metso

# VALVCON
# ELECTRIC ACTUATOR
# FOR SPECIAL APPLICATIONS, OIL FIELD
# Q6.2.2, Q6.2.4 & Q6.2.4F

Installation, Maintenance and
Operating Instructions


metso
Expect results

IMO-I1383 • 5/2009

# Table of Contents



## READ THESE INSTRUCTIONS FIRST!

This instruction manual contains important information regarding the installation, operation, and troubleshooting of Metso's Electric Q6.2.2, Q6.2.4 and Q6.2.4F Actuators. Please read these instructions carefully and save them for future reference.

**SAVE THESE INSTRUCTIONS!**

# 1 GENERAL

## 1.1 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.

**NOTE:** THE ACTUATOR IS DESIGNED FOR HAZARDOUS LOCATIONS. AFTER IT IS FIELD INSTALLED, THE ACTUATOR MUST NOT BE OPERATED WITH THE COVER OFF OR WITH LESS THEN ALL EIGHT COVER BOLTS SECURELY FASTENED. ACTUATOR SHOULD BE PROPERLY GROUNDED IN ACCORDANCE WITH LOCAL ELECTRICAL CODE.

## 1.2 Description

The Q6.2.2, Q6.2.4 and Q6.6.4F are 600 in•lb, 12 VDC electric actuators with 80% duty cycle. Installation is simplified and reliability is improved. They are controlled by two 12 VDC internal relays.

This Instruction Manual pertains only to the Q6.2.2, Q6.2.4 and Q6.2.4F actuators.

# 2 INSTALLATION

## 2.1 Tools Required

- 3/16 inch hex wrench (cover screws)
- 1/16 inch hex wrench (limit switches)

## 2.2 Temperature Limits

**Low ambient temperatures**
The minimum recommended ambient temperature without a heater is approximately 30°F (-1˚C) (varies with frequency of use).

**High ambient temperatures**
The maximum recommended ambient temperature is 150°F (65.5˚C) with the actuator shaded from direct sunlight.

**High media temperatures**
With media temperatures up to 200°F (93˚C), additional precautions are not usually necessary. For media temperatures between 200°F and 300°F (93˚C and 149˚C), a shielding plate (about one inch larger than the actuator in each dimension) should be placed between the actuator and the mounting bracket. In addition, the actuator should be mounted at the 3 o'clock or 9 o'clock position relative to the pipe. For media temperatures above 300°F (149˚C), a valve with an extended shaft mounting arrangement should be used.

## 2.3 Actuator Mounting

Verify that the output torque of the actuator is appropriate for the torque requirements of the valve. The Q6.2.2, Q6.2.4 and Q6.2.4F actuators are furnished with a female drive output. 0.75" square. Two I.S.O. bolt patterns (ISO 5211) are provided for ease of actuator mounting. See **(Figure 2)** on the following page for dimensions required for sizing and mounting purposes.

**It is mandatory that the actuator be firmly secured to a sturdy mounting bracket.** A minimum of four bolts with lockwashers 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.

# 3 MAINTENANCE

## 3.1 Wiring

The identification label on each actuator specifies the voltage and current requirements for the actuator, and a wiring diagram is provided on the terminal board of each actuator. **(Figure 1)** shows the standard power and control wiring connections for the actuator.

For clockwise (CW) and counter-clockwise (CCW) control, switch the power negative to terminal 5 for CW or to terminal 4 for CCW operation. Open and closed limit indication is provided at terminals 9 through 12 (A dry contact closure occurs between terminals 12 and 11 at the full CCW position. A dry contract closure between terminals 10 and 9 occurs at the full CW position.). If power is properly applied, the power indicator light above terminal 1 and 2 will be on.

