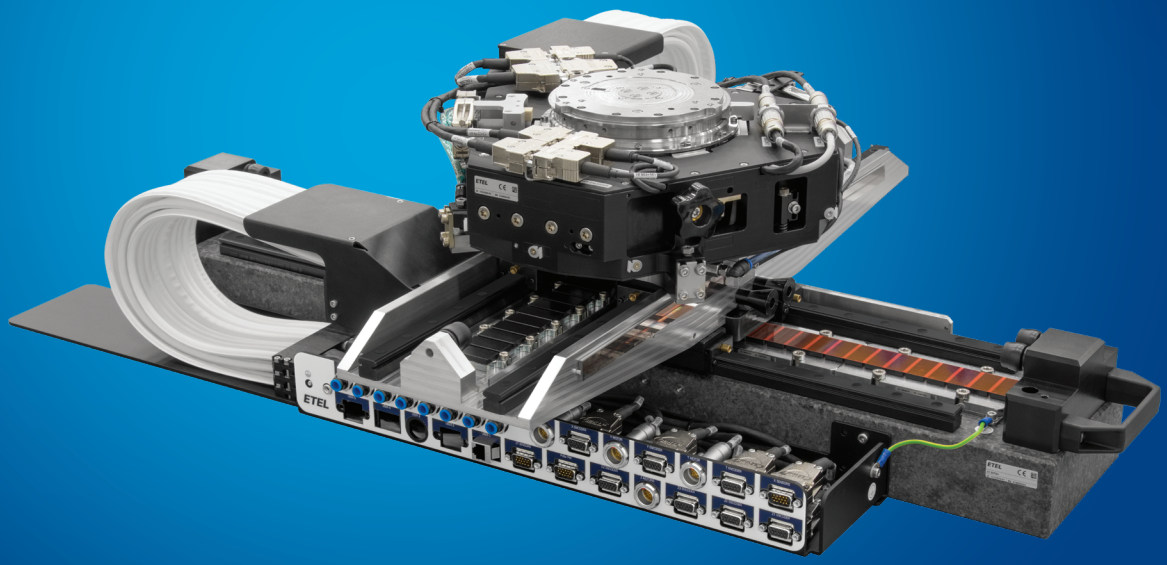

XYZ3TM+ STACKED SYSTEM

ASME-NNNN-07-0475-0410xx

CHARON2 XYZ3TM+ with ACCURET VHP

Data sheet

Version 1.1

ETEL

AXIS DESIGNATION							
Number of controlled axes		7					
Axes name		X	Y	Fine Z	Tip-Tilt	Theta	Coarse Z
Thrust transmitter: DD (direct drive) or ID (indirect drive)		DD	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	kg	2					0.25
Rated inertia	$kg.m^2$	-	-	-	-	0.018	-
Rated input voltage	VDC	96	96	48	48	96	96
Tool point position	mm	270 mm above bottom surface					
Ambient temperature	°C	22 ± 1					
Isolation system	-	QUIET					

DIMENSIONAL DATA	UNIT						
Width	mm	808					
Length	mm	952					
Height	mm	250					
Total stroke	mm or °	475	410	±2	±0.08°	364°	12
Moving mass (without payload)	kg	27.4	14.8	5	-	3	0.6
Total mass (without payload)	kg	59.6					
Rotor inertia (without payload)	$kg.m^2$	-	-	-	-	0.004	-

FORCE / TORQUE CAPABILITIES (1)	UNIT						
Peak force / torque	N or Nm	512	298	65.3	-	7.36	34.4
Continuous force / torque	N or Nm	130	54.3	15.7	-	0.831	11.3
Standstill force / torque	N or Nm	98	40.9	-	-	0.669	-
Max. detent force / torque (average to peak)	N or Nm	7.1	7.9	-	-	0	-
Static friction (maximal value)	N or Nm	22	22	-	-	0.2	5
Dynamic friction (maximal value)	N/(m/s) or Nm/(rad/s)	22	22	-	-	0.2	3

LOAD CAPACITIES	UNIT						
Maximum axial load	N	-	-	-	-	25	4

DYNAMIC PERFORMANCE	UNIT						
Duty cycle	%	18	17	-	-	6	70
Maximum speed	m/s or rad/s	1	1	0.1	-	10	0.25
Maximum acceleration	m/s^2 or rad/s^2	10	10	3	-	180	8
Typical position stability at 2kHz	nm or arcsec	±2	±2	±3	-	±0.025	±50

