

rotork®

Keeping the World Flowing
for Future Generations

Wellhead Electrification

Reduce your methane emissions and
improve production wellhead safety
and efficiency.



Improved leak detection, repair programmes and equipment can reduce oil and gas methane emissions by 75%



Rotork is a market-leading global provider of mission-critical flow control and instrumentation solutions for the industrial actuation and flow control markets. These include oil and gas, water and wastewater, power, chemical process and industrial applications.

Customers rely on us for innovative, high quality and dependable solutions for managing the flow of liquids, gases and powders. We help customers around the world to improve efficiency, reduce emissions, minimise their environmental impact and assure safety.

Our reliability record is second to none. Our products are designed with safety and performance at their core and are put through vigorous testing and certified to international standards. Our products are certified for use in the world’s most dangerous, and hazardous areas.

Partnering with us provides the following:

- Assured safety and reliability
- Industry leading accuracy and efficiency
- Proven technology that works with all network control systems
- Product range with solutions to suit every application
- Assistance with plant planning, development and maintenance through our local support services
- We have innovative research and development centers throughout the world

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Why Electrify Wellhead Operation?

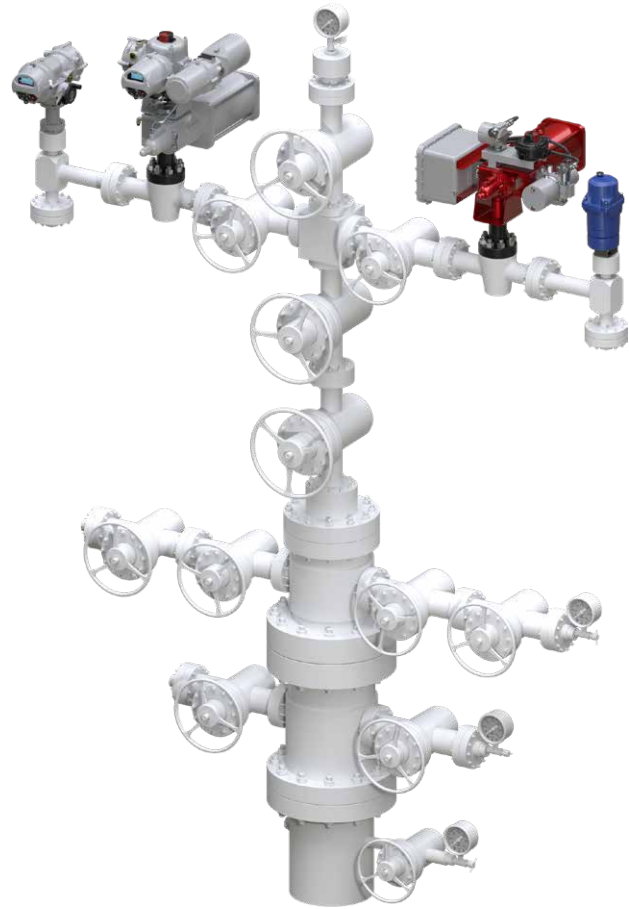
There are three main reasons to electrify wellhead valve control:

- › **Automation**
- › **Process control**
- › **Energy efficiency**

In order to meet strict emissions legislation for oil and gas operations, wellheads need to reduce their direct and indirect emissions. Traditional valve actuation uses the motive gas in pipelines which is then vented to the atmosphere during valve operation. Wellhead production choke valves can cause unnecessary flaring if not accurately controlled. Workers also have to drive to remote sites several times a month to check and manually operate valves.

Rotork's low-power DC valve actuators can run on solar power in remote locations to operate and adjust wellhead valves. They have been designed for fast throttling of production choke valves to reduce unnecessary flaring and can also communicate with remotely located control rooms, feeding back valve performance and highlighting potential issues to assist in maintenance planning.

The table below shows how each of the three reasons benefits the operator, reducing environmental impact while increasing efficiency, safety and profitability.



