XYZ3TH STACKED PLATFORM

ASME-NNNN-09-0365-0355xx

Vulcano XYZ3T^{H}

Data sheet

Version 1.1

ETEL

AXIS DESIGNATION						
Number of controlled axes		9				
Axes name		Y1-Y2	X	Fine Z	Tip-Tilt	Coarse Z	Theta
Thrust transmitter: DD (direct drive) or ID (indirect drive)		DD	DD	DD	DD	DD	DD

TESTING CONDITIONS	UNIT						
Position controller	-	VHP100 10/30A	VHP100 10/30A	VHP48 1.5/3A	VHP48 1.5/3A	VHP48 5/10A	VHP48 5/10A
Motion controller	-	UltimET					
Rated payload	kg (lbs)	-	-	-	-	0.15 (0.33)	1 (2.2)
Rated inertia	kg.m²	-	-	-	-	-	7.74E-03
Rated acceleration	m/s² (in/s²) or rad/s²	25 (984.2)	25 (984.2)	1 (0.04)	-	-	55
Rated speed	m/s (in/s) or rad/s	1 (39.36)	1 (39.36)	0.05 (0.002)	-	0.1 (0.04)	10 (95.5 rpm)
Tool point position	mm	52 mm centered above ZT3H chuck interface					
Ambient temperature	°C	22 ±1					
Isolation system	-	QuiET					

DIMENSIONAL DATA (1)	UNIT						
Stage width	mm (in)	753 (29.64)					
Stage length	mm (in)	916 (36.06)					
Stage height	mm (in)	244.5 (9.62)					
Total stroke	mm (in)	365 (14.37)	355 (13.97)	±2 (±0.078)	±0.1°	15 (0.59)	364°
Moving mass (without rated payload)	kg (lbs)	26 (57.32)	13.5 (29.76)	3.8 (8.37)	-	0.4 (0.88)	-
Total mass (without payload)	kg (lbs)	91 (200.62)					
Rotor inertia (without payload)	kg.m²	-	-	-	0.013	-	0.0024

FORCE / TORQUE CAPABILITIES	UNIT						
Fp/Tp Peak force / torque	N or Nm	1800	519	189.6	8.91	18.1	2.89
Fc/Tc Continuous force / torque	N or Nm	380	122	30	1.41	6.2	0.504
Fs/Ts Stall force / torque	N or Nm	286	92.7	30	1.41	6.2	0.337
Fd/Td Max. detent force / torque (average to peak)	N or Nm	24	7.2	-	-	-	-
Static friction (maximal value)	N or Nm	15	12	-	-	3	0.25
Dynamic friction (maximal value)	N/(m/s) or Nm/(rad/s)	34	45	-	-	-	0.03

LOAD CAPACITIES	UNIT	
Maximum payload	kg (lbs)	2 (4.4)
Maximum inertia	kg.m²	0.035

DYNAMIC PERFORMANCE	UNIT						
Maximum acceleration	m/s² (in/s²) or rad/s²	25 (984.2)	25 (984.2)	-	-	-	55
Maximum speed	m/s (in/s) or rad/s	1.5 (59)	1.5 (59)	-	-	-	10 (95.5 rpm)
Typical position stability	nm or arcsec	±0.6	±0.7	±1.9	±0.0043	-	±0.0038
Typical speed stability (tracking error at 10% of rated speed)	nm or arcsec	1300	1000	-	-	-	2

STAGE ACCURACY (2)	UNIT						
Positioning accuracy (with mapping)	µm or arcsec	±0.8		±0.020	-	-	±0.75
Bidirectional repeatability (3)	µm or arcsec	±0.35		±0.010	-	-	±0.35
Horizontal straightness / radial runout	µm	-	-	-	-	-	±1
Vertical straightness / total axial error	µm	-	-	-	-	-	±1
XY displacement while moving in Z	µm	-	-	±0.7	-	±1.05	-
Roll	arcsec	±20	±20	±0.5	-	-	-
Pitch	arcsec	±20	±20	±0.5	-	-	-
Yaw	arcsec	±1.5	±14.5	±0.5	-	-	-

ENCODER CHARACTERISTICS	UNIT					
Encoder and signal type	-	Optical / sin-cos	Optical / sin-cos	Optical / sin-cos	Inductive / analog	Optical / sin-cos
Output signal	-	1 Vpp	1 Vpp	1 Vpp	0-10 VDC	1 Vpp
Signal period or line count	µm or period/turn	4	4	0.512	-	360'000
Reference mark	-	one (center of stroke)	one (center of stroke)	one (center of Z stroke)	-	No
Power supply	V	5	5	5	15-30	5

