

rotork® Process Controls



CVA Applications



Worldwide Industry Case Studies
Control Valve Actuators

Established Leaders in Actuation Technology

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Rotork is the global market leader in valve actuation products, with a fifty-year track record serving the oil and gas, power, water and waste treatment industries.

We strive always for technical excellence, innovation and the highest quality standards in everything we do. As a result, our people and products remain at the forefront of actuation technology.

Uncompromising reliability is a feature of our entire product range, from our flagship electric actuator range through to our pneumatic, hydraulic and electro-hydraulic actuators, as well as gear boxes and valve accessories.

Rotork is committed to providing first class support to each client throughout the whole life of their plant, from initial site surveys to installation, maintenance, audits and repair. From our network of national and international offices, our engineers work around the clock to maintain our position of trust.

Rotork. Established leaders in actuation technology.

Application Overview

This brochure provides a comprehensive overview of the applications and associated functions available with Rotork CVA control valve actuators – comprising CVL linear and CVQ quarter-turn actuators.

Building on Rotork's historical success with innovative technology, the CVA offers a highly accurate and responsive method of automating control valves, without the complexity and cost of a pneumatic supply. With an increased focus on production costs and efficiency, accurate control of product through the pipeline is paramount. With resolution figures better than 0.1% and the ability to eliminate position overshoot, the Rotork CVA range helps to maximise product quality and plant capacity.

In keeping with Rotork's 'sealed-for-life' philosophy, all setup and calibration is carried out non-intrusively via a Bluetooth® enabled PDA (not supplied) using the freely downloadable Rotork Enlight software, so that no access is required to the main electronics compartment during commissioning. Additionally the terminal compartment is separately sealed, thus minimising the risk of moisture ingress during installation.



Offshore Oil and Gas Production Platforms

Offshore oil and gas production platforms, usually located in remote locations, are candidates for electric control valve actuators. Because of their design and power supply, CVA electric actuators do not require the same meticulous maintenance as pneumatic actuators and positioners; therefore electric actuators can greatly reduce the costs and time associated with keeping the control valve assembly calibrated to peak operating condition. Frequently smaller offshore platforms are unmanned so an absolute minimum amount of maintenance and human intervention is desirable.

An added benefit of not using instrument air offshore is the weight savings realised by eliminating air compressors, receivers, dryers and other peripheral equipment. Because an electric actuator can run from an existing generator, having none of this additional equipment represents a significant weight savings, which means a reduction in the support structure (or jacket) cost.



Oil or Gas Wells

Oil or gas wells located in remote production fields such as those in Canada or Australia, are ideal for electric control valve actuators. An instrument air supply system is costly to purchase and requires significant energy to run. For an installation that has no main power available, an instrument air supply is not practical, especially when only one or two control valves are in use at a location.

The CVA electric control valve actuator in the picture can accurately position the MasterFlo choke valve shown or constantly modulate it with a power draw as little as 30 Watts or less.

The actuator uses a DC power supply such as provided by solar energy systems or a thermal energy generator. In addition, it provides a fail-to-position capability should a failure in power supply or control signal occur. This means a remote terminal unit (RTU) and radio control can be used to control the remote wellhead at a reasonable cost using the CVA electric control valve actuator.



Power Stations

A Power Station in New Hampshire, which burns both natural gas and low-sulphur fuel oil, installed an electric control valve actuator to help reduce maintenance costs and improve accuracy in a demanding outdoor fuel-oil flow control application.

It was decided to replace the existing pneumatic I/P positioner and spring diaphragm pneumatic actuator operating a 6-inch class 150 ball valve. A CVA electric control valve actuator was chosen because it provides extremely precise control-valve operation with repeatability and resolution performance at less than 0.1% of full scale. The valve and actuator are located outdoors and control the flow from a fuel-oil day tank to fuel-oil pumps. The valve modulates often to maintain the correct flow as the load on the unit changes. These actuators use wireless Bluetooth communication technology that can be used for quick and easy actuator set-up auto calibration and adjustment.

