



Actuated Thermoplastic Valves



Product Guide & Engineering Specifications



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ACTUATED THERMOPLASTIC VALVE

Full Line of Valve Actuation

From basic on-off actuation to full feature, custom applications, Spears® offers a wide variety of both pneumatic and Electric actuated valve packages for Ball Valves, Butterfly Valves and Diaphragm Valves. Spears® maintains one of the broadest lines of valve options to select from in PVC, CPVC and Polypropylene materials.

Pre-Matched Valve & Actuator Packages

Spears® makes actuation easy by matching each valve type and size with the appropriate actuator for proper operating torque and cycle time to assure optimum performance.

Custom Actuation Configurations

Spears® Premium Actuation Packages can be fully customized to user specifications by addition of selected control accessories. Select from our wide variety of accessories and options or contact Spears® for virtually any special actuation need, even if not specified.

Factory Assembled - Ready for Installation

Whether standard or custom configured, actuation packages include valve, actuator mounting, coupling and factory assembled precision actuator ready for installation. Spears® uses only the finest materials in interfacing each valve and actuator to provide reliable operation and long service life.

How to Use This Manual

This manual provides technical information on Spears® actuated valve packages and accessories. Actuation Packages are listed in separate sections by valve type (ball, butterfly, diaphragm) and actuation type (Electric, Pneumatic).

Each section provides full package information including package description, standard valve specifications and options, package actuator specifications and options, a brief list of available accessories, plus a Sample Engineering Specification and dimensional data for the standard Actuation Package.

Specifications for actuator Options & Accessories for custom actuation are described in additional sections according to actuator type (Electric or Pneumatic). Each section includes an overview followed by a brief description of each option and accessory.

The appendices provide additional information on general actuation terminology and definitions, and on Spears® part numbering convention for custom actuation for use at the user's discretion. Part number formulation is not required to order valve packages from Spears®, but is provided for those who wish to select the appropriate part number in preparation of a custom valve package order.

***Contact Spears® for any desired accessories, options, functions
or special controls not listed in this guide.***

The information in this manual is believed to be accurate at the time of publication, but is subject to change without notice.

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SPEARS® ACTUATED VALVE PACKAGES



Choose from economical Electro Ball Valve packages, or one of Spears® Premium Actuation packages which can be fully customized to user specifications with addition of custom feature and control accessories for Spears® True Union and Compact Ball Valves, Butterfly Valves or Diaphragm Valves. Retrofit actuation of existing Spears® valve installations is also available. Contact factory for additional information.

Actuated Valve Packages Overview

Basic Valve Illustration	Valve Type	Basic Valve Options				Actuation Package Available		
		Basic Valve Material	Size Range (inch)	Seal Material Options	End Connector Options	Premium Electric Actuation	Premium Pneumatic Actuation	Electro Series Actuation
	True Union Ball Valves	PVC	1/2 - 6	EPDM Viton® PTFE	Socket Threaded Flanged	X	X	X 1/2" - 2"
		CPVC	1/2 - 6	EPDM Viton® PTFE	Socket Threaded Flanged	X	X	X 1/2" - 2"
	Compact Ball Valves	PVC	1/2 - 6	EPDM Viton®	Socket Threaded Flanged	X	X	X 1/2" - 2"
		CPVC	1/2 - 6	EPDM Viton®	Socket Threaded Flanged	X	X	X 1/2" - 2"
	Butterfly Valves	PVC	1-1/2 - 12	Buna-N EPDM Viton® PTFE	Flanged	X	X	
		CPVC	1-1/2 - 12	Buna-N EPDM Viton® PTFE	Flanged	X	X	
		PP	1-1/2 - 24 ¹	EPDM Viton® PTFE	Flanged	X	X	
	Diaphragm Valves	PVC	1/2 - 4 ²	EPDM Viton® PTFE	Socket ³ Threaded ³ Spigot ⁴ Flanged	X	X	
		CPVC	1/2 - 4 ²	EPDM Viton® PTFE	Socket Threaded Spigot Flanged	X	X	
		PP	1/2 - 4 ²	EPDM Viton® PTFE	Threaded Flanged	X	X	

- Notes:**
- 1 - Butterfly Valves sizes 30" - 60" produced to order.
 - 2 - 2-1/2" to 4" Diaphragm Valves available in Flanged ends only.
 - 3 - 1/2" - 2" Socket and threaded Diaphragm Valves are True Union style.
 - 4 - Spigot Diaphragm Valves available in sizes 1/2" - 2" only.

Contact Spears® for Additional Custom Configurations to User Specifications

Viton® is a registered trademark of DuPont Dow Elastomers.



ELECTRIC ACTUATOR FEATURES OVERVIEW

Standard 2-Position Electric Actuator Features	Electro Series Ball Valves	Premium Electric TU Ball Valves	Premium Electric Butterfly Valves	Premium Electric Diaphragm Valves
Motor Rotation	Unidirectional	Reversing	Reversing	Reversing
NEMA Rating	4X	4	4	4
Enclosure Material	PP	Powder Coated Aluminum	Powder Coated Aluminum	Powder Coated Aluminum
Enclosure Conduit Entry	1/2 NPT	1/2 NPT	1/2 NPT	1/2 NPT
Voltage	115 VAC	115 VAC	115 VAC	115 VAC
Pre wired to terminal strip	Wired direct	Standard	Standard	Standard
Thermal Overload Protection	Standard	Standard	Standard	Standard
Basic Manual Override	--	Standard (1/2" - 2")	--	--
Declutchable Manual Override	--	Standard (4" - 6")	Standard	Option
Limit Switches (SPDT)	1	2	2	2
Mounting Position	Any	Any	Any	Any
Permanent Lubrication	Standard	Standard	Standard	Standard
Friction Brake	--	--	Standard	--
Options & Accessories				
24 VAC	Option	Option	Option	Option
230 VAC	Option	Option	Option	Option
230 VAC 3-phase, 60 Hz	--	Option	Option	Option
230 VAC 3-phase, 50 Hz	--	Option	Option	Option
460 VAC 3-phase, 60 Hz	--	--	Option	--
460 VAC 3-phase, 50 Hz	--	--	Option	--
12 VDC	Option	Option	Option	Option
24 VDC	Option	Option	Option	Option
NEMA 4X, 7, 9 Rating	(4x Standard)	Option	Option	Option
Basic Manual Override	--	Standard (1/2" - 2")	--	--
Declutchable Manual Override	--	Option (Standard on 4" - 6")	(Standard)	Option
Duty Cycle Upgrade	Option	Option	Option	Option
Spring Return (Fail Safe)	--	Option	Option	--
Positioner Board (Modulating)	--	Accessory	Accessory	Accessory
Additional Limit Switch Sets	--	Accessory	Accessory	Accessory
LED Indicator Lights	--	Accessory	Accessory	Accessory
Position Indicator (Visual)	Standard	Standard	Standard	N/A
Heater & Thermostat	--	Accessory	Accessory	Accessory
Torque Sensor	--	Accessory	Accessory	Accessory
Speed Controller	--	Accessory	Accessory	Accessory
Transmitter	--	Accessory	Accessory	Accessory
Controller Interface	--	Accessory	Accessory	Accessory
"2-Wire" Control Relay	Accessory	Accessory	Accessory	Accessory
Friction Brake	--	Accessory	Standard	--
ID Tag-SS	Accessory	Accessory	Accessory	Accessory

Contact Spears® for Additional Custom Configurations to User Specifications

PNEUMATIC ACTUATOR FEATURES OVERVIEW



Standard Pneumatic Actuator Features	Premium Pneumatic TU Ball Valves	Premium Pneumatic Butterfly Valves	Premium Pneumatic Diaphragm Valves
Type	Dual Piston, Rack & Pinion	Dual Piston, Rack & Pinion	Linear Piston
Enclosure Material (ends/body)	Epoxy Coated/Hard Anodized Aluminum	Epoxy Coated/Hard Anodized Aluminum	PES-Polyestersulphone
Standard Operation	Air-to-Air or Air-Spring Closed	Air-to-Air or Air-Spring Closed	Air-to-Air or Air-Spring Closed
Standard Operating Pressure	80 psi	80 psi	80 psi
Air Connection Size	1/8" or 1/4"	1/8" or 1/4"	1/8" or 1/4"
Basic Manual Override	Standard	Standard	--
Indicator	Standard	Standard	Standard
Options & Accessories			
Air-Spring Open	Option	Option	Option
40 psi Operating Pressure	Option	Option	--
60 psi Operating Pressure	Option	Option	Option
Basic Manual Override	(Standard)	Option	--
Dec clutchable Manual Override	Option	Option	--
Pneumatic Positioner	Accessory	Accessory	Not Air-to-Air
Electro-Pneumatic Positioner	Accessory	Accessory	Not Air-to-Air
Dome Positioner Indicator	Accessory	Accessory	Accessory
Pointer Indicator	Standard	Standard	--
3 & 4-Way Solenoid Valve	Accessory	Accessory	Accessory
Dual Coil Solenoid Valve	Accessory	Accessory	--
Limit Switches	Accessory	Accessory	Accessory
Output Signal Limit Switches	Accessory	Accessory	--
Stainless Steel Pressure Gauge Set	Accessory	Accessory	Accessory
Stem Extension	Accessory	Accessory	Accessory
ID Tag-SS	Accessory	Accessory	Accessory

*Depending on the size and configuration.

Contact Spears® for Additional Custom Configurations to User Specifications



ELECTRO SERIES ACTUATED BALL VALVES

The Electro Actuated Ball Valve provides high quality, basic on-off electrical actuation at an economical price, with voltage options and special “2-wire” control available. This prepackaged combination is constructed with an all plastic NEMA 4X enclosure directly mounted to a PVC or CPVC valve body for lighter weight and a low profile design for minimal space requirements. All Electro Series Ball Valves are pressure rated to 235 psi and suitable for vacuum service. Available in IPS sizes 1/2" - 2", with socket, threaded, or flanged ends and choice of EPDM or Viton® O-ring seals.



ELECTRO ACTUATED COMPACT BALL VALVE

Compact Electro Ball Valves are built around Spears® industrial grade Compact 2000 Ball Valve. This heavy bodied, sealed unit design is well suited for a multitude of general purpose, industrial, and OEM actuation needs.



ELECTRO ACTUATED TRUE UNION BALL VALVE

The Electro True Union Ball Valve utilizes Spears® industrial grade True Union Ball Valve. This fully repairable, double union style allows easy in-line removal for servicing and is the valve of choice for many industrial and chemical processing applications.

ELECTRO 50 & 100 ACTUATOR SPECIFICATIONS

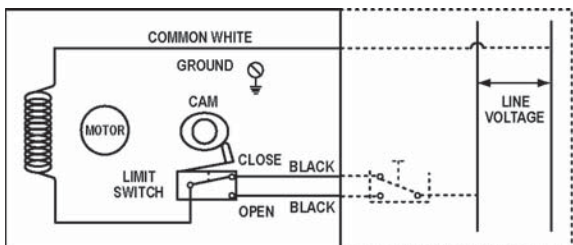
Motor: Brushless, Non-Reversing, Shaded Pole, Thermally Protected
 Torque: ELECTRO-50 50 in./lbs. (1/2" - 1" Valves)
 ELECTRO-100 100 in./lbs. (1-1/4" - 2" Valves)
 Opening Time: 5 seconds
 Closing Time: 5 seconds
 Duty Cycle: 25% standard (optional 75% available)
 Limit Switch: Cam Operated, Omni Directional, SPDT
 Housing: NEMA 4X (Weatherproof, Corrosion Proof), High Impact Polypropylene, SS 316 Fasteners
 1/2" NPT Connection
 Indicator: Visual Open/Close - Standard
 Voltage: 115V standard (see Voltage Options)

Optional “2-Wire” Control:
 Control switch setup operates as a solenoid valve. Valve opens when control switch is open 5-seconds and closes when control switch is closed 5-seconds. Uses 4-wire connection with 2 wires to line voltage and 2 wires to SPST control switch.

Voltage Options:

Voltage	Load AMP Electro-50	Load AMP Electro-100
12 VAC	2.40	N/A
24 VAC	2.1	7.8
115 VAC	.6	1.9
230 VAC	.5	1.5
12 VDC	.3	.2
24 VDC	.2	.2

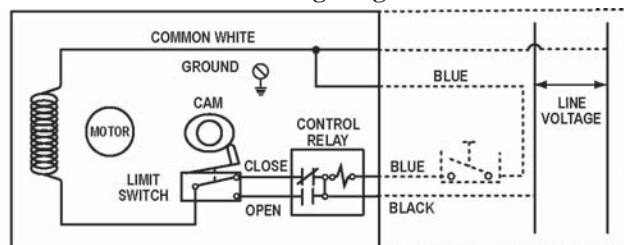
Standard Wiring Diagram 115 VAC Wiring



ELECTRO WIRING

EXTERNAL WIRING

“2-Wire” Control Wiring Diagram



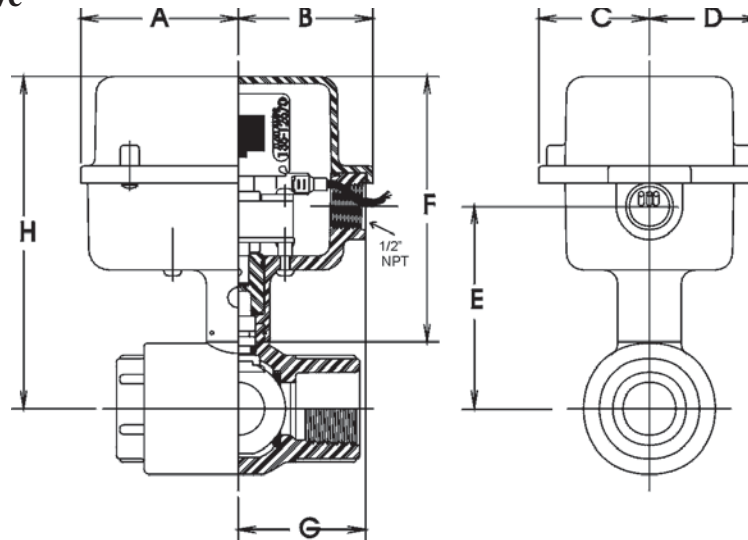
ELECTRO WIRING

EXTERNAL WIRING

ELECTRO SERIES ACTUATED BALL VALVES



Compact Ball Valve



Actuated Compact Ball Valve Dimensions

Valve Size	A	B	C	D	E	F	G	H
1/2	2-7/8	2-1/2	2	2	3-3/8	5-5/8	2-5/16	6-5/8
3/4	2-7/8	2-1/2	2	2	3-9/16	5-5/8	2-5/16	6-7/8
1	2-7/8	2-1/2	2	2	3-5/8	5-5/8	2-5/16	7-1/16
1-1/4	3-5/8	2-7/16	2	2	4-3/4	5-7/8	2-7/16	7-5/8
1-1/2	3-5/8	2-7/16	2	2	5	5-7/8	2-7/16	7-7/8
2	3-5/8	2-7/16	2	2	5-1/2	5-7/8	2-7/16	8-3/8

Valve: PVC or CPVC Industrial Grade Valve,
 Non-Repairable Sealed Unit
 PTFE Seats
 EPDM or Viton® O-rings
 Socket, Threaded or Flanged End Connection
 Vacuum Service Rated
 Pressure rated to 235 psi water @ 73° F
 (Flanged to 150 psi)

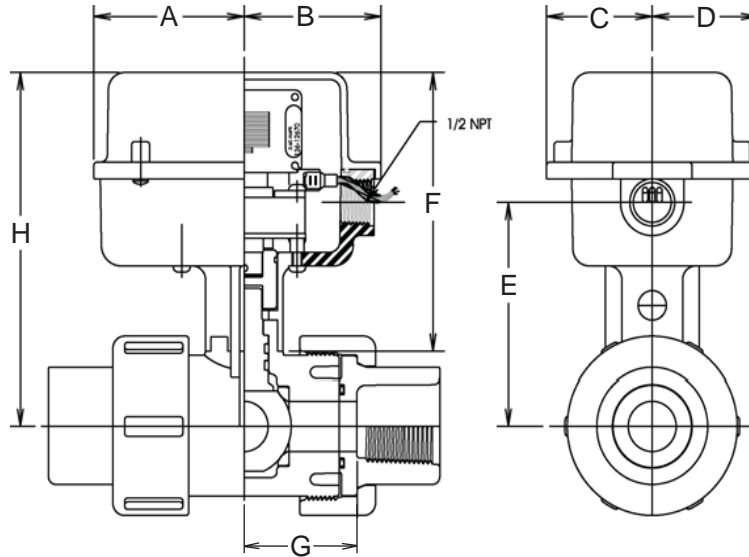
Sample Engineering Specification

All actuated ball valves shall be PVC or CPVC construction with direct mount electric actuator. Valve shall be compact sealed unit type, pressure rated to 235 psi @ 73° F (150 psi for flanged), with PTFE seats, Safe-T-Shear® Stem, EPDM or Viton® O-rings, and socket, threaded or flanged end connections. Actuator shall be direct mount, with brushless non-reversing quarter turn motors and built in visual open/close position indicator. Actuator housing shall be weather proof and corrosion proof (NEMA 4X) with type 316 stainless steel fasteners, as manufactured by Spears® Manufacturing Company.



ELECTRO SERIES ACTUATED BALL VALVES

True Union Ball Valve



Actuated True Union Ball Valve Dimensions

Valve Size	A	B	C	D	E	F	G	H
1/2	2-7/8	2-1/2	2	2	3-3/8	5-5/8	2-5/16	6-5/8
3/4	2-7/8	2-1/2	2	2	3-9/16	5-5/8	2-5/16	6-7/8
1	2-7/8	2-1/2	2	2	3-5/8	5-5/8	2-5/16	7-1/16
1-1/4	3-5/8	2-7/16	2	2	4-13/16	5-7/8	2-7/16	7-5/8
1-1/2	3-5/8	2-7/16	2	2	5	5-7/8	2-7/16	7-7/8
2	3-5/8	2-7/16	2	2	5-1/2	5-7/8	2-7/16	8-3/8

Valve: PVC or CPVC Industrial Grade Valve
 Double Union Style with Blocked Seal Carrier
 Fully Repairable & Adjustable
 PTFE Seats
 EPDM or Viton® O-rings
 Socket, Threaded or Flanged End Connection
 Vacuum Service Rated
 Pressure rated to 235 psi water @ 73° F
 (Flanged to 150 psi)

Sample Engineering Specification

All actuated ball valves shall be PVC or CPVC construction with direct mount electric actuator. Valve shall be True Union type, pressure rated to 235 psi @ 73° F (150 psi for flanged), with buttress threaded union nuts, PTFE seats, Safe-T-Shear® Stem, EPDM or Viton® O-rings, and socket, threaded or flanged end connections. Actuator shall be direct mount, with brushless non-reversing quarter turn motors and built in visual open/close position indicator. Actuator housing shall be weather proof and corrosion proof (NEMA 4X) with type 316 stainless steel fasteners, as manufactured by Spears® Manufacturing Company.