	Increase worker safety	Reduce total cost of ownership	Increase productivity / uptime	Reduce CO ₂ / methane emissions
Automation	<ul style="list-style-type: none"> Reduce time workers spend on dangerous roads from wellsite to wellsite, manually opening/closing production choke valves 	<ul style="list-style-type: none"> Lower labor and transportation/fleet costs 	<ul style="list-style-type: none"> Real-time choke valve adjustments without needing to drive hours to wellsite to manually adjust production choke valves Actuator local controls for on-site re-calibration 	<ul style="list-style-type: none"> Reduce emissions from truck fleets
Process control	<ul style="list-style-type: none"> Pre-defined opening/closing configurations and manual override limits can prevent oilfield operators from dangerous human error 	<ul style="list-style-type: none"> Fast throttling of the production choke valve can prevent damage to upstream production facilities in slugging or well over-pressurization 	<ul style="list-style-type: none"> Slow opening of the production choke valve protects the well reservoir fracked formation Fast throttling of the production choke valve prevents having to shut down the well with ESD 	<ul style="list-style-type: none"> Fast throttling of the production choke valve can reduce unnecessary flaring when slugging or well over-pressurization occurs
Energy efficiency	<ul style="list-style-type: none"> 24 VDC power prevents electrical shock hazard and having to service actuators using Hazard Risk Category 2 Personal Protective Equipment (PPE) 	<ul style="list-style-type: none"> Solar power as electricity power source for 24 VDC devices instead of using maintenance intensive air compressors Energy efficient devices will draw lower power from electricity source 	<ul style="list-style-type: none"> 24 VDC solar power can feed battery backup stations to maintain well operation at all times 	<ul style="list-style-type: none"> Solar power as electricity power source for 24 VDC devices Move away from gas-powered pneumatic actuators that release methane every time they stroke the production choke valve

Rotork Solutions

For more than 60 years Rotork have designed valve actuators and flow control equipment for the oil and gas industry. Our wellhead products deliver everything from intelligent valve control and monitoring to fit-and-forget solutions.

Surface safety valve (SSV) solutions

Skilmatic SI3 electro-hydraulic actuator

The SI3 range delivers spring fail-safe Emergency Shutdown (ESD) actuation with intelligent control and monitoring that can close a valve in 0.1 seconds. These actuators are specified in safety critical applications within the oil and gas industry such as Remote Operated Shutoff Valves (ROSoV) and Safety Instrumented Systems (SIS) with SIL 2 and 3 requirements.



The SI3 is a perfect SSV solution for new wellheads where the activity and pressure of the well is unproven and subject to rapid change. Its ability to quickly shut down the well can immediately stop damage to surrounding infrastructure.

Modular Electro-Hydraulic solutions

Our Modular Electro-Hydraulic actuation solutions can be designed to meet specific client or application requirements. The ability to choose any power supply including 24 VDC, different sizes of spring-return actuator and different control systems allow us to tailor these products to meet your needs.



These Modular Electro-Hydraulic solutions can be tailored to provide exact SSV operation as required by the well site operator.

IQT Shutdown Battery electric actuator

The IQT Shutdown Battery electric actuator provides a compact, explosionproof shutdown solution for applications which must be shut down in a phased or staged sequence.



It can be used as a compact alternative to spring-return fail-safe actuators and is perfectly suited for unmanned locations.

IQT Shutdown Battery delivers reliable valve actuation technology to operate remote wellhead SSV valves in any environmental conditions.

Production choke valve solutions

IQT3F Pro electric actuator

Our advanced IQT3F Pro intelligent actuators are lightweight, compact and resilient, and designed for long life applications in the field.



Non-intrusive operation, easy setup, proportional control, high accuracy, low power 24 VDC power configuration, high resolution movement and hazardous area certification provide the reliability and accuracy required for oil and gas field operations.

To meet all the requirements of choke and control valve drive mechanisms, three drive outputs are available conforming to actuator interface standards ISO 5210 for multi-turn and linear output drives.

The IQT3F Pro is perfectly suited for new wellsite installations where monitoring and adjustment of new wells is required on a daily basis.

