

## high speed positioner

### nanoX 400 line

- 480µm range of motion
- highest dynamical performance
- excellent guidance accuracy
- 0.8 nm resolution
- Ø 3mm free aperture

#### applications:

- automation
- laser optics
- life science
- scanning systems



fig.: nanoX 400

#### Concept

The nanoX 400 one axis low voltage linear stage is a development within our ultra-fast nanoX®-line. It provides a long positioning and scanning range up to 480microns.

Due to FEA-optimization of these stages you meet highest dynamical performance and excellent guiding accuracy. This is accomplished even with high mass loads in a compact package.

Our optimization also incorporates excellent temperature compensation properties.

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

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

Piezoactuators 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 piezoactuators 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 400	nanoX400 SG	nanoX400 CAP
part no.		-	T-108-20	T-108-21	T-108-26
axis		-	X		
motion open loop ( $\pm 10\%$ )*		$\mu\text{m}$	480	480	
motion closed loop ( $\pm 0,2\%$ )*		$\mu\text{m}$	-	400	
capacitance ( $\pm 20\%$ )**		$\mu\text{F}$	10.2		
feedback sensor		-	-	strain gauge	capacitive
resolution*** open loop		nm	0.8		
closed loop		nm	-	8	2
typ. repeatability		nm	-	80	20
typ. non-linearity		%	-	0.1	0.02
resonant frequency		Hz	400		
additional = 50g		Hz	300		
additional = 100g		Hz	250		
additional = 300g		Hz	150		
stiffness		N/ $\mu\text{m}$	0.4		
push/pull force open loop		N	100 /100		
push/pull force closed loop		N	-	16/16	
max. load		N	50		
lateral force limit		N	100		
rotational error x, y, z		$\mu\text{rad}$	5 / 5 / 5		
dimensions (l x w x h)		mm	52 x 52 x 32		52 x 70 x 32
central aperture		mm	$\varnothing 3$		
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		
temperature range		$^{\circ}\text{C}$	-20 ... +80		
material		-	stainless steel / aluminum		
weight		g	250	270	370

\* typical value measured with ENV 40 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	<b>nanoX 400</b>	T-108-20
amplifier/controller	<b>30V300 nanoX</b>	E-468-011
actuator	<b>nanoX 400 SG</b>	T-108-21
amplifier/controller	<b>ENV 40 SG nanoX</b>	E-248-100
power supply unit	<b>ENT 40/20</b>	E-103-13
PC-interface	<b>EDA 4</b>	E-202-40
casing for all modules	<b>42 TE</b>	E-103-97
actuator	<b>nanoX 400 CAP digital</b>	T-108-26D
amplifier/controller	<b>EVD 50 CL</b>	E-720-300
casing for d-Drive		E-751-000

