

User Manual

MODEL 8315

Closed Loop Picomotor™ Piezo Actuators



Copyright © 2026 by MKS Instruments, Inc.

Original instructions.

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or by any information storage or retrieval system, except as may be expressly permitted in writing by MKS Instruments, Inc. This document is provided for information only, and product specifications are subject to change without notice. Any change will be reflected in future publishings.

mksinst™ is a trademark of MKS Instruments, Inc.

Newport™ is a registered trademark of MKS Instruments, Inc., Andover, MA

Picomotor™ is a trademark of MKS Instruments, Inc., Andover, MA

Teflon® and Kapton® are registered trademarks of DuPont de Nemours, Inc.

Table of Contents

Warranty	4
Preface.....	5
1 Certifications	6
1.1 Regulatory Label	6
1.2 United States	6
1.3 Canada	6
1.4 Australia and New Zealand	7
1.5 South Korea	7
1.6 European Union CE	8
1.7 United Kingdom Conformity Assessed Mark.....	9
2 Safety Information	10
2.1 Safety Procedures and Precautions.....	10
2.2 Symbols Used in This Instruction Manual.....	10
2.3 Symbols Found on the Unit.....	11
2.3.1 Waste Electrical and Electronic Equipment (WEEE) Mark.....	11
2.3.2 RoHS China safety label.....	11
2.4 Warnings	11
2.5 Cautions	11
3 Introduction	13
4 Picomotor™ motorization features	14
5 Specifications.....	15
6 Dimensions	16
7 Installation.....	17
7.1 Unpacking	17
7.2 Mounting the actuator.....	17
8 Tips for achieving nanometer-scale performance	18
9 Connection to Newport™ Controllers	19
9.1 Warnings on Controllers.....	19
9.2 Cables	19
9.3 Connection	20
9.4 Configuration and operation.....	20
10 Connection to Non-Newport Electronics	21
10.1 Encoder connector pinout	21
10.2 Example wiring diagram	22
11 Maintenance	23
11.1 Maintenance.....	23
11.2 Repair	23
Service Form.....	25

Warranty

MKS Instruments, Inc. warrants that this product will be free from defects in material and workmanship and will comply with MKS published specifications at the time of sale for a period of one year from date of shipment. If found to be defective during the warranty period, the product will either be repaired or replaced at MKS option.

To exercise this warranty, write or call your local MKS office or representative. You will be given prompt assistance and return instructions. Send the product, freight prepaid, to the indicated service facility. Repairs will be made, and the instrument returned freight prepaid. Repaired products are warranted for the remainder of the original warranty period or 90 days, whichever occurs last.

Limitation of Warranty

This warranty does not apply to defects resulting from modification or misuse of any product or part.

CAUTION

Warranty does not apply to damages resulting from:

- **Incorrect usage:**
 - **Driven load greater than maximum specified load.**
 - **Actuator speed higher than specified speed.**
 - **Improper grounding:**
 - **Connectors must be properly secured.**
 - **When the load on the stage represents an electrical risk, it must be connected to ground.**
 - **Excessive or improper cantilever loads.**
- **Modification of the actuator or any part thereof.**

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE. MKS INSTRUMENTS, Inc. SHALL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE PURCHASE OR USE OF ITS PRODUCTS.

Preface

CONFIDENTIALITY & PROPRIETARY RIGHTS

Reservation of Title

The MKS Instruments, Inc. Programs and all materials furnished or produced in connection with them ("Related Materials") contain trade secrets of MKS and are for use only in the manner expressly permitted. MKS claims and reserves all rights and benefits afforded under law in the Programs provided by MKS.

MKS shall retain full ownership of Intellectual Property Rights in and to all development, process, align or assembly technologies developed and other derivative work that may be developed by MKS. Customer shall not challenge, or cause any third party to challenge, the rights of MKS.

Preservation of Secrecy and Confidentiality and Restrictions to Access

Customer shall protect the MKS Instruments, Inc. Programs and Related Materials as trade secrets of MKS, and shall devote its best efforts to ensure that all its personnel protect the MKS Programs as trade secrets of MKS. Customer shall not at any time disclose MKS trade secrets to any other person, firm, organization, or employee that does not need (consistent with Customer's right of use hereunder) to obtain access to the MKS Programs and Related Materials. These restrictions shall not apply to information (1) generally known to the public or obtainable from public sources; (2) readily apparent from the keyboard operations, visual display, or output reports of the Programs; (3) previously in the possession of Customer or subsequently developed or acquired without reliance on the MKS Programs; or (4) approved by MKS for release without restriction.

