

*FDA Series*



*High Performance*

*Control & Choke Valves*

# FDA Series

## High Performance Control & Choke Valves

Like all Cyclonic valves, the FDA Series is built with the Cyclonic Design Difference. When you need to control a wide range of pressures and flow rates of gases or liquids, Cyclonic's superior design gives you accurate control and a long safe valve life.

### Easy Actuation Changes

Pre-drilled for simple in-line actuation changes, whether manual or automated.

### Field Lubricated Stem

Can be used with handle or actuator.

### Upstream Driver

Allows for easy service of internal components.

### Low Torque

Exclusive internal gear drive requires less torque, often allowing use of smaller, less expensive actuation. Precise repeatable control.

### In-Line Flow Path

Minimizes pressure drop, erosion and cavitation.

### Short Pattern Design

Greater flexibility where space is limited.

### 100% Testing

Each valve we make is tested to ANSI B16.34 / API 598 standards.

### Tungsten Carbide

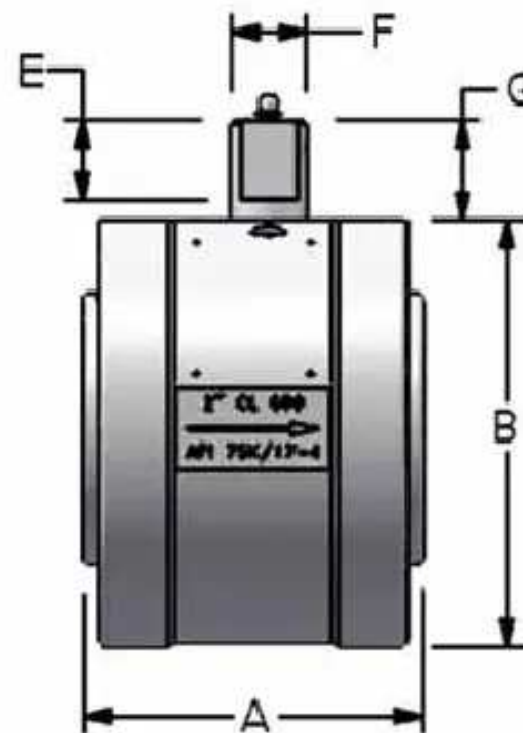
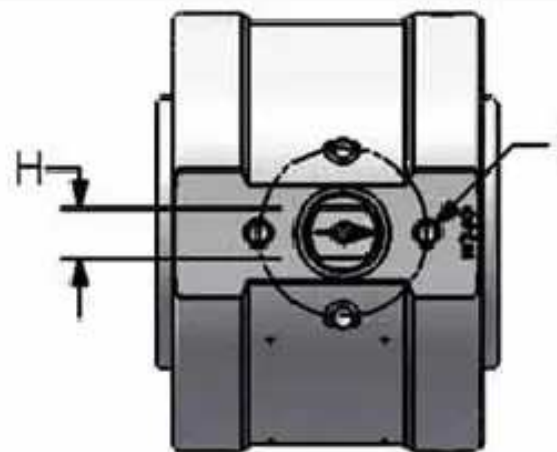
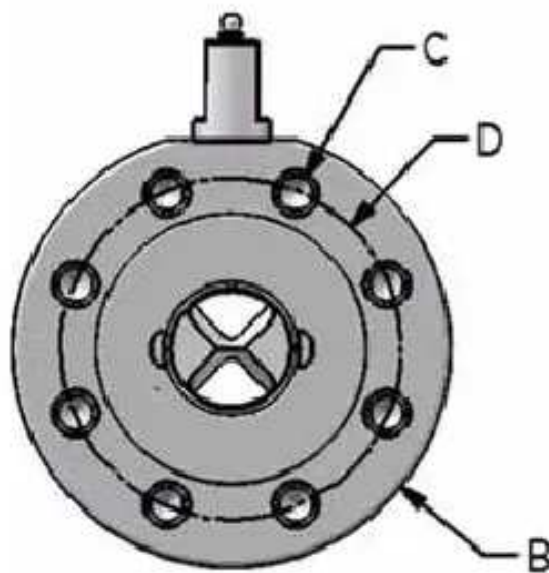
Control discs and extended downstream erosion protection.



# FDA Series

## Technical Specifications

- Machined from solid bar stock; no porosity, limitless possible lengths
- Pressure ratings up to 10,000 psi MOP
- Xylan™ coated 17-4 stainless steel stem and disc driver
- Standard materials of API 75K 4130 and 316SS, or customer-specified materials
- ANSI B16.34 and/or API 6A wall thickness and bolt loading
- Manual, electric, hydraulic or pneumatic actuation
- Open/close or modulating service
- Selectable failure position
- Raised Face and RTJ flanges available



Size Code	Press Code	Disc Type	Size (in)	Pressure Rating	Max Ori Size	A (in)	B (in)	C (in)	D (in)	E (in)	F (in)	G (in)	H (in)	I (in)
15	06	D2	1-1/2	CL 600	58/64	3.61	6.13	0.88	4.50	0.94	0.74	1.00	0.56	4 x .250-20 (1.75 BCD)
18	10	D6	1-13/16	10K MOP	91/64	6.73	7.88	0.88	5.75	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
20	06	D2	2	CL 600	58/64	5.00	6.50	0.75	5.00	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
20	06	D6	2	CL 600	91/64	5.00	6.50	0.75	5.00	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
20	15	D2	2	CL 1500	58/64	5.00	6.50	1.00	6.50	1.11	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
20	15	D6	2	CL 1500	91/64	5.00	6.50	1.00	6.50	1.11	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
20	62	D2	2	6250 MOP	58/64	4.90	6.25	0.88	4.94	0.94	0.74	1.14	0.56	4 x .375-16 (2.00 BCD)
21	10	D6	2-1/16	10K MOP	91/64	6.73	7.88	0.88	6.25	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
29	50	D9	2-9/16	5K MOP	120/64	6.19	9.62	1.00	7.25	1.20	1.12	1.44	0.75	4 x .375-16 (2.50 BCD)
30	06	D6	3	CL 600	91/64	5.00	8.25	0.88	6.62	1.27	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
30	06	D9	3	CL 600	120/64	5.75	8.25	0.88	6.62	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
30	15	D6	3	CL 1500	91/64	6.00	10.50	1.25	8.00	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
30	25	D9	3	CL 2500	120/64	6.06	12.00	1.38	9.00	1.20	1.12	1.40	0.75	4 x .375-16 (2.50 BCD)
30	09	D2	3	CL 900	58/64	5.00	9.50	1.00	7.50	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
30	09	D6	3	CL 900	91/64	5.00	9.50	1.00	7.50	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
31	10	D9	3-1/16	10K MOP	120/64	7.40	10.62	1.12	8.50	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
40	06	D6	4	CL 600	91/64	5.60	10.75	1.00	8.50	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
40	06	D9	4	CL 600	120/64	5.60	10.75	1.00	8.50	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
40	09	D6	4	CL 900	91/64	6.06	11.50	1.25	9.25	1.20	1.12	1.30	0.75	4 x .375-16 (2.50 BCD)
40	09	D9	4	CL 900	120/64	6.06	11.50	1.25	9.25	1.20	1.12	1.30	0.75	4 x .375-16 (2.50 BCD)
40	15	D6	4	CL 1500	91/64	6.06	12.25	1.38	9.50	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)
40	15	D9	4	CL 1500	120/64	6.10	12.25	1.38	9.50	1.20	1.12	1.50	0.75	4 x .375-16 (2.50 BCD)

In order to consistently offer you the highest quality, fully engineered products, we reserve the right to change our specifications and designs at any time. Cyclonic Valve products and the Cyclonic logo are registered and/or common law trademarks of Cyclonic Valve Company, Inc. This document, including textual matter and illustrations, is copyright protected by Cyclonic Valve Company, Inc., with all rights reserved ©2011 Cyclonic Valve Company.



***Cyclonic valves are more than just valves.  
They're SOLUTIONS!***



*Cyclonic Valve Headquarters in Tulsa, OK*

***Since 1991, Cyclonic has been setting the standards for precise and repeatable control of gases and liquids. We listen to our customers, and then design and manufacture valves to meet and exceed their expectations.***

#### **HOW DO WE DO THAT?**

Cyclonic's in-house manufacturing capability means superior quality control, unmatched customer service, and shorter lead times.

Our valves are machined from solid bar stock, in API 75K 4130 or 316 stainless steel. Cyclonic's tungsten carbide wear components and proprietary designs provide Class VI shutoff, low torque operation, and accurate flow control.

Our exclusive **"Side Entry"** design allows simple one-man complete in-line inspection and maintenance, critical for increasing safety and protecting the environment.

