

# Piezo Scanning Nano-Stages, Positioners and Controllers

- 1 Optical Tables
- 2 Brackets & Rails
- 3 Base Mounts & Accessories
- 4 Optical Mounts
- 5 Optical Positioners
- 6 Base Positioners
- 7 Translation & Rotation Stages
- 8 Motorised Positioners & Controllers
- 9 Fine Adjustment Screws
- 10 Opto-Mechanics & Sets
- 11 Light Test & Measurement Instruments
- 12 Lasers & Laser Accessories



**8NTS-X**  
Compact Single Axis  
Piezo Actuator



**8NTS-XYZ-200**  
2(3)D Piezo Scanning Stage



**8NTS-XYZ-200-A**  
Piezo Scanning Stage  
with Central Hole



**8NTS-XYZ-40-SPM**  
Plane-Parallel Nano Piezo  
Scanning Stage



**8NTS-Z**  
Z Axis Piezo Potioning Stage



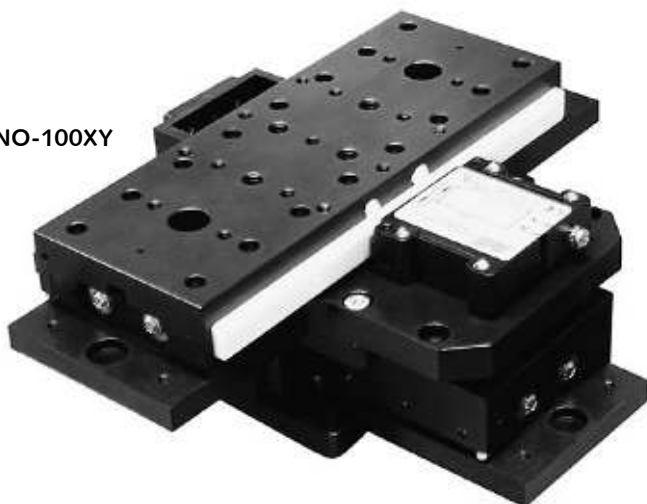
**8NSC**  
Nano Stage Controllers

*Pages 8-73...8-77*

## Nano Positioners

### 8NANO-100

8NANO-100XY



#### SPECIFICATIONS

Travel range	100 mm
Low frictional force	
Straightness	5 $\mu$
Backlash	0
Stiffness	100 N/ $\mu$
Resolution	50 nm
Speed	0.001-150 mm/s
Repeatability	0.1 $\mu$
Precision	0.5 $\mu$
Load capacity	3 kg
Weight	1.3 kg

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## Piezo Scanning Nano-Stages

**8NTS**

Piezo scanning stages are perfectly suitable for very accurate and low inertia automated systems. Because of compact design and low weight, designers can easily incorporate positioners to the projects without high weight and volume efficiency losses.

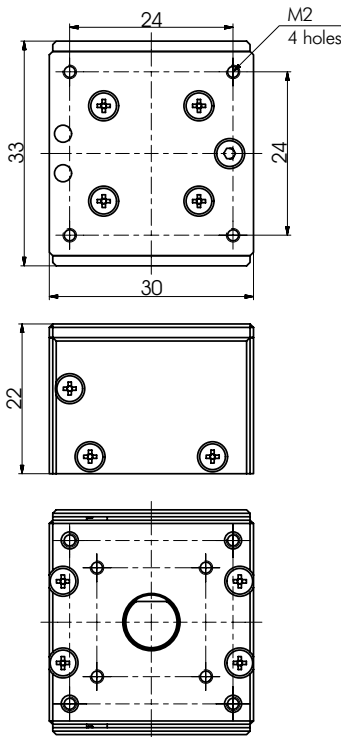
NTS series nano stages have wide spectrum of strokes (from 20  $\mu\text{m}$  to 200  $\mu\text{m}$ ). Using open-loop

control algorithm it is possible to reach 100 picometers resolution. Stability in closed-loop control algorithm guarantees double capacity sensor technic. On request we could prepare stages compatible to work in vacuum and high temperatures (since -40 up to 80 °C).

