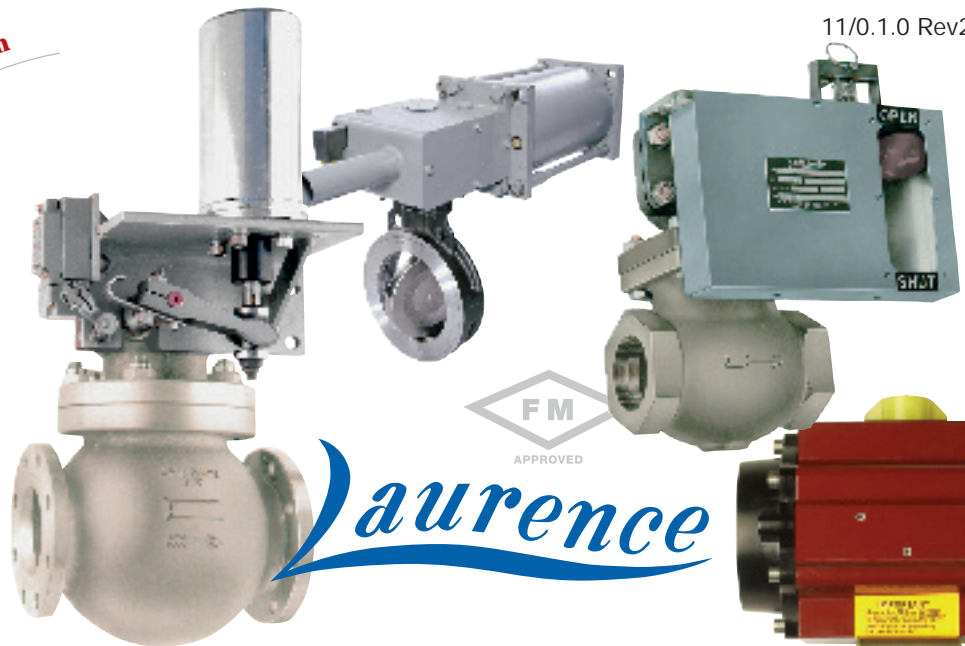
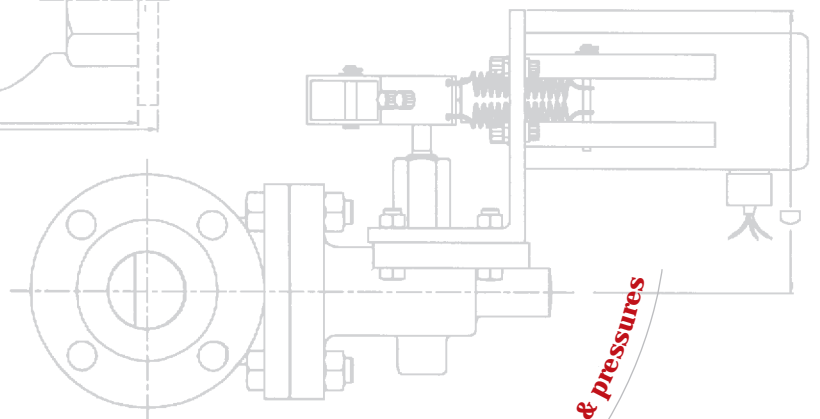
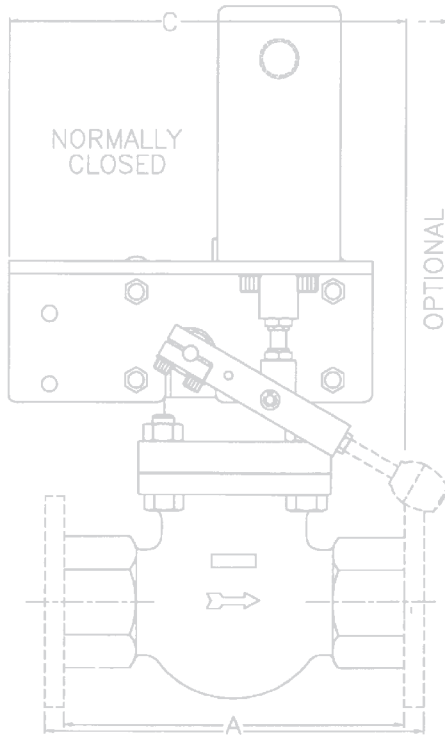
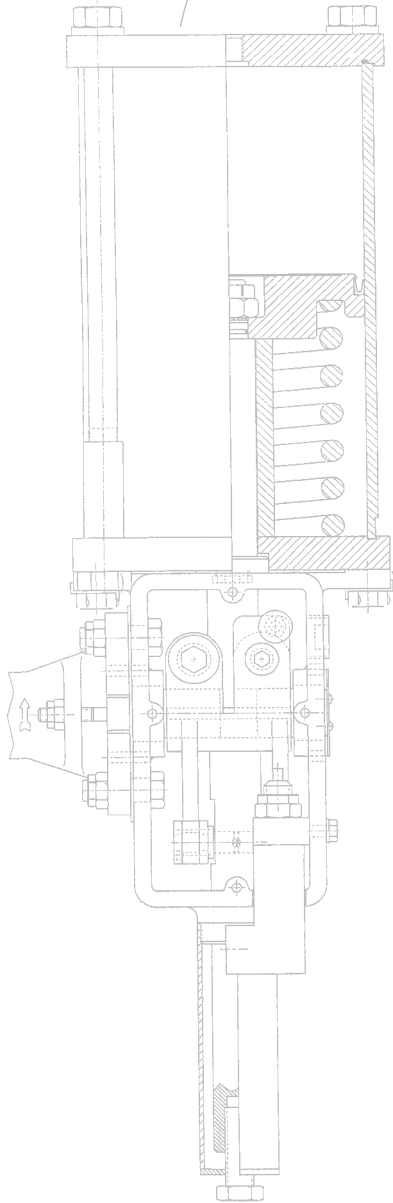


*Q.D. Quick Delivery Program*



*Laurence*



*higher temperatures & pressures*

# ON-OFF VALVES handbook

# Questions?..... SOLUTIONS

- ★ **FM & CE Approved**
- ★ **Solenoid Isolated** from corrosive, high temperature or flammable media
- ★ **No Minimum Pressure** or flow required to operate
- ★ **Greater Force** and low torque of rotary shaft easily opens against higher pressures
- ★ **Quick Acting** without air assist
- ★ **Manual Open/Close Override** with visual position indicator
- ★ **Slight Rotary Motion** means virtually no maintenance needed
- ★ **Heavy Return Spring(s)** provide positive closure and stay closed against moderate backpressure
- ★ **Wide Flexibility** in modes of actuation
- ★ **Fail-Safe Shutoff** provided by pressure and flow on loss of power
- ★ **Optional Soli-Con® Actuator:**
  - Full voltage initial pulse provides ample power to open
  - Reduced voltage after split-second is sufficient to hold valve open — prevents burnout from mechanical overload
- ★ **Rush Delivery Programs** QD and QD Premium delivery available for many of our standard configurations.



## LESLIE (QD) QUICK DELIVERY PROGRAMS

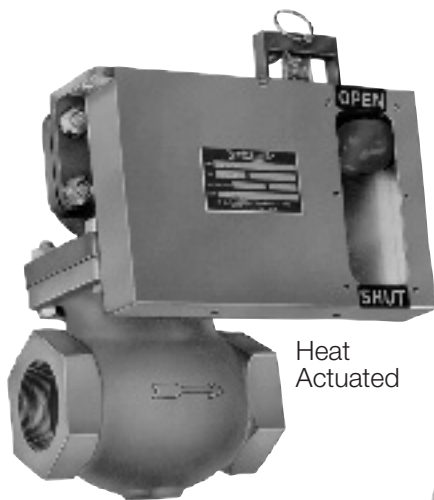
*QD - Guaranteed to ship in 5 working days or less*

*QD Premium - Guaranteed to ship in 24 hours or less*

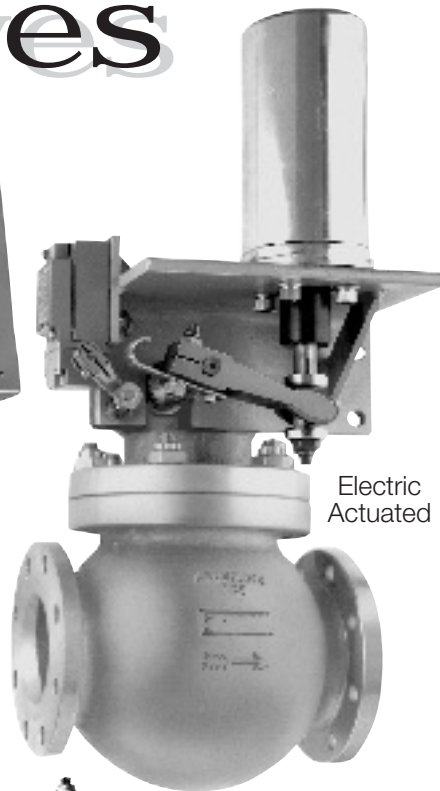
*Many standard replacement parts available through the QD and QD Premium programs.*

# Laurence

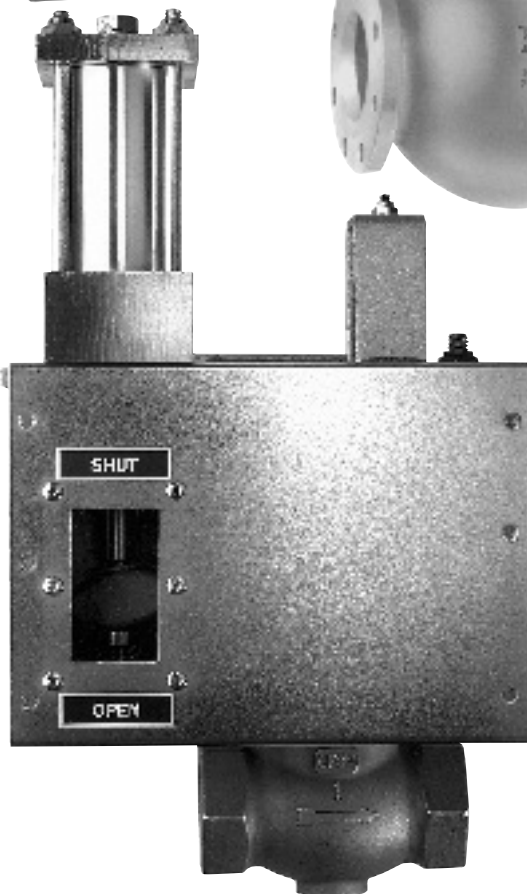
## Rotary On-Off Control Valves



Heat  
Actuated



Electric  
Actuated



Pneumatic/  
Hydraulic  
Actuated

### APPLICATIONS

Dirty, viscous or unclean liquids  
Fuel oils, gasoline, lube oils,  
fuel gases  
Steam, superheated steam,  
hot gases  
All waters including seawater  
Solvents, ammonia, Halon, CO<sub>2</sub>  
Air vacuum, inert gases, hydrogen,  
oxygen, helium

### VALVE OPTIONS

- Heavy duty position switch(es)
- Manual override locking device
- Molded coils
- Gravity assist to fail position
- Terminal blocks
- External linkage cover
- Overload relay
- Seismic resisting construction
- Limited space mounting orientations
- Trip delay devices
- U.S. Navy shock & vibration resisting construction
- Materials traceability; certification to MIL-I-45208

### ELECTRIC ACTUATOR OPTIONS

Weatherproof

Watertight

FM Approved Explosion Proof

(Class I, Groups A, B, C or D;  
Class II, Groups E, F or G;  
Division 1 or 2)

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## LAURENCE COMBUSTION TURBINE VALVES

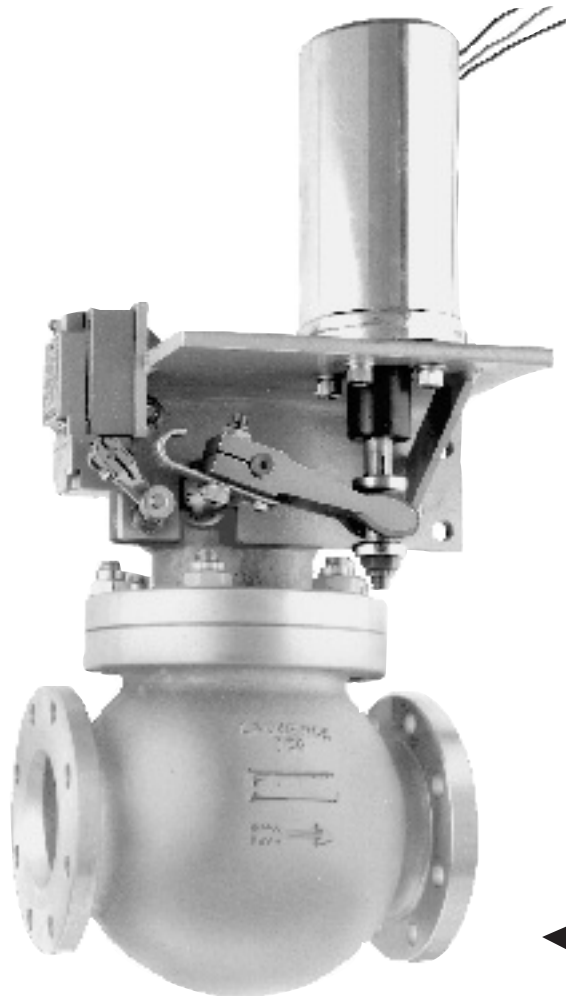
Compressed Air Extraction Valve .....	back cover
Atomizing Air Bypass Valve .....	back cover

LESLIE CONTROLS, INC. has a policy of continuous product research and improvement and reserves the right to change design and specifications without notice. Responsibility for typographical errors is specifically disclaimed.

*It is solely the responsibility of the system designer and the user to select products and materials suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Assistance shall be afforded with the selection of the materials based on the technical information supplied to Leslie Controls, Inc.; however, the system designer and user retain final responsibility. The designer should consider applicable Codes, material compatibility, product ratings and application details in the selection and application. Improper selection, application or use of the products described herein can cause personal injury or property damage. If the designer or user intends to use the product for an application or use other than originally specified, he must reconfirm that the selection is suitable for the new operating conditions.*

# 2500 SERIES

**ELECTRIC ACTUATED,  
FAST ACTING, PROCESS FLUID,  
SHUT-OFF VALVES**



**APPROVED**



## 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.

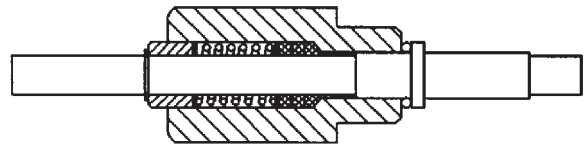
**Dependable shutoff:** Pressure and flow (above the seat) tending to close the valve achieves shutoff reliability not possible with ball, gate, or butterfly type valves.

**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.

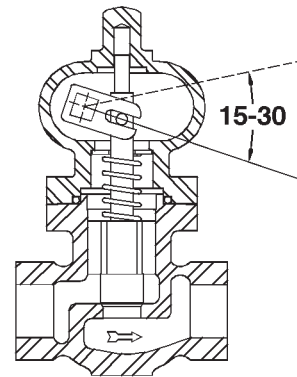
#### FACTORY MUTUAL SYSTEMS APPROVED

**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.

## 2500 SERIES VALVE PISTON OPTIONS

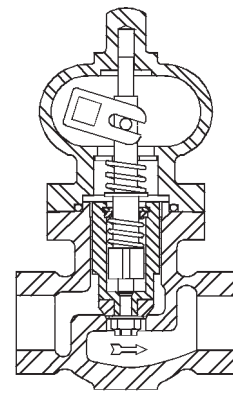
### OPTION D - Direct Operated for Low Pressures

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.



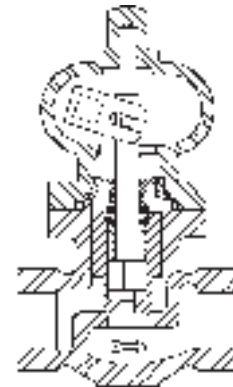
### OPTION P - Pilot Operated for Clean Gases or Light Liquids

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.



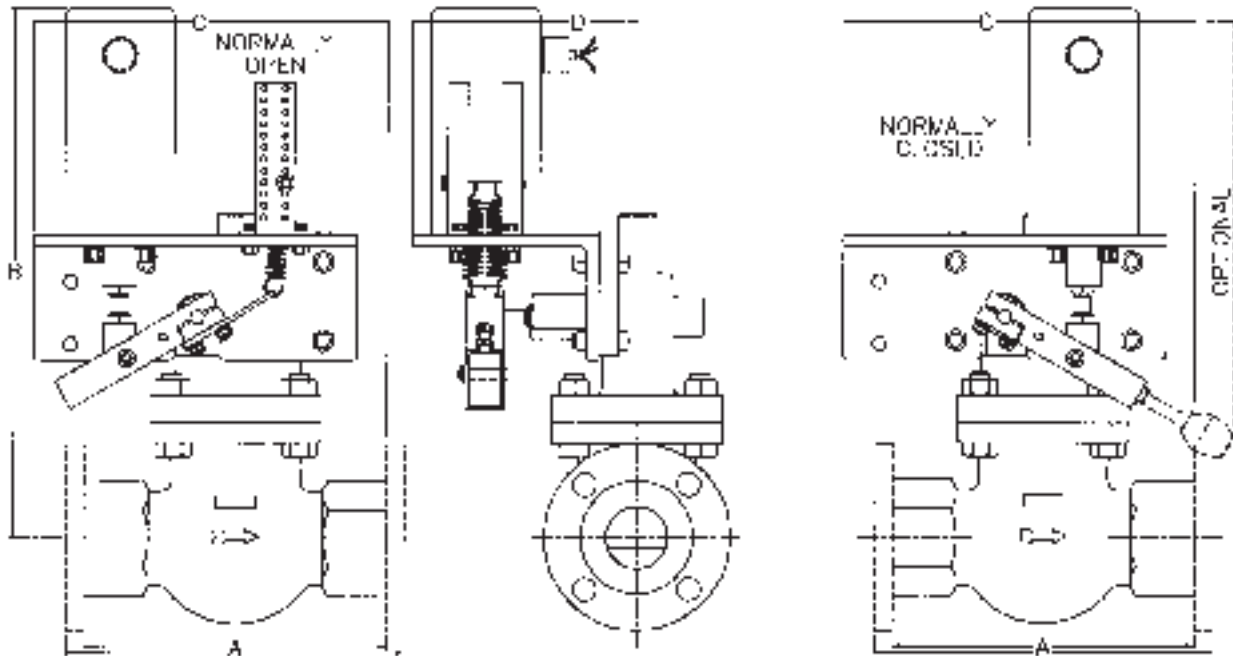
### OPTION S - Semi-Direct Operated for Dirty/Viscous Liquids

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	720	300	N/A	N/A	13	4	10-3/4	10	5-1/2
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.



## 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 <sup>1</sup>	Holding (amps)	Inrush <sup>2</sup> (amps)	Cycles <sup>3</sup> 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:

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

#### 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						
<b>2</b>	<b>5</b>	<b>2</b>	<b>0</b>	<b>F</b>	<b>A</b>	<b>C</b>	<b>M</b>	<b>P</b>	<b>S</b>	<b>1</b>	<b>F</b>	<b>T</b>	<b>E</b>	<b>Y</b>	<b>C</b>	<b>S</b>	<b>L</b>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

<p><b>Series</b> - Position 1 &amp; 2 25</p> <p><b>Valve Size</b> - Position 3 &amp; 4 05 = ½ 08 = ¾ 10 = 1 15 = 1½ 20 = 2 30 = 3 40 = 4</p> <p><b>Valve Type</b> - Position 5 &amp; 6 FA = Fully Electric FM = FM Shut Off Valve<sup>1</sup> ET = Electrically Tripped NV = No Voltage Release</p> <p><b>Trip/Fail Position</b> - Position 7 O = Normally Open<sup>1</sup> C = Normally Closed</p> <p><b>Disc</b> - Position 8 M = Metal T = Teflon<sup>®</sup></p>	<p><b>Piston</b> - Position 9 P = Pilot Operated D = Direct Operated S = Semi-direct<sup>2</sup> Operated</p> <p><b>Body/Bonnet Material</b> - Position 10 S = Stainless Steel CF8M (316) C = Carbon Steel WCB</p> <p><b>ANSI CL</b> - Position 11 &amp; 12 1F = 150 Flanged 3F = 300 Flanged 3T = 300 FNPT<sup>3</sup></p> <p><b>Shaft Seal Mat'l</b> - Position 13 T = Teflon<sup>®</sup> A = Ammonia Service</p> <p><b>Enclosure</b><sup>5</sup> - Position 14 E = Explosion Proof W = Watertight (NEMA 4)</p>	<p><b>Voltage</b> - Position 15 U = Universal<sup>4</sup> V = 24 DC<sup>4</sup> W = 250 DC<sup>6</sup> X = 220 (50 or 60 Hz)<sup>6</sup> Y = 125 DC Z = 120 (50 or 60 Hz)</p> <p><b>Options</b> - Position 16, 17 &amp; 18 <b>Switches</b> CS = SPDT Show Closed CD = DPDT Show Closed OS = SPDT Show Open OD = DPDT Show Open 2S = SPDT Show Both 2D = DPDT Show Both <b>Other</b> T = Terminal Box L = Lock Device w/Handle</p>
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### 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**<sup>®</sup> 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<sup>®</sup> 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 1½" 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

 <p style="font-size: small;">A subsidiary of CIRCOR International, Inc. 12501 Telecom Drive · Tampa, Florida 33637 (813) 978-1000 · FAX: (813)-978-0984</p> <p style="font-size: large; font-weight: bold; color: blue;">CONTROL VALVE SPEC SHEET</p>	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<sub>v</sub> \_\_\_\_\_

Body Mat'l \_\_\_\_\_ Inner Parts \_\_\_\_\_ Valve Disc \_\_\_\_\_

Screwed Ends     Flanged150     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.

## SERIES 500, 550 & 600 – 2-WAY SHUTOFF TYPE (Fail Closed)

# SOLI-CON® VALVES



### FEATURES

- Low current draw, low wattage, low heating;
- Built-in overload trip-out feature prevents coil burnout, self-resetting;
- No AC hum or chatter;
- No external air supply required;
- Corrosive, viscous, dirty fluids do not contact any magnetic parts;
- Steam, other hot fluids are isolated away from the operator;
- Fuel gas, other explosive/flammable liquids can't escape into the electrical actuator enclosure;
- Heavy-walled, ANSI conforming valve bodies;
- Manual opening and manual closing provision;
- Visual valve-position-indication provision

### SOLI-CON® VALVES

Laurence Soli-Con® valves are SOLID-STATE-CONTROLLED ELECTRIC-ACTUATED QUICK-ACTING TWO-POSITION VALVES. The Soli-Con® actuator provides reliable, safe and efficient valve operation at greatly reduced current consumption, size, weight, noise, heat rise, maintenance AND COST compared to conventional solenoid, motorized and other modes of valving.

The Soli-Con® actuator contains a tractive electromagnet and an electronic module which conditions and controls the input voltage to the electromagnet coil. Initially the module delivers a voltage spike to the coil for approximately one-half second, more than sufficient time for the actuator to operate the valve through its complete travel. Thereafter, the module drops the voltage to a preset level that is sufficient to hold the valve in the actuated or energized position.

Upon loss of voltage, the actuator releases and the valve returns to its normal/fail-safe position, assisted by pressure and flow above the seat, the valve main spring(s), and the weight of the internal and external valve-train parts.

### 2-WAY SHUTOFF VALVES

All valves in this bulletin are normally closed/shut. Upon application of line voltage to the Soli-Con® actuator the valve opens and remains open as long as the input voltage is maintained. Upon loss of voltage the valve fails closed/shuts off and remains closed with or without fluid pressure applied to the valve until voltage is again applied.

### ROTARY SHAFT TYPE

Laurence Rotary Shaft type valves are globe-type, poppet/piston valves, which are operated by an external lever connecting the lifting action of the linear electric actuator to the valve piston/plug which lifts off the seat, through a ROTARY Shaft Seal.

This design offers greater force to operate the valve and allows stronger return spring(s) to assure reliable fail-safe action because of the external-lever mechanical advantage, compared to "direct-lift"/"direct-acting" actuated valves. In addition, the slight Rotary motion (15-30° arc) of the valve shaft compared to reciprocating-stem packing glands, provides much longer maintenance-free life.

### SERIES 500SC

These are "Direct Operated" valves; referring to the *inner* valve construction in which the full-area valve disc is lifted off the seat against the full inlet shut-off pressure, without the aid of a pressure assist from the media by an internal pilot or a minimum pressure or flow requirement. These are quick opening and closing valves, with speed of operation essentially independent of fluid viscosity, line pressure, or pressure drop across the valve.

### SERIES 550SC

These are "Semi-Direct Operated" valves for liquids only at higher pressures than Series 500SC. The actuator, assisted by the pressure of the media, lifts the full-area disc off the seat; however, because the piston is connected to the actuator (valve piston is not floating), valve operation is positive and quick and the valve acts as a pure Direct Operated valve at low pressures down to 0 PSI.

Viscous or unclean liquids can be handled reliably because the diameter of the valve first-stage port is 25-50% of the main port diameter, compared to the needle-sized orifices of most pilot-operated piston or diaphragm valves.

### SERIES 600SC

These valves are "Semi-Direct Operated" also, and are suitable for gases and light clean liquids at even higher pressures. They too are media-pressure-assisted, and require no minimum pressure or flow to open and close fully. These valves also contain no floating pistons or diaphragms that can flutter, tight-fitting piston rings that can stick, or needle-sized orifices that can clog, and thus are positive acting throughout all ranges of pressure, compared to competitive pilot-operated valves.





NEMA 1 • NEMA 2 • NEMA 3 • NEMA 4 • NEMA 4X • NEMA 12  
ACTUATOR ENCLOSURE

FM APPROVED • EXPLOSION PROOF  
CLASS I, GROUPS B, C & D • CLASS II GROUPS E, F & G



VALVE BODY		INNER PARTS	DISC	SERIES 500SC		SERIES 550SC		SERIES 600SC	
Bronze	ASTM* B-62	Stainless Steel	Rg	502SC	522SC	552SC	572SC	605SC	625SC
			Res	502GSC	522GSC	552GSC	572GSC	605GSC	625GSC
Naval Bronze	B-61	Monel	Rg	503SC	523SC	553SC	573SC	603SC	623SC
			Res	503GSC	523GSC	553GSC	573GSC	603GSC	623GSC
Stainless Steel Type 304	A-351 CF8	Stainless Steel Type 303/304	Rg	506 SC	526SC	556SC	576SC	610SC	630SC
			Res	506GSC	526GSC	556GSC	576GSC	610GSC	630GSC
Stainless Steel Type 316	A-351 CF8	Stainless Steel Type 316	Rg	507 SC	527SC	557SC	577SC	611SC	631SC
			Res	507GSC	527GSC	557GSC	577GSC	611GSC	631GSC
Stainless Steel Alloy-20	A-351 CN7M	Stainless Steel Alloy-20	Rg	508 SC	528SC	558SC	578SC	612SC	632SC
			Res	508GSC	528GSC	558GSC	578GSC	612GSC	632GSC
Steel**	A-216 WCB	Stainless Steel	Rg	509 SC	529SC	559SC	579SC	609SC	629SC
			Res	509GSC	529GSC	559GSC	579GSC	609GSC	629GSC
Monel	Fed QQ-N -288	Monel	Rg	504 SC	524SC	554SC	574SC	604SC	624SC
			Res	504GSC	524GSC	554GSC	574GSC	604GSC	624GSC

\* - For purposes of identifying alloy by chemical analysis only.

**VALVE BODIES** - ANSI rated (B16.15 & B16.24 - bronze; B16.5 & B16.34 - steel & S.S.), globe type.

**INNER PARTS** - means all parts coming in contact with the fluid (actuator magnetic parts are not wetted by the fluid).

**REGRINDING DISC (Rg)**- a rounded or beveled metal disc on the closely guided valve piston, lapped-in for tight shut-off. (Shut-off meets MSS-SP-61).

**RESILIENT DISC (Res)**- a bevel disc; available in Teflon, Buna, glass-filled Teflon, or Viton. (Shut-off meets MSS-SP-61).

**SEAT** - Integral (machined in valve body) is standard. Inserted and stellite-faced seats are also available.

**BODY-BONNET FLANGE O-RING SEAL** - Teflon, Buna, Viton, EPR, or metal.

**ROTARY SHAFT SEAL** - Teflon (standard); Buna, Viton, EPR, Graphoil, and metal are also available.

**ACTUATOR ENCLOSURE** - has ½" NPT conduit connection; zinc dichromate coating for corrosion resistance.

**ACTUATORS** - are rated for continuous 24-hour energization at ambient temperatures as high as 85°C (185°F) where fluid temperature in the valve does not exceed the ambient, or 50°C (122°F) for fluid temperatures up to 425°F; not recommended for continuous cycling rates greater than six times per minute at 40°C ambient. Module and coil are potted inherently in the enclosure. Coils are Class H insulated. Two AWG#18 non-polarized lead wires plus a green ground wire are furnished, 23" long.

## OPTIONAL FEATURES

**POSITION SWITCH(ES)** - Heavy duty, SPDT or DPDT, for remote indication of valve position, or to actuate an alarm or relay; contacts rated up to 20 amps @ 120/60 AC or 10 amps @ 125 DC; to indicate valve closed/not closed and/or valve open/not open. Add "PS" to suffix on page 3.

**EXTERNAL LINKAGE COVER** - to discourage tampering with, or tying-up of valve mechanism and/or to prevent direct contact with the weather or corrosive ambient. Add "LC" to suffix on page 3. Optionally available with Lexan window.

**TERMINAL BLOCK** - for making actuator electrical connections; in an external junction box. Add "TB" to suffix on page 3.

**ACTUATOR VOLTAGES** - 120V 60Hz, 110V 50Hz, 240V 60Hz or 220V 50Hz, AC; 125V or 250V, DC; others are available.

**ACTUATOR CURRENT** (approx.)

Actuator size SCA - 4.7 amps inrush, 0.1 amps holding @ 120V 60Hz AC;  
SCB - 13.7 amps inrush, 0.2 amps holding @ 120V 60Hz AC;  
SCD - 5.0 amps inrush, 0.01 amps holding @ 125V DC;  
SCE - 13.5 amps inrush, 0.04 amps holding @ 125V DC.

**MOUNTING** - all valves must be mounted with the actuator in a vertical, upright position. Horizontal pipe mounting is standard; valves should be mounted in horizontal pipe lines whenever possible. For vertical pipe mounting, add "V" to the catalog number prefix above and specify whether flow is upward or downward; resilient disc is recommended.

