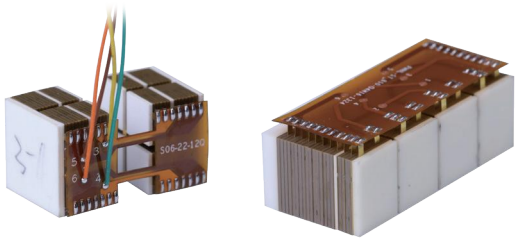
Microstep Motor Module



Feature

- Nanometer-level stepping accuracy
- High repeatability
- Microsecond-level response
- Theoretical infinite travel
- Self-locking upon power loss

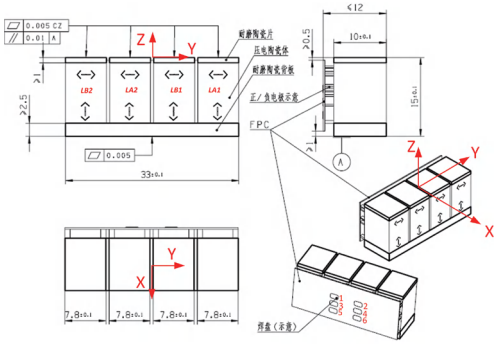
Description

The microstep motor ceramic module is composed of multiple layers of piezoelectric ceramics (mechanically connected in series) with interdigitated electrodes (electrodes parallel to each other). It includes a certain number of piezoelectric ceramic thickness slices and shear slices, which can produce displacement along the Z-axis. It achieves long travel by raising the thickness slices and advancing the shear slices, similar to the crawling motion of a caterpillar.

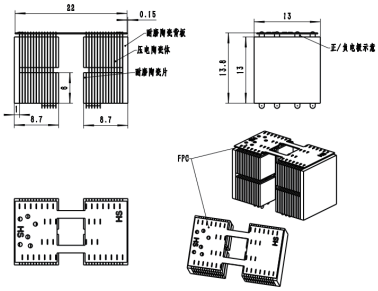
Applications

- Scientific research
- Precision optical adjustment equipment
- Industrial automation
- Semiconductor equipment
- Precision motion control
- Precision inspection equipment

Interface Definition

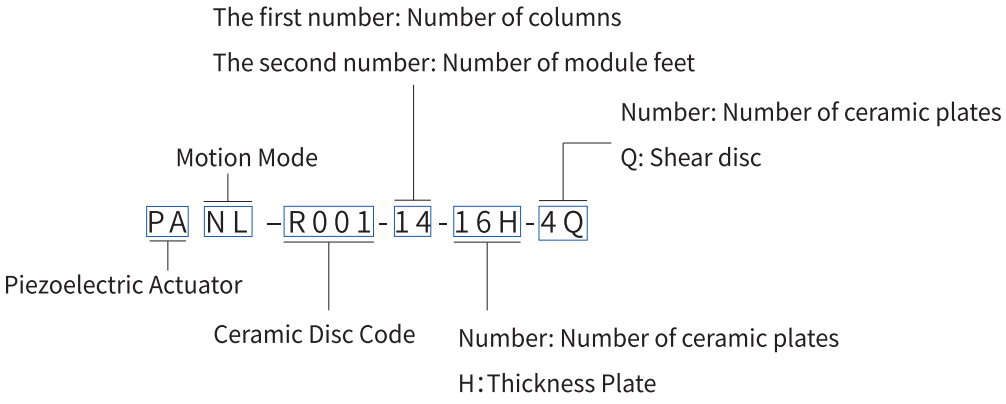


PANL-R001-14-16H4Q
PANL Series Microstep Motor Module



PANL-S06-22-5H7Q
PANL-S06-22-7H5Q
PANL-S06-22-12Q
PANL Series Microstep Motor Module

