



# CHARON2 XYZ3<sup>TM</sup> with AccurET VHP

Data Sheet

AXIS DESIGNATION					
Number of controlled axes	6				
Axes name	X (bottom axis)	Y (top axis)	Fine Z	Tip-Tilt	Theta
Thrust transmitter: DD (direct drive) or ID (indirect drive)	DD	DD	DD	DD	DD

TESTING CONDITIONS			UNIT		
Position controller	-	VHP 100 10/30 Arms	VHP 48 5/10 Arms	VHP 100 7/15 Arms	
Motion controller	-	UltimET			
Rated payload (1)	kg	2			
Rated inertia (1)	kg.m <sup>2</sup>	-	-	-	0.018
Rated input voltage	VDC	96	96	48	96
Tool point position	mm	275 above bottom surface			
Ambient temperature	°C	22 ±1			
Isolation system	-	QuiET			

DIMENSIONAL DATA		UNIT				
Width	mm	766				
Length	mm	846				
Height	mm	230				
Total stroke	mm or °	365	355	±2	±0.08	Infinite
Moving mass (without payload)	kg	25	13	4.2	-	-
Total mass (without payload)	kg	51				
Rotor inertia (without payload)	kg.m <sup>2</sup>	-	-	-	-	0.004

FORCE / TORQUE CAPABILITIES (2)		UNIT				
Peak force / torque	N or Nm	512	298	65.3	-	7.87
Continuous force / torque	N or Nm	130	54.3	15.7	-	1.74
Standstill force / torque	N or Nm	98	40.9	-	-	1.32
Max. detent force / torque (average to peak)	N or Nm	7.1	7.9	-	-	0
Static friction (maximal value)	N or Nm	22	22	-	-	1
Dynamic friction (maximal value)	N/(m/s) or Nm/(rad/s)	60	60	-	-	0.03

LOAD CAPACITIES		UNIT				
Maximum payload	kg	2				

DYNAMIC PERFORMANCE		UNIT				
Duty cycle	%	20	20	-	-	10
Maximum speed	m/s or rad/s	1	1	0.1	-	30
Maximum acceleration	m/s <sup>2</sup> or rad/s <sup>2</sup>	10	10	3	-	180
Typical position stability at 2kHz	nm or arcsec	±2	±2	±3	-	±0.02

ACCURACY		UNIT				
Positioning accuracy (without mapping)	µm or arcsec	±20		-	-	-
Positioning accuracy (with mapping)	µm or arcsec	±1		-	-	-
Bidirectional repeatability	µm or arcsec	±0.4		±0.03	-	±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	µm	-		±0.1	-	-
Orthogonality	arcsec	±15		-	-	-
Roll	arcsec	±5	±10	-	-	-
Pitch	arcsec	±5	±15	-	-	-
Yaw	arcsec	±10	±10	-	-	-

WORKING ENVIRONMENT		UNIT				
Clean room compatibility (3)		ISO 2				

ELECTRICAL SPECIFICATIONS (2)		UNIT	X (bottom axis)	Y (top axis)	Fine Z	Tip-Tilt	Theta
	Motor type	-	Ironcore	Ironcore	Electro-magnet		Toothless
	Motor model	-	LMG10-030-3QB-H01	LMG-05-030-3RA-H01	EMF-14.5-058-1NA-219		TTB0126-030-3NA
	Number of phases	-	3	3	3x single phase		3
<b>Kt</b>	Force constant	N/Arms or Nm/Arms or N/A <sub>DC</sub>	26.6	24.6	19.6		1.23
<b>Ku</b>	Back EMF constant (4)	V <sub>rms</sub> /(m/s) or V <sub>rms</sub> /(rad/s) or V <sub>DC</sub> /(m/s)	16.2	14.9	19.6		0.71
<b>Km</b>	Motor constant	Nm/√W	16.8	13.2	8.34		-
<b>R20</b>	Electrical resistance at 20 °C (4)	Ohm	1.68	2.31	5.50		10.50
<b>L1</b>	Electrical inductance (4)	mH	9.02	10.8	13.50		2.65
<b>I<sub>p</sub></b>	Peak current	Arms or A <sub>DC</sub>	30.0	19.9	3.38		6.90
<b>I<sub>c</sub></b>	Continuous current	Arms or A <sub>DC</sub>	5.00	2.26	0.80		1.47
<b>I<sub>s</sub></b>	Standstill current	Arms or A <sub>DC</sub>	3.79	1.71	-		1.11
<b>n<sub>s</sub></b>	Standstill speed	mm/s or rad/s	0.22	0.2	-		0.0016
<b>U<sub>m</sub></b>	Max. input voltage	VDC	100	100	48		100
<b>P<sub>c</sub></b>	Max. cont. power dissipation	W	77.6	20.4	3.88		41.9
<b>2τ<sub>p</sub></b>	Magnetic period	mm	32	32	-		-
<b>2p</b>	Number of poles	-	-	-	-		28

ENCODER CHARACTERISTICS		UNIT				
	Encoder and signal type	-	Optical Incremental	Optical Incremental	Optical Incremental	Optical Incremental
	Output signal	-	1 Vpp	1 Vpp	1 Vpp	1 Vpp
	Signal period or line count	µm or period/turn	4	4	4	18000
	Reference mark	-	One	One	One centered in Z	One
	Power supply	V	5	5	5	5

TYPICAL MOVE AND SETTLE TIMES		UNIT				
	Move 1: 10 µm within ±100 nm window	ms	50	-	-	-
	Move 2: 25 mm within ±100 nm window	ms	170	-	-	-
	Move 3: 80 mm within ±100 nm window	ms	250	-	-	-
	Move 4: 100 µm within ±30 nm window	ms	-	-	60	-
	Move 5: 1 mm within ±30 nm window	ms	-	-	100	-
	Move 6: 90 deg within ±40 µdeg	ms	-	-	-	360
	Move 7: 180 deg within ±40 µdeg	ms	-	-	-	525
	Move 8: 360 deg within ±40 µdeg	ms	-	-	-	850

GUIDING ELEMENTS					
	Type	Ball bearing	Ball bearing	Flexures	Crossed roller bearing

MATERIAL AND FINISH					
	Baseplate	Granite	Aluminium & Silicon Alloy	Anodized aluminium	-
	Carriage	Aluminium & Silicon Alloy	Stainless steel	Anodized aluminium	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 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) Payload can be assimilated to a cylinder of diameter 270 mm, 19 mm thick, weighting 2 kg. Inertia is expressed with respect to the center of gravity of the payload, Z being the axis of rotation.
- (2) Tolerances on electrical parameters are available on request.
- (3) Under laminar flow conditions at 0.25 m/s along Y axis. Measured at 230 mm from the bottom surface of the stage. Contact ETEL for more details.
- (4) Terminal to terminal.