

VALVCON

Back-up Powered Electric Actuator ADC Series

Metso Automation is a leading designer and provider of Valvcon compact, reliable, electronically controlled electric actuators for valves and dampers. We offer 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.

We have developed and introduced the industry's most innovative Valvcon electric actuator products, including simple "set and go" calibration, intelligent processor-based digital electronics, "Plug-in" accessory boards, Back-Up Power actuators, as well as electric actuators designed for remote control, solar-powered applications and two-wire network applications.

The quarter-turn electric actuator will comply with Part 15, Class A of the FCC regulations for emissions and conducted radiation for industrial devices. It will also be designed to meet NEMA standards for use in weathertight or weather-tight 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 optional internal back-up power source to drive to a pre-set position in the event of an external power loss. Actuator mounting flanges 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 130° F; optional internal heaters are required at temperatures below 32° F.

FEATURES AND BENEFITS

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. Additionally, electronic control boards shall include a simple user-interface, including slide switches and selection knob for mode selection, calibration and set up. The electronic control boards will also supply a 4-20 mA or 0-10VDC position feedback signal and include a holding brake feature to prevent back-driving. 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. In AC applications a highly reliable switching power supply will provide power conversion to drive the internal DC motor; DC applications will utilize an equally reliable DC to DC regulator. Other than periodic battery replacement; no maintenance will be required.

Motor

The internal electric motor will be of a brushless DC type, capable of running continuously at full torque at ambient temperature at or below 104° F.

Lubrication

All rotating power train components will be coated with a multi-purpose grease. Lubricants will be suitable for ambient conditions of -40° F to 130° F. For operation in temperatures between 32° F and -40° F an optional heater and thermostat assembly must be included.

Gearing

The powertrain will be comprised of hardened steel, machine cut spur gears. Non-metallic, aluminum, cast or stamped gearing will not be permitted.

Limit Switches

Actuators will have two standard end-of-travel switches, single pole double throw, rated at 15 amps at 250 VAC. Under normal operation the end of travel limit switches will not be activated; activating the limit switches will interrupt actuator travel. Up to two additional limit switches, adjustable to operate at any position as required by the process application, may be added to the actuator for end of travel indication.

On/Off Control (Open/Close Operation) with optional Battery Back-Up

Open/Close actuators require separate Power and Control signals. The Power signal must be constantly maintained; immediately upon loss of the Power signal, the internal back-up power source will drive the actuator to the Power Loss Position. The Control signal consists of one to three maintained AC or DC contacts and the actuator can be set to operate in Two-wire, Three-wire or Three-position modes. In Two-wire mode a signal is maintained to drive the actuator to the CCW position and removed to drive to the CW position. In Three-wire mode separate Control signals are applied to drive the actuator to the CW and CCW positions and may be removed at any point in mid-stroke to position the valve or damper. In Three-position mode separate Control signals are applied to drive the actuator to the CW, "MID" or CCW positions and may be removed at any point in mid-stroke to position the valve or damper. The Power Loss Position may be either the full CW, the full CCW or "MID" position and is determined by the fail position selection switch.

Proportional Control with optional Battery Back-Up (Modulating Operation)

Modulating control actuators will accept a variable, proportional 4-20 mA or 0-10VDC valve position signal and respond by positioning the valve linearly with an accuracy of 1%. Normally, the actuator will drive clockwise in response to a decreasing control signal; however, the actuator will be capable of "reverse acting" operation (driving counter-clockwise in response to a decreasing control signal) without internal wiring changes. The actuator will also provide the ability to adjust the sensitivity to control signal changes. Slide switches will enable the user to set the actuator response to a loss of control signal, select the "fail" position upon loss of Power and select either the single cycle or multi-cycle loss of power mode. Locked rotor, stall protection will detect whenever the actuator is unable to achieve the position commanded by the control signal, and will terminate power to the motor in order to prevent damage due to repeated stall conditions.

The Back-Up Powered Electric Actuators from Metso Automation

Metso Automation 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.

Optional Internal Battery Back-Up

Valvcon ADC Series can be equipped with an optional internal battery pack. The actuator is driven by an external power source under normal conditions. When power is lost, the internal battery pack can be set up to either drive immediately to the pre-set position, or continue to respond to a maintained control signal. The ADC Series is an excellent choice for continuous duty modulating applications, or any application where an inexpensive alternative to mechanical spring back-up is desired.

