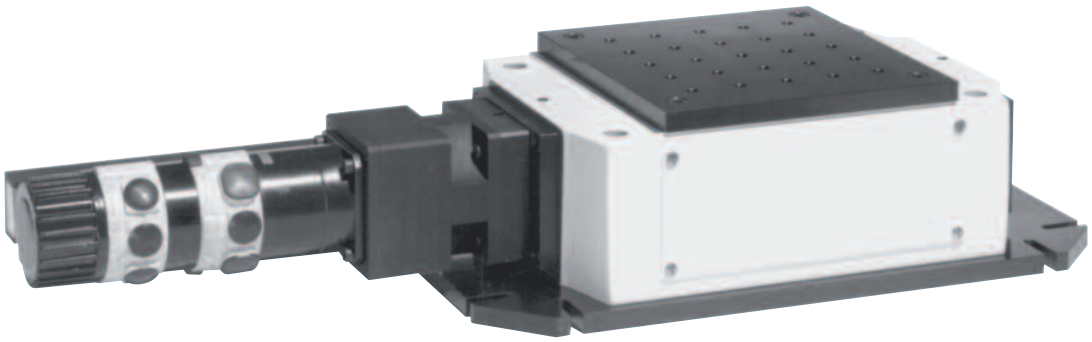
mks

UZM Series

Vertical Linear Stages



Newport®

USER'S MANUAL

Warranty

Newport Corporation warrants this product to be free from defects in material and workmanship for a period of 1 year from the date of shipment. If found to be defective during the warranty period, the product will either be repaired or replaced at Newport's discretion.

To exercise this warranty, write or call your local Newport representative, or contact Newport headquarters in Irvine, California. You will be given prompt assistance and return instructions. Send the instrument, transportation prepaid, to the indicated service facility. Repairs will be made and the instrument returned, transportation prepaid. Repaired products are warranted for the balance of the original warranty period, or at least 90 days.

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:**
  - **Load on the stage greater than maximum specified load.**
  - **Carriage 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 stage or any part thereof.**

CAUTION

Please return equipment in the original (or equivalent) packing.

You will be responsible for damage incurred from inadequate packaging if the original packaging is not used.

This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular use. Newport Corporation shall not be liable for any indirect, special, or consequential damages.

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Original instructions.

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Table of Contents

EC Declaration of Conformity

UZM Series

EU Declaration of Conformity

following Annex II-1A
of Directive 2006/42/EC on machinery

The manufacturer:

MICRO-CONTROLE Spectra-Physics,
9 rue du Bois Sauvage
F-91055 Evry FRANCE

Hereby declares that the machinery:

- Description: " UZM"
- Function: Vertical Linear Stages
- Models: M-/UZM160/CC.05/ PE.05/ PP.05

– the technical file of which was compiled by:

Mr Hervé LE COINTE , Quality Director,
MICRO-CONTROLE Spectra-Physics, Zone Industrielle - B.P.29
F-45340 Beaune La Rolande France

– complies with all the relevant provisions of the Directive 2006/42/EC on machinery.
– complies with all the relevant provisions of the Directive 2014/30/EU relating to electro-magnetic compatibility.
– complies with all the relevant provisions of the Directive 2011/65/EU relating to RoHS2.

– was designed and built in accordance with the following harmonised standards:

- NF EN 61326-1:2013 « Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements »
- NF EN 55011:2010/A1:2011 Class A

– was designed and built in accordance with the following other standards:

- NF EN 61000-4-2
- NF EN 61000-4-3
- NF EN 61000-4-4
- NF EN 61000-4-5
- NF EN 61000-4-6

ORIGINAL DECLARATION

Done in Beaune La Rolande on 16 May 2017
Hervé LE COINTE
Quality Director

DC1-EN rev:A

Definitions and Symbols

The following terms and symbols are used in this documentation and also appear on the product where safety-related issues occur.

General Warning or Caution

The exclamation symbol may appear in warning and caution tables in this document. This symbol designates an area where personal injury or damage to the equipment is possible.

The following are definitions of the Warnings, Cautions and Notes that may be used in this manual to call attention to important information regarding personal safety, safety and preservation of the equipment, or important tips.

WARNING

Warning indicates a potentially dangerous situation which can result in bodily harm or death.

CAUTION

Caution indicates a potentially hazardous situation which can result in damage to product or equipment.

NOTE

Note indicates additional information that must be considered by the user or operator.

European Union CE Mark

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.

Warnings and Cautions

ATTENTION

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.

Warnings

WARNING

The motion of objects of all types carries potential risks for operators. Ensure the protection of operators by prohibiting access to the dangerous area and by informing the personnel of the potential risks involved.

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 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 Newport service facility for repairs.

WARNING

Do not place this stage in unstable locations such as on a wobbly table or sloping surface, where it may fall or tip over and cause injury.

If this stage has been dropped or the case has been damaged, switch off the motor power and then disconnect the electronics power supply.

Contact your Newport service facility and request repairs.

WARNING

Do not attempt to modify this stage; this may cause an electric shock or downgrade its performance.

WARNING

Do not exceed the usable depth indicated on the mounting holes (see section “Dimensions”). Longer screws can damage the mechanics or cause a short-circuit.

Caution

CAUTION

Do not place this stage in a hostile environment such as X-Rays, hard UV,… or in any vacuum environment.

