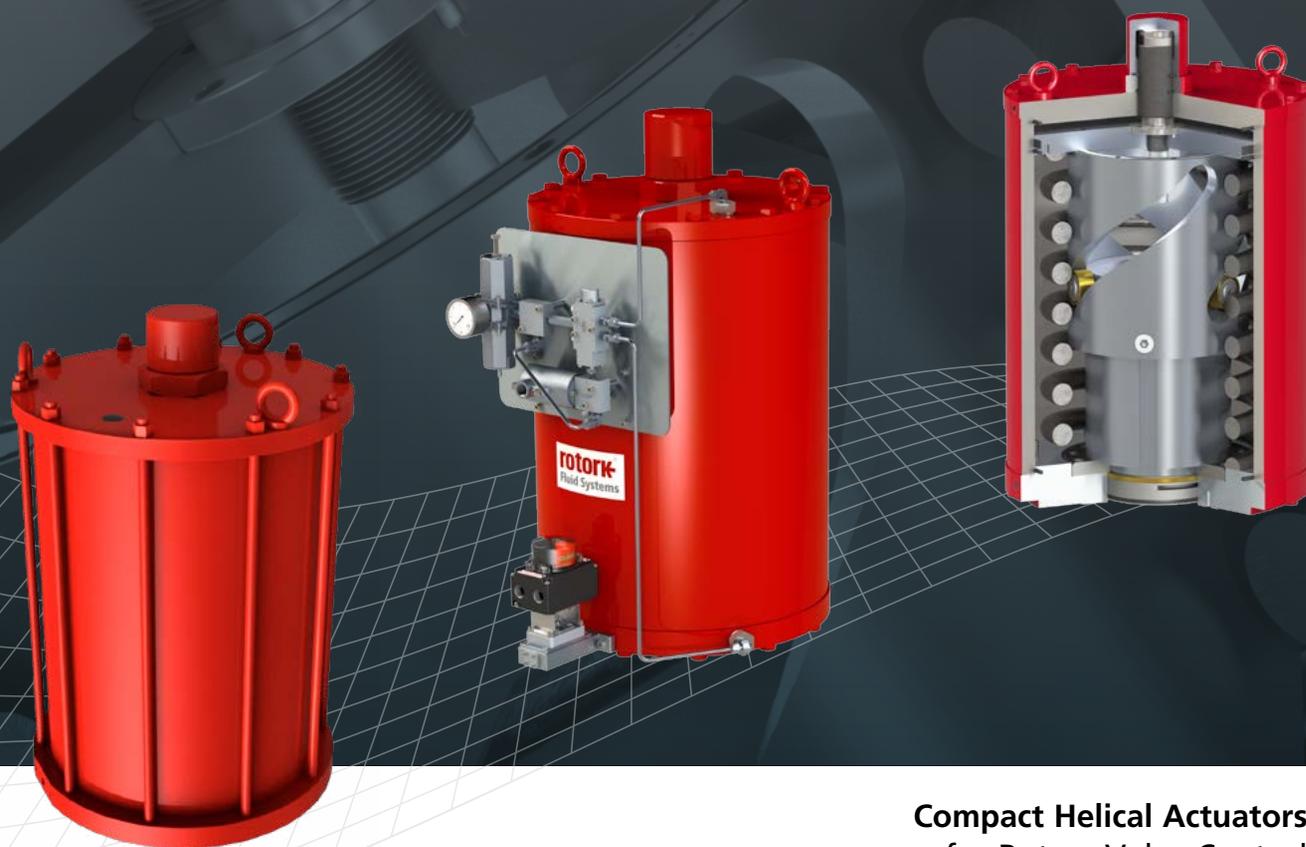


# rotork<sup>®</sup> Fluid Systems

**CQ** Range



**Compact Helical Actuators  
for Rotary Valve Control**

**Keeping the World Flowing**

# rotork®

Keeping the World Flowing



**RELIABILITY  
IN FLOW CONTROL  
CRITICAL  
APPLICATIONS**



**› Reliable operation**  
when it matters

Assured reliability for critical applications and environments. Whether used 24/7 or infrequently, Rotork products will operate reliably and efficiently when called upon.

