

# VALVCON® I-SERIES ACTUATOR 115VAC AND 230VAC

## GENERAL

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

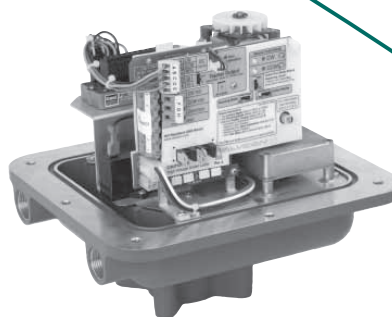
Metso has developed and introduced the industry's most innovative electric actuator features, including simple "set and go" calibration, intelligent processor-based digital electronics, "plug-in" accessory boards, back-up power, as well as electric actuators designed for remote control, solar-powered applications and two-wire network applications.

Metso has built its reputation and success on the ability to envision, implement, and deliver innovative *Valvcon* actuator technology products and services to support emerging market requirements. As emerging technologies and market needs continue to evolve, Metso will lead the way with high quality *Valvcon* electric actuators that exceed industry expectations and further refine the valve actuation process.

## FEATURES AND BENEFITS

### Motor

The motor is capable of running continuously at full torque for up to 15 minutes at ambient temperatures at or below 104°F. Subsequently, the motor is capable of 75% duty cycle. Motors are split phase, capacitor driven with an auto reset thermal sensor, and provide high starting torque and be totally enclosed within the actuator's housing cover.



### Lubrication

All rotating power train components are coated with a multi-purpose grease. Lubricants are suitable for ambient conditions of -40° F to 150° F.

### Gearing

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

### Manual Operation

A wrench-operated override shaft is provided for manual operation. As an option, a metallic hand wheel may also be provided. The override device is engaged through a declutching mechanism, which separates the final output drive from the motor output.

### Limit Switches

Actuators have two standard end of travel switches, single pole double throw, rated at 11 amps at 250 VAC. The limit switches are activated by metal cams mounted on the actuator drive shaft. At the end of travel, the power is routed through the limit switches to a terminal strip location for pilot or position indication applications. The limit indicator outputs are fuse protected with auto-resetting polyfuses, with a working limit of 0.25 amps, to protect the limit switches and internal circuitry from possible overloads originating outside of the actuator. To simplify maintenance, these polyfuses are permanent and do not need to be replaced. They reset automatically, shortly after the overload condition is corrected — in approximately 3 minutes. Two additional limit switches may be added to the actuator, adjustable to operate at any position, as required by the process application.

## The I-Series from Metso

With the innovative *Valvcon* electric actuators, Metso pioneered the concept of plug-in, modular electronics in valve automation. This concept redefined and simplified the entire valve actuation process-upgrades and modifications can now be done in the field, in a matter of minutes, with no hard wiring, soldering or factory returns.

For years, the I-Series has set the standard for high quality, rugged and reliable electric actuators. Metso uses its proven technology to vastly simplify actuator set-up and calibration and to enhance actuator performance. I-Series electric actuators are designed to offer highly efficient operation in a compact package. Ideally suited for most quarter-turn valves and dampers, they are designed for a wide range of service, from on-off duty, to modulating or proportional control, to two-wire networks.

### Flexible, Reliable Actuation

The Metso reputation for success is also built on the ability to meet the needs of its customers with high quality, reliable, "leading edge" actuator technology, products and services. We strive to anticipate and exceed your application needs. Engineered with a modular approach, *Valvcon* actuation systems allow you to modify or upgrade actuators in the field-giving you the flexibility to actuate new valves or to retrofit existing valves with amazing ease.

### Extended Duty Cycle for Continuous Cycling

Metso conservatively rates its AC motors at 75% duty cycle. Motors can operate continuously at full rated torque for up to 15 minutes without pausing. After running continuously for 15 minutes, motors need to rest for only 1/3 of the cycle time between each cycle. That is, if the cycle time is 30 seconds, they must rest for 10 seconds between each cycle. In constantly modulating applications, all *Valvcon* I-Series actuators can handle up to 30 starts per minute.

### Breakaway Torque

Designed for efficiency and reliability, all *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!