Break-away Torque

Designed for efficiency and reliability, all Metso Automation Valvcon actuators deliver the power you need when and where it is needed. With efficient gear trains and motors these actuators are rated at breakaway torque. Immediately upon power up, the actuator supplies the rated torque — when it is needed to break the valve away from its seat. Other manufacturer's actuators may be rated at running torque, but actually deliver significantly less breakaway torque.

FEATURES AT A GLANCE!

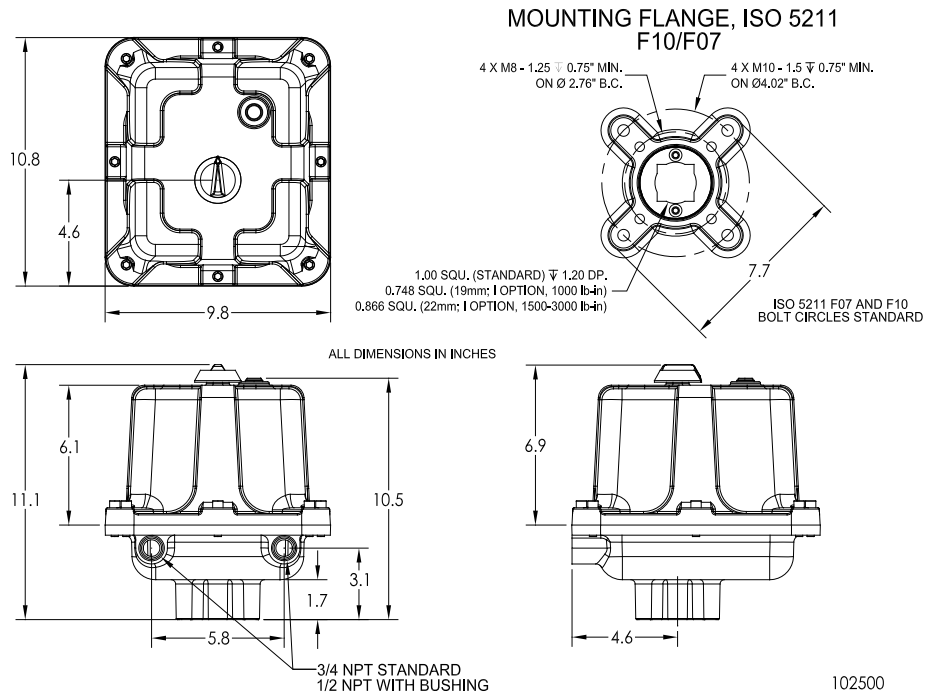
ADC Series

- Optional internal battery packs allow for continued modulation during power outages, provided the control signal remains.
- Field-settable for "fail clockwise" or "fail counter-clockwise."

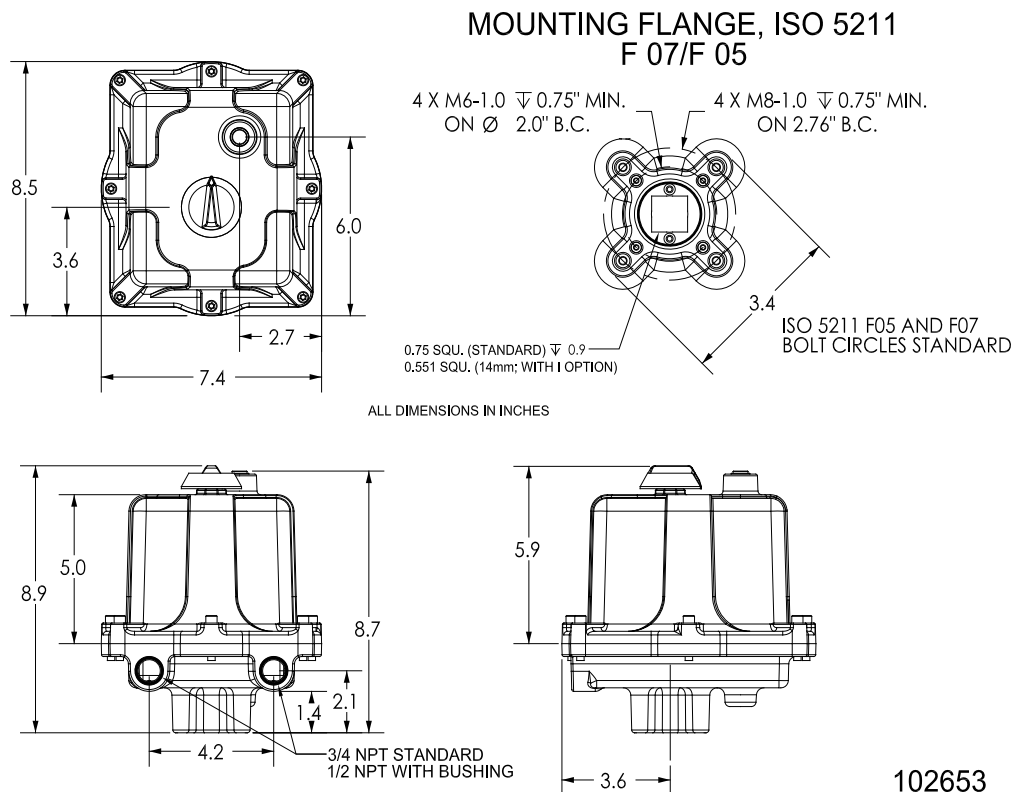
Valvcon Back-up Powered Actuators:

- 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.

LADC-Series Enclosure



ADC-Series Enclosure



ALL DIMENSIONS IN INCHES

ADC SPECIFICATIONS

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 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 continuous duty 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.

Modulating Data

Torque (in-lbs)	Duty Cycle	12VDC		24VDC		24VAC		115VAC		230VAC	
		Cycle Time (sec/90°)	Current Draw (Amps)	Cycle Time (sec/90°)	Current Draw (Amps)	Cycle Time (sec/90°)	Current Draw (Amps)	Cycle Time (sec/90°)	Current Draw (Amps)	Cycle Time (sec/90°)	Current Draw (Amps)
150	100%	11	2.2	13	1.2	8	1.8	9	0.4	9	0.4
300	100%	17	2.5	13	1.4	12	2.1	13	0.5	13	0.4
600	100%	17	2.8	13	1.7	13	2.5	14	0.6	14	0.5
1000	100%	21	4	14	2.4	15	3.5	15	0.9	15	0.6
1500	100%	40	4	24	2.4	27	3.5	29	0.9	29	0.6
2000	100%	40	4.3	33	2.4	28	3.5	29	0.9	29	0.6
2500	100%	55	3.3	40	2	38	3.1	39	0.8	39	0.6
3000	100%	60	3.7	42	2.2	40	3.5	42	0.8	43	0.6

On/Off Data

Torque (in lbs.)	Speed (per 90° rotation, in seconds)		Duty Cycle**	Normal Operating Current Draw (in Amps)				
		24VDC only		12VDC	24VDC	24VAC	115VAC	230VAC
150	5	3	Continuous**	1.9	2.4	1.5	.2	.1
300	10	5	Continuous**	1.9	2.4	1.5	.2	.1
600	15	8	Continuous**	1.9	2.4	1.5	.2	.1
1000	15	15	Continuous**	3.5	3.5	2.0	.4	.2
1500	20	20	Continuous**	3.5	3.5	2.0	.4	.2
2000	25	25	Continuous**	4.8	4.8	2.0	.4	.2
2500	30	30	Continuous**	4.8	4.8	2.0	.4	.2
3000	35	35	Continuous**	4.8	4.8	2.0	.4	.2

**Continuous for 1 hour after which duty cycle is reduced to 80%.

BACK-UP POWERED ELECTRIC ACTUATORS OPTIONS

Tropical Heater/Thermostat

(Order Code H)

Recommended in all high humidity applications where condensation may accumulate inside the actuator. For 115VAC applications the heater consumes 15 watts, for 230VAC applications the heater consumes 40 watts.

ISO 5211 Output

(Order I)

ISO 5211 Standard mounting configuration and output coupling.

150-600 in-lb models with "I" options are supplied with a 14mm female square. (note: without option "I" the female square is 3/4 inch).

1000 in-lb models with "I" options are supplied with a 19mm female square and 1500-3000 in-lb models are supplied with a 22 mm female square. (note: without option "I" the female square is 1inch).