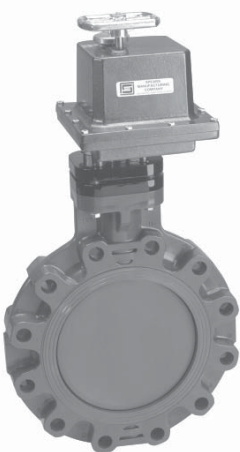
PREMIUM ACTUATED VALVE PACKAGES



Electric True Union Ball Valve



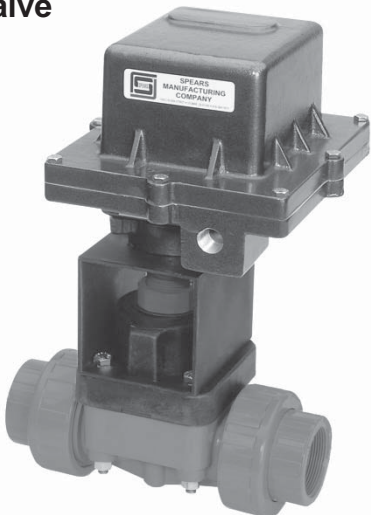
Pneumatic True Union Ball Valve



Electric Actuated Butterfly Valve



Pneumatic Actuated Butterfly Valve



Electric Actuated Diaphragm Valve



Pneumatic Actuated Diaphragm Valve



ELECTRIC ACTUATED TRUE UNION BALL VALVES

Spears® True Union 2000 Ball Valve Premium Electric Actuation Package

The compact design of True Union 2000 Ball Valves provides maximum versatility with minimum space requirements. Fully serviceable valve cartridge also mates with Spears® Union 2000 Schedule 80 pipe unions. Both valves and unions utilize Buttress Thread union nuts for superior strength. All ball valves feature Spears® self adjusting Floating Seat design for extended service, and Spears® Safe-T-Shear® Stem with double O-ring stem seals for assurance of fluid containment in case of inadvertent valve damage. Available in chemical and corrosion resistant PVC or CPVC with socket, flanged or Spears® Patented Special Reinforced (SR) threaded.

Actuated package includes polypropylene valve mounting bracket for accurate valve/actuator alignment and support in any position. Premium electric actuator utilizes a reversing type motor with UL approved, built in thermal overload protection. Gear train is permanently lubricated with manual override standard. Enclosure is corrosion resistant polyester powder coated aluminum, weatherproof NEMA 4 rating, 1/2" NPT conduit outlet. All hardware is stainless steel. Includes 2-SPDT limit switches pre-wired for standard 115 VAC, 60 HZ.



Declutchable Style Shown

True Union 2000 Ball Valve Specifications

Style	Double union • 1/4 turn shut off • Double O-ring stem seals • Safe-T-Shear® Stem • Blocked seal carrier
Material	PVC or CPVC
Size Range	1/2" - 6" & 8" Venturied*
Pressure Rating	1/2" - 4" = 235 psi @ 73° F 6" - 8" & all flanged valves = 150 psi @ 73° F
Vacuum Service Seats	To 26 in-Hg PTFE
O-rings	EPDM or Viton®
End Connector	Socket, SR Threaded, or Flanged
Certifications	EPDM Valves NSF Certified for potable water use.

*8" Venturied is 6" valve fitted with 8 x 6 adapters

Custom Electric Actuation Options & Accessories

- Modulating (variable positioning)
- Heater & Thermostat
- Additional Limit Switch sets
- Position Indicator
- LED Indicator lights
- Torque Sensor
- Declutchable Manual Override (Standard 2-1/2" - 6")
- Duty Cycle Upgrades (75% & 100%)
- NEMA 4x, 7, & 9 Enclosures
- Spring Return Operation (Fail Safe)
- Voltage Options: 24 VAC, 230 VAC, 12 VDC, 24 VDC

Note: Modulation requires special enclosure for 1/2" - 2" valves.

Standard Actuator Specifications

Motor	Reversing
Thermal Overload Protection	Standard
Cycle Time	1/2" - 2" = 2.5 sec. 2-1/2" - 3" = 5.0 sec. 4" - 6" = 15.0 sec.
Duty Cycle	1/2" - 2" = 75% 2-1/2" - 6" = 25%
Lock Rotor Current	1/2" - 2" = 0.55 amps 2-1/2" - 3" = 0.75 amps 4" = 0.75 amps 6" = 1.10 amps
Manual Override	Standard (Declutchable 4" - 6")
Limit Switch	2, SPDT
Enclosure	NEMA 4 1/2" NPT connection
Material/Finish	Aluminum/Powder Coated
Voltage	115 VAC, 60 Hz
Lubrication	Permanent

Sample Engineering Specification

All ball valves shall be electrically actuated True Union 2000 type constructed from PVC Type I Cell Classification 12454 or CPVC Type IV Cell Classification 23447. All O-rings shall be EPDM or Viton®. All valves shall have Safe-T-Shear® stem and double O-ring stem seals. All valve union nuts shall have Buttress threads. All seal carriers shall be Safe-T-Blocked®. All valve components shall be replaceable. All EPDM valves shall be certified by NSF international for use in potable water service. All 1/2" through 4" valves shall be pressure rated at 235 psi and all 6" through 8" & all flanged valves shall be pressure rated at 150 psi for water at 73° F. Electric Actuators shall be factory installed, 115 VAC with thermally protected, reversing motor and powder coated NEMA 4 rated enclosure. All mounting fasteners shall be stainless steel. Actuator shall be equipped with [selected options list], as manufactured by Spears® Manufacturing Company.

TRUE UNION BALL VALVES - ELECTRIC



Standard Package Dimensional Information:

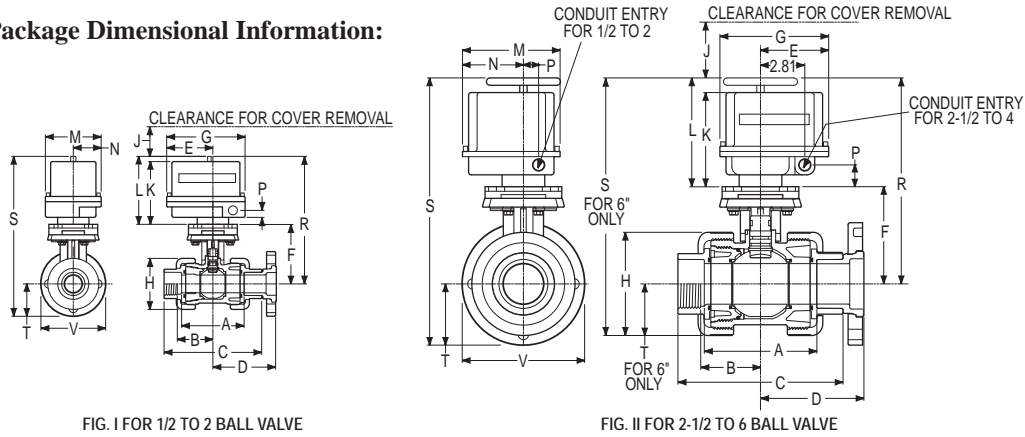


FIG. I FOR 1/2 TO 2 BALL VALVE

FIG. II FOR 2-1/2 TO 6 BALL VALVE

NOMINAL SIZE	A	B	C		D	E	F	G	H	J	K
			SOCKET	THREAD							
1/2	2.44	1.19	4.19	3.81	2.95	3.31	1.76	5.62	1.88	2.50	4.50
3/4	2.75	1.40	4.75	4.25	3.32	3.31	2.01	5.62	2.25	2.50	4.50
1	2.88	1.45	5.13	4.69	3.57	3.31	2.21	5.62	2.50	2.50	4.50
1-1/4	3.25	1.66	5.75	5.19	3.82	3.31	2.79	5.62	3.06	2.50	4.50
1-1/2	3.50	1.77	6.25	5.44	4.16	3.31	3.00	5.62	3.50	2.50	4.50
2	4.75	2.39	7.75	6.75	5.00	3.31	3.69	5.62	4.25	2.50	4.50
2-1/2	6.95	3.47	10.44	9.68	6.70	4.45	5.39	6.88	6.19	3.00	5.38
3	6.95	3.47	10.69	9.75	6.98	4.45	5.39	6.88	6.19	3.00	5.38
4	7.31	3.64	11.87	10.25	7.44	4.62	5.82	7.00	7.50	4.00	6.75
6	11.03	5.50	17.13	15.75	10.15	4.62	9.29	7.00	11.63	4.00	6.75

NOMINAL SIZE	L		M	N	P	R		S		T	V	FIG.
	DISENGAGED	ENGAGED				DISENGAGED	ENGAGED	DISENGAGED	ENGAGED			
1/2	N/A	4.88	4.00	2.00	1.31	N/A	6.64	N/A	7.83	1.19	3.54	I
3/4	N/A	4.88	4.00	2.00	1.31	N/A	6.89	N/A	8.24	1.35	3.54	I
1	N/A	4.88	4.00	2.00	1.31	N/A	7.09	N/A	8.56	1.47	3.54	I
1-1/4	N/A	4.88	4.00	2.00	1.31	N/A	7.67	N/A	9.47	1.80	4.13	I
1-1/2	N/A	4.88	4.00	2.00	1.31	N/A	7.88	N/A	9.88	2.00	4.53	I
2	N/A	4.88	4.00	2.00	1.31	N/A	8.57	N/A	10.88	2.31	5.10	I
2-1/2	8.62	8.22	4.25	2.12	1.00	14.01	13.61	17.13	16.73	3.12	7.00	II
3	8.62	8.22	4.25	2.12	1.00	14.01	13.61	17.13	16.73	3.12	7.00	II
4	9.25	9.15	7.00	4.38	1.56	15.07	14.97	19.17	19.07	4.10	8.50	II
6	9.25	9.15	7.00	4.38	1.56	18.54	18.44	24.36	24.26	5.82	11.25	II

Electric Actuator Wiring Diagram

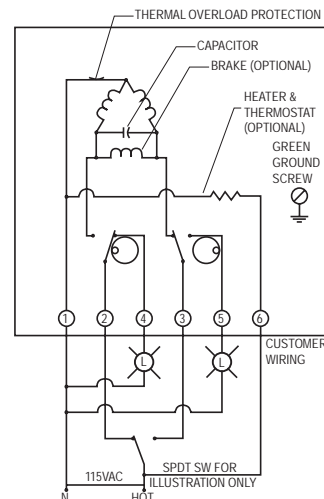
Rotary Electric Actuator

Field Wiring

- T1 Neutral
- T2 To open valve
- T3 To close valve
- T4 Light indication for open position
- T5 Light indication for closed position

Operation

- Power to T1 and T2 will open valve (120VAC)
- Power to T1 and T3 will close valve (120VAC)
- Light connected to T1 and T4 indicates open
- Light connected to T1 and T5 indicates closed





PNEUMATIC ACTUATED TRUE UNION BALL VALVES

Spears® True Union 2000 Ball Valve Premium Pneumatic Actuation Package

The compact design of True Union 2000 Ball Valves provides maximum versatility with minimum space requirements. Fully serviceable valve cartridge also mates with Spears® Union 2000 Schedule 80 pipe unions. Both valves and unions utilize Buttress Thread union nuts for superior strength. All ball valves feature Spears® self adjusting Floating Seat design for extended service, and Spears® Safe-T-Shear® Stem with double O-ring stem seals for assurance of fluid containment in case of inadvertent valve damage. Available in chemical and corrosion resistant PVC or CPVC with socket, flanged or Spears® Patented Special Reinforced (SR) threaded.



Actuated package includes polypropylene valve mounting bracket for accurate valve/actuator alignment and support in any position. Premium pneumatic actuator is an Air-to-Air (Double Acting; optional Spring Return) featuring twin piston rack and pinion operation with adjustable stops, and permanent lubrication. Manual override is standard. Housing is hard anodized aluminum with epoxy coated aluminum end caps.

True Union 2000 Ball Valve Specifications

Style	Double union • 1/4 turn shut off • Blocked seal carrier • Double O-ring stem seals • Safe-T-Shear® Stem
Material	PVC or CPVC
Size Range	1/2" - 6" & 8" Venturied*
Pressure Rating	1/2" - 4" = 235 psi @ 73° F 6" - 8" & all flanged valves = 150 psi @ 73° F
Vacuum Service	To 26 in-Hg
Seats	PTFE
O-rings	EPDM or Viton®
End Connector	Socket, SR Threaded, or Flanged
Certifications	EPDM Valves NSF Certified for potable water use.

*8" Venturied is 6" valve fitted with 8 x 6 adapters

Standard 2-Position Actuator Specifications

Type	Dual piston • rack & pinion • adjustable stop
Standard Operation	Air-to-Air (double acting)
Supply Pressure	80 psi
Air Connection	1/4" - 1/8"
Position Indicator	Pointer-Standard
Manual Override	Standard
Body	Hard anodized aluminum
End Caps	Epoxy coated aluminum

Custom Pneumatic Actuation Options & Accessories

- Spring Return Operation (Fail Safe)
- 60 psi or 40 psi Operating Pressure
- Declutchable Manual Override
- Pneumatic & Electro Pneumatic Positioners
- 3 & 4 Way Solenoid Valve
12VDC, 24VDC, 115VAC, 230VAC
NEMA 4/4x & 7/9 rating
- Dual Power Solenoids
- Output Signal Limit Switches
- Standard Limit Switches
- Dome Position Indicator
- Stainless Steel Gauge Sets
- Customized ID Tags

Sample Engineering Specification

All ball valves shall be pneumatically actuated True Union 2000 type constructed from PVC Type I Cell Classification 12454 or CPVC Type IV Cell Classification 23447. All O-rings shall be EPDM or Viton®. All valves shall have Safe-T-Shear® stem and double O-ring stem seals. All valve union nuts shall have Buttress threads. All seal carriers shall be Safe-T-Blocked®. All valve components shall be replaceable. All EPDM valves shall be Certified by NSF International for use in potable water service. All 1/2" through 4" valves shall be pressure rated at 235 psi and all 6" through 8" and all flanged valves shall be pressure rated at 150 psi for water at 73° F. Pneumatic Actuators shall be factory installed, dual piston, rack & pinion design with adjustable stops. Operation shall be Air-to-Air (double acting) for 80 psi supply pressure. All mounting fasteners shall be stainless steel. Actuator shall be equipped with [selected options list], as manufactured by Spears® Manufacturing Company.

PNEUMATIC ACTUATED TRUE UNION BALL VALVES



Standard Package Dimensional Information:

1/2" TO 6" - INDUSTRIAL 2000
BALL VALVE W/PNEUMATIC ACTUATOR

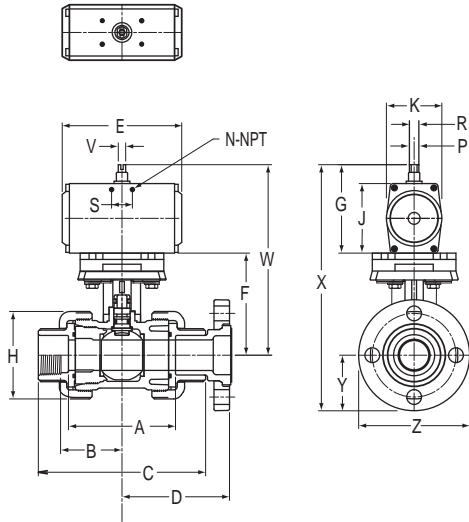


FIG. I FOR 1/2 TO 1-1/4 BALL VALVE

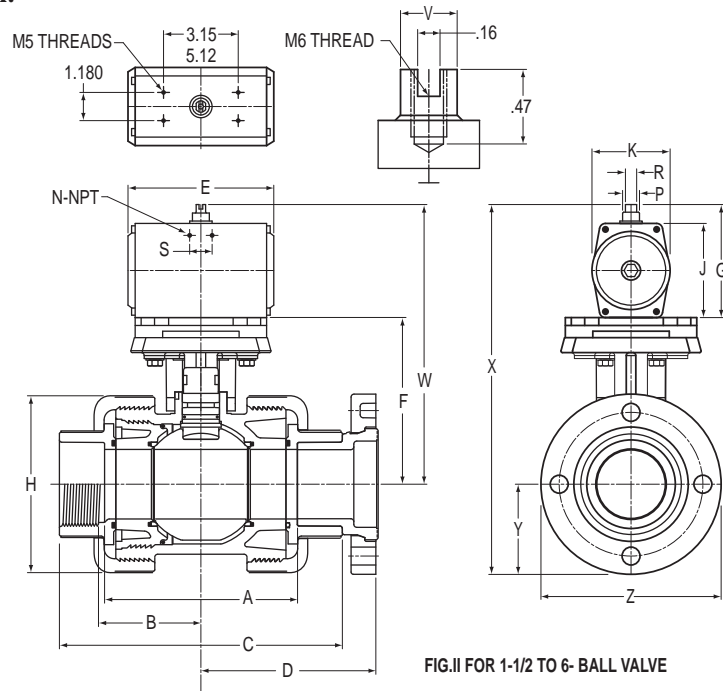


FIG. II FOR 1-1/2 TO 6 BALL VALVE

NOMINAL SIZE	A	B	C		D	E		F	G		H	J
			SOCKET	THREAD		AIR TO AIR	AIR TO SPRING		AIR TO AIR	AIR TO SPRING		
1/2	2.44	1.19	4.19	3.81	2.95	5.00	5.00	3.31	3.82	3.82	1.88	2.91
3/4	2.75	1.40	4.75	4.25	3.32	5.00	5.00	3.50	3.82	3.82	2.25	2.91
1	2.88	1.45	5.13	4.69	3.57	5.00	5.00	3.63	3.82	3.82	2.50	2.91
1-1/4	3.25	1.66	5.75	5.19	3.82	5.00	5.00	4.76	3.82	3.82	3.06	2.91
1-1/2	3.50	1.77	6.25	5.44	4.16	5.00	5.00	5.25	3.82	3.82	3.50	2.91
2	4.75	2.39	7.75	6.75	5.00	5.00	5.24	5.76	3.82	4.37	4.25	3.46
2-1/2	6.95	3.47	10.44	9.68	6.70	5.00	6.10	7.00	3.82	4.84	6.19	3.94
3	6.95	3.47	10.69	9.75	6.98	5.00	6.10	7.00	3.82	4.84	6.19	3.94
4	7.31	3.65	11.87	10.25	7.44	6.10	7.99	8.50	4.84	5.55	7.50	4.61
6	11.03	5.50	17.13	15.75	10.15	7.99	11.18	9.29	5.55	6.71	11.63	5.51

K		N	P	R	S	V	W		X		Y	Z	FIG.
AIR TO AIR	AIR TO SPRING						AIR TO AIR	AIR TO SPRING	AIR TO AIR	AIR TO SPRING			
2.32	2.32	1/4	.79	.47	.94	.390	7.13	7.13	8.88	8.88	1.75	3.50	I
2.32	2.32	1/4	.79	.47	.94	.390	7.32	7.32	9.25	9.25	1.93	3.86	I
2.32	2.32	1/4	.79	.47	.94	.390	7.45	7.45	9.58	9.58	2.13	4.25	I
2.32	2.32	1/4	.79	.47	.94	.390	8.58	8.58	10.88	10.88	2.30	4.61	I
2.32	2.32	1/4	.79	.47	.94	.390	9.07	9.07	11.56	11.56	2.49	4.98	II
2.32	2.76	1/4	.79	.47	.94	.390	9.58	10.13	12.56	13.11	2.98	5.96	II
2.32	3.27	1/4	1.02	.55	.94	.390	10.82	11.84	14.57	15.59	3.75	7.50	II
2.32	3.27	1/4	1.02	.55	.94	.390	10.82	11.84	14.57	15.59	3.75	7.50	II
3.27	3.94	1/4	1.38	.79	.94	.550	13.34	14.05	17.92	18.63	4.58	9.15	II
3.94	4.72	1/4	1.97	1.10	.94	.790	14.84	16.00	20.66	21.82	5.82	11.25	II



ELECTRIC ACTUATED BUTTERFLY VALVES

Spears® Butterfly Valve Premium Electric Actuation Package

Spears® innovative patented seat design departs from traditional liner-seat type valves to eliminate seat creep, reduce operating torque and provide positive seal off. Ideally suited for flow control or throttling, this high performance valve offers a full variety of options for greater application versatility. Fully isolated (Dry Stem), solid type 316 stainless steel with optional PTFE coated stems available for extra protection assurance. PVC and CPVC valves are available in Standard or True Lug style for sizes 1-1/2" through 14". Polypropylene valves are available in Standard valve style for sizes 1-1/2" through 24", plus sizes 30" through 60" produced to order. Premium electric actuator utilizes a reversing type motor with UL approved, built in thermal overload protection. Gear train is permanently lubricated with manual override standard. Enclosure is corrosion resistant polyester powder coated aluminum, weatherproof NEMA 4 rating, 1/2" NPT conduit outlet. Includes 2-SPDT limit switches pre-wired for standard 115 VAC connection.



