

rotork®

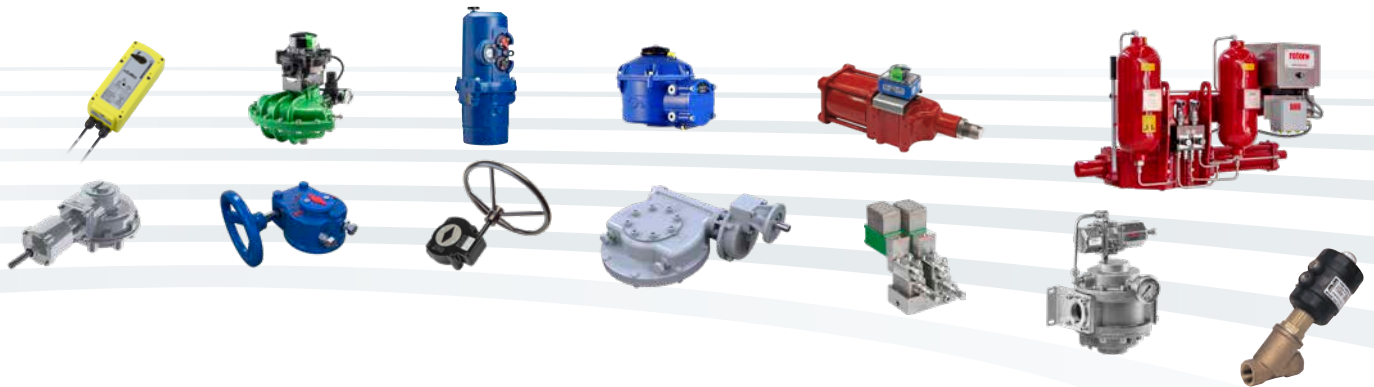
Keeping the World Flowing
for Future Generations

CVA Applications



Linear and Quarter-turn Control Valve Actuators

Reliability in critical flow control applications



› Reliable operation when it matters

Assured reliability for critical applications and environments. Whether used infrequently or continuously, Rotork products will operate reliably and efficiently.

› Quality-driven global manufacturing

We offer products that have been designed with over 60 years of industry and application knowledge. Our research and development ensures cutting edge products are available for multiple applications across multiple industries.

› Customer focused service and worldwide support

Rotork solve customer challenges and develop new solutions that are tailored to the needs of our clients. We offer dedicated, expert service and support from initial inquiry, to product installation, to long term after sales care.

› Low cost of ownership

Long-term reliability prolongs service life. Rotork helps to reduce long term cost of ownership and provides greater efficiency to process and plant.

CVA Applications

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Comprehensive product range serving multiple industries

Rotork products offer improved efficiency, assured safety and environmental protection across sectors such as the Power, Oil & Gas, Water & Wastewater, HVAC, Marine, Mining, Pulp & Paper, Food & Beverage, Pharmaceutical and Chemical sectors.

Market leaders and technical innovators

We have been the recognised market leader in flow control for over 60 years.

Our customers rely upon Rotork for innovative solutions to safely manage the flow of liquids, gases and powders.

Global presence, local service

We are a global company with local support.

Manufacturing sites, service centres and sales offices throughout the world provide unrivalled customer services, fast delivery and ongoing, accessible support.

Corporate social responsibility is at the heart of our business

We are socially, ethically and environmentally responsible and committed to embedding CSR across all our processes and ways of working.

Applications 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 industry focus on production costs and efficiency, accurate control of product through the pipeline is paramount. The CVA range provides resolution figures better than 0.1% and the ability to eliminate position overshoot, helping 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 W 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" 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 Bluetooth wireless 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 two to three 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 Manufacturing

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 photograph.

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.



Fertilizer Plants

A fertilizer plant purchased five precision electric actuators for Canada. This facility produces a full line of nitrogen fertilizers and industrial products and serves agricultural and industrial customers.

CVA electric control valve actuators were chosen because of their independence from instrument air. This means that moisture and particulate contamination from instrument air need not be a consideration.

Also the plant requires a 15 minute operating time should main power be lost. This was easily supplied by a UPS. The engineers consider this to be a more reliable back up source of power than instrument air receivers. They had experienced problems with check valves and leakage with air receivers so decided to go all electric.

These electric actuators, in service since the fall of 2009, have performed to the customer's complete satisfaction without any problems. Unlike pneumatic actuators, there is no drift in the actuator calibration, so accurate control is ensured without continuous maintenance intervention.



Oil Terminals

An oil terminal in New Zealand handles liquids for export which are pumped through a pipeline approximately 50 km long. The product is stored at a tank farm before being loaded to tankers for export.

The customer needed to replace an unreliable electro-hydraulic actuator at the tank farm. It was 25 years old and proving to be very difficult to maintain, this was a problem, along with intermittent failure to operate.

A full modulating CVA electric actuator was selected for back-pressure control on the 50-mile pipeline. The Fisher back pressure control valve maintains a 10 bar back pressure in the pipeline for optimum flow conditions.

The actuator commissioning software enables parameters to be downloaded into a user-friendly report, allowing the customer to view data on printed format, on screen, or electronically for maintenance records. This was an important aspect of asset management for this customer.



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. Sixteen more CVAs are being installed at the sister plant.



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 CVA electric actuators because of the accuracy, configurable fail-safe capability, Bluetooth wireless 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.



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 - 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.



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.



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 three-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.



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Rotork plc
Brassmill Lane, Bath, UK
tel +44 (0)1225 733200
email mail@rotork.com

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