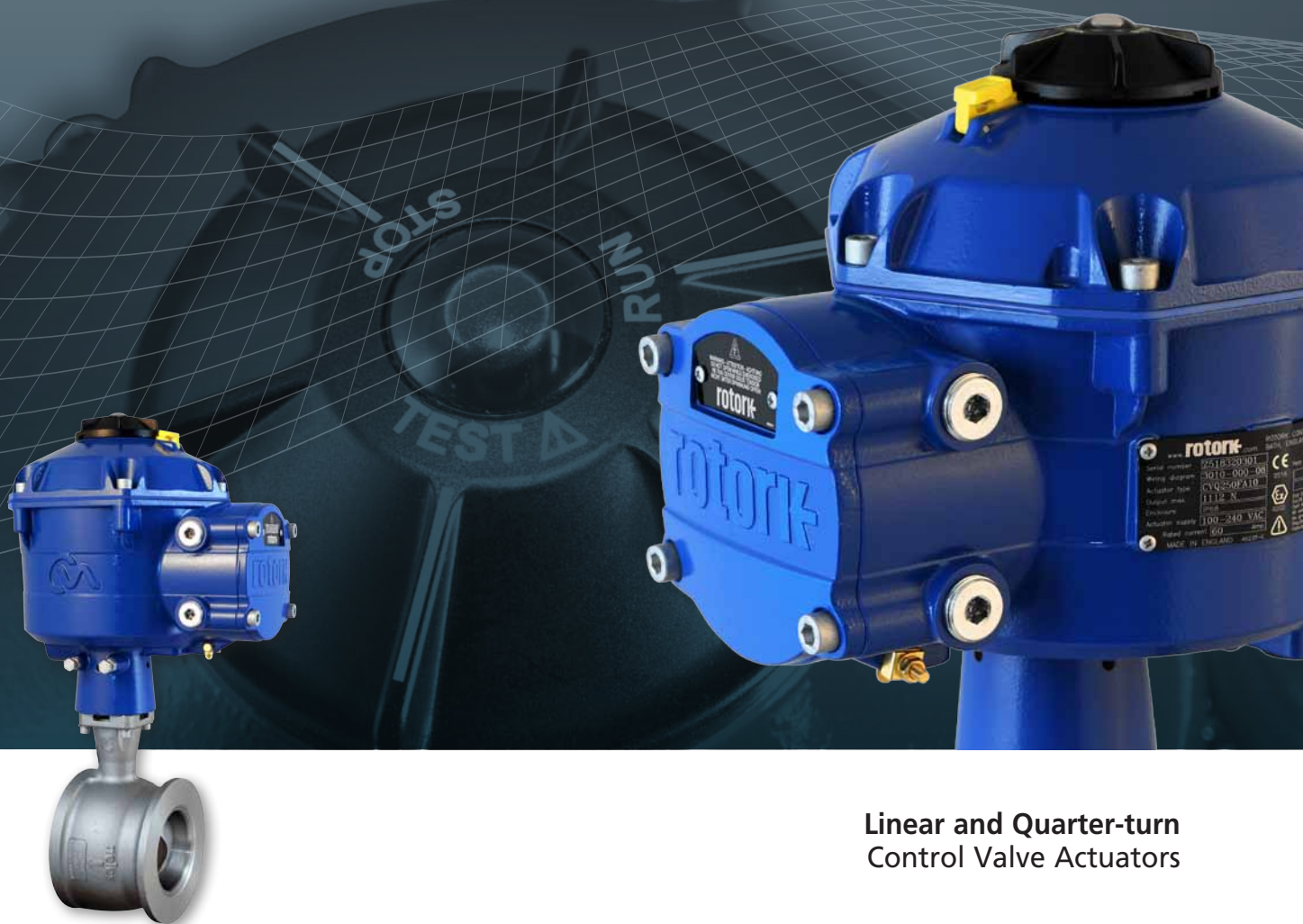


# rotork®

## Process Controls

### CVA Range



Linear and Quarter-turn  
Control Valve Actuators

Established Leaders in Actuation Technology

## Product Overview

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

For information about CVA actuators and an explanation of their features see Section 1. For detailed technical specifications and performance data see Section 2.

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 configuration is performed 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.



