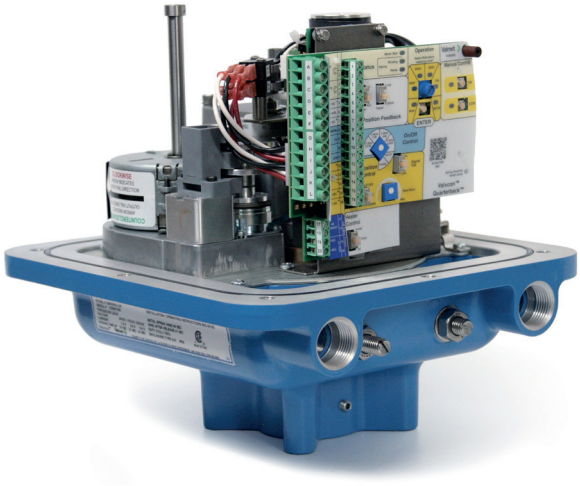
Valvcon™ Quarterback™ QB-series electric actuator with mechanical spring back-up power

Valmet 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/waste-water 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, "Plugin" accessory boards, Back-Up Power actuators, as well as electric actuators designed for remote control, solar-powered applications and two-wire network applications.

Specifications

The quarter-turn electric actuator complies with Part 15, Class A of the FCC regulations for emissions and conducted radiation for industrial devices. It meets NEMA standards for use in weathertight or weathertight and hazardous locations. The actuator is a single, complete unit composed of a compact cast aluminum housing, motor, gearing, electronic "Smart" limit settings for end-of-travel control, SPDT limit switches controlled by metal cams for position indication, visual position indicator, and an internal mechanical spring back-up to drive to a pre-set position in the event of an external power loss. Actuator mounting flanges comply with ISO 5211 standards incorporating a female drive for direct output coupling. The actuator is capable of operating in ambient environments of -40° F/C to 130° F / 55° C.



Features and benefits

Isolation and Electrical

Internal electronic control board has clearly marked connection terminals for Power and Control Signals to prevent incorrect wiring and provides CW and CCW push buttons for local manual control. The actuator control electronics are electrically isolated to allow multiple actuators to be wired in parallel. Electronic control board is protected on the outward side with an insulating overlay providing terminal locations and additional safety. Additionally, the electronic control board includes a simple user-interface, consisting of slide switches and selection pots for mode selection, calibration, and set up. The electronic control board supplies a 4-20mA or 0-10VDC position feedback signal, includes a holding brake feature to prevent back-driving, a heater and thermostat for low-temperature or high-humidity applications, and two auxiliary limit switches for indication. All internal connections, (motor leads, limit switch leads, etc.) are coded, using different style connectors for each function, to prevent incorrect wiring. All connections plug-in to simplify field repairs and upgrades. In AC line applications a highly reliable switching power supply provides power conversion to drive the internal brushless DC motor; in low-voltage applications the board provides the necessary conversion to drive the motor. Other than periodic replacement of the back-up spring packs; no maintenance is required.

Gearing

The brushless DC motor is capable of running continuously at full torque at ambient temperature at or below 104° F / 40° C.

Lubrication

All rotating power train components are coated with a multi-purpose grease. Lubricants are suitable for ambient conditions of -40° F/C to 130° F / 55° C.

Gearing

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

Travel Limit Switches

During normal, (Smart Limit) operation the ends of travel are limited by the saved user settings for the Zero and Span positions. Two additional SPDT limit switches are included for position indication purposes; the switches are rated for 11A 1/2HP 250 VAC. The auxiliary switches are fully adjustable to operate at any position, as required by the process application, providing end-of-travel indication.

On/Off Control (Open/Close Operation) or Position Control (Modulating Operation)

The actuator can be configured for either On/Off or Modulating operation.

On/Off Control (Open/Close Operation):

QB-Series actuators can be configured for Open/Close operation requiring separate Power and Control signals. The Power signal must be constantly maintained; 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 CW mode a signal is maintained to drive the actuator to the CW position and removed to drive to the CCW position. In Two-wire CCW 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. Three-wire mode may be configured for Three-position operation, whereby 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.

Position Control (Modulating Operation):

QB-Series actuators can be configured for Modulating operation in which they will accept a variable, proportional 4-20mA or 0-10VDC valve position signal and respond by positioning the valve proportionately with an accuracy of 1%. Normally, the actuator drives clockwise in response to a decreasing control signal; however, the actuator is capable of "reverse acting" operation (driving counterclockwise in response to a decreasing control signal) without internal wiring changes. The actuator also accepts a resistance value position signal, i.e. 0-135 Ohms, directly with simple board configuration adjustments. The actuator also provides the ability to adjust the sensitivity to control signal changes. A slide switch enables the user to set the actuator response to a loss of control signal. Locked rotor, stall protection initiates whenever the actuator is unable to achieve the position commanded by the control signal, and terminates power to the motor in order to prevent damage due to prolonged/ repeated stall conditions.

