

Asset management at the core of latest intelligent part-turn valve actuator

The introduction of the new Rotork IQT electric valve actuator brings the advanced functionality and asset management capabilities of Rotork's 3rd Generation intelligent technology to the direct-drive operation of part-turn valves. Proven in the field by thousands of IQ 3rd Generation multi-turn actuators, new functionality brought to the compact and robust part-turn actuator includes an unrivalled range of advanced data logging and communication capabilities that have been increased in response to the end users' desire to access more data, both in the field and in the control room.

IQ 3rd Generation technology - designed for asset management

3rd Generation IQT and IQ actuators share the same advanced datalogging and asset management capabilities. In today's industries the emphasis on the benefits of preventative maintenance has never been greater and, in fluids handling environments, large numbers of valves and their critical function of controlling the flow have made them a focus of attention. The condition of the valves is a good indication of the condition of the overall plant, so a lot of benefit can be gained if the valve

actuator can regularly update the plant manager about the state of the valve that it is operating.

There are many different styles of valve and they each have their own unique torque demand curve. Capturing the torque demand curve from a newly installed and calibrated valve actuator assembly provides a reference point against which future curves can be measured. As the valve ages, the force required to open and close it can change because of internal and external factors. For example a damaged seal on a ball valve can be reflected by a fluctuating torque demand across the valve stroke. The identification of issues such as these

can be used to plan maintenance without interrupting the plant and improve overall plant productivity.

The powerful datalogger therefore provides comprehensive data capture of historical operating data for preventative maintenance, troubleshooting and asset management. Data includes valve torque profiles, operational start profiles, vibration and temperature trend logs and an event log. Service or maintenance alarms are selectable from configurable menus including open and close torque levels, total starts and vibration levels. Valve maintenance requirements can be identified and anticipated, eliminating unplanned interruptions to the process or over-cautious planned maintenance outages.

Looking in more detail at the data that is provided for preventative maintenance purposes, the valve and actuator usage log incorporates a record of total turns, average torque, total operations, total motor run time and maximum starts per hour. This information is supported with data for time-stamped alarms and user selectable limits for hi torque, hi-hi torque and number of torque trips. The full event/error log records time-stamped commands and basic alarms, whilst all alarms are independently recorded in the error log. The torque profiles provide valuable information on the condition of the valve as mentioned above. Data stored in the actuator includes valve seating profiles along with the latest and average torque profiles. This is supported by trend log profiles selectable from 24 hours up to five years, together with logged data on temperature, starts per hour and average positions. In this context the Namur107 standard helps the operator by enabling the selection of the most important alarms from a predefined list. For each alarm, one of four categories of importance can be selected, ranging through Failure, Out of Specification, Function Check and Maintenance.

For positive identification, a full description of the actuator (virtual nameplate, hardware, installed software and installed options) is also stored and can



Fig 1 – IQT actuators are suitable for three phase, single phase or DC power supplies, with a torque output range of up to 2,000 Nm available for isolating, regulating and modulating duties. The motor always runs in the correct direction, irrespective of supply type and connection. In addition, the output speed can be non-intrusively adjusted over a 4:1 range without affecting the output torque. All valve interface bases conform to ISO5211 or MSS SP 101 and are fitted with removable couplings.

be displayed. This is complemented by information about the valve, encompassing the type, size, manufacturer, installation date, serial number, tag number, service temperature and location. The logged data is completed by the inclusion of details of the service history including factory acceptance date, commissioning date, last inspection date and service notes.

Download and analysis

New data channels used within the IQ 3rd Generation actuators to give network cards access to more information use the Common Protocol Interface, which has been adopted by all major network system companies. Network connectivity options include Modbus®, Foundation Fieldbus®, Profibus®, HART® and DeviceNet® open systems, as well as Rotork's own dedicated Pakscan™ wired or wireless systems. The diagnostic information available from the IQ datalogger can be extracted from the actuator and downloaded on any PC running Rotork's Insight2 diagnostic software. Using the secure Bluetooth® hand-held Setting Tool Pro, the data from up to 10 actuators can be transferred to a PC. The datalogger information can also be transferred via the Rotork proprietary two-wire or wireless Pakscan digital control network. The Pakscan