Our **"EDS™ Erosion Detection System"** can prevent fluids or gases from escaping into the environment by providing early warning before an incident happens.

#### **WHO USES CYCLONIC VALVES?**

- Anadarko
- BP
- Baker Hughes/Centrilift
- Chesapeake
- Chevron
- ConocoPhillips
- Denbury
- Devon
- Marathon Oil
- Newfield
- QEP
- Quicksilver
- Schlumberger/Reda
- Many others

#### **HOW ARE THEY USED?**

Cyclonic valves are used for automated and manual production chokes, plunger lift control, high pressure control of CO<sub>2</sub>, water, and steam injection, as by-pass valves, blow-off/bleed-down valves, at OEM pump testing and repair facilities, as compressor suction/by-pass/discharge valves, and in many other applications.

Most common line sizes 1" - 6" are readily available, in pressure ratings up to 10,000 psi. End connections include API and ANSI flanges, NPT, BW, SW,

Victaulic®, water style or other customer specified connections.

***It all comes down to this...***

***The Cyclonic difference***

***Exceeding your expectations every day.***



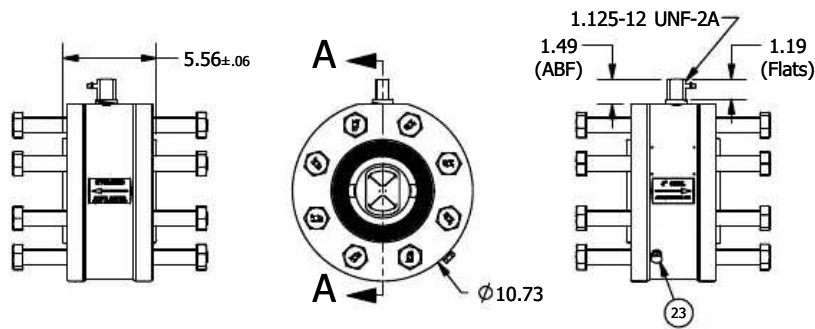
All Cyclonic Valves are proudly made in the USA.

*Imagine the possibilities...*



***Cyclonic Valve Company, Inc.***

2349 West Vancouver  
Broken Arrow, OK 74012-1183  
918-317-8200 or 1-800-922-1707  
FAX 918-317-8206  
EMAIL SALES@cyclonic.com

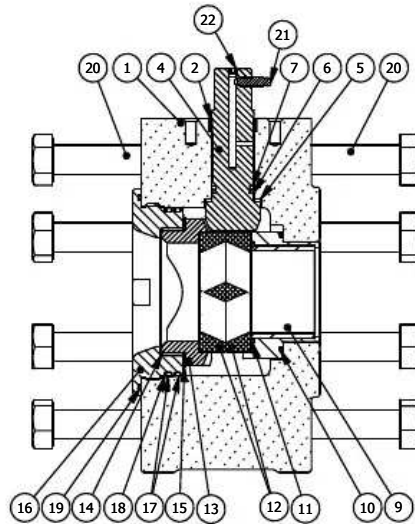


**FA406-xxP-4-4ZZ**  
(FDA4006-D9S)  
4" CL 600, D9 Discs, RF  
API 75K, TC Lined WS  
HNBR/Nitrile Seals

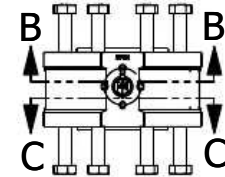


Note s:

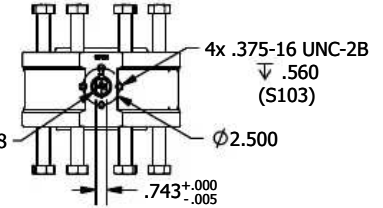
- Control discs available for up to 110 Cv, with area equivalent to 120/64" orifice.
- Recommended spare parts are: Control Discs (items 12), Rebuild kit CRK-FA4xx-QP-RL-6S, Wearsleeve assembly WSXA0118-011N2 (items 8-11). Optional spare parts include Stem (item 4) and Disc Driver™ (item 13). Spare parts price list is available on request.
- Actuation options include: handle with position indicator plate, electric or pneumatic actuators. Manual valve is furnished with provisions for future actuator mounting (requires mounting kit).
- Material and finishes are appropriate for intended service. Specifications are available on request.
- All nominal dimensions shown are for reference. Tolerances comply with applicable industry standards.



SECTION A-A



SECTION B-B



SECTION C-C

ITEM	PART NUMBER	DESCRIPTION	QTY.
1	CBD0047A-9C200	Body, Control Valve	1
2	SLB1406-DUS01	Sleeve Bearing	1
3	DPN2501-44700	Dowel Pin, 1/4" Dia. x 1/2"	16
4	CST00092-48129	Stem, Control Valve	1
5	TW164125-27086	Thrustwasher	1
6	PPK1252-V3100	Seal, PolyPak	1
7	MBU1252-PM180	Backup Ring	1
8	WS000118-01109	Wearsleeve	1

ITEM	PART NUMBER	DESCRIPTION	QTY.
9	DSL00034-50100	Discharge Sleeve	1
10	OR20152-V3100	O-Ring	1
11	OR20148-V3100	O-Ring	1
12	D9S2XXXX-XXXXX	Disc, Control	2
13	DRV00048-48129	Driver	1
14	CE000012-27100	Sleeve	1
15	TW445262-27955	Thrustwasher	1
16	CVR00018-9C104	Retainer, Control Valve	1

ITEM	PART NUMBER	DESCRIPTION	QTY.
17	OR20248-V3100	O-Ring	2
18	BU80248-V2100	Backup Ring	1
19	OR20161-V3100	O-Ring	1
20	FHH1409-B7H04	Bolt-HH, .875" x 3.250"	16
21	GZ00428-57213	Grease Zerk	1
22	FSS0428-44200	Set Screw, .250" x .250"	1
23	PPG250H-44100	Plug, 1/4" NPT	1

Approximate Weight: 140 Lbs.

Doc. No.	REV
CD-FDA4006-D9SP-9-4-5-RL-6S	02
S:\SWData\Assemblies	SHEET 1 OF 1

NAME	DATE
DRAWN MJM	10/2/13
APPR.	
DO NOT SCALE DRAWING	REVIEWED By herring at 1:45 pm, Sep 20, 2019

PROPRIETARY AND CONFIDENTIAL  
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CYCLONIC VALVE COMPANY, INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF CYCLONIC VALVE COMPANY, INC. IS PROHIBITED.

02 - CBD 47A-9C100 was .09100, CVR00018-9C100 was .09100, GZ00 28-57213 was GZ00428-57213, CRK-FA4xx-QP-RL-6, was CRK-FA406-QP-RL-6, Removed TW308 0P-27032 DLJ 09/20/2019





