

2500 SERIES ELECTRICALLY ACTUATED SHUTOFF VALVE



ROTARY SHAFT

Series 2500 valves are 2-way, globe-type, piston valves. They are operated by an external lever connecting the lifting action of the linear actuator to the valve piston/plug through a rotary shaft. The Rotary Shaft principle creates a mechanical advantage enabling more force in operating the valve. It also allows stronger return spring action to ensure reliable, fail-safe return.

Isolated actuator: In the Rotary Shaft valve, the fluid is contained in the lower valve body assembly, completely away from the electrical portion of the valve. Therefore, there is no possibility of explosive gas or corrosive liquid leaking into the electrical enclosure, as there is in any packless type solenoid valve.

High temperature capability: Because the magnetic plunger and the solenoid are mounted outside and away from the valve body, up to 425°F fluid temperature, including steam, can be safely handled without coil insulation breakdown which is often associated with packless type solenoid valves.

Quick acting, two position: Speed of operation is less than one second and is independent of line-media conditions.

Manual operation provision: In case of an emergency or for trial operation, the valve may be operated by hand using the external lever.

Visual position indication: The external lever also serves as a visual position indicator.

Corrosion resistant materials: All internal parts are made from 316 stainless steel.

High pressure capability: The mechanical advantage provided by the external lever of the rotary shaft type enables the valve to be fitted with a much stronger closure spring than is possible with any direct lift packless type solenoid valve. This allows a much higher opening pressure and/or a greater factor of safety for opening and closing the valve.

Much longer maintenance-free life: The slight arc (15-30°) of the rotary shaft offers superior seal life expectancy compared to reciprocating-stem packing glands.

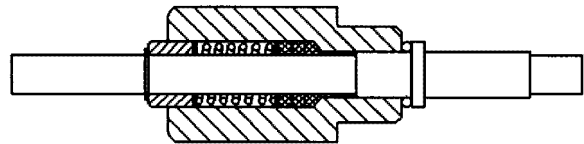
Dependable shutoff: Pressure and flow (above the seat) tending to close the valve achieves shutoff reliability not possible with ball, gate, or butterfly type valves.

Zero pressure operation: Valve is not dependent on pressure or flow to open or close fully.

No tiny orifices: These valves contain no diaphragms, needle-sized orifices or piston rings typical of packless type solenoid valves which are prone to clogging.

Heavy walled valve bodies: All valves have heavy walled cast bodies which meet the ANSI ratings of class 150 & 300 for steel.

A Doubled Seal System: Ensures an absolute minimum of fugitive emissions. The primary seal is Teflon[®] with a spring loaded, secondary seal (see drawing below).



SPECIAL FEATURES

FAST DELIVERY - This modular design provides the capability to stock valve components that can be assembled and shipped quickly.

FIELD REVERSIBILITY - The 2500 series is designed with versatility in mind. In order to adapt to changing process conditions, the valve action can be reversed while it remains in the pipeline. The operation may be changed from normally closed to normally opened with a kit or vice versa.

SWITCH KITS - The 2500 series valves can be fitted with add on valve position indication switch kits in the field.

Heavy duty position switches in NEMA 4 and explosion proof enclosures are featured.

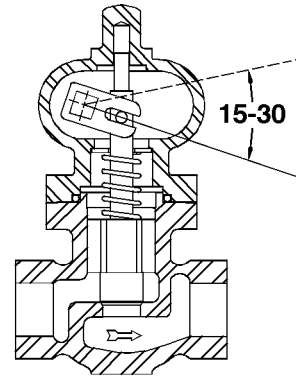
FACTORY MUTUAL SYSTEMS APPROVED EXPLOSION-PROOF - This series features fully electrical valves that are FM approved for safety shut-off of fuel oils and gases. In addition, this series features FM approved actuators where explosion-proof approval is required: Class I, Groups B, C, & D, Division 1, and Class II Groups E, F, & G, Division 1 explosion proof; and NEMA 4 watertight actuator enclosure with 1/2" NPT conduit connection.

Teflon[®] is a registered trademark of E.I. DuPont de Nemours Co., Inc.

2500 SERIES VALVE PISTON OPTIONS

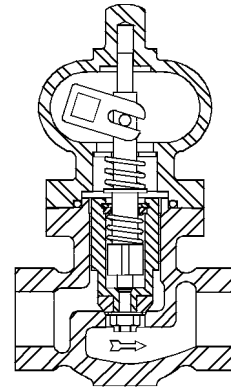
OPTION D - Direct Operated for Low Pressures

This series can be used for viscous or dirty fluids as well as light liquids and gases. These are "Direct Operated" valves; referring to the inner valve construction where the full area valve disc is lifted off the seat against the full inlet shutoff pressure. This is done without the aid of a pressure assist from the media or by an internal pilot or minimum flow requirement. These valves open and close, quickly and fully, down to zero psi. Closing speed is essentially independent of fluid viscosity, line pressure or pressure drop across valve.



