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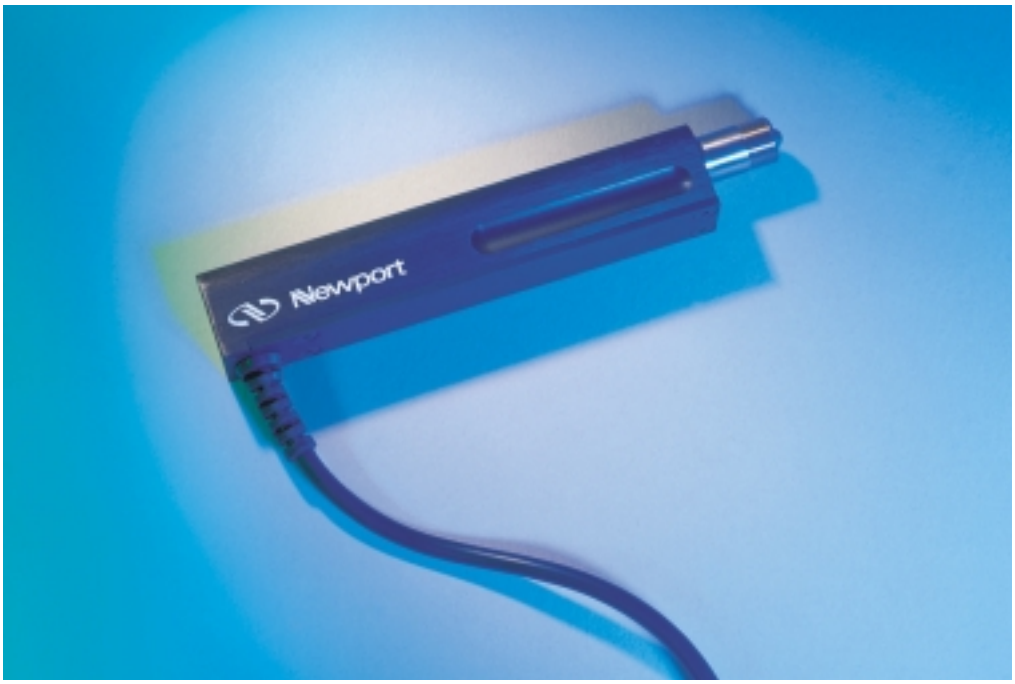
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CMA Series Linear Actuator



Instructions

Newport®

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CMA SERIES LINEAR ACTUATOR INSTRUCTIONS

1.0 Introduction

This Instruction Sheet describes the operation of Newport CMA Series Linear Actuators. Please read this entire document prior to operating your CMA Actuator.

CAUTION

Please note that your CMA Actuator is a high precision instrument. Please use proper care when handling or storing this instrument.

The CMA incorporates a compact design that provides precision motion, and allows it to be used with a wide variety of translation stages, mirror mounts, and in OEM applications. CMA Actuator features include:

- Light, compact, space saving design.
- Stepper, DC open loop, and DC Servo motor versions.
- ESP smart technology: this provides 'plug and play' compatibility with the Newport ESP Series motion controller (PP and CCCL versions).
- Sub-micron minimum incremental motion
- < 15µm bi-directional repeatability
- Maximum rated load is 9 kg (19.8 lbs.) at 200 µm/sec.
- Integrated limit switches. Failsafe limits cut motor power, preventing accidental over travel on DC open loop versions (CC); limit-sensing switches provide feedback to the controller, on Stepper motor (PP) and DC Servo motor (CCCL) versions.
- 4.6m cable with standard input 25 pin sub D connector (PP and CCCL versions)
- 3m cable with 'phone jack' connector (CC version). Optional Newport 25 pin sub D connector module is available.
- 2,000 hours MTBF.

2.0 Actuator Mounting

Using the 3/8-inch brass-mounting sleeve, the actuator can be mounted to a wide variety of Newport components in one of four ways:

1. Unscrew the retaining nut and insert the CMA into the mount. Use the spanner wrench (included), to tighten the nut.

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2. If the mount has a clamping screw, the retaining nut is not used. Simply insert the actuator and tighten the clamping screw.
3. In the rare case, that neither of the above methods can be used, it might be necessary to partially disassemble the device the actuator is being used in. When access to the retaining nut side is reached, simply follow mounting method No. 1, above.
4. For mounting in panels up to 1/2" thick, drill a 3/8" hole, insert actuator and tighten retaining nut.

3.0 Controller Interfaces

The compatible Newport controllers are matched to a CMA Actuator model number in the following matrix:

CMA Actuator/Newport Controller Compatibility Matrix[1]

	CMA-12CC CMA-25CC	CMA-12PP CMA-25PP	CMA-12CCCL CMA-25CCCL
861	X		
ESP100 and ESP300	X	X	X
ESP6000 with DCIB			X
ESP6000 with UNIDRIV6000		X	X
MM4006			X
ESP7000		X	X

NOTE: 1. To determine compatibility with other controllers, see motor specifications in section 6.2.

