

# rotork®

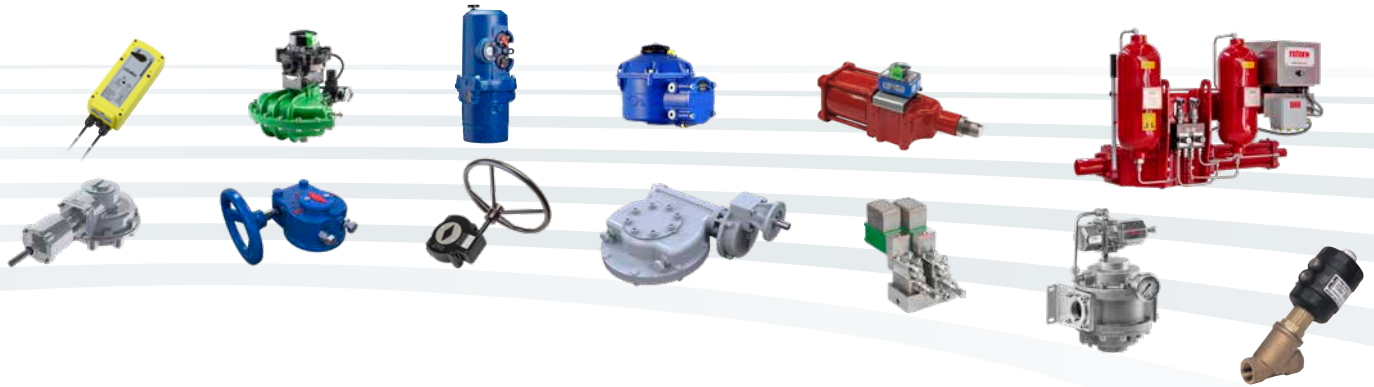
Keeping the World Flowing  
for Future Generations

Q Range



Part-turn Electric Valve Actuators

## Reliability in critical flow control applications



### › Reliable operation when it matters

Assured reliability for critical applications and environments. Whether used infrequently or continuously, Rotork products will operate reliably and efficiently.

### › Quality-driven global manufacturing

We offer products that have been designed with over 60 years of industry and application knowledge.

Our research and development ensures cutting edge products are available for multiple applications across multiple industries.

### › Customer focused service and worldwide support

Rotork solve customer challenges and develop new solutions that are tailored to the needs of our clients.

We offer dedicated, expert service and support from initial inquiry, to product installation, to long term after sales care.

### › 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.

## Q Range

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### Comprehensive product range serving multiple industries

Rotork products offer improved efficiency, assured safety and environmental protection across sectors such as the Power, Oil & Gas, Water & Wastewater, HVAC, Marine, Mining, Pulp & Paper, Food & Beverage, Pharmaceutical and Chemical sectors.

### Market leaders and technical innovators

We have been the recognised market leader in flow control for over 60 years.

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

### Global presence, local service

We are a global company with local support.

Manufacturing sites, service centres and sales offices throughout the world provide unrivalled customer services, fast delivery and ongoing, accessible support.

### Corporate social responsibility is at the heart of our business

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

# Robust, reliable and compact part-turn actuator **with the flexibility** to suit your application

- › Continuous position indication at all times, even without power
- › Oil bath lubrication provides extended life and the ability to mount in any orientation
- › Water ingress protection – double-sealed to IP68 1.2 m for 48 hours
- › Safe, motor-independent, handwheel operation available at all times
- › Inclusive mechanical travel stops to prevent over-rotation
- › Self-locking drive train in electrical and manual modes to prevent valve back driving
- › Increased protection by using independent torque and position sensing
- › Optional integrated control package to increase site integration possibilities







## Q Standard

### Part-turn Q Standard actuator

Rotork Q Standard actuators are the simplest models in the Q range of products. They are designed for use with external controls and motor switchgear. Q Standard actuators comprise the following components:

- Squirrel cage induction motor, drive train and independently declutchable manual override handwheel for hand operation including padlock able hand/auto lever
- Standard valve flange mounting including removable drive nut for machining to match the valve stem
- Self locking drive train in electrical and manual modes
- Drive train permanently immersed in an oil bath to ensure maximum efficiency and avoid the damaging tunneling affects associated with grease filled actuators

To operate a Q Standard, external controls with motor switchgear must be wired to the applicable actuator terminals. The wiring diagram will detail electrical connection requirements for operation.

