

CERTIFICATE OF CONFORMITY



- HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
- Certificate No:** FM17US0101X
- Equipment:** CML, CMQ, CMR Series
(Type Reference and Name) Compact Modulating Actuators (CMA)
Electronic Valve Actuators
- Name of Listing Company:** Rotork Process Controls
- Address of Listing Company:** 5607 W Douglas Ave
Milwaukee, WI 53218
United States
- The examination and test results are recorded in confidential report number:
3048160 dated 28th March 2013
- FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:
FM Class 3600:2018, FM Class 3615:2018, FM Class 3616:2011, FM Class 3810:2018,
ANSI/UL 61010-1:2012, ANSI/UL 60079-0:2020, ANSI/UL 60079-1:2015, ANSI/UL 60079-31:2015,
ANSI/UL 50E:2015, ANSI/IEC 60529:R2011
- If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
- This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.
- Equipment Ratings:**
Explosionproof for Class I, Division 1, Groups C and D; Dust-ignitionproof for Class II, Division 1, Groups E, F and G, Class III; Flameproof for Zone 1, AEx db IIB T4 Gb; and Dust-Protected by Enclosure AEx tb IIIC T85C Db Hazardous Locations, for overall ambient temperature ranges of -20°C to +65°C or -40°C to +60°C depending on the configuration; indoor and outdoor Type 4 and IP66/IP67 or IP66/IP68 (IPX8 at 7 m, 72 hr).

Certificate issued by:


J.E. Marquardt

VP, Manager - Electrical Systems

18 February 2022

Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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US Certificate Of Conformity No: FM17US0101X

11. The marking of the equipment shall include:

CLASS I, DIV 1, GROUPS C & D; CLASS II, DIV 1, GROUPS E, F & G; CLASS III

ZONE 1 AEx db IIB T4 Gb; ZONE 21 AEx tb IIIC T85C Db

T4, MIN. RATED AMBIENT TEMP (-20°C or -40°C); MAX. RATED AMBIENT TEMP (+60°C or +65°C)

Note: IP66/IP68 for model CML (Linear) Sizes 1500 and 3000 only; IP67 for all other models.

12. **Description of Equipment:**

The CMA (Compact Modulating Actuator) is self contained and used for continuous remote electrical operation of a control valve. The CMA consists of a main flameproof enclosure containing all of the electrical components and an attached smaller mechanical enclosure containing only gearing and mechanical power transfer devices. It is available in three different functions: Linear, Quarter-turn, and Rotary. The main enclosure is defined into "Sizes" per the table on the following page.

The top part of the equipment is the explosionproof "XP" enclosure (the main enclosure), which is cylindrical in shape and includes a base and cover. The main enclosure is constructed out of the same aluminum either Low Pressure Gravity Cast (LPGC) or High Pressure Die Cast (HPDC). For Size 1, 2 and 3 equipment identified in the table on the following page, the cover has three different sizes: standard, intermediate and extended. For Size 4 and 5 equipment identified in the table on the following page, the covers are all the same size. The main enclosure includes a hand-knob which creates a cylindrical flamepath joint with the housing. The user may use the hand-knob to switch from manual to remote operation and control of the actuator. The cover forms a cylindrical flamepath joint with the base to which it is attached by M8 fasteners. The joints are provided with suitable seals for environmental protection.

The main enclosure houses all of the electronic components which make up the monitoring and control circuitry. This circuitry consists of power and logic PCBs both mounted on an aluminum bracket. The bracket is fastened to a cast aluminum mount which also acts as a mount for the DC motor. The whole assembly is fastened to the base. The operator uses an LCD display to program the actuator to control the motor and the logic PCB uses a feedback mechanism to sense the position of the output shaft. There are four ¾ NPT or M25 threaded entries to the enclosure for field wiring purposes.

Operation Temperature Ranges:

The ambient operating temperature range of the equipment is -20°C to +65°C or -40°C to +60°C, depending on the model.

Electrical Data:

Electrical ratings are either 12 VDC and 50 Watts maximum; or 24 VDC or 110...240VAC, 1Ø, 50/60Hz, and 540 Watts maximum, depending on the configuration.

Temperature Ratings:

The equipment is rated and marked for ambient temperature ranges of Ta = -20°C to +65°C (Standard Version) or Ta = -20°C to +60°C (UPS/HMI and HMI Versions) with the Standard Seals; or Ta = -40°C to +60°C (All Versions) with the Low Temperature Seals.

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CML-a. Compact Modulating Actuators (CMA).

CMQ-b. Compact Modulating Actuators (CMA).

