



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.

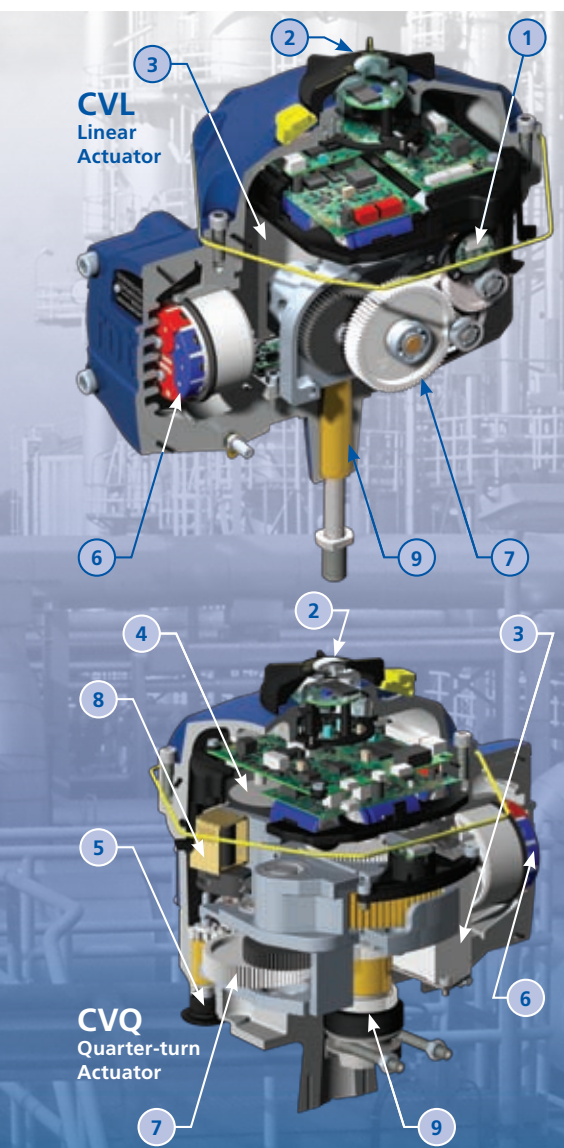
Rotork has proven expertise in applying new technologies in the automation of valves to bring enhanced performance and innovative features. This philosophy has now been applied to a new range designed specifically for the exacting demands of process control, specifically continuous modulating control 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.
- 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 & instrumentation compatible.
- Non-intrusive setup/calibration using Bluetooth.
- Optional manual override.
- Available in both Quarter-turn and Linear configurations.



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 Bluetooth® enabled PDA (not supplied) loaded with freeware Rotork Enlight software. 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 100V–240V AC 50/60Hz. An optional 24V DC 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.

Mechanical Performance

CVL - Linear

	Lbsf - Inches - Inches/second		Newtons - mm - mm/second		
CVL	Min thrust	Rated Thrust*	Max Stroke	Speed	Full Stroke time (sec)
500	200	500	1.5	0.25	6
	890	2224	38.1	6.35	
1000	400	1000	2	0.1	20
	1780	4448	50.8	2.54	
1500	600	1500	2	0.1	20
	2669	6672	50.8	2.54	

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

CVQ - 90°

	Inch/Lbs	Nm	
CVQ	Min Torque	Rated Torque*	Operating time (sec)
1200	480	1200	15
	54.2	135.5	
2400	960	2400	20
	108.4	271	

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

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.