- Electronics are simple to use, with a clearly labeled terminal strip and easy access to user wiring
- Plug-in electronics for simple upgrades and modifications, with coded connectors to make internal miswiring impossible
- Standard extended 75% duty cycle at ambient temperatures up to 104°F
- Visual position indicator is part of the cover (no removal necessary) and clearly shows valve position
- Dual conduit openings make wiring easier, and keep power and control wiring separate
- "Captive" cover bolts are permanently attached to the cover and simplify installation in awkward locations (small enclosure only)
- Stall protection stops the motor if excessive torque or stop is encountered, providing protection from stall conditions (Foundation Fieldbus applications only)
- Thermal overload cutout protects the motor from damage caused by over duty cycle applications
- Split-phase, capacitor run motors provide long-life and high duty cycles with very low power consumption

## I-SERIES PROTOCOL OPTIONS

### (Order Code AS) AS-i (Actuator Sensor interface)

AS-i networks up to 31 field devices onto a single pair of wires that delivers both signal and bus power. AS-i control schemes interface very conveniently with most popular PLCs and DCS systems.

### (Order Code DN) DeviceNet™

DeviceNet integrates up to 63 devices on a 4-wire trunk network. DeviceNet interfaces conveniently with many popular DCS/PLCs.

### (Order Code FF) Foundation Fieldbus

Foundation Fieldbus is designed for use in the process industries. Foundation Fieldbus offers multi-drop capabilities (up to 32 devices per network), long trunk length and compatibility with intrinsically safe circuits. Foundation Fieldbus interfaces conveniently with many popular DCS/PLCs.

## OTHER I-SERIES OPTIONS

### (Order Code H) Tropical Heater/Thermostat

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.

### (Order Codes I1, I2, I3, and I4) ISO 5211 Metric Output

The actuator is equipped with an ISO 5211 compliant mounting configuration.

The standard drive output for 150-600 lb-in models is a 3/4" female square. The standard drive output for 1000-3000 lb-in models is a 1" female square. We offer several female metric drive output options, consult the "How to Order" section for available sizes for a given actuator model.

### (Order Code K) Brake

A brake prevents the actuator from being backdriven. Required for all dampers, butterfly valves, PVC ball valves, and resilient seated valves.

### (Order Code S2) Additional Limit Switches

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, 11 amps 250VAC, CSA certified.

### (Order Code T) Heater/Thermostat

Recommended in 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.

### (Order Codes Y1, Y2, and Y3) Keyed Output

The actuator is equipped with an ISO 5211 compliant mounting configuration.

The standard drive output for 150-600 lb-in models is a 3/4" female square. The standard drive output for 1000-3000 lb-in models is a 1" female square. We offer several female keyed drive output options, consult the "How to Order" section for available sizes for a given actuator model.

### (Order Code Z) Handwheel

For manual operation when power is not available. The handwheel is disengaged from the geartrain and does not turn during normal operation. When the handwheel is pushed down, it disengages the motor from the geartrain and allows manual operation.

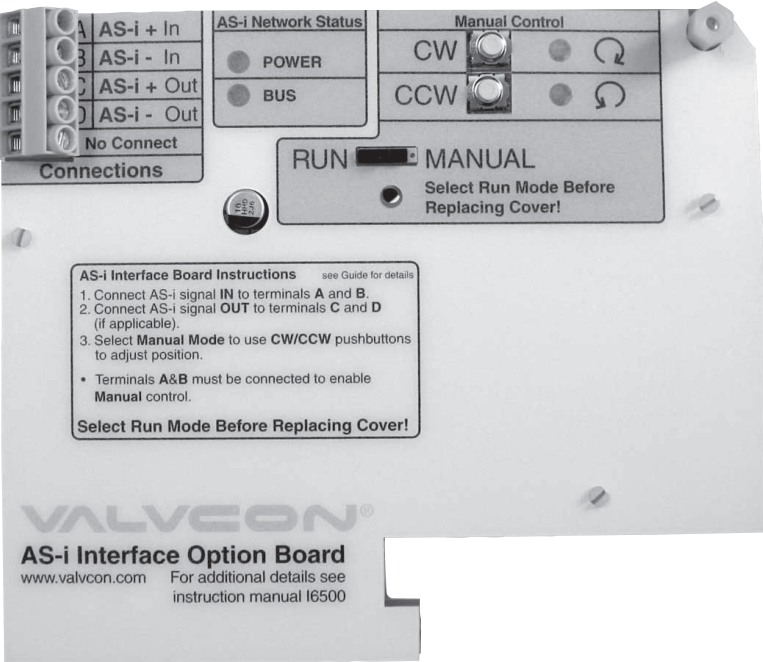
### (IWX and LIWX) Hazardous Location Enclosures

The standard enclosures (IW and LIW) are rated for NEMA 4/4X (weather tight and corrosion resistant). The Hazardous Location enclosures (IWX and LIWX) 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.

