

# MEASURING TOOLS

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# OPTICAL MEASURING

การวัดด้วยเลนส์

## Mitutoyo

เครื่องวัดชิ้นงาน ชนิดแสงเงา

**PJ-H30 series**

**SERIES 303 — Premium Benchtop Series**

**MeasurLink® ENABLED**  
Data Management Software by Mitutoyo



**PJ-H30D3017B**

- Conforms to JIS B7184: 1999 "Profile projectors".
- High-end model that achieves accuracy of (3.0+0.02L)  $\mu$ m
- $\phi$ 306 mm screen makes erect-unreversed images more visible.
- The largest measuring range in the class, up to 300x170 mm.
- Quick-release handle and 3-lens parfocal turret enables smooth measurement of workpiece.
- Elevating shaft mechanism for the screen head reduces operator fatigue.
- Unique model equipped with a highly accurate edge detector (OPTOEYE) and motorized up down drive is available.
- For data processing, a 2D data processor **QM-Data200** is available.

Protractor screen	Model No.	<b>PJ-H30A1010B</b>	<b>PJ-H30A2010B</b>	<b>PJ-H30A2017B</b>	<b>PJ-H30A3017B</b>
	Order No.	<b>303-712-1**</b>	<b>303-713-1**</b>	<b>303-714-1**</b>	<b>303-715-1**</b>
Protractor screen, OPTOEYE (built-in), Electromotive focusing	Model No.	<b>PJ-H30D1010B</b>	<b>PJ-H30D2010B</b>	<b>PJ-H30D2017B</b>	<b>PJ-H30D3017B</b>
	Order No.	<b>303-732-1**</b>	<b>303-733-1**</b>	<b>303-734-1**</b>	<b>303-735-1**</b>
Projected image		Erect			
	Effective diameter	$\phi$ 306mm (12")			
	Screen material	Fine-ground glass			
	Screen rotation	$\pm 360^\circ$ ( $\pm 370^\circ$ for display)			
Protractor screen	Angle display	Digital counter (LED) (ABS/INC mode switching, Zero Set)			
	Resolution	1' or 0.01" (switchable)			
	Mechanism	Fine feed and clamp			
	Cross-hairs	90° (solid lines)			
Projection	Magnification	10X (standard accessory), 5X, 20X, 50X, 100X, All lens have the same focus. Half-mirror for the coaxial surface illumination are built-in and movable.			
	Lens mount	Bayonet mount, 3-lens mount turret type			
Magnification	Transmitted illumination	Less than $\pm 0.1\%$ of nominal magnification			
accuracy	Surface illumination	Less than $\pm 0.15\%$ of nominal magnification			
Illumination	Transmitted illumination	Halogen bulb (24 V, 150 W, 50 hours) ( <b>515530</b> ), Variable Illumination angle (Coaxial surface/Oblique reflected, Beam concentration and adjustment), Built-in heat-absorbing filter, Built-in cooling fan, Stepless brightness adjustment, Soft lighting (inrush current reduction)			
	Surface illumination	Halogen bulb (24 V, 150 W, 50 hours) ( <b>515530</b> ) Zoom Telecentric system, Heat absorbing filter, Built-in cooling fan, Stepless brightness adjustment, Soft lighting (inrush current reduction), Bulb sliding mechanism			
Resolution for X/Y counter**		0.001mm/.0001"			
Measuring unit		High-accuracy digital scale			
Measuring range (XxY)		100x100mm	200x100mm	200x170mm	300x170mm
Measuring accuracy **3		(3+0.02L) $\mu$ m L: Measured length (mm)			

\*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: 0.5  $\mu$ m or 0.1  $\mu$ m resolution is also available. Please contact Mitutoyo Techno Service Business Division.

\*3: Measuring method complies with JIS B7184.

เครื่องวัดชิ้นงาน ชนิดแสงเงา

**PJ-A3000**

**SERIES 302 — Standard Benchtop Series**

**MeasurLink® ENABLED**  
Data Management Software by Mitutoyo



**PJ-A3010F-200**

- A standard model that achieves both high operability and cost effectiveness.
- Screen diameter is 300 mm and a range of stage sizes is available to suit a wide a range of applications.
- The halogen lamp is easily replaced using a sliding mechanism.
- For data processing, a 2D data processor **QM-Data200** is available.