WORKING ENVIRONMENT	
Clean room compatibility (4)	ISO 1

TYPICAL MOVE AND SETTLE TIMES	UNIT						
Move 1: 10µm within ±100 nm	ms	50	50	-	-	-	-
Move 2: 25 mm within ±100 nm	ms	140	140	-	-	-	-
Move 3: 80 mm within ±100 nm	ms	170	170	-	-	-	-
Move 4: 100µm within ±30 nm	ms	-	-	45	-	-	-
Move 5: 1 mm within ±30 nm	ms	-	-	90	-	-	-
Move 6: 15 mm	ms	-	-	-	-	250	-
Move 1: 90° within ±20 µ°	ms	-	-	-	-	-	360
Move 2: 180° within ±20 µ°	ms	-	-	-	-	-	525
Move 3: 360° within ±20 µ°	ms	-	-	-	-	-	850

ELECTRICAL SPECIFICATIONS		UNIT	Y1-Y2	X	Fine Z	Tip-Tilt	Coarse Z	Theta
	Motor type	-	Ironcore	Ironcore	Electro-magnet		Electro-magnet	Toothless
	Motor model	-	LMG10-050-3UA-H01	LMG10-030-3QB-H01	EMF-050-1LA		EMG016.-054-1NA-209	TTB0120-15-3NA
	Number of phases	-	3	3	4x monophase		1	3
Kt	Force constant (5)	N/Arms or Nm/Arms	35.4	26.6	16.9		12.1	0.693
Ku	Back EMF constant (5)(6)	Vrms/(m/s) or Vrms/(rad/s)	21.4	16.2	16.9		12.6	0.41
R20	Electrical resistance at 20°C (6)	Ohm	1.46	1.68	9.55		10.6	9.06
L1	Electrical inductance (6)	mH	8.54	9.10	21.3		43.3	2.49
Ip	Peak current (5)	Arms or A_{DC}	39.2	31.1	3		1.5	4.24
Ic	Continuous current (5)	Arms or A_{DC}	5.54	4.70	0.45		0.5	0.841
Is	Stall current (5)	Arms or A_{DC}	4.20	3.56	-		-	0.595
vs/ns	Stall speed	m/s or rad/s	350 E-6	420 E-6	-		-	0.0029 (0.028 rpm)
Udc	Nominal input voltage	VDC	96	96	48		48	48
Pc	Max. cont. power dissipation	W	96.5	79.6	2		3	10.4
2τp	Magnetic period	mm	32	32	-		-	-
2p	Number of poles	-	-	-	-		-	20

VACUUM CHARACTERISTICS		UNIT						
Vacuum supply for wafer chuck								
V_c	Vacuum at interface output	bar	-0.6					
Vacuum supply for axis cleanliness								
Fv_c	Vacuum flow	l/min	5	5	-	-	5	5

GUIDING ELEMENTS							
Type	Recirculating bearings (3x)	Recirculating bearings (2x)	Flexure	Flexure	Plain bearing	Rotary bearing (2x)
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MATERIAL AND FINISH						
Baseplate	Stainless steel	-	-	-	-	-
Carriage	-	Anodized aluminum (7)	Anodized aluminum (7)		Anodized aluminum	Stainless steel

According to the Machinery Directive 2006/42/EC, the system presently described falls into the "partly completed machinery" category and fully complies with it as long as the system is operated according to the working conditions described in the corresponding manual. Customer is responsible for setting safeties/limitations that will keep the system in its safe operating area. ETEL cannot be held responsible if the system is used in an improper way.

Notes: The specifications given may be mutually exclusive. Hypothesis, tolerances and definition are in ETEL systems documentation.
(1) With bumpers compressed (except for total stroke) and without any additional customer part attached to the mobile interface.
(2) Values given at 3 sigmas.
(3) Repeatability measured with 10 m/s² acceleration.
(4) Under laminar flow conditions at 0.25 m/s along Y axis. Measured 12 mm above customer mobile interface. Contact ETEL for more details.
(5) Monophase motor have DC values rather than rms values.
(6) Terminal to terminal.
(7) Contact ETEL if you consider mounting payload on this axis.

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