V22 Version

COREMORROW
Piezo Nano Motion

Piezo Nano Motion

- Piezo Objective Scanner Series -

Harbin Core Tomorrow Science & Technology Co.,Ltd.

Piezo Objective Scanner Series

Based on piezoelectric actuators as driving sources, piezo objective scanner is mainly used for driving objective lens to make nano-stepping motion in microscope or laser processing system.

Piezo Objective Scanner

Piezo objective scanner is specially designed for focusing and microscopy of objective lens. It is designed with a frictionless flexible hinge parallel guide mechanism design, and has ultra-high focus stability. The piezo objective scanner can be integrated into the microscope inspection/measurement or the observation device to improve accuracy, and can be used in conjunction with a variety of high-resolution microscopes.

▸ Highlights

High Dynamics - P72

The low-profile objective positioner adopts the parallelogram design principle, high rigidity, and can move at high speed with a load of 200g.

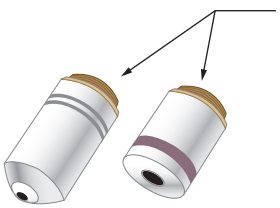
Long Travel - P73

This scanner features long travel and high precision, and its travel can reach 1000μm.

Large Load Capacity - P76

This large-load piezo objective scanner features large load capacity, fast response, and excellent linearity of Z-axis motion. It can be loaded with 500g load at high frequency.

▸ Adapters Compatible



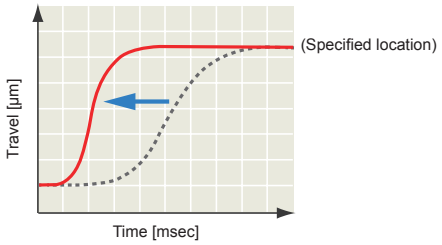
Thread sizes

- M27×0.75
- M26×0.75
- M26×1/36"
- M25×0.75
- W0.8×1/36"

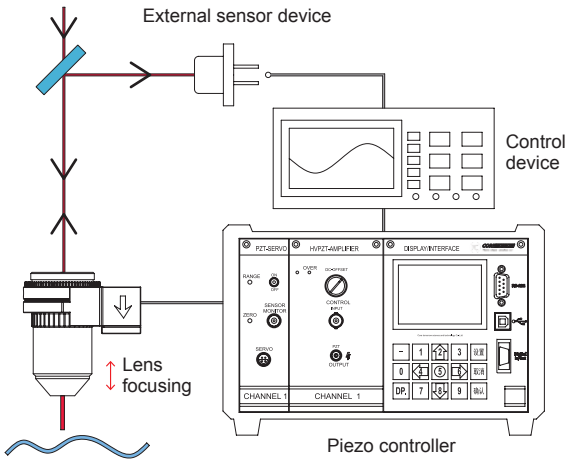
A variety of thread sizes are available, and can be configured with different brands of objective lenses, as well as threaded adapters for transfer.

▸ Adjustable Response Time

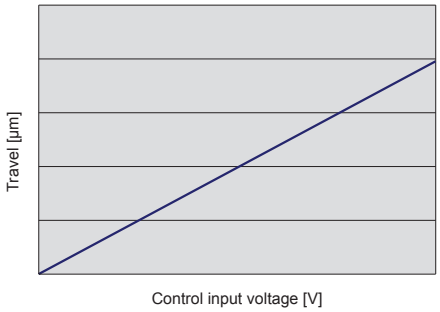
With different controllers and loads, the response time can be adjusted.



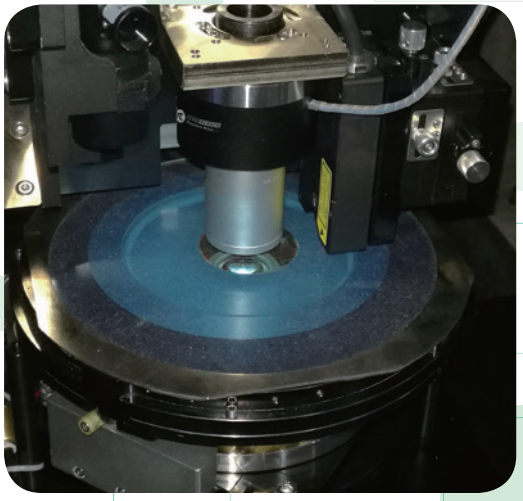
▸ Driving and Control



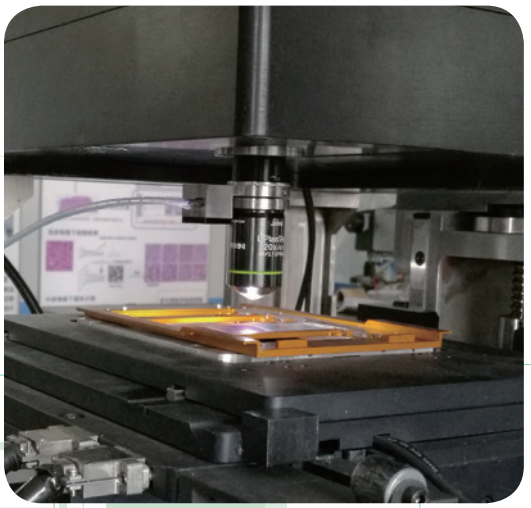
▸ Closed-Loop Curve



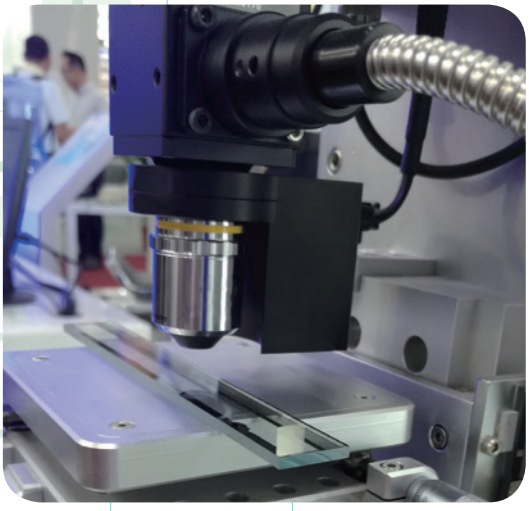
▸ Applications



Laser Processing–Wafer Cutting



Microscope Step Imaging



White Light Interferometer

Inverted Microscope Imaging

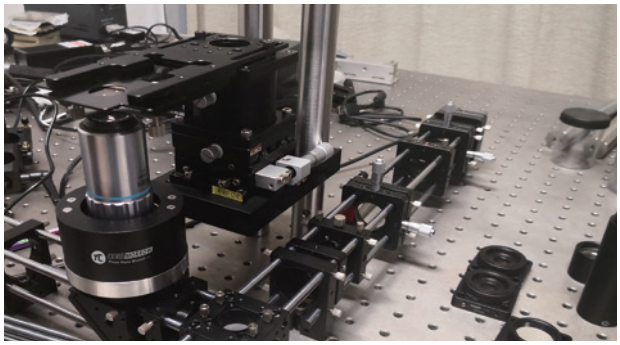
Applications

- Adjustment focus
- Semiconductor inspection
- Image processing
- Laser processing
- Confocal microscope
- Interference /metrology