# CVA Actuator Range

## CVA Linear and Quarter-Turn Actuators

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

### Simplified Configuration

The Rotork CVA range provides simple, safe and rapid non-intrusive configuration using a generic field communicator. Actuator limit setting can be achieved using the quick setup wizard, which allows the actuator to 'set' its own end-of-travel limits.

### Process Analysis

Comprehensive control valve performance information is delivered to the user via the built-in datalogger. Valve position, dwell times and load values etc. are stored in order for detailed process analysis to be carried out. This allows asset management and predictive maintenance software to collect valuable data in order to maintain plant availability and efficiency.

### Features

- Single-Phase or Direct Current power supplies.
- Linear drive action (CVL).
- Quarter-turn drive action (CVQ).
- On-board datalogger included as standard.
- Bluetooth® compatible for local setup / control and diagnostics.
- Accurate and repeatable positional control using 4-20 mA signal.
- Digital communication options including HART®, Profibus and Foundation Fieldbus.
- Direct torque / thrust measurement for protection and monitoring.
- Scalable control input characterisation.
- Configurable fail-to-position option using supercapacitor technology.
- Optional Intrinsically Safe control inputs and feedback outputs.
- Continuous unrestricted modulation duty – S9.
- Watertight IP68 and explosionproof enclosures.
- Optional manual override.



CVL Linear Actuator



CVQ Quarter-Turn Actuator

# Advanced Setup Features

## 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. Rosemount 375. 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.