A Q Standard can be upgraded with a Q Pak control module to provide a ready-to-operate actuation solution with integral controls and motor switchgear.



## Q Standard

### Motor

To meet the specific torque characteristics of the wide variety of applications in our global market, Rotork has developed a range of 3-phase and single-phase motors with high starting torque. Special features have been designed into the drive train to ensure uninterrupted operation even when the valve or damper torque demand increases due to wear or requirement for maintenance. For isolating service applications this includes a hammer blow mechanism within the drive train to provide an impact force at the start of electrical or manual movement.

To avoid damage to the actuator motor, thermal protection is included as standard using three thermostats embedded in the motor windings. This will inhibit actuator operation if the temperature of the motor exceeds specification.

### Actuator switch mechanism

The purpose of the actuator switch mechanism is to sense valve position and torque so the actuator motor can be controlled appropriately. Q Standard is designed to seat at the ends of travel using torque switches however position switches are also included for remote indication. Torque and position switches are fully adjustable to suit the particular application requirements. Additional position switches can be included to suit application requirements.

### Mechanical Position Indication

All Q range actuators incorporate a mechanical position indicator. This is permanently visible through the top cover of the actuator. The indicator mechanism is driven directly from the final output drive of the actuator and is therefore an exact representation of the actuator and valve position.

### System Integration

Q Standard incorporates a wide variety of electrical options to ensure exact application demands can be met. In addition to the standard switches, 2 additional switches can be installed to provide intermediate or end of travel position indication.

Some applications may require continuous position indication. Q Standard can meet this requirement with a mechanically driven potentiometer or integrated CPT (Current Position Transmitter) option that transmits a potentiometric or loop powered 4-20 mA output signal to the external motor controller.

### Local Control Selectors

Q Standard can include integral selectors that control the actuator operating mode; Local, Stop or Remote, and also provide a local Open or Close input. Wiring for the selector switches is designed to integrate easily with an external motor controller.

If security is a concern, the mode selector can be pad locked in the desired operating mode. Access can then be restricted to authorised personnel only.





## Q Pak

### Q Pak

The Q Pak comprises all the features of the Q Standard with the addition of the control interface module.

This module incorporates a deep cover which houses local control selectors, logic PCB, motor switchgear and transformer. Inclusion of the logic PCB enhances the capabilities of Q range actuators ensuring increased integration with existing site systems.