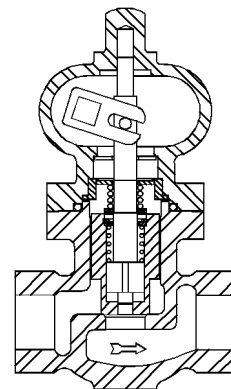
OPTION P - Pilot Operated for Clean Gases or Light Liquids

Use this series for light liquids (less than 200 SSU) and clean gases in higher pressure applications than the "D" series. These are "Semi Direct Operated" valves. The actuator lifts the first stage port relieving the static line pressure on top of the main piston. This relief creates a pressure imbalance due to inlet and outlet area size differences which assist in lifting the piston off the seat, opening the valve fully. The first stage is connected to the piston with an auxiliary spring. Therefore, it is essentially the actuator that provides a lifting action and not the pressure imbalance. Consequently, there is no dependence on pressure or flow to operate the valve. This allows the valve to act as "Direct Operated" down to zero psi compared to that of most pilot operated or diaphragm valves with needle sized orifices. Moreover, this allows the valve operation to be positive and quick.



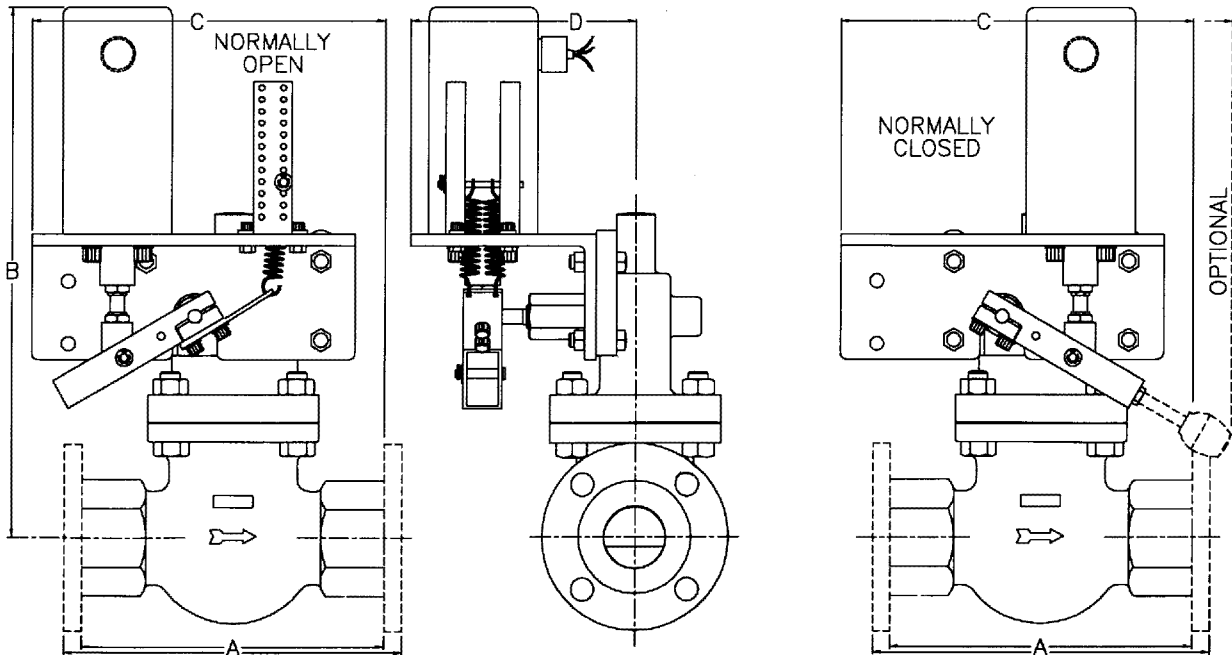
OPTION S - Semi-Direct Operated for Dirty/Viscous Liquids

Use this series for viscous or dirty liquids in higher pressure applications than the "D" series. These are "Semi Direct Operated" valves. The actuator lifts the full area disc off the seat with the assistance of the pressure of the media. Because the piston is connected to the actuator and not floating, the valve operation is positive and quick. This also allows the valve to act as "Direct Operated" at low pressures down to zero psig. Viscous or unclean liquids can be handled reliably because the first stage valve port is 25 to 50% of the main port diameter; as compared to needle sized orifices of most pilot operated valves.



