



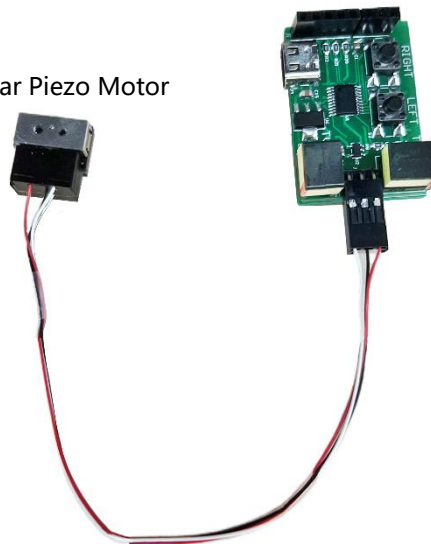
N59 Piezo Motor and Supporting Control Module

User Manual

Version: V1.0

E66.A2K-H Piezo Motor Control Module

N59 Linear Piezo Motor



This user manual describes the following products:

- N59 Linear Piezo Motor
- E66.A2K-H Piezo Motor Control Module

Declaration

Thank you for choosing CoreMorrow's products!

For your smooth and correct use of this product, please read this manual carefully before use, and follow the relevant instructions in the manual for installation and use. Improper operation may cause damage to the product and/or injury to the operator, so it is required that the entire installation and operation process should be completed by professionals with a certain foundation and a certain understanding of product principles, or under the guidance of a professional.

If you disassemble or transform the product without permission, our company will not be responsible for any consequences arising therefrom.

To change the product model and other false sales of our company's products are illegal, users should be vigilant. Once found, you should actively report or contact our company, jointly crack down on illegal acts, and prevent fraud and economic losses. CoreMorrow will investigate for the legal responsibility of the illegal subject and related parties.

With the continuous development and innovation of technology, CoreMorrow will timely add the latest information to the manual as required. If you need, please contact us, or to our website (www.coremorrow.com) for download, we apologize for any inconvenience caused to you.

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1. Introduction

1.1. Purpose and Content

- The manual is mainly for smooth and correct use of N59 linear piezo motor.
- The manual contains all the necessary information for N59 linear piezo motor and supporting control module.
- Introduction of the precautions during installation and use.

1.2. Symbol and Meaning

Symbol	Meaning
	DANGER: Improper handling may could cause injury to the operator.
	Attention: Improper handling can cause damage to the equipment.
	No order between items.
1. 2.	Please operating in order.

1.3. Users of This Manual

The default user of this manual has knowledge of N59 linear piezo motor and supporting control module, and has a certain basis for their installation and use.

1.4. User Manual Download

User manual download process instructions:

1. Open the website www.coremorrow.com;

2. Search for product model (e.g. N59) or series (e.g. linear piezo motor) on the website;
3. Click on the corresponding product to open the product details page;
4. On the product details page, scroll down to "Downloads";
5. Click on the desired file to download.

Be careful! If the manual is lost or there are problems downloading, please contact our customer service department.

2. Safety Guide

This product is designed with the most advanced technology and safety standards.

For your own safety and the correct use of the product, please observe the following points when in use.



A change in temperature and pressure will charge the piezo actuator, and the actuator will remain charged for a period of time when it is disconnected from the controller, so the operator should pay attention to when in use:

- Do not disassemble the piezo product.
- Discharge the product before mounting, which can be done by connecting to the controller.
- Do not unplug the wire connecting with controller during operation.
- Before use, check whether the connection wire of the product is in good condition and whether the product and the controller are effectively grounded. During operation, strictly standardize the operation. Do not touch the product (up to 150V voltage) with your hand when power on, in case of danger.



In order to prevent damage to the product caused by improper operation, the following points should be paid attention to when in use.