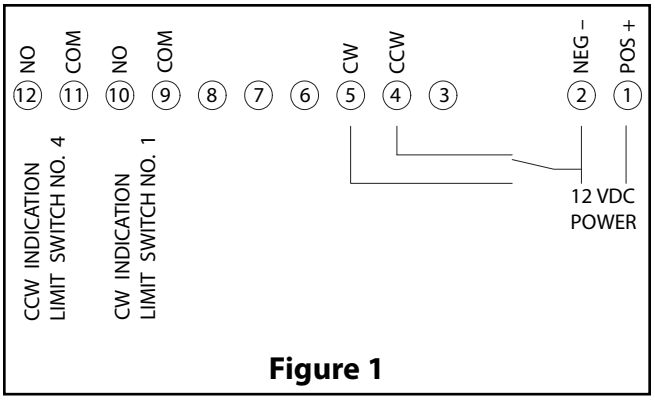
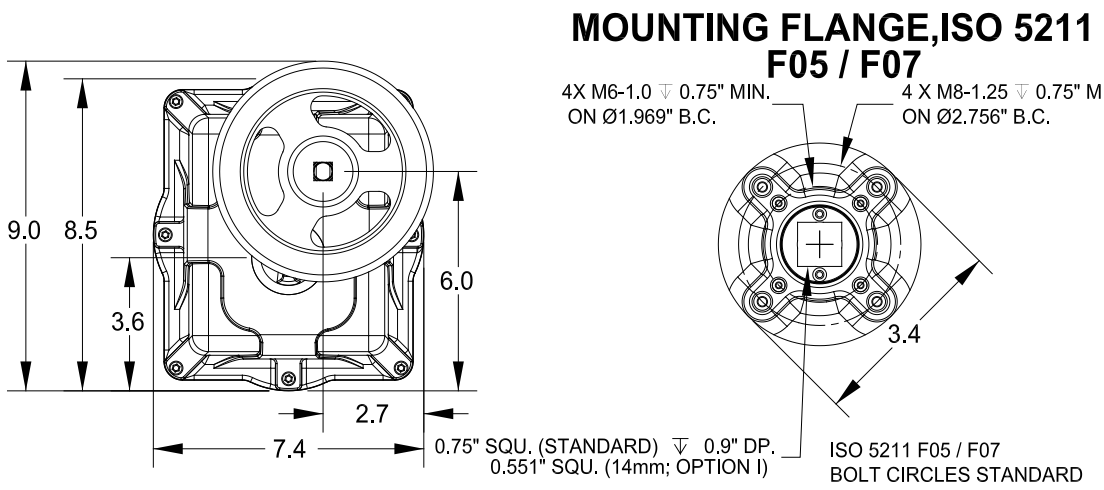



