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INDUSTRY LEADING FLOW CONTROL NEWS FROM THE WORLD OF ROTORK

Nuclear power generation: Rotork invests in the future

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Smart Valve Monitoring delivers networked solution for increased partial stroke test functionality

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Nuclear power generation: Rotork invests in the future

COVER STORY

Rotork has been involved in the supply of electric actuators for installation in nuclear power plants since the 1960s and since the 1970s has been a participant member of the sub-committees of the US Standards Committee responsible for drafting various IEEE 382 standards.

This extensive experience of nuclear operations and nuclear qualifications is now contributing to the development of new products.

Teams of nuclear-dedicated engineers are co-ordinating and facilitating worldwide product and service developments. The teams are designing products specifically for the nuclear industry, with safety and valve protection high

on the agenda. The new products are solely designed for the nuclear environment and not adaptations of non-nuclear actuator product lines, although innovations and new technologies inherent in products such as the intelligent IQ actuator range are incorporated when they are appropriate for the nuclear industry. Research into the use of new materials and

optimised designs to reduce the size and weight of products is also carried out.

Rotork is also investing in the Hiller plant at Pittsburgh to create a *Centre of Excellence* for nuclear actuators and an integral part of this activity has been the strengthening of customer support services.

Electric actuator developments

The latest electric valve actuator ranges for nuclear new-builds are tailored to suit the specific requirements of the internationally predominant nuclear island designs.

The NE actuator range has been developed for use in EDF and AREVA (EPR) nuclear power stations. The ND DC (direct current) and NA AC (alternating current) actuator range has been developed for Westinghouse AP1000 Pressurised Water Reactor (PWR)

nuclear power stations. These new designs are developments of the widely proven Rotork NA range that has been fully qualified to IEEE 382-1996/2006, comprising a simple single-stage worm drive in an oil bath gearbox, electric motor, torque and limit switches and a separate terminal compartment to which all electrical components are wired. The actuators are designed for a working life of 60 years.



NE electric valve actuator.

Story continues on p4...

Rotork IQ3 intelligent valve actuators specified for strategic gas pipeline

During the past decade, thousands of Rotork IQ intelligent electric valve actuators have been installed on stages one and two of the 4000 kilometre long West-East Gas Pipeline (WEPP) network that runs through sixty-six counties in the ten provinces of China.

The first stage of this huge undertaking, which opened in 2004, brings natural gas from the Tarim Basin gas fields in Xinjiang to the Yangtze River Delta area for the production of electricity.

In 2008 construction began on a second pipeline, in part running parallel to and interconnected with the first. The second pipeline runs from Xinjiang to Guangzhou and is being followed by two further pipeline developments, all designed to supply billions of cubic metres of gas to satisfy the burgeoning demand for energy in China's industrial and population centres.

With construction of the third stage now underway, Rotork is beginning to fulfil orders with IQ3 intelligent electric actuators. Launched in 2012, the IQ3 is designed to dovetail seamlessly into existing IQ actuator installations and control protocols, whilst introducing new levels of functionality and asset management abilities, combined with further refinements to a well-proven and rugged mechanical design.



Rotork IQ3 intelligent electric actuators introduce new levels of functionality and asset management abilities

All-electric Rotork valve control package selected for offshore wind farm



Some of the Rotork CVA actuators for the DanTysk project, fitted to butterfly valves and ready for despatch from Rotork Holland's actuation workshop facility.

Rotork is supplying an all-electric valve actuation package encompassing isolating, regulating and modulating actuators with two-wire digital control for the DanTysk offshore wind farm in the North Sea.

Almost one hundred Rotork quarter-turn electric actuators will control butterfly valves on the DanTysk transformer platform, situated 70 kilometres west of the German island of Sylt. The contract includes fitting the actuators to the valves, which has been performed prior to delivery at the specialist actuation workshop facilities attached to Rotork Holland, where the order was won.

Approximately half the actuators are IQT Pro intelligent isolating and regulating duty units, the balance comprising CVA fully modulating control valve actuators. Both designs share advanced and user friendly non-intrusive programming and commissioning technologies, combined with comprehensive integral data logging, diagnostic and asset management capabilities. Rugged, double-sealed IP68 watertight and explosionproof enclosures enhance long-term reliability in the harshest of environments, as can often be encountered in offshore applications.

Rotork CVA electric actuators deliver continuous, repeatable modulating control with a programmable fail to position option.

Resolution, repeatability and hysteresis performance is quoted at less than 0.1% of full scale, offering suitability for the most demanding control valve applications.

Digital two-wire control is provided by Rotork's proprietary Pakscan P3 system, the third generation of a market-leading product, capable of monitoring and controlling up to 240 field units without repeaters on a single highway with a length of up to 20 kilometres. Designed specifically for the valve actuation environment, Pakscan incorporates secure field communications with inbuilt network redundancy to maintain control even in the event of equipment or cable failure. On the DanTysk project the Pakscan network Master Station will link the actuators to a distributed control system and to a remote, centralised monitoring centre situated at Esbjerg in Denmark.

The DanTysk offshore wind farm is a joint venture between Vattenfall and Stadtwerke München (SWM). On completion of the €1 billion project at the beginning of 2014, 80 wind turbines with a capacity of 288 MW will supply electricity for up to 400,000 households. Rotork's involvement follows a similar North Sea offshore wind farm contract in 2011, also supplied by Rotork Holland, when IQT Pro actuators were specified for the Borwin Alpha transformer platform, serving the BARD Offshore 1 wind farm.