Model Interpretation



Technical Specifications

	PANL-R001-14-16H4Q	PANL-S06-22-5H7Q
Active axes	Z/X	Z/X
Height uniformity	⩽0.03 mm	⩽0.03 mm
Coplanarity of the top surface	⩽5 μm	⩽5 μm
Bottom surface coplanarity	⩽5 μm	⩽5 μm
Top-to-bottom surface parallelism	⩽10 μm	⩽10 μm
Actuating voltage of shear-mode ceramics	-250 V~+250 V	-250 V~+250 V
Longitudinal piezoelectric ceramic drive voltage	-250 V~+250 V	-250 V~+250 V
Shear piezoelectric ceramic displacement (Y-axis displacement)	⩾±2 μm@± 250 V	⩾±7 μm@±250 V
Longitudinal piezoelectric ceramic displacement (Z-axis displacement)	⩾3 μm@500 Vp-p(±250 V)	⩾0.9 μm@500 Vp-p(±250 V)
Maximum output force of shear piezoelectric ceramics	⩾±100 N@±250 V	⩾±50 N@±250 V
Maximum output force of longitudinal piezoelectric ceramics	⩾2000 N@+250 V	⩾700 N@+250 V
Longitudinal mechanical stiffness of a single piezoelectric ceramic leg	⩾500 N/μm	⩾250 N/μm
Capacitance of shear piezoelectric ceramics	⩽40 nF±15%@ 1 Vp-p&1 kHz	⩽45 nF±15%@ 1 Vp-p&1 kHz
Capacitance of longitudinal piezoelectric ceramics	⩽150 nF±15%@ 1 Vp-p&1 kHz	⩽40 nF±15%@ 1 Vp-p&1 kHz
Hysteresis nonlinearity of shear piezoelectric ceramics @ 500Vp-p	⩽40%	⩽40%
Operating temperature	-25 °C~130 °C	-25 °C~130 °C
Curie temperature	280 °C	280 °C
Dimensions		
L	33 mm±0.1 mm	13 mm±0.1 mm
W	10 mm±0.1 mm	13 mm±0.1 mm
H	15 mm±0.005 mm	8.7 mm±0.005 mm

Technical Specifications

	PANL-S06-22-7H5Q	PANL-S06-22-12Q
Active axes	Z/X	Z/X
Height uniformity	⩽0.03 mm	⩽0.03 mm
Coplanarity of the top surface	⩽5 μm	⩽5 μm
Bottom surface coplanarity	⩽5 μm	⩽5 μm
Top-to-bottom surface parallelism	⩽10 μm	⩽10 μm
Actuating voltage of shear-mode ceramics	-250 V~+250 V	-250 V~+250 V
Longitudinal piezoelectric ceramic drive voltage	-250 V~+250 V	—
Shear piezoelectric ceramic displacement (Y-axis displacement)	⩾±5 μm@± 250 V	⩾±12 μm@±250 V
Longitudinal piezoelectric ceramic displacement (Z-axis displacement)	⩾1.5 μm@500 Vp-p(±250 V)	—
Maximum output force of shear piezoelectric ceramics	⩾±50 N@±250 V	⩾±50 N@±250 V
Maximum output force of longitudinal piezoelectric ceramics	⩾1000 N@+250 V	—
Longitudinal mechanical stiffness of a single piezoelectric ceramic leg	⩾250 N/μm	⩾250 N/μm
Capacitance of shear piezoelectric ceramics	⩽30 nF±15%@ 1 Vp-p&1 kHz	⩽90 nF±15%@ 1 Vp-p&1 kHz
Capacitance of longitudinal piezoelectric ceramics	⩽60 nF±15%@ 1 Vp-p&1 kHz	—
Hysteresis nonlinearity of shear piezoelectric ceramics @ 500Vp-p	⩽40%	⩽40%
Operating temperature	-25 °C~130 °C	-25 °C~130 °C
Curie temperature	280 °C	280 °C
Dimensions		
L	13 mm±0.1 mm	13 mm±0.1 mm
W	13 mm±0.1 mm	13 mm±0.1 mm
H	8.7 mm±0.005 mm	8.7 mm±0.005 mm

* Displacement Measurement: Drive voltage -250V to 250V, tolerance ±15%.
** Dimensions: The marked dimensions refer to the size of the single-side ceramic module, excluding the circuit board.
*** Capacitance Measurement Conditions: Room temperature environment, 1 Vpp, 1 kHz, tolerance ±15%.

Customization Information

- **Drive Voltage:** YiNGUAN can flexibly customize the maximum drive voltage of the device. The common available range for the maximum drive voltage we provide is 50V to 250V. Other special maximum drive voltages can also be customized flexibly according to customer requirements.

- **Displacement Customization:** The output displacement is primarily determined by the device's dimensions. YiNGUAN offers a variety of combinations of shear and thickness displacements, with selectable displacement ranges.

Customization Information(Continued from previous page)

- **Operating Frequency:** YiNGUAN can flexibly design according to customer requirements. The maximum drive frequency for monolithic actuators can reach up to 50 kHz.
- **Form Factor Customization:** The length, width, and height of the module can be customized flexibly according to customer needs.
- **Connection Options:** While meeting the AWG usage standards, a wiring harness or flexible printed circuit board (FPC) can be optionally equipped. The length and orientation of the wiring harness, as well as the design of the circuit board, can also be customized flexibly according to customer requirements.