

2-axis mirror tilting system

series PSH x/2

- high dynamic tilting systems
- tilting axes in perpendicular orientation
- +/- tilting – up to 16mrad optical
- high resonant frequency due to high stiffness
- sub- μ rad resolution
- micro second rise time

application:

- beam steering
- scanning processes
- precise adjustment of optical components
- beam stabilization



fig.: PSH10/2

Concept

The series PSH x /2 are 2-axis tilt systems are designed for highly dynamic applications. This is due to a direct drive principle without flexure hinges. The two tilting axes are perpendicular to each other. The tilting stage is designed for “plus-minus tilting” up to ± 4 mrad mechanical – optical up to 16mrad total. Because the mirror is being pushed up on one side and pulled down on the other during tilting, forces are generated; this makes the system very well suited for dynamic applications. The direct drive principle guarantees a rise time in micro second range. The changing input signal causes a change in the electrical field of the actuator, which produces near real-time motion. This makes the systems ideal for laser beam stabilization applications.

Specials

If the PSH x/2 is equipped with strain gage feedback sensors, available as an option, the tilting range can be defined and controlled with an accuracy and reproducibility that is within a few micro-radians. The casing material can be changed according to the application. This makes the series PSH x/2 useable for vacuum and temperature sensitive applications. To support use in dynamical applications, the piezo electrical actuators are isolated only by flexible material.

Notes for mounting

The size of the moving platform, 22x22mm, allows mirrors or optics up to 1” in diameter to be mounted. There are 4 threaded holes located in the top plate to easily mount other components such as mirrors or prisms. A mirror mount adapter is available as an accessory. The part number for ordering is K-110-90. The mirror mount adapter must be affixed with screws on the moving platform so the adapter platform can be quickly exchanged. Please see also our “notes for mounting”, on our website. The series PSH x/2 comes with an integrated pre-load which makes the system well suited for high dynamical applications within the range of its resonant frequency.

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technical datas:

series PSH x/2	dimension	PSH 5/2	PSH 10/2	
part. no.	-	K-105-00	K-110-00	
axes	-	x y		
max. tilt per axis – open loop ($\pm 10\%$)	mrad	± 2	± 4	
capacitance per axes ($\pm 20\%$)*	μF	1.7	3.4	
resolution open loop**	μrad	0.01	0.02	
resonant frequency (@5g)	Hz	3600	3500	
stiffness in z-axis	Nm/mrad	0.5	0.5	
output voltage	V	-20 ... +130		
connector	voltage	- ODU 3pin		
cable length	m	1		
min. bending radius of cable	mm	>15		
material	-	stainless steel, aluminium		
dimension (l x w x h)	mm	22x22x29.5	22x22x47.5	
weight	g	40	52	
series PSH x/2 with integrated sensor system	dimension	PSH 5/2SG	PSH 10/2SG	
part. no.	-	K-105-01	K-110-01	
max. tilt per axis – closed loop ($\pm 0.2\%$)	mrad	± 2	± 4	
typ of sensor	-	DMS		
resolution**	closed loop	μrad	0.1	0.2
typ. repeatability		μrad	0.4	0.4
connector	sensor	-	LEMO 0S 304	
cable length	m	1.2		
dimension (l x w x h)	mm	22x22x35	22x22x53	
weight	g	85	95	

* typical value for small electrical field strength

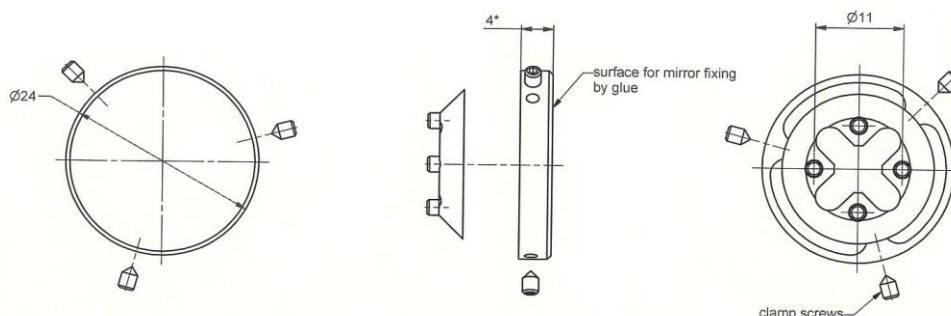
** the resolution of piezo electrical actuator is limited by the noise characteristic of the applied signal only