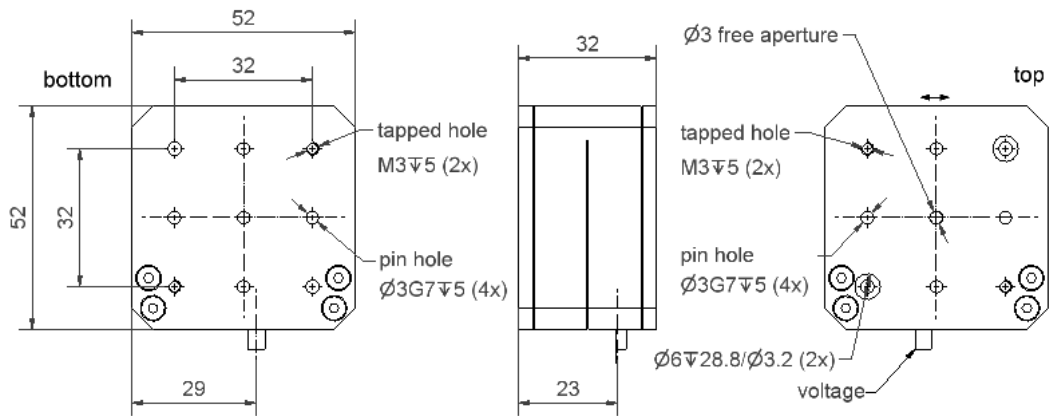


fig.: nanoX 400

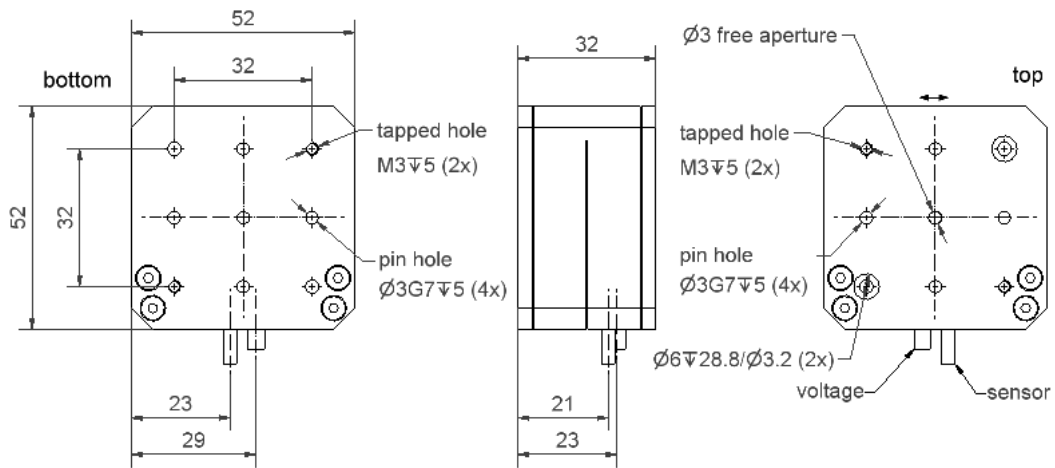


fig.: nanoX 400 SG

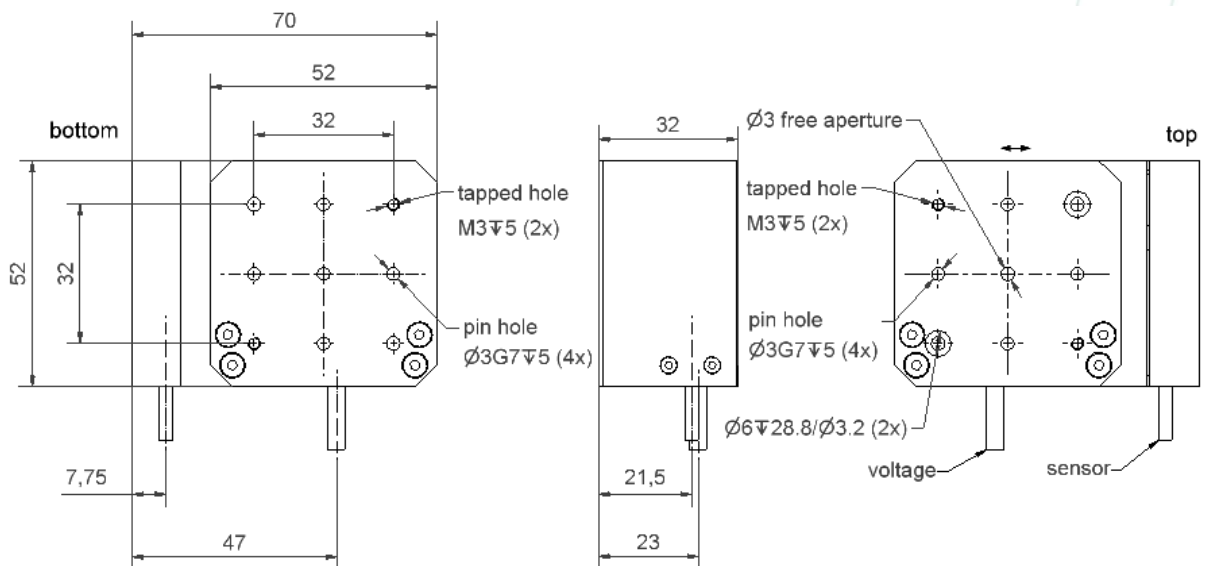
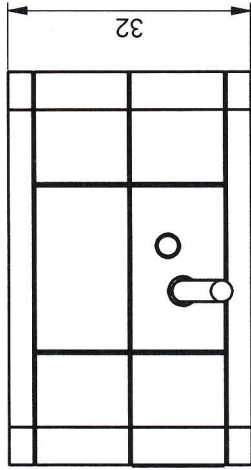