Where headroom is limited, valve body-bonnet assembly can be furnished inverted with respect to the actuator topworks. Add "Z" to the prefix above.

**LEVER LOCKING DEVICE** - To hold or lock valve in actuated or manually overridden position. Add "LD" to suffix on page 3.

**GRAVITY OPERATED** - With a weight on external lever to assist return to normal (fail-safe) position, for additional reliability; maximum pressure capability may be reduced. Add "W" to suffix on page 3.

**MATERIALS TRACEABILITY** - With foundry/mill heat numbers on all pressure containing parts and corresponding chemical and physical analyses furnished or maintained on file.



CATALOG NUMBER SUFFIX	PIPE & PORT SIZE	CLASS & TYPE CONNECTION	MAXIMUM OPENING DIFFERENTIAL PRESSURE (PSI)			ACTUATOR SIZES		C <sub>v</sub>
			SERIES 500	SERIES 550	SERIES 600	AC	DC	
096	1/4"	SCREWED (FNPT)	1440	—	—	SCA	SCD	1.4
244	1/2"	SCREWED (FNPT)	300	—	2160	SCA	SCD	3.0
246		"	1025	—	—	SCB	SCE	
284		150 FLANGED	275	—	275	SCA	SCD	
314		300 FLANGED	300	—	720	SCA	SCD	
316		"	720	—	720	SCB	SCE	
364	3/4"	SCREWED (FNPT)	135	600	1100	SCA	SCD	6.8
366		"	465	1440	1440	SCB	SCE	
404		150 FLANGED	135	275	275	SCA	SCD	
406		"	275	275	275	SCB	SCE	
414		300 FLANGED	135	600	720	SCA	SCD	
416	"	465	720	720	SCB	SCE		
442	1"	SCREWED (FNPT)	75	250	1100	SCA	SCD	10
444		"	250	860	1440	SCB	SCE	
472		150 FLANGED	70	250	275	SCA	SCD	
474		"	250	275	275	SCB	SCE	
482		300 FLANGED	70	250	720	SCA	SCD	
484	"	240	720	720	SCB	SCE		
590	1 1/4"	SCREWED (FNPT)	45	175	675	SCA	SCD	15.5
592		"	155	600	1440	SCB	SCE	
630		150 FLANGED	45	175	275	SCA	SCD	
632		"	155	275	275	SCB	SCE	
640		300 FLANGED	45	175	675	SCA	SCD	
642	"	155	600	720	SCB	SCE		
720	1 1/2"	SCREWED (FNPT)	25	125	400	SCA	SCD	22.5
722		"	85	430	1375	SCB	SCE	
752		150 FLANGED	25	125	275	SCA	SCD	
754		"	85	275	275	SCB	SCE	
760		300 FLANGED	20	90	295	SCA	SCD	
762	"	70	310	720	SCB	SCE		
830	2"	SCREWED (FNPT)	10	110	235	SCA	SCD	40
832		"	35	375	400	SCB	SCE	
860		150 FLANGED	10	110	235	SCA	SCD	
862		"	35	275	275	SCB	SCE	
892		300 FLANGED	15	290	615	SCB	SCE	
930	2 1/2"	150 FLANGED	6	20	160	SCA	SCD	63
932		"	20	70	275	SCB	SCE	
940		300 FLANGED	5	18	145	SCA	SCD	
942		"	18	60	500	SCB	SCE	
960	3"	150 FLANGED	10	165	275	SCB	SCE	90
970		300 FLANGED	10	165	440	SCB	SCE	96
980	4"	150 FLANGED	6	110	275	SCB	SCE	160
982		300 FLANGED	6	110	330	SCB	SCE	175
1202	6"	150 FLANGED	—	35	185	SCB	SCE	375
1212		300 FLANGED	—	35	185	SCB	SCE	

**PRESSURES** - The listings shown indicate our current maximum standard capability; however, these are not pressure "ratings." Because designs and testing parameters may vary slightly for the same suffix because of actual pressures, temperatures, viscosity, etc., all valves with the same suffix number are not necessarily "rated" at the maximum opening differential pressure shown. Therefore, always advise/specify your actual pressure and temperature conditions and consult factory for the pressure rating for your application.

The pressure listings shown represent the maximum differential pressure the valve can be opened against (modp = the maximum difference between the inlet pressure and the outlet pressure when the valve is shut-off). A higher inlet pressure can be handled if a corresponding higher outlet pressure exists when the valve is shut-off. All valves will hold closed at emergency pressures greatly exceeding the listings shown because the inlet pressure is above the seat, tending to close the valve. However, in a few cases the safe operating pressure is limited by the pressure-temperature tables of ANSI B16.5, B16.15, B16.24 or B16.34; in these cases listings are based on -20 to +100°F fluid temperature.

If outlet pressure exceeds inlet pressure when the valve is shut-off, the valve will remain closed only up to a moderate amount\* of negative or back-pressure differential, after which the valve will open and tend to equalize the outlet and the inlet pressures; advise your max. anticipated negative differential.

\* - amount of negative pressure valve will hold closed against depends on valve size, size of closure spring(s) and size of external lever weight, if any.

**FOR HIGHER PRESSURES** - consult factory for specials, or:

- Specify a fractional (reduced) internal port diameter, where flow rate is not important; (Series 500 only)
- See Bulletin Series 1100SC for Manually Reset Soli-Con® valves or Bulletin Series 700 or 1100 for Manually Reset Solenoid valves;

**TEMPERATURES** - our maximum standard fluid temperature capability is 550°F, and our minimum standard fluid temperature capability is -50°F; although designs and testing parameters may vary at various points within this capability; therefore always advise/specify your actual temperature conditions. Valves for higher temperatures and cryogenics are also available.

**PORT SIZES** - All valves have full diameter internal ports (seats).

#### TYPE CONNECTIONS -

- Bronze and naval bronze bodies: Class 250 screwed, Class 150 or Class 300 flanged, flat face (FF);
- Stainless Steel, steel and monel bodies: Class 300 or Class 600 screwed; Class 150 or Class 300 flanged, raised face (RF);

Butt-weld or Socket weld connections are also available; Add "BW" or "SW" to screwed-ends suffix up to 1 1/2" pipe size, and to flanged-ends suffix 2" to 6" pipe size.

Class 600 flanged, Class 900, MIL-F-20042 flanged, and sil-braze (socket or union) ends are also available.

- **\*\*STAINLESS STEEL, STEEL, & MONEL VALVES** - screwed ends are standard up to 1 1/2" pipe size only. Where steel body with screwed ends or with welding ends up to 1 1/2" is specified, stainless steel type 304 valve body is furnished.

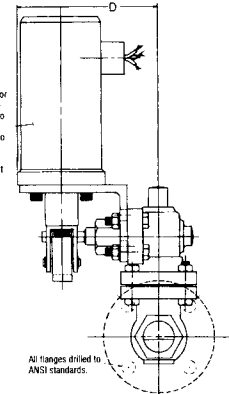
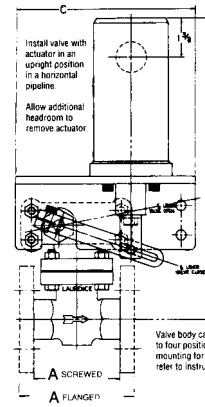
**C<sub>v</sub> FLOW FACTORS** - are approximate, for estimating only.

**SEE PAGE 4** - for dimensions, flow formulas and ordering data.

**TO SPECIFY A CATALOG NUMBER** - Combine the catalog number prefix from page 2 with the catalog number suffix from above; e.g. 502SC262, 552GSC414, 505SCV860BWPSLC, etc.

# DIMENSIONS

CATALOG NUMBER SUFFIX	PIPE & PORT SIZE	CLASS & TYPE CONNECTION	FACE TO FACE "A"	"B"	"C"	"D"	WT.	ACTUATOR SIZE
096	1/4"	SCREWED (FNPT)						SCA
244	1/2"	SCREWED	3	10 1/2	6 1/4	4 3/4	13	SCA
246		"	3	12 1/2	6 1/4	5	21	SCB
284		150 FLANGED	4 1/4	10 1/2	6 1/4	4 3/4	15	SCA
314		300 FLANGED	6	10 1/2	6 1/4	4 3/4	17	SCA
316		"	6	12 1/2	6 1/4	5	25	SCB
364	3/4"	SCREWED	3 1/2	10 1/2	6 1/2	4 3/4	13	SCA
366		"	3 1/2	12 1/2	6 1/2	5	21	SCB
404		150 FLANGED	4 1/4	11	6 1/2	4 3/4	15	SCA
406		"	4 1/4	13	6 1/2	5	23	SCB
414		300 FLANGED	7	11	7 1/2	4 3/4	17	SCA
416	"	7	13	7 1/2	5	25	SCB	
442	1"	SCREWED	4	11	6 1/4	5	17 1/2	SCA
444		"	4	13	6 1/4	5	25 1/2	SCB
472		150 FLANGED	5 1/4	11	7	5	17 1/2	SCA
474		"	5 1/4	13	7	5	25 1/2	SCB
482		300 FLANGED	5 1/2	11	7 1/4	5	19	SCA
484	"	5 1/2	13	7 1/4	5 1/4	27	SCB	
590	1 1/4"	SCREWED	4 1/4	11 1/4	6 1/4	4 1/2	20	SCA
592		"	4 1/4	13 1/4	6 1/4	5 1/4	28	SCB
630		150 FLANGED	5 1/2	11 1/4	7 1/4	5	21	SCA
632		"	5 1/2	13 1/4	7 1/4	5 1/4	29	SCB
640		300 FLANGED	RF	8 1/2	11 1/4	8	5	22
		FF	5 7/8	11 1/4	7 1/2	5	21	SCA
		RF	8 1/2	13 1/4	8	5	30	SCB
		FF	5 7/8	13 1/4	7 1/2	5 1/4	29	SCB
720	1 1/2"	SCREWED	7	12 1/2	7 1/2	5	25	SCA
722		"	7	14 1/2	7 1/2	5 1/4	33	SCB
752		150 FLANGED	RF:6 1/4 FF:6	12 1/2	7 1/2	5	26	SCA
754		"	RF:6 1/4 FF:6	14 1/2	7 1/2	5 1/4	34	SCB
760		300 FLANGED		12 1/2	9 1/2	5	47	SCA
762	"		9	14 1/2	9 1/2	5 1/4	55	SCB
830	2"	SCREWED	6	12 1/2	7 1/2	5	40	SCA
832		"	6	14 1/2	7 1/2	5	48	SCB
860		150 FLANGED	7 1/2	13	7 1/2	5 1/4	40	SCA
862		"	7 1/2	15	7 1/2	5 1/2	57	SCB
890		300 FLANGED	10 1/2	13	9	5 1/2	87	SCA
892	"	10 1/2	15	9	5 1/2	95	SCB	
930	2 1/2"	150 FLANGED	8	13 1/4	8	5	63	SCA
932		"	8	15 1/4	8	5 1/2	71	SCB
940		300 FLANGED	11 1/2	15 1/4	10 1/2	6 1/2	117	SCA
942		"	11 1/2	17 1/2	10 1/2	6 1/2	124	SCB
960	3"	150 FLANGED	9 1/4	17 1/2	10	7	107 1/2	SCB
970		300 FLANGED	11 1/2	19 1/2	12	7	119 1/2	SCB
980	4"	150 FLANGED	11 1/4	18 1/2	11 1/4	7	137 1/2	SCB
982		300 FLANGED	14	18 1/2	12 1/2	7	173 1/2	SCB
1202	6"	150 FLANGED	17 1/2	21	17 1/2	11	292	SCB
1212		300 FLANGED	18 1/2	23	18 1/2	11 1/2	300	SCB



## DIMENSIONS

All above dimensions and weights are approximate for estimating purposes only.

- Standard flanges are drilled per ANSI B16.5 or B16.24
- Install valve with actuator in upright position in a horizontal pipeline.
- Valve bodies can be rotated 90° to four positions to facilitate mounting for direction of flow. Specify with order if body orientation is to be different than standard shown above.
- Consult factory for vertical pipe mounting dimensions. Specify whether flow is upward or downward.
- The actuator may be rotated 90° to four positions to vary the location of the conduit connection. Allow additional headroom to remove actuator.
- If available headroom is limited, valve can be furnished with valve body inverted: add "Z" to suffix on page 3 and specify flow direction desired.

## Cv FLOW FACTOR FORMULAS

(Approx. for estimating only.)

FOR LIGHT LIQUIDS:

$$\text{pressure drop (PSI)} = \left( \frac{\text{GPM}}{C_v} \right)^2 \left( \text{specific gravity} \right)$$

where specific gravity of water = 1.0

FOR AIR, GASES:

$$\text{pressure drop (PSI)} = \left( \frac{(460 + ^\circ\text{F}) (\text{spec. grav.})}{\text{inlet gauge pressure} + 15} \right) \left( \frac{\text{SCFH}}{1360 \times C_v} \right)^2$$

where specific gravity of air = 1.0

FOR STEAM:

$$\text{pressure drop (PSI)} = \left( \frac{\text{specific volume (ft}^3/\text{lb)}}{63 \times C_v} \right)^2$$

## ORDERING DATA

Full catalog number (prefix + suffix + option adders)

Pipe size

Max. Opening Differential Pressure and other actual pressure conditions, if any

Liquid or gas handled

Viscosity, specific gravity, concentration, clean?

Fluid & ambient temperatures (actual)

C<sub>v</sub>, Flow rate, max, allowable pressure drop, if important

Valve body, inner parts, disc, & seals materials desired

Class & type of end connections

For horizontal or vertical pipe mounting? If vertical, is flow upward or downward?

Type of solenoid enclosure (if explosion proof, specify Class & Group and/or nature of hazard)

Voltage & frequency

Max. time energized and frequency of operation

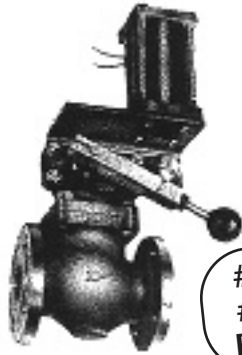
Optional or special features

Summary of application and/or sketch of system

For your convenience use our Soli-Con® Valve Data Sheet for compiling the above information; to save time in:

- writing a specification
- requesting price & delivery
- requesting additional literature or a complete catalog

# SERIES 700, 700HP, 800 – 2-WAY MANUALLY RESET



#6 FUEL OIL  
#2 FUEL OIL  
FUEL GASES

## SAFETY SHUTOFF

# SOLENOID VALVES

- NO VOLTAGE RELEASE - Trip on Current Failure

- NORMALLY CLOSED - Reset to Open

- ROTARY SHAFT TYPE - with Rotary Teflon Shaft Seal

## MANUALLY RESET, NO VOLTAGE RELEASE

- Reset or "latched-up" manually
- Held reset by the energized electromagnet (solenoid) - (current on)
- Trip or fail-safe upon current failure

These valves may be tripped by failure of an electrical signal from a burner flame safeguard, pressure or level switch, thermostat, timer, limit switch, photoelectric device, gas analyzer, flow switch, salinity cell, or other sensing device or relay.

## NORMALLY CLOSED, RESET TO OPEN

- Closed in the normal or "tripped" position
- Manually opened to reset or "latch up"
- Fail closed upon current failure

These valves are used for SAFETY SHUT-OFF applications such as stopping the flow of oil or gas to a burner, or steam to a heater, when dangerous, abnormal, or shutdown conditions exist. They may also be used in semi-automatic filling or batching operations in conjunction with an integrating flow meter, weigh scale, lever switch or timer.

For valves that TRIP OPEN upon current failure and are manually closed when reset; to be used for emergency discharge or purge, for fire deluge, or for process cooling, see BULLETIN SERIES 750/750HP/850 - NORMALLY OPEN.

See BULLETIN SERIES 900/900HP/1000 for FREE-HANDLE SAFETY SHUT-OFF SOLENOID VALVES.

All valves in this bulletin are of the ROTARY SHAFT TYPE. They are basically lift, globe-style valves; however the linear lifting action of the external operating lever is transmitted thru a mechanical advantage into a slight rotary motion by way of the ROTARY shaft seal unit, and is then converted back into a linear action to lift the valve piston (plug) and disc off the seat.

## FEATURES

### ROTARY SHAFT TYPE, with ROTARY TEFLON SHAFT SEAL

- Higher pressures can be handled because of the mechanical advantage in opening the valve.
- Greater safety shut-off reliability is achieved because: (1) pressure and flow (above the seat) tend to close the valve and hold it closed, (2) the rotary shaft type mechanical advantage allows a stronger direct-closure internal spring, an optional external spring, and/or optional weight-on-lever to be installed.
- Shaft seal maintenance is virtually eliminated with the ROTARY TEFLON SHAFT SEAL - no "in and out" wear and tear of the packing occurs as in reciprocating, "direct-lift" valves.
- Fluid media is contained in a separate lower unit, away from the magnetic parts and away from the coil -- corrosive fluids are handled safely; hot fluids do not appreciably affect the coil, therefore fewer inadvertent shut-downs occur as a result of coil failure; no chance of fuel gases or other flammable or explosive fluids escaping into the coil enclosure due to solenoid-core tube breakage; viscous or dirty liquids cannot foul the magnetic parts.

### CLOSELY GUIDED VALVE INTERNAL PARTS

- Prevents binding due to misalignment.
- Consistent lasting tight shut-off.

### NO MINIMUM PRESSURE or FLOW REQUIREMENT

- Opens and closes fully down to 0 PSI
- Positive valve action at all rated pressure ranges.

### HEAVY VALVE BODY

- Higher static pressure ratings, greater strength.
- Prevents permanent leakage due to distortion of valve body and seat when installed with oversize wrenches.

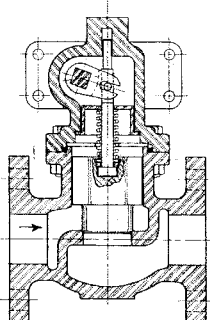
### HEAVY-DUTY PILOT SWITCH PROVISION

- Contactor-type heavy-duty limit switch(es) can be mounted readily to indicate valve position remotely or to actuate an alarm or another relay.

## SERIES 700

SERIES 700 are pure Direct Operated valves; (referring to the internal construction) wherein the full-area valve disc is lifted off the seat against the full, static line pressure by raising the external lever; i.e. without the aid of an internal pilot and without a minimum pressure or flow requirement. The valve will open, remain open, and/or will close fully and remain closed down to 0 PSI differential. Closing speed is essentially instantaneous and independent of fluid viscosity, line pressure, or pressure drop across the valve.

SERIES 700 valves are suitable for handling #6 fuel oil, sea water, other viscous and unclean liquids as well as fuel gases, steam, water, #2 fuel oil, etc.



SERIES 700, REGRINDING DISC

## SERIES 700HP

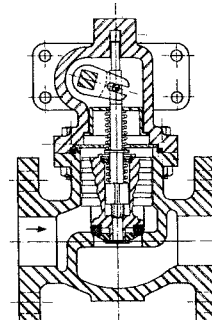
SERIES 700HP are semi-Direct Operated valves for liquid service only at higher pressures than SERIES 700. The main piston opens fully when the external lever is raised because of a solid connection between them. Valve action is quick and positive and requires no minimum pressure or flow to open and close fully, however is pressure assisted at higher pressures.

SERIES 700HP valves are suitable for handling #6 and #2 fuel oils, lube oils, sea water, river water, viscous liquids, light slurries, solvents, corrosive liquids, condensate, etc.

## SERIES 800

SERIES 800 also are semi-Direct Operated valves suitable for air, steam, fuel gases, as well as light liquids at higher pressures than SERIES 700HP.

When the external lever is raised, a first-stage port opens, relieving the static line pressure on top of the main piston. A pressure imbalance is created because the first-stage port area is greater than the flow-clearance area feeding the top of the piston and this imbalance assists in lifting the piston off the seat to open the valve fully. However, due to an auxiliary spring and a solid connection between the stem and the main piston in our valve, it is basically the raising of the lever, not this pressure assist, that provides a lifting action and thus, there is no dependence on a minimum pressure or flow to operate.



SERIES 800, RESILIENT DISC

# CATALOG NUMBER PREFIXES

<b>SERIES 700</b>	<b>SERIES 800</b>
NEMA 1 General Purpose NEMA 2 Drip-tight NEMA 3 Weatherproof NEMA 4 Weatherproof NEMA 12 Dust-tight Electromagnet Enclosures Class I, Groups A, B, C, & D Division 1, Explosion Proof Electromagnet Enclosure	NEMA 1 General Purpose NEMA 2 Drip-tight NEMA 3 Weatherproof NEMA 4 Weatherproof NEMA 12 Dust-tight Electromagnet Enclosures Class I, Groups A, B, C, & D Division 1, Explosion Proof Electromagnet Enclosure

VALVE BODY		INNER PARTS	DISC	CATALOG NUMBER PREFIXES			
Bronze	ASTM* B-62	Brass & S.S.	Regrinding	700WA	720	803WA	823
			Resilient	701WA	721	804WA	824
Bronze	B-62	Stainless Steel	Regrinding	702WA	722	805WA	825
			Resilient	702CWA	722G	805GWA	825G
Naval Bronze	B-61	Monel	Regrinding	702NBWMA	722NBM	805NBWMA	825NBM
			Resilient	702NBMGWA	722NBMG	805NBMGWA	825NBMG
Steel	A216 WCB	Stainless Steel	Regrinding	709WA	729	809WA	829
			Resilient	709GWA	729G	809GWA	829G
Stainless Steel Type 304	A351 CF8	Stainless Steel Type 303/304	Regrinding	706WA	726	810WA	830
			Resilient	706GWA	726G	810GWA	830G
Stainless Steel Type 316	A351 CF8M	Stainless Steel Type 316	Regrinding	707WA	727	811WA	831
			Resilient	707GWA	727G	811GWA	831G
Stainless Steel Alloy-20	A351 CN7M	Stainless Steel Alloy-20	Regrinding	708WA	728	812WA	832
			Resilient	708GWA	728G	812GWA	832G
Monel	FED QQ-N -288	Monel	Regrinding	708MWA	728M	812MWA	832M
			Resilient	708MGWA	728MG	812MGWA	832MG

**FOR SERIES 700HP ADD "HP" TO SERIES 700 PREFIX ABOVE**

**VALVE BODIES** - Globe type (standard). \*—Chemical Analysis of castings comply with those in spec. shown.

**INNER PARTS** - means ALL parts coming in contact with the fluid (magnetic parts are not wetted by the fluid).

**REGROUNDING DISC** - a closely guided, rounded metal disc, lapped-in for tight shut off.

**RESILIENT DISC** - Buna, Teflon, Glass-filled TFE, Viton.

**SEAT** - Integral (standard). Inserted and stellite-faced seats are also available.

**BODY-BONNET FLANGE O-RING SEAL** - Buna, TFE, Viton, EPR, Metal.

**ROTARY SHAFT SEAL** - Teflon (standard). Also Buna, Viton, EPR and metal.

## OPTIONAL FEATURES

**PILOT SWITCH(ES)** - Heavy duty, SPDT or DPDT, for remote indication of valve position or to actuate an alarm or relay; contacts rated up to 20 amps at 115/60 AC or 10 amps at 125 DC depending on switch style, type of enclosure and contact arrangement, etc.; to indicate valve open/not open and/or valve closed/not closed. Add "PS" to suffix on Page 3.

**ELECTROMAGNET CUT-IN SWITCH** - To energize the electromagnet only as the valve is being opened and latched up. Add "CS" to suffix on Page 3.

**EXTERNAL LINKAGE COVER** - To discourage tampering with, or tying-up of the valve mechanism, and/or to prevent direct contact with the weather or corrosive ambient. Add "LC" to suffix on Page 3. Optionally available with LEXAN window.

**TRIP DELAY** - To delay valve closing, available up to four seconds, depending on valve size, voltage, etc. Add "TD" to suffix on Page 3.

**TERMINAL BLOCK** - For making solenoid connections within the solenoid enclosure. Add "TB" to suffix on Page 3.

**GRAVITY OPERATED** - With weight on external lever to assist return to normal or tripped position - for additional reliability from gravity. Add "W" to suffix on Page 3.

**INVERTED BODY** - For limited headroom. Add "Z" to suffix on Page 3.

**MATERIALS TRACEABILITY, RADIATION-RESISTING COILS AND SEALS, SHOCK AND VIBRATION-RESISTANT CONSTRUCTIONS AND CERTIFICATIONS.**

**ELECTROMAGNET ENCLOSURES** - See above.

① ALL LAURENCE EXPLOSION PROOF ENCLOSURES ARE FM APPROVED FOR CLASS I GROUPS A, B, C & D, Division 1!

**ELECTROMAGNET COILS** Max. Ambient Temp. Max. Fluid Temp.

Class H insulation 185F ③ 550F ④

However the safe temperatures for a specific application depend on the overall consideration of the actual max. ambient and fluid temperatures, the temperature rise of the coil to be used, range of applied voltage and nature of hazardous area, if any - consult factory for the safe temps. for your application. Also, higher temperatures can be handled in some cases.

③ - based on fluid temperature of 230F or less.  
 ④ - based on ambient temperature of 40C (104F).

Standard coils are waterproofing-varnish dipped, vacuum impregnated and baked. Molded Class H coils for greater resistance to moisture, fungus and physical damage are available. Standard coils are for continuous duty (24-hour continuous energization, with maximum steady state coil temperature being within rating of class of insulating materials used).

### STANDARD VOLTAGES

A.C. - 115/60, 115/50, 220/60, 220/50 or 440/60. A D.C. coil is used along with a solid-state rectifier for greater holding power, lower current draw and zero electrical noise.  
 D.C. - 125, 250 volts  
 Other voltages, frequencies, special electrical characteristics can be furnished - consult factory.

**MOUNTING** - All valves must be mounted with the solenoid in a vertical, upright position. Horizontal pipe mounting is standard and should be utilized whenever possible. For vertical pipe mounting add "V" to prefix above and specify whether flow is upward or downward; resilient valve disc is recommended. Not available in 6" pipe size.



# CATALOG NUMBER SUFFIXES

CATALOG NUMBER SUFFIX		PIPE & PORT SIZE	CLASS & TYPE CONNECTIONS	C <sub>v</sub> FLOW RATING	MAXIMUM INLET PRESSURE (PSIG)		
					SERIES 700	SERIES 700HP	SERIES 800
AC	DC						
14	14DC	1/2"	600 Screwed	3.0	300 PSI	—	1480 PSI
18	18DC		150 Flanged	3.0	285	—	285
20	20DC		300 Flanged	3.0	300	—	740
24	24DC	3/4"	600 Screwed	6.8	250	1480	1480
28	28DC		150 Flanged	6.8	250	285	285
30	30DC		300 Flanged	6.8	250	740	740
34	34DC	1"	600 Screwed	10.0	200	740	1480
38	38DC		150 Flanged	10.0	200	285	285
40	40DC		300 Flanged	10.0	200	740	740
44	44DC	1-1/4"	600 Screwed	15.5	150	740	1480
48	48DC		150 Flanged	15.5	150	285	285
50	50DC		300 Flanged	15.5	150	740	740
54	54DC	1-1/2"	600 Screwed	22.5	100	400	400
58	58DC		150 Flanged	22.5	100	285	285
60	60DC		300 Flanged	24.0	100	740	740
638	638DC	2"	250 Screwed	40.0	60	400	400
678	678DC		150 Flanged	40.0	60	285	285
698	698DC		300 Flanged	46.0	60	600	740
718	718DC	2-1/2"	250 Screwed	62.5	40	300	400
738	738DC		150 Flanged	62.5	40	285	285
758	758DC		300 Flanged	69.0	40	300	740
798	798DC	3"	150 Flanged	90.0	20	285	285
838	838DC		300 Flanged	96.0	20	300	740
896	896DC	4"	150 Flanged	160.0	10	285	285
936	936DC		300 Flanged	175.0	10	300	740
106	106DC	6"	150 Flanged	375.0	—	285	285

## PRESSURES

Above figures are intended to indicate our current maximum standard capability. The actual "rating" of a given suffix number will depend on materials selection, actual pressures, actual temperatures, and other application specifics. In other words, all valves with the same suffix number are not necessarily "rated" at the figure shown. Therefore, ALWAYS ADVISE or SPECIFY YOUR ACTUAL pressure and temperature conditions, etc.

The above figures represent the maximum differential pressure the valve can be opened against (max. inlet pressure minus the max. outlet pressure when the valve is closed). A higher inlet pressure can be handled if a corresponding higher downstream pressure exists when the valve is closed. All valves will hold closed at emergency pressures greatly exceeding the figures shown because the line pressure and flow are above the seat, tending to close the valve. However, in many cases the safe operating pressure is limited by pressure-temperature tables of ANSI B16.34 (and above figures are based on -20 to +100F).

**TEMPERATURES** - Standard maximum fluid temperature: 550F  
Standard minimum fluid temperature: -50F,  
although variations are made in the standard construction for temperatures within this range - ALWAYS SPECIFY YOUR ACTUAL TEMPERATURE CONDITIONS. Valves for higher temperatures and cryogenics are available - consult factory.

**PORT SIZES** - All valves have full diameter internal ports.

**ELECTROMAGNET SIZE AND CURRENT** - All standard valves shown above have electromagnet size "CMR" for A.C., 0.2 amps inrush and holding @ 115 V 60 Hz; size "CM" for D.C., 0.2 amps @ 125 V D.C.

**C<sub>v</sub> FLOW RATINGS** - are approximate, for estimating only. See Bulletin Series 500 or 600 for flow formulas for liquids, gases, and steam.

**STAINLESS STEEL, STEEL & MONEL VALVES** - Screwed ends are standard up to 1½" pipe size only. Stainless steel type 304 body is standard for all screwed-ends and some flanged- and weld-ends steel body valves.

## TYPE CONNECTIONS

Bronze and Naval Bronze Bodies: Class 250 Screwed, Class 150 and 300 ANSI Flanged, Flat face (FF).  
Stainless Steel, Steel, Monel bodies: Class 300 and 600 Screwed; Class 150 and 300 ANSI Flanged, raised face (RF).

## ALSO AVAILABLE

- Socket-Weld or Butt-Weld ends. Add "SW" or "BW" to screwed-ends suffix up to 1½", flanged-ends suffix up to 6" pipe size.
- 1/4", 3/8" and 8" pipe and port sizes.
- Class 600 and Class 900 ANSI Flanged, MIL-F-20042 Flanged and Silver-Brazing (female socket or union) ends.
- Fractional (reduced) internal port size (Series 700) to achieve higher opening pressure capability, where flow rate is of secondary importance.

## ORDERING DATA

Full Catalog Number (prefix + suffix + option adders)

Pipe Size and C<sub>v</sub>

ACTUAL Maximum Inlet Pressure, and Maximum Opening Differential Pressure

Liquid or Gas Handled

Viscosity, Concentration, Specific Gravity, Clean?