**› Customer-focused service**  
worldwide support

Solving customer challenges and developing new solutions. From initial enquiry through to product installation, long-term after-sales care and Client Support Programmes (CSP).

**› Quality-driven**  
global manufacturing

Products designed with 60 years of industry and application knowledge.

Research and development across all our facilities ensures cutting edge products are available for every application.

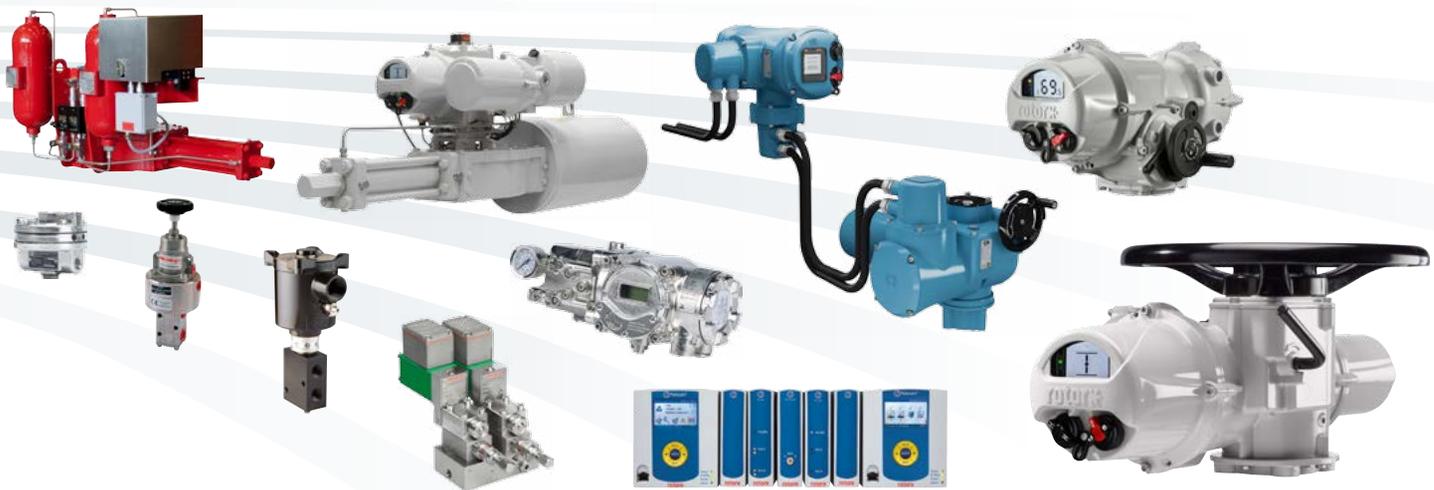
**› Low cost**  
of ownership

Long-term reliability prolongs service life.

Rotork helps to reduce long term cost of ownership and provides greater efficiency to process and plant.

# CQ Range

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## Comprehensive product range serving multiple industries

Improved efficiency, assured safety and environmental protection.

Rotork products and services are used throughout industry inclusive of Power, Oil & Gas, Water & Wastewater, HVAC, Marine, Mining, Pulp & Paper, Food & Beverage, Pharmaceutical and Chemical industries around the world.

## Global presence local service

Global company with local support.

Manufacturing sites, service centres, sales offices and *Centres of Excellence* throughout the world provide unrivalled customer services and fast delivery.

## Market leader technical innovator

The recognised market leader for 60 years.

Our customers have relied upon Rotork for innovative solutions to safely manage the flow of liquids, gases and powders.

## Corporate social responsibility

A responsible business leads to being the best business.

We are socially, ethically, environmentally responsible and committed to embedding CSR across all our processes and ways of working.

## Rotork Actuators – Quality Controlled

Rotork Fluid Systems has manufacturing facilities in Italy, Sweden, China, the UK and the USA, providing the capacity to produce a high volume of products, ensuring that you deliver your projects on time.

### Centres of Excellence

Rotork Fluid Systems maintains a network of *Centres of Excellence* strategically located around the world. These centres hold stock, provide application engineering and packaging of control components as well as providing sales, service, installation and commissioning support.

