

# VALVCON

## V Series Actuator

### 115VAC and 230VAC



#### General

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

Metso Automation has 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.

Metso Automation 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 Automation 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 will be capable of running continuously at full torque for up to 15 minutes at ambient temperatures at or below 104 degrees F. Subsequently, the motor must be capable of 75% duty cycle. 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.

##### 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 150° 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.

##### Manual Operation

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

##### Limit Switches

Actuators will have two standard end of travel switches, single pole double throw, rated at 15 amps at 250 VAC. The limit switches will be activated by metal cams mounted on the actuator drive shaft. At the end of travel, the power will be routed through the limit switches to a terminal strip location for pilot or position indication applications. The limit indicator outputs will be 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 will be 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.

##### Open/Close Operation

Open/Close actuators will be controlled via two, powered, maintained contacts, one for driving in the clockwise direction, and one for driving in the counter-clockwise direction. Power may be removed mid-stroke to position the valve. The AC input power will be fuse protected on both AC Hot and AC Common. The fuses will never blow in normal operation — they will be conservatively rated and soldered in place for high reliability.

##### Proportional Control (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) with no necessitated internal wiring changes. The actuator will also supply a 4-20 mA or 0-10VDC position feedback signal, and provide the ability to adjust the cycle time of the actuator. A slide switch will enable the user to set the actuator response to a loss of control signal. Locked rotor 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 V Series from Metso Automation

With the innovative Valvcon V Series, Metso Automation 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 V Series has set the standard for high quality, rugged and reliable electric actuators. Metso Automation uses its proven technology to vastly simplify actuator set-up and calibration and to enhance actuator performance. V 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 Automation 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 Automation 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 Metso Automation Valvcon V Series actuators can handle up to 30 starts per minute.

## 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.

## Simplified Set-up

The Valvcon V Series Control Board introduces a revolutionary advance in the set-up and calibration of electric actuators — SIMPLICITY!!!

With the Mode Selector Switch and the touch of a simple “enter, set and go” push button, the V Series Control Board simplifies actuator set-up. On-board push buttons and slide switches make manual positioning easy, and simplify the selection of input signal type, feedback signal type, and actuator fail position in the event of a loss of control signal. With a simple turn of a dial, signal sensitivity (dead band) and cycle time (speed) are easily adjusted.

## 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 mis-wiring impossible
- Standard extended 75% duty cycle at ambient temperatures up to 104 degrees 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 (modulating 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

## V Series Board Options

### Control Board

(Order Code C)

The add-on Control Board allows control from either 4-20mA or 0-10VDC (or 2-10VDC) control signals. This board also provides:

- position feedback (4-20mA or 0-10VDC)
- locked rotor/stall protection
- speed control for slower cycle times
- adjustable dead band (sensitivity to signal changes)
- on-board supervisory control via push buttons
- selectable pre-set response to loss of control signal (fail to zero or fail last position)
- reverse acting operation with no wiring changes required
- split range operation

### ISO Readback Board

(Order Code U)

For 2-wire open/close and 3-wire (jogging) open/stop/close or 3-wire latching control. Isolates control signals and motor circuitry in multiple 2-wire or 3-wire actuator systems. The control signal does not need to match the input power (i.e. a 115VAC powered actuator can be controlled by a 12VDC control signal). Provides 4-20mA or 0-10VDC position feedback.

### Speed Control/Timer Board

(Order Code J)

The Speed Control feature solves the problem of the valve opening too quickly in fluid and steam applications where the resulting "hammer" or "shock" is eliminated. Both cycles, (CW and CCW) can be extended independently anywhere from the normal speed down to 1/200th the normal speed.

The Timer feature provides automatic cycling in On/Off applications where the actuation cycle can be scheduled anywhere from once every minute to once every 24 hours.

The Timer and Speed Control functions can be used together or independently.

## Other V Series 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).

### Brake

(Order Code K)

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

### Feedback Potentiometer

(Order Code P)

Provides a 0-1000 ohm (3 wire) variable resistance to indicate actuator output position.

### 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.

### Handwheel

(Order Code Z)

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.