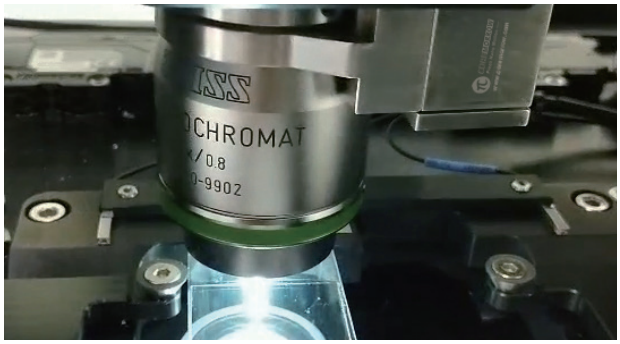
Product List

Type	Type	Axes	Travel[μm]	Resolution[nm]	Resonant frequency[kHz]	Load capacity[kg]	Page
High dynamics	P72.Z100	Z	100	2.5	0.35	0.2	4
Long travel	P73.Z200	Z	200	5	0.21	0.2	6
Long travel	P73.Z500	Z	500	7	0.17	0.4	6
Long travel	P73.Z1000	Z	1000	10	0.11	0.2	6
Lager load	P76.Z50	Z	75	2.5	1.8	0.5	8
Lager load	P76.Z50S/KA	Z	50	2.5	0.8	0.5	8
Lager load	P76.Z100	Z	100	2.5	0.8	0.5	8
Lager load	P76.Z200	Z	200	5	0.9	0.5	8
Lager load	XD701	Z	200	7	0.33	1.5	10
Common	XP-721	Z	100	3	0.5	0.2	11
Inversion	20091	Z	50	-	1.4	0.2	13

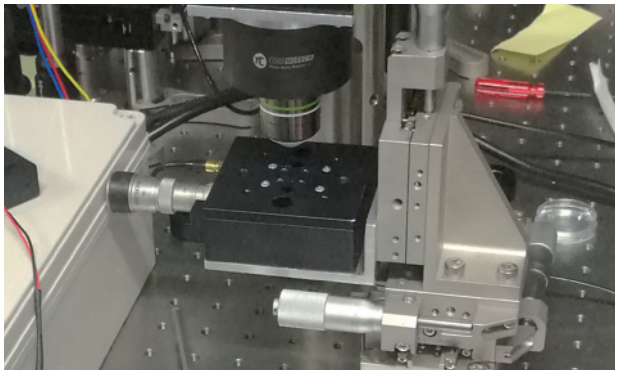
Nanostructure Scan Measurement



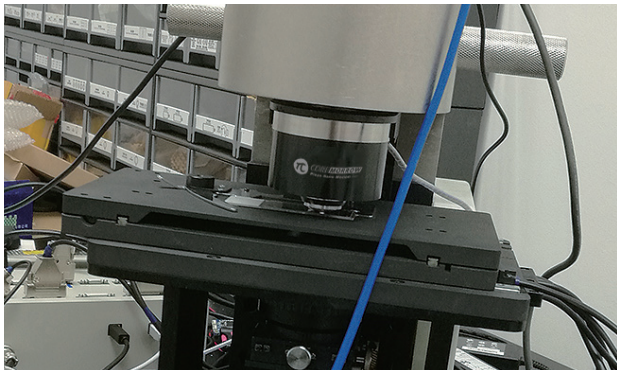
Optical Inspection–Wafer Inspection



Microscan Imaging



Sample Scan Imaging



P72 Piezo Objective Scanner

P72 piezoelectric objective scanner is a Z-axis motion piezo positioner specially designed for objective lens focusing microscopy. It adopts a frictionless flexible hinge parallel guiding mechanism, with ultra-high focusing stability. The objective positioner is loaded with a microscopic detection/measurement or observation device to improve accuracy.

▸ Characteristics

- Travel to 100μm
- Load capacity to 0.2kg
- Millisecond response time
- Closed loop for high repeatability

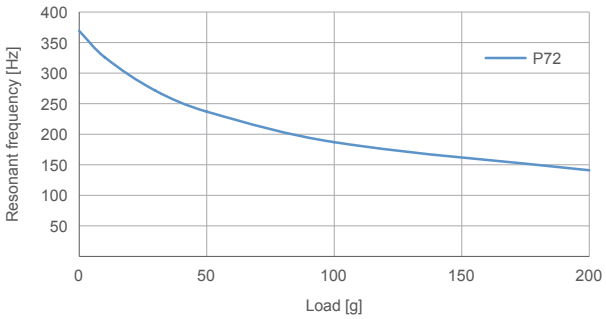
▸ Typical Applications

- 3D imaging
- Surface structure analysis
- Biotechnology
- Interference/metering
- Confocal microscope
- Semiconductor test

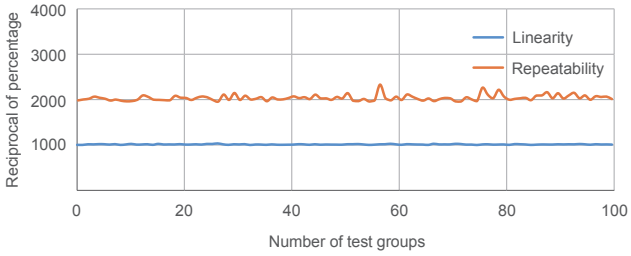
▸ Small Size, High Dynamics

P72 Piezo Objective Scanner is very compact. Its body uses a flexible hinge mechanism, which is frictionless and has a very high resolution and it can carry 200g load for high-speed precision motion, it has been widely used in optical scanning, confocal microscopy and other fields.

▸ Frequency and Load Curve



▸ Positioning Accuracy

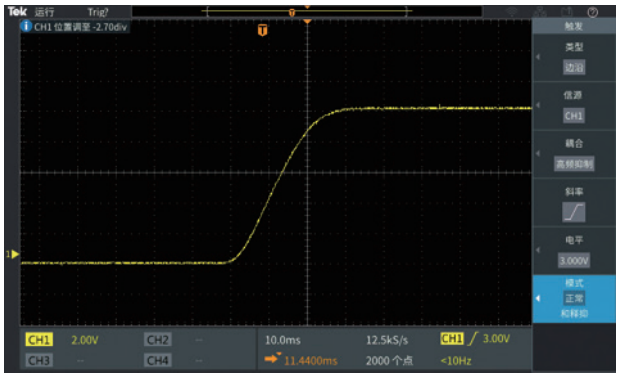


▸ Adapter Compatible

P72 objective positioner is connected to the objective lens through an adapter to quickly make the objective lens in the desired position. A variety of thread adapters are available, such as M27×0.75, M26×0.75, M26×1/36”, M25×0.75, W0.8×1/36”, etc., and custom is available.