### Design and Testing

Rotork Fluid Systems has dedicated research and development facilities around the world combined with test facilities that include bespoke specialist testing systems, ensuring reliable operation and lifetime functionality of our products.

Contact Rotork for your operational or safety application requirements. We will work with you from conception, to design, to manufacture, to installation, and finally to maintenance and service support.

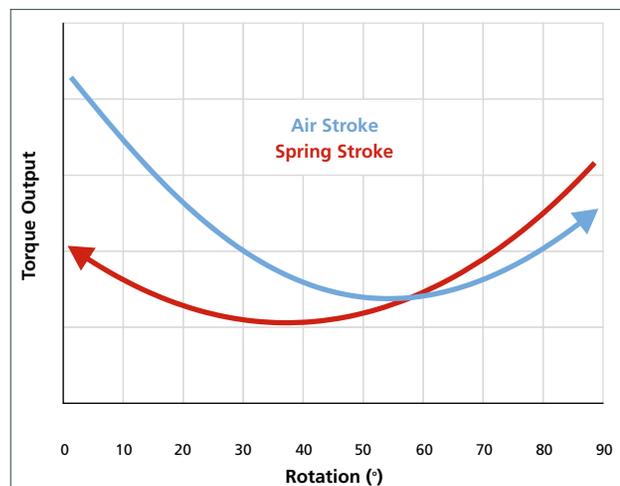
## CQ Range Compact Helical Actuators

The CQ range provides an innovative fully-concentric and balanced actuator design for quarter-turn valves. The design features a helical mechanism that transforms linear piston motion into quarter-turn valve stem rotation. CQ actuators are capable of delivering the same torque range as traditional scotch yoke design actuators, but within a much smaller footprint. They are therefore ideally suited for installation in confined spaces. Further, Rotork's unique helical cam follower bearing design provides higher efficiency than a helical gear mechanism utilised by other valve actuator manufacturers.

As standard, the CQ torque output profile, like that of a scotch-yoke actuator, is engineered to parallel the torque demand profile typically found with popular quarter-turn valve types. The CQ design however is unique in that the torque profile can be custom engineered and manufactured to meet non-standard valve torque requirements.

Pneumatically powered CQP actuators are available in both double-acting and spring-return configurations. Several cylinder sizes are available to suit a wide range of valve torque requirements.

A variety of options and accessories are available to make the CQ range a perfect choice for virtually any quarter-turn application with challenging space envelope requirements.



## CQ Range Compact Helical Actuators

Every Rotork actuator is built to provide long and efficient service with minimum maintenance. The design, engineering and materials used in their construction ensure optimum performance even in very harsh environments.

### Operating Pressure

Pneumatic: Up to 7 bar (175 psi)

### Torque Output:

Standard: Up to 150,000 Nm (1.3m lbf.in)

The CQ standard range of sizes is suitable for applications that require a pneumatically powered actuator with torque demand of up to 150,000 Nm. We also offer CQ actuator designs with greater output and/or hydraulic power. Please contact Rotork for these applications.

### Temperature Ranges

Standard: -30 to 100 °C (-22 to 212 °F)

High: -20 to 160 °C (-4 to 320 °F)

Low: -40 to 160 °C (-40 to 320 °F)

Extreme Low: -60 to 160 °C (-76 to 320 °F)

### Stroke Adjustment

Standard:  $0^{\circ} \pm 5^{\circ}$

Rotations beyond 90° can be provided upon request.

