

# rotork® Controls



The Rotork CVA delivers a range of sizes suitable for almost all linear and part-turn control valve applications requiring highly accurate positioning. It offers end users high standards in performance, build quality and overall value.

## CVA Range

Linear and Part-turn  
Control Valve Actuators

### Features

- Linear drive action (CVL)
- Part-turn drive action (CVQ)
- Continuous unrestricted modulation duty – S9
- On-board datalogger included as standard
- Configurable fail-to-position option using supercapacitor technology
- Explosion proof to international standards
- Suited for single-phase or DC power supplies
- Direct torque / thrust measurement for protection and monitoring
- Adjustable speed control
- Double-sealing to IP68 providing protection in the most demanding environments
- *Bluetooth*® enabled for local setup / control and diagnostics
- Accurate and repeatable positional control using 4-20 mA signal
- Scalable control input characterisation
- Optional Intrinsically Safe (IS) control inputs and feedback outputs
- Optional manual override
- Digital communication options including HART®, Foundation Fieldbus®, Profibus®, *Pakscan*™, Modbus® and RIRO available



**HART**  
COMMUNICATION PROTOCOL

**Pakscan**™

**Modbus**®

**PROFI**  
**BUS**

**RIRO**

**FOUNDATION**

**DeviceNet**  
COMFORMANCE TESTED

Keeping the World Flowing

# Advanced Engineering

## 1 Dual Sensor™ Technology

In order to achieve positioning to 0.1%, two independent position sensors are used to eliminate backlash and inertia effects in the gearing. The sensors are 12-bit rotary magnetic encoders, one on the motor output and the other near the output shaft of the actuator.

## 2 User Interface

The primary user configuration interface is via a generic field communicator using software freely downloadable from the website [www.rotork.com](http://www.rotork.com). In addition, each actuator has a tri-colour status LED located at the top of the rotary selector.

## 3 Power Supply / Fail-to-Position

Incorporated within each AC actuator is a switch mode power supply, which can accept a range of input voltages from 100–240 VAC 50/60 Hz. An optional 24 VDC supply can be catered for. For fail-to-position action on loss of supply, the CVA can be fitted with a reserve powerpack, which consists of ‘super capacitors’. The reserve powerpack will allow the actuator to move to a predetermined position on power failure.

## 4 DC Brushless Motor

The CVA uses a high efficiency, continuous rated, brushless DC motor. This allows maintenance free operation even with continuous unrestricted modulation duty.

## 5 Hand Drive

Optional hand drive mechanism can be provided with both linear and part-turn actuators to allow manual operation of the valve.

## 6 Terminal Bung - Double-Sealing

The “double-sealed” terminal compartment provides a compact wiring interface for power, control and feedback indication. Four conduit entries are provided as standard with internal and external earth connection points. Control and indication circuits can be supplied certified to “IS”. Double-sealing is important as the terminal compartment is then segregated by a watertight seal from the rest of the actuator. If the cover is left off during installation or if conduit entries or cable glands are not properly sealed, the actuator remains fully protected.

## 7 Geartrain

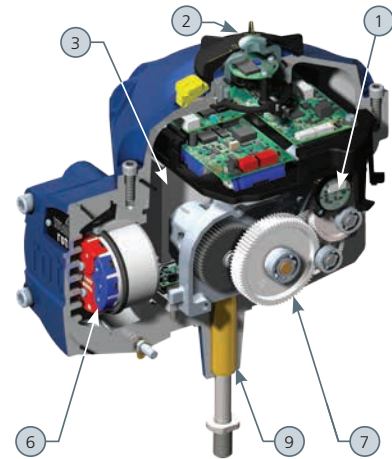
Simple yet durable high efficiency spur gear drive, lubricated for life with proven high reliability.

## CVA Range Performance Summary

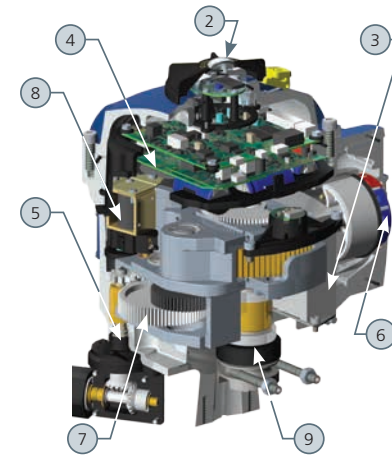
CVL - Linear	Min Thrust lbf (N)	Rated (Max) Thrust* lbf (N)	Max Stroke in (mm)	Speed in/sec (mm/sec)	Full Stroke Time sec
500	200 (890)	500 (2,224)	1.5 (38.1)	0.25 (6.35)	6
1000	400 (1,780)	1,000 (4,448)	2 (50.8)	0.1 (2.54)	20
1500	600 (2,669)	1,500 (6,672)	2 (50.8)	0.1 (2.54)	20
5000	2,000 (8,896)	5,000 (22,241)	4.5 (114.3)	0.1 (2.54)	45

\*Corresponds to 100% thrust sensor setting. Minimum thrust corresponds to 40% thrust sensor setting.