Note: This option is for use with liquids only.

2500 SERIES DIMENSIONS



Size & Connections				Max. Opening Diff. Press. (psi)						Dimensions				
Suffix	Pipe/ Port (in.)	Ends	CV	Direct (D)		Pilot (P)		Semi-Direct (S)		Net Wgt. (lbs.)	A (in.)	B (in.)	C (in.)	D (in.)
				Metal	Teflon	Metal	Teflon	Metal	Teflon					
				05	1/2	FNPT	3	300	300					
05	1/2	150FL	3	275	275	275	275	N/A	N/A	15	4-1/4	10-3/4	10	5-1/2
05	1/2	300FL	3	300	300	720	300	N/A	N/A	17	5-1/2	10-3/4	10	5-1/2
08	3/4	FNPT	6.8	135	135	720	270	600	270	13	3-1/2	10-3/4	10	5-1/2
08	3/4	150FL	6.8	135	135	275	270	275	270	15	4-7/8	10-3/4	10	5-1/2
08	3/4	300FL	6.8	135	135	720	270	600	270	17	7	10-3/4	10	5-1/2
10	1	FNPT	10	75	75	720	240	250	240	17-1/2	4	11-1/2	10	5-1/2
10	1	150FL	10	75	75	275	240	250	240	17-1/2	5-1/8	11-1/2	10	5-1/2
10	1	300FL	10	75	75	720	240	250	240	19	5-1/2	11-1/2	10	5-1/2
15	1-1/2	FNPT	22.5	25	25	400	285	125	125	25	7	12	10	5-3/4
15	1-1/2	150FL	22.5	25	25	275	275	125	125	26	6-1/2	12	10	5-3/4
15	1-1/2	300FL	22.5	25	25	295	285	125	125	47	7-1/2	12	10	5-3/4
20	2	FNPT	40	30	30	600	220	375	220	45	10-3/4	15	7	7
20	2	150FL	40	30	30	275	220	275	220	45	10	15	7	7
20	2	300FL	46	30	30	600	220	375	220	90	10-1/2	15	9	7
30	3	150FL	90	10	10	275	150	165	150	108	9-7/8	17-1/2	10	7
30	3	300FL	96	10	10	440	150	165	150	120	11-3/4	19-1/2	12	7
40	4	150FL	160	5	5	275	115	110	110	138	11-3/4	18-1/2	11-3/4	7
40	4	300FL	160	5	5	330	115	110	110	174	14	18-1/2	12-1/2	7

Dimensions do not show optional features such as position switch kits or manual reset ("C" dimension increases up to 2-1/2 inches). Pressures are based on ANSI ratings at 100°F.

MOUNTING NOTE: All 2500 Series valves must be mounted with the solenoid in a vertical, upright position. Valve bodies are to be mounted in a horizontal pipeline. For mounting in vertical pipeline or any other pipeline orientation, please consult the factory.

ON-OFF

2500 SERIES ACTUATORS

SOLI-CON® SOLENOID ACTUATORS

The Soli-Con® solenoid actuator is a solid-state-controlled electric actuator, which effectively eliminates coil burn-out due to mechanical overload. The solid-state-controller acts as both a timer and electrical signal conditioner. Upon energizing (applying an electrical signal), the timing circuit delivers an "inrush" current spike to the coil to "pull-in" the plunger (armature) and operate the valve. After approximately a half second (~500 ms), the circuit drops the current to the coil to a small fraction of an amp "holding" the plunger magnetically in its new position. Actual current depends upon voltage and actuator size (model); see table below. The conditioning circuit regulates the voltage and current delivered to the coil allowing for greater voltage ranges and eliminating AC hum and chatter. This lowers the coil temperature rise, resulting in longer coil life, while also saving energy and maintenance costs. Additionally, should the valve be operated in excess pressure or blocked, the coil will not be damaged.



SOLI-CON® ELECTROMAGNET ACTUATORS

The Soli-Con® electromagnet actuator is a solid-state-controlled electric actuator, which holds the plunger in the "latched" position. The solid-state-controller acts as electrical signal conditioner. Upon energizing (applying an electrical signal), the circuit only allows "holding" current to the coil, disabling the "inrush" current draw and "pull-in" event. This actuator is used on the Manual Reset – No Voltage Release (NV) valve type. In all other aspects, it is the same as the solenoid actuators.

NOTE: All Soli-Con® actuators feature continuous duty operation, Class H coils, function up to a maximum ambient temperature of 185°F (85°C), and contain a 1/2" FNPT conduit connection.