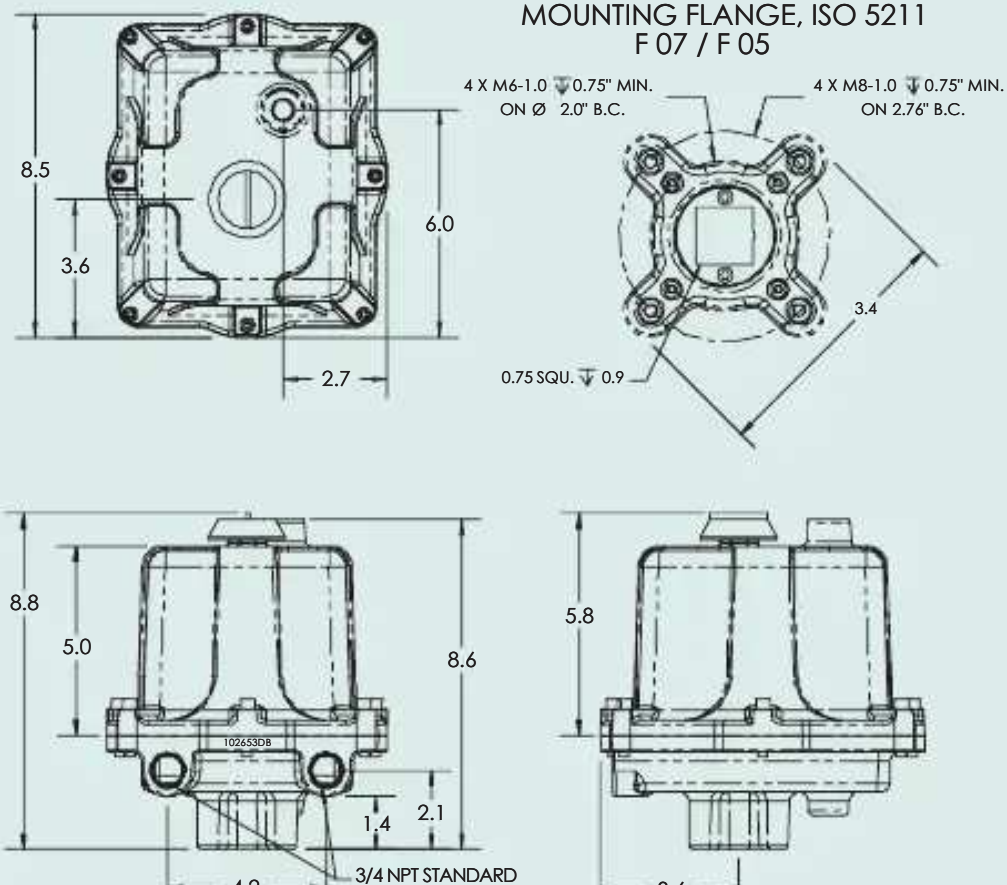
# MSB, and ESR Series



## ESR & ADC-Series Enclosures

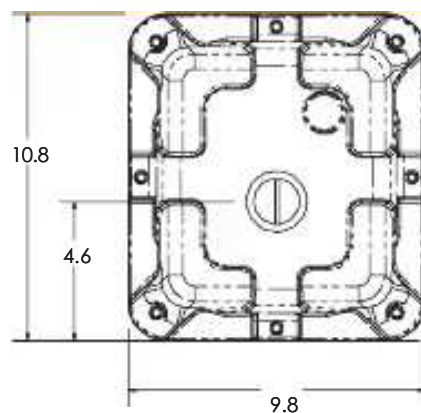
ALL DIMENSIONS IN INCHES

MOUNTING FLANGE, ISO 5211  
F 07 / F 05



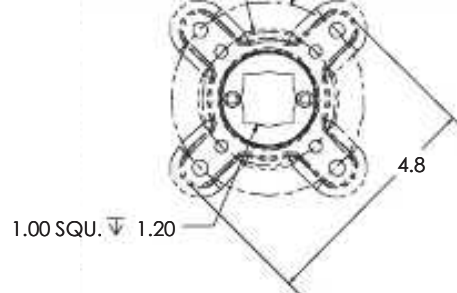
**MSB &**

ALL DIMENSIONS IN INCHES

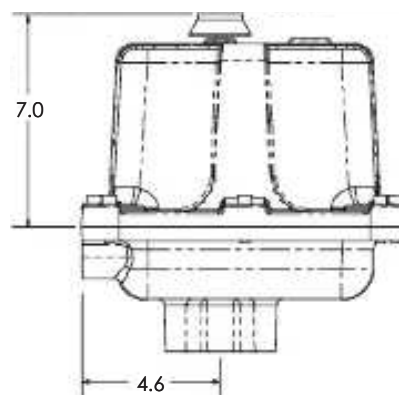
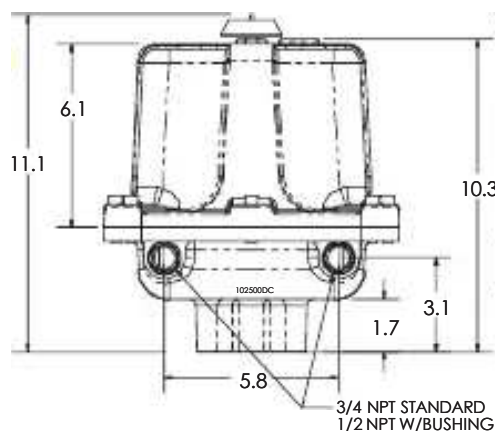
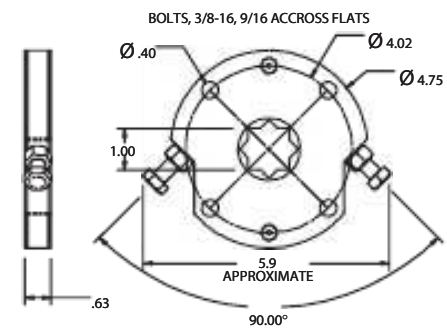


MOUNTING FLANGE, ISO 5211  
F 10 / F 07

4 X M8 - 1.25  $\nabla$  0.75" MIN.  
ON  $\varnothing$  2.76" B.C. 4 X 10 - 1.5  $\nabla$  0.75" MIN.  
ON  $\varnothing$  4.02" B.C.



**Optional Mechanical Stop**



## Introduction

# Rugged Electric Actuators with Internal Back-up Power for Valves and Dampers

### Valvcon: A Tradition of Innovation

Valvcon is the leader in the design and manufacture of compact, reliable, electronically controlled electric actuators for valves and dampers. Valvcon offers a complete line of electric actuators for accurate positioning of dampers and valves in the aerospace, automotive, consumer services, discrete manufacturing, energy, environmental, oil/pipeline, petrochemical, power/utilities, process, recreation, transportation, and water/wastewater industries.

Valvcon has developed and introduced the industry's most innovative products, including simple "set and go" calibration, intelligent processor-based digital electronics, "Plug-in" accessory boards, "Fail-Safe" actuators, as well as electric actuators designed for remote control, solar-powered applications.

Valvcon has built its reputation and success on the ability to envision, implement, and deliver innovative actuator technology products and services to support emerging market requirements. As emerging technologies and market needs continue to

### Features at a Glance!

#### MSB Series

- The mechanical spring is integral to the housing. It is wound during initial power-up, and remains in "stand-by" mode until a power outage. This means no increase in size and little increase in weight compared to a standard actuator.
- The enclosure measures only 9.5" x 10.5" x 11.5" and weighs only 36-39 pounds.
- Special low current draw DC powered models are ideal for remote, solar-powered sites such as well heads and



market requirements. As emerging technologies and market needs continue to evolve, Valvcon will lead the way with high quality actuators that exceed industry expectations and further refine the valve actuation process.

## Actuators from Valvcon

Under the industry term "Fail-Safe," Valvcon offers several product lines that are designed to drive a valve or damper to a pre-determined position in the event of a power loss. Under normal power conditions, they provide accurate positioning in response to the powered control signals.

**Mechanical Spring Back-up** — Valvcon's MSB Series provides an internal mechanical spring for back-up power. Under normal conditions, the actuator is driven by an internal motor. When power is lost, the mechanical spring immediately drives the valve or damper to a pre-set position.

**Internal Battery Power** — Valvcon's ADC Series provides an internal battery pack. Like the MSB series, the actuator is driven by an internal motor under normal conditions. When power is lost, the internal battery pack comes alive, and can either immediately drive to the pre-set position, or continue to respond to a maintained control signal. The ADC Series is an excellent choice for modulating applications, or any application where a less expensive solution is desired.

**Electronic Spring Return** — Valvcon's ESR Series provides an internal bank of super-capacitor power storage devices that never need replacement. Designed for two position operation, it provides true two-wire control: when the actuator is energized, it drives to one position; when de-energized, the actuator powers itself to the other position. The ESR Series is appropriate for applications that require operation from a single pair of wires.

pipelines.

- No periodic or preventive maintenance required.

### ESR Series

- Operates like a solenoid valve — energize two wires to drive in one direction, then de-energize to allow the stored energy to drive it in the other direction.
- Super-capacitors have a useful life of 8-10 years without replacement of the energy storage devices.

### Valvcon Back-up Powered Actuators:

- Patented technology provides back-up capabilities within the standard size actuator enclosures!
- Dual conduit openings make wiring easier, and keep power and control wiring separate.
- Two year warranty.

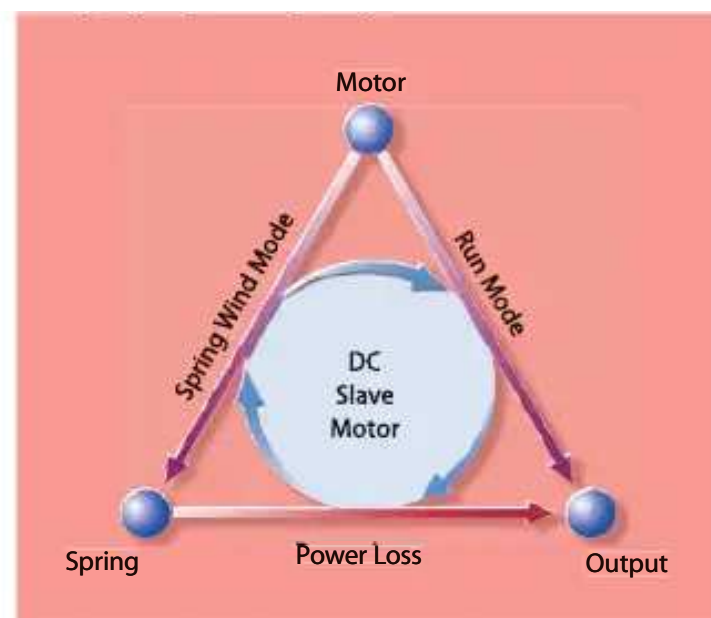
## MSB Specifications

### Mechanical Spring Back-up Power

Available for both AC and DC applications, MSB Series actuators require little constant power and can be an excellent choice for solar, remote applications. External "ready" indicator signal is available for control panel use. Speed control options provide a choice for fast close or slow close upon loss of power.

