

Valvcon™ QX-series electric actuators

Installation, maintenance and
operating instructions

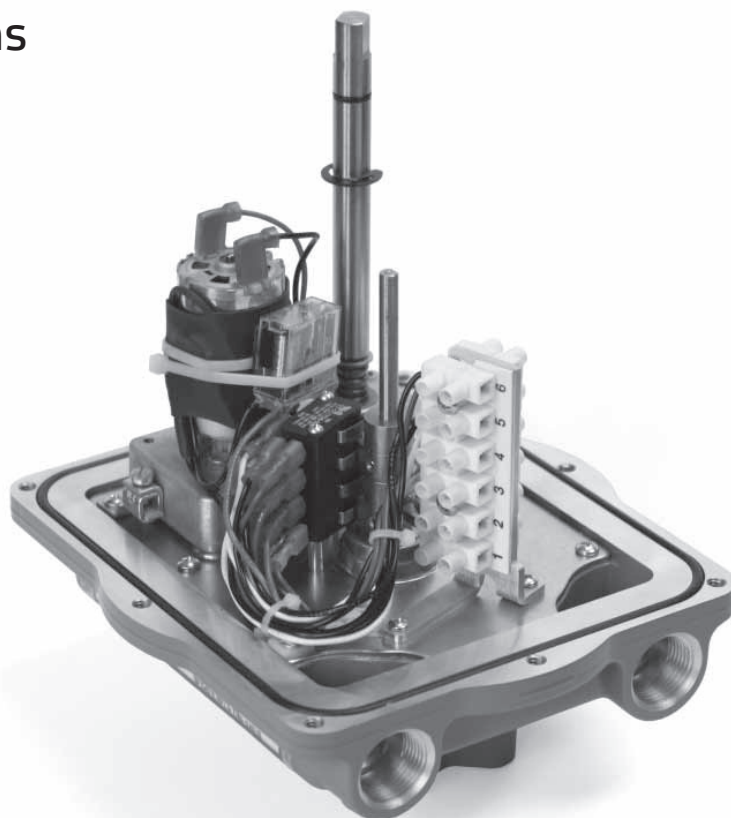


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READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1. GENERAL

1.1 SCOPE OF THE MANUAL

This instruction manual contains important information regarding the installation, operation and maintenance of the Valvcon™ QX-Series electric actuator. Please read these instructions carefully and save them for future reference.

1.2 ACTUATOR MARKINGS

WARNING

AS THE USE OF THE ACTUATOR IS APPLICATION SPECIFIC, A NUMBER OF FACTORS SHOULD BE TAKEN INTO ACCOUNT WHEN SELECTING A ACTUATOR FOR A GIVEN APPLICATION. THEREFORE, SOME OF THE SITUATIONS IN WHICH THE ACTUATORS ARE USED ARE OUTSIDE THE SCOPE OF THIS MANUAL.

IF YOU HAVE ANY QUESTIONS CONCERNING THE USE, APPLICATION OR COMPATIBILITY OF THE ACTUATOR WITH THE INTENDED SERVICE, CONTACT NELES FOR MORE INFORMATION.

The actuator has an identification nameplate label attached to the base casting (see **Figure 1**).

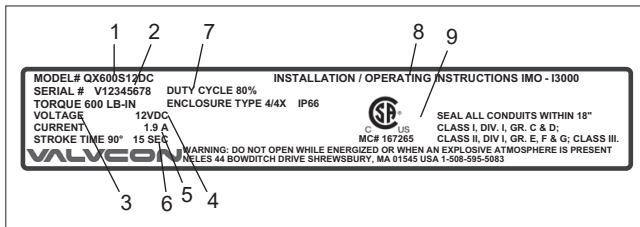


Figure 1. Identification Nameplate Label

Identification nameplate label markings:

1. Model number
2. Serial number
3. Maximum output torque
4. Voltage
5. Current draw (full-load running)
6. Cycle time
7. Duty cycle
8. Applicable manual
9. Certifications marking

1.3 SAFETY PRECAUTIONS

WARNING

DO NOT EXCEED THE ACTUATOR PERFORMANCE LIMITATIONS!

EXCEEDING THE TORQUE LIMITATIONS MARKED ON THE ACTUATOR IDENTIFICATION NAMEPLATE LABEL MAY CAUSE DAMAGE TO THE ACTUATOR AND/OR FINAL DRIVE ELEMENT.