Additional Limit Switches

(Order Code S2)

Up to two additional limit switches may be added for position indication or as dry contacts to operate other devices. Single pole, double throw switches rated for 1/2 HP, 15 amps @ 250VAC, CSA certified.

Heater/Thermostat

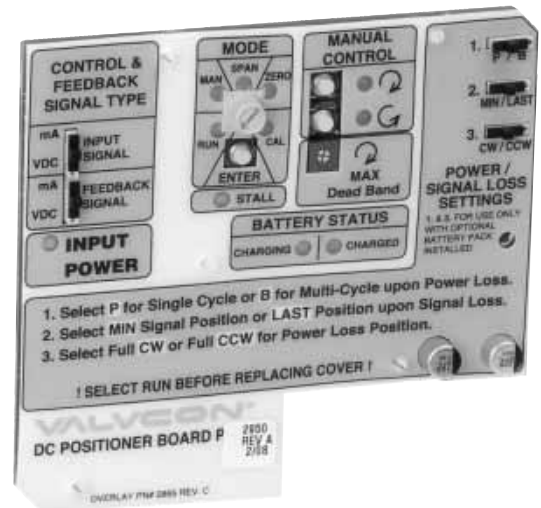
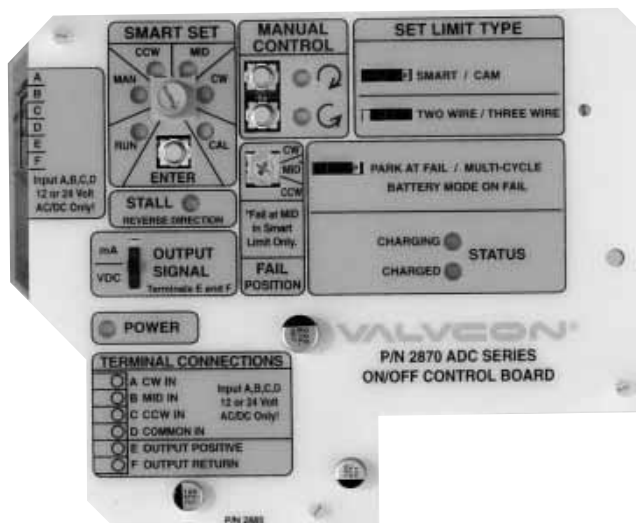
(Order Code T)

Required in all applications where the temperature may drop below 32°F. For 115VAC applications the heater consumes 15 watts, for 230VAC applications the heater consumes 40 watts.

Hazardous Location Enclosures

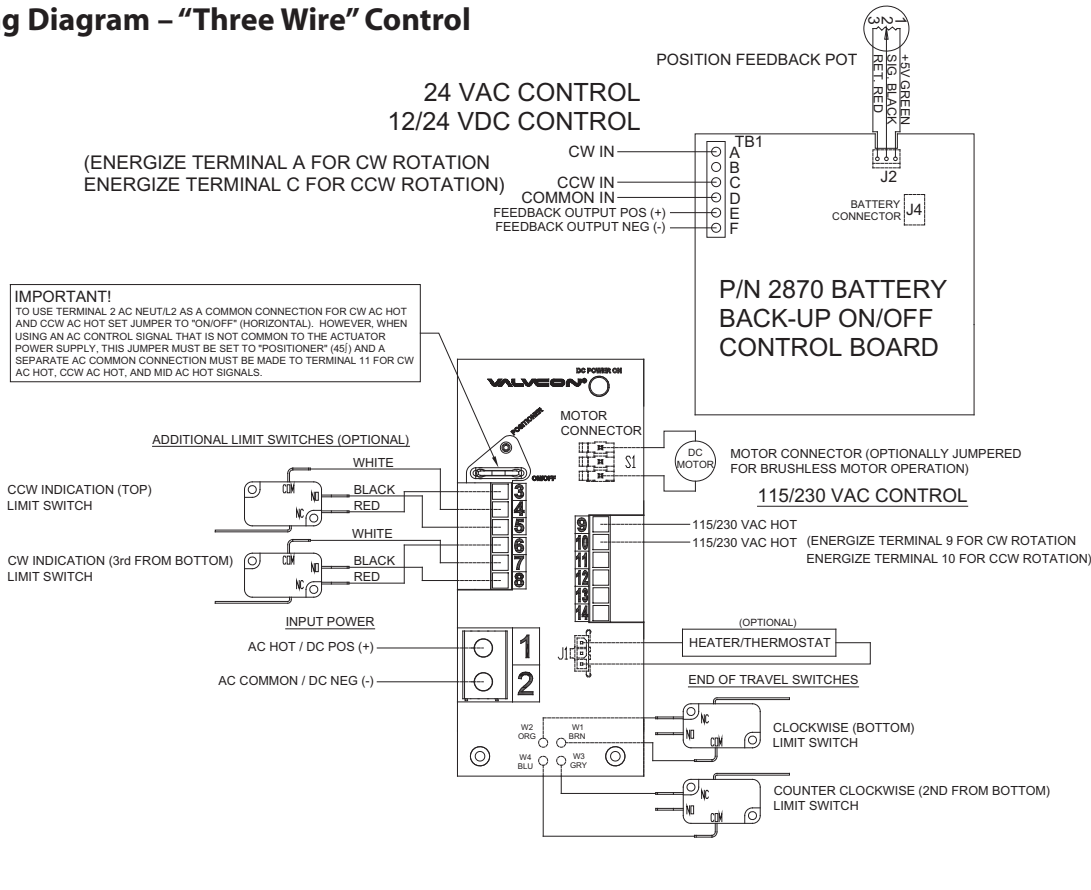
(ADCWX and LADCWX)