With Valvcon's patented technology, the spring is wound once — without the need to wind the spring on each cycle, Valvcon's MSB series uses standard, compact, highly efficient motors and drive trains.

Upon initial power-up, the actuator automatically winds the internal power spring. When fully wound, the spring is latched in stand-by mode and the actuator operates as a normal actuator. A power interruption will cause the spring to unlatch, driving the actuator output to the pre-determined "power loss" position. This position can be fully clockwise or fully counter-clockwise. When power is returned to the actuator, the spring wind cycle is repeated.



The above diagram illustrates the three operational modes of the actuator: Spring Wind, Run, and Power Loss. The DC slave motor sets the mode. In Spring Wind Mode, input power is used to wind the spring. In Run Mode, input power is used to drive the actuator's output. During power loss, power from the internal spring is used to drive the actuator's output.



✓ Output	ISO 5211 F07 and F10 bolt circles, with 1" female square Optional metric output: 22mm square by 30mm deep
✓ Duty Cycle	AC applications: The actuator may run continuously at ambient temperatures at or below 104°F for up to 15 minutes. After running for 15 minutes, the actuator may operate at up to 75% duty cycle (that is, between each 90 degree rotation, the actuator must rest for 1/3 of the 90 degree cycle time) NOTE: AC Applications: At 50Hz, the duty cycle is 60% @ 104° F DC Applications: Continuous
✓ Voltage	115VAC: 103.5 to 126.5VAC, 50 or 60 Hz 230VAC: 207 to 253VAC, 50 or 60 Hz  12VDC: 10.8 to 13.2 VDC 24VDC: 22.6 to 26.4 VDC
✓ Limit Switches	(2) Single pole, double throw switches rated for 1/3 HP, 10 amps @ 125/230VAC, CSA certified. The two standard switches are used for end of travel control, and may also be used for pilot or position indication applications in on/off or jogging applications
✓ Motor	AC Applications: Split phase capacitor driven motor with Class B or better insulation; sub-fractional horsepower motor DC applications: Brushed, DC, sub-fractional horsepower
✓ Lubrication	Permanently lubricated gear train and bearings
✓ Gear Train	Hardened steel spur gears
✓ Approximate Weight	36 lbs. (600 inch lb. models)    37.5 lbs. (1200 inch lb. models)    39 lbs. (1800 inch lb. models)
✓ Endosure	Cast aluminum
✓ Springs	Stainless steel, reverse wound, flat coil springs
✓ Spring Returns	500 90° rotations (after 500, contact factory for servicing information)
✓ Rewind time (after 90° rotation)	90 secs. (600 inch lb. models)    150 secs. (1200 inch lb. models)    210 secs. (1800 inch lb. models)
✓ Power Loss Position	Factory set, fully clockwise or fully counter-clockwise
✓ Degrees of rotation	15 to 90 degrees

### Technical Data

Torque (in lbs)	Normal Operating Speed (per 90° rotation, in seconds)		Power Loss Speed (90° rotation)	Power Loss Speed With Speed Control Option	Normal Operating Current (in amps)				Static Current (when not driving in either direction)**				Duty Cycle*	
	115VAC or 230VAC	12VDC or 24VDC			115VAC	230VAC	12VDC	24VDC	115VAC	230VAC	12VDC	24VDC	115VAC or 230VAC	12VDC or 24VDC
500	17	12	<1 second	8 seconds	.8	.4	2.5	1.5	150 mA	75 mA	350 mA**	400 mA**	75%	Continuous*
1200	34	24	<1 second	7 seconds	.8	.4	2.5	1.5	150 mA	75 mA	350 mA**	400 mA**	75%	Continuous*
1800	51	36	<1 second	6 seconds	.8	.4	2.5	1.5	150 mA	75 mA	350 mA**	400 mA**	75%	Continuous*

\*\* Note: with the optional "Low Current Draw" solenoid, the static current draws 50mAmps.  
\* Continuous up to 1 hour then reduce to 80% duty cycle

### Extended Duty Cycle for Continuous Cycling

Valvcon conservatively rates its AC motors at 75% duty cycle. Valvcon motors can operate continuously for up to 15 minutes without pausing, at full rated torque. After running continuously for 15 minutes, the motors need to rest for only 1/3 of the cycle time between each cycle. That is, if the cycle time is 51 seconds, they must rest for 17 seconds between each cycle. After an extended rest, they may again run continuously for up to 15 minutes.

### Patented De-clutching Spring Saves Space & Weight while Extending Spring Life

Valvcon's MSB series is the first electric actuator that includes a mechanical spring for emergency power, within the smallest enclosure in the industry! With no additional space requirements, and very little added weight, these actuators are ideal for any application that requires emergency back-up energy.

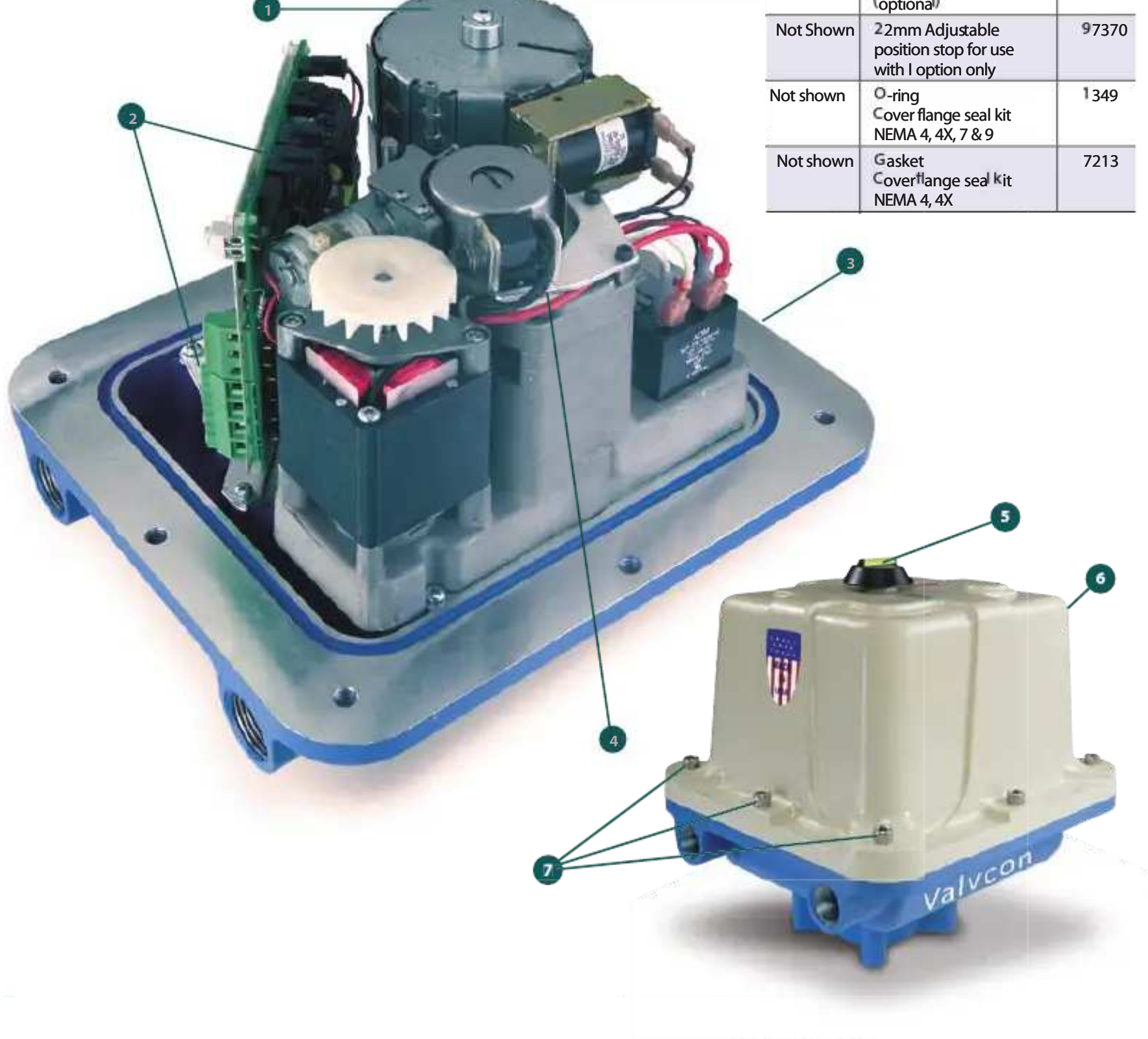
### Wiring in Parallel

Valvcon's MSB series actuators have signal isolation as a standard feature. Multiple actuators can be wired in parallel.

