

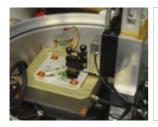
# P84 Piezo Micrometer User Manual

Version: V1.0



This document describes the following products:

- P84.X100S/K
- X65P84S/K
- XY65P84S/K
- XZ65P84S/K
- XYZ65P84S/K







#### **DECLARATION**

Thank you for choosing CoreMorrow's products!

This user manual is applicable to P84 piezo micrometer, 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 injury to the operator and/or damage to the product, 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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#### 1.1 Purpose and content

- The manual is mainly for your smooth and correct use of piezo micrometer.
- The manual contains all necessary information for P84.
- ▶ The manual describes the precautions during installation and use.

#### 1.2 Symbol and meaning



**DANGER:** Improper handling may could cause injury to the operator.



Attention: Improper handling can cause damage to the equipment.

#### 1.3 Expected reader

The manual default user has knowledge of piezo prodoucts and controllers, and has a basis for its installation and use.

#### 1.4 Manual lost replacement

If the manual is accidentally lost, please contact our customer service department, we will send you the latest version of user manual.



## 2. Safety Guide

P84 piezo micrometer 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 micrometer, and it 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 P84.
- Discharge P84 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 the following points when in use.
  - ▶ P84 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.
  - ▶ Recommended voltage range is 0~120V for long-term use and lifetime.
  - 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 connect P84 to controller.
  - Do not connect via an extension cable casually, if you need a longer cable, please contact CoreMorrow.



#### 3.1 Product Introduction

P84 piezo micrometer has the following advantages:

#### ▶ High performance piezo stack:

P84 piezo micrometer is driven by a highly reliable ceramic actuator with a fully insulated structure, so its performance and service life are far better than the traditional actuator. The insulating layer can effectively prevent the piezoelectric ceramic from being damaged when exposed to moisture. Therefore, the stability of piezoelectric ceramics can be guaranteed under extreme circumstances. Compared with traditional driving mechanism, there are no transmission parts and friction. Therefore, ceramic actuator has the characteristics of no rebound, no maintenance, and no wear, etc.

#### ▶ Flexible hinge structure:

P84 adopting flexible hinge mechanism has advantages of no friction, high positioning accuracy. Flexible hinge is an element not affected by static and dynamic friction, based on the elastic deformation of metal material (e.g., steel), there is no rolling and sliding parts. Flexible unit has very high load capacity and stiffness. Hinge guide needs no maintenance and no wear and tear. Suitable for a wide range of temperatures, no lubricating oil is required.

#### Strain Sensor:

Strain sensor detects the position information by its own expansion. They are fixed in the proper position of the transmission part and measure the displacement of the moving part. This type of position measurement is made by contact and indirect measurement. So the displacement of the moving platform is measured by measuring lever, guide hinge, or piezoel stack.

The sensor is connected by full bridge without drift and can accurately do the position in the nanometer range.

Piezo micrometer refers to integrating piezo stage on manual micrometer. The manual



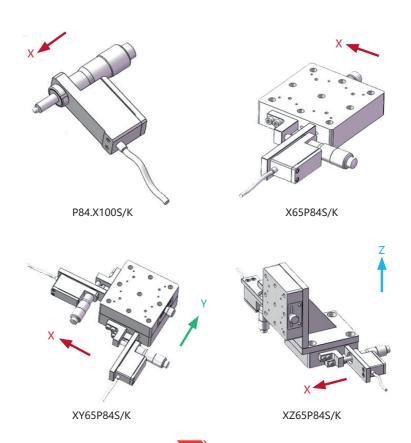
micrometer has 13mm displacement.

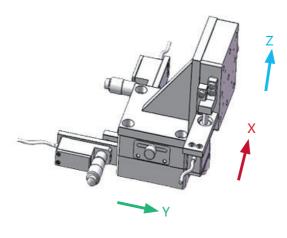
P84 features 100µm displacement. The accuracy of micrometer is within the adjustment range of piezo stage, thus ensuring the accuracy and convenience of the adjustment.