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

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 +35 °C**
- **Storage temperature: -10 to +40 °C (in its original packaging)**

CAUTION

Do not move this stage if its motor power is on.

Make sure that the cable to the electronics is disconnected before moving the stage. Failure to do so may damage the cable and cause an electrical shock.

CAUTION

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

CAUTION

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

CAUTION

When the carriage is in its end-of-run position, it is strongly recommended not to go beyond this point as this may damage the stage mechanism.

CAUTION

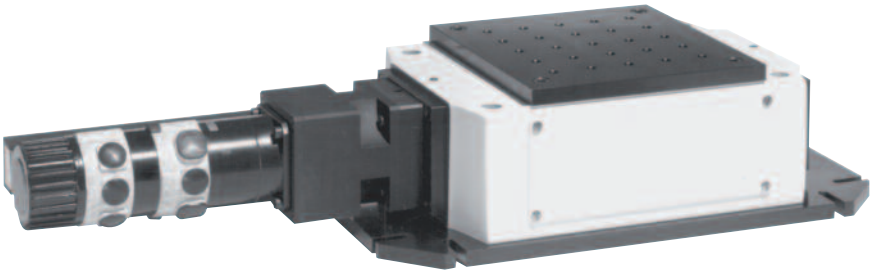
Contact your Newport service facility to request cleaning and specification control every year.

Vertical Linear Stages
UZM160

1.0 Introduction

This manual provides operating instructions for the UZM160 stage that you have purchased:

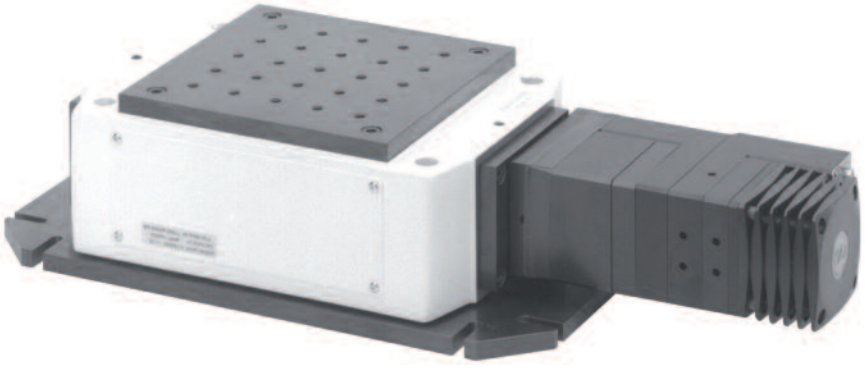
- UZM160PP.05
- UZM160PE.05
- UZM160CC.05



UZM160CC.05

RECOMMENDATION

We recommend you read carefully the chapter “Connection to electronics” before using the UZM160 stage.



UZM160PP.05

2.0 Description

UZM160 vertical translation stages offer high-precision vertical translation for applications requiring submicron resolution accuracy. High-resolution vertical motion is achieved with a precision inclined-plane design, consisting of two opposing wedges which move past each other by means of inclined, ball-bearing races. A precision leadscrew translates the lower edge horizontally, and this motion is converted into vertical translation by the inclined ball races between the two wedges. For automatic return to a pre-determined height, all UZM160 stages include a center home position.

Position measuring is performed with a 2000 pts/rev. encoder, integral with the motor shaft.

Unlike vertically-mounted translation stages, UZM160 stages center the mass of the payload directly over the bearings, avoiding positioning errors caused by cantilever loads. The low-profile design of these stages make them particularly suited for space-limited XYZ positioning applications.

The modular design of UZM160 stages brings you the flexibility to choose the drive configuration that best matches your specific application requirements: DC-motor or stepper motor driven versions, with mini-step or full-step drive options.

For optimal performance, we recommend the use of our motion controllers.

UZM160 stages are supplied with a 3-meter cable for connection to our motion controllers.

2.1 Design Details

Base Material	Steel
Bearings	Linear ball bearings
Drive Mechanism	2-wedge design with transmission ratio of 4:1, Backlash-compensated leadscrew
Drive Screw Pitch	4 mm
Reduction Gear	10:1 [1]
Feedback	Screw mounted rotary encoder, 2,000 cts/rev, index pulse
Limit Switches	Mechanical
Origin	Optical, at center of travel
Cable Length	3 m (included)
Vacuum Compatibility	On request, vacuum compatible version of UZM160PE.05 available up to 10^{-6} hPa

[1] *Additional motor mounted gear on some drive options.*

3.0 Characteristics

3.1 Definitions

Specifications of our products are established in reference to ISO 230 standard part II “Determination of accuracy and repeatability of positioning numerically controlled axes”.

This standard gives the definition of position uncertainty which depends on the 3 following parameters:

Absolute Accuracy

Difference between ideal position and real position.

Accuracy

Difference between ideal position and real position after the compensation of linear errors.

Linear errors include: cosine errors, inaccuracy of screw or linear scale pitch, angular deviation at the measuring point (Abbe error) and thermal expansion effects. All Newport motion electronics can compensate for linear errors.

The relation between absolute accuracy and on-axis accuracy is as follows:

$$Absolute\ Accuracy = Accuracy + Correction\ Factor \times Travel$$

Repeatability

Ability of a system to achieve a commanded position over many attempts.

Reversal Value (Hysteresis)

Difference between actual position values obtained for a given target position when approached from opposite directions.

