



## Electric actuators for advanced automation of large control valves

Combining high thrust output with a 4.5" (114.3 mm) stroke length, CML now enables the automation of larger control valves with higher pressure ratings.

	Modulating Thrust		Seating Thrust	
	lbf	kN	lbf	kN
CML-1500	1,500	6.7	2,250	10
CML-3000	3,000	13.3	4,500	20

CML-1500 and CML-3000 maintain the array of features and functions available with the existing CMA range while substantially extending the performance capabilities for direct drive linear valves.

CML actuators provide an all electric alternative to spring diaphragm actuators where pneumatic supply is not available or supply issues exist. CMA can also offer significant emission reductions compared to equivalent pneumatic actuators and the necessary infrastructure required to support them.

- > Seating thrust up to 4,500 lbf (20 kN)
- > Modulating thrust up to 3,000 lbf (13.3 kN)
- > Less than 1 watt standby power
- > Accurate and repeatable position control with 0.1% accuracy
- > Adjustable speed control
- > Explosion proof to international standards
- > Optional Reserve Power Pack (RPP) for fail-to-position operation
- > Integral local controls and positional display

## CML-1500 and CML-3000

Linear Control Valve Actuators



- › Built-in HMI allows for quick and simple setup
- › Compatible with a wide variety of fieldbus, hardwired and analogue site systems
- › Suitable for 1-phase or DC power supplies
- › Encoder technology for dependable position measurement
- › Suitable for mounting in any orientation
- › Fully enclosed ball screw drive train for increased reliability and efficiency at higher thrust
- › Permanently lubricated, maintenance-free drive train
- › Zero stick slip during operation
- › Brushless DC motor for reliable, accurate, S9 / Class D continuous modulation capability



### Encoder Technology

CML actuators utilise absolute encoder technology where a unique digital code corresponds to stroke length of the actuator.

To achieve high resolution, the 12-bit position sensor is located at the output gear stages, removing any internal backlash effect that may exist in the drive train.

### Super Capacitor Technology

The Reserve Power Pack (RPP) ensures reliable fail-to-position operation using super capacitors that are optimised for repeat charging / discharging cycles.

### DC Brushless Motor

CML actuators use a high efficiency, continuous rated, brushless DC motor. This ensures accurate positioning at S9 / Class D continuous modulating duty.

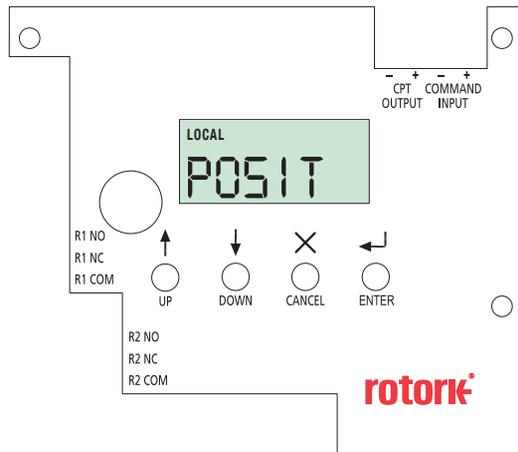
### Geartrain

The simple yet durable, efficient spur gear drive train is lubricated for life with proven high reliability. The ball screw final output drive ensures reliability and efficiency during operation.

CML actuators include T86 step change capability for fast control loops. 10% positional change is possible in only two seconds.

Thrust is instantly delivered to the valve to provide smooth operation without any stick/slip effect to disrupt the process variable. The sturdy mechanical drive train eliminates unwanted movements associated with spring diaphragm actuators

CML actuators include an anti-backdrive mechanism capable of resisting up to 125% of the actuator rated thrust.



## User Interface

Two programmable relays energise upon reaching a desired position or any other available condition among the programmable options.

Field selectable adjustments for:

- Deadband
- Zero and span
- Command signal type
- Standard or reverse acting
- Manual-auto operation
- Fail-to-position on loss of signal capability

## Bus Network Compatibility

Rotork CML actuators are compatible with a wide range of communication and process controls systems by including the appropriate option card. The actuator reports status feedback, via the field highway, to the overall plant control system (DCS or PLC) and valve control commands are actioned.

Our own *Pakscan*™ system complements the open systems from Foundation Fieldbus®, Profibus®, Modbus®, HART® and DeviceNet®. Innovative technology together with expert bus system knowledge ensures that Rotork can always provide the ideal solution for your site control system.



### Performance summary

Speed values shown below are at 100% speed setting. Speed can be reduced to 50% in 1% increments.

CML actuators are suitable for S9 (IEC60034) / Class D (EN15714-2) operating duty.

The rated modulating and seating thrust for each size of actuator is detailed below.

CML actuators can resist backdriving forces from the valve up to 125% of seating thrust without movement. CML-1500 and CML-3000 resolution is 0.1%.

### CML: Linear Actuator

Model	Min Modulating Thrust		Max Modulating Thrust		Max Seating Thrust*		Max Speed		Max Stroke	
	lbf	N	lbf	N	lbf	N	inches/sec	mm/sec	inches	mm
CML-100	60	267	100	445	150	667	0.25	6.35	1.5	38.1
CML-250	150	667	250	1,112	375	1,668	0.13	3.18	1.5	38.1
CML-750	450	2,002	750	3,336	1,125	5,004	0.13	3.18	2.0	50.8
<b>CML-1500</b>	<b>900</b>	<b>4,003</b>	<b>1,500</b>	<b>6,672</b>	<b>2,250</b>	<b>10,009</b>	<b>0.23</b>	<b>5.72</b>	<b>4.5</b>	<b>114.3</b>
<b>CML-3000</b>	<b>1,800</b>	<b>8,007</b>	<b>3,000</b>	<b>13,345</b>	<b>4,500</b>	<b>20,017</b>	<b>0.23</b>	<b>5.72</b>	<b>4.5</b>	<b>114.3</b>

\* **Seating Thrust** – Some applications require tight seating of the valve in the close position. The CML has a selective seating capability. The seating thrust values shown for CML are the forces available to close a valve tightly at the end of travel. The seating thrust option can be selected and configured during setup (at "close action" selection, choose "thrust").

### Positioning Control Performance

The following control positioning performance is based on a 4-20 mA control system with CMA operating over its maximum stroke, rated speed and constant force with minimum deadband set and with a linear demand/valve characteristic. Resolution is defined as: minimum change in input signal required for guaranteed response.

#### 4-20 mA Positioning - % demand signal range

Equal to or better than:

<b>Resolution</b>	Linear and Part-turn	<b>0.1%</b>
<b>Linearity</b>		<b>1%</b>

### Position Feedback Performance

The following position feedback performance is based on CMA operating at maximum stroke with a linear characteristic set. Feedback calibration is automatic to the set limit positions. Resolution is defined as: minimum change in position required for feedback signal change.

#### 4-20 mA Feedback - % feedback signal range

Equal to or better than:

<b>Resolution</b>	Linear and Part-turn	<b>0.1%</b>
<b>Linearity</b>		<b>1%</b>

Ultimate performance will be determined by the process, valve and control system.

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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