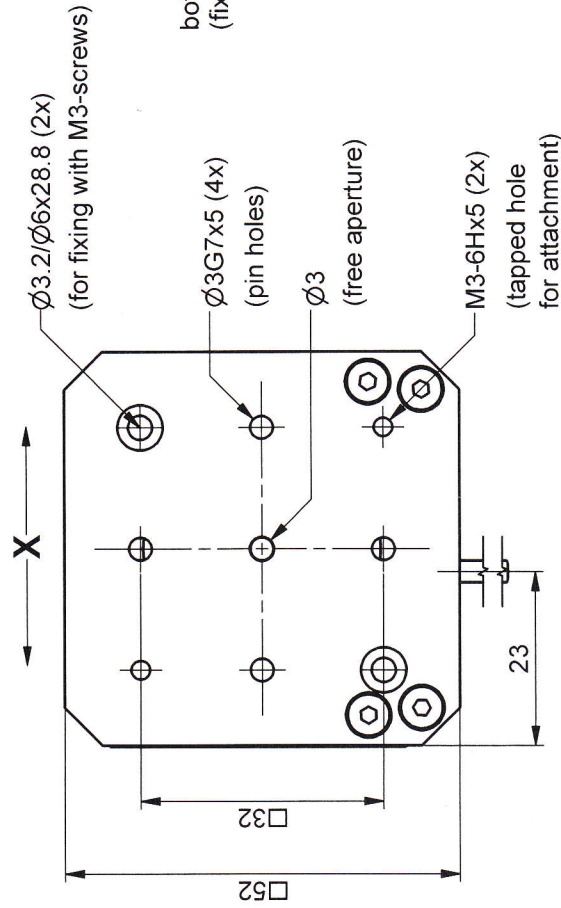
fig.: nanoX 400 CAP

Pay attention please to the "handling instructions" you can download from our homepage.

