

M-605 High-Accuracy Translation Stage

Ultra-Compact, with Direct Position Measurement



M-605.2DD high precision translation stage

- **Integrated 0.1 μm Linear Encoder for Highest Accuracy**
- **Travel Ranges 25 mm (1") and 50 mm (2")**
- **Max. Velocity 50 mm/s with ActiveDrive Motor**
- **High Load Capacity up to 30 kg**
- **Zero-Backlash Recirculating Ballscrews**
- **Non-contact Limit and Reference Switches**
- **Stress-Relieved Aluminum Base for Highest Stability**
- **Flexible Bellows Protects the Mechanics from Dust and Spray**
- **XY & XYZ Combinations Possible**
- **MTBF >20,000 h**

M-605 series translation stages are designed to meet the most demanding positioning requirements in applications where space is limited.

They feature a space-saving design with the ballscrew side-by-side to the motor and an extremely flat, precision-ma-

chined base of high-density, stress-relieved aluminum providing exceptional stability and minimum weight.

Integrated Linear Scale Encoder

For highest accuracy and repeatability, M-605 stages are equipped with integrated linear-scale encoders (direct metrology) providing 0.1 μm minimum incremental motion and 1 μm full-travel accuracy.

Heavy Duty and Maintenance Free

All models are equipped with high-precision linear guiding rails and recirculating ball bearings. The choice of components and careful mounting guarantees high load capacity, longer lifetime and high guiding accuracy.

Ballscrews for High Speed, Precision and Lifetime

The precision-ground ballscrew is maintenance-free and pre-loaded to eliminate me-chanical play. Its significantly reduced friction, compared to conventional leadscrews, allows for higher velocity, lower power consumption and longer lifetime.

A flexible bellows protects the mechanics from dust and spray.

ActiveDrive

For maximum dynamic performance, the M-605 series stages are equipped with the highly efficient ActiveDrive direct-drive system, which can achieve speeds of up to 50 mm/s. The ActiveDrive design, developed by PI, features a high-efficiency PWM (pulse width modulation) servo-amplifier mounted side-by-side with the DC motor and offers several advantages:

- Increased efficiency, by eliminating power losses between the amplifier and motor
- Reduced cost of ownership and improved reliability, because no external driver is required
- Elimination of PWM amplifier noise radiation, by mounting the amplifier and



M-605.2DD XYZ-combination

Ordering Information

M-605.1DD
Compact Precision Linear Stage, 25 mm, 0.1 μm Linear Encoder, ActiveDrive DC Motor

M-605.2DD
Compact Precision Linear Stage, 50 mm, 0.1 μm Linear Encoder, ActiveDrive DC Motor

Accessories:

M-605.AV1
Angle Bracket for Vertical Mount of M-605 on M-605

M-110.01
Adapter Plate for Horizontal Mount of M-605 on Honeycomb Tables, M-400- and M-500 Series Translation Stages and Several Rotation Stages

Ask about custom designs!

motor together in a single, electrically shielded case

Limit and Reference Switches

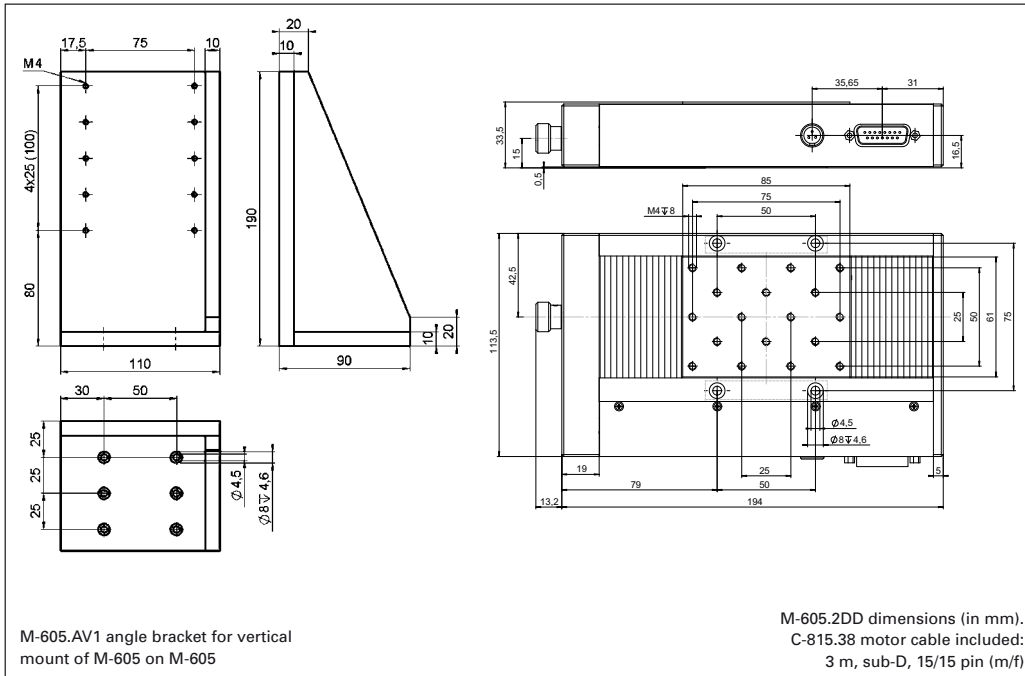
For the protection of your equipment, non-contact Hall-effect limit and reference switches are installed. The direction-sensing reference switch supports advanced automation applications with high precision.

Precision Assembly

Each M-605 stage is precision assembled and optimized using laser interferometers for performance testing.

Application Examples

- R&D
- Semiconductor testing
- Mass storage device testing
- Metrology
- Photonics packaging
- Quality assurance testing
- Precision Linear Motion Control



Technical Data

Model	M-605.1DD	M-605.2DD	Units
Active Axes	X	X	
Motion and positioning			
Travel range	25	50	mm
Integrated sensor	Linear encoder	Linear encoder	
Sensor resolution	0.1	0.1	µm
Design resolution	0.1	0.1	µm
Min. incremental motion	0.3	0.3	µm
Unidirectional repeatability	0.1	0.1	µm
Bidirectional repeatability	0.2	0.2	µm
Accuracy	1	1	µm
Pitch	±30	±30	µrad
Yaw	±30	±30	µrad
Max. velocity	50	50	mm/s
Origin repeatability	1	1	µm
Mechanical properties			
Thread pitch	1	1	mm
Max. load	300	300	N
Max. push / pull force	20 / 20	20 / 20	N
Max. lateral force	100	100	N
Drive properties			
Motor type	ActiveDrive DC Motor	ActiveDrive DC Motor	
Operating voltage	24 (PWM)	24 (PWM)	V
Electrical power	6	6	W
Limit and reference switches	Hall-effect	Hall-effect	
Miscellaneous			
Operating temperature range	-20 to +65	-20 to +65	°C
Material	Al (black anodized)	Al (black anodized)	
Mass	1.5	1.8	kg
Recommended controller/driver	C-863 single-axis C-843 PCI board (up to 4 axes)	C-863 single-axis (p. 4-114) C-843 PCI board (p. 4-120) (up to 4 axes)	

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

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