**Figure 1**




**Shown with optional position indicator (not applicable on Q6.2.4)**

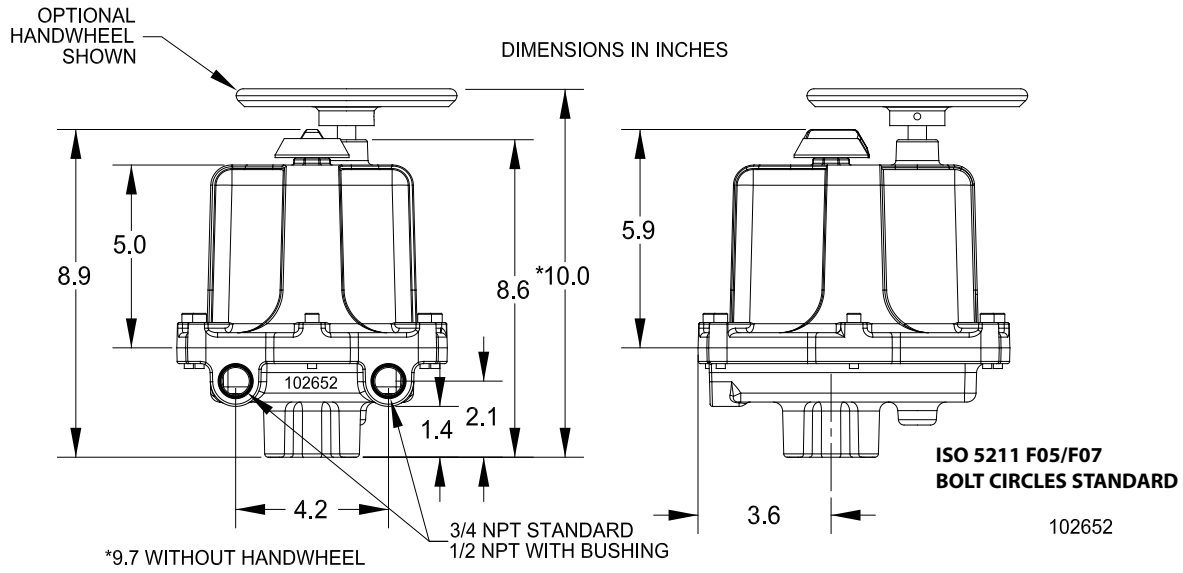



**Figure 2**

## 3.2 Manual Override

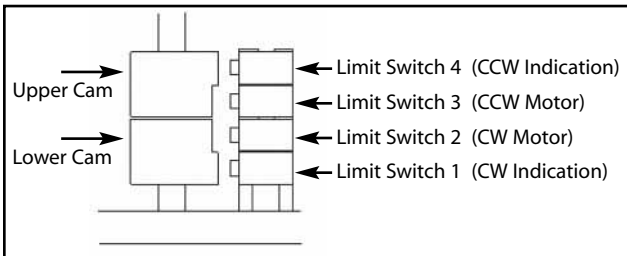
**NOTE:** THE MANUAL OVERRIDE TURNS THE OPPOSITE DIRECTION AS THE OUTPUT DRIVE. TURN THE OVERRIDE CW TO DRIVE THE VALVE IN THE CCW DIRECTION.

To use the manual override function, push the override shaft down to disengage the motor from the gear train. While holding the shaft down, turn the shaft with a wrench to obtain the desired position. Be careful not to drive the actuator past the limit switch settings; it is possible to damage installed options such as a feedback potentiometer.

The manual override shaft must be returned to its fully upward position before operating the actuator.

## 3.3 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. Limit switch #2 determines the full CW position. Limit switch #3 determines the full CCW position.




**NOTE:** Indication wires are Black & White.
Motor wires are Red & White.

**Figure 3**

## 3.4 Adjustment of Limit Switches

If adjustment of the clockwise or counter-clockwise position is required, proceed as follows:

**A. Remove Actuator Cover**

Remove the actuator cover by removing the screws securing the cover to the base.

**B. Adjust the CW limit switch cam**

1. Use the manual override, or drive the actuator electrically to position until you can access the set screw on the lower cam.
2. Using a 1/16 inch hex wrench, loosen the set screw in the lower cam.
3. Use the manual override, or drive the actuator electrically to the full CW position.
4. Rotate the cam clockwise toward the limit switch arm until both limit switch #1 and #2 click closed.

**NOTE:** The indication limit switch falls closed three degrees ahead of the motor switch. Make sure both switches click closed.

5. Tighten the set screw on the limit switch cam.

**C. Adjust the CCW limit switch cam**

1. Use the manual override, or drive the actuator electrically to position until you can access the set screw on the upper cam.
2. Using a 1/16 inch hex wrench, loosen the set screw in the upper cam.
3. Use the manual override, or drive the actuator electrically to the full CCW position.
4. Rotate the cam counterclockwise toward the limit switch arm until both limit switch #3 and #4 click closed.

**NOTE:** The indication limit switch falls closed three degrees ahead of the motor switch. Make sure both switches click open.

5. Tighten the set screw on the limit switch cam.

## 3.5 Troubleshooting

If the actuator fails to operate:

Check that proper voltages are present at the actuator's terminal connections. Check all the plug-in connections to be sure they are properly installed **(see Figure 4)**.

