

# Microscopes

Microscope lineups that systemize observation, measurement and processing

## MF SERIES 176 — Measuring Microscopes

- An easy-to-operate standard measuring microscope using specially designed long working distance ML objective lenses.
- Measuring accuracy is the highest in its class (and conforms to JIS B 7153).
- Illumination can be selected from an LED unit, which has a longer life, or a powerful halogen unit for high-magnification applications.
- Excellent usability, a high-NA and long working distance objectives enable effective observation.

### Manual type

- Stages range in size from 100x100 mm to 400x200 mm.
- The XY stage is equipped with a quick-release mechanism that enables switching between coarse and fine feed to provide swift and precise stage movement, even over a large distance.



**MF-B2017D**  
The binocular tube (eyepiece) and illumination unit are optional accessories.

## SPECIFICATIONS

		MF-A1010D	MF-A2010D	MF-A2017D	MF-A3017D	MF-A4020D
Without Z-axis scale	Model No.	MF-A1010D	MF-A2010D	MF-A2017D	MF-A3017D	MF-A4020D
	Order No.	176-861*1	176-862*1	176-863*1	176-864*1	176-865*1
With Z-axis scale	Model No.	MF-B1010D	MF-B2010D	MF-B2017D	MF-B3017D	MF-B4020D
	Order No.	176-866*1	176-867*1	176-868*1	176-869*1	176-870*1
Observation image		BF (Bright-field)/Erect image				
Eyepiece (optional) with diopter adjustment		10X (eyepiece field number: 24), 15X, 20X Note: Monocular - one 10X eyepiece provided as standard; Binocular - two 10X eyepieces provided as standard				
Objective (optional)		ML objective 3X (provided as standard), 1X, 5X, 10X, 20X, 50X, 100X				
Illumination unit (One of the two options must be selected.)	LED illumination unit	Transmitted illumination: Telecentric system, Built-in aperture diaphragm, White LED light source, stepless light intensity control with cooling fan Reflected illumination: Koehler illumination, Variable aperture diaphragm mechanism, White LED light source, stepless light intensity control Control unit: Power ON/OFF switch (main switch), 100 to 240 V AC power input connector				
	Halogen illumination unit	Transmitted illumination: Telecentric system, Built-in aperture diaphragm, Halogen bulb (12 V, 50 W), stepless light intensity control, With cooling fan Reflected illumination: Koehler illumination, Variable aperture diaphragm mechanism, Halogen bulb (12 V, 50 W), stepless light intensity control, With cooling fan Control unit: Power ON/OFF switch (main switch), 100 to 240 V AC power input connector				
Stage	Measurement range	100x100 mm	200x100 mm	200x170 mm	300x170 mm	400x200 mm
	Quick-release mechanism	Provided as standard for the X and Y axes				
	Zero-set button	Provided as standard for the X and Y axes (and for the Z axis only for the MF-B type)				
Z axis	Max. workpiece height	150 mm		220 mm		
	Feed mechanism	Coaxial coarse and fine feed, handles on both sides (coarse: 30 mm/rotation, fine: 0.2 mm/rotation)				
Measuring accuracy*2 (X and Y axes, when not loaded)		(2.2+0.02L) $\mu$ m L: measuring length (mm)				
	Resolution	1/0.5/0.1 $\mu$ m 0.0001/0.00005/0.00001 in switchable				
Digital display	Display axes	X and Y (or X, Y, and Z only for the MF-B type)				
	Functions	Zero-setting, direction switching, RS232C output, USB output (specific to QSPAK)				

\*1: The following suffixes are added to the order No. to specify the User Manual's language:  
-10 for English; -11 for Simplified Chinese; No suffix for Japanese.

\*2: Measuring method complies with JIS B7153.

Bulb replacement for transmitted/reflected illumination	Standard: Halogen bulb (12 V, 50 W) (513667) Bulb life: 50 hours
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### Motor-Driven Z-axis

- Usability of the MF series has been improved by motorizing. The Z-axis of the newly introduced MF-J is motorized to enable easier focus adjustment and measurement on heavy workpieces.
- Using the Vision Unit (optional) enables the image AF function.