## Compact Single Axis Piezo Actuator

**8NTS-X**


- Double capacity sensor technology for feedback
- Travel range up to 120  $\mu\text{m}$
- Ultra high resolution 0.1 nm
- Low cost
- Compact design and low weight
- Suitable for universal applications
- High stiffness
- Compensated creep effect of piezoceramics
- Low frequency noise resistance
- Ideal capable for microscopic application
- Vacuum version available

**NEW**


### SPECIFICATIONS

#### Motion properties

Active axis	X
Z range, $\mu\text{m}$	120
Resolution (closed loop), nm	1
Resolution (open loop), nm	0.1
Angle tilting over the full range, deg	<0.01
Maximum scanning speed, Hz	10

#### Control Properties

Electrical capacity, pF	20
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#### Mechanical Properties

Resonant frequency Z, kHz	3
Load capacity, g	100
Operating temperature range, °C	-40...80
Dimensions, mm	30×30×22
Material	Aluminum

## 2(3)D Piezo Scanning Stage

**8NTS-XYZ-200**


- Double capacity sensor technology for feedback
- Travel range in horizontal directions up to 200  $\mu\text{m}$
- Travel range in vertical direction up to 20  $\mu\text{m}$
- Ultra high resolution 0.1 nm
- Low cost
- Compact design and low weight
- Suitable for universal applications
- High stiffness
- Compensated creep effect
- Low frequency noise resistance
- Ideal capable for microscopic application
- Vacuum version available


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 Optical  
Tables

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Brackets  
& Rails

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Base  
Mounts &  
Accessories

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Optical  
Mounts

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Optical  
Positioners

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Base  
Positioners

 6  
Translation &  
Rotation  
Stages

 7  
Motorised  
Positioners &  
Controllers

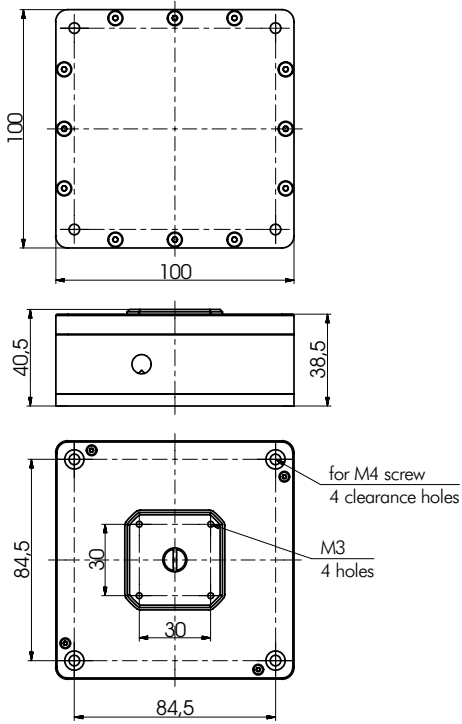
 8  
Fine  
Adjustment  
Screws

 9  
Opto-  
Mechanics &  
Sets

 10  
Light Test &  
Measurements  
Instruments

 11  
Lasers &  
Accessories

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**SPECIFICATIONS**

**Motion properties**

Active axis	XY(Z)
XY range, $\mu\text{m}$	200 × 200
Z range, $\mu\text{m}$	20
Resolution (closed loop), nm	1
Resolution (open loop), nm	0.1
Angle tilting over the full range, deg	<0.01
Maximum scanning speed, Hz	10