recommended controller unit

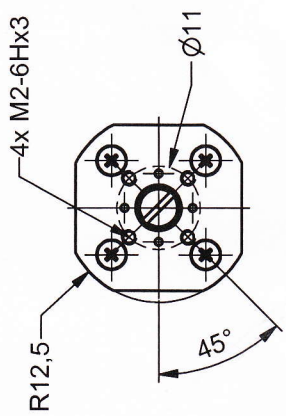
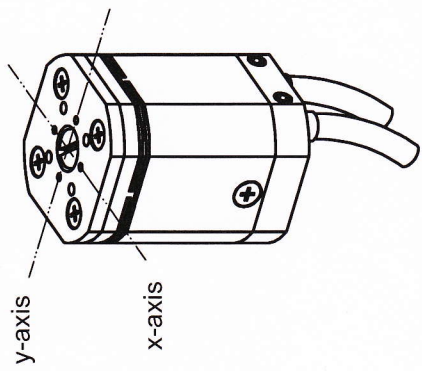
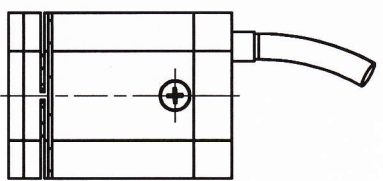
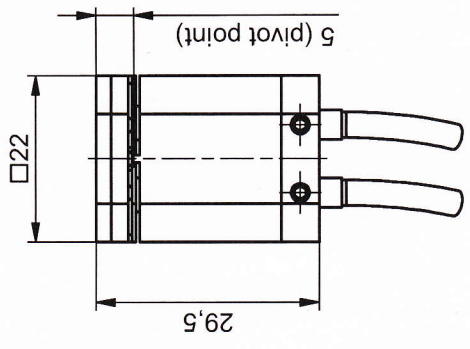
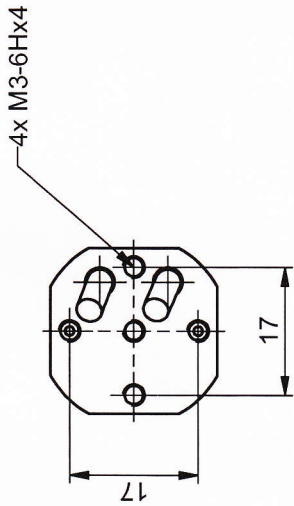
	series of amplifier	part number	number of channels required
analog controller OEM-version	30V300 nanoX	E-468-011	2
analog controller 19" casing	system ENV nanoX	configuration available after request	2
digital controller OEM-version	30DV50	E-754-300	2
digital controller 19" casing	system d-Drive	configuration available after request	2

