

MF

SERIES 176 — Measuring Microscopes

Technical Data

Observation image:	Erect image
Optical tube (optional):	Monocular or binocular tube (depression: 25°), Reticle projection method, with TV mount, Optical path ratio (eyepiece/TV mount: 50/50)
Eyepiece lens (optional):	10X, 15X, 20X
Objective:	3X (375-037), W.D.: 72.5mm Optional: 1X, 5X 10X, 20X, 50X, 100X
Transmitted illumination	
• Light source:	Halogen bulb or LED (12V, 50W)
• Optical system:	Telecentric illumination with adjustable aperture diaphragms
• Functions:	Light intensity adjustable, Non-stepped brightness adjustment
Surface illumination	
• Light source:	Halogen bulb or LED (12V, 50W)
• Optical system:	Koehler illumination with adjustable aperture diaphragms
• Functions:	Light intensity adjustable, Non-stepped brightness adjustment
Display unit:	
• No. of axis:	2 axes (MF-A type) or 3 axes (MF-B type)
• Resolution:	.0001" / .00005" / .00001" / 0.001mm / 0.0005mm / 0.0001mm
• Functions:	Zero-setting, Direction switching, Data output (via RS-232C interface)
Power supply:	120V AC, 50/60Hz
Mass:	145lbs / 65.5kg (505C, 1010C) / 153lbs / 69.5kg (2010C) / 287lbs / 130kg (2017C) / 304lbs / 138kg (3017C) / 317lbs / 144kg (4020C)

Optional Reticles for 3X Eyepiece

12AAG838 (12AAG878):	Cross-hair (7μm width)
12AAG836 (12AAG877):	Cross-hair (5μm width)
12AAG873 (12AAG876):	Cross-hair (3μm width)
12AAG839 (12AAG879):	Cross-hair and 45° angle
12AAG840 (12AAG880):	Broken cross-hair and 60° angle
12AAG841 (12AAG881):	Zeiss type chart
12AAG842*:	20mm scale (0.1mm reading)
12AAG843*:	Concentric circle (ø1.2 - ø18mm)
12AAG844*:	10mm scale (0.1mm reading)
12AAG845*:	5mm scale (0.05mm reading)
12AAG846*:	10x10mm section (1mm min.)
12AAG847*:	Metric screw thread (P = 0.25-1.0)
12AAG848*:	Metric screw thread (P = 1.25-2.0)
12AAG849*:	Involute gear tooth (14.5°), module = 0.1 - 1.0
12AAG850*:	Involute gear tooth (20°), module = 0.1 - 1.0
12AAG851*:	Unified screw thread (80 - 28TPI)
12AAG852*:	Unified screw thread (24 - 14TPI)
12AAG853*:	Unified screw thread (13 - 10TPI)
12AAG854*:	Concentric circle (ø.01" - ø.2")

() : for MF-U models, * : MF/MF-U compatible

Reticle mount (standard accessory)



for MF-U models

for MF models

Cross-hair and 45° angle (standard accessory)



12AAG839

The MF measuring microscopes' expandability, such as when used in combination with Mitutoyo's vision unit to boost its performance or data management on a PC, promises further improved measuring efficiency.

FEATURES

- Observation with a clear and flare-less erect image and a wide field of view
- Measuring accuracy that is the highest in its class (and conforms to JIS B 7153)
- ML series, high-NA objectives that are specially designed for the MF series (long working distance type)

- Illumination unit (reflected/transmitted) selectable from a high-intensity LED or halogen bulb (required)
- Variable aperture diaphragm (reflected/transmitted) allows observation measurement while suppressing light diffraction
- Variety of standardized stages in sizes up to 400x200mm
- Quick-release mechanism useful for moving the stage quickly when measuring workpieces that are large in size or quantity
- Coarse/fine feed handles equipped as standard on both sides allow precise focus and observation measurement regardless of handedness
- High-magnification eyepiece observation up to 2000x
- Standard measuring microscope that has a wide variety of optional accessories including a Vision Unit and various digital CCD cameras



Using optional slide type nosepiece with 2-lens mount (factory set option)

MF-B2017C

XY stage travel range: 8 x 6.6" / 200 x 170mm (with optional binocular tube)