The standard enclosures (W) are rated for NEMA 4/4X (weather tight and corrosion resistant). The Hazardous Location enclosures (WX) are rated for NEMA 4/4X/7 & 9, Class I, Div 1, Groups C&D; Class II, Div. 1, Groups E, F, & G; Class III.



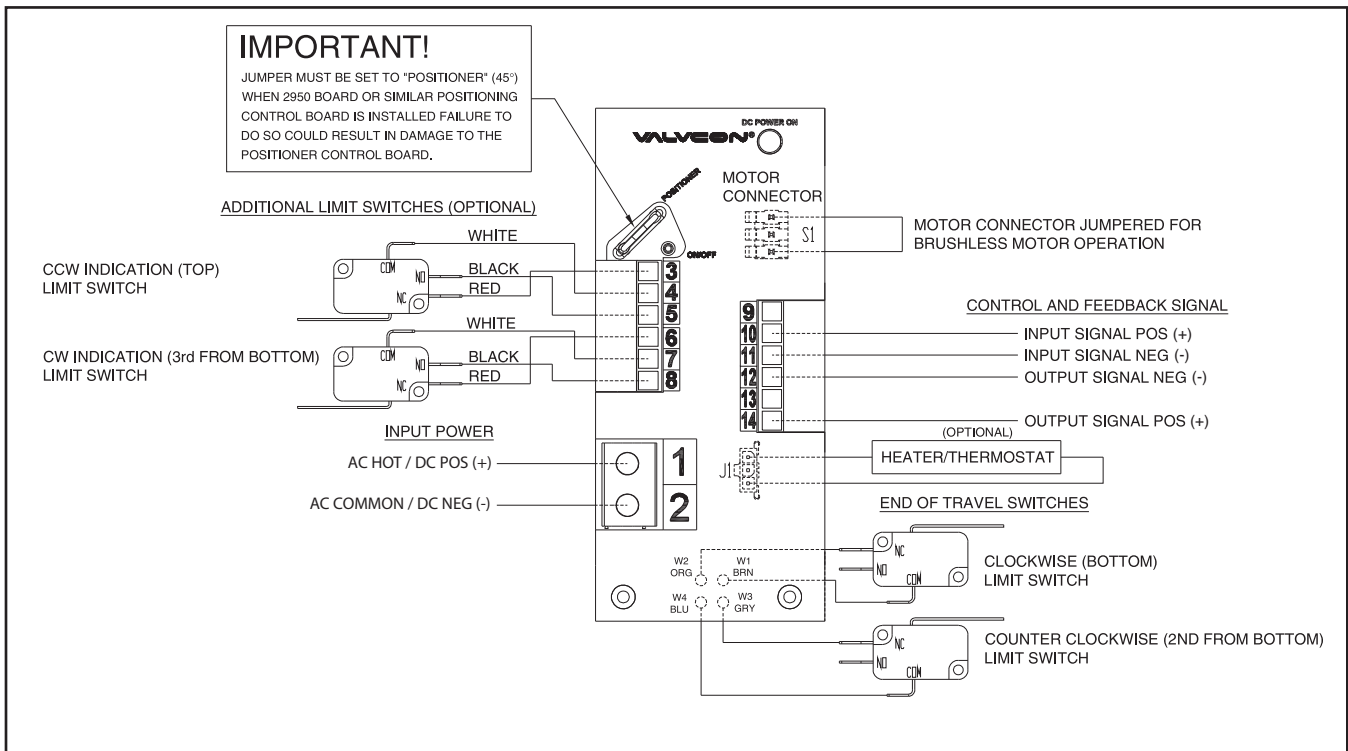
ADC/LADC On/Off Applications

Wiring Diagram – “Three Wire” Control



Note: “Three Wire” control shown for other configurations see IMO.

ADC/LADC Modulating Applications



HOW TO ORDER – ADC SERIES ACTUATORS

Example:

Sample model code: ADCW150CL2IS2N24AC

1	Series
ADC	ADC

2	Enclosure
W	Weathertight (NEMA 4/4X)
WX	Weathertight & Explosion proof (NEMA 4/4X/7 & 9)

3	Torque (in lbs)
150	150
300	300
600	600

4	Options ¹
C	Modulating
CL2	Modulating Battery Back-Up
L2	On/Off Battery Back-Up
L4	ON/Off Battery Back-Up - 3 Position
R2	ON/Off Isolated Control
R3	ON/Off Board - 3 Position

1	2	3	4	5	6
ADC	W	150	CL2	IS2	N24AC

5	Other Options
H ²	Tropical Heater/Thermostat
I ^{3a}	ISO 5211 Output
S2	Two Auxiliary Limit Switches
T ⁴	Heater/Thermostat
Z ⁵	Handwheel

6	Operating Voltage
N115AC	115VAC
N230AC	230VAC
N24AC	24VAC
N12DC	12VDC
N24DC	24VDC

HOW TO ORDER – LADC SERIES ACTUATORS

Example:

Sample model code: LADCW150CL3IS2N24AC

1	Series
LADC	LADC

2	Enclosure
W	Weathertight (NEMA 4/4X)
WX	Weathertight & Explosion proof (NEMA 4/4X/7 & 9)

3	Torque (in lbs)
1000	1000
1500	1500
2000	2000
2500	2500
3000	3000

4	Options ¹
C	Modulating
CL3	Modulating Battery Back-Up
L3	On/Off Battery Back-Up