- The product should be used in a dust-free, oil-free and lubricant-free environment.
- As the product is designed with flexible structure, it is recommended that the load should not exceed load capacity of product.
- When loading, DO NOT apply torque force and DO NOT pry or twist the load surface, so as not to damage the structure.
- Do not disassemble the product to avoid damage.
- Avoid stretching and bending the cable interface to prevent damage to the cable.
- Use the dedicated cable provided by CoreMorrow to this product to controller.
- Do not connect via an extension cable casually, if you need a longer cable, please contact CoreMorrow.

3. Product Overview

3.1 Product Introduction of N59.9K

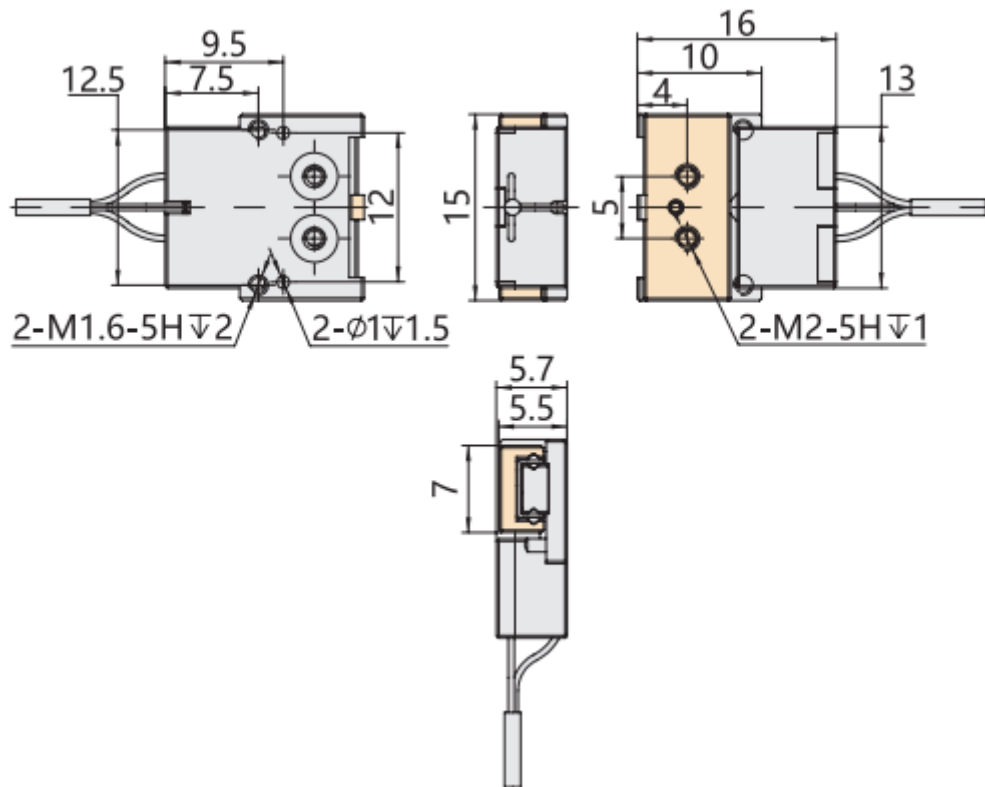
3.1.1. Physical Picture



3.1.2. Product Features

- Piezo resonance principle
- Motion in X
- Travel to $\pm 4.5\text{mm}$
- Speed up to 25mm/s
- Resolution to 50nm
- Load capacity to 0.2kg
- Power off self-locking

3.1.3. Drawing



3.1.4. Technical Data

Type	N59.9K	Units
Active axes	X	
Travel range	9/±4.5	mm
Speed limit	25	mm/s±20%
Resolution	50	nm±20%
Load capacity	0.2	kg
Operating temperature	0~50	°C
Mass	4	g
Material	Al, Stainless steel	
Cable length	1.5	m