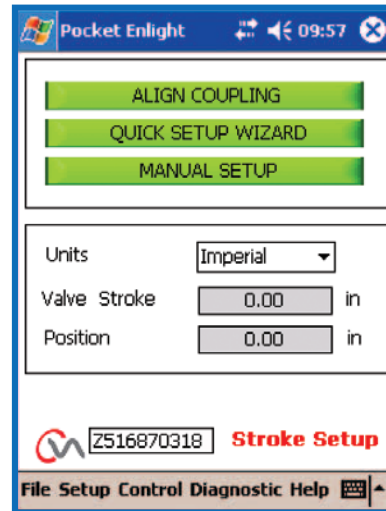


Figure 2

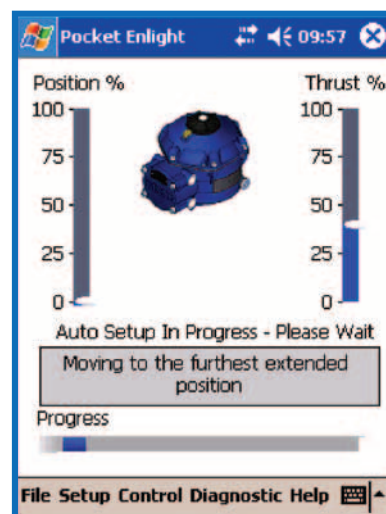


Figure 3

# Advanced Design Features

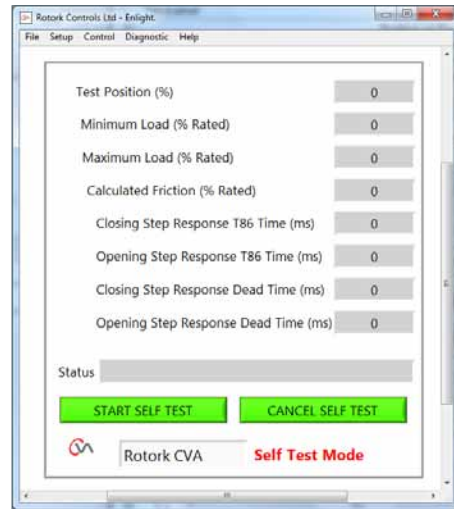
## Reliability

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

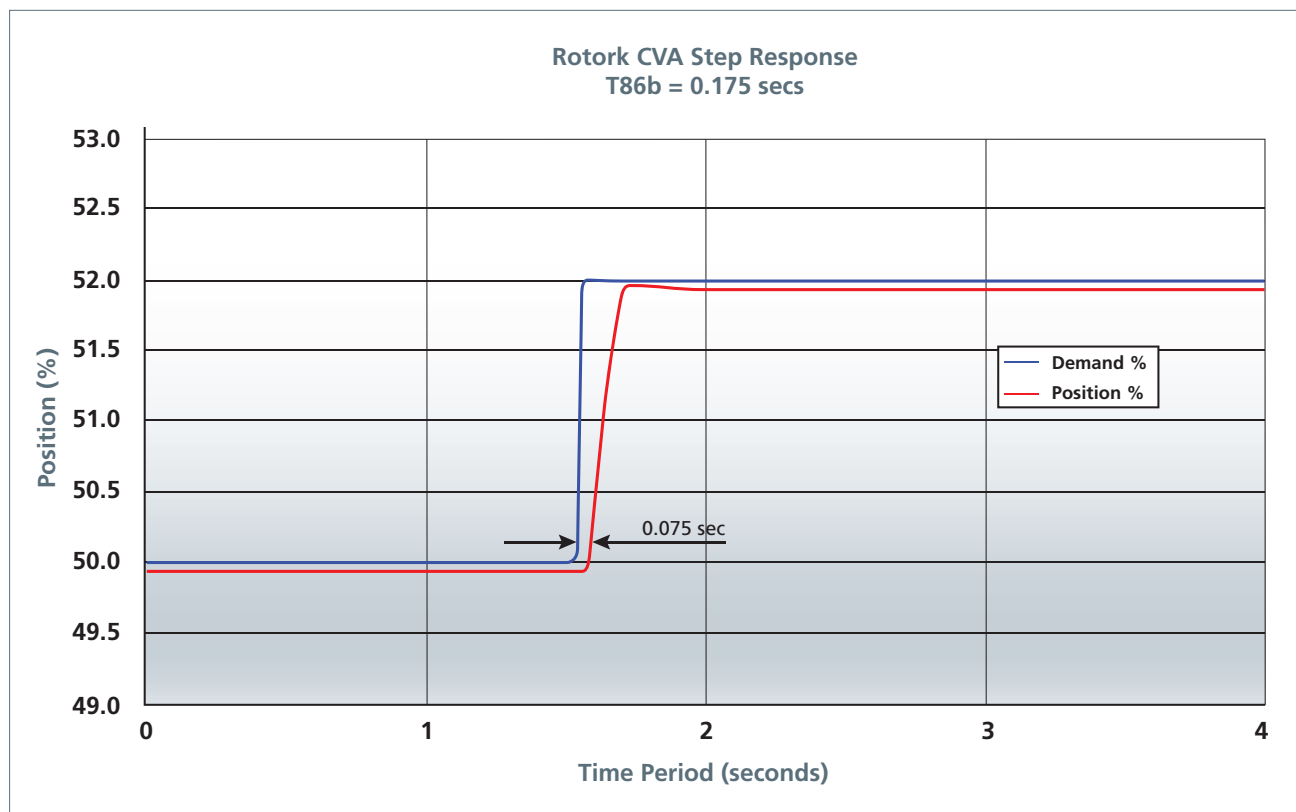
- Dual Sensor™ technology – utilising two independent position sensors, backlash and positional errors can be minimised.
- Brushless DC motor – the highly reliable brushless motor allows full continuous unrestricted modulation duty – S9.
- Simple, efficient geartrain – this simple yet durable high efficiency 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.

## Performance

The response below 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.



CVA Enlight Self Test Screen Shot.



## Advanced Design Features

### Fail-to-Position

The CVA can be configured to perform one of the following four fail-to-position actions upon the loss of mains supply. The optional reserve power pack consists of a number of "Super Capacitors" which can store enough energy to perform the actions listed below. The capacitors are re-charged every time the mains power is reinstated and this process takes less than 1 minute to complete.

Unlike rechargeable battery technology, super capacitors do not suffer from the 'memory' effect of being charged/discharged many times.

- Stay Put** – Actuator remains in its current position.
- Open Limit** – Actuator moves to the position set as the open limit.
- Close Limit** – Actuator moves to the position set as the closed limit.
- Intermediate Position** – Actuator moves to a pre-programmed position.

### Stiffness

The CVA is designed specifically to provide a resistant or "stiff" output drive mechanism so that process disturbance has little or no effect on valve position. Only "true" control system demand changes cause valve positioning responses.

In contrast, pneumatic control valve actuators are compliant or "soft" by design due to the nature of the compressible operating medium. Process disturbance tends to cause valve deflection. The subsequent "forced" position change requires a control system response in addition to the control required to maintain process stability. Control instability may result in reduced control quality or throughput.

The CVA range can withstand back-driving forces up to 125% of rated output force before any significant deflection occurs. With surges, valve position control is better maintained and therefore process quality and throughput.

