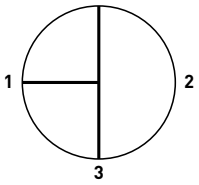
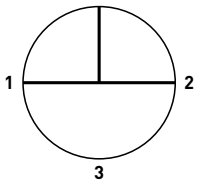
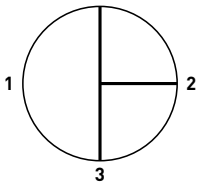
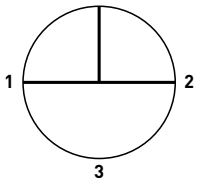
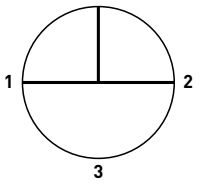
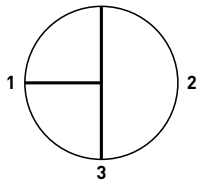
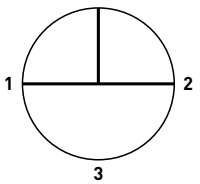
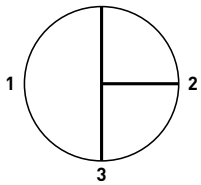
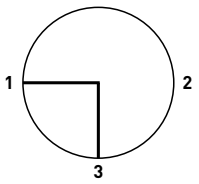
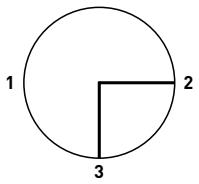
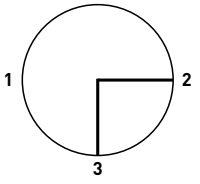
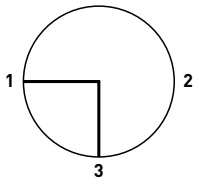
T-PORT CONFIGURATIONS FOR 90 DEGREE ROTATION

Configuration	Start 0^0 and/or Fail-to	End 90^0 and/or Powered
Configuration T1		
Configuration T2		
Configuration T3		
Configuration T4		

L-PORT CONFIGURATIONS FOR 90 DEGREE ROTATION

Configuration	Start 0^0 and/or Fail-to	End 90^0 and/or Powered
Configuration L1		
Configuration L2		

Above illustrations represents the utilization of a 90-degree rotation actuator. Additional flow paths can be achieved with 180-degree rotation actuators and other considerations. Consult VSI for additional options.

Valve Solutions, Inc
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E: sales@valvesolutions.com

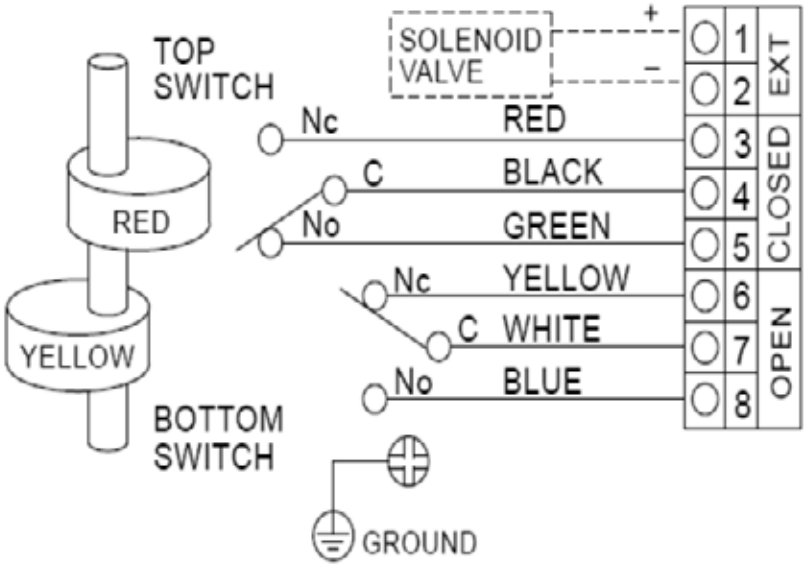
ACCESSORIES FOR ACTUATORS

Electric solenoid for remote control of valves operated by Series C spring-return or double-acting pneumatic actuators

