

high-speed piezo translation stages

nanoX 200 line

- 240µm range of motion
- highest dynamical performance
- excellent guidance accuracy
- 0.4 nm resolution
- Ø 3mm central aperture

applications:

- machine tools
- laser optics
- life science
- scanning systems



fig.: nanoX 200 SG

Concept

The one-axis linear positioning stages nanoX 200 are a development within the ultra-fast nanoX® -line. Due to FEA - optimization these stages achieve the highest dynamical performance and excellent guiding accuracy even under high loads.

The sophisticated monolithic guidance design of the solid flexure hinges means the trajectory is free from mechanical play and friction - a feature of all psj-stages.

Also, the systems are temperature compensated – while changing the environmental temperature the stage keeps its position.

Vacuum and cryogenic versions are available on demand as well as body material variations of invar, superinvar, aluminum or titanium.

An optional external sensor preamplifier (version “extern” / “digital”) offers independence from cable length.

Specials

The highest positioning accuracy, stability, linearity and reproducibility are achieved in closed loop operation when used in combination with the high resolution capacitive direct measuring feedback system from **piezosystem jena**.

The digital amplifier/controller from piezosystem jena allows additional feature in-situ and dynamical set up of PID-parameters, slew rate and notch filter band width. The mechanical resonance can be found using the built in wobble generator. The notch filter set up eliminates undesired frequencies from the output voltage, such as the stage’s resonant frequency.

So you easy can adapt the set up depending on the current load scenario and optimize the performance of the system.

Mounting/Installation

Piezo actuators generate a pressure force to effect the resulting motion based on a solid state phenomena. The resolution is only limited by the noise of the amplifier and metrology. Such devices are neither affected by magnetic fields nor do they produce them. In cryogenic environments they function down to almost zero Kelvin. There is an associated decrease in the extension behavior. In vacuum conditions piezo actuators can be used at pressure below 10Pa. They should not be operated in the pressure range from 10Pa to 10kPa due to the greatly reduced dielectric breakdown strength of air.

The raster tapped and thru holes allow easy integration of the stage into any application or mechanical setup.

technical data:

| series nanoX | unit | nanoX 200 | nanoX 200 SG | nanoX 200 CAP |
|---------------------------------------|-----------------------|----------------------------|--------------------|-------------------------|
| part no. | - | T-106-20 | T-106-21 | T-106-26 |
| axis | - | X | | |
| motion open loop ($\pm 10\%$)* | μm | 240 | 240 | |
| motion closed loop ($\pm 0,2\%$)* | μm | - | 200 | |
| capacitance ($\pm 20\%$)** | μF | 2x2.6 | | |
| integrated measurement system | - | - | strain gage | capacitive |
| resolution*** open loop | nm | 0.4 | | |
| closed loop | nm | - | 4 | 1 |
| typ. repeatability | nm | - | 50 | 10 |
| typ. non-linearity | % | - | 0.1 | 0.02 |
| resonant frequency | Hz | 700 | | |
| additional load = 50g | Hz | 600 | | |
| additional load = 100g | Hz | 400 | | |
| additional load = 300g | Hz | 250 | | |
| stiffness | N/ μm | 1.1 | | |
| max. push/pull force open loop | N | 100 / 100 | | |
| max. push/pull force closed loop **** | N | - | 100/100 | |
| max. load | N | 100 | | |
| lateral force limit | N | 100 | | |
| rotational error | x/y/z μrad | 5 / 5 / 5 | | |
| voltage range | V | -20 ... +130 | | |
| connector | voltage | - | ODU series L 3pol. | |
| | sensor | - | - | LEMO 0S.304 LEMO 0S.650 |
| cable length | m | 1 | 1.2 | 1.6 |
| min. bend radius of cable | mm | >15 | | |
| material | - | stainless steel / aluminum | | |
| dimensions (l x w x h) | mm | 52 x 52 x 22 | | 52 x 70 x 22 |
| central aperture | mm | $\varnothing 3$ | | |
| weight | g | 175 | 190 | 300 |

* typical value measured with 30V300 nanoX amplifier

** typical value for small electrical field strength

*** The resolution is only limited by the noise of the power amplifier and metrology.

**** max. force, with which the system operates in closed loop within the specification

recommended configurations:

| | | |
|------------------------|------------------------------|-----------|
| actuator | nanoX 200 | T-106-20 |
| amplifier/controller | 30V300 nanoX | E-468-011 |
| actuator | nanoX 200 SG | T-106-21 |
| amplifier/controller | ENV 40 SG nanoX | E-248-100 |
| power supply unit | ENT 40/20 | E-103-13 |
| PC-interface | EDA 4 | E-202-40 |
| casing for all modules | 42 TE | E-103-97 |
| actuator | nanoX 200 CAP digital | T-106-26D |
| amplifier/controller | EVD 50 CL | E-720-300 |
| casing for d-Drive | | E-751-000 |

Please pay attention to our "notes for mounting", which are available as download on our homepage.

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