▸ Closed-Loop Step Time

Step time of 30ms at loading 200g to 100% travel.

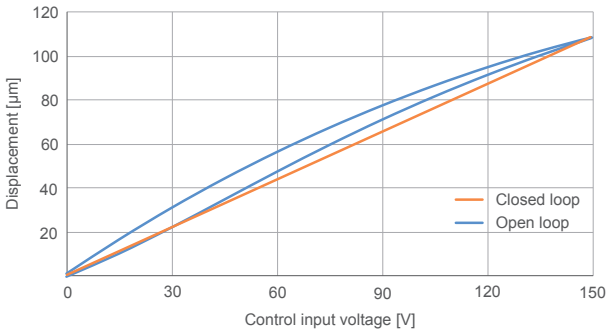


▸ Recommended Controllers

E00/E01	E52	E53
		
1 channel Digital, analog Open/closed loop Ave. current: 291mA	1 channel Digital, analog Open/closed loop Ave. current: 300mA	1 channel Digital, analog Open/closed loop Ave. current: 60mA

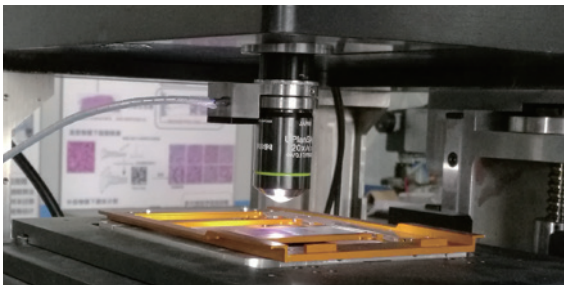
Note: Please see "Piezo Controller" for detailed information.

Open/Closed Loop Curve



Application Example

P72 piezoelectric objective scanner can be used for automatic cell microscopy, cold atom microscopy and so on.



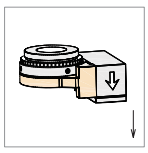
Technical Data

Type	S-Closed loop K-Open loop	P72.Z100S	P72.Z100K	Units
Active axes		Z	Z	
Travel range(0~120V)		80	80	µm±10%
Travel range(0~150V)		100	100	µm±10%
Integrated sensor		SGS	-	
Resolution		5	2.5	nm
Linearity		0.1	-	%F.S.
Repeatability		0.05	-	%F.S.
Push/pull force		110/15	110/15	N
Stiffness		1.4	1.4	N/µm±20%
Unloaded resonant frequency		350	350	Hz±20%
Unloaded step time		10	3	ms±20%
Unloaded operating frequency	10% travel	50	50	Hz±20%
	100% travel	15	15	
Load capacity		0.2	0.2	kg
El. capacitance		3.6	3.6	µF±20%
Material		Steel	Steel	
Mass		150	150	g±5%

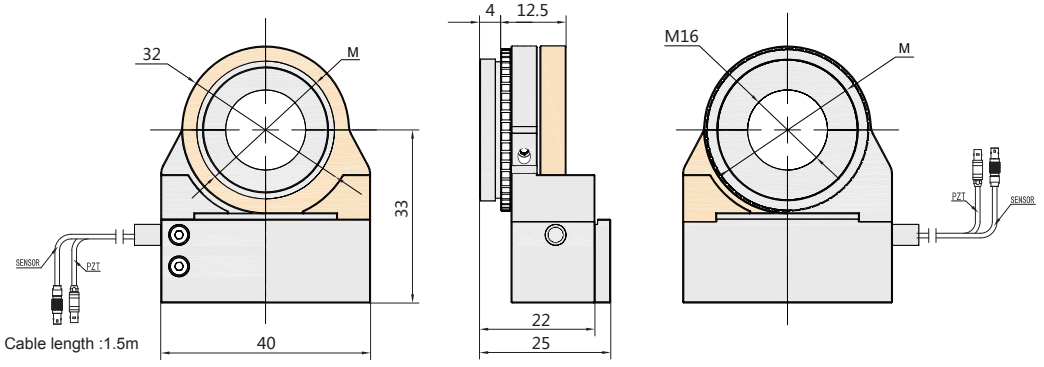
Note: Above parameters are measured with the E00/E01 piezo controller. The maximum driving voltage can be -20V~150V;
For high-reliability and long-term operation, the recommended driving voltage is 0~120V.

Drawing

P72.Z100S/K



M(Type)
W0.8×1/36"
M25×0.75
M26×1/36"
M26×0.75
M27×0.75



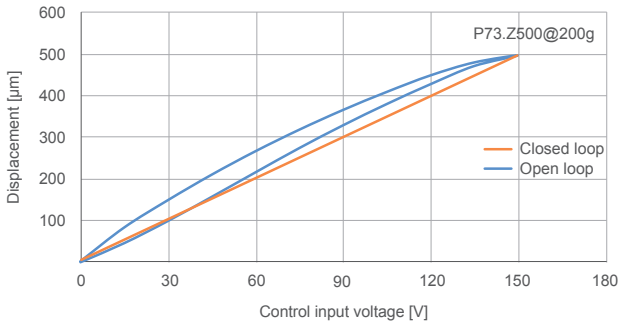
P73 Piezo Objective Scanner

P73 piezo objective scanner features a long travel of 200μm, 500μm or 1000μm in Z direction. It also adopts flexible hinge mechanism, with no friction, good linearity and high positioning accuracy. P73 is widely used in long-travel scanning of microscopic imaging, two-photon microscopy and other fields.