WARNING

DO NOT EXCEED THE ACTUATOR ELECTRICAL LIMITATIONS!

EXCEEDING THE ELECTRICAL LIMITATIONS MARKED ON THE ACTUATOR IDENTIFICATION NAMEPLATE LABEL MAY CAUSE DAMAGE TO THE ACTUATOR AND/OR PERSONAL INJURY.

WARNING

BEWARE OF MOVEMENT OF THE FINAL DRIVE ELEMENT AND ANY LINKAGE BETWEEN IT AND THE ACTUATOR!

KEEP HANDS, OTHER PARTS OF THE BODY, TOOLS AND OTHER OBJECTS OUT OF THE WAY OF MOVING PARTS. FAILURE TO DO THIS MAY RESULT IN DAMAGE OR PERSONAL INJURY!

2. TRANSPORTATION AND STORAGE

Check the actuator and any accompanying devices for any damage that may have occurred during transport.

Store the actuator carefully. Storage indoors in a dry place is recommended.

Move the actuator to its intended location just before installation.

The actuator is usually shipped in the full clockwise, (typically closed) position.

If the actuator(s) will be stored for a period longer than 90 days, follow the recommendations in IMO-S2 to maintain the actuator's integrity.

3. GENERAL INSTALLATION INFORMATION

3.1 DESCRIPTION OF QX-SERIES ELECTRIC ACTUATORS

QX-Series Electric Actuators are designed to provide reliable, efficient operation of final control elements, such as 1/4 turn valves, with torque requirements up to 3,000 inch pounds. QX-Series actuators are available in 12 VDC & 24 VDC.

WARNING

DANGEROUS VOLTAGES ARE PRESENT INSIDE THE ACTUATOR COVER UNLESS THE POWER SUPPLY TO THE ACTUATOR HAS BEEN SHUT OFF OR DISCONNECTED. USE EXTREME CAUTION WHENEVER WORKING ON THE ACTUATOR WITH THE COVER REMOVED.

Tools Required for Installation

1/16 inch hex wrench (cam set screw wrench; supplied)

5mm hex wrench (cover screws)

6mm hex wrench (cover screws)

Small flat blade screwdriver

3.2 OPERATION

QX-SERIES OPERATION

WARNING

WHENEVER WORKING INSIDE THE ACTUATOR, CARE MUST BE TAKEN TO AVOID DAMAGE TO THE MACHINED FLANGE SURFACES ON THE COVER AND BASE CASTINGS. FAILURE TO DO SO CAN VOID THE ACTUATOR'S ENVIRONMENTAL CERTIFICATION.

The QX-Series actuator is designed for On/Off (Open/Close) operation. The default position/direction of travel is clockwise, power must be applied to terminals 1 (NEG/-) and 2 (POS/+). To drive in the counter-clockwise direction, an additional "control signal" must be applied to terminal 3 (POS/+); when this "control signal" is de-energized, (and power is still present at terminals 1 and 2) the actuator will return to the clockwise position. Two single-pole, doublethrow limit switches control the ends of travel; the actuator will continue to drive in the "powered" direction until power is removed or a cam trips an end-of-travel switch. Power

may be removed mid-stroke to position the final drive device. Once the actuator reaches an end-of-travel switch, power and the "control signal" may be removed or left applied without damaging the actuator. The actuator includes two auxiliary limit switches that maybe used for position indication or for interlocking other devices.

WIRING

The QX-Series actuator operates from the customer's supplied external power (DC +/-POS and DC -/NEG). When power is applied to terminals 1 (NEG/-) and 2 (POS/+) the actuator will drive in the clockwise direction. When a "control signal" is applied to terminal 3 (POS/+), and power is still present at terminals 1 and 2, the actuator will drive in the counter-clockwise direction. (Refer to Figure 1 for the power and control wiring connections.)