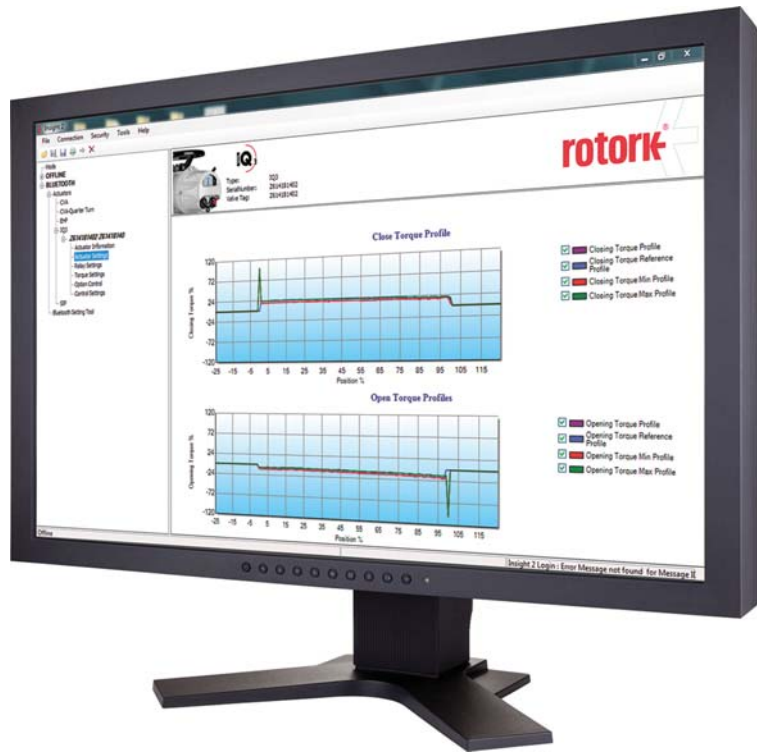


Fig 2 – Rotork Insight2 diagnostic software computer screen display, in this case showing valve opening and closing torque profiles.

master station is Ethernet-enabled so the control room can access it via the internet through its IP address. There are standard preconfigured web pages that display all of the data and operation logs for each actuator

on the network. Information transmitted over the Pakscan network is also in the master station's Long Term Datalogger, giving total visibility of every command and status update of all the actuators on the network.



Fig 3 – The diagnostic information available from the IQ datalogger can be extracted from the actuator using the secure Bluetooth® hand-held Setting Tool Pro.