CMR-250 / GB3 electric actuator

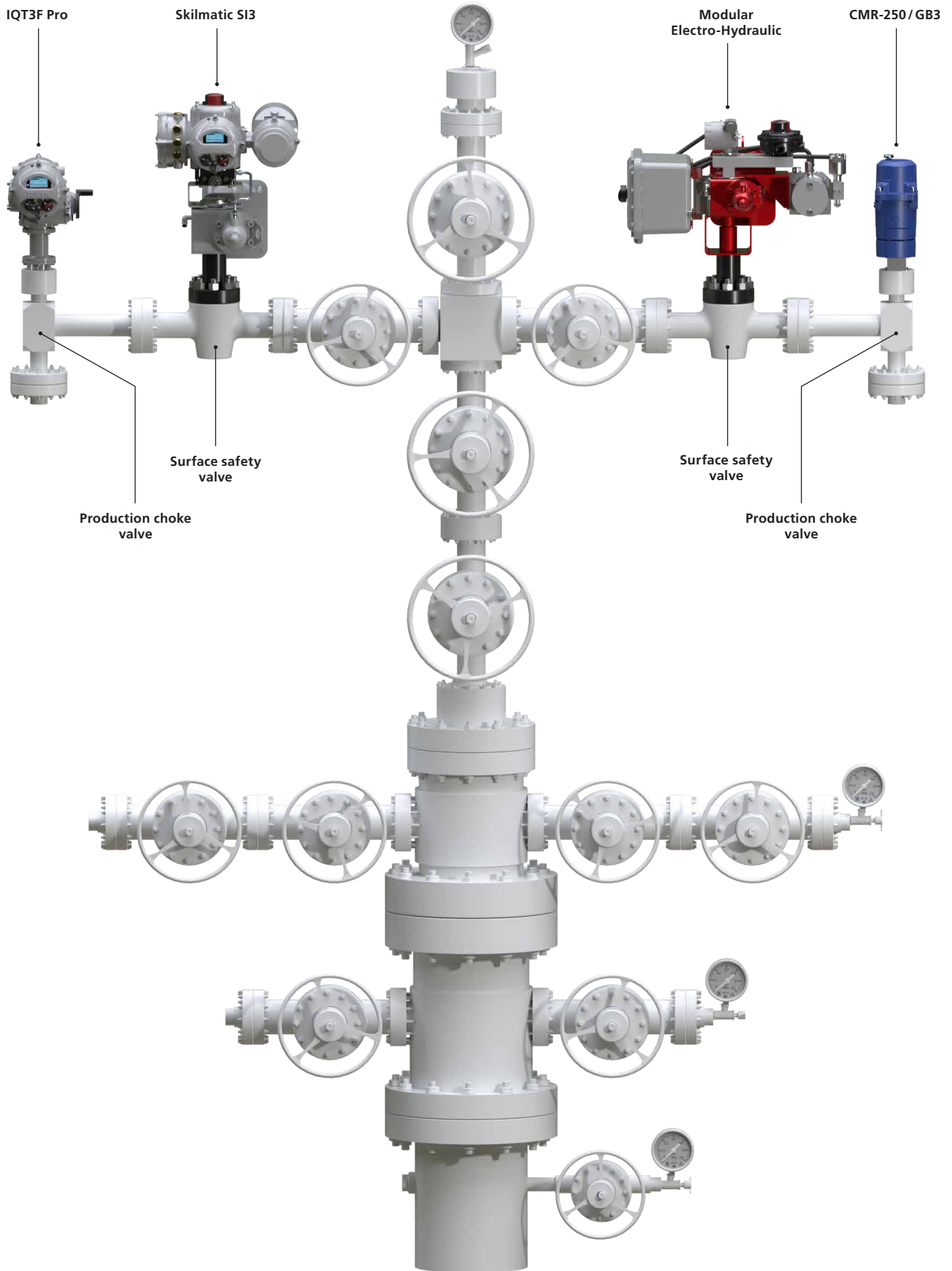
The compact CMR-250/GB3 is a multi-turn, rotary actuator designed to meet the exacting balanced-choke requirements for high torque, low power consumption, modulating control. Low power consumption makes it ideal for solar-powered, battery back-up systems.