Declutchable Style Shown

Butterfly Valve Specifications

Style	Flanged
Material	PVC, CPVC, UV Stabilized PP
Size Range	PVC/CPVC = 1-1/2" - 12" PP = 1-1/2" - 24" (custom 30" - 60")
Pressure Rating	1-1/2" - 12" = 150 psi @ 73° F 14" = 100 psi @ 73° F 16" = 85 psi @ 73° F 18" = 70 psi @ 73° F 20" - 24" = 50 psi @ 73° F
Seats & Seals	Buna-N, EPDM or Viton® on PVC/CPVC valves; EPDM or Viton® on Polypropylene valves
Bolt Pattern	ANSI Class 125/150

Special Valve Options & Accessories

- PVC & CPVC True-Lug valves w/ factory installed lugs
- Teflon® coated stainless steel stem
- Titanium & Hastaloy Stems
- PTFE encased valve seat
- Field installable Lug Insert sets for PVC/CPVC valves through 12"
- Stem Extensions
- Seat & Seal Replacement Kits
- 30" - 60" Polypropylene valves (contact Spears® for details)

Custom Electric Actuation Options & Accessories

- Modulating (variable positioning)
- Heater & Thermostat
- Additional limit switch sets
- Position indicator
- LED Indicator lights
- Torque sensor
- Duty Cycle Upgrades (75% & 100%)
- NEMA 4x, 7, & 9 Enclosures
- Voltage Options: 24 VAC, 230 VAC, 230 VAC 3-phase 60 Hz, 460 VAC 3-phase 60 Hz, 12 VDC, 24 VDC (see Accessories & Options section for limitations)
- Custom ID Tags

Standard 2-Position Actuator Specifications

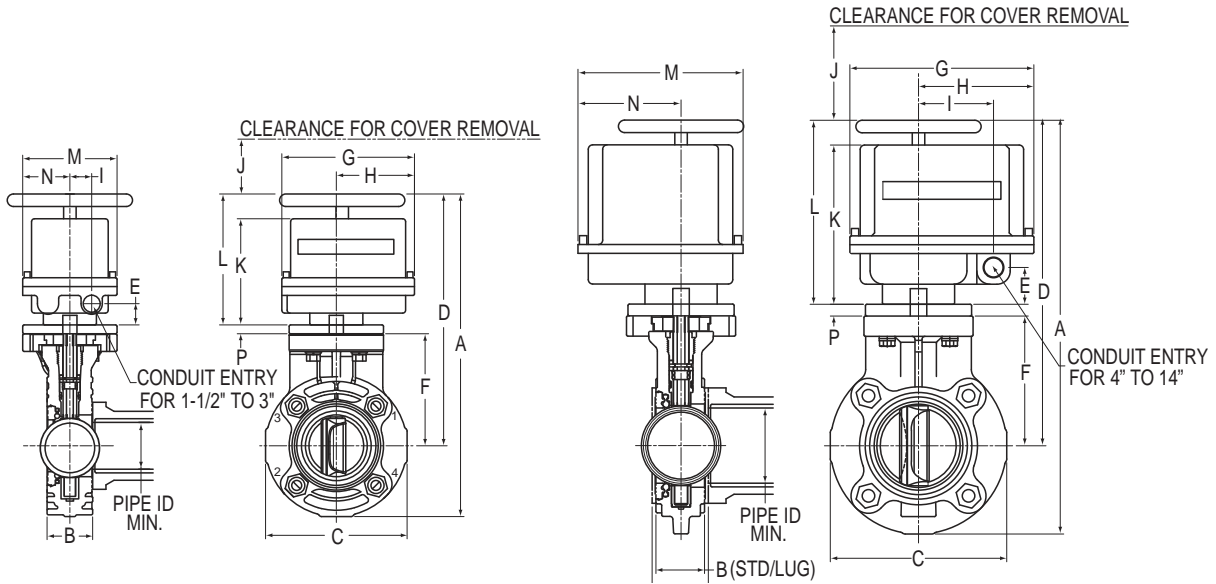
Motor	Reversing
Thermal Overload Protection	Standard
Cycle Time (90°)	1-1/2" - 3" = 5 sec. 4" = 10 sec. 6" - 8" = 15 sec. 10" = 30 sec. 12" = 12 sec.
Duty Cycle	1-1/2" - 10" = 25% 12" = 100%
Lock Rotor Current	1-1/2" - 2-1/2" = 0.75 amps 3" = 0.75 amps 4" - 6" = 1.1 amps 8" - 10" = 1.1 amps 12" = 2.60/0.98 amps
Manual Override	Standard (Declutchable 1-1/2" & up)
Brake	Standard
Limit Switch	2, SPDT
Enclosure	NEMA 4, 1/2" NPT Connection
Material/Finish	Powder Coated Aluminum
Voltage	115 VAC, 60 Hz
Lubrication	Permanent

Note: Contact Spears® for information on valve sizes 14" and larger.

Sample Engineering Specification

All electrically actuated Butterfly valves shall be constructed from PVC Type I Cell Classification 12454 or CPVC Type IV Cell Classification 23447 or UV stabilized Polypropylene. All valve seats and O-rings shall be Buna-N, EPDM or Viton®. Seat shall be a non-liner type interlocked to valve body. Bolt hole pattern shall conform to ANSI/ASME B16.5 CL 125/150. Disc shall be offset design with Type 316 stainless steel stem. Valves shall be pressure rated at [select from specification] for water at 73° F. Electric Actuators shall be factory installed, 115 VAC with thermally protected, reversing motor and powder coated NEMA 4 rated enclosure. Actuator shall be equipped with [selected options list] as manufactured by Spears® Manufacturing Company.

ELECTRIC ACTUATED BUTTERFLY VALVES



NOMINAL SIZE	A		B		C	D		G	J	M	MINIMUM PIPE ID FOR WAFER
	DISENGAGED	ENGAGED	STANDARD	TRUE LUG		DISENGAGED	ENGAGED				
1-1/2	16-7/16	15-11/16	1-9/16	2-1/4	5	14-3/32	13-11/32	6-7/8	3	4-1/4	N/A
2	17-19/32	16-27/32	1-15/16	2-9/16	6	14-19/32	13-27/32	6-7/8	3	4-1/4	N/A
2-1/2	18-3/16	17-7/16	2	2-3/4	7	15-3/32	14-11/32	6-7/8	3	4-1/4	N/A
3	19-5/16	18-9/16	2-3/32	2-13/16	7-1/2	15-23/32	14-31/32	6-7/8	3	4-1/4	3-3/16
4	19-1/4	19-1/32	2-9/32	3	9	14-3/4	14-9/16	7	4	7	4-1/8
6	22-27/32	22-21/32	2-3/4	3-1/2	11	17-3/8	17-3/16	7	4	7	6-1/8
8	25-1/16	24-27/32	2-15/16	3-3/4	13-1/2	18-3/8	18-3/16	7	4	7	7-11/16
10	27-7/8	27-11/16	3-1/4	4	16	19-7/8	19-11/16	7	4	7	9-11/16
12	34-1/6	33-1/8	3-1/2	4-1/4	19	21-1/2	23-5/8	9-1/4	4	9-1/4	11-11/16

Note: Due to variations in potential system operating conditions, 14" - 24" Actuated Butterfly Valve packages are sized according to application parameters. Please contact Spears® for additional information.

Electric Actuator Wiring Diagram

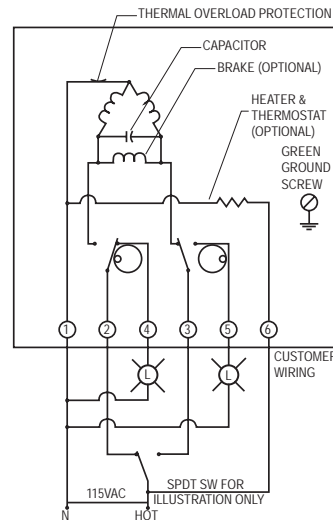
Rotary Electric Actuator

Field Wiring

- T1 Neutral
- T2 To open valve
- T3 To close valve
- T4 Light indication for open position
- T5 Light indication for closed position

Operation

Power to T1 and T2 will open valve (120VAC)
 Power to T1 and T3 will close valve (120VAC)
 Light connected to T1 and T4 indicates open
 Light connected to T1 and T5 indicates closed





PNEUMATIC ACTUATED BUTTERFLY VALVES

Spears® Butterfly Valve Premium Pneumatic Actuation Package

Spears® innovative patented seat design departs from traditional liner-seat type valves to eliminate seat creep, reduce operating torque and provide positive seal off. Ideally suited for flow control or throttling, this high performance valve offers a full variety of options for greater application versatility. Fully isolated (Dry Stem), solid type 316 stainless steel stems with optional PTFE coated stems available for extra assurance. PVC and CPVC valves are available in Standard or True Lug style for sizes 1-1/2" through 14". Polypropylene valves are available in Standard valve style for sizes 1-1/2" through 24", plus sizes 30" through 60" produced to order. Premium pneumatic actuator is an Air-to-Air (Double Acting; optional Spring Return) featuring twin piston rack and pinion operation with adjustable stops, and permanent lubrication. Manual override is standard. Housing is hard anodized aluminum with epoxy coated aluminum end caps.



Butterfly Valve Specifications

Style	Flanged
Material	PVC, CPVC, PP
Size Range	PVC/CPVC = 1-1/2" - 12" PP = 1-1/2"- 24" (custom 30" - 60")
Pressure Rating	1-1/2" - 12" = 150 psi @ 73° F 14" = 100 psi @ 73° F 16" = 85 psi @ 73° F 18" = 70 psi @ 73° F 20" - 24" = 50 psi @ 73° F
Seats & Seals	Buna-N, EPDM or Viton® on PVC/CPVC valves; EPDM or Viton® on Polypropylene valves
Bolt Pattern	ANSI Class 125/150

Standard 2-Position Actuator Specifications

Type	Dual piston • rack & pinion • adjustable stop
Standard Operation	Air-to-Air (double acting)
Supply Pressure	80 psi
Air Connection	1/4" - 1/8" Depends on Actuator
Basic Manual Override	Standard
Position Indicator	Pointer-Standard
Body	Hard anodized aluminum
End Caps	Epoxy coated aluminum

Note: Contact Spears® for information on valve sizes 14" and larger.

Special Valve Options & Accessories

- “True-Lug” style factory installed lugs (PVC & CPVC valves only)
- Teflon® coated stainless steel stem
- Titanium & Hastaloy Stems
- PTFE encased valve seat
- Field installable Lug Insert sets for PVC/CPVC valves through 12"
- Stem Extensions
- Seat & Seal Replacement Kits
- 30" - 60" Polypropylene valves (contact Spears® for details)

Custom Pneumatic Actuation Options & Accessories

- Spring Return Operation (Fail Safe)
- 60 psi or 40 psi Operating Pressure
- Declutchable Manual Override
- Pneumatic & Electro Pneumatic Positioners
- 3 & 4 Way Solenoid Valves
12VDC, 24 VDC, 115VAC, 230VAC
NEMA 4/4x & 4.4x.7.9 rating
- Dual Power Solenoids
- Output Signal Limit Switches
- Standard Limit Switches
- Dome Position Indicator
- Stainless Steel Gauge Sets
- Customized ID Tags

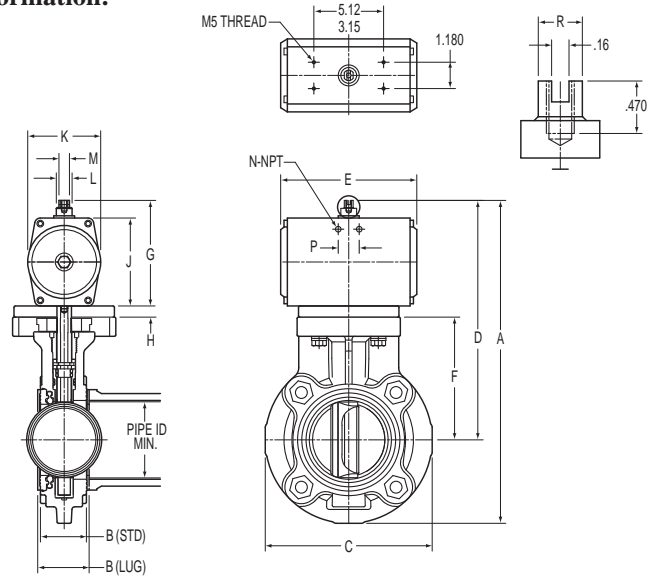
Sample Engineering Specification

All pneumatically actuated Butterfly valves shall be constructed from PVC Type I Cell Classification 12454 or CPVC Type IV Cell Classification 23447 or UV stabilized Polypropylene. All valve seats and O-rings shall be Buna-N, EPDM or Viton®. Seat shall be a nonlinear type interlocked to valve body. Bolt hole pattern shall conform to ANSI/ASME B16.5 CL 125/150. Disc shall be offset design with Type 316 stainless steel stem and hardware. Valves shall be pressure rated at [select from specifications] for water at 73° F. Pneumatic Actuators shall be factory installed, dual piston, rack & pinion design with adjustable stops. Operation shall be Air-to-Air (double acting) for 80 psi supply pressure. Actuator shall be equipped with [selected options list], as manufactured by Spears® Manufacturing Company.

PNEUMATIC ACTUATED BUTTERFLY VALVES



Standard Package Dimensional Information:



NOMINAL SIZE	A		B		C	D		E		F
	AIR TO AIR	AIR TO SPG	STANDARD	TRUE LUG		AIR TO AIR	AIR TO SPG	AIR TO AIR	AIR TO SPG	
1-1/2	10-31/32	10-31/32	1-9/16	2-1/4	5	8-15/32	8-15/32	5	5	4-1/4
2	11-31/32	12-1/2	1-15/16	2-9/16	6	8-31/32	9-1/2	5	5-1/4	4-3/4
2-1/2	13-3/32	14-3/32	2	2-3/4	7	9-19/32	10-19/32	5	6-1/8	5-1/4
3	15-7/32	15-3/32	2-3/32	2-13/16	7-1/2	11-15/32	11-11/32	5-1/4	6-31/32	5-5/8
4	16-11/32	17-1/16	2-9/32	3	9	11-27/32	12-9/16	6-1/8	8	6-1/4
6	21-1/4	22-13/32	2-3/4	3-1/2	11	15-3/4	16-29/32	8	11-3/16	8-5/8
8	24-3/8	27-21/32	2-15/16	3-3/4	13-1/2	17-5/8	20-7/8	8-1/2	13-9/32	9-5/8
10	27-7/32	30-7/32	3-1/4	4	16	19-7/32	22-7/32	11-3/16	14-1/2	11
12	29-23/32	32-23/32	3-1/2	4-1/4	19	20-7/32	23-7/32	11-3/16	14-1/2	12

NOMINAL SIZE	G		H		J	K		L	M	N
	AIR TO AIR	AIR TO SPG	AIR TO AIR	AIR TO SPG		AIR TO AIR	AIR TO SPG			
1-1/2	3-27/32	3-27/32	3/8	3/8	2-15/16	2-11/32	2-11/32	13/16	15/32	1/4
2	3-27/32	4-3/8	3/8	3/8	3-15/32	2-11/32	2-25/32	13/16	15/32	1/4
2-1/2	3-27/32	4-27/32	1/2	1/2	3-31/32	2-11/32	3-9/32	1-1/32	9/16	1/4
3	4-3/8	4-31/32	1-15/32	3/4	4-1/4	2-25/32	3-19/32	1-1/32	9/16	1/4
4	4-27/32	5-9/16	3/4	3/4	4-5/8	3-9/32	3-15/16	1-3/8	13/16	1/4
6	5-9/16	6-23/32	1-9/16	1-9/16	5-17/32	3-15/16	4-3/4	1-31/32	1-1/8	1/4
8	6-15/32	9-23/32	1-9/16	1-9/16	7-13/16	4-3/4	6-25/32	2-3/8	1-1/8	1/4
10	6-23/32	9-23/32	1-1/2	1-1/2	7-13/16	4-3/4	6-25/32	2-3/8	1-7/16	1/4
12	6-23/32	9-23/32	1-1/2	1-1/2	7-13/16	4-3/4	6-25/32	2-3/8	1-7/16	1/4

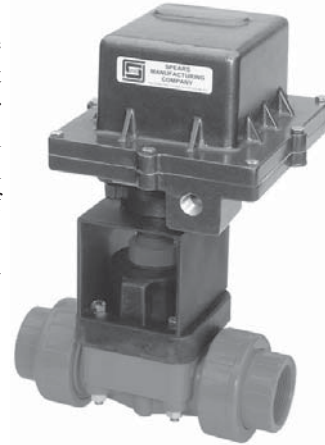
NOMINAL SIZE	P	R
1-1/2	15/16	13/32
2	15/16	13/32
2-1/2	15/16	13/32
3	15/16	13/32
4	15/16	9/16
6	15/16	13/16
8	15/16	13/16
10	15/16	1-1/8
12	15/16	1-1/8



ELECTRIC ACTUATED DIAPHRAGM VALVES

Spears® Diaphragm Valve Premium Electric Actuation Package

This full-featured industrial grade valve is engineered to provide accurate throttling and shut off for chemical processing, industrial, and water treatment applications. Weir type design eliminates entrapped fluids in valve. Excellent for handling of liquids with suspended solids, viscous materials and slurries. Premium electric actuator utilizes a multi-turn reversing motor with UL approved, built in thermal overload protection and permanently lubricated gear train. Weatherproof NEMA 4 enclosure is corrosion resistant polyester powder coated aluminum, 1/2" NPT conduit outlet. Includes 2-SPDT limit switches pre-wired for standard 115 VAC, 60 Hz.



Diaphragm Valve Specifications

Style	Diaphragm • Weir type • fully repairable
Material	PVC, CPVC, UV Stabilized PP
Size Range	1/2" - 8"
Pressure Rating	PVC & CPVC 1/2" - 2" = 235 psi @ 73°F 1/2" - 4" Flanged = 150 psi @ 73°F 6" = 100 psi @ 73°F 8" = 75 psi @ 73°F PP: 1/2" - 4" = 150 psi @ 73°F 6" = 100 psi @ 73°F 8" = 75 psi @ 73°F With PTFE Diaphragm: 1/2" - 4" = 150 psi @ 73°F
Diaphragm	EPDM, Viton®, or elastomer backed PTFE
End Connector	PVC & CPVC = True Union socket/threaded, or Spigot Body (1/2" - 2") Flanged Body (1/2" - 8") PP: True Union threaded (1/2" - 2"), Flanged Body (sizes 2-1/2" - 8")

Standard 2-Position Actuator Specifications

Motor	Multi-turn reversing
Thermal Overload Protection	Standard
Cycle Time (open - close)	1/2" - 1-1/2" = 2 min. 2" = 10 min. 2-1/2" - 3" = 2 min. 4" = 1 min. 6" - 8" = TBA
Duty Cycle	25%, 75%
Manual Override	Optional
Torque Sensor	Optional
Limit Switch	2, SPDT pre-wired
Enclosure	NEMA 4 1/2" NPT connection
Material/Finish	Aluminum /Powder Coated
Voltage	115 VAC, 60 Hz
Lock Rotor Current	1/2" - 2" = 0.75 amps 2-1/2" - 3" = 1.5 amps 4" = 7.5 amps 6" - 8" = TBA
Lubrication	Permanent

Special Valve Options & Accessories

- Diaphragm & O-ring Replacement Kits
- Hypalon® (CSM) Diaphragms
- EPDM backed PTFE Diaphragms
- Viton® backed PTFE Diaphragms

Custom Electric Actuation Options & Accessories

- Declutchable Manual Override
- Auxiliary Limit Switches
- NEMA 7, & 9 Enclosures
- Position Indicator Lights (red/green)
- Voltage Options: 12 VDC, 24 VDC, 24 VAC, 230 VAC
(see Accessories & Options section for limitations)
- Custom ID Tags

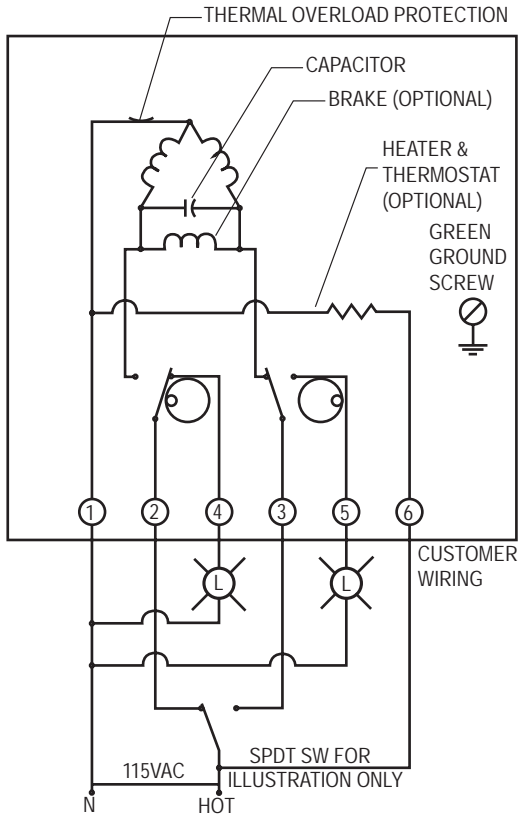
Sample Engineering Specification

All electrically actuated diaphragm valves shall be True Union Socket/Thread or Flanged or Spigot type constructed from PVC Type I Cell Classification 12454 or CPVC Type IV Cell Classification 23447 or UV Stabilized PP. All valve diaphragms shall be EPDM or Viton® or Hypalon® or elastomer backed PTFE. All True Union valve union nuts shall have Buttress threads. All valve components shall be replaceable. All 1/2" through 2" valves shall be pressure rated to 235 psi, all 2-1/2" through 4" valves, 1/2" - 4" flanged valves and 1/2" - 4" PTFE diaphragm valves to 150 psi, all 6" valves to 100 psi, and all 8" valves to 75 psi for water at 73° F. Electric Actuators shall be factory installed, 115 VAC with thermally protected, reversing motor and powder coated NEMA 4 rated enclosure. Actuator shall be equipped with [selected options list] as manufactured by Spears® Manufacturing Company.