Minimum Incremental Motion (MIM or Sensitivity)

The smallest increment of motion a device is capable of delivering consistently and reliably.

Resolution

The smallest increment that a motion device can theoretically move and/or detect. Resolution is not achievable, whereas MIM, is the real output of a motion system.

Yaw, Pitch

Rotation of carriage around the Z axis (Yaw) or Y axis (Pitch), when it moves.

The testing of accuracy, repeatability, and reversal error are made systematically with test equipment in controlled environment ($20^{\pm 1}$ °C).

A linear cycle with 21 data points on the travel and 4 cycles in each direction gives a total of 168 points.

Guaranteed and Typical Specifications

Guaranteed maximum performance values are verified per Newport's A167 metrology test procedure. For more information, please consult the metrology tutorial section in the Newport catalog or at **www.newport.com**

3.2 Mechanical Specifications

Travel Range	9 mm
Minimum Incremental Motion	0.2 µm
Uni-directional Repeatability, Typical [1]	0.25 µm
Bi-directional Repeatability, Typical [1]	2.75 µm
Accuracy, Typical [1]	±4 µm
Maximum Speed	UZM160CC.05 & UZM160PP.05: 1 mm/s UZM160PE.05: 0.1 mm/s
Pitch, Typical [1] [2]	±50 µrad
Yaw, Typical [1] [2]	±100 µrad

1) For the definition of Typical and Guaranteed specifications see "Motion Basics Terminology & Standards" Tutorial at www.newport.com

2) To obtain arcsec units, divide µrad value by 4.8.

CAUTION

To reach specifications stated, stages must be fixed on a plane surface with a flatness of 5 µm.

3.3 Load Specification Definitions

Normal Load Capacity (Cz)

Maximum load a stage can move while maintaining specifications.

This value is given with speed and acceleration specified for each stage, and with a load perpendicular to bearings.

Axial Load Capacity (±Cx)

Maximum load along the direction of the drive train.

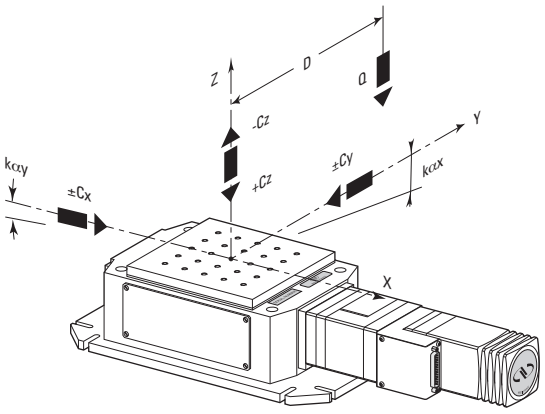
Off-Centered Load (Q)

Maximum cantilever-load a stage can move: $Q \leq Cz \div (1 + D/a)$

D: Cantilever distance.

a: Construction parameter.

3.4 Load Characteristics and Stiffness



Cz, Normal centered load capacity	-200 N; +300 N
-Cx, +Cx, Axial load capacity	±200 N
Kαx, Compliance in roll	0.13 µrad/Nm
Kαy, Compliance in pitch	0.65 µrad/Nm
Q x D, Max. Torque	20 Nm
Where Q = Off-center load (N) D = Cantilever distance (m)	

3.5 Stage Weights

The weight indicated into the below table is the average value for stages without any cable.

	Weight [lb (kg)]
UZM160	47.4 (21.5)
3-meter MMCABLE-3 Cable	1.54 (0.7)
3-meter MCAB-3 Cable	1.32 (0.6)

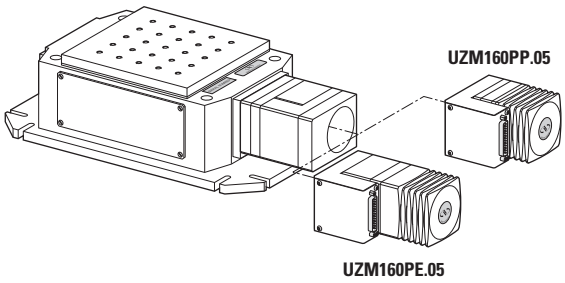
The weight difference between drive units is not significant.

4.0 Drives and Motors

4.1 Stepper Drive Versions

Stepper-motor-driven stages are offered in two variants:

- One mini-step drive version (UZM160PP.05) with resolutions of 0.05 µm. This combines high speed positioning and smooth displacement from 1/10-step per encoder count driving mode. For ultra-smooth low-speed positioning, micro-stepping up to 250x is possible using our controllers.
- One full-step version (UZM160PE.05) with step-down gear and resolutions of 0.05 µm. This is primarily designed for applications requiring the position to be maintained within the stage's resolution when power is switched off.



Mini-Step Drive

Is used for stepper motors, when 1 pulse emitted by electronic corresponds to theoretical physical motion of a fraction of a full step of the motor.

For these stages a mini-step equals 1/10 of a full step.

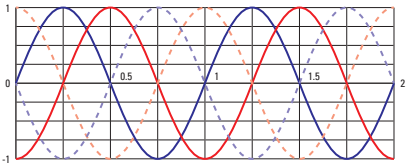
Full-Step Drive

Is used for stepper motors, when 1 pulse emitted by electronic corresponds to theoretical physical motion of 1 full step of the motor.