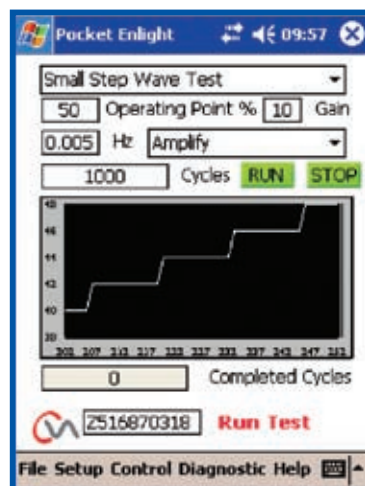
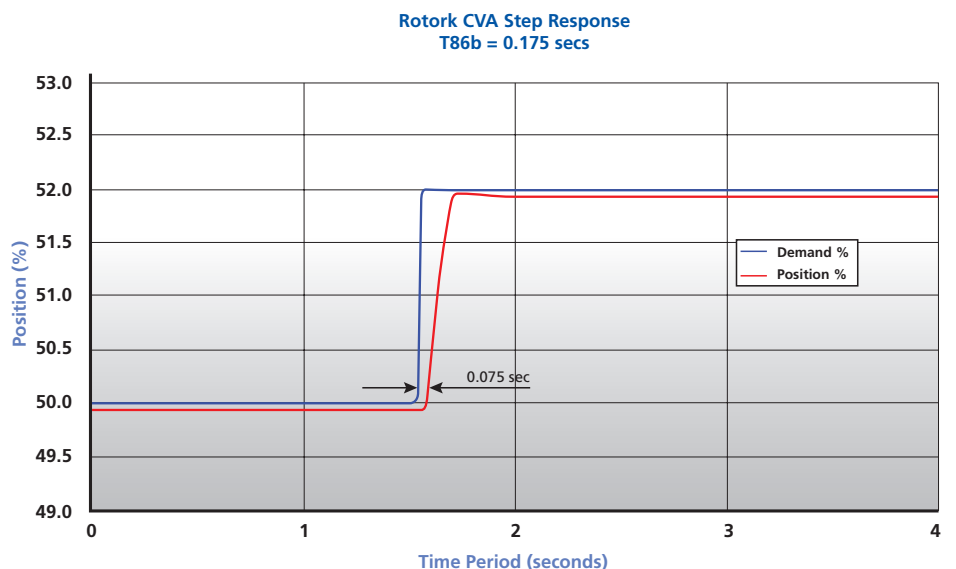
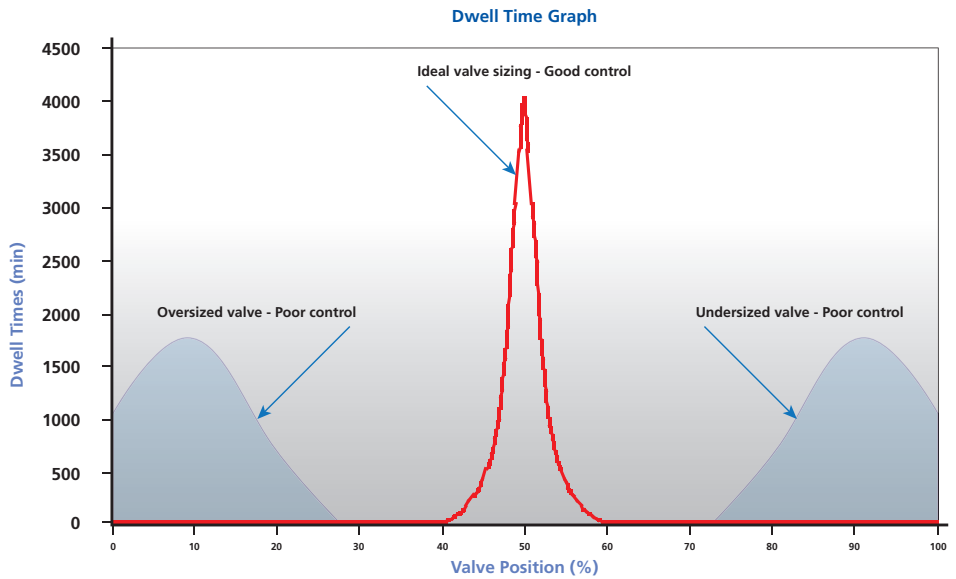
Low Deadtime

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.

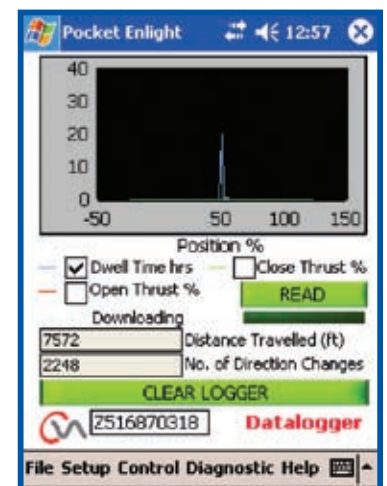
Reliability

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.



PDA Step Change Test



Datalogger View with PDA

Set-up and Configuration



All setup and configuration is performed non-intrusively using a Bluetooth® enabled PDA running the Rotork Enlight software (Fig. 1), which is freely downloadable from the website www.rotork.com

Each actuator in range is uniquely displayed on the PDA. 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 PDA quick setup wizard (Fig. 2). During the setup wizard process, the CVA runs the valve closed 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 PDA display.



Above: Figure 1
Left: Figure 2
Below: Figure 3