### Hazardous Location Enclosures

(VWX and LVWX)

The standard enclosures (VW and LVW) are rated for NEMA 4/4X (weather tight and corrosion resistant). The Hazardous Location enclosures (VWX and LVWX) 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.

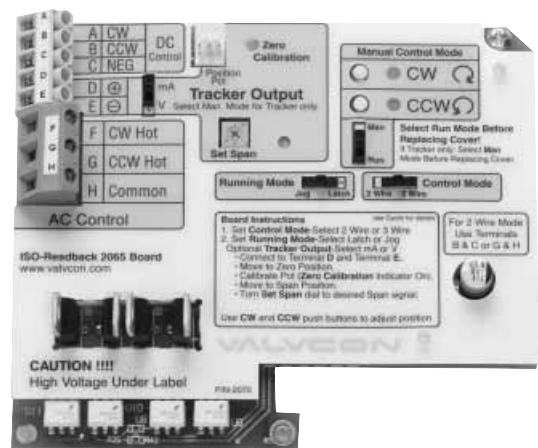
### Certifications

(CSA)

Certification by the Canadian Standards Association of either hazardous or weatherproof locations is standard on all V Series models.

# Control Board—Valvcon Control Board for Standard 115VAC and 230VAC Modulating Applications

✓ Input Impedance	Voltage Input: 35K ohms; Current Input: 200 ohms
✓ Control Signal	May be either 4-20mA or 0-10VDC (selectable via on-board slide switch) Fully compatible with ISA-S50.1 as a type 4, class L, powerisolated device. Input minus and transmit minus are tied together and isolated from power and earth ground
✓ Position Signal	May be either 4-20mA or 0-10VDC (selectable via on-board slide switch) Minimum resistive load for voltage output: 1K ohm Maximum resistive load for current output: 500K ohm
✓ Locked Rotor Protection	If the actuator cannot achieve the position commanded by the control signal, after 5 seconds it will stop the motor. The actuator will remain paused until the control signal commands it to drive in the opposite direction
✓ Control Fail Position	In the event of a loss of control signal (with power still supplied), user can choose between Zero and Last via slide switch NOTE: If the minimum control signal = 0VDC, fail position must be set at "Last"
✓ Cycle Rate (Speed) Control	User can choose 90 degree rotation times of: normal, 2X normal, 3X normal, 5X normal, 10X normal and 20x normal
✓ Dead Band	The amount of change in control signal that the actuator will ignore before the output shaft begins to move. Adjustable from 1% to 3%
✓ Accuracy	1% (dead band settings)
✓ Repeatability	For any given control signal value, the ability of the actuator to drive to the same physical position (i.e, a 12.0 mA signal should result in a 45.0° actuator output position). +/- 1%
✓ Resolution	The smallest amount of actuator response that can be obtained by changing the input signal. +/- 1%
✓ Split Range	Actuator may accept split range (i.e., 4-12mA or 12-20mA) control signal with no wiring changes
✓ Reverse Acting	With no wiring changes required, the actuator may be calibrated to drive clockwise upon increasing control signal, and counter-clockwise upon decreasing control signal
✓ On-Board Supervisory Control	Push buttons override the analog control signal, allowing the user to manually position the valve or damper



## 115VAC and 230VAC Models\*

Torque Output (breakaway)	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 inrush)	
			115VAC	230VAC	115VAC	230VAC	115VAC	230VAC
150 in lb	8	75%	70VA	115VA	.6 amps	.5 amps	1.25 amps	.924 amps
300 in lb	15	75%	70VA	115VA	.6 amps	.5 amps	1.25 amps	.924 amps
600 in lb	30	75%	70VA	115VA	.6 amps	.5 amps	1.25 amps	.924 amps
1000 in lb	25	75%	92VA	161VA	.8 amps	.7 amps	1.66 amps	1.29 amps
1500 in lb	40	75%	92VA	161VA	.8 amps	.7 amps	1.66 amps	1.29 amps
2000 in lb	55	75%	92VA	161VA	.8 amps	.7 amps	1.66 amps	1.29 amps
2500 in lb	70	75%	92VA	161VA	.8 amps	.7 amps	1.66 amps	1.29 amps
3000 in lb	75	55%	92VA	161VA	.8 amps	.7 amps	1.66 amps	1.29 amps