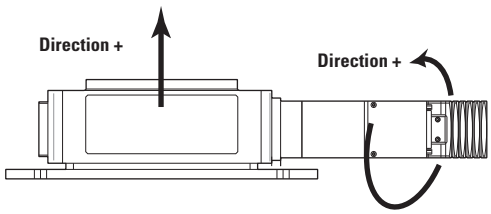
Stepper Motor Performance Specifications and Characteristics

	Resolution (µm)	Speed (mm/s)	Angle by Step (°)	RMS Current per Phase (A)	Resistance (Ω)	Inductance (mH)
UZM160PP.05	0.05	1	1.8	0.6	2.9	3.4
UZM160PE.05	0.05	0.1	1.8	0.6	2.9	3.4

Command Signals for the Stepper Motors



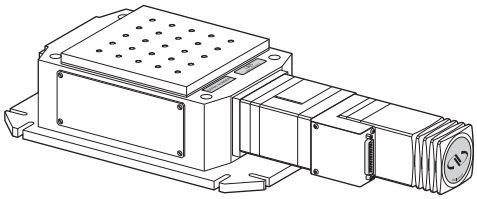
Step	1	2	3	4	5	8	7	8
+ Phase 1	+	+	–	–	+	+	–	–
– Phase 1	–	–	+	+	–	–	+	+
+ Phase 2	–	+	+	–	–	+	+	–
– Phase 2	+	–	–	+	+	–	–	+
Direction		– ←			MOTION		→ +	



4.2 DC-Servo Drive Version

One DC-motor-driven configuration is available (UZM160CC.05) with a resolution of 0.05 µm.

This features a built-in tachometer that provides superior motion control accuracy in higher dynamic applications.

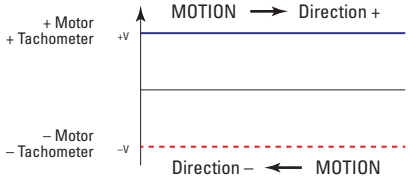


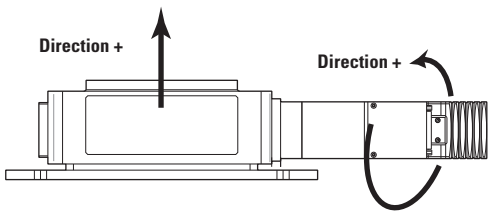
UZM160CC.05

DC-Motor Performance Specifications and Characteristics

	Resolution (µm)	Speed (mm/s)	Nominal Voltage (V)	Max RMS Current (A)	Max. Peak Current (A)	Resistance (Ω)	Inductance (mH)	Tachometer Const. (V/krpm)
UZM160CC.05	0.05	1	30	0.7	1.2	18.6	6.6	3

Command Signals for the DC-Motor



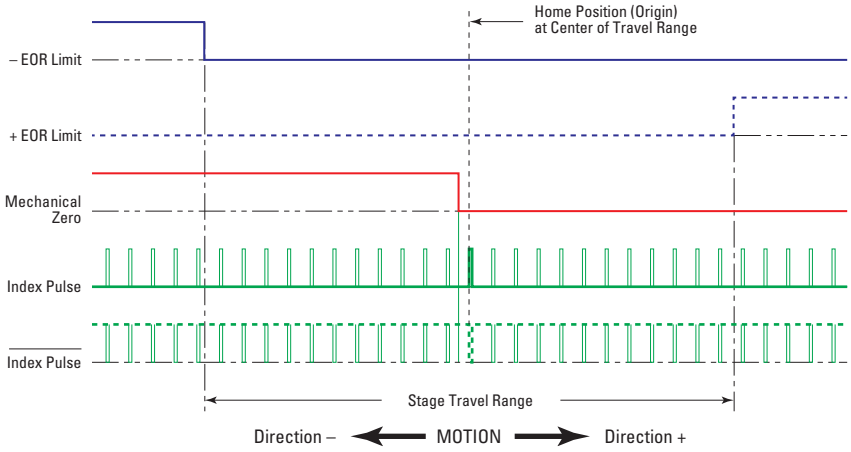


In the above drawings, + Motor signal is referred to – Motor signal, + Tacho Generator signal is referred to – Tacho Generator signal.

① When the stage moves in + Direction, the + Motor voltage is higher than – Motor voltage, and + Tacho Generator voltage is higher than – Tacho Generator voltage.

② When the stage moves in – Direction, the + Motor voltage is lower than – Motor voltage, and + Tacho Generator voltage is lower than – Tacho Generator voltage.

4.3 Sensor Position



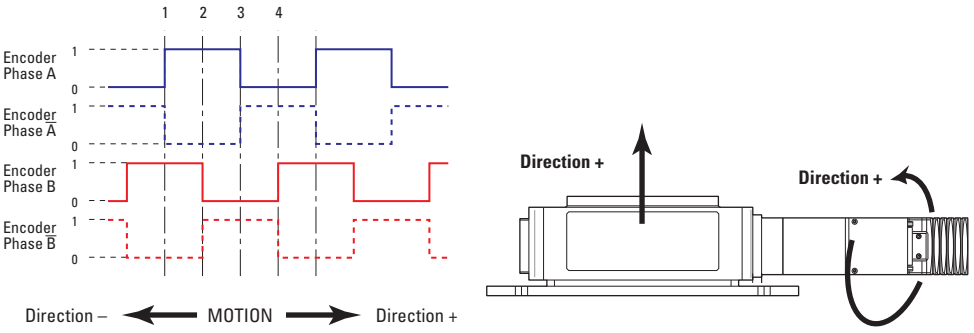
End-of-Run and Mechanical Zero are 5 V open collector type.