Internal Mechanical Spring Back-up

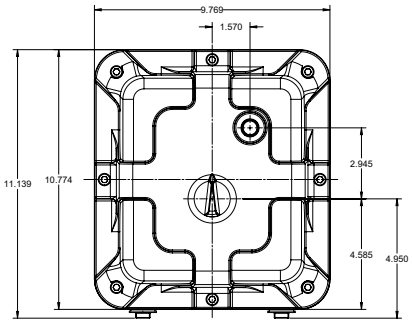
With the standard mechanical spring back-up feature, immediately upon loss of the Power signal, the internal spring pack(s) will drive the actuator to the Power Fail Position. The Power Fail Position may be either the full CW, or the full CCW position and is determined by the Power Fail Position selection switch, and the internal spring-pack orientation.

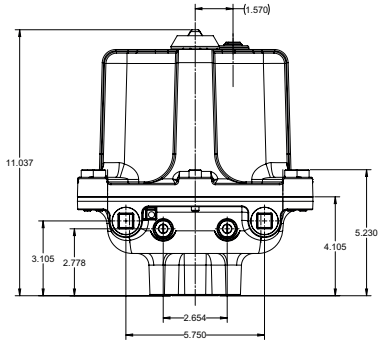
- Field-settable for "fail clockwise", or "fail counter-clockwise".
- Proven technology provides internal mechanical spring back-up capabilities within the standard size actuator enclosure

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, damper, or other final drive element away from its seat. Other manufacturer's actuators may be rated at running torque, but actually deliver significantly less breakaway torque.

QB-series enclosure

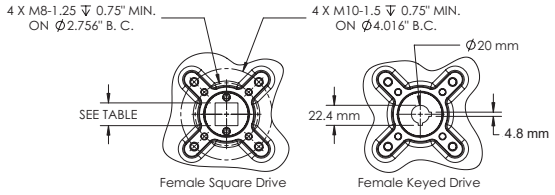




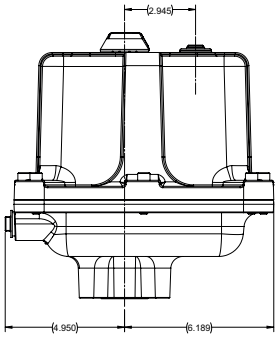
TO REMOVE COVER REQUIRES AN ADDITIONAL 5.75"

ALL DIMENSIONS IN INCHES

Mounting Flange, ISO 5211
F07/F10



Actuator Size	Drive Option	Drive Type	Drive Size	Depth
600-1200 lb-in (50-100 lb-ft; 68-136 Nm)	Standard	Square	1.000 (25mm)	1.20 (30.5mm)
600-1200 lb-in (50-100 lb-ft; 68-136 Nm)	Option "I2"	Double Square	0.669 (17mm)	1.20 (30.5mm)
600-1200 lb-in (50-100 lb-ft; 68-136 Nm)	Option "I3"	Double Square	0.748 (19mm)	1.20 (30.5mm)
600-1200 lb-in (50-100 lb-ft; 68-136 Nm)	Option "I4"	Double Square	0.866 (22mm)	1.20 (30.5mm)
600-1200 lb-in (50-100 lb-ft; 68-136 Nm)	Option "Y2"	Keyed	0.787 (20mm)	1.50 (38.1mm)
600-1200 lb-in (50-100 lb-ft; 68-136 Nm)	Option "Y3"	Keyed	0.984 (25mm)	1.50 (38.1mm)



Approximate Weight	37 lb / 17 kg

All Dimensions in inches unless otherwise stated

QB-series features at a glance!

- Universal Input Power – Actuator accepts 115/230AC and 24DC
- Universal Control – On/Off or Positioning from the same package
- Included Heater/Thermostat Feature – Can be enabled for "low-temp" use,"humidity control" use, or disabled to reduce power consumption.
- CSA (C US) Certification
- Dual conduit openings make wiring easier, and keep power and control wiring separate.
- Two year warranty.