Model No.	<b>PJ-A3005D-50</b>	<b>PJ-A3010F-100</b>	<b>PJ-A3005F-150</b>	<b>PJ-A3010F-200</b>
Order No.	<b>302-704*</b>	<b>302-703*</b>	<b>302-702*</b>	<b>302-701*</b>
Projected image	Inverted-reversed			
	Effective diameter	$\phi$ 315mm (12.4")		
	Screen material	Fine-ground glass		
	Screen rotation	$\pm 360^\circ$ ( $\pm 370^\circ$ for display)		
Protractor screen	Angle display	Digital counter (LED) (ABS/INC mode switching, Zero Set)		
	Resolution	1' or 0.01" (switchable)		
	Mechanism	Fine feed and clamp		
	Cross-hairs	90° (solid lines)		
Projection	Magnification	10X (standard accessory), 20X, 50X, 100X 10X, 20X (equipped with an external half-mirror for coaxial surface illumination)		
Illumination	Transmitted illumination	Halogen bulb (24 V, 150 W, 500 hours) ( <b>512305</b> ), Telecentric system, Heat-absorbing filter, Built-in cooling fan, 2-step (High/Low) brightness switch, Combination use with a color filter available		
	Surface illumination	Halogen bulb (24 V, 150 W, 500 hours) ( <b>512305</b> ) Beam concentration and adjustment available, Heat-absorbing filter, Built-in cooling fan		
Resolution for X/Y counter	0.001mm/.00005"	0.001mm/.0001"		
Measuring unit	Digital micrometer head	Digital scale		
Measuring range (XxY)	50x50mm	100x100mm	150x50mm	200x100mm

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

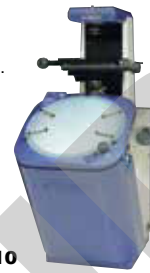
## เครื่องวัดชิ้นงาน ชนิดแสงเงา

## PV-5110

## SERIES 304 — Profile Projectors

- Floor-standing projector with a vertical axis and a unique forward-sloping screen.
- The large 500 mm diameter screen enables the whole of a 100 mm diameter workpiece to be inspected using a 5X projection lens without needing to move the workpiece.

- The sloping screen design enables the operator to maintain a comfortable operational posture for long periods of time while making comparative measurements or tracing a projected image.
- For data processing, a 2D data processor **QM-Data200** is available.



PV-5110

Model No.	PV-5110
Order No.	304-919*1
Projected image	Inverted-reversed
Effective diameter	ø508mm (20")
Screen material	Fine-ground glass
Screen rotation	±360° (±370° for display)
Protractor	Digital counter (LED) (ABS/INC mode switching, Zero Set)
screen	Resolution 1' or 0.01° (switchable)
Mechanism	Fine feed and clamp
Cross-hairs	90° (solid lines)
Zero-base index	(Equipped with the built-in backlight)
Projection	Magnification 10X (standard accessory), 5X, 20X, 50X, 100X
lens	Lens mount Quick insertion type
Illumination	Transmitted illumination Halogen bulb (24 V, 150 W, 500 hours) (512305), Telecentric system, Heat-absorbing filter, Built-in cooling fan, 2-step (High/Low) brightness switch, Combination use with a color filter available
Surface illumination	Double-lighting oblique surface illumination unit (Optional), Halogen bulb (24 V, 150 W, 500 hours) (512305), 2-step (High/Low) brightness switch
Resolution for X/Y counter*2	—
Measuring unit	Digital scale
Measuring range (XxY)	200x100mm (164x68mm*3)

\*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: X and Y counters are not built into the **PV-5110** main unit. If a counter display is required, it is recommended that a **QM-Data200** or **KA-212** is purchased separately.

\*3: The range where no shading is observed using a 5X projection lens with transmitted illumination.

## เครื่องวัดชิ้นงาน ชนิดแสงเงา

## PH-3515F, PH-A14

## SERIES 172 — Profile Projector

- Standard models as used in the machine tool industry. Best for observation and measurement of cutting tools (end mills, lathe tools).
- The stage has a higher loading capacity (45 kg) than any other type of projector.