### (CSA) Certifications (C US)

Certification by the Canadian Standards Association of either hazardous or weatherproof locations is standard on I-Series models with the AS-i or DeviceNet options.

VALVCON AS-i BOARD FOR 115VAC AND 230VAC APPLICATIONS



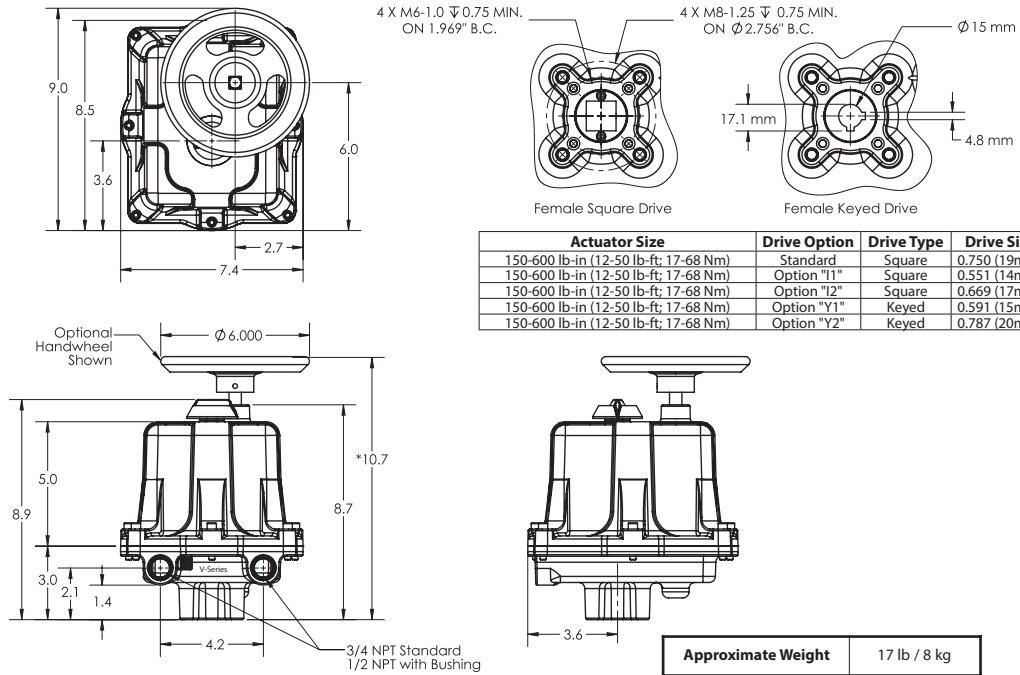
115VAC AND 230VAC MODELS\*

Torque Output	Speed (seconds per 90° rotation)	Duty Cycle	VA Rating		Max Running Current at Full Load (True RMS)		Max Effective Peak Inrush Current (= .66 x Peak rush)	
			115VAC	230VAC	115VAC	230VAC	115VAC	230VAC
150 lb-in; 12 lb-ft; 17 Nm	8	75%	70vA	115vA	.6 amps	.5 amps	1.25 amps	.924 amps
300 lb-in; 25 lb-ft; 34 Nm	15	75%	70vA	115vA	.6 amps	.5 amps	1.25 amps	.924 amps
600 lb-in; 50 lb-ft; 68 Nm	30	75%	70vA	115vA	.6 amps	.5 amps	1.25 amps	.924 amps
1000 lb-in; 83 lb-ft; 113 Nm	25	75%	92vA	161vA	.8 amps	.7 amps	1.66 amps	1.29 amps
1500 lb-in; 125 lb-ft; 169 Nm	40	75%	92vA	161vA	.8 amps	.7 amps	1.66 amps	1.29 amps
2000 lb-in; 167 lb-ft; 226 Nm	55	75%	92vA	161vA	.8 amps	.7 amps	1.66 amps	1.29 amps
2500 lb-in; 208 lb-ft; 282 Nm	70	75%	92vA	161vA	.8 amps	.7 amps	1.66 amps	1.29 amps
3000 lb-in; 250 lb-ft; 339 Nm	75	55%	92vA	161vA	.8 amps	.7 amps	1.66 amps	1.29 amps

\*Notes:  
1. The Maximun Current stated above includes all options. If the brake and/or heater & thermostat are not installed, the actual current draws will be less.

