



IQ Pro – Intelligent Actuators

Rotork IQ Pro - Reliable, Intelligent Control

The Rotork IQ range, comprising IQ multi-turn and IQT quarter-turn actuators, delivers a complete range of actuators suitable for all valve applications requiring control and indication flexibility. It offers end users outstanding standards of performance, build quality and overall value.

Simple Commissioning

The Rotork IQ range provides simple, safe and rapid non-intrusive commissioning with infra-red control. Actuator settings such as torque levels, position limits, control and indication functions can be accessed and adjusted using the “point and shoot” IQ Setting Tool *Pro*. This supplied, intrinsically safe (IS) tool is unique to Rotork and allows for non-intrusive actuator set-up whatever the environment, power on or off.

Simple Troubleshooting

The large digital position display clearly indicates real time valve position from a distance. In addition, active valve, control, actuator status and alarm text messages are displayed on the easy to read back-lit display. Using the IQ Setting Tool *Pro* real-time torque against position profiles and actuator configuration can be accessed during commissioning, adjustment or local valve performance monitoring. The onboard data logger records operational, alarm and valve torque profile data providing valuable information on valve and plant operating performance and conditions.

IQ Pro range offers a range of powerful features:

- Three-phase, direct current and single-phase actuators.
- Direct drive quarter-turn (IQT models).
- On-board data logger included as standard.
- IrDA™ compatible for local and remote actuator analysis via InSight PC software.
- Clear, user friendly controls and indication.
- Multilingual text display for status and setup.
- Simplified torque and position control for increased reliability.
- Comprehensive control and flexibility.
- Approved for use in SIL applications.†

†with an additional SFCM Control Module

IQ Pro Intelligent Actuators



The IQ range

The Rotork IQ delivers a complete range of actuators suitable for all multi-turn valve applications requiring control and indication flexibility. It offers end users ever higher standards of performance, build quality and overall value.

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IQ

IQ actuators are multi-turn electric actuators which can be used for isolation or regulating duties of up to 60 starts per hour. IQ's are watertight or watertight and explosionproof depending upon specification.

Direct torque output range from 34 Nm (25 lbf ft) to 3,000 Nm (2,200 lbf ft).

IQM

The modulating version of the IQ has a solid state reversing starter in place of the electromechanical contactors. "Hammerblow" lost motion drive is removed and fast response remote control circuits for rapid control are included. The IQM is suitable for up to 1,200 starts per hour. The solid state starter also adds an electronic motor 'brake' feature, improving positional control.

IQML

Benefiting from all the features of the IQ and IQM actuators, the IQML has a linear output drive providing modulating thrust output of up to 100 kN.

IQS

IQS actuators are single phase versions of IQ actuators.

Torque range from 65 Nm (48 lbf ft) to 450 Nm (332 lbf ft).

IQD

IQD actuators are direct current (DC) versions of IQ actuators.

Torque range from 27 Nm (20 lbf ft) to 305 Nm (225 lbf ft).

IQH

The IQH provides a range of high output speeds while being generally irreversible and therefore providing a self-locking* ability by the actuator for the valve. Developed for diverter valves in meter prover applications, IQH provides fast operation with positive seating without backdriving.

*For detailed information see publication E118.

Special Designs

With our extensive product range and engineering knowledge Rotork can provide solutions for most applications.

†with an additional SFCM Control Module

Established Leaders in Actuation Technology



The IQT range

The IQT (IQ quarter-turn) is the result of ongoing commitment to product development at the cutting edge of new technology.

Maintaining the simple commissioning and troubleshooting design of the Rotork IQ (see left), the new IQT introduces a direct drive, quarter-turn actuator—offering the highest standards in comprehensive control, access to real time diagnostics and comprehensive bus compatibility.