SERVICE INFORMATION

The user should not attempt any maintenance or service of the present product and its accessories beyond the procedures outlined in this manual. Any problem that cannot be resolved should be referred to MKS | Newport. When calling MKS | Newport regarding a problem, please provide the Tech Support representative with the following information:

- Your contact information.
- System serial number or original order number.
- Description of problem.
- Environment in which the system is used.
- State of the system before the problem.
- Frequency and repeatability of problem.
- Can the product continue to operate with this problem?
- Can you identify anything that may have caused the problem?

MKS | NEWPORT RMA PROCEDURES

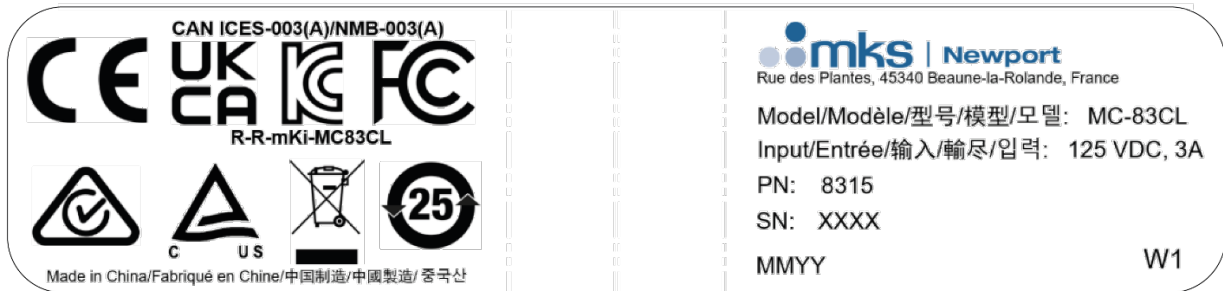
Any product being returned to MKS | Newport must have been assigned an RMA number by Newport. Assignment of the RMA requires the item serial number.

PACKAGING

Materials being returned under an RMA must be securely packaged for shipment. If possible, reuse the original factory packaging.

1 Certifications

1.1 Regulatory Label



1.2 United States

FCC Part 15 Digital Devices – Class A (Commercial)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This product has demonstrated EMC compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components. It is important that you use compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference.

1.3 Canada

EMC

CAN ICES-003 (A) / NMB – 003 (A)

Cet appareil num rique de la classe A est conforme   la norme NMB-003 du Canada

This product has demonstrated EMC compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components. It is important that you use compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference.

La conformit  CEM de ce produit a  t  d montr e dans des conditions impliquant l'utilisation de p riph riques conformes et de c bles blind s entre les composants du syst me. Il est important d'utiliser des p riph riques conformes et des c bles blind s entre les composants du syst me afin de r duire le risque de provoquer des interf rences.

1.4 Australia and New Zealand



The information in this section applies to products bearing the Australia and New Zealand Regulatory Compliance Mark (RCM)

This device equipment complies with the Australian and New Zealand regulatory approvals requirements.

Warning

Class A products that may also be utilized in domestic/residential environments may cause radio interference in which case the user may be required to take adequate measures.

1.5 South Korea



The information in this section applies to products bearing the KCC mark.

알림 : 대한민국으로 배송되는 제품인 경우

Class A : A 급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
--------------------------------------	--

1.6 Japan

This product complies with electromagnetic compatibility and interference requirements as identified in JIS C 61326.

この製品は、JIS C 61326 に規定されている電磁両立性および干渉要件に準拠しています。

1.7 Taiwan

Class A Equipment

This equipment has been tested to Taiwan standards CNS 13803 emissions and immunity.

Warning Users: Changes to this product are not authorized.

A級設備

該設備經過台灣標準 CNS 13803 輻射和抗擾度測試

警告使用者：未經授權對此產品進行更改。

1.8 European Union CE



The presence of the CE Mark on Newport Corporation equipment means that it has been designed, tested and certified as complying with all applicable European Union (CE) regulations and recommendations.