### Approvals and Industry Standards

- Actuators certified in accordance with IP66M/68M
- Actuators certified in accordance with ATEX Directive
- Actuators certified in accordance with PED Directive
- EAU Certificates of Conformity
- Management System in accordance with ISO 9001:2008
- Certified suitable for use at SIL3

### Standard Features and Benefits

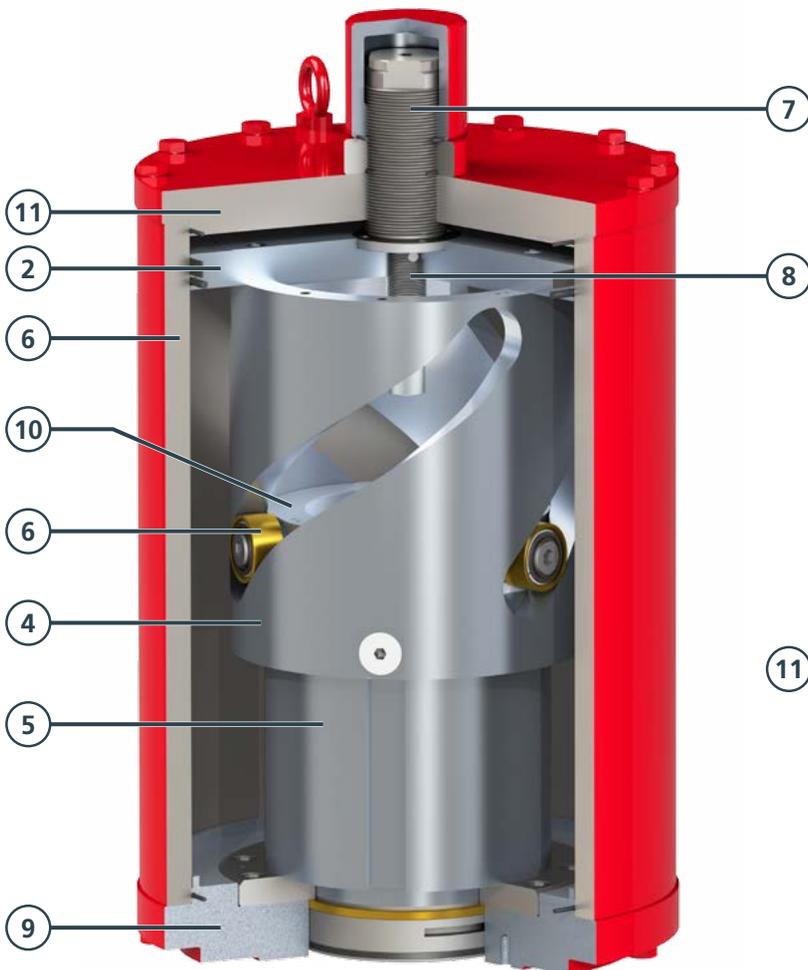
- **Compact Design**  
The design has the smallest footprint and envelope dimensions of any actuator type for a given torque output. Valve adaption is normally within the actuator envelope which further reduces the space requirements.
- **Ease of Maintenance**  
Designed with maintenance in mind, disassembly and access to internal components can be easily and safely accomplished.
- **Environmental Protection**  
The completely enclosed design provides optimum resistance in corrosive environments. Epoxy paint is standard.
- **Balanced Design**  
The concentric design provides even weight distribution that facilitates installation and removal as well as minimal load stress on the valve.

### Optional Features and Benefits

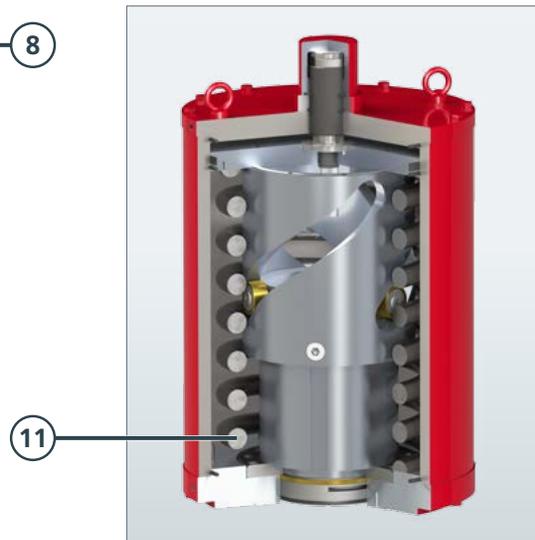
- **Manual Override**  
For override on a CQP pneumatically powered actuator, please consult Rotork.
- **Closed Loop System**  
Although CQ actuators are designed with corrosion protection through material specification and surface treatments, some operating environments are extremely corrosive. Additional protection is available using a closed loop or clean breath control circuit in which the surrounding atmosphere does not enter the actuator.
- **Complete Control Systems**  
Control component packages are part of an actuator/valve installation. Rotork has extensive experience in the design and assembly of all types of fluid power control systems to satisfy any customer requirement for on/off, modulating or ESD service. Control packages can be mounted on a panel or in a cabinet, either on the actuator or at a remote location.  
  
