

| AXIS DESIGNATION | | | |
|--|-----------------|--------------|-------|
| Number of controlled axes | 3 | | |
| Axes name | X (bottom axis) | Y (top axis) | Theta |
| Thrust transmitter: DD (direct drive) or ID (indirect drive) | DD | DD | DD |

| TESTING CONDITIONS | UNIT | | | |
|---------------------|-------------------|-----------------------------|--------------------|-------------------|
| Position controller | - | VHP 100 10/30 Arms | VHP 100 10/30 Arms | VHP 100 7/15 Arms |
| Motion controller | - | UltimET | | |
| Rated payload (1) | kg | 2 | | |
| Rated inertia (1) | kg.m ² | - | - | 0.018 |
| Rated input voltage | VDC | 96 | 96 | 96 |
| Tool point position | mm | 247 mm above bottom surface | | |
| Ambient temperature | °C | 22 ±1 | | |
| Isolation system | - | QuiET | | |

| DIMENSIONAL DATA | UNIT | | | |
|---------------------------------|-------------------|------|-----|----------|
| Stage width | mm | 772 | | |
| Stage length | mm | 958 | | |
| Stage height | mm | 227 | | |
| Total stroke | mm | 475 | 410 | Infinite |
| Moving mass (without payload) | kg | 22.2 | 9.6 | - |
| Total mass (without payload) | kg | 54.5 | | |
| Rotor inertia (without payload) | kg.m ² | - | - | 0.004 |

| FORCE / TORQUE CAPABILITIES (2) | UNIT | | | |
|--|-----------------------|-----|------|------|
| Peak force / torque | N or Nm | 512 | 298 | 7.87 |
| Continuous force / torque | N or Nm | 130 | 54.3 | 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) | 22 | 22 | 0.03 |

| LOAD CAPACITIES | UNIT | | | |
|-----------------|------|----|--|--|
| Maximum payload | kg | 30 | | |

| DYNAMIC PERFORMANCE | UNIT | | | |
|-------------------------------------|--|----|----|-------|
| Duty cycle | % | 25 | 25 | 10 |
| Maximum speed | m/s or rad/s (rpm) | 1 | 1 | 30 |
| Maximum acceleration | m/s ² or rad/s ² | 10 | 10 | 180 |
| Typical position stability at 2 kHz | nm or arcsec | ±2 | ±2 | ±0.02 |

| ACCURACY | UNIT | | | |
|--|--------------|------|------|------|
| Positioning accuracy (without mapping) | µm or arcsec | ±20 | | ±30 |
| Positioning accuracy (with mapping) | µm or arcsec | ±1 | | ±3 |
| Unidirectional repeatability | µm or arcsec | - | | ±1 |
| Bidirectional repeatability | µm or arcsec | ±0.4 | | ±2 |
| Horizontal straightness / radial runout | µm | ±3 | ±3.5 | ±3.5 |
| Vertical straightness / total axial error at R = 42.5 mm | µm | ±2.5 | ±5 | ±3 |
| Orthogonality | arcsec | ±15 | | - |
| Roll | arcsec | ±5 | ±10 | - |
| Pitch | arcsec | ±5 | ±15 | - |
| Yaw | arcsec | ±10 | ±10 | - |

| WORKING ENVIRONMENT | | | |
|------------------------------|-------|--|--|
| Clean room compatibility (3) | ISO 2 | | |

| ELECTRICAL SPECIFICATIONS (2) | | UNIT | X (bottom axis) | Y (top axis) | Theta |
|-------------------------------|-----------------------------------|----------------------------|-------------------|-------------------|---------------------|
| | Motor type | - | Ironcore | Ironcore | Toothless |
| | Motor model | - | LMG10-030-3QB-H01 | LMG05-030-3RA-H01 | TTB0126-030-3NA-239 |
| | Number of phases | - | 3 | 3 | 3 |
| Kt | Force constant | N/Arms or Nm/Arms | 26.6 | 24.6 | 1.23 |
| Ku | Back EMF constant (4) | Vrms/(m/s) or Vrms/(rad/s) | 16.2 | 14.9 | 0.712 |
| Km | Motor constant | N/√W or Nm/√W | 16.8 | 13.2 | - |
| R20 | Electrical resistance at 20°C (4) | Ohm | 1.68 | 2.31 | 10.50 |
| L1 | Electrical inductance (4) | mH | 9.02 | 10.8 | 2.65 |
| Ip | Peak current | Arms | 30.0 | 19.9 | 6.90 |
| Ic | Continuous current | Arms | 5.00 | 2.26 | 1.47 |
| Is | Standstill current | Arms | 3.79 | 1.71 | 1.11 |
| vs | Standstill speed | mm/s or rad/s | 0.22 | 0.20 | 0.0016 |
| Um | Max. input voltage | VDC | 100 | 100 | 100 |
| Pc | Max. cont. power dissipation | W | 77.6 | 20.4 | 41.9 |
| 2τp | Magnetic period | mm | 32 | 32 | - |
| 2p | Number of poles | - | - | - | 28 |

| ENCODER CHARACTERISTICS | | UNIT | | | |
|-------------------------|-----------------------------|-------------------|-----------------------|-----------------------|-----------------------|
| | Encoder and signal type | - | Optical - incremental | Optical - incremental | Optical - incremental |
| | Output signal | - | 1 Vpp | 1 Vpp | 1 Vpp |
| | Signal period or line count | μm or period/turn | 4 | 4 | 18 000 |
| | Reference mark | - | One | One | One |
| | Power supply | V | 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: 1 deg within ±40 μdeg | ms | - | - | 100 |
| | Move 5: 180 deg within ±40 μdeg | ms | - | - | 500 |

| GUIDING ELEMENTS | | | | | |
|------------------|------|--|--------------|--------------|------------------------|
| | Type | | Ball bearing | Ball bearing | Crossed roller bearing |

| MATERIAL AND FINISH | | | | | |
|---------------------|-----------|--|--------------------------|--------------------------|-----------------|
| | Baseplate | | Granite | Aluminum & Silicon alloy | Aluminum alloy |
| | Carriage | | Aluminum & Silicon alloy | Stainless steel | 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.