- Unique projector employing horizontal optical system. The optical axis and the stage are parallel, and the workpiece can be easily removed.
- For data processing, a 2D data processor **QM-Data200** is available.



PH-3515F



PH-A14

Model No.	PH-3515F	PH-A14
Order No.	172-868*1	172-810*2
Projected image	Erect-reversed	Invert-reversed
Effective diameter	ø353mm (13.9")	ø356mm (14")
Screen material	Fine-ground glass	
Screen rotation	±360° (±370° for display)	
Protractor	Digital counter (LED) (ABS/INC mode switching), Zero Set	Vernier
screen	Resolution 1' or 0.01° (switchable)	2' (graduation)
Mechanism	Fine feed and clamp	
Cross-hairs	90° (solid lines)	
Projection	Magnification 10X (standard accessory), 5X (PH-3515F only), 20X, 50X, 100X	
lens	Screw mount	
Magnification	Transmitted illumination Within ±0.1% of nominal magnification	
accuracy	Surface illumination Within ±0.15% of nominal magnification	
Illumination	Transmitted illumination Halogen bulb (24 V, 150 W, 500 hours) (515530), Telecentric system, Heat-absorbing filter, Built-in cooling fan, 2-step (High/Low) brightness switch, Combination use with a color filter available	
Surface illumination	Parabolic halogen bulb (24 V, 200 W, 500 hours) (12BAA637) Beam concentration and adjustment available, Heat-absorbing filter, Built-in cooling fan	
Resolution for X/Y counter*2	—	
Measuring unit	Digital scale	
Measuring range (XxY)	254x152mm	200x100mm

\*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: To denote your AC power cable add the following suffixes to the order No.: -10A for UL/CSA, -20D for CEE, -20DC for CCC, -20E for BS, -20K for KC.

\*3: For the PH-A14, a light source (24 V, 150 W), which is common to the Transmitted illumination and Surface illumination, is used. It is not possible to regulate brightness.

\*4: XY counter is not built in the main unit of the **PH-3515F** or **PH-A14**. If a counter display is required, it is recommended to purchase the **QM-Data200** or a counter (**KA-212**) separately.

Note: Depending on the angle of illumination, measurement results may be smaller than actual values.

# OPTICAL MEASURING

การวัดด้วยเลนส์

# Mitutoyo

กล้องไมโครสโคป

**MF series**

**SERIES 176 — Measuring Microscopes**

**MeasurLink® ENABLED**  
Data Management Software by Mitutoyo



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

- 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.

Without Z-axis scale	Model No.	MF-A1010D	MF-2010D	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) Adjustable diopter		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				
	Measurement range	100x100mm	200x100mm	200x170mm	300x170mm	400x200mm
Stage	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	150mm		220mm		
	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)μm L: measuring length(mm)				
	Minimum reading	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-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



## 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

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 button	Fitted to X and Y axes	
Z axis	Max. workpiece height	220mm	
	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.

## กล้องไมโครสโคป

## MF-U series

## SERIES 176 — Universal Measuring Microscopes

- 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.

**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-UB2017D**

The turret, objectives and illumination unit are optional accessories.



BF (bright-field)	Without Z-axis scale	Model No.	MF-UA1010D	MF-UA2010D	MF-UA2017D	MF-UA3017D	MF-UA4020D
	Order No.		176-871*1	176-872*1	176-873*1	176-874*1	176-875*1
BD (bright-field/dark-field)	With Z-axis scale	Model No.	MF-UB1010D	MF-UB2010D	MF-UB2017D	MF-UB3017D	MF-UB4020D
	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
	Order No.		176-881*1	176-882*1	176-883*1	176-884*1	176-885*1
BD (bright-field/dark-field)	With Z-axis scale	Model No.	MF-UD1010D	MF-UD2010D	MF-UD2017D	MF-UD3017D	MF-UD4020D
	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) Adjustable diopter			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)						
Illumination unit (One of the two options must be selected.)			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				
			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		100x100mm	200x100mm	200x170mm	300x170mm	400x200mm
	Quick-release mechanism		Provided as standard for the X and Y axes				
Z axis	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)				
	Max. workpiece height		150mm				
Measuring accuracy *2 (X and Y axes, when not loaded)	Feed mechanism		Coaxial coarse and fine feed, handles on both sides (coarse: 10 mm/rotation, fine: 0.1 mm/rotation)				
	Minimum reading		(2.2+0.02L)µm L: measuring length(mm)				
Digital display	Display axes		1/0.5/0.1µm .0001"/.00005"/.00001" switchable				
	Functions		X and Y (or X, Y, and Z only for the MF-UB and -UD types)				
			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) <b>(513667)</b>
	Bulb life: 50 hours
For replacement for reflected illumination (from separate light source) *3	Standard: Halogen bulb (12 V, 100 W) <b>(517181)</b>
	High-intensity bulb (12 V, 100 W) <b>(12BAD602)</b>