ELECTRICAL REQUIREMENTS Solid-State-Controlled Actuators

Model ¹	Holding (amps)	Inrush ² (amps)	Cycles ³ per minute	Voltage (volts/hertz)
SCB	0.2	14.2	3	120/60 (Z)
SCB	0.17	7.5	3	220/60 (X)
SCE	0.04	13.5	3	125/DC (Y)
SCE	0.04	6.4	3	250/DC (W)
SCG	0.8	14.0	2	24/DC (V)
SCH	Covers the following:			
SCH	0.7	10.0	2	48/60 (U)
SCH	0.5	7.0	2	120/60 (U)
SCH	0.35	6.0	2	220/60 (U)
SCH	0.5	10.0	2	48/DC (U)
SCH	0.3	6.0	2	125/DC (U)
SCH	0.25	5.0	2	250/DC (U)

1. For solenoid actuators, models SCG and SCH are used on ½ - 1½ valves, and models SCB and SCE are used on 2" - 4" valves. For electromagnet actuators, models SCG and SCH are used on all valve sizes.
2. Inrush amps do not apply for manual reset - no voltage release valve type.
3. Maximum cycles per minute (on/off) rated with a valve having a fluid temperature of 425°F.

2500 SERIES VALVE TYPES

FULLY AUTOMATIC (FA)

This fully electric valve automatically changes its position based on electrical signal. When the Soli-Con® solenoid actuator is de-energized (on loss of electrical signal), the valve will "fail" to its "normal" or fail-safe position. Upon applying or restoring the electrical signal, the solenoid actuator will automatically energize and change the valve position.

FM SAFETY SHUT-OFF (FM)

This version of the fully electric valve is FM approved for safety shut-off of fuel oils and gases. The valve features an explosion proof Soli-Con® solenoid actuator and is only supplied in the normally closed fail-safe position.

MANUAL RESET – ELECTRICALLY TRIPPED (ET)

This manual reset valve must be manually actuated to move from its "normal" or fail-safe position to its "latched" position. When the Soli-Con® solenoid actuator is in the de-energized state (no electrical signal), the valve is held mechanically in its "latched" position. Upon applying an electrical signal (energizing), the solenoid actuator will "trip" the valve to revert back to its "normal" position. Momentary energizing is all that is required to "trip" this valve.



MANUAL RESET – NO VOLTAGE RELEASE (NV)

This manual reset valve must be manually actuated to move from its "normal" or fail-safe position to its "latched" position. When the Soli-Con® electromagnet actuator is energized (with an electrical signal), the valve is held magnetically in its "latched" position. Upon de-energizing (loss of electrical signal), the electromagnet actuator will "release" the valve to revert back to its "normal" position. Since the electromagnet actuator is used for holding only, it avoids the higher "inrush" current of the solenoid actuator.

OPTIONS:

LIMIT SWITCH

Limit switches may be supplied to indicate "valve open/not open", "valve closed/not closed" or both. Choices are SPDT or DPDT switches. All switches supplied will be both watertight and explosion proof.

TERMINAL BLOCK

A terminal block can be furnished in a separate external enclosure for making electrical connections to the electric actuator.

LOCKING DEVICE

A locking device may be supplied with a manual operator knob to hold valve in the override position.

PRESSURE DROP CALCULATIONS

FOR LIQUIDS:

$$\text{Pressure drop (PSID)} = \left[\frac{\text{GPM}}{C_v} \right]^2 \times (\text{Specific gravity})$$

FOR GASES:

$$\text{Pressure drop (PSID)} = \left[\frac{460^\circ + ^\circ\text{F}}{\text{Inlet Psig} + 15} \right] \times \left[\frac{\text{SCFH}}{1360 \times C_v} \right]^2$$

FOR STEAM:

$$\text{Pressure drop (PSID)} = \left[\text{Specific Volume (ft}^3/\text{lb)} \right] \times \left[\frac{\text{lb/hr}}{63 \times C_v} \right]^2$$

SUITABLE FOR
0 TO 300PSI
SATURATED STEAM

2500 SERIES ORDERING CODE

Series	Size	Type	Trip/Fail Position	Disc	Piston	Material	ANSI CL	Shaft Seal Mat'l	Enclosure	Voltage	Options						
2	5	2	0	F	A	C	M	P	S	1	F	T	E	Y	C	S	L
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Series - Position 1 & 2 25
Valve Size - Position 3 & 4 05 = 1/2 08 = 3/4 10 = 1 15 = 1 1/2 20 = 2 30 = 3 40 = 4
Valve Type - Position 5 & 6 FA = Fully Electric FM = FM Shut Off Valve ¹ ET = Electrically Tripped NV = No Voltage Release
Trip/Fail Position - Position 7 O = Normally Open ¹ C = Normally Closed
Disc - Position 8 M = Metal T = Teflon [®]

