Installation & Operating Manual

HQ5
HQ Series 1/4 Turn Electric Actuator

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Contents

1. Introduction

1.1 Purpose

The purpose of this manual is to introduce and explain the installation, operation and maintenance of HQ5 electric actuators.

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

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 HQ5 electric actuators.

⚠ 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.

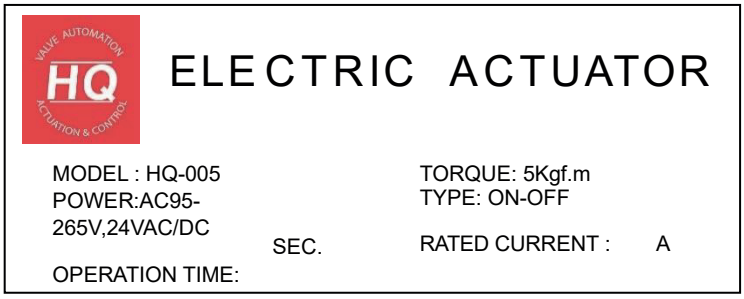
⚠ WARNING: Refers to personal safety. Alerts the user to potential danger. Failure to follow warning notices could result in personal injury or death.

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

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 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 informaton and features

HQ5 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
						110V	220V	24V	
HQ5	50	13	70	F03, F04, F05, F07	85V ~265V AC or 24V AC/DC	0.2A	0.1A	0.8A	2.6

3.1.2 Standard Technical Data

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

3.1.3 Optional Technical Data (Optional)

RBP	Rechargeable Battery Backup
PIU	Potentiometer Unit (0~1KΩ)
PCU	Proportional Control Unit (input, output 0~10V DC, 4~20mA DC)

EXT	Extended Rotation (0-270°)

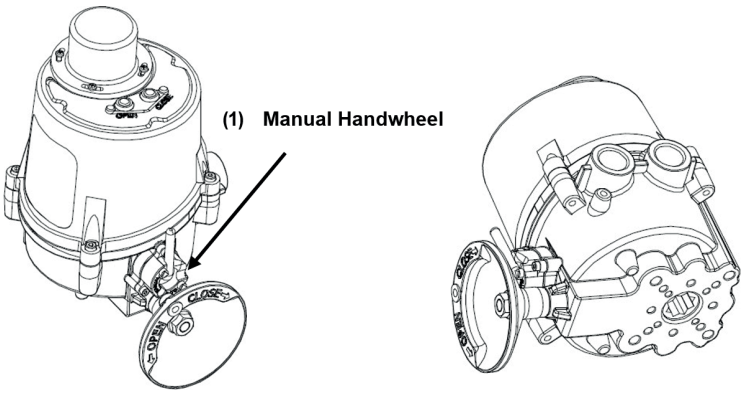
3.1.4 Duty Cycle[1]
Duty cycle rated IEC60034 – S4 70%
Exceeding the actuator's rated duty cycle may cause thermal overload.

Note:
[1]) 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



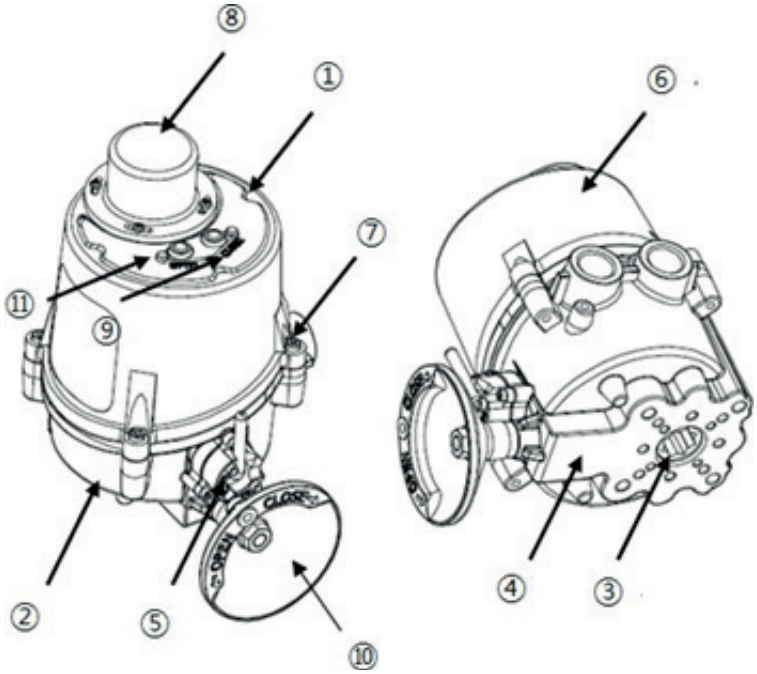
⚠ CAUTION
Ensure power is isolated before the manual override is engaged.
The manual override lever must be dis-engaged before power is applied to the actuator. Failure to do so will end in motor burnout.
Gently oscillate the handwheel while engaging & disengaging the manual override lever. The lever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

3.1.7 Lubrication

HQ5 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.