## I-SERIES ENCLOSURES (150-600 LB-IN)

### Mounting Flange, ISO 5211 F05 / F07

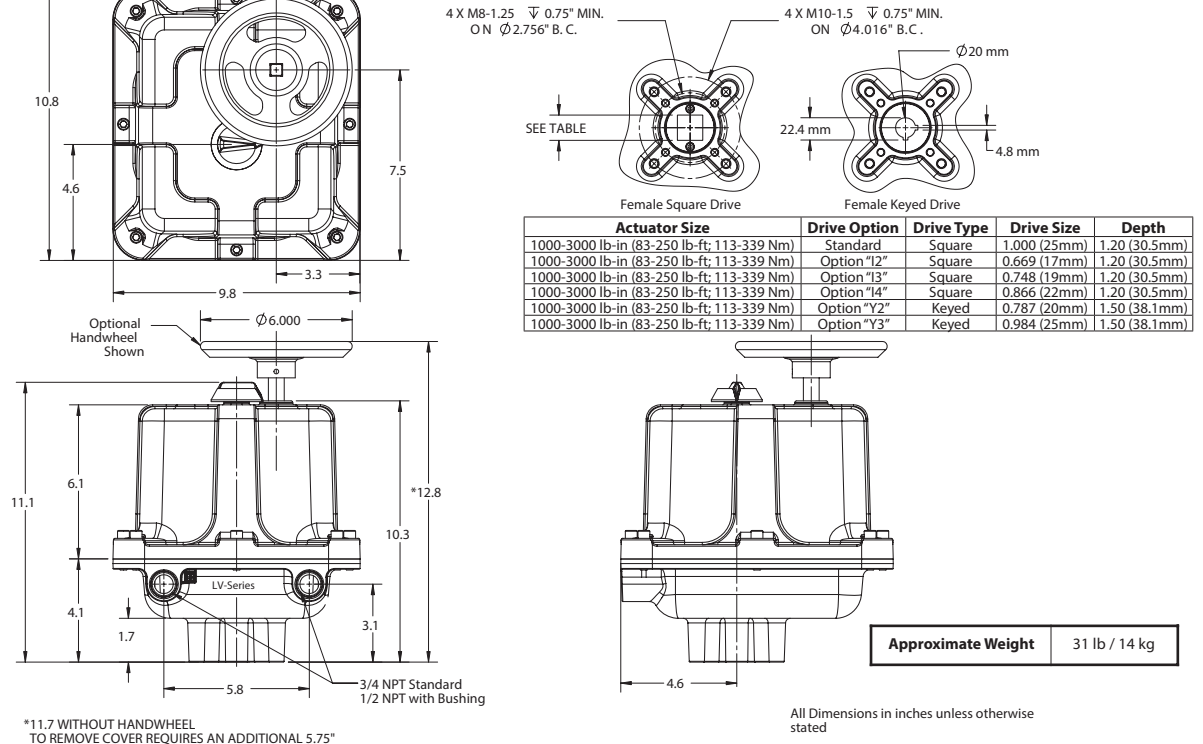


\*9.7 WITHOUT HANDWHEEL  
TO REMOVE COVER REQUIRES AN ADDITIONAL 4.75"