WARNING

USE CARE WHENEVER WORKING WITH THE ACTUATOR COVER REMOVED. DAMAGE, SCRATCHES, OR DENTS ON THE MACHINED FLANGE SURFACES OF THE ENCLOSURE MAY VOID COMPLIANCE WITH NEMA, CSA, AND/OR UL SPECIFICATIONS. (SEE SECTION 3.3.3)

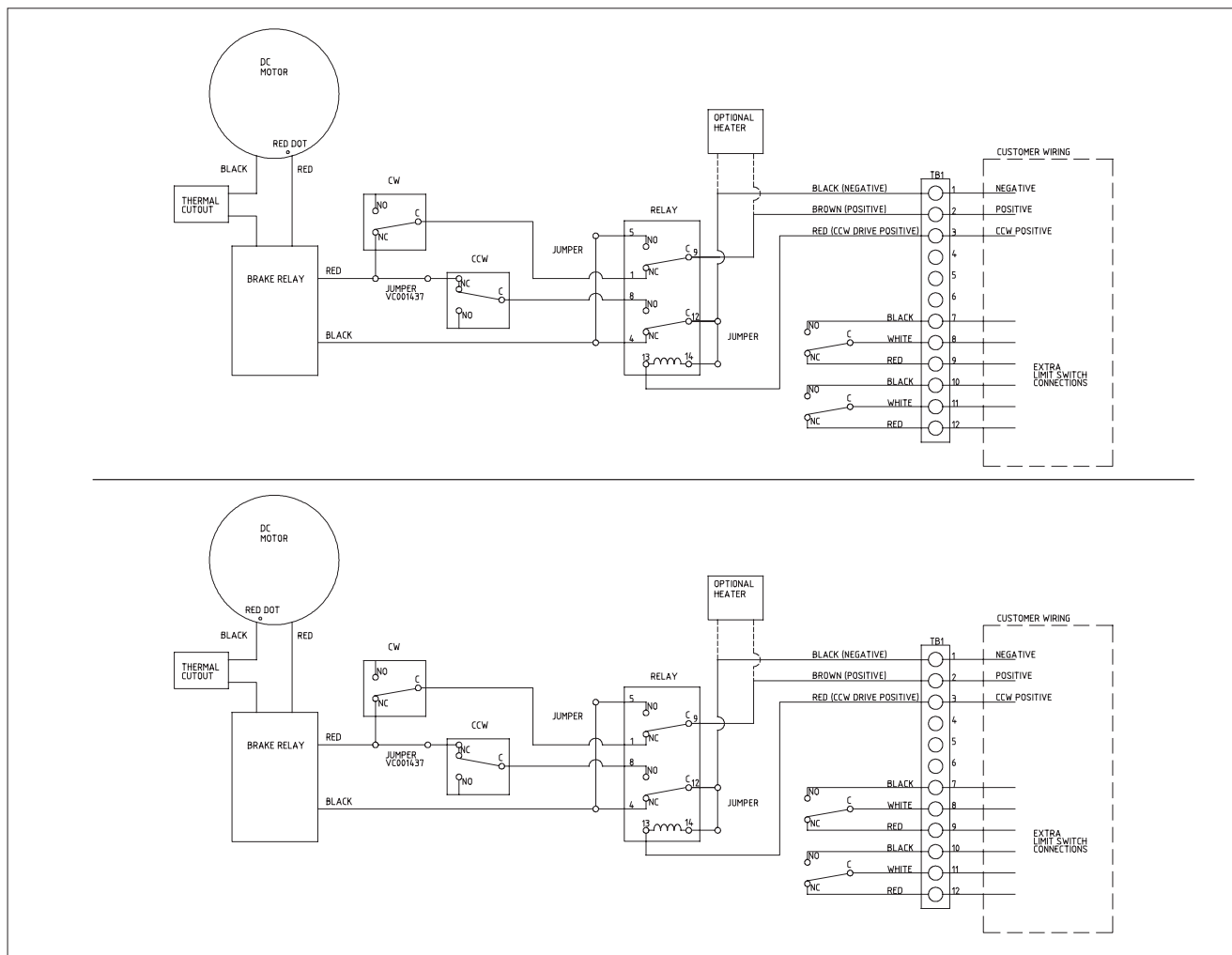


Figure 2. QX Actuator Wiring for 12 AND 24 VDC – Small Enclosure (top), Large Enclosure (bottom)

WARNING

ACTUATORS SHOULD BE PROPERLY GROUNDED AND WIRED IN ACCORDANCE WITH LOCAL ELECTRICAL CODE; SEE PRODUCT IDENTIFICATION NAMEPLATE FOR MAXIMUM CURRENT DRAW.

3.3 ADJUSTMENT OF END-OF-TRAVEL

LIMIT SWITCHES

Two limit switches operated by cams on the output shaft determine the exact positions where the actuator will stop at the end of each cycle. Counting from the bottom, the first switch determines the CW end-of-travel position. The second switch determines the CCW end-of-travel position. The limit switches can be adjusted from 5° to 270° of actuator rotation. If adjustment of the open or closed position is required, proceed as follows:

Caution: Disconnect power supply circuit before opening enclosure.