The Index Pulse provides a repeatable Home Position at ±1 step.

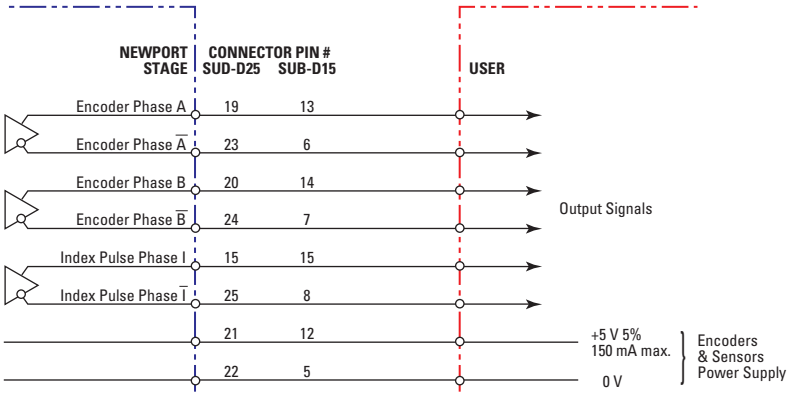
CAUTION

"End-of-Run" and "Mechanical Zero" are active signals and should not be connected to any other source.

4.4 Feedback Signal Position



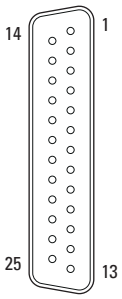
The incremental sensor consists of an optical scale and an encoder head. When the carriage moves, the encoder head generates square signals in quadrature and sends to pins #19, #20, #23 and #24 of the SUB-D25 connector.



"Encoder" and "Index Pulse" are "differential pair" (type RS-422) type output signals. Using these signals permits a high immunity to noise. Emission circuits generally used by Newport are 26LS31 or MC3487. Reception circuits to use are 26LS32 or MC3486.

4.5 Pinouts

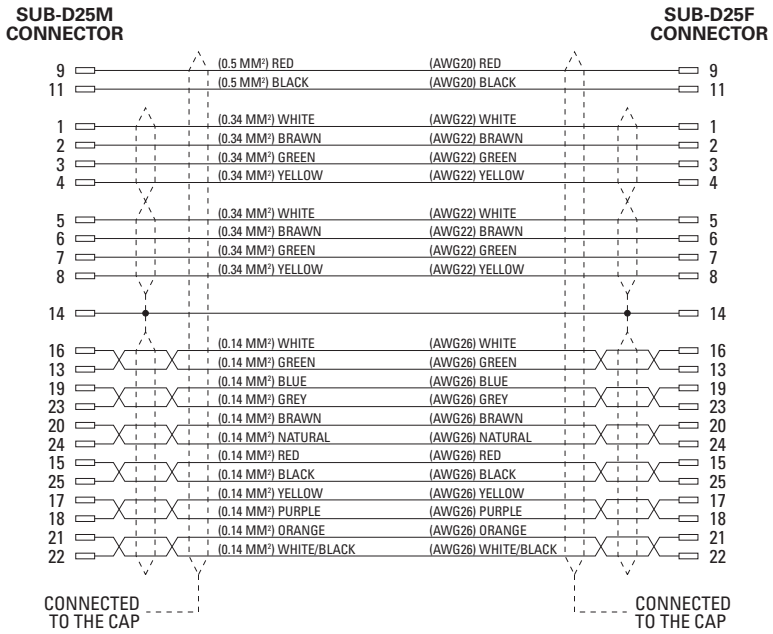
The pinout diagram for the UZM160 stages SUB-D25M connector is shown below.



	Stepper Motor		DC-Motor & Tachometer
1	Phase 1	**1**	+ Tachometer
2	Phase 1	**2**	+ Tachometer
3	Phase 2	**3**	– Tachometer
4	Phase 2	**4**	– Tachometer
5	Phase 3	**5**	+ Motor
6	Phase 3	**6**	+ Motor
7	Phase 4	**7**	– Motor
8	Phase 4	**8**	– Motor
9	N.C.	**9**	N.C.
10	N.C.	**10**	N.C.
11	N.C.	**11**	N.C.
12	N.C.	**12**	N.C.
13	Mechanical Zero	**13**	Mechanical Zero
14	Ground	**14**	Ground
15	Index Pulse I	**15**	Index Pulse I
16	0 V	**16**	0 V
17	+ End-of-Run	**17**	+ End-of-Run
18	– End-of-Run	**18**	– End-of-Run
19	Encoder Phase A	**19**	Encoder Phase A
20	Encoder Phase B	**20**	Encoder Phase B
21	+5 V	**21**	+5 V
22	0 V	**22**	0 V
23	Encoder Phase /A	**23**	Encoder Phase /A
24	Encoder Phase /B	**24**	Encoder Phase /B
25	Index Pulse /I	**25**	Index Pulse /I