Rotork offers components from all leading industry-leading suppliers as well as a comprehensive array of reliable and innovative products of our own design. These products include pneumatic and hydraulic manifolds, control valves, regulators, switch boxes, and other ancillary components for general purpose or severe service and explosion-proof applications.
- **Special Paint**  
Rotork can accommodate any specification for special paint.

# Inside the CQP Pneumatic Actuator

**Typical CQP Double-Acting Actuator**  
(CQP 040-485AD1B)



**Typical CQP Spring-Return Actuator<sup>1</sup>**  
(CQP 040-485AC1B)



## Operation of the Mechanism

The actuator's basic components consist of a cylindrical body containing a cylinder with vertical slots connected to the bottom flange, and a cylinder with helical slots connected to the pneumatic piston. Cam follower bearings are attached to the upper part of the drive and are positioned within the slots of the helical slot cylinder.

A set of keys on the lower part of helical slot cylinder are mated to linear slots/keyways in the vertical slot cylinder. Pneumatic pressure on the piston provides linear motion of the helical slot cylinder, while rotation of the same is inhibited by the keys. In combination with this linear movement, the cam follower bearings travel along the helical slots providing rotation of the drive shaft.

ITEM	DESCRIPTION	MATERIAL
1	End Flange	Carbon Steel
2	Piston	Carbon Steel
3	Cam Follower Bearing	Aluminium Bronze
4	Helical Slot Cylinder	Carbon Steel
5	Vertical Slot Cylinder	Carbon Steel
6	Pneumatic Cylinder	Carbon Steel ( <i>internally ENP<sup>2</sup></i> )
7	Upper Stop Bolt	Alloy Steel
8	Lower Stop Bolt	Alloy Steel
9	Bottom Flange	Carbon Steel
10	Drive Shaft	Carbon Steel
11	Spring	Spring Steel
12	Tie Rod ( <i>not shown</i> ) <sup>3</sup>	Alloy Steel

1. Models 010-090 utilise a single spring. Larger sizes utilise multiple springs.  
2. Electroless Nickel Plated  
3. Bodies can be provided with tie rods or with threaded end flanges.