CVL  
Linear Actuator



CVQ  
Part-turn Actuator



## 8 Anti Back-Drive Mechanism

The CVA standard build is capable of resisting any back drive from the valve up to 125% of the rated force. For applications where loss of power requires absolute “fail-in-position” capability, an optional solenoid locking mechanism is available.

## 9 Output Drive

For CVQ the base conforms to MSS SP-101 or ISO 5211. CVL may be adapted to suit individual valves.

CVQ - 90°	Min Torque lbf.in (Nm)	Rated (Max) Torque** lbf.in (Nm)	Operating Time sec
1200	480 (54.2)	1,200 (135.5)	15
2400	960 (108.4)	2,400 (271)	20

\*\*Corresponds to 100% torque sensor setting. Minimum torque corresponds to 40% torque sensor setting. Mechanical stop adjustment: +/-5°.

Note: Operating speed is adjustable from 5 - 100% in 1% increments. Figures shown are at 100% setting.

# Performance

## Dwell Time Logging

The total accumulated time spent within each 1% portion of stroke is recorded by the CVA datalogger. This data may provide essential information regarding the valve sizing, control loop tuning and process stability.

For example, a valve sized for a specified process requirement to provide optimum control ranging around the 50% position should have a dwell time characteristic idealised in the graph opposite. Offsets towards the open or closed positions may indicate under or oversizing of the valve or process conditions outside design specification. A broad characteristic may confirm significant process rangeability or indicate instability. Coupled with other process data, valve dwell time can provide information leading to improved efficiency and production.

A reference dwell profile can be recorded shortly after the installation of the actuator to be used to check for sizing and stability. This may then be used for comparison in the future.

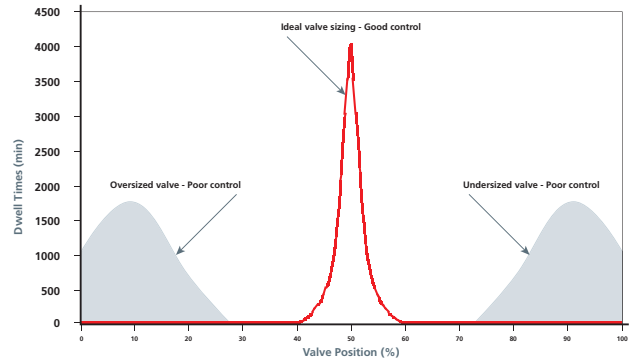
## Performance

The response (right) shows the low dead-time (0.075 sec) and high resolution of the CVA. With a step change of 2% the time taken for the CVA to move 1.7% is 0.175 seconds (T86) without overshooting the set-point.

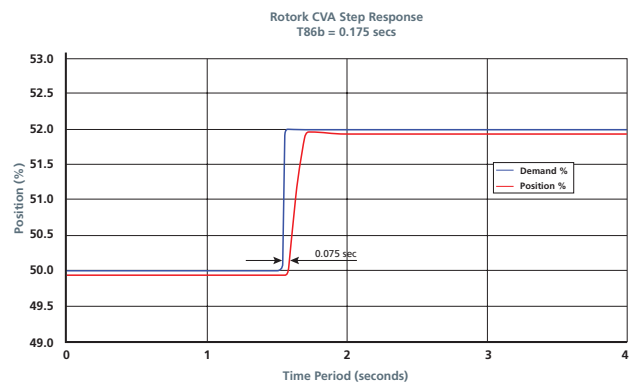
## Reliability

There are numerous advanced design features that help achieve a reliable product including:

- Dual Sensor™ technology: Using two independent position sensors, backlash and positional errors are minimised
- Brushless DC motor enables full continuous unrestricted modulation duty – S9
- The simple yet durable, high-efficiency geartrain, is lubricated for life and designed for arduous control valve duties
- Double-sealing to IP68 provides protection in the most demanding environments



