V22 Version

COREMORROW
Piezo Nano Motion

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- Piezo Fiber Stretchers -

Harbin Core Tomorrow Science & Technology Co.,Ltd.

Piezo Fiber Stretchers

Piezo fiber stretcher is a piezo stack assembled into a flexible hinge structure. The optical fiber could be wound in the groove on the outer diameter edge, piezo stack generates displacement and stretches the fiber.

H01 Piezo Fiber Stretchers



H01 piezo fiber stretcher is designed for fiber stretching applications. Its principle is to cause the hinge structure outward expansion by the action of three piezo stacks placed at 120 degrees thereby stretching the optical fiber wound in the outer diameter groove.

▸ Ave.Power Calculation

Piezo fiber stretcher' formulas of dynamic application:

$$P=U_{p\text{-}p}{}^{2} \cdot f \cdot c$$

P: Ave. power(W) $U_{p\text{-}p}$: Peak to peak driving voltage(V)

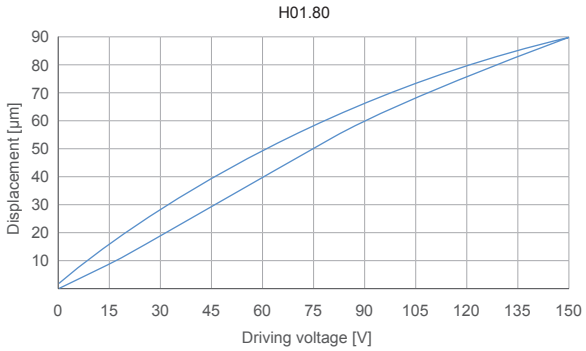
f: Output frequency(Hz) **C**: El.capacitance(F)

For no heat sink, the ave. power should be≤5W.

In dynamic application, if the ave. power is over 5W, it needs to be installed heat sink on outer shell.

The outer shell temperature could not to be over 60°C, otherwise, the piezo stacks would be permanently damaged.

▸ Displacement vs Voltage



▸ Wound Optical Fiber

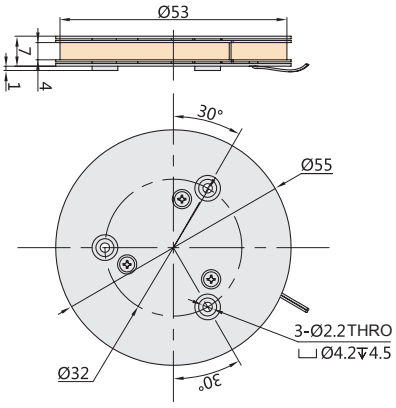
▸ Technical Data

Type		H01.80	H01.20	H01.6	Units
Motion		Radial expansion			
Travel range (0~+120 V)	Radial	64	15	5.6	μm±20%
	Fiber/circle	336	80	28	μm±20%, Cal.
Travel range (0~+150 V)	Radial	80	18.5	7	μm±20%
	Fiber/circle	420	100	35	μm±20%, Cal.
Resolution	Radial	4	1	0.5	nm
	Fiber/circle	20	5	2.5	nm, Cal.
Radial max. blocking force		160	600	250	N
Unloaded resonant frequency		740	3975	9500	Hz±20%
Stiffness		3	30	30	N/μm±20%
El. capacitance		5.4	5.4	1.2	μF±20%
Material		Steel	Steel	Titanium, al	
Mass		220	280	60	g±5%
Size		Ø80×14	Ø80×19.5	Φ55×8	mm

*Max driving voltage -20~150V, recommended voltage 0~120V for long-term and high-reliable operation. Technical data is measured by CoreMorrow E00/E01 series piezo controller.

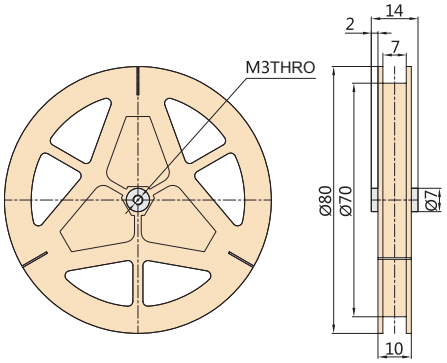
▸ Drawing

H01.6

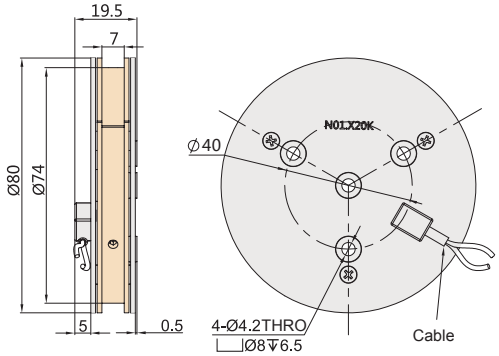


Drawings

H01.80



H01.20



Other Fiber Stretching Solutions

Piezo Stacks

When apply voltage to piezo stack, it will elongate in the direction of polarization, and the elongation is about 1.5‰ of the piezo stack length.