Environmental sealing

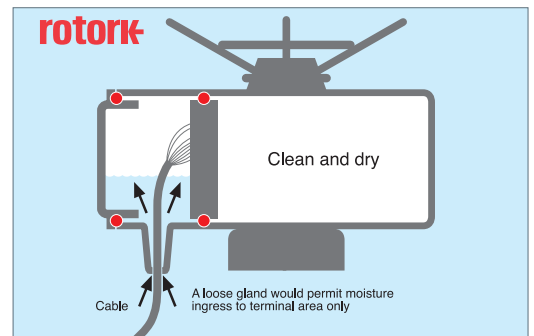
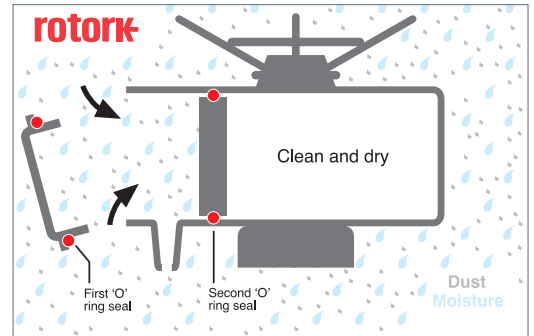
The importance of effective environmental sealing cannot be over-emphasised, particularly in view of the length of working life. Electric actuators are normally inactive and even in conventional plant applications, where the valve is in regular use, most actuators are idle for over 99% of the time. In safety related systems the operating frequency and duration is even lower, dictated almost entirely by the periodic plant test programme. Therefore the ultimate reliability of electric actuators depends on how well the electrical components are protected from the external environment. Inside the nuclear containment, the ambient temperature and humidity will rise to extreme levels during a Design Basis Event (DBE), at which time the motorised valves must perform their safety related functions.

Rotork electric actuators utilise 'O' ring sealed sleeve jointed watertight and dust tight enclosures as standard, housing all internal components in a pressure-tight enclosure which excludes dirt and moisture and prevents temperature change induced breathing. For added security Rotork's separately 'O' ring sealed terminal compartment design is used to ensure that internal electrical components are fully protected even during on-site wiring.

In a further development, during site maintenance in nuclear installations it is advantageous to keep personnel exposure times to a minimum, so the demand for a quick disconnect system has increased. A combined power and control plug-and-socket assembly for use inside the containment area has therefore been introduced, conforming to the relevant IEC safety standards. 'O' ring sealing is included in the design to preserve the environmental protection when the plug components are disconnected, maintaining the 'double-sealed' design principle.



Continued from page 2

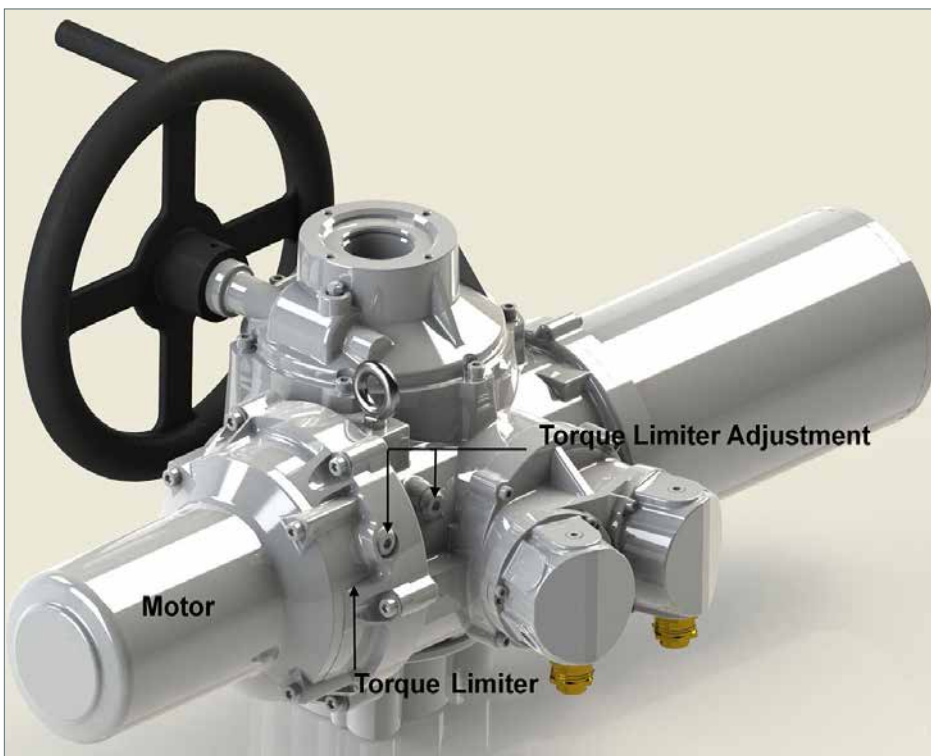


▲ Environmental protection provided by the Rotork 'Double Sealed' enclosure.

◀ Plug and socket assembly for Rotork Type NE nuclear actuator.

Torque limiting

Some nuclear actuators on safety-related valve duties are sized to ensure that they will operate under abnormal conditions such as voltage drop and high temperatures.



Torque Limiting Brake configuration.