**Control Properties**

Electrical capacity XY axes, pF	30
Electrical capacity Z axis, pF	35

**Mechanical Properties**

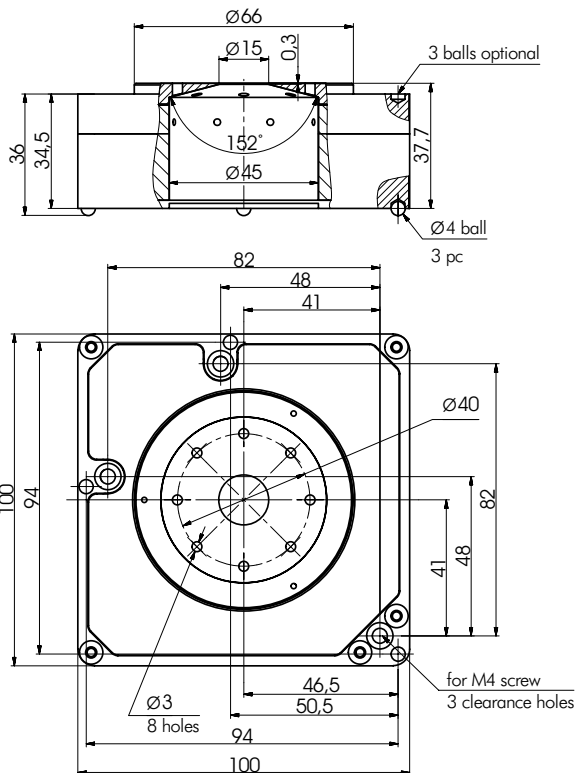
Resonant frequency Z, kHz	30
Resonant frequency XY, kHz	1
Load capacity, g	100
Operating temperature range, °C	-40...80
Dimensions, mm	100×100×33 mm
Material	Aluminum

**Piezo Scanning Stage with Central Hole**

**8NTS-XYZ-200-A**



- Double capacity sensor technology for feedback
- Travel range in horizontal directions up to 200  $\mu\text{m}$
- Travel range in vertical direction up to 20  $\mu\text{m}$
- Ultra high resolution 0.1 nm
- Clear aperture diameter 45 mm
- Low cost
- Compact design and low weight
- Suitable for universal applications
- High stiffness
- Compensated creep effect
- Low frequency noise resistance
- Ideal capable for microscopic application
- Vacuum version available



**SPECIFICATIONS**

**Motion properties**

Active axis	XYZ
XY range, $\mu\text{m}$	200 × 200
Z range, $\mu\text{m}$	20
Resolution (closed loop), nm	1
Resolution (open loop), nm	0.1
Angle tilting over the full range, deg	<0.01
Maximum scanning speed, Hz	10

**Control Properties**

Electrical capacity XY axes, pF	10
Electrical capacity Z axis, pF	10

**Mechanical Properties**

Clear aperture diameter, mm	45
Resonant frequency Z, kHz	3
Resonant frequency XY, kHz	1
Load capacity, g	100
Operating temperature range, °C	-40...80
Dimensions, mm	100×100×35 mm
Material	Aluminum

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## Plane-Parallel Nano Piezo Scanning Stage

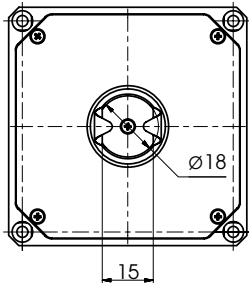
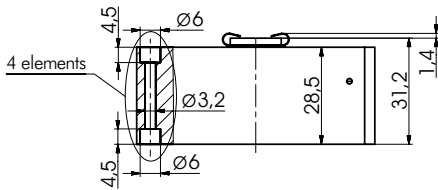
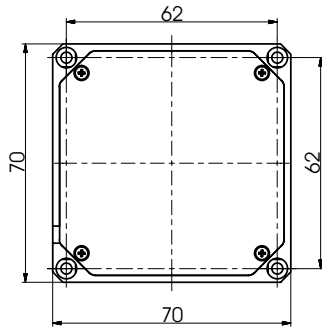
**8NTS-XYZ-40-SPM**


- Double capacity sensor technology for feedback
- Travel range up to 40  $\mu\text{m}$
- Ultra high resolution 0.1 nm
- Low cost
- Compact design and low weight
- Suitable for universal applications
- High stiffness
- Compensated creep effect of piezoceramics
- Low frequency noise resistance
- Ideal capable for microscopic application
- Vacuum version available

**NEW**

### SPECIFICATIONS

XY travel range, $\mu\text{m}$	40 × 40
Z range, $\mu\text{m}$	5
Resonant frequency XY, kHz	5
Resonant frequency Z, kHz	50
Resolution (closed loop), nm	1
Resolution (open loop), nm	0.1
Angle tilting over the full range, deg	<0.01
Maximum scanning speed, Hz (line/sec)	50
Base sample weight, g	50
Dimensions, mm	70 × 62 × 32.2
Material	Aluminium



