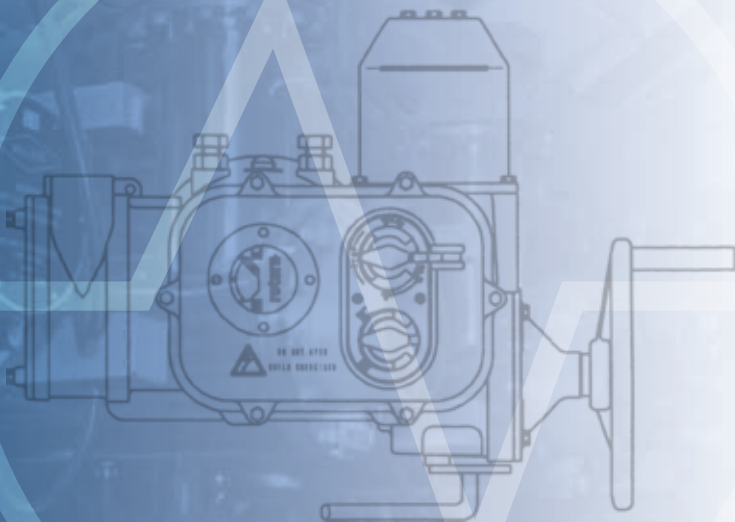


Electric Actuators and Control Systems

rotork® Controls

Established Leaders in Valve Actuation



Q Range

**Watertight Single-Phase
Electric Quarter-turn Actuators**
for part turn valves and dampers

Publication E610E Issue 03/08



Rotork actuators have been in use all around the world for over 50 years. In this time Rotork has grown to become the leader in the valve automation industry. With manufacturing, service centres, offices and representatives throughout the world, Rotork is able to offer global service solutions to your company.

In the 50 years since the company was founded, Rotork Actuation has become a byword for excellence in the field of valve, sluice gate and damper actuation products for the oil, gas, power, water and waste treatment industries - worldwide.

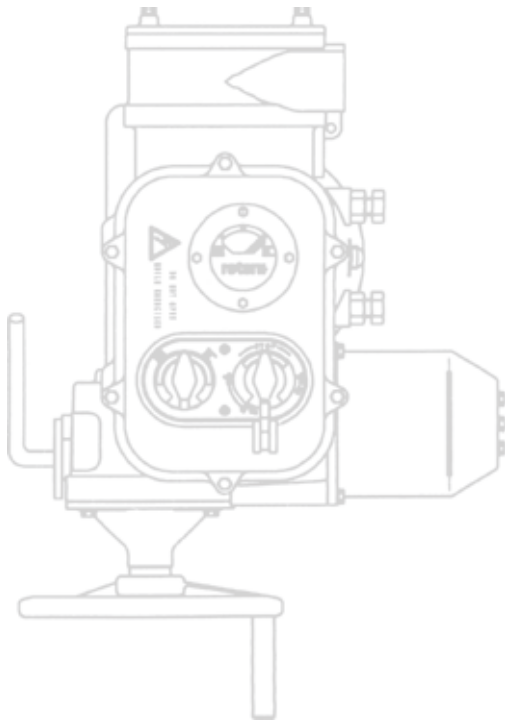
We owe our success to an uncompromising focus on quality at every stage - and at every level - of Rotork's operations.

From initial site survey, specification and design, through to materials, manufacturing and testing, installation, commissioning and after-sales service we accept nothing but the best.

At the heart of the company is an exceptional workforce - the highly trained, forward-thinking engineers, technicians and support staff who each have a crucial role to play in maintaining Rotork's unrivalled reputation for innovation, reliability and first class customer support.

The Rotork family of products also include pneumatic, hydraulic and electro-hydraulic actuators as well as a comprehensive range of gearboxes and valve accessories. Rotork's own Pakscan digital control system offers market leading features whilst all our actuators offer the ability to interface with other digital control systems.

Rotork. Established leaders in valve actuation technology.



Contents

| Contents | |
|-------------------------------|---|
| Inside the 'Q' Range Actuator | 4 |
| Features of the 'Q' Range | 4 |
| 'Q' Range performance summary | 5 |
| 'Q' Standard specification | 6 |
| 'Q' Pak specifications | 7 |

This brochure provides a comprehensive overview of the applications and associated functions available with Rotork Q actuators - comprising Q Standard and Q Pak actuators.

The new watertight 'Q' Range actuators have been designed using Rotork's world proven reliability in combination with the latest technology.

They provide a simple, cost-effective way of controlling small quarter-turn valves and dampers. Designed to meet industry's need for a compact and reliable watertight actuator, it is suitable for use in many areas where an IP68 (NEMA 6) enclosure is required. The 'Q' Range is a single-phase electric actuator which is available in two versions, both with the Rotork 'double-sealed' IP68 enclosure.