ELECTRIC ACTUATED DIAPHRAGM VALVES



Diaphragm Valve Wiring Schematic



Actuator shown in open position
 Power to #1 & #2 To Open
 Power to #1 & #3 To Close

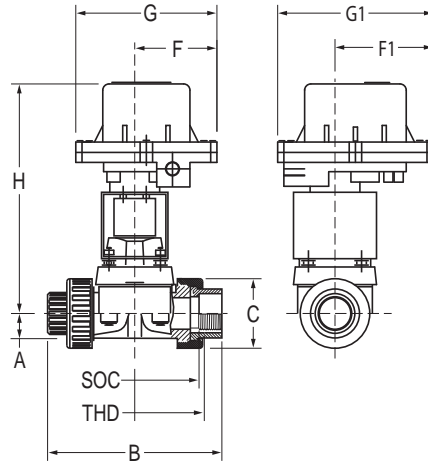
When the actuator is over torqued or in a stall condition, the current draw increases and the current sensor detects the increase. Upon exceeding the thermal coupling overload the circuit opens and actuator shuts off. Once temperature reduces, thermal coupler will reconnect and actuator will operate.

This wiring diagram illustrates connection for heater, thermostat, indicator lights, and two auxiliary switches (all optional).



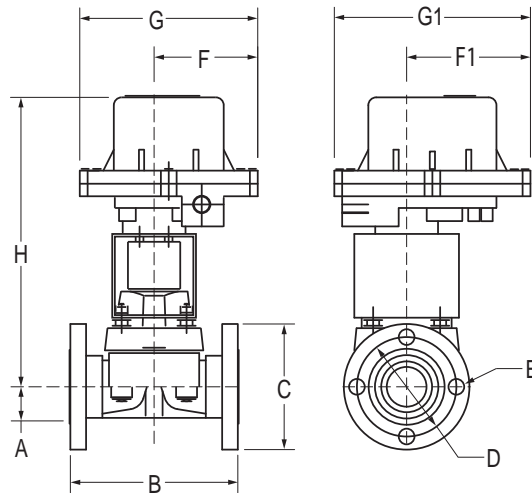
ELECTRIC ACTUATED DIAPHRAGM VALVES

Standard Package Dimensional Information



Electric Diaphragm Valve - Socket/Threaded

Size	A	B	C	F	F1	G	G1	H	Socket	Thread
1/2	9/16	5-17/32	1-15/16	4-31/32	5-15/16	8-1/2	9-3/8	12-13/16	1-29/32	2-1/16
3/4	23/32	6-1/2	2-1/2	4-31/32	5-15/16	8-1/2	9-3/8	12-31/32	2-1/4	2-17/32
1	27/32	7-1/4	2-7/8	4-31/32	5-15/16	8-1/2	9-3/8	13-5/32	2-1/2	2-3/4
1-1/4	1-9/32	8	5-5/16	4-31/32	5-15/16	8-1/2	9-3/8	13-15/32	2-3/4	3-1/16
1-1/2	1-9/32	9-1/16	3-17/32	4-31/32	5-15/16	8-1/2	9-3/8	13-15/32	3-5/32	3-19/32
2	1-1/2	10-1/2	4-7/32	4-31/32	5-15/16	8-1/2	9-3/8	13-27/32	3-3/4	4-1/4



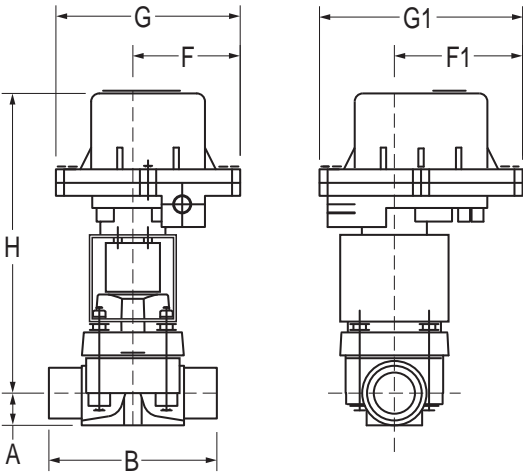
Electric Diaphragm Valve - Flanged

Size	A	B	C	D	E	F	F1	G	G1	H
1/2	9/16	4-5/8	3-1/2	2-3/8	5/8	4-31/32	5-15/16	8-1/2	9-3/8	12-11/16
3/4	23/32	5	3-7/8	2-3/4	5/8	4-31/32	5-15/16	8-1/2	9-3/8	12-31/32
1	27/32	5-5/8	4-1/4	3-1/8	5/8	4-31/32	5-15/16	8-1/2	9-3/8	13-5/32
1-1/4	1-9/32	6-1/2	4-5/8	3-1/2	5/8	4-31/32	5-15/16	8-1/2	9-3/8	13-15/32
1-1/2	1-9/32	6-3/4	5	3-7/8	5/8	4-31/32	5-15/16	8-1/2	9-3/8	13-15/32
2	1-1/2	8	6	4-3/4	3/4	4-31/32	5-15/16	8-1/2	9-3/8	13-27/32

ELECTRIC ACTUATED DIAPHRAGM VALVES

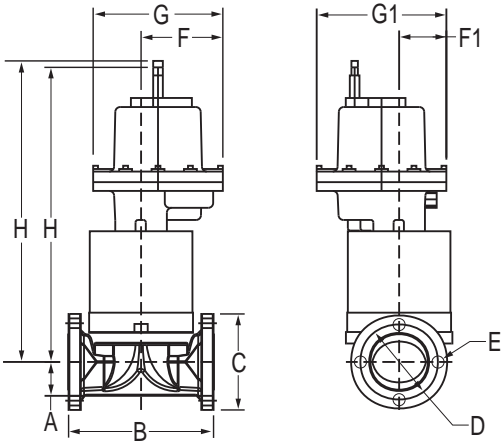


Standard Package Dimensional Information



Electric Diaphragm Valve - Spigot

Size	A	B	F	F1	G	G1	H
1/2	9/16	4-3/8	4-31/32	5-15/16	8-1/2	9-3/8	12-13/16
3/4	23/32	4-3/4	4-31/32	5-15/16	8-1/2	9-3/8	12-31/32
1	27/32	5-3/8	4-31/32	5-15/16	8-1/2	9-3/8	13-5/32
1-1/4	1-9/32	6-1/4	4-31/32	5-15/16	8-1/2	9-3/8	13-15/32
1-1/2	1-9/32	6-1/2	4-31/32	5-15/16	8-1/2	9-3/8	13-15/32
2	1-1/2	7-3/4	4-31/32	5-15/16	8-1/2	9-3/8	13-27/32



Electric Diaphragm Valve - Flanged 2-1/2" - 6"

Size	A	B	C	D	E	F	F1	G	G1	H	
										Open	Close
2-1/2	2-5/8	7/32	7-1/2	5-1/2	3/4	6-11/32	3-11/16	10-1/16	10-1/16	22-27/32	22-11/32
3	2-5/8	11-3/16	7-1/2	6	3/4	6-11/32	3-11/16	10-1/16	10-1/16	22-27/32	22-11/32
4	Contact Spears®										
6	Contact Spears®										



PNEUMATIC ACTUATED DIAPHRAGM VALVES

Spears® Diaphragm Valve Premium Pneumatic Actuation Package

This full-featured industrial grade valve is engineered to provide accurate throttling and shut off for chemical processing, industrial, and water treatment applications. Weir type design eliminates entrapped fluids in valve. Excellent for handling of liquids with suspended solids, viscous materials and slurries. Premium pneumatic actuators are Air-to-Spring (Double Acting) Actuator for 1/2" - 2" valves features a packless/glandless linear piston design and one-piece actuator/bonnet constructed from high integrity PES (Polyethersulphone), chemically resistant to virtually all acids, caustics, and solvents. Actuator for 2-1/2" - 4" valves features a linear diaphragm design and chemical resistant Polyester coated housing.



Diaphragm Valve Specifications

Style	Diaphragm • Weir type • fully repairable
Material	PVC, CPVC, PP
Size Range	1/2" - 6"
Pressure Rating	PVC & CPVC 1/2" - 2" = 235 psi @ 73° F 1/2" - 4" Flanged = 150 psi @ 73° F 6" = 100 psi @ 73° F PP: 1/2" - 4" = 150 psi @ 73° F 6" = 100 psi @ 73° F With PTFE Diaphragm 1/2" - 4" = 150 psi @ 73° F
Diaphragm	EPDM, Viton®, or elastomer backed PTFE
End Connector	PVC & CPVC = True Union socket/threaded, or Spigot Body (1/2" - 2") Flanged Body (1/2" - 6") PP: True Union threaded (1/2" - 2"), Flanged Body (2-1/2" - 6")

Standard 2-Position Actuator Specifications

Valve Sizes	1/2" - 2":	
Type		Piston • Linear action
Standard Operation		Air-to-Spring (double acting)
Supply Pressure		80 psi
Air Connection		1/8"
Body		PES (Polyethersulphone)
Valve Sizes	2-1/2" - 4":	
Type		Diaphragm • Linear action
Standard Operation		Air-to-Spring (double acting)
Standard Operating Pressure		80 psi
Air Connection		1/4" (3" & 4" valves)
Body		Polyester coated

Special Valve Options & Accessories

- Diaphragm & O-ring Replacement Kits
- Hypalon® (CSM) Diaphragms
- EPDM backed PTFE Diaphragms
- Viton® backed PTFE Diaphragms

Custom Pneumatic Actuation Options & Accessories

- Spring Return Operation (Fail Safe)
- Visual Position Indicator
- Pneumatic & Electro Pneumatic Positioners
- 3 & 4 Way Solenoid Valves
- Micro Limit Switches
- Custom ID Tags

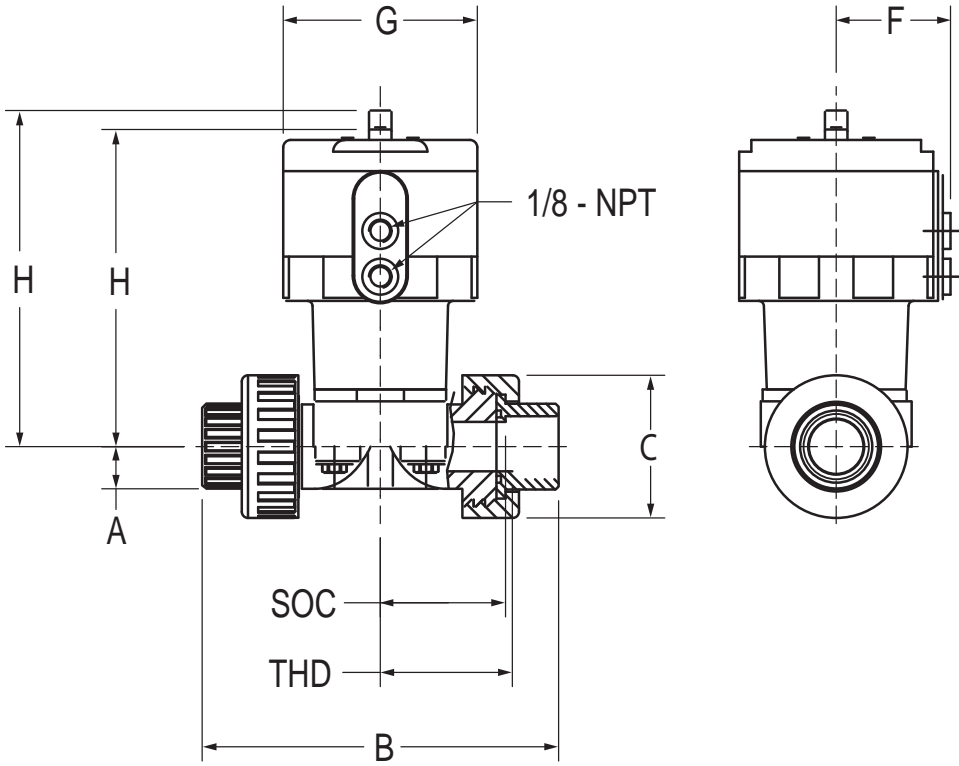
Sample Engineering Specification

All pneumatically actuated diaphragm valves shall be True Union Socket/Thread or Flanged or Spigot type constructed from PVC Type I Cell Classification 12454 or CPVC Type IV Cell Classification 23447 or UV Stabilized PP. All valve diaphragms shall be EPDM, Viton® or Hypalon® or elastomer backed PTFE. All True Union valve union nuts shall have Buttress threads. All valve components shall be replaceable. All 1/2" through 2" valves shall be pressure rated to 235 psi, all 2-1/2" through 4" valves, 1/2" - 4" flanged valves and 1/2" - 4" PTFE diaphragm valves to 150 psi, all 6" valves to 100 psi. Pneumatic Actuators shall be factory installed, linear type with preset stops. Operation shall be Air-to-Spring (double acting) for 80 psi supply pressure range. Actuator shall be equipped with [selected options list], as manufactured by Spears® Manufacturing Company.

PNEUMATIC ACTUATED DIAPHRAGM VALVES



Standard Package Dimensional Information



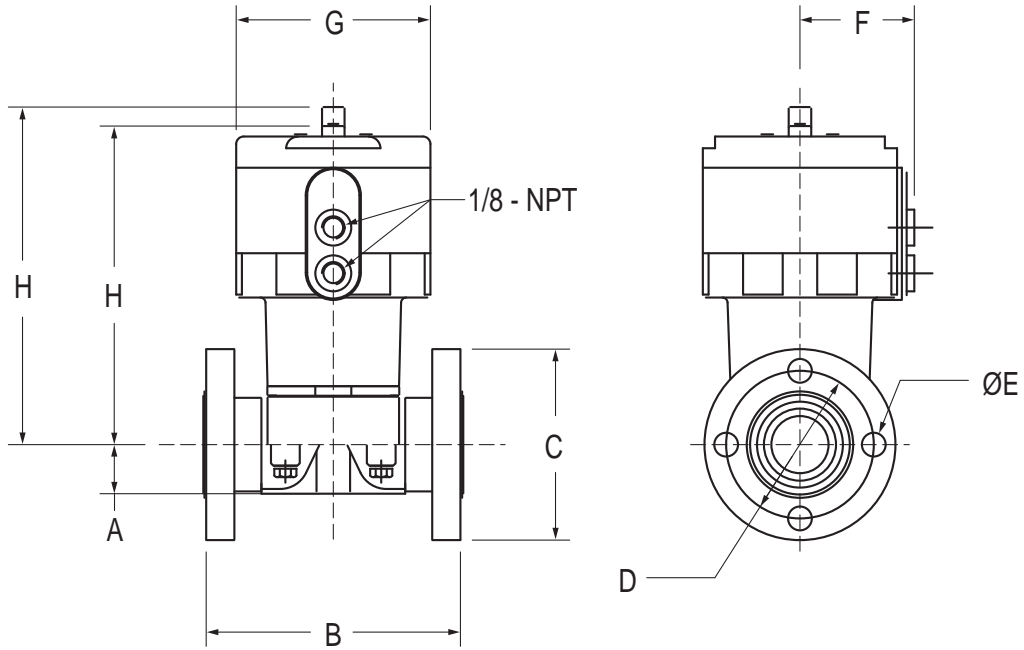
Pneumatic Diaphragm Valve - Socket/Threaded

Size	A	B	C	F	G	H		Socket	Threaded
						Open	Close		
1/2	9/16	5-15/16	1-15/16	1-21/32	2-11/16	4-17/32	4-5/16	1-29/32	3-3/8
3/4	23/32	6-1/2	2-9/32	2-3/8	3-15/16	6-7/32	5-31/32	2-1/4	2-17/32
1	27/32	7-1/4	2-7/8	2-3/32	4-1/16	6-11/16	6-5/16	2-1/2	2-23/32
1-1/4	1-9/32	8	3-5/16	3-1/16	6-1/32	9-5/16	8-5/8	2-3/4	3-1/16
1-1/2	1-9/32	9-3/8	3-9/16	3	5	9-5/16	9-5/16	3-5/16	3-19/32
2	1-1/2	10-1/2	4-7/32	3-1/16	6-1/32	10-1/32	9-3/32	3-3/4	4-1/4



PNEUMATIC ACTUATED DIAPHRAGM VALVES

Standard Package Dimensional Information



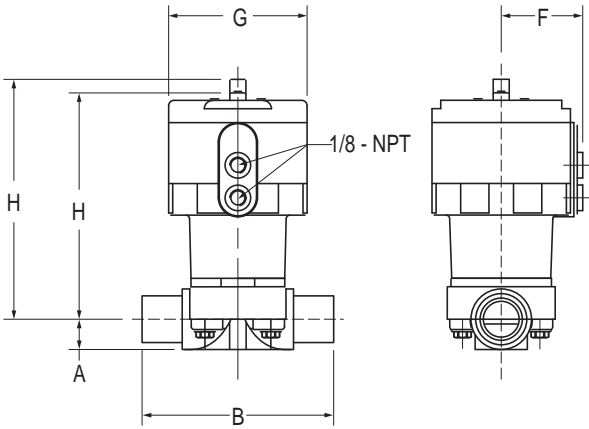
Pneumatic Diaphragm Valve - Flanged

Size	A	B	C	D	E	F	G	H	
								Open	Close
1/2	9/16	4-5/8	3-1/2	2-3/8	5/8	1-17/32	2-13/16	4-17/32	4-9/32
3/4	23/32	5	3-7/8	2-3/4	5/8	2-3/32	4-1/16	6-7/32	5-15/16
1	7/8	5-5/8	4-1/4	3-1/8	5/8	2-3/32	4-1/16	6-11/16	6-5/16
1-1/4	1-9/32	6-1/2	4-5/8	3-1/2	5/8	3-1/16	6-1/32	9-5/16	8-5/8
1-1/2	1-9/32	6-3/4	5	3-7/8	5/8	3-1/16	6-1/32	9-5/16	8-5/8
2	1-1/2	8	6	4-3/4	3/4	3-1/16	6-1/32	10-1/32	9-3/32

PNEUMATIC ACTUATED DIAPHRAGM VALVES

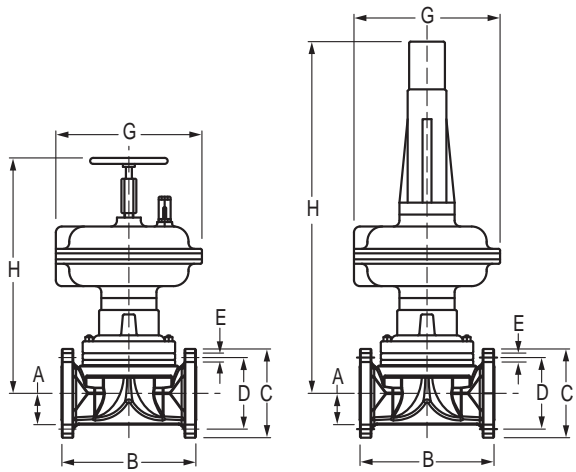


Standard Package Dimensional Information



Pneumatic Diaphragm Valve - Spigot

Size	A	B	F	G	H	
					Open	Close
1/2	9/16	4-3/8	1-17/32	2-13/16	4-17/32	4-9/32
3/4	23/32	4-3/4	2-15/16	4-1/16	6-1/4	5-15/16
1	27/32	5-3/8	2-3/32	4-1/16	6-11/16	6-5/16
1-1/4	1-9/32	6-1/4	3-1/16	6-1/32	9-5/16	8-5/8
1-1/2	1-9/32	6-1/2	3-1/16	6-1/32	9-5/16	8-5/8
2	1-1/2	7-3/4	3-1/16	6-1/32	10-1/32	6-1/32



Pneumatic Diaphragm Valve - Flanged 2-1/2" - 6"

Size	A	B	C	D	E	G		H	
						Air to Air	Spring Return	Air to Air	Spring Return
2-1/2	2-5/8	11-7/32	7-1/2	5-1/2	3/4	12-1/4	12-1/4	18-5/8	28-1/8
3	2-13/16	11-1/4	7-1/2	5-15/16	3/4	9-5/8	12-1/4	13	28-1/8
4	2-3/4	13-1/4	9	7-1/2	3/4	16	16	22-11/16	31-13/32
6	Contact Spears®								



ELECTRIC ACTUATOR OPTIONS & ACCESSORIES

The basic options and accessories listed in this section represent many of the most commonly used for electric actuation. Contact Spears® for any desired accessories, options, functions, or special controls not listed. For differentiation, “Option” is used to identify a basic variation in the actuator while “Accessory” is used to identify an add-on function to the actuator. Both options and accessories are factory configured to order on the actuation package.