2 Tech Drive
Andover, MA 01810
www.mks.com

EU27 Declaration of Conformity

Corporate Headquarters

MKS Inc
2 Tech Drive, Suite 201
Andover, MA 01810 USA

EU27 Representative

Micro Contrôle Spectra Physics
7 rue des Plantes 45340 Beauce la Rolande
France

Product Model(s): MC-83CL

Product Type/Description: Picomotor Piezo Actuator

Product Brand(s): MKS Newport

Safety Directive: Low Voltage Directive 2014/35/EU

Safety Standard(s): IEC 61010-1:2010/AMD 1:2016

Electromagnetic Compatibility Directive: 2014/30/EU

EMC Standards: IEC 61326-1:2020

EN IEC 61326-1:2021

EN 55011:2016 + A1:2017 + A2:2021 + A11:2020

CISPR11:2024

Immunity Standards: EN IEC 61326-1:2021

Environmental Directive(s):

- European Union's REACH Regulation EC1907-2006 Article 33 regarding Substances of Very High Concern (SVHC) and the specific substances described in Article 67 and Annex XVII with amendments
- European Union RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

The object of the declaration described above is in conformity with the relevant community harmonization legislation. MKS product conforms to the above Directive(s) and Standard(s) only when installed in accordance with manufacturer's specifications. This declaration has been issued under the sole responsibility of the manufacturer.

1.9 United Kingdom Conformity Assessed Mark



The presence of the UKCA Mark on Newport equipment means that it has been designed, tested and certified as complying with all applicable United Kingdom's regulations and recommendations.



2 Tech Drive
Andover, MA 01810
www.mks.com

United Kingdom Declaration of Conformity

Corporate Headquarters

MKS, Inc
2 Tech Drive, Suite 201
Andover, MA 01810 USA

UK Representative

MKS Instruments UK Ltd.
2 Cowley Way, Weston Road
Crewe, Cheshire, CW1 6AE United Kingdom
Tel: +44 01270 253400

Product Model(s): MC-83CL

Product Type/Description: Picomotor Piezo Actuator

Product Brand(s): MKS Newport

Safety Directive: Low Voltage Directive 2014/35/EU

Safety Standard(s): IEC 61010-1:2010/AMD 1:2016

Electromagnetic Compatibility Directive: 2014/30/EU

EMC Standards: IEC 61326-1:2020

EN IEC 61326-1:2021

EN 55011:2016 + A1:2017 + A2:2021 + A11:2020

CISPR11:2024

Immunity Standards: EN IEC 61326-1:2021

Environmental Directive(s):

- European Union's REACH Regulation EC1907-2006 Article 33 regarding Substances of Very High Concern (SVHC) and the specific substances described in Article 67 and Annex XVII with amendments
- United Kingdom Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (as amended)
- European Union RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

The object of the declaration described above is in conformity with the relevant community harmonization legislation. MKS product conforms to the above Directive(s) and Standard(s) only when installed in accordance with manufacturer's specifications. This declaration has been issued under the sole responsibility of the manufacturer.

2 Safety Information

2.1 Safety Procedures and Precautions

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the instrument and may impair the protection provided by the equipment. MKS Instruments, Inc. assumes no liability for the customer's failure to comply with these requirements.

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT

Do not install substitute parts or perform any unauthorized modification to the instrument. Return the instrument to an MKS I Newport Service Center for service and repair to ensure that all safety features are maintained.

SERVICE BY QUALIFIED PERSONNEL ONLY

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified service personnel only.

2.2 Symbols Used in This Instruction Manual

Definitions of, NOTE, CAUTION, WARNING and DANGER messages used throughout the manual.

NOTE	The NOTE sign denotes important information. It calls attention to a procedure, practice, condition, or the like, which is essential to highlight.
CAUTION	The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of all or part of the product.
WARNING	The WARNING sign denotes a hazard. It calls attention to a procedure, practice, condition, or the like, which, if not correctly performed or adhered to, could result in injury to personnel.
DANGER	The DANGER sign indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

2.3 Symbols Found on the Label

The following are symbols that may be found on the label.

2.3.1 Waste Electrical and Electronic Equipment (WEEE) Mark



This symbol on the product or on its packaging indicates that this product must not be disposed with regular waste. Instead, it is the user responsibility to dispose of waste equipment according to the local laws. The separate collection and recycling of the waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For information about where the user can drop off the waste equipment for recycling, please contact your local MKS | Newport representative.

2.3.2 RoHS China safety label



This symbol on the product or on its packaging indicates that this product complies with China's Restriction of Hazardous Substances (RoHS) directive and indicate the product's Environmental Protection Use Period (EPUP) in years. The symbol "25" signifies that hazardous substances contained in the product will not leak or cause environmental damage under normal use for a period of 25 years..