IQT features:

- Direct drive quarter-turn
- Three phase, direct current and single phase actuators
- Multilingual text display for status and setup
- On-board data logger included as standard
- IrDA™ compatible for local and remote actuator analysis via InSight PC software
- Clear, user friendly controls and indication
- Simplified torque and position control for increased reliability
- Comprehensive control and flexibility
- Approved for use in SIL applications†



IQT

IQT actuators are direct drive quarter-turn electric actuators which can be used for isolation or regulating duties of up to 60 starts per hour. IQT's are watertight or watertight and explosionproof depending upon specification.

Torque output from 50 Nm (37 lbf ft) to 2,000 Nm (1,476 lbf ft).

IQT Fail Safe

The IQT Failsafe actuator provides valve failsafe operation by utilising power from an internal battery during AC supply mains failure. Under normal supply conditions the actuator operates from the site AC electrical supply. On loss of this supply the actuator automatically switches over to receive power from a 24 V DC supply allowing control of the valve to the failsafe position.

For detailed information see publication E116.

IQTM

The modulating version of the IQT has solid state motor switching and includes fast response remote control circuits for rapid response to control signals. The IQTM is suitable for up to 1,200 starts per hour.

IQTF

The IQTF provides extended output rotation for part turn valve types requiring more than 90° for operation. Typical valves include 180° and 270° diverter valves and multiport manifolds requiring bi-directional 360° operation. The IQTF actuator has a low output speed for increased positional accuracy.

The IQTF may also be utilised for low turn, multiturn applications where slow operation is required.

For detailed information see publication E119.

IQTN

The IQTN has been developed to meet the specialist demands of nautical & military applications within a standard package.

Retaining all the features of the IQT the IQTN has a shorter electronics cover for confined on-board spaces and an anti-shock base.

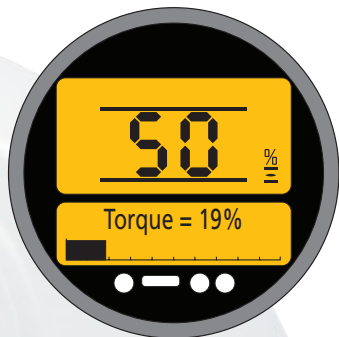
For detailed information see publication E1122.

Special Designs

With our extensive product range and engineering knowledge Rotork can provide solutions for all applications.

IQ Pro Intelligent Actuators

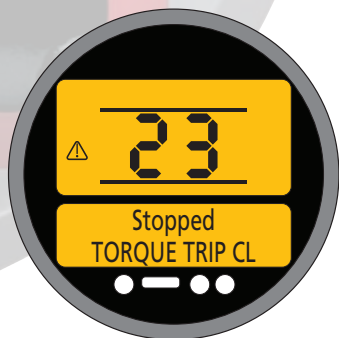
Pro



Torque and Position Monitoring



Realtime Monitoring



Actuator Alarms



Pro features

IQ Pro combines existing proven Rotork IQ features with additional control and indication functions, improved user interface design, performance monitoring and datalogging - including valve torque signature profiles. This means unparalleled support in achieving reliable valve actuation.

Founded on over 15 years of operational experience, the IQ Pro control system combines proven control logic with field programmable technology, thus providing increased functionality and reliability. IQ Pro control logic can be upgraded over the IrDA™ interface – this will “future proof” valve operation against control system and actuator developments and upgrades.

In combination with the new non-intrusive, Intrinsically Safe Rotork Setting Tool Pro, IQ actuator set-up and datalogger files can be transported from the field to the office for storage and analysis.

IQ and IQT Pro offer a range of powerful features unparalleled in Valve Actuation:

- Field upgradeable control system
- Larger, clearer display
- Customer configurable, multilingual text capability
- Datalogger valve torque signature profiling
- Status & monitoring diagnostics
- Retrofittable to existing IQ & IQT range of actuators (post 2000)
- Improved data download speed x 10

Setting Tool Pro features include:

- Non-intrusive, Infra-red communication
- Intrinsically safe for use in hazardous areas
- On site actuator configuration and data download
- Data transfer from actuator to PC with free Rotork Insight software
- Capacity for 10 configuration and 4 datalogger files
- Multiple configuration capability

Note: Setting Tool Pro data transfer capability is compatible only with IQ actuators supplied since 2000.