Overview of Basic Options & Accessories Available

Options & Accessories	Electro Series Ball Valves	Premium Electric TU Ball Valves	Premium Electric Butterfly Valves	Premium Electric Diaphragm Valves
24 VAC	Option	Option	Option	Option
230 VAC	Option	Option	Option	Option
230 VAC 3-phase, 60Hz	--	Option	Option	Option
230 VAC 3-phase, 50 Hz	--	Option	Option	Option
12 VDC	Option	Option	Option	Option
24 VDC	Option	Option	Option	Option
NEMA 4X, 7, 9 Rating	4X Standard	Option	Option	Option
Declutchable Manual Override	--	Option	(Standard Feature)	Option
Duty Cycle Upgrade	Option	Option	Option	Option
Spring Return (Fail Safe)	--	Option	Option	--
Positioner Board (modulating)	--	Accessory	Accessory	Accessory
Transmitter	--	Accessory	Accessory	Accessory
“2-Wire” Control Relay	Accessory	Accessory	Accessory	--
Position Indicator (Visual)	Standard	Standard	Standard	--
LED Indicator Lights	--	Accessory	Accessory	Accessory
Heater & Thermostat	--	Accessory	Accessory	Accessory
Limit Switch Sets	--	Accessory	Accessory	Accessory
Torque Sensor	--	Accessory	Accessory	Accessory
Speed Controller	--	Accessory	Accessory	Accessory
Friction Brake	--	Accessory	(Standard Feature)	--
ID Tag - SS	Accessory	Accessory	Accessory	Accessory

Contact Spears® for any desired accessories, options, functions, or special controls not listed in this guide.

ELECTRIC ACTUATOR OPTIONS & ACCESSORIES



Standard (2-position) Actuator Voltage Options

Voltage options and maximum current draw (Lock Rotor Current) are listed for each type and size of valve with 2-position (open/close) actuation. See Modulating Service Option for variable position actuators and applicable voltages.

Electro Series Ball Valves (All 1/2" - 2")

Voltage Options	Loc Roter AMP Electro-50	Loc Roter AMP Electro-100
12 VAC	2.4	N/A
24 VAC	2.1	7.8
230 VAC	.5	1.5
12 VDC	.3	.2
24 VDC	.2	.2
115 VAC	.6	1.9

True Union 2000 Ball Valves

Voltage Options	Size	Max. Current
24 VAC	1/2" - 2"	2.5
	2-1/2" - 4"	3.2
	6"	3.2
230 VAC	1/2" - 6"	.38
	12 VDC	1/2" - 2"
24 VDC	2-1/2" - 6"	4.0
	1/2" - 2"	2.44
	2-1/2" - 6"	3.2

Diaphragm Valves

Voltage Options	Size	Max. Current
24 VAC	1/2" - 4"	3.2
230 VAC	1/2" - 4"	.38
12 VDC	1/2" - 2"	4.0
	2-1/2" - 4"	N/A
24 VDC	1/2" - 2"	2.6
	2-1/2" - 4"	N/A

Butterfly Valves

Voltage Options	Size	Max. Current
24 VAC	1-1/2" - 6"	3.2
	8" - 10"	3.2
	12"	20
230 VAC	1-1/2" - 10"	.38
	12"	2.8
12 VDC	1-1/2" - 6"	4.0
	8" - 10"	4.0
	12"	14
24 VDC	1-1/2" - 6"	3.2
	8" - 10"	3.2
	12"	20



ELECTRIC ACTUATOR OPTIONS & ACCESSORIES

Enclosure NEMA Rating Options

Standard enclosures are NEMA 4. The following NEMA ratings are available for all True Union Ball Valves, Butterfly Valves and Diaphragm Valves (see NEMA Ratings in Terminology & Definitions for additional description detail).

Enclosure Rating	General Description
NEMA 4	Watertight & Dust Tight
NEMA 4X	Watertight & Dust Tight with corrosion resistance
NEMA 7	Explosion Proof (class I, division 1, groups A, B, C, D)
NEMA 9	Explosion Proof (class II, division 1, groups E, F, G)

Declutchable Manual Override Option

Available for all Premium Electric actuated valves.

Valve Type	Standard Actuator Package	Declutchable Option Available
True Union 2000 Ball Valve 1/2" - 3"	Manual	Yes
True Union 2000 Ball Valve 4" - 6"	Declutchable	(standard)
Butterfly Valve - All	Declutchable	(standard)
Diaphragm Valve - All	None	Yes

Slightly different than straight manual override, *Declutchable* Manual Override disengages the actuator gear train for manual operation of the valve. Valves with this option have a hand wheel mounted on top of the actuator for manual valve operation. Spears® True Union Ball Valves and Butterfly valves include either straight Manual or Declutchable Override as part of standard actuation package, as indicated in the Table.

Duty Cycle Upgrade Option

Available for all Premium Electric actuated valves. Upgrades in duty cycles use heavier motors to handle heat build up from extended operation. Standard duty cycles are listed for each valve type and are upgradeable to extended cycles as indicated. Valves with Modulating Service option are equipped with a minimum of a 75% duty cycle as standard. Contact Spears® if a higher Duty Cycle is required

Valve Type	Size Range	Standard Duty Cycle	Upgrade To 75%
Electro Series	1/2" - 2"	25%	X
True Union Ball Valve	1/2" - 2"	75%	--
True Union Ball Valve	2-1/2" - 4"	25%	X
Butterfly Valve	1-1/2" - 10"	25%	X
Butterfly Valve	12"	100%	--
Diaphragm Valve	1/2" - 6"	25%	X

Spring Return (Fail Safe) Option

Available for all Premium Electric actuated Ball valves and Butterfly valves. An internal spring in the actuator is configured to either open or close upon loss of power supply. Special gear clutch uncouples motor during spring return. Operation can be specified as either fail-open when spring return open is desired or fail-close when spring return close is desired.

ELECTRIC ACTUATOR OPTIONS & ACCESSORIES



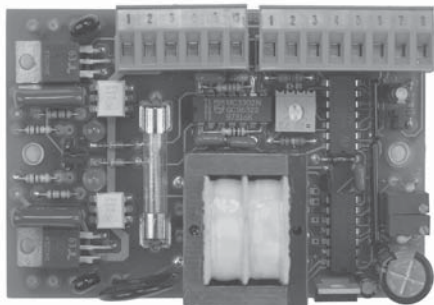
“2-Wire” Control Relay

Available for Premium Electric actuated Ball valves and Butterfly Valves. Special control switch setup operates the valve through internally mounted control relay. Valve opens when control switch is open and closes when control switch is closed. Uses 4-wire connection with 2 wires to line voltage and 2 wires to SPST control switch. Available either in normally closed or normally open configuration.



LED Position Indicator Lights

Available for all Premium Electric actuated valves. LED (light emitting diode) red/green indicator lights mounted on actuator enclosure to designate open/closed position.



Positioner Board (Modulating)

Available for all Premium Electric actuated valves. Modulation is used to control or throttle flow in response to an external control signal. An internally mounted, solid state positioner board accurately controls valve position from open to close. Available in the actuator voltages and input signals shown **Note:** Modulating Service option includes Duty Cycle Upgrade to a minimum of 75%.

Modulating Actuator Voltage	Input Signal
115 VAC	4-20mA, 0 - 5 VDC, 0 - 10 VDC
230 VAC	4-20mA, 0 - 5 VDC, 0 - 10 VDC
24 VAC	4-20mA, 0 - 5 VDC, 0 - 10 VDC
24 VDC	4-20mA, 0 - 5 VDC, 0 - 10 VDC

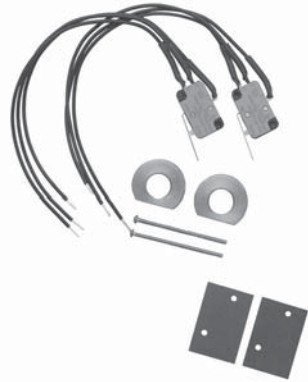


Heater and Thermostat

Available for all Premium Electric actuated valves. Mounted internally, heats the inside of the enclosure in low temperature environments to prevent condensation and keep internal lubricants fluid. The thermostat activates the heater when the enclosure internal temperature drops below the set point. There are a variety of thermostats available and a set point must be specified at the time of ordering.

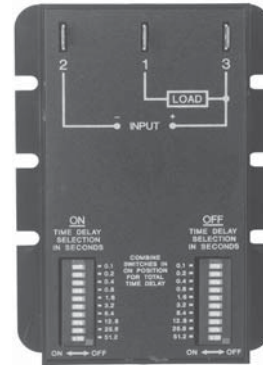


ELECTRIC ACTUATOR OPTIONS & ACCESSORIES

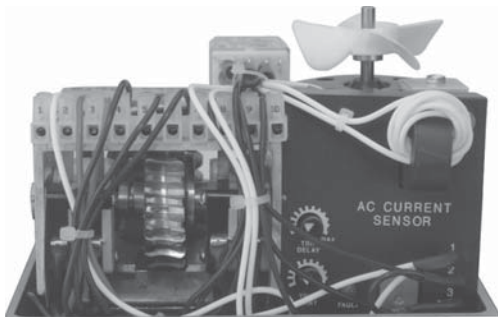


Auxiliary Limit Switches (Provide in sets of 2)
 Available for all Premium Electric actuated valves. Additional internally mounted single pole double throw limit switch (SPDT) independent from the motor switches. Typically used for indicator lights, auxiliary equipment, etc. Actuation packages accept from 1 to 2 additional sets of auxiliary limit switches as indicated. When ordering replacement sets, specify hole size of cams (either 3/8" or 1/2").

Valve Type	Auxiliary Limit Switch Sets
True Union Ball Valve	
1/2" - 2"	1
2-1/2" - 3"	1
4" - 6"	2
Butterfly Valve	
1-1/2"	1
2" - 10"	2
12"	2
Diaphragm Valve - all Sizes	

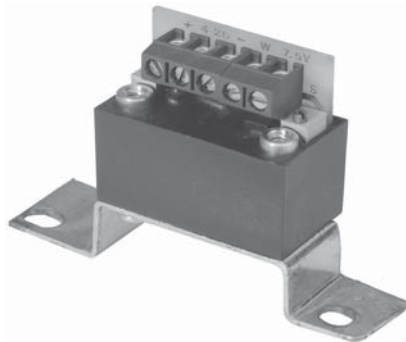


Speed Controller
 Available for all Premium Electric actuated valves. Internally mounted relays (not shown) and solid state timer allow variable control of valve cycle time (speed) by selecting combinations of ON time and OFF time options. Rate may be slowed, but cannot exceed the standard cycle time specified for the actuator.



Torque Sensor
 Available for all Premium Electric actuated valves. Internally mounted sensor is adjustable to specific torque limits to avoid damage to valve in the event of blockage.

ELECTRIC ACTUATOR OPTIONS & ACCESSORIES



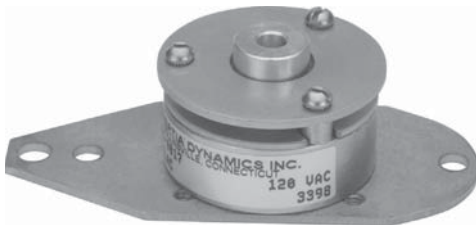
Transmitter

Available for all Premium Electric actuated valves. The Transmitter module is normally used with the 4-20mA Positioner Board and the board's power supply. It can also be used as a stand alone feedback transmitter when no position controller is used, but will require an external power supply for stand alone application. This internally mounted module provides a 4-20mA output signal directly proportional to the Positioner Board feedback potentiometer. This signal can be used by a remote instrument to monitor or display actuator position. Zero and span adjustments allow adjustment of the Transmitter's 4-20mA signal to correspond with the zero and span positions set by the Positioner Board.



Custom ID Tag

Stainless steel valve/actuator ID Tag imprinted to user specified identification criteria. Each tag is 1/2" x 3" and accommodates up to 3 lines of text, maximum of 12 characters and spaces per line.



Friction Brake

Available for all Premium Electric actuated valves. Internally mounted device which is used to eliminate mechanical "coast" of the actuator motor at the end of its cycle. Brakes are standard on all electrically actuated Butterfly Valves and not applicable to Diaphragm Valves.



PNEUMATIC ACTUATOR OPTIONS & ACCESSORIES

For Ball Valves & Butterfly Valves

The basic options and accessories listed in this section represent many of the most commonly used for Pneumatic actuation of Ball Valves and Butterfly Valves (see next section for Pneumatic Diaphragm Valves). Contact Spears® for any desired accessories, options, functions, or special controls not listed. For differentiation, “Option” is used to identify a basic variation in the actuator while “Accessory” is used to identify an add-on function to the actuator. Both options and accessories are factory configured to order on the actuation package.

Overview of Basic Options & Accessories Available

Standard Pneumatic Actuator Features	Premium Pneumatic True Union Ball Valves	Premium Pneumatic Butterfly Valves
Spring Return (Fail Safe)	Option	Option
40 or 60 psi Operating Pressure	Option	Option
Dec clutchable Manual Override	1/2" - 2" Option 2-1/2" - 6" Option	Accessory
Pneumatic Positioner	Accessory	Accessory
Electro-Pneumatic Positioner	Accessory	Accessory
Transmitter	Accessory	Accessory
Dome Position Indicator	Accessory	Accessory
Mechanical Limit Switches	Accessory	Accessory
Output Signal Mechanical Limit Switches	Accessory	Accessory
Output Signal Proximity Limit Switches	Accessory	Accessory
3 & 4-Way Solenoid Valve	Accessory	Accessory
Dual Power 3 & 4-Way Solenoid Valve	Accessory	Accessory
Stainless Steel 3-Gauge Set	Accessory	Accessory
ID Tag - SS	Accessory	Accessory

Contact Spears® for any desired accessories, options, functions, or special controls not listed in this guide.

Spring Return (Fail Safe) (Air-to-Open or Air-to-Close) Option

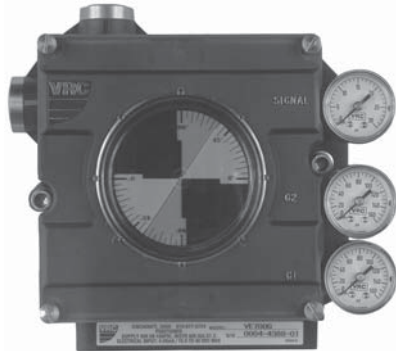
Available for all Premium Pneumatic actuated valves. An internal spring in the actuator is configured to either open or close upon loss of air supply. Spring return can be specified as either Air-to-Open (fail-close) when spring return close is desired or Air-to-Close (fail-open) when spring return open is desired.

Operating Pressure Option

Available for Premium Pneumatic actuated True Union Ball Valves and Butterfly Valves. Standard ball and butterfly valve actuators require an 80 psi supply pressure. With this option, the actuator is configured for lower supply pressures of either 40 psi or 60 psi (must specify).

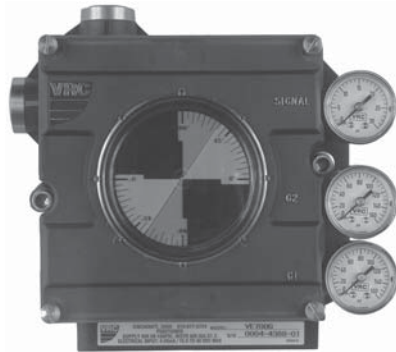
PNEUMATIC ACTUATOR OPTIONS & ACCESSORIES

For Ball Valves & Butterfly Valves



3 to 15 psi Pneumatic Positioner (for Ball & Butterfly Valves)

Available for Premium Pneumatic actuated True Union Ball Valves and Butterfly Valves. Positioner is used to control or throttle flow by modulating the air to the actuator in response to an external 3-15 psi control signal input. Available with NEMA 4 or 4X rated enclosure mounted on top of actuator with flat top green/black indicator or optional high visibility Dome Indicator. Includes pressure gauge set of one (1) input gauge 0-30 psi and two (2) output gauges 0-160 psi. Optional Stainless Steel gauge set available.



Electro-Pneumatic Positioner 4-20mA, 0-5 VDC, or 0-10 VDC

Available for Premium Pneumatic actuated True Union Ball Valves and Butterfly Valves. Positioner is used to control or throttle flow by modulating the air to the actuator in response to an external 4-20 milliamp (current), 0-5 VDC (resistive), or 0-10 VDC (resistive) control signal input which is converted to a proportional 3 - 15 psi pneumatic signal used by the positioner. Available with NEMA 4, 4X, 7 or Intrinsically Safe NEMA 7 rated enclosure mounted on top of actuator with flat top green/black indicator or dome indicator with green/red 180° high visibility. Includes pressure gauge set of one (1) input gauge 0-30 psi and two (2) output gauges 0-160 psi. Optional Stainless Steel gauge set available.



Dome Indicator

Available for Premium Pneumatic actuated True Union Ball Valves and Butterfly Valves. Dome style beacon with high visibility green/red indicator for improved viewing of valve position. Indicator only. **Note:** Dome indicators may be included with certain selections of positioners or limit switches.



