

## Installation, Operation and Maintenance Manual

**HQ-005 Electric Actuators  
Version – Ver. 1  
Revision – Rev. 4  
Document No. HKQI-611**



- **Small & Compact Design**
- **High corrosion resistance**
- **Beacon indicator with LED lamps**
- **IP67 Weatherproof Aluminium housing**
- **Multi-voltage Power Supply**
- **Long life cycle**

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# 1 INTRODUCTION

## 1.1 Purpose

The purpose of this manual is to introduce and explain the installation, operation and maintenance of HQ-005 electric actuators.

A copy of all wiring diagrams & data sheet showing dimensional data can be found online at our website

[www.actuated-solutions.co.uk](http://www.actuated-solutions.co.uk)

## 1.2 Safety Notices

Safety notices in this manual outline precautions the user must take to reduce the risk of personal injury and damage to the equipment. The user(s) must read these instructions before the installation, operation or maintenance of HQ-005 electric actuators.

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**⚠ DANGER:** *Refers to personal safety and alerts the user to danger or harm.  
The hazard or unsafe practice will result in severe injury or death.*

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**⚠ WARNING:** *Refers to personal safety. Alerts the user to potential danger.  
Failure to follow warning notices could result in personal injury or death.*

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**CAUTION:** *Directs the user's attention to general precautions that, if not followed, could result in personal injury and/or equipment damage.*

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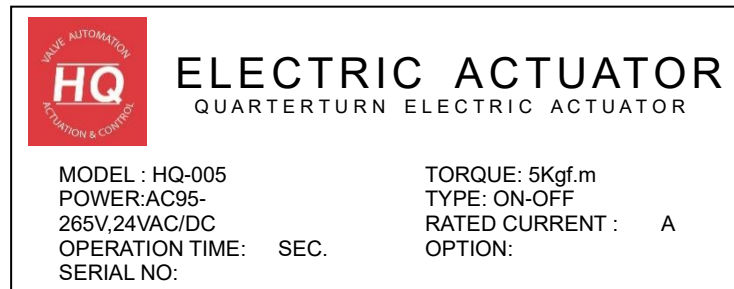
## 2 PRODUCT IDENTIFICATION

### 2.1 Product Identification

The actuator name plate is located on the opposite side of the conduit entry. The name plate contains the following:

#### 2.1.1 Marking

##### A) General



- HQ logo (trade mark)
- Model
- Torque
- Electrical power supply
- Type
- Rated current
- Operating time (seconds)
- Serial No.
- Option

### 2.2 Initial Inspection

Upon on the receipt of the actuator, the user should inspect the condition of the product and ensure that product specification stated in the name plate matches with the order sheet.

- Remove the packing wrap or wooden box carefully. Inspect the product for any physical damage that may have occurred during shipment.
- Check the product specification with product ordered. If a wrong product has been shipped, immediately report to our coordinator.

### 2.3 Storage

Actuators must be stored in a clean, cool and dry area. The unit should be stored with the cover installed and the conduit openings sealed. Storage must be off the floor, covered with a sealed dust protector. When actuators are to be stored outdoor, they must be stored off the ground, high enough to prevent from being immersed in water or buried in snow.

## 3 GENERAL INFORMATION AND FEATURES

### 3.1 General Information

HQ-005 electric actuators are designed for the operation of small size quarter turn valves; e.g. ball, butterfly and damper valves etc. with high reliability and efficiency.

