

# rotork®

## Process Controls

### CVA Range - Linear and Quarter-turn actuators to automate control valves

The CVA range of linear and quarter-turn actuators provides an electrically powered process control operator suitable for most control valve types and sizes. The CVA sets a new standard for process control valve actuators.

Rotork has proven expertise in applying new technologies in the automation of valves to bring enhanced performance and innovative features. This philosophy has now been applied to a new range designed specifically for the exacting demands of process control, specifically continuous modulating control valve applications.

Using the combination of advanced actuator engineering and process control experience, plus specification input from major control valve end users, Rotork have produced a range of control valve actuators that are unique in the industry and provide solutions to many common control issues.

#### Features

- Electrically powered.
- High performance, continuous unrestricted modulation duty - S9.
- High resolution and repeatability.
- Comparable life to pneumatic operators.
- Linear versions available up to 5,000 lbsf.
- Optional bus interfaces available.
- Comprehensive datalogging.
- Watertight IP68 and explosionproof enclosures.
- Programmable fail-to-position option.
- Separate, double-sealed terminal compartment.
- Optional 'Intrinsically Safe' control and instrumentation compatible.
- Non-intrusive setup/calibration using Bluetooth.
- Optional manual override.
- Available in both Quarter-turn and Linear configurations.



### CVA Range

#### Linear and Quarter-turn control valve actuators

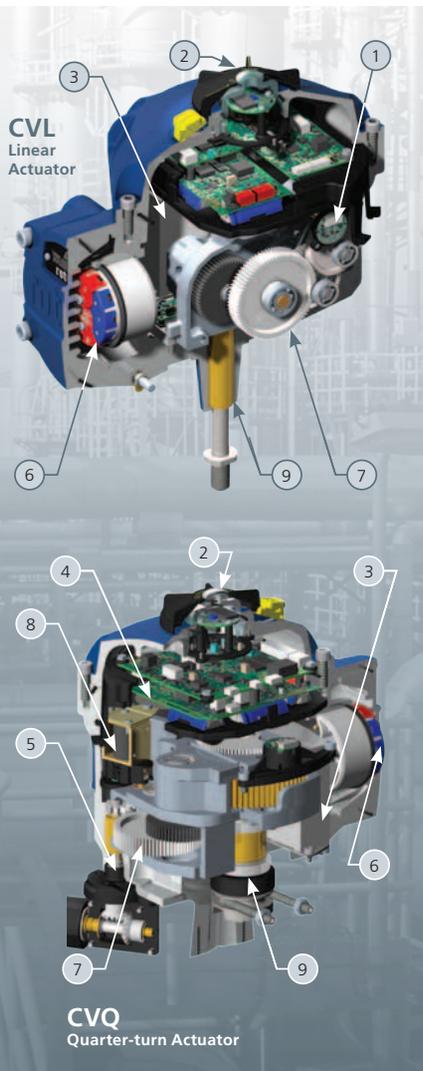


Established Leaders in Actuation Technology



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## Process Controls



### Advanced Engineering

#### 1 Dual Sensor™ Technology

In order to achieve 0.1% resolution, 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 quarter-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 and 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.

#### 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.

### 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.

CVQ - 90°	Min Torque in/lbs (Nm)	Rated (Max) Torque* in/lbs (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°.