### Part Identification for

#### MSB 115VAC Model

Item	Description	Part #
(1)	Spring cage assembly (600 inch lb. each)	98500
(2)	Electronic board and bracket kit	92080
(3)	Motor capacitor kit	93061
(4)	Brake kit (optional)	98715
(5)	Position indicator replacement kit NEMA 4, 4X	91392
(6)	Aluminum cover kit NEMA 4, 4X	97290
(7)	Cover bolt kit, stainless steel (8 pieces)	91564
Not shown	Limit switch & cam kit	98000
Not shown	Feedback Potentiometer kit (optional)	98200
Not shown	Adjustable position stop 1" (optional)	97270



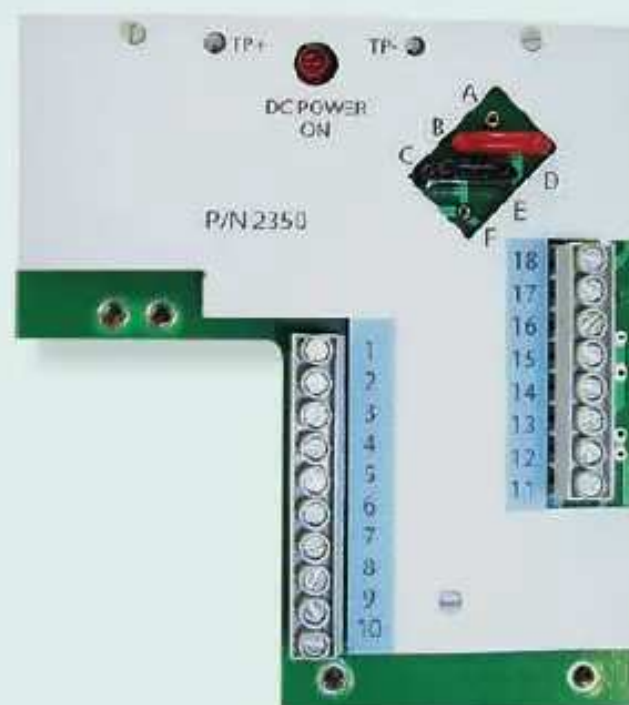
## Battery Back-up Power

Valvcon ADC Series electric actuators, equipped with internal battery power, allow you to shut down your system in the event of an external power loss. Engineered to supply dependable valve actuation, they can provide up to 10 complete cycles under their own internal power.

The electronic back-up powered feature incorporates a rechargeable battery pack on a plug-in, modular PC board under the actuator cover. Upon power loss or a signal from an external sensor, the Valvcon battery pack is automatically activated as the main power supply. The battery is compact and fits easily into the standard enclosures for an easy, space-saving upgrade. No hard-wiring or other complex operations are required.

Valvcon battery back-up actuators are available in on/off (two position) or modulating models.

- Internal batteries allow for continued cycling during power outages, enabling an orderly shut-down of critical processes.
- A built-in trickle charger, with over-charge protection, ensures the batteries always





- have enough power when called upon.
- Batteries can be easily replaced in the field.

✓ Temperature Range	32° F to 130° F (without heater and thermostat) -40° F to 130° F (with heater and thermostat)
✓ Conduit Connections	ADC Series: (2) 3/4" NPT*     LADC Series: (2) 3/4" NPT
✓ Duty Cycle	Continuous up to 1 hour, after which duty cycle is 80%
✓ Voltage	115VAC: 103.5 to 126.5VAC, 50 or 60 Hz 230VAC: 207 to 253VAC, 50 or 60 Hz 12VDC: 10.8 to 13.2 VDC 24VAC: 22.6 to 26.4 VAC 24VDC: 22.6 to 26.4VDC
✓ Limit Switches	(2) Single pole, double throw switches rated for 1/3 HP, 10 amps @ 125/230VAC, CSA certified, used for end of travel control only. Two additional switches may be added as dry contacts for pilot or position indication applications.
✓ Motor	Brushed, DC, sub-fractional horsepower
✓ Lubrication	Permanently lubricated gear train and bearings
✓ Gear Train	Hardened steel spur gears
✓ Endosure	Cast aluminum
✓ Approximate Weight	17 lbs for sizes up to 600 inch pounds 31 lbs for sizes 1000 inch pounds and above
✓ Battery Shelf Life	Shelf life: 2 years
✓ Battery Replacement	Every 12 months in sizes up to 600 inch pounds Every 24 months in sizes 1000 inch pounds and above
✓ Power Loss Position	Field settable, fully clockwise or fully counter-clockwise
✓ Starts Per Minute	3
* EFFECTIVE Q3 2003	

	230, 24VAC, 12VDC	24VDC		230VAC	24VAC	12VDC	24VDC	
150	5	3	.2	.1	1.5	1.9	2.4	Continuous**
300	10	5	.2	.1	1.5	1.9	2.4	Continuous**
600	15	8	.2	.1	1.5	1.9	2.4	Continuous**
1000	15	15	.4	.2	2	3.5	1.75	Continuous**
1500	20	20	.4	.2	2	3.5	1.75	Continuous**
2000	25	25	.4	.2	2	4.8	2.4	Continuous**
2500	30	30	.4	.2	2	4.8	2.4	Continuous**
3000	35	35	.4	.2	2	4.8	2.4	Continuous**

\*\* Continuous for up to 1 hour then reduce to 80% duty cycle

## ESR Specifications

### Electronic Energy Storage Back-up Power

The Valvcon ESR Series is designed in such a way that if the actuator can be powered in one direction, it can always power back! The actuators incorporate circuit technology and electronic high energy storage systems developed for NASA for use with electric actuators on aerospace vehicles.

All components are internal to Valvcon's standard enclosures, with no external power packs or panels to connect and locate. With advanced electronic circuitry replacing moving mechanical parts, the ESR series provides a advanced solution to ensure long life and high reliability.

- "Soft close" feature: the reverse (non-powered) cycle speed gradually decreases as it approaches the stop position. This can be used to help prevent water damage or other undesirable conditions that can result from a rapid return or closure of a valve or damper.
- Only two wires required for operation — just like a solenoid valve!
- Charge Monitor Delay ensures the actuator will not drive from the "Power Loss Position" until it has enough stored power to return to that position.

The ESR Series is designed so that it requires only one "hot" lead and one "neutral" lead to control and complete both the full open and full closed cycles. Wiring is simple and fast, designed for easy installation.

✓ Temperature Range	32° F to 130° F (without heater and thermostat) -40° F to 130° F (with heater and thermostat)
✓ Conduit Connections	(2) 3/4" NPT*
✓ Duty Cycle	Continuous up to 1 hour, after which duty cycle is 80%
✓ Voltage	115VAC: 103.5 to 126.5VAC, 50 or 60 Hz 230VAC: 207 to 253VAC, 50 or 60 Hz 12VDC: 10.8 to 13.2 VDC 24VAC: 22.6 to 26.4 VAC 24VDC: 22.6 to 26.4VDC
✓ Limit Switches	(2) Single pole, double throw switches rated for 1/3 HP, 10 amps @ 125/230VAC, CSA certified, used for end of travel control only. Two additional switches may be added as dry contacts for pilot or position indication applications.
✓ Motor	Brushed, DC, sub-fractional horsepower
✓ Lubrication	Permanently lubricated gear train and bearings
✓ Gear Train	Hardened steel spur gears
✓ Endosure	Cast aluminum
✓ Approximate Weight	17 lbs for sizes up to 600 inch pounds
✓ "Electronic Spring" useful life	8-10 years
✓ Power Loss Position	Field settable, fully clockwise or fully counter-clockwise
✓ Brown Out Protection	To avoid actuating during brown-outs, the ESR series incorporates a two second delay after sensing a loss of power