ACTUAL Fluid and Ambient Temperatures

Flow Rate desired and Max. Allowable Pressure Drop

Valve Body, Inner Parts and Disc Material desired

Type and Rating of Connections

Horizontal or Vertical Pipe Mounting; if vertical, whether upward or downward flow

Type of Electromagnet Enclosure (if explosion proof, specify Class and Group and/or nature of hazard)

Voltage and Frequency

Maximum Time On and Frequency of Operation

Electromagnet Insulation Class

Summary of Application and/or Sketch of System

Optional or Special Features

For your convenience, use OUR Solenoid Valve Data Sheet for compiling the above information.

**TO SPECIFY A CATALOG NUMBER** - Combine the catalog number prefix from Page 2 with the catalog number suffix from above; e.g. 706WA24, 706WAHP24, 706WA24SW, 706WA24SWPS.

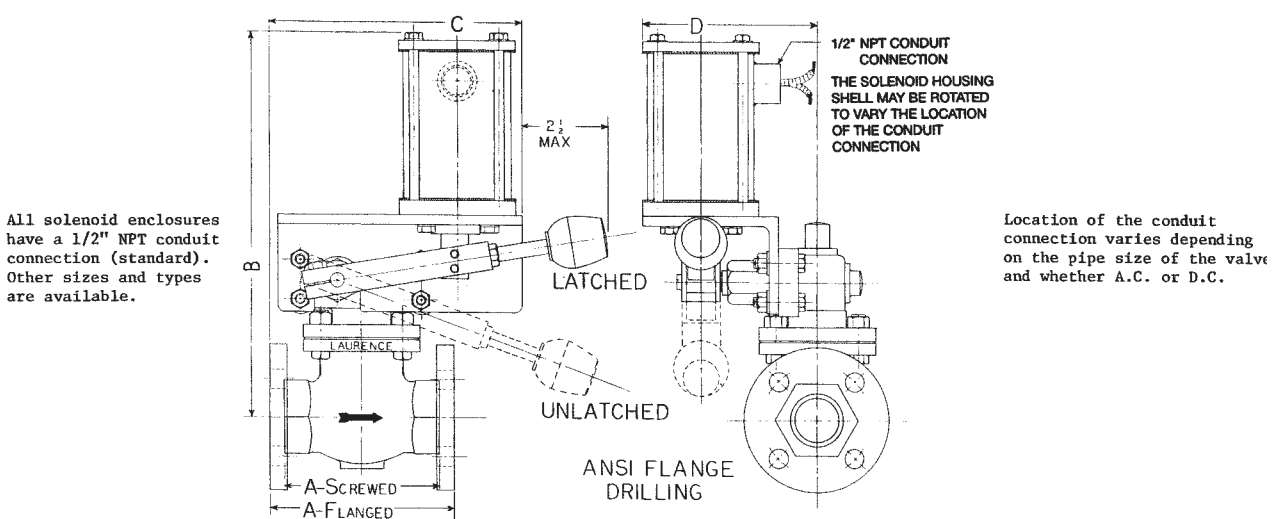
# DIMENSIONS

## HORIZONTAL PIPE MOUNTING

CATALOG NUMBER SUFFIX		PIPE SIZE	FACE TO FACE A	B*	C	D	NET WEIGHT
AC	DC						
14	14DC	1/2"	3	10-1/4	6-1/4	4-3/4	14
18	18DC		4-7/8	10-1/2	6-1/2	4-3/4	16
20	20DC		6	10-1/2	7-1/4	4-3/4	18
24	24DC	3/4"	3-1/2	10-1/2	6-1/4	4-3/4	15
28	28DC		4-7/8	10-1/2	6-1/2	4-3/4	17
30	30DC		7	10-1/2	7-3/4	4-3/4	20
34	34DC	1"	4	10-3/4	6-1/4	4-3/4	18
38	38DC		5-1/8	11	6-3/4	4-3/4	25
40	40DC		5-1/2	12-1/2	7-1/4	4-3/4	28
44	44DC	1-1/4"	4-3/4	11-1/2	6-1/2	4-3/4	24
48	48DC		5-1/2	11-1/2	6-3/4	4-3/4	26
50	50DC		8-1/2	11-1/2	8-1/4	4-3/4	37
54	54DC	1-1/2"	7	11-1/2	6-3/4	4-3/4	26
58	58DC		6-1/8	11-1/2	7	5	31
60	60DC		9	14-3/4	8-1/2	5-1/4	55
638	638DC	2"	6	12-3/4	7	5	35
678	678DC		7-1/2	13	7-3/4	5	43
698	698DC		10-1/2	15	11	5-1/2	80
718	718DC	2-1/2"	10	13-3/4	9	5	53
738	738DC		8	13-3/4	8	5	63
758	758DC		11-1/2	16	11-1/4	5-1/4	103
798	798DC	3"	9-7/8	16	10-1/4	5-1/4	95
838	838DC		11-3/4	15-3/4	11-1/4	5-1/4	120
896	896DC		11-3/4	16	11-1/4	5-1/4	132
936	936DC	4"	14	16-1/4	12-1/2	6-1/4	165
106	106DC	6"	17-3/4	18-1/2	13-3/4	8	250

\* For DC suffixes, dimension "B" is 1-1/2" less in most cases.

- All above dimensions and weights are approximate, for estimating purposes only. Dimensions are based on A.C. solenoid - (D.C. solenoid slightly larger in some cases).
- Net weights are based on a bronze valve.



- All flanges drilled per ANSI standards.
- Valve bodies can be rotated 90° to four positions to facilitate mounting for direction of flow. Specify with order if body orientation is to be different than standard shown above.
- On all valves, additional headroom should be allowed for removal of the solenoid enclosure/coil. Consult factory for details.
- Consult factory for Vertical Pipe Mounting dimensions. Specify whether upward or downward flow.
- Consult factory for Inverted Body dimensions. Specify direction of flow.

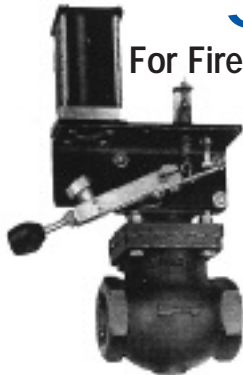


# SERIES 750, 750HP, 850 – 2-WAY MANUALLY RESET

FAIL OPEN

## SOLENOID VALVES

For Fire Deluge - Emergency Dump, Vent, Discharge- Process Cooling



- NO VOLTAGE RELEASE - Trip on Current Failure

- NORMALLY OPEN - Reset to Close, TRIPS OPEN

- ROTARY SHAFT TYPE - with Rotary Teflon Shaft Seal

### MANUALLY RESET, NO VOLTAGE RELEASE

- Reset or "latched-up" manually
- Held reset by the energized electromagnet (solenoid) - (current on)
- Trip or fail-safe upon current failure

These valves can be reset either Locally by hand or remotely through a pull-chain or extended push-rod device. They can be tripped upon loss of a signal from a fire detection device such as heat or smoke detector, or from a gas analyser, pressure, temperature or level switch, or manual push button or limit switch, or any other sensing/control device.

These valves can be tripped manually while current remains on, if necessary.

### NORMALLY OPEN, RESET TO CLOSE

- Open in the normal or "tripped" position
- Manually closed when reset or "latched up"
- Fail open upon current failure

For valves that trip open UPON ENERGIZATION, and are held latched mechanically, SEE BULLETIN SERIES 1150/1150HP/1250.

For valves that TRIP CLOSED upon current failure and are manually opened when reset; for safety shut-off of gas or oil to a burner or of steam to a heater, etc., SEE BULLETIN SERIES 700/700HP/800.

### ROTARY SHAFT TYPE

All valves in this bulletin are of the ROTARY SHAFT type, meaning they are actuated by a slight ROTARY motion (20-30° arc) which, by way of the Rotary Teflon Shaft Seal, transmits the positive return action of the external operating lever through a mechanical advantage to lift the valve piston (plug) and disc off the seat.

### FEATURES

#### ROTARY SHAFT TYPE, with ROTARY TEFLON SHAFT SEAL

Shaft seal maintenance is virtually eliminated because of this slight, closely guided rotary motion - no "in and out" wear and tear of the packing occurs as in reciprocating-stem solenoid and pneumatic valves.

#### NO MINIMUM PRESSURE or MINIMUM FLOW REQUIREMENT

Opens and closes fully down to 0 PSI.  
Positive, quick action at all pressures - no floating-piston flutter due to water hammer, back pressure surges, or suction effects.

#### NO AUXILIARY AIR or PILOT SUPPLY NEEDED - ALL ELECTRIC

Eliminates dependence on two media for operating continuity; Eliminates clutter and costly installation of air lines and accessories; Eliminates worry of frozen or plugged air lines.

#### HEAVY-WALLED VALVE BODY

Higher static pressure ratings, greater strength.  
Prevents permanent leakage due to distortion of valve body and seat upon installation with oversize wrenches.

#### HEAVY-DUTY PILOT SWITCH PROVISION

Contact-type heavy-duty limit switch(es) can be mounted readily to indicate valve position remotely or to actuate an alarm or another relay.

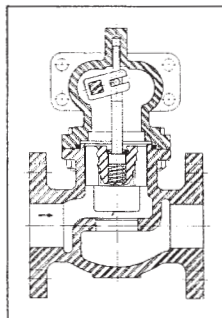
#### CLOSELY GUIDED VALVE INTERNAL PARTS

Prevents binding due to misalignment.  
Consistent, lasting tight shut-off.

### SERIES 750

SERIES 750 are pure Direct Operated solenoid valves (referring to the internal construction) wherein the full-area valve disc is lifted off the seat against the full, static line pressure by a strong external spring; i.e., without the aid of an internal pilot and without a minimum pressure or flow requirement. The valve opens and closes fully down to 0 PSI differential and both opening and closing is instantaneous. Closing speed is essentially independent of fluid viscosity, line pressure, or pressure drop across the valve.

SERIES 750 valves are suitable for handling sea water, river water, halon, foam concentrate, and other unclean and/or viscous liquids as well as fresh water, CO<sub>2</sub> and other inert gases, steam, etc.



SERIES 750, REGRINDING DISC

### SERIES 750HP

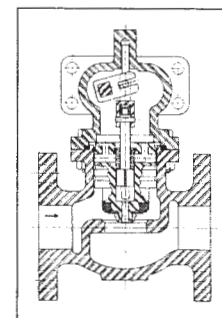
SERIES 750HP are semi-Direct Operated solenoid valves for liquid service only at higher pressures than SERIES 750. The main piston opens fully by the strong external spring because of a solid connection between them. Valve action is quick and positive and requires no minimum pressure or flow to open and close fully, however is pressure-assisted at higher pressures.

SERIES 750HP valves are suitable for handling sea water, river water, halon, foam concentrate, and other unclean and/or viscous liquids as well as fresh water, and other general-purpose liquids.

### SERIES 850

SERIES 850 are also semi-Direct Operated solenoid valves suitable for handling fresh water, halon, CO<sub>2</sub>, inert gases, steam and other light, clean liquids and gases at higher pressures than SERIES 750HP.

When the solenoid trips, a first-stage port opens relieving the static line pressure on top of the main piston. A pressure imbalance is created because the first-stage port area is greater than the flow-clearance area feeding the top of the piston and this imbalance assists in lifting the piston off the seat to open the valve fully. However due to an auxiliary spring and a solid connection between the stem and the main piston in our valve, it is basically the strong external spring, not this pressure assist, that provides a lifting action and thus there is no dependence on a minimum pressure or flow to operate.



SERIES 850, RESILIENT DISC

# CATALOG NUMBER PREFIXES

				SERIES 750		SERIES 850	
VALVE BODY		INNER PARTS	DISC	CATALOG NUMBER PREFIXES			
Bronze	ASTM B-62	Brass & S.S.	Regrinding	750	770	853	873
			Resilient	751	771	854	874
Bronze	B-62	Stainless Steel	Regrinding	752	772	855	875
			Resilient	752G	772G	855G	875G
Naval Bronze	B-61	Monel	Regrinding	752NBM	772NBM	855NBM	875NBM
			Resilient	752NBMG	772NBMG	855NBMG	875NBMG
Steel	A216 WCB	Stainless Steel	Regrinding	759	779	859	879
			Resilient	759G	779G	859G	879G
Stainless Steel Type 304	A351 CF8	Stainless Steel Type 303/304	Regrinding	756	776	860	880
			Resilient	756G	776G	860G	880G
Stainless Steel Type 316	A351 CF8M	Stainless Steel Type 316	Regrinding	757	777	861	881
			Resilient	757G	777G	861G	881G
Stainless Steel Alloy-20	A351 CN7M	Stainless Steel Alloy-20	Regrinding	758	778	862	882
			Resilient	758G	778G	862G	882G
Monel	FED QQ-N -288	Monel	Regrinding	758M	778M	862M	882M
			Resilient	758MG	778MG	862MG	882MG

FOR SERIES 750HP ADD "HP" TO SERIES 750 PREFIX ABOVE

**VALVE BODIES** - Globe type (standard). Angle type bodies are also available in some sizes - consult factory.

**INNER PARTS** - means ALL parts coming in contact with the fluid (magnetic parts are not wetted by the fluid).

**REGROUNDING DISC** - a closely guided, rounded metal disc, lapped-in for tight shut off.

**RESILIENT DISC** - Buna, Teflon, Glass-filled TFE, Viton.

**SEAT** - Integral (standard). Inserted and stellite-faced seats are also available.

**BODY-BONNET FLANGE O-RING SEAL** - Buna, TFE, Viton, metal.

**ROTARY SHAFT SEAL** - Teflon (standard). Also Buna, Viton, and metal.

## OPTIONAL FEATURES

**PILOT SWITCH(ES)** - Heavy duty, SPDT or DPDT, for remote indication of valve position or to actuate an alarm or relay, contacts rated up to 20 amps at 115/60 or 0.5 amps at 125 DC, for valve closed and/or valve open. Add "PS" to suffix on page 3.

**ELECTROMAGNET CUT-IN SWITCH** - to energize the electromagnet only as the valve is being closed and reset. Add "CS" to suffix on page 3.

**EXTERNAL LINKAGE COVER** - To discourage tampering with, or tying-up of, the valve mechanism, and/or to prevent direct contact with the weather or corrosive ambient. Add "LC" to suffix on page 3.

**TERMINAL BLOCK** - For making solenoid connections within the solenoid enclosure. Add "TB" to suffix on page 3.

**GRAVITY OPERATED** - With weight on external lever to assist return to normal or tripped position - for additional reliability from gravity. Add "W" to suffix on page 3.

**INVERTED BODY** - For limited headroom.

**MATERIALS TRACEABILITY, RADIATION-RESISTING COILS & SEALS, SHOCK & VIBRATION-RESISTANT CONSTRUCTIONS & CERTIFICATIONS.**

**ELECTROMAGNET ENCLOSURES** - See above, plus: Driptight, NEMA 2; Weatherproof, NEMA 3; or Watertight, NEMA 4. Add "WA" to NEMA 1 prefix above.

Dusttight, NEMA 12 (not explosion proof) - Add "DU" to NEMA 1 prefix above.

① ALL LAURENCE EXPLOSION PROOF ENCLOSURES ARE FM APPROVED FOR CLASS 1 GROUPS A, B, C & D, DIVISION I!

### ELECTROMAGNET COILS

Max. Ambient Temp.      Max. Fluid Temp.

Class H insulation      175F ③      550F ④

However the temperature ratings for a given application depend on the combination of the actual max. ambient and fluid temperatures, the duty rating and size of the solenoid coil, and nature of hazardous area, if any. Consult factory. Also, higher temperatures can be handled in some cases.

③ - based on fluid temperature of 175F or less.

④ - based on ambient temperature of 40C (104F).

Standard coils are waterproofing-varnish dipped, vacuum impregnated and baked. Molded Class H coils for greater resistance to moisture, fungus and physical damage are available.

### STANDARD VOLTAGES

A.C. - 115/60, 115/50, 220/60, 220/50 or 440/60. A D.C. coil is used along with a solid-state rectifier for greater holding power, lower current draw and zero electrical noise.

D.C. - 125, 250 volts.

Other voltages, frequencies, special electrical characteristics can be furnished - consult factory.

**MOUNTING** - All valves must be mounted with the solenoid in a vertical, upright position. Horizontal pipe mounting is standard and should be utilized whenever possible. For vertical pipe mounting add "V" to prefix above and specify whether flow is upward or downward; resilient valve disc is recommended.

# CATALOG NUMBER SUFFIXES

CATALOG NUMBER SUFFIX		PIPE & PORT SIZE	CLASS & TYPE CONNECTIONS	C <sub>v</sub> FLOW FACTOR	MAXIMUM INLET PRESSURE (PSIG)		
					SERIES 750	SERIES 750HP	SERIES 850
AC	DC						
14	14DC	1/2"	600 Screwed	3.0	300	---	1200
18	18DC		150 Flanged	3.0	285	---	285
20	20DC		300 Flanged	3.0	300	---	720
24	24DC	3/4"	600 Screwed	6.8	135	600	1100
28	28DC		150 Flanged	6.8	135	285	285
30	30DC		300 Flanged	6.8	135	600	720
34	34DC	1"	600 Screwed	10.0	75	250	1100
38	38DC		150 Flanged	10.0	75	250	285
40	40DC		300 Flanged	10.0	75	250	720
44	44DC	1-1/4"	600 Screwed	15.5	45	175	675
48	48DC		150 Flanged	15.5	45	175	285
50	50DC		300 Flanged	15.5	45	175	675
54	54DC	1-1/2"	250 Screwed	22.5	25	125	400
58	58DC		150 Flanged	22.5	25	125	285
60	60DC		300 Flanged	24	25	125	675
638	638DC	2"	250 Screwed	40	18	110	340
678	678DC		150 Flanged	40	18	110	285
698	698DC		300 Flanged	46	18	110	340
718	718DC	2-1/2"	250 Screwed	63	12	75	275
738	738DC		150 Flanged	63	12	75	275
758	758DC		300 Flanged	69	12	75	275
798	798DC	3"	150 Flanged	90	5	75	200
838	838DC		300 Flanged	96	5	75	200
896	896DC	4"	150 Flanged	160	3	50	150
936	936DC		300 Flanged	175	3	50	150
106	106DC	6"	150 Flanged	375	-	50	150
107	107DC		300 Flanged	375	-	50	150

## PRESSURES

Above figures are intended to indicate our current maximum standard capability. The actual "rating" of a given suffix number will depend on materials selection, actual pressures, actual temperatures, and other application specifics. Therefore ALWAYS ADVISE or SPECIFY YOUR ACTUAL pressure and temperature conditions, etc.

The above figures represent the maximum differential pressure the valve can be opened against (max. inlet pressure minus the max. outlet pressure when the valve is closed). A higher inlet pressure can be handled if a corresponding higher downstream pressure exists when the valve is closed. All valves will hold closed at emergency pressures greatly exceeding the figures shown because the line pressure and flow are above the seat, tending to close the valve. However, in many cases the safe operating pressure is limited by the pressure-temperature tables of ANSI B16.5 (and above figures are based on -20 to +100F).

**TEMPERATURES** - Standard maximum fluid temperature: 550F  
Standard minimum fluid temperature: -50F,  
although variations are made in the standard construction for temperatures within this range - ALWAYS SPECIFY YOUR ACTUAL TEMPERATURE CONDITIONS. Valves for higher temperatures and cryogenics are available - consult factory.

**PORT SIZES** - All above valves have full diameter ports.

**ELECTROMAGNET SIZE AND CURRENT** - All standard valves shown above have electromagnet size "CMR" for A.C., 0.2 amps inrush and holding @ 115 V 60 Hz; size "CM" for D.C., 0.2 amps @ 125 V D.C.

**C<sub>v</sub> FLOW RATINGS** - are approximate, for estimating only. See Bulletin Series 500 or 600 for flow formulas for liquids, gases, and steam.

**STAINLESS STEEL, STEEL & MONEL VALVES** - screwed ends are standard up to 1 1/2" pipe size only. Stainless Steel type 304 body is standard for all screwed-ends and some flanged and weld-ends steel body valves.

## TYPE CONNECTIONS

Bronze & Naval Bronze bodies: Class 250 Screwed, Class 150 & 300 Flanged, flat face (FF).  
Stainless Steel, Steel, Monel bodies: Class 300 & 600 Screwed, Class 150 & 300 Flanged, raised face (RF).

## ALSO AVAILABLE

- Socket-Weld or Butt-Weld ends. Add "SW" or "BW" to screwed-ends suffix up to 1-1/4", flanged-ends suffix up to 6" pipe size.
- 1/4", 3/8" and 8" pipe and port sizes.
- 600# Flanged, MIL-F-20042 Flanged and Silver-Brazing (female socket or union) ends.
- Fractional (reduced) internal port size (series 750) to achieve higher opening pressure capability, where flow rate is of secondary importance.

## ORDERING DATA

- Full Catalog Number (prefix + suffix + option adders)
- Pipe size and C<sub>v</sub>
- Maximum Inlet Pressure, and Maximum Opening Differential Pressure (Actual)
- Liquid or Gas Handled
- Viscosity, Concentration, Specific Gravity, Clean?
- Fluid & Ambient Temperatures (Actual)
- Flow Rate desired & Max. Allowable Pressure Drop
- Valve body, Inner Parts & Disc Materials desired
- Type & Rating of Connections
- Horizontal or Vertical Pipe Mounting
- Type of Electromagnet Enclosure (if explosion proof specify Class & Group and/or nature of hazard)
- Voltage & Frequency
- Maximum Time On and Frequency of Operation
- Electromagnet Insulation Class
- Summary of Application and/or Sketch of System
- Optional or Special Features

For your convenience, use OUR Solenoid Valve Data Sheet for compiling the above information, to save time:

- Writing a specification
- Requesting price and delivery
- Requesting more literature or complete catalog

**TO SPECIFY A CATALOG NUMBER** - Combine the catalog number prefix from page 2 with the catalog number suffix from above; e.g. 75624, 756GNA24, 756GNA24SW, 75624SWPS.

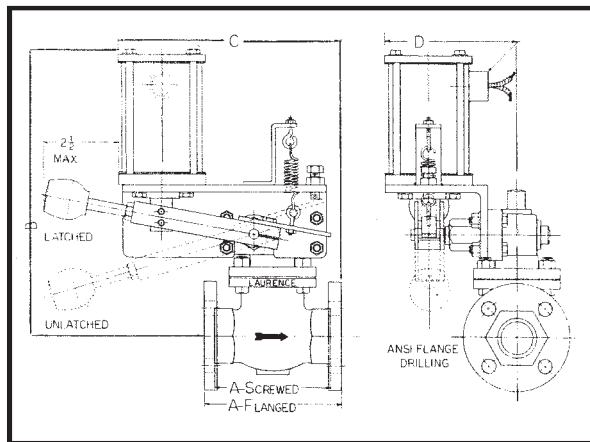
## DIMENSIONS

CATALOG NUMBER SUFFIX		PIPE SIZE	"A" FACE TO FACE	"B"*	"C"	"D"	NET WEIGHT
AC	DC						
14	14DC	1/2"	3	10-1/4	7-1/4	4-5/8	15
18	18DC		4-1/2	10-1/4	8	4-5/8	19
20	20DC		5	10-1/2	8	4-5/8	24
24	24DC	3/4"	3-1/2	10-1/2	7-1/4	4-5/8	16
28	28DC		.5	10-1/2	8	4-5/8	20
30	30DC		5-1/4	10-1/2	8	4-5/8	25
34	34DC	1"	4	10-3/4	7-1/4	4-5/8	19
38	38DC		5	12	8	4-5/8	25
40	40DC		5-1/2	12-1/4	8	4-5/8	30
44	44DC	1-1/4"	4-3/4	11-1/2	7-3/4	4-5/8	24
48	48DC		5-1/2	11-1/2	8	4-5/8	29
50	50DC		5-7/8	11-3/4	8-1/4	4-5/8	38
54	54DC	1-1/2"	7	12	8	4-5/8	28
58	58DC		6-1/8	12	8-1/2	4-5/8	33
60	60DC		9	12-1/2	10	4-5/8	42
638	638DC	2"	6	12-3/4	8-1/2	5	37
678	678DC		7-1/2	13	9-1/4	5	47
698	698DC		10-1/2	13-3/4	11-1/4	5	82
718	718DC	2-1/2"	7-7/8	14-1/4	9-1/2	4-7/8	55
738	738DC		8	14-1/4	9-3/4	4-7/8	65
758	758DC		11-1/2	16	11-3/4	4-7/8	105
798	798DC	3"	10	16	11	7-1/2	110
838	838DC		11-3/4	16	11-3/4	7-1/2	135
896	896DC	4"	11-3/4	16	11-3/4	7-1/2	140
936	936DC		14	16-1/2	13	7-1/2	170
106	106DC	6"	16	18-1/4	16	8-1/2	242

\* For DC suffixes, dimension "B" is slightly less in most cases.

- All above dimensions and weights are approximate, for estimating purposes only. Dimensions are based on
  - A.C. solenoid - (D.C. solenoid slightly larger in some cases).
- Net weights are based on a bronze valve.

All solenoid enclosures have 1/2" NPT conduit connections (standard). Other sizes and types are available.



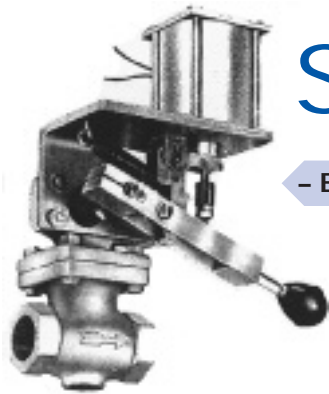
Location of the conduit connection varies depending on the type of solenoid enclosure and whether AC or DC.

CONSULT FACTORY IF FURTHER DETAILS ARE NEEDED

- All flanges drilled per ANSI standards
- Valve bodies can be rotated 90° to four positions to facilitate mounting for direction of flow
- On all valves, additional headroom should be allowed for removal of the solenoid enclosure
- If available headroom is limited, valve can be furnished with valve body inverted - add "Z" to suffix on page 3
- Vertical pipe mounting dimensions can be furnished on request. Specify whether flow is upward or downward



# SERIES 1100, 1100HP, 1200 - 2-WAY MANUALLY RESET



TRIP SHUTOFF

## SOLENOID VALVES

- ELECTRICALLY TRIPPED - Trip upon Energization

- NORMALLY CLOSED - Latch to Open

- ROTARY SHAFT TYPE - with Rotary Teflon Shaft Seal

### MANUALLY RESET, ELECTRICALLY TRIPPED

- Reset or latched-up manually
- Held in latched position mechanically (current off)
- Trip upon energization (current on)

These valves may be tripped by a signal from a burner flame safeguard, pressure or level switch, thermostat, timer, limit switch, photoelectric device, gas analyser, flow switch, salinity cell, or other sensing and control device.

### NORMALLY CLOSED, LATCH TO OPEN

- Closed in the normal (unlatched or tripped) position
- Manually opened when latched up (current off)
- Closes upon energization (current on)

These valves are used for SAFETY SHUT-OFF applications such as stopping the flow of oil or gas to a burner, or steam to a heater, when dangerous, abnormal or shutdown conditions exist. They may also be used in semi-automatic filling or batching operations in conjunction with an integrating flow meter, weigh scale, level switch, or timer.

For valves that TRIP OPEN upon energization and are manually closed when latched up; to be used for emergency discharge or purge, or for fire deluge or process cooling, SEE BULLETIN SERIES 1150 & 1250 - NORMALLY OPEN.

### ROTARY SHAFT TYPE

All valves in this bulletin are of the ROTARY SHAFT type, meaning they are actuated by a slight rotary motion (20-30° arc) which, by way of the Rotary Teflon Shaft Seal, transmits the lifting action of the external operating lever through a mechanical advantage to lift the valve piston (plug) and disc off the seat.

### FEATURES

#### ROTARY SHAFT TYPE, with ROTARY TEFLON SHAFT SEAL

Shaft seal maintenance is virtually eliminated because of this slight, closely guided rotary motion - no "in and out" wear and tear of the packing occurs as in reciprocating-stem solenoid and pneumatic valves.

#### NO MINIMUM PRESSURE or MINIMUM FLOW REQUIREMENT

Opens and closes fully down to 0 PSI. Positive, quick action at all pressures - no floating-piston flutter due to water hammer, back pressure surges, or suction effects.

#### NO AUXILIARY AIR or PILOT SUPPLY NEEDED - ALL ELECTRIC

Eliminates dependence on two media for operating continuity; Eliminates clutter and costly installation of air lines and accessories; Eliminates worry of frozen or plugged air lines;

#### HEAVY-WALLED VALVE BODY

Higher static pressure ratings, greater strength. Prevents permanent leakage due to distortion of valve body and seat when installed with oversized wrenches.

#### HEAVY-DUTY PILOT SWITCH PROVISION

Contact-type heavy-duty limit switch(es) can be mounted readily to indicate valve position remotely or to actuate an alarm or another relay.

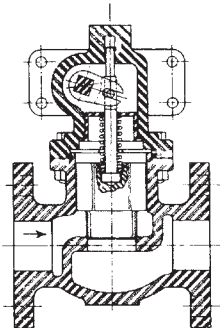
#### CLOSELY GUIDED VALVE INTERNAL PARTS

Eliminates sticking; Consistent, lasting tight shut-off.

### SERIES 1100

SERIES 1100 are pure Direct Operated solenoid valves (referring to the internal construction) wherein the full-area valve disc is lifted off the seat against the full, static line pressure by raising the external lever; i.e. without the aid of an internal pilot and without a minimum pressure or flow requirement. The valve opens and closes fully down to 0 PSI differential and both opening and closing is instantaneous. Closing speed is essentially independent of fluid viscosity, line pressure, or pressure drop across the valve.

SERIES 1100 valves are suitable for handling #6 fuel oil, sea water, other viscous and unclean liquids as well as fuel gases, steam, water, #2 fuel oil, etc.



SERIES 1100, REGRINDING DISC

### SERIES 1200

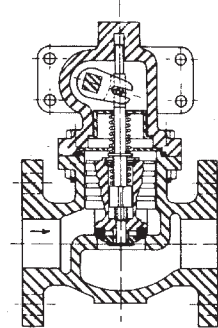
SERIES 1200 also are semi-Direct Operated solenoid valves suitable for air, steam, fuel gases, as well as light liquids at higher pressures than SERIES 1100HP.

When the external lever is raised, a first-stage port opens relieving the static line pressure on top of the main piston. A pressure imbalance is created because the first-stage port area is greater than the flow-clearance area that feeds the top of the piston and this imbalance assists in lifting the piston off the seat to open the valve fully. However due to an auxiliary spring and a solid connection between the stem and the main piston in our valve, it is basically the raising of the lever, not this pressure assist, that provides a lifting action and thus there is no dependence on a minimum pressure or flow to operate.