Selection of XY stage by travel range

1010C: 4 x 4" / 100 x 100mm



2010C: 8 x 4" / 200 x 100mm



3017C: 12 x 6.6" / 300 x 170mm



4020C: 16 x 8" / 400 x 200mm



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SPECIFICATIONS

Model No. (XY stage size)	1010C	2010C	2017C	3017C	4020C	
Order No.	MF-A	176-662-10	176-663-10	176-664-10	176-665-10	176-666-10
	MF-B	176-682-10	176-683-10	176-684-10	176-685-10	176-686-10
XY stage travel range	4 x 4" 100 x 100mm	8 x 4" 200 x 100mm	8 x 6.7" 200 x 170mm	6 x 6.7" 300 x 170mm	16 x 8" 400 x 200mm	
Z-axis travel range	6" / 150mm	6" / 150mm	8.7" / 220mm	8.7" / 220mm	8.7" / 220mm	
Focusing method	Manual focusing (coarse focusing: 30mm/rev., fine focusing: 0.2mm/rev.)					
Measurement method	Linear encoder (2-axis model: X / Y-axis, 3-axis model: X / Y / Z-axis)					
Resolution (switchable)	.0001" / .00005" / .00001" / 0.001mm / 0.0005mm / 0.0001mm					
Measuring accuracy (at 20°C)	XY-axis: (2.2+0.02L)µm, L = Measuring length (mm) when not loaded, JIS B 7153					
Indication accuracy (at 20°C)	Z-axis: (5+0.04L)µm, L = Measuring length (mm) (MF-B type)					
Floating function	X and Y axes with Quick-release mechanism					
XY stage top size	11 x 11" 280 x 280mm	14 x 11" 350 x 280mm	16.1 x 13.4" 410 x 342mm	20.07 x 13.4" 510 x 342mm	24" x 13.4" 610 x 342mm	
Effective glass size	7 x 7" 180 x 180mm	10 x 6" 250 x 150mm	10.6 x 9.4" 270 x 240mm	14.5 x 9.4" 370 x 240mm	17.3 x 9.4" 440 x 240mm	
Swiveling function	—	—	±5° (left)	±5° (left)	±3° (left)	
Max. stage loading	22lbs / 10kg	22lbs / 10kg	44lbs / 20kg	44lbs / 20kg	33lbs / 15kg	
Max. workpiece height	6" / 150mm	6" / 150mm	8.7" / 220mm	8.7" / 220mm	8.7" / 220mm	

Selection of machine type

Machine type	MF-A	MF-B
Measurement system	X and Y-axis (2-axis type)	X, Y and Z-axis (3-axis type)

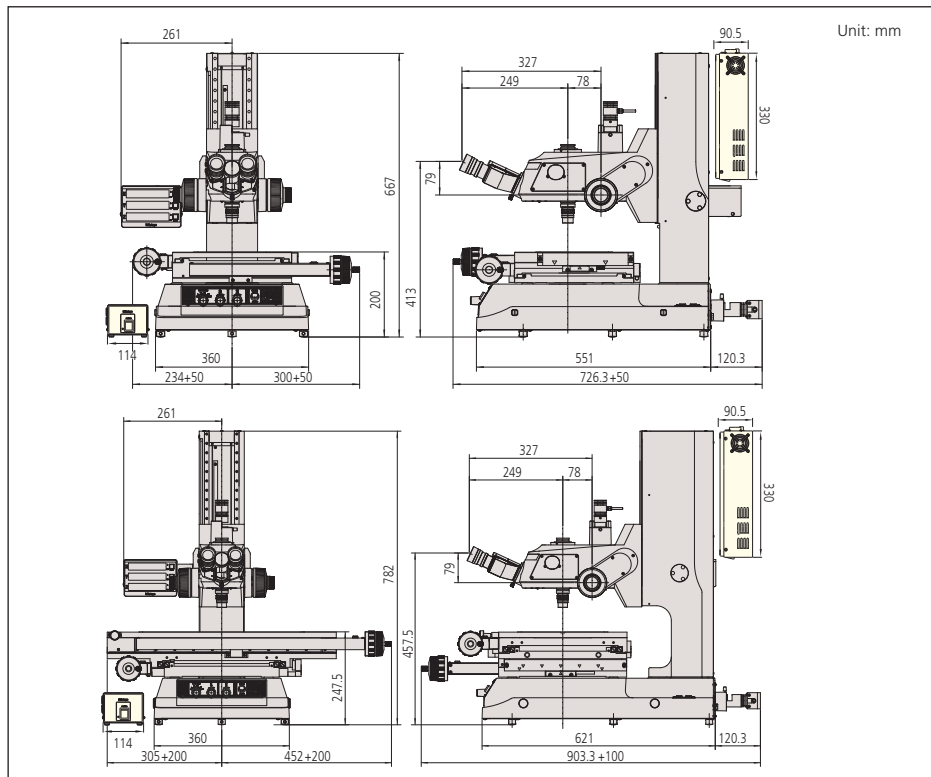
Illumination Unit (must select)

