

# rotork®

Keeping the World Flowing  
for Future Generations

**IQ<sup>3</sup>**  
*Pro*



## IQ3H Pro range

High speed, self-locking  
multi-turn electric valve actuators

- › Graphical interface, remote indication and data logger accessible without power
- › Explosionproof to international standards
- › Oil bath lubrication provides extended life and the ability to mount in any orientation
- › Increased protection by using independent torque and position sensing
- › Double-sealed to IP66/68 7 m for 72 hours
- › Safe, motor-independent, handwheel operation
- › Detailed trend analysis and diagnostic data available for asset management
- › Control and commissioning via Rotork app, Bluetooth® Setting Tool Pro handset (BTST) or local control knobs
- › Easy installation and maintenance using detachable thrust bases
- › Continuous position sensing at all times, even without power
- › Compatible with a wide variety of fieldbus, hardwired and analogue site systems

IQH provides a range of high output speed IQ range actuators with integral epicyclic gearing. Gearing is optimised to be irreversible and provide a self-locking function for the valve.\*

IQH actuators have been developed for diverter valves in meter prover applications that require fast operation with positive seating and zero backdriving.



*A 1:3 step up epicyclic gearbox enables high speed operation*

**HART**  
COMMUNICATION PROTOCOL

**Pakscan™**

**Modbus®**

**PROFIBUS**

**RIRO**

**FOUNDATION**

**DeviceNet®**

\*It should be noted that a self-locking ability cannot be guaranteed for worm and wheel drives under all conditions including high loads and vibration, either under static and dynamic conditions. When handwheel operation is selected the gear train is disconnected and therefore any locking ability will be lost.

**rotork®**

## Simple, secure commissioning and configuration

Ensuring correct configuration and keeping it secure is the bedrock of reliable operation.

All IQ3 Pro actuators can be set up non-intrusively using the Rotork app on a smartphone, Rotork Bluetooth® Setting Tool Pro (BTST) handset or via manual setup using the actuator control knobs.

Torque levels, position limits, control and indication functions can all be accessed using any of these setting options. Bluetooth wireless connectivity with a smartphone or BTST allows easy use without direct line-of-sight, however security has to match.

For the Rotork app, a secure connection is established between the app and the actuator utilising 'PIN pairing' to gain access. For the BTST, a secure connection is achieved by the initial 'pairing' of tool and actuator being carried out by a single infrared transaction after which a Bluetooth wireless connection automatically takes over. Manual setup using the actuator control knobs allows access to on-screen menus and settings. Password entry is required to enable manual setup and it is automatically disabled after five minutes of inactivity. All configuration changes are password protected and the actuator is immune to connection by non-Rotork devices or programmes.

IQ3 Pro range actuators benefit from a configurable, information-rich display, with a highly intuitive menu system for commissioning, updates and diagnostics.

IQ3 Pro range actuators can be interrogated and set up, even when mains power is not available; the actuator can be configured and interrogated by using power from its display back-up battery.

- Rapid and secure commissioning and configuration even without power via advanced, multilingual HMI display
- Non-intrusive setting in any environmental conditions - no cover removal required, using the Rotork app on a smartphone<sup>1</sup>, Rotork Bluetooth® Setting Tool Pro (BTST) handset or via manual setup using the actuator control knobs
- Rotork app configuration wizard enables easy and convenient commissioning of valves
- Easy installation and valve maintenance using detachable thrust bases
- Duplicate operation, configuration and commissioning up to 100m from actuator with Remote Hand Station (RHS)
- Auto set-up function on part-turn variants

## Technological advances

### Position

Reliable valve position sensing is critical. Using the latest technology and after years of testing, the patented Rotork IQ absolute encoder is contactless, has only four active parts, can measure up to 8,000 output turns and has redundancy and self checking. The Rotork IQT redundant absolute encoder is contactless, has only one moving part and self-checking ability. Unlike existing absolute encoder designs, these technological breakthroughs increase position sensing reliability while providing zero-power position measurement.

### Display

The advanced display allows large segment character position displays down to -50 °C while the matrix display provides detailed setting, status and diagnostic multilingual screens. The large display is backlit to provide excellent contrast even in the brightest ambient light conditions and is protected by a toughened glass window. An optional protective clip-in cover is available where high UV levels or abrasive environments are present.

### Torque

IQ3 Pro utilises a torque sensor developed and used successfully by Rotork for over 20 years. Torque generated when moving the valve produces a proportional thrust reaction on the motor worm-shaft. This thrust creates pressure in the piezo torque transducer which converts it to a voltage signal directly proportional to the output torque being produced by the actuator. The signal is used by the control circuit for torque limiting, real-time torque indication and for recording valve operating force profiles in the data logger. IQ torque sensing is simple, accurate and extremely reliable over the life of the actuator. Unlike other systems employed, IQ torque measurement has the advantage of being independent of voltage and temperature variations.

### Control

Control elements such as main control and network interface cards, are connected using an internal bus system based on CAN, reducing wiring and connections for increased reliability.

## Unrivalled industry-leading reliability

Valve operation must be reliable. Rotork IQ3 Pro range actuators are engineered for a lifetime of uninterrupted service in the toughest applications. Built on the Rotork drive train, proven since 1957, IQ3 Pro range actuators retain industry leading reliability.

1 - Smartphones must be certified intrinsically safe for use in hazardous areas.