A. Remove the cover

Remove actuator cover. Remove the override shaft from the actuator cover bushing; if the actuator is equipped with a handwheel, remove the handwheel before removing the top piece of the "two-piece" shaft from the cover bushing. **NOTE:** Use caution to prevent damage to machined flange surface of cover casting; see cover replacement for additional information.

B. Drive the actuator to the full CCW position.

C. Adjust the CCW limit switch cam

- 1) Using a 1/16 inch hex wrench, loosen the set screw in the CCW limit switch cam (the second from the bottom).
- 2) Rotate the cam toward the limit switch arm until the switch just clicks closed.
- 3) Re-tighten the set screw on the limit switch cam (Be careful not to over-tighten the screw).

D. Drive the actuator to the full CW position.

E. Adjust the CW limit switch cam

- 1) Using a 1/16 inch hex wrench, loosen the set screw in the CW limit switch cam (the bottom one).
- 2) Rotate the cam toward the limit switch arm until the switch just clicks closed.
- 3) Re-tighten the set screw on the limit switch cam (Be careful not to over-tighten the screw).

F. Adjust auxiliary switches as needed, and then replace the cover (see section 3.3.3)

AUXILIARY LIMIT SWITCHES

These switches are factory set to trip just before the end-of-travel limit switches. If adjustment is desired, the switches are set in the same manner as the end-of-travel limit switches.

CW Indication Switch: (3rd from bottom)

NO to Terminal 7
COM to Terminal 8
NC to Terminal 9

CCW Indication Switch: (4th from bottom)

NO to Terminal 10
COM to Terminal 11

PROPER ACTUATOR COVER INSTALLATION

NOTE: For actuators including hazardous location certification.

Prior to installing cover, inspect machined flange surfaces for any damage, scratches, or dents. Damage, scratches, or dents that will not fit completely in a circle having a diameter of 1/64" will void hazardous location certifications. If such imperfections are present the damaged enclosure part(s) must be replaced. Consult the factory for replacement parts.

1. Remove the override shaft from the actuator cover bushing; if the actuator is equipped with a handwheel, remove the handwheel before removing the top piece of the "two-piece" shaft from the cover bushing.
2. Install the override shaft on the square motor shaft; if the actuator is equipped with a handwheel, install the bottom piece of the "two-piece" shaft on the motor shaft and then install the top piece of the shaft onto the bottom piece of the shaft.
3. Align cover so that the override shaft will pass through the override bushing and carefully push it down so that the cover flange contacts the base flange.
4. Once the cover is properly seated, tighten the screws to secure the cover; a cross pattern is recommended for uniform distribution of load.
5. If the position indicator is not seated to the output/cam shaft, turn until it drops into place in order to ensure accurate visual position indication.

3.4 TEMPERATURE LIMITS

LOW AMBIENT TEMPERATURES

The minimum recommended ambient temperature is -40°F/C.

HIGH AMBIENT TEMPERATURES

The maximum recommended ambient operating temperature is 150°F (66°C). **NOTE:** Actuators mounted outdoors must be shaded from direct sunlight to keep the internal temperature below 150°F (66°C). Sustained exposure to temperatures over 150°F (66°C) can damage the internal components.

HIGH MEDIA TEMPERATURES

For media temperatures between 200°F (93°C) and 300°F (148°C), a shielding plate (about one inch larger than the actuator in each dimension, and at least a 1/16" thick) should be placed between the actuator and the mounting bracket. In addition, the actuator should not be mounted directly above the pipe. For media temperatures above 300°F (148°C), a valve with an extended shaft mounting arrangement should be used.

4. MOUNTING THE ACTUATOR

WARNING

DANGEROUS VOLTAGES ARE PRESENT INSIDE THE ACTUATOR COVER UNLESS THE POWER SUPPLY TO THE ACTUATOR HAS BEEN SHUT OFF OR DISCONNECTED. USE EXTREME CAUTION WHENEVER WORKING ON THE ACTUATOR WITH THE COVER REMOVED.

4.1 ACTUATOR INSTALLATION

Verify that the output torque of the actuator is appropriate for the torque requirements of the valve. The output torque is listed on the actuator's base nameplate.

Actuator Drive Output - QX-Series actuators are furnished with a female drive output. Two bolt hole patterns (ISO 5211) are provided for actuator mounting (See **figure 3**).