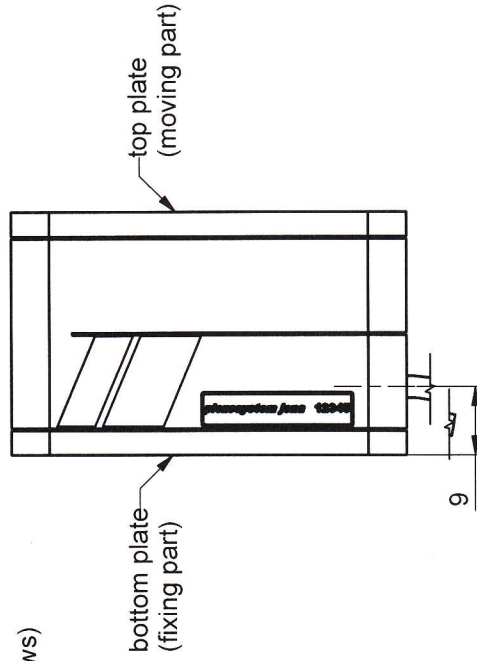
front view



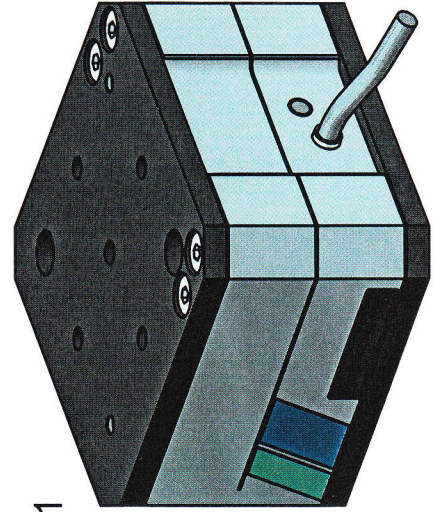
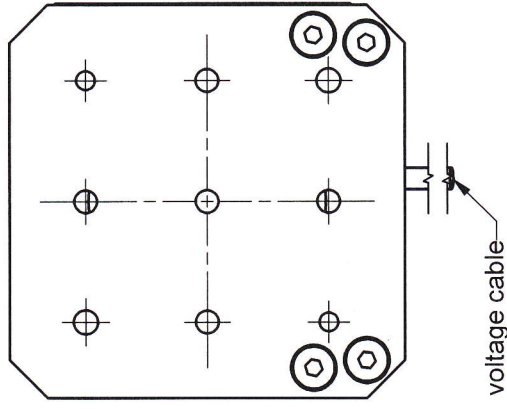
top view



side view



bottom view



model 1:1

**ORIGINAL**

standard cable length 1m

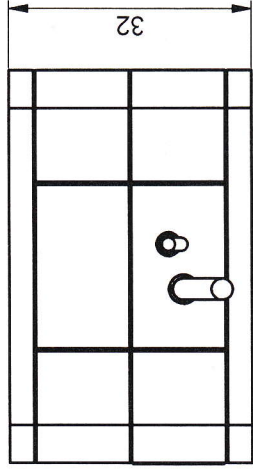
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			customers drawing
			<b>piezosystem jena</b>

unit [mm]

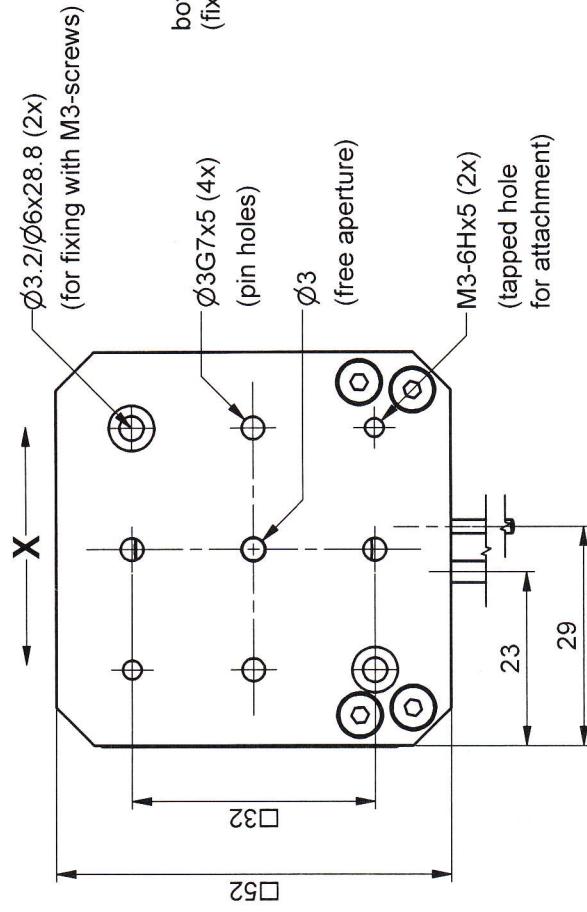
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tapped hole tolerance  $\pm 0.05$