This results in actuators being sized so that they are capable of producing up to 4 times the valve design thrusts at normal voltage and temperatures, which could cause valve damage. Additionally this often results in valves having to be designed to accept the increased loads, meaning that they are usually larger and heavier, which impacts piping design and adds cost to the plant. It is possible to protect the valve by fitting a brake. However, the prevention of damage by an electro-mechanical brake cannot be guaranteed as it remains energised with the motor. A mechanical torque limiter that is totally independent of environmental conditions, voltage and control system delays will guarantee protection under any circumstances.

Working with a number of customers and end users, Rotork has developed an innovative and entirely mechanical patented solution that will ensure that excess motor torque cannot be applied to the valve, even in the event of a torque switch failure, incorrect wiring, incorrect phase rotation or an electrical fault.

The Torque Limiting Brake is fitted internally between the actuator motor and gear case, without adding to the actuator's overall dimensions.

Torque limiting *continued*

It works on the axial movement of the worm shaft, which is always proportional to the torque produced at the actuator output. A brake disc fitted to the worm shaft comes into contact with brake pads in the open and close operating directions when the actuator output torque reaches an adjustable limit between 1.4 and 2 times the required valve torque.

The greater the torque applied by the motor, the greater the braking force and, because the brake is dealing with the lowest force at the input rather than the output end of the actuator, wear and tear on the brake is negligible through thousands of operations. Under normal torque switch control, the brake is never engaged. Independent adjustment of the open and close brake discs is easily



Typical Torque Limiter Performance Curve.

achieved through access plugs on the actuator gear case and does not involve any dismantling. Swift and accurate adjustment can be further facilitated by means of a 'smart' valve stem and diagnostic plug fitted to the actuator. Tests

have shown that the adoption of the Torque Limiting Brake can eliminate the practise of over-sizing valve structures because of the risk of stall torque damage, particularly in high speed valve operating conditions.

The NE and ND actuator ranges are in the process of full qualification testing to IEEE 382-1996/2006 and to plant specific requirements. Rotork's established nuclear ranges of actuators have already achieved accreditation to IEEE 382-1996/2006 following the completion of testing in 2010, ensuring the continued support of existing installations and legacy product, and enabling controlled obsolescence management.

Complementing these products, Rotork Gears has developed a new generation of nuclear qualified gearboxes, consisting of quarter-turn worm and multi-turn bevel and spur gear designs. Designed for manual or motorised operation, the new designs feature increased gear ratios, enabling the selection of economical and efficient gearbox and actuator combinations.

Fluid power actuators

Rotork Fluid Systems has invested heavily in developing the actuators for main steam isolation valves (MSIV) and main feed water isolation valves (MFIV), replacing what was previously a customised solution for individual valve designs into a standardised range.

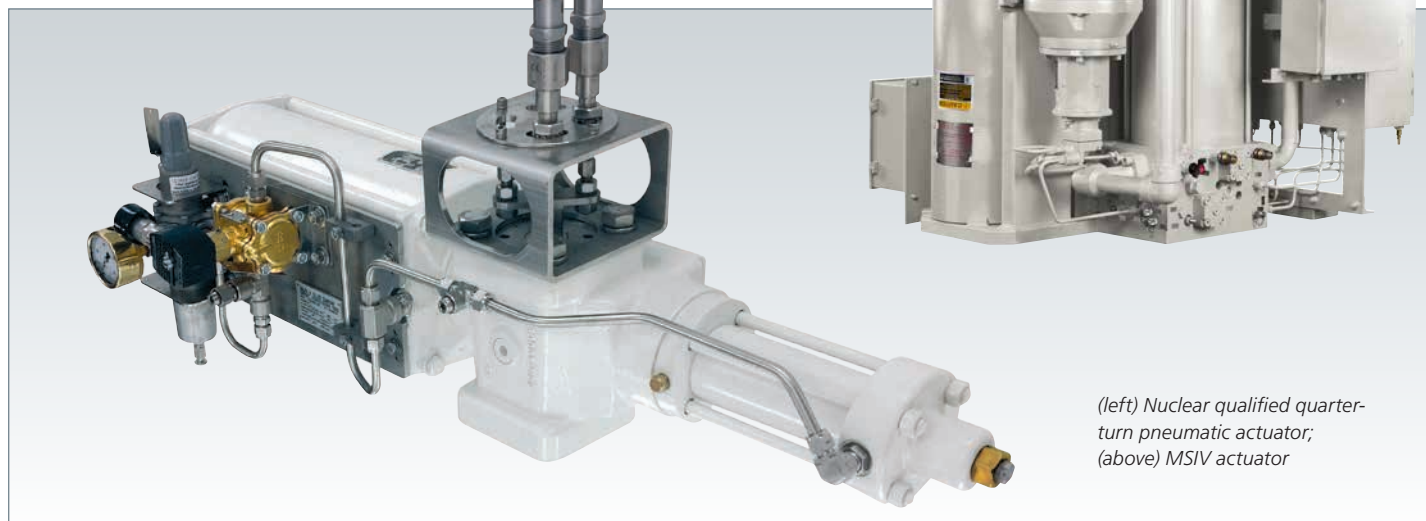
The resulting NH range of gas charged hydraulic actuators retains all the features of the previous generation with a reduced number of components and reduced overall weight. A key feature is the ability to lock into position hydraulically, which prolongs the life of the equipment by eliminating extra cycles that would otherwise be needed to correct drift.