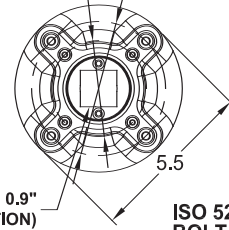
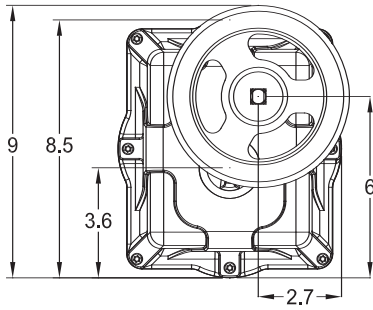
**\*Notes:**

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

## V-Series Enclosures

### MOUNTING FLANGE, ISO 5211 F07/F05

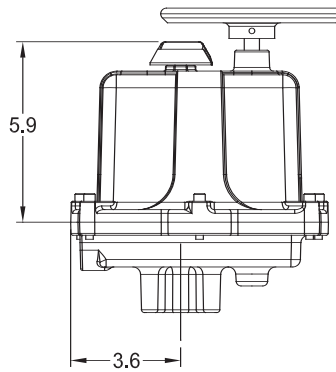
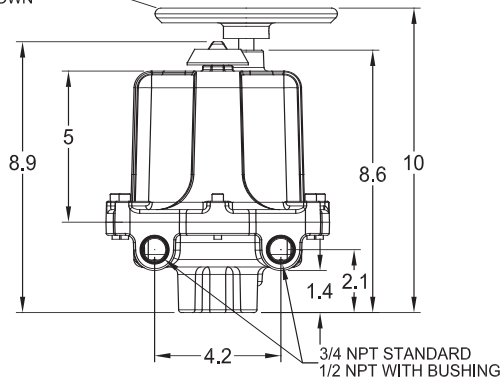
4 X M6-1.0  $\nabla$  0.75" MIN.  
ON  $\varnothing$ 2.0" B.C.      4 X M8-1.0  $\nabla$  0.75" MIN.  
ON  $\varnothing$ 2.0" B.C.



0.75" SQU. (STANDARD)  $\nabla$  0.9"  
0.551" SQU. (14mm; I OPTION)

ISO 5211 F05/F07  
BOLT CIRCLES STANDARD

OPTIONAL HANDWHEEL SHOWN      DIMENSIONS IN INCHES

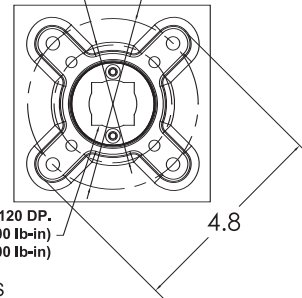
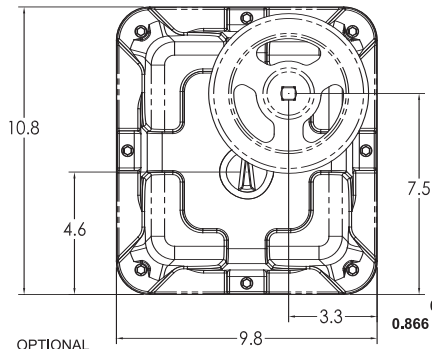


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## LV-Series Enclosures

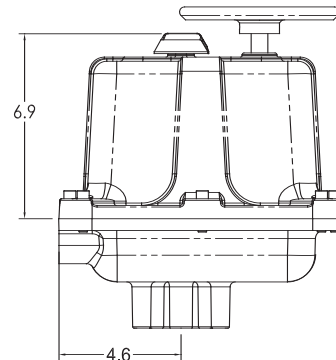
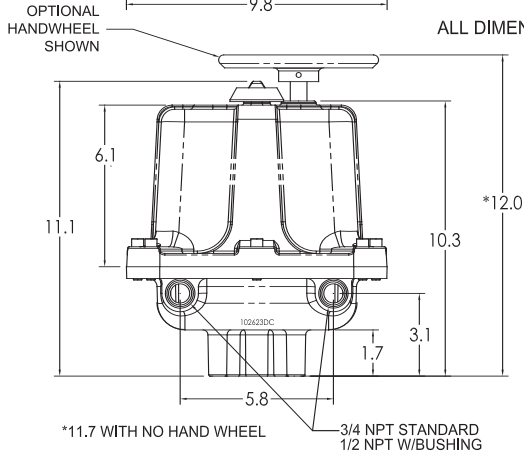
### MOUNTING FLANGE, ISO 5211 F 10 / F 07