Bracket requirements - It is mandatory that the actuator be firmly secured to a sturdy mounting bracket. A minimum of four bolts with lock-washers should be used to secure the actuator to the bracket. No flexibility in the bracket is allowed, and backlash, or "play", in the coupling should be minimized. The actuator output shaft must be in-line (centered) with the valve shaft to avoid side-loading the shaft.

5. MANUAL OVERRIDE

WARNING

FAILURE TO USE MANUAL OVERRIDE PROPERLY COULD RESULT IN DAMAGE TO THE ACTUATOR GEARING. ENSURE THAT THE OVERRIDE IS FULLY DISENGAGED AND DO NOT USE EXCESSIVE FORCE WHEN MANUALLY POSITIONING ACTUATOR. DO NOT DRIVE THE ACTUATOR BEYOND THE TRAVEL LIMIT SETTINGS. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN DAMAGE TO THE ACTUATOR AND/OR FINAL DRIVE ELEMENT.

WARNING

MANUAL OVERRIDE OF THE ACTUATOR IS INTENDED FOR USE WHEN POWER IS NOT AVAILABLE. USING THE OVERRIDE SHAFT OR HANDWHEEL (IF APPLICABLE) WHEN POWER IS STILL PRESENT AT THE ACTUATOR COULD RESULT IN DAMAGE OR PERSONAL INJURY!

To use the manual override, push the override shaft down approximately 1/4 inch to disengage the motor from the gear train. Failure to disengage motor prior to turning override will cause damage to the actuator. While holding the shaft down, turn the shaft with a wrench or handle to the desired position. The override shaft on actuators below 1000 in•lb must be rotated in the opposite direction of the desired direction of the output shaft. In actuators 1000 in•lb and above, the override and the output shaft turn in the same direction.

Do not drive the actuator beyond the limit switch settings. The manual override shaft must be returned to its fully upward position before the motor is re-engaged. Rotate the shaft slightly to align the spur gears until the shaft "springs" back to its re-engaged position.

NOTE: The rotation direction of the output may not be the same as the rotation of the override shaft!

6. TROUBLESHOOTING

If the actuator fails to operate:

- Check that proper voltages are present at the actuator's terminal connections.
- Check that all connections are properly made.
- Check that the limit switches are properly set.
- Check that the actuator has enough torque output for the application.

7. QX-SERIES STANDARD OPTIONS

7.1 OPTION "H" – TROPICAL HEATER AND THERMOSTAT

The tropical heater and thermostat option is a self-adhesive, resistant heater strip which is applied to primary gearbox. It is hard-wired to the terminal block and is recommended in high-humidity applications. The tropical heater option is also recommended installations that experience wide temperature swings in order to evaporate any condensation. Thermostat is pre-set to activate at or below 90°F (32°C) and deactivate at or above 110°F (43°C). The tropical heater draws 15 watts at 12 VDC and 24VDC. This option is factory installed only.

7.2 OPTION 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 keyed drive output options, consult the "How to Order" section for available sizes for a given actuator model. This option is factory installed only.

7.3 OPTION "T" – HEATER AND THERMOSTAT

The heater and thermostat option is a self-adhesive, resistance heater strip which is applied to the primary gearbox. It is hard-wired to the terminal block and is required in installations where the ambient temperatures drop below 32°F (0°C). The heater option is also recommended in installations that experience wide temperature swings in order to evaporate any condensation. The thermostat is pre-set to activate at or below 40°F (4°C) and deactivate at or above 60°F (15°C). The heater draws 15 watts at 12 VDC and 24VDC. This option is factory installed only.

7.4 OPTION 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. This option is factory installed only.

7.5 OPTION “Z” – HANDWHEEL OVERRIDE P/N VC009097, P/N VC009098

All QX-Series actuators are supplied with a wrench-operated manual override shaft. If the Handwheel Override option is selected the shaft is replaced by a declutchable shaft and a six-inch handwheel. This option can also be installed in the field; for 150 – 600 in•lb models order kit **P/N VC009097** and for 1000 – 3000 in•lb models order kit **P/N VC009098**.

WARNING

WHENEVER WORKING INSIDE THE ACTUATOR BE SURE TO FOLLOW ALL GUIDELINES, AND HEED ALL WARNINGS IN THIS MANUAL. IF INSTALLING AN OPTION KIT, BE SURE TO READ AND FOLLOW THE SUPPLIED INSTRUCTIONS CAREFULLY AND HEED ANY ADDITIONAL WARNINGS.