MSIV actuators have recently been supplied to Hainan and Qinshan nuclear power plants in China and Mochovce in Slovakia.

Rotork Fluid Systems has also successfully qualified a new range of quarter-turn pneumatic actuators to the requirements of IEEE382-1996/2006 for inside containment safety related duty and AP1000 PWR for the PV10, PV11 and PV41 packages.

A range of linear actuators is qualified to the same levels. Continuing this work, a new range of linear pneumatic and hydraulic actuators for other locations and duties in nuclear power stations is also in an advanced stage of development.

rotork® Fluid Systems



(left) Nuclear qualified quarter-turn pneumatic actuator; (above) MSIV actuator

Rotork's big valve gearboxes assist the supply of fresh water to Shanghai



Valve gearboxes manufactured by Rotork Gears have been supplied for the operation of giant butterfly valves in a 17 billion Renminbi (RMB) project designed to increase, improve and secure the future supply of fresh water to the city of Shanghai.

The Qingcaosha raw water project will provide a daily supply of over seven million cubic metres (tonnes) of clean water through a network of huge pipelines, the main four with a diameter of 5.5 metres (DN5500). Rotork heavy duty model IW17 worm gearboxes have been ordered to operate butterfly valves manufactured by CVVT (China Valve Technology Ltd) on these pipelines.

With a gear ratio of 14142:1 and an output torque of 850,000 Nm, the gearboxes enable manual valve operation or operation with a portable pneumatic tool.

Work in progress on one of the giant DN5500 CVVT butterfly valves, with Rotork IW17 gearbox attached, prior to installation on the Qingcaosha project.

Rotork IW quarter-turn worm gearboxes are designed for rugged service duties with low or no maintenance. Available for clockwise or anti-clockwise valve operation, they feature a minimum safety factor of twice the maximum output torque.

Tightly controlled manufacturing tolerances provide negligible backlash between the worm and quadrant to deliver accurate movement and reduced vibration during travel.

Grease filled for life, the gearboxes are 'O' ring sealed with an IP67 or IP68 watertight enclosure for service in all environments at ambient temperatures between -20 and +80 °C. Options include high or low temperature service, limit switches, flexible drive extensions, padlock kits and an AWWA specification.

Actuation contract for nuclear power plant includes leviathan valves

Situated on the coast at Chixi Town, south of Guangzhou in China's Guangdong Province, the Taishan Nuclear Power Station is expected to be one of the largest in the world.

It is also China's first nuclear power plant to adopt the European EPR (European Pressurised Reactor) third generation reactor technology. The first phase of the project involves the construction of two EPR power plants, each with the world's largest capacity of 1,750 MW.

On the station's conventional island project, Rotork has supplied more than 100 IQ intelligent electric valve actuators for Velan wedge gate and parallel slide valves. Manufactured in sizes up to 36 inches and pressure ratings up to Class 1500, these valves will perform feed water and steam isolation duties.

The contract included 16 high speed IQ91 actuators with secondary IS gearboxes fitted to 36 inch Class 900 parallel slide valves for feed water isolation. Weighing in at over 14 tons each, these are the largest pressure seal valves that Velan has ever manufactured.

The Rotork IQ actuators were specified for this contract and supplied through Rotork Controls Canada. Designed for maximum reliability with enhanced functionality, IQ actuators feature non-intrusive, intrinsically safe commissioning, data logging and predictive maintenance capabilities.

Reliability is enhanced by the double-sealed IP68 watertight enclosure, whilst the ability to download and diagnose operating data assists the planning and implementation of effective asset management with the minimum interruption to plant operations.



The massive size of the 36 inch high pressure parallel slide valves (16 supplied in total) is evident in this photograph.

Rotork CVA electric control valve actuators are being installed during an upgrade programme on the pipeline network connecting Russia and Central Asia with Western Europe. Ukraine is an important part of this energy supply infrastructure which, in total, meets one third of Western Europe's demand for natural gas.

The Ukrainian energy company Ukgaz Energo has made it a priority to modernise the network in its country, which handles approximately 90% of the gas supplied by Gazprom in Russia. In a recently completed project, 28 Rotork CVA modulating electric valve actuators were installed on the compressor station at Bilche-Volytsa, replacing obsolete pneumatic equipment.

Rotork's exclusive agent in Ukraine, ITO Ltd, supplied a package consisting of CVA (CVL linear output) actuators and new globe valves to improve diethyleneglycol (DEG) control on

the station's dehumidification unit. Assembly, test and calibration of the actuators and valves was performed by ITO at their factory. CVA actuators deliver continuous, repeatable modulating control with a programmable fail to position option. Resolution, repeatability and hysteresis performance is quoted at less than 0.1% of full scale, offering suitability for the most demanding control valve applications.

The all-electric Rotork CVA actuator features advanced and user friendly non-intrusive programming and commissioning technologies, combined with comprehensive integral data logging, diagnostic and asset management capabilities. A rugged, double-sealed IP68 watertight and explosionproof enclosure enhances long-term maintenance-free reliability in the harshest of environments.

The customer is very happy with the move to Rotork electric control valve actuation. In particular, the diagnostic capabilities, accuracy and reliability of the CVA "have exceeded all expectations".

Rotork CVA delivers improved control valve performance on European gas supply pipeline



Some of the Rotork CVA actuators installed on the Bilche-Volytsa compressor station.