All Dimensions in inches unless otherwise  
stated

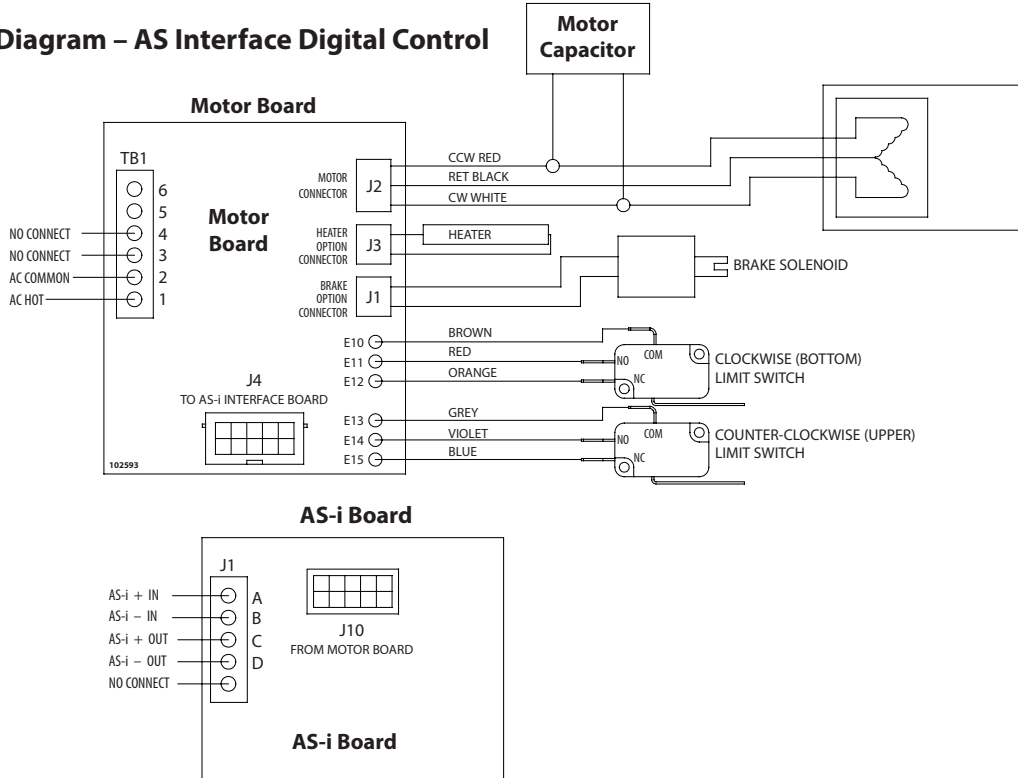
## I-SERIES ENCLOSURES (1000-3000 LB-IN)

### Mounting Flange, ISO 5211 F07 / F10



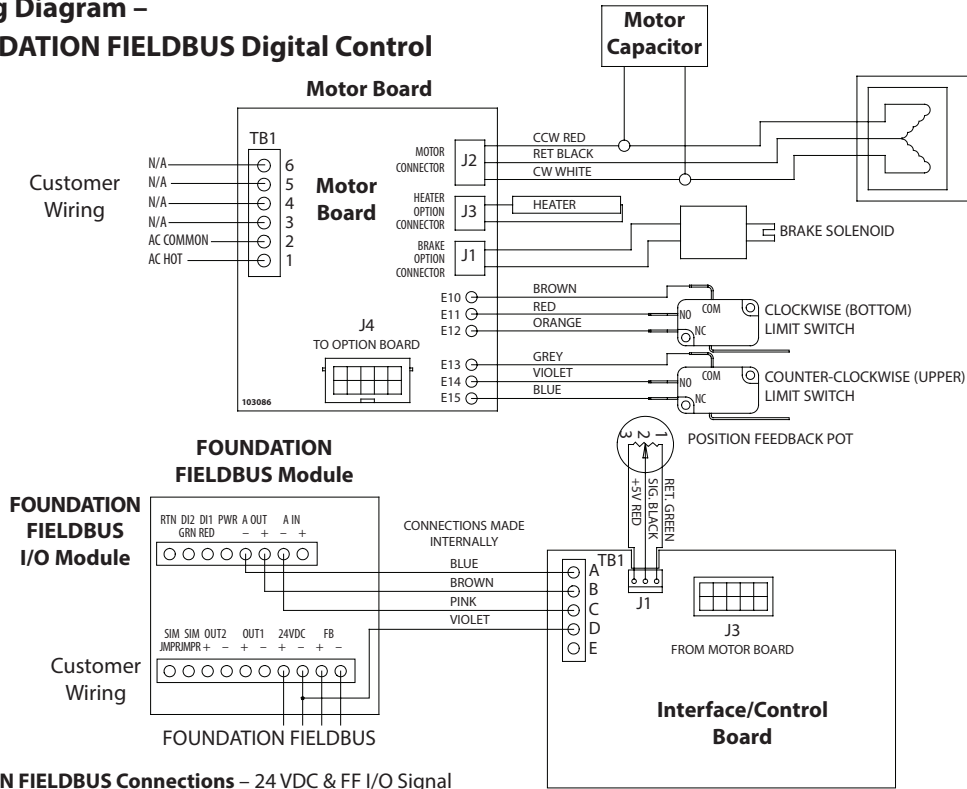
## 115VAC AND 230VAC ACTUATORS WITH AS-i PROTOCOL OPTION

### Wiring Diagram – AS Interface Digital Control



## 115VAC AND 230VAC ACTUATORS WITH FOUNDATION FIELDBUS PROTOCOL OPTION

### Wiring Diagram – FOUNDATION FIELDBUS Digital Control



FOUNDATION FIELDBUS Connections – 24 VDC & FF I/O Signal

Diagrams depict typical installations. See individual product IMOs for wiring diagrams of I-Series actuators with other protocol options.