8. VOLTAGE

12 VDC & 24 VDC. QX-Series actuators are rated for full torque at +/- 10% of the nominal voltage. QX-Series actuators are rated 80% duty.

9. GENERAL OPERATING INFORMATION

For enclosure specifications and dimensions, see (Table 1 and Figure 3) specifications & technical information.

9.1 ENCLOSURE RATINGS AND PRODUCT CERTIFICATIONS

All QX-Series actuator enclosures are certified weathertight and “explosionproof” (NEMA 4/4X, and NEMA 7&9) by CSA. The enclosures are certified to meet both Canadian and U.S. standards for applications in both Hazardous and Non-Hazardous locations. Ensure that the actuator’s ratings are appropriate for the application environment prior to installation.

WARNING

WHENEVER WORKING INSIDE THE ACTUATOR, CARE MUST BE TAKEN TO AVOID DAMAGE TO THE MACHINED FLANGE SURFACES ON THE COVER AND BASE CASTINGS. FAILURE TO DO SO CAN VOID THE ACTUATOR’S ENVIRONMENTAL CERTIFICATION.

9.2 DUTY CYCLE AND MOTOR PROTECTION

QX-Series actuators are equipped with a brushed DC motor and are rated for 80% duty cycle operation in environments at/below 104°F (40°C) and for a maximum of 30 starts per minute. Higher temperature applications decrease the available duty cycle.

9.3 OPERATING TEMPERATURE LIMITS

QX-Series actuators are designed to operate in ambient environments between -40°F (-40°C) and 150°F (66°C). If the ambient temperature may drop below 32°F (0°C), the heater and thermostat option is recommended. In outdoor applications where ambient temperatures exceed 80°F (27°C), actuators should be shielded from direct sunlight. In applications with high media temperatures, insulating blankets, heat shields and/or extended mounting shafts should be used to maintain ambient temperatures at the actuator within normal operating limits.

Heaters and thermostats are recommended for all outdoor applications and may also be used to dry condensation in high-humidity environments.

9.4 ACTUATOR MOUNTING

The actuator may be mounted in any position including upside-down. It must be firmly secured to a direct mount flange or sturdy mounting bracket. A minimum of four bolts with lock washers should be used to secure the actuator to the bracket. Flexibility in the bracket is not allowed, and backlash, or “play”, in the coupling should be minimized. The actuator output shaft must be in line (centered) with the valve shaft to avoid side-loading the shaft. (See Figure 3 for output drive dimensions and mounting hardware specifications.)

9.5 LUBRICATION

All rotating power train components are permanently lubricated with multi-purpose PTFE grease suitable for the operating temperature range of the actuator. Additional lubrication is not required in normal operation.

9.6 PROBLEM PREVENTION

Most actuator problems result from improper installation.

Incorrect Wiring and Set Up - Make certain the actuator is wired correctly and travel stops are properly set before power is applied.

Coupling, Alignment, and Mounting - Do not add extra torque! Make certain that the mounting arrangement is sturdy, centered, properly aligned, and that all mounting hardware is secure and properly tightened.

Moisture - Replace the cover tightly and make certain conduit entry holes are sealed properly to prevent moisture infiltration.

Temperature - Excessive temperatures affect duty cycle, actuator performance and the condition of the internal power storage. QX-Series actuators are designed to operate in environments below 150°F (66°C). In applications with high media temperatures, insulating blankets, heat shields, extended mounting shafts or off-set mounting may be used to maintain ambient temperatures at the actuator within normal operating limits.

9.7 WARRANTY

All V-Series actuators are backed by a 2-year warranty that covers materials and workmanship. The warranty expires 24 months from installation or 30 months from delivery; whichever comes first.

To request a Return Authorization for an actuator within the warranty period, please consult your local Neles distributor.

9.8 REPAIR SERVICE/SPARE PARTS

We recommend that electric actuators be directed to our Northeast Service Center for maintenance. The Service Center is equipped to provide rapid turn-around at reasonable cost and offer new product warranty with all reconditioned electric actuators.

For electric actuators outside of the warranty period, request a Return Authorization by calling the Northeast Service Center at (508) 595-5195; or by sending an e-mail to valvconservice@neles.com.