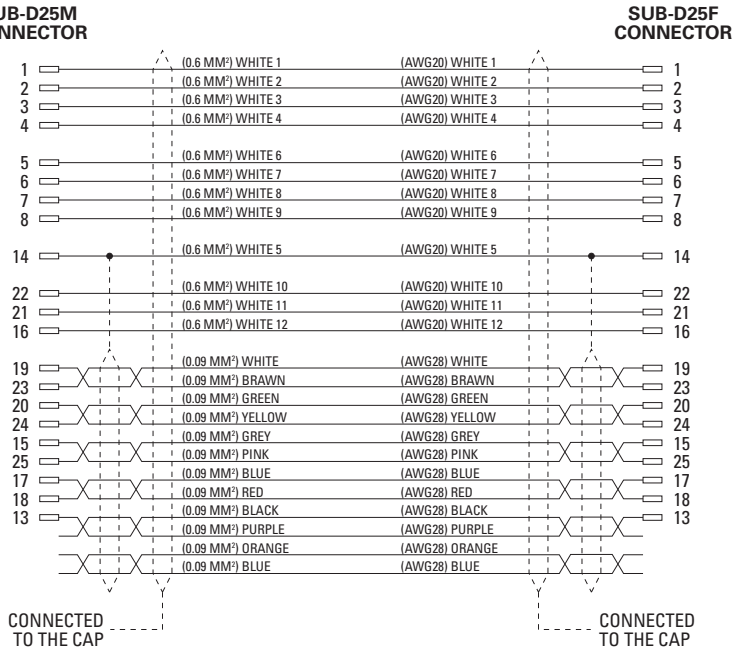
4.6 MMCABLE-3 Cable

A 3-meter MMCABLE-3 cable is supplied with each stepper version of the UZM160 stages (see section 5.3: ”Cables”).



4.7 MCAB-3 Cable

A 3-meter MCAB-3 cable is supplied with each UZM160CC.05 stage (see section 5.3: ”Cables”).



5.0 Connection to Newport Controllers

5.1 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.**
- **Do 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 is equipped with a 3-wire grounding type plug.

Any interruption of the grounding connection can create an electric shock hazard.

If you are unable to insert the plug into your wall plug receptacle, contact your electrician to perform the necessary alterations to ensure that the green (green-yellow) wire is attached to earth ground.

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.

5.2 Connection

There is a label on every stage indicating its part and serial numbers.

WARNING

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

NOTE

These stages are ESP compatible. Enhanced System Performance is Newport's exclusive technology that enables Newport ESP motion controllers to recognize the connected Newport ESP stage and upload the stage parameters. This ensures that the user can operate the motion system quickly and safely.

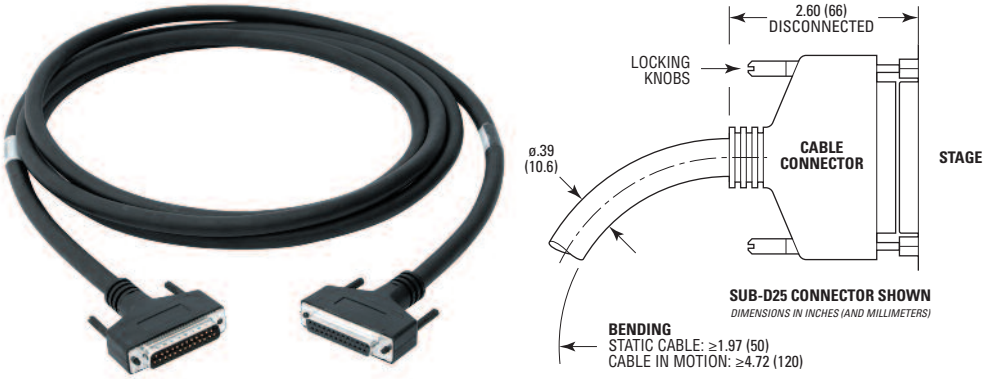
5.3 Cables

Our stages are delivered with a **MMCABLE-3** or **MCAB-3** 3-meter cable according to the UZM160 stage you bought. This cable is equipped with a SUB-D25M connector so it can be directly connected to our controllers/drivers.

The cable supplied with your UZM160 stage is given in the following table:

Stages	Supplied Cable
UZM160PP.05	MMCABLE-3
UZM160PE.05	MMCABLE-3
UZM160CC.05	MCAB-3

5.4 MMCABLE-3 Cable



WARNING

This cable is shielded correctly. For a correct operation, make sure to lock connectors (ground continuity provided by the cable).

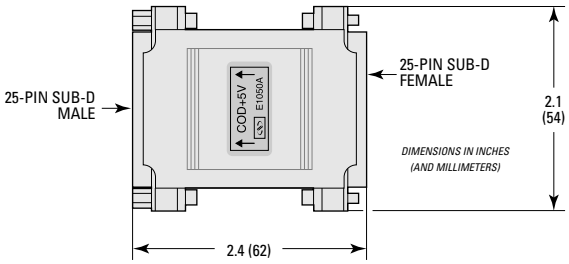
For applications where the standard 3-meter cable (**MMCABLE-3**) included with your stage is not adequate, Newport offers longer length cables designed to ensure the integrity of your positioning application.

These cables are specially shielded and terminated with Newport's standard SUB-D25 connectors. They are available in 5-m (**MMCABLE-5**), 7-m (**MMCABLE-7**) or 10-m (**MMCABLE-10**) lengths.