#### 3.1.1 Performance

Type	Max. output Torque	Operating time(sec.)	Duty Cycle IEC34-1	Mounting Size	Power 1 Phase	Rated Current (A) 60/50 Hz			Weight
	NM	90°	S4 (%)	ISO 5210	AC or DC	AC	DC/AC	kg	
HQ-005	50	13	70	F03, F04, F05 F07	85V ~ 265V AC or 24V AC/DC	110V 0.2A	220V 0.1A	24V 0.8A	2.6

#### 3.1.2 Standard Technical Data

<b>Enclosure Rated</b>	Weatherproof IP67
<b>Enclosure</b>	High grade aluminum alloy, corrosion resistant coated
<b>Power Supply</b>	110 / 220V AC 1 Ph 60/50Hz 24 V DC/AC
<b>Duty Type</b>	S4 70% / S2 30min (IEC 60034)
<b>Motor</b>	BLDC motor
<b>Limit Switches</b>	2 x open/close SPDT, 250V AC 5A rating
<b>Auxiliary Limit Switches</b>	2 x open/close SPDT, 250V AC 5A rating
<b>Indicator</b>	Continuous position indicator & full position LED lamp
<b>Manual Override</b>	Manual Handwheel
<b>Lubrication</b>	Grease moly EP
<b>Ambient Temperature</b>	-20 °C ~ + 70 °C
<b>External Coating</b>	Dry powder polyester
<b>Cable Entry</b>	2 x M20
<b>Standard Rotation</b>	0-90°

#### 3.1.3 Optional Technical Data (Optional)

<b>RBP</b>	Rechargeable Battery Backup
<b>PIU</b>	Potentiometer Unit (0~1KΩ)
<b>PCU</b>	Proportional Control Unit (input, output 0~10V DC, 4~20mA DC)
<b>EXT</b>	Extended Rotation (0-270°)

#### 3.1.4 Duty Cycle <sup>1)</sup>

Duty cycle rated IEC60034 – S4 70%

Exceeding the actuator's rated duty cycle may cause thermal overload.

**Note:**

 <sup>1)</sup> Type of duty according to VDE 0530 / IEC 60034-1

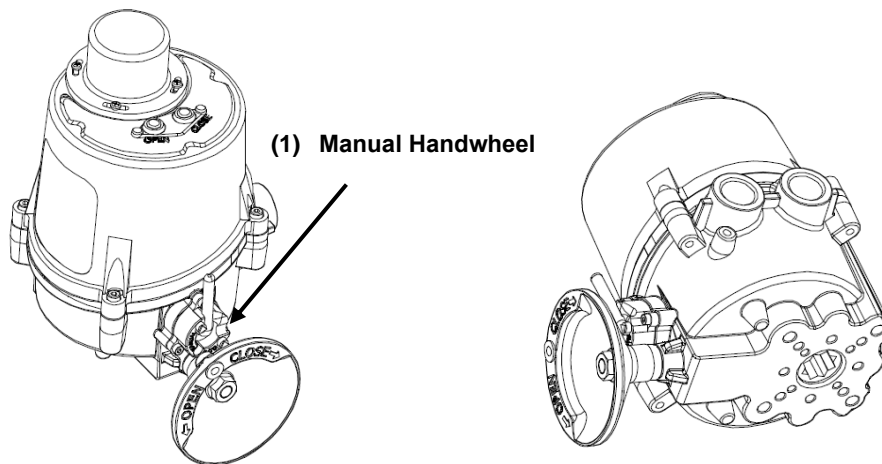
Short – time duty S2	Intermittent duty S4
The operation time at a constant load is short, so that thermal equilibrium is not reached. The pause is long enough for the machine to cool down to ambient temperature. The duration of the short –time operation is limited to 15min (10min, 30min)	The duty is a sequence of identical cycles which consist of starting time, operation time with constant load and rest period. The rest period allows the machine to cool down so that thermal equilibrium is not reached. The relative on-time at S4-25% or S4-50% is limited to 25% and 70% respectively.