The Q-standard version is suitable for simple open/close duties where on/off control is required. This is achieved without the need for reversing contactors, giving simplified wiring. The designs of the motor and limit switch mechanism ensure combined ease of setting and reliability in use.

The Q-pak version benefits from the addition of a specially designed control interface module which enables it to operate from a wide variety of remote control signals and provides status monitoring outputs.



Inside the Q Range Actuator



Features

- Reliability of single-phase squirrel cage motors.
- Simple remote control for basic applications.
- Rugged compact double-sealed watertight enclosure providing environmental protection during plant construction and cabling.
- Positive travel limitation by externally adjustable mechanical stops.
- Simple action auxiliary switch setting.
- Declutchable handwheel with padlockable hand/auto selector arranged for power preference.
- Self locking electrical and manual drive.
- Q-pak version gives compatibility with standard Rotork control and monitoring configurations.

Q Range torque output and dimensional data are available directly from www.rotork.com

Performance Summary

Mechanical Data

| Model | Electrical supply volts | 90° Travel time seconds | | Torquet | | Mounting base designation to | | Maximum stem acceptance | |
|-------|-------------------------|-------------------------|------------|---------|-------|------------------------------|----------|----------------------------------|----------------------------------|
| | | 50Hz | 60Hz | Nm | lbsft | ISO5211 | imperial | mm | ins |
| | | | | | | Standard | Optional | bore/keyway | A/F square |
| Q100 | 220, 240 | 27, 18, 9 | 23, 15, 8 | 135 | | F05 | F07 | 22* | 16* |
| | | | | 100 | | FA05 | FA07 | 1 ³ / ₁₆ * | 5/ ₈ * |
| | 110, 115, 120 | 27, 18, 9 | 23, 15, 8 | 135 | | F05 | F07 | 22* | 16* |
| | | | | 100 | | FA05 | FA07 | 1 ³ / ₁₆ * | 5/ ₈ * |
| Q300 | 220, 240 | 54, 36, 18 | 45, 30, 15 | 406 | | F10 | F07 | 42** | 30** |
| | | | | 300 | | FA10 | FA07 | 1 ⁵ / ₈ | 1 ¹ / ₈ |
| Q300 | 110, 115, 120 | 54, 36, 18 | 45, 30, 15 | 406 | | F10 | F07 | 42** | 30** |
| | | | | 300 | | FA10 | FA07 | 1 ⁵ / ₈ | 1 ¹ / ₈ ** |

Q100/Q300 handwheel turns: 15

† Torque rating is maximum torque. Switch setting is in both directions.

Torque output is adjustable from 30% to 100% of rated torque

Drive sleeves are normally supplied blank for machining by valve supplier

* Maximum stem acceptance for both Q100 F05/FA05 and F07/FA07 bases

** These dimensions apply to F10/FA10 base. With Q300 F07/FA07 base, max. acceptance is 28 mm bore or 20 mm A/F square hole.

Electrical Data

| Model | Electrical supply volts | Travel time seconds | | Starting current Amps | Run current Amps | Nominal kW | Power factor |
|-------|-------------------------|---------------------|-------|-----------------------|------------------|------------|--------------|
| | | 50 Hz | 60 Hz | | | | |
| Q100 | 110, 115, 120 | 27 | 23 | 2.7 | 2.6 | 0.07 | 0.99 |
| | | 18 | 15 | 3.2 | 2.3 | 0.10 | 0.97 |
| | | 9 | 8 | 7.0 | 4.9 | 0.21 | 0.90 |
| | 220, 240 | 27 | 23 | 1.35 | 1.3 | 0.07 | 0.99 |
| | | 18 | 15 | 1.65 | 1.2 | 0.10 | 0.95 |
| | | 9 | 8 | 3.6 | 2.6 | 0.21 | 0.90 |
| Q300 | 110, 115, 120 | 54 | 45 | 2.5 | 1.8 | 0.08 | 0.98 |
| | | 36 | 30 | 6.0 | 3.1 | 0.14 | 0.95 |
| | | 18 | 15 | 8.6 | 5.3 | 0.27 | 0.90 |
| | 220, 240 | 54 | 45 | 1.4 | 1.0 | 0.08 | 0.98 |
| | | 36 | 30 | 2.9 | 1.6 | 0.14 | 0.95 |
| | | 18 | 15 | 4.7 | 2.6 | 0.27 | 0.90 |

Motor poles

6

4

2

Q Standard Specification

Enclosure

Watertight to IEC529, IP68 (suitable for submersion under 3 metres head of water for 48 hours) NEMA 4 and 6. Even when the terminal cover is removed, the electrical compartment is protected to a level of IP67 from ingress of dirt and moisture.