NOTE: When sending electric actuators to the Service Center for repair, do not disassemble them! The actuator should be relatively clean upon return. For further information on spare parts and service or assistance, visit our Web site at www.neles.com/products/actuators/electric-actuators.

NOTE: When ordering spare parts, always include the following information:

- a. Actuator model number from the product identification nameplate label.
- b. Serial number from the product identification nameplate label.
- c. Part number and/or description of the part required.
- d. Required quantity.

10. SPECIFICATIONS & TECHNICAL INFORMATION

Table 1 - Specifications	
Temperature Range	-40°F to 150°F (-40°C to 66°C).
Conduit Connections	(2) 3/4" NPT all sizes (3/4" to 1/2" reducing bushings included).
Output	150 to 600 in-lbs: ISO 5211 F05 and F07 bolt circles, 3/4" female square; see "Dimensions" section and "How to Order " table for additional output options. 1000 to 3000 in-lbs: ISO 5211 F07 and F10 bolt circles, 1" female square; see "Dimensions" section and "How to Order " table for additional output options.
Voltage	12 VDC: 10.8 to 13.2 VDC 24 VDC: 21.6 to 26.4 VDC
Limit Switches	(4) Single pole, double throw switches rated for 11A 1/2HP 250VAC, CSA certified; two are used for end-of-travel control. The two additional limit switches are included and can be used as dry contacts, for pilot or position indication.
Motor	Brushed DC, sub-fractional horsepower.
Lubrication	Permanently lubricated gear train and bearings.
Gear Train	Hardened steel spur gears.
Enclosure	Cast aluminum; with a baked-on, super durable polyester powder coat finish.
Approximate Weight	17 lbs (8 kg) for sizes up to 600 lb•in (50 lb•ft; 68 Nm); 31 lbs (14 kg) for sizes 1000 lb•in (83 lb•ft; 113 Nm) and above.
Cover Screws	Captive cover screws for models 150 - 600 in•lb, are Class 12.9 M6 x 1.0 x 30 mm socket head cap screw; tighten to between 48 - 72 in•lb (for non-lubricated fasteners). Captive cover screws for models 1000 - 3000 in•lb, are Class 12.9 M8 x 1.25 x 36 mm socket head cap screw; tighten to between 10 - 12 ft•lb (for non-lubricated fasteners).

Figure 3.

10

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10.2 QX-SERIES ACTUATORS BY MODEL NUMBER

How To Order - QX-Series Electric Actuators							
Actuator Series	Enclosure Type	Torque		Other Options (if desired)		Operating Voltage	
Order Code		Order Code	Description	Order Code	Description	Order Code	Description
QX (see note 1)	Weathertight & Explosionproof NEMA 4/4X/7&9	150	150 in lb	H (see note 2)	Tropical Heater/Thermostat	S12DC	12VDC
		300	300 in lb	I1 (see note 3)	14mm Female Square Output	S24DC	24VDC
		600	600 in lb	I2 (see note 3)	17mm Female Square Output		
				T (see note 4)	Heater/Thermostat		
				Y1 (see note 3)	15mm Female Keyed Output		
				Y2 (see note 3)	20mm Female Keyed Output		
				Z	Handwheel		
		1000	1000 in lb	H (see note 2)	Tropical Heater/Thermostat		
		1500	1500 in lb	I2 (see note 3)	17mm Female Square Output		
		2000	2000 in lb	I3 (see note 3)	19mm Female Square Output		
		2500	2500 in lb	I4 (see note 3)	22mm Female Square Output		
		3000	3000 in lb	T (see note 4)	Heater/Thermostat		
				Y2 (see note 3)	20mm Female Keyed Output		
				Y3 (see note 3)	25mm Female Keyed Output		
				Z	Handwheel		

NOTES:

1. All QX-Series actuators include a holding brake, two auxiliary limit switches, visual position indication, a wrench-operated manual override, a NEMA 4/4X/7&9 enclosure and CSA (C US) Certification as standard features.
2. This heater option activates at or below 90°F (32°C) and deactivates at 110°F (43°C); 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 (4°C) and deactivates at 60°F (15°C); it is recommended in applications where the temperature may drop below 32°F (0°C).

- **The QX-Series Enclosure** is certified by CSA to meet specifications for NEMA 7&9, hazardous locations, (Class I, Division 1, Groups C, and D; Class II, Division 1, Groups E, F, and G; Class III) as well as to meet NEMA 4/4X and IP 66 specifications.

For enclosure specifications and dimensions see (Table 1 and Figure 3).