WARNING

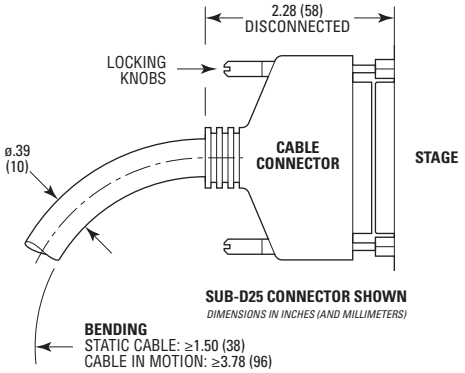
Keep the motor cables at a safe distance from other electrical cables in your environment to avoid potential cross talk.

For cable lengths in excess of 3 meters, we recommend the **MMCABLE-REG** to ensure a high quality, regulated 5 V supply to the stages.



This regulator is available as an option. Please note that for best efficiency, this regulator should be attached to the stage to re-adjust the 5 V coming from the controller through the long cable.

5.5 MCAB-3 Cable



WARNING

This cable is shielded correctly. For a correct operation, make sure to lock connectors (ground continuity provided by the cable).

For applications where the standard 3-meter cable (**MCAB-3**) included with your stage is not adequate, Newport offers longer length cables designed to ensure the integrity of your positioning application.

These cables are specially shielded and terminated with Newport's standard SUB-D25 connectors. They are available in 5-m (**MCAB-5**), 7-m (**MCAB-7**) or 10-m (**MCAB-10**) lengths.

WARNING

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

6.0 Connection to Non-Newport Electronics

6.1 Connections

WARNING

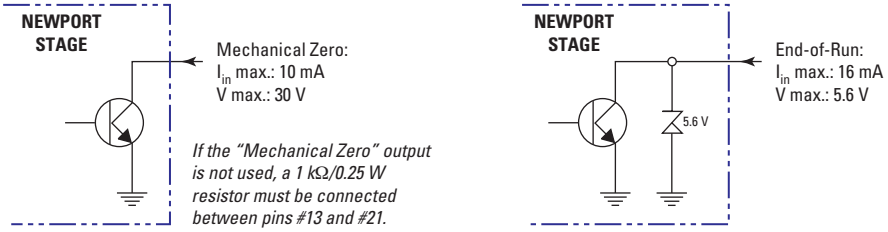
Newport is not responsible for malfunction or damage of UZM160 stages when used with non-Newport controllers.

WARNING

Newport guarantees "CE" compliance of UZM160 stages only if used with Newport cables and controllers.

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

- **The Mechanical Zero logic signal is open collector type. It supports up to 30 V and 10 mA.**
- **The End-of-Run signal is open collector type with a 5.6 V protective Zener diode.**



7.0 Stage Mounting

7.1 Stage Mounting

WARNING

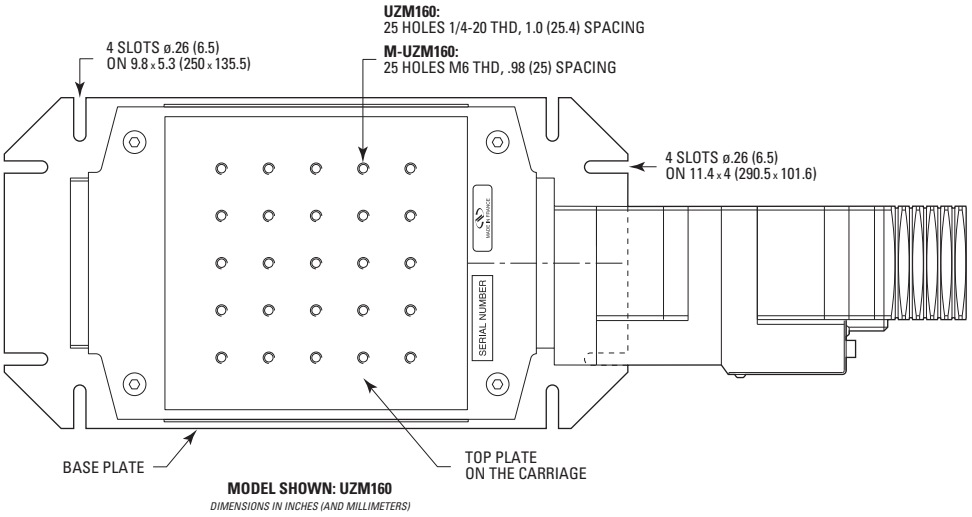
Before to use a (M-)UZM stage, it is imperative to fix it:

- **Directly on a rectified working surface, from holes located on the mounting plate,**
- **On another stage, directly or with a mounting interface.**

But in no case, the stage has to remain without fastening.

It is equally necessary to fasten the device to move on the carriage:

- **Directly.**
- **Removing the plate on the top of the stage.**



CAUTION

The working surface flatness directly influences stage accuracy and performance.

7.2 Interfaces Disassembling

① Unscrew 4 CHc M6 screws square 5.0 in. (128 mm). Disassemble the top plate of the stage.

② Disassemble the base plate fixed with 4 CHc M6 screws on 7.6 x 5.0 in. (192 x 128 mm), on the body stage.