## Model Number Designation

Example Model Number **CQ P - 040 - 435 A / C 1 - A - F25 - 072**

### ACTUATOR TYPE

**CQ** = Compact Helical Actuator

### SUPPLY TYPE

**P** = Pneumatic

### BODY SIZE

010, 020, 030, 040, 050, 060, 070, 080, 090, 100, 110, 120

### CYLINDER SIZE

Pneumatic = 300-980

### TEMPERATURE

**A** = Standard -30 +100 °C

**B** = High -20 to 160 °C

**C** = Low -40 to 160 °C

**E** = Extreme Low -60 to 160 °C

### EXECUTION TYPE

**C** = Spring-return Fail Close

**O** = Spring-return Fail Open

**D** = Double-acting

### SPRING / DA MODULE

1, 2, 3

### ASSEMBLY TYPE

**A** = External Tie Rods Sizes 010 to 090

**B** = Threaded Flange Sizes 010 to 090

**C** = Internal Tie Rods Sizes 100 to 120

### FLANGE DRILLING

**F14** Size 010

**F16** Sizes 010, 020, 030

**F25** Sizes 020, 030, 040

**F30** Sizes 040, 050, 060

**F35** Sizes 050, 060, 070, 080

**F40** Sizes 070, 080, 090, 100

**F48** Sizes 090, 100, 110, 120

**F60** Sizes 110, 120

### MAXIMUM SHAFT SIZE mm

**48** Size 010

**60** Size 020, 030

**72** Size 040

**98** Size 050, 060

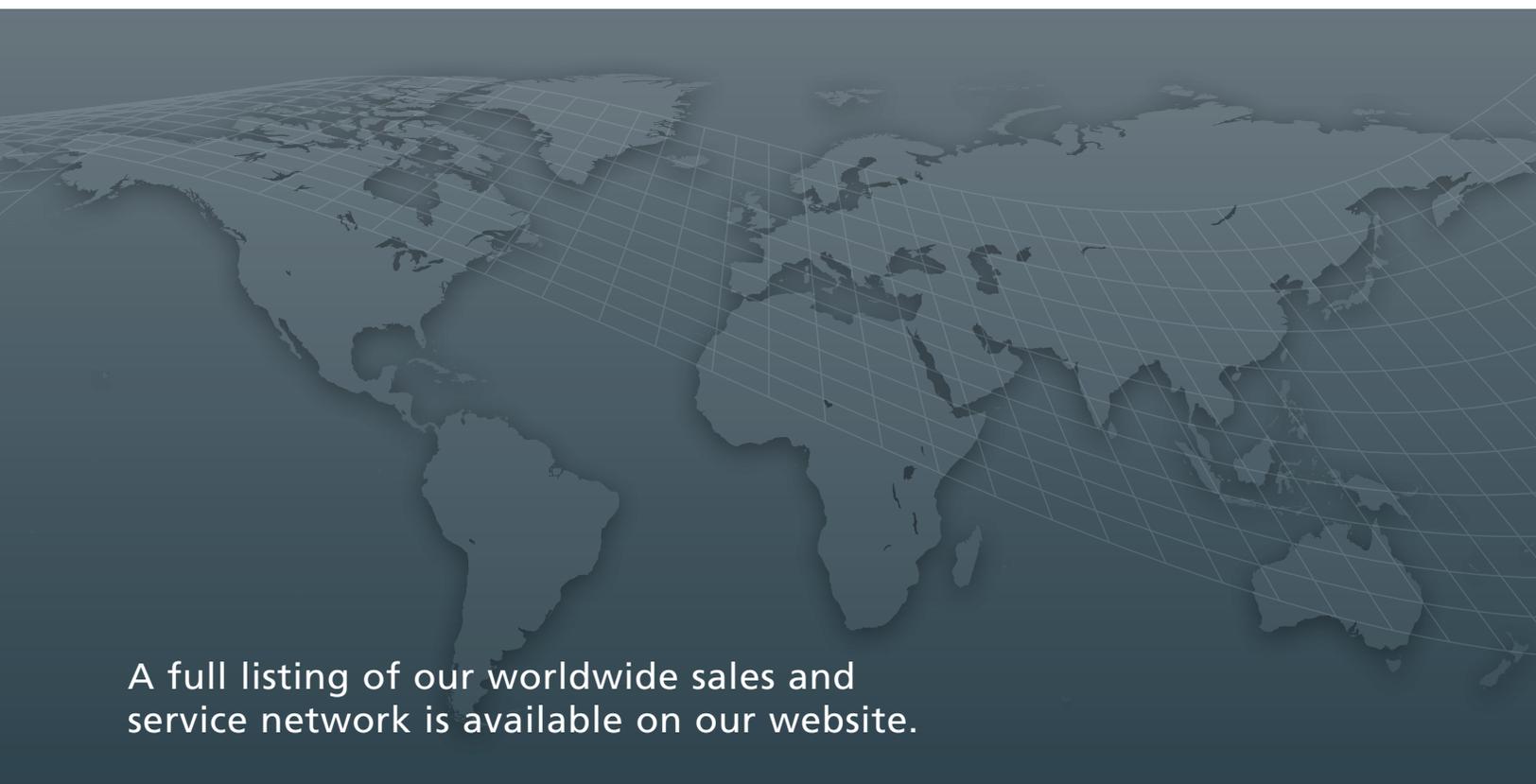
**160** Size 070, 080

**180** Size 090, 100

**220** Size 110, 120

# rotork<sup>®</sup>

Keeping the World Flowing



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

Rotork is a corporate member of the Institute of Asset Management