2.4 Cautions

CAUTION

This stage is a Class A device. In a residential environment, this device can cause electromagnetic interference. In this case, suitable measures must be taken by the user.

CAUTION

Do not leave this stage in places subject to extremely high temperatures or low temperatures. This may cause an electric shock.

- Operating temperature: +10 to +40 °C, 50% RH max.
- Storage temperature: -30 to +85 °C, 50% RH max. (in its original packaging)
- Storage/Operating altitude: 1000 m

CAUTION

Do not place this stage in a location affected by dust, oil fumes, steam or high humidity. This may cause an electric shock.

CAUTION

There are no user serviceable parts inside the device. Work performed by persons not authorized by MKS | Newport will void the warranty.

CAUTION

Be careful that the stage is not bumped when it is being carried. This may cause it to malfunction.

2.5 Warnings

WARNING

Do not attempt to operate this equipment if there is evidence of shipping damage or you suspect the unit is damaged. Damaged equipment may present additional hazards to you. Contact MKS | Newport technical support for advice before attempting to plug in and operate damaged equipment.

WARNING

The Picomotor™ is intended for use ONLY with Newport™ Picomotor Controller/Driver units. Connection of other devices to the motor may cause damage to the unit or the connected device, fire, and/or personal injury.

WARNING

Do not use this stage when its motor is emitting smoke or is unusually hot to the touch or is emitting any unusual odor or noise or is in any other abnormal state. Stop using the stage immediately, switch off the motor power and then disconnect the electronics power supply.

After checking that smoke is no longer being emitted contact your Newport service facility and request repairs. Never attempt to repair the stage yourself as this can be dangerous.

WARNING

Make sure that this stage is not exposed to moisture and that liquid does not get into the stage.

Nevertheless, if any liquid has entered the stage, switch off the motor power and then disconnect the electronics from power supply.

Contact your MKS | Newport service facility and request repairs.

WARNING

Do not insert or drop objects into this stage, this may cause an electric shock, or lock the drive.

Do not use this stage if any foreign objects have entered the stage. Switch off the motor power and then disconnect the electronics power supply.

Contact your MKS | Newport service facility for repairs.

WARNING

When handling this stage, always unplug the equipment from the power source for safety.

WARNING

If this equipment is used in a manner not specified in this manual, the protection provided by this equipment may be impaired.

WARNING

Do not open the motor cover or cut the motor cable. High voltages (up to 120 V, 200 mA) are accessible with the cover removed or the cable cut.

3 Introduction

This manual provides operating instructions for the Closed Loop Picomotor™ Piezo Actuator purchased in the Model 8315 Series:



Model 8315 Picomotor Piezo Actuators.

Picomotor actuators are ideal for motorizing fine-positioning stages and mounts for applications that require exceptional precision, small step sizes, and set-and-forget stability, all in a compact package.

Compatible with our optomechanical translation stages or customer's custom devices.

The 8315 Closed Loop Picomotor Actuator is ideal for applications where closed-loop control and absolute position calibration is required.

With an integrated rotary encoder, and forward and reverse limit switches, this unique device offers the best attributes of the standard Picomotor™ actuator with the added benefits of exceptional accuracy and bi-directional repeatability over the entire travel range.

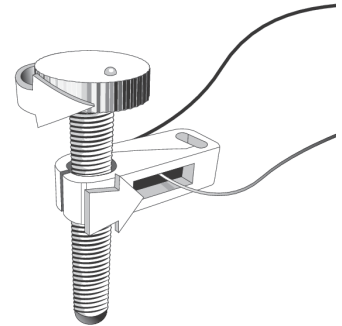
4 Picomotor™ motorization features

When fine control is needed for laser alignment, linear stages, rotary stages, etc., Newport™ has an innovative, reliable solution.

Here we outline several reasons why our Picomotor™ actuators and motorized stages and mounts are optimum products.

PICOMOTOR TECHNOLOGY

Picomotor actuators rely on the basic difference between dynamic and static friction. Our Picomotor actuator uses this principle with a threaded jaw, similar to two halves of a split nut, clamped around a precision 80-pitch screw. One jaw is connected to one end of a piezoelectric transducer, and the other jaw is connected to the other end of the transducer. A slow electrical signal applied to the piezo slowly changes the length, causing the two jaws to slide in opposite directions. This slow sliding motion makes the screw turn (static friction). At the end of the transducer motion, a fast electrical signal quickly returns the jaws to their starting positions. Because of the screw's inertia and low dynamic friction, it remains motionless, holding its position. Simply reversing the order of the fast and slow signals reverses the direction of rotation.