**WARNING:** As the use of the actuator is application specific, a number of factors should be taken into account when selecting an actuator for a given application. Therefore, some of the applications in which the actuators are used are outside the scope of this document. If you have questions concerning the use, application or compatibility of the actuator with the intended service, contact Metso Flow Control for more information.

## HOW TO ORDER – I-SERIES ELECTRIC ACTUATORS (150-600 LB-IN)

### Example:

Sample model code: IW600ASY1N115AC

1	Series
I	I

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

3	Torque
150	150 lb-in (12 lb-ft; 17 Nm)
300	300 lb-in (25 lb-ft; 34 Nm)
600	600 lb-in (50 lb-ft; 68 Nm)

4	Protocol Options <sup>(1)</sup>
AS	AS-i
DN	DeviceNet

1	2	3	4	5	6
I	W	600	AS	Y1	N115AC

5	Other Options
-	No entry if standard
H <sup>(2)</sup>	Tropical Heater/Thermostat
I1 <sup>(3)</sup>	14mm Female Square Output
I2 <sup>(3)</sup>	17mm Female Square Output
K	Brake
S2	Two Auxiliary Limit Switches
T <sup>(4)</sup>	Heater/Thermostat
Y1 <sup>(3)</sup>	15mm Female Keyed Output
Y2 <sup>(3)</sup>	20mm Female Keyed Output
Z	Handwheel

6	Operating Voltage
N115AC	115AC
N230AC	230AC

## HOW TO ORDER – I-SERIES ELECTRIC ACTUATORS (1000-3000 LB-IN)

### Example:

Sample model code: LIW1500FFI4TN115AC

1	Series
LI	LI

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

3	Torque
1000	1000 lb-in (83 lb-ft; 113 Nm)
1500	1500 lb-in (125 lb-ft; 169 Nm)
2000	2000 lb-in (167 lb-ft; 226 Nm)
2500	2500 lb-in (208 lb-ft; 282 Nm)
3000	3000 lb-in (250 lb-ft; 339 Nm)

4	Protocol Options <sup>(1)</sup>
AS	AS-i
DN	DeviceNet
FF	Foundation Fieldbus

1	2	3	4	5	6
LI	W	1500	FF	I4, T	N115AC

5	Other Options
-	No entry if standard
H <sup>(2)</sup>	Tropical Heater/Thermostat
I2 <sup>(3)</sup>	17mm Female Square Output
I3 <sup>(3)</sup>	19mm Female Square Output
I4 <sup>(3)</sup>	22mm Female Square Output
K	Brake
S2	Two Auxiliary Limit Switches
T <sup>(4)</sup>	Heater/Thermostat
Y2 <sup>(3)</sup>	20mm Female Keyed Output
Y3 <sup>(3)</sup>	25mm Female Keyed Output
Z	Handwheel

6	Operating Voltage
N115AC	115AC
N230AC	230AC

#### Notes:

1. Must select only one protocol option.
2. This heater option activates at or below 90°F and deactivates at 110°F; it is recommended in high-humidity applications.
3. The standard drive output for 150 - 600 lb-in actuators is a 3/4" female square; the standard drive output for 1000 - 3000 lb-in actuators is a 1" female square.
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.



### Committed to Customer Service

Metso worldwide web site: [www.metso.com/electricactuators](http://www.metso.com/electricactuators), provides 24 hour a day access to all technical support material- from sales brochures to instruction manuals to installation and troubleshooting tips. For local support, our network of trained stocking distributors/representatives are industry leading experts in valve automation. Contact the Metso, *Valvcon* product web site to locate the nearest stocking distributor/ representative.

### Timely Technical Support

Metso Flow Control is on call to answer your engineering or application questions, and to quickly repair or upgrade your actuators. These highly trained support engineers offer a broad range of expertise, with the combined experience to assist specifying engineers and contractors with information on feasibility and special applications.

### A Tradition of Quality

Metso is dedicated to producing superior-quality products that are second to none. Our development laboratory and manufacturing facilities exemplify our total commitment to producing quality products.

Subject to change without prior notice.

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