Actuator display

IQ *Pro* incorporates a unique liquid crystal display developed specifically for actuator indication. The unique, diffused LED backlighting system has a top section which indicates valve position and is operational over the full operating temperature range of the actuator. Large segments with backlighting allow clear visibility of valve position in all light conditions.

The lower section shows real time valve, control and actuator status, torque and alarm messaging during operation. Using the Setting Tool changes the display from position mode to set-up mode, allowing the user to view, adjust and change actuator settings.

The LCD display is supplemented with green, yellow and red position indication lights.

The display together with the control cover can be rotated through 90° increments to suit valve orientation and access.

Indication back up

Rotork recognise the need for local and remote position indication at all times, even when the actuator is powered down. The IQ incorporates a battery to maintain and update position indication when the main power is switched off. The battery also supports data logging and commissioning whilst power is off.

Set-up

Infra-red set up, adjustment and review using the supplied, intrinsically safe IQ Setting Tool *Pro* gives users access to the configuration of the actuator.

Help screens

Eight help screens can be accessed with the IQ setting tool allowing real time, grouped analysis of control signal status, valve and actuator status and indication status.

Valve torque indication

Valve torque against position can be displayed in real time with a single setting tool keystroke. Trip levels set for torque switches can be checked and adjusted based on the actual valve operating torque requirements. This results in a more realistic and accurate set up, therefore reducing the need for future "snagging". Problems such as valve tight-spots, seating and breakout forces can be assessed immediately in the field.

SIL and high integrity control systems

IQ *Pro* SIL option is available for Safety Instrumented Systems (SIS) requiring a defined Safety Integrity Level 1, 2 or 3*. The TÜV™ certified IQ *Pro* SIL option provides dual redundancy for control operation making safety functions "Stay-put" and "ESD" (IQ range only) available. For more information see publication E110.

For applications requiring higher integrity but not SIL defined, standard IQ *Pro* can be configured for conditional control. In this mode, operation depends on two discrete signals being applied. As an example of a close valve command, by applying

a signal to the remote close input and close conditional input simultaneously the actuator will operate and close the valve. If only one signal is applied, or a signal is lost, the actuators will stayput. For applications requiring ESD, the dedicated ESD input is available with a higher priority over local or remote control signals. This will therefore override any existing or applied control signal while it is applied.

Asset Management - Data logging

IQ *Pro* allows complete actuator configuration and build information to be downloaded and saved to PC. It also includes a data logger that captures and stores valve, actuator and control system status information in non-volatile memory, including:

- **Valve torque profile** - open/closed instantaneous and average torque profiles plotted against valve stroke. Reference profiles stored during commissioning can be compared to in-service torque profiles for valve performance analysis.
- **Starts log** – open/closed start positions plotted against valve stroke. Allows process control valve operation.
- **Statistics** – number of operations, highest recorded torque, last limit switch operation, battery run time, battery voltage.
- **Monitor log** – Control system, actuator and indication event log. Can be replayed and filtered for events of interest such as "torque trip". The last 1024 events are stored and stamped with date and time.

Using the IQ *Pro* IrDA™ interface, datalogger files can be downloaded to the IQ *Pro* tool or PDA running freeware IQ Pocket Insight for uploading to PC. IQ Insight PC based software is described in detail in publication E110.