### SERIES 1100HP (not shown)

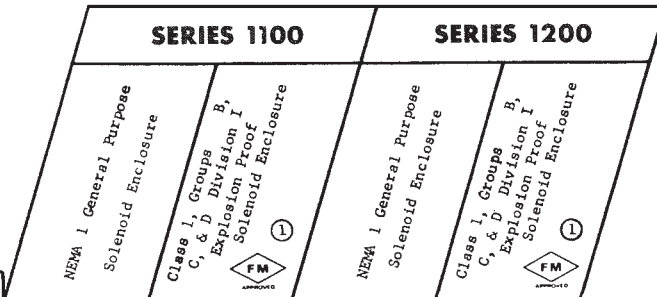
SERIES 1100HP are semi-Direct Operated solenoid valves for liquid service only at higher pressures than SERIES 1100. The main valve opens fully when the external lever is raised because of a solid connection between them. Valve action is quick and positive and requires no minimum pressure or flow to open and close fully, however is pressure-assisted at higher pressures.

SERIES 1100HP valves are suitable for handling #6 and #2 fuel oils, lube oils, sea water, river water, viscous liquids, light slurries, solvents, corrosive liquids, condensate, etc.



SERIES 1200, RESILIENT DISC

# CATALOG NUMBER PREFIXES



VALVE BODY	INNER PARTS	DISC	CATALOG NUMBER PREFIXES			
Bronze	Stainless Steel	Regrinding	1102	1122	1205	1225
		Resilient	1102G	1122G	1205G	1225G
Naval Bronze	Monel	Regrinding	1102NBM	1122NBM	1205NBM	1225NBM
		Resilient	1102NBMG	1122NBMG	1205NBMG	1225NBMG
Steel	Stainless Steel	Regrinding	1109	1129	1209	1229
		Resilient	1109G	1129G	1209G	1229G
Stainless Steel Type 304	Stainless Steel Type 303/304	Regrinding	1106	1126	1210	1230
		Resilient	1106G	1126G	1210G	1230G
Stainless Steel Type 316	Stainless Steel Type 316	Regrinding	1107	1127	1211	1231
		Resilient	1107G	1127G	1211G	1231G
Stainless Steel Alloy-20	Stainless Steel Alloy-20	Regrinding	1108	1128	1212	1232
		Resilient	1108G	1128G	1212G	1232G

FOR SERIES 1100HP ADD "HP" TO SERIES 1100 PREFIX ABOVE

**VALVE BODIES** - Globe type (standard). Angle type bodies are also available in some sizes - consult factory.

**INNER PARTS** - means ALL parts coming in contact with the fluid (magnetic plunger is not wetted by the fluid).

**REGRINDING DISC** - a closely guided, rounded metal disc, lapped-in for tight shut off.

**RESILIENT DISC** - Buna, Teflon, Glass-filled Teflon, Viton.

**SEAT** - Integral (standard). Inserted and stellite-faced seats are also available.

**BODY-BONNET FLANGE O-RING SEAL** - Buna, Teflon, Viton, metal.

**ROTARY SHAFT SEAL** - Teflon (standard). Also Buna, Viton and metal.

## OPTIONAL FEATURES

**PILOT SWITCH(ES)** - Heavy duty, SPDT or DPDT, for remote indication of valve position or to actuate an alarm or relay, contacts rated up to 20 amps at 115/60 or 0.5 amps at 125 DC, for valve closed and/or valve open, Add "PS" to suffix on page 3.

**SOLENOID CUT-OUT SWITCH** - To de-energize the solenoid after current has been applied to trip the valve. Add "CS" to suffix on page 3.

**EXTERNAL LINKAGE COVER** - To discourage tampering with, or tying-up of the valve mechanism, and/or to prevent direct contact with the weather or corrosive ambient. Add "LC" to suffix on page 3.

**TERMINAL BLOCK** - For making solenoid connections within the solenoid enclosure. Add "TB" to suffix on page 3.

**GRAVITY OPERATED** - With weight on external lever to assist return to normal or tripped position - for additional reliability from gravity. Add "W" to suffix on page 3.

**INVERTED BODY** - For limited headroom  
**MATERIALS TRACEABILITY, RADIATION-RESISTING COILS & SEALS, SHOCK & VIBRATION-RESISTANT CONSTRUCTIONS & CERTIFICATIONS**

**SOLENOID ENCLOSURES** - see above, plus:  
 Driptight, NEMA 2; Weatherproof, NEMA 3; or Watertight, NEMA 4 - Add "WA" to NEMA 1 prefix above.

Dusttight, NEMA 12 (not explosion proof) - Add "DU" to NEMA 1 prefix above.

① MOST LAURENCE EXPLOSION PROOF ENCLOSURES ARE FM APPROVED FOR CLASS 1 GROUPS B, C, & D, DIVISION I!

Consult factory for Class 1 Group C areas.

### SOLENOID COILS

	Safe	Safe
	Ambient Temp.	Fluid Temp.
Class H insulation	215°F ③	550°F ④

however the temperature ratings for a given application depend on the combination of the actual max. ambient and fluid temperatures, the duty rating and size of the solenoid coil, and nature of hazardous area, if any. Consult factory. Also, higher temperatures can be handled in some cases.

- ③ - based on fluid temperature of 215°F or less.
- ④ - based on ambient temperature of 40°C (104°F).

Standard coils are waterproofing-varnish dipped, vacuum impregnated and baked, Molded Class H coils for greater resistance to moisture, fungus and physical damage are available.

**STANDARD VOLTAGES** 115, 220, or 440 volts; 60 or 50 Hz A.C. 125 or 250 volts D.C.

Other voltages, frequencies, special electrical characteristics can be furnished - consult factory.

**MOUNTING** - All valves must be mounted with the solenoid in a vertical, upright position. Horizontal pipe mounting is standard and should be utilized whenever possible. For vertical pipe mounting add "V" to prefix above and specify whether flow is upward or downward; resilient valve disc is recommended.



# CATALOG NUMBER SUFFIXES

CATALOG NUMBER SUFFIX		PIPE & PORT SIZE	TYPE CONNECTIONS	SOLE-NOID SIZE		C <sub>v</sub> FLOW RATING	MAXIMUM INLET PRESSURE (PSIG)					
							SERIES 1100	SERIES 1100HP	SERIES 1200			
AC	DC			AC	DC							
15	152DC	1/2"	600# Screwed	CI	D	3.0	300	1480	1480			
19	192DC		150# Flanged							3.0	285	285
21	212DC		300# Flanged							3.0	300	740
25	252DC	3/4	600# Screwed	CI	D	6.8	250	1480	1480			
29	292DC		150# Flanged							6.8	250	285
31	312DC		300# Flanged							6.8	250	740
35	352DC	1	600# Screwed	CI	D	10.0	200	740	1480			
39	392DC		150# Flanged							10.0	200	285
41	412DC		300# Flanged							10.0	200	740
45	452DC	1-1/4	600# Screwed	CI	D	15.5	150	740	1480			
49	492DC		150# Flanged							15.5	150	285
51	512DC		300# Flanged							15.5	150	740
55	552DC	1-1/2	250# Screwed	CI	D	22.5	100	400	400			
59	592DC		150# Flanged							22.5	100	285
61	612DC		300# Flanged							24.0	100	740
65	652DC	2	250# Screwed	DI	E	40	60	400	400			
69	692DC		150# Flanged							40	60	285
71	712DC		300# Flanged							46	60	740
73	732DC	2-1/2	250# Screwed	DI	E	63	40	300	400			
75	752DC		150# Flanged							63	40	285
77	772DC		300# Flanged							69	40	740
81	812DC	3	150# Flanged	DI	E	90	20	285	285			
85	852DC		300# Flanged							96	20	300
91	912DC	4	150# Flanged	DI	E	160	10	285	285			
95	952DC		300# Flanged							175	10	300
110	114DC	6	150# Flanged	EI	T7DC	375	--	285	285			

## PRESSURES

Above figures are intended to indicate our current maximum capability. The actual "rating" of a given suffix number will depend on materials selection, actual pressures, actual temperatures, and other application specifics. Therefore ALWAYS ADVISE or SPECIFY YOUR ACTUAL pressure and temperature conditions, etc.

Series 1100HP and 1200 values are in general limited by the pressure-temperature tables of ANSI B16.5 and are based on -20 to +100°F. In the case of Series 1100 and where Series 1100HP and 1200 suffixes are not limited by ANSI B16.5, the above figures represent a maximum differential pressure between upstream and downstream the valve can be opened against; and thus higher upstream (inlet) pressures can be handled if a corresponding downstream pressure exists when the valve is closed.

**TEMPERATURES** - Standard maximum fluid temperature: 550°F  
Standard minimum fluid temperature: -50°F,  
although variations are made in the standard construction for temperatures within this range - ALWAYS SPECIFY YOUR ACTUAL TEMPERATURE CONDITIONS. Valves for higher temperatures and cryogenics are available - consult factory.

**PORT SIZES** - All above valves have full diameter ports.

**SOLENOID SIZE** - is for comparison purposes, factory application and pricing of options. It need not be specified.

**CURRENT DRAW** - Inrush and holding currents depend on valve size, solenoid size, voltage, duty rating and class of insulation. Consult factory for ratings.

**C<sub>v</sub> FLOW RATINGS** - are approximate, for estimating only. See Bulletin Series 500 or 600 for flow formulas for liquids, gases, and steam.

**STAINLESS STEEL, STEEL, & MONEL VALVES** - screwed ends are standard up to 1-1/2" pipe size only. Stainless Steel type 304 body is standard for all screwed-ends and some flanged steel body valves

**TYPE CONNECTIONS** -

Bronze & Naval Bronze bodies: 250# Screwed; 150# & 300# Flanged, flat face (FF).  
Stainless Steel, Steel, Monel bodies: 300#, 600# Screwed; 150#, 300# Flanged, raised face (RF).

## ALSO AVAILABLE

- Socket-Weld or Butt-Weld ends. Add "SW" or "BW" to screwed-ends suffix up to 1-1/2", flanged-ends suffix up to 6" pipe size.
- 1/4", 3/8", and 8" pipe and port sizes.
- 600# Flanged, MIL-F-20042 Flanged, and Silver-Brazing (female socket or union) ends.
- Fractional (reduced) internal port size (Series 1100) to achieve higher opening pressure capability, where flow rate is of secondary importance.

## ORDERING DATA

Full Catalog Number (prefix + suffix + option adders)

Pipe Size & C<sub>v</sub>

Maximum Inlet Pressure, and Maximum Opening Differential Pressure (Actual)

Liquid or Gas Handled

Viscosity, Concentration, Specific Gravity, Clean?

Fluid & Ambient Temperatures (Actual)

Flow Rate desired & Max. Allowable Pressure Drop

Valve Body, Inner Parts, & Disc Materials desired

Type & Rating of Connections

Horizontal or Vertical Pipe Mounting

Type of Solenoid Enclosure (if explosion proof specify Class & Group and/or nature of hazard)

Voltage & Frequency

Maximum Time On and Frequency of Operation

Solenoid Insulation Class

Summary of Application and/or Sketch of System

Optional or Special Features

For your convenience, use OUR Solenoid Valve Data Sheet for compiling the above information, to save time:

- Writing a specification
- Requesting price and delivery
- Requesting more literature or complete catalog

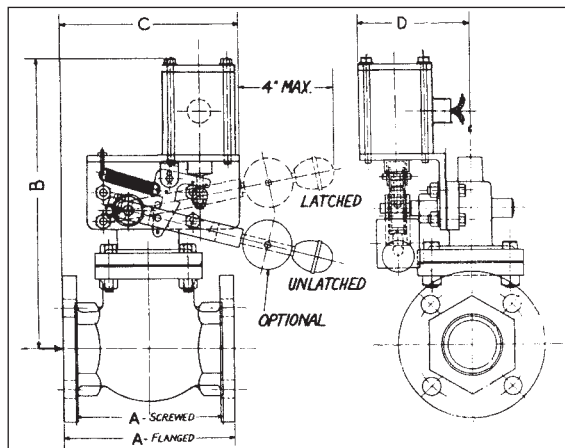
**TO SPECIFY A CATALOG NUMBER** - Combine the catalog number prefix from page 2 with the catalog number suffix from above; e.g. 110624, 1106WA24, 1106GWA24SW, 110624SWPS.

# DIMENSIONS

FOR SOLENOID ENCLOSURES: NEMA 1 General Purpose NEMA 2 Driptight NEMA 3 Weatherproof NEMA 4 Watertight NEMA 12 Dusttight							FOR SOLENOID ENCLOSURES: CLASS 1, GROUPS B, C & D, Div. 1 Explosion Proof			
CATALOG NUMBER SUFFIX	PIPE SIZE	FACE-TO-FACE	B	C	D	NET WEIGHT*	B	C	D	NET WEIGHT*
15		3	9-1/4	6-1/4	4-5/8	13	10-1/4	6-1/4	4-5/8	16
19	1/2"	5-1/4	9-1/4	6-1/2	4-5/8	17	10-1/4	6-1/2	4-5/8	20
21		5	9-5/8	6-3/8	4-5/8	22	10-5/8	6-3/8	4-5/8	25
25		3-1/2	9-1/2	6-1/4	4-5/8	14	10-1/2	6-1/4	4-5/8	17
29	3/4	5	9-5/8	6-3/8	4-5/8	18	10-5/8	6-3/8	4-5/8	21
31		5-3/8	9-5/8	6-1/2	4-5/8	23	10-5/8	6-1/2	4-5/8	26
35		4	9-7/8	6-1/4	4-5/8	16	10-7/8	6-1/4	4-5/8	19
39	1	5-1/8	10-3/4	6-3/8	4-5/8	20	11-3/4	6-3/8	4-5/8	23
41		5-1/2	11	6-1/2	4-5/8	25	12	6-1/2	4-5/8	28
45		4-3/4	10-1/4	6-1/8	4-5/8	20	11-1/4	6-1/8	4-5/8	23
49	1-1/4	5-1/2	10-1/4	6-1/2	4-5/8	24	11-1/4	6-1/2	4-5/8	27
51		5-7/8	10-3/4	6-1/2	4-5/8	30	11-3/4	6-1/2	4-5/8	33
55		5-1/2	10-3/4	6-1/2	4-5/8	23	11-3/4	6-1/2	4-5/8	26
59	1-1/2	6-1/8	10-3/4	6-3/4	4-1/2	27	11-3/4	7	4-1/2	30
61		9	13	8	5	36	14	8	5	39
65		6	12-1/4	7	5-1/8	35	13-5/8	7-1/4	5-1/2	42
69	2	7-1/2	12-3/8	7-3/4	5-1/8	42	13-3/4	8-1/4	5-1/2	49
71		10-1/2	14	8-1/2	5-1/8	77	15-3/8	9	5-5/8	84
73		7-7/8	13-1/2	7-1/2	5-1/4	45	14-7/8	7-7/8	5-1/4	52
75	2-1/2	8	13-7/8	8	5-1/4	55	15-1/4	9-3/8	5-1/4	62
77		11-1/2	14-3/4	9	5	90	16-1/8	9-1/2	5-1/2	97
81		9-7/8	14-5/8	8-1/4	5	94	16	8-3/4	5-1/2	101
85	3	11-3/4	14-5/8	10-1/2	5	118	16	11	5-1/2	125
91		11-3/4	14-3/8	10-1/2	5	125	15-3/4	11	5-1/2	132
95	4	14	15-3/8	11-1/2	5	155	16-3/4	12	5-1/2	168
110	6	16	18-5/8	16	8-1/4	255	19-5/8	16-1/4	8-1/2	260

- All above dimensions and weights are approximate, for estimating purposes only. Dimensions are based on A.C. solenoid - (D.C. solenoid slightly larger in some cases).
- Net weights are based on a bronze valve.

All solenoid enclosures have 1/2" NPT conduit connections (standard). Other sizes and types are available.



- All flanges drilled per ANSI B16.5.
- Valve bodies can be rotated 90° to four positions, to facilitate mounting for direction of flow.
- On all valves, additional headroom should be allowed for removal of the solenoid enclosure.
- If available headroom is limited, valve can be furnished with valve body inverted - Add "2" to suffix on page 1.
- Vertical pipe mounting dimensions can be furnished upon request. Specify whether flow is upward or downward.

# SERIES 1150, 1150HP, 1250 - 2-WAY MANUALLY RESET

TRIP OPEN

## SOLENOID VALVES

For Fire Deluge - Emergency Dump, Vent, Discharge - Process Cooling,  
Oil Dump on Turbine Overspeed or Shutdown



- ELECTRICALLY TRIPPED - Trip upon Energization

- NORMALLY OPEN - Latch to Close - Trip Open

- ROTARY SHAFT TYPE - with Rotary Teflon Shaft Seal

### MANUALLY RESET, ELECTRICALLY TRIPPED

- Reset or latched-up manually
- Held in latched position mechanically (current off)
- Trip upon energization (current on)

These valves can be reset either locally by hand or remotely through a pull-chain or extended push-rod device. They can be tripped by a signal from a fire detection device such as heat or smoke detector, or from a gas analyser, pressure, temperature or level switch, or manual push button or limit switch, or any other sensing/control device that supplies a suitable electrical signal.

An emergency, local manual trip device can also be furnished as an option.

### NORMALLY OPEN, LATCH TO CLOSE

- Open in the normal (unlatched or tripped) position
- Manually closed when latched up (current off)
- Open upon energization (current on)

For valves that trip open ON CURRENT FAILURE, and are held latched by the continuously energized coil, SEE BULLETIN SERIES 750/750HP/850.

For valves that TRIP CLOSED upon energization and are manually opened when latched up; for safety shut-off of gas or oil to a burner or of steam to a heater, etc., SEE BULLETIN SERIES 1100/1100HP/1200.

### ROTARY SHAFT TYPE

All valves in this bulletin are of the ROTARY SHAFT type, meaning they are actuated by a slight rotary motion (20-30° arc) which by way of the Rotary Teflon Shaft Seal, transmits the positive return action of the external operating lever through a mechanical advantage to lift the valve piston (plug) and disc off the seat.

### FEATURES

#### ROTARY SHAFT TYPE, with ROTARY TEFLON SHAFT SEAL

Shaft seal maintenance is virtually eliminated because of this slight, closely guided rotary motion - no "in and out" wear and tear of the packing occurs as in reciprocating-stem solenoid and pneumatic valves.

#### NO MINIMUM PRESSURE or MINIMUM FLOW REQUIREMENT

Opens and closes fully down to 0 PSI.

Positive, quick action at all pressures - no floating-piston flutter due to water hammer, back pressure surges, or suction effects.

#### NO AUXILIARY AIR or PILOT SUPPLY NEEDED - ALL ELECTRIC

Eliminates dependence on two media for operating continuity; Eliminates clutter and costly installation of air lines and accessories; Eliminates worry of frozen or plugged air lines.

#### HEAVY-WALLED VALVE BODY

Higher static pressure ratings, greater strength.

Prevents permanent leakage due to distortion of valve body and seat when installed with oversize wrenches.

#### HEAVY-DUTY PILOT SWITCH PROVISION

Contact-type heavy-duty limit switch(es) can be mounted readily to indicate valve position remotely or to actuate an alarm or another relay.

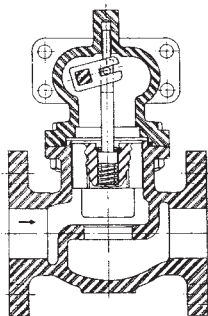
#### CLOSELY GUIDED VALVE INTERNAL PARTS

Prevents sticking due to misalignment; lasting tight shut-off.

### SERIES 1150

SERIES 1150 are pure Direct Operated solenoid valves (referring to the internal construction) wherein the full-area valve disc is lifted off the seat against the full, static line pressure by a strong external spring; i.e., without the aid of an internal pilot and without a minimum pressure or flow requirement. The valve can open, remain open, and/or close fully down to 0 PSI differential. Opening time is essentially instantaneous and independent of fluid viscosity, line pressure, or pressure drop across the valve.

SERIES 1150 valves are suitable for handling sea water, river water, halon, foam concentrate, and other unclean and/or viscous liquids as well as fresh water, CO<sub>2</sub> and other inert gases, steam, etc.

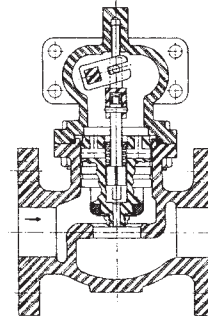


SERIES 1150, REGRINDING DISC

### SERIES 1250

SERIES 1250 are also semi-Direct Operated solenoid valves suitable for handling fresh water, halon, CO<sub>2</sub>, inert gases, steam and other light, clean liquids and gases at higher pressures than SERIES 1150HP.

When the solenoid trips the latch, a first-stage port opens relieving the static line pressure on top of the main piston. A pressure imbalance is created because the first-stage port area is greater than the flow-clearance area that feeds the top of the piston. The imbalance assists in lifting the piston off the seat to open the valve fully. However due to an auxiliary spring and a solid connection between the stem and the main piston in our valve, it is basically the strong external spring, not this pressure assist, that provides a lifting action and thus there is no dependence on a minimum pressure or flow to operate.



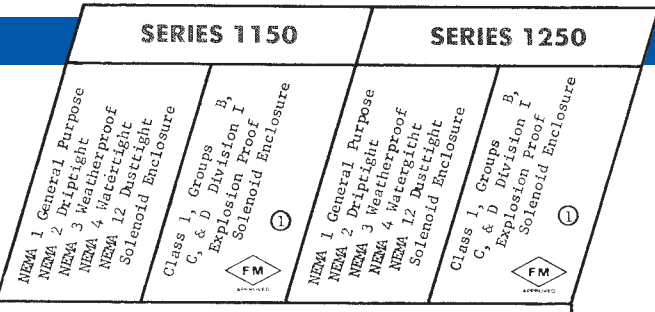
SERIES 1250, RESILIENT DISC

### SERIES 1150HP

SERIES 1150HP are semi-Direct Operated solenoid valves for liquid service only at higher pressures than SERIES 1150. The main valve opens fully by the strong external spring because of a solid connection between them. Valve action is quick and positive and requires no minimum pressure or flow to open and close fully, however is pressure-assisted at higher pressures.

SERIES 1150HP valves are suitable for handling sea water, river water, halon, foam concentrate, and other unclean and/or viscous liquids as well as fresh water, and other general-purpose liquids.

# CATALOG NUMBER PREFIXES



VALVE BODY		INNER PARTS	DISC	CATALOG NUMBER PREFIXES			
Bronze	ASTM B-62	Brass & S.S.	Regrinding	1150WA	1170	1253WA	1273
			Resilient	1151WA	1171	1254WA	1274
Bronze	B-62	Stainless Steel	Regrinding	1152WA	1172	1255WA	1275
			Resilient	1152GWA	1172G	1255GWA	1275G
Naval Bronze	B-61	Monel	Regrinding	1152NBMWA	1172NBM	1255NBMWA	1275NBM
			Resilient	1152NBMGWA	1172NBMG	1255NBMGWA	1275NBMG
Steel	A216 WCB	Stainless Steel	Regrinding	1159WA	1179	1259WA	1279
			Resilient	1159GWA	1179G	1259GWA	1279G
Stainless Steel Type 304	A351 CF8	Stainless Steel Type 303/304	Regrinding	1156WA	1176	1260WA	1280
			Resilient	1156GWA	1176G	1260GWA	1280G
Stainless Steel Type 316	A351 CF8M	Stainless Steel Type 316	Regrinding	1157WA	1177	1261WA	1281
			Resilient	1157GWA	1177G	1261GWA	1281G
Stainless Steel Alloy-20	A351 CN7M	Stainless Steel Alloy-20	Regrinding	1158WA	1178	1262WA	1282
			Resilient	1158GWA	1178G	1262GWA	1282G
Monel	FED QQ-N-288	Monel	Regrinding	1158MWA	1178M	1262MWA	1282M
			Resilient	1158MGWA	1178MG	1262MGWA	1282MG

FOR SERIES 1150HP ADD "HP" TO SERIES 1150 PREFIX ABOVE

**VALVE BODIES** - Globe type (standard). Angle type bodies are also available in some sizes - consult factory.

**INNER PARTS** - means ALL parts coming in contact with the fluid. (solenoid magnetic parts are not wetted by the fluid.)

**REGROUNDING DISC** - a closely guided, rounded metal disc, lapped-in for tight shut off

**RESILIENT DISC** - Buna, Teflon, Glass-filled Teflon, Viton.

**SEAT** - Integral (standard). Inserted and stellite-faced seats are also available.

**BODY-BONNET FLANGE O-RING SEAL** - Buna, Teflon, Viton, metal.

**ROTARY SHAFT SEAL** - Teflon (standard). Also Buna, Viton and metal.

## OPTIONAL FEATURES

**POSITION SWITCH(ES)** - Heavy duty, SPDT or DPDT, for remote indication of valve position or to actuate an alarm or relay; contacts rated up to 20 amps @ 115/60 AC or 10 amps @ 125 DC; for valve closed and/or valve open. Add "PS" to suffix on Page 3.

**EXTERNAL LINKAGE COVER** - To discourage tampering with, or tying-up of the valve mechanism, and/or to prevent direct contact with the weather or corrosive ambient. Add "LC" to suffix on Page 3. Optionally available with Lexan window.

**TERMINAL BLOCK** - For making solenoid connections within the solenoid enclosure. Add "TB" to suffix on Page 3.

**SOLENOID CUT-OUT SWITCH** - To de-energize the solenoid after current has been applied to trip the valve. Add "CS" to suffix on page 3.

**GRAVITY OPERATED** - With weight on external lever to assist return to normal or tripped position - for additional reliability from gravity. Add "W" to suffix on page 3.

**INVERTED BODY** - For limited headroom; **MANUAL TRIPPING DEVICE**; **MATERIALS TRACEABILITY, RADIATION-RESISTING COILS & SEALS**; **SHOCK & VIBRATION-RESISTANT CONSTRUCTIONS & CERTIFICATIONS**

**SOLENOID ENCLOSURES** - standard with 1/2" NPT conduit connection.

① MOST LAURENCE EXPLOSION PROOF ENCLOSURES ARE FM APPROVED FOR CLASS I GROUPS B, C & D, DIVISION I!

Consult factory for CLASS I GROUP C areas.

**SOLENOID COILS** - Safe Ambient Temp. Safe Fluid Temp.

Class H insulation 215 F ③ 550 F ④

The safe temperatures for a specific application depend on an overall consideration of the actual max. ambient and fluid temperatures, the temperature rise of the coil to be used, range of applied voltage and nature of hazardous area, if any - consult factory for the safe temps. for your application. Also, higher temperatures can be handled in some cases.

③ - based on fluid temperature of 215 F or less.  
④ - based on ambient temperature of 40 C (104 F).

Standard coils are waterproofing-varnish dipped, vacuum impregnated and baked. Molded Class H coils for greater resistance to moisture, fungus and physical damage are available. Standard coils are for continuous duty (24-hour continuous energization, with maximum steady state coil temperature within rating of class of insulating materials used).

### STANDARD VOLTAGES

A.C. - 110-120/60, 110-120/50, 220-240/60, 220-240/50, 440-460/60 Volts/hz.

D.C. - 125 or 250 volts.

Other voltages/frequencies, special electrical characteristics can be furnished (pressure listings may differ) - consult factory.

### MOUNTING

All valves must be mounted with the solenoid in a vertical, upright position. Horizontal pipe mounting is standard and should be utilized whenever possible. For vertical pipe mounting add "V" to prefix above and specify whether flow is upward or downward; resilient valve disc is recommended. For limited headroom, add "Z" to horizontal pipe mounting prefix above for inverted valve body.



# CATALOG NUMBER SUFFIXES

CATALOG NUMBER SUFFIX	PIPE & PORT SIZE	CLASS & TYPE END CONNECTIONS	SOLENOID SIZE		C <sub>v</sub> FLOW FACTOR	MAXIMUM OPENING DIFFERENTIAL PRESSURE ( PSIG)			
			AC	DC		SERIES 1150	SERIES 1150HP	SERIES 1250	
15 19 21	152DC 192DC 212DC	1/2"	600 Screwed 150 Flanged 300 Flanged	CI	D	3.0 3.0 3.0	300 285 300	--- --- ---	1200 285 720
25 29 31	252DC 292DC 312DC	3/4	600 Screwed 150 Flanged 300 Flanged	CI	D	6.8 6.8 6.8	135 135 135	600 285 600	1100 285 720
35 39 41	352DC 392DC 412DC	1	600 Screwed 150 Flanged 300 Flanged	CI	D	10.0 10.0 10.0	75 75 75	250 250 250	1100 285 720
45 49 51	452DC 492DC 512DC	1-1/4	600 Screwed 150 Flanged 300 Flanged	CI	D	15.5 15.5 15.5	45 45 45	175 175 175	675 285 675
55 59 61	552DC 592DC 612DC	1-1/2	600 Screwed 150 Flanged 300 Flanged	CI	D	22.5 22.5 24.0	25 25 25	125 125 125	400 285 675
65 69 71	652DC 692DC 712DC	2	250 Screwed 150 Flanged 300 Flanged	DI	E	40 40 46	18 18 18	110 110 110	340 285 340
73 75 77	732DC 752DC 772DC	2-1/2	250 Screwed 150 Flanged 300 Flanged	DI	E	63 63 69	12 12 12	75 75 75	275 275 275
81 85	812DC 852DC	3	150 Flanged 300 Flanged	DI	E	90 96	5 5	75 75	200 200
91 95	912DC 952DC	4	150 Flanged 300 Flanged	DI	E	160 175	3 3	50 50	150 150
110 111	114DC 115DC	6	150 Flanged 300 Flanged	EI	T7DC	375 375	- -	50 50	150 150

## PRESSURES

The listings shown are intended to indicate our current maximum standard capability. The pressure "rating" of a given suffix number will depend on an overall consideration of the actual pressure range, actual temperature range, materials selection, ambient temperature range (for DC voltages), viscosity range, and other specifics for a particular application. In other words, all valves with the same suffix number are not necessarily "rated" at the maximum opening differential pressure figure shown. Therefore **ALWAYS ADVISE or SPECIFY YOUR ACTUAL pressure and temperature conditions** and consult factory for the pressure rating for your application.

The figures shown represent the maximum differential pressure the valve can be opened against (max. inlet pressure minus the min. outlet pressure when the valve is closed). A higher inlet pressure can be handled if a corresponding higher downstream pressure exists when the valve is closed. All valves will hold closed at emergency pressures greatly exceeding the figures shown because the line pressure and flow are above the seat, tending to close the valve. However, in a few cases, the safe operating pressure is limited by the pressure-temperature tables of ANSI B16.5, B16.15, or B16.24 (in these cases figures are based on -20 to +100F fluid temperature).

**TEMPERATURES** - Standard maximum fluid temperature: 550 F  
Standard minimum fluid temperature: -50 F, although variations are made in the standard construction for temperatures within this range - **ALWAYS SPECIFY YOUR ACTUAL TEMPERATURE CONDITIONS**. Valves for higher temperatures and cryogenics are available - consult factory.