### Phase Rotation Protection

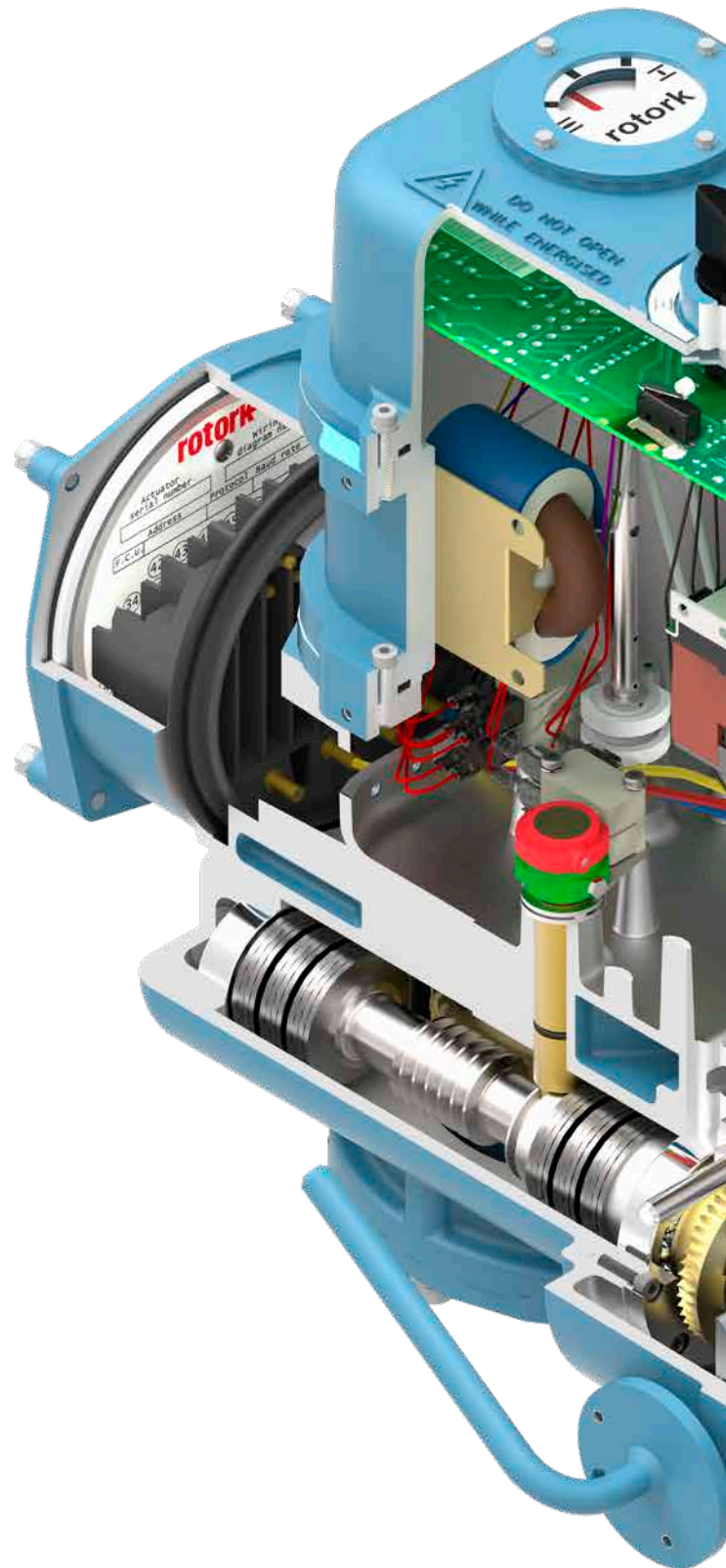
Q Pak actuators include Rotork Synchrophase automatic phase rotation correction. This prevents the actuator operating in the wrong direction by ensuring the Q three-phase motor is always presented with the correct phase rotation. Synchrophase senses the incoming phase rotation and energises the appropriate contactor to cause movement in the correct direction.

### Integral controls

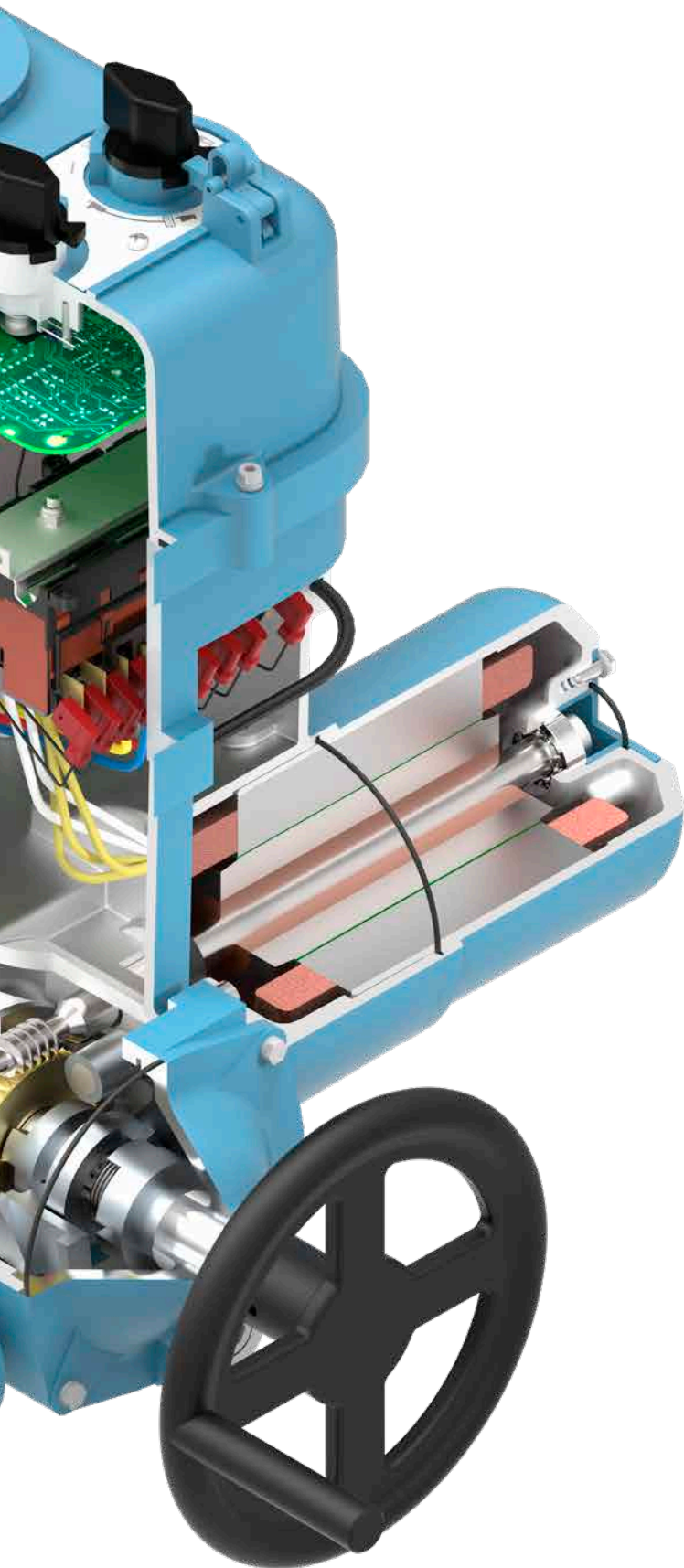
Q Pak actuators are offered as a ready-to-operate actuation solution. The motor switch gear, power supply components and integral control logic interface allow a unit to be operated with the local controls when applying only an adequate power supply. Remote operation can be achieved using appropriate commands to the pre-defined terminals.