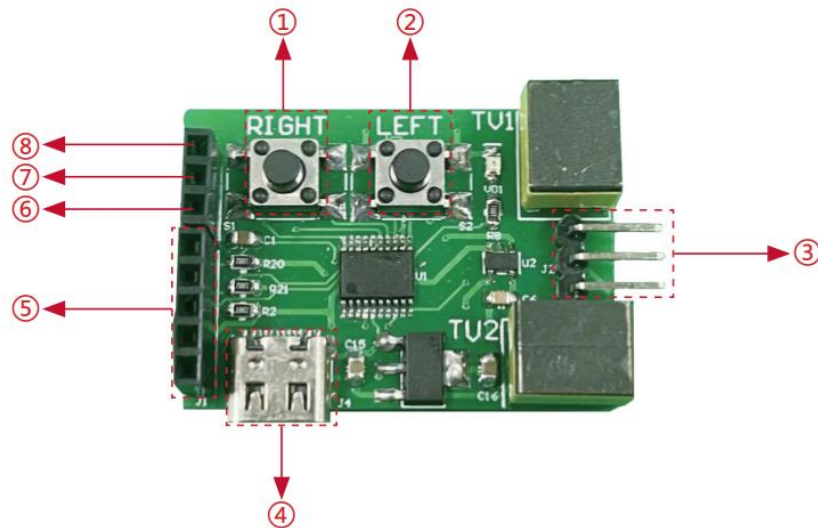
3.1.5. Motion Direction



X motion, two-way linear

3.2 Product Introduction of E66.A2K-H

3.2.1 Button Introduction



No.	Function Description
①	Moving button to the right
②	Moving button to the left
③	Motor connector
④	Power plug connector
⑤	Debugging interface
⑥	Control signal input interface - grounding
⑦	Control signal input interface - Moving to the right
⑧	Control signal input interface - Moving to the left

3.2.2 Technical Data

Type	E66.A2K-H1
Channels	1
Control mode	Open loop, button operation ,external input PWM signal control
Power supply(V)	+5V/1A
Static power(W)	<0.03
Processor	32bit 48M
Operating temperature(°C)	0~50
PZT connector	Single row pressure needle, 2.54mm
Size(mm)	38×27×12
Mass(g±5%)	11

3.3 Open Loop Control Mode

Applying a PWM signal to the control signal input interface can make N59 to move in linear in a specified direction: when the control signal is connected to Right, it moves to the right direction; when connected to Left, it moves to the left direction; and GND is the common ground terminal. When the high level is 3.3V, the N59 starts to move in linear, and when the low level is 0V, the N59 stops moving. Unused terminals must be kept low or suspended.

3.4 Step and Continuous Modes

Whether the travel mode is step mode or continuous mode depends on the signal applied to the control signal input interface. A constant "high" level (DC) signal will cause the N59 to move continuously at its highest speed. Pulses or pulse sequences

will cause the N59 to move in step mode. Special note: The continuous mode usage time should not exceed 10 seconds.

In step mode(PWM mode) , the size of each step is determined by the pulse duration, and the travel speed is determined by the pulse repetition rate. The minimum pulse duration is around 60 μ s. The maximum repetition rate F (in Hz) is determined by the dynamic range of the N59, and for all piezo motors, the maximum repetition rate F is 4kHz.

4. Operating Environment

The N59 linear piezo motor must comply with the following usage environment:

Environmental Condition	Condition Description
Area of application	For indoor use only
Operating temperature	0~50℃
Storage temperature	-10~85℃
Environmental requirements	dust-free, oil-free, lubricant-free and non-corrosive
Relative humidity	< 60%

Note: If the ambient temperature exceeds the operating temperature range of this product, please contact our customer service personnel.

5. Installation and Operation

Safety check should be carried out before installation, such as whether the connection wire is damaged or broken, whether the drive power supply is grounded, etc.

5.1. Installation and Precautions

Be careful! During the installation of the piezo motor and the installation of the load, please tighten the bolts slowly and do not apply excessive torque to avoid damaging the mechanism.

1. Ensure that the mounting surface is flat and pay attention to the appropriate position of the outlet, which will not cause significant bending of the cable. Avoid pulling and bending cables.
2. Secure N59 with specified screws and tighten.