Rotork actuators on the Royal Navy's new aircraft carriers

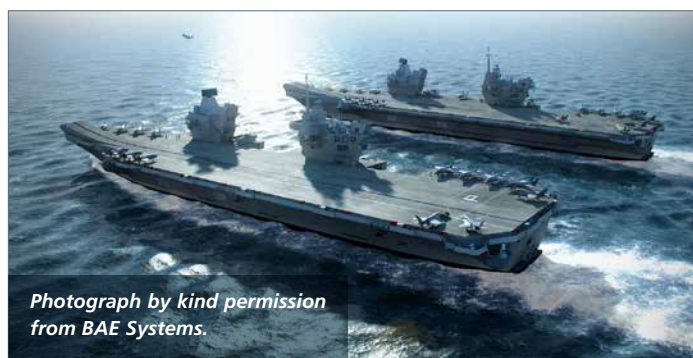
Hundreds of Rotork electric actuators are being installed on the Royal Navy's giant new aircraft carriers HMS Queen Elizabeth and HMS Prince of Wales, both of which will be 920 ft long and weigh in at 65,000 tonnes full displacement.

Each ship will be home to more than 1,200 Rotork actuators, mostly operating ball and butterfly valves on duties encompassing sea water, fresh water, chilled water, fuel and fire-fighting systems. Electric actuation was selected for the applications due to the low maintenance demands of the equipment. Rotork's ability to satisfy all the specified requirements of the contract with commercially available off-the-shelf (COTS) products also made an important contribution to the decision to award the contract. Rotork's ability included the provision of Profibus two-wire digital network connectivity, combined with proprietary non-intrusive configuration and data transfer technologies and the availability of sophisticated valve

diagnostic information, facilitated by integral actuator data loggers.

For duties that are important for the integrity of the vessels' hulls, Rotork is supplying IQTN direct drive quarter-turn actuators, which have been developed from a market-leading commercial industry design to specifically meet the demands of naval marine duties. The IQTN design has been independently tested for shock tolerance and its overall size has been reduced to lower its centre of gravity and account for shipboard space restraints.

IQTN actuator setting and configuration is performed non-intrusively using a hand held setting tool and two-way wireless link. The integral data logger keeps a record of historical operating activity,



Photograph by kind permission from BAE Systems.

including valve torque curves, which can be downloaded and analysed with Rotork software for maintenance planning or to identify and diagnose potential operating issues. The same software enables all set-up and configuration information to be reviewed, re-configured and then uploaded back into the actuator.

The majority of the remaining applications will be operated by Rotork ROMpak actuators, another specially developed design, introduced to provide the marine

industry with a lightweight and compact solution for the operation of quarter-turn valves and dampers. All the Rotork actuator designs feature local and remote control options and a manual override.

For the provision of comprehensive control and feedback data about the valves, the actuators are equipped with the Rotork Profibus-DP card, which supports standard DP-V0 cyclic data exchange and DP-V1 acyclic data exchange for diagnosis, set-up and historical data.

Rotork announces the acquisition of Schischek

Rotork has announced the acquisition of the entire share capital of the operating companies of the Schischek group. Schischek is a leader in the design, manufacture and sale of explosion-proof electric actuators, sensors, transmitters and controllers, principally for the heating, ventilation and air conditioning (HVAC), chemical, pharmaceutical, shipbuilding and offshore industries.

Schischek will become part of Rotork's Controls division and Roland Graf, the current Managing Director of Schischek, will remain in this position. The acquisition increases Rotork's existing range of explosion-proof actuators and provides Rotork with exposure to an attractive new end market.

Schischek product ranges encompass rotary and linear electric actuators and control systems providing on-off and positional control for for 2 and 3 way valves and dampers, including spring-return options. Actuator ranges are complemented by transmitting and switching sensors for differential pressure, temperature and humidity and other accessories including door holder magnets.

Designed and manufactured to the highest possible standards and in accordance with ATEX94/9/EC, Schischek products are suitable for operation in Ex zones 1, 2, 21, & 22 where



Left: Schischek ExRun S explosion-proof electric actuator for globe and three-way valves.

Above: Schischek explosion-proof modulating electric digital sensors for temperature, humidity, pressure, differential pressure and variable air volume.

gases, vapours, mists and dust may be present in the environment. Widespread applications include many industrial processes that use potentially explosive media, extraction units in tunnel systems or air flow control units in chemical laboratories, dust extraction systems in paint lines, waste water plants, container ships and tankers, oil and gas platforms and gas pipeline compressor stations.

Schischek products are used throughout the world and are approved and certificated by Ex, UL, CSA (both US and Canada), ExGostR and IECEx. Products are also IP66 and SIL2 rated.

Commenting on the acquisition Peter France, Rotork Chief Executive, said: *"Schischek is an excellent addition to Rotork's Controls division. Schischek's explosion-proof products, which are highly regarded for their quality and reliability, will enhance our range of electric actuators and enlarge our addressable market."*

New range of compact leak-free high pressure regulators from Rotork Fairchild

Rotork Fairchild has launched a new range of compact high pressure pneumatic regulators for instrument and industrial control applications.

The new Rotork Fairchild range features patent pending improved valve seat sealing that eliminates the risk of media leakage often associated with conventional high pressure regulators. In addition, innovative diaphragm designs deliver superior accuracy and higher performance pressure regulation, especially with fluctuating supply pressures.

Constructed with 316 stainless steel bodies, the units are available as the HPD diaphragm design for pressures up to 413 Bar (6,000 psi) and as the HPP piston design for even higher supply pressures.