### Motor switchgear

For Q Pak actuators, the motor switching is controlled with a reversing contactor. This enables integrated directional control for isolating duty applications. The reversing contactor includes an automatic time delay circuit that permits "instant reversal". The time delay avoids excessive shock loads during switching that may cause unnecessary wear to valve stems and also limits current surges through the contactor to prolong service life of the actuator.







### Increased Functionality

By including integral controls within the Q Pak actuator, extra functionality can be provided to further meet the demands of modern actuation applications. Intermediate positioning is possible with the 4-20 mA Fomatic analogue control option. Q Pak actuators are also capable of including internally powered 4-20 mA analogue position feedback to remotely indicate intermediate position.

### 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. The *Pakscan* master station includes a full colour integral display that shows the status of all the field devices, current state of the communications ports, system alarms, diagnostic information plus actuator control and set up facilities. In addition to these local features, remote access to the asset management information is available via the built in web pages.

## *Pakscan*<sup>™</sup>

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



# Performance Summary

## Actuator Performance

Rated torque is the maximum torque switch setting. Torque switches are adjustable from 30% to 100% of rated.

Model	Rated Torque		Operating Time (sec)		Mounting Flange		Handwheel Turns for 90°
	Nm	lbf.ft	50 Hz	60 Hz	ISO 5211	MSS SP-101	
Q100	135	100	27	23	F05/F07*	FA05/FA07*	15
			18	15			
			9	8			
Q300	406	300	54	45	F10/F07*	FA10/FA07*	15
			36	30			
			18	15			
Q450**	610	450	54	45	F10/F07*	FA10/FA07*	15
			36	30			
			18	15			
Q650**	900	664	15	13	F14/F12*/F16*	FA14/FA12*/FA16*	52
			30	25			
			45	38			

\*Optional flange.

\*\*3 phase power supply only.

## Actuator Fixings

Model	Flange	Bore & Keyway		Square AF	
		Max mm	Max in	Max mm	Max in
Q100	F05/FA05, F07/FA07	22	13/16	16	5/8
Q300 / Q450	F07/FA07	28	1 1/10	20	3/4
	F10/FA10	42	1 5/8	30	1 1/8
Q650	F14/F12/F16 FA14/FA12/FA16	56	2 1/5	40	1 5/8

Removeable drive sleeves are supplied blank for machining by valve supplier.



