M-653 · M-655 Differential Micrometer Drive

Stroke to 20 mm, Manual

M-653.00 differential micrometer drive

- 0.1 µm Sensitivity
- 1 µm Graduations
- Travel Range up to 20 mm

Model	Travel range coarse/fine	Spindle pitch coarse/fine	Shaft ø	Tip ø	Total length at 0 mm
M-653.00	5/0.2 mm	0.4/0.02 mm	6 mm	3 mm	56 mm
M-655.00	20/1.0 mm	0.5/0.05 mm	12 mm	6,8 mm	112 mm

M-631 · M-632 · M-633 Micrometer Drive

Non-Rotating Tip, Optional Piezo Drive, Manual

M-633, M-632, M-631 Micrometers (from top)

- 10, 25 and 50 mm Travel Range
- Pitch 0.5 mm/rev.
- Low-Friction Construction
- 1 µm Manual Sensitivity
- Sub-nm Resolution with Optional PZT Actuator

Model	Travel range	Max. push/ pull force	Tip ø	Shaft ø	Total length at 0 mm
M-631.00	10 mm	50 N	12 mm	16 mm	76 mm
M-632.00	25 mm	50 N	12 mm	16 mm	110.5 mm
M-633.00	50 mm	50 N	12 mm	16 mm	170.5 mm

M-619 – M-626 Precision Micrometer Drive

Stroke to 25 mm, Manual

Micrometer drives with up to 25 mm travel

- 1 µm Sensitivity
- 10 µm Graduations
- Model M-626.05 with Lockable Spindle

Model	Travel range	Shaft ø	Tip ø	Total length at 0 mm
M-619.00	6.5 mm	6 mm	3.5 mm	37 mm
M-619.10	6.5 mm	6 mm	3.5 mm	44.5 mm
M-620.00	10 mm	6 mm	3 mm	44 mm
M-621.00	10 mm	8 mm	5 mm	45 mm
M-622.00	15 mm	10 mm	5.5 mm	63 mm
M-623.00	15 mm	12 mm	5.5 mm	69 mm
M-626.00 & M-626.05	18 mm	6 mm	3 mm	53 mm
M-626.10	18 mm	6 mm	3 mm	64.5 mm
M-624.00	25 mm	12 mm	6.8 mm	87 mm

M-619 – M-626

Micrometer Drives with Rotating Tips

Micrometer drives with rotating tips

- **1 µm Sensitivity**
- **10 µm Graduations**
- **Travel up to 25 mm**
- **Model M-626.05 with Lockable Spindle**

These PI precision micrometer drives comply with the DIN 863 precision standard. The 0.5 mm pitch threads are ground into the through-hardened spindle. M-619 micrometers feature flat tips, the other micrometers come with spherical tips. The scale rises with retracting spindle, with maximum length at the zero position.

Ordering Information

M-619.00
Micrometer Drive with 6.5 mm Travel, 6 mm Shaft ø

M-619.10
Micrometer Drive with 6.5 mm Travel, 6 mm Shaft ø

M-620.00
Micrometer Drive with 10 mm Travel, 6 mm Shaft ø

M-621.00
Micrometer Drive with 10 mm Travel, 8 mm Shaft ø

M-622.00
Micrometer Drive with 15 mm Travel, 10 mm Shaft ø

M-623.00
Micrometer Drive with 15 mm Travel, 12 mm Shaft ø

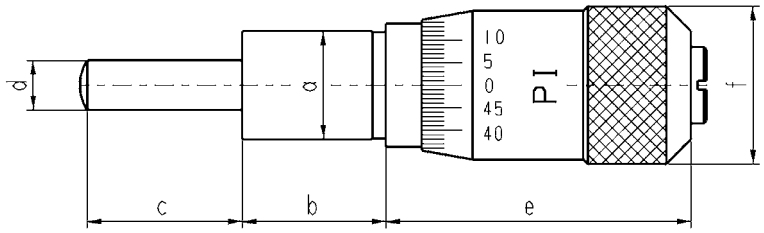
M-626.00
Micrometer Drive with 18 mm Travel, 6 mm Shaft ø

M-626.05
Micrometer Drive with 18 mm Travel, 6 mm Shaft ø, Lockable Spindle

M-626.10
Micrometer Drive with 18 mm Travel, 6 mm Shaft ø

M-624.00
Micrometer Drive with 25 mm Travel, 12 mm Shaft ø

Ask about custom designs!