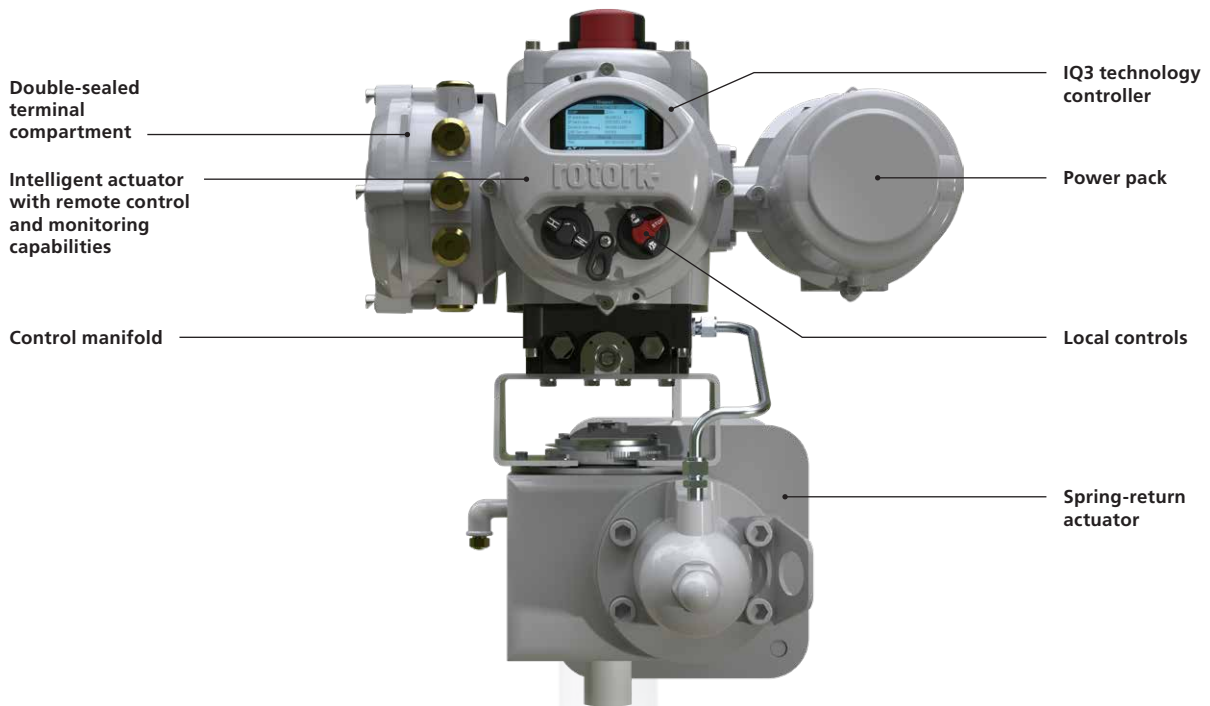
The CMR-250/GB3 is adaptable to all choke valve manufacturers and has hazardous area certification.

CMR-250 / GB3 is designed as a perfect replacement actuator for remote wellheads that require little adjustment.

Rotork Solutions



Skilmatic S13 – High speed fail-safe actuator



The Skilmatic S13 range of self-contained electro-hydraulic actuators combine the simplicity of electrical operation with the precision of hydraulic control and the reliability of mechanical spring-return or accumulator fail-safe action.



Advanced control

- Available to meet requirements of various site control systems from local/remote two position control and ESD/PST through to positioning control using hard-wired switched signals, analogue, or network systems
- Built-in valve position and pressure monitoring sensors integrate with the actuator's control circuit to regulate position and pressure. They provide real-time status and alarm indication, and records valve operating profiles to the internal data logger which are date and time stamped



High reliability

- Reliable valve position monitoring is critical in all remote valve automation applications. The actuators monitor the position through a high-resolution non-contacting sensor
- They are compact and robust spring-return actuators designed primarily for fail-safe applications where functional safety is paramount. They are available as either fail-safe clockwise or anti-clockwise
- The actuators are specifically designed for safety critical applications, such as wellhead ESD (SSV valves) and accept various input signals as standard
- Suitable for use in SIS systems certified to IEC61508:2010



Low power consumption

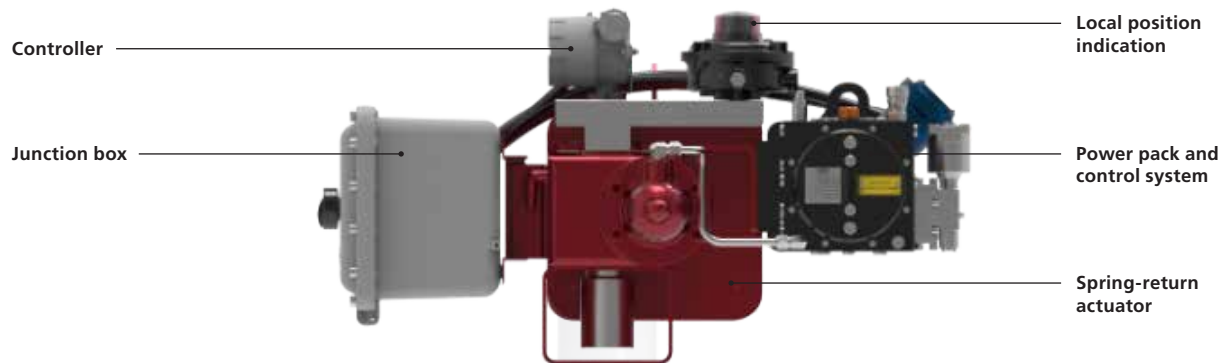
- Only requires electrical power supply for operation (1-phase, 3-phase, or 24 VDC)