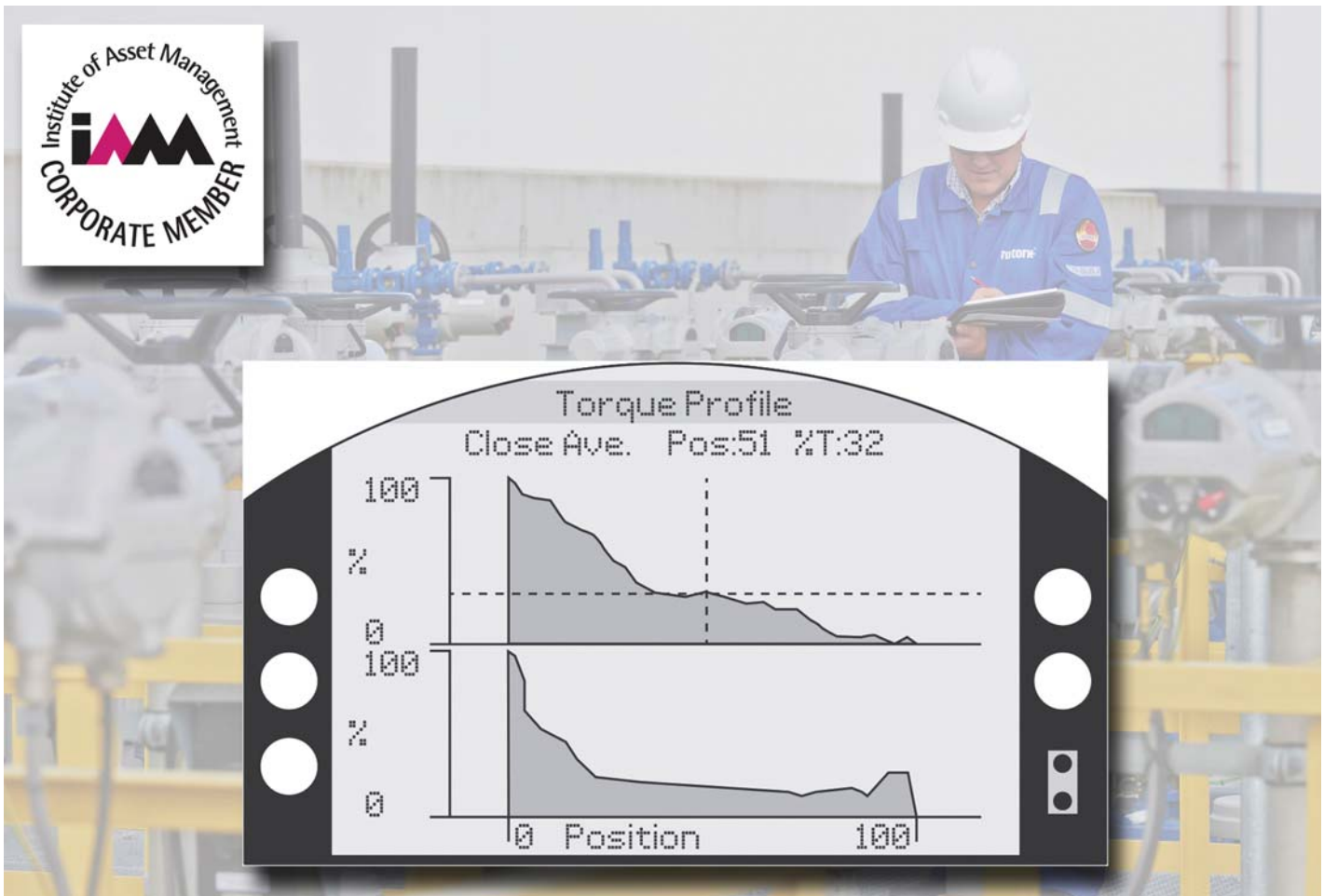


Fig 4 – Rotork is a corporate member of the Institute of Asset Management, a professional body for those involved in the acquisition, operation and care of physical assets, especially critical infrastructure.

Designed for tough environments

Diagnostic graphics present a window into the conditions at the valve, showing the valve torque, usage profiles and service logs, facilitating real-time analysis directly at the actuator. The information-rich backlit display is the focus of attention for non-intrusive wireless communication and multi-functional indication, including user-friendly multi-lingual menus for configuration and commissioning. Local position indication, valve and actuator status, asset management and diagnostic operating information is available to be downloaded or viewed directly at the actuator on the large LCD display. The display provides real-time status data, positional and warning icon information, visible at temperatures between +70°C and -50°C. Actuator setup and operating menus along with detailed diagnostic and operational data screens are clearly displayed in dot matrix format at temperatures down to -20°C. Using the *Bluetooth*® hand-held Setting Tool Pro, the speed and ease of commissioning

and configuring the actuator have been improved. Insight2 can further streamline actuator setup by pre-defining complete sets of instructions and settings. Each collection of settings can be saved as a 'mission data set' and quickly applied to multiple actuators requiring the same configuration. Torque sensing is reliable and accurate over the life of the actuator. This is very important for asset management, as the torque profile of the valve operating stroke is recorded by the actuator data logger as a 'footprint' during commissioning and subsequently recorded during every valve operation. This data forms a crucial part of the information that can be downloaded from the actuator and used for maintenance planning. Similarly, reliable valve positioning is critical. A patented absolute encoder with only one moving part tracks valve position without the requirement for a battery even when there is loss of power. In addition, as all configuration and datalogger data is stored in a non-volatile EEPROM memory, all settings are retained. If an actuator is manually operated during a power outage, the local display and remote indication

is kept updated by a battery which also facilitates data logging and power-off commissioning.

The IQ double-sealed IP68 watertight and temporarily submersible enclosure is universal to all Rotork actuators, including those with explosion-proof certification. It permanently protects internal electrics from the ambient environment, even during site wiring with the terminal housing cover removed. Hazardous area actuators are fully approved to the latest ATEX standards.

The double-sealed design, in which the terminal housing is separately O-ring sealed from the rest of the actuator, has been a standard feature on Rotork electric actuators for over forty years. It is proven to increase long term reliability, durability and availability in the harshest of climates. On the actuator's compact and robust enclosure, local Open/Close and Local/Stop/Remote selectors are coupled magnetically to internal switches without penetrating the actuator body, further enhancing non-intrusive environmental protection. Emergency handwheel operation with motor preference is provided as standard.