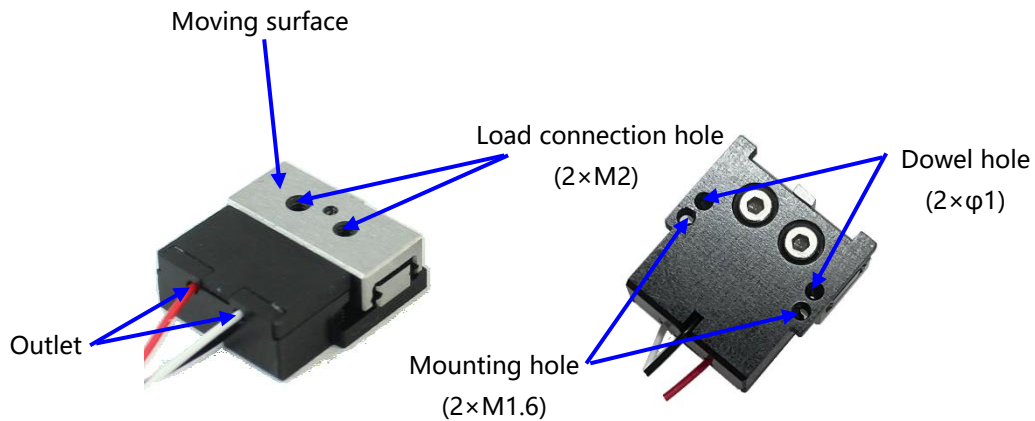
No.	Mounting hole size	Quantity	Installation torque
01	M1.6	2	<0.01N·m

3. When installing the load, tighten it appropriately to ensure positioning accuracy. Slowly tighten the load, do not apply too much torque to avoid damaging the mechanism.

No.	Load mounting hole size	Quantity	Installation torque
01	M2	2	<0.01N·m

After the installation of the piezo motor and the installation of the load, please connect N59 to the E66.A2K-H piezo motor control module.

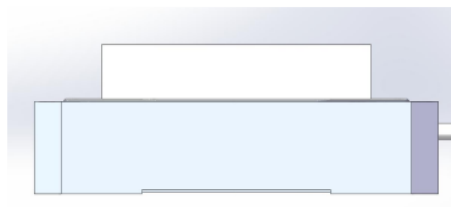
The installation diagram is as follows:



5.2. Load

When mounting the load, ensure that the load quality is less than the maximum load capacity of the product, and try to mount the load in the center of the moving surface.

The correct position to mount the load is shown in the figure below.

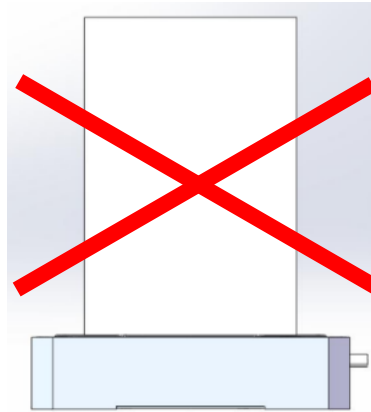


The load is applied to the center of the moving surface

For the protection of the product, we do not recommend that the load is too high.

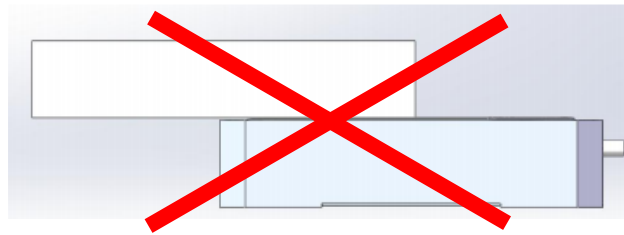
If a higher load must be used, please appropriately low the position of the center of gravity of the load.