QB-series specifications

Mechanical Spring Back-up Power

Valvcon™ QB-Series electric actuators are equipped with internal mechanical spring back-up power, allowing you to shut down your system in the event of an external power loss. Engineered to supply dependable actuation, they can provide up to 500 power-loss cycles, before the spring pack(s) should be replaced. The back-up powered feature incorporates compact, self-contained spring pack(s) that fit right under the actuator cover. Upon power loss, the spring energy is automatically released, driving the actuator to the selected "fail" position.

Valvcon™ QB-Series mechanical spring back-up actuators can be configured for continuous-duty on/off (open/close) or modulating operation.

- Spring packs can be easily replaced in the field.

QB-series data

Torque output (full rated load; end of spring torque	24VDC				115VAC				230VAC				All voltages
	Cycle time	Current draw	Initial spring wind	Wind after release	Cycle time	Current draw	Initial spring wind	Wind after release	Cycle time	Current draw	Initial spring wind	Wind after release	Spring release cycle time
	(sec/90°)	(Amps)	secs.	secs.	(sec/90°)	(Amps)	secs.	secs.	(sec/90°)	(Amps)	secs.	secs.	(sec/90°)
600 lb-in; 50 lb-ft; 68 Nm	30	1.5	74	54	30	0.7	79	58	30	0.6	78	56	1.5
1200 lb-in; 100 lb-ft; 136 Nm	39	2.4	89	66	39	1.2	95	75	39	1.1	95	70	1.5

QB-series electric actuators standard features

Heater/Thermostat

The Heater/Thermostat option can be activated by changing the position of a slide switch on the board. The feature can be set for low-temperature, humidity control, or turned off completely to reduce power consumption.

Auxiliary Limit Switches

Two limit switches are included 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.

QB-series electric actuators options

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

The actuator is equipped with an ISO 5211 compliant mounting configuration. The standard drive output for all QB-Series 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 Codes Y2, and Y3) Keyed Output

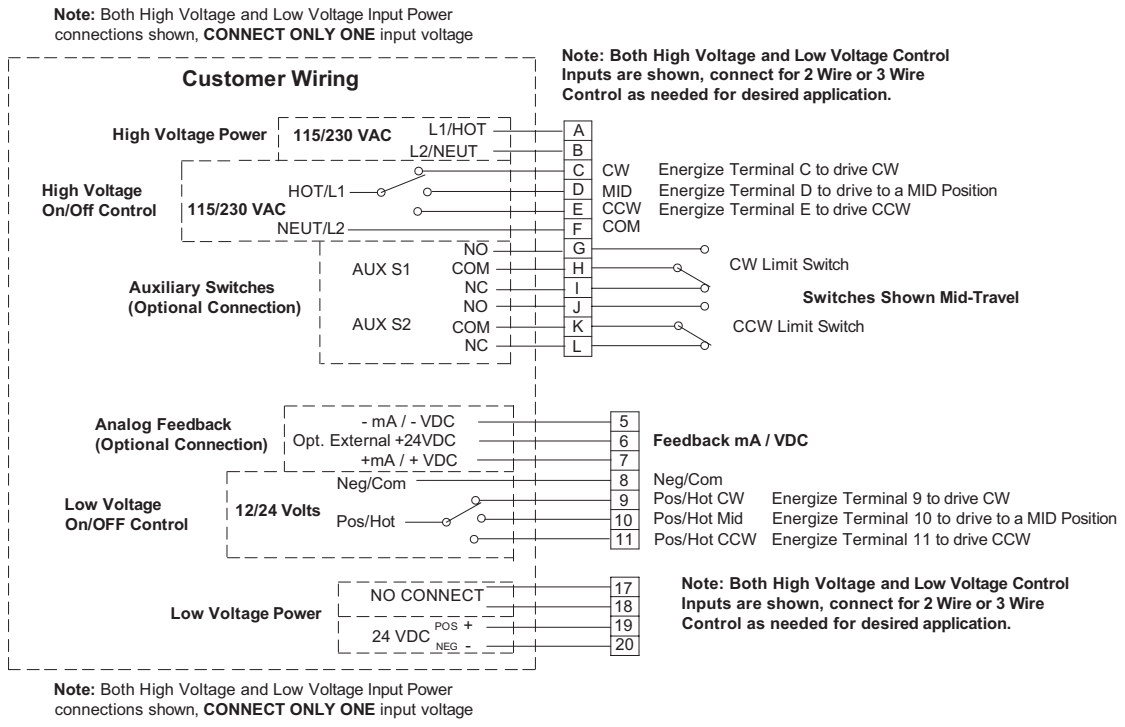
The actuator is equipped with an ISO 5211 compliant mounting configuration. The standard drive output for all QB-Series models is a 1" female square. We offer several female keyed drive output options, consult the "How to order" section for available sizes for a given actuator model.