▸ Characteristics

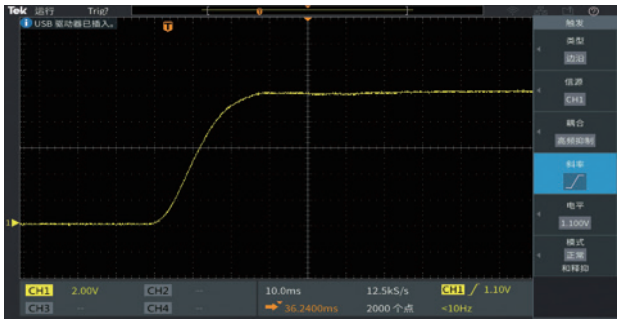
- Optional 200μm, 500μm or 1000μm travel
- Millisecond response time
- Closed loop for high repeatability

▸ Open/Closed-Loop Curves



▸ Closed-Loop Step Time

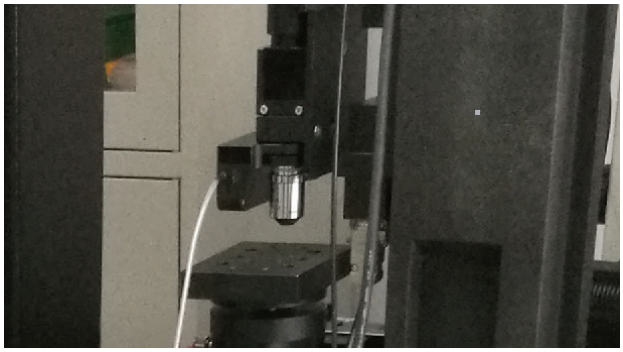
The step time loading 150g is about 30ms to reach 100% travel.



▸ Adapters Compatible

P73 objective positioner is connected to the objective lens through an adapter to quickly make the objective lens in the desired position. Various adapters are available, such as M27×0.75, M26×0.75, M26×1/36", M25×0.75, W0.8×1/36", etc.

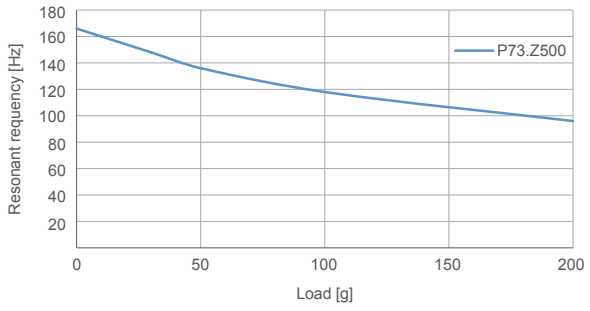
▸ Surface Analysis



▸ Typical Applications

- 3D imaging
- Semiconductor test
- Surface structure analysis
- Interference/metering
- Biotechnology
- Confocal microscope

▸ Frequency vs Load Curve



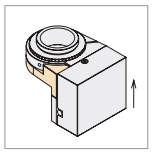
▸ Recommended Controllers

E00/E01	E53	XE-650
		
1 channel Digital, analog Open/closed loop Ave. current: 291mA	1 channel Digital, analog Open/closed loop Ave. current: 60mA	1 channel I/O, analog Open/closed loop Ave. current: 50mA

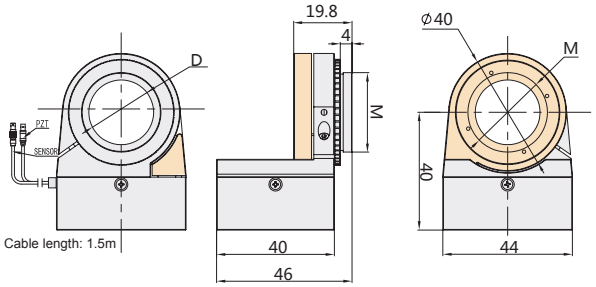
Note: Please see "Piezo Controller" for detailed information.

▸ Drawings

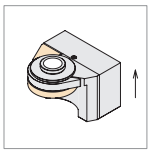
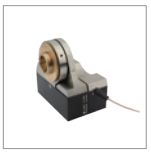
P73.Z200



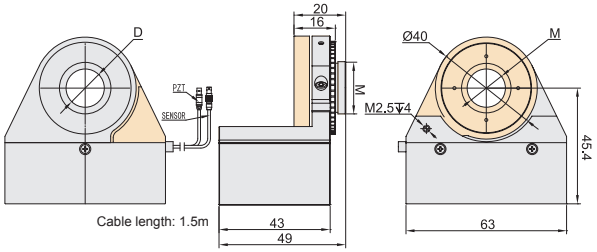

M(Model)	D
M26×0.75	Ø21
M26×1/36"	Ø21
M27×0.75	Ø22
M25×0.75	Ø20
W0.8×1/36"	Ø15



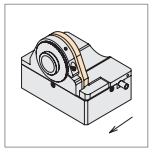
P73.Z500

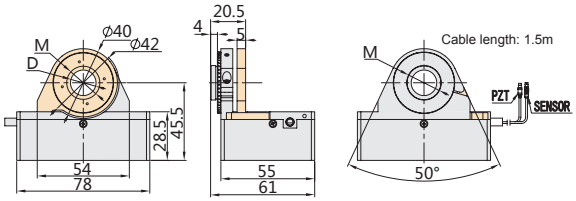
M(Model)	D
M26×0.75	Ø21
M26×1/36"	Ø21
M27×0.75	Ø22
M25×0.75	Ø20
W0.8×1/36"	Ø15



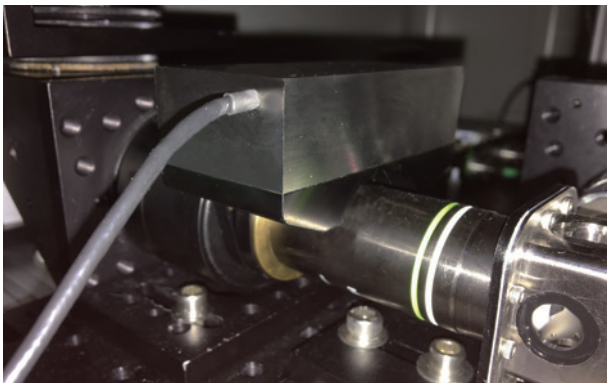
P73.Z1000




M(Model)	D
M26×0.75	Ø21
M26×1/36"	Ø21
M27×0.75	Ø22
M25×0.75	Ø20
W0.8×1/36"	Ø15



▸ Application Example



Fluorescence Imaging

▸ Technical Data

Type	S-Closed loop K-Open loop	P73.Z200S	P73.Z200K	P73.Z500S	P73.Z500K	P73.Z1000S	P73.Z1000K	Units
Active axes		Z	Z	Z	Z	Z	Z	
Travel range(0~120V)		160	160	400	400	800	800	μm±10%
Travel range(0~150V)		200	200	500	500	1000	1000	μm±10%
Integrated sensor		SGS	-	SGS	-	SGS	-	
Resolution		11	5	18	7	36	10	nm
Linearity		0.1	-	0.1	-	0.5	-	%F.S.
Repeatability		0.05	-	0.05	-	0.3	-	%F.S.
Push/pull force		80/10	80/10	80/10	80/10	20/5	20/5	N
Stiffness		0.25	0.25	0.2	0.2	0.02	0.02	N/μm±20%
Unloaded resonant frequency		210	210	170	170	110	110	Hz±20%
Unloaded step time		20/10	20/10	20/10	20/10	50/25	50/25	ms±20%
Unloaded operating frequency	10% travel	40	40	40	40	-	-	Hz±20%
	100% travel	10	10	10	10	-	-	
Load capacity		0.2	0.2	0.4	0.4	0.2	0.2	kg
El. capacitance		7.2	7.2	14	14	43.2	43.2	μF±20%
Material		Steel, Al	Steel, Al	Steel, Al	Steel, Al	Steel, Al	Steel, Al	
Mass		360	360	450	450	786	786	g±5%

Note: Above parameters are measured with the E00/E01 piezo controller. The maximum driving voltage can be -20V~150V; For high-reliability and long-term operation use, the recommended driving voltage is 0~120V.