Motor to connector J1

Bottom limit switch to connector J5

Second limit switch to connector J2

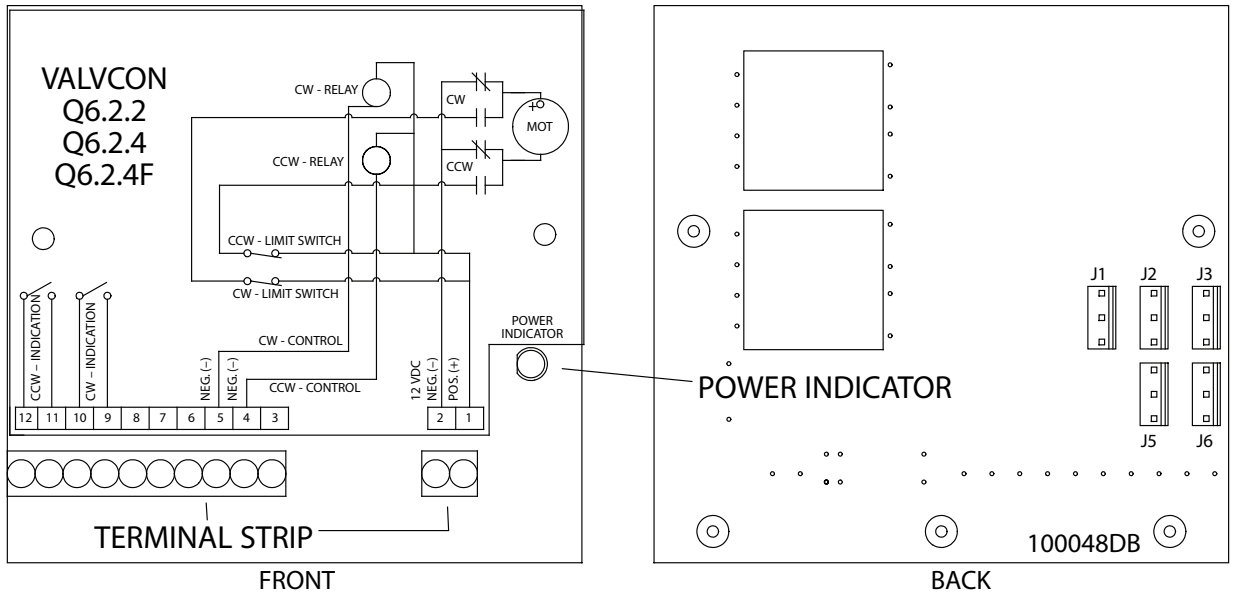
Third limit switch to connector J3

Fourth limit switch to connect J6

If the actuator is stalling:

Check that the limit switches are properly set.

Check that the actuator has enough torque for the application.




WIRING CONNECTIONS

J1 MOTOR
J2 CW LIMIT SWITCH (2ND LIMIT SWITCH)
J3 CCW LIMIT SWITCH (3RD LIMIT SWITCH)

J5 CW INDICATOR SWITCH (1ST LIMIT SWITCH)
J6 CCW INDICATOR SWITCH (4TH LIMIT SWITCH)

CW – CLOCKWISE
CCW – COUNTERCLOCKWISE

**Figure 4**

# 4 EXPLODED VIEW

**PARTS LIST**
**Special Application Actuator Q6.2.2, Q6.2.4 & Q6.2.4F**

| Item No. | Description | Qty. |
|---|---|---|
| 1 | Cover | 1 |
| 2 | Cover Screws | 8 |
| 3 | Terminal Board | 1 |
| 4 | Board Bracket | 1 |
| 5 | Cams | 2 |
| 6 | Limit Switches | 4 |
| 7 | Override Shaft | 1 |
| 8 | Motor | 1 |
| 9 | Base Plate | 1 |
| 10 | Base Plate Screws | 6 |
| 11 | Cam/Output Shaft | 1 |
| 12 | Bull Gear | 1 |
| 13 | Pinion Gear | 1 |
| 14 | Base | 1 |
| 15 | Visual Position Indicator (not shown) | 1 |