#### 3.2 Product Features

- ▶ 1~3 axes are available
- Manual micrometer displacement to 13mm, resolution to 10μm
- Selectable sensor

#### 3.3 Motion direction





XYZ65P84S/K

The identification of the labels on the wires of P84 as follows:

Model	Motion direction	Function	Label
P84.X100S/K	х	PZT Drive	CH1
X65P84S/K		Senser output	1
XY65P84S/K	Х	PZT Drive	CH1
		Senser output	1
	Y	PZT Drive	CH2
		Senser output	2
XZ65P84S/K	Х	PZT Drive	CH1
		Senser output	1
	Z	PZT Drive	CH2
	2	Senser output	2



XYZ65P84S/K	Х	PZT Drive	CH1
		Senser output	1
	Υ	PZT Drive	CH2
		Senser output	2
	Z	PZT Drive	CH3
		Senser output	3

### 4. Operating environment

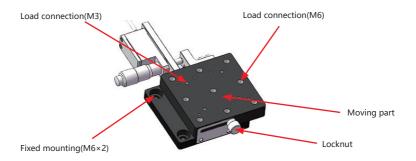
- A clean, dustfree and non-corrosive environment
- ▶ Operating temperature : -20~80°C
- ▶ Relative humidity: <60%
- ▶ Recommended voltage range is 0~120V for long-term use and lifetime



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

P84 mounting diagram is shown below:

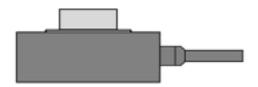


- 1. Gently push moving part to moving direction, turn the locking knob to tighten the moving part.
- 2. Fix the piezo micrometer with M6 pan head screws.
- 3. Loosen the locking knob.
- 4. Install load and tighten properly to ensure positioning accuracy.
- 5. Connect the cable to corresponding interface of piezo controller according to the label on the connector.

#### 5.2 Load

When mounting the load, ensure that the load quality is less than the maximum load capacity of P84, and try to mount the load in the center of the moving surface.

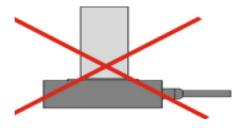
The correct position to mount the load is shown below:



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.

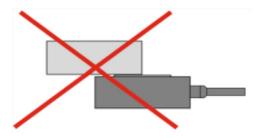
The wrong mounting way is shown in the figure below:



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



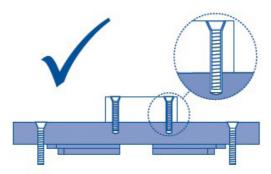
It is forbidden to mount the load on one side of the moving platform, which will cause serious damage to the product, as shown in the figure below.



Do not mount long loads on one side of the platform

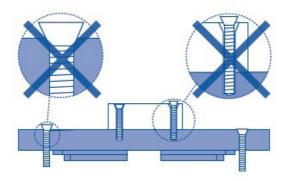
Too long screws selected in the fastening and connection process will lead to failure of mounting or part of bolts will be exposed, which will scratch the product and affect the motion accuracy of the product. If the bolt is too short, the connection will be weak, and it is easy to be loosened. Loosening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

#### Notice:

- ▶ When mounting the load, tighten the load slowly. The torque should not be too large to prevent damage to the mechanism.
- Avoid stretching and bending cables.
- Use the dedicated cable provided by CoreMorrow to connect P84 and the controller.
- Do not connect via an extension cable casually, if you need a longer cable, please contact CoreMorrow.

#### 5.3 Operating

Please reconfirm the following information before turning on the power:

- The operating environment meets the operating environment requirements of P84.
- Fixed screws must be tightened.

After the above information is confirmed, relevant controller operations can be carried out:

- 1.Please read the user manual of the controller carefully before operation, and then start the controller.
- 2.Set the controller' output voltage to zero first.
- 3.Check no abnormal phenomenon, then input voltage value (via keyboard or analog control) according to specified input voltage range.



- 4.Operating normally within the rated voltage range of piezoelectric ceramics (0 $\sim$ 120V, maximum 150V).
- 5. After use, please carry out voltage reset operation.



#### 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

#### Inspection content:

- ▶ Before opening the package, please check the outer packing carefully to see if there is any breakage, wetting, dampness, deformation, etc.
- 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.

#### Attention:

- Please handle with care when opening the package, so as not to knock against the product and cause permanent damage to it.
  - Please do not use heavy tools or rough way to open.

▶ Please do not discard all the packaging materials which are needed for repair and return.



#### 7.1 Problem Handling

FAQ are shown in the table below.

Problem description	Possible reason	Solution	
No displacement or less displacement	The connection wire is not connected properly or poor contact	Check the connection wire	
	Excessive load	Load according to the product's load capacity	
	Sensor zero drift	Check the sensor	
Low accuracy	Mountingsurface unevenness	Mount the platform on a flat surface	
	Loose connection	Fasten connection	
	Wrong connection	Check if the wiring is correct	
Vibration or inaccurate positioning at startup	Incorrect input control parameters	Stop immediately and check the parameter Settings	
	Resonance occurs	Make drive frequency less than resonance frequency	



- ▶ 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.

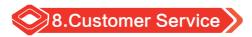
#### Daily cleaning:

- ▶ 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



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



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