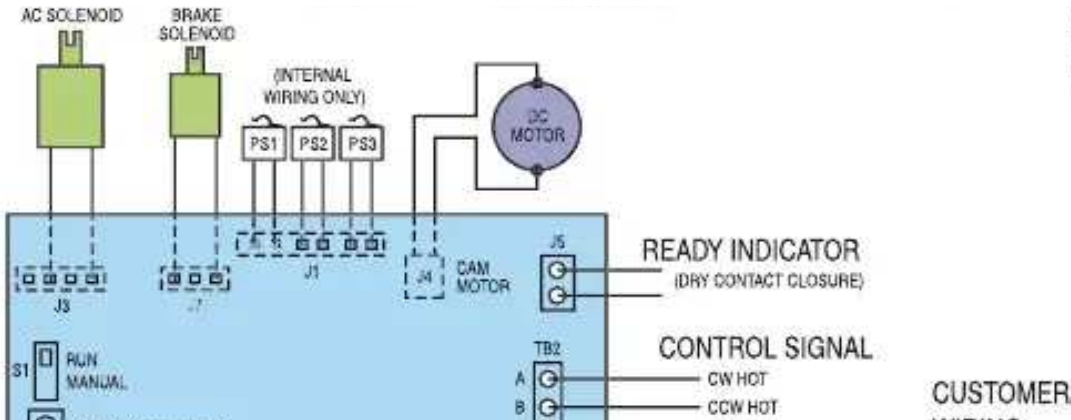
\* EFFECTIVE Q3 2003

Technical Data – AC Models

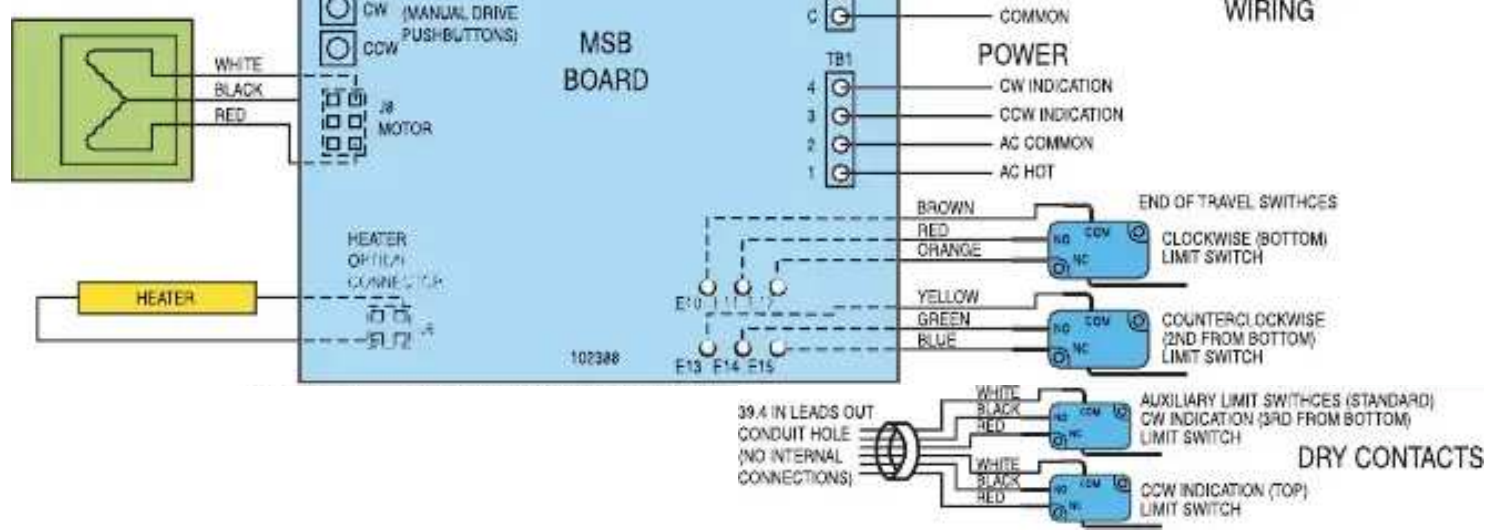
Torque (in lbs)	Normal Operating Speed (per 90° rotation in seconds)	Normal Operating Speed (per 90° rotation in seconds)	Power Loss Speed (90° rotation)	Maximum Charge Monitor Delay (before actuation begins)	Normal Operating Current Draw (in amps)					Duty Cycle**
					115VAC	230VAC	24VAC	12VDC	24VDC	
150	5	3	10 seconds	1 minute	.2	.1	1.5	1.9	2.4	Continuous**
300	10	5	15 seconds	2 minutes	.2	.1	1.5	1.9	2.4	Continuous**
600	15	8	25 seconds	3 minutes	.2	.1	1.5	1.9	2.4	Continuous**

\*\* Continuous for up to 1 hour then reduce to 80% duty cycle

MSB On/Off Applications

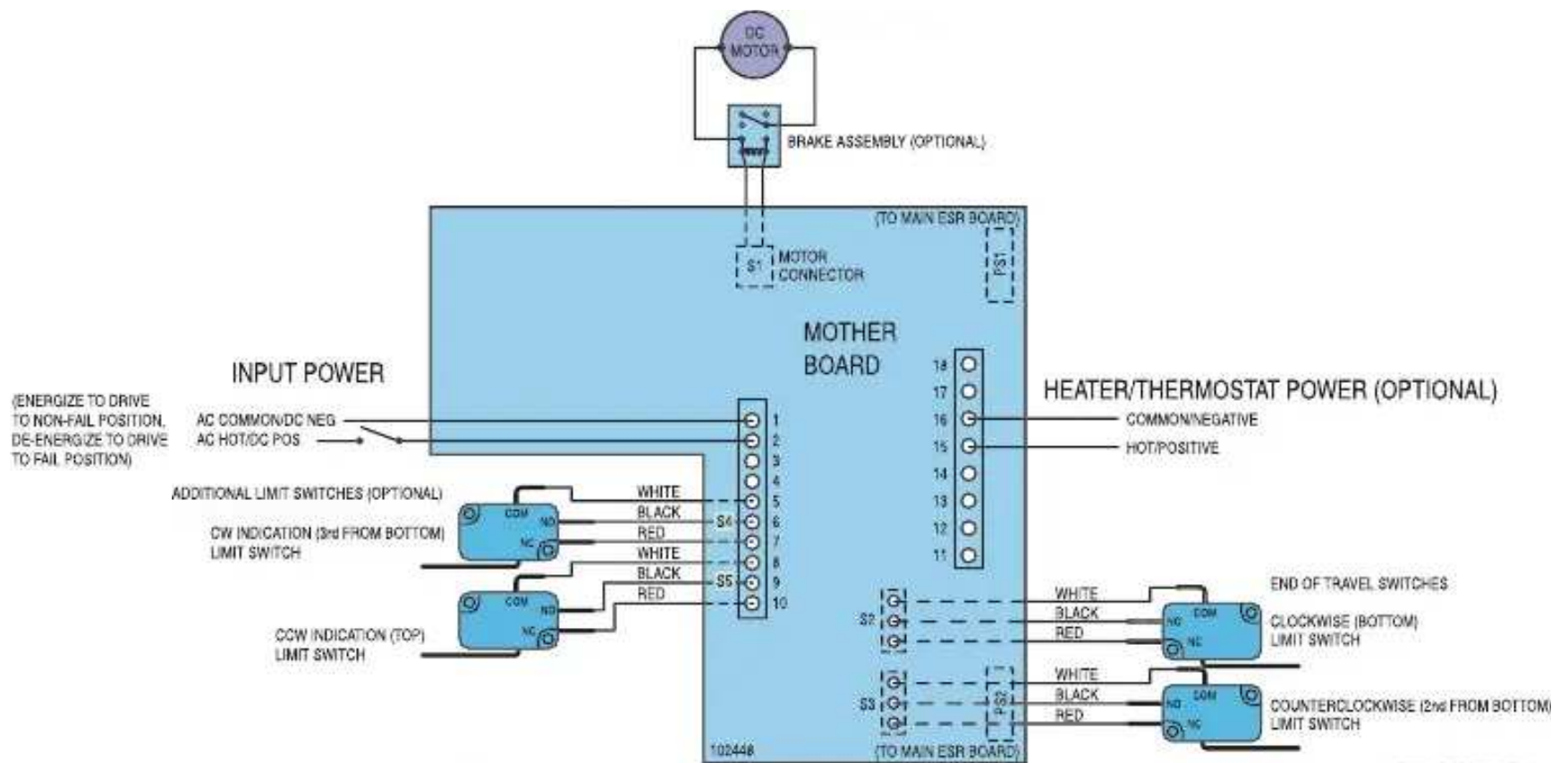






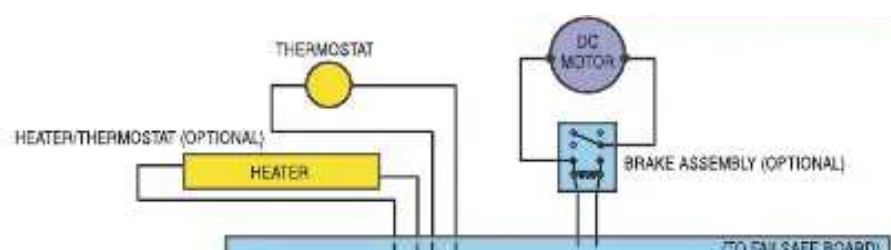
Note: Valvcon's MSB series actuators have signal isolation as a standard feature. Multiple actuators can be wired in parallel.