EXCEPTIONAL PRECISION

Our Picomotor actuators have a step size of <30 nm per step, allowing for very small, controlled movements.

SET-AND-FORGET STABILITY WITH VIRTUALLY NO BACKLASH

The Picomotor actuator moves when voltage is applied to the piezo, changing its length and in turn moving the jaws which turn the screw.

When no power is applied, the actuator does not move. You can feel confident that your set-up will stay put, even when you power down your system.

SUBSTANTIAL FORCE FROM A SMALL PACKAGE

With load capacity of 5 lbs (22N), our Picomotor actuators have a substantial push force.

All this fits in a compact package.

Our Tiny Picomotor actuator now offers up to 3 lbs of push force in an even smaller package size.

EASY-TO-USE, FLEXIBLE CONTROLLERS AND DRIVERS

Our Intelligent Picomotor controller and drivers are modular.

It is possible to daisy-chain up to 31 drivers together, so a network of up to 124 standard Picomotor actuators can be made.

There are two interface options with the controller: handpad or computer both providing plug-and-play use.

Alternatively, it is possible to use our TTL/Analog Picomotor Driver.

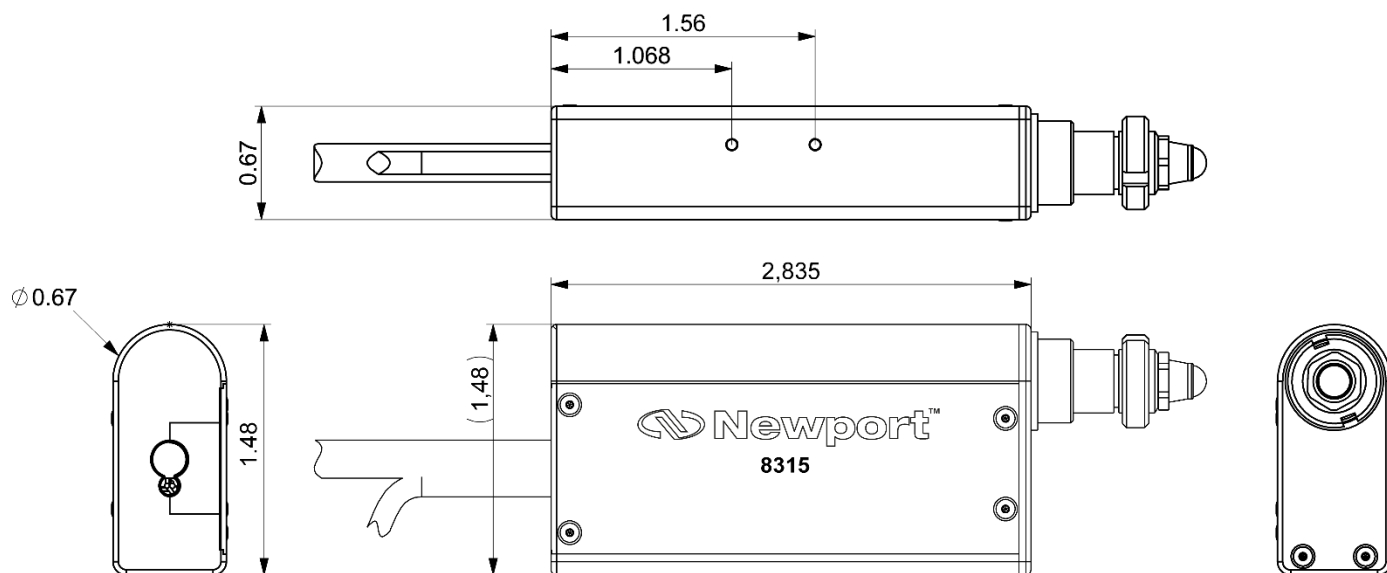
5 Specifications

Bi-Directional Repeatability	±1 µm Over Full Travel (from either direction)
Uni-Directional Repeatability	±0.5 µm Over Full Travel (from same direction)
Speed (@ 2 kHz pulse rate)	1.2 mm/min (20 µm/sec typical)
Closed-Loop Settling Time	<100 ms
Closed-Loop Steady-State Error	0 counts
Encoder Resolution	40 nm per encoder count ⁽¹⁾
Connector Type	15-pin D-sub vacuum chamber feedthrough
Survival Temperature Range (non-operating)	-30 / +85 °C
Mounting	0.375" (9.5 mm) Shank
Linear Travel	0.50" (12.7 mm)
Minimum Incremental Motion (open loop)	<30 nm
Limit Sensors	2 and 1 Home Sensor
Angular Resolution	<0.6 mrad
Maximum Load	5 lbs (22 N)
Torque	2.5 oz-in (0.018 N · m)
Operating Temperature	+10 / +40 °C
Lifetime	2,500 Standard Cycles ⁽²⁾
Wire Length	6.5 ft (2 m)

