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incredibly precise

High load positioner

TRITOR 320 CAP

- **40 / 40 / 320 µm motion in closed loop**
- **dynamical properties with masses up to 20 kg**
- **excellent guidance**
- **0.8 nm resolution in z-direction**
- **150x150 mm free aperture**

applications:
- automation
- semiconductor industry
- vacuum environments
- non-magnetic applications

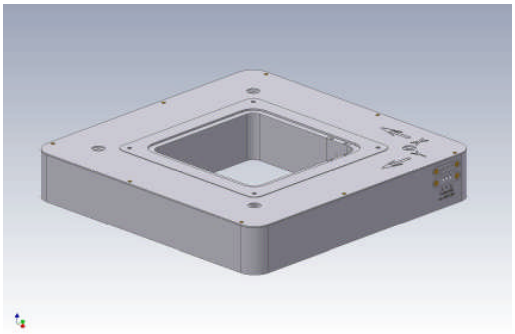

Fig.1: TRITOR 320 CAP

Concept

The 3axis Positioning Element TRITOR 320 CAP was developed for the high accuracy positioning of large loads. High dynamical properties are achieved as a result of our FEM optimization. Fast and precise positioning can be reached even under masses up to 20kg, while still maintaining excellent guidance.
As with all elements from ***piezosystem jena,*** the performance of the TRITOR 320 can be attributed to its construction with flexure hinges that are completely free of friction.
Vacuum and cryogenic versions are available upon request, as well as material variations with Invar, Super Invar, Aluminum or even Titanium.
Versions denoted “external” and “digital” come with the option for a sensor preamplifier that makes the use of cables length-independent.

Specials

In combination with high resolution capacitive direct metrology from ***piezosystem jena***, the elements can reach the highest accuracy in stability, repeatability and linearity.
The digital amplifier from ***piezosystem jena*** allows PID parameters, rise limitation and notch filter bandwidth to be set on-site. An integrated frequency sweep generator may be used to determine the mechanical resonant frequency of the actuator. Then the notch filter is used to filter out that particular frequency from the control signal. This is done to prevent the control signal from exciting the mechanical resonance of the structure.
It is possible to quickly and easily optimize the system through trial and error.

Mounting Instructions

The force and expansion behavior of piezo actuators is based upon effects on solid bodies. Hence, the motion resolution only depends on the noise of the control electronics. Piezo actuators neither produce nor are influenced by magnetic fields.
Actuators can be used down to temperatures of 0K, though relative expansion will decrease linearly.
Under vacuum conditions, the actuators can be used down to a vacuum of 10Pa. In the range 10Pa-10kPa, air becomes a conductor which can cause the system to short-circuit.
The TRITOR 320 is easy to integrate into an existing system using easily accessible mounting holes.

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technical data:

series tritor		unit	TRITOR 320 CAP		
part number		-	T-406-76/T-406-76D		
axes		-	X	Y	Z
motion open loop(±10%)*		µm	50		320
motion closed loop (±0,2%)*		µm	40		320
capacitance (±20%)**		µF	44		116
feedback sensor		-	capacitive		
resolution*** open loop		nm	0.1		0.8
closed loop		nm	1		
typ. repeatability		nm	2	2	14
typ. non-linearity		nm	10	20	250
resonant frequency		Hz	250	250	150
additional load = 12kg		Hz	140		70
stiffness		N/µm	36		4,2
max. push/pull force open loop****		N	900/300		900/300
max. push/pull force closed loop****		N	180		170
max. load		N	200		
lateral force limit		N	150		
rotational error / roll, pitch, yaw		µrad	10 / 15 / 2	5 / 20 / 2	40 / 90 / 70
dimensions (l x w x h)		mm	320 x 320 x 55		
central aperture		mm	150x150		
voltage range		V	-20 ... +130		
connectors	voltage	-	LEMO 0S.302/ SUB-D		
	sensor	-	LEMO 0S.650/ SUB-D		
cable length		m	2		
min. bend radius of cable		mm	15 mm		
temperature range		°C	-20 … +80		
material		-	stainless steel (non-magnetic)/ aluminum		
weight		g	8000		

* typical value with ENV 40 nanoX amplifier
** typical small signal behavior
*** resolution of the system only limited by noise of the system
**** max. force for the system to work within the given specifications, pull force means force in direction of stroke

recommended configuration:

actuator	**TRITOR 320 CAP**	T-406-76D
amplifier	**EVD 50 CL (3x)**	E-720-300
casing d-Drive		E-751-000

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