



# XYZT PLANAR PLATFORM

**ASAI-YGNN-06-0320-0320xx**

**Metis**

Data sheet

Version 1.2



## AXIS DESIGNATION

Number of controlled axes	6				
Axes name	Y1, Y2	X	Fine Z	Coarse Z	Theta
Thrust transmitter: DD (direct drive) or ID (indirect drive)	DD	DD	DD	ID	DD

## DIMENSIONAL DATA

	UNIT	VALUES				
Stage width	mm (in)	775 (30.5)				
Stage length	mm (in)	911.5 (35.8)				
Stage height	mm (in)	529 (20.8) (with coarse Z down and fine Z centered)				
Total stroke (1)	mm (in)	320±1 (12.6)	320±1 (12.6)	4 (0.16)	12 (0.47)	Infinite
Moving mass (with rated payload)	kg (lbs)	25 (55.1)	15 (33)	6.3 (13.8)	1.7 (3.7)	-
Total mass (with rated payload)	kg (lbs)	625 (1377.8)				
Rotor inertia (with rated payload)	kg.m <sup>2</sup>	-	-	-	-	0.012

## FORCE / TORQUE CAPABILITIES (2)

	UNIT	VALUES				
F <sub>p</sub> /T <sub>p</sub> Peak force / torque	N or Nm	300 * 2	300	94.5 (31.52*3)	132	3.32
F <sub>c</sub> /T <sub>c</sub> Continuous force / torque (3)	N or Nm	55.9 * 2	55.9	24.4 (8.15*3)	-	1.22

## LOAD CAPACITIES (4)

	UNIT	VALUES				
Rated payload	kg (lbs)	1 (2.2)				
Rated inertia	kg.m <sup>2</sup>	-	-	-	-	0.007

## DYNAMIC PERFORMANCE

	UNIT	VALUES				
Maximum speed	m/s (in/s) or rad/s	1.2 (47.24)	1.2 (47.24)	0.1 (3.93)	0.02 (0.78)	15.7
Maximum acceleration (5)(6)	m/s <sup>2</sup> (in/s <sup>2</sup> ) or rad/s <sup>2</sup>	12 (472.44)	12 (472.44)	2 (78.74)	1 (39.37)	104.7
Typical position stability (7)	nm or arcsec	±25	±25	±15	-	±0.2

## STAGE ACCURACY (8)(9)

	UNIT	VALUES				
Positioning accuracy full stroke (indicative value)	µm or arcsec	±10	±10	-	-	±30
Positioning accuracy full stroke w/ calibration	µm or arcsec	±1 (indicative value, depends on mapping tool)		±0.6	-	±3
Unidirectional repeatability	µm or arcsec	-	-	-	±0.25 (top position)	±1
Bidirectional repeatability (10)	µm or arcsec	±0.4	±0.4	±0.3	-	±2
Horizontal straightness / radial runout	µm	±1.5	±2	±1.8	-	±1.5
Vertical straightness / total axial error (at rot. center)	µm	±2	±2	-	-	±1.5
Tilt	arcsec	-	-	±5	-	-

## ENCODER CHARACTERISTICS

	UNIT	VALUES				
Encoder type	-	Optical	Optical	Optical	Inductive	Optical
Output signal	-	1 Vpp	1 Vpp	1 Vpp	TTL	1 Vpp
Signal period / number of lines	µm or period/turn	4	4	4	18.8	18'000
Reference mark	-	One	One	One	One	One

## WORKING ENVIRONMENT

Clean room compatibility	Down to ISO 2 at the wafer level (application dependent)				
Maximum ambient temperature	32 °C				

ELECTRICAL SPECIFICATIONS (2)		UNIT					
Motor type	-		Ironless (per axis)	Ironless	3 moving coils (values given per motor)	Stepper	Toothless
<b>Kt</b> Force constant	N/Arms or Nm/Arms		19.4	19.4	10.72	-	0.704
<b>Ku</b> Back EMF constant (11)	Vrms/(m/s) or Vrms/(rad/s)		11.2	11.2	10.73	-	0.407
<b>R20</b> Electrical resistance at 20°C (11)	Ohm		2.57	2.57	3.3	1.56	9.06
<b>L1</b> Electrical inductance (11)	mH		1.59	1.59	6.4	1.9	2.49
<b>Ip</b> Peak current	Arms		16.2	16.2	3	1.5	3.77
<b>Ic</b> Continuous current (3)	Arms		3.8	3.8	0.8	-	1.3
<b>Udc</b> Nominal input voltage	VDC		96	96	48	48	48
<b>Pc</b> Max. cont. power dissipation (3)	W		35	35	2	7	12
<b>2τp</b> Magnetic period	mm		32	32	-	-	-
<b>2p</b> Number of poles	-		-	-	-	100	20
Number of phases	-		3	3	1	2	3

FEATURES		UNIT					
Air pad bearing (12)							
<b>V<sub>b</sub></b> Vacuum preload	bars		-0.12 (nominal value)				
<b>F<sub>v<sub>b</sub></sub></b> Vacuum flow	l/min		10 (required)				
<b>P<sub>b</sub></b> Pressure	bars		2.5 (nominal value)				
<b>F<sub>p<sub>b</sub></sub></b> Pressure flow	l/min		10 (required)				
Vacuum feedthrough to wafer chuck (in ZT box)							
<b>V<sub>c</sub></b> Vacuum	bars		-0.6 (indicative value, measured at ZT box directly)				
<b>F<sub>v<sub>c</sub></sub></b> Vacuum flow	l/min		10 (required)				
Gravity compensation	-		-	-	Calibrated for rated payload	-	-

TYPICAL MOVE AND SETTLE TIMES (8)(13)					
Move 1	10 μm in 60 ms within ±100 nm	1 μm in 40 ms within ±30 nm	-	1° in 100 ms within ±60 μdeg	
Move 2	1 mm in 120 ms within ±100 nm	100 μm in 100 ms within ±30 nm	-	10° in 200 ms within ±60 μdeg	
Move 3	20 mm in 200 ms within ±100 nm	1 mm in 200 ms within ±30 nm	-	180° in 700 ms within ±60 μdeg	
Move 4	100 mm in 300 ms within ±100 nm	-	-	-	
Move 5	300 mm in 550 ms within ±100 nm	-	-	-	

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 'Integration 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.

- (1) Standard stroke. Custom stroke on request.
- (2) Hypothesis and tolerances are in ETEL's Handbook.
- (3) Coils at 80 °C for X and Y axes, 30 °C for Z axis and 40 °C for T axis.
- (4) Indicative load capacity with a payload centered on the carriage. Please contact ETEL for any other case.
- (5) Recommended value. Please contact ETEL for any other case.
- (6) Limited by ZT box.
- (7) Measured at encoders level with ETEL AccurET VHP controllers and with active isolation system.
- (8) Values given at 3 sigmas. Specifications measured on a precision mounting surface (typical flatness 10 μm), uniformly supported over its full length with vibration insulation. Specifications measured with ETEL's electronics at an ambient temperature of 22°C±1°C.
- (9) Tool point location: at ZT box interface (Z:253.3 mm from the granite base).
- (10) X and Y repeatability measured in 1D direction after temperature stabilization. The stage executes 320 mm rows with 20 mm steps 3 times back-and-forth.
- (11) Terminal to terminal.
- (12) Clean dry air : maximum size of particule 1μm, maximum condensing point +3°C, maximum concentration of oil 0.1 mg/m3.
- (13) Measured at encoders level with ETEL AccurET 300 controllers for Y1, Y2, X, T axes and AccurET VHP48 for fine Z axis.