**MF-J2017D**  
The binocular tube (eyepiece) and illumination unit are optional accessories.

### Specifications for Motor-Driven Z-axis MF models

		MF-J2017D	MF-J3017D	MF-J4020D
Model No.		MF-J2017D	MF-J3017D	MF-J4020D
Order No.		176-891*1	176-892*1	176-893*1
Vision AF*2		Yes		
Stage	Quick release mechanism	Fitted to X and Y axes		
	Zero set switch	Fitted to X and Y axes		
Z axis	Max. workpiece height	220 mm		
	Feed mechanism	Motordrive (Maximum measuring speed: 20 mm/s)		

\*1: To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, DC for CCC, E for BS, K for KC, C and No suffix is required for PSE.

\*2: Vision Unit and an image AF cable are separately required.  
The specification other than the above is subject to the MF series.



Refer to the MF/MF-U series Catalog (No. E14003) for more details.

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**MeasurLink** ENABLED  
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

## MF-U SERIES 176 — Universal Measuring Microscopes

**MeasurLink** ENABLED  
Data Management Software by Mitutoyo

- Integration of metallurgical and measurement microscope functions provides high-resolution observation and a high-accuracy measurement solution.
- Measuring accuracy is the highest in its class (and conforms to JIS B 7153).
- Illumination can be selected from an LED unit, which has a longer life, or a powerful halogen unit for high-magnification applications.
- Excellent usability, a high-NA and long working distance objectives enable effective observation.



**MF-UB2017D**  
The turret, objectives and illumination unit are optional accessories.

### Manual type

- Stages range in size from 100×100 mm to 400×200 mm.
- The XY stage is equipped with a quick-release mechanism that enables switching between coarse and fine feed to provide swift and precise stage movement, even over a large distance.



Refer to the MF/MF-U series Catalog (No. E14003) for more details.

## SPECIFICATIONS

BF (bright-field)	Without Z-axis scale	Model No.	MF-UA1010D	MF-UA2010D	MF-UA2017D	MF-UA3017D	MF-UA4020D
	With Z-axis scale	Order No.	176-871*1	176-872*1	176-873*1	176-874*1	176-875*1
BD (bright-field/dark-field)	Without Z-axis scale	Model No.	MF-UB1010D	MF-UB2010D	MF-UB2017D	MF-UB3017D	MF-UB4020D
	With Z-axis scale	Order No.	176-876*1	176-877*1	176-878*1	176-879*1	176-880*1
BD (bright-field/dark-field)	Without Z-axis scale	Model No.	MF-UC1010D	MF-UC2010D	MF-UC2017D	MF-UC3017D	MF-UC4020D
	With Z-axis scale	Order No.	176-881*1	176-882*1	176-883*1	176-884*1	176-885*1
BD (bright-field/dark-field)	Without Z-axis scale	Model No.	MF-UD1010D	MF-UD2010D	MF-UD2017D	MF-UD3017D	MF-UD4020D
	With Z-axis scale	Order No.	176-886*1	176-887*1	176-888*1	176-889*1	176-890*1
Observation image	BF (Bright-field), DF (Dark-field) (MF-UC and MF-UD models only), Polarization, Differential Interference Contrast (DIC)/Erect image						
Eyepiece (optional) with diopter adjustment	10X (eyepiece field number: 24, two eyepieces provided as standard), 15X, 20X						
Turret (required)	Bright-field (BF)	Manual / Motor (select either one)					
	Bright-field/dark-field (BD)						
Objective (optional)	Bright-field (BF)	M Plan Apo, M Plan Apo SL, G Plan Apo series					
	Bright-field/dark-field (BD)	BD Plan Apo, BD Plan Apo SL series					
Illumination unit (One of the two options must be selected.)	LED illumination unit	Transmitted illumination: Telecentric system, Built-in aperture diaphragm, White LED light source, stepless light intensity control, With cooling fan Reflected illumination: Koehler illumination, Variable aperture diaphragm mechanism, White LED light source, stepless light intensity control Control unit: Power ON/OFF switch (main switch), 100 to 240 V AC power input connector					
	Halogen illumination unit	Transmitted illumination: Telecentric system, Built-in aperture diaphragm, Halogen bulb (12 V, 50 W), stepless light intensity control, With cooling fan Reflected: BF/BD Kohler illumination with adjustable aperture diaphragm, 12 V, 100 W or 12 V, 15 W halogen lamp (selectable), external fiber-optic illumination, stepless brightness adjustment Control unit: Power ON/OFF switch (main switch), 100 to 240 V AC power input connector					
Stage	Measuring range	100×100 mm	200×100 mm	200×170 mm	300×170 mm	400×200 mm	
	Quick-release mechanism	Provided as standard for the X and Y axes					
	Zero-set button	Provided as standard for the X and Y axes (and for the Z axis only for the MF-UB and -UD types)					
Z axis	Max. workpiece height	150 mm			220 mm		
	Feed mechanism	Coaxial coarse and fine feed, handles on both sides (coarse: 10 mm/rotation, fine: 0.1 mm/rotation)					
Measuring accuracy *2 (X and Y axes, when not loaded)		(2.2+0.02L)μm L: measuring length (mm)					
	Resolution	1/0.5/0.1 μm 0.0001/0.00005/0.00001 in switchable					
Digital display	Display axes	X and Y (or X, Y, and Z only for the MF-UB and -UD types)					
	Functions	Zero-setting, direction switching, RS232C output, USB output (specific to QSPAK)					