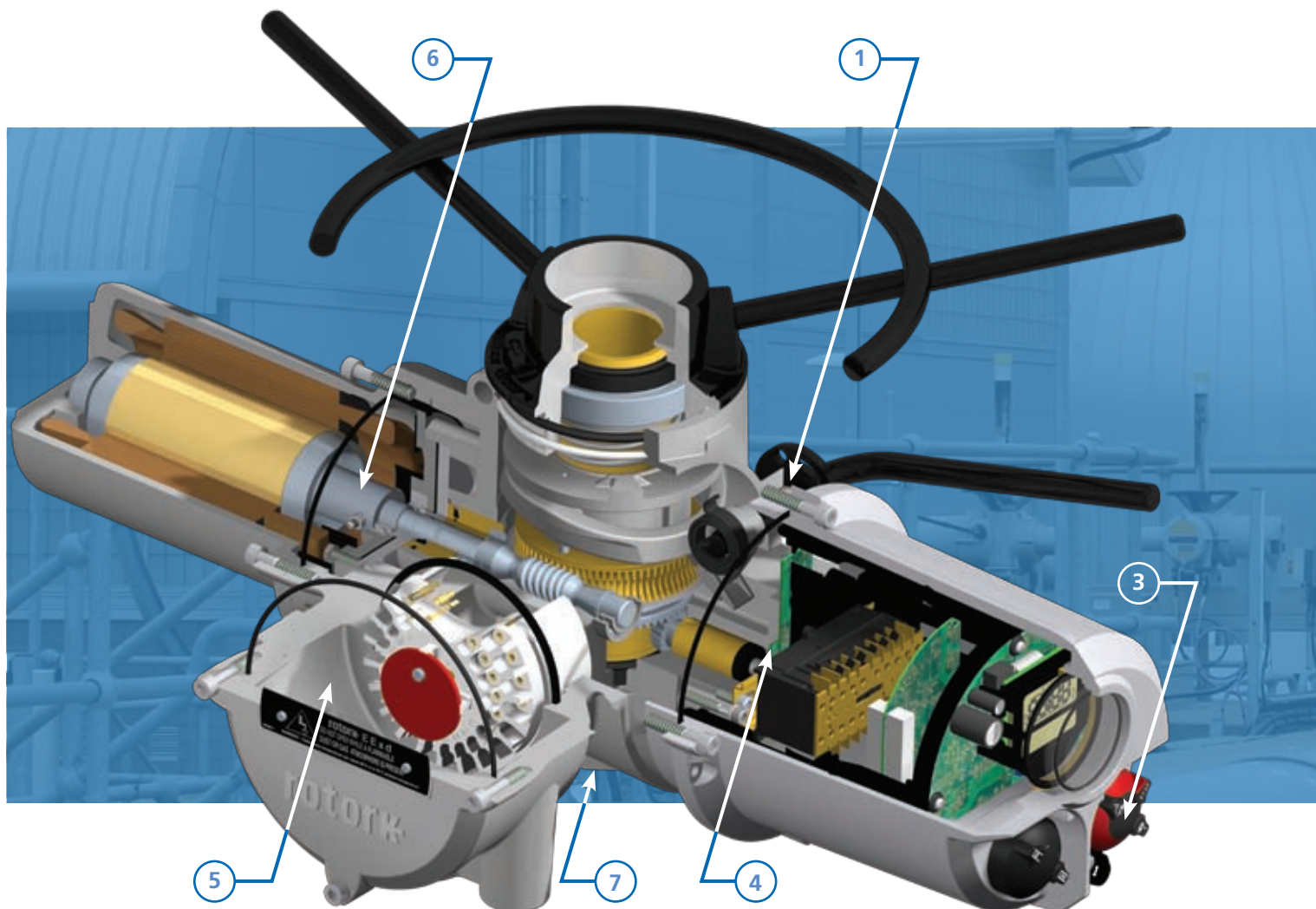
For more detailed information on IQ and IQT *Pro* products please see publication E110.



* SIL3 applications may be met using a 1oo2 actuator configuration

IQ Pro Intelligent Actuators

Advanced Engineering



1 Hand operation

Direct drive handwheel (or geared handwheel on larger sizes and IQT) provides reliable emergency manual operation in the event of a power supply failure. Includes padlockable* hand/auto clutch for safe operation even when the motor is running.