The wrong mounting way is shown in the figure below:



Try not to let the position of the center of gravity far exceed the active surface

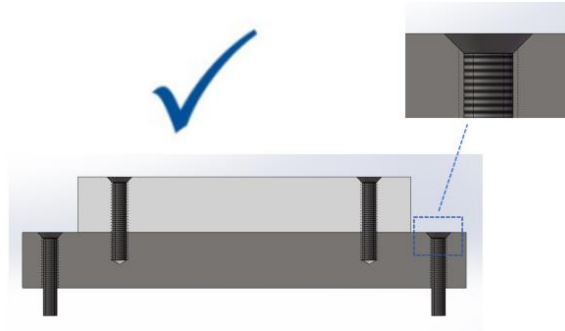
It is forbidden to mount the load on one side of the moving surface, which will cause serious damage to the product, as shown in the figure below.



Do not mount long loads on one side of the surface

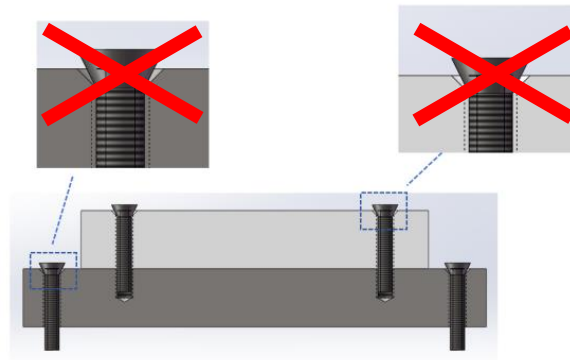
Too long screws selected in the fastening and connection process will lead to failure of mounting or part of bolts will be exposed, which will scratch the product and affect the motion accuracy of the product. If the bolt is too short, the connection will be weak, and it is easy to be loosened. Loosening during operation will damage the internal structure of the product.

We recommend using the connection method shown in the figure below:



The correct bolt connection

Please do not connect in this way as shown below:



Inappropriate bolt selection

5.3. Operating

Please confirm the following information before starting the power supply:

- The environment meets requirements of N59 operating environment.
- The fixing screws must be tightened.

After the above information is confirmed, operations related to the controller:

5.3.1 Controller and power connection

Connect the 5V DC power supply to the power plug connector on the E66.A2K-H power connector. The other end of the power supply can be connected to the corresponding power socket (220V AC) or a portable power bank.

5.3.2 Connect the controller to the N59

The N59 is connected to the controller through a motor connector. This connector is used in conjunction with the corresponding connector on the controller PCB board. Connectors can only be connected in one possible direction. Gently press the connector until it is flush with the edge of the socket on the controller PCB board.

5.3.3 Controller controls motor movement

The piezo motor control module generates the driving signal required for the movement of the N59, which in turn drives the moving surface to achieve linear displacement. This design allows the N59 motion surface to perform two-way motion in the X direction, and can also manually alternate bidirectional linear motion through two buttons on the controller.

Precautions:

- Please carefully read the user manual of the controller selected by the user before starting the controller;
- Normal operation within the rated voltage range of piezoelectric ceramics;
- If there is abnormal noise or oscillation during use, immediately turn off the power and check the parameter settings;

6. Transportation and Inspection

6.1. Transportation

This product is packed in cartons. Transportation is carried out under the packaging conditions. This product can be transported by various means of transport under normal circumstances. In the process of transportation, direct rain and snow, corrosive substances, strong collision, extrusion, irregular placement and other improper behaviors should be avoided as far as possible.

6.2. Open-Box Inspection

Improper external force applied to the surface of piezoelectric products can cause damage to mechanisms such as flexible hinges and sensors. The tension at the cable outlet and the bending of the connecting cable may cause the piezoelectric product to fail to connect properly with the controller and thus not function properly.