Micrometer drives with rotating tips. See table for dimensions.

Technical Data

Models	M-619.00 / M-619.10	M-620.00 / M-621.00	M-622.00 / M-623.00	M-626.00* / M-626.10	M-624.00	Units
Range	6.5 / 6.5	10 / 10	15 / 15	18 / 18	25	mm
Pitch	0.5 / 0.5	0.5 / 0.5	0.5 / 0.5	0.5 / 0.5	0.5	mm
Scale Reading	0.01 / 0.01	0.01 / 0.01	0.01 / 0.01	0.01 / 0.01	0.01	mm
Shaft ø (a)	6 / 6	6 / 8	10 / 12	6 / 6	12	mm
Shaft Length (b)	6 / 6	7 / 8	10 / 16	7 / 7	16	mm
Tip at 0 mm (c)	9 / 16.5	13 / 13	18 / 18	19 / 30.5	28	mm
Tip ø (d)	3.5 / 3.5	3 / 5	5.5 / 5.5	3 / 3	6.8	mm
Thimble at 0 mm (e)	22 / 22	24 / 24	35 / 35	27 / 27	43	mm
Thimble ø (f)	9.5 / 9.5	15 / 15	17 / 17	13 / 13	17	mm

* Model M-626.05 with lockable spindle

Piezo Actuators
Nanopositioning & Scanning Systems
Active Optics / Steering Mirrors
Tutorial: Piezoelectrics in Positioning
Capacitive Position Sensors
Piezo Drivers & Nanopositioning Controllers
Hexapods / Micropositioning
Photonics Alignment Solutions
Motion Controllers
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M-227 DC-Mike High-Resolution Linear Actuator

Non-Rotating Tip, Long Stroke to 50 mm

M-227.10 (w/ piezo tip), M-227.25, M-227.50 (w/ ball tip), high-resolution DC-Mike actuators and several tip options

Ordering Information

M-227.10
High-Resolution DC-Mike Linear Actuator, 10 mm

M-227.25
High-Resolution DC-Mike Linear Actuator, 25 mm

M-227.50
High-Resolution DC-Mike Linear Actuator, 50 mm

M-219.10
Ball Tip

P-855.20
Piezo Actuator for Micrometer Drive

- **Travel Ranges 10, 25 and 50 mm**
- **Min. Incremental Motion to 0.05 µm**
- **Non-Rotating Tip**
- **Closed-Loop DC-Motors**
- **Sub-nm Resolution with Optional PZT Drive**
- **MTBF >5,000 h**

M-227 are ultra-high-resolution linear actuators providing linear motion up to 50 mm with sub-micron resolution in a compact package. They consist of a micrometer with non-rotating tip, driven by a closed-loop DC-motor/gearhead combination with motor-shaft-mounted high-resolution encoder. The combination of an extremely low stiction/friction construction and high-resolution encoder allows for a minimum incremental motion of 50 nanometers at speeds up to 1 mm/sec.

Non-Rotating Tip

Compared to conventional rotating-tip micrometer drives, the non-rotating-tip design offers several advantages:

- Elimination of torque-induced positioning errors
- Elimination of sinusoidal motion errors
- Elimination of wear at the contact point
- Elimination of tip-angle-dependent wobble

Compact, High-Precision, Cost-Effective

M-227 actuators provide a cost-effective solution for industrial and OEM environments.

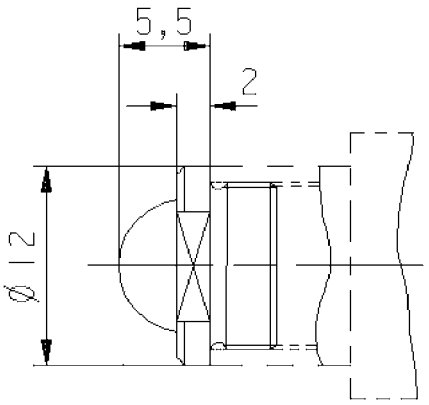
Integrated Line Drivers

All actuators 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 actuator and controller.