2. If using the UNIDRIVE 6000 to drive the CMA Actuator purchased prior to March 1999, (amplifier part number 22381-01 Rev. L) please contact a Newport technical service engineer at (800) 222-6440 for an amplifier upgrade.

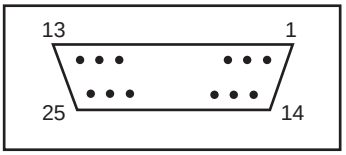
4.0 Connector Pin Assignments

CMA-12PP CMA-25PP		CMA-12CCCL CMA-25CCCL		CMA-12CC CMA-25CC
PIN NO.	STEPPER MTR.	PIN NO.	DC MOTOR	Connector is 'Phone Jack' style.(See Detail B, in drawing shown on next page)
1	Phase B +	5	Motor -	
3	Phase B -	7	Motor +	
5	Phase A +	13	[See Section 5.0]	
7	Phase A -	14	Shld Ground	
13	[See Section 5.0]	16	Limit Ground	
14	Shld Ground	17	+ Limit	
16	Limit Ground	18	- Limit	

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17	+ Limit	19	Encoder Output A
18	- Limit	20	Encoder Output B
21	+ 5 VDC	21	+ 5 VDC
22	VDC Ground	22	- VDC Ground

NOTE: Pins not listed are not used. Although + 5 VDC is not used in the CMA-XXPP for an encoder, it is used for circuitry controlling limits.



25-Pin Connector Pin Orientation

5.0 Connection to Non-Newport Controllers

CAUTION

Newport takes no responsibility for improper functioning or damage of an actuator when it is used with any non-Newport controllers.

CAUTION

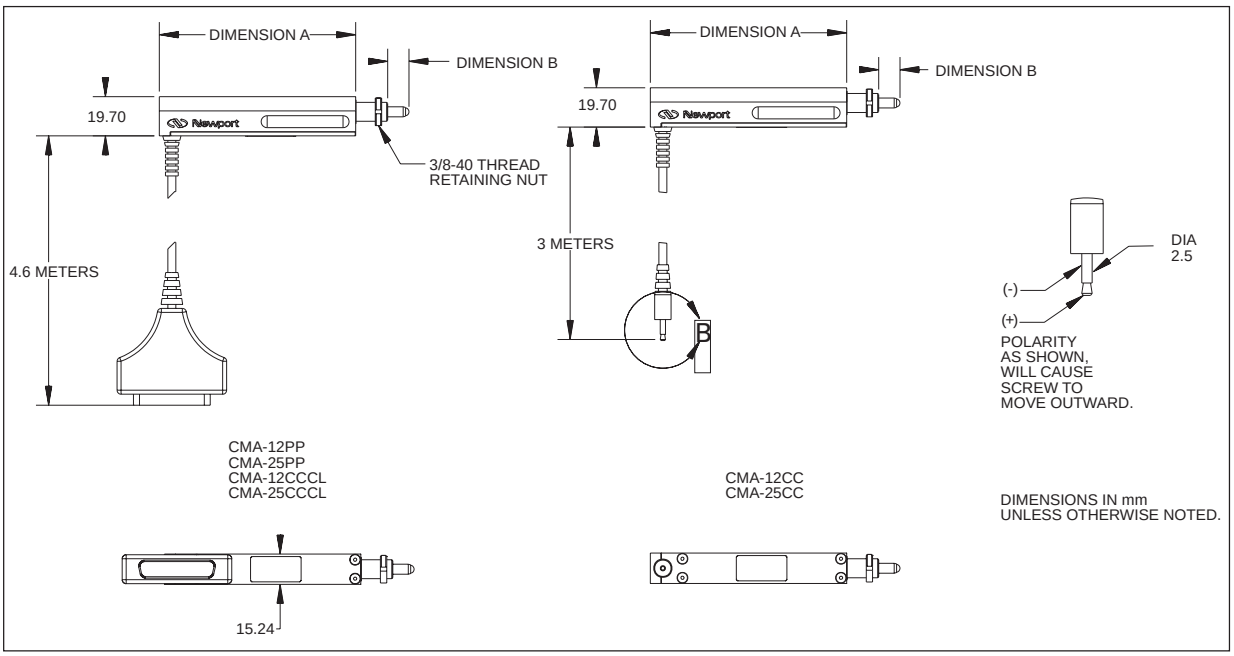
Newport guarantees the CE compliance of the CMA actuators only if they are used with Newport cables and controllers.