**PORT SIZES** - All above valves have full diameter ports.

### TYPE CONNECTIONS

Bronze & Naval Bronze bodies: Class 250 Screwed, Class 150 & 300 Flanged, flat face (FF).  
Stainless Steel, Steel, Monel bodies: Class 300 & 600 screwed, Class 150 & 300 flanged, raised face (RF).  
Butt-weld or socket-weld connections are also available. Add "BW" or "SW" to screwed-ends suffix up to 1½" pipe size and to flanged-ends suffix 1½" to 6" pipe size.  
Class 600 flanged, silver-brazing ends (female socket or union), and MLL-F-20042 flanged ends are also available - consult factory.

**STAINLESS STEEL, STEEL & MONEL VALVES** - Screwed ends are standard up to 1½" pipe size only. Stainless steel type 304 body is standard for all screwed-ends steel body valves.

**SOLENOID SIZE** - is for comparison purposes, factory application, and pricing of options. It need not be specified.

**CURRENT DRAW** - Inrush and holding currents depend on valve size, solenoid size, ambient temperature (DC voltage), voltage/frequency and other electrical characteristics of the coil selected. Consult factory for specific data.

**C<sub>v</sub> FLOW RATINGS** - are approximate, for estimating only. See Bulletin Series 500 or 600 for flow formulas.

## ORDERING DATA

Full Catalog Number (prefix + suffix + option adders)

Pipe Size & C<sub>v</sub>

Maximum Inlet Pressure, and Maximum Opening Differential Pressure (Actual)

Liquid or Gas Handled

Viscosity, Concentration, Specific Gravity, Clean?

Fluid & Ambient Temperatures (Actual)

Flow Rate desired & Max. Allowable Pressure Drop

Valve Body, Inner Parts, & Disc Materials desired

Type & Rating of Connections

Horizontal or Vertical Pipe Mounting

Type of Solenoid Enclosure (if explosion proof specify Class & Group and/or nature of hazard)

Voltage & Frequency

Solenoid Insulation Class

Summary of Application and/or Sketch of System

Optional or Special Features

For your convenience, use OUR Solenoid Valve Data Sheet for compiling the above information, to save time:

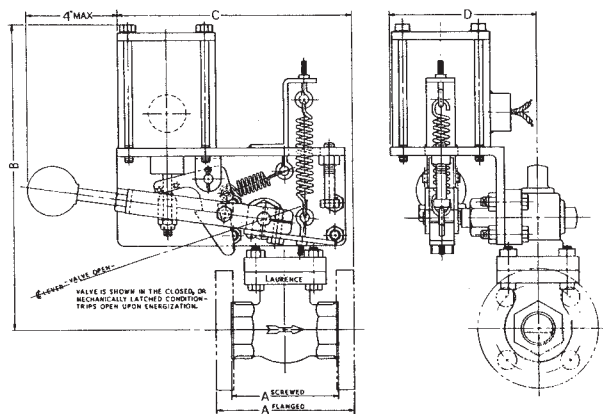
- Writing a specification
- Requesting price and delivery

**TO SPECIFY A CATALOG NUMBER** - Combine the catalog number prefix from Page 2 with the catalog number suffix from above; e.g. 1156WA25, 1156WA25SW, 1156WA25SWPS.

## DIMENSIONS

CATALOG NUMBER SUFFIX	PIPE SIZE	FACE-TO-FACE	FOR SOLENOID ENCLOSURES:				FOR SOLENOID ENCLOSURES:			
			B	C	D	NET WEIGHT	B	C	D	NET WEIGHT
15		3	9-1/4	7-1/4	4-5/8	14	10-1/4	7-1/4	4-5/8	17
19	1/2	5-1/4	9-1/4	7-3/4	4-5/8	18	10-1/4	7-3/4	4-5/8	21
21		5	9-5/8	7-3/4	4-5/8	23	10-5/8	7-3/4	4-5/8	26
25	3/4	3-1/2	9-1/2	7-1/4	4-5/8	15	10-1/2	7-1/4	4-5/8	18
29		5	9-5/8	7-3/4	4-5/8	19	10-5/8	7-3/4	4-5/8	22
31		5-3/8	9-5/8	7-3/4	4-5/8	24	10-5/8	7-3/4	4-5/8	27
35	1	4	9-7/8	7-1/4	4-5/8	17	10-7/8	7-1/4	4-5/8	20
39		5-1/8	10-3/4	7-3/4	4-5/8	21	11-3/4	7-3/4	4-5/8	24
41		5-1/2	11	8	4-5/8	26	12	8	4-5/8	29
45	1-1/4	4-3/4	10-1/4	7-1/2	4-5/8	21	11-1/4	7-1/2	4-5/8	24
49		5-1/2	10-1/4	8	4-5/8	25	11-1/4	8	4-5/8	28
51		5-7/8	10-3/4	8-1/4	4-5/8	31	11-3/4	8-1/4	4-5/8	34
55	1-1/2	5-1/2	10-3/4	8	4-5/8	24	11-3/4	8	4-5/8	27
59		6	10-3/4	8-1/4	4-1/2	28	11-3/4	8-1/4	4-1/2	31
61		9	13	10	5	37	14	10	5	40
65	2	6	12-1/4	8-1/4	5-1/8	36	13-5/8	8-3/4	5-1/2	43
69		7-1/2	12-3/8	9	5-1/8	43	13-3/4	9-1/2	5-1/2	50
71		10-1/2	14	10-3/4	5-1/8	78	15-3/8	11-1/4	5-5/8	85
73	2-1/2	7-7/8	13-1/2	9-1/2	5-1/4	46	14-7/8	10	5-1/4	53
75		8	13-7/8	9-3/4	5-1/4	56	15-1/4	10-1/4	5-1/4	63
77		11-1/2	14-3/4	11-1/2	5	90	16-1/8	12	5-1/2	98
81	3	9-7/8	14-5/8	10-3/4	5	95	16	11-1/4	5-1/2	102
85		11-3/4	14-5/8	11-3/4	5	119	16	12-1/4	5-1/2	126
91	4	11-3/4	14-3/8	11-3/4	5	126	15-3/4	12-1/4	5-1/2	133
95		14	15-3/8	12-3/4	5	156	16-3/4	13-1/4	5-1/2	169
110	6	16	18-5/8	14-1/2	8-1/4	256	19-5/8	14-3/4	8-1/2	261
111		17-1/2	19-5/8	15-1/4	8-1/4	265	20-5/8	15-1/2	8-1/2	272

- All above dimensions and weights are approximate, for estimating purposes only. Dimensions are based on A.C. solenoid - (D.C. solenoid slightly larger in some cases).
- Net weights are based on a bronze valve.



Location of the conduit connection varies depending on the type of solenoid enclosure and whether A.C or D.C.

CONSULT FACTORY IF FURTHER DETAILS ARE NEEDED

- All flanges drilled per ANSI B16.5.
- Valve bodies can be rotated 90° to four positions, to facilitate mounting for direction of flow
- On all valves, additional headroom should be allowed for removal of the solenoid enclosure.
- If available headroom is limited, valve can be furnished with valve body inverted - Add "Z" suffix on page 3
- Vertical pipe mounting dimensions can be furnished upon request. Specify whether flow is upward or downward.



# SERIES 3300 - 3-WAY ROTARY SHAFT TYPE

## DIRECT OPERATED - POPPET TYPE SOLENOID VALVES

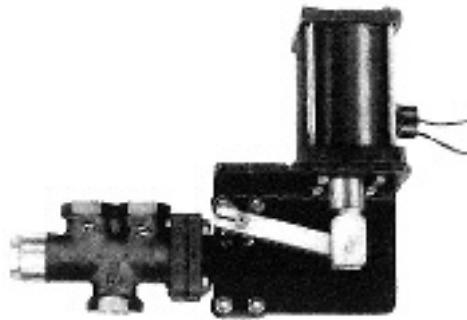
FULLY ELECTRICAL (Automatic Reset)

- For PILOT CONTROL: Opening and Closing of Pneumatic and Hydraulic Control Valves, Devices & Systems; Safety Shutoff, Emergency Venting

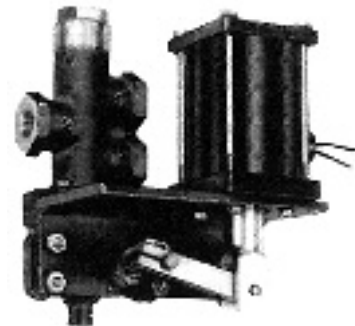
- For DIRECTIONAL CONTROL: Diverting, By-Passing, Recirculating, Selecting, Sampling, Switching



Series 3300



Series 3300V



Series 3300Z

### ROTARY SHAFT TYPE

All valves in this bulletin are of the ROTARY SHAFT TYPE, meaning they are actuated by a slight ROTARY motion (20-30° arc) which, by way of the Rotary Teflon Shaft Seal, transmits the lifting action of the solenoid plunger and operating lever through a mechanical advantage to the valve poppets in the form of a lifting action.

Many more applications can be suitably handled, and much greater versatility and adaptability is afforded, compared with "direct-lift" packless type solenoid valves which are truly suitable only for general purpose fluids and general purpose applications.

### FLOW FORMS

Each 3-Way solenoid valve is factory adjusted for a particular FLOW FORM; that is, for installation and operation according to the chart below. These are two position valves - one of the two ports is always closed while the other is open.

#### FOR PILOT CONTROL:

FORM "M" - Supply Normally Closed  
Energize to open inlet port,  
De-energize to vent

FORM "N" - Supply Normally Open  
Energize to vent  
De-energize to open inlet port

#### FOR DIRECTIONAL CONTROL:

FORM "O" - Diverting (one inlet, two outlets)  
Energize to open normally closed outlet, close normally open outlet.  
De-energize to reverse above action (return to normal position).

FORM "P" - Selecting (two inlets, one outlet)  
Energize to open normally closed inlet, close normally open inlet.  
De-energize to reverse above action (return to normal position).

	FLOW FORM "M" INLET AT "A" VENT AT "C"	FLOW FORM "N" INLET AT "C" VENT AT "A"	FLOW FORM "O" INLET AT "B" OUTLETS AT "A" & "C"	FLOW FORM "P" INLETS AT "A" & "C" OUTLET AT "B"
ACTUATED POSITION (SOLENOID ENERGIZED)				
NORMAL POSITION (SOLENOID DE-ENERGIZED)				

### FEATURES

#### ROTARY SHAFT TYPE with ROTARY TEFLON SHAFT SEAL

Greater valve-actuation and valve-return reliability is achieved compared to customary packless type valves because of the mechanical advantage from the long external operating lever. More solenoid power is available to actuate the valve more positively and/or to handle higher pressures. Also there is power available to compress stronger internal return springs, and, if desired or required, to permit the use of an optional additional external main spring and/or a gravity-weight on the lever.

Corrosive, unfiltered and/or hot air and other difficult fluid media are handled safely; contained in a lower valve unit away from the magnetic and closely guided solenoid plunger.

Manual opening and manual closing is provided by the external lever; in case of emergency, for trial operation, etc.

Visual valve position indication is provided by the inherent external lever.

#### NO MINIMUM PRESSURE or FLOW REQUIREMENT

Opens and closes fully down to 0 PSI.  
Positive, quick action at all pressures - DIRECT OPERATED (no internal pilot, no floating poppets, no suction effects as with diaphragms).

#### CLOSELY GUIDED VALVE INTERNAL PARTS

Prevents binding due to misalignment; consistent, lasting tight shut-off.

#### HEAVY-DUTY PILOT SWITCH PROVISION

Contact-type heavy-duty limit switch(es) can be mounted readily to indicate valve position remotely or to actuate an alarm or a relay.

### DIRECT OPERATED - POPPET TYPE

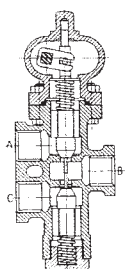
#### ADVANTAGES:

- No tiny orifices to clog with dirt or freeze up;
- No flutter, no suction effects and diaphragm hang-ups;
- Valve position not affected by change of flow direction or loss of pressure;
- No periodic replacing of worn or torn diaphragms;
- No minimum pressure requirement;

AS IN A PILOTED DIAPHRAGM 3-WAY VALVE!

- No sliding o-ring seals to wear or replace;
- No galling of metal-to-metal sliding surfaces;
- Not as susceptible to fouling from dirt;
- Not susceptible to binding from extreme ambient temperature fluctuations;

AS IN A SLIDING-SPOOL TYPE 3-WAY VALVE!



# CATALOG NUMBER PREFIXES

VALVE BODY		INNER PARTS	CATALOG NUMBER PREFIXES			
Bronze	* ASTM B-62	Brass & S.S.	3300WA	3310	3300WAV	3310V
Bronze	B-62	Stainless Steel	3302WA	3312	3302WAV	3312V
Naval Bronze	B-61	Monel ①	3302NBWA	3312NBM	3302NBWAV	3312NBV
Steel	A216 WCB	Stainless Steel	3309WA	3319	3309WAV	3319V
Stainless Steel Type 304	A351 CFB	Stainless Steel Type 303/304	3305WA	3315	3305WAV	3315V
Stainless Steel Type 316	A351 CF8M	Stainless Steel Type 316	3306WA	3316	3306WAV	3316V
Stainless Steel Alloy-20	A351 CN7M	Stainless Steel Alloy-20 ②	3308WA	3318	3308WAV	3318V
Monel	FED QQ-N-288	Monel ①	3308MWA	3318M	3308MWAV	3318MV

\* For purposes of identifying alloy by chemical analysis

**VALVE BODIES** - standard: with screwed (female NPT) connections; CLASS 250-bronze, CLASS 300 & 600-steel & stainless steel. Flanged, butt-weld, socket-weld & sil-braze ends are also available - consult factory.

**INNER PARTS** - means ALL parts coming in contact with the fluid (solenoid magnetic parts are not wetted by the fluid).

- ① Springs are normally inconel. Maximum pressure listings may differ - consult factory.
- ② Valve bottom poppet spring is normally 316 S.S.

**VALVE DISCS** - standard: Teflon, except bronze body series 3300WA - Buna N (up to 1/2" port). Viton also available with bronze body series 3300WA (up to 1/2" port). Regrinding type are also available (rounded metal discs, lapped in for tight shut-off). Add "X" to Cat.No. prefix above.

**VALVE SEATS** - standard: integral.

**VALVE BODY-BONNET FLANGE O-RING SEAL** - standard: Teflon, except bronze body series 3300WA - buna N. Viton, EPR, and metal also available.

**SHAFT SEAL** - standard: ROTARY TEFLON SHAFT SEAL. Buna N, Viton, EPR, and lapped metal-to-metal as alternate primary seals are also available.

## OPTIONAL FEATURES

**POSITION SWITCH(ES)** - Heavy duty, SPDT or DPDT, for remote indication of valve position or to actuate an alarm or relay; contacts rated up to 20 amps @ 115/60 AC or 10 amps @ 125 DC; for valve closed and/or valve open. Add "PS" to suffix on Page 3.

**EXTERNAL LINKAGE COVER** - To discourage tampering with, or tying-up of the valve mechanism, and/or to prevent direct contact with the weather or corrosive ambient. Add "LC" to suffix on Page 3. Optionally available with lexan window.

**TERMINAL BLOCK** - For making solenoid connections within the solenoid enclosure. Add "TB" to suffix on Page 3.

**LEVER LOCKING DEVICE** - To hold or lock valve in actuated or manually-overridden position. Add "LD" to suffix on Page 3.

**GRAVITY OPERATED** - With a weight on external lever to assist return to normal or fail-safe position - for additional reliability from gravity. Maximum pressure capability may differ - consult factory. Add "W" to suffix on Page 3.

**OVERLOAD RELAY** - To prevent coil burnout should the valve not actuate when energized for any reason. Recommended with viscous or unclean liquids, or when abnormal pressure surges or voltage dips can be expected. Separate unit for panel mounting.

**MATERIALS TRACEABILITY, RADIATION-RESISTING COILS & SEALS**  
**SHOCK & VIBRATION-RESISTANT CONSTRUCTIONS & CERTIFICATIONS.**

**SERIES 3300**  
(Horizontal Pipe Mounting)

**SERIES 3300V**  
(Vertical Pipe Mounting)

NEMA 1 General Purpose  
NEMA 2 Drip-Proof  
NEMA 3 Weather-Proof  
NEMA 4 Water-Proof  
NEMA 12 Dust-Tight  
Solenoid Enclosure

Class I, Groups A, B, C, & D, Division 1, Explosion Proof, Solenoid Enclosure



NEMA 1 General Purpose  
NEMA 2 Drip-Proof  
NEMA 3 Weather-Proof  
NEMA 4 Water-Proof  
NEMA 12 Dust-Tight  
Solenoid Enclosure

Class I, Groups A, B, C, & D, Division 1, Explosion Proof, Solenoid Enclosure



**SOLENOID ENCLOSURES** - standard with 1/2" NPT conduit connection (except size T9 - 3/4" NPT).

- ③ MOST LAURENCE EXPLOSION PROOF ENCLOSURES ARE FM APPROVED FOR CLASS I GROUPS A, B, C & D, DIVISION 1!
- Consult factory for CLASS I, GROUP C areas.

**SOLENOID COILS** - Safe Ambient Temp. Safe Fluid Temp.  
Class H insulation 215F ⑤ 550F ⑥

However the safe temperatures for a specific application depend on the overall consideration of the actual max. ambient and fluid temperatures, the temperature rise of the coil to be used, range of applied voltage and nature of hazardous area, if any - consult factory for the safe temps. for your application. Also, higher temperatures can be handled in some cases.

- ⑤ - based on fluid temperature of 215F or less.
- ⑥ - based on ambient temperature of 40C (104F).

Standard coils are waterproofing-varnish dipped, vacuum impregnated and baked. Molded Class H coils for greater resistance to moisture, fungus and physical damage are available. Standard coils are for continuous duty (24-hour continuous energization, with maximum steady state coil temperature within rating of class of insulating materials used).

### STANDARD VOLTAGES

A.C. - 110-120/60, 110-120/50, 220-240/60, 220-240/50, 440-460/60 Volts/hz.  
D.C. - 125 and 250 volts.  
Other voltages/frequencies, special electrical characteristics can be furnished (pressure listings may differ) - consult factory.

**MOUNTING** - All valves must be mounted with the solenoid in a vertical, upright position. Horizontal pipe mounting is standard and should be utilized whenever possible. For vertical pipe mounting (Series 3300V), such as mounting directly on top of a diaphragm cage, see above; or for limited headroom add "Z" to horizontal pipe mounting prefix above for inverted valve body (Series 3300Z).

# CATALOG NUMBER SUFFIXES

CATALOG NUMBER SUFFIXES		PIPE SIZE	C <sub>v</sub> FLOW FACTOR	SOLENOID SIZE		MAXIMUM OPERATING PRESSURE DIFFERENTIAL (PSI)			
						FLOW FORMS M, N & P		FLOW FORM O	
A.C.	D.C.			A.C.	D.C.	A.C. VOLTAGES	D.C. VOLTAGES	A.C. VOLTAGES	D.C. VOLTAGES
24	24DC	1/4"	1.4	CI	C	100	35	60	--
26	26DC			DI	D	140	125	85	75
262	262DC			EI	E	175	155	105	95
32	32DC	3/8"	1.4	CI	C	100	35	60	--
34	34DC			DI	D	140	125	85	75
342	342DC			EI	E	175	155	105	95
37	37DC	3/8"	1.7	CI	C	70	25	40	--
39	39DC			DI	D	100	90	60	55
392	392DC			EI	E	125	110	75	65
42	42DC	3/8"	2.0	CI	C	40	15	25	--
44	44DC			DI	D	60	55	35	30
442	442DC			EI	E	80	70	50	45
50	50DC	1/2"	1.4	CI	C	90	30	55	50
52	52DC			DI	D	180	160	105	95
54	54DC			EI	E	250	225	150	135
542	542DC			T7	T7DC	600	600	350	350
57	57DC	1/2"	1.8	CI	C	60	20	35	30
59	59DC			DI	D	125	110	75	65
61	61DC			EI	E	180	160	105	95
612	612DC			T7	T7DC	400	400	250	250
64	64DC	1/2"	2.3	CI	C	40	15	25	20
66	66DC			DI	D	90	80	55	50
68	68DC			EI	E	125	110	75	65
682	682DC			T7	T7DC	300	300	180	180
70	-	1/2"	3.0	CI	-	25	-	15	-
72	72DC			DI	D	55	50	30	25
74	74DC			EI	E	90	80	55	50
742	742DC			T7	T7DC	180	180	105	105
762	762DC	3/4"	1.4	CI	C	90	30	55	--
764	764DC			DI	D	180	160	105	95
766	766DC			EI	E	250	225	150	135
768	768DC			T7	T7DC	600	600	350	350
782	782DC	3/4"	1.8	CI	C	60	20	35	--
784	784DC			DI	D	125	110	75	65
786	786DC			EI	E	180	160	105	95
788	788DC			T7	T7DC	400	400	250	250
80	80DC	3/4"	2.3	CI	C	40	15	25	--
82	82DC			DI	D	90	80	55	50
84	84DC			EI	E	125	110	75	65
842	842DC			T7	T7DC	300	300	180	180
87	-	3/4"	3.0	CI	-	25	-	15	--
89	89DC			DI	D	55	50	30	25
91	91DC			EI	E	90	80	55	50
912	912DC			T7	T7DC	180	180	105	105
95	95DC	3/4"	4.5	DI	D	35	30	20	15
97	97DC			EI	E	50	45	30	25
972	972DC			T7	T7DC	125	125	75	75
1064	-	1"	2.6	EI	-	100	-	60	--
1066	1066DC			T7	T7DC	400	400	250	250
1068	1068DC			T9	T9DC	500	500	300	300
1122	-	1"	3.3	EI	-	60	-	35	--
1124	1124DC			T7	T7DC	250	250	150	150
1126	1126DC			T9	T9DC	300	300	180	180
1132	-	1"	5.0	EI	-	40	-	25	--
1134	1134DC			T7	T7DC	160	160	95	95
1136	1136DC			T9	T9DC	200	200	120	120
1162	-	1"	8.0	EI	-	25	-	15	--
1164	1164DC			T7	T7DC	110	110	65	65
1166	1166DC			T9	T9DC	135	135	80	80
1204	1204DC	1"	10.5	T7	T7DC	75	75	45	45
1206	1206DC			T9	T9DC	85	85	50	50

**PRESSURES**

Above listings are intended to indicate our current maximum capability. The pressure "rating" of a given suffix number will depend on the overall consideration of the actual pressures, actual temperatures, materials selection, flow form, ambient temperatures (for DC voltages), and other application specifics. In other words, all valves with the same suffix number are not necessarily "rated" at the figure shown. Therefore ALWAYS ADVISE or SPECIFY YOUR ACTUAL pressures and temperature conditions and consult factory for the pressure rating for your application.

For FLOW FORM "O" - if higher pressures and/or larger sizes are needed see Bulletin Series 3350.

For FLOW FORM "P" - The above figures mean the maximum differential between the two inlet pressures. Therefore both the minimum and the maximum pressure that could possibly exist at each inlet must be specified. Also specify which inlet pressure is to be normally closed and which is to be normally open.

TEMPERATURES - Standard max. fluid temperature: 550F;  
Standard min. fluid temperature: -50F;

although variations are made in the standard construction for temperatures within this range. Therefore ALWAYS SPECIFY YOUR ACTUAL TEMPERATURE CONDITIONS. Valves for cryogenics and higher temperatures are available - consult factory.

C<sub>v</sub> FLOW FACTORS - are the real measure of valve flow capacity, not port diameter! The greater the C<sub>v</sub> the faster your cylinder or diaphragm will actuate and vent. See Bulletin 500 or 600 for flow formulas. The above listings are approximate, for estimating only.

SOLENOID SIZE - is for comparison purposes, factory application, and pricing of options. It need not be specified.

CURRENT DRAW - Inrush and holding currents depend on valve size, solenoid size, ambient temperature (D.C. Voltages), voltage/frequency, and other electrical characteristics of the coil selected. Consult factory for specific data.

TO SPECIFY A CATALOG NUMBER - Combine the catalog number prefix from Page 2 with the catalog number suffix from above, e.g. 3300WA24, 331024, 3300WAV24PS, 3310V24CTB.

**ORDERING DATA**

Full catalog number (prefix + suffix + option adders)

Pipe size & C<sub>v</sub>  
Flow Form (see Page 1)

ACTUAL maximum inlet pressure and/or ACTUAL max. operating pressure differential (diff. between open and closed ports) (see notes on this page for Form "P".)

Fluid handled

ACTUAL fluid and ambient temperatures

Flow rate and allowable pressure drop, if important

Viscosity, specific gravity, concentration, etc. if applicable

Valve body and inner parts materials desired

Type of connections

Horizontal or vertical pipe mounting

Type of solenoid enclosure (if explosion proof specify

Class & Group and/or nature of hazard)

Voltage and frequency

Max. time on and frequency of operation

Solenoid coil insulation class

Summary of application and/or sketch of system

Optional of special features

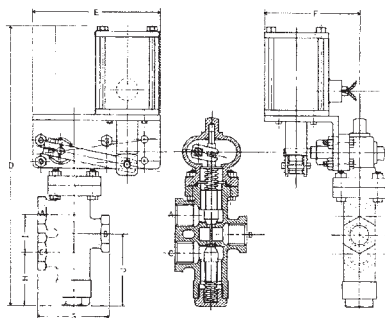
For your convenience, use OUR Solenoid Valve Data Sheet for compiling the above information.

① - For stainless steel & steel body only. Max. pressure for bronze body limited by ANSI B16.15.

# DIMENSIONS (in.) (AC voltage only)

CATALOG NUMBER SUFFIX	PIPE SIZE	SOLENOID SIZE	NEMA 1 GENERAL PURPOSE, NEMA 2 DRIPTIGHT, NEMA 3 WEATHERPROOF, NEMA 4 WATERTIGHT, NEMA 12 DUSTTIGHT, SOLENOID ENCLOSURE				"FM" APPROVED, CLASS I, GROUPS A, B, C, & D, DIVISION 1, EXPLOSION PROOF, SOLENOID ENCLOSURE			
			D	E	F	NET WT. (LB.)	D	E	F	NET WT. (LB.)
			24 26 262	1/4"	CI DI EI	11-1/4 12 13	6-1/4 6-1/4 6-3/4	4-3/4 4-3/4 5-1/4	12 14 20	12 13-1/4 13-3/4
32 34 342	3/8"	CI DI EI	11-1/4 12 13	6-1/4 6-1/4 6-3/4	4-3/4 4-3/4 5-1/4	12 14 20	12 13-1/4 13-3/4	6-1/4 6-3/4 7	4-3/4 6-3/4 5-1/2	14 18 25
37 39 392	3/8"	CI DI EI	11-1/4 12 13	6-1/4 6-1/4 6-3/4	4-3/4 4-3/4 5-1/4	12 14 20	12 13-1/4 13-3/4	6-1/4 6-3/4 7	4-3/4 6-3/4 5-1/2	14 18 25
42 44 442	3/8"	CI DI EI	11-1/4 12 13	6-1/4 6-1/4 6-3/4	4-3/4 4-3/4 5-1/4	12 14 20	12 13-1/4 13-3/4	6-1/4 6-3/4 7	4-3/4 6-3/4 5-1/2	14 18 25
50 52 54 542	1/2"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	15 17 23 31	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	17 20 28 36
57 59 61 612	1/2"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	15 17 23 31	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	17 20 28 36
64 66 68 682	1/2"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	15 17 23 31	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	17 20 28 36
70 72 74 742	1/2"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	15 17 23 31	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	17 20 28 36
762 764 766 768	3/4"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	14 16 22 30	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	16 19 27 35
782 784 786 788	3/4"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	14 16 22 30	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	16 19 27 35
80 82 84 842	3/4"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	14 16 22 30	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	16 19 27 35
87 89 91 912	3/4"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	14 16 22 30	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	16 19 27 35
95 97 972	3/4"	DI EI T7	13-3/4 14-3/4 17-1/4	6-1/4 6-3/4 8	4-3/4 5-1/4 6-3/4	16 22 30	15 15-1/2 18-3/4	6-3/4 7 8	5-1/4 5-1/2 6-3/4	19 27 35
1064 1066 1068	1"	EI T7 T9	19 21-1/2 24-3/4	6-3/4 8 8-1/4	5-1/4 6-3/4 8-3/4	30 39 75	19-3/4 23 25-3/4	7 8 8-3/4	5-1/2 6-3/4 8-1/4	36 43 81
1122 1124 1126	1"	EI T7 T9	19 21-1/2 24-3/4	6-3/4 8 8-1/4	5-1/4 6-3/4 8-3/4	30 39 75	19-3/4 23 25-3/4	7 8 8-3/4	5-1/2 6-3/4 8-1/4	36 43 81
1132 1134 1136	1"	EI T7 T9	19 21-1/2 24-3/4	6-3/4 8 8-1/4	5-1/4 6-3/4 8-3/4	30 39 75	19-3/4 23 25-3/4	7 8 8-3/4	5-1/2 6-3/4 8-1/4	36 43 81
1162 1164 1166	1"	EI T7 T9	19 21-1/2 24-3/4	6-3/4 8 8-1/4	5-1/4 6-3/4 8-3/4	30 39 75	19-3/4 23 25-3/4	7 8 8-3/4	5-1/2 6-3/4 8-1/4	36 43 81
1204 1206	1"	T7 T9	21-1/2 24-3/4	8 8-1/4	6-3/4 8-3/4	39 75	23 25-3/4	8 8-3/4	6-3/4 8-1/4	43 81

- All dimensions and weights shown here are approximate for estimating purposes only.
- For dimensions for D.C. voltages - consult factory. As an approximation, above dimensions for D.C. are about 10% greater than corresponding A.C. dimensions in some cases.
- For Series 3300, valve bodies can be rotated 90° to four positions, to facilitate mounting for direction of flow. Specify with order if body orientation is to be different than standard shown below.
- For Series 3300V dimensions - consult factory. Specify whether "B" connection should be facing up or down.
- For Series 3300Z dimensions - consult factory. Specify direction "B" connection should be facing.



PIPE SIZE	G	H	I	J
1/4", 3/8"	2-1/2	1-7/8	1-1/8	2-3/8
1/2", 3/4"	3-3/8	2-1/2	1-3/4	3-3/8
1"	4-7/8	3-5/8	1-9/16	3-3/8

- 1/2" NPT conduit connection is standard on all valves (except solenoid size T9 & T9DC - 3/4" NPT). Other sizes and types are available. Location of the conduit connection varies depending on the type of solenoid enclosure, size of solenoid and whether A.C. or D.C.