The HPD design features high strength Inconel diaphragms as standard and will accurately regulate output pressures down to 1.66 Bar (25 psi).

It is available with the standard polymer valve seat for media temperatures up to 80 °C and supply pressures up to 241 Bar (3,500 psi). Optional higher performance valve seats are fitted for temperatures up to 260 °C and a maximum supply pressure of 413 Bar (6,000 psi).

The all-stainless steel HPP piston design models will also handle temperatures up to 260°C and increase the supply pressure capability to 689 Bar (10,000 psi).

Both the HPD and HPP designs are available with 6mm (1/4") ports in either 2 or 4 port configurations and in multiple output pressure ranges. Standard knobs can be replaced with tamper proof caps for high temperature and/or non-adjustment applications. Rotork Fairchild regulators can be mounted at the ports, the bottom surface or in panel mounted configurations.



The compact new Rotork Fairchild high pressure regulators deliver superior accuracy and eliminate the risk of valve seat leakage.

The Rotork SVM (Smart Valve Monitoring) system has been selected to provide a networked solution for digital valve monitoring and partial stroke testing on a large scale oilfield installation in the Middle East.

The system is designed to deliver predictive maintenance information from widely distributed areas for use by the operators to reduce shutdowns and improve overall plant efficiency.

This is made possible by the ability of the SVM to be integrated into an existing Ethernet and fibre optic infrastructure, enabling over 100 monitored valve actuators on wellheads at numerous locations to be networked over distances of 10 kilometres or more.

The SVM field control units on this project are attached to the emergency shutdown (ESD) circuits for shut off valves installed in sets of two and four on more than 50 wellheads. Analysis is performed on the SVM server computer in the centralised control room. Communication between the wellhead sites and the computer is fully integrated within the operator's existing network infrastructure. The SVM field units are incorporated into the Ethernet network that links other equipment and instrumentation at each wellhead site. A fibre optic link is then used to transmit the data to intermediate engineering and control stations at two manifold sites. From these sites, fibre optic links are again used to transmit data from all the wellheads to the centralised control room.

Partial stroke testing (PST) is a function used in a safety instrumented system (SIS) to enable the operator to identify possible failure modes on a shutdown or ESD valve without the need to completely close the valve and hence disrupt the process. Partial stroke testing is an accepted hydrocarbon industry standard technique that

Smart Valve Monitoring delivers networked solution for increased partial stroke test functionality

is quantified in detail by regulatory bodies such as the IEC and ISA. The partial valve stroke prevents unexpected failure on demand of the safety function and demonstrates that certain potential problems that would otherwise go undetected, such as spring fractures in the spring chamber of the pneumatic actuator, are not present. Consequently, the interval for testing for these otherwise undetected errors can be extended.

The Rotork Smart Valve Monitor incorporates several features that are not available from other systems, as well as providing detailed diagnostic data that allows the operator to plan for strategic preventative maintenance. The key to the SVM's reliable performance is its separation from the valve's control system. This enables the operator to design the control system exactly to suit the routine and safety requirements without having to compromise for the testing programme.

The SVM system is powered by the control signal to the actuator's solenoid valve. The monitoring function is then provided by a pressure transmitter located between the solenoid valve and actuator which records the instrument pressure changes whilst the valve is moving.

Any change in the valve performance is detected and identified by a change in the pressure wave exiting the actuator. The simple, self-contained design of the SVM enables it to be used with the most complex control mechanisms and makes it impossible for the SVM to prevent the valve from closing on demand.

Analysis of the 4-20 mA signal from the pressure transmitter during the partial stroke test is performed using SVM software to confirm the correct functioning of the valve or identify a fault. To achieve this, the output pressure curve of the transmitter is compared with the pressure signature of the actuator, obtained during commissioning. Identified faults can include valve obstructed, damaged actuator cylinder, seized valve or failsafe spring failure, stem shear or disconnected valve, stiff valve, increased breakout torque, damaged valve seat, internal cylinder corrosion, exhaust restriction and sticking solenoid valve.

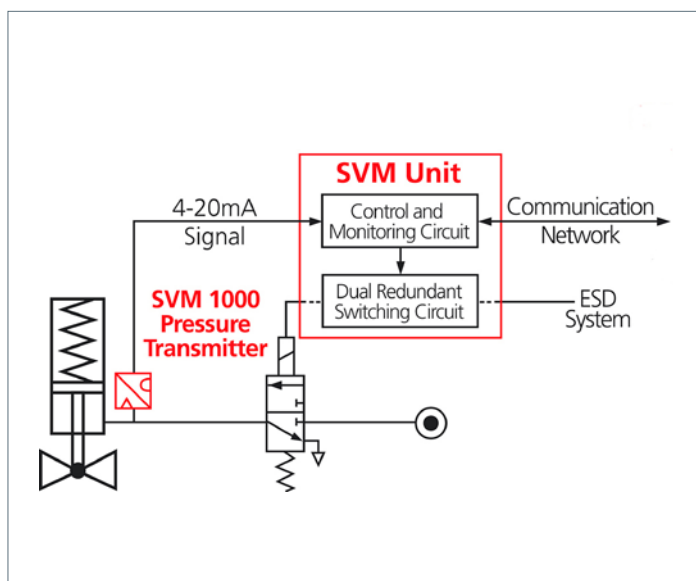
The SVM always tests every final element component of the shutdown system and is therefore capable of detecting all the failure modes of the valve, actuator and controls that are possible during a partial stroke test. It is designed to ensure that operators obtain the maximum safety performance from their systems whilst running their plants at maximum efficiency.