Easy field serviceability

- They enable safe and secure local monitoring and actuator control with the Remote Hand Station (RHS)
- Customers can remotely operate, interrogate, and configure the actuator from up to 100 meters distance
- Easy non-intrusive set-up using the Rotork Bluetooth® Setting Tool *Pro* supplied with the actuator

Modular Electro-Hydraulic – Tailored fail-safe actuator solutions



Our Modular Electro-Hydraulic solutions combine the simplicity of electrical operation with the high torque/thrust and fail-safe fast-action capabilities of hydraulic high-pressure control for both rotary and linear valve actuation.

Typically used in applications where external pneumatic or hydraulic power sources are unavailable, these fully modular and compact solutions provide the customer with the right architecture to meet any specific need.

Advanced control

- Modular Electro-Hydraulic solutions provide true electric fail-safe designs that are always spec-compliant and certified
- Thanks to the functional flexibility of the modular design, the widest range of solutions, from simple on/off operation to multiple voting SIL-rated Emergency Shutdown (ESD) and Partial Stroke Testing (PST) can be easily configured

High reliability

- Modular designs use high specification components including digital interfaces and non-intrusive enclosures
- Manufactured and supported by Rotork centers-of-excellence. Designed for long-term operation with reduced service requirements in tough and remote environments

Low power consumption

- True mechanical fail-safe solution, with low power consumption, ideal for solar power source applications

Easy field serviceability

- Commissioning without opening the control box – ideal for dusty/wet areas. The self-contained designs ensure fewer pipes/fittings on the actuator, reducing oil leak points and possibility of damage in transit

IQT3 Pro Shutdown Battery – High accuracy fail-to-position actuator



The IQT3 Pro Shutdown Battery actuator provides fail-to-position functionality in the event of a mains power loss in both hazardous and non-hazardous environments. The integral battery pack provides a compact, explosionproof

shutdown solution. The battery is housed within the actuator's double-sealed enclosure, maintaining the actuator's ingress protection and hazardous area classification.



Advanced control

- Our products deliver the operating speed range and high torque/thrusts requirements of ESD valves (SSV valves) on upstream oil and gas wellheads
- They can be configured to suit application requirements. It can, as desired, be fail-closed, fail-open, stayput or go to an intermediate position
- Remote monitoring capabilities allow operators to monitor and control valve positions from a distance



High reliability

- The redundant absolute encoder is contactless, has only one moving part and self-checking ability, increasing position sensing reliability while providing zero-power position measurement
- Self-protection technology guards the actuator's integrity and operating performance by continuously monitoring temperature, torque and voltage, ensuring long life
- UPS mode allows the actuator to continue to operate as normal on loss of power (until battery charge runs out), meaning there is no impact on wellhead operations



Low power consumption

- SSV valves require large amounts of energy to safely operate in emergency situations. The actuator delivers energy efficient operation combined with stored energy for emergency situations, both helping to reduce and optimize the power footprint of the wellsite
- IQT3 Pro offers power efficient 24 VDC configurations to minimize power consumption at remote wellhead sites



Easy field serviceability

- The actuators are oil bath lubricated for life. Oil lubrication out-performs grease over a wide temperature range and allows installation in any orientation
- They provide easy in-field serviceability for commissioning, maintenance and recalibration, minimizing oil and gas field intervention time by ensuring that interaction with these products is as seamless as possible, especially since mobilizing oilfield technicians to reach remote locations is a time-consuming effort in itself
- All IQT3 Pro actuators incorporate a sophisticated data logger which can provide comprehensive data capture and analysis for planned maintenance and troubleshooting issues with valves and processes

IQT3F Pro – High performance intelligent choke valve actuator



Rotork's IQT3F Pro electric actuator is specifically designed to deliver advanced production choke valve actuation with non-intrusive operation, easy setup, proportional control, high accuracy, and low power 24 VDC power configuration.