### 3.1.5 Torque Control

Torque sensor which detects the variation of torque during operation is installed for preventing damage of valve and actuator under overload condition. Once actuator is under overload, torque sensor is tripped and actuator stopped immediately

(This is standard when the actuator is fitted with PCU & is an option of on/off control)

### 3.1.6 Manual Override



 Caution

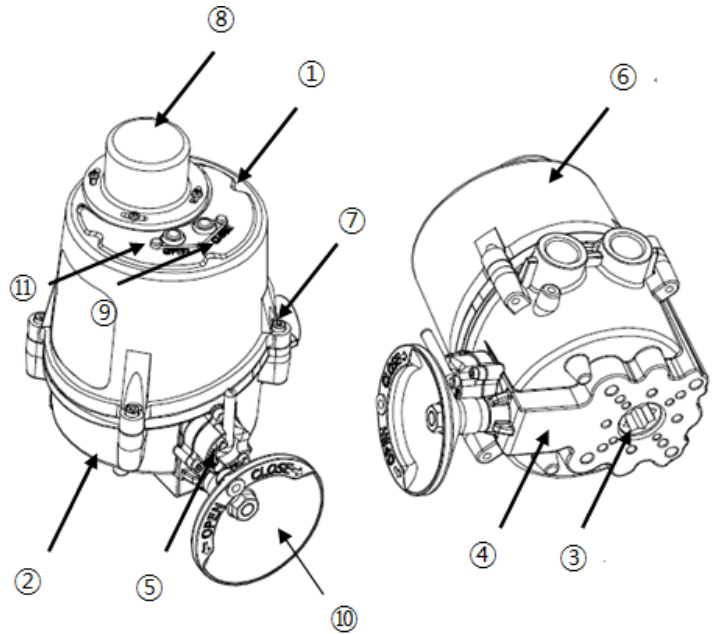
Ensure power is isolated before the manual override is engaged.  
The manual override lever must be dis-engaged before power is applied to the actuator.  
Failure to do so will end in motor burnout.  
Gently oscillate the handwheel while engaging & disengaging the manual override lever.  
The lever in vertical position = Engaged  
The lever in horizontal position = Dis-engaged

### 3.1.7 Lubrication

HQ-005 electric actuator is a totally enclosed unit with permanent lubricated gear train (Moly EP Grease). Once installed, further lubrication should not be required. However, periodic preventative maintenance will extend the operating life of the actuator.

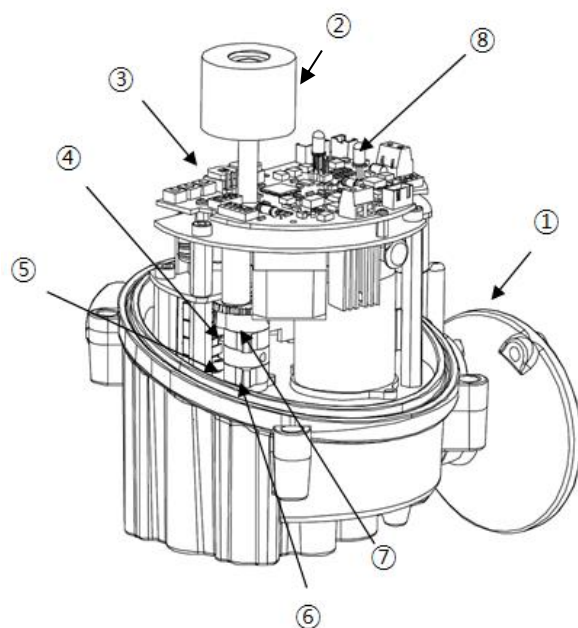
External Parts	
HQ-005	
1	Top Cover
2	Body
3	Star drive (double square 14mm)
4	Mounting base (F03, F04, F05,F07)
5	Manual lever
6	Name Plate
7	Captive cover bolt
8	Beacon Indicator
9	Fully closed LED lamp (red color)
10	Manual hand wheel
11	Fully open LED lamp (green color)

### 3.2 External Parts for Standard Models



Internal Parts	
HQ-005	
1	Manual push shaft
2	Indicator
3	PCB
4	Auxiliary Open Switch
5	Closed limit switch
6	Open limit switch
7	Auxiliary Closed Switch
8	Fully closed LED lamp (Red)
9	Fully open LED lamp (Green)

### 3.3 Internal Parts for Standard Models



## 4 INSTALLATION

### 4.1 Pre-installation for using in General Service

Verify the actuator's nameplate to ensure correct model number, torque output, operating speed, voltage and enclosure type before installation or use.