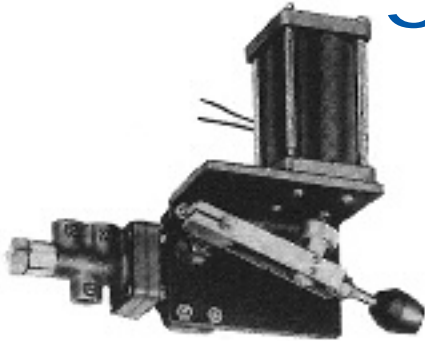
- On all valves additional headroom should be allowed for removal of the solenoid enclosure. Consult factory for details.



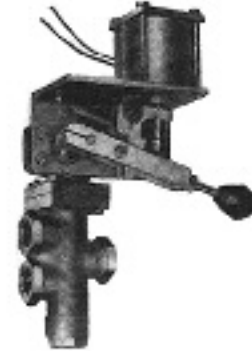
# SERIES 3400 & 3500 - 3-WAY MANUALLY RESET

## ROTARY SHAFT TYPE SOLENOID VALVES

Direct Operated - Poppet Type



SERIES 3400 — TRIP UPON CURRENT FAILURE



SERIES 3500 — TRIP UPON ENERGIZATION

### MANUALLY RESET, NO VOLTAGE RELEASE

- Reset or latched up manually
- Held latched by energized solenoid (current on)
- Trip or fail-safe upon current failure

These valves may be tripped by failure of a signal from a burner flame safeguard, pressure or level switch, flow switch, thermostat, timer, limit switch, photoelectric device, salinity cell, gas analyser, or other sensing device or relay.

### MANUALLY RESET, ELECTRICALLY TRIPPED

- Reset or latched up manually
- Held latched mechanically (current off)
- Trip or fail-safe upon energization

These valves may be tripped by receipt of a signal from a burner flame safeguard, pressure or level switch, flow switch, thermostat, timer, limit switch, photoelectric device, salinity cell, gas analyser, or other sensing device or relay.

### ROTARY SHAFT TYPE

All valves in this bulletin are of the ROTARY SHAFT TYPE, meaning they are actuated by a slight ROTARY motion (20-30° arc) which, by way of the Rotary Teflon Shaft Seal, transmits the lifting action of the operating lever through a mechanical advantage to the valve poppets.

### FLOW FORMS

Each 3-way solenoid valve is factory adjusted for a particular FLOW FORM; that is, for installation and operation according to the chart below. These are two position valves - one of the two ports is always closed while the other is open.

#### - For PILOT CONTROL: Opening and Closing of Pneumatic and Hydraulic Control Valves, Devices & Systems; Safety Shut-Off, Emergency Venting

FORM "M" - Supply Normally Closed  
Latch to open inlet port  
Trip to vent

FORM "N" - Supply Normally Open  
Latch to vent  
Trip to open inlet port

#### - For DIRECTIONAL CONTROL: Diverting, By-Passing, Recirculating, Selecting, Sampling, Switching

FORM "O" - Diverting (one inlet, two outlets)  
Latch to open normally closed outlet, close normally open outlet.  
Trip to reverse above action ( return to normal position ).

FORM "P" - Selecting (two inlets, one outlet)  
Latch to open normally closed inlet, close normally open inlet.  
Trip to reverse above action ( return to normal position ).

SERIES	FLOW FORM "M" INLET a "A" OUTLET a "B" VENT a "C"	FLOW FORM "N" INLET a "C" OUTLET a "B" VENT a "A"	FLOW FORM "O" INLET a "B" N/C OUTLET a "A" N/O OUTLET a "C"	FLOW FORM "P" N/C INLET a "A" N/O INLET a "C" OUTLET a "B"
3400				
3500				
ACTUATED "LATCHED" POSITION				
NORMAL "UN-LATCHED" POSITION				

### FEATURES

#### ROTARY SHAFT TYPE with ROTARY TEFLON SHAFT SEAL:

Greater valve-actuation and valve-return reliability is achieved compared to customary packless type valves because of the mechanical advantage from the long external operating lever.

No seal maintenance is generally required. The slight rotary motion produces negligible wear. No "in and out" wear and tear of the packing occurs as in reciprocating "direct lift" valves.

Corrosive, unfiltered and/or hot air and other difficult fluid media are handled safely; contained in a lower valve unit away from the solenoid.

Manual opening and manual closing are provided by the external lever; in case of emergency, for trial operation, etc.

Visual valve position indication is provided by the inherent external lever.

#### NO MINIMUM PRESSURE or FLOW REQUIREMENT

Opens and closes fully down to 0 PSI.

Positive, quick action at all pressures - **DIRECT OPERATED** (no internal pilot, no floating poppets, no suction effects as with diaphragms).

#### CLOSELY GUIDED VALVE INTERNAL PARTS

Prevents binding due to misalignment; consistent, lasting tight shut-off.

#### HEAVY-DUTY PILOT SWITCH PROVISION

Contact-type heavy-duty limit switch(es) can be mounted readily to indicate valve position remotely or to actuate an alarm or a relay.

### DIRECT OPERATED, POPPET TYPE

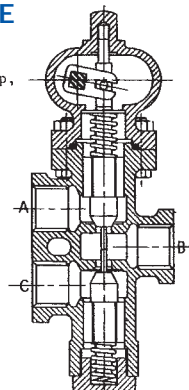
#### ADVANTAGES:

- No tiny orifices to clog with dirt or freeze up,
- No flutter, no suction effects & hang ups,
- Valve position not affected by change of flow direction or loss of pressure,
- No periodic replacing of worn or broken diaphragms,
- No minimum pressure requirement;

#### AS IN A PILOTED DIAPHRAGM 3-WAY VALVE!

- No sliding o-ring seals to wear & replace,
- No galling of metal-to-metal sliding surfaces,
- Not as susceptible to fouling from dirt,
- Not susceptible to binding from extreme ambient temperature fluctuations;

#### AS IN A SLIDING-SPOOL TYPE 3-WAY VALVE!





# CATALOG NUMBER PREFIXES

## SERIES 3400 NO VOLTAGE RELEASE

## SERIES 3500 ELECTRICALLY TRIPPED

NEMA 1 General Purpose  
NEMA 2 Drip-tight  
NEMA 3 Weatherproof  
NEMA 4 Weatherproof  
NEMA 12 Dust-tight  
Solenoid Enclosure

Class I, Groups A, B, C, & D, Division 1, Explosion Proof Solenoid Enclosure



NEMA 1 General Purpose  
NEMA 2 Drip-tight  
NEMA 3 Weatherproof  
NEMA 4 Weatherproof  
NEMA 12 Dust-tight  
Solenoid Enclosure

Class I, Groups A, B, C, & D, Division 1, Explosion Proof Solenoid Enclosure



VALVE BODY		INNER PARTS	CATALOG NUMBER PREFIXES			
Bronze	ASTM B-62	Brass & S.S.	3400WA	3410	3500WA	3510
Bronze	B-62	Stainless Steel	3402WA	3412	3502WA	3512
Naval Bronze	B-61	Monel ①	3402NBWMA	3412NBM	3502NBWMA	3512NBM
Steel	A216 WCB	Stainless Steel	3409WA	3419	3509WA	3519
Stainless Steel Type 304	A351 CF8	Stainless Steel Type 303/304	3405WA	3415	3505WA	3515
Stainless Steel Type 316	A351 CF8M	Stainless Steel Type 316	3406WA	3416	3506WA	3516
Stainless Steel Alloy-20	A351 CN7M	Stainless Steel Alloy-20 ②	3408WA	3418	3508WA	3518
Monel	FED QQ-N-288	Monel ①	3408MWA	3418M	3508MWA	3518M

**INNER PARTS** - means ALL parts coming in contact with the fluid (solenoid magnetic parts are not wetted by the fluid).

- ① Springs are normally Inconel. Maximum pressure listings may differ - consult factory.
- ② Valve bottom poppet spring is normally 316 S.S.

**VALVE DISCS** - standard: TFE,

Regrinding type are also available (rounded metal discs, lapped in for tight shut-off). Add "X" to Cat. No. prefix above.

**VALVE BODIES** - standard: with screwed (female NPT) connections; CLASS 250-bronze, CLASS 300 & 600-steel & stainless steel. Flanged, butt-weld, socket-weld & sil-braze ends are also available. Chemicals and physicals of castings comply with those in specification shown.

**VALVE SEATS** - standard: integral.

## OPTIONAL FEATURES

**POSITION SWITCH(ES)** - Heavy duty, SPDT or DPDT, for remote indication of valve position or to actuate an alarm or relay; contacts rated up to 20 amps @ 115/60 AC or 10 amps @ 125 DC; for valve closed and/or valve open. Add "PS" to suffix on Page 3.

**SOLENOID CUT-IN SWITCH** - (Series 3400 only) to energize the solenoid only as the valve is being latched up. Add "CS" to suffix on page 3.

**SOLENOID CUT-OUT SWITCH** - (Series 3500 only) to de-energize the solenoid after the valve has tripped. Add "CS" to suffix on page 3.

**EXTERNAL LINKAGE COVER** - To discourage tampering with, or tying-up of the valve mechanism, and/or to prevent direct contact with the weather or corrosive ambient. Add "LC" to suffix on page 3. Optionally available with Lexan window.

**TRIP DELAY** - (Series 3400 only) to avoid inadvertent valve trip during a momentary power loss. Consult factory

**TERMINAL BLOCK** - For making solenoid connections within the solenoid enclosure. Add "TB" to suffix on page 3.

**LEVER LOCKING DEVICE** - To hold or lock valve in actuated or manually-overridden position. Add "LD" to suffix on page 3.

**GRAVITY OPERATED** - With a weight on external lever to assist return to normal or fail-safe position - for additional reliability from gravity. Maximum pressure capability may differ - consult factory. Add "W" to suffix on page 3.

**INVERTED BODY** - For limited headroom.

**MATERIALS TRACEABILITY, RADIATION-RESISTING COILS & SEALS SHOCK & VIBRATION-RESISTANT CONSTRUCTIONS & CERTIFICATIONS.**

**VALVE BODY-BONNET FLANGE O-RING SEAL** - standard: Teflon, except bronze body series 3400WA & 3500WA - Buna N, Viton, metal and EPR also available

**SHAFT SEAL** - standard: ROTARY TEFLON SHAFT SEAL. Buna N, Viton, Ethylene Propylene, and lapped metal-to-metal as alternate primary seals are also available.

**SOLENOID ENCLOSURES** - Standard with 1/2" NPT conduit connection  
③ MOST LAURENCE EXPLOSION PROOF ENCLOSURES ARE "FM" APPROVED FOR CLASS I GROUPS B, C, & D, DIVISION 1!

**SERIES 3400 ALSO APPROVED FOR GROUP A**

SOLENOID COILS -	SERIES 3400	SERIES 3500	SAFE
	SAFE	SAFE	SAFE
	AMBIENT TEMP.	AMBIENT TEMP.	FLUID TEMP.

Class H insulation      230F ⑤      185F ⑤      550F ⑥

The safe temperatures for a specific application depend on the overall consideration of the actual max. ambient and fluid temperatures, the temperature rise of the coil to be used, range of applied voltage and nature of hazardous area, if any - consult factory for the safe temps. for your application. Also, higher temperatures can be handled in some cases.

- ⑤ - based on fluid temperature of 185F or less.
- ⑥ - based on ambient temperature of 40C (104F).

Standard coils are waterproofing-varnish dipped, vacuum impregnated and baked. Molded Class H coils for greater resistance to moisture, fungus, and physical damage are available. Standard coils are for continuous duty (24-hour continuous energization, with maximum steady state coil temperature within rating of class of insulating materials used).

**STANDARD VOLTAGES** -

A.C. - 115, 220, or 440 volts; 60 or 50 Hz. For Series 3400 a D.C. coil along with a solid-state rectifier is used for greater holding power, lower current draw, and no electrical noise.

D.C. - 125, or 250 volts.

Other voltages, frequencies, special electrical characteristics can be furnished - consult factory.

**MOUNTING** - All valves must be mounted with the solenoid in a vertical, upright position. Horizontal pipe mounting is standard and should be utilized whenever possible. Where vertical pipe mounting is required for mounting directly on top of a diaphragm cage - Add "M" to prefix above. ( i.e. 3400WAV ) Or, for limited headroom add "Z" to above prefix for inverted valve body. ( i.e. 3400WAZ )

# CATALOG NUMBER SUFFIXES

CATALOG NUMBER SUFFIX A.C., D.C.	PIPE SIZE	C <sub>v</sub> FLOW FACTOR	SERIES		MAXIMUM OPERATING PRESSURE DIFFERENTIAL (PSI) ①				
			3400 SOLENOID SIZE A.C., D.C.		3500 SOLENOID SIZE A.C., D.C.		FLOW FORMS		
			M & P	N	O				
23,23DC 25DC	1/4"	1.4	CMR - CM -	CI - D -	175	250	105		
31,31DC 33DC	3/8"	1.4	CMR - CM -	CI - D -	175	250	105		
41,41DC 43DC	3/8"	2.0	CMR - CM -	CI - D -	80	115	50		
49,49DC 51DC	1/2"	1.4	CMR - CM -	CI - D -	600②	600②	350		
56,56DC 58DC	1/2"	1.8	CMR - CM -	CI - D -	400	400	250		
63,63DC 65DC	1/2"	2.3	CMR - CM -	CI - D -	300	300	180		
69,69DC 71DC	1/2"	3.0	CMR - CM -	CI - D -	180	180	105		
772,772DC 774DC	3/4"	1.4	CMR - CM -	CI - D -	600②	600②	350		
782,782DC 784DC	3/4"	1.8	CMR - CM -	CI - D -	400	400	250		
79,79DC 81DC	3/4"	2.3	CMR - CM -	CI - D -	300	300	180		
86,86DC 88DC	3/4"	3.0	CMR - CM -	CI - D -	180	180	105		
93,93DC 94DC	3/4"	4.5	CMR - CM -	CI - D -	125	125	75		
1062S,1062SDC 1066S,1066SDC	1 ③	2.6	CMR - CM -	EI - E -	500	500	300		
107S,107SDC 111S,111SDC	1 ③	3.3	CMR - CM -	EI - E -	300	300	180		
1202,1202DC 1206,1206DC	1	5.0	CMR - CM -	EI - E -	200	200	120		
1148,1148DC 117,117DC	1	8.0	CMR - CM -	EI - E -	135	135	80		
1208,1208DC 124,124DC	1	10.5	CMR - CM -	EI - E -	85	85	50		

- ① - Max. differential between the open and closed ports.
- ② - For stainless steel and steel body only. Max. pressure for bronze body limited by ANSI B16.15.
- ③ - Standard with 303 stainless steel inserted seats with bronze body.

**SOLENOID SIZE** - is for comparison purposes, factory application, and pricing of options. It need not be specified.

**CURRENT DRAW** - Inrush and holding currents depend on valve size, solenoid size, ambient temperature (D.C. Voltages), voltage/frequency, and other electrical characteristics of the coil selected. Consult factory for specific data.

## PRESSURES

Above listings are intended to indicate our current maximum capability. The pressure "rating" of a given suffix number will depend on the overall consideration of the actual pressures, actual temperatures, materials selection, flow form, ambient temperatures (for DC voltages), and other application specifics. In other words, all valves with the same suffix number are not necessarily "rated" at the figure shown. Therefore ALWAYS ADVISE or SPECIFY YOUR ACTUAL pressures and temperature conditions and consult factory for the pressure rating for your application.

For FLOW FORM "O" - if higher pressures and/or larger sizes are needed see Bulletin Series 3350, 3450 or 3550.

For FLOW FORM "P" - The above figures mean the maximum differential between the two inlet pressures. Therefore both the minimum and the maximum pressure that could possibly exist at each inlet must be specified. Also specify which inlet pressure is to be normally closed and which is to be normally open.

**TEMPERATURES** - Standard max. fluid temperature: 550F  
Standard min. fluid temperature: -50F

Variations are made in the standard construction for temperatures within this range. Therefore ALWAYS SPECIFY YOUR ACTUAL TEMPERATURE CONDITIONS. Valves for cryogenics and higher temperatures are available - consult factory.

C<sub>v</sub> FLOW FACTORS - are the real measure of valve flow capacity, not port diameter! The greater the C<sub>v</sub> the faster your cylinder or diaphragm will actuate and vent. See Bulletin 500 or 600 for flow formulas. The above listings are approximate, for estimating only.

## ORDERING DATA

Full catalog number (prefix + suffix + option adders)  
Pipe size & C<sub>v</sub>  
Flow Form (see Page 1).

ACTUAL maximum inlet pressure and/or ACTUAL max. operating pressure differential (diff. between open and closed ports) (see notes on this page for FORM "P").

Fluid handled

ACTUAL fluid and ambient temperatures

Flow rate and allowable pressure drop, if important

Viscosity, specific gravity, concentration, etc. if applicable

Valve body and inner parts materials desired

Type of connections

Type of solenoid enclosure (if explosion proof specify Class & Group and/or nature of hazard)

Voltage and frequency

Max. time on frequency of operation

Solenoid coil insulation class

Summary of application and/or sketch of system

Optional or special features

For your convenience, use OUR Solenoid Valve Data Sheet for compiling the above information.

TO SPECIFY A CATALOG NUMBER - Combine the catalog number prefix from Page 2 with the catalog number suffix from above, e.g. 3402WA23, 3515772DC, 3412NBM1208, 3502WA71DCCSLD

# DIMENSIONS

CATLAOG NUMBER SUFFIX	PIPE SIZE	SOLE-NOID SIZE	FOR SOLENOID ENCLOSURES:				FOR SOLENOID ENCLOSURES:			
			D	E	F	NET WEIGHT	D	E	F	NET WEIGHT
			NEMA 1 General Purpose NEMA 2 Driptight NEMA 3 Weatherproof NEMA 4 Watertight NEMA 12 Dusttight				Class I, Groups B, C, D, Division I, Explosion Proof			

## SERIES 3400

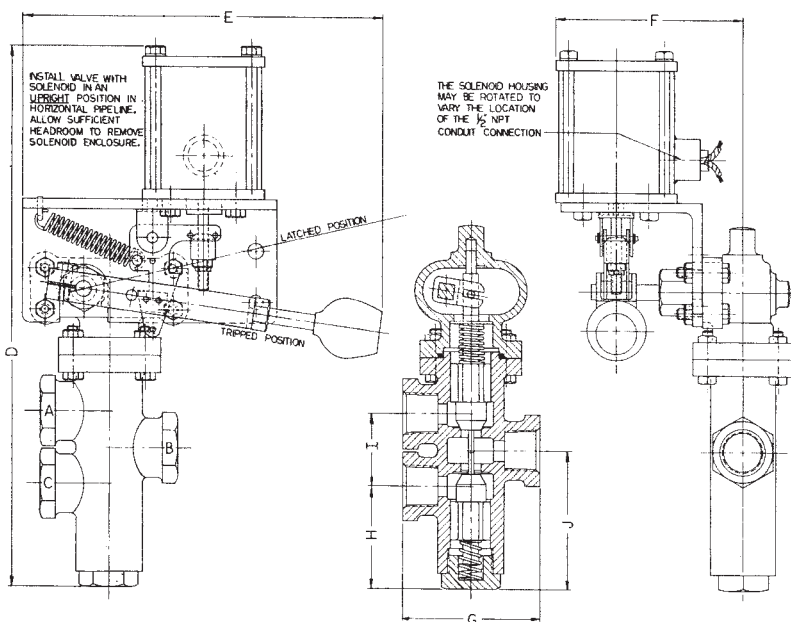
23, 31, 41	1/4, 3/8	CMR	12-3/4	6-1/4	4-3/4	15	12-3/4	6-1/4	4-3/4	15
23DC, 31DC, 41DC	1/4, 3/8	CM	11	6-1/4	4-3/4	14	12	6-1/4	4-3/4	14
49, 56, 63, 69, 772, 782, 79, 86, 93	1/2, 3/4	CMR	14-1/2	6-1/4	4-3/4	16	14-1/2	6-1/4	4-3/4	16
49DC, 56DC, 63DC, 69DC, 772DC, 782DC	1/2, 3/4	CM	12-3/4	6-1/4	4-3/4	15	13-3/4	6-1/4	4-3/4	15
1062S, 107S, 1202, 1148, 1208	1	CMR	18-3/4	6-1/4	4-3/4	23	18-3/4	6-1/4	4-3/4	23
1062SDC, 107SDC, 1202DC, 1148DC, 1208DC	1	CM	17	6-1/4	4-3/4	22	18	6-1/4	4-3/4	22

## SERIES 3500

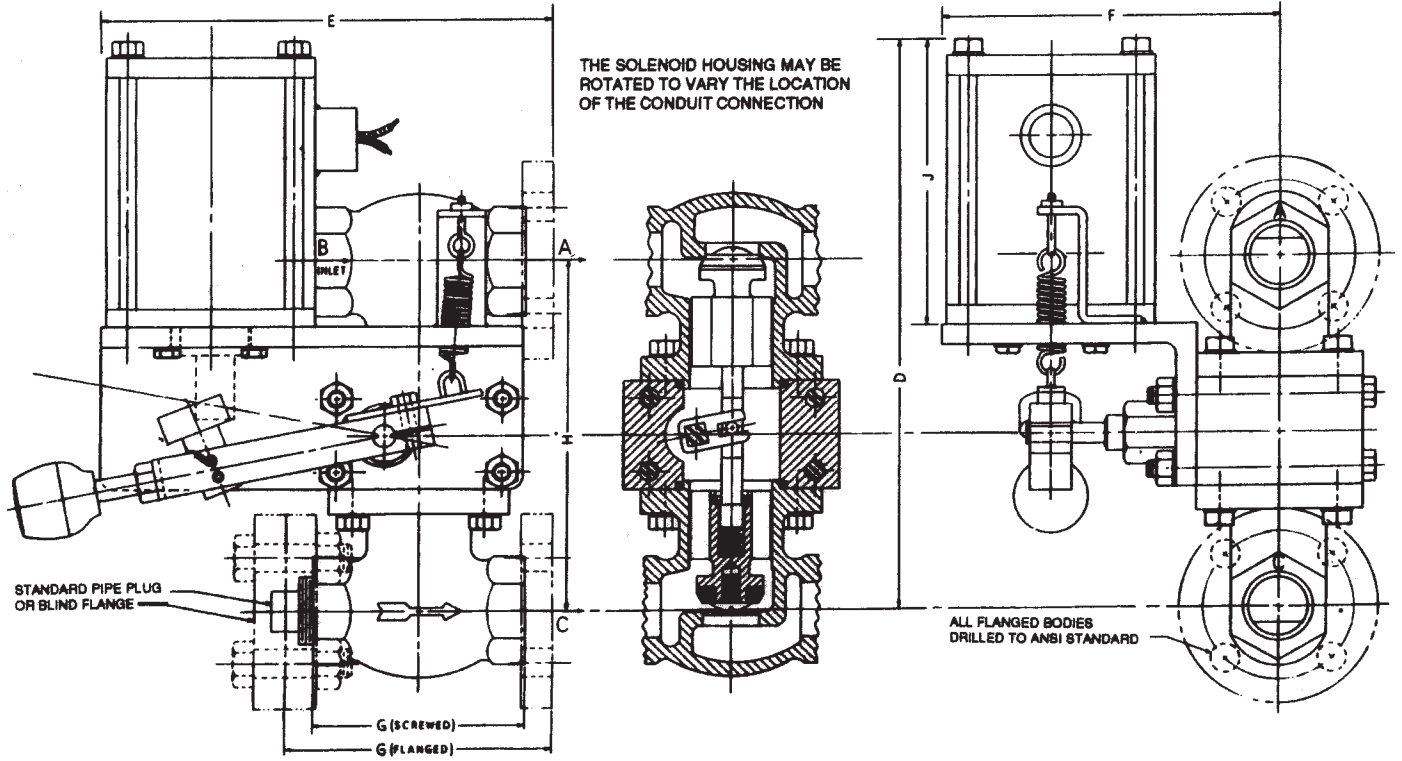
23, 23DC, 31, 31DC, 41, 41DC	1/4, 3/8	CI, C	11-1/2	6-1/4	4-3/4	14	12-1/2	6-1/4	4-3/4	14
25DC, 33DC, 43DC	1/4, 3/8	D	12-1/2	6-1/4	5	18	13-3/4	6-1/4	5-1/4	21
49, 49DC, 56, 56DC, 63, 63DC, 69, 69DC, 772, 772DC, 782, 782DC, 79, 79DC, 86, 86DC, 93, 93DC	1/2, 3/4	CI, C	13-1/4	6-1/4	4-3/4	15	14-1/4	6-1/4	4-3/4	15
51DC, 58DC, 65DC, 71DC, 774DC, 784DC	1/2, 3/4	D	14-1/4	6-1/4	5	20	15-1/2	6-1/2	5-1/4	23
1066S, 111S, 1206, 117, 124	1	EI	17-3/4	6-3/4	5-1/4	27	18-3/4	7	5-1/2	30
1066SDC, 111SDC, 1206DC, 117DC, 124DC	1	E	17	6-3/4	5-1/4	26	18-3/4	7	5-1/2	29

All above dimensions and weights are approximate, for estimating purposes only. Net weights are based on a bronze valve. For Vertical Pipe Mounting dimensions consult factory. Specify whether "B" connection should be facing up or down.

PIPE SIZE	G	H	I	J
1/4, 3/8	2-1/2	1-3/4	1-1/8	2-3/8
1/2, 3/4	3-3/8	2-1/2	1-3/4	3-3/8
1	4-3/8	3-1/2	3-1/2	5-1/4



On all valves additional headroom should be allowed for removal of the solenoid enclosure/coil. Valve bodies can be rotated 90° to four positions, to facilitate mounting for direction of flow. If available headroom is limited, valve can be furnished with valve body inverted.



Install valve with solenoid in an upright position in horizontal pipe lines. Allow sufficient headroom to remove solenoid - see Dimension "J".

To facilitate mounting for direction of flow, upper valve body can be rotated 180°, lower valve body can be rotated 90° to four positions - see instruction sheet.

**SERIES CY500 & CY600  
2-WAY ROTARY SHAFT TYPE  
CYLINDER OPERATED VALVE**

NORMALLY CLOSED - OPENED BY CYLINDER  
Horizontal or Vertical Pipe Mounting

Laurence Catalog No. \_\_\_\_\_  
 Pipe Size \_\_\_\_\_ Cv (APR) \_\_\_\_\_ Port Dia. \_\_\_\_\_  
 Valve Body \_\_\_\_\_ Inner Parts \_\_\_\_\_  
 Discs \_\_\_\_\_ Shaft Seal \_\_\_\_\_  
 Fluid \_\_\_\_\_ Spec. Grav. \_\_\_\_\_  
 Viscosity \_\_\_\_\_ Other Properties \_\_\_\_\_  
 Max. Opening Differential Pressure \_\_\_\_\_  
 Operating Temps \_\_\_\_\_ Ambient \_\_\_\_\_  
 Flow Rate \_\_\_\_\_ P. \_\_\_\_\_  
 Type Connections \_\_\_\_\_  
 Solenoid Enclosure \_\_\_\_\_  
 \_\_\_\_\_ Volts \_\_\_\_\_ Hertz - Coil Ins. Class \_\_\_\_\_

Duty: Continuous      Conduit Connection: 1/2" NPT

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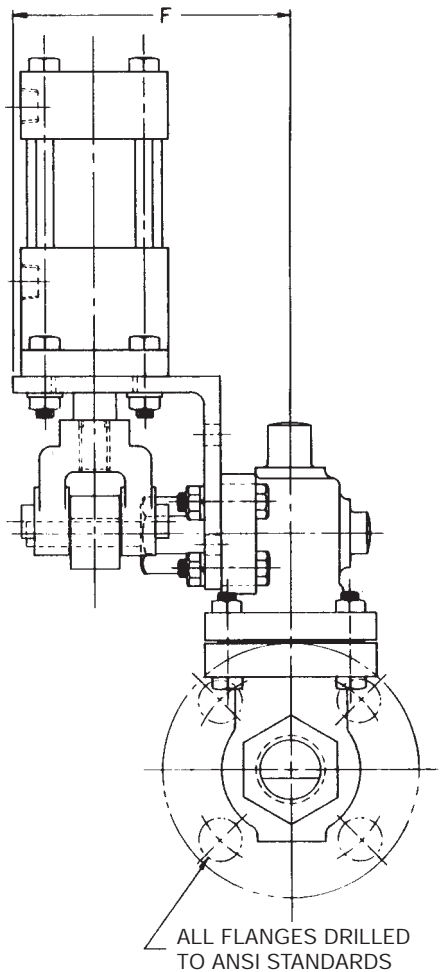
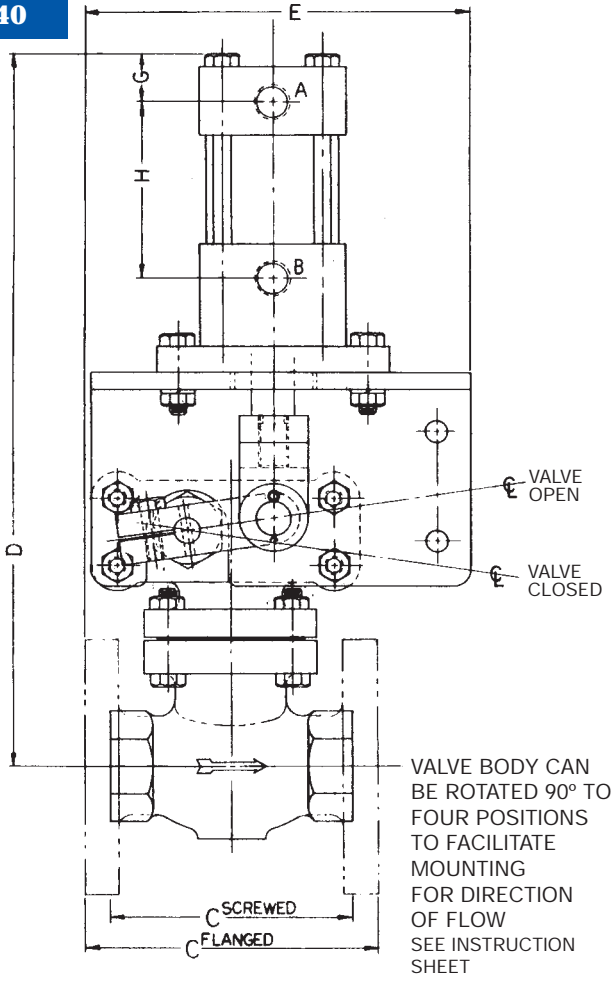
Dimensions: D- \_\_\_\_\_ F- \_\_\_\_\_ H- \_\_\_\_\_  
 E- \_\_\_\_\_ G- \_\_\_\_\_ J- \_\_\_\_\_