P76 Piezo Objective Scanner

P76 series piezoelectric objective scanner features a large load capacity up to 500g, Z-axis linear motion range up to 200μm, adopting flexible hinge mechanism, no friction, good linearity, high closed-loop positioning accuracy.

▸ Characteristics

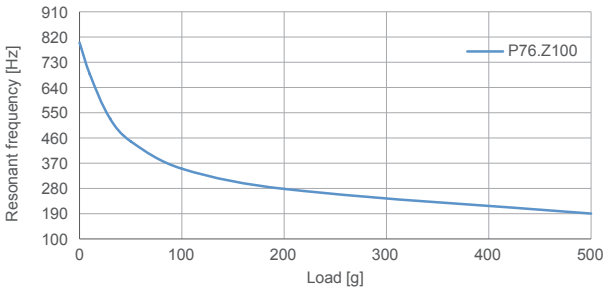
• Millisecond response • Closed loop for high repeatability • Excellent focusing stability • Designed for objective positioning

▸ Large Load Capacity, High Frequency and Resolution

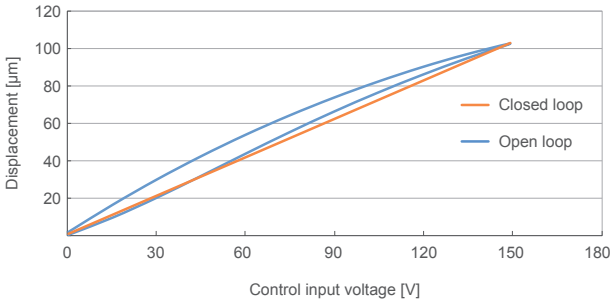
P76 Piezo objective scanner is designed for high-load, large-aperture objectives to achieve the fastest step times in high-resolution microscopy applications. Its extremely rugged design provides very fast settling times and scanning frequency, even when carrying a few hundred grams of objective. The rotationally symmetric alignment of multiple piezoelectric actuators and the optimized design of the flexure and lever elements give it a high stiffness while ensuring excellent guiding accuracy and dynamics.

P76 Piezo Objective Scanner has a maximum load of 500g. It is suited for multiphoton microscopy and confocal microscopy applications. P76 Piezo Objective Positioner can be used to match a variety of standard lenses from such as Zeiss, Nikon, Olympus, and Leica. It can also be used in conjunction with a manual adjustment stage via an adapter.

▸ Frequency vs Load Curve



▸ Open/Closed-Loop Curve(@500g load)



▸ Typical Applications

- 3D imaging
- Auto focusing system
- Wafer cutting
- Interference/metering
- Confocal microscope
- Semiconductor test

▸ Thread Adapter for Easy Integration

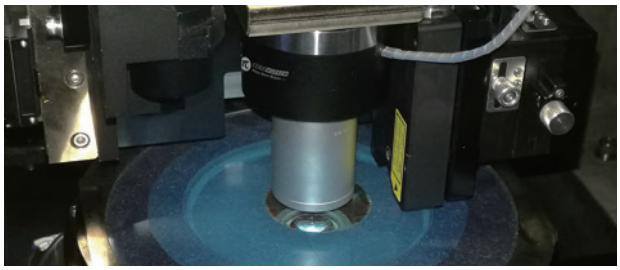
P76 objective positioner is connected to the objective through an adapter. A variety of thread adapters are available, such as M27×0.75, M26×0.75, M26×1/36", M25×0.75, W0.8×1/36", etc., and custom is available

▸ Recommended Controllers

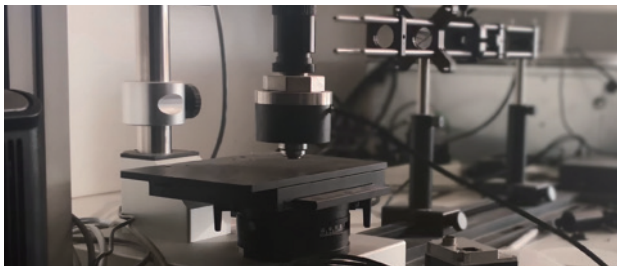
E00/E01	E52	E53
		
1 channel Digital, analog Open/closed loop Ave. current: 291mA	1 channel Digital, analog Open/closed loop Ave. current: 300mA	1 channel Digital, analog Open/closed loop Ave. current: 60mA

Note: Please see "Piezo Controller" for detailed information.

Application Examples



Wafer Cutting



Material Analysis

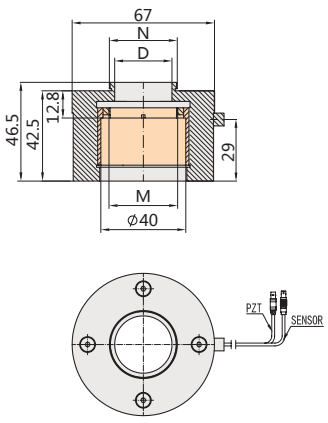
Technical Data

Type	S-Closed loop K-Open loop	P76.Z50S P76.Z50K	P76.Z100S P76.Z100K	P76.Z50SA P76.Z50KA	P76.Z200S P76.Z200K	Units
Active axes		Z	Z	Z	Z	
Travel range(0~120V)		60	80	40	160	μm±10%
Travel range(0~150V)		75	100	50	200	μm±10%
Integrated sensor		SGS/-	SGS/-	SGS/-	SGS/-	
Resolution		15/2.5	5/2.5	5/2.5	10/5	nm
Linearity		0.1/-	0.05/-	0.05/-	0.1/-	%F.S.
Repeatability		0.05/-	0.02/-	0.02/-	0.04/-	%F.S.
Push/pull force		180/16	70/10	35/10	150/10	N
Stiffness		3	0.8	0.8	0.9	N/μm±20%
Unloaded resonant frequency		1800	800	800	900	Hz±20%
Unloaded step time		1.6/1	5/2	5/2	10/4	ms±20%
Load capacity		0.5	0.5	0.5	0.5	kg
El. capacitance		7.2	7.2	3.2	14.4	μF±20%
Material		Aluminum, Steel	Aluminum, Steel	Aluminum, Steel	Aluminum, Steel	
Mass		550	520	510	800	g±5%

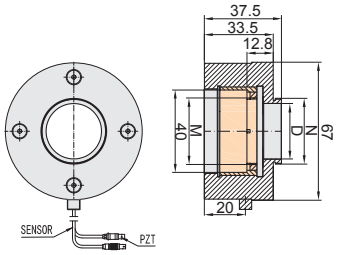
Note: Above parameters are measured with the E00/E01 piezo controller. The maximum driving voltage can be -20V~150V;
For high-reliability and long-term operation, the recommended driving voltage is 0~120V.