Piston - Position 9 P = Pilot Operated D = Direct Operated S = Semi-direct ² Operated
Body/Bonnet Material - Position 10 S = Stainless Steel CF8M (316) C = Carbon Steel WCB
ANSI CL - Position 11 & 12 1F = 150 Flanged 3F = 300 Flanged 3T = 300 FNPT ³
Shaft Seal Mat'l - Position 13 T = Teflon [®] A = Ammonia Service
Enclosure ⁵ - Position 14 E = Explosion Proof W = Watertight (NEMA 4)

Voltage - Position 15 U = Universal ⁴ V = 24 DC ⁴ W = 250 DC ⁶ X = 220 (50 or 60 Hz) ⁶ Y = 125 DC Z = 120 (50 or 60 Hz)
Options - Position 16, 17 & 18 Switches CS = SPDT Show Closed CD = DPDT Show Closed OS = SPDT Show Open OD = DPDT Show Open 2S = SPDT Show Both 2D = DPDT Show Both Other T = Terminal Box L = Lock Device w/Handle

EXAMPLE: 2520FACMP51FTEYL

2520	FAC	MP	S	1F	T	E	Y	L
1,2,3,4	5,6,7	8,9	10	11,12	13	14	15	16,17 and/or 18

2520: 2-Way fully automatic rotary shaft type **Soli-Con**[®] valve with solid-state-controlled electric actuator
Horizontal pipe mounting; upright actuator
Continuous duty class H molded coil With 1/2" NPT conduit connection
2" pipe size, 2" port; Cv = approx. 40

FAC: Normally closed, energize to open, fail closed

M: Metal (Regrinding) valve disc

P: Pilot assisted operation

S: Stainless steel valve body and inner parts

1F: ANSI Class 150 RF flanged ends

T: Teflon[®] rotary shaft seal

E: "FM" Approved explosion proof and NEMA 4 watertight actuator enclosure

Y: 125 Volts, DC

L: With locking device to hold valve in the (manually override or 'energized') position

1. FMO is not available.

2. Liquid only

3. 1/2" to 2" valve size only

4. 1/2" to 1 1/2" valve size only; Universal Voltage is 48-240 VAC (50 or 60 Hz) and 48-250 VDC.

5. Explosion Proof (E) required with FMC valve type. FM approved for CL.I, Div. I, Groups B, C & D and CL.II, Div. I, Groups E, F & G.

6. Not offered as explosion proof

2500 SERIES Valve Specification Form

Laurence Products, Electric On / Off



A division of CIRCOR International, Inc.
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(813) 978-1000 · FAX: (813)-978-0984

CONTROL VALVE SPEC SHEET

Project/Job _____
Unit/Customer _____
P.O./LCO File # _____
Item _____
Contract _____
MFR Serial# _____

Data Sheet _____ of _____
Spec _____
Tag _____
Dwg _____
Service _____

I have (or anticipate) a requirement for an electrically actuated valve as follows:

Quantity _____ Pipe Size _____

- 2-way
 - Fully Electrical
 - Energize to Open (Normally Closed)
 - Energize to close (Normally Open)
 - Manually Reset
 - Latch to Open (Normally Closed)
 - Latch to Close (Normally Open)
- Trip on Current Failure
- Trip on Energization

Summary of Application _____

Fluid Handled _____ Viscosity _____ @ _____ Clean? _____ Conc. _____ Spec. Grav. _____

Max Opening Differential Pressure _____ Fluid Temp _____ Ambient Temp _____

Flow Rate _____ Max Allowable Pressure Drop _____ Req'd C_v _____

Body Mat'l _____ Inner Parts _____ Valve Disc _____

Screwed Ends Flanged 150 Flanged 300 Socketweld Buttweld Other _____

Horizontal Pipe Mounting Vertical Pipe Mounting- Up Flow Down Flow

Actuator Enclosure: NEMA4 Watertight/Dusttight Explosion Proof Class I,

Group _____ Div _____ Other _____

AC DC Volts _____ Hz _____ Duty _____ Frequency of Operation _____

Coil Insulation Class H (std) Other _____ Position Switch(es) _____

Other Options _____

Other Description _____

Please send _____ copies of dimension drawing _____ copies of Laurence On-Off Valves Handbook.

ON-OFF

QUESTIONS? CALL LESLIE CONTROLS @ (813) 978-1000 PLEASE FAX COMPLETED FORM TO: (813) 977-0174

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