They are lightweight, compact and resilient actuators designed for long-life applications in the field.

Advanced control

- They provide separate speeds for the opening and closing of the choke valve. Slow and accurately controlled opening to protect the wellhead, production facilities and the reservoir's fracked formation. Fast throttling down to minimize flaring intensity and avoid costly restarts from emergency shutdowns due to high level pressure events

High reliability

- Built on the Rotork drive train, proven for over 30 years, the IQT3F Pro features a double-sealed, non-intrusive enclosure to protect internal components from environmental conditions even during installation and commissioning. Designed to protect the actuator and valve: a jammed choke or power surge will not damage or burn out the actuator

Low power consumption

- 24 VDC configuration of the IQT3F Pro provides a low power alternative. This is ideal for well sites operating on solar power or for operators looking to control and reduce grid power costs

Easy field serviceability

- They deliver remote real-time monitoring and control of choke valves without needing to drive hours to the wellsite for manual adjustment. For in-field operations, they provide a user-friendly experience with automatic limit setting, large feature-rich display, and control and commissioning via Rotork App, Bluetooth® setting tool handset or local control knobs

CMR-250 / GB3 – Reliable compact choke valve actuator

- Manual handwheel
- Built in HMI under cover
- Simple, set up and leave operation
- Network control and monitoring capabilities
- Integrated gearbox
- High accuracy and modulating output



Optional electrical cover with local controls and display

The CMR-250/GB3 is a multi-turn, rotary actuator designed to meet the exacting balanced-choke requirements for high torque, low power consumption, modulating control in a compact

space envelope. The low power consumption makes the CMR-250/GB3 ideal for solar-powered, battery back-up systems.



Advanced control

- Designed for high frequency and high-speed operations such as actuation of wellhead production choke valves
- Encoder technology for dependable position measurement, 0.2% accuracy and repeatable position control that helps reduce flaring exercise
- Optional super capacitor configurations are available for reliable fail-safe functionality



High reliability

- Built on technology that allows self-protection against abrupt changes in external conditions, by continuously monitoring temperature, torque and voltage
- Our electric process control solutions are highly dependable and eliminate in-field interventions and repairs that are common with pneumatic diaphragm actuator failures associated with debris or condensates in instrument air, or failures from rotary components of air compressors
- Brushless DC motor with S9/Class D continuous modulation capability allows actuator to perform seamlessly even during frequent operation and in harsh environmental conditions



Low power consumption

- Optimizing wellsite solar power and energy storage infrastructure, or minimizing consumption when grid power is available, is a key differentiating factor of the CMA against pneumatic actuators running on instrument air from an on-site air compressor
- The low power 24 VDC configuration of the CMA delivers an advanced actuation solution for upstream production processing with minimal power consumption



Easy field serviceability

- The lifecycle of upstream production processing infrastructure will see big shifts in operating intensity and valve maintenance. Easy in-field actuator serviceability and configuration will be critical to ensure seamless interventions to support sustained process uptime
- Communication protocol options and practical in-field user interfaces offer field technicians a user-friendly interaction for easy commissioning, maintenance, recalibration and feedback
- Built-in Human Machine Interface (HMI) allows quick and simple setup while optional integral local controls and positional display helps easy monitoring of actuator

Performance Data

SI3 actuator

	Seating torque lbf.ft (Nm)		Operating time (sec)			
	From*	To**	Hydraulic direction		Spring direction	
			From*	To**	From*	To**
SI3-SR	563 (763)	1,118 (1,516)	12	33	0.7	40

Performance figures are based on the most common sizes of SI3 used on wellhead SSV valves. For higher torques please refer to PUB021-062.

* Minimum 'From' figures are for SI3 actuator size SI3-240-070.

** Maximum 'To' figures are for SI3 actuator size SI3-085S-050.

Modular Electro-Hydraulic solutions

	Torque rate	Open/closing time	Working pressure
Modular EH	Up to 200,000 Nm	As per customer spec	Up to 210 bar

IQT3 Pro actuator

Actuator	IQT125	IQT250	IQT500	IQT1000	IQT2000	IQT3000
Seating torque	Torque					
		Nm	lbf.ft			
	125	250	500	1,000	2,000	3,000
	92	185	369	738	1,476	2,214
Operating time (seconds)						
90° Min	5	8	15	30	60	60
90° Max	20	30	60	120	240	120

IQT actuator output torque is configurable to 40 - 100% of seating torque.