CAUTION

Nevertheless, if a CMA-PP or CMA-CCCL is connected to a non-Newport controller, a 1kΩ/0.25 W resistor must be connected between pin 13 and pin 21 (see section 4.0 for connector pin assignments).

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6.0 Drawing



NOTE: All dimensions are in inches (Millimeters) unless otherwise noted.

Dimension A and B for Drawing

MODEL NAMES	DIMENSION A in.(mm)	DIMENSION B in.(mm)
CMA-12CC	3.88 (98.6)	0.04 to 0.58 (0.9 to 14.7)
CMA-12PP	3.88 (98.6)	0.04 to 0.58 (0.9 to 14.7)
CMA-25CC	4.38 (111.3)	0.24 to 1.28 (6.0 to 32.5)
CMA-25PP	4.38 (111.3)	0.24 to 1.28 (6.0 to 32.5)
CMA-12CCCL	4.38 (111.3)	0.04 to 0.58 (0.9 to 14.7)
CMA-25CCCL	4.88 (124.0)	0.24 to 1.28 (6.0 to 32.5)

NOTE: Please review minimum cable bend radius as noted in section 7.1.

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7.0 Specifications

7.1 Performance, Mechanical and Electrical Specifications

	CMA-12CC	CMA-12PP	CMA-12CCCL	CMA-25CC	CMA-25PP	CMA-25CCCL
Travel	12.5mm	12.5mm	12.5mm	25mm	25mm	25mm
Resolution	N/A	0.097656 µm	0.048828 µm	N/A	0.097656 µm	0.048828 µm
Min. Incr. Motion	<0.5 µm typical	0.3 µm	0.2 µm	<0.5 µm typical	0.3 µm	0.2 µm
Uni-directional Repeatability	N/A	< ±1.5 µm	< ± 1.0 µm	N/A	< ± 1.5 µm	< ± 1.0 µm
MTBF	2000 hr.					
Limit Switches[1]	Failsafe Limit	Limit Sensing	Limit Sensing	Failsafe Limit	Limit Sensing	Limit Sensing
Motor Type	DC	Stepper	DC servo	DC	Stepper	DC servo
Backlash	<15 µm					
Speed[2] (µm/sec)	50-400	0-400	50-400	50-400	0-400	50-400
Normal Load Capacity	9kg max - rated capacity varies with speed					
Bi-directional Repeatability[3]	N/A	≤ ± 2 µm	≤ ± 1.5 µm	N/A	≤ ± 2 µm	≤ ± 1.5 µm
Controller Compatibility	See Controller Compatibility matrix					
Safety Standards	CE Certified					
Operating Temp Range	40 - 100º F					
Cable[4]	4.6m integrated flexible cable with molded 25-pin, sub-D connector with ESP chip integrated. Pinouts will conform to Newport's current standard[5].					

1. Fail safe limit switches cut power to the motor when limit switch is activated. To move actuator, power must be reversed. Limit sensing switches send a signal to the controller when the limit switch is activated. The controller should then cut power to the motor. Not using feedback from the limited sensing switch will result in damage to the CMA Actuator (PP and CCCL versions).

2. Maximum speed for CMA-xxCC when used with the 861 controller is less then 400 µm/sec and can be dependent on the strength of the battery supplying power.

3. Assumes controller backlash compensation.

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4. The recommended minimum cable bend radius is 15mm for a static bend and 40mm for bending in cycling mode. Exceeding this minimum cable bend radius may result in damage to the actuator.
5. CC versions have a standard phone jack cable termination, with an available adapter for 'ESP smart 25 pin sub D connector'.

7.2 Motor Specifications

7.2.1 DC Motor

ELECTRICAL SPECIFICATIONS	CMA-12CC	CMA-25CC	CMA-12CCCL	CMA-25CCCL
Supply Voltage (V)	12	12	12	12
Armature Resistance (Ohm)	103 ± 12%	103 ± 12%	103 ± 12%	103 ± 12%
Max. Efficiency (%)[1]	68	68	68	68
No Load Speed (RPM)[1]	12,000	12,000	12,000	12,000
No Load Current (mA)[2]	4 ±50%	4 ±50%	4 ±50%	4 ±50%
Friction Torque (@ No Load Speed)	0.004 oz-in	0.004 oz-in	0.004 oz-in	0.004 oz-in
Stall Torque (oz-in)	0.13	0.13	0.13	0.13
Velocity Constant (RPM/Volt)	1,290	1,290	1,290	1,290
Back EMF Constant (mV/RPM)	0.775	0.775	0.775	0.775
Torque Constant (oz-in/Amp)	1.05	1.05	1.05	1.05
Armature Inductance (mH)	0.310	0.310	0.310	0.310
Gear Ratio	256:1	256:1	256:1	256:1