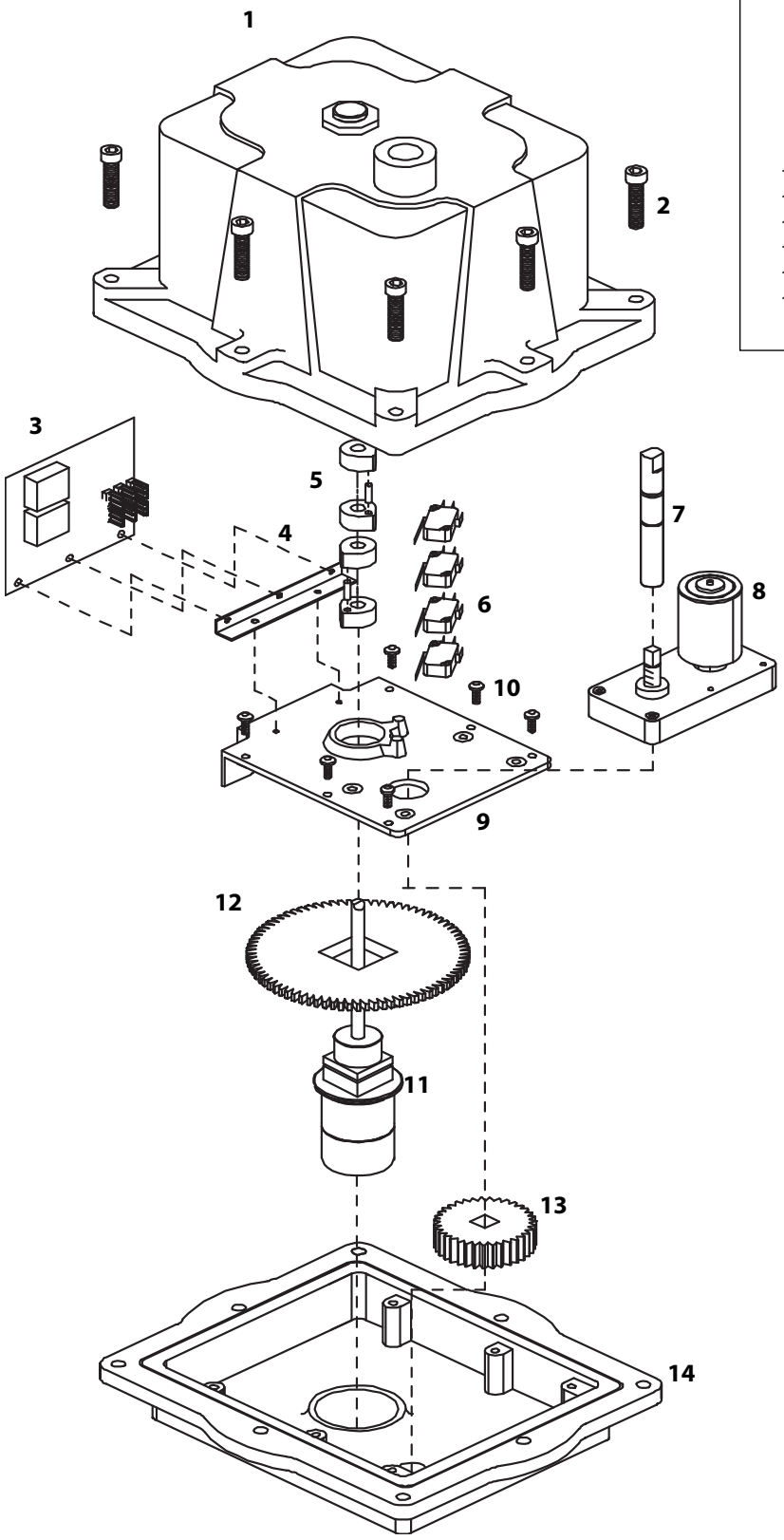



**Figure 5**

**Metso Automation Inc.**
**Europe**, Levytie 6, P.O.Box 310, 00811 Helsinki, Finland. Tel. int. +358 20 483 150. Fax int. +358 20 483 151
**North America**, 44 Bowditch Drive, P.O.Box 8044, Shrewsbury, Massachusetts, 01545-8044 USA. Tel. int. +1 508 595 5083. Fax int. +1 508 595 5183
**www.metso.com/automation/valvcon**