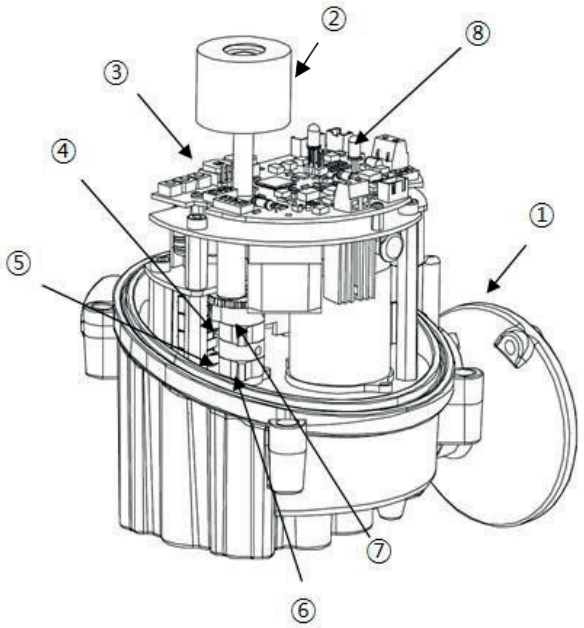
3.2 External Parts for Standard Models

External Parts
HQ5
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)



3.3 Internal Parts for Standard Models

Internal Parts
HQ5
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)



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.

⚠ 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:

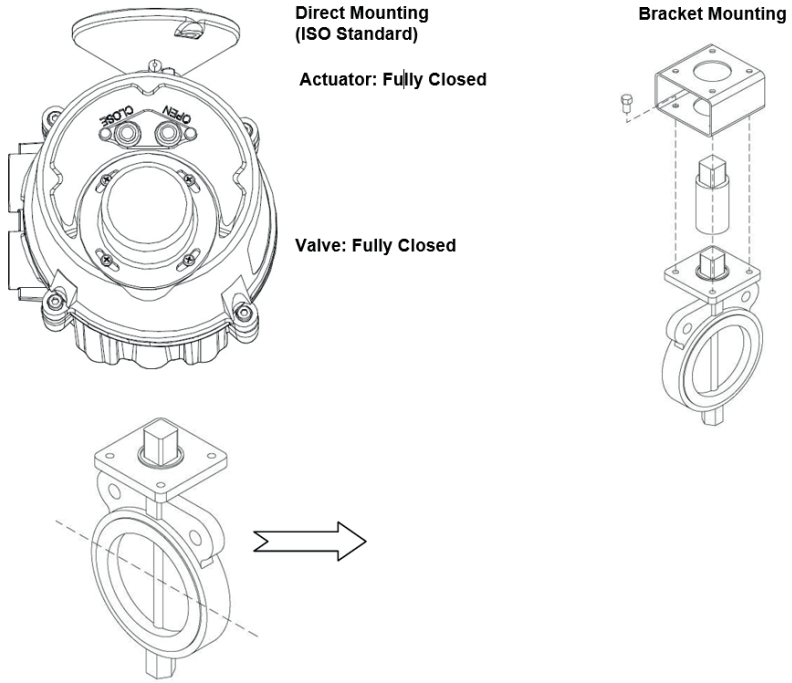
- Prior to mounting, the actuator must be checked for any damage
- Damaged parts must be replaced by original spare parts

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.

CAUTION:

- Do not attempt to work on your HQ5 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

4.2.1 Actuator Mounting Base Details



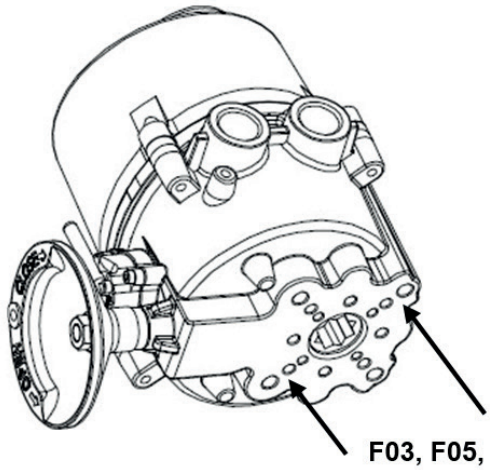
Note:
Make sure both the actuator and valve are fully closed.