Drawings

P76.Z50/P76.Z100

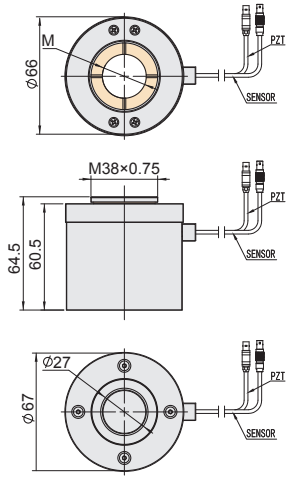


P76.Z50S/KA



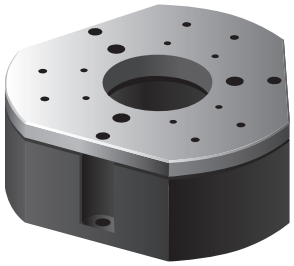
M(Type)	N(Type)	D
M38×0.75	M38×0.75	ø27
M32×0.75	M32×0.75	ø27
M27×0.75	M27×0.75	ø22
M26×0.75	M26×0.75	ø21
M26×1/36“	M26×1/36“	ø21
M25×0.75	M25×0.75	ø20
W08×1/36“	W08×1/36“	ø15

P76.Z200

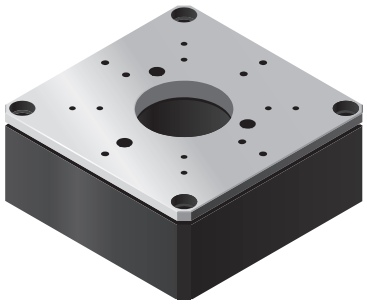


M(Type)
M27×0.75
M26×0.75
M26×1/36"
M25×0.75
W0.8×1/36"

XD701 Piezo Objective Scanner(Custom Version)



XD701-D1



XD701-D2

The XD701 piezoelectric objective scanner is specially designed for the use of multi-head objectives. It reserves a variety of mounting holes for easy replacement between different objectives. XD701 has two sizes for choice.

▸ Characteristics

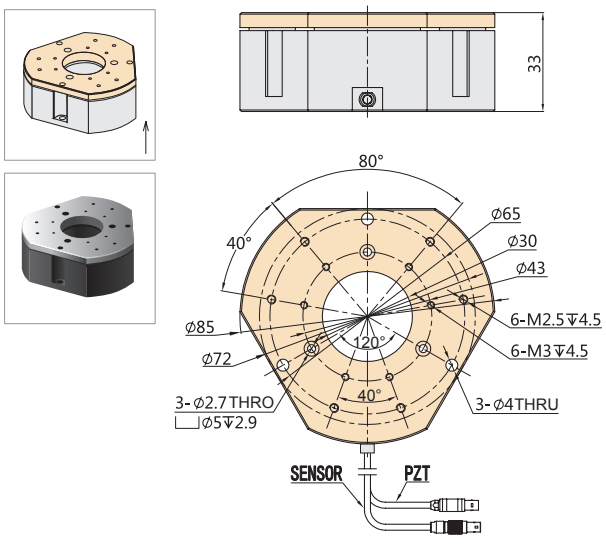
- Travel up to 200μm
- Aperture: Φ30mm
- Load capacity to 1.5kg
- Optional closed-loop sensor

▸ Technical Data

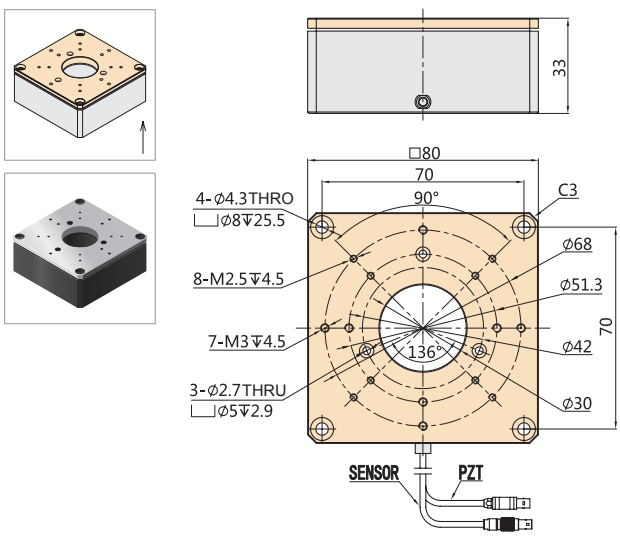
Type	XD701	Units
Travel range(0~+120V)	160	μm±20%
Travel range(0~+150V)	200	μm±20%
Integrated sensor	SGS/-	
Aperture dia.	Φ30	mm±0.05
Closed-loop Resolution	7	nm
Linearity	0.05	%F.S.
Repeatability	0.01	%F.S.
Unloaded resonant frequency	330	Hz±20%
Load capacity	1.5	kg
El.capacitance	10.8	μF±20%

▸ Drawing

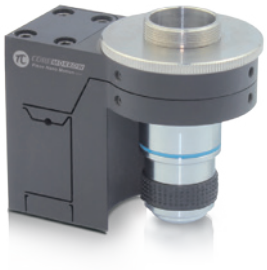
XD701-D1



XD701-D2



XP-721 Piezo Objective Scanner

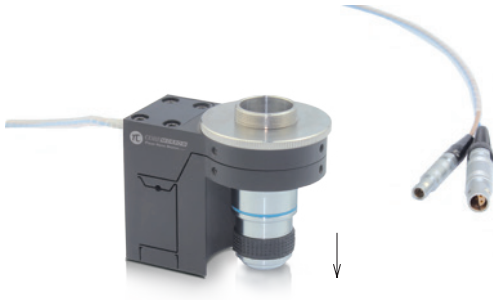


XP-721 is a small-volume piezo objective positioner with a separate thread adapter design that can be used with a variety of microscopes.