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

## Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

## Microscopes

กล้องไมโครสโคป

## Inspection Mirror

กระจกส่อง

## Magnifier

แว่นขยาย

## Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

# OPTICAL MEASURING

การวัดด้วยเลนส์

Mitutoyo

Microscopes  
กล้องไมโครสโคป



## 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 Series

BF (brightfield)	Model No.	MF-UJ2017D	MF-UJ3017D	MF-UJ4020D
	Order No.	176-894*1	176-895*1	176-896*1
BD (brightfield/darkfield)	Model No.	MF-UK2017D	MF-UK3017D	MF-UK4020D
	Order No.	176-897*1	176-898*1	176-899*1
Eyepiece (optional) Adjustable diopter		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	Measurement range	200x170mm	300x170mm	400x200mm
	Quick-release mechanism	Fitted to X and Y axes		
Z axis	Zero-set button	Fitted to X and Y axes		
	Max. workpiece height	220mm		
Measuring accuracy *3 (X and Y axes, when not loaded)	Feed mechanism	Motor drive (measuring speed: max. 20 mm/s)		
	Minimum reading	(2.2 + 0.02L)µm L: measuring length (mm)		
Digital display	Display axes	1/0.5/0.1µm .0001"/.00005"/.00001" switchable		
	Functions	X, Y and Z		
		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 R-005.



## กล้องไมโครสโคป

## Hyper MF/MF-U

## SERIES 176 — High-Accuracy Measuring Microscopes

- This is the ultimate measuring microscope achieving the world's highest accuracy (1.5+10L/1000µm), with 0.01µm resolution.
- Three-axis motorized front operation joystick control, which makes a refreshing change from conventional microscope operation, allows fine positioning even during fast movement.
- Large workstage with stroke of 250x150 mm provides enough margin for the measurement of larger workpieces.
- The best-selling data processing unit, **QMDData200**, and the Vision Unit can be integrated to provide an effective and stable measurement environment.

## Hyper MF-U

The optical tube, turret, and objective lens are optional.



## Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดตั้งเงา

## Microscopes

กล้องไมโครสโคป

## Inspection Mirror

กระจกส่อง

## Magnifier

แว่นขยาย

## Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

Model No.	HyperMF-B2515B	HyperMF-UB2515B	HyperMF-UD2515B	HyperMF-UE2515B	HyperMF-UF2515B
Order No.	176-430*1	176-431*1	176-432*1	176-433*1	176-434*1
Optical tube	Finite correction optical system BF (Bright-field)	Infinity-correction optical system BF (Bright-field)	Infinity-correction optical system BD (Bright/Dark-field)	Infinity-correction optical system BF (Bright-field) with the LAF function	Infinity-correction optical system BD (Bright/Dark-field) with the LAF function
	Standard reticle (Built-in)	90° broken-cross line (line width 5µm)			
	Pupil distance adjustment	Siedentopf type Adjustment range: 51 to 76mm			
	Optical path switching ratio	Observation/TVphotomicrography = 50/50			
	Vertical tilt angle	25°	Tilting		
	TV port	Provided as standard			
Observation image	Erect image				
Eye-piece Magnification	10X, 15X, 20X				
Objective lens (optional)	Selectable from the monocular unit (equipped with an eyepiece) or binocular tube (equipped with two eyepieces)	Equipped with two 10X eyepieces			
	ML series objective lens	1X, 3X, 5X, 10X, 20X, 50X, 100X	—		
	BF (Bright field)	—	M Plan Apo, M plan Apo SL, G plan Apo		
	BD (Bright / Dark field)	—	BD Plan Apo, BD Plan Apo SL		
Turret	BF (Bright field)	—	(Equipped with a four-hole manual turret/ motorized five-hole turret *2)		
(optional)	BD (Bright / Dark field)	—	(Equipped with a four-hole manual turret/ motorized four-hole turret *3)		
Focusing section	Maximum height of workpiece	150mm			
	Measuring accuracy	(1.5+0.01L) µm L: Measuring length (mm)			
	Drive method	Motorized control using a joystick			
Illumination unit	Transmitted illumination device	Telecentric system, Built-in aperture diaphragm, Halogen bulb (12 V, 50 W), 100-step light intensity control, Fiber-optic cable cold light illumination			
	Reflected illumination unit	Koehler illumination, Variable aperture diaphragm mechanism, Halogen bulb (12 V, 100 W), 100-step light intensity control, Fiber-optic cable cold light illumination			
Workstage	Measuring range (XxY)	250x150mm			
	Measuring accuracy** (When no load is put on the X- or Y-axis)	(0.9+0.003L) µm L: Measuring length (mm)			
	Dimensions of the top plane	460x350mm			
	Usable dimensions of the stage glass	300x200mm			
	Swiveling angle	±3°			
	Maximum loading mass	30kg			
	Drive method	Motorized control with the use of a joystick			
Detector	High precision digital scale (Patented)				
Digital display	Resolution	0.01µm			
	Axes to be displayed	X, Y, Z			
	Data processing unit	QM-Data200 or Vision Unit (required)			
Operation section	LAF (just focus)	—	—	Available	
	LAF (tracking focus)	—	—	Available	

\*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 and \*3 are factory-installed options.

\*4: Measurement accuracy complies with JIS B7153.

Bulb replacement for transmitted/ reflected illumination	Standard: Halogen bulb (12 V, 50 W) <b>(02APA527)</b>	For replacement for reflected illumination (from separate light source)	Standard: Halogen bulb (12 V, 100 W) <b>(517181)</b> High-intensity bulb (12 V, 100 W) <b>(12BAD602)</b>
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# OPTICAL MEASURING

การวัดด้วยเลนส์

Mitutoyo

กล้องไมโครสโคป

TM series

SERIES 176 — Toolmakers' Microscopes

MeasurLink<sup>®</sup> ENABLED  
Data Management Software by Mitutoyo

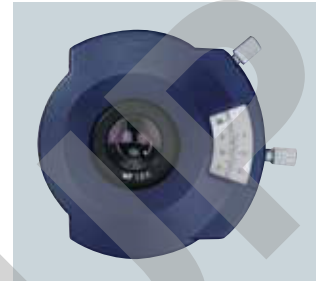


TM-505B



TM-1005B

Angle Index (Standard Accessory)



\* micrometer heads is option.

- Compact universal toolmakers' microscope that can be installed on any site.
- Newly designed LED illuminators provide enhanced observation for higher accuracy and resolution.
- Optional LED circular illuminator available for applications requiring all-round lighting.
- Achieves a maximum measuring height of 115 mm despite the compact size.
- Installation of digimatic micrometer heads (MHD-50MB, option) makes measurement easy and precise.
- A vernier scale (Angle Index) built into the eyepiece mount enables accurate angular measurements.
- Overall magnification is 30X using the standard accessory lenses but can be changed to lie within the 20-200X range by using optional objectives and/or eyepieces.

Model No.		TM-505B	TM-1005B
Order No.		176-818*1	176-819*1
Optical tube		Monocular type (Vertical tilt angle: 30°)	
Observation image		Erect	
Eyepiece protractor		Resolution (graduation) : 1°, Rotation angle: 360°, Resolution (angle): 6', Adjustable zero point	
Eyepiece		Standard accessory: 15X (field number: 13), Options: 10X, 20X	
Objective lens		Standard accessory: 2X, Options: 5X, 10X	
Microscope head	Maximum height of workpiece	115mm	107mm
	Focusing method	Manual (Coarse feed)	
Illumination unit	Transmitted illumination	Stepless brightness adjustment, White LED light source with green filter	
	Surface illumination	Oblique single-source type, Stepless brightness adjustment, White LED light source	
Cross-travel stage	Measuring range	50x50mm	100x50mm (An optional 50 mm gauge block is required to cover full range. A CERA block is recommended.)
	Table size	152x152mm	240x152mm
	Usable area of the stage glass	96x96mm	154x96mm
	Maximum stage glass loading	5kg	
Linear measurement method		Micrometer head*2	
Resolution		Depends on the micrometer head specifications*2 (for <b>MHD-50MB (164-163)</b> : 0.001 mm)	
Micrometer head travel range		for <b>MHD-50MB (164-163)</b> : 50mm	
Power supply		AC 100 to 240 V 50/60 Hz Maximum power consumption: 4.2 W	
Main unit mass		14kg	15kg