4 X M8 - 1.25  $\nabla$  0.75" MIN.  
ON  $\varnothing$  2.76" B.C.      4 X M10 - 1.5  $\nabla$  0.75" MIN.  
ON  $\varnothing$ 4.02" B.C.

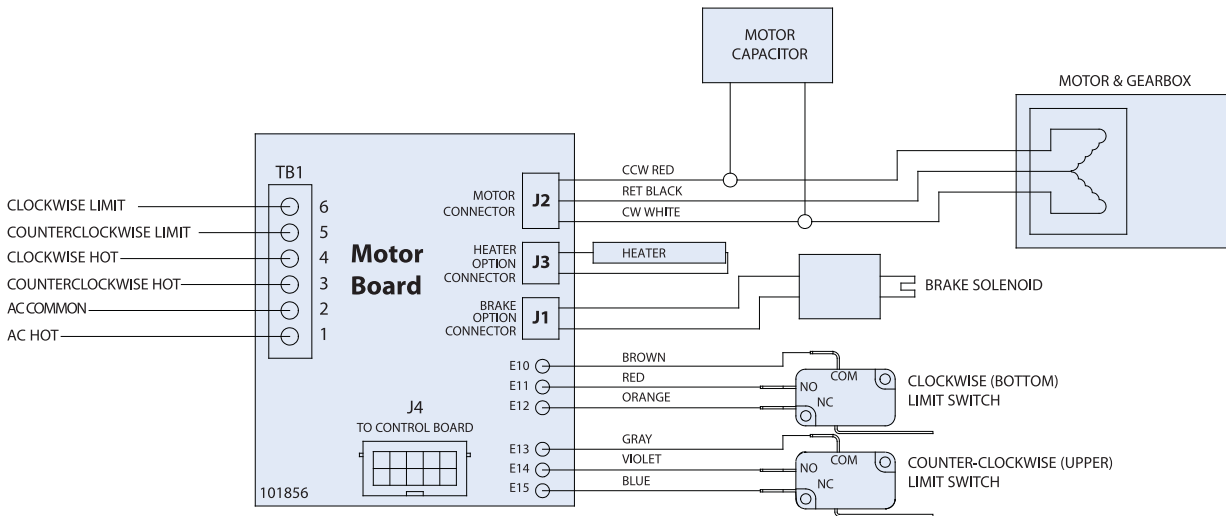


1.00 SQU. (STANDARD)  $\nabla$  120 DP.  
0.748 SQU. (19mm; OPTION I, 1000 lb-in)  
0.866 SQU. (22mm; OPTION I, 1500-3000 lb-in)

