

# M-605 High-Accuracy Translation Stage

## Ultra-Compact, with Direct Position Measurement



M-605.2DD high precision translation stage

- Integrated 0.1  $\mu\text{m}$  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  $\mu\text{m}$  minimum incremental motion and 1  $\mu\text{m}$  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-mechanical 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

### Ordering Information

**M-605.1DD**  
Compact Precision Linear Stage, 25 mm, 0.1  $\mu\text{m}$  Linear Encoder, ActiveDrive DC Motor

**M-605.2DD**  
Compact Precision Linear Stage, 50 mm, 0.1  $\mu\text{m}$  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

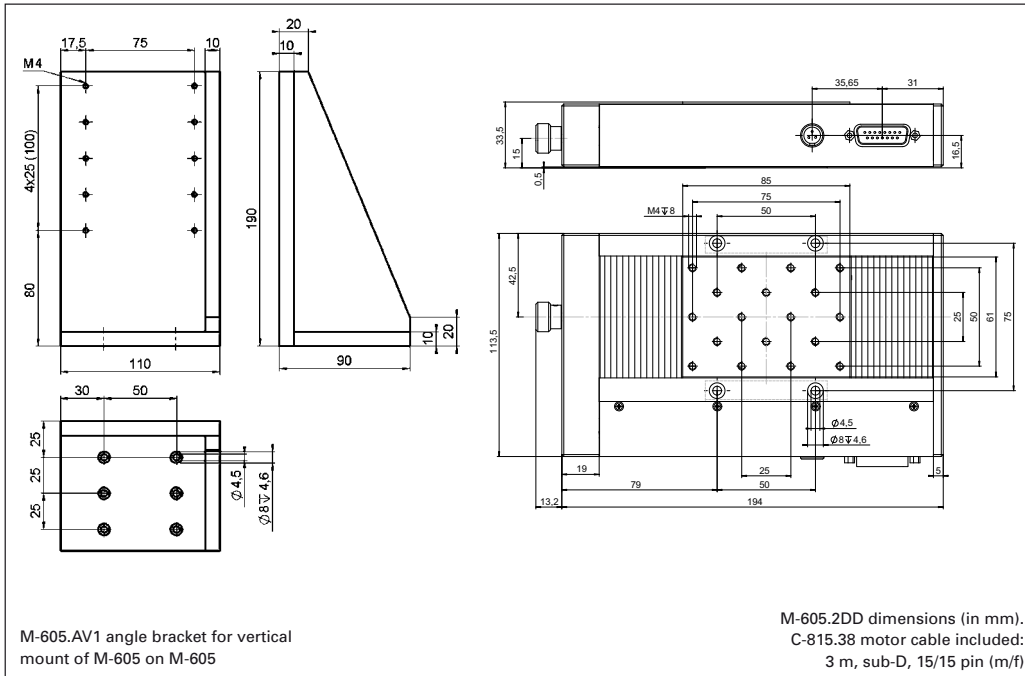
Each M-605 stage is precision assembled and optimized using laser interferometers for performance testing.

### Application Examples

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



M-605.2DD XYZ-combination



## Linear Actuators &amp; Motors

## Nanopositioning/Piezoelectrics

## Nanometrology

## Micropositioning

## Hexapod 6-Axis Systems / Parallel Kinematics

## Linear Stages

## Translation (X)

Vertical (Y)

Multi-Axis

## Rotary &amp; Tilt Stages

## Accessories

## Servo &amp; Stepper Motor Controllers

Single-Channel

Hybrid

Multi-Channel

## Micropositioning Fundamentals

## Index

## Technical Data

Model	M-605.1DD	M-605.2DD	Units
Active Axes	X	X	
<b>Motion and positioning</b>			
Travel range	25	50	mm
Integrated sensor	Linear encoder	Linear encoder	
Sensor resolution	0.1	0.1	$\mu\text{m}$
Design resolution	0.1	0.1	$\mu\text{m}$
Min. incremental motion	0.3	0.3	$\mu\text{m}$
Unidirectional repeatability	0.1	0.1	$\mu\text{m}$
Bidirectional repeatability	0.2	0.2	$\mu\text{m}$
Accuracy	1	1	$\mu\text{m}$
Pitch	$\pm 30$	$\pm 30$	$\mu\text{rad}$
Yaw	$\pm 30$	$\pm 30$	$\mu\text{rad}$
Max. velocity	50	50	mm/s
Origin repeatability	1	1	$\mu\text{m}$
<b>Mechanical properties</b>			
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
<b>Drive properties</b>			
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	
<b>Miscellaneous</b>			
Operating temperature range	-20 to +65	-20 to +65	$^{\circ}\text{C}$
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)	