1 Specified at nominal supply voltage.

2 Specified with shaft diameter of .8mm at no load speed.

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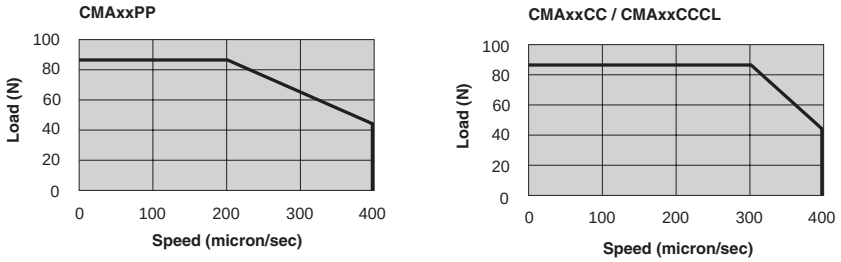
7.2.2 Stepper Motors[1]

ELECTRICAL SPECIFICATIONS	CMA-12PP	CMA-25PP
Phase Resistance (ohms)	7.4	7.4
Phase Inductance (1 kHz) (mH)	2.1	2.1
Nominal Current/phase (2 ph.on) (A)	0.25	0.25
Nominal Current/phase (1 ph.on) (A)	0.35	0.35
Back EMF Amplitude (V/k step(s)	1.5	1.5
Gear Ratio 256:1	256:1	256:1

1. Recommend mini-stepping (10:1), for smoother operation.

NOTE: If using a non-Newport switching amplifier to drive the CMA actuator, it is recommended that filter coils be included on the amplifier to reduce motor heating.

7.3 Rated Load vs. Speed



NOTE: Maximum speed for the CMA-xxCC when used with the 861 controller is less then 400 µm/sec and can be dependent on the strength of the battery supplying the power.

8.0 Maintenance and Service

Please review this section prior to the use of this product.

CAUTION

If the actuator encounters a hard stop within its range of travel (i.e.: a translation stage or mirror in end of travel); the motor should be stopped as soon as possible to prevent damage to the gear head, or overheating in this high torque condition.

8.1 Maintenance Information

Care and regular maintenance of your actuator will prolong it's expected life.

1. Protect the drive screw threads during handling. Store actuators with the drive screw retracted to a point which allows the protective cap to be installed.

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2. It may be necessary to lubricate the drive screw after approximately 500 hours of continuous use. A lint free wipe should be used if removing spent or excess lubricant from the drive screw. A suitable lubricant can be provided by Newport upon request. (Newport part number CMA-LUBE).

8.2 Service Information

To obtain information concerning factory service, please contact a Newport technical service engineer at (800) 222-6440. Please have the following information available:

1. Model number
2. Purchase order number
3. Complete description of the problem

8.3 Warranty/Return Information

Product Warranty

Because we are confident that they will meet your high standards, our products carry the following warranty, effective for a period of one year from the original invoice date unless otherwise stated in the product literature.

- Products will be free of defects in material and workmanship.
- Products will meet the specifications stated in this document.

If you find any defects in material or workmanship or a failure to meet specifications within the warranty period, return the product to us clearly marked with a Return Authorization Number (RA#) and we will either repair or replace it at our discretion.

Our warranty excludes products that have been improperly installed or maintained, modified or misused. Notification of claim must occur within the warranty period. Newport's liabilities are limited as set forth in our standard terms and conditions. Copies of which are available upon request.

Returning Products

Unused and undamaged products may be returned to Newport within 30 days of the initial invoice date (60 days outside the USA), but are subject to a 25% restocking fee.

You must first obtain an RA# by calling our Service Department or visiting us at www.newport.com/service, our web-site. Ship the product back to us prepaid in the original or equivalent packaging with the RA# clearly marked on the outside of the box. Pack carefully to prevent damage. Newport cannot be responsible for any damage occurring in transit to us and we do not accept products returned without an RA#.

Non-Warranty Repairs

If a product needs repairing after the one-year warranty period expires; we will first provide an estimate of repair charges and then repair the product upon receiving authorization from you. Repairs are warranted for 90 days.

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EU DECLARATION OF CONFORMITY

We declare that the accompanying product, identified with the CE mark, complies with requirements of the Electromagnetic Compatibility Directive, 89/336/EEC and Low Voltage Directive 73/23/EEC.

Model Number: CMA

Year CE mark affixed:

Type of Equipment:

Electrical equipment for measurement, control and laboratory use

Standards Applied:

Compliance was demonstrated to the following standards to the extent applicable:

BS EN61326: 1998 "Electrical equipment for measurement, control and laboratory use – EMC requirements"

This equipment meets the CISPR 11 Class A radiated and conducted emission limits.

BS EN 61000-3-2, Harmonic current emissions, Class A

BS EN 61000-3-3, Voltage fluctuations and flicker

BS EN 61010-1 "Safety requirements for electrical equipment for measurement, control and laboratory use"

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