It is important to verify that the torque output of the actuator is appropriate for the torque requirements of the valve and that the duty cycle of the actuator is appropriate for the intended application.


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**⚠ WARNING:**

- ✓ *Read this installation, operation and maintenance manual carefully and completely before attempting to install, operate, or troubleshoot the actuator.*
- 

### 4.2 Actuator Mounting

**Note:**

-  *Prior to mounting, the actuator must be checked for any damage*
-  *Damaged parts must be replaced by original spare parts*

Mounting is most easily done with the valve shaft pointing vertically upward. But mounting is also possible in any other position; the actuator may be mounted in any position.

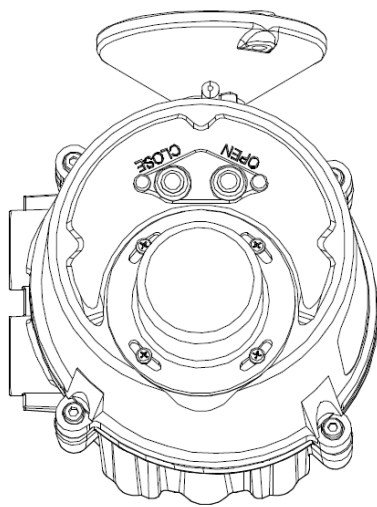
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**CAUTION:**

- ✓ *Do not attempt to work on your HQ005 actuator without first shutting off the incoming power*
  - ✓ *Do not attach ropes or hooks to the hand wheel for the purpose of lifting by hoist*
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### 4.2.1 Actuator Mounting Base Details

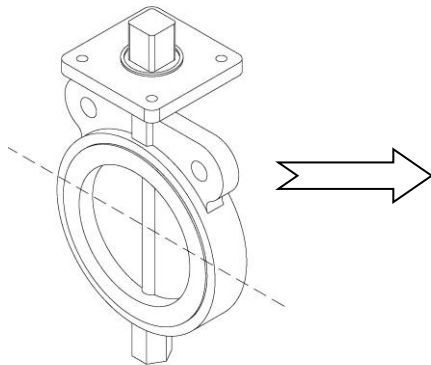
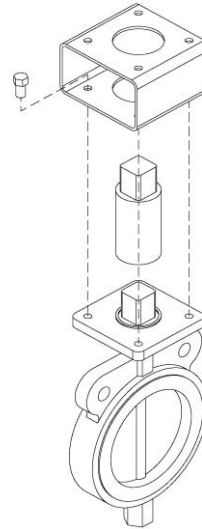


**Direct Mounting  
(ISO Standard)**

**Actuator: Fully Closed**

**Valve: Fully Closed**

**Bracket Mounting**



**Note:**

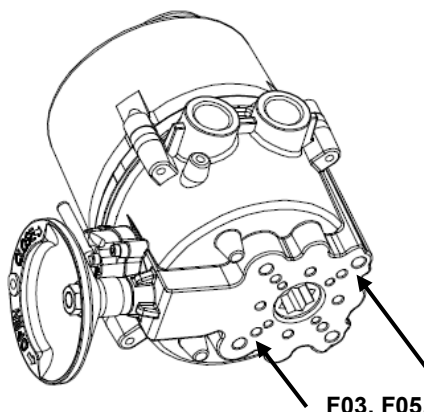
 **Make sure both the actuator and valve are fully closed.**

**Actuator Mounting Base: F03/F04/F05/F07**

**Star Adapter**

14mm→9mm

14mm→11mm



**F03, F05, F07 Bolt Circles**

**F04 Bolt Circles (45°)**

 **DANGER:**

✓ **HAZARDOUS VOLTAGE. Make sure all incoming power is disconnected before performing the mounting.**