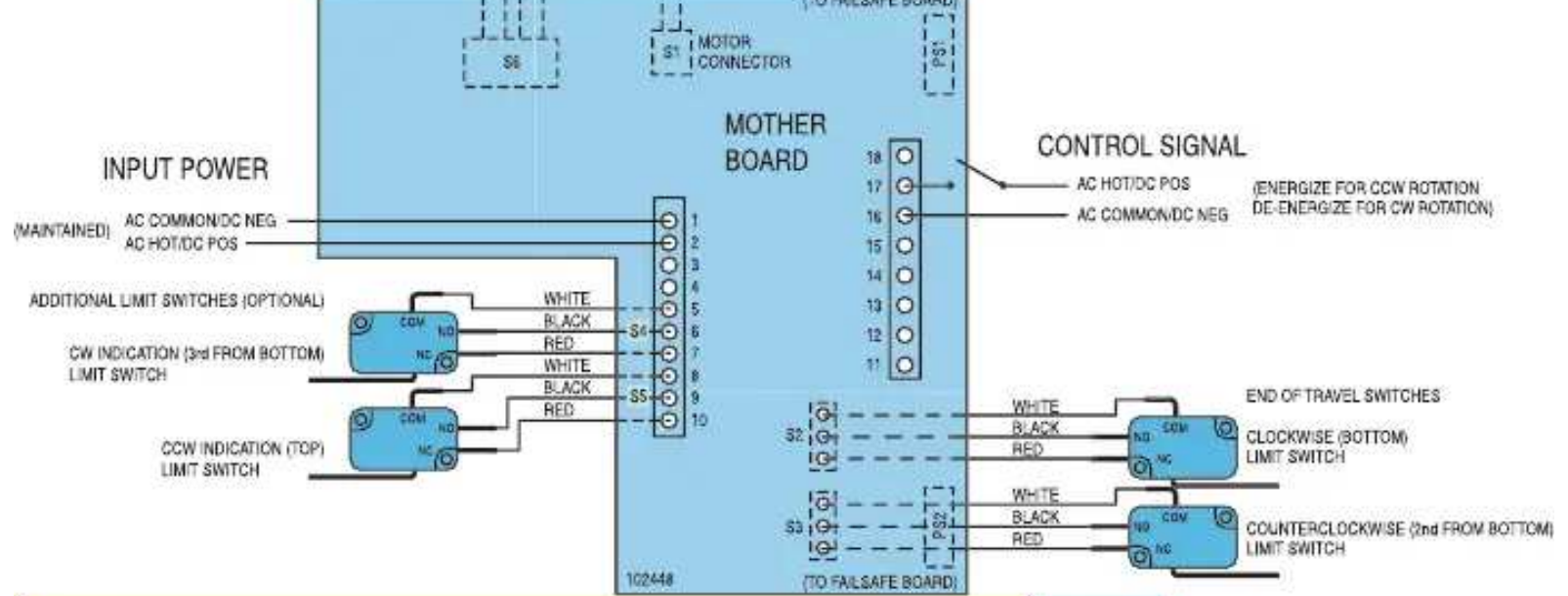
## ESR On/Off Applications



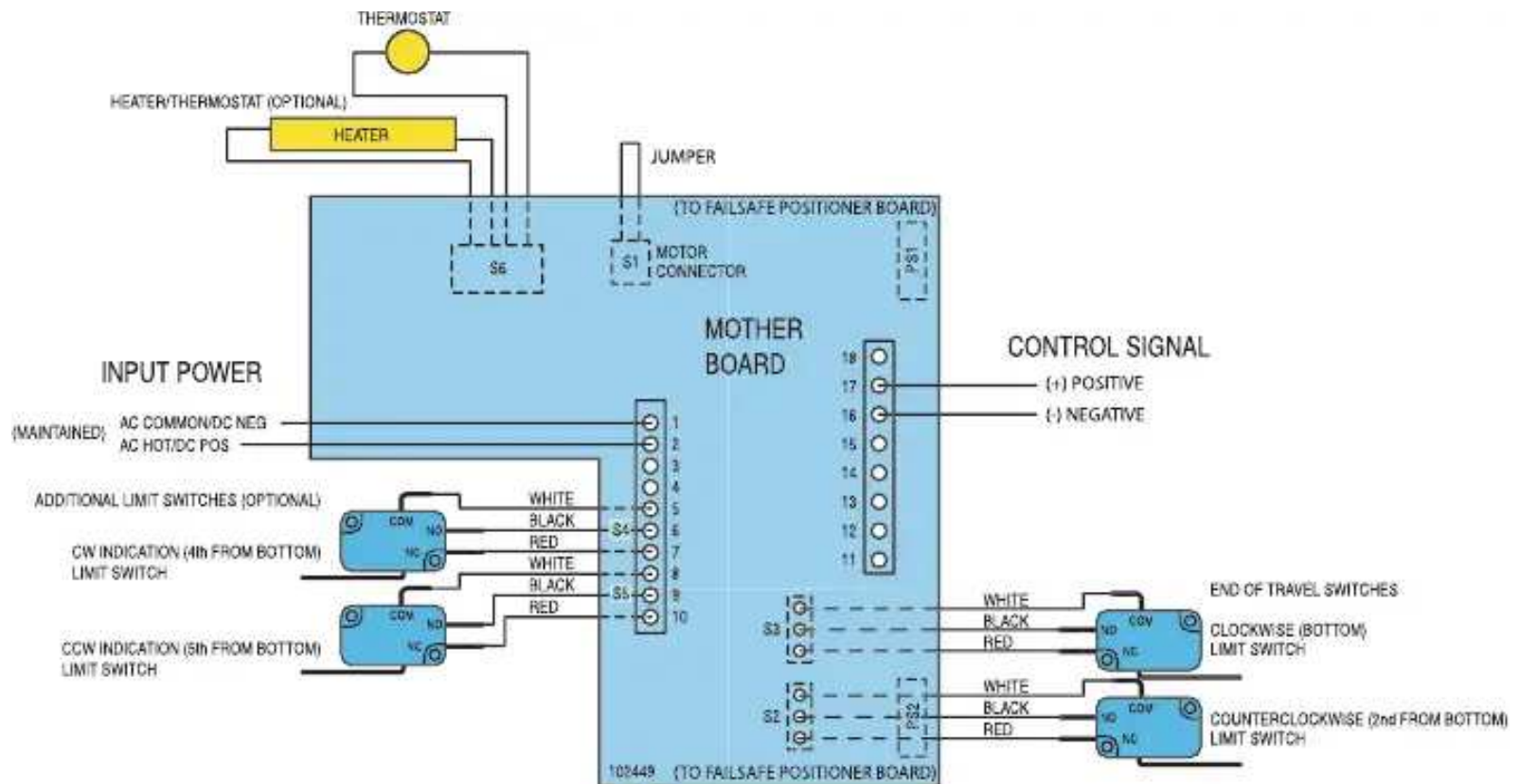
6

## ADC/LADC On/Off Applications





ADC



# 115VAC and 230VAC MSB Series Electric Actuator Specification

## General

The quarter-turn electric actuator will comply with Part 15, Class A of the FCC

## Motor

The main drive motor will be capable of running continuously at full torque for up

## Mechanical Stops

To prevent damage to the valve or damper, the actuator may be fitted with optional,



regulations for emissions and conducted radiation for industrial devices. It will also be designed to meet NEMA standards and certified by the Canadian Standards Association (CSA) for (weathertight or weathertight and hazardous) locations. The actuator will be a single, complete unit composed of a compact cast aluminum housing, motor, gearing, limit switches controlled by metal cams for end of travel control, mechanical position indicator, and an internal mechanical spring(s) to drive to a pre-set position in the event of an external power loss. Actuator mounting flange shall comply with ISO 5211 standards incorporating a female drive for direct output coupling. The actuator shall be capable of operating in ambient environments of -40° F to 150° F; optional internal heaters are required at temperatures below 32° F.