Operating speed of IQT 24 VDC actuators will vary with load.

Performance Data

IQT3F Pro actuator

Actuator size	Seating torque lbf.ft (Nm)	Operating speeds (rpm)				
		rpm (standard)	rpm (DC extended speed)	rpm (AC extended speed)	max turns, min rpm	max turns, max rpm
IQT3F 50	37 (50)	2.5 - 10	2.6 - 13	3.2 - 16	22	22
IQT3F 100	74 (100)	1.5 - 6	1.8 - 9	2.4 - 12	22	22
IQT3F 125	92 (125)	0.8 - 3	0.8 - 4	1 - 5	12	22
IQT3F 250	185 (250)	0.5 - 1.88	–	–	3.75	22

Actuator size	Stem lead mm	Rated thrust		Max stroke		Standard mm/sec	Max speed DC extended speed mm/sec	AC extended speed mm/sec	Min speed mm/sec
		kN	lbf	mm	in				
IQT3F 125 L	5	37.89	8,518	110	4.33	0.25	0.33	0.42	0.07
	7	35.10	7,891	157	6.18	0.35	0.47	0.58	0.09
	10	31.61	7,107	157	6.18	0.50	0.67	0.83	0.13
	15	27.03	6,077	157	6.18	0.75	1.00	1.25	0.20
IQT3F 250 L	5	75.78	17,036	110	4.33	0.16	n/a	n/a	0.04
	7	70.21	15,783	157	6.18	0.22	n/a	n/a	0.06
	10	63.23	14,214	157	6.18	0.31	n/a	n/a	0.08
	15	54.06	12,154	157	6.18	0.47	n/a	n/a	0.13

In accordance with ISO 22153, thrust is calculated using a constant value coefficient of friction (CoF). CoF can vary with load, speed and lubrication. Refer to PUB002-065 for the recommended lubrication routine.

Linear speeds are subject to rounding and speed/stem tolerances.

CMR actuator

	Min torque lbf.ft (Nm)	Max torque lbf.ft (Nm)	Max speed rpm	Min stroke turns	Max stroke turns
CMR-250/GB3	160 (18.1)	400 (45.2)	5.8	0.25	200

Sustainability



2022 performance across key sustainable metrics:

CO₂ emissions
(scopes 1 and 2)

-17%

Carbon emissions
(per £m revenue)

-21%

Electricity usage

-2%

Water usage

+6%

Sustainability commitment

Rotork is determined to help drive the transition to a cleaner future where environmental resources are used responsibly. The Group is committed to being a net-zero business by 2035 (by 2045 for scope 3).

Rotork's intelligent electric actuation solutions enable the decarbonization of industrial processes through electrification and the use of renewable energy.

ESG ratings

S&P Global placed Rotork in the 95th percentile in the Machinery & Electrical Equipment industry in its 2022 Corporate Sustainability Assessment. Sustainalytics ranked Rotork 10th out of 416 companies in the industrial machinery sector.

Eco-transition portfolio

The eco-transition portfolio, consisting of Rotork's products and services which have particular environmental or sustainability benefits, comprises the Group's 'water & wastewater', 'methane emissions reduction', and 'new energies & technologies' portfolios.

Carbon capture is part of the new energies and technologies portfolio.

Our leading ESG ratings

MSCI

AA

Leader

S&P Global CSA

Top 5%

Ranked in the top quintile in our industry globally

Sustainalytics

Top

Industry top rated

CDP Worldwide

CDP Climate: B
CDP Water Security: B

Rotork understands the value of prompt, punctual and superior site services. Rotork Site Services have specialist expertise, insight and experience in service support for mission-critical flow control and instrumentation solutions for oil and gas, water and wastewater, power, chemical process and industrial applications. We offer global frontline support backed by dedicated in-house experts.

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 Site Services is comprised of two main areas; Lifetime Management and Site Services. Lifetime Management is the suite of services within Rotork Site Services which help you manage the risk associated with aging assets and includes our Reliability Services offering. Site Services comprises essential actuator service, repair, maintenance and upgrades.

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.

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