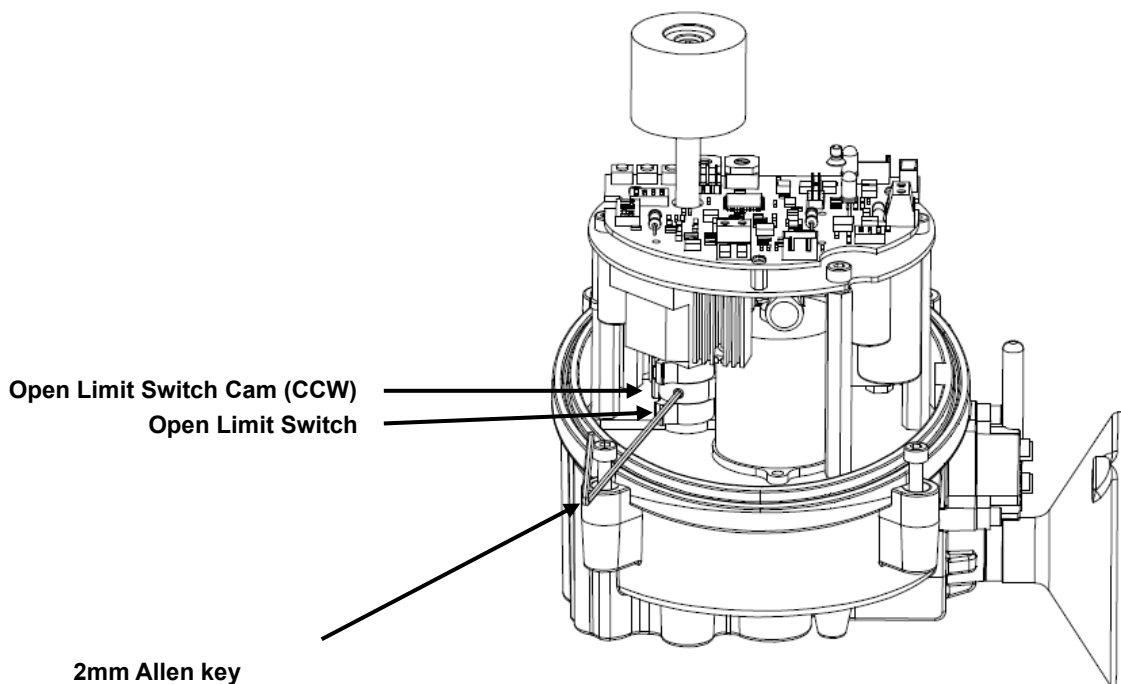
### 4.3 Limit Switch Setting

- Manually rotate the hand wheel of the actuator to fully closed position
- Using a Allen key, loosen the set screw in the CLOSE limit switch cam
- Rotate the CLOSE cam towards CW limit switch lever until the switch 'clicks'
- Tighten the set screw with the Allen key
- Manually rotate the hand wheel of the actuator to opened position
- Using the Allen key, loosen the set screw in the OPEN limit switch cam
- Rotate the OPEN cam towards CCW limit switch lever until the switch 'clicks' (see Figure below)
- Tighten the set screw with the Allen key

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**⚠ DANGER:**

- ✓ **HAZARDOUS VOLTAGE. Make sure all incoming power is disconnected before setting the limit switch**
- 



## 5 MAINTENANCE

### 5.1 Maintenance

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**CAUTION:**

- ✓ *Turn off all power before attempting to perform maintenance on the actuator.*
  - ✓ *POTENTIALLY HIGH PRESSURE VESSEL. Before removing or disassembling your actuator, ensure that the valve or other actuated device is isolated and not under pressure.*
- 

Under the normal conditions, maintenance should be carried out at six month intervals. But when the conditions are more severe, more frequent inspections may be advisable.