## Supply Voltages

Model	1-Phase	3-Phase
Q100	110, 120, 220, 230, 240: <b>50 Hz</b> 110, 120, 220, 230, 240: <b>60 Hz</b>	380, 400, 415: <b>50 Hz</b> 440, 460, 480: <b>60 Hz</b>
Q300	110, 120, 220, 230, 240: <b>50 Hz</b> 110, 120, 220, 230, 240: <b>60 Hz</b>	380, 400, 415: <b>50 Hz</b> 440, 460, 480: <b>60 Hz</b>
Q450	-	380, 400, 415: <b>50 Hz</b> 440, 460, 480: <b>60 Hz</b>
Q650	-	380, 400, 415: <b>50 Hz</b> 440, 460, 480: <b>60 Hz</b>

Permissible power supply tolerances for voltage and frequency:

- Voltage tolerance  $\pm 10\%$
- Frequency  $\pm 5\%$

## Design Specification

Q Standard and Q Pak		
<b>Enclosure</b>	Watertight IP68 (3 m for 48 hours). Protection maintained even when terminal cover removed.	
<b>Operating Temperature</b>	-30 to +70 °C (-22 to +158 °F)	
<b>Vibration</b>	0.5 g over a frequency range of 10 to 200 Hz	
<b>Shock</b>	NSS Grade II	
<b>Gearing</b>	Double reduction Steel worm and Aluminium Bronze worm wheel. Second stage worm gearing prevents back driving.	
<b>Switches</b>	Torque and auxiliary limit switches are changeover type (1 NO/ 1 NC) with the following inductive load ratings:	
	110/240 VAC	15 A
	110 VDC	0.25 A
	50 VDC	2.5 A
	24 VDC	3 A
<b>Motor Duty</b>	<p>3-phase - Class A &amp; B (EN 15714-2) or S2 - 20% (IEC 60034-1)</p> <p>1-phase - Class A &amp; B (EN 15714-2) or S2 - 20% (IEC 60034-1) restricted to a maximum of 5 consecutive operations.</p> <p>60 starts per hour rating.</p> <p>Q range actuators utilise purpose designed motors that are integral to the actuator. As such, these motors do not fall within the scope of IEC 60034, however they do meet applicable requirements of motor design for actuator operation.</p>	
<b>Insulation</b>	Class F insulation with integrated thermostat	
<b>Conduit Entries</b>	Standard: 2 x M32 or 2 x 1 " ASA NPT Optional: Additional M20 entry	
<b>Material</b>	Gearcase and motor housing are diecast aluminium to BS1490 grade LM4. Other components are aluminium alloy.	
<b>Mechanical Stops</b>	Adjustable 80° - 100° travel	
<b>Approvals</b>	IECEE CB Scheme  and 	



## Site Services

Rotork has specialist expertise, insight and experience in flow control. Our service solutions increase plant efficiency and reduce maintenance costs, while workshop services return equipment to as-new condition.

Our experience and understanding of the flow control industry means we have extensive insight and ideas of what we can do to provide significant value to our customers and their operations. Rotork products are recognised as the best-in-class for reliability, safety and value adding technology in extremely demanding applications.

We are committed to helping customers maximise the continuous, fault-free operation and working life of their actuators. We provide asset analytics by utilising our OEM knowledge with industry leading analytical technology to give our customers the greatest insight possible into the health and usable life of their valuable assets.

With established worldwide Support Centres we are able to offer same-day or next-day service to the majority of our customers. We use internationally recognised quality management standards to ensure consistently high levels of quality service worldwide.

See [PUB056-013](#) for further details.

Rotork has specialist expertise, insight and experience in flow control.

We provide insight into how we can deliver value to our customers.

Our service solutions increase plant efficiency and reduce maintenance costs.



## Site Services

### Reliability Services

Rotork has the infrastructure required to effectively support all of our customers. As the original designers and manufacturers, we are the best place to go to get the highest levels of service possible. Our strategically located Support Centres offer the impressive levels of service our customers should expect.

Our tiered approach allows customers to have flexibility about what services are most appropriate for them. Our tailor-made programmes increase reliability and availability. We can help with your site development when you need to expand, diversify or introduce a new process to your plant.

Our 60 years of application experience, innovation and product improvement help you plan the way ahead. Rotork's talented engineers and technicians ensure we add value to a customer's experience with us, by supporting future plans for maintenance schedules which can ensure maximum uptime and process efficiencies. A predictive maintenance strategy can facilitate continuing high production demands. We are committed to the reduction of maintenance downtime and cost.

