

M-110 · M-111 · M-112 Compact Micro-Translation Stage

Choice of Drives & Travel Ranges, XY(Z) Combinations Possible



M-112.2DG, M-111.2DG, M-110.2DG
(from front to back) providing 25 mm,
15 mm and 5 mm travel range

- Travel Ranges 5, 15 and 25 mm
- Very Cost Effective
- Min. Incremental Motion to 50 nm
- Max. Velocity 2 mm/s
- Closed-Loop DC Motors and Stepper Motors
- Non-Contact Limit and Reference Switches
- Optional Recirculating Ball Screw Drives Provide High Speeds & Long Lifetimes
- Vacuum-Compatible Versions Available to 10^{-6} hPa

M-110, M-111 and M-112 are ultra-high resolution motorized translation stages providing linear motion of 5 to 25 mm in an extremely compact package. They feature a precision lead-screw with sub-micron resolution

and precision linear ball bearings guaranteeing $<0.5 \mu\text{m}$ straightness of travel.

Compact Dimensions, High Performance

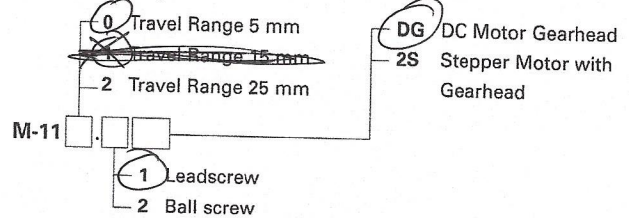
To meet industrial demands, the M-11x.2 linear translation stages are equipped with a recirculating ball screw for precise motion with reduced friction. This allows 24/7 duty cycles. M-110, M-111 and M-112 can be combined to XY and XYZ systems for multiaxis alignment applications.

Stepper and Servo Motors

A miniature DC or stepper motor actuates motion via a backlash-compensated screw /

Ordering Information

Translation stage



Ask about custom designs!

nut system and gearhead. Both drive options provide a cost-effective solution for industrial and OEM environments. To meet the most critical positioning demands, the DC motor is equipped with a high resolution encoder featuring resolution down to $0.007 \mu\text{m}$ per count.

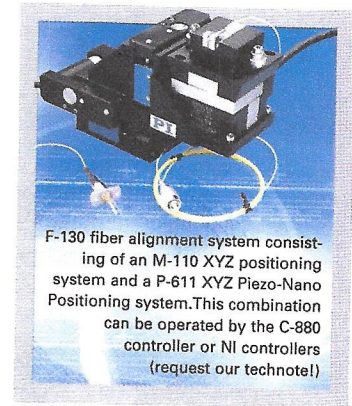
Limit and Reference Switches

For the protection of your equipment, non-contact Hall-effect limit and reference switches are installed. The direction-sensing reference switch supports advanced automation applications with high precision.

All stages include an integral 0.5 m cable with 15-pin sub-D connector and come with a 3 m extension cable. On the DC servo versions, the connector features integrated line drivers for cable lengths up to 10 meters between stage and controller (DC-motors only).

Low Cost of Ownership

The combination of these positioners with the networkable, single-channel C-863 Mercury™ (DC-Motor, see p. 4-114) or C-663 Mercury™ Step (see p. 4-112) controller offers high performance for a very competitive price in both single- and multiaxis configurations. For 3 or 4 axes, the C-843 PC plug-in board for DC motors (see p. 4-120) can also be recommended.



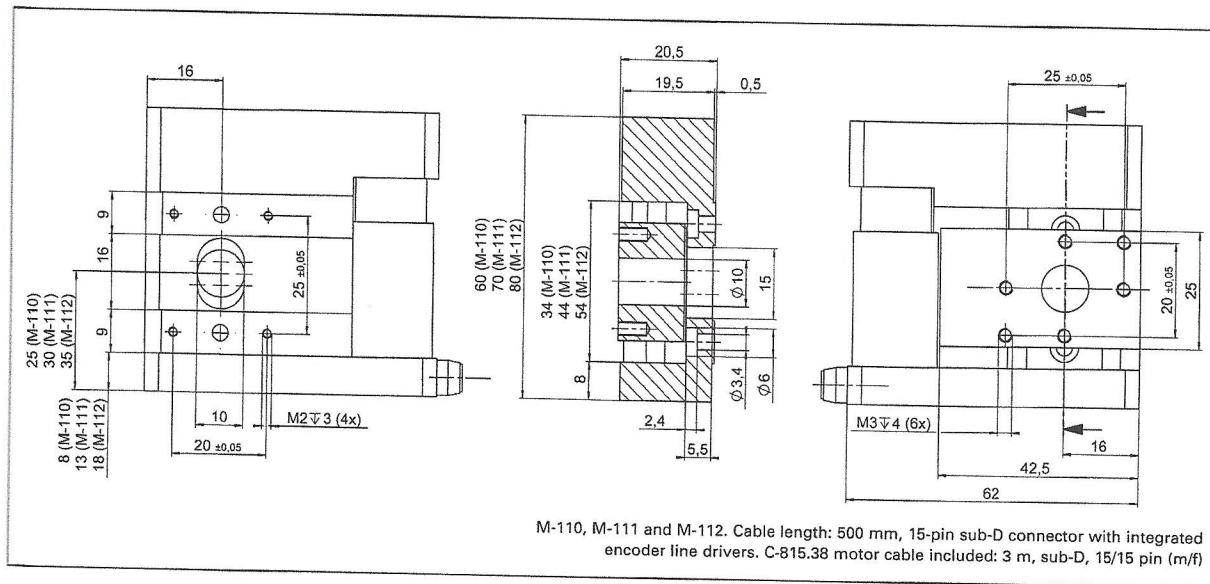
F-130 fiber alignment system consisting of an M-110 XYZ positioning system and a P-611 XYZ Piezo-Nano Positioning system. This combination can be operated by the C-880 controller or NI controllers (request our technote!)

Note

See "Accessories" (see p. 4-89 ff) for adapters, brackets, etc.

Application Examples

- Fiber optics testing
- Fiber positioning
- Metrology
- Micromachining
- Photonics packaging
- Quality assurance testing
- Testing equipment



Technical Data

Model	M-110.1DG / M-111.1DG / M-112.1DG	M-110.12S / M-111.12S / M-112.12S	M-110.2DG / M-111.2DG / M-112.2DG	M-110.22S / M-111.22S / M-112.22S	Units
Motion and positioning					
Travel range	5 / 15 / 25	5 / 15 / 25	5 / 15 / 25	5 / 15 / 25	mm
Integrated sensor	Rotary encoder	—	Rotary encoder	—	
Sensor resolution	2048		2048		Cts./rev.
Design resolution	0.0069	0.038*	0.0086	0.046*	μm
Min. incremental motion	0.05	0.05	0.2	0.2	μm
Backlash	2	2	4	4	μm
Unidirectional repeatability	0.1	0.1	0.5	0.5	μm
Pitch / Yaw	±50 / ±150 / ±150	±50 / ±150 / ±150	±50 / ±150 / ±150	±50 / ±150 / ±150	μrad
Max. velocity	1 / 1.5 / 1.5	1 / 1 / 1	1.5 / 2 / 2	1 / 1 / 1	mm/s
Mechanical properties					
Drive screw	Leadscrew	Leadscrew	Recirculating ballscrew	Recirculating ballscrew	
Thread pitch	0.4	0.4	0.5	0.5	mm
Gear ratio	28.44444:1	28.44444:1	28.44444:1	28.44444:1	
Motor resolution*	—	384*	—	384*	
Max. load	30 / 30 / 20	30 / 30 / 20	30 / 30 / 20	30 / 30 / 20	N
Max. push / pull force	10	10	10	10	N
Max. holding force	10	10	10	10	N
Max. lateral force	15 / 10 / 10	15 / 10 / 10	15 / 10 / 10	15 / 10 / 10	N
Drive properties					
Motor type	DC-motor, gearhead	2-phase stepper motor	DC-motor, gearhead	2-phase stepper motor	
Operating voltage	0 to ±12	24	0 to ±12	24	V
Electrical power	0.52 / 1.75 / 1.75	1.5	0.52 / 1.75 / 1.75	1.5	W
Current consumption	160 / 320 / 320**		160 / 320 / 320**		mA
Limit and reference switches	Hall-effect	Hall-effect	Hall-effect	Hall-effect	
Miscellaneous					
Operating temperature range	-20 to +65	-20 to +65	-20 to +65	-20 to +65	°C
Material	Al (black anodized)	Al (black anodized)	Al (black anodized)	Al (black anodized)	
Mass	0.3 / 0.4 / 0.5	0.3 / 0.4 / 0.5	0.3 / 0.4 / 0.5	0.3 / 0.4 / 0.5	kg
Recommended controller/driver	C-863 single-axis C-843 PCI board, for up to 4 axes	C-863 single-axis	C-863 single-axis C-843 PCI board, for up to 4 axes	C-863 single-axis	

Linear Actuators & Motors

Nanopositioning / Piezoelectrics

Nanometrology

Micropositioning

Hexapod 6-Axis Systems /
Parallel Kinematics

Linear Stages

Translation (X)

Vertical (Y)

Multi-Axis

Rotary & Tilt Stages

Accessories

Servo & Stepper
Motor Controllers

Single-Channel

Hybrid

Multi-Channel

Micropositioning
Fundamentals

Index