Net Weight \_\_\_\_\_ lbs

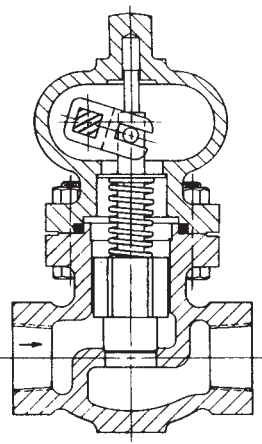
Current Data: \_\_\_\_\_ Amps Holding  
 \_\_\_\_\_ Amps Inrush  
 at \_\_\_\_\_ Volts \_\_\_\_\_ Hertz

Refer to \_\_\_\_\_  
 Laurence S.O. Number \_\_\_\_\_  
 Laurence Serial No. \_\_\_\_\_  
 Item \_\_\_\_\_ Tag \_\_\_\_\_  
 Mark \_\_\_\_\_  
 Customer \_\_\_\_\_  
 P.O. \_\_\_\_\_ Req. \_\_\_\_\_  
 User \_\_\_\_\_  
 Location \_\_\_\_\_

FLOW FORM "O" - Connect inlet at "B"  
 Normally Closed Outlet at "A"  
 Normally Open Outlet at "C"  
 Latch to close "C" outlet, open "A" outlet  
 Trip to open "C" outlet, close "A" outlet

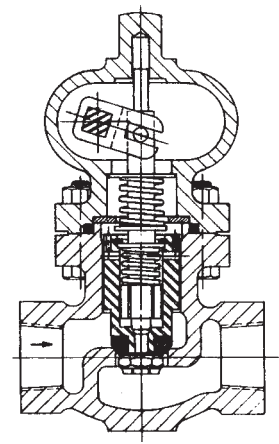


**SERIES CY500  
DIRECT OPERATED**



SHOWN WITH  
REGRINDING DISC

**SERIES CY600  
SEMI-DIRECT OPERATED**



SHOWN WITH  
RESILIENT DISC

**SERIES CY500 & CY600  
2-WAY ROTARY SHAFT TYPE  
CYLINDER OPERATED VALVE**

**NORMALLY CLOSED - OPENEND BY CYLINDER**  
Horizontal or Vertical Pipe mounting

Laurence Catalog No. \_\_\_\_\_  
 Pipe Size \_\_\_\_\_ Cv (APR) \_\_\_\_\_ Port Dia. \_\_\_\_\_  
 Discs \_\_\_\_\_ Shaft Seal \_\_\_\_\_  
 Fluid \_\_\_\_\_ Spec. Grav. \_\_\_\_\_  
 Viscosity \_\_\_\_\_  
 Other Properties \_\_\_\_\_  
 Max. Opening Pressure Differential \_\_\_\_\_  
 Operating Temps \_\_\_\_\_ Ambient \_\_\_\_\_  
 Flow Rate \_\_\_\_\_ P \_\_\_\_\_  
 Type Connections \_\_\_\_\_  
 Min./Max. Cyl. Operatiing Pressure \_\_\_\_\_ / \_\_\_\_\_  
 \_\_\_\_\_ Acting \_\_\_\_\_ Cylind. Conn \_\_\_\_\_  
 Dimensions: C- \_\_\_\_\_ D- \_\_\_\_\_ E- \_\_\_\_\_ F- \_\_\_\_\_  
 G- \_\_\_\_\_ H- \_\_\_\_\_  
 Net Weight \_\_\_\_\_ lbs  
 Refer to \_\_\_\_\_  
 Laurence S.O. Number \_\_\_\_\_  
 Laurence Serial No. \_\_\_\_\_  
 Item \_\_\_\_\_ Tag \_\_\_\_\_  
 Mark \_\_\_\_\_  
 Customer \_\_\_\_\_  
 P.O. \_\_\_\_\_ Req. \_\_\_\_\_  
 User \_\_\_\_\_  
 Location \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

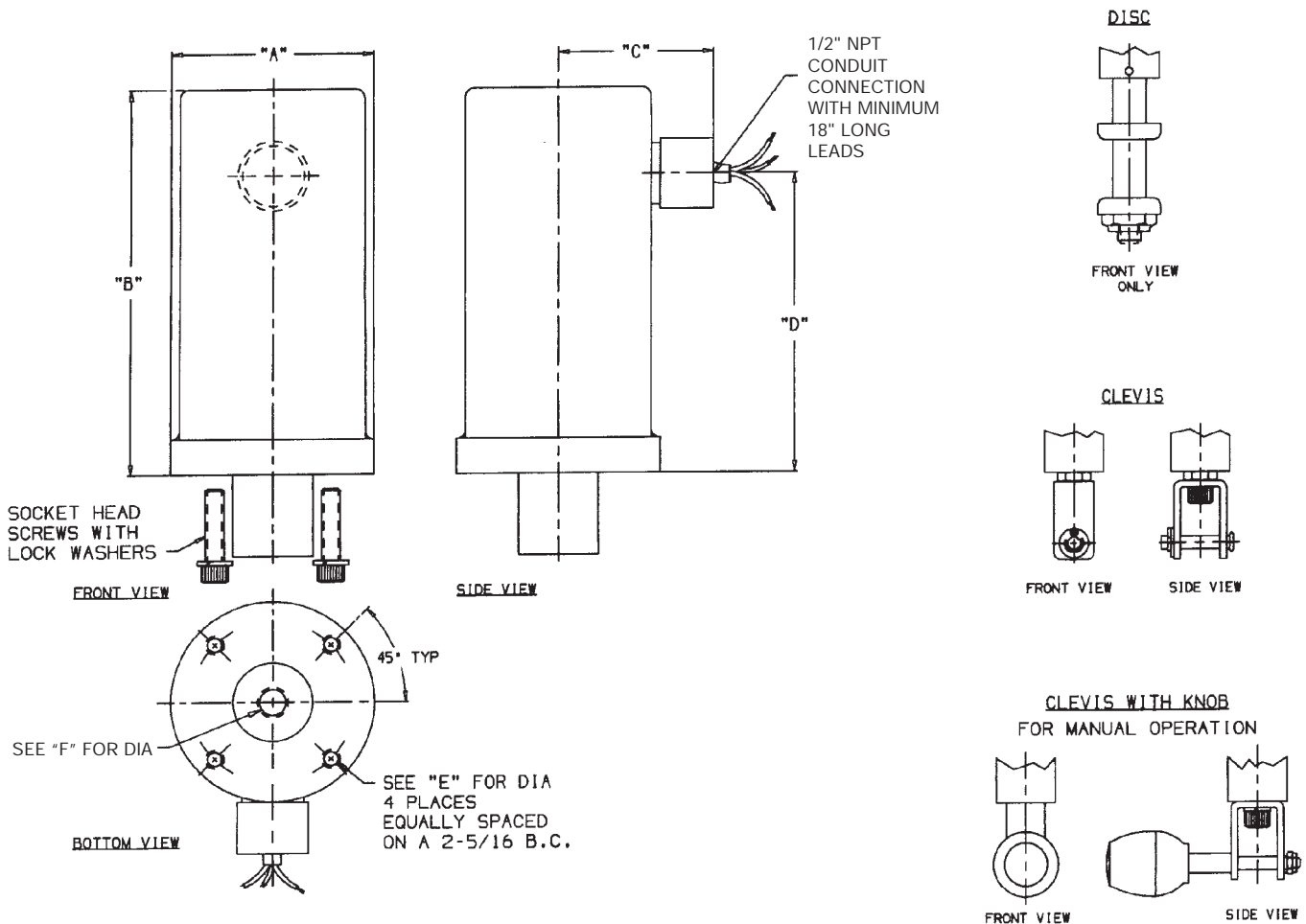


SOLI-CON®		RATED VOLTAGE	INRUSH/ HOLDING <sup>1</sup>	"A" DIA	"B"	"C"	"D"	"E"	"F"	MAX. Stroke	MIN. Force <sup>2</sup>	MIN. Hold <sup>2</sup>
NEMA 4	Explosion Proof FM Approved											
SCA	ESCA	120 VAC 60 HZ Range: 90-140 VAC	4.7 / 0.1	2-7/8	5-1/2	2-3/16	4-1/4	1/4-20UNC-2B	5/16-1BUNC-2B	1.5	7.0	27.0
SCA	ESCA	220 VAC 60 HZ Range: 180-275	4.5 / 0.1	2-7/8	5-1/2	2-3/16	4-1/4	1/4-20UNC-2B	5/16-1BUNC-2B	1.5	7.0	27.0
SCD	ESCD	125 VDC Range: 90-140 VAC	5.3 / 0.1	2-7/8	5-1/2	2-3/16	4-1/4	1/4-20UNC-2B	5/16-1BUNC-2B	1.5	7.0	27.0
SCD	ESCD	250 VDC Range: 180-275	2.5 / .16	2-7/8	5-1/2	2-3/16	4-1/4	1/4-20UNC-2B	5/16-1BUNC-2B	1.5	7.0	27.0
SCB	ESCB	120 VAC 60HZ Range: 90-140 VAC	14.2 / .2	3-1/2	7-1/4	2-11/16	5-3/4	3/8-16UNC-2B	7/16-14UNC-2B	2.50	26.0	77.0
SCE	ESCE	125 VDC Range: 90-VDC	13.5 / .04	3-1/2	7-1/4	2-11/16	5-3/4	3/8-16UNC-2B	7/16-14UNC-2B	2.50	21.0	60.0
SCB	N/A	220 VAC 60HZ Range: 180-275VAC	7.5 / .17	3-1/2	7-1/4	2-11/16	5-3/4	3/8-16UNC-2B	7/16-14UNC-2B	2.50	21.0	60.0
SCG	ESCG <sup>3</sup>	24 VDC Range: 21.6-26.4 VDC	14.0 / .8	3-1/2	6-3/16	2-19/32	4-37/64	1/4-20UNC-2B	5/16-1BUNC-2B	1.50	10.5	28.0
SCH	ESCH <sup>3</sup>	48/120/240 VAC Range: ± 10%	6.5-12.0 / .4-1.4	3-1/2	6-3/16	2-19/32	4-37/64	1/4-20UNC-2B	5/16-1BUNC-2B	1.50	10.5	28.0
SCH	ESCH <sup>3</sup>	48/125/250 VDC Range: ± 10%	6.5-12.0 / .4-1.4	3-1/2	6-3/16	2-19/32	4-37/64	1/4-20UNC-2B	5/16-1BUNC-2B	1.50	10.5	28.0

NOTES:

1. INRUSH/HOLDING - Amps at nominal voltage.
2. FORCE/HOLDING in pounds - Based on maximum temperature and minimum voltage.
3. SOLI-CON® to be mounted on existing bracket.

### OPTIONAL PLUNGER ATTACHMENTS





**FM APPROVED EXPLOSION PROOF SOLENOID OPERATORS/ACTUATORS**

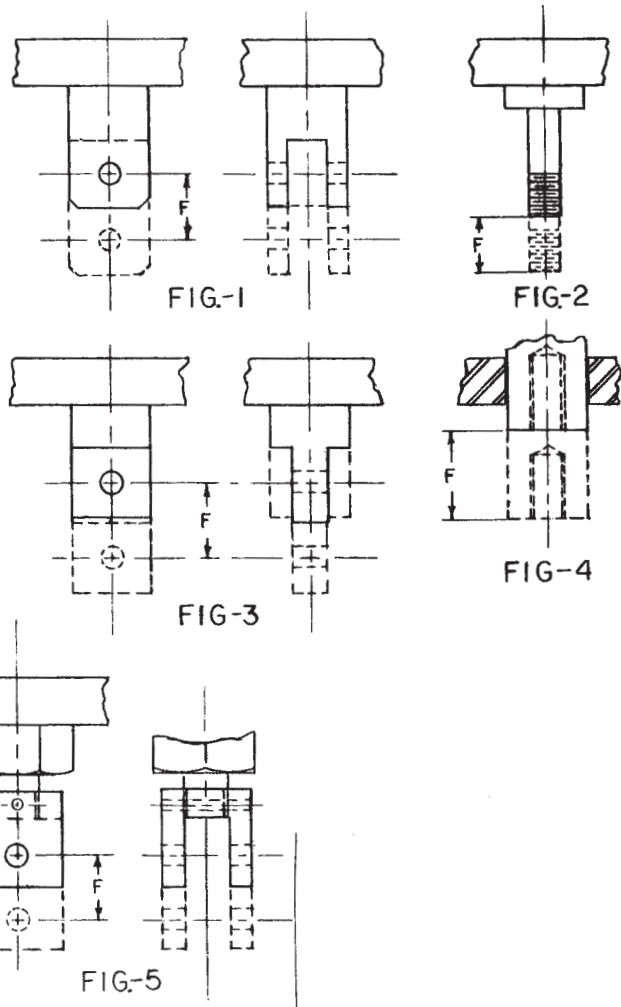
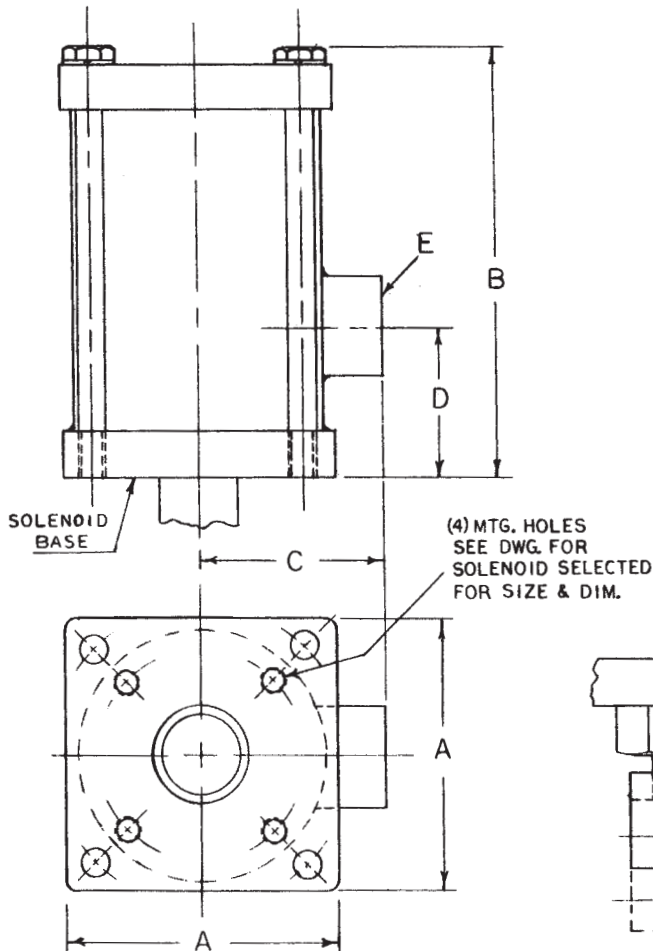


**APPROVED**

For CLASS I, GROUPS A, B, C & D, Division 1 & 2 Areas and CLASS II, GROUPS E, F & G, Division 1 & 2 Areas.

SOLENOID OPER. MODEL	F MAX. STROKE INS.	CONTINUOUS DUTY				FIG. NO.	A	B	C	D	E	SEE ADD. SPEC. PAGE
		MAX. PULL-LBS.		CURRENT-AMPS.								
		85% VOLTS	115VAC 125VDC	INRUSH	HOLD							
EC1(AC)	3/4	2.4	3.25	4.0	0.6	1&2	3	4-3/4	2-1/4	1-5/8	1/2 NPT	2
EC(DC)	1/2	1.5	2.5	0.2	0.2	3&4	3	4-3/4	2-1/4	1-5/8	1/2 NPT	2
ED1(AC)	1	4.7	6.75	6.8	0.8	1&2	4	5-7/8	2-1/2	1-3/4	1/2 NPT	2
ED(DC)	5/8	2.5	5.25	0.3	0.3	3&4	4	5-7/8	2-1/2	1-3/4	1/2 NPT	2
EE1(AC)	1-3/8	5.5	7.0	11.5	1.1	1&2	4-1/2	6-1/2	2-7/8	1-5/8	1/2 NPT	2
EE(DC)	3/4	5.0	7.0	0.3	0.3	3&4	4-1/2	6-1/2	2-7/8	1-5/8	1/2 NPT	2
ET7AC	1-1/2	14.0	20.0	24.0	3.3	5	5-5/8	9-1/4	3-1/2	4-1/2	1/2 NPT	3
ET7DC	1-1/2	14.0	20.0	10.6	0.1	5	6-3/8	9-1/4	3-7/8	5	1/2 NPT	3
ET8AC	2-1/8	18.0	25.0	40.0	4.6	5	7-1/8	11-1/2	4-1/4	7-1/4	3/4 NPT	3
ET8DC	2-1/8	18.0	25.0	12.5	0.13	5	7-1/8	11-1/2	4-1/4	7-1/4	3/4 NPT	3
ET9AC	2-1/8	25.0	35.0	48.0	4.1	5	7-1/8	11-1/2	4-1/4	7-1/4	3/4 NPT	3
ET9DC	2-1/8	25.0	35.0	13.5	0.13	5	7-5/8	11-1/2	4-1/2	8-1/2	3/4 NPT	3

- NOTES:** - AC pull values are higher if load exists only at maximum stroke;
- When inquiring or specifying, submit a thorough description or graph of load vs. stroke;
  - Not every Model is approved for all areas; consult factory;
  - In some cases, pull values for CLASS I, GROUP C, are lower; consult factory.



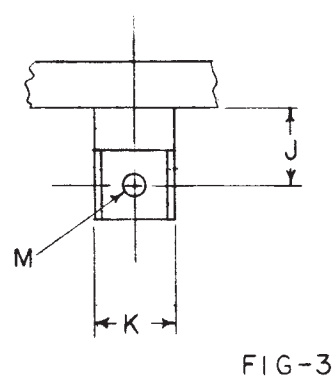
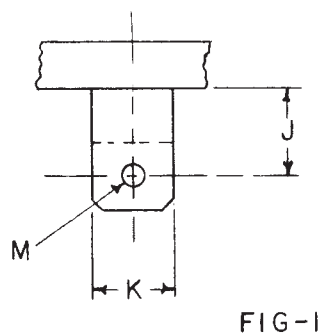
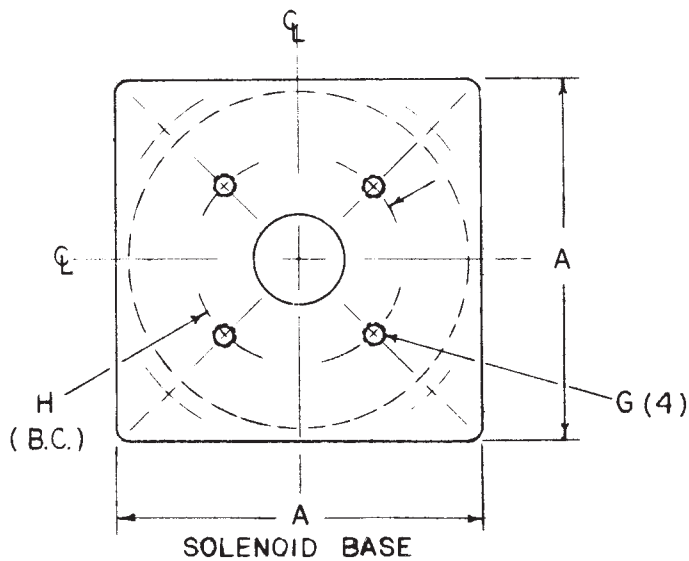
DETAILS FOR SOLENOID MOUNTING BASE  
AND PLUNGER END CONNECTIONS

FOR MODEL SERIES:  
ECI(AC); EDI(AC); EEI(AC)  
EC(DC); ED(DC); EE(DC)


SOLENOID OPER. MODEL	* FIG. NO.	A	G	H	ENERGIZED J	K	L	M	N	O	P	Q
ECI(AC)	1&2	3	1/4-20	2-5/16	1-1/2	7/8	1/2	17/64	1/2	1/4-20	2	1/4
EC(DC)	3&4	3	1/4-20	2-5/16	1-1/4	7/8	11/32	17/64	1/2	1/4-20	2	1/8
EDI(AC)	1&2	4	1/4-20	2-5/16	1-1/2	1	5/8	17/64	1/2	1/4-20	2	5/16
ED(DC)	3&4	4	1/4-20	2-5/16	1-1/4	1	11/32	17/64	1/2	1/4-20	2	3/8
EEI(AC)	1&2	4-1/2	1/4-20	2-5/16	1-1/2	1-1/8	3/4	17/64	1/2	1/4-20	2	5/16
EE(DC)	3&4	4-1/2	1/4-20	2-5/16	1-1/4	1-1/8	11/32	17/64	1/2	1/4-20	2	1/4

\* FIGS. 1 & 3 ARE STANDARD  
FIGS. 2 & 4 ARE OPTIONS

CLEARANCE HOLE REQUIRED FOR MOUNTING SOLENOID 1-3/4" DIA.

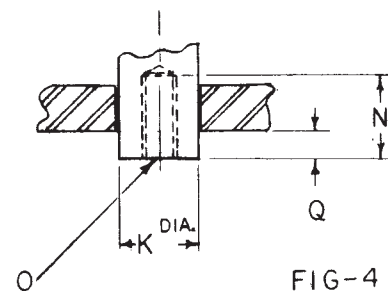
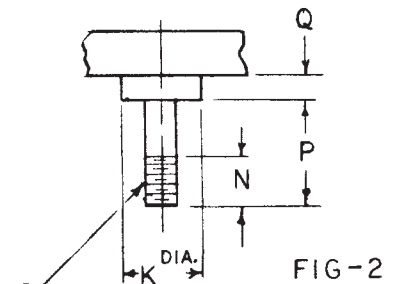


**FM APPROVED EXPLOSION PROOF  
SOLENOID OPERATORS/ACTUATORS**

UNAUTHORIZED ALTERATIONS TO THE  
SOLENOID ENCLOSURE VOIDS THE  APPROVAL AND THE PRODUCT WARRANTY

FOR MOUNTING OTHER THAN PULLING  
UPRIGHT (AS SHOWN, PAGE 1),  
PLEASE CONSULT FACTORY.

BLIND MOUNTING HOLES, DRILLED TO ACCEPT FURNISHED SELF-TAPPING SCREWS.  
DESIGNED FOR USE WITH A 1/4" THICK SOLENOID MOUNTING PLATE.



DETAIL FOR SOLENOID MOUNTING BASES  
AND PLUNGER END CONNECTION  
FOR MODEL SERIES: "ET"

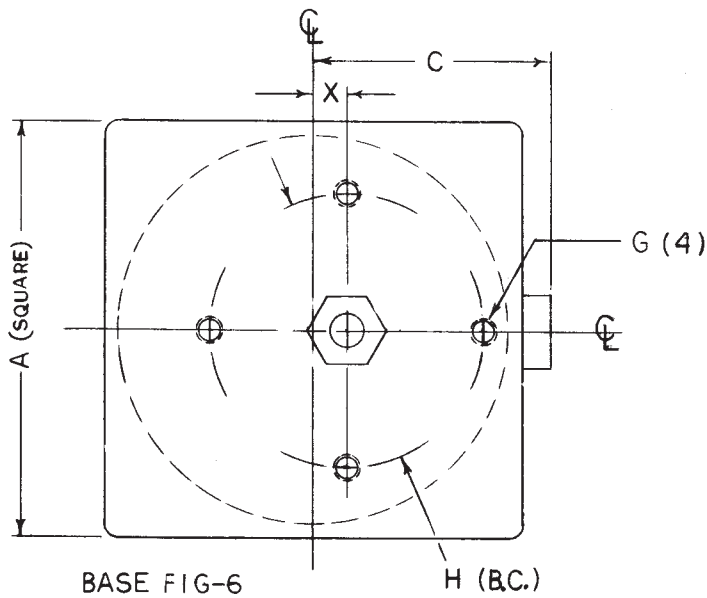
SOLENOID OPER. MODEL	A	G	H	ENERGIZED J	K	L	M	OFF-SET X	Y	Z	CLEARANCE HOLE FOR MTG.	BASE FIG. NO.
ET7AC	5-5/8	5/16-18	4	2-3/16	1	33/64	3/8				2" DIA.	6
ET7DC	6-3/8	5/16-18	4	2-3/16	1	33/64	3/8	1/2			2" DIA.	6
ET8AC	7-1/8	3/8-16		2-3/16	1	33/64	3/8		1-15/32	2-3/8	2-1/2" DIA.	7
ET8DC	7-1/8	3/8-16		2-3/16	1	33/64	3/8		1-15/32	2-3/8	2-1/2" DIA.	7
ET9AC	7-1/8	3/8-16		2-3/16	1	33/64	3/8		1-15/32	2-3/8	2-1/2" DIA.	7
ET9DC	7-5/8	3/8-16		2-3/16	1	33/64	3/8	1/4	1-15/32	2-3/8	2-1/2" DIA.	7



**FM APPROVED EXPLOSION PROOF  
SOLENOID OPERATORS/ACTUATORS**

UNAUTHORIZED ALTERATIONS TO THE  
SOLENOID ENCLOSURE VOIDS THE APPROVAL AND THE PRODUCT WARRANTY

FOR MOUNTING OTHER THAN PULLING  
UPRIGHT (AS SHOWN, PAGE 1),  
PLEASE CONSULT FACTORY.



BLIND MOUNTING HOLES, TAPPED TO ACCEPT FURNISHED MACHINE BOLTS.  
DESIGNED FOR USE WITH A 3/8" THICK MOUNTING PLATE.

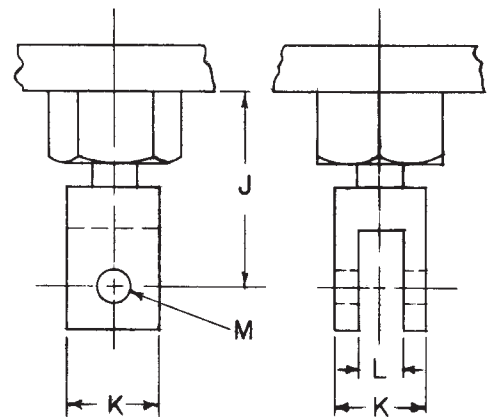
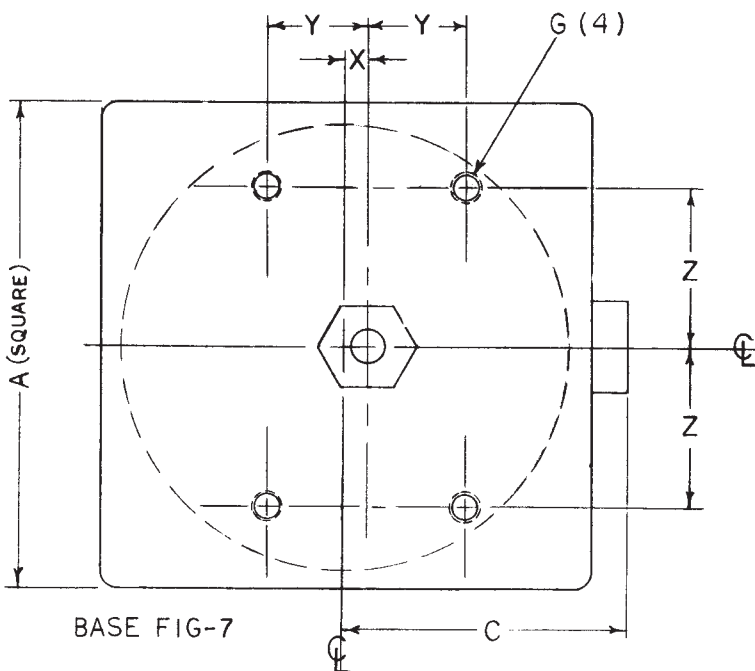



FIG-5

# ELECTRIC ON/OFF ACTUATORS SPECIFICATION FORM

 <p><b>LESLIE CONTROLS, INC.</b> A subsidiary of CIRCOR International, Inc. 12501 Telecom Drive · Tampa, Florida 33637 (813) 978-1000 · FAX: (813)-978-0984</p> <p><b>CONTROL VALVE SPEC SHEET</b></p>	Project/Job _____	Data Sheet _____ of _____
	Unit/Customer _____	Spec _____
	P.O./LCO File # _____	Tag _____
	Item _____	Dwg _____
	Contract _____	Service _____
MFR Serial# _____		

I have (or anticipate) a requirement for an actuator as follows:

Quantity \_\_\_\_\_  A.C.  D.C. Voltage \_\_\_\_\_ Hertz \_\_\_\_\_

Summary of Application \_\_\_\_\_  
\_\_\_\_\_

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

Group \_\_\_\_\_ Div \_\_\_\_\_

Other \_\_\_\_\_

Solenoid: Your net pull or push force (load) in lbs. \_\_\_\_\_ Plunger travel (stroke) required in inches \_\_\_\_\_  
PLEASE SUBMIT DESCRIPTION OR GRAPH OF LOAD VS. STROKE

Solenoid Actuator to be mounted with axis:  Horizontal  Vertical

Pulling Up  Pulling Down  Pushing Up  Pushing Down

Will you provide a spring return for the Solenoid Actuator? \_\_\_\_\_

IF SO, SUBMIT DESCRIPTION OR GRAPH OF SPRING TENSION (OR COMPRESSION) VS. STROKE

Type of plunger connection  Clevis w/Hole  Threaded Rod  Threaded Hole  \_\_\_\_\_

Electromagnetic: Your net holding force (load) in lbs. \_\_\_\_\_

Pole piece design, if other than standard \_\_\_\_\_

Maximum Period of Energization \_\_\_\_\_ Frequency of Operation \_\_\_\_\_

Ambient Temperature Range \_\_\_\_\_ Indoors/Outdoors \_\_\_\_\_

Coil insulation  Class H (std)  Molded  Other \_\_\_\_\_

Special Electrical Characteristics \_\_\_\_\_

Mounting description or provisions required \_\_\_\_\_

Are there any weight, dimensional or shape limitations? \_\_\_\_\_

Coil to have  Lead Wires (std)  Terminal Block  Other \_\_\_\_\_

Conduit connection  1/2" NPT (std)  3/4" NPT  Other \_\_\_\_\_

Other Description \_\_\_\_\_

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



# ELECTRIC ON-OFF CONTROL VALVES

## 3-WAY FLOW FORMS

Each 3-way valve is factory adjusted for one of the following Flow Forms:

**For Pilot Control:**

**Form M** - Supply normally closed  
 Energize to open inlet port.  
 De-energize to vent.

**Form N** - Supply normally open  
 Energize to vent.  
 De-energize to open inlet port.

**For Directional Control:**

**Form O** - Diverting (one inlet, two outlets)  
 Energize to open normally closed outlet & close normally open outlet.  
 De-energize to reverse above action (return to normal position).

**Form P** - Selecting (two inlets, one outlet)  
 Energize to open normally closed inlet & close normally open inlet.  
 De-energize to reverse above action (return to normal position).