### Maintenance and Certification Compliance

Rotork provides tailored packages of maintenance; we cover regular servicing through to refurbishment and end of life replacement. These add significant value to our customer's assets, by maximising the working life of an actuator and minimising or eliminating unplanned downtime.

On sites where providing evidence of valid asset certification is a legal requirement, Rotork engineers can carry out the necessary OEM level inspections and provide the statutory paperwork to comply with regulations.

### Health Check:

- Site survey
- Asset register
- Asset condition assessment

### Planned Maintenance:

- Preventative and corrective maintenance
- Performance assessment
- Asset database
- Maintenance register

### Enhanced Warranty:

- Conditioned based monitoring based upon asset criticality
- Enhanced/extended warranty

### Predictive Maintenance:

- Predictive maintenance
- Advanced analytics
- Remote monitoring

### Options:

- 24/7 dispatch or technical support
- Priority scheduling
- Parts management
- New actuator start up
- Resident engineer
- Cabling (power and control)
- System integration
- Valve inspection/maintenance



## Site Services

### Global Service and Support

Rotork understand the importance of prompt and punctual customer service. To add continuous value to our customer's business, we supply them with superior flow control solutions by providing high quality, industry leading products and complete service solutions. Whether a customer has an actuator requiring on-site servicing, a custom design service requirement or a new actuator installation, we have the complete solution capability to deliver the fastest turnaround possible with the least plant disruption, maximising the value added support we provide.

### Actuator Workshop Overhaul

- Rotork and non-Rotork products
- Workshop facilities including torque testing and re-coating
- Large OEM stock in all workshops
- Fully trained and experienced service engineers
- Loan actuator facilities

### Field Support

- Site repairs and commissioning
- Upgrades
- Fault finding
- Maintenance planning and scheduling
- Call-out with fully equipped service vehicles

### Planned Shutdown Support

- Preventative maintenance
- Full on-site overhaul and testing facilities
- OEM spares and support
- Support for Rotork and non-Rotork products
- Commissioning support to achieve return to service targets
- Project management and supervision of your plant overhaul and return to service dates

### Valve Automation Services

#### On-site – Manual Valve Automation and Actuator Replacement

- Design, manufacture, supply and installation services to automate your existing manual valves, penstock or dampers
- Power supplies, uninterruptable power supplies, distribution boards, motor control centres
- System integration
- Control system design, PLC, bus systems, logic, flow control systems, PID control, fail-safe critical plant
- Full Mechanical, Electrical, Instrumentation, Control and Automation (MEICA) by our qualified installation team
- Replacement of obsolete or ageing actuators in the field with the latest Rotork product range
- Correct product selection for the right application
- Design and manufacture of adaption components
- Electrical interface design and installation
- Fully commissioned to the plant control room
- Extended warranty on all products installed by Rotork technicians

#### Off-site – New Valve Automation

- Automation of new or refurbished valves in our dedicated Support Centres
- Correct product selection to suit the process demands
- Design and manufacture of all engineered components
- Correct assembly of valve and actuator/gearbox combinations
- Selection and procurement of the preferred or specified valve for your application
- Free issue valves accepted for automation in our Support Centres
- Packed and shipped to the desired destination

### Accreditation and Assurance

Rotork is world renowned as a safe and reliable operator, providing our customers with reassurance and peace of mind. Rotork's engineering teams are experts in the design and implementation of actuation solutions for all circumstances and environments. Our extensive global knowledge base draws upon previous installations and environmental situations.

Rotork is trusted by major utility and industrial companies to design, install and maintain their actuation stock. We can provide service and on-site repairs on all brands of actuators for the oil and gas, water and power, and chemical, process and industrial sectors. For further information, or to arrange a consultation, please contact one of our dedicated Customer Service teams via the locator tool available on our website.



# rotork<sup>®</sup>

## Site Services



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[www.rotork.com](http://www.rotork.com)

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

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As part of a process of on-going product development, Rotork reserves the right to amend and change specifications without prior notice. Published data may be subject to change. For the very latest version release, visit our website at [www.rotork.com](http://www.rotork.com)

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