(1) The encoder resolution is 2000 lines per revolution, and with quadrature encoding this results in 8000 counts per revolution.

(2) Standard cycle is 1 mm of travel range out and back pushing a 5 lbs axial load.

6 Dimensions



7 Installation

7.1 Unpacking

The Picomotor™ actuators are delivered in packaging designed for safe transport. Carefully remove the product from packaging.

CAUTION

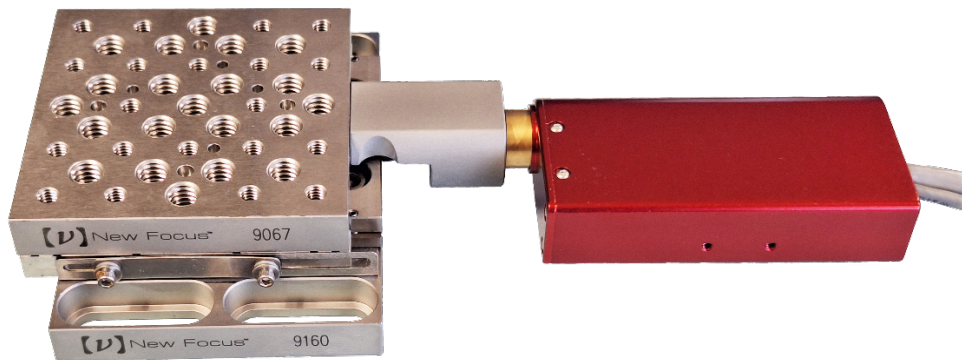
Pay attention the actuator does not fall and is not bumped during handling. Do not touch the screw threads with any hard object, even lightly.

7.2 Mounting the actuator

9.5MM SHANK

The mounting shaft is 0.375" (9.5mm) typical in standard micrometers.

We have provided a threaded nut, so you can insert the motor into a bushing and tighten the nut to mount the motor.



This is the preferred mounting method because it reduces the possibility of distortion on the motor's housing.

If instead you are going to mount the motor's shaft in a micrometer clamp, be careful not to clamp too hard on the motor's housing.

This can deform the motor's shank and may cause increased friction between the inner rotating screw and the fixed exterior housing.

If the motor slows or fails completely, try loosening the clamp.

You can turn the motor manually using the hex nut at the end of the screw.

Please be careful, however, not to touch the threads of the screw with your tools.

Any damage to the screw threads will result in a significantly shorter motor lifetime.

8 Tips for achieving nanometer-scale performance

In order to achieve consistent performance and maximize the lifetime of your Picomotor™ actuators, keep the following precautions in mind:

- If the motor hits a stop, turn off the driver as soon as possible. Running the Picomotor actuator against a hard stop will decrease the lifetime but will not cause immediate irreparable damage.
- Use a small amount of lubricant between the stainless-steel ball tip and the load surface to prevent wear and the generation of debris in the interface. We recommend Krytox GPL 205 or the low-vapor pressure Krytox, LVP LCT-42 grease.
- Keep the interface between the stainless-steel ball tip and the load surface clean of debris. Even small particles on the order of a micron can make a difference in the repeatability and torsional load of the actuator.
- Use the Model 8315 for pushing against smooth, hard, flat surfaces only, such as the sapphire pads used in Newport mirror mounts and translation stages. Pushing on aluminum or stainless-steel surfaces will wear out the ball tip. If the load surface is too soft, small amounts of material can build up in the interface between the ball tip and load surface resulting in surface roughness which can degrade repeatability.
- Do not push against cone or v-shapes, especially in softer materials such as aluminum. When the ball wears against a cone or v-shape in softer materials, particle generation can lead to increased friction and torsional loads. These torsional loads can easily exceed the Drive torque, thus stalling the motor.
- Avoid damage to the screw threads. Do not touch the screw threads with any hard object, even lightly. To provide the fine resolution, the screw has very fine-pitch threads. If the threads are damaged, this damaged area will produce repeated excessive wear within the fixed motor housing and significantly reduce the lifetime of the motor.
- Avoid clamping tightly on the motor's housing. As stated previously, this can cause increased friction between the rotating inner screw and the fixed exterior housing resulting in slowed motor motion or complete failure. This can also result in damaged screw threads.
- Periodically examine the stainless-steel ball tip and the load surface for wear.