ACCURACY	UNIT						
Positioning accuracy (without mapping)	µm or arcsec	±20	±20	-	-	±30	-
Positioning accuracy (with mapping)	µm	±1	±1	-	-	-	-
Unidirectional repeatability	µm	-	-	-	-	-	±10(2) / ±5(3)
Bidirectional repeatability	µm or arcsec	±0.4	±0.4	±0.03	-	±2	±15(2) / ±7.5(3)
Horizontal straightness / radial runout	µm or arcsec	±3	±3.5	-	-	±3.5	-
Vertical straightness / total axial error at tool point	µm or arcsec	±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	±15	-	-	-	-
Yaw	arcsec	±10	±10	-	-	-	-

WORKING ENVIRONMENT	
Clean room compatibility (5)	ISO2

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

ELECTRICAL SPECIFICATIONS (1)		UNIT						
	Motor type	-	Ironcore	Ironcore	Electro-Magnet		Ironless	Electro-Magnet
	Motor model	-	LMG10-030-3QB	LMG05-030-3RA	EMF-14.5-058-1NA-219		SLICE0109-015	EMG012.-075
	Number of phases	-	3	3	3 x single-phase		3	1
Kt	Force constant	N/Arms or Nm/Arms or N/A_{DC}	26.6	24.6	19.6		0.646	10.7
Ku	Back EMF constant (6)	Vrms/(m/s) or Vrms/(rad/s) or VDC/(m/s)	16.2	14.9	19.6		0.372	10.9
Km	Motor constant	Nm/√W	16.8	13.2	8.34		0.309	6.11
R20	Electrical resistance at 20°C (6)	Ohm	1.68	2.31	5.5		2.92	3.06
L1	Electrical inductance (6)	mH	9.02	10.8	13.5		5.52	8.97
Ip	Peak current	Arms or A_{DC}	30	19.9	3.38		11.8	3.49
Ic	Continuous current	Arms or A_{DC}	5.00	2.26	0.8		1.33	1.05
Is	Standstill current	Arms or A_{DC}	3.79	1.71	-		1.01	-
ns	Standstill speed	m/s or rad/s	0.22	0.2	-		-	-
Um	Max. input voltage	VDC	100	100	48		100	100
Pc	Max. cont. power dissipation	W	77.6	20.4	3.88		8.75	3.93
2τp	Magnetic period	mm	32	32	-		-	-
2p	Number of poles	-	-	-	-		32	-

VACUUM CHARACTERISTICS (7)	UNIT						
Vacuum supply for wafer chuck : vacuum at interface output	bar	-	-	-0.6			
Vacuum supply for axis cleanliness : vacuum flow	l/min	20	20	-	-	5	5

TYPICAL MOVE AND SETTLE TIMES	UNIT						
Move 1: 10µm within ±100 nm	ms	50		-	-	-	-
Move 2: 25mm within ±100 nm	ms	170		-	-	-	-
Move 3: 80mm within ±100 nm	ms	250		-	-	-	-
Move 4: 100µm within ±50 nm	ms	-	-	60	-	-	-
Move 6: 1mm within ±50 nm	ms	-	-	100	-	-	-
Move 7: 10mm within ±500 nm	ms	-	-	-	-	-	180
Move 8: 1° within ±40 µdeg	ms	-	-	-	-	70	-
Move 9: 180° within ±40 µdeg	ms	-	-	-	-	450	-

GUIDING ELEMENTS						
Type	Ball bearing	Ball bearing	Flexures		Ball bearing	Ball bearing

MATERIAL AND FINISH						
Baseplate	Granite	Aluminium	Anodized aluminum		-	Stainless steel
Carriage	Aluminium	Stainless steel	Anodized aluminum		Stainless steel	Stainless steel

OPTIONS / ACCESSORIES / FEATURES	UNIT						
Gravity compensation	N	-	-	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 over full stroke.
(3) Measured at a radius of 150 mm over a limited stroke of 0 to + 3 mm.
(4) Maximum displacement measured on a 100 µm sliding window, wherever the position on the fine Z stroke.
(5) Measured at the chuck interface level under horizontal laminar flow at 0.4m/s without activating the Theta hard-stop.
(6) Terminal to terminal.
(7) Clean dry air : maximum size of particule 1 µm, maximum condensing point +3 °C, maximum concentration of oil 0.1 mg/m3.