The fiber can be attached to piezo stack surface or to both ends. When the piezo stack elongates, the fiber will be stretched evenly.

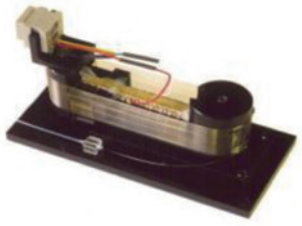
The gray-colored piezo stack is very thin, the surface is smooth and easy to bond optical fiber.

Tube Piezo Components

When the voltage is applied to tube piezo component, it expands in the direction of polarization(radial), so the optical fiber wound around the outer surface can be stretched.

We offer a wide range of standard size tube piezo components, as well as custom sizes and materials.

Fiber Stretching Structure



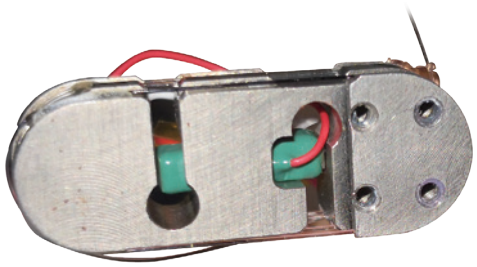
Optical fiber is evenly wound around the fixed end and the moving end, and the piezo stack is connected to the controller through connector. When het voltage signal is applied to piezo stack, the piezo stack elongates, thereby push the moving end to move and increase the distance between the moving end and the fixed end to stretch the fiber.

The stretching length depends on the displacement of the piezo stack used.

Notice

1. Optical fiber is made of glass fiber. When winding the fiber, please be careful not to touch the bare fiber to avoid the fiber from piercing the skin.
2. When winding the fiber, the force should be used properly, and the fiber should be wound on the surface in a natural tight state without slipping.
3. When winding the fiber, the fiber array should be neat, uniform and tight to facilitate uniform stretching of the fiber.
4. When fixing the fiber through glue, we recommend to use high-strength epoxy glue, which could fix the fiber without affecting the stretching of the fiber; and the volume of glue should be appropriate, not placed too much.

H01.9 Fiber Phase Modulator



▸ Characteristics

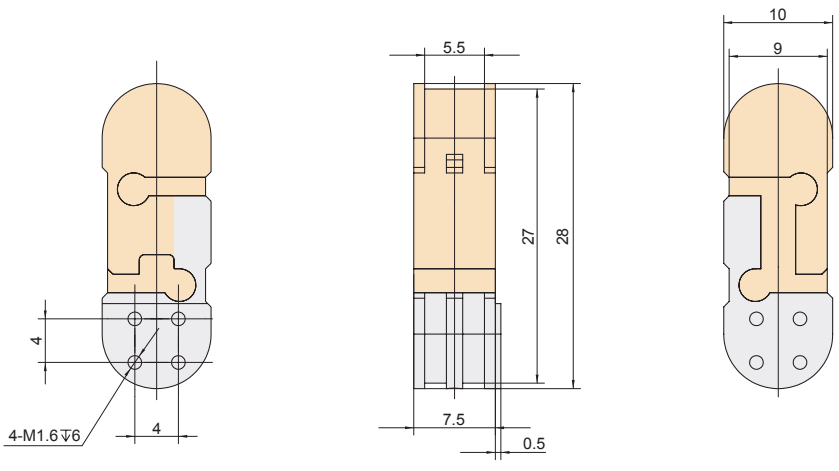
- Linear displacement up to 9μm
- About 18μm stretching length for one single-turn fiber
- Driving voltage 0~120V/150V
- Light weight
- Suitable for fiber stretching applications, such as optical phase shifting, optical delay, etc.

▸ Technical Data

Type	H01.9	Units
Active axes	X	
Nominal travel range	9	μm±20%
Driving voltage	0~150	V
Open-loop resolution	0.1	nm
El.capacitance	0.18	μF±20%
Material	Steel	
Mass	14	g±5%

Note: The above parameters are measured using E00 piezo controllers. The max driving voltage can be -20~150V; For high-reliability long-term use, the recommended driving voltage is 0~120V.

▸ Drawing



Challenge the Limits of Nano Motion and Control Technology...

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