9 Connection to Newport™ Controllers

NOTE

Closed loop Picomotor™ piezo actuators are intended to be used with Newport™ 8743-CL closed loop controller/driver.

9.1 Warnings on Controllers

Controllers are intended for use by qualified personnel who recognize shock hazards and are familiar with safety precautions required to avoid possible injury.

Read the controller user's manual carefully before operating the instrument and pay attention to all written warnings and cautions.

WARNING

Disconnect the power plug under the following circumstances:

- If the power cord or any attached cables are frayed or damaged in any way.
- If the power plug is damaged in any way.
- If the unit is exposed to rain, excessive moisture, or liquids are spilled on the unit.
- If the unit has been dropped or the case is damaged.
- If you suspect service or repair is required.
- Whenever you clean the electronics unit.

CAUTION

To protect the unit from damage, be sure to:

- Keep all air vents free of dirt and dust.
- Keep all liquids away from the unit.
- Not expose the unit to excessive moisture (85% humidity).
- Read this manual before using the unit for the first time.

WARNING

All attachment plug receptacles in the vicinity of this unit are to be of the grounding type and properly polarized.

Contact your electrician to check your receptacles.

WARNING

This product operates with voltages that can be lethal.

Pushing objects of any kind into cabinet slots or holes, or spilling any liquid on the product, may touch hazardous voltage points or short out parts.

9.2 Cables

Standard Closed Loop Picomotor™ piezo actuator Model 8315 is equipped with two pigtail cables.

The motor cable is terminated with an RJ-22 connector and the encoder cable is terminated with a male 15-pin SUB-D HD connector.

CAUTION

Do not lay Picomotor™ actuator cables on or near the control pad cable.

9.3 Connection

WARNING Always turn the controller's power OFF before connecting to a stage.

Connect actuator motor cable RJ-22 connector on controller/driver.
Connect actuator encoder cable HD DB15 connector on controller/driver.

WARNING Keep these cables at a safe distance from other electrical cables in your environment to avoid potential cross talk.

9.4 Configuration and operation

Refer to controller/driver User's Manual.

NOTE The Picomotor™ emits high-pitched tones during operation. These sounds are normal and do not indicate a problem with the device. Operating speed varies slightly with each motor.

10 Connection to Non-Newport Electronics

When operating with non-Newport controllers, it is recommended to adhere to the encoder wiring pinout presented below and to use cabling with similar characteristics. Because only the patented Picomotor drive waveform can be used to drive the Picomotor actuator, you must insert the RJ-22 connector into a Newport Picomotor controller & driver module (Model 8742 4-channel open loop, Model 8743-CL 2-channel closed loop), or single-axis Picomotor driver module (Model 8703 TTL/Analog driver).

WARNING

Newport is not responsible for malfunction or damage of Picomotor actuators when used with non-Newport controllers.

WARNING

Newport guarantees certifications compliance of Picomotor stages only if used with the appropriate Newport cable and controller.

It is the customer's responsibility to modify the cables and take care of sensor signal connections when using the stage with non-Newport controllers.