CMR-c. Compact Modulating Actuators (CMA).

a = Size 100, 250, 750, 1500 or 3000.

b = Size 250, 500 or 1000.

c = Size 50, 89, 100, 125, 200 or 250.

Options are identified by wiring diagram number on the nameplate according to the Size of the actuator model and include: M00-00, M00-D0, M00-F0, M00-H0, M00-K0, M00-M0, M00-N0, M00-P0, M01-00, M01-D0, M01-F0, M01-H0, M01-K0, M01-M0, M01-N0, M01-P0, M02-0S, M02-DS, M02-FD, M02-FS, M02-HD, M02-HS, M02-KD, M02-KS, M02-MD, M02-MS, M02-ND, M02-NS, M02-PD, M02-PS, M10-00, M10-D0, M10-F0, M10-H0, M10-K0, M10-M0, M10-N0, M10-P0, M11-00, M11-D0, M11-F0, M11-H0, M11-K0, M11-M0, M11-N0, M11-P0, M12-0S, M12-DS, M12-FD, M12-FS, M12-HD, M12-HS, M12-KD, M12-KS, M12-MD, M12-MS, M12-ND, M12-NS, M12-PD, M12-PS, M32-00, M32-0S, M32-D0, M32-DS, M32-F0, M32-FD, M32-FS, M32-H0, M32-HD, M32-HS, M32-K0, M32-KD, M32-KS, M32-M0, M32-MD, M32-MS, M32-N0, M32-ND, M32-NS, M32-P0, M32-PD, M32-PS, M42-00, M42-0S, M42-D0, M42-DS, M42-F0, M42-FD, M42-FS, M42-H0, M42-HD, M42-HS, M42-K0, M42-KD, M42-KS, M42-M0, M42-MD, M42-MS, M42-N0, M42-ND, M42-NS, M42-P0, M42-PD, M42-PS, M52-00, M52-0S, M52-D0, M52-DS, M52-F0, M52-FD, M52-FS, M52-H0, M52-HD, M52-HS, M52-K0, M52-KD, M52-KS, M52-M0, M52-MD, M52-MS, M52-N0, M52-ND, M52-NS, M52-P0, M52-PD, or M52-PS.

The CMA range includes the following variants:

Model	Size*	Minimum Thrust or Torque	Maximum Thrust or Torque	Speed	Stroke	Shut-off Thrust or Torque
CMR-50	1	2.3 Nm	5.6 Nm	11 RPM	N/A	N/A
CML-100	1	177.9 N	444.8 N	6.35 mm/s	38.1 mm	889.6 N
CMR-100	2	4.5 Nm	11.3 Nm	10 RPM	N/A	N/A
CMR-200	2	9 Nm	22.6 Nm	5 RPM	N/A	N/A
CMQ-250	1	11.3 Nm	28.2 Nm	5 s/qtr-turn	N/A	42.3 Nm
CML-250	2	444.8 N	1112 N	3.175 mm/s	38.1 mm	2200 N
CMQ-500	2	22.6 Nm	56.5 Nm	7.5 s/qtr-turn	N/A	84.8 Nm
CMR-89	3	4.04 Nm	10.1 Nm	24 RPM	N/A	N/A
CMR-125	3	5.6 Nm	14.1 Nm	18 RPM	N/A	N/A
CMR-250	3	11.3 Nm	28.2 Nm	10 RPM	N/A	N/A
CML-750	3	1334.5 N	3336.2 N	3.18 mm/s	50.8 mm	6670 N
CMQ-1000	3	45.2 Nm	113.0 Nm	11 s/qtr-turn	N/A	169.5 Nm
CML-1500	4	2668.8 N	6672 N	4.57 mm/s	114.3 mm	10 kN
CML-3000	5	5337.6 N	13.34 kN	4.57 mm/s	114.3 mm	20 kN

*Note "Size" refers to performance aspects of the equipment; Sizes 1 and 2 are physically the same.

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13. Specific Conditions of Use:

1. The critical dimensions of the flamepaths are:

CML-100, CML-250 (Size 1 & 2 - Linear)		
Flamepath	Maximum Gap (mm)	Minimum Length L (mm)
Lid/Base	0.15	12.8
Base/Screw Shaft	0.145 ¹	13.5
Base/Feedback Shaft Bushing	-0.02 ²	13.7
Feedback Shaft Bushing/Shaft	0.06	13.7
Handknob Shaft/Lid (short cover)	0.10	25.9
Handknob Shaft/Lid (intermediate and extended covers)	0.10	15.7

CMR-50, CMR-100, CMR-200 (Size 1 & 2 - Rotary)		
Flamepath	Maximum Gap (mm)	Minimum Length L (mm)
Lid/Base	0.15	12.8
Base/Pinion Shaft	0.235 ¹	29.8
Base/Output Shaft	0.145 ¹	12.8
Handknob Shaft/Lid (short cover)	0.10	25.9
Handknob Shaft/Lid (intermediate and extended covers)	0.10	15.7