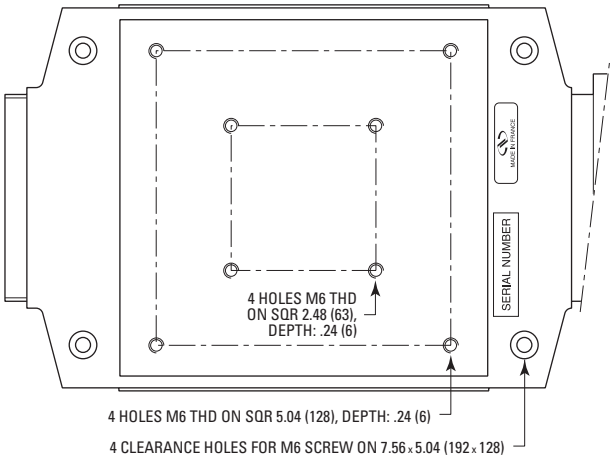
7.3 Interface Plates Mounting

Make steps of “Interfaces Disassembling” chapter in the opposite order.

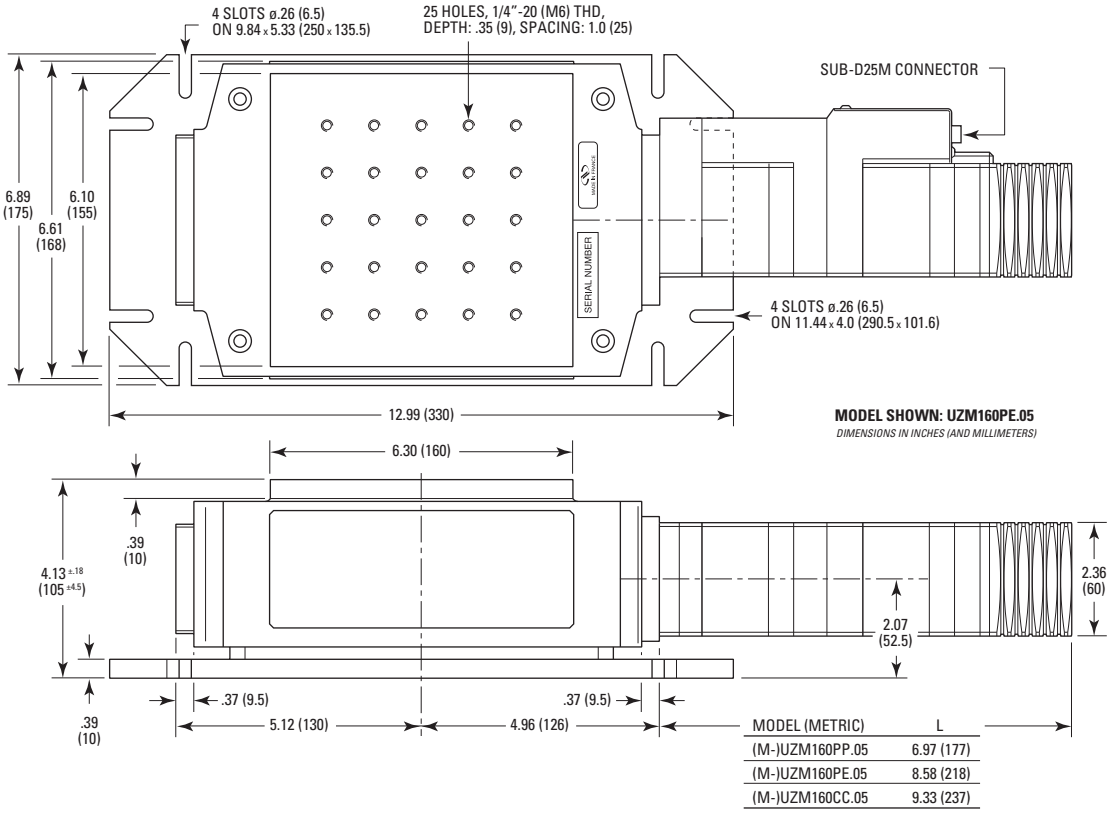
7.4 Assembly Pattern

Stacking UZM160 Series stages either together or with other Newport stage is easily accomplished. Below are example schematics of the assembly patterns used. These interfaces are accessed by unscrewing and removing the upper and/or lower plates of the stages (see dimension drawing).

UZM160 TOP INTERFACE
AFTER REMOVING THE TOP PLATE
DIMENSIONS IN INCHES (AND MILLIMETERS)



8.0 Dimensions



MODEL (METRIC)	L
(M-)UZM160PP.05	6.97 (177)
(M-)UZM160PE.05	8.58 (218)
(M-)UZM160CC.05	9.33 (237)

9.0 Maintenance

RECOMMENDATION

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

9.1 Maintenance

The UZM160 stage requires no particular maintenance. Nevertheless, this is a precision mechanical device that must be kept and operated with caution.

PRECAUTIONS

The UZM160 stage must be used or stocked in a clean environment, without dust, humidity, solvents or other substances.

RECOMMENDATION

It is recommended to return the stage to Newport for re-lubrication after 2000 hours of use.

If the UZM160 stage is mounted on a workstation and cannot be easily removed, please contact Newport's After Sales Service for further instructions.

9.2 Repair

CAUTION

Never attempt to disassemble a component of the stage 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.

9.3 Calibration

CAUTION

It is recommended to return your UZM160 stage to Newport once a year for recalibration to its original specifications.

Service Form

Your Local Representative
Tel.: _____
Fax: _____

Name: _____ Return authorization #: _____
(Please obtain prior to return of item)

Company: _____

Address: _____ Date: _____

Country: _____ Phone Number: _____

P.O. Number: _____ Fax Number: _____

Item(s) Being Returned:

Model #: _____ Serial #: _____

Description: _____

Reasons of return of goods (please list any specific problems): _____

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