10.1 Encoder connector pinout

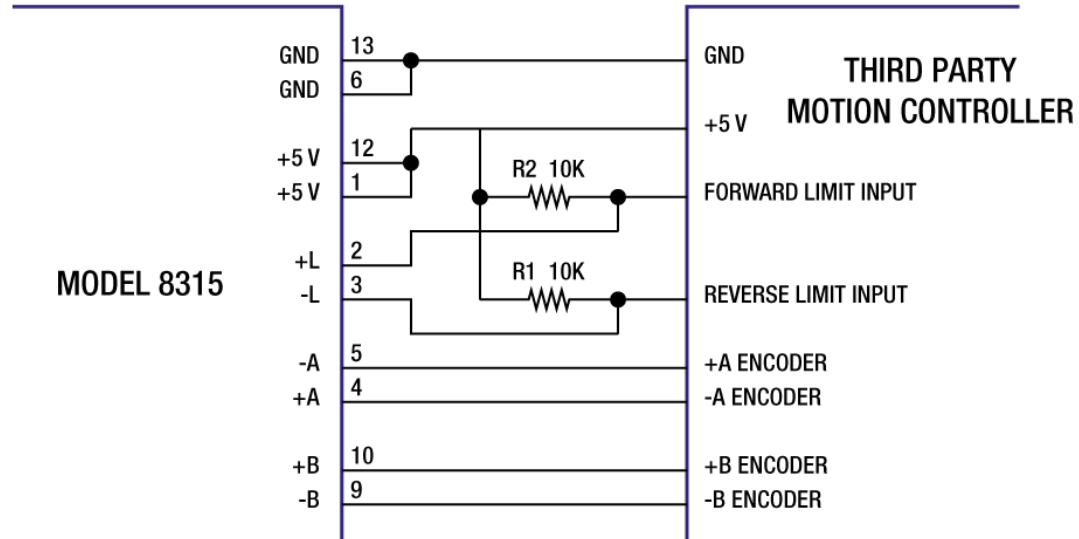
SUB-D15 HD Male		
Pin	Signal	Description
1	+5 V	+5 V limit-sensors and encoder power supply
2	+L	Forward limit sensor (open collector output, normally closed)
3	-L	Reverse limit sensor (open collector output, normally closed)
4	+A	Encoder phase +A output
5	-A	Encoder phase -A output
6	GND	Interface ground
7	N/C	Not connected
8	N/C	Not connected
9	-B	Encoder phase -B output
10	+B	Encoder phase +B output
11	N/C	Not connected
12	+ 5V	+5V encoder power supply
13	GNG	Encoder ground
14	N/C	Not connected
15	N/C	Not connected

WARNING

The shielding of the SUB-D15-HD connector must be connected to the system ground (GND).

The limit sensors and the encoder home sensor are open collector outputs. When the actuator is in the positive portion of the travel, these outputs are pulled low through a transistor that is rated to 20 mA. When the actuator reaches its end of travel, one of the limit sensors will change to a floating voltage. The same with the home sensor when the actuator comes in the negative portion of travel. By using a 10-kΩ pull-up resistor to 5 V, you can convert these sensor signals to TTL levels (See diagram below).

10.2 Example wiring diagram



The Model 8315 is compatible with any third-party motion controller that can read TTL-level quadrature encoder signals.

NOTE

The Model 8315 encoder outputs are differentially encoded on two wires. For a controller which accepts only single-ended encoder signals, tie -A, and -B to GND.

11 Maintenance

NOTE

Please contact Technical Sales Support team for recommendations on application specific maintenance.

11.1 Maintenance

The closed loop Picomotor™ piezo actuator requires no particular maintenance. Nevertheless, this is a precision mechanical device that must be kept and operated with caution.

CAUTION

The Picomotor™ actuator must be used or stocked in a clean environment, without dust, humidity, solvents or other substances.

CAUTION

Do not clean with solvent. If you need to clean the actuator, wipe it with a clean, dry, lint-free cloth.

CAUTION

Do not apply lubricant to the screw.

11.2 Repair

CAUTION

Never attempt to disassemble a component of the actuator that has not been covered in this manual.
To disassemble a non-specified component can cause a malfunction of the stage.

If you observe a malfunction in your stage, please contact us immediately to arrange for a repair.

CAUTION

Any attempt to disassemble or repair a stage without prior authorization will void your warranty.

Visit MKS | Newport Online at:
www.newport.com

North America & Asia

Newport Corporation
1791 Deere Ave.
Irvine, CA 92606, USA

Sales

Tel.: +1 (949)-863-3144
e-mail: sales@newport.com

Technical Support

Tel.: +1 (949)-863-3144
e-mail: tech@newport.com

Service, RMAs & Returns

Tel.: +1 (949)-863-3144
e-mail: service@newport.com

Europe

MICRO-CONTROLE Spectra-Physics S.A.S
7 rue des Plantes
45340 Beaune-la-Rolande
France

Sales Europe (EMEA)

Tel.: +49 (0) 6151-708-0
e-mail: germany@newport.com

Sales France

Tel.: +33 (0)1 60 91 68 68
e-mail: france@newport.com

Sales UK

Tel.: +44 (0)1235 432 710
e-mail: uk@newport.com

Technical Support

e-mail: tech_europe@newport.com

Service & Returns

Tel.: +33 (0)2 38 40 51 55
DST-BEA-RMA-service@newport.com