\*1: The following suffixes are added to the order No. to specify the User Manual's language: -10 for English; -11 for Simplified Chinese; No suffix for Japanese.

\*2: Measuring method complies with JIS B7153.

Bulb replacement for transmitted/reflected illumination	Standard: Halogen bulb (12 V, 50 W) (513667)
	Bulb life: 50 hours
For replacement for reflected illumination (from separate light source) *3	Standard: Halogen bulb (12 V, 100 W) (517181)
	High-intensity bulb (12 V, 100 W) (12BAD602)

\*3: At the time of purchase, a standard bulb and a high-intensity bulb are provided. (Only for the Reflected illumination models.)

## Motor-Driven Z-axis

- Usability of the MF-U series has been improved by motorizing. The Z-axis of the newly introduced MF-UJ/UK is motorized to enable easier focus adjustment and measurement on heavy workpieces.
- Using Vision Unit (optional) enables the image AF function.



**MF-UJ2017D**  
The turret, objectives and illumination unit are optional accessories.

## Specifications for Motor-Driven Z-axis MF-U models

BF (Bright-field)	Model No.	MF-UJ2017D	MF-UJ3017D	MF-UJ4020D
	Order No.	176-894*1	176-895*1	176-896*1
BD (Bright-field/dark-field)	Model No.	MF-UK2017D	MF-UK3017D	MF-UK4020D
	Order No.	176-897*1	176-898*1	176-899*1
Eyepiece (optional) with diopter adjustment		10X (eyepiece field number: 24, two eyepieces provided as standard), 15X, 20X		
Objective (optional)	Bright-field (BF)	M Plan Apo, M Plan Apo SL, G Plan Apo series		
	Bright-field/dark-field (BD)	BD Plan Apo, BD Plan Apo SL series		
Vision AF *2		Yes		
Stage	Measuring range	200x170 mm	300x170 mm	400x200 mm
	Quick release mechanism	Fitted to X and Y axes		
	Zero set switch	Fitted to X and Y axes		
Z axis	Max. workpiece height	220 mm		
	Feed mechanism	Motor drive (measuring speed: max. 20 mm/s)		
Measuring accuracy *3 (X and Y axes, when not loaded)	Resolution	(2.2 + 0.02L) μm L: measuring length (mm)		
	Resolution	1/0.5/0.1 μm 0.0001/0.00005/0.00001 in switchable		
Digital display	Display axes	X, Y and Z		
	Functions	Zero-setting, direction switching		

\*1: To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, DC for CCC, E for BS, K for KC, C and No suffix is required for PSE.

\*2: Vision Unit and an image AF cable are separately required.

\*3: Measuring method complies with JIS B7153.

Note: For all specifications not included above see page J-7.