



XYZ3T STACKED SYSTEM

ASME-NNNN-07-0365-0355xx

CHARON2HD XYZ3TM⁺ with AccurET VHP

Data sheet

Version 1.0

ETEL

AXIS DESIGNATION						
Number of controlled axes	7					
Axes name	X (bottom axis)	Y (top axis)	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	-		VHP 100 (10/30A)		VHP 48 (5/10A)		VHP 100 (7/15A)	
Motion controller	-		UltimET					
Rated payload	kg		-	-	-	-	0,15	2
Rated inertia	kg.m ²		-	-	-	-	-	0,018
Rated input voltage	VDC		96		48		96	
Tool point position	mm		270 above bottom surface					
Ambient temperature	°C		22 ± 1					
Isolation system	-		QuiET					

DIMENSIONAL DATA		UNIT						
Width	mm		730					
Length	mm		855					
Height	mm		250					
Total stroke	mm or °		365	355	±2	±0.08	12	364°
Moving mass (without payload)	kg		35,6	16,4	5	-	0,6	3
Total mass (without payload)	kg		60					
Rotor inertia (without payload)	kg.m ²		-	-	-	-	-	0,004

FORCE / TORQUE CAPABILITIES (1)		UNIT						
Peak force / torque	N or Nm		991	681	65,3	-	34,4	7,36
Continuous force / torque	N or Nm		360	193	15,7	-	11,3	0,831
Standstill force / torque	N or Nm		272	145	-	-	-	0,669
Max. detent force / torque (average to peak)	N or Nm		26	16	-	-	-	0
Static friction (maximal value)	N or Nm		25	25	-	-	5	0,2
Dynamic friction (maximal value)	N/(m/s) or Nm/(rad/s)		25	25	-	-	3	0,2

LOAD CAPACITIES		UNIT						
Maximum payload	kg		2					

DYNAMIC PERFORMANCE		UNIT						
Duty cycle	%		20	35	-	-	70	6
Maximum speed	m/s or rad/s		1,25	1,25	0,1	-	0,25	10
Maximum acceleration	m/s ² or rad/s ²		20	20	3	-	8	180
Typical position stability at 2 kHz	nm or arcsec		±2	±2	±3	-	±100	±0.025

ACCURACY		UNIT						
Positioning accuracy (without mapping)	µm		±20		-	-	-	-
Positioning accuracy (with mapping)	µm		±1		-	-	-	-
Unidirectional repeatability	µm		-	-	-	-	±10 ⁽²⁾ / ±5 ⁽³⁾	-
Bidirectional repeatability	µm or arcsec		±0.4		±0.03	-	±15 ⁽²⁾ / ±7.5 ⁽³⁾	±2
Horizontal straightness / radial runout	µm		±3	±3.5	-	-	-	±3.5
Vertical straightness / total axial error at tool point	µm		±2.5	±5	-	-	-	±3
XY displacement while moving in Z (4)	µm		-	-	±0.1	-	±15	-
Orthogonality	arcsec		±15		-	-	-	-
Roll	arcsec		±5	±10	-	-	-	-
Pitch	arcsec		±5	±25	-	-	-	-
Yaw	arcsec		±10	±10	-	-	-	-

ELECTRICAL SPECIFICATIONS (1)		UNIT	X (bottom axis)	Y (top axis)	Fine Z	Tip-Tilt	Coarse Z	Theta
Motor type	-		Ironcore	Ironcore	Electro-Magnet	Electro-Magnet	Ironless	
Motor model	-		LMS15-050-3TC	LMG10-050-3TB	EMF-14.5-058-1NA-219	EMG012-.075	SLICE0109-015	
Number of phases	-		3	3	3 x single-phase	1	3	
Kt Force constant	N/Arms or Nm/Arms		45,4	26,8	19,6	10,7	0,646	
Ku Back EMF constant (5)	Vrms/(m/s) or Vrms/(rad/s)		27,1	16,3	19,6	10,9	0,372	
Km Motor constant	Nm/√W		45,5	28,2	8,34	6,11	0,309	
R20 Electrical resistance at 20°C (5)	Ohm		0,663	0,605	5,5	3,06	2,92	
L1 Electrical inductance (5)	mH		6,74	3,77	13,5	8,97	5,52	
Ip Peak current	Arms		30	30	3,38	3,49	11,8	
Ic Continuous current	Arms		8,14	7,33	0,8	1,05	1,33	
Is Standstill current	Arms		6,17	5,55	-	-	1,01	
ns Standstill speed	mm/s		0,15	0,16	-	-	-	
Um Max. input voltage	VDC		100	100	48	100	100	
Pc Max. cont. power dissipation	W		74	56,3	3,88	3,93	8,75	
2τp Magnetic period	mm		32	32	-	-	-	
2p Number of poles	-		-	-	-	-	32	

VACUUM CHARACTERISTICS		UNIT						
Vacuum supply for wafer chuck								
Vacuum at interface output	bar		-0,6					
Vacuum supply for axis cleanliness								
Vacuum flow	l/min		10	6	-	5	5	

ENCODER CHARACTERISTICS		UNIT					
Encoder and signal type	-		Optical - incremental	Optical - incremental	Optical - absolute	Optical - incremental	
Output signal	-		1 Vpp	1 Vpp	1 Vpp	EnDat 2.2	1 Vpp
Signal period or line count	μm or period/turn		4	4	4	10	18'000
Reference mark	-		One	One	One centered in Z	Absolute	One
Power supply	V		5	5	5	5	5

WORKING ENVIRONMENT		UNIT						
Clean room compatibility (6)	-		ISO 2					

TYPICAL MOVE AND SETTLE TIMES		UNIT						
Move 1: 10 μm within ±100 nm window	ms		40	-	-	-	-	
Move 2: 25 mm within ±100 nm window	ms		135	-	-	-	-	
Move 3: 80 mm within ±100 nm window	ms		190	-	-	-	-	
Move 4: 100 μm within ±30 nm window	ms		-	-	60	-	-	
Move 5: 1 mm within ±30 nm window	ms		-	-	100	-	-	
Move 6: 1 deg within ±40 μdeg	ms		-	-	-	-	70	
Move 7: 180 deg within ±40 μdeg	ms		-	-	-	-	450	
Move 8: 10 mm within ±500 nm	ms		-	-	-	-	180	

GUIDING ELEMENTS		UNIT						
Type	-		Ball bearing	Ball bearing	Flexures	Ball bearing	Ball bearing	

MATERIAL AND FINISH		UNIT						
Baseplate	-		Anodized aluminum	Aluminium & silicon alloy	Anodized aluminum	-	Stainless steel	
Carriage	-		Aluminium & silicon alloy	Anodized aluminum	Anodized aluminum	Stainless steel	Stainless steel	

OPTIONS / ACCESSORIES / FEATURES		UNIT						
Temperature sensors	-		Yes	No	No	No	No	No
Gravity compensation	-		-	-	Yes	-	Yes	-

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 motor 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. Unless stated otherwise, all measurements are made within the testing conditions.

- (1) Tolerances on electrical parameters are available on request.
- (2) Measured at a radius of 150 mm.
- (3) Measured at a radius of 150 mm other a limited stroke of 0 to + 3 mm.
- (4) Maximum displacement measured over a 100 μm sliding window, wherever the position on the fine Z stroke.
- (5) Terminal to terminal.
- (6) Under vertical laminar flow conditions at 0.5 m/s. Measured at tool point level. Contact ETEL for more details.

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