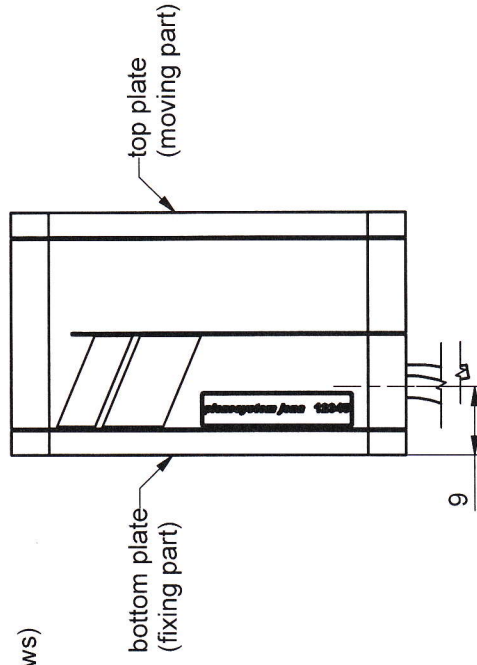
front view



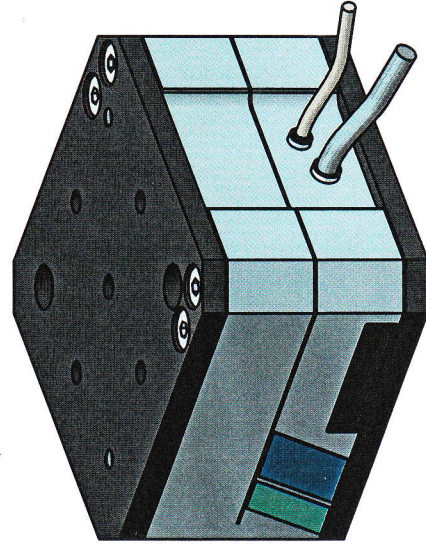
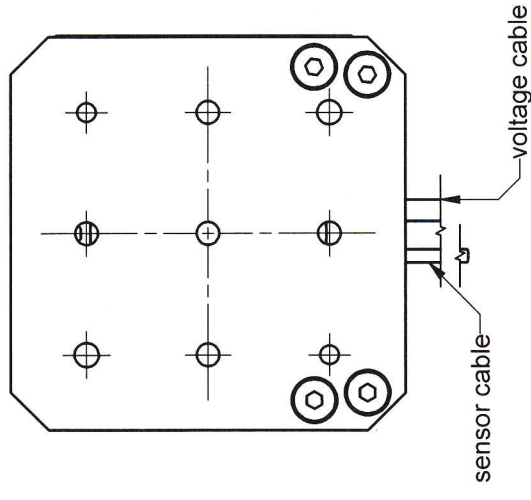
top view



side view



bottom view



model 1:1

**ORIGINAL**

standard cable length 1.2m (EXT/DIG 2m)

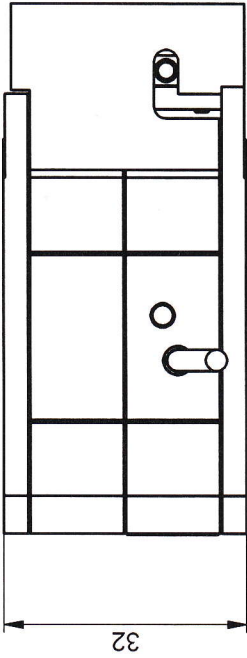
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			piezosystem jena		

unit [mm]

