

Compact Linear Stage

XY(Z) Combinations with a Variety of Drives and Travel Ranges

M-110 • M-111 • M-112



- Very compact due to folded drive
- Stepper motors and closed-loop DC motors
- Noncontact reference and limit switches
- XY setups can be mounted directly
- Large quantities available quickly
- Variants suitable for vacuum available

Compact linear stage, versatile in use

Linear stage with compact size due to folded drive with belt drive. Clear aperture with 10 mm Ø. XY setups can be mounted directly without adapter plate.

Drive

- 2-phase stepper motor or closed-loop DC gear motor
- Backlash-compensated threaded spindle or ball screw

Position measuring

- Variants with DC gear motor: Rotary encoder on the motor shaft
- Noncontact Hall effect reference and limit switches

Application fields

Precision microassembly. Research. Laser inscription. Automation. Optical alignment.

Motion	Unit		M-110. 1DG1	M-110. 2DG1	M-110. 12S1	M-110. 22S1	M-111. 1DG1	M-111. 2DG1	M-111. 12S1	M-111. 22S1
Active axes			X	X	X	X	X	X	X	X
Travel range in X	mm		5	5	5	5	15	15	15	15
Maximum velocity in X, unloaded	mm/s		1	1.5	1	1	1.5	2	1	1

Positioning	Unit	Tolerance	M-110. 1DG1	M-110. 2DG1	M-110. 12S1	M-110. 22S1	M-111. 1DG1	M-111. 2DG1	M-111. 12S1	M-111. 22S1
Unidirectional repeatability in X	µm	Typ.	0.25	0.15	0.25	0.15	0.25	0.15	0.25	0.15
Bidirectional repeatability in X	µm	Typ.	± 2	± 2	± 2	± 2	± 2	± 2	± 2	± 2
Minimum incremental motion in X	µm	Typ.	0.05	0.2	0.02	0.2	0.05	0.2	0.02	0.2
Backlash in X	µm	Typ.	3	3	3	3	3	3	3	3
Reference switch			Hall effect	Hall effect	Hall effect	Hall effect	Hall effect	Hall effect	Hall effect	Hall effect
Limit switches			Hall effect	Hall effect	Hall effect	Hall effect	Hall effect	Hall effect	Hall effect	Hall effect
Motor encoder			Incremental rotary encoder	Incremental rotary encoder			Incremental rotary encoder	Incremental rotary encoder		
Resolution, motor encoder	Cts./rev.		2048	2048			2048	2048		
Motor encoder: Sensor signal			A/B quadrature, RS-422	A/B quadrature, RS-422			A/B quadrature, RS-422	A/B quadrature, RS-422		

Drive Properties	Unit	Tolerance	M-110. 1DG1	M-110. 2DG1	M-110. 12S1	M-110. 22S1	M-111. 1DG1	M-111. 2DG1	M-111. 12S1	M-111. 22S1
Drive type			DC gear motor	DC gear motor	2-phase stepper motor	2-phase stepper motor	DC gear motor	DC gear motor	2-phase stepper motor	2-phase stepper motor
Motor resolution	Full steps/rev.				24	24			24	24
Nominal voltage	V		12	12			12	12		
Nominal current, RMS	A	Typ.	0.16	0.16	0.25	0.25	0.32	0.32	0.25	0.25
Drive force in negative direction of motion in X	N	Typ.	10	10	10	10	10	10	10	10
Drive force in positive direction of motion in X	N	Typ.	10	10	10	10	10	10	10	10

Mechanical Properties	Unit	Tolerance	M-110. 1DG1	M-110. 2DG1	M-110. 12S1	M-110. 22S1	M-111. 1DG1	M-111. 2DG1	M-111. 12S1	M-111. 22S1
Guide			Ball guide	Ball guide	Ball guide	Ball guide	Ball guide	Ball guide	Ball guide	Ball guide
Drive screw type			Fine-threaded spindle	Ball screw	Fine-threaded spindle	Ball screw	Fine-threaded spindle	Ball screw	Fine-threaded spindle	Ball screw
Drive screw pitch	mm		0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.5
Gear ratio i			256 : 9	256 : 9	256 : 9	256 : 9	256 : 9	256 : 9	256 : 9	256 : 9
Holding force in X, passive	N				10	10			10	10
Moved mass in X, unloaded	g		11	12	11	12	11	12	11	12
Permissible push force in Y	N	Max.	15	15	15	15	10	10	10	10
Permissible push force in Z	N	Max.	30	30	30	30	30	30	30	30
Permissible torque in θ_x	N·m	Max.	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Permissible torque in θ_Y	N·m	Max.	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Permissible torque in θ_Z	N·m	Max.	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Overall mass	g		250	250	250	250	270	270	270	270
Material			Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum

Miscellaneous	Unit		M-110.1DG1	M-110.2DG1	M-110.12S1	M-110.22S1	M-111.1DG1	M-111.2DG1	M-111.12S1	M-111.22S1
Connector			HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)
Recommended controllers / drivers			C-863 C-884 G-901 G-910 ACS modular controller	C-863 C-884 G-901 G-910 ACS modular controller	C-663 G-901 G-910 ACS modular controller	C-663 G-901 G-910 ACS modular controller	C-863 C-884 G-901 G-910 ACS modular controller	C-863 C-884 G-901 G-910 ACS modular controller	C-663 G-901 G-910 ACS modular controller	C-663 G-901 G-910 ACS modular controller
Cable length	m		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Operating temperature range	°C		-20 to 65	-20 to 65	-20 to 65	-20 to 65	-20 to 65	-20 to 65	-20 to 65	-20 to 65

Motion	Unit		M-112.1DG1	M-112.2DG1	M-112.12S1	M-112.22S1
Active axes			X	X	X	X
Travel range in X	mm		25	25	25	25
Maximum velocity in X, unloaded	mm/s		1.5	2	1	1

Positioning	Unit	Tolerance	M-112.1DG1	M-112.2DG1	M-112.12S1	M-112.22S1
Unidirectional repeatability in X	µm	Typ.	0.25	0.15	0.25	0.15
Bidirectional repeatability in X	µm	Typ.	± 2	± 2	± 2	± 2
Minimum incremental motion in X	µm	Typ.	0.05	0.2	0.02	0.2
Backlash in X	µm	Typ.	3	3	3	3
Reference switch			Hall effect	Hall effect	Hall effect	Hall effect
Limit switches			Hall effect	Hall effect	Hall effect	Hall effect
Motor encoder			Incremental rotary encoder	Incremental rotary encoder		
Resolution, motor encoder	Cts./rev.		2048	2048		
Motor encoder: Sensor signal			A/B quadrature, RS-422	A/B quadrature, RS-422		

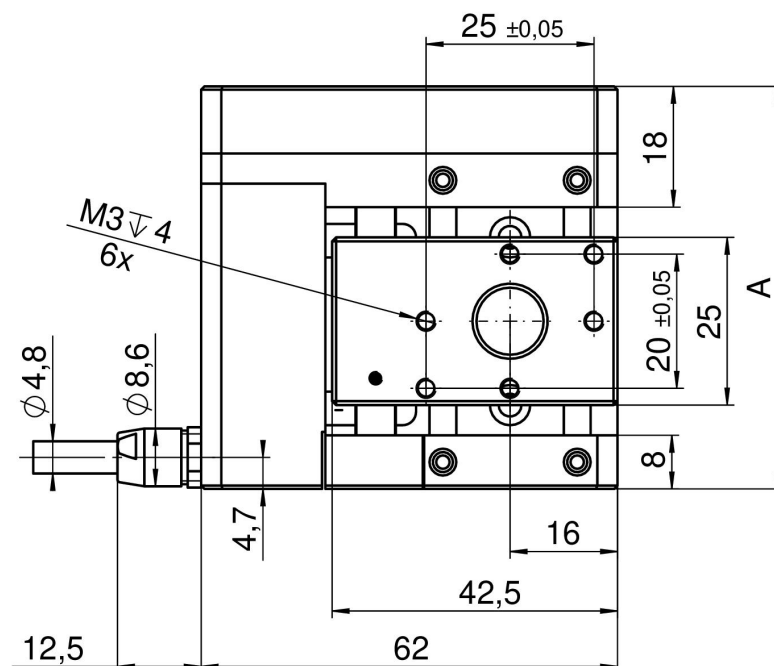
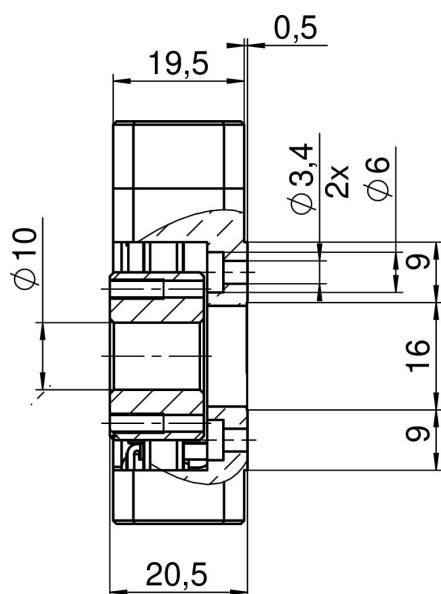
Drive Properties	Unit	Tolerance	M-112.1DG1	M-112.2DG1	M-112.12S1	M-112.22S1
Drive type			DC gear motor	DC gear motor	2-phase stepper motor	2-phase stepper motor
Motor resolution	Full steps/rev.				24	24
Nominal voltage	V		12	12		
Nominal current, RMS	A	Typ.	0.32	0.32	0.25	0.25
Drive force in negative direction of motion in X	N	Typ.	10	10	10	10
Drive force in positive direction of motion in X	N	Typ.	10	10	10	10

Mechanical Properties	Unit	Tolerance	M-112.1DG1	M-112.2DG1	M-112.12S1	M-112.22S1
Guide			Ball guide	Ball guide	Ball guide	Ball guide
Drive screw type			Fine-threaded spindle	Ball screw	Fine-threaded spindle	Ball screw
Drive screw pitch	mm		0.4	0.5	0.4	0.5
Gear ratio i			256 : 9	256 : 9	256 : 9	256 : 9
Holding force in X, passive	N				10	10
Moved mass in X, unloaded	g		11	12	11	12
Permissible push force in Y	N	Max.	10	10	10	10
Permissible push force in Z	N	Max.	20	20	20	20
Permissible torque in θ_x	N·m	Max.	0.15	0.15	0.15	0.15
Permissible torque in θ_Y	N·m	Max.	0.15	0.15	0.15	0.15
Permissible torque in θ_Z	N·m	Max.	0.15	0.15	0.15	0.15
Overall mass	g		300	300	300	300
Material			Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum

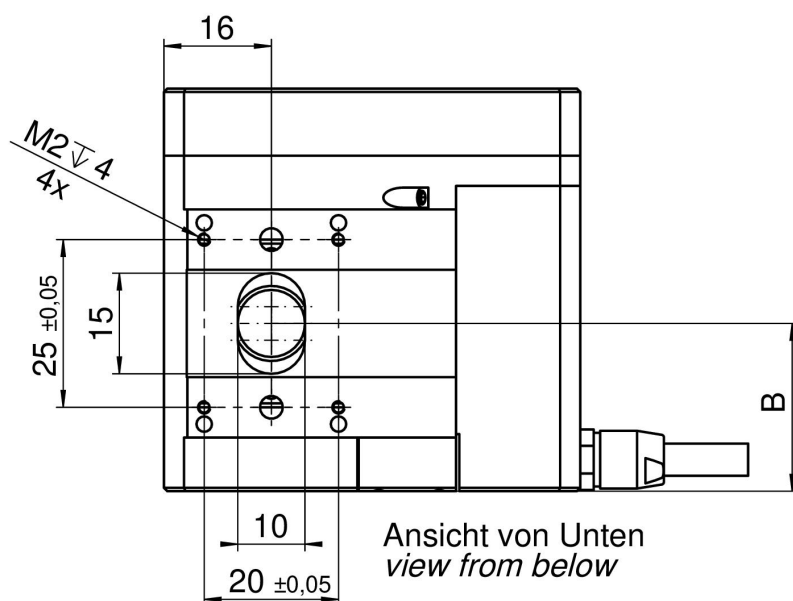
Miscellaneous	Unit		M-112.1DG1	M-112.2DG1	M-112.12S1	M-112.22S1
Connector			HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)
Recommended controllers / drivers			C-863 C-884 G-901 G-910 ACS modular controller	C-863 C-884 G-901 G-910 ACS modular controller	C-663 G-901 G-910 ACS modular controller	C-663 G-901 G-910 ACS modular controller
Cable length	m		0.5	0.5	0.5	0.5
Operating temperature range	°C		-20 to 65	-20 to 65	-20 to 65	-20 to 65

Note on minimum incremental motion: Values are achieved with the recommended controller
Note on nominal current: Values apply per phase

Drawings / Images



	A	B
M-110.1DG1	60	25
M-110.2DG1		
M-110.12S1		
M-110.22S1		
M-110.1VG1		
M-111.1DG1	70	30
M-111.2DG1		
M-111.12S1		
M-111.22S1		
M-111.1VG1		
M-112.1DG1	80	35
M-112.2DG1		
M-112.12S1		
M-112.22S1		
M-112.1VG1		



M-11x.xxx1, dimensions in mm



XY setups possible without adapter plate

Order Information

M-110.1DG1

Compact linear stage; DC gear motor; 5 mm travel range, 30 N load capacity, 1 mm/s maximum velocity; fine-threaded spindle; incremental rotary encoder, 2048 cts./rev. resolution; 0.5 cable length

M-110.2DG1

Compact linear stage; DC gear motor; 5 mm travel range, 30 N load capacity, 1.5 mm/s maximum velocity; ball screw; incremental rotary encoder, 2048 cts./rev. resolution; 0.5 cable length

Order Information

M-110.12S1

Compact linear stage; 2-phase stepper motor; 5 mm travel range; 30 N load capacity; 1 mm/s maximum velocity; fine-threaded spindle; 0.5 m cable length

M-110.22S1

Compact linear stage; 2-phase stepper motor; 5 mm travel range; 30 N load capacity; 1 mm/s maximum velocity; ball screw; 0.5 m cable length

M-111.1DG1

Compact linear stage; DC gear motor; 15 mm travel range, 30 N load capacity, 1.5 mm/s maximum velocity; fine-threaded spindle; incremental rotary encoder, 2048 cts./rev. resolution; 0.5 cable length

M-111.2DG1

Compact linear stage; DC gear motor; 15 mm travel range, 30 N load capacity, 2 mm/s maximum velocity; ball screw; incremental rotary encoder, 2048 cts./rev. resolution; 0.5 cable length

M-111.12S1

Compact linear stage; 2-phase stepper motor; 15 mm travel range; 30 N load capacity; 1 mm/s maximum velocity; fine-threaded spindle; 0.5 m cable length

M-111.22S1

Compact linear stage; 2-phase stepper motor; 15 mm travel range; 30 N load capacity; 1 mm/s maximum velocity; ball screw; 0.5 m cable length

M-112.1DG1

Compact linear stage; DC gear motor; 25 mm travel range, 20 N load capacity, 1.5 mm/s maximum velocity; fine-threaded spindle; incremental rotary encoder, 2048 cts./rev. resolution; 0.5 cable length

M-112.2DG1

Compact linear stage; DC gear motor; 25 mm travel range, 20 N load capacity, 2 mm/s maximum velocity; ball screw; incremental rotary encoder, 2048 cts./rev. resolution; 0.5 cable length

M-112.12S1

Compact linear stage; 2-phase stepper motor; 25 mm travel range; 20 N load capacity; 1 mm/s maximum velocity; fine-threaded spindle; 0.5 m cable length

M-112.22S1

Compact linear stage; 2-phase stepper motor; 25 mm travel range; 20 N load capacity; 1 mm/s maximum velocity; ball screw; 0.5 m cable length