ASCO SERIES 8551				
Enclosure Type	DC Watts	AC Watts	VA Holding	VA Inrush
EF(1)	6.9	6.3	7	10.1
WT(2)	6.9	6.3	7	10.1
Standard Voltages of WT and EF: 24/50-60Hz, (120/60, 110-120/50), (240/60, 220-240/50) Volts AC; 6, 12, 24, 120 Volts DC				

(1) Combination Explosionproof and Watertight Types 1, 2, 3, 3S, 4 and 4x
(2) General Purpose and Watertight Types 1, 2, 3, 3S, 4, 4X

Switch box with end of travel limit switches for remote indication of valves operated by Electric Series EXCM Spring Return or Series C pneumatic actuators



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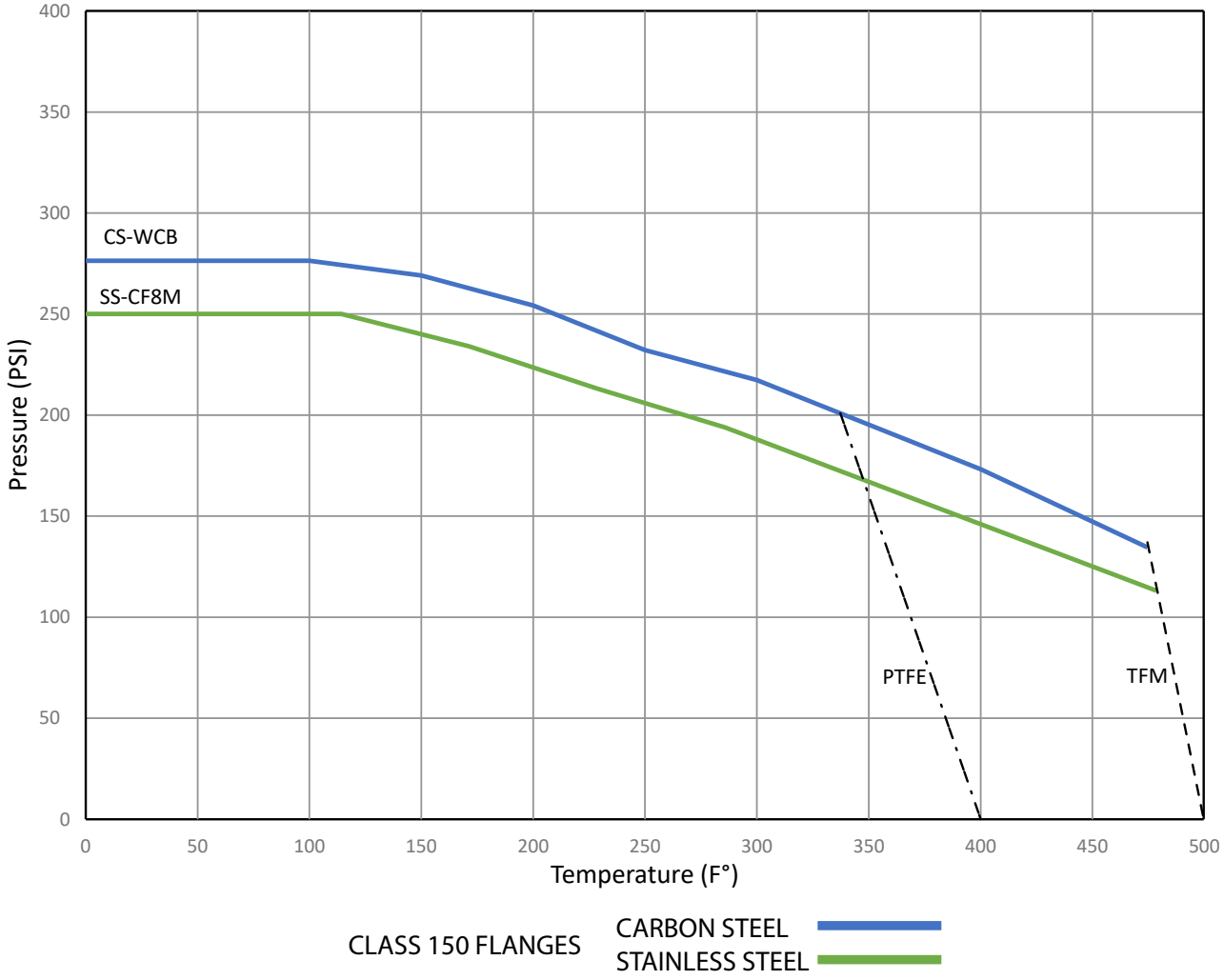
PRESSURE/TEMPERATURE RATINGS CHART