An optional solenoid locking mechanism is available, which will lock the actuator in the set position when power is removed or lost. The lock can withstand back-driving forces of at least 300% of the unit rated torque/thrust.

### Intrinsic Safety

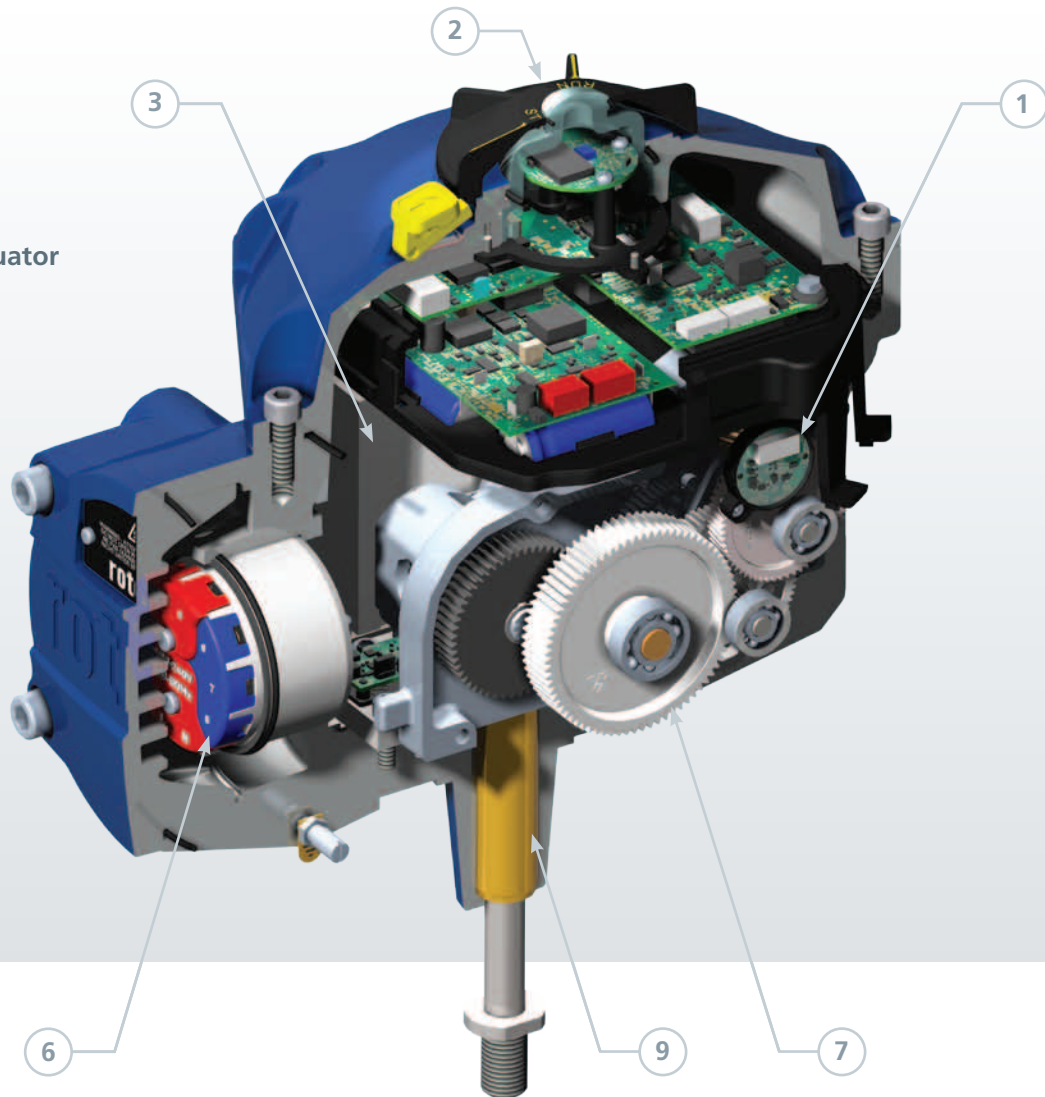
The 4-20 mA demand and feedback signals can be supplied as an Intrinsically Safe (IS) "ia" option. This is the highest level and requires the equipment to remain Intrinsically Safe in the presence of two faults. It offers the benefit of being suitable for most explosive environments or existing IS systems.

The IS approval is only applicable for the customer I/O connections, so the actuator still has to meet the relevant approval requirements for hazardous areas. For full details of the available explosionproof approvals see section 6.2, page 25.