ALL DIMENSIONS IN INCHES



## 115VAC and 230VAC ON/OFF Standard

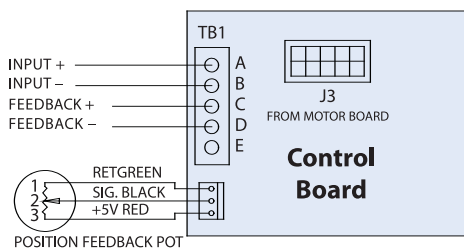
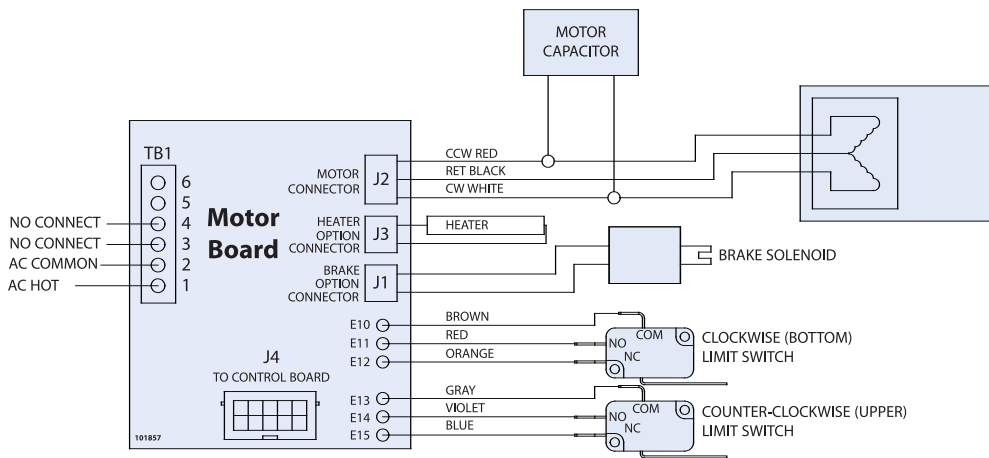


### MOTOR BOARD WIRING

TERMINAL	6	CW LIMIT	(LINE VOLTAGE OUT)
TERMINAL	5	CCW LIMIT	(LINE VOLTAGE OUT)
TERMINAL	4	CW AC HOT	<b>(MUST CONNECT)</b>
TERMINAL	3	CCW AC HOT	<b>(MUST CONNECT)</b>
TERMINAL	2	AC COMMON	<b>(MUST CONNECT)</b>
TERMINAL	1	AC HOT	(FOR HEATER OPTION)

**CAUTION:** Valcon AC voltage actuators use reversing induction motors which cause high voltages. **Devices connected to terminal 3 and to terminal 4 must be rated for a minimum 250VAC (550VAC for 230VAC applications).** Due to the induced feedback voltage, multiple actuators can not be wired in parallel. Separate (isolated contacts) must be provided for each actuator.

## 115VAC and 230VAC with Optional Control Board





## HOW TO ORDER - V SERIES ELECTRIC ACTUATORS

**Example:**

Sample model code:  
LV W 1500 C HIKS2 N230AC

1	Series
V	
LV	

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

3	Torque (in lbs)
150	150
300	300
600	600
1000	1000
1500	1500
2000	2000
2500	2500
3000	3000

1	2	3	4	5	6
LV	W	1500	C	H,I,K,S2	N115AC

4	Board Options*
C	Control Board
J	Speed Control Timer Board
U	ISO Readback Board

5	Other Options
H <sup>1</sup>	Tropical Heater/Thermostat
I <sup>2</sup>	ISO 5211 Compliant Output
K	Brake
P	Feedback Potentiometer
S2	2 Additional Limit Switches
T <sup>3</sup>	Heater/Thermostat
Z	Handwheel

6	Operating Voltage
N115AC	115VAC
N230AC	230VAC

\* Select only one board option as needed.

- 1 This heater option activates at or below 90°F and deactivates at 110°F; it is recommended high-humidity applications.
- 2 150-600 in-lb models with option "I" are supplied with a 14mm female square. (note: without option "I" the female square is 3/4 inch). 1000 in-lb models with option "I" are supplied with a 19mm female square and 1500-3000 in-lb models are supplied with a 22mm female square. (note: without option "I" the female square is 1inch).
- 3 This heater option activates at or below 40°F and deactivates at 60°F; it is recommended in applications were temperature may drop below 32°F.

## Committed to Customer Service

Metso Automation's worldwide web site, [www.valvcon.com](http://www.valvcon.com), 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 Automation, Valvcon product web site to locate the nearest stocking distributor/representative.

## Timely Technical Support

Metso Automation Express Services 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. Find Metso Automation Express at [www.valvcon.com](http://www.valvcon.com).

## A Tradition of Quality

Metso Automation 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.

## Technical Documentation Change Notice

Please contact us for the most current information.

Automated Valve & Equipment Co. | [valvepros.com](http://valvepros.com) | (800) 962-5964