accessories

Mirror mount adapter for series PSH x/2, part number: K-110-90

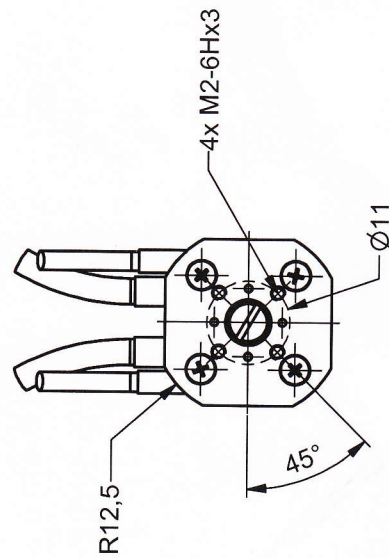
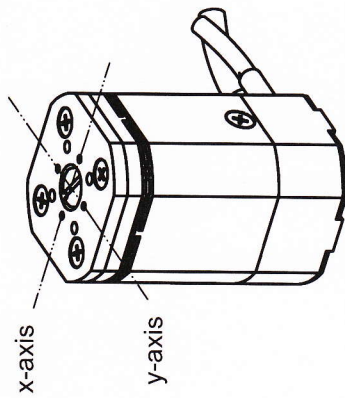
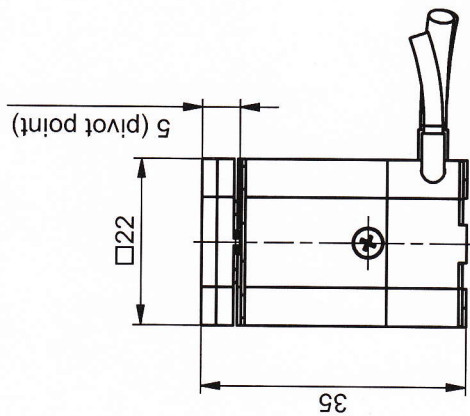
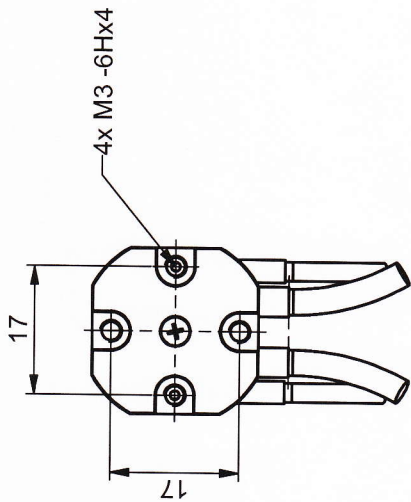


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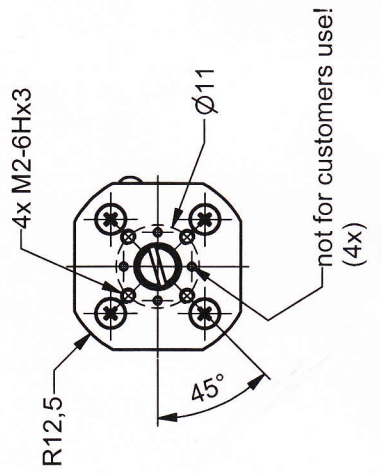
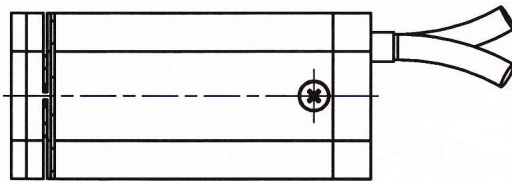
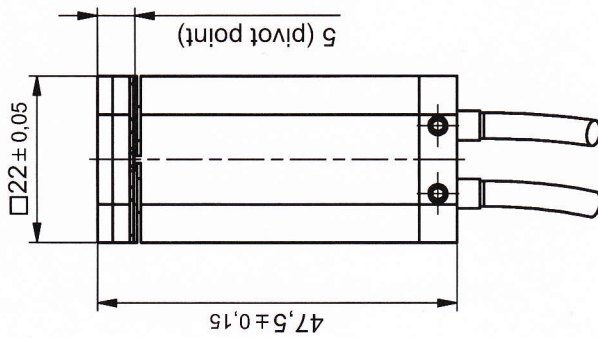
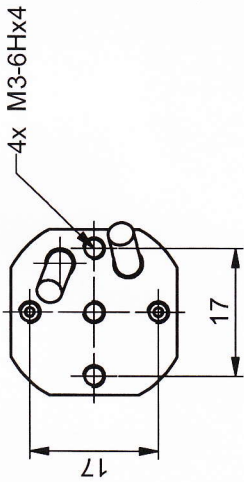
ORIGINAL

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			customers drawing
			piezosystem jena

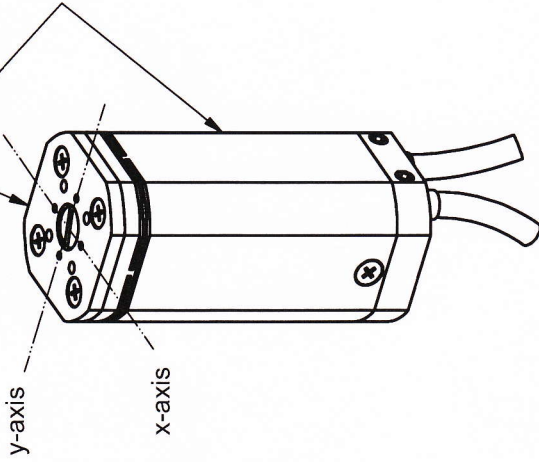


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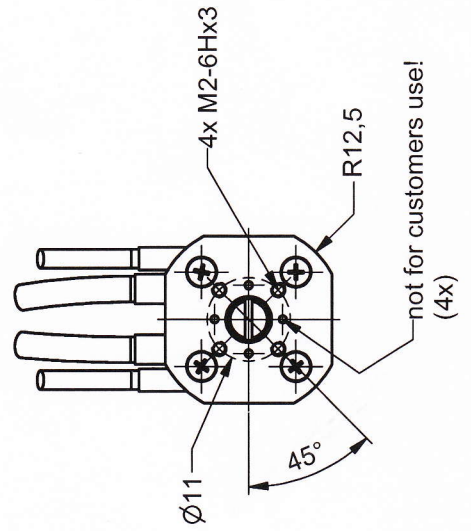
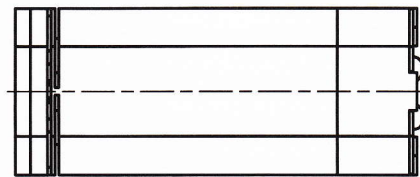
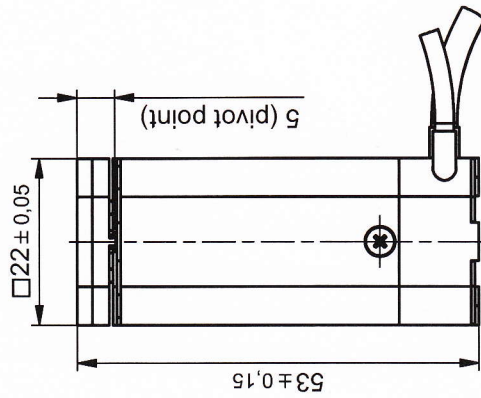
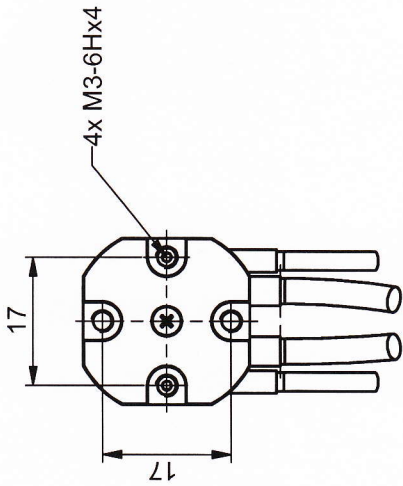


angular error around z-axis between
these two parts without load: ± 0,1°

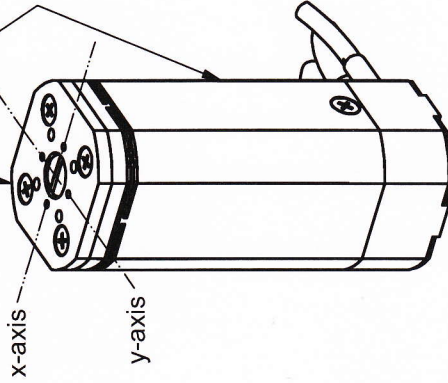


ORIGINAL

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		scale	1:1
			customers drawing piezosystem jena



angular error around z-axis between these two parts without load: $\pm 0,1^\circ$



ORIGINAL

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			piezosystem jena

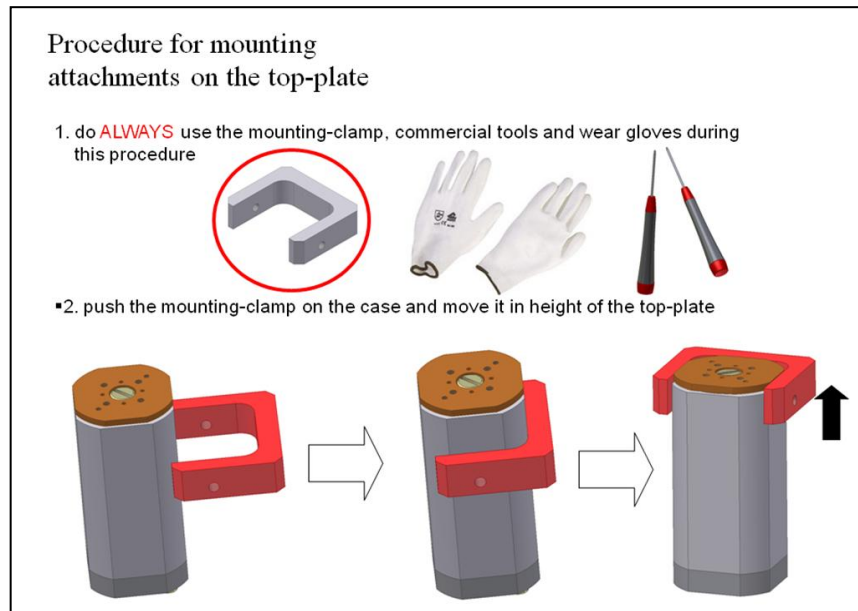
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Handling instructions

To avoid any damage during mounting and installation please take care about the following instructions

The mounting-clamp can be ordered as accessories with part number **K-190-02**.



- Please avoid shock impacts and shaking of these elements

- Please avoid shear and torque forces by mounting and during use

- The max. Torque force by mounting of components shouldn't exceed 20Ncm

- Make sure that push- and pulling forces during dynamical use are below the given pre-load of the system

Special notice for using piezoelectrical elements series PX, PZ, PXY, TRITOR, PSH and PZS from piezosystem jena

These elements have integrated solid-state flexure hinges for motion transmission. Depending on the special performance, the element can be preloaded and can work dynamically. Elements, especially mirror mounts of the series PSH, are suited for dynamical applications and will not be damaged if handled correctly.

But please note:

The mounting and handling of these elements should be done very carefully to avoid plastic bending of the hinges which will damage the elements. Most of these elements consist of a ground or bottom plate that will be attached by screws. The top plate of the elements makes the motion. Mirrors or other elements to be moved can be mounted on the top plate.

The mounting can be accomplished using screws or adhesives (depending on the element and on the application). However, avoid forces between the top plate, the middle part and the bottom element (tensile, shear, strain or torque forces). These forces can cause damage to the elements. Do not open the elements or remove the bottom and top plates. Elements for dynamical applications are fixed using adhesives and when opening the elements forces occur which will bend the hinges and damage the element.

If it is necessary to use forces for mounting be sure that these forces can not occur between the parts of the piezoelement (e.g. by clamping).

If it is necessary to remove a plate, please contact us.

If the element is handled incorrectly or if the element has been opened, the warranty will be lost.

Please note:

Keep the actuator away from a humid environment. After receiving please store the actuator in a dry room (an air conditioned room is preferable) for at least 24 hours or put it in a desiccator for at least two hours before use.

After long storage a depolarization of the piezoactuator might happen. Therefore a slow increasing of the voltage is recommended. Under no circumstances should the actuator be operated with 130V immediately. *piezosystem jena* recommends an increase to maximum voltage in not less than 10 seconds.

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