Temperature

The 'Q' Range has been designed for use in ambient temperatures from -30 to +70 °C.

Vibration

The actuator can withstand plant induced vibration of 0.5g over a frequency range of 10 to 200 Hz and seismic vibration of 1g in a frequency range of 0.2 to 33 Hz. Structural integrity is maintained with a seismic vibration of up to 6g.

Performance

Output torque available from 30 lbs.ft (40 Nm).

Power Supply

The 'Q' Range of actuators is available as standard for use on the following single phase electrical supplies:

50 Hz-110 V, 220 V, 240 V

60 Hz-110 V, 115 V, 120 V, 127 V, 220 V and 240 V.

Other voltages can be supplied to special order. A tolerance of $\pm 10\%$ applies to the above voltages. The motor is S2 rated for a 20% duty cycle according to IEC 34.2.

Construction

The gearcase and all housings are diecast aluminium to BS1490. The main gearcase and motor housings are to grade LM4 with the remainder being LM24.



Local control selectors

Output Drive

Easily removable blank, steel drive bush suitable for machining by customer to suit valve stem.

Gearing

Double reduction worm and wheel with steel worm and aluminium bronze worm wheel. The second stage worm and wheel is self locking to ensure that the output cannot be back driven by valve reaction forces.

Switches

Torque-limit and auxiliary limit switches are provided as detailed below and have the following electrical ratings on inductive loads:

110/240 VAC 15 A

110 VDC 0.25 A

50 VDC 2.5 A

24 VDC 3 A



Torque switch setting

Torque-Limit Switches

One each for open and close ends of travel with normally closed contacts. Torque measurement is derived from the self locking output worm and wheel gearing, which avoids torque switch reset on the de-energization of the motor and its associated 'hammering' phenomenon.



Auxilliary limit switch setting

Auxilliary Limit Switches

One auxilliary limit switch with a change over contact is provided for each direction of travel.

Q Pak Specification

Motor

A single-phase squirrel cage capacitor run, class F insulated induction motor is fitted. The motor is protected from overload by a thermostat.

Local Indication

A mechanical, continuous position indicator is provided on the electrical compartment cover.

Mounting

All flange mountings are in accordance with ISO5211. As an alternative, they are available with UNC thread holes. See publication E640.

Manual Operation

A handwheel is provided for manual operation, which is engaged by a padlockable hand/auto selection lever arranged for power preference. When engaged, the handwheel drives the second wormshaft. At no time can the handwheel be driven by the motor.



Mechanical stop adjustment

Mechanical Stops

Externally adjustable mechanical stops are provided with a setting range of 80° to 100° of output movement. The setting of these provides travel limitation for both electrical and manual operation.

Conduit Entries

Two off M32 or two off 1 inch ASA NPT.

Q-Standard – Optional Extras

Two auxiliary limit switches each independently adjustable to any pointing of valve travel.

12 watt anti-condensation heater to suit motor supply voltage. Integrally mounted open/close and local/stop/remote selectors.

1 watt potentiometer for remote valve position indication. Externally powered 4-20 mA Current Position Transmitter (CPT).

The Q-pak comprises all the features of the Q-standard, as described above, with the addition of the control interface module.



Control interface module

Control Interface Module

This module incorporates a deep cover which houses a printed circuit board with logic circuits, control switches and a transformer. The cover carries open/close and local/stop/remote selectors. The logic circuits allow either internally or externally fed remote controls. Other facilities include: motor running indication, monitor relay and emergency shut down (ESD) facility.

Q-Pak - Optional Extras

With the addition of Rotork manufactured cards the Q Pak actuator options include:

- Folomatic proportional control
- Internally powered Current Position Transmitter
- Bus Control Systems

Bus Control Systems



The Rotork Pakscan system is capable of controlling and monitoring up to 240 field devices (actuators or other devices) using a master station connected by serial or ethernet to a DCS. A local HMI, which has a full colour integral display, shows the status of all the field devices, the current state of the communications ports, system alarms and diagnostic information, plus actuator control and set up facilities. Remote access to the asset management features are available via the built in web pages as well as the status, diagnostic, set up and control facilities provided by the local HMI. See publication S001.



In addition to being fully compatible with Rotork Pakscan, the Q Pak actuators can be seamlessly integrated into many other fieldbus digital control systems, such as Profibus, Foundation Fieldbus, DeviceNet and Modbus.



A full listing of our worldwide sales and service network is available on our website.

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