Note: power operation always has preference unless hand/auto lever is purposely locked into 'hand drive'. Lost motion 'hammerblow' effect is provided with both direct and independently geared handwheels.

2 Non intrusive setting

All actuator settings and diagnostics are made through the sealed indication window using IrDA™ communication. It is not necessary to remove electrical covers which would expose the integral controls to the plant environment.

3 Local controls

Local controls and padlockable* Local/Stop/Remote selector switch operate internal reed switches, avoiding penetrating shafts which would have to be sealed to prevent moisture ingress.

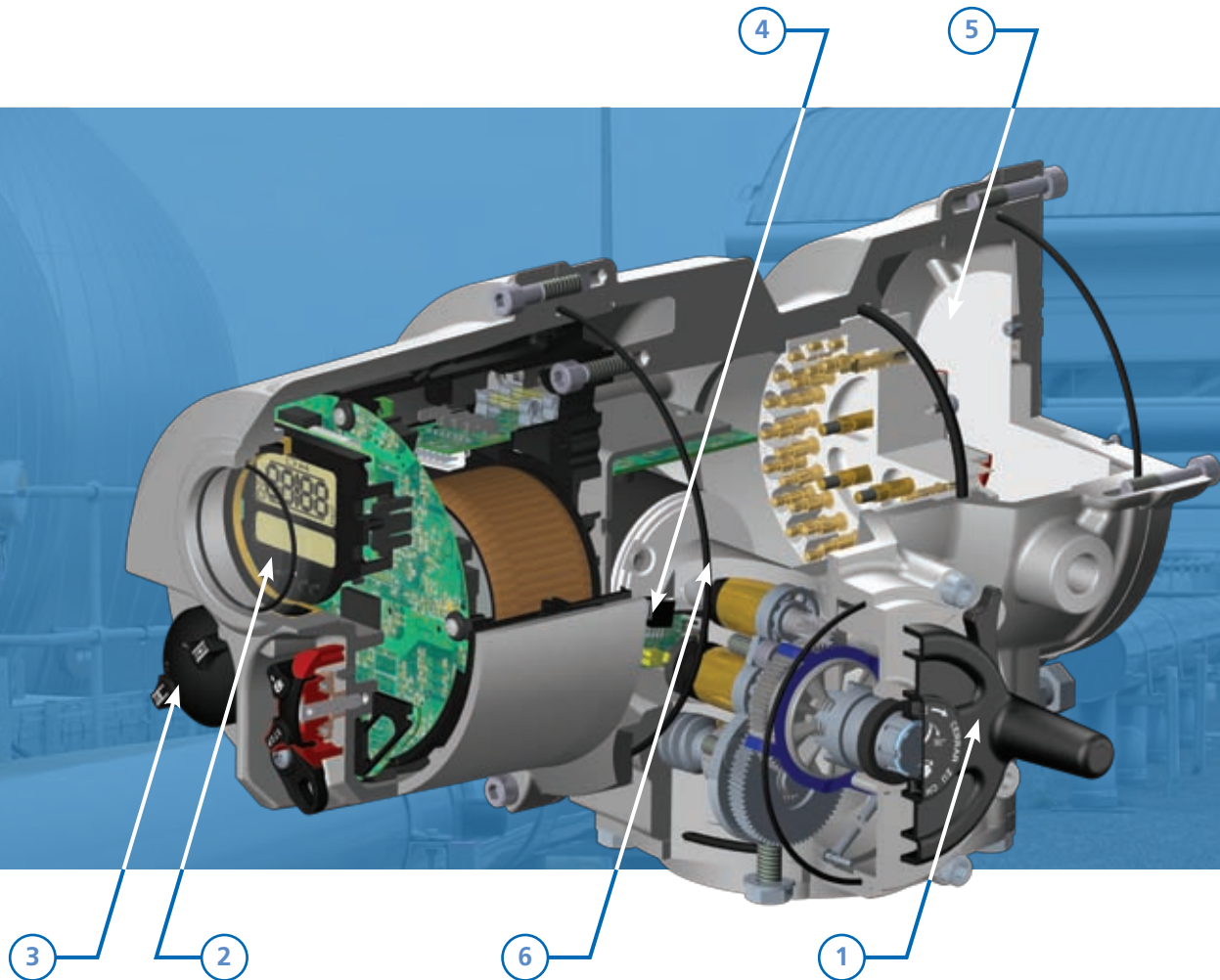
4 Position control

Hall effect magnetic pulse system accurately measures and controls the stroke of the actuator without using gears and switches.

5 Terminal compartment

Separately sealed terminal compartment ensures the integrity of the electrical equipment even when the terminal cover is removed during on-site wiring.

Established Leaders in Actuation Technology



6 IQ motor and drive

The motor shaft and worm shaft separate to facilitate simple actuator speed change. The motor has low inertia and high torque. Peak torque is produced rapidly after starting but with very little overrun when de-energized.

The winding thermostat provides accurate temperature sensing, independent of ambient temperature conditions, to optimize the motor's thermal capacity. The motor drive includes a lost motion 'hammerblow' to assist in unseating tightly shut valves. A single worm and wheel drive run in an oil bath for maximum life with ambient temperature tolerance.

IQT motor

This is a high efficiency compact unit with a proven reliability record in valve actuation applications over 20 years. Integrated speed control allows output speed adjustment over a 4:1 speed range.

7 Thrust base