Established Leaders in Actuation Technology

## 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.

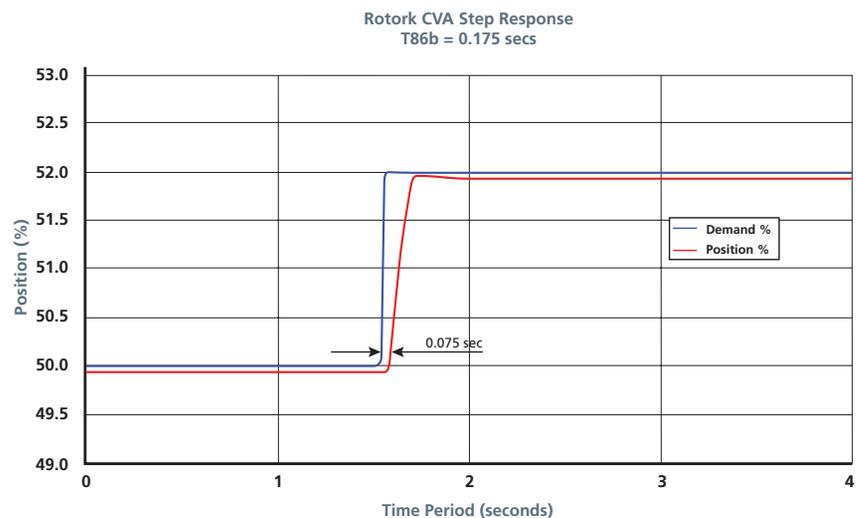
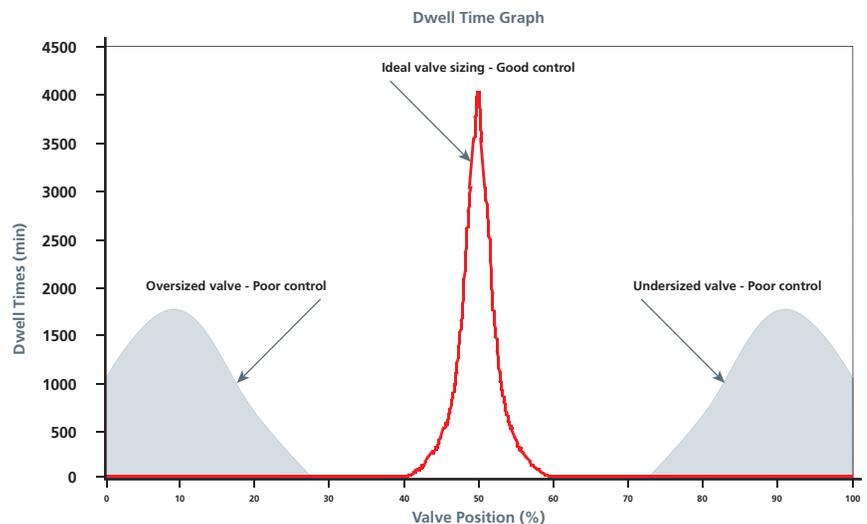
### Low Deadtime

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 (T86b) without overshooting the set-point.

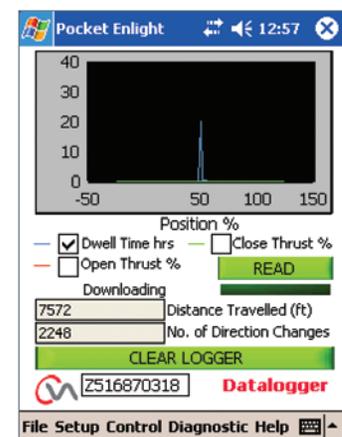
### Reliability

There are numerous advanced designed features that help achieve a reliable product, some of which are detailed below:

- Dual Sensor™ technology – utilising two independent position sensors, backlash and positional errors can be minimised.
- Brushless DC motor – the highly reliable brushless motor allows full continuous unrestricted modulation duty – S9.
- Simple, efficient geartrain – this simple yet durable high efficiency geartrain, which is lubricated for life, is designed for arduous control valve duties.
- Double-sealing – Rotork's Double-Sealing to IP68 has been applied to the CVA, providing protection in the most demanding environments.



CVA Enlight Self Test Screen Shot



Datalogger View

# CVA Range

## Linear and Quarter-turn Control Valve Actuators

### 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. The CVA can be configured using a Bluetooth® device such as a PDA or PC, alternatively a typical instrument shop HART communicator can be used.



Figure 2

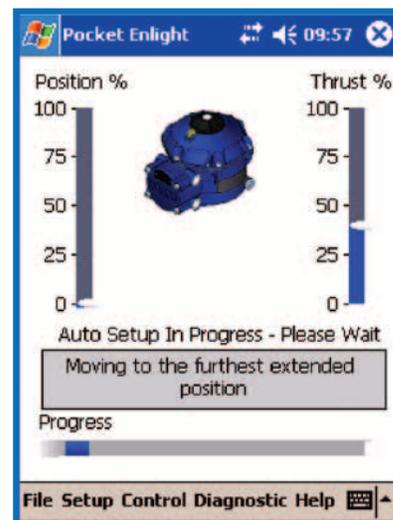


Figure 3

## Introducing the CVL-5000 control valve actuator

The CVL-5000 is the natural extension of the CVA range. The enhanced thrust output and stroke length allows the automation of larger control valves and control valves with higher pressure rating.

The fail-to-position capability of the CVA is retained with the CVL-5000, using the same super capacitor technology. The very high level of position resolution and repeatability is maintained in this addition to our range. In all other aspects, the CVL-5000 has the same features as the other CVA sizes including the enclosure specification, the Bluetooth interface and the comprehensive data logging capabilities.