L5	ON/Off Battery Back-Up - 3 Position
R2	ON/Off Isolated Control
R3	ON/Off Board - 3 Position

1	2	3	4	5	6
LADC	W	1500	CL3	IS2	N24AC

5	Other Options
H ²	Tropical Heater/Thermostat
I ^{3b}	ISO 5211 Output
S2	Two Auxiliary Limit Switches
T ⁴	Heater/Thermostat
Z ⁵	Handwheel

6	Operating Voltage
N115AC	115VAC
N230AC	230VAC
N24AC	24VAC
N12DC	12VDC
N24DC	24VDC

Notes:

1. Must select only one board option; all of these board options include 4-20mA or 0-10VDC position feedback, (2-10VDC on On/Off option boards) and a holding brake feature.
2. This heater option activates at or below 90°F and deactivates at 110°F; it is recommended in high-humidity applications.
- 3a. 150 - 600 lb-in models with I option are supplied with a 14mm female square (note that without option I the female square is 3/4").
- 3b. 1000 lb-in models with I option are supplied with a 19mm female square and 1500 - 3000 lb-in models are supplied with a 22mm female square (note that without option I the female square is 1").
4. This heater option activates at or below 40°F and deactivates at 60°F; it is recommended in applications where the temperature may drop below 32°F.
5. Handwheel option not recommended with Back-Up Powered options.

Technical Documentation Change Notice

Technical Bulletins of our products are constantly being reviewed and revised. Please consult our web site www.metsoautomation.com, for the most current information.

Metso Automation, Flow Control

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