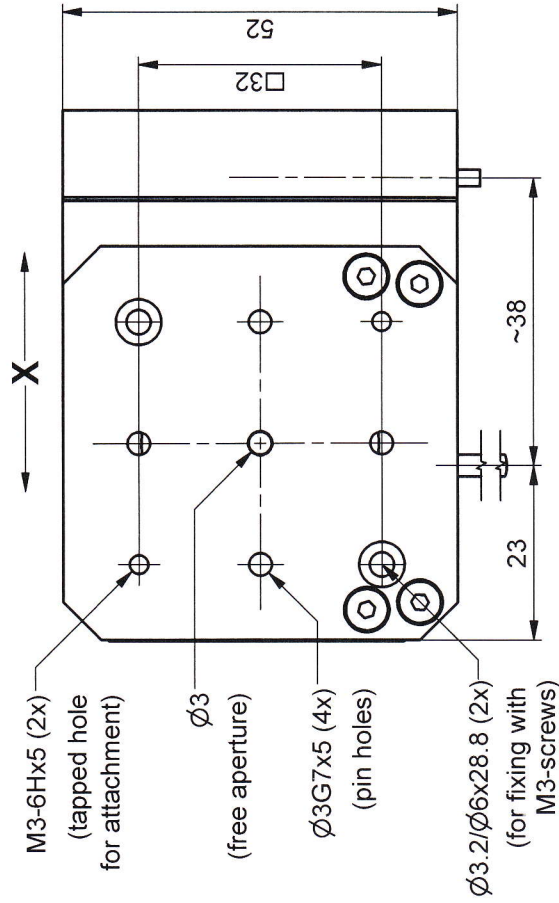
pin hole tolerance  $\pm 0.02$

tapped hole tolerance  $\pm 0.05$

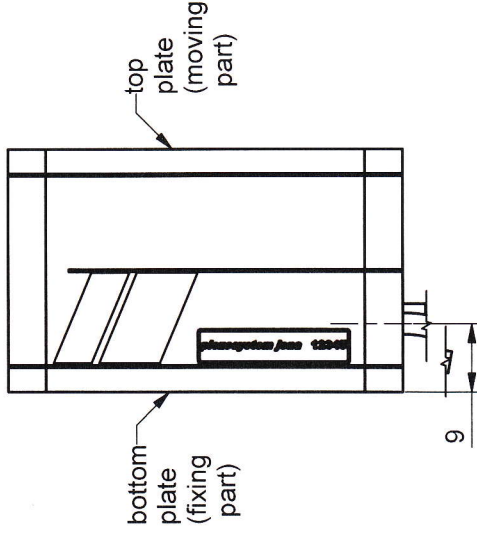
front view



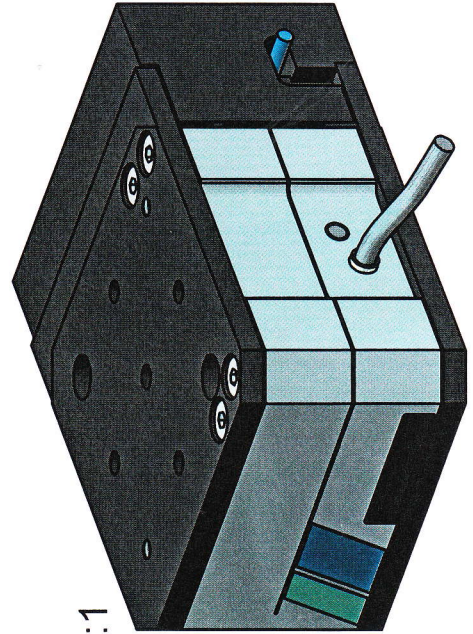
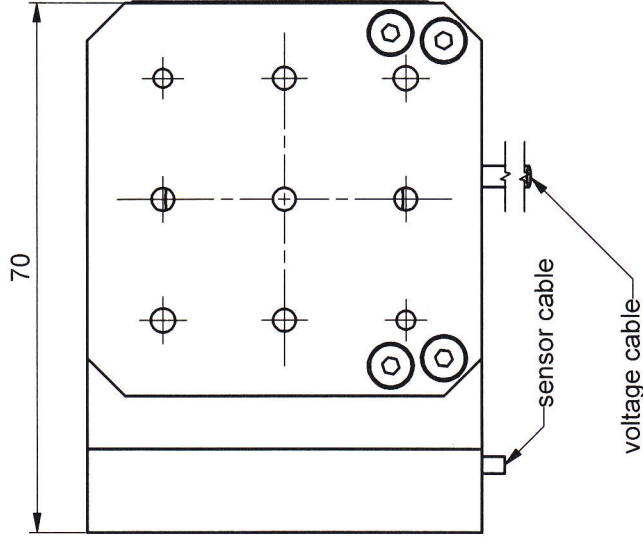
top view



side view



bottom view



model 1:1

**ORIGINAL**

standard cable length 1.6m (EXT/DIG 2m)

part.-no.	T-108-26	part.-name	nanoX 400 CAP
file name	PT10826	OK: date/sign.	13. AUG 2011
	rev.01	scale	1:1
	customers drawing <b>piezosystem jena</b>		

unit [mm]  
 pin hole tolerance  $\pm 0.02$   
 tapped hole tolerance  $\pm 0.05$