On-site technicians also did extensive tests on the fail-to-position feature, and verified proper performance in both loss-of-power and loss-of-signal situations. These actuators use a supercapacitor module that provides an advanced, programmable method for fail-to-position protection.



Chemical Plants

A chemical plant in Texas, USA, required very high modulating capability.

A CVA electric control valve actuator with manual override replaced a pneumatic actuator that was failing 2 to 3 times per year due to high cycles and moisture in the compressed air lines. It is mounted to a globe valve for steam turbine control on a recovery unit.

The pneumatic actuator and positioner failed in the past, due to the high cycles required, over 120,000 operations per month, so reliability is a high priority. Electric actuators can easily provide a manual override which assures the customer that they can operate in the event of a power failure.



Glass Manufacture

An Asian fibreglass manufacturer uses electric actuators for several of their plants. Previously, they used a locally made control valve and actuator but suffered from poor performance of the actuator and valve controls.

Raw fibreglass material (pellet form) is transported from a hopper into a furnace and melted. Globe control valves must accurately control the ratio of natural gas and oxygen to the furnace to melt the raw glass. The precision of the CVA delivers this accurate control.

The correct mixture of natural gas and oxygen will ensure good combustion and provide a lean burn, saving both natural gas and oxygen.

Oxygen pipes are grey and natural gas are yellow in the picture.

The melted material is then extruded into fine threads of fibreglass. Water mist is sprayed onto the fine threads. The cooled fibre threads are reeled into coils and sold as finished product. These threads are extremely strong and used to weave or wrap fibreglass pipe, tanks, car bumpers and speed boats.



Fuel Terminals

A fuel terminal in the USA blends biodiesel and diesel with the help of nine electric control valve actuators mounted to 2" butterfly valves for side stream blending.

CVA precision electric actuators are used in side stream blending. This is a two product ratio blender where the smaller of two products is metered and controlled by a valve. The main product, diesel, is free flowing. Another meter and its corresponding control valve are located downstream from where the two products merge.



Water Plants

A Canadian water plant was looking for an alternative solution to upgrade their plant. Their de-chlorination project improves the environmental performance of the plant and involves adding a process on-site to remove chlorine from any residuals resulting from the treatment process. This is required to meet provincial regulations.

Until the CVA was introduced, a precision electric actuator with manual override and fail-to-position capability was not available. They selected the valve that would best suit their process and matched it to the CVA.

Testing was done using three actuators mounted to valves installed at a pilot project. One was a replacement of a pump sitting beside an existing unit and the other two were mounted in the same split range configuration to be used at a sister plant to handle flows that range from 0.0138 L/min to 30.6523 L/min. The smaller valve will have a Cv of 0.1 and the larger valve will have a Cv of 2.5. The actuators are programmed to adjust accordingly based on flow meter data collected immediately prior to the process seeing the control valves.

The testing has proven the effectiveness of the CVA on the precision Fisher valves. 16 more CVAs are being installed at the sister plant.



Petroleum and Petrochemical Business

A petroleum and petrochemical company in the Far East operates a full range of businesses including a refinery, distribution terminals and service stations. Primary products include fuels, chemical feedstock and lubricant oils.

The terminal replaced a spring return actuator with a CVA electric control valve actuator. The customer had difficulty getting service support and spare parts for the spring return unit. The electric actuator is mounted to a 2" butterfly valve on the VRU (Vapor Recovery Unit).

A VRU is a system composed of a scrubber, a compressor and a pressure sensor. Its main purpose is to recover vapors formed inside completely sealed crude oil or condensate tanks. The pressure sensor detects pressure variations inside the tanks and turns the compressor on and off. The vapors are sucked through a scrubber, where the liquid trapped is returned to the liquid pipeline system or to the tanks, and the vapor recovered is pumped into gas lines.

Electric fail-to-position actuators can offer a one-actuator solution. Adjustable torques and speeds allow the actuator to adapt to a variety of valves. The CVA electric actuator with its fail-to-position module closes the valve in 15 seconds, exceeding the requirements of the application and solving a maintenance problem for the customer.



Chemical Plants

A chemical plant in Australia recently installed two electric actuators at a continuous tar distillation plant and a naphthalene plant.