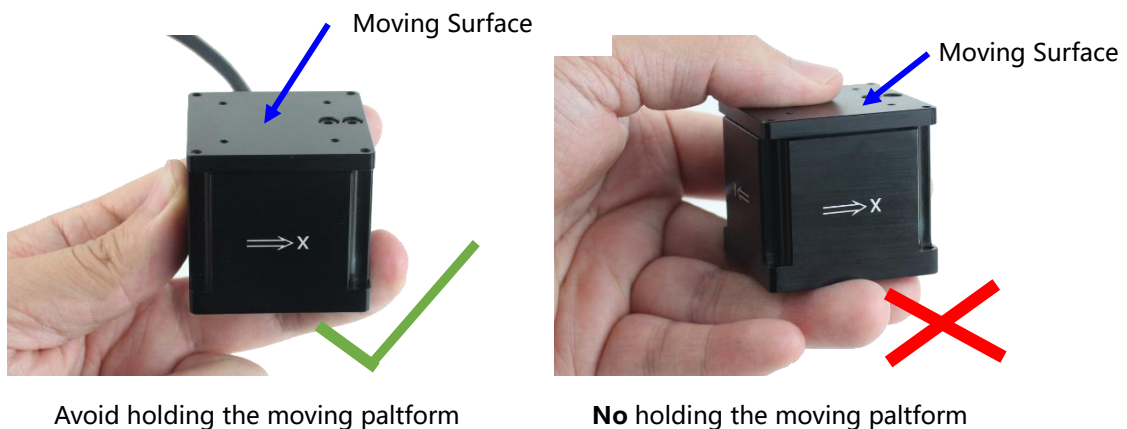
6.2.1. Open-Box

- Before opening the package, please check the outer packing carefully to see if there is any breakage, wetting, dampness, deformation, etc.
- Please do not use heavy tools or rough way to open, and prevent the product from being scratched or damaged by blades or other sharp objects.
- When removing the product from the packaging box, do not pull the cable of the product to prevent improper force from damaging the cable.
- Please handle with care when opening the package, so as not to knock against

the product and cause permanent damage to it.

➤ When holding the product, do not hold the product's moving surface to avoid damaging the internal structure of the product due to improper force. (Note: See the schematic diagram of the handheld product below. The piezo product in the diagram is for reference only.)

➤ Keep all packaging materials in case the product needs to be returned.



6.2.2. Item verification

- Please check the completeness of package contents one by one according to the supply contract and packing list.
- Check whether the surface of the product has obvious damage.
- Check whether the product identification is clear and complete.
- Check whether the connector is loose and the connector wire is broken or damaged.

In case of any of the above, please make a detailed record and take a photo of it.

Meanwhile, please contact us for processing immediately.

7. Maintenance and Treatment

7.1. Problem Handling

If the user cannot solve the problem by himself in the process of using, please record the problem in detail and contact CoreMorrow, and professional technical personnel will help to solve.

Problems caused by improper operation are not covered by the warranty.

CoreMorrow is not responsible for any problems caused by dismantling products without permission.

7.2. Daily maintenance

If the product is not used for a long time, please store it in a dust-free, well-ventilated, clean and non-corrosive indoor environment after packaging.

In the daily maintenance, please do not loosen the bolts on the product structure, so as not to affect the movement accuracy of the product.

Daily cleaning:

Please disconnect the product from the controller before cleaning the surface of the product.

When cleaning, gently wipe the surface of the product with a towel dipped in a small amount of detergent, and then clean it with alcohol. Please do not use ultrasonic cleaner.

When cleaning the surface, try not to pick up the product. If you have to pick up the product, it is better to put the sponge under the product for protection. The product

should not be too high from the sponge, in case the product falls off.

7.3. Disposal

Waste products should be disposed according to national and local rules and regulations. In order to fulfill our responsibility as a product manufacturer, we will dispose all old equipments on the market in an environmentally friendly manner. If you have equipment that cannot be disposed, you can ship it to CoreMorrow.

Address: 1F, Building I2, No.191 Xuefu Road, Nangang District, Harbin, Heilongjiang

Tel: +86-451-86268790



8. Customer Service

8.1. Use question consultation

If you have questions about the products you are currently using, please let us know the following information:

- Product model and relevant number
- The controller model
- Software driver version
- Computer operating system that installs supporting software

8.2. Contact us

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CoreMorrow Official and CTO WeChat are below:

