

## PXY 16 series

### xy – Piezo Scanner

- 16 x 16  $\mu\text{m}^2$  positioning / scanning area
- parallel high-resolution capacitive metrology
- 0.04 nm resolution
- excellent guidance accuracy
- parallel kinematics
- large  $\varnothing$  66 mm aperture
- improved reliability and robustness

#### application:

- fast scanning applications, as well as nanopositioning and adjustment in the field of scanning microscopy, image processing, semiconductors, automation etc.



fig.: PXY 16 OEM

#### Concept

The PXY 16 is a biaxial linear stage with a scanning and positioning range of 16 x 16  $\mu\text{m}^2$ . With its wide opening, it allows to be used in a variety of optical applications.

The parallel kinematics optimized by FEM show an excellent and independent behaviour of both axes. Due to the high stiffness and robustness compared to conventional designs, the PXY 16 series offers the highest level of dynamics combined with excellent tracking accuracy.

On request, vacuum and low temperature modifications are available, as well as material variations like aluminium, invar, superinvar or titanium.

The optional sensor pre-amplifier ("external" / "digital" version) allows implementations independent of cable lengths.

#### Characteristics

In combination with high-resolution capacitive direct metrology from **piezosystem jena's**, the highest level of position accuracy, stability, linearity and repeatability is possible in closed loop operation.

In addition, the digital amplifiers from **piezosystem jena** allow the modification of various control parameters, including e.g. PID values and notch filter bandwidth. Using an internal wobble generator, mechanical resonances can be determined in order to eliminate them from the control signal via the notch filter adaptation to avoid the stimulation of resonances.

It is thus easy for the user to determine the optimal system setup via iterative trial and error operation, depending on the current load scenario.

#### Mounting/Installation

The force and expansion behaviour of piezo actuators is based on solid-body effects. Thus, the resolution is only dependent on the noise of the control electronics. Piezo actuators are neither influenced by nor do they generate magnetic fields. In cryogenic environments they work close to 0K with a linear decreasing relative expansion. Even under vacuum conditions, piezo actuators can be used. Both scenarios, however, need special adaptations. Due to the reduced dielectric breakdown field strength in air they do not work between 10 Pa and 10 kPa.

The grid with its thread holes and through holes allows easy integration of the piezoelectric element into a variety of standardized and customized applications.

## PXY 16 series

### technical specifications:

	unit	PXY 16 OEM		PXY 16 CAP	PXY 16 CAP external	PXY 16 CAP digital
part no.	-	S-644-00	S-646-00	S-644-06	S-644-06E	S-644-06D
axes	-	X and Y				
stroke	open loop ( $\pm 10\%$ )*	16				
	closed loop ( $\pm 0,2\%$ )*	-	12			
electrical capacitance ( $\pm 20\%$ **)	$\mu\text{F}$	3.6 per axis				
feedback sensor	-	w/o		capacitive		
resolution***	open loop	0.04		0.04		
	closed loop	-		1		
typ. repeatability	nm	-		5		
typ. nonlinearity	%	-		0.02		
resonant frequency	add. mass = 10g	Hz		335		
	add. mass = 130g	Hz		325		
	add. mass = 360g	Hz		305		
	add. mass = 540g	Hz		285		
stiffness (x / y / z)	N/ $\mu\text{m}$	10 / 10 / 15				
max. push / pull force	open loop	N		200 / 50		
	closed loop****	N		20 / 20		
max. loading	N	50				
max. lateral force	N	20				
tilt	x, y, z	$\mu\text{rad}$				
		5 / 5 / 5				
dimensions (l x w x h)	mm <sup>3</sup>	98 x 98 x 20		104 x 104 x 20		
aperture	mm	$\varnothing 66$				
voltage range	V	-20 ... +130				
connector****	voltage	-	LEMO 0S.250	-	LEMO 0S.302	
	sensor	-	-	LEMO 0S.650	ODU.4pol	d-sub
cable length****	m	1.2	1.0	1.6	2.0	2.0
temperature range	$^{\circ}\text{C}$	-20 ... +80				
material	-	aluminium / stainless steel				
total mass	g	725	700	900		

\* measured with 30V300 CLE

\*\* typical small signal strength behaviour

\*\*\* resolution is only limited by the noise of the amplifier and metrology

\*\*\*\* maximum load in controlled operation

#### recommended configuration:

actuator	1 x	<b>PXY 16 CAP digital</b>	S-644-06D
controller	1 x	<b>NV 40/3 CLE</b>	E-101-23
actuator	1 x	<b>PXY 16 CAP</b>	S-644-06
controller	2 x	<b>ENV 300 CAP</b>	E-270-600
power supply	1 x	<b>ENT 400 (230V / 115V)</b>	E-103-33 / 34
PC interface	1 x	<b>EDA 4</b>	E-202-40
casing	1 x	<b>case 19" / 84 TE</b>	E-103-911
actuator	1 x	<b>PXY 16 CAP digital</b>	S-644-06D
controller	2 x	<b>EVD 50</b>	E-720-300
casing	1 x	<b>d-Drive case with EDS2 interface</b>	E-751-000

## PXY 38

### *compact 2-axes translation stages*

#### **Concept:**

The systems of the series PXY 38 are ideally suited for nm-precise positioning of optic components such as mirrors and laser diodes, adjustment and mounting in semiconductor technologies and electronics, and applications in measurement technologies and quality assurance as well as microbiology.

The series PXY 38 consist of piezo electrical actuator in stage design with a solid top and bottom plate for easily integration in optical setups. The monolithic flexure hinges design offers high precision motion range, high stiffness and in due of this excellent dynamical performance for extremely fast and accurate positioning tasks.

#### **Specials:**

With the use of a control signal, the X and Y-axis can be controlled separately. The axis are located orthogonal to each other and the direction of motion is show by small markings on the stage. As an option they may come equipped with strain gage or capacitive position sensors, depending on the system configuration, to achieve very accurate repeatability in the low nanometer range. The systems of this series are available in vacuum and cryogenic temperature configurations.

#### **Interfaces:**

The elements of the series PX are actuators integrated with an inner lever transmission in housing. Since the lever mechanism works in both directions, pulling forces between bottom and top plate need to be avoided, as they could damage the stage. The stage is fixed to a base plate.

Components can be mounted on the top plate by two threaded diagonal holes and can be accurately affixed using the precise pin holes.



image: PXY 38

#### *Product highlights:*

- accurate parallel motion
- up to 38 $\mu$ m motion range
- without mechanical play
- easily combined with other piezo electrical systems
- precision pin holes for accurate adjustment
- high dynamic range

#### *Applications:*

- fiber positioning
- 2D-scanning systems
- beam alignment
- semiconductor
- micro manipulation



## PXY 16 series

### drawings:

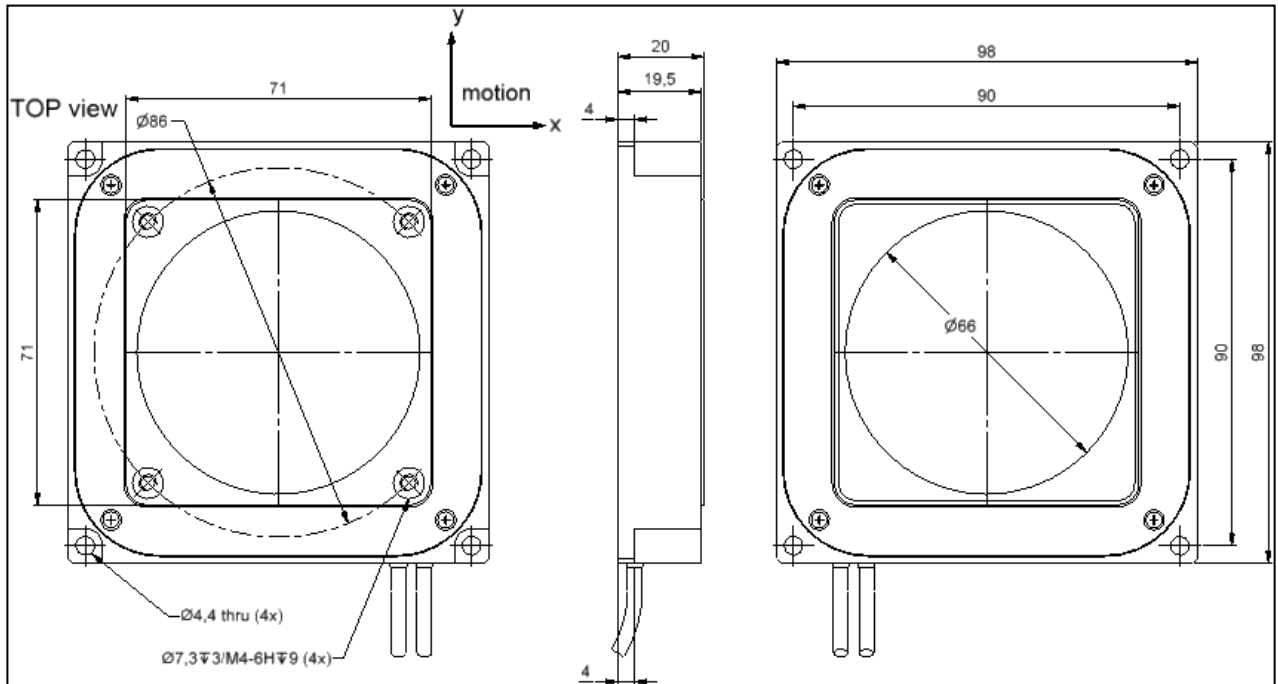


fig.: PXY 16 OEM

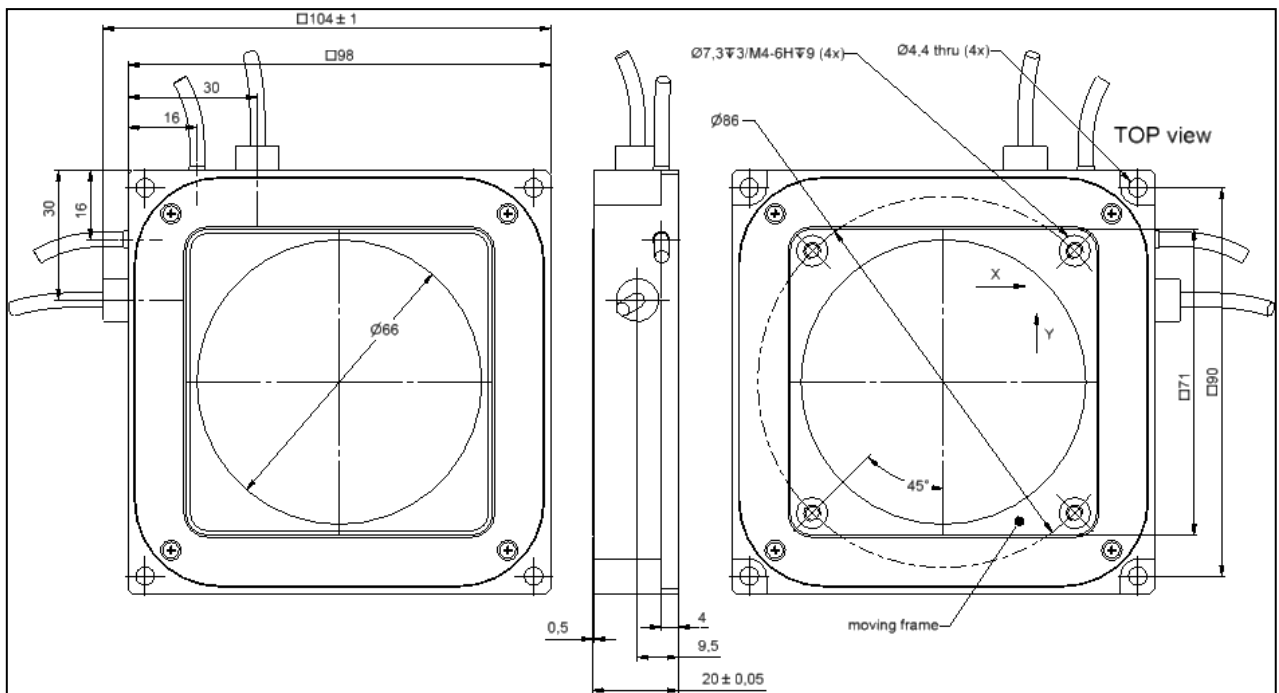


fig.: PXY 16 CAP / PXY 16 CAP extern / PXY 16 CAP digital

Please pay attention to the “handling instructions” you can download from our homepage.

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