## Z Axis Piezo Positioning Stage

**8NTS-Z**


- Double capacity sensor technology for feedback
- Travel range in vertical direction up to : 100  $\mu\text{m}$
- Ultra high resolution: 0.1 nm
- Sample weight up to : 300 g
- Low cost
- Compact design and low weight
- Suitable for universal applications
- High stiffness
- Compensated creep effect
- Low frequency noise resistance
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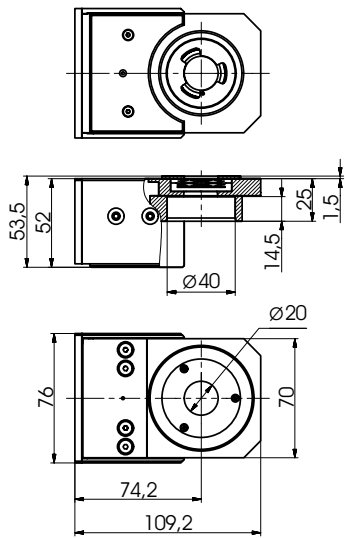
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Instruments

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Accessories

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**SPECIFICATIONS**

**Motion properties**

Active axis	Z
Resolution (closed loop), nm	1
Resolution (open loop), nm	0.1
Angle tilting over the full range, deg	<0.01
Maximum scanning speed, Hz	10

**Control Properties**

Electrical capacity Z axis, pF	15
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**Mechanical Properties**

Resonant frequency Z, kHz	0.5
Load capacity, g	300
Operating temperature range, °C	-40...80
Dimensions, mm	108×73×67.5
Material	Aluminum

**Nano Stages Controllers**

**8NSC**



**8NSC-1000**  
3 axis controller

**8NSC-3061**  
9 axis controller

- Closed Loop Feedback
- DAC
- USB / RS-232C communication
- Synchronization OUT
- High Voltage Amplifier -5/150 V
- NSpec Software

*Single Channel Controller Available!*

**8NSC controllers lineup**

Electronic controllers 8NSC is designed to control piezo positioners of 8NTS series.

**8NSC-1000** is able to control 3 piezo stages.

**8NSC-3061** can control 9 piezo stages and up to 4 stepper motor translation stages with micro step option, for instance, for rough adjustment of scanning head (stage).

8NSC-3061 SPM controller contains 2-channel lock-in amplifier to provide resonant SPM techniques, for example non-contact SPM mode. Lock in amplifier includes high stable voltage generator based on digital frequency synthesizer. High speed data processing is implemented using programmable logic (FPGA). This allows to perform high quality lock-in detection up to 1.5 MHz band.

**SPECIFICATIONS**

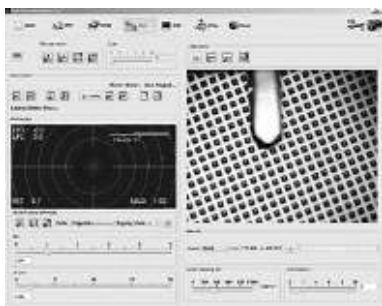
CPU	32 bit; RISC
PC interface	USB 2.0
Other interfaces	RS 232, RS 485, SYNC I/O
Voltage	-10 – 150 V
Noise	<5 ppm
Bit (digital-analog converters)	18 bit

**8NSC-3061**

<b>Piezo control</b>	
Number of channels max	9
<b>Stepper motor control</b>	
Number of channels	4
Power supply	24 V, 3 A
Support microstepping mode	up to 1/16 step
<b>Lock-in amplifier</b>	
Number of channels	2
Coefficient preamplifier	1 – 100
Voltage range	±10 V
Bit ADC	16 bit
Amplitude of the output voltage	10 mV – 10 V
Stability of the main oscillator	<5 ppm

**8NSC-1000**

<b>Piezo control</b>	
Number of channels max	3



**Software:**  
Basic Nspec software, SDK for Windows, Linux, Mac OS, Android for Tablet PC.