Characteristics

- Z travel to 100μm
- Load capacity to 200g
- Millisecond response
- Closed loop for high repeatability

Motion in Z



Typical Applications

- 3D imaging
- Interference/metering
- Surface structure analysis
- Confocal microscopy
- Biotechnology
- Semiconductor testing

Thread Adapter for Easy Integration

XP-721 objective positioner is connected to the objective lens through an adapter to quickly make the objective lens in the desired position. A variety of thread adapters are available, such as M27×0.75, M26×0.75, M26×1/36”, M25×0.75, W0.8×1/36”, etc., custom is available.

Quick Installation, High Stability

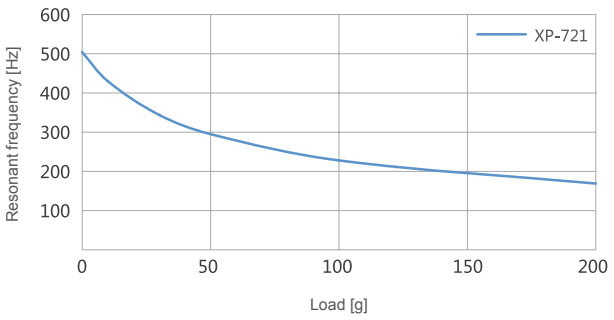
XP-721 piezo objective scanner is compact and cost-effective, and can be matched with many types of microscope objectives on the market.

The product is mounted between the lens mount and the objective lens via a threaded adapter. The objective scanner body is threaded onto the lens turret and the objective lens is attached to the scanner. This design eliminates the need to remove the other components when removing the objective lens.

Application Example

XP-721 piezo objective scanner is mounted in an inverted optical microscope.

Frequency vs Load Curve

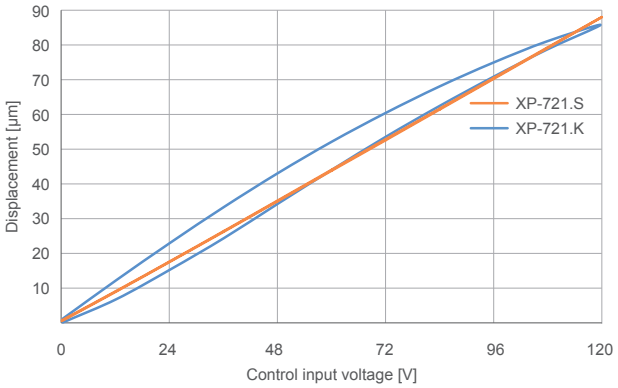


Recommended Controllers

E00/E01	E53	XE-650
		
1 channel Digital, analog Open/closed loop Ave. current: 291mA	1 channel Digital, analog Open/closed loop Ave. current: 60mA	1 channel I/O, analog Open/closed loop Ave. current: 50mA

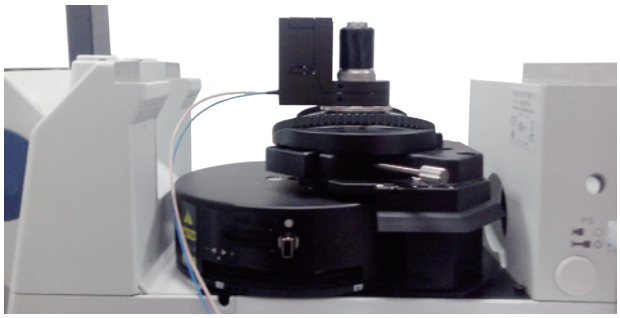
Note: Please see "Piezo Controller" for detailed information.

Open-Loop Curve



Application Example

XP-721 piezo objective scanner is integrated into sample microscopy.



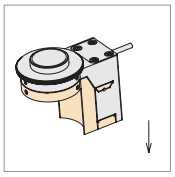
Technical Data

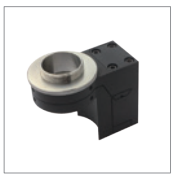
Type	S-Closed loop K-Open loop	XP-721.S	XP-721.K	Units
Active axes		Z	Z	
Travel range(0~120V)		80	80	µm±10%
Travel range(0~150V)		100	100	µm±10%
Integrated sensor		SGS	-	
Resolution		10	3	nm
Linearity		0.2	-	%F.S.
Repeatability		0.1	-	%F.S.
Push/pull force		30/10	30/10	N
Stiffness		0.3	0.3	N/µm±20%
Unloaded resonant frequency		500	500	Hz±20%
Unloaded step time		10/2	10/2	ms±20%
Unloaded operating frequency	10% travel	60	60	Hz±20%
	100% travel	20	20	
Load capacity		0.2	0.2	kg
El. capacitance		3.6	3.6	µF±20%
Material		Aluminum	Aluminum	
Mass		250	250	g±5%

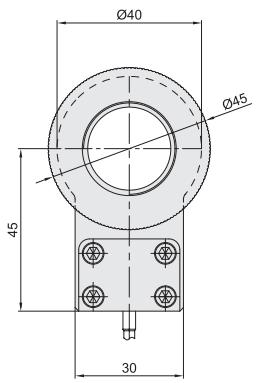
Note: Above parameters are measured with the E00/E01 piezo controller. The maximum driving voltage can be -20V~150V; For high-reliability and long-term operation, the recommended driving voltage is 0~120V.

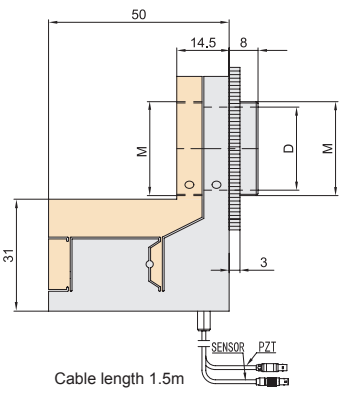
Drawing

XP-721









M (Model)	D
M26×0.75	Ø23
M26×1/36"	Ø23
M27×0.75	Ø24
M25×0.75	Ø22
W0.8×1/36"	Ø17

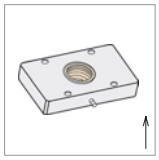
20091 Inverted Piezo Objective Scanner

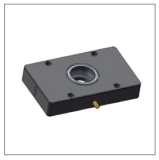
This customized piezo objective scanner is dedicated to carrying an inverted objective lens, and is suitable for structures and equipment where the sample is located above the objective lens. It has a load capacity of 200g and a stroke of 50μm.