Hazardous Location Enclosures (QBWX)

The standard enclosure (QBW) is rated for NEMA 4/4X (weather tight and corrosion resistant). The Hazardous Location enclosure (QBWX) is certified by CSA to meet NEMA 4/4X/7 & 9, Class I, Div 1, Groups C&D; Class II, Div. 1, Groups E, F, & G; Class III.

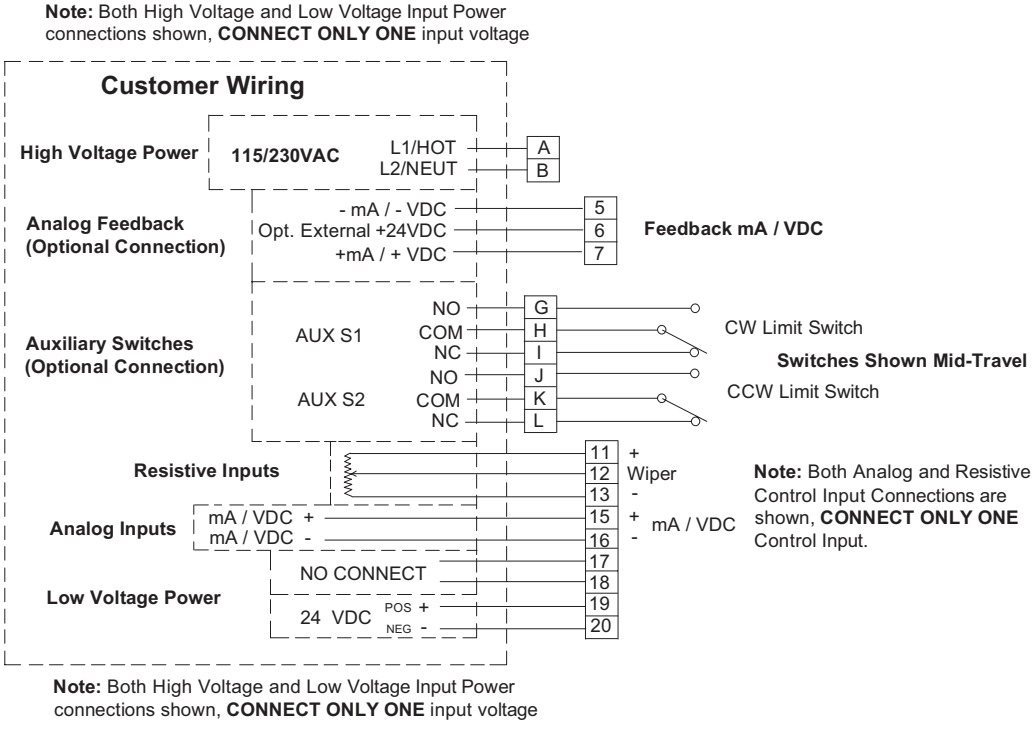
QB ON/OFF APPLICATIONS

On / Off (2 Wire and 3 Wire) Control Wiring



QB MODULATING APPLICATIONS

Analog (mA / VDC / Resistive) Position Control Wiring



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 Valmet for more information.

How to order – QB-series electric actuators (600 and 1200 LB-IN)

Example:
Sample model code:
QBWX1200UI3-UP

1.	2.	3.	4.	5.	6.
QB	WX	1200	U	I3	-UP

1	Series
QB	QB

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

3	Torque
600	600 lb-in (50 lb-ft; 68 Nm)
1200	1200 lb-in (100 lb-ft; 136 Nm)

4	Board Options [1]
U	Universal Control Board

5	Other Options
-	No entry if standard
I2[2]	17mm Female Square Output
I3[2]	19mm Female Square Output
I4[2]	22mm Female Square Output
MB[3]	MODBUS® Communication
Y2[2]	20mm Female Keyed Output
Y3[2]	25mm Female Keyed Output

6	Operating Voltage
-UP	115AC, 230AC, or 24DC

Notes:

1. All QB-Series actuators accept any of the following input voltages (24VDC, 115VAC and 230VAC), are rated for continuous duty cycle, include a holding brake, two auxiliary limit switches, 4-20mA or 0-10VDC position feedback, CSA “C US” certification, and a heater/thermostat that can be user-enabled on the option board.
2. The standard drive output for QB-Series actuators is a 1” female square.
3. The MODBUS® Communication option allows for controlling, and polling the unit for diagnostic information using a MODBUS® communication signal (RS-485; Two-Wire).

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