- Ensure that the actuator is properly aligned with the valve or other actuated device
- Ensure that all wirings are insulated, connected and terminated properly
- Ensure that all screws are present and tight
- Ensure cleanness of internal electrical devices
- Ensure that conduit connections are properly installed and are dry
- Check the internal devices for any condensation
- Check the enclosure of O-ring seals and verify that the O-rings are not pinched between flange
- Verify the declutch mechanism
- Visually inspect the open/close cycle
- Inspect the identification labels for wear and replace it if necessary

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**⚠ WARNING:**

- ✓ *Treat cover with care. Gap surfaces must not be damaged or dirtied in any way. Do not jam the cover during fitting.*
- 

### 5.2 Tools

- Metric Allen Key (Hex Wrench) × 1
- Screw Driver × 1
- Metric Spanner × 1
- Wrench 200mm × 1
- Wrench 300mm × 1
- Wire Stripper Long Nose × 1
- Multi-meter (AC, Dc, Resistance) × 1
- PCU Board Option: DC Signal Generator (4 – 20mA DC) × 1
- PCU & CTU Board Option: 1mA Ammeter (0 – 25mA)

## 6 TROUBLE SHOOTING

The following instructions are listed in the order of the most common difficulties encountered during the installation and start-up.

Symptom	Probable Cause	Corrective Action
Motor will not run	Open in control circuit	Refer to appropriate wiring diagram and check for continuity
	Insulation resistance breakdown in motor	Perform megger Test
No power available to actuator	Tripped circuit breaker	Reset circuit breaker
Manual Override hard to turn	Valve stem improperly lubricated	Lubricate with grease
	Actuator lubrication has broken down	Clean out old grease and replace with recommended lubricant
	Valve Torque too high	Check torque with manufacturer
Valve only opens or closes partially with motor	Jammed valve	Refer to valve maintenance
	Limit switch setting incorrect	Check setting and reset if necessary
Manual Override Nut will not operate valve	Stripped gearing	Replace as necessary
	Broken hand wheel shaft	Replace as necessary
	Broken valve stem	Repair or replace as necessary
Motor runs but will not operate valve	Manual override engaged	Make sure manual override lever in horizontal position
Actuator operates more than 90°	Limit switch setting Incorrect or wiring of single phase actuator	Please check to make sure limit switches are set for 90° and actuator is switched on neutral signal not live signal
Green (Open) LED not working	Wiring of single phase actuator	Please check actuator is switched on neutral signal not live signal

### ! The actuator does not respond

- Visually inspect the actuator to check no shipping or handling damage has occurred
- Verify the line voltage supplied to the actuator; check that the line voltage matches with the rating on the actuator’s nameplate
- Check the internal wiring against the supplied wiring diagram of the actuator (copy of which can be found on our website)
- Check the limit switch cams

### ! The actuator is supplied with power but does not operate

- Verify the line voltage supplied to the actuator; check that the line voltage matches with the rating on the actuator’s nameplate.
- Check that the actuator torque is greater than the valve torque
- Check the limit switch cams
- Check that the wiring is correct
- Check the mechanical travel stop adjustment
- Verify that the actuator against the rotation of the valve (standard units are counter-clockwise rotation to open)
- Check for any corrosion and condensation that any of the electrical or mechanical devices have not been contaminated
- Verify that coupler/bracket is correctly installed and is not causing any binding

**! Actuator runs erratically**

- Check the ambient temperature
- Verify that the duty cycle has not been exceeded
- Check the position of manual override lever
- Check wiring is correct (For single phase make sure actuator is switched on Neutral not Live signal)
- For 24V actuators make sure voltage does not exceed 26.4V

**! Optional Equipment(s)****1) Potentiometer Current Position Transmitter**

- Check the resistance value
- Check potentiometer gear for jamming
- Check ZERO and SPAN calibration
- Check the board for any damage

**2) PCU – Positioner card**

- Verify the input signal
- Check the configuration of the dip switches
- Check the board for any damage

**3) RBP – Battery backup**

- Check Fail position is correct (Fail closed / Fail open or stayput available)
- Check battery health – press battery test button  
(GREEN = Fully Charged AMBER = Average charge RED = Low charge)

**Notes:**

- ✚ ***For more information regarding this product, please contact the manufacturer or your supplier for more details.***
- ✚ ***Please refer to the website for the latest wiring diagram & data sheet showing additional dimension data.***