3 & 4-Way Solenoid Valves

Available for Premium Pneumatic actuated True Union Ball Valves and Butterfly Valves. This combination valve operates either as a 3-way or 4-way pilot valve mounted to the actuator. The 3-way valve is a normally closed poppet design to insure tight shut-off. These valves are designed for use with spring return actuators. The 4-way valve can be used as either a 4-way 2 position design or a 3-way normally closed design merely by rotating a gasket located in the sub-base prior to assembly to the actuator. The 3-way operation routes the exhaust pressure to the spring side of the actuator to prevent corrosion problems within the actuator. An optional speed control can be purchased. Air inlet connection is 1/4" NPT. Thermoplastic composite enclosure is NEMA 4, 4x (standard) or NEMA 4, 4x, 7, 9 combination with 1/2" male conduit connection. Standard 115 VAC with voltage options of 230 VAC, 24 VAC, 12 VDC, and 24 VDC.



PNEUMATIC ACTUATOR OPTIONS & ACCESSORIES

For Ball Valves & Butterfly Valves



Dual Power Solenoid Valves

Available for Premium Pneumatic actuated True Union Ball Valves and Butterfly Valves. This configuration of 3 & 4-way solenoid valves accepts two separate power sources, one to open and one to close the valve, for use on Air-to-Air (double acting) actuators only.



Limit Switch with Indicator



Output Signal Limit Switches

Mechanical SPDT (2) or DPDT (2)
Proximity SPDT (2) or DPDT (2)

Available for Premium Pneumatic actuated True Union Ball Valves and Butterfly Valves. Set of two (2) auxiliary limit switches. Switches deliver a specified output current signal of 4-20mA or resistive signals of 0-5 or 0-10 VDC. Mechanical switches are SPDT or DPDT rated at 10 amp 125/250 VAC. Proximity (non-contact) switches are SPDT or DPDT rated at 1 amp 120 VAC. These limit switches are available with or without 180° visual indicator. Switch enclosure is NEMA 4/4x/7/9 rated.



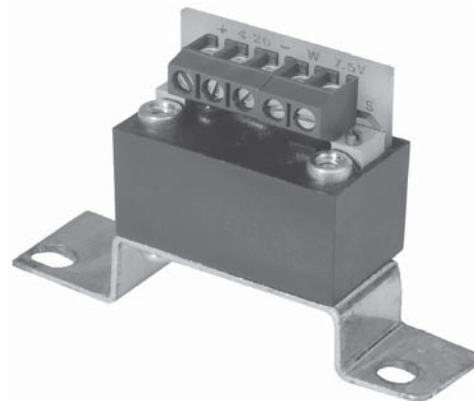
Stainless Steel Gauge Set

Three (3) gauge set. Stainless steel gauge replacement for use on Pneumatic and Electro-Pneumatic Positioners. Includes one (1) input pressure gauge 0-30 psi, and two (2) output pressure gauges 0-160 psi.



Custom ID Tag

Stainless steel valve/actuator ID Tag imprinted to user specified identification criteria. Each tag is 1/2" x 3" and accommodates up to 3 lines of text, maximum of 12 characters and spaces per line.



Transmitter

Available for Premium Pneumatic actuated True Union Ball Valves and Butterfly Valves. The Transmitter is an internally mounted module for use in the Positioner. The module is designed to give a 4-20 milliamp linear output signal with a 0-90° Positioner shaft rotation. The unit is environmentally sealed and loop powered. Transmitter is designed for use in General Purpose Locations and is not approved for Hazardous Locations as classified by the NEC.

PNEUMATIC ACTUATOR OPTIONS & ACCESSORIES

For Diaphragm Valves



The basic options and accessories listed in this section represent many of the most commonly used for Pneumatic actuation of Pneumatic Diaphragm Valves (see previous section for Pneumatic Ball Valves and Butterfly Valves). Contact Spears® for any desired accessories, options, functions, or special controls not listed. For differentiation, “Option” is used to identify a basic variation in the actuator while “Accessory” is used to identify an add-on function to the actuator. Both options and accessories are factory configured to order on the actuation package.

Overview of Basic Options & Accessories Available

Pneumatic Actuator Features	Premium Pneumatic Diaphragm Valves
Spring Return	Option
80 psi Operating Pressure	Standard
Declutchable Manual Override	2-1/2 & Larger
Pneumatic Positioner	Air-to-Spring not Air-to-Air
Electro-Pneumatic Positioner	Air-to-Spring not Air-to-Air
Micro Limit Switch Module	Accessory
3 & 4-Way Solenoid Valve	Accessory
Stainless Steel 3-Gauge Set	Accessory
ID Tag - SS	Accessory

Contact Spears® for any desired accessories, options, functions, or special controls not listed in this guide.

Spring Return (Fail Safe) (Air-to-Open or Air-to-Close) Option

Available for all Premium Pneumatic actuated valves. An internal spring in the actuator is configured to either open or close upon loss of air supply. Spring return can be specified as either Air-to-Open when spring return close is desired or Air-to-Close when spring return open is desired.

Operating Pressure (for Diaphragm Valves)

Spears® Diaphragm Valves use a 80 psi standard, 40 psi - 60 psi optional operating pressure. Specify pressure requirements at time of order.

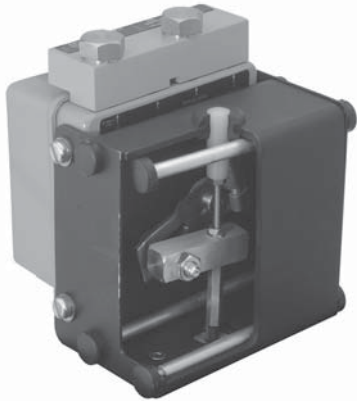
3 to 15 psi Pneumatic Positioner (for Diaphragm Valves)

Available for all Premium Pneumatic actuated Diaphragm Valves. Positioner is used to control or throttle flow by modulating the air to the actuator in response to an external 3-15 psi control signal input. Available with NEMA 4x enclosure mounted on top of actuator with 180° visual indicator. Positioner can be top or bottom loading, with or without gauges. Gauge set includes: 1 input pressure gauge 0-30 psi and 2 output pressure gauges 0-160 psi. Optional Stainless Steel gauge set available.





PNEUMATIC ACTUATOR OPTIONS & ACCESSORIES For Diaphragm Valves



Electro-Pneumatic Positioner (for Diaphragm Valves), not for air-to-air 4 to 20 mA

Available for all Premium Pneumatic Actuated Diaphragm Valves. Positioner is used to control or throttle flow by modulating the air to the actuator in response to an external 4-20 milliamp control signal input which is converted to a proportional 3-15 psi pneumatic signal used by the positioner. Available with NEMA 4x, enclosure mounted on top of actuator with 180° visual indicator. Used with air-to-spring only



3-Way Solenoid Valves 4-Way Solenoid Valves (for Diaphragm Valves)

Available for all Premium Pneumatic Actuated Diaphragm Valves. Universal operation design allows pressure to any port. 4-way solenoid valve is used for double acting (air-to-air) actuators. 3-way solenoid valve is used for spring return (fail open/fail close) actuators. Air inlet is 1/4" NPT. Enclosures are molded epoxy NEMA 4, 4x (standard) or NEMA 4/4x/7/9 combination with 1/2" conduit connection and brass body (stainless steel body available by special order). Standard 115 VAC with voltage options of 230 VAC, 24 VAC, 12 VDC, and 24 VDC.



Micro Limit Switch Module (for Diaphragm Valves) SPDT (2) or DPDT (2)

Available for all Premium Pneumatic Actuated Diaphragm Valves. Module of two (2) auxiliary mechanical limit switches. Switches are SPDT rated at 10 amp 125/250 VAC. Switch module includes 180° visual indicator. Switch enclosure is NEMA 4/4x/7/9 rated.



Custom ID Tag

Stainless steel valve/actuator ID Tag imprinted to user specified identification criteria. Each tag is 1/2" x 3" and accommodates up to 3 lines of text, maximum of 12 characters and spaces per line.

ADDITIONAL ACTUATED VALVE CONFIGURATION, OPTIONS & ACCESSORIES NOT SPECIFIED



Spears® can provide virtually any actuation need for Spears® valves. The following actuated valve configurations, options and accessories not currently specified in this manual are a few of those available on a special order basis. **See Appendix B: Premium Actuated Valve Part Number Selection** for configuration and accessory options. Please contact Spears® for additional technical information or other custom actuation needs. Certain special order options and custom Actuation Packages may require extended lead times. Please contact Spears® for details.

Special Actuated Ball Valves

- Compact 2000 Ball Valves
- Single Entry Ball Valves
- True Union 2000 3-Way Vertical & Horizontal Ball Valves
- Vented Ball Valves

Special Actuated Butterfly Valves

- Tandem 3-Way - two valves operated from one actuator, both closing or both opening at the same time.
- Tandem Diverting - two valves operated from one actuator, one opening while the other closes.
- “No Seat” actuated Butterfly Valves for duct (damper) applications.
- Polypropylene 30" to 60" Actuated Valves (custom produced)

Actuated Gate Valves

- PVC & CPVC Construction
- Sizes 1/2" - 4"
- Socket, Threaded, Flanged End Connections

Special Actuator Options

- Actuators Only
- Actuator Brackets Only
- Actuator Stem Extensions
- Double Powder Coated Electric Enclosures
- Stainless Steel Pneumatic Enclosures
- Electric Spring Return Open or Close with No Override
- Battery Back-up Electric Actuators

Special Switch Sets & Solenoids

- Single Limit Switch & Bracket Only (no actuator) for manual valves
- Double Limit Switch & Bracket Only (no actuator) for manual valves
- Dual Coil 5-Way Solenoid Valves

Replacement Parts

Many replacement parts are available for Spears® electric and pneumatic actuators and valves. Contact Spears® for specific parts needed.



Appendix A - Actuation Terminology & Definitions

The following valve actuation terminology is provided for better understanding and elimination of miscommunications. Terms and definitions are grouped by related topics and listed in alphabetical order.

GENERAL SYSTEM TERMS

Ambient Temperature - The temperature of the air surrounding the actuator. Generally stated as a maximum and minimum for proper actuator operation. Note that ambient temperature range for an actuator may exceed that of a plastic valve and should not be considered to be the same as the service temperature.

Maximum Line Pressure - The media pressure against which the valve will have to close.

Maximum Service Temperature - Maximum temperature of the media. Service temperature should be considered in selection of the proper thermoplastic valve material for the application.

Media - The material flowing through a valve.

Modulating - Throttling or regulating the flow through a valve by varying the position between open and closed.

On-Off Service - Basic full open or full closed operation to start or stop flow.

Operating Torque - Force required to operate a valve, expressed in inch-pounds or foot-pounds.

Supply Pressure - Facility air pressure supply required to operate pneumatic actuator.

ACTUATOR TERMS

Double Acting - A Pneumatic actuator which uses air to both open and close the valve. Also referred to as “Air-to-Air” operation.

Electric Actuator - An electromechanical device used to actuate (open, close or modulate) a valve. An electric motor and gear train is used to actuate the valve. Numerous application considerations must be made in using an electric actuator. These include, duty cycle, cycle time, supply voltage, operating temperature and enclosure rating (NEMA) for use of electric devices under various environmental conditions.

Fail-Closed - Spring return in a pneumatic actuator which closes the valve upon loss of air pressure. Also referred to as “Air-to-Spring Close” or “Spring-to-Close” operation.

Fail-Open - Spring return in a pneumatic actuator which opens the valve upon loss of air pressure. Also referred to as “Air-to-Spring Open” or “Spring-to-Open” operation.

Pneumatic Actuator - An air operated mechanical device used to actuate (open, close or modulate) a valve. The actuator converts air pressure into mechanical force most commonly using either a piston or diaphragm. The mechanical force output can be either rotational, as in actuation of a ball valve, or linear as commonly used in actuation of a diaphragm valve. Pneumatic actuators are not significantly limited by duty cycles and cycle time (virtually instantaneous) found with electric actuators. However, they may require additional accessories to further control speed of operation and a voltage supply for certain electric signal devices which may be desired.

Spring Return - An actuator using a spring to return the valve to either an open or closed position upon loss of power. Spring returns are most commonly used with pneumatic actuators, but can be used on electric actuators where it is necessary for the valve to open or close by design or by system failure (see also Fail-Close and Fail-Open terms).

Appendix A - Actuation Terminology & Definitions



ACTUATOR ACCESSORY & RATING TERMS

Duty Cycle - The capability of an Electric actuator motor to operate or “cycle” continuously - a 100% Duty Cycle. Ratings less than 100% mean that the actuator motor is capable of intermittent operation, as is the case with most actuation applications. For example, a 25% Duty Cycle means that for each 1-minute of operation, 3-minutes of non-operation is required. Duty cycles greater than 25% are generally needed only when additional work loads are encountered, such as valve modulation or in actuation of larger butterfly valves.

Limit Switches - Electrical switches which may be applied to either electric or Pneumatic actuators to supply a signal that the valve cycle has been completed. In Electric actuators, the primary limit switches are used to control the open and closed position of the valve. Auxiliary limit switches may be used to perform other functions such as starting or stopping a pump. Limit switches are most often mechanical and are activated by physical contact with either a lever or plunger. Proximity switches are electrically tripped without physical contact and may be used with certain computer or micro processor controls.

NEMA Rating - National Electric Manufacturers Association standard for rating electrical component enclosures. The most commonly used NEMA ratings for electric actuator and electrical accessory enclosures are NEMA 4 and NEMA 4X.

NEMA 1: General Purposes - for indoor use without unusual service conditions, primarily to protect components from contact.

NEMA 2: Drip proof - for indoor use with degree of protection against limited amounts of falling water or dirt.

NEMA 3: Rain tight - for outdoor use with protection from windblown dust, rain and sleet, and undamaged by ice formation.

NEMA 4: Watertight and Dust tight - for indoor/outdoor use with a protection from windblown dust, rain or hose directed wash down environments.

NEMA 4X: Watertight and Dust tight - same as NEMA 4 with addition of corrosion resistance.

NEMA 7: Explosion Proof (class I, division 1, groups A, B, C, D) - designed to contain an internal explosion without causing an external hazard when installed in a designated environment group. Group A= atmospheres containing acetylene; Group B = atmospheres containing hydrogen; Group C = atmospheres containing ethyl-ether vapors, ethylene, or cyclopropane; Group D = atmospheres containing gasoline, hexane, naphtha, benzene, butane, propane, alcohol, acetone, benzol, lacquer, solvent vapors or natural gas.

NEMA 9: Explosion Proof (class II, division 1, groups E, F, G) - Dust-ignition-proof enclosures designed to prevent both entrance of dust and external heating capable of igniting dust on the enclosure or in the surrounding atmosphere. Group E = atmospheres containing metal dust including aluminum, magnesium, their commercial alloys, and other metals of similar hazardous characteristics; Group F = atmospheres containing carbon black, coal or coke dust; Group G = atmospheres containing flour, starch, or grain dust.

Positioner - Attachment for either electric or Pneumatic actuators which provides automatic modulating control of the valve position from open to closed. Electric positioners work by comparison of 2-currents, one derived from the input signal and one from the actuator. Pneumatic positioners increase, decrease and balance the air supply according to an input signal from an external control source. Input signals are generated by either a 3 to 15 psi pneumatic signal, or a 4 to 20 milliamp electro-pneumatic signal.

Solenoid Valve - An electro-magnetically operated valve which enables electrical control of air supply to a pneumatic actuator. Solenoids are wired to a manual switch or any electric controller. Double Acting actuators require a 4-way solenoid, Spring-Return actuators require a 3-way solenoid for proper air control. As electrical devices, solenoid valves are available in various NEMA ratings.

Transducer - A device that converts one signal type to another. In actuation controls, the most common use of a transducer is in conversion between electrical signals and pneumatic signals.



Appendix B - Premium Actuated Valve Part Number Selection

The section is provided for formulation of part numbers on custom actuated valve packages. A 3-step process is used to build custom actuated valve part numbers:

Step 1 - Select the desired type, style, options and material of valve from appropriate Valve Selection Table. Specify nominal valve size from Size Code available.

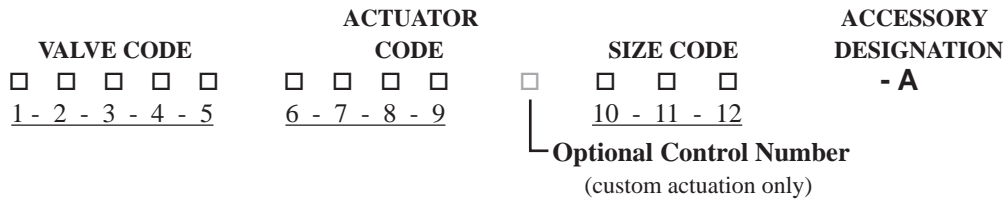
Step 2 - Select the desired actuator style options from the Actuator Selection Tables

Step 3 - Select desired actuator accessories (if any) from the Accessories Selection Tables.

IMPORTANT: Custom accessories are ordered under a separate part number from the actuated Valve Package. Accessory part numbers are ordered individually and factory assembled with selected Actuated Valve Package.

If any accessories are being ordered, add the suffix, “- A” to the end of the Actuated Valve Package part number. This suffix is added only if an Accessory(s) is being selected for add on to the initial Actuated Valve Package.

ACTUATED VALVE PACKAGE PART NUMBER POSITIONS



Step 1: Valve & Size Code Selection

Spears® actuated valve selection table include Ball Valves (Selection Table 1) Butterfly Valves (Selection Table 2), Diaphragm Valves (Selection Table 3) and Gate Valves (Selection Table 3A). Use the table information to complete the Valve Code in the package part number.

Table 1: BALL VALVES

(Valve Type - End Connector - O-ring - Special Options - Material – Size Selection)

	VALVE CODE	RESERVED FOR ACTUATOR	SIZE CODE
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <u>1 - 2 - 3 - 4 - 5</u>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <u>6 - 7 - 8 - 9</u>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <u>10 - 11 - 12</u>
<p>Valve Type</p> <ul style="list-style-type: none"> 0 = Compact Ball P = Compact 2000 1 = True Union Ball 2 = TU 2000 Ind.Ball Z = TU 2000 Std Ball 3 = Utility (Special) S = Single Entry (Special) T = TU 2000 Ind Tandem U = Hor 3-way L Tandem V = Hor 3-way T Tandem W = Ver 3-way L Tandem X = Ver 3-way 2L Tandem Y = Ver 3-way 3L Tandem R = Ver 3-way T Tandem A = Hor 3-way L-port B = Hor 3-Way T-port C = Ver 3-Way L-port D = Ver 3-Way 2L-port E = Ver 3-Way 3L-port F = Ver 3-Way T-port 	<p>O-ring</p> <ul style="list-style-type: none"> 0 = Buna-N 1 = EPDM 2 = Viton® 3 = PTFE Encapsulated 4 = Silicone 5 = Viton® ETP 6 = AFLAS® TFE/P (FEPM) <p>End Connector (see note 1)</p> <ul style="list-style-type: none"> 1 = Socket 2 = Thread 3 = SR Thread 4 = Flanged 5 = BSP Thread 6 = DIN Plain 7 = JIS Plain 8 = Flange CL300 Drilling 	<p>Material</p> <ul style="list-style-type: none"> 1 = PVC 2 = CPVC 3 = PP (see note 1) 4 = LXT PVC <p>Special Options</p> <ul style="list-style-type: none"> 0 = None 1 = Lubricant Free (see note 2) 2 = Vented Ball 	<p>Size</p> <ul style="list-style-type: none"> 005 = 1/2" 007 = 3/4" 010 = 1" 012 = 1-1/4" 015 = 1-1/2" 020 = 2" 025 = 2-1/2" 030 = 3" 040 = 4" 060 = 6"
			<p>Notes:</p> <ul style="list-style-type: none"> 1 – PP valves available in regular True Union style sizes 1/2" - 4" only, with threaded or SR threaded end connectors only. 1/2" - 2" PVC & CPVC True Union valves ordered as “socket” come with both socket and regular threaded end connectors. 2-1/2" - 6" valves come with socket only. 2 – All Ball Valves are assembled with <u>non-silicone</u> lubricant. 3 – Tandem (Diverting) part number includes two valves operated from one actuator with one opening while the other closes.

