

High- Load Precision Stage

COST- EFFECTIVE, LARGE CHOICE OF DRIVES & TRAVEL RANGES FOR HIGH LOADS



M-414

- + High precision components
- + Part of the M-403, M-404, M-413, M-414 modular family
- + Travel ranges from 100 mm to 300 mm
- + Resolution to 0.023 μm
- + Recirculating ballscrew drives provide high speeds & long lifetimes
- + Min. incremental motion 0.1 μm
- + Stress- relieved aluminum base for highest stability

Specifications

	M-414.1PD / M-414.2PD / M-414.3PD	M-414.1DG / M-414.2DG / M-414.3DG	M-414.12S / M-414.22S / M-414.32S	Unit	Tolerance
	with ActiveDrive	with DC gear motor	with stepper motor		
Active axes	X	X	X		
Motion and positioning					
Travel range	100 / 200 / 300	100 / 200 / 300	100 / 200 / 300	mm	
Integrated sensor	Rotary encoder	Rotary encoder	–		
Sensor resolution	4000	2000	–	Cts./ rev.	
Design resolution	0.5	0.023	0.31	μm	typ.
Min. incremental motion	0.5	0.1	0.4	μm	typ.
Backlash	0.5	4	2	μm	typ.
Unidirectional repeatability	0.5	1	1	μm	typ.
Pitch / yaw*	100	100	100	μrad	typ. over 100 mm
Velocity	100	3	6	mm/ s	max.
Reference point switch repeatability	1	1	1	μm	typ.
Mechanical properties					
Thread pitch	2	2	2	mm/ rev.	
Gear ratio	–	42.9206	–		
Motor resolution	–	–	6400**	steps/ rev.	
Stiffness in motion direction	8	8	8	N/ μm	$\pm 20\%$
Load capacity	500	500	500	N	max.
Push / pull force	100	100	100	N	max.
Lateral force	200	200	200	N	max.
Drive properties					
Drive type	DC motor, ActiveDrive	DC gear motor	2- phase stepper motor**		
Operating voltage	24 (PWM)	0 to 12 (differential; polarity determines direction)	24	V	
Motor power	70	3.6	4.8	W	nominal
Miscellaneous					

Operating temperature range	-20 to 65	-20 to 65	-20 to 65	°C	
Material	Al (black anodized)	Al (black anodized)	Al (black anodized)		
Mass	4.4 / 5.4 / 6.6	4.2 / 5.2 / 6.4	4.4 / 5.4 / 6.6	kg	±5 %
Cable length	3	3	3	m	±10 mm
Connector	Sub- D 15 (m)	Sub- D 15 (m)	Sub- D 15 (m)		
Recommended controller / driver	C-863 (single- axis) C-843 PCI board, for up to 4 axes	C-863 (single- axis) C-843 PCI board, for up to 4 axes	C-663 (single- axis)		

* For travel ranges above 100 mm, the pitch / yaw value is valid for every 100 mm.

** 24 V chopper voltage, max. 0.8 A/ phase; 400 full steps/ rev., motor resolution with C-663 stepper motor controller.

Order Information

M-414.1PD

Precision Linear Stage, Ball Screw, 120 mm wide, 100 mm, ActiveDrive

M-414.2PD

Precision Linear Stage, Ball Screw, 120 mm wide, 200 mm, ActiveDrive

M-414.3PD

Precision Linear Stage, Ball Screw, 120 mm wide, 300 mm, ActiveDrive

M-414.1DG

Precision Linear Stage, Ball Screw, 120 mm wide, 100 mm, DC Gear Motor

M-414.2DG

Precision Linear Stage, Ball Screw, 120 mm wide, 200 mm, DC Gear Motor

M-414.3DG

Precision Linear Stage, Ball Screw, 120 mm wide, 300 mm, DC Gear Motor

M-414.12S

Precision Linear Stage, Ball Screw, 120 mm wide, 100 mm, Stepper Motor

M-414.22S

Precision Linear Stage, Ball Screw, 120 mm wide, 200 mm, Stepper Motor

M-414.32S

Precision Linear Stage, Ball Screw, 120 mm wide, 300 mm, Stepper Motor

M-414.1VP

Precision Linear Stage, Ball Screw, 120 mm wide, 100 mm, ActiveDrive, Vacuum Compatible to 10⁻⁶ hPa

M-414.2VP

Precision Linear Stage, Ball Screw, 120 mm wide, 200 mm, ActiveDrive, Vacuum Compatible to 10⁻⁶ hPa

M-414.3VP

Precision Linear Stage, Ball Screw, 120 mm wide, 300 mm, ActiveDrive, Vacuum Compatible to 10⁻⁶ hPa

M-414.1VG

Precision Linear Stage, Ball Screw, 120 mm wide, 100 mm, DC Gear Motor, Vacuum Compatible to 10⁻⁶ hPa

M-414.2VG

Precision Linear Stage, Ball Screw, 120 mm wide, 200 mm, DC Gear Motor, Vacuum Compatible to 10⁻⁶ hPa

M-414.3VG

Precision Linear Stage, Ball Screw, 120 mm wide, 300 mm, DC Gear Motor, Vacuum Compatible to 10⁻⁶ hPa

Controllers / Drivers / Amplifiers

[C-663 Mercury Step Controller](#)

[C-843 DC- Servo- Motor Controller](#)

[C-863 Mercury Servo Controller](#)

[C-884 Four Axis Motion Controller](#)

Accessories

[M-060.HP Adapter Plate](#)

[M-061.HP Adapter Plate](#)

[M-062.HP Adapter Plate](#)

[M-110.01 Adapter Plate](#)

[M-403.AP1 Adapter Plate](#)

[M-403.AP3 Adapter Plate](#)

[M-413.AP1 Adapter Plate](#)

[M-413.AP2 Adapter Bracket](#)

[M-403.AP2 Adapter Bracket](#)

Related Products

[L-511 High- Precision Linear Positioning Stage](#)

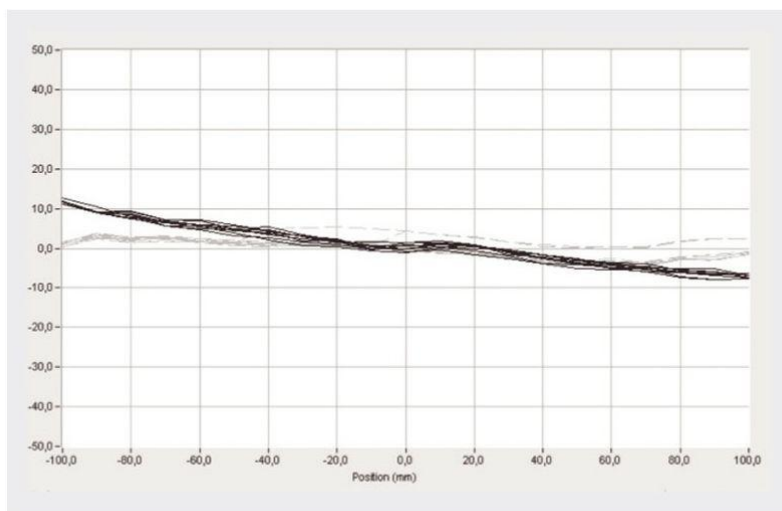
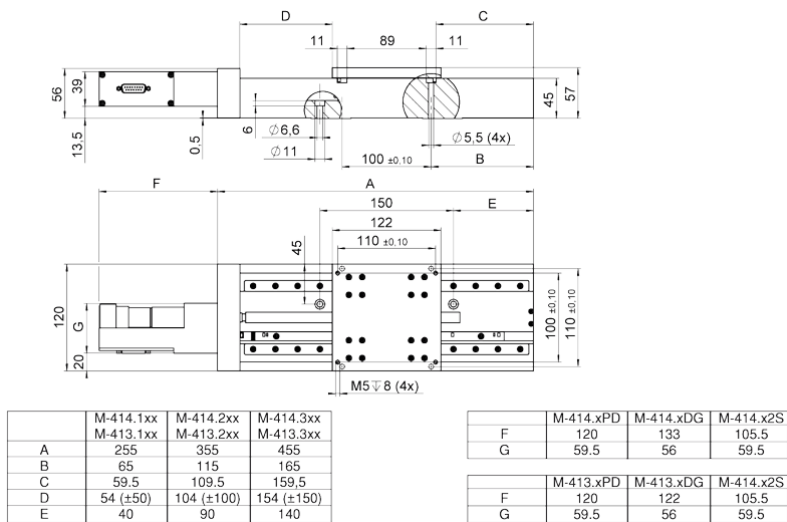
[M-404 Precision Translation Stage](#)

[M-413 High- Load Precision Stage](#)

[M-417 Precision Linear Stage](#)

[M-511 • M-521 • M-531 High- Precision Linear Translation Stage](#)

Drawings / Images



Polished bearings provide excellent guiding accuracy: better than 15 arcseconds (75 µrad) over 200 mm of travel, as shown above for the M-414 stage