Note: The main unit with digimatic micrometer head (MHD-2\*MB) is provided in the TM-500 series.

TM-A505B (176-820A)

TM-A1005B (176-821A)

Other specifications are the same as the other TM-500 Series.

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

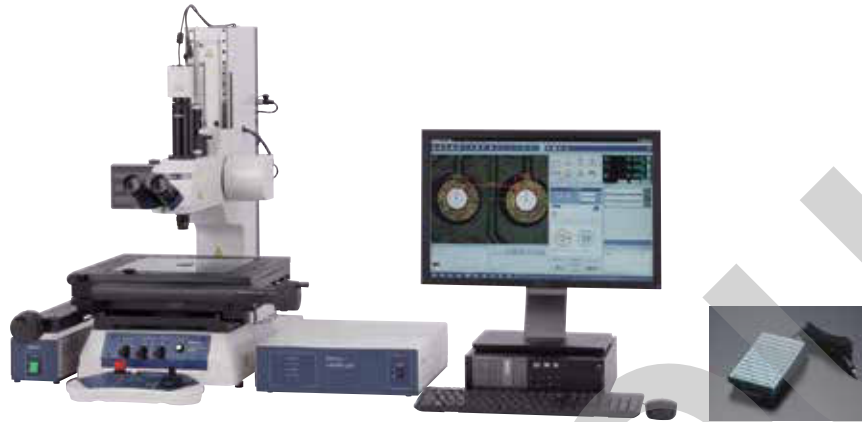
\*2: Micrometer heads are optional for **TM-505B** and **TM-1005B**.



กล้องไมโครสโคป

Vision Unit

SERIES 359 — Vision System Retrofit for Microscopes

MeasurLink<sup>®</sup> ENABLED  
Data Management Software by Mitutoyo

MF-J2017D plus Vision Unit

Foot switch  
12AAJ088

- The measurement tools and various macro icons allow measurement in one easy step.
- The graphics and measurement navigation functions facilitate operation.
- The image saving function and the data output function to the spreadsheet software are standard.
- Combined use with the MF/MF-U Series (Motor-Driven Z-axis/Motor-Driven) achieves the image AF (auto focus) function.

## SPECIFICATIONS

	Vision Unit
Magnification of the optical system	When installed on the microscope 0.5X (using the 0.5X TV adapter)
Image detection	High-sensitivity 1/2" color CMOS camera 3 million pixels
Resolution	0.1 $\mu\text{m}$
Accuracy (Measurement environment: 20°C)	Depends on the accuracy specification of the Mitutoyo measuring microscope to which the unit is fitted. For reference: When using an ML series 3X objective lens (In an inspection using a sample workpiece based on the Mitutoyo standards) Measurement accuracy in the screen: Within $\pm 2.5 \mu\text{m}$ Repetitive accuracy in the screen ( $\pm 2\sigma$ ): Within $\pm 1 \mu\text{m}$
Software (option)	QSPAK Vision Unit Edition

Note: QSPAK and a data processor are required separately.