The benefits of using the SVM are therefore not limited to simply reducing the probability of valve failure on demand. Gains can also be made in the capital cost and the production performance of a plant. For example, the requirement for costly redundant valves can be reduced or eliminated.

Production performance can be enhanced by extending the periods between compulsory plant shutdowns and predicting potential valve failures, enabling the pre-ordering of spare parts and identification of maintenance priorities.



The Rotork SVM field unit is incorporated on the valve actuator control panel for hazardous area applications.



Typical SVM installation schematic.

Type K passes the speed test for power plant damper operation

The swift performance capability of the Rotork Type K vane type damper drive has provided the successful retrofit solution to a critical application involving the safe and efficient operation of balanced-draft power generation boilers.

Inlet draft (ID) fan inlet dampers at power stations regulate the fan-induced pressure and airflow supply to balanced-draft power generation boilers.

These boilers require a consistent internal operating pressure for efficient and safe combustion. Boiler pressure fluctuations create combustion problems that can, in extreme conditions, lead to catastrophic failure and structural damage. The maintenance of consistent operating pressure relies entirely on the swift operation of the ID fan inlet

dampers. At the three-unit 2,735 MW Florida Power & Light Manatee Power Station at Parrish, Florida, the ID fan inlet dampers demand full 90 degree damper movement at full torque load in three seconds or less in order to safeguard the operation of the boilers.

In a recent outage at the station it was necessary to replace the ID fan inlet damper drives on Units 1 and 2, which were over 30 years old and incompatible with the HART® protocol of the station's new Distributed Control System. In addition the manual overrides on the drives had proved to be unreliable.

The equipment selected to replace the obsolete equipment was Type K 'PM Series' pedestal mounted TK-6 damper drives, delivering a torque of 5,000 lbs.ft at a tested time of less than three seconds for a full 90 degree stroke.



An obsolete ID fan inlet damper drive in need of replacement on Unit 1 at the Florida Power & Light Manatee Station.



Operated by vane-type direct drive pneumatic actuators, these units offer a smoother and faster acting performance than any alternative design.

Type K provided a 'drop-in-place' retrofit installation, matching the dimensions of the existing damper drive footprint on all eight of the replacement installations in Units 1 and 2. Integrated air volume boosters were fitted to obtain the required rotation speed and the control interface was provided by smart positioners.

The Type K damper drive 'drop-in-place' replacement, matching the footprint of the old equipment. Note that the handwheel has been re-engineered in the vertical position to facilitate access to the hinged man-way door behind the unit, which provides access to the ID fan for servicing.

Prior to delivery, Type K completed factory acceptance testing on the drives and obtained the test cycle times as recorded by the smart positioners. Test results were video recorded and documented for Florida Power & Light to review.

Installation was followed by witnessed acceptance testing during which the drives performed as quickly and smoothly at full load as the factory testing had indicated, contributing to a punctual return to boiler readiness for electricity generation.

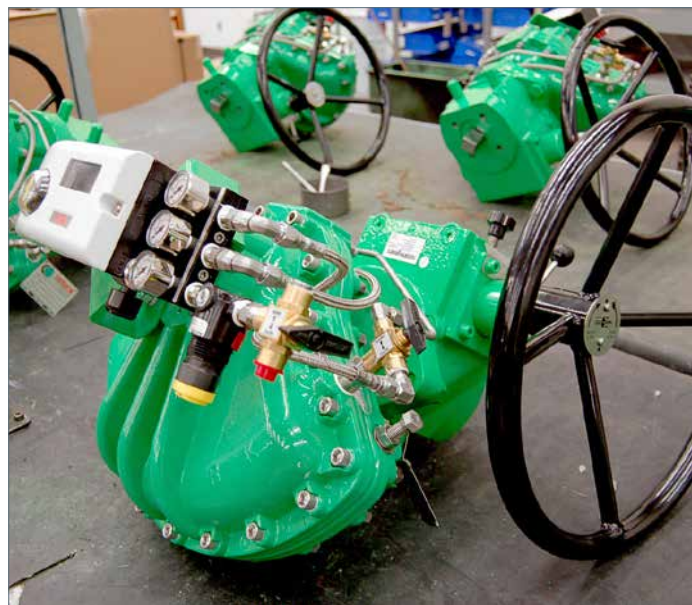
Following the retrofit at Manatee Station Units 1 and 2, Type K has supplied four identical damper drives to the Florida Power & Light Martin Station on the east coast of Florida. The four remaining drives on Unit 3 at Manatee are programmed for replacement in 2013.

In a similar project, Rotork Gears has supplied specialised declutch manual override gearboxes on swift delivery for a damper drive retrofit upgrade project at a large municipal power plant.

Twelve ILG-D gearboxes were delivered within four weeks by the Rotork Gears Houston facility for attachment to Type K pneumatic damper drives installed at an 1850 MW coal-fired power plant in New Mexico. The applications mainly involve induced and forced fan combustion control. Installed in four groups of three, the gearbox design has enabled the handwheels to be suitably positioned through 90° quadrants to accommodate obstructions and for ease of operation.