With the addition of the CVL-5000, the capability of the CVA range is extended to allow an all electric automation solution where larger control valves are needed.

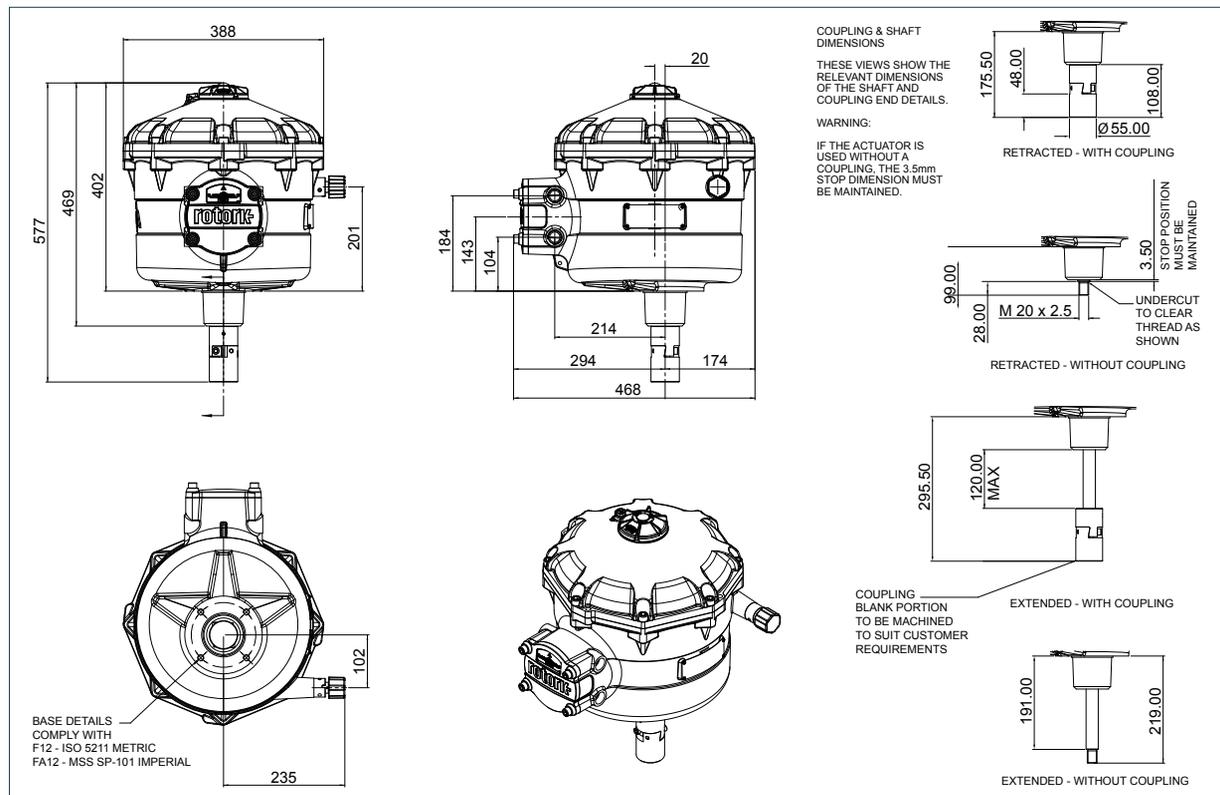


### CVL-5000 Performance Summary

CVL - Linear	Min Thrust lbf (N)	Rated (Max) Thrust* lbf (N)	Max Stroke in (mm)	Speed in/sec (mm/sec)	Full Stroke Time sec
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-5000 Dimensional Data



All dimensions in millimetres

Dimensions are subject to change without notice and should not be used for preparation of drawings or fabrication of installation mounting. For current installation manuals and other product information, see [www.rotork.com](http://www.rotork.com)

Leading CVA Applications



*Gas Processing*



*Potable Water*



*Power*



*Oil and Gas Well*



*Glass Manufacturing*



*Chemical Plant*

**and many more...**

For further CVA case studies see the following publications:

PUB042-005 – CVA Applications

PUB042-007 – CVA Glass Industry Applications

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

**www.rotork.com**

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

**USA**  
Rotork Process Controls  
tel +1 (414) 461 9200  
fax +1 (414) 461 1024  
email rpcinfo@rotork.com

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