## Applicable Models

- Mitutoyo **MF series**, **MF-U series** (Connection to the **MF-H series** is not available.) **Hyper MF series**, **Hyper MF-U series**

## Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

## Microscopes

กล้องไมโครสโคป

## Inspection Mirror

กระจกส่อง

## Magnifier

แว่นขยาย

## Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

# OPTICAL MEASURING

การวัดด้วยเลนส์

**Mitutoyo**

จอแสดงผล

**QM-Data200**

**SERIES 264 — 2-D Data Processing Unit**

**MeasurLink<sup>®</sup> ENABLED**

Data Management Software by Mitutoyo



**QM-Data200**  
(stand type)

- 2D Data Processor designed to perform arithmetic processing of XY coordinate data acquired from projectors and measuring microscopes for local display or output to a printer.
- Informative color-graphic displays on the large LCD screen make for easy measurement operations.
- The AI measurement function (automatic identification of measuring item) eliminates switching between the measurement command keys.
- Equipped with a measurement procedure teaching function and measuring position navigation in Repeat mode.
- The user menu function allows users to register measurement commands or part programs to create their own menus.
- Measurement result output to (CSV) format in spreadsheet software.
- Part programs and calculation results can be saved on a USB-compatible memory device.

## SPECIFICATIONS

Model No.	QM-Data200		
Order No.	Standard type	Flexible arm type	Standard type
	264-155*1	264-156*1	264-159*1
Applicable models (Conventional models)*2	<b>PJ-A3000 series</b> <b>PJ-H30 series</b> <b>PV-5110</b> <b>PH-3515F</b> <b>PH-A14</b> <b>MF series</b> <b>MF-U series</b>	<b>PJ-A3000 series</b> <b>PJ-H30 series</b> <b>PV-5110</b> <b>PH-3515F</b> <b>PH-A14</b>	<b>HyperMF/MF-U</b>
Unit of measurement	Length: mm	Angle: Switchable between decimal degree and sexagesimal notation	
Resolution	0.1μm		0.01μm
Program function	Creating, performing, and editing of measurement procedures		
Statistical processing	Number of data, maximum value, minimum value, mean value, standard deviation, range, histogram Statistics classified by each measurement function (Statistics classified by each command)		
Display unit	Color graphic LCD (equipped with a backlight)		
ABS point	—		Available (Automatic movement)
LAF (Laser AF)	—		Available
Edge sensor position correction	Available (Profile Projectors with OPTOEYE)		—
Input/output	XYZ: Data input from linear scales (Maximum number of axes: 3) RS-232C 1 : Connection to an external PC RS-232C 2 : Connection to a measuring unit counter OPTOEYE: Connection to an OPTOEYE edge signal (OPTOEYE 200) FS: For the connection to the foot switch PRINTER: For the connection to an external printer USB-MEMORY: For the connection to a USB memory		
Measurement result file output	RS-232C output (CSV format, MUX-10 format)		
Display language	16 languages (Japanese, English, German, French, Italian, Spanish, Portuguese, Cheskey, Chinese (simplified/traditional), Korean, Turkish, Swedish, Polish, Dutch, Hungarian)		
Power supply	AC 100 to 240 V 50/60 Hz		
Maximum power consumption	17 W (excluding optional accessories)		
External dimensions (WxHxD)	260x242x310 mm (including the stand section)	318x153x275 mm (when the arm is horizontal)	260x242x310 mm (including the stand section)
Mass	Approx. 2.9kg	Approx. 2.8kg	Approx. 2.9kg
Standard Accessories	AC adapter, Power cable, Quick Operation Guide		

\*1: To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, E for BS, K for KC, C and No suffix is required for PSE, and 00 for power cord other than A, D, E, K, C, No suffix.

\*2: Please contact Mitutoyo office with respect to the models that are applicable to the models other than mentioned above.

## กล้องไมโครสโคป

## FS-70 series

## SERIES 378 — Microscope Unit for Semiconductor Inspection

- Compact microscope unit equipped with an eyepiece observation section.
- A versatile microscope head typically used as an OEM product suitable for fitting to specialist machines, such as those designed for inspection and repair of semiconductor wafers using YAG (near-infrared, visible, near-ultraviolet, or ultraviolet) lasers\*.

\* The performance and safety of laser-equipped system products is not guaranteed.

- Usable in infrared optical systems\*. Applications: internal observation of silicon systems; spectral characteristics analysis using infrared.
- An infrared source and infrared camera are necessary.
- Models supporting BF (Bright-field), DF (Dark-field), Polarization, and Differential Interference Contrast (DIC) are available.
- The inward-facing turret and long working distance objective lenses maintain the high operability of the microscope.



The parfocal manual turret, eyepieces and objective lenses are optional.

## Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

## Microscopes

กล้องไมโครสโคป

## Inspection Mirror

กระจกส่อง

## Magnifier

แว่นขยาย

## Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

Model No.	FS70	FS70-TH	FS70Z	FS70Z-TH	FS70L	FS70L-TH	FS70L4	ES70L4-TH
Order No.	378-184-1	378-184-3	378-185-1	378-185-3	378-186-1	378-186-3	378-187-1	378-187-3
Short base model No.	FS70-S	FS70-THS	FS70Z-S	FS70Z-THS	FS70L-S	FS70L-THS	FS70L4-S	FS70L4-THS
Order No.	378-184-2	378-184-4	378-185-2	378-185-4	378-186-2	378-186-4	378-187-2	378-187-4
Focus adjustment	50 mm travel range with concentric coarse (3.8mm/rev) and fine (0.1 mm/rev) focusing wheels (right / left)							
Image	Erect image							
Optical tube type	Siedentopf, adjustable interpupillary distance range: 51 - 76 mm							
Field number	24mm							
Tilt angle	—	0° - 20°	—	0° - 20°	—	0° - 20°	—	0° - 20°
Optical pass ratio	Fixed type (Eyepiece/TV = 50/50)	Switchable type (Eyepiece/ Tube = 100/0: 0/100)	Fixed type (Eyepiece/TV = 50/50)	Switchable type (Eyepiece/Tube = 100/0: 0/100)				
Protective filter	—				Built-in laser beam filter			
Tube lens	1X		1X - 2X zoom		1X			
Applicable laser	—				1064/532/355 nm		532/266 nm	
Camera mount	C-mount (using optional adapter B**)				Use a laser with TV port.		C-mount receptacle (with green filter switch)	
Illumination system, optional	Reflective illumination for bright-field (Koehler illumination, with aperture diaphragm) 12 V, 100 W fiber-optics, stepless adjustment, light guide length: 1.5 m							
Objective, optional (for observation)	M Plan Apo, M Plan Apo SL, G Plan Apo							
Objective, optional (for laser-cutting)	—				M/LCD Plan NIR, M/LCD Plan NUV		M Plan UV	
Loading *2	14.5kg	13.6kg	14.1kg	13.2kg	14.2kg	13.5kg	13.9kg	13.1kg
Mass (main unit)	6.1kg	7.1kg	6.6kg	7.5kg	6.4kg	7.2kg	6.7kg	7.5kg

\*1: Installation is optional.

\*2: Loading on optical tube excluding weight of objective lenses and eyepieces

Bulb replacement	Standard: Halogen bulb (12 V, 100 W) (No.517181)
	For the fiber-optic cable illumination unit (12 V, 100 W) (No.378-700)

# OPTICAL MEASURING

การวัดด้วยเลนส์

Mitutoyo

กล้องไมโครสโคป

VMU series

SERIES 378 — Video Microscope Unit



- Telecentric system equipped with an aperture diaphragm is standard on the reflected illumination optical system.
- Best suited to process images for which uniform illumination is required.
- Design and manufacture are flexible to meet your demands such as double camera mounting or double (low/high magnification).

- Compact and lightweight microscope designed to be built in for camera observation
- A versatile microscope head typically used as an OEM product suitable for fitting to specialist machines, such as those designed for inspection and repair of semiconductor wafers using YAG (near-infrared, visible, near-ultraviolet, or ultraviolet) laser <sup>\*1</sup>.
- <sup>\*1</sup> The performance and safety of laser-equipped system products is not guaranteed.
- For VMU-LB and VMU-L4B, the rigidity and general performance of the microscope main unit have been enhanced compared with previous models.
- Applications <sup>\*2</sup>: Internal observation of silicon systems, spectral characteristics analysis using infrared, etc.
- <sup>\*2</sup> An infrared source and infrared camera are necessary.

Model No.	VMU-V	VMU-H	VMU-LB	VMU-L4B
Order No.	378-505	378-506	378-513	378-514
Camera mounting direction	Vertical	Horizontal	Vertical	
Observation	Bright-field/Erect image	Bright-field/Inverted image	Bright-field/Erect image	
TV adapter	Equipped with a C-mount		Equipped with a C-mount (Equipped with a green filter switching mechanism)	
Optical tube	Built-in 1X (visible/