Sample Model Code:
QX2000I4ZS12DC

Actuator Series	QX
Torque	2000
Other Options (if applicable)	I4 Z
Operating Voltage	S12DC

- **Torque = Breakaway Torque** Valvcon™ electric actuators are rated at breakaway torque. This is the torque required to move a full load immediately upon power-up.

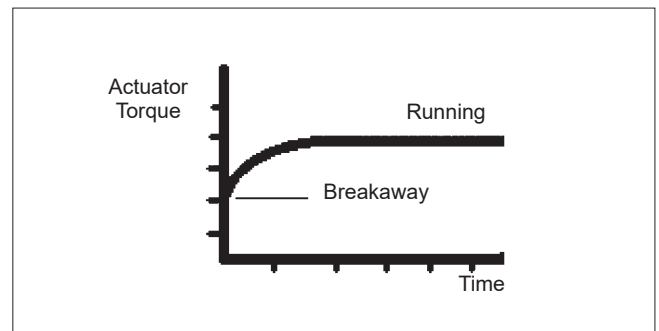


Figure 4.

11. ADDITIONAL ACTUATOR PRODUCTS AND ACCESSORIES FROM NELES

ADC-Series

- Universal Control Board for On/Off and Modulating applications
- Up to 3000 inch pounds (250 lb•ft; 339 Nm)
- Optional Internal Battery Back-Up
- Continuous Duty Cycle
- Universal Input Power: 115VAC, 230VAC, 24VAC, 12VDC or 24VDC
- NEMA 4/4X and NEMA 4/4X/7&9 enclosures
- CSA (C US) Certified
- CE Compliant
- Certified to ATEX Directive 2014/34/EU: Ex db IIB T6 Gb, and IECEx CSA 14.0057X ("WX" models only)
- IP 66
- Standard Features: auxiliary limit switches, heater/thermostat, manual override and visual position indicator
- Available Options: metric and "keyed" female outputs, MODBUS® board, and handwheel override

I-Series Network Capable

- AS-Interface
- DeviceNet™
- Foundation Fieldbus
- Other fieldbus protocols (consult factory)
- CSA Certified to Canadian and U.S. standards

V-Series

- Up to 3000 inch pounds (250 lb•ft; 339 Nm) for On/Off, Modulating or Automatic Cycling applications
- 115VAC and 230VAC voltages
- 75% Duty Cycle (55% on 3000 lb-in models)
- NEMA 4/4X and NEMA 4/4X/7&9 enclosures
- CSA (C US) Certified
- CE Compliant
- Certified to ATEX Directive 2014/34/EU: Ex db IIB T6 Gb, and IECEx CSA 14.0057X ("WX" models only)
- Standard Features: manual override and visual position indicator
- Available Options: Modulating Control Board, Speed Control/Timer Board, Iso/Readback Board, extra limit switches, heater/thermostats, motor brake, feedback potentiometer, metric and "keyed" female outputs and handwheel override

LCR Series

- Up to 600 inch pounds (50 lb•ft; 68 Nm)
- Economical actuators for Reversing applications
- 25% duty cycle (80% on 12VDC or 24VDC models)
- NEMA 4/4X enclosure
- 115VAC, 230VAC, 24VAC, 12 VDC and 24VDC voltages
- Options include extra limit switches and heater/ thermostats
- Male output (standard) or female output (optional)

LCU Series

- Up to 600 inch pounds (50 lb•ft; 68 Nm)
- Economical actuators for Unidirectional applications
- 25% duty cycle (80% on 12VDC or 24VDC models)
- NEMA 4/4X enclosure
- 115VAC, 230VAC, 24VAC, 12 VDC and 24VDC voltages
- Options include extra limit switches and heater/ thermostats
- Male output (standard) or female output (optional)

Q6-Series for Remote Solar Applications

- 600 inch pounds (50 lb•ft; 68 Nm)
- 12VDC
- Low current draw
- 80% Duty Cycle
- NEMA 4/4X/7&9
- CSA (C US) Certified

ESR-Series

- Up to 600 inch pounds (50 lb•t; 68 Nm) for true "Two-Wire" On/Off applications
- 80% Duty Cycle
- 115VAC and 230VAC voltages
- NEMA 4/4X and NEMA 4/4X/7&9 enclosures
- Available Options: dynamic brake, extra limit switches, heater/thermostats and metric and "keyed" female outputs

Subject to change without prior notice.

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