



Digital Piezo Translators DPT-E



- DPT-C interchange ability
- Built-in calibration
- Highest loads, fast step settle times
- Increased travel ranges

Precision, Accuracy and Speed for the best in Nano-positioning

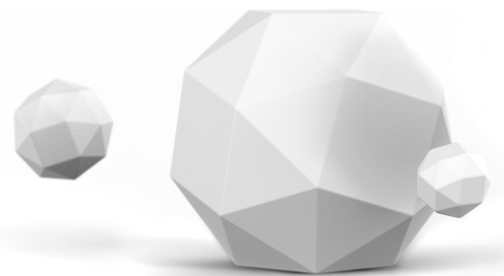
The DPT-E range of actuators are designed with capacitive feedback control to give precise positioning.

A system comprising a DPT-E actuator with the fully programmable NPC-D-5200 digital closed loop controller is ideal for the most demanding applications. Capable of moving loads of up to 60 kg over the full travel range with low electronic noise and high linearity, giving confidence that the actuator is positioned with precision, speed and accuracy. High thermal stability super invar construction gives superior position stability. The DPT-E is designed to be a direct replacement for the high voltage DPT-C it supersedes. The travel ranges have been increased by at least 25% from the DPT-C equivalent models as well as other enhancements.

Key features	Key benefits
Preloaded super-invar construction	High positional stability
Capacitive sensor feedback control	Low noise and high linearity of movement
High blocking force	Capable of moving loads of up to 60kg over their full closed loop
Plug and play inter-changeability	Calibration held within the actuator allowing controllers to be switched
Friction free positioning	Sub nanometre repeatability
NPC-D-5200 digital closed loop controller	Bespoke optimisation of settings
UHV, radiation hard / cryogenic non-magnetic and High Temperature variants	Custom solutions

Typical applications include:

- Interferometry
- Beam alignment
- Mask-wafer chuck alignment
- Cavity tuning
- Metrology



Digital Piezo Translators: DPT-E

Specification

Parameter	Value						Units	Comments
Static Physical								
Variant	DPT-E-20	DPT-E-50	DPT-E-110	DPT-E-20-UHV	DPT-E-50-UHV	DPT-E-110-UHV		
Supersedes Model	DPT-C-S	DPT-C-M	DPT-C-L	DPT-C-S-UVAC	DPT-C-M-UVAC	DPT-C-L-UVAC		
Material	Super Invar (0.35nm/K CTE)							Note 1
Length	42.2	76.7	127.8	42.2	76.7	127.8	mm	+/- 0.3
Diameter	20	20	20	20	20	20	mm	
Air Cable Length	2	2	2	1	1	1		Longer Available On Request
UHV Kapton Cable Length	0	0	0	1	1	1		Longer Available On Request
Closed Loop Range	20	50	110	20	50	110	µm	Note 2
Open Loop Range	26	66	145	26	66	145	µm	Typical
Blocking Force	3500	3500	3500	3500	3500	3500	N	Typical
Full Range Push Force	600	600	600	600	600	600	N	Note 3
Max Pull Force	200	200	200	200	200	200	N	Note 8
Stiffness	120	48	21	120	48	21	N/µm	Typical
Response (settle) Time	<2	<2.5	<3	<2	<2.5	<3	ms	Note 4
Dynamic Physical								
Position Resolution	0.2	0.3	0.4	0.4	0.6	0.8	nm	Note 5
Operating Temperature	-30 +80	-30 +80	-30 +80	-30 +80	-30 +80	-30 +80	°C	Please consult for cryogenic and high temperature operation.
Storage Temperature	-50 +100	-50 +100	-50 +100	-50 +100	-50 +100	-50 +100	°C	
Operating Pressure	1Atm	1Atm	1Atm	10 ⁻³ to 10 ⁻⁹ Torr	10 ⁻³ to 10 ⁻⁹ Torr	10 ⁻³ to 10 ⁻⁹ Torr		
Error terms (typical values)								
Linearity Error (peak to peak)	<0.03	<0.03	<0.03	<0.08	<0.08	<0.08	Note 6	
Repeatability (rms)	0.5	0.6	0.8	0.8	1	1.2	nm	Typical

Notes

1. Housing (out of the thermal expansion loop) in Stainless Steel 316 or 316L on UHV models.
2. Typical value for actuators operated in open loop.
3. Full closed loop range, forces greater than this may lead temporarily to range reduction.
4. 0.5 µm step, unloaded with a fast PID setting and using a digital controller
5. This is the maximum actual physical rms position noise of the actuator with slow PID setting and the digital controller using standard cable lengths. Longer cable lengths will increase position noise.
6. Percent error over the full range of motion using a digital controller.
7. Measured at the centre of the actuator displacement.
8. Pulling in excess of this value can cause the actuator to require recalibration. Total Preload is 320N, for larger pulling forces add the external preload accessory.



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Customized solutions:

Please contact us for any specific requirements not shown on this data sheet.

Vacuum compatible options are available with a variety of feed through options to suit your vacuum system. Systems are calibrated with the feed through connected. Flanges can be ordered with the actuator as a complete system. To guarantee interchangeability please ensure airside cables are ordered to connect from the feed through to the controller. Note that cable material and length influence position noise performance.

Ultra High Vacuum (UHV) option:

The DPT-Es are available in vacuum compatible options: these special actuators are made from very low outgassing materials and can be baked out at up to 90°C. Please specify the suffix –UHV.

High Temperature option:

Operating up to 110 °C and can be baked out at 130 °C. Range and pushing forces will reduce from standard models. These are also desirable for high frequency dynamic operations as self-heating is reduced.

Non Magnetic option:

Super Invar parts are replaced with nonmagnetic Stainless Steel.

Radiation Hard option:

Uses materials which degrade less when exposed to radiation, available on UHV models only.

Accessories:

- VEP3: V-groove end piece
- FS25-1": 25mm diameter mirror holder
- FS12-1/2": 12.5mm diameter mirror holder
- BEP5: spherical end piece
- PEP: plain end piece
- MEP: magnetic end piece
- CMI-D: mounting block
- Additional external preload for larger pulling forces
- Custom solutions to meet your needs

Note Accessories are illustrated on installation and handling instructions.

Alternatives:

- DPT-D series offers increased pulling forces and positioning accuracy
- NPS-Z-15B offers flexure guidance
- NPS-Z-15L gives ten times the force for very large load applications
- NPS-Z-500A offers a longer actuation range with reduced pushing force