## Advanced Engineering

### CVL Linear Actuator



#### 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 freely downloadable Rotork Enlight software. In addition, each actuator has a tri-colour status LED located at the top of the rotary selector.

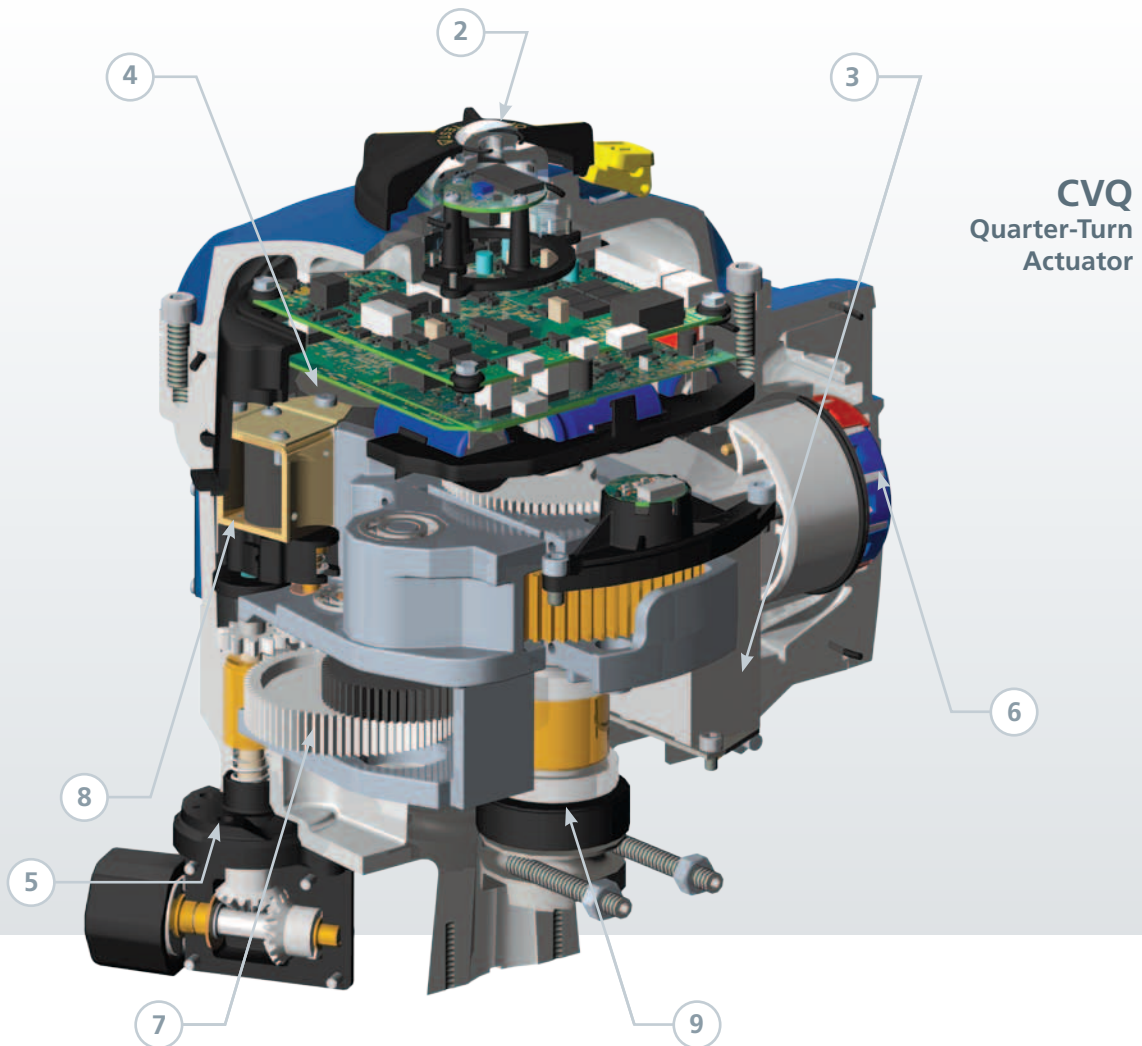
#### 3 Reserve Powerpack / Power Supply

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 an optional 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.

## Advanced Engineering



CVQ  
Quarter-Turn  
Actuator

### 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. Even if the cover is left off during installation or conduit entries for 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 increased "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.