Isolation and Electrical

Internal electronic control boards shall have clearly marked and different size connection terminals for Power and Control Signals to prevent incorrect wiring and shall provide CW and CCW push buttons for local manual control. The actuator control electronics shall be electrically isolated to allow multiple actuators to be wired in parallel. Electronic control boards shall be protected on the outward side with insulating overlays providing operating instructions and additional safety. All internal connections, (motor leads, limit switch leads, option connectors, etc.) shall be coded, using different style connectors for each function, to prevent incorrect wiring. All connections will plug-in to simplify field repairs and upgrades. No preventive or periodic maintenance of any type will be required.

to 15 minutes at ambient temperatures at or below 104 degrees F. Subsequently, the motor must be capable of 75% duty cycle for all operating cycle times. Motors will be split-phase, capacitor driven with an auto reset thermal sensor, and will provide high starting torque and be totally enclosed within the actuator's housing cover.

Spring Back-up

A loss of power event shall immediately disengage the drive motor and engage the back-up spring through the main drive train, driving the valve or damper to the pre-set Power Loss Position. The actuator must be capable of driving to the full Power Loss Position in less than 1 second; or less than 8 seconds with optional spring speed control. The mechanical spring package must be totally enclosed within the actuator's housing. The spring must be rated for a minimum of 500 cycles to drive the actuator a full cycle at a torque equal to the full rated torque of the actuator.

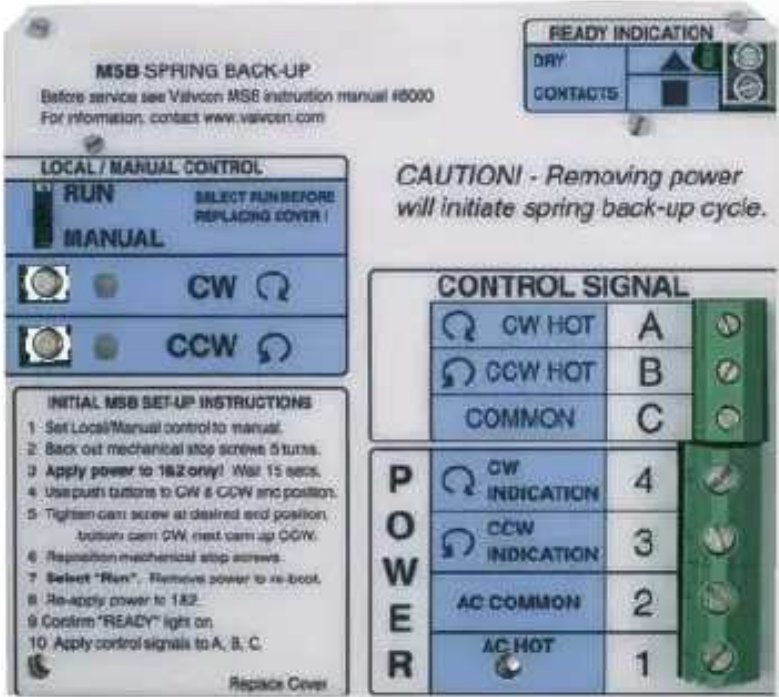
When electrical power is applied, the spring shall be adequately wound and the electric motor shall automatically re-engage the output drive in the normal operating mode. No external signaling or manual resetting shall be required upon spring discharge or loss of power. The actuator shall be configured such that under no circumstances will the actuator engage the output drive unless adequate energy is stored in the mechanical spring to drive the actuator to the Power Loss Position. The spring shall remain in the fully wound condition during normal operation. During normal (powered) operation, the wound spring will be disengaged from the actuator drive train.

adjustable mechanical stops to prevent the actuator from driving beyond the end of travel positions. Stops shall be capable of ±12 degrees end of travel adjustment.

Open/Close Operation

Open/Close actuators require separate power and control signals. The power signal must be constantly maintained; immediately upon loss of power signal, the spring will release and drive the actuator to the Power Loss Position. The control signal consists of two powered, maintained contacts, one for driving in the clockwise direction and one for driving in the counter-clockwise direction. The control signal may be removed at any point in mid-stroke to position the valve or damper.

Dry contact is provided for indication when local control has been introduced.



How to Order MSB-Series Actuators

Important Information: A Valvcon mechanical position stop (p/n 97270 or p/n 97370 w/"I" option) must be added for any valve or damper that is not equipped with its own mechanical stop. The mechanical stop must be rated for at least 150% of the rated torque of the actuator.

Series	Enclosure	Order Code	Torque (In lbs)	Order Code	Options (2) Additional Limit Switches are Standard	Order Code	Voltage	Order Code	Power Loss Position	Order Code
MSB	NEMA 4/4X	W	600	600	Spring Speed Control	B2	115VAC	N115A	Full Clockwise	FCW

	NEMA 4/4X/7/9	WX	1200	1200	ISO 5211 Output	I*	230VAC	N230A	Full Counter-Clockwise	FCCW
			1800	1800	Brake	K	12VDC	S12D		
					Heater/Thermostat	T	24VDC	S24D		
					Feedback Potentiometer	P				

**Example:** MSB WX 1200 K N115A FCW

\*Note: "I" option includes 22MM female square output drive

### How to Order ADC-Series Actuators

Series	Enclosure	Order Code	Torque (In lbs)	Order Code	Options	Order Code	Other Options	Order Code	Voltage	Order Code
ADC	NEMA 4/4X	W	150	150	Back-up Powered On/Off	L2	Position Feedback	G	115VAC	S115A
	NEMA 4/4X/7/9	WX	300	300			ISO 5211 Output	I	230VAC	S230A
			600	600	Back-up Powered Modulating	CL2	Brake	K	24VAC	S24A
LADC	NEMA 4/4X	W	1000	1000			Feedback Pot	P	12VDC	S12D
	NEMA 4/4X/7/9	WX	1500	1500	Back-up Powered On/Off	L3	(1) Additional Limit Switch	S1	24VDC	S24D
			2000	2000			(2) Additional Limit Switches	S2		
			2500	2500	Back-up Powered Modulating	CL3	Heater/Thermostat	T		
			3000	3000			Tropical Heater/Thermostat	H		

**Example:** LADC WX 2000 L3 G 12D

### How to Order ESR-Series Actuators

Series	Enclosure	Order Code	Torque (In lbs)	Order Code	Options	Order Code	Voltage	Order Code
ESR	NEMA 4/4X	W	150	150	ISO 5211 Output	I	115VAC	S115A
	NEMA 4/4X/7/9	WX	300	300	Brake	K	230VAC	S230A
			600	600	(1) Additional Limit Switch	S1	24VAC	S24A
					(2) Additional Limit Switches	S2	12VDC	S12D
					Heater/Thermostat	T	24VDC	S24D
					Tropical Heater/Thermostat	H		

**Example:** ESR WX 300 T 12D

**Ask For Information About Other Valvcon Actuators**

**"LC" series for low cost on/off applications**



## Metso Automation

### Europe

L I P O B

00011 Helsinki, Finland

Tel.int.+358 20 483 150

Fax int.+358 20 483 151

### Valvcon Corporation

528 Route 13 South, PO Box 901

Milford, NH 03055 USA

Tel.int.+1 603 249 9020

Fax int.+1 603 249 9140

### North America

Corporate Offices

44 Bearfoot Road

Northborough, Massachusetts

01532 USA

Tel.int.+1 508 852 0200

Fax int.+1 508 393 0978

### Latin America

Av. Central, 181 Chácaras Reunidas

12238-430 São José dos Campos

SP BRAZIL

Tel.int.+55 123 9353 500

Fax int. +55 123 9353 535

### Middle East

Jebel Ali Freezone, P.O. Box 17175

Dubai

United Arab Emirates

Tel.int.+971 4 8836 974

Fax int.+971 4 8836 836

### Asia Pacific

501 Orchard Road

#05-09 Wheelock Place

238880 Singapore

Tel.int.+65 735 5200

Fax int.+65 735 4566

[www.metsoautomation.com](http://www.metsoautomation.com)

[www.valvcon.com](http://www.valvcon.com)

- Up to 600 inch pounds
- 25% duty cycle
- NEMA 4/4X enclosures
- 115VAC, 230VAC, 24VAC, 12VDC and 24VDC voltages
- Options include timer boards for automatic cycling, extra limit switches and heater/thermostats
- Male output (standard) or female output (optional)

## **“V” series for rugged industrial applications**

- 75% duty cycle in 115VAC or 230VAC applications; 80% duty cycle in 12VDC and 24VDC applications
- Up to 3000 inch pounds breakaway torque
- Modular plug-in options for analog control, automatic cycling and 2-wire or 3-wire control applications

## **“HV” series for 24VAC applications**

- Up to 3000 inch pounds
- High duty cycle motors
  - On/off or modulating (4-20mA or 2-10VDC) control

## **“Q6” series for battery powered DC applications**

- 600 inch pounds
- 12VDC or 24VDC voltages
- Low current draw

## **Network communications options**

- MODbus®
- AS-I Net®
- LonWorks®
- DeviceNet®
- Foundation Fieldbus®
- Other fieldbus protocols (consult factory)