Appendix B - Premium Actuated Valve Part Number Selection



Table 2: BUTTERFLY VALVES
(Valve Type - Stem - Seat & O-ring - Special Options - Material - Size Selection)

	VALVE CODE	Reserved for Actuator	SIZE CODE
	□ □ □ □ □	□ □ □ □	□ □ □
	1 - 2 - 3 - 4 - 5	6 - 7 - 8 - 9	10 - 11 - 12
Valve Type	<ul style="list-style-type: none"> 4 = Std. Butterfly 5 = True Lug Butterfly 6 = Tandem 3-Way (see note 6) 7 = Tandem Diverting (see note 7) 8 = High Purity TFM J = Pool Butterfly - white (see note 8) K = Wafer Butterfly L = Shaved Std. Butterfly 	<p>Material</p> <ul style="list-style-type: none"> 1 = PVC (see note 1) 2 = CPVC 3 = PP (see note 2) <p>Special Options (see note 3)</p> <ul style="list-style-type: none"> 0 = None 1 = Zinc plated Lugs (for True Lug) 2 = SS 316 Lugs (for True Lug) 3 = Non lubricated 4 = Zinc lug/ non lubricated 5 = SS 316 lug/ non lubricated 6 = No Seat (duct application) 7 = Zinc plated Lug Inserts (for Std. Butterfly; see note 9) 8 = SS Lug Inserts (for Std. Butterfly; see note 9) 	<p>Size (see note 5)</p> <ul style="list-style-type: none"> 015 = 1-1/2" 020 = 2" 025 = 2-1/2" 030 = 3" 040 = 4" 060 = 6" 080 = 8" 100 = 10" 120 = 12" 140 = 14" 160 = 16" 180 = 18" 200 = 20" 240 = 24"
Stem Material	<ul style="list-style-type: none"> 1 = SS 316 2 = PTFE Coated SS 316 3 = Titanium 4 = Hastaloy 	<p>Seat & O-ring (see note 4)</p> <ul style="list-style-type: none"> 1 = Buna-N 2 = EPDM 3 = Viton® 4 = PTFE Sleeved 5 = TFM 6 = PTFE Sleeved EPDM 	

Notes:

- 1 – PVC and CPVC valves available through 14" only.
- 2 – All PP and 14" PVC/CPVC valves available in Standard Butterfly style only.
- 3 – Lugs specified with True Lug and Lug Insert styles only.
- 4 – PP valves are standard with EPDM or Viton®.
- 5 – Actuated valve sizes 14" and larger are custom produced to order, contact Spears® Technical Services.
- 6 – Tandem 3-Way part number includes two valves operated from one actuator, both closing or both opening at the same time.
- 7 – Tandem Diverting part number includes two valves operated from one actuator with one opening while the other closes.
- 8 – Pool Butterfly Valves available in sizes 1-1/2" to 12" with SS316 Stem, EPDM Seats, PVC White only. No other options are available.
- 9 – Lug Inserts are used when Lug Style valve is ordered for Tandem Diverting valve type.



Appendix B - Premium Actuated Valve Part Number Selection

Table 3: DIAPHRAGM VALVES
(Valve Type - End Connector - O-ring - Diaphragm - Material - Size Selection)

	VALVE CODE	Reserved for Actuator	-	SIZE CODE
	□ □ □ □ □	□ □ □ □		□ □ □
	1 - 2 - 3 - 4 - 5	6 - 7 - 8 - 9		10 - 11 - 12
<p>Valve Type</p> <p>9 = Diaphragm Valve H = Zero Dead Leg</p> <p>End Connector (see note 1)</p> <p>1 = Socket (True Union) 2 = Thread (True Union) 3 = SR Thread (True Union) 4 = Spigot 5 = Flanged 6 = DIN Plain 7 = JIS 8 = BSP Thread</p>	<p>Material (see note 1)</p> <p>1 = PVC 2 = CPVC 3 = PP 4 = LXT PVC 5 = PVC/Hastaloy-C Bolts 6 = CPVC/Hastaloy-C Bolts 7 = PVC/Titanium Bolts 8 = CPVC/Titanium Bolts</p> <p>Diaphragm</p> <p>1 = Buna-N 2 = EPDM 3 = Viton® 4 = Hypalon® (CSM) 5 = PTFE w/EPDM 6 = PTFE w/Viton®</p> <p>O-ring (see note 2)</p> <p>0 = None 1 = EPDM 2 = Viton® 3 = PTFE Encapsulated</p>	<p>Size (see note 1)</p> <p>005 = 1/2" 007 = 3/4" 010 = 1" 012 = 1-1/4" 015 = 1-1/2" 020 = 2" 025 = 2-1/2" 030 = 3" 040 = 4" 060 = 6" 080 = 8"</p>		

Notes:

- 1 – All valves with socket, thread, or SR thread end connectors are True Union style only.
 Socket end connectors available on PVC and CPVC valve sizes 1/2" - 2" only.
 Thread and SR thread end connectors available on PVC, CPVC, and PP valve sizes 1/2" - 2" only.
 DIN, JIS, and BSP end connectors available on PVC and CPVC valve sizes 1/2" - 2" only.
 Flanged end connectors available on all sizes of PVC and CPVC valves.
 Flanged end connectors available on PP valve sizes 3" and larger only.
 Zero Dead Leg valves are Socket Tee x selected End Connector code.
- 2 – O-rings are used on True Union style valves sizes 1/2" - 2" with socket, thread, or SR thread end connectors only.
 Enter "0" for all other end connectors.



Appendix B - Premium Actuated Valve Part Number Selection

Step 2: Actuator Code Selection

Spears® actuated valves are available with either electric or pneumatic motors. Actuators are pre matched to each type and size of valve with proper operating torque and cycle time. Additional actuator accessories are selected and are factory installed on the Actuated Valve Package in Step 3 instructions.

Select the applicable options from either the Electric Actuators (Selection Table 4) or Pneumatic Actuators (Selection Table 5) and enter the designated **Actuator Code** portion of the package part number.

Table 4: ELECTRIC ACTUATORS

(Voltage - Enclosure Rating - Manual Override - Duty Cycle)

ACTUATOR CODE				Optional Control Number (not used on basic packages)		
□ □ □ □ □	□ □ □ □	□	-	□ □ □		
<u>1 - 2 - 3 - 4 - 5</u>	<u>6 - 7 - 8 - 9</u>			<u>10 - 11 - 12</u>		
Reserved for Valve				Reserved for Size		
Voltage (see note 1) A = 115 VAC 60 Hz B = 230 VAC 60 Hz C = 230 VAC 3-phase 50 Hz (EU) D = 230 VAC 3-phase 60 Hz E = 24 VAC F = 12 VDC G = 24 VDC L = 460 VAC 3-Phase 50 Hz (EU) M = 460 VAC 3-Phase 60 Hz R = 415 VAC 3-Phase 50 Hz (EU) S = 230 VAC 50 Hz (EU) T = 575 VAC 3-Phase 60Hz (EU) U = 115 VAC 50 Hz (EU) X = Single Indicator Switch Only (see note 2) Y = Double Indicator Switch Only (see note 2) Z = Actuator Bracket Only (see note 2) 1 = 480 VAC 50 Hz 2 = 480 VAC 60 Hz 3 = 480 VAC 3-Phase 50 Hz 4 = 480 VAC 3-Phase 60 Hz Enclosure 1 = NEMA 4 4 = NEMA 9 2 = NEMA 4x 5 = NEMA 4 Double Powder Coated 3 = NEMA 7 6 = NEMA 4x Double Powder Coated	Duty Cycle (see note 3) 1 = 25% 7 = 40% 2 = 75% 8 = 60% 3 = 100% 9 = 20% 4 = 50% 5 = 70% (custom only) 6 = 80% (custom only)	Manual Override (see note 4) 0 = None 1 = Basic Manual Override 2 = Declutchable Manual Override 3 = Spring Return Open with Declutchable Manual Override (see note 5) 4 = Spring Return Close with Declutchable Manual Override (see note 5) 5 = Spring Return Open no override (see note 5) 6 = Spring Return Close no override (see note 5) 7 = RCE Battery Backup Actuator 8 = Spring Return Open with Basic Manual Override (see note 5) 9 = Spring Return Close with Basic Manual Override (see note 5)				
		7 = NEMA 7 Double Powder Coated 9 = AWWA 8 = NEMA 9 Double Powder Coated B = NEMA 6 A = NEMA 7 Modulation enclosure C = NEMA 6P, prolonged (for 1/2"-2" modulated Ball Butterfly) submersion at limited depth.				

Notes:

- 1 – 460 VAC available on Butterfly Valves only.
- 2 – Bracket & Indicator Switch Only part numbers do not allow any other options (must be Z000, Y000, or X000)
- 3 – **Standard Duty Cycles** vary according to valve type and size as indicated in chart below. Standard Duty Cycles can be *upgraded* only. Note: 50% duty cycle available on non-standard, special order actuators only.

Valve Type	Size Range	25% Duty Cycle	75% Duty Cycle	100% Duty Cycle
Ball Valve	1/2" - 2"		X	
Ball Valve	2-1/2" - 4"	X		
Butterfly Valve	1-1/2" - 10"	X		
Butterfly Valve	12" - 24"			X
Diaphragm Valve	1/2" - 8"	X		

- 4 – Basic Manual Override is standard on Ball Valve sizes 1/2" – 3" with Declutchable Manual Override as an option. Declutchable Manual Override is standard on Ball Valve sizes 4" & larger and all Butterfly Valves. Standard Gate Valve and Diaphragm Valve packages have no override with Declutchable Manual Override as an option. Spring return not available on electric Diaphragm valves.
- 5 – Electric Spring Return Actuators come standard with no type of override. Need to verify if either Declutchable Manual Override or Basic Manual Overrides are available in all applications.

Appendix B - Premium Actuated Valve Part Number Selection



Actuator Only Part Numbers

Individual Premium Electric actuators can be ordered for specific Spears® valve types and sizes. Includes actuator and mounting hardware for specified valve type and size. To specify valve type for actuator only, enter the first digit valve type code followed by zeros ("0") for remaining 4-digits of the valve code section of the part number plus the applicable 3-digit valve size code (see valve selection Tables 1, 2, or 3). Complete the actuator code selection as described in this section. See Step 3 for any desired actuator accessories.

Example: A 115 VAC electric actuator only with NEMA 4 enclosure, basic manual override and 75% duty cycle for 2" standard True Union Ball Valve would have the following part number: 10000A112-020

Optional Control Numbers (custom use) – Electric Actuators

1 = AUMA SA07.5-19A/ AUMA-115 Actuator w/remote pilot station

2 = Rotork AQM105 Actuator

3 = RCE15-5-4-1-15 Remote Control Station w/24 VAC Battery Back-up

4 = RCE10-4-1-5-15 Remote Control Station w/24 VDC Battery Back-up

5 = Oversize Housing

6 = AUMA SG05.1 Actuator

7 = AUMA SG05.1-2 Actuator

B = AUMA SG05.1-3 460VAC 3-phase Actuator, indicator lights, 4-20mA positioner, NEMA 4x

8 = AUMA SA07.1-26B Actuator

H = AUMA SA07.5-38A 115 VAC Single Phase Actuator, (2) Gear Train Limit Switches, Open / Close Torque Switches, Space Heater, Plug & Socket type terminals, Side Mounted hand wheel, Nema 4x enclosure, Reversing starters, Power Supply board, Interface Board - 110 VAC, 3 Push buttons O/S/C, Selector Switch L/O/R, 3 Lights open / fault / close

9 = Actuator Upsize (one size to accommodate accessories)

A = EIM Controls P2N1-3 (460 VA 3-phase Actuator)

C = SURE 25-10, 115 VAC Actuator, Spring return close, w/ modulating 4-20 mA positioner board

D = AUMA SAR07.5-13B/GS63.3, 5000 in.-lb., 460 VAC 3-Phase 60HZ Actuator, indicator lights, 4-20mA positioner, NEMA4x.

E = AUMA SG07.1, 2640 in.-lb., 120VAC Actuator, NEMA 4x/6

F = RCE-40-410-4-115, 115 VAC actuator w/ battery backup

G = Valvcon # IW150HS2DNZN115A. 1-1/2", w/ heater/thermostat, 2 aux limit switches, Device Net card, declutchable manual override, 115VAC

J = RCE 15-5-4-15, 150 in. lb., 115VAC, 5 sec. cycle, 100% duty rating, NEMA 4x/7/9 enclosure, w/battery backup

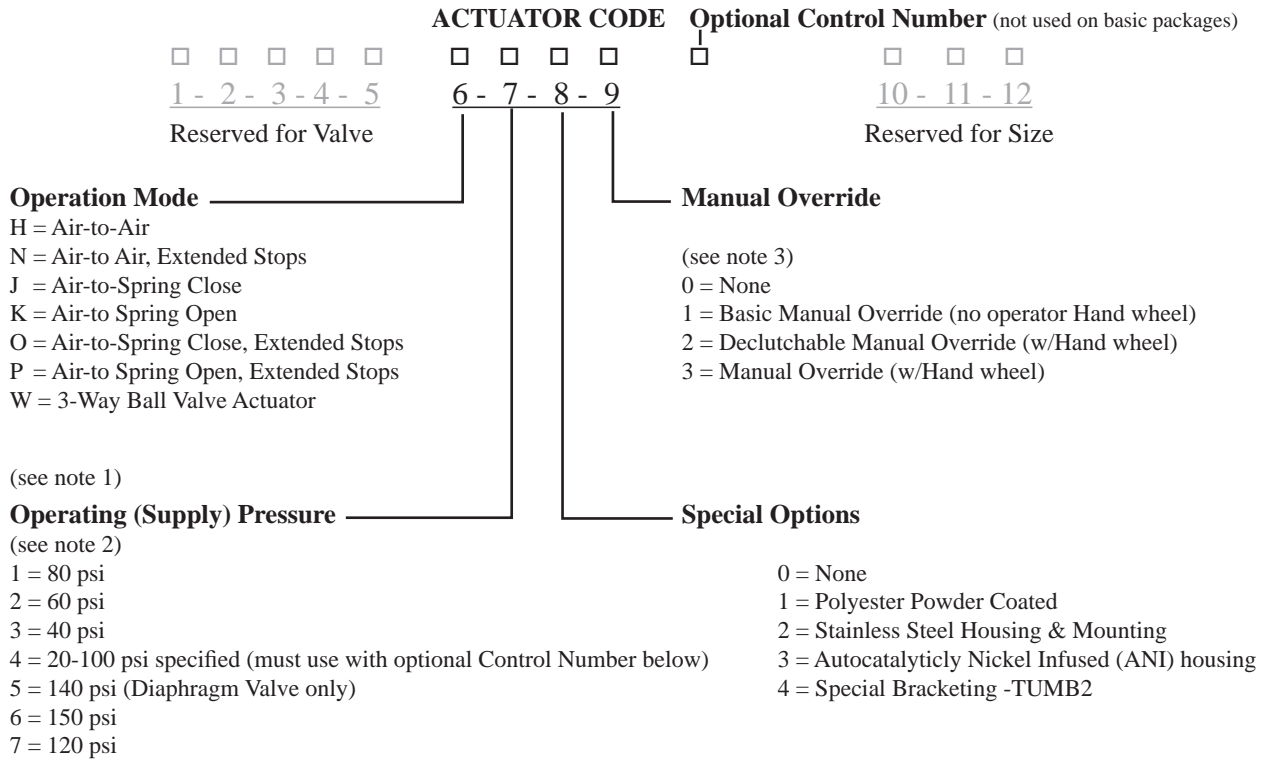
X = Actuator assembled with Double Containment Valve & Valve Box (for use in "actuator only" part number)

Note: When control number is used on a package with accessories, the dash (-) is dropped before the "A" due to part number limitations.



Appendix B - Premium Actuated Valve Part Number Selection

Table 5: PNEUMATIC ACTUATOR
(Operation - Operating Pressure - Manual Override)



Notes:

- 1 – Bracket only part numbers do not allow any other options (must be Z000); available for Ball Valves only.
- 2 – Operating pressures (1-2-3) apply to Ball valve actuators.
- 3 – Basic Manual Override is standard on all Ball Valves and Butterfly Valves with Declutchable Manual Override as an option. Standard Diaphragm Valve package has no override. No manual override option sizes 1/2" –2". Basic Manual Override are an option on valve sizes 2-1/2" & larger that are equipped with Air-to-Air and Air-to-Spring Closed.

Actuator Only Part Numbers

Individual Premium Pneumatic actuators can be ordered for specific Spears® valve types and sizes. Includes actuator and mounting hardware for specified valve type and size. To specify valve type for actuator only, enter the first digit valve type code followed by zeros ("0") for remaining 4-digits of the valve code section of the part number plus the applicable 3-digit valve size code (see valve selection Tables 1, 2, or 3). Complete the actuator code selection as described in this section. See Step 3 for any desired actuator accessories.

Example: An 80 psi, air-to-air pneumatic actuator only with declutchable manual override for 2" standard Butterfly Valve would have the following part number: 40000H102-020.

Optional Control Numbers (custom use) – Pneumatic Actuators

- 1 = Downsized actuator for vacuum application.
- 2 = Habonin brand pneumatic actuator
- 3 = Customer Requested Upsized Actuator (one size larger than standard)
- 4 = Saunders 602-1/2 actuator
- X = Actuator assembled with Double Containment Valve & Valve Box (for use in "actuator only" part number)

Control Numbers for user specified pressure. Must be used with Operating (Supply) Pressure code 7, #4:

- | | | |
|------------|------------|-------------|
| A = 20 psi | D = 50 psi | G = 80 psi |
| B = 30 psi | E = 60 psi | H = 90 psi |
| C = 40 psi | F = 70 psi | J = 100 psi |

Note: When control number is used on a package with accessories, the dash (-) is dropped before the "A" due to part number limitations.

Appendix B - Premium Actuated Valve Part Number Selection



Step 3: Actuator Accessory Selection

Premium actuator accessories are available for both Electric actuators (Selection Table 7) and Pneumatic actuators (Selection Table 8 and 9). Actuator accessory options are selected and ordered separately as individual Accessory part numbers for the actuated valve. If accessory options are to be ordered, be sure the suffix, “- A ”, was added to the end of the selected Actuated Valve Package part number configured in Step 1 & 2 to designate that the accessories are assembled with the valve package.

A separate part number is used for each accessory ordered. Select the desired Accessory Part Number from the selection tables for each accessory.

Example: An electric actuated valve is desired with a heater and thermostat, an SPDT limit switch set and a 0-5 VDC signal positioner board. From Table 7, the following Accessory part numbers should be ordered with the actuated valve package:

Heater & Thermostat = **A-H1**
 Limit Switch Set = **A-LS1**
 Positioner Board = **A-PB2**

Contact Spears® for any desired accessories or functions not specified in the Accessory Selection Tables

Selection Table 7: Premium Electric Actuator Accessories

Accessory	Description	Accessory Part Number
Heater	Heater & Thermostat - On @ 41°F, Off @ 60.8°F	A-H1
	Heater & Thermostat - On @ 62.6°F, Off @ 80.6°F	A-H2
Auxiliary Limit Switches	2-SPDT Limit Switch Set (1/2" shaft cam)	A-LS1
	2-SPDT Limit Switch Set (3/8" shaft cam ³)	A-LS2
	2-SPDT Limit Switch Set for Electric Spring Return	A-LS3
Position Indicators	LED Indicator Lights	A-P2
Modulating Positioner Boards	115 VAC 4-20mA	A-PB1
	115 VAC 0-5 VDC	A-PB2
	115 VAC 0-10 VDC	A-PB3
	230 VAC 4-20mA	A-PB4
	230 VAC 0-5 VDC	A-PB5
	230 VAC 0-10 VDC	A-PB6
	24 VAC 4-20mA	A-PB7
	24 VAC 0-5 VDC	A-PB8
	24 VAC 0-10 VDC	A-PB9
	24 VDC 4-20mA	A-PB10
	24 VDC 0-5 VDC	A-PB11
	24 VDC 0-10 VDC	A-PB12
		115 VAC 4-20mA For Electric Spring Return Actuator
Transmitter	4-20mA	A-T1
Torque Sensor	Adjustable Electronic Torque Sensor	A-TS1
Speed Controller	Variable Speed Controller	A-SC1
2"-Wire Control ¹ (operates as solenoid valve)	Control Relay Switch Setup 115 VAC - Normally Closed	A-CR1
	Control Relay Switch Setup 115 VAC - Normally Open	A-CR2
	Control Relay Switch Setup 24 VAC - Normally Closed	A-CR3
	Control Relay Switch Setup 24 VAC - Normally Open	A-CR4
	Control Relay Switch Setup 230 VAC - Normally Closed	A-CR5
	Control Relay Switch Setup 230 VAC - Normally Open	A-CR6
	Control Relay Switch Setup 12 VDC - Normally Closed	A-CR7
	Control Relay Switch Setup 12 VDC - Normally Open	A-CR8
	Control Relay Switch Setup 12 VDC - Normally Closed	A-CR9
	Control Relay Switch Setup 12 VDC - Normally Open	A-CR10
Friction Brake ²	Mechanical Brake	A-FB1
Lockout Switch	Power disconnect switch activated when n manual override is in use	A-LK1

Notes:

- 1 – “2-Wire” Control is not applicable to Diaphragm Valves
- 2 – Friction Brake is standard on Butterfly Valves and not applicable to Diaphragm Valves
- 3 – The A-LS2 is used on 1/2" - 2" basic Ball Valve packages; A-LS1 used on all others.