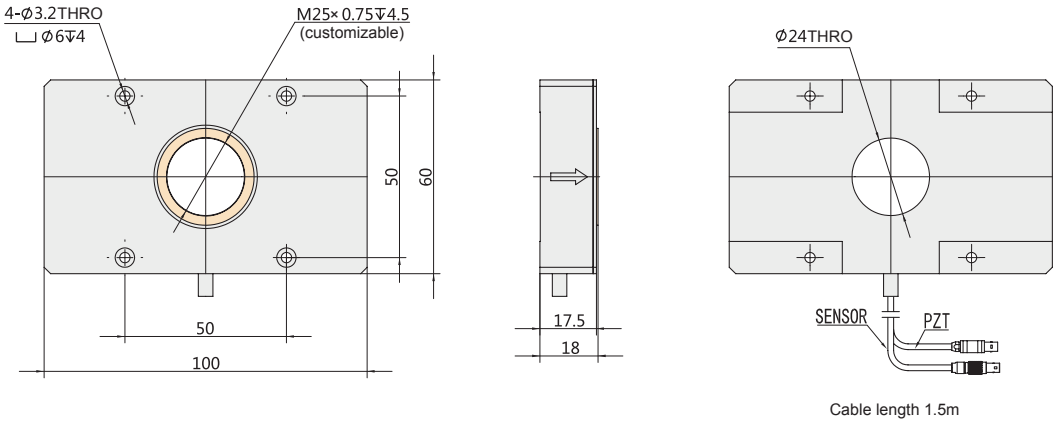
▸ Technical Data

Type	20091	Units
Active axes	Z	
Travel range(0~120V)	40	μm±20%
Travel range(0~150V)	50	μm±20%
Sensor	SGS	
Unloaded resonant frequency	1400	Hz±20%
Resonant frequency @120g load	600	Hz±20%
El. capacitance	7.2	μF±20%
Load capacity	200	g±5%
Material	Aluminium	

▸ Drawing

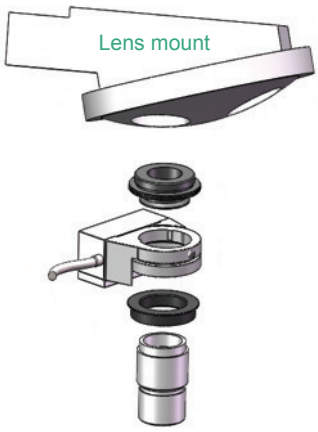




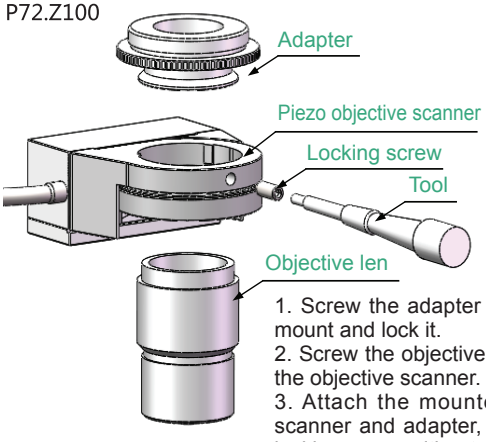


Cable length 1.5m

Installation

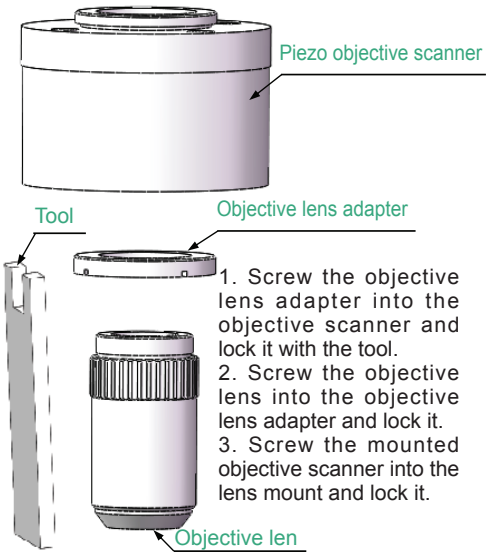


P72.Z100



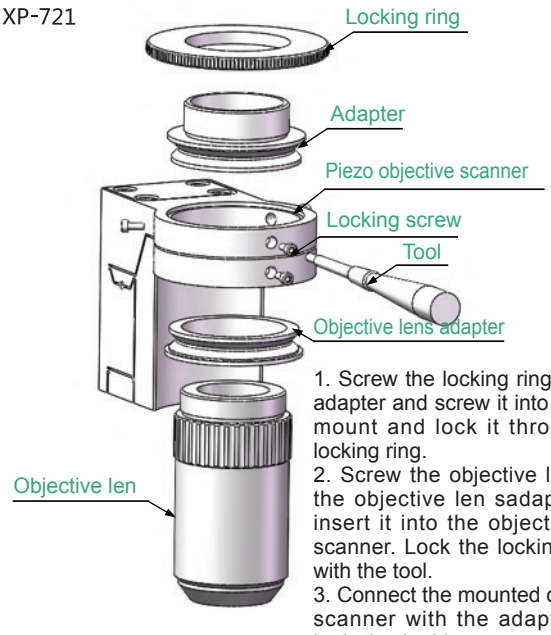
1. Screw the adapter into the lens mount and lock it.
2. Screw the objective lens adapter the objective scanner.
3. Attach the mounted objective scanner and adapter, and lock the locking screw with a tool.

P76.Z100



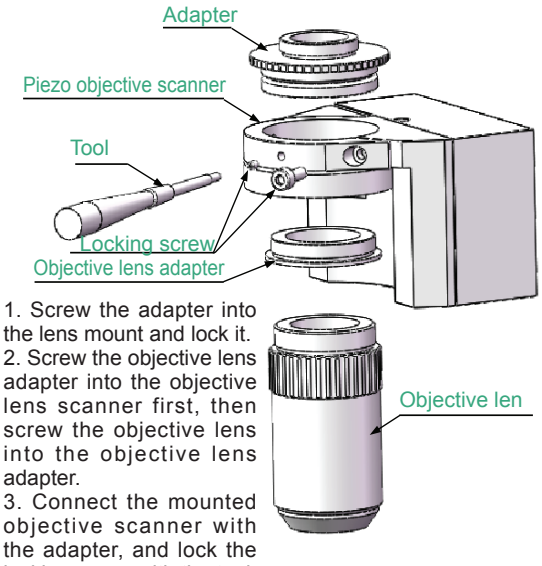
1. Screw the objective lens adapter into the objective scanner and lock it with the tool.
2. Screw the objective lens into the objective lens adapter and lock it.
3. Screw the mounted objective scanner into the lens mount and lock it.

XP-721



1. Screw the locking ring into the adapter and screw it into the lens mount and lock it through the locking ring.
2. Screw the objective lens into the objective len sadapter and insert it into the objective lens scanner. Lock the locking screw with the tool.
3. Connect the mounted objective scanner with the adapter, and lock the locking screw with the tool.

P73.Z200/P73.Z500/P73.Z1000



1. Screw the adapter into the lens mount and lock it.
2. Screw the objective lens adapter into the objective lens scanner first, then screw the objective lens into the objective lens adapter.
3. Connect the mounted objective scanner with the adapter, and lock the locking screw with the tool.

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

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