



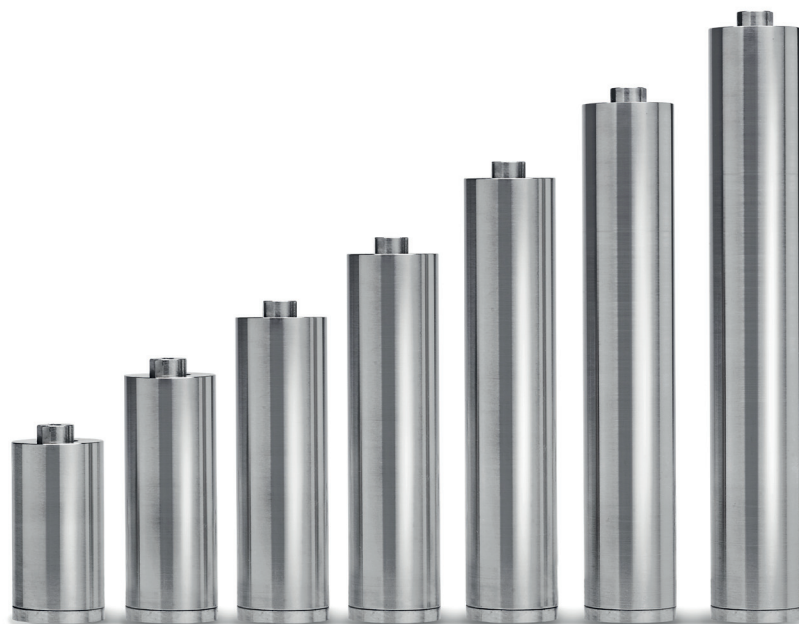
DPT-D

Digital Piezo Translators equipped with capacitive sensors
closed with a closed loop range of up to 120 μ m

Features

- **Ultimate positioning performance guaranteed by capacitive sensors**
 - 0.2nm (rms) Position noise
 - <0.01% Linearity
 - 0.5nm Repeatability
- **Super Invar construction providing higher thermal stability**
- **ID Chip Equipped for controller interchangeability**
- **Low voltage standard for complete vacuum compatibility**
- **Up to 120 μ m displacement and 2,000N force**
- **Extensive choice of accessories and interfaces**
- **Vacuum compatible options**

The Digital Piezo Translators are the original unique DPTs and represent the ultimate solution for nanopositioning tasks. These closed loop piezo actuators incorporate capacitive sensors that deliver cutting-edge performances in terms of stability, linearity and repeatability. Queensgate's state-of-the-art digital controllers support full interchangeability for the DPTs avoiding the need for expensive and time consuming in house re-calibrations. The DPT-D family consists of 7 low voltage models with a travel range up to 120 μ m which can be vacuum prepared and come with an extensive choice of accessories.



DPT-D

Suggested controllers

The DPT-D can be driven by a range of analogue and digital controllers: the NPC-A-1110DS analogue closed loop controller is a simple, cost-effective solution featuring +/-10V analogue and TTL output, a manual offset control and a position display. Alternatively, the fully programmable NPC-D-5110DS digital closed loop controller is ideal for the most demanding applications in terms of linearity (4TH order linearisation) and resolution. All Queensgate systems feature ID chips with calibration information to allow plug-and-play operation with any digital controller.

Applications

- Interferometry
- Adaptive optics
- Mask-wafer chuck alignment
- Scanning probe microscopy
- Cavity tuning



DPT-D Digital Piezo Translators

Specifications

Parameter	Value							Units	Comments
Static physical									
Variant	10	20	40	60	80	100	120		
Material	Super Invar								Note 1
Length	45.5	54.5	72.5	90.5	108.5	126.5	144.5	mm	
Diameter	22	22	22	22	22	22	22	mm	
Mass (without connector)	90	103	133	157	160	178	202	g	
Cable length	2	2	2	2	2	2	2	m	
Closed loop range	10	20	40	60	80	100	120	μm	Note 2
Stack capacitance	1.8	3.6	7.2	10.8	14.4	18.2	22	μF	Note 3
Blocking force	2000	2000	2000	2000	2000	2000	2000	N	
Max push force	600	600	600	600	600	600	600	N	Note 4
Max pull force	200	200	200	200	200	200	200	N	
Stiffness	240	120	60	40	30	24	20	N/μm	
Dynamic physical (typical values)									
Response (settle) time	<2	<2	<2	<2	<2	<2	<2	ms	Note 5
Max position noise (rms)	0.2	0.2	0.2	0.5	0.5	1	1	nm	Note 6
Operating temperature	10-50	10-50	10-50	10-50	10-50	10-50	10-50	°C	
Storage temperature	0-70	0-70	0-70	0-70	0-70	0-70	0-70	°C	
Error terms (typical values)									
Linearity error (peak to peak)	<0.03	<0.03	<0.01	<0.01	<0.01	<0.01	<0.01	%	Note 7
Repeatability (rms)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	nm	Note 8

Notes

- Housing (out of the thermal expansion loop) in stainless steel
- Minimum value guaranteed
- Small signal capacitance +/-20%
- Full range
- 500nm step unloaded fast PID settings (BW 500Hz) and digital controller
- This is the actual position noise of the actuator with slow PID settings (BW 35Hz) and digital controller
- Percent error over the full range of motion with digital controllers
- Measured at the centre of the actuator displacement

Vacuum compatible options

The DPT-Ds are also available in a vacuum compatible option: these special translators are made from very low outgassing materials and can be baked out at up to 100°C.

Please specify the suffix -VAC (e.g. DPT-D-40-VAC) for vacuum preparation down to 10⁻⁶ hPa and U-VAC (e.g. DPT-D-40-UVAC) for vacuum preparation down to 10⁻⁹ hPa featuring Kapton cables.

Vacuum compatible DPT-D have 4 BNC connectors for the vacuum feedthrough. Queensgate recommend the ZBNCD-450-4 feedthrough from Cadburn-MDC. To guarantee inter-changeability please ensure you order airside cables to connect from the feedthrough to the controller. Note that cables material and length influence position noise performance.

Accessories

- VEP3: V-groove end piece
- FS25-1": 25mm diameter mirror holder
- FS12-½": 12.5mm diameter mirror holder
- BEP5: spherical end piece
- PEP: plain end piece
- MEP: magnetic end piece
- CMI-D: mounting block