The first CVA actuator installed is on the wharf hot oil line back-pressure valve used to warm pitch to keep it liquid. The valve controls back-pressure against a

4-20 mA signal and must fail open on power failure.

Ease of powering and lack of stick slip and overshoot makes the CVA electric actuator the preferred solution for this application.



Oil Recovery - Water Flood

Many oil companies use water flooding, a method of secondary recovery in which water is injected into the reservoir formation to displace residual oil. The water from injection wells physically sweeps the displaced oil to adjacent production wells.

An exploration and production company purchased CVA electric control valve actuators mounted on small angled quarter-turn choke valves to control the flow of water at five different oil field well sites. They selected electric actuators because of the accuracy, configurable fail-safe capability, Bluetooth setup, compact size and unlimited modulating duty. Well heads are often in remote locations, so the flexibility of electric power and low maintenance compared to instrument air makes electric actuators more attractive.



Oil Recovery - Steam Flood

In oil recovery, electric process control actuators play an important role in the steam flooding process with many units installed on HRSG (Heat Recovery Steam Generators) units. The HRSG's produce power and use the excess steam to inject into the wells to extract the additional oil.

The CVA electric actuator was chosen because it provides extremely precise control-valve operation with repeatability and resolution performance at less than 0.1% of full scale. The actuators are mounted to 2" 1500 ANSI ball valves. Because of the high seat friction, ball valves are susceptible to stick/slip and are hard to position accurately with pneumatic actuators. The motion control on the CVA overcomes this problem.



HVAC (Heating, Ventilating and Air Conditioning)

At an HVAC (heating ventilating and air conditioning) plant in a data storage company in Singapore, the air has to be maintained at strict levels of temperature and humidity. This is essential to maintain the reliability of the data storage equipment.

The chiller controls therefore have to be precise and also, should power fail, be capable of moving to a preset position. CVA actuators were selected to operate 3 way diverter valves to control the volume of flow between the chillers and a buffer tank. This maintains a precise temperature in the chillers. On power failure the valves moves the valve to allow flow to the cooling coils.



Potable Water Treatment

A potable water treatment authority in Texas upgraded the ozone systems at three sites. CVL actuators were selected for cryogenic control valve service by the valve maker, Severn Glocon. The application requires precise control and a fail-to-position mode. No other equipment in the area was pneumatically powered so there was no instrument air readily available. Therefore, the electric CVA control valve actuators were selected.

Ozone – O₃ is a natural purifier and disinfectant, it is made up of three Oxygen atoms bound weakly together such that one is readily available to transfer electrons with other organic substances such as bacteria and viruses. This released single atom binds with the other substance in a process called oxidation. Rust is an example of this process where iron oxidizes into iron oxide.

The process controls liquid oxygen fed to ozone generators where pure oxygen passes through an electric corona, breaking up some oxygen molecules into O₁ highly reactive ions that in turn bond with regular molecules creating O₃ – ozone.



rotork® Process Controls

Rotork is a global leader in valve actuation technology. We provide a comprehensive range of valve actuators, controls and associated equipment, as well as a variety of valve actuator services including commissioning, preventive maintenance and retrofit solutions. We are committed to providing the marketplace with the latest technology, consistent high quality, innovative designs, outstanding reliability and superior performance.

Rotork Process Controls has its own dedicated engineering group for applications, product improvements and new product development. This enables the benefits of Rotork's actuation technology to be applied to the most challenging process control problems.

The Process Controls group is able to meet the specialized control needs of our customers in all industrial areas and for all applications. Our actuators are used in chemical, power, municipal water and waste water plants as well as on oil and gas upstream and downstream applications.

With over fifty years of engineering and manufacturing expertise, we have tens of thousands of successful valve actuator installations throughout the world.

USA head office

tel +1 (414) 461 9200

email rpcinfo@rotork.com

UK

tel +44 (0)1225 733200

email mail@rotork.com

A full listing of our worldwide sales and service network is available on our website at www.rotork.com



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UK
Rotork plc
tel +44 (0)1225 733200
fax +44 (0)1225 333467
email mail@rotork.com

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