Appendix B - Premium Actuated Valve Part Number Selection

(Selection Table 7: Premium Electric Actuator Accessories - CONTINUED)

Accessory	Description	Accessory Part Number
Remote/Off/Local Control Switch	Remote/off/local, open/close momentary contact push buttons, red (close) and green (open) position indicating lights	A-RS1
Special Hardware	Titanium Bolts	A-B1
ID Tag	Type 316 Stainless Steel ID Tag 1/2" x 3" (3-lines, 12-characters & spaces)	TAG3-015
Stem Extension	Ball Valve Stem Extension ⁴	A-BVSE-XXX-000
	True Union 2000 Ball Valve Stem Extension	A-BVSE2-XXX-000
	Butterfly Valve Stem Extension	A-BFSE-XXX-000
	Diaphragm Valve Stem Extension	A-DESE-XXX-000

Note:

4 – Stem Extension Part Numbers: Enter size code for “xxx” in part number. Replace “000” with desired length code in part number; length is from top of valve to bottom of actuator.

Selection Table 8: Ball Valve & Butterfly Valve Premium Pneumatic Actuator Accessories

Accessory	Description	Accessory Part Number
PNEUMATIC POSITIONERS	3-15 psi NEMA 4 Flat-Top Indicator	A-PP1
	3-15 psi NEMA 4 Dome Indicator	A-PP2
	3-15 psi NEMA 4 Dome Indicator, Integrated 2-SPDT Mech. Switches	A-PP3
ELECTRO PNEUMATIC POSITIONERS WITH INDICATOR	4-20mA NEMA 4 Flat-Top Indicator	A-EP1
	4-20mA NEMA 4 Dome Indicator	A-EP2
	4-20mA NEMA 4 Dome Indicator, Integrated 2-SPDT Mech. Switches	A-EP3
	4-20mA NEMA 7 Flat-Top Indicator	A-EP4
	4-20mA Intrinsically Safe (CSA/UL) Flat-Top Indicator	A-EP5
	4-20mA NEMA 7 Dome Indicator	A-EP6
	4-20mA Intrinsically Safe w/2-SPST Proximity Switches	A-EP22
SOLENOID VALVES	3 & 4-way 115 VAC NEMA 4/4x	A-SV1
	3 & 4-way 230 VAC NEMA 4/4x	A-SV2
	3 & 4-way 24 VAC NEMA 4/4x	A-SV3
	3 & 4-way 12 VDC NEMA 4/4x	A-SV4
	3 & 4-way 24 VDC NEMA 4/4x	A-SV5
	3 & 4-way 115 VAC 7/9	A-SV6
	3 & 4-way 230 VAC 7/9	A-SV7
	3 & 4-way 24 VAC 7/9	A-SV8
	3 & 4-way 12 VDC 7/9	A-SV9
	3 & 4-way 24 VDC 7/9	A-SV10
	Dual Power 3 & 4-way 115 VAC NEMA 4/4x	A-SV11
	Dual Power 3 & 4-way 230 VAC NEMA 4/4x	A-SV12
	Dual Power 3 & 4-way 24 VAC NEMA 4/4x	A-SV13
	Dual Power 3 & 4-way 12 VDC NEMA 4/4x	A-SV14
	Dual Power 3 & 4-way 24 VDC NEMA 4/4x	A-SV15
	Dual Power 3 & 4-way 115 VAC NEMA 7/9	A-SV16
	Dual Power 3 & 4-way 230 VAC NEMA 7/9	A-SV17
	Dual Power 3 & 4-way 24 VAC NEMA 7/9	A-SV18
	Dual Power 3 & 4-way 12 VDC NEMA 7/9	A-SV19
	Dual Power 3 & 4-way 24 VDC NEMA 7/9	A-SV20
	Stainless Steel 3 & 4-way 115 VAC NEMA 4/4x	A-SV21
	3-Way 24 VDC Hi Temperature (Class H) NEMA 4x	A-SV22
3 & 4-way 230 VAC NEMA 4/4x 1/2" NPT Din Connector	A-SV23	

Note: Pneumatic and Electro-Pneumatic positioners include brass gauges: 1 input gauge @ 0-30 psi and 2 output gauges @ 0-160 psi. Stainless steel gauges may be ordered separately.

Appendix B - Premium Actuated Valve Part Number Selection



(Table 8: Ball Valve & Butterfly Valve Premium Pneumatic Actuator Accessories - continued)

Accessory	Description	Accessory Part Number
LIMIT SWITCH & TRANSMITTER COMBINATION	4-20mA 2-SPDT NEMA 4/4x/7/9	A-LS20
	4-20mA 2-SPDT NEMA 4/4x/7/9 w/ Visual Indicator	A-LS21
	4-20mA 2-DPDT NEMA 4/4x/7/9	A-LS22
	4-20mA 2-DPDT NEMA 4/4x/7/9 w/ Visual Indicator	A-LS23
	4-20mA 2-Proximity NEMA 4/4x/7/9	A-LS24
	4-20mA 2-Proximity NEMA 4/4x/7/9 w/ Visual Indicator	A-LS25
LIMIT SWITCHES	2-SPDT NEMA 4/4x	A-LS40
	2-SPDT NEMA 4/4x w/ Visual Indicator	A-LS41
	2-SPDT NEMA 4/4x w/ Green/Red Dome Indicator	A-LS41D
	2-SPDT NEMA 4/4x w/ Low Profile Indicator	A-LS41L
	2-DPDT NEMA 4/4x	A-LS42
	2-DPDT NEMA 4/4x w/ Visual Indicator	A-LS43
	2-Proximity NEMA 4/4x	A-LS44
	2-Proximity NEMA 4/4x w/Low Profile Indicator (source power requires intrinsic safety barrier or amplifier)	A-LS44L
	2-Proximity NEMA 4/4x w/ Visual Indicator	A-LS45
	2-Proximity NEMA 7/9	A-LS46
	2-Proximity NEMA 7/9 w/ Visual Indicator	A-LS47
	2-Proximity NEMA 7/9 w/ Low Profile Indicator	A-LS47L
	2-SPDT NEMA 4/4x/7/9	A-LS48
	2-SPDT NEMA 4/4x/7/9 w/ Visual Indicator	A-LS49
	2-DPDT NEMA 4/4x/7/9	A-LS50
	2-DPDT NEMA 4/4x/7/9 w/ Visual Indicator	A-LS51
4-SPDT NEMA 4/4x w/180° Indicator	A-LS52	
INDICATORS	Dome Indicator	A-V2
TRANSMITTER	4-20mA Output Transmitter	A-PT1
PRESSURE GAUGE SET	Stainless steel case, 3-gauge set for use with positioners: 1 - input pressure gauge 0-30 psi, 2 output gauges 0-160 psi	A-G1
	Plastic case, 3-gauge set for use with positioners: 1 - input pressure gauge 0-30 psi, 2 output gauges 0-160 psi	A-G2
AIR MUFFLERS	Standard Sintered Bronze, 40 Micron 1/8" NPT	A-M18
	Standard Sintered Bronze, 40 Micron 1/4" NPT	A-M14
	Speed Control Muffler (Adjustable Air Flow) 1/8" NPT	A-M2V18
	Speed Control Muffler (Adjustable Air Flow) 1/4" NPT	A-M2V14
ID TAG	Type 316 Stainless Steel ID Tag 1/2" x 3" (3-lines, 12-characters & spaces)	TAG3-015
Stem Extensions	Ball Valve Stem Extension ¹	A-BVSE-xxx-000
	True Union 2000 Ball Valve Stem Extension ¹	A-BVSE2-xxx-000
	Butterfly Valve Stem Extension ¹	A-BFSE-xxx-000

Notes:

1 – Stem Extension Part Numbers: Enter size code for “xxx” in part number. Replace “000” with the desired length code in part number; length is from top of valve to bottom of actuator.



Appendix B - Premium Actuated Valve Part Number Selection

Table 9: Diaphragm Valve Premium Pneumatic Actuator Accessories

Accessory	Description	Accessory Part Number
PNEUMATIC POSITIONERS	3-15 psi NEMA 4x w/Visual Indicator Top Loading (no gauge)	A-DPP1
	3-15 psi NEMA 4 x w/Visual Indicator Top Loading w/gauges (3)	A-DPP2
	3-15 psi NEMA 4 x w/Visual Indicator Bottom Loading (no gauge)	A-DPP3
	3-15 psi NEMA 4 x w/Visual Indicator Bottom Loading w/gauges (3)	A-DPP4
ELECTRO PNEUMATIC POSITIONERS	4-20 mA (3-15 psi) NEMA 4 x w/Visual Indicator (up to 2")	A-DEP1
	4-20 mA (3-15 psi) NEMA 4 x w/Visual Indicator w/SS Gauges (up to 2")	A-DEP2
	4-20 mA (3-15 psi) NEMA 4 x w/Visual Indicator (2-1/2" & up)	A-DEP3
	4-20 mA (3-15 psi) NEMA 4 x w/Visual Indicator w/SS Gauges (2-1/2" & up)	A-DEP4
	4-20mA (3-15 psi) NEMA 4 x w/Dome Indicator w/2-SPDT Limited Switches (2-1/2" & up)	A-DEP5
3-WAY SOLENOID VALVES	115 VAC NEMA 4/4x	A-DSV1
	230 VAC NEMA 4/4x	A-DSV2
	24 VAC NEMA 4/4x	A-DSV3
	12 VDC NEMA 4/4x	A-DSV4
	24 VDC NEMA 4/4x	A-DSV5
	115 VAC NEMA 4/4x/7/9	A-DSV6
	230 VAC NEMA 4/4x/7/9	A-DSV7
	24 VAC NEMA 4/4x/7/9	A-DSV8
	12 VDC NEMA 4/4x/7/9	A-DSV9
	24 VDC NEMA 4/4x/7/9	A-DSV10
4-WAY SOLENOID VALVES	115 VAC NEMA 4/4x	A-DSV11
	230 VAC NEMA 4/4x	A-DSV12
	24 VAC NEMA 4/4x	A-DSV13
	12 VDC NEMA 4/4x	A-DSV14
	24 VDC NEMA 4/4x	A-DSV15
	115 VAC NEMA 4/4x/7/9	A-DSV16
	230 VAC NEMA 4/4x/7/9	A-DSV17
	24 VAC NEMA 4/4x/7/9	A-DSV18
	12 VDC NEMA 4/4x/7/9	A-DSV19
	24 VDC NEMA 4/4x/7/9	A-DSV20
MICRO ² LIMIT SWITCHES	2-SPDT NEMA 4 w/180° Visual Indicator	A-DLS20
	2-SPDT NEMA 7/9 w/180° Visual Indicator	A-DLS25
PROXIMITY LIMIT SWITCHES	2-SPDT NEMA 4/4X	A-DLS23
LIMIT SWITCHES ³	2-SPDT NEMA 4	A-DLS24
SPEED CONTROLLER	Variable Speed Controller	A-DPSC1
ID TAG	Type 316 Stainless Steel ID Tag 1/2" x 3" (3-lines, 12-characters & spaces)	TAG3-015
Stem Extensions	Diaphragm Valve Stem Extension ¹	A-DPSE-xxx-000
HANDWHEEL OVERRIDE	Handwheel override for 1/2" to 2" Linear Diaphragm Actuators	A-DHW1
	Handwheel override for 2-1/2" to 6" Linear Diaphragm Actuators	A-DHW2

Notes: 1 – Stem Extension Part Numbers: Enter size code for “xxx” in part number. Replace “000” with the desired length code in part number; length is from top of valve to bottom of actuator.
 2 – Micro Limit Switches used on valve sizes 1/2" through 2".
 3 – Limit Switches are used on valve sizes 2-1/2" & Larger

Appendix C - Valve Actuation Questionnaire Checklist

Return Fax To Tech Services: (818) 364-6945



Contact Name: _____ **Date:** _____
Business Name: _____
City: _____ **State:** _____ **Country:** _____
Phone: _____ **Fax:** _____ **E-mail:** _____
Project Name: _____

Diaphragm Valves: System Media Pressure (Required) psi _____ kPa _____ Bar _____ Nominal Size in _____ mm _____ cm _____ Valve Quantity Each _____		
Diaphragm Valve Type: EPDM <input type="checkbox"/> Viton® <input type="checkbox"/> PTFE/Viton® <input type="checkbox"/> PTFE/EPDM <input type="checkbox"/> Other Valve Type <input type="checkbox"/> _____	Body Material: PVC <input type="checkbox"/> CPVC <input type="checkbox"/> LXT PVC <input type="checkbox"/> Polypropylene <input type="checkbox"/>	End Connector O-rings 1/2" - 2": EPDM <input type="checkbox"/> Viton® <input type="checkbox"/> PTFE/Viton® <input type="checkbox"/> PTFE/EPDM <input type="checkbox"/> Other <input type="checkbox"/> _____ (If Other Explain)
End Connector: Socket <input type="checkbox"/> SR Threaded <input type="checkbox"/> Flange <input type="checkbox"/> Spigot <input type="checkbox"/>		
<input type="checkbox"/> Other information: _____		
<p>Pneumatic <input type="checkbox"/> Not all combinations may be available.</p> <p>FailSafe Type - (Position to which valve cycles upon air loss) <input type="checkbox"/> Double Acting (No FailSafe. Stays in last activated position) <input type="checkbox"/> Spring Return - Close (FailSafe in <u>closed position</u> upon air loss) <input type="checkbox"/> Spring Return - Open (FailSafe in <u>open position</u> upon air loss) <input type="checkbox"/> Other: _____</p> <p>Operating Air Pressure (psi) - (Compressed air supply required to operate actuator) <input type="checkbox"/> 80-116 <input type="checkbox"/> Other: _____</p> <p>Override Type - (Override used to cycle valve upon air loss. Not available in sizes 1/2" - 2") <input type="checkbox"/> Basic <input type="checkbox"/> Declutchable <input type="checkbox"/> Other: _____</p> <p>Aux. Limit Switches- (Additional mechanical switches to operate external lights, alarms etc. (set of 2) <input type="checkbox"/> SPDT - Mechanical <input type="checkbox"/> SPDT - Proximity <input type="checkbox"/> DPDT - Mechanical</p> <p>Voltage Signal Type: Specify Voltage: _____</p> <p>Visual Indicator - (Provides local visual valve position indication) <input type="checkbox"/> Low Profile <input type="checkbox"/> Dome</p> <p>Positioner Type - (Positioner accepts an input signal from PLC to control valve cycle). <input type="checkbox"/> Pneumatic Positioner (Air supply required to operate valve) Signal Pressure - (Air pressure required to position the valve) <input type="checkbox"/> 3-15 psi <input type="checkbox"/> Other: _____ <input type="checkbox"/> Electro-Pneumatic Positioner (Air and voltage supply required to operate) Input <input type="checkbox"/> 4-20mA <input type="checkbox"/> 0-10 VDC <input type="checkbox"/> Other: _____ <input type="checkbox"/> With Transmitter - (Sends output signal to PLC to provide valve position) Transmitter Output <input type="checkbox"/> 4-20mA <input type="checkbox"/> 0-10 VDC <input type="checkbox"/> Other: _____ NEMA Rating - (Enclosure rating indicates level of ingress protection from fluids and solids) <input type="checkbox"/> 4 <input type="checkbox"/> 4x <input type="checkbox"/> Other: _____</p> <p>Solenoid Valve - (Regulates actuator intake/exhaust air supply) <input type="checkbox"/> 3 way (Air-to-Spring) <input type="checkbox"/> 4 way (Double Acting Actuators only) <input type="checkbox"/> Other: _____</p> <p>Solenoid Valve Voltage <input type="checkbox"/> 115 VAC <input type="checkbox"/> 230 VAC <input type="checkbox"/> Other: _____</p> <p>NEMA Rating - (Enclosure rating indicates level of ingress protection from fluids, solids and gases) <input type="checkbox"/> 4 <input type="checkbox"/> 4x <input type="checkbox"/> Other: _____</p> <p><input type="checkbox"/> Other Options: _____</p>	<p style="text-align: center;">Not all combinations may be available.</p> <p>Electric Multi Turn <input type="checkbox"/></p> <p>Voltage Supply Power: <input type="checkbox"/> 115 VAC <input type="checkbox"/> 230 VAC <input type="checkbox"/> Other: _____</p> <p>Frequency <input type="checkbox"/> 50 Hertz <input type="checkbox"/> 60 Hertz</p> <p>Phase <input type="checkbox"/> Single <input type="checkbox"/> Three</p> <p>Override Type - (Override used to cycle valve upon power loss) <input type="checkbox"/> Basic <input type="checkbox"/> Declutchable <input type="checkbox"/> Other: _____</p> <p>Duty Cycle (Amount of work valve can accomplish before requiring rest) <input type="checkbox"/> 25% <input type="checkbox"/> 75% <input type="checkbox"/> Other: _____</p> <p>NEMA Rating - (Enclosure rating indicates level of ingress protection from fluids and solids) <input type="checkbox"/> 4 <input type="checkbox"/> 4x <input type="checkbox"/> Other: _____</p> <p>Positioner Type - (Positioner accepts an input signal from PLC to control valve cycle) <input type="checkbox"/> Positioner with Transmitter Signal Input <input type="checkbox"/> 4-20mA <input type="checkbox"/> 0-10 VDC <input type="checkbox"/> Other: _____ Transmitter - (Sends output signal to PLC to provide valve position) Signal Output <input type="checkbox"/> 4-20mA <input type="checkbox"/> 0-10 VDC <input type="checkbox"/> Other: _____ <input type="checkbox"/> Positioner - NO Transmitter Signal Input <input type="checkbox"/> 4-20mA <input type="checkbox"/> 0-10 VDC <input type="checkbox"/> Other: _____</p> <p>Auxiliary Limit Switches (Additional mechanical switches to operate external lights, alarms etc.) <input type="checkbox"/> 2 <input type="checkbox"/> 4 (Set of 2 each)</p> <p>Standard Accessories - All options not available in all actuator combinations <input type="checkbox"/> Torque Sensor <input type="checkbox"/> Battery Backup <input type="checkbox"/> LED Indicating Lights (red /green) <input type="checkbox"/> Speed Control <input type="checkbox"/> 2 Wire Control Relay <input type="checkbox"/> Heater & Thermostat <input type="checkbox"/> [On @ 41F] [Off @ 60.8F] <input type="checkbox"/> [On @ 69.8F] [Off @ 89.6F] <input type="checkbox"/> [On @ 62.6F] [Off @ 80.6F]</p> <p><input type="checkbox"/> Other Options: _____</p>	

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