

White Paper



Benefits of intelligent valve actuation in *very low temperature environments*

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Sectors: Oil & Gas

Category: Electric Valve Actuation

Products: IQ, IQT, Pakscan, Client Support Programme



Introduction

Rotork IQ technology is well established in the field of intelligent valve actuation. In addition to Rotork's double-sealed enclosure, 'non-intrusive' commissioning, data-logging and predictive maintenance capabilities, the latest IQ3 generation features an extended range of advanced functionality and communication capabilities. Hazardous area certified for operation at very low temperatures down to -61°C, the IQ3 design offers many features that can specifically benefit the operators of plants in every low temperature environment.

With the current emphasis in the oil and gas industry on unmanned, remotely operated sites, often utilising renewable energy sources in harsh and challenging environments, capitalising on the functionality and energy saving benefits of IQ3 technology has never been more important.

No heaters

Equipment traditionally used in low temperature environments has been fitted with internal space heaters to offset the effects of the cold when the equipment is idle. The practice originated when electrical equipment was poorly sealed and prone to damage caused by condensation. It continues today with equipment that is vulnerable to penetration by moisture when covers are removed on site for setting switches and commissioning. There can also be problems associated with the reliability of some electronic components at very low temperatures.

Typically an internal heater requires a 120V power supply permanently connected to each actuator. Where plants rely on renewable energy sources – as in many remote locations – this constant draw on the power supply can be an issue. Even in plants using mains electricity, eliminating this requirement will achieve noticeable energy cost savings over a period of time. In addition, equipment requiring permanent space heating is left vulnerable if power is not present, for example during maintenance or a power outage.

The IQ3 actuator design enables it to operate reliably without an internal heater at even the lowest temperatures. The key to this proven benefit is the actuator's double-sealed enclosure, combined with 'non-intrusive' setting and commissioning. The separately sealed terminal compartment enables site wiring to be completed without exposing any internal parts to the ambient environment. Setting the switches and commissioning is performed with the 'non-intrusive' hand held setting tool without removing any covers. This means that the actuator is fully hermetically sealed from the time it leaves the factory and there is no opportunity for moisture to penetrate the enclosure in the field. Rigorous low temperature testing of the actuator's electronics and display window confirm that they operate reliably at very low temperatures and after long periods of inactivity.



Fig 1 - Rotork IQ technology enables reliable operation without an internal heater at even the lowest temperatures.

Reduced cabling, digital control



Fig 2 - Each Pakscan network, wired or wireless, is supervised by the Pakscan Master Station, which links the plant network with the control system. Pictured here, the latest Pakscan P4 Master Station has introduced an ultra-fast Plus network.

The expense inherent in traditional hardwiring, where more data demands more cables, is eliminated by the adoption of the digital control network. Reduced cabling complexity, reduced installation costs and the desire to obtain increased levels of information from the plant have all contributed to the development and adoption of the digital technology. Rotork has been a pioneer in this field and the Rotork Pakscan system, now in its fourth generation, is specifically designed for the valve actuation environment.

Valve monitoring and control functions have added significance due to the proliferation of data available from the IQ3 actuator. Because actuators are situated in the critical areas of plant operation, the information that they provide is especially valuable for gauging the health of the process. The collection and analysis of all this information can therefore make a vital contribution to operators' abilities to manage

their flow control assets, maximise efficiency and reduce the cost of ownership.

The full potential of this high level of information is limited by the amount of data accessible through traditional wiring, meaning that preventative maintenance, involving the manual checking of devices, would still be required in these environments. However, the development of networks, both wired and wireless, means that all this data is available for the generation of predictive maintenance, with the inherent benefit of optimum plant utilisation and the ability to identify and repair potential breakdowns before there is an unplanned interruption to the process. Rotork's IQ3 intelligent actuator technology incorporates a comprehensive menu of operating and diagnostic data, designed to support asset management and refined with the benefit of feedback from the field over more than twenty years.

The actuator indication window is the focus of attention for setting operational parameters and displaying valve, actuator and process information in real time directly at the actuator. This display can include menu driven setting information, current and historical status, process performance and diagnostics. For example, changes to the valve operating torque characteristics can be displayed, traced and identified. There is ample space to store all this information in the actuator's datalogger.

This information is available at the actuator and downloadable using the hand-held setting tool for transfer to a PC running Insight 2 diagnostic software. It is also downloadable over a wireless or Plus Pakscan network, so the user can perform the operation without leaving the control room, saving the time and the expense of visiting many individual valve installations on large sites, or actuated valves in remote or hazardous locations.

Each Pakscan network, wired or wireless, is supervised by the Pakscan master station, which links the plant network with the control system. Information transmitted over the Pakscan network is stored in the Master Station in the LTD (Long Term Datalogger) module. The information monitored and recorded by the LTD can be saved for future reference and gives total visibility of every command and status update for every Pakscan device on the network. This information can be used as part of the asset management function. In addition, Rotork's Invision software is designed to operate with Pakscan and is generally used as a local operator control panel and a maintenance and diagnostic tool.

Asset management and client support



Fig 3 - Gathering the data for the Client Support Programme involves a visit to the site, but options to further enhance the service include a direct link between the master station and Rotork via the internet or the cloud.

The ability to objectively analyse this information and identify the key areas that are important for each individual site's specific requirements is an essential requirement for effective asset management. Rotork can provide this function as an integral part of its Client Support Programme and its value can be gauged from figures provided from customers' own data, showing an average 20% reduction in valve and actuator related problems and a 30% reduction in maintenance costs in the first year for plant operators adopting the service.

Gathering the data involves a visit to the site, but options to further enhance the service include a direct link between the master station and Rotork via the internet or the cloud. This will introduce real-time direct access to all the dataloggers on the wireless or Plus network by the asset management software, improving the ability to provide a more responsive, efficient and economical service. For example, direct access could be particularly beneficial during the early stages of the programme in order to build up an accurate picture of future maintenance and replacement part requirements, bearing in mind that on the same site there can be dramatic differences between the operating frequencies of different actuators which would need to be identified.

There are numerous advantages resulting from a Client Support Programme with remote 24/7 access to the data. For example, this level of direct access would enable alarms and notifications from individual field units on the network to be immediately notified to the support team, enabling a precise response and swift elimination of the potential problem. Actuators programmed with diagnostic alarms would be able to communicate with the software as necessary, enabling plants to run with

enhanced efficiency with peace of mind for the operators.


Overall, direct day-to-day access will make a huge contribution to the achievement of the goals of best practice asset management. These include the avoidance of unpredicted downtime and the protection of investments through optimised maintenance, with support tailored to match the criticality of individual devices. Well maintained and functionally reliable equipment has greater value to the operator's business, enables employees to spend less time on maintenance and more on productivity, thereby protecting the operator's commitments to its own customers. By association, greater awareness of technology upgrades enables equipment lifecycles to be maximised, further increasing the return on investment.

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