CMQ-250, CMQ-500 (Size 1 & 2 - Quarter-turn)		
Flamepath	Maximum Gap (mm)	Minimum Length L (mm)
Lid/Base	0.15	12.8
Base/Pinion Shaft	0.235 ²	29.8
Base/Feedback Shaft Bushing	-0.02 ¹	13.7
Feedback Shaft Bushing/Shaft	0.06	13.7
Handknob Shaft/Lid (short cover)	0.10	25.9
Handknob Shaft/Lid (intermediate and extended covers)	0.10	15.7

CML-750 (Size 3 - Linear)		
Flamepath	Maximum Gap (mm)	Minimum Length L (mm)
Lid/Base	0.15	12.8
Base/Screw Shaft	0.235 ¹	37.3
Base/Feedback Shaft Bushing	-0.02 ²	13.7
Feedback Shaft Bushing/Shaft	0.06	13.7
Handknob Shaft/Lid (short cover)	0.10	25.9
Handknob Shaft/Lid (intermediate and extended covers)	0.10	15.7

CMR-89, CMR-125, CMR-250 (Size 3 - Rotary)		
Flamepath	Maximum Gap (mm)	Minimum Length L (mm)
Lid/Base	0.15	12.8
Base/Pinion Shaft	0.235 ¹	37.3
Base/Output Shaft	0.145 ¹	13.0
Handknob Shaft/Lid (short cover)	0.10	25.9
Handknob Shaft/Lid (intermediate and extended covers)	0.10	15.7

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CMQ-1000 (Size 3 - Quarter-turn)		
Flamepath	Maximum Gap (mm)	Minimum Length L (mm)
Lid/Base	0.15	12.8
Base/Pinion Shaft	0.235 ¹	37.3
Base/Feedback Shaft Bushing	-0.02 ²	13.7
Feedback Shaft Bushing/Shaft	0.06	13.7
Handknob Shaft/Lid (short cover)	0.10	25.9
Handknob Shaft/Lid (intermediate and extended covers)	0.10	15.7

CML-1500 and CML-3000 (Size 4 & 5 - Linear)		
Flamepath	Maximum Gap (mm)	Minimum Length (mm)
Lid / Base	0.20	26.4
Screw Shaft Bushing / Shaft	0.10	68.5
Base / Screw Shaft Bushing	0.361	36.96
Handwheel Shaft / Base	0.20	27.9

Note 1: This dimension includes an allowance for the 0.05mm requirements defined in ANSI/UL 60079-1

Note 2: Negative sign denotes an interference fit.

- The equipment utilizes a non-metallic outer coating and has a potential static hazard. Clean only with a damp cloth.
- The screws securing the outer window frame maintain the integrity of the flameproof enclosure and must not be removed.

14. Test and Assessment Procedure and Conditions:

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. Schedule Drawings

A copy of the technical documentation has been kept by FM Approvals.

16. Certificate History

Details of the supplements to this certificate are described below:

Date	Description
28 th March 2013	Original Issue.
19 th April 2017	Supplement 4: Report Reference: 3060693 dated 19 th April 2017. Description of the Change: This supplement includes updates to new certificate format, minor documentation revisions, as well as testing and evaluation to qualify minor construction changes to the equipment enclosures.

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Date	Description
23 rd May 2018	<u>Supplement 5:</u> Report Reference: 3062907 dated 23 rd May 2018. Description of the Change: Evaluation conducted for continued compliance of Size 1, 2 and 3 CMA Series and addition of Size 4 and 5 Linear CMA Series (CML-1500 and CML-3000 models), as well as associated updates to controlled documentation and equipment instruction manuals. Updates to standard editions.
24 th February 2019	<u>Supplement 6:</u> Report Reference: PR451412 dated 24 th February 2019. Description of the Change: Testing and evaluation conducted to qualify changes to enclosure for Size 1, 2 and 3 actuators, additional Approval for Canada for Size 4 and 5 actuators, as well as associated documentation revisions.
18 th February 2022	<u>Supplement 7:</u> Report Reference: PR461421 dated 18 th February 2022. Description of the Change: Evaluation conducted in accordance with applicable ANSI/UL 60079 series standards based on IECEx evaluation and US National Differences, for additional compliance and Zone ratings for entire CMA Series. Addition of "X" suffix to this certificate and Specific Conditions of Use. Revisions to labels and instructions made accordingly. Company name updated to "Rotork Controls Inc" – refer to RR227966 for details.

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