Rotork ILG-D gearboxes are specifically designed to provide a reliable means of manually overriding double-acting

Rotork declutch gearboxes deliver swift support for retrofit power plant upgrade



Actuator packages, consisting of K-Tork actuators, Rotork ILG-D gearboxes and smart positioners, ready for delivery to site.

pneumatic valve actuators in power and process applications. Mounted between the actuator and the valve or damper, the gearboxes employ a declutch mechanism to disengage the handwheel drive during pneumatic operation.

The full range of Rotork ILG gearboxes offers a rugged solution for spring-return or double-acting pneumatic actuation applications with output torques up to 32,000 Nm (283,520 lbf.in) in an ambient temperature range of -20 to +120 °C (-4 to +250 °F). Standard environmental enclosure ratings are IP65 and IP68. This contract is an excellent example of how group companies can combine to provide the best technical and commercial solutions for flow control applications.

Coal mine application demonstrates the advantages of electro-hydraulic valve actuation

Mount Thorley Warkworth (MTW) is an integrated operation of two adjacent open cast mines in the Hunter Valley region of New South Wales, Australia, supplying international and domestic markets with semi-soft coking coal and thermal coal.

Rotork has supplied valve actuators for the pipework delivering water to the north and south coal processing (washing) plants from a new 2 GL (gigalitre*) dam source. This project has included an actuator for a pipeline supplying water to a new Water Cart Fill Point for routine dust suppression operations. Each water cart fill is made up of 120 tonnes of water, delivered at a pressure high enough to overcome a 10 metre rise in the height of the pipework at the point of delivery.

The specification for the actuator to operate the isolation valve on

the Water Cart Fill Point was very demanding, calling for a solar powered, 24VDC SIL-rated electric fail safe actuator, capable of closing a 500 mm butterfly valve in 10 seconds. Rotork has been able to satisfy all these criteria with a standard Skilmatic Pro electro-hydraulic product solution.

These self-contained electrically powered actuators - comprising integrated control module, hydraulic manifold and a power unit consisting of a motor, hydraulic pump and reservoir - offer flexibility and customisation to suit specific applications. Utilising an integral spring mechanism to provide the most reliable means of positioning valves to a pre-determined safe position, they have been specifically designed for use in critical fail safe applications.

Skilmatic Pro actuators combine the simplicity of electrical operation with the precision of hydraulic



The Rotork Skilmatic Pro electro-hydraulic valve actuator installed on the Water Cart Fill Point. Solar panels seen in the background provide the renewable energy source to operate the actuator.

control and the reliability of mechanical fail-safe action. With the recent incorporation of a new intelligent control and monitoring system, the actuators provide an ideal solution for two position, safety shutdown or precise modulating control applications

The benefits of reliable valve actuation are combined with advanced HMI, monitoring, data logging, diagnostic and

communication technologies utilising Rotork's non-intrusive Bluetooth® Setting Tool. The Pro options include the ability to provide a valve signature profile as an integral part of commissioning data. Using the Setting Tool, the actuator configuration, valve operating profiles and data logger files can be transferred from the field and to a standard PC for storage and analysis as part of predictive maintenance routines.

New directors for Rotork Instruments Division

Alan Paine has been appointed as Divisional Managing Director, Rotork Instruments. Alan joined Rotork in November 2011 as Managing Director for Rotork Fairchild due to the acquisition of Fairchild Industrial Products Company. Alan will lead and drive Rotork's strategy of both organic and acquisitive growth in the Instruments Division.

Alan Paine, Divisional Managing Director, Rotork Instruments.



Alan will be ably assisted by Howard Williams, who has been appointed Divisional Sales Director, moving from his previous position of Vice President Sales for Rotork Controls Inc., where he was responsible for the sales of electric actuators and associated products and services in the USA.

Howard Williams, Divisional Sales Director, Rotork Instruments.



The Rotork Instruments board is completed by Divisional Finance Director Dave Velten, who also joined Rotork through the acquisition of Fairchild, where he will continue in his role as financial controller.

Dave Velten, Divisional Finance Director, Rotork Instruments.



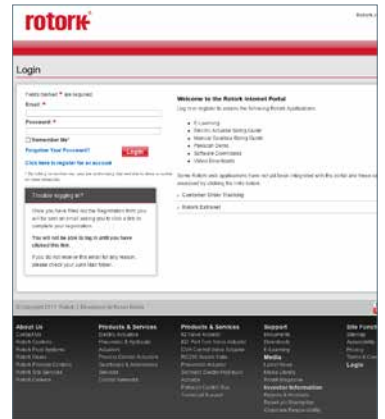
Rotork Website Update

A new IQ3 E-Learning Module is available on Rotork website.

The IQ3 module consists of an overview of the actuator functions and controls plus instructions for carrying out the basic setting procedure once the unit is installed onto the valve for the very first time.

The module should take no more than 30 minutes to complete.

To access the Customer Portal, go to www.rotork.com and click the 'Login' link in the top right hand corner of the screen.



Login screen at www.rotork.com

New Rotork Valvekits Website

Under the slogan 'Everything for the valve industry except Valves and Actuators', the new website describes Valvekits' abilities to supply a vast array of valve and actuator related products.

These include mounting kits, extension stems, locking devices, worm gears, bevel gears, accessory mounting brackets, linkages and panels for the fitting of filter regulators, positioners and solenoids.



The new website can be viewed at www.valvekits.co.uk

For more information on ROTALK articles and features contact ROTORK Bath: +44 (0)1225 733200 email: information@rotork.com



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