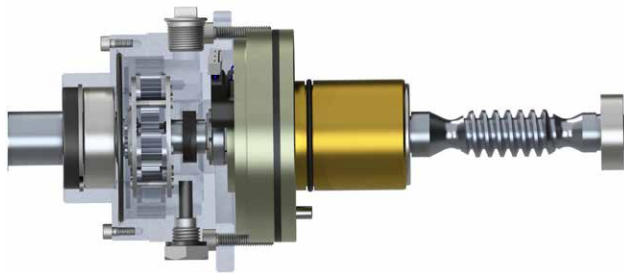
## Asset management

With an advanced display, position, torque, status and configuration data is clear and immediately accessible. In addition the valve, actuator and process data is available in real-time on screen or in the control room. Valve stroke torque/thrust graphs, duty trend logs, vibration levels and valve & actuator manufacturing data can be extracted and stored as the basis for planned maintenance and operational activities, process performance characteristics and comparison.

Entire operations can be performed in minutes and data logs can be downloaded to the Rotork app or Rotork Bluetooth® Setting Tool *Pro*, then transferred to a PC and analysed using Rotork Insight 2 software or uploaded to Rotork's intelligent Asset Management (iAM) system.

## The IQH epicyclic gearbox

Fast operation is achieved by using a 1:3 step up epicyclic gearbox between the 2-pole motor and worm gearbox. This is a mature design and was first implemented in the IQ design of the 1990s.



## Optimised for preventative maintenance

All IQ3 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. They capture:

- Valve torque profiles
- Operational starts profiles
- Operational, vibration and temperature trend logs
- Event log

Asset management data regarding the actuator and the valve is stored within the actuator and available for download. Specific asset management information includes:

- Running time
- Average torque
- Starts
- Life statistics

IQ3 Pro actuators include configurable service / maintenance alarms. The alarm parameters are:

- Open torque levels
- Close torque levels
- Starts/hr
- Total starts
- Total turns
- Service intervals

## Performance data

		Actuator output speeds					
RPM	50 Hz	108		144		216	
	60 Hz	130		173		259	
Final gear ratio		80:1		60:1		40:1	

		Torque**					
Model		Nm	lbf.ft	Nm	lbf.ft	Nm	lbf.ft
IQH20		75	55	75	55	68	50
IQH25		108	80	98	72	83	61
IQH35		202	149	182	134	153	113
IQH40		397	293	347	256	240	177

\*\* Torque rating is maximum torque setting in both directions.  
Stall torque will be 1.4 to 2 times this value depending on speed and voltage.

### IQ3H Pro specification

The IQ3H Pro matches the same specification as IQ3 Pro (refer to PUB002-197) unless stated differently in this publication.

#### General

<b>Enclosure and temperature</b>	IP66/68 7 m for 72 hours Type 4, 4X & 6 -40 °C to +70 °C (-40 °F to +158 °F)
	<b>EU &amp; UK - Hazardous Area</b> ATEX (2014/34/EU), UKEX (2016 No. 1107) -20 °C to +70 °C (-4 °F to +158 °F)
	<b>International - Hazardous Area</b> IECEX: IEC 60079-0, IEC 60079-1, IEC 60079-7, IEC 60079-31 & ISO 80079-36 -20 °C to +70 °C (-4 °F to +158 °F)
	<b>FM &amp; cCSAus</b> XP Class I, Div 1, Group B, C, D DIP Class II, Div 1, Group E, F, G -40 °C to +70 °C (-40 °F to +158 °F)

For detailed certification information refer to PUB002-039.

<b>Power supply</b>	3-phase supplies only
<b>Mounting interface</b>	ISO 5210, MSS SP-102
<b>Lubrication</b>	Oil bath with sealed lubricated epicyclic gearing
<b>Handwheel</b>	Top direct drive handwheel Side geared handwheel
<b>Conduit entries</b>	3 x M25 x 1.5p, 1 x M40 x 1.5p Via adaptors: 3 x 1" NPT, 1 x 1½" NPT Via adaptors: 3 x PG16, 1 x PG29
<b>Orientation</b>	Any
<b>Finish</b>	Polyester powder coat (P1) Polyester powder coat + offshore triple coat – ferrous parts (P2) Offshore triple coat – all parts (PX)

#### Indication

<b>Remote indication</b>	4 x volt-free relay contacts
<b>Remote indication options</b>	8 x extra volt-free relay contacts 4-20 mA position / torque output <i>Pakscan</i> ™, Profibus®, Modbus®, Foundation Fieldbus®, DeviceNet®, HART®

#### Operation

<b>Type</b>	Isolating
<b>Duty cycle</b>	Class A & B (ISO 22153) S2-15 min (IEC60034)

#### Control

<b>Wiring diagram</b>	Basic – 100B0000
<b>Local control</b>	Non-intrusive design LOCAL / STOP / REMOTE selector OPEN / CLOSE selector Restricted access with padlock
<b>Remote control</b>	Hardwired digital inputs OPEN, CLOSE, STOP, ESD, OPEN INTERLOCK, CLOSE INTERLOCK
<b>Remote control options</b>	4-20 mA position control - Folomatic
<b>Network control options</b>	<i>Pakscan</i> ™, Profibus®, Modbus®, Foundation Fieldbus®, DeviceNet®, HART®

#### System

<b>Configuration</b>	Non-intrusive infrared / Bluetooth
<b>Local display</b>	LCD and dot matrix dual layer display Multilingual setting support Wide viewing angle Backlit for full visibility in daylight Toughened glass protection
<b>Limit switching</b>	2.5 to 8,000 turns, resolution 7.5° Contactless absolute encoder Built-in redundancy
<b>Torque switching</b>	Independently configurable switches Piezo electric torque sensor device Switch bypass function available
<b>Data logger</b>	Standard detailed data logger Torque profiles, trend graphs, event log, fault log, service log

#### Support tools

<b>Analysis software</b>	Insight 2 PC software Configuration and data log review
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A full listing of the Rotork sales and service network is available on our website.

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Fluid Power Actuators and Control Systems  
Gearboxes and Gear Operators  
Precision Control and Indication  
Projects, Services and Retrofit