	<u>FLOW FORM M</u> INLET AT A OUTLET AT B VENT AT C	<u>FLOW FORM N</u> INLET AT C OUTLET AT B VENT AT A	<u>FLOW FORM O</u> INLET AT B OUTLETS AT A & C	<u>FLOW FORM P</u> INLETS AT A & C OUTLETS AT A & C
ACTUATED POSITION (SOLENOID ENERGIZED)				
NORMAL POSITION (SOLENOID DE-ENERGIZED)				

# ELECTRIC ON-OFF CONTROL VALVES

## SPEC SHEET

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
- Free Handle
- Trip on Energization

- 3-way
  - Fully Electrical
  - Manually Reset
    - Trip on Current Failure
    - Trip on Energization
  - Pilot Control
    - Supply Normally Closed (when de-energized or unlatched)
    - Supply Normally Open
  - Directional
    - Diverting - 1 inlet, 2 outlets
    - Selecting - 2 inlets, 1 outlet
- Free Handle

**SEE FLOW FORMS  
ON OPPOSITE PAGE  
FOR 3-WAY OPTIONS**

- 4-way
  - Fully Electrical
  - Manually Reset
    - Trip on Current Failure
    - Trip on Energization
- Free Handle

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<sub>v</sub> \_\_\_\_\_

Body Mat'l \_\_\_\_\_ Inner Parts \_\_\_\_\_ Valve Disc \_\_\_\_\_

Screwed Ends  Flanged150  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.

NAME \_\_\_\_\_ DEPT. OR TITLE \_\_\_\_\_

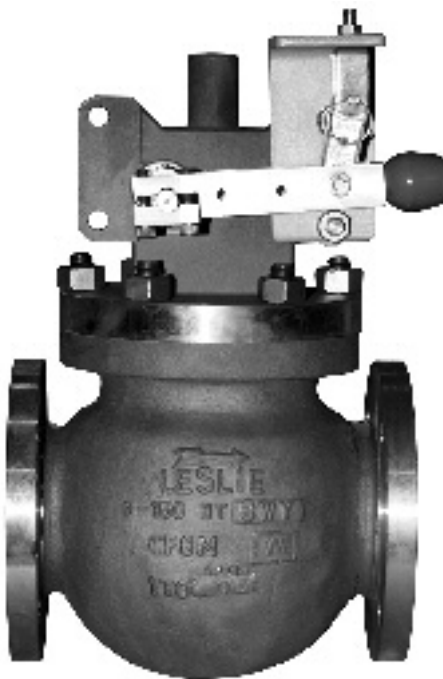
COMPANY \_\_\_\_\_ PHONE NO. \_\_\_\_\_

ADDRESS \_\_\_\_\_

FAX NO. \_\_\_\_\_

QUESTIONS? CALL LESLIE CONTROLS @ (813) 977-0137 PLEASE FAX COMPLETED FORM TO: (813) 977-0174

## FIRE-CIDE® SERIES - HEAT ACTUATED SHUTOFF VALVE



### ROTARY SHAFT DESIGN

**FIRE-CIDE®** series valves are globe-type valves, operated by a manual external lever. Lifting action is transmitted from the lever directly to the valve stem and piston through the “rotary shaft”. This mechanical advantage allows the valve to operate at higher pressures and allows for a stronger return spring to assure reliable, fail-safe operation compared to “direct lift” or “direct acting” valves. Closing speed, for fail closed valves, is not significantly affected by fluid viscosity, line pressure or pressure drop across valve. The slight arc of motion (15-30°) of the valve rotary shaft provides much longer maintenance-free life of the rotary shaft seal compared to reciprocating-stem packing glands.

### BUILT FOR SAFETY

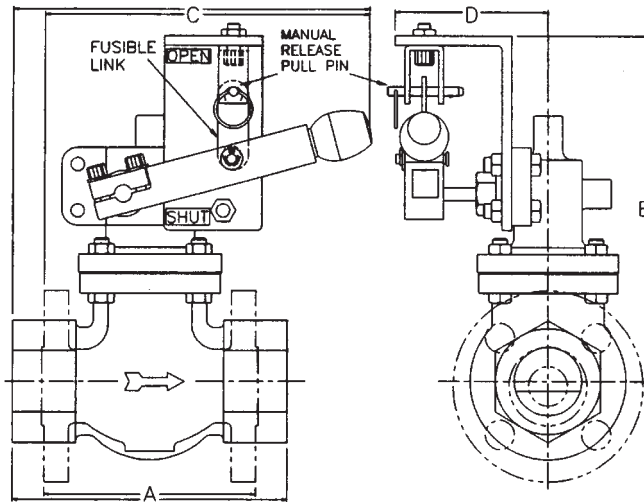
OSHA requires a heat actuated valve on each withdrawal line from indoor tanks containing flammable or combustible fluids. The **FIRE-CIDE®** series valves conform to and exceed the requirements of OSHA para. 1910.1016 (b) (4) (iv) (c). These valves can also be placed on outdoor flammable liquid lines as a sensible safety precaution. They can be tripped manually and instantly by pulling a release pin for periodic testing or manual operation.

ALL VALVES **FACTORY MUTUAL SYSTEM** APPROVED FOR EMERGENCY SHUT-OFF

## FIRE-CIDE® SERIES HIGHLIGHTS

- Fire safe rated
- Steel heavy-walled body for high pressure
- Corrosion resistant, stainless steel inner parts
- Manual operation provision for periodic testing
- Full diameter internal valve port for high  $C_v$ 's
- ANSI Class threaded or RF flanged ends
- Zero pressure and flow required for closing
- No diaphragms or needle sized orifices to clog
- Viscous and dirty fluids can be handled efficiently
- Standard fluid temperature range: -50° to 550°F
- MSS SP-61 seat leakage rated
- Quick acting, two position; fails closed @ link rating
- All fusible links are UL Listed
- Inherently safe

## FIRE-CIDE® 2800 SERIES DIMENSIONS



All dimensions (inches), weights (pounds) and  $C_v$ 's listed are approximate and are for estimating purposes only. All flanges are drilled to ANSI B16.5. Valve is shown in the mechanically latched open position; it trips closed upon melting of the link or removal of pin. Valve bodies can be rotated 90°, 180° or 270° to accommodate flow direction. Larger sizes and alternate end connections are available. Please consult factory for further details.

SIZE CONNECTIONS				MAX. OPENING DIFF. PRESS. (psi)						DIMENSIONS				
Suffix	Pipe/ Port (in.)	Ends	$C_v$	Direct (D)		Pilot (P)		Semi-Direct (S)		Net Wt. (lbs.)	A (in.)	B (in.)	C (in.)	D (in.)
				Metal	Teflon	Metal	Teflon	Metal	Teflon					
05	½	FNPT	3	300	300	720	300	N/A	N/A	12	4	5	7	4¾
05	½	150FL	3	275	275	275	275	N/A	N/A	13	4¼	5	7	4¾
05	½	300FL	3	300	300	720	300	N/A	N/A	15	5½	5	7	4¾
08	¾	FNPT	6.8	250	250	720	270	720	270	14	3½	6	7	4¾
08	¾	150FL	6.8	250	250	275	270	275	270	16	4⅞	6	7	4¾
08	¾	300FL	6.8	250	250	720	270	720	270	20	7	6	7	4¾
10	1	FNPT	10	200	200	720	240	720	240	16	4	7	7	4¾
10	1	150FL	10	200	200	275	240	275	240	20	5⅞	7	7	4¾
10	1	300FL	10	200	200	720	240	720	240	25	5½	7	7	4¾
15	1½	FNPT	22.5	150	150	720	170	720	170	21	7	8	8	4¾
15	1½	150FL	22.5	150	150	275	170	275	170	26	6½	9	8	4¾
15	1½	300FL	22.5	150	150	720	170	720	170	40	7½	12	12	4¾
20	2	FNPT	40	150	150	400	220	400	220	34	10¾	8	10	4½
20	2	150FL	40	150	150	275	220	275	220	39	10	9	10	4½
20	2	300FL	46	150	150	720	220	720	220	50	10½	10	12	4½
30	3	150FL	90	100	100	275	150	275	150	97	9⅞	9	11	4½
30	3	300FL	96	100	100	720	150	300	150	112	11¾	11	12	4½
40	4	150FL	160	60	60	275	115	275	115	115	11¾	10	11	4½
40	4	300FL	160	60	60	720	115	300	115	125	14	13	14	4½

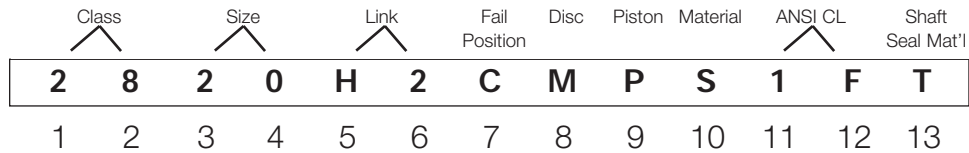
**\*PRESSURES** - The above suffixes represent the maximum inlet differential pressure (psi) the valves can be opened against. Because the line pressure and flow are above the seat, tending to close the valve, all valves will shut and hold closed at emergency pressures greatly exceeding those figures shown. The maximum pressures are limited by ANSI B16.5/B16.34.

**MOUNTING NOTE:** All 2800 Series valves must be mounted in an upright position (as shown above). Valve bodies are to be mounted in a horizontal pipeline. For mounting in vertical pipeline or any other pipeline orientation, please consult the factory.

### EXPANDED OFFERING/ADDITIONAL OPTIONS

The 2800 series is a basic offering of the FM approved FIRE-CIDE® valves. In addition to all the features of the 2800 series, the 1700/1800 series is an expanded offering of our heat actuated fusible link shutoff valves including sizes from 1/4" to 8" will full port construction. The 1700/1800 series also offers additional options such as linkage covers, position indication switches, and buttweld or socketweld end connections. Materials for this series include Bronze, Naval Bronze, Alloy 20, Monel, and Hastelloy. For additional information and a catalog bulletin, please contact the factory.

## FIRE-CIDE® 2800 SERIES ORDERING CODE



<p><b>Class</b> - Position 1 &amp; 2 28</p> <p><b>Valve Size</b> - Position 3 &amp; 4 05 = ½ 08 = ¾ 10 = 1 15 = 1½ 20 = 2 30 = 3 40 = 4</p>	<p><b>Link</b> - Position 5 &amp; 6 H1 = 135°F H2 = 165°F H3 = 212°F H4 = 286°F H5 = 386°F</p> <p><b>Fail Position</b> - Position 7 C = Normally Closed</p> <p><b>Disc</b> - Position 8 M = Metal<sup>1</sup> T = Teflon®</p> <p><b>Piston</b> - Position 9 P = Pilot Operated D = Direct Operated S = Semi-direct<sup>2</sup></p>	<p><b>Material</b> - Position 10 S = Stainless Steel 316 CF8M C = Carbon Steel WCB</p> <p><b>ANSI CL</b> - Position 11 &amp; 12 1F = 150 Flanged 3F = 300 Flanged 3T = 300 FNPT<sup>3</sup></p> <p><b>Shaft Seal Mat'l</b> - Position 13 T = Teflon® M = Metal</p>
---	--	--

NOTE: Fusible links are UL approved.  
Threaded ends are available in ½" to 2" only.

1. Valve standard offering
2. Liquid only
3. ½" to 2" only

### EXAMPLE: 2820H2CMPS1FT

2820	H2	C	MP	S	1F	T
1,2,3,4	5,6	7	8,9	10	11,12	13


- 2820: 2-Way "FM" Approved safety shutoff, rotary shaft type Fire-Cide® Valve  
Horizontal pipe mounting; upright actuator  
2" pipe size, 2" port; Cv = approx. 40
- H2: 165°F fusible link  
C: Fail Close, held open with the link  
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

1. Valve standard offering
2. Liquid only
3. ½" to 2" valve size only
4. Valve standard offering up to 425°F



# 2800 SERIES FIRE-CIDE® VALVE SPECIFICATION FORM

Laurence Product, Fusible Link

 <p><b>LESLIE CONTROLS, INC.</b>  <small>A subsidiary of CIRCOR International, Inc.</small>          12501 Telecom Drive · Tampa, Florida 33637          (813) 978-1000 · FAX: (813)-978-0984</p> <p><b>CONTROL VALVE SPEC SHEET</b></p>	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 a Fire Safety Shut Off valve as follows:

Quantity \_\_\_\_\_ Pipe Size \_\_\_\_\_  FM Approved

- 2-way  Fail Closed
- Fail Open

Summary of Application \_\_\_\_\_

Fluid Handled \_\_\_\_\_ Spec. Grav. \_\_\_\_\_

Viscosity \_\_\_\_\_ Concentration \_\_\_\_\_ Free of Solids? \_\_\_\_\_

Max Inlet Pressure \_\_\_\_\_ Min/Max Fluid Temp \_\_\_\_\_

Flow Rate \_\_\_\_\_ Max Allowable Pressure Drop \_\_\_\_\_

Temperature Rating of Fusible Link Desired \_\_\_\_\_

Body Mat'l \_\_\_\_\_ Inner Parts \_\_\_\_\_ Valve Disc \_\_\_\_\_

Screwed Ends  Flanged 150  Flanged 300  Other \_\_\_\_\_

Horizontal Pipe Mounting  Vertical Pipe Mounting-  Up Flow  Down Flow

Position Switch to Indicate-  Valve Open  Valve Closed  SPDT  DPDT

Other Description \_\_\_\_\_

Please send \_\_\_\_\_ copies of an applicable dimension drawing.

Please send \_\_\_\_\_ additional copies of Laurence On-Off Valves Handbook.

## 1700, 1700HP AND 1800 SERIES ORDERING



VALVE BODY	INNER PARTS	DISC	SERIES 1700	SERIES 1700HP	SERIES 1800
			CATALOG NUMBER PREFIXES		
Bronze	Stainless Steel	Regrinding Resilient	1702 1702G	1702HP 1702GHP	1805 1805G
Naval Bronze	Monel	Regrinding Resilient	1702NBM 1702NBMG	1702NBMHP 1702NBMGHP	1805NBM 1805NBMG
Steel	Stainless Steel	Regrinding Resilient	1709 1709G	1709HP 1708GHP	1809 1808G
Stainless Steel Type 304	Stainless Steel Type 303/304	Regrinding Resilient	1706 1706G	1706HP 1706GHP	1810 1810G
Stainless Steel Type 316	Stainless Steel Type 316	Regrinding Resilient	1707 1707G	1707HP 1707GHP	1811 1811G
Stainless Steel Alloy-20	Stainless Steel Alloy 20	Regrinding Resilient	1708 1708G	1708HP 1708GHP	1812 1812G
Monel	Monel	Regrinding Resilient	1708M 1708MG	1708MHP 1708MGHP	1812M 1812MG

**FOR VERTICAL PIPE MOUNTING, ADD "V" TO CATALOG NUMBER PREFIX ABOVE**

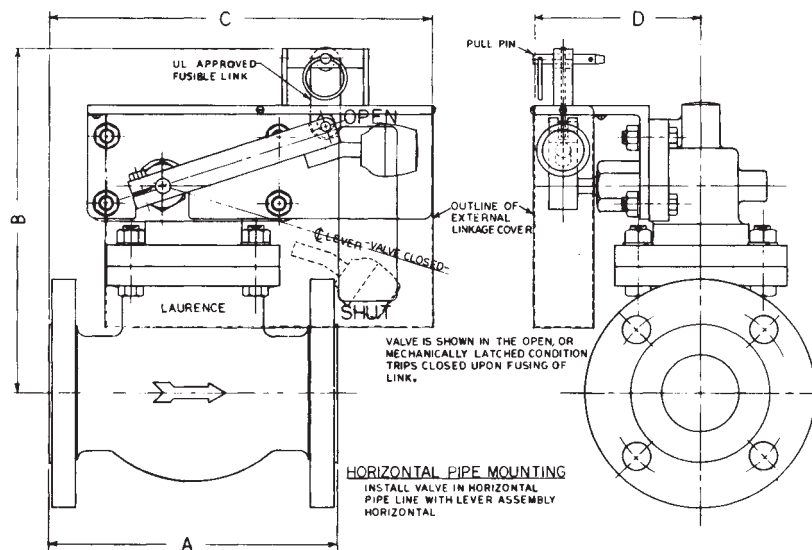
CATALOG # SUFFIX	PIPE & PORT SIZE (INCHES)	CLASS & TYPE CONNECTIONS	C <sub>V</sub> FLOW FATING	MAXIMUM INLET PRESSURE (PSIG)		
				SERIES 1700	SERIES 1700HP	SERIES 1800
14	½	600 Screwed	3.0	300	—	1480
18		150 Flanged	3.0	285	—	285
20		300 Flanged	3.0	300	—	740
24	¾	600 Screwed	6.8	250	1480	1480
28		150 Flanged	6.8	250	285	285
30		300 Flanged	6.8	250	740	740
34	1	600 Screwed	10.0	200	740	1480
38		150 Flanged	10.0	200	285	285
40		300 Flanged	10.0	200	740	740
44	1¼	600 Screwed	15.5	150	740	740
48		150 Flanged	15.5	150	285	285
50		300 Flanged	15.5	150	740	740
54	1½	600 Screwed	22.5	100	740	740
58		150 Flanged	22.5	100	285	285
60		300 Flanged	24.0	100	740	740
65	2	250 Screwed	40	60	400	400
69		150 Flanged	40	60	285	285
71		300 Flanged	46	60	740	740
73	2½	250 Screwed	63	40	300	400
75		150 Flanged	63	40	285	285
77		300 Flanged	69	40	300	740
81	3	150 Flanged	90	20	285	285
85		300 Flanged	96	20	300	740
91	4	150 Flanged	160	10	285	285
95		300 Flanged	175	10	300	740
106	6	150 Flanged	375	—	285	285
108	8	150 Flanged	760	—	285	285

# 1700, 1700HP AND 1800 SERIES DIMENSIONS

CONSULT FACTORY IF FURTHER DETAILS ARE NEEDED

CATALOG NUMBER SUFFIX	PIPE SIZE	FACE TO FACE	HORIZONTAL PIPE MOUNTING			
			B	C	D	NET WEIGHT
14	1/2"	3"	6"	9"	3-3/4"	12 lb.
18		5-1/4	6	9-1/4	3-3/4	13
20		5	6-1/2	9-1/2	3-3/4	15
24	3/4	3-1/2	7-1/4	9-1/4	3-3/4	14
28		5	7-1/2	9-1/2	3-3/4	16
30		5-3/8	7-1/2	9-1/2	3-3/4	20
34	1	4	6-1/2	9	3-3/4	16
38		5-1/8	8	9-1/4	4-1/4	20
40		5-1/2	8-3/4	9-1/2	4-1/4	25
44	1-1/4	4-3/4	8	9-1/4	4-1/4	18
48		5-1/2	8	9-1/2	4-1/4	22
50		5-7/8	8	9-3/4	4-1/4	32
54	1-1/2	5-1/2	8-1/2	9-1/2	4-1/4	21
58		6-1/8	8-1/2	9-3/4	4-1/4	26
60		9	10-3/4	12-1/4	6-1/2	40
65	2	6	9	9-1/2	4-1/2	34
69		7-1/2	9-1/4	10-1/4	4-1/2	39
71		10-1/2	10-1/2	12-1/4	6-1/2	50
73	2-1/2	7-7/8	9-3/4	11-1/4	6-1/2	50
75		8-1/8	9-3/4	11-1/4	6-1/2	60
77		11-1/2	11-1/4	12-3/4	6-1/2	75
81	3	9-7/8	11	11-3/4	6-1/2	97
85		11-3/4	11	12-3/4	6-1/2	112
91	4	11-3/4	10-3/4	12-3/4	6-1/2	115
95		14	11-3/4	14	6-1/2	125
106	6	16	14-1/4	16	8-3/4	240

- All above dimensions and weights are approximate, for estimating purposes only.
- Net weights are based on a bronze valve.



FOR HORIZONTAL OR VERTICAL PIPE MOUNTING

- All flanges drilled per ANSI B 16.5
- Valve bodies can be rotated 180° to accommodate flow direction right to left. (Horizontal Pipe Mounting)
- If available headroom is limited, valve can be furnished with valve body inverted - Add "Z" to suffix.

## 3-WAY FLOW FORMS

Each 3-way valve is factory adjusted for one of the following Flow Forms:

### For Pilot Control:

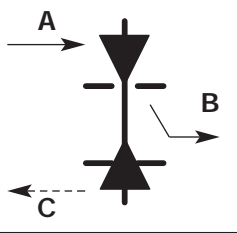
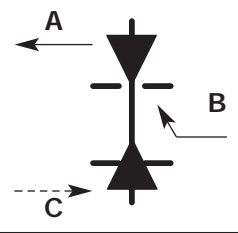
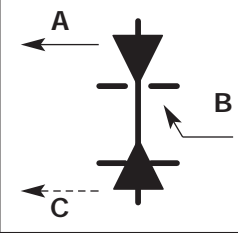
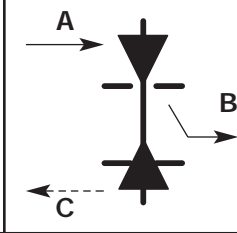
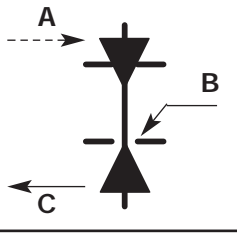
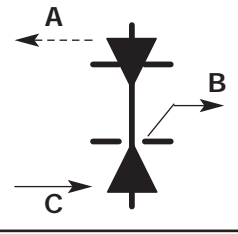
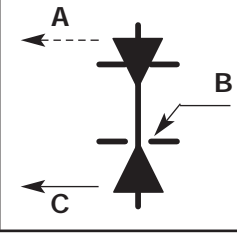
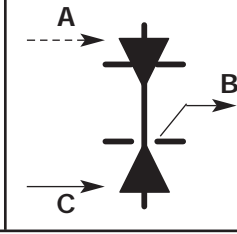
**Form M** - Supply normally closed  
Latch to open inlet port.  
Trip to vent.

**Form N** - Supply normally open  
Latch to vent.  
Trip to open inlet port.

### For Directional Control:

**Form O** - Diverting (one inlet, two outlets)  
Latch to open normally closed outlet & close normally open outlet.  
Trip to reverse above action (return to normal position).

**Form P** - Selecting (two inlets, one outlet)  
Latch to open normally closed inlet & close normally open inlet.  
Trip to reverse above action (return to normal position).

	<u>FLOW FORM M</u> INLET AT A OUTLET AT B VENT AT C	<u>FLOW FORM N</u> INLET AT C OUTLET AT B VENT AT A	<u>FLOW FORM O</u> INLET AT B OUTLETS AT A & C	<u>FLOW FORM P</u> INLETS AT A & C OUTLETS AT A & C
ACTUATED POSITION (LATCHED)				
NORMAL POSITION (TRIPPED)				

# FIRE-SIDE® SERIES SPEC SHEET

I have (or anticipate) a requirement for a Fire Safety Shut Off valve as follows:

Quantity \_\_\_\_\_ Pipe Size \_\_\_\_\_  FM Approved

2-way 
 Fail Closed  
 Fail Open

3-way 
 Flow Form M - Pilot Control, Latch to Open  
 Flow Form N - Pilot Control, Latch to Vent  
 Flow Form O - Diverting  
 Flow Form P - Selecting

**SEE FLOW FORMS  
ON OPPOSITE PAGE  
FOR 3-WAY OPTIONS**

4-way ----- Consult Factory

Summary of Application \_\_\_\_\_

Fluid Handled \_\_\_\_\_ Spec. Grav. \_\_\_\_\_

Viscosity \_\_\_\_\_ Concentration \_\_\_\_\_ Free of Solids? \_\_\_\_\_

Max Inlet Pressure \_\_\_\_\_ Min/Max Fluid Temp \_\_\_\_\_

Flow Rate \_\_\_\_\_ Max Allowable Pressure Drop \_\_\_\_\_

Temperature Rating of Fusible Link Desired \_\_\_\_\_

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

Position Switch to Indicate-  Valve Open  Valve Closed  SPDT  DPDT

Other Description \_\_\_\_\_

Please send \_\_\_\_\_ copies of an applicable dimension drawing.

Please send \_\_\_\_\_ additional copies of Laurence On-Off Valves Handbook.

NAME \_\_\_\_\_ DEPT. OR TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_ PHONE NO. \_\_\_\_\_

ADDRESS \_\_\_\_\_

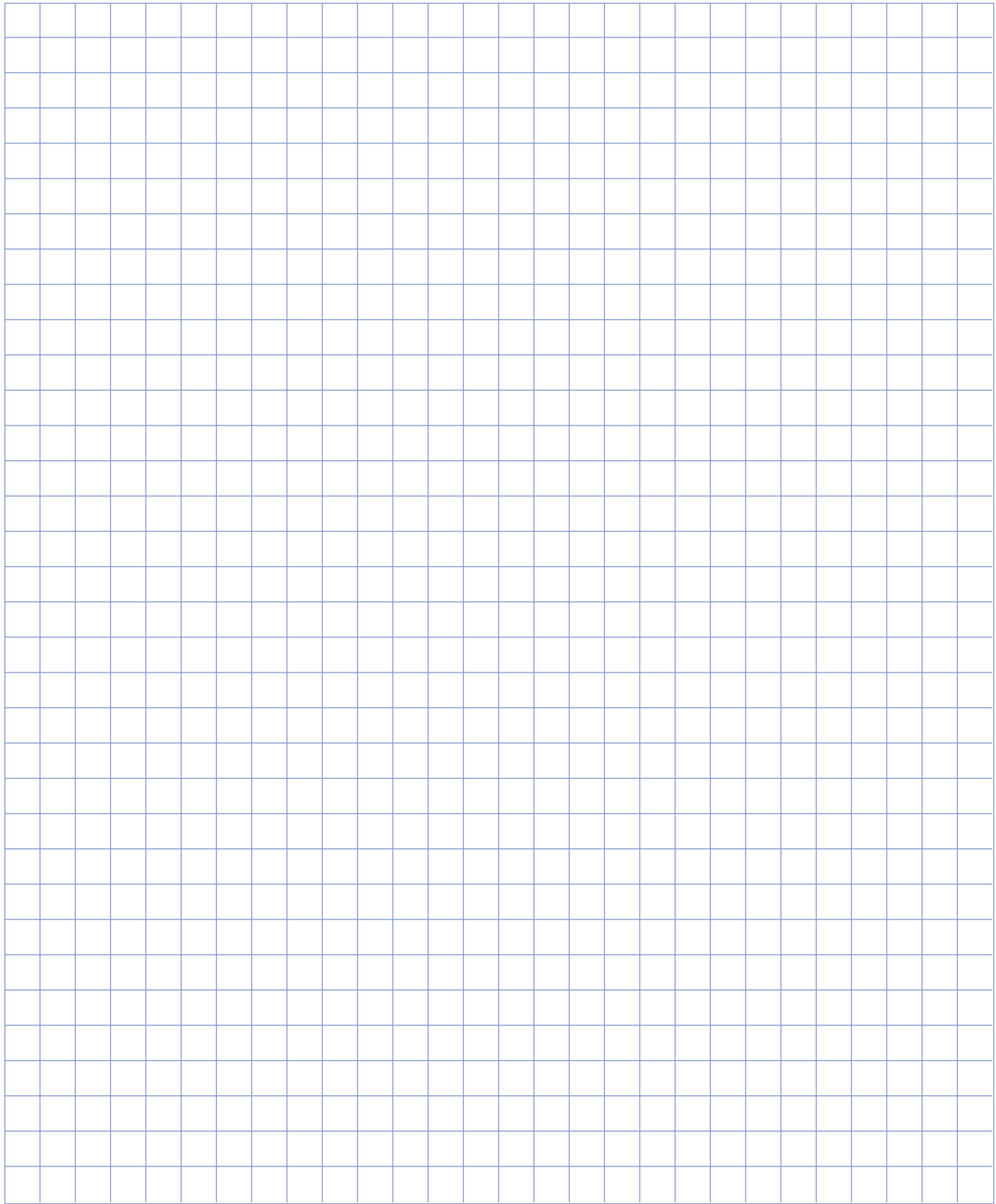
\_\_\_\_\_ FAX NO. \_\_\_\_\_

QUESTIONS? CALL LESLIE CONTROLS @ (813) 977-0137 PLEASE FAX COMPLETED FORM TO: (813) 977-0174



**Notes:**

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# combustion turbine valves

from laurence

## COMPRESSED AIR EXTRACTION VALVE FOR INDUSTRIAL GAS TURBINES

### ★ **RELIABILITY**

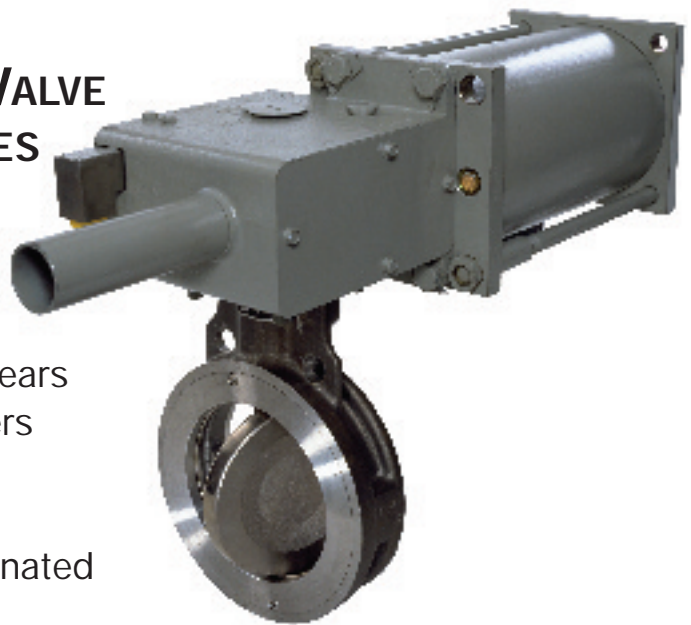
- Designed to take the heat
- All SS internals, nothing to corrode
- Superior dependability for over 15 years
- Lasts ten times longer than the others

### ★ **TURBINE AVAILABILITY**

- Eliminates compressor surge worries
- Downtime to rebuild is virtually eliminated

### ★ **QUICK, EASY INSTALLATION**

- Direct replacement on GE and other Gas Turbines
- QD & QD Premium Delivery available



## ATOMIZING AIR BYPASS VALVE FOR DUAL-FUEL COMBUSTION TURBINES

- ★ More Economical, Compact & Greater Capacity than Globe Valves
- ★ All Stainless Steel
- ★ Resilient Seat
- ★ Class VI Shutoff
- ★ High Temp Actuator
- ★ QD Delivery available

Since LESLIE CONTROLS was founded in 1900, we have been an industry leader in quality fluid control equipment. We have developed a full line of engineered products to suit your requirements, including diaphragm control valves, control instrumentation, pressure and temperature regulators and steam water heaters.

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