Applicable Illumination Unit	LED	Halogen
Order No.	176-345A	176-347A

Eye Tube Selection (must select)

Monocular with 10X eyepiece	172-392
Binocular with 10X eyepiece	172-393

DIMENSIONS



Optional Accessories

- 176-392:** Monocular tube with 10X eyepiece
- 176-393:** Binocular tube with 10X eyepiece set
- 378-866:** 10X eyepiece set (view field dia.: 24mm)
- 378-857:** 15X eyepiece set (view field dia.: 16mm)
- 378-858:** 20X eyepiece set (view field dia.: 12mm)
- 375-043:** Protractor eyepiece (10X)
- 176-313:** Digital protractor eyepiece (10X)
- 375-036-2:** 1X objective (W.D.: 61mm, N.A.: 0.03)
- 375-037-1:** 3X objective (W.D.: 77mm, N.A.: 0.09)
- 375-034-1:** 5X objective (W.D.: 61mm, N.A.: 0.13)
- 375-039:** 10X objective (W.D.: 51mm, N.A.: 0.21)
- 375-051:** 20X objective (W.D.: 20mm, N.A.: 0.42)
- 375-052:** 50X objective (W.D.: 13mm, N.A.: 0.55)
- 375-053:** 100X objective (W.D.: 6mm, N.A.: 0.7)
- 176-314-1:** Slide type nosepiece (2-mount, parfocal)
- 176-314-2:** Slide type nosepiece (2-mount, mag. adjusted)
- 12AAA643:** ND2 color filter (transmitted / surface)
- 12AAA644:** ND8 color filter (transmitted / surface)
- 12AAA645:** GIF filter (transmitted / surface)
- 12AAA646:** LB80 color filter (transmitted / surface)
- 375-054:** 0.5X camera adapter (with C-mount adapter)
- 970441:** C-mount adapter
- 513667:** Halogen bulb (24V, 50W)
- 12BAB345:** Halogen bulb (long life type, 24V, 50W)
- 176-308:** Vibration damping stand
- 176-309:** Mounting stand
- 375-056:** Stage micrometer
- 12AAA165:** Lens cleaning kit
- 12AAA846:** Foot switch

Illumination units

- 176-351-6A:** Oblique surface illumination unit
- 176-367-2A:** LED ring illuminator
- 176-343A:** Twin fiber-optics illuminator
- 176-366A:** Ring fiber-optics illuminator
- 12AAG806:** GIF color filter (for fiber-optics illuminator)
- 12AAG807:** LB80 color filter (for fiber-optics illuminator)

Fixture and Stage accessories

- 176-107:** Holder with clamp*
- 172-378:** V-block with clamp*
(max. workpiece dia.: 1" / 25mm)
- 172-197:** Swivel center support*
(max. workpiece dia.: 3.1" / 80mm)
- 176-305:** Rotary stage with fine feed knob for 505C/1010C/2010C models
- 176-306:** Rotary stage with fine feed knob for 2017C/3017C/4020C models

*Fixture mount adapter (**176-310**) is required for 2010C models.
Fixture mount adapter (**176-304**) is required for 2017C/3017C/4020C models.



QM-Data200
2-D data processing unit
264-155A: Stand mount type
12AAA807: Connecting cable set

Focus pilot FP-05
Focus assisting system



Vision Unit
PC-based vision measuring system