Cast iron, water sealed bearings. Easily removable drive bushing for machining to suit valve stem for convenient valve adaptation.

*Minimum 6mm / 1/4 inch padlock

IQ Pro and IQT Pro range:

	Electrical Supply	Actuator Type	Duty Cycle	Torque Range*
IQ Pro	3-phase	Multi-turn isolating/regulating duty	60 starts hour	14 - 3000 Nm direct drive. When combined with a gearbox up to 43,000 multi-turn or 500,000 quarter-turn.
IQM/ML Pro	3-phase	Multi-turn modulating duty	up to 1200 starts/hour S4 - 50% duty	12 - 550 Nm with linear output thrust range 5 - 100 Kn
IQS Pro	Single-phase	Multi-turn isolating/regulating duty	60 starts/hour	25 - 450 Nm
IQD Pro	Direct Current	Multi-turn isolating/regulating duty	60 starts/hour	27 - 305 Nm
IQH Pro	3-phase	High speed multi-turn isolating/regulating duty	60 starts/hour S2, 25%	68 - 397 Nm
IQT Pro	3-phase, Single-phase & Direct Current	Direct drive quarter-turn isolating/regulating duty	60 starts/hour	50 - 2000 Nm
IQTM Pro	3-phase, Single-phase & Direct Current	Direct drive quarter-turn modulating duty	up to 1200 starts/hour S4 - 50% duty	50 - 2000 Nm
IQTF Pro	3-phase, Single-phase & Direct Current	Direct drive slow speed full-turn	S2 - 20%, 60 starts/hour, at 75% of rated torque	50 - 2000 Nm

* Actuator direct output. Higher torque ranges are available using gearbox combinations.

IQ Pro supporting documents and software are available at www.rotork.com

PC Software IQ Insight, PDA software: IQ Pocket Insight available for free download.
E110 IQ & IQT Catalogue.
E120 IQ & IQT Control and Monitoring.
E130 IQ electric motor performance data.
E135 IQT electric motor performance data.

E170 IQ Installation & Maintenance Instructions.
E175 IQT Installation & Maintenance Instructions.
E117 IQ Insight software.
Dimensions Dimensional drawings of all IQ Pro and IQT Pro range actuators are available in PDF and DXF format in IQ/IQT range - Specifications.