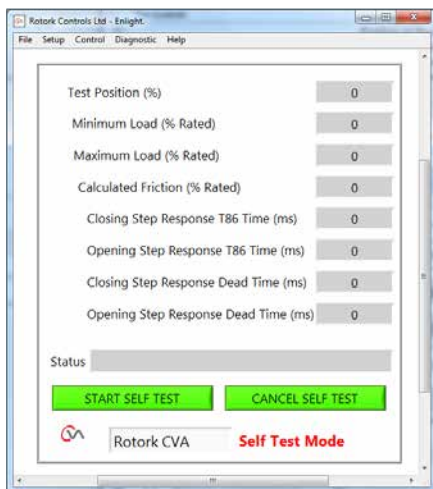
Dwell Time Graph



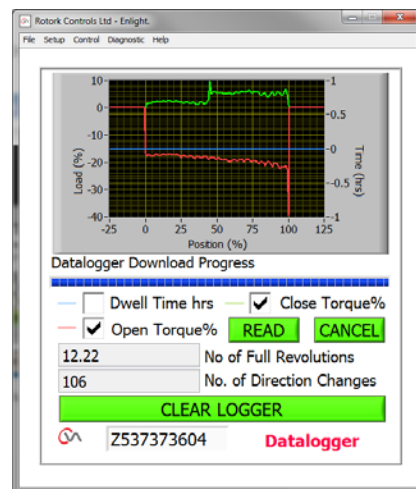
Response Time Graph

## Dwell Time Logging

The total accumulated time spent within each 1% portion of stroke is recorded by the CVA datalogger. This data may provide essential information regarding the valve sizing, control loop tuning and process stability.



CVA Enlight Self Test Screen Shot



Datalogger View

### Setup and Configuration

All setup and configuration is performed non-intrusively using a generic field communicator using software (Fig. 1), which is freely downloadable from the website [www.rotork.com](http://www.rotork.com). Each actuator in range is uniquely displayed. Once the appropriate actuator is selected the LED on the actuator will flash blue.

### Quick Setup Wizard

End-of-travel limit setting can be carried out automatically using the quick setup wizard (Fig. 2). During the setup wizard process, the CVA runs to the valve limit until it meets resistance, then backs off slightly and eases into the seat where the limit is then set. This is then repeated for the opposite direction. During the quick setup procedure the applied force can be limited for the duration of the setup. Once complete the operating force can be set to meet process requirements. During the setup the actual measured load will be displayed (Fig. 3).

When auto calibration is complete the valve travel is shown on the display.

Figure 1. Left: ECOM, Right: Rosemount 475. The CVA can be configured using a Bluetooth wireless enabled device such as a PC or alternatively a typical shop HART communicator such as an ECOM or Rosemount 475

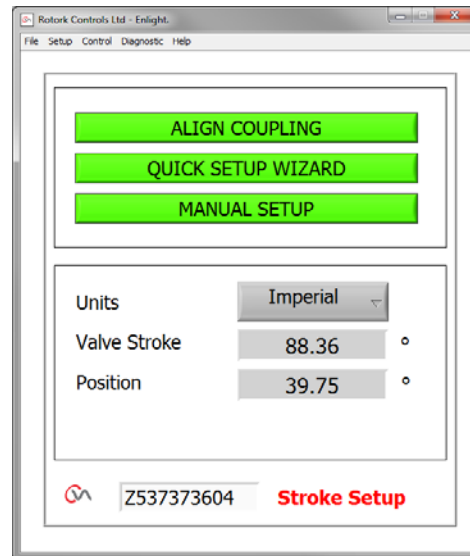


Figure 2

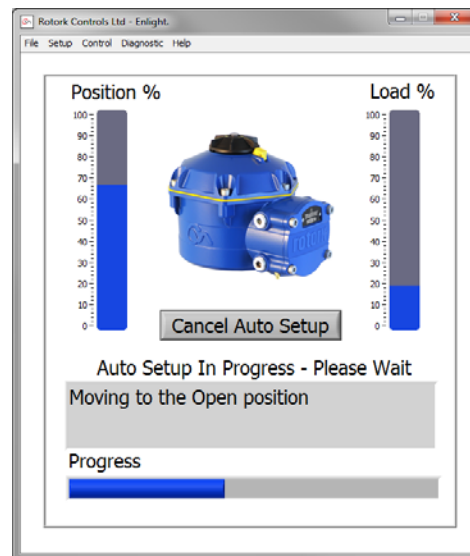


Figure 3

A full listing of the Rotork sales and service network is available on our website.

[www.rotork.com](http://www.rotork.com)

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**Gears**  
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