Actuator Mounting Base: F03/F04/F05/F07

Star Adapter

14mm→9mm

14mm→11mm



F03, F05, F07 Bolt Circles

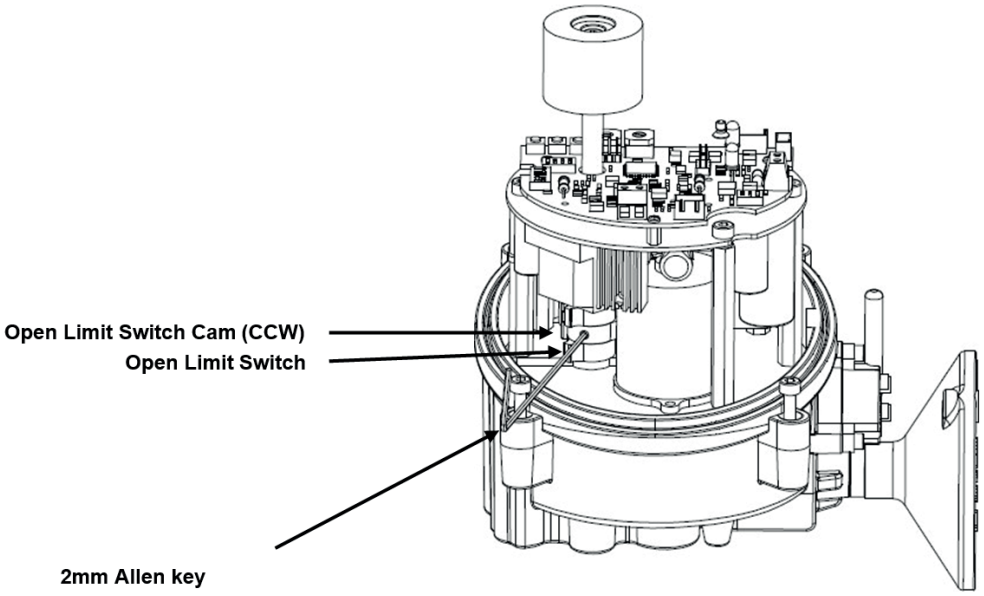
F04 Bolt Circles (45°)

⚠ 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

⚠ DANGER:
HAZARDOUS VOLTAGE. Make sure all incoming power is disconnected before setting the limit switch



5. Maintenance

5.1 Maintenance

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

⚠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. Troubleshooting

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

Failure Mode	Probable Cause	Corrective Action
Motor will not run	Open in control circuit Insulation resistance breakdown in motor	Refer to appropriate wiring diagram and check for continuity Perform megger Test
No power available to actuator	Tripped circuit breaker	Reset circuit breaker
Manual Override hard to turn	Valve stem improperly lubricated Actuator lubrication has broken down Valve Torque too high Jammed valve	Lubricate with grease Clean out old grease and replace with recommended lubricant Check torque with manufacturer Refer to valve maintenance
Valve only opens or closes partially with motor	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)

Note:
For more information regarding this product, please contact Albion Valves (UK) Ltd.
Please refer to the website for the latest wiring diagram & data sheet showing additional dimension data.

About Albion Valves (UK) Ltd

Albion has been supplying valves and fittings to the building services and industrial markets for the past 40 years.

Albion was created with the sole purpose of providing quality products at an affordable price. With a growing reputation for quality and reliability, Albion is now an established brand providing the industry with a trusted alternative to premium-priced products.

Our commitment to setting the highest standards in all areas of our business means, if you're looking for quality, service, delivery and choice — you'll find it's all at Albion.

Quality

Whatever you need, you can rest assured that if it comes from Albion it has been designed and manufactured to deliver optimum performance and is accredited with the necessary approvals. Our in-house quality department are always on hand too!

Service

We pride ourselves on our customer service – we have even won awards for it! Our cradle to grave approach means you will never be on your own!

Delivery

We know that time is money, and when a priority project depends on a part you can trust Albion to deliver – next day for all orders placed before 4:00PM.

Choice

We may have started out with a single brass ball valve, but our range has grown substantially since and we now consider ourselves to be a 'One Stop Shop' with our comprehensive range. It is becoming more and more apparent to the industry, that it really is all at Albion.