CLASS 150 FLANGES

CARBON STEEL
STAINLESS STEEL

WARRANTY

This limited warranty applies in the United States to products manufactured by VSI, LLC. VSI, LLC. warrants the product purchased from it or its authorized reseller to be free from defects in material and workmanship under normal use during the one year warranty period from the date of its purchase. Other products not manufactured by VSI, LLC. which are provided as part of an assembly may carry additional warranties from that manufacturer or supplier.

During the warranty period, VSI, LLC. will repair or replace defective parts of the product, or, at VSI, LLC. sole option, issue a credit for the original purchase price of the product. Repaired or replaced product will be warranted hereunder only for the remaining portion of the original warranty period. All exchanged products under this Limited Warranty will become the property of VSI, LLC. A proper Return Material Authorization (RMA) number will have to be obtained for all products to be returned under this Limited Warranty. Any claim under this Limited Warranty must include a description of the problem encountered and any relevant information that may assist VSI, LLC. in the replication or resolution of the problem.

This Limited Warranty is transferable during its term to the end user of the product. Any transfer shall not extend or alter the terms of this Limited Warranty.

This Limited Warranty extends only to products purchased from VSI, LLC. or its authorized reseller and does not extend to any product that has been damaged or rendered defective as a result of (a) modification, repair, alteration or improper installation by any person other than VSI, LLC. or its authorized representative; (b) unreasonable or improper use or storage, use beyond rated conditions, operation other than per VSI, LLC. or the manufacturer's instructions, or being otherwise subjected to improper maintenance, negligence or accident; or (c) any use of the product after purchaser has knowledge of any defect in the product.

The warranties provided above are in lieu of and exclude all other warranties, statutory, express or implied, including without limitation any warranty or merchantability or fitness for a particular purpose. VSI, LLC. expressly disclaims all warranties not stated in this limited warranty. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty.

VSI, LLC. warranty liability shall not exceed the original purchase price of the defective product. VSI, LLC. is not liable for any damages caused by theproduct or other products or the failure of the product or other products to perform, including any lost profits, lost savings, incidental or consequential damages. VSI, LLC. is not responsible for charges resulting from the removal and/or replacement of the product. VSI, LLC. is not liable for any claims made by third parties or by the purchaser for a third party. This limitation applies whether damages are sought, or a claim is made, under the Limited Warranty or as a tort claim, product liability claim, contract claim, or any other claim. This limitation cannot be waived by any person. This limitation of liability will be effective even if VSI, LLC. or its authorized representative has been advised by the purchaser of the possibility of such damages.

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PART NUMBER MATRIX

☐☐ ☐☐ ☐☐ ☐ - ☐☐ ☐ - ☐ / ☐ / ☐ / ☐

SIZE CODE
2" - 2"
3" - 3"
4" - 4"

MODEL
S73-Series 7300*

FLANGE CLASS
15 - ASME Class 150*

PORT SIZE
F - Full Port (2"-3")
S - Standard Port (4")

BODY MATERIAL
S - Stainless Steel CF8M
C - Carbon Steel WCB*

SEAT
1 - TFM
2 - PTFE*

OPERATOR
B - Barestem
H - Handle

FLOW PATH
T1 - T-Port Config. 1
...
T4 - T-Port Config. 4
L1 - L-Port Config. 1
L2 - L-Port Config. 2

ACTUATOR[1]
Electric
EXCM03 - 120V ExP Spring Return[2]
1020-X - 120V NEMA 4 2-Pos
1020/S-X - 120V NEMA 4 Mod.
Pneumatic
C-xxxSR - Spring Return
C-xxxDA - Double Acting

LIMIT SWITCH BOX[1]
ALS100 - NEMA 4 Limit Switch Box
ALS500 - ExP. Limit Switch Box

SOLENOID[1]
EF - Explosion Proof
WT- Water Tight

* Standard Material
(1) If Equipped
(2) For EXCM03 Actuator specify Arrangement
Location IE: EXCM03-1, EXCM03-2, etc

EXAMPLE:
3"S7315F-C2B-T2/EXCM03-1/ALS500
A 3" Series 7300, ASME Class 150 body, Carbon Steel WCB body, TFM seat, Barestem, T-Port with Configuration 2, EXCM03 ExP. Spring Return Electric Actuator in Location 1, and ALS500 ExP. Limit Switch Box

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NOTES

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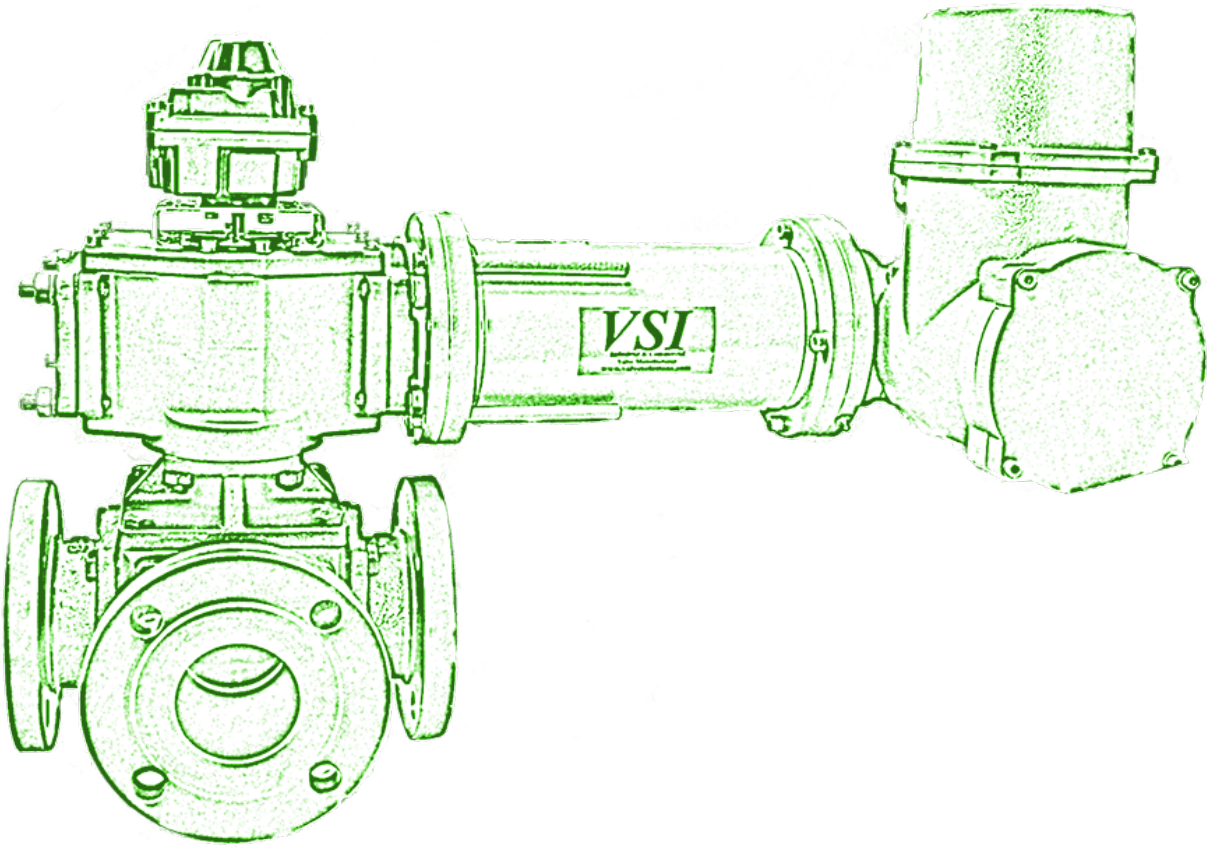

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VSI

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