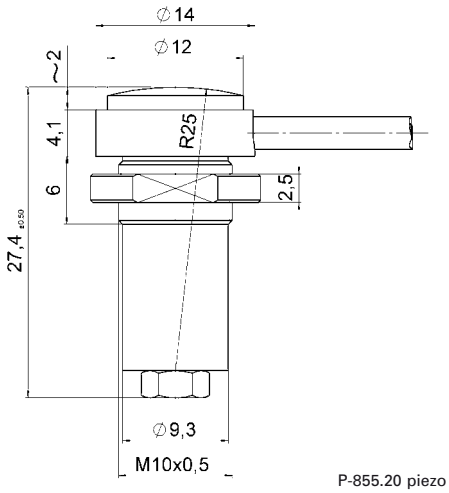
High-Resolution Piezo Option

All models come with standard flat tips. A variety of other tips are also available, such as a piezoelectric tip featuring 20 µm travel with sub-nanometer resolution for dynamic scanning and tracking see p. 1-73 and 1-58.

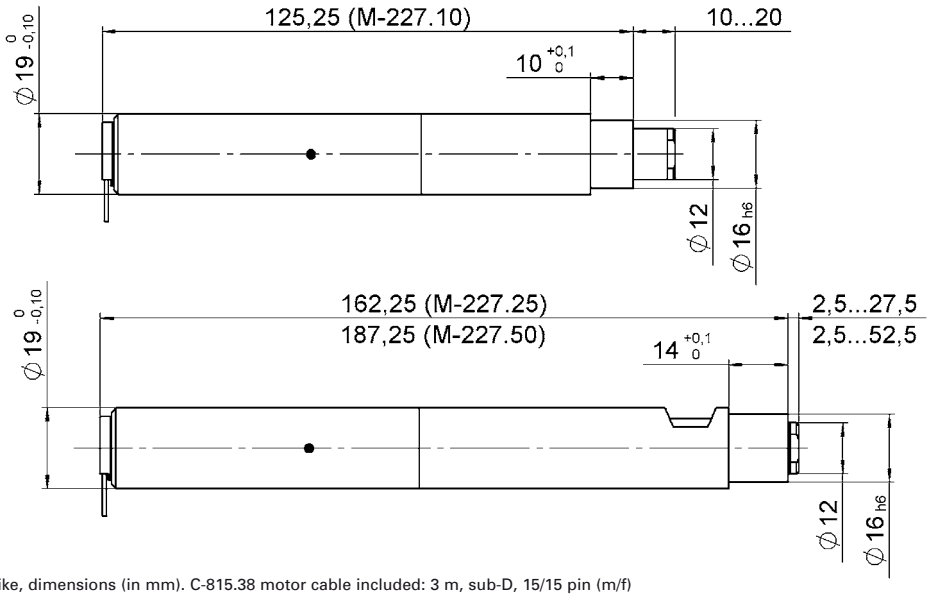
For higher loads and integrated limit switches refer to the M-230 (see p. 1-46 *ff*), M-235 (see p. 1-50 *ff*) and M-238.



M-219.10 ball tip option



P-855.20 piezo tip option



M-227 DC-Mike, dimensions (in mm). C-815.38 motor cable included: 3 m, sub-D, 15/15 pin (m/f)

Technical Data

Model	M-227.10	M-227.25	M-227.50	Units
Active axes	X	X	X	
Motion and positioning				
Travel range	10	25	50	mm
Integrated sensor	Rotary encoder	Rotary encoder	Rotary encoder	
Sensor resolution	2048	2048	2048	Cts./rev.
Design resolution	0.0035	0.0035	0.0035	µm
Min. incremental motion	0.05	0.05	0.05	µm
Backlash	2	2	2	µm
Unidirectional repeatability	0.1	0.1	0.1	µm
Max. velocity	0.75	0.75	0.75	mm/s
Mechanical properties				
Drive screw	Leadscrew	Leadscrew	Leadscrew	
Thread pitch	0.5	0.5	0.5	mm
Gear ratio	69.12:1	69.12:1	69.12:1	
Max. push/pull force	40	40	40	N
Max. lateral force	0.1	0.1	0.1	N
Drive properties				
Motor type	DC-motor, gearhead	DC-motor, gearhead	DC-motor, gearhead	
Operating voltage	0 to ±12	0 to ±12	0 to ±12	V
Electrical power	1.25	1.25	1.25	W
Miscellaneous				
Operating temperature range	-20 to +65	-20 to +65	-20 to +65	°C
Material	Al (anodized), steel	Al (anodized), steel	Al (anodized), steel	
Mass	0.16	0.22	0.26	kg
Cable length	0.1	0.1	0.1	m
Connector	15-pin sub-D connector	15-pin sub-D connector	15-pin sub-D connector	
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-863 single-axis (see p. 4-114) C-843 PCI-board, for up to 4 axes (see p. 4-120)	

*Higher forces on request

M-219 Optional Tips

For Micrometers and Actuators

Ordering Information

M-219.00
Spherical Tip, M10 x 0.5 mm

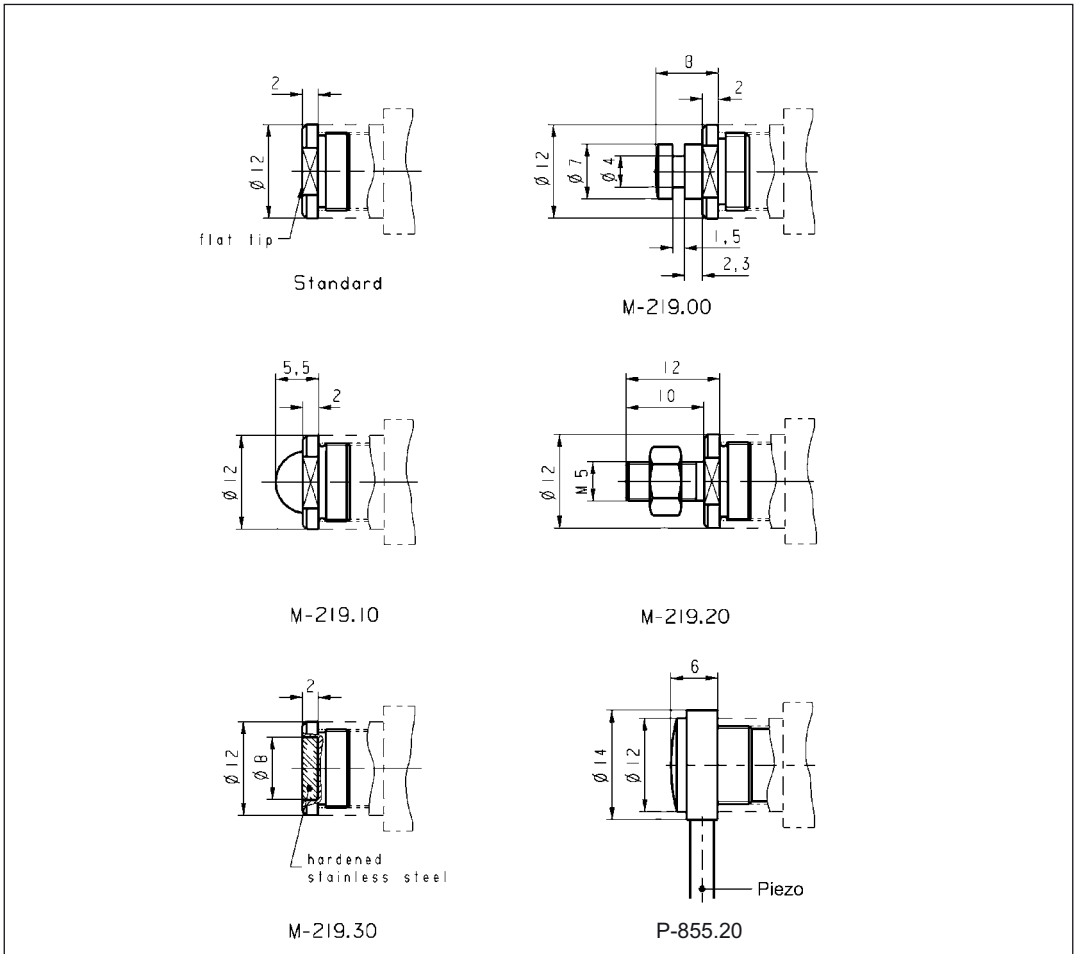
M-219.10
Ball Tip, M10 x 0.5 mm

M-219.20
Tip with M 5 Threaded Stud, M10 x 0.5 mm

M-219.30
Hardened Stainless Steel Tip, M10 x 0.5 mm

Ask about custom designs!

M-227 DC-Mikes, M-168 Stepper Mikes and M-631 to M-633 manual micrometer drives are supplied with flat tips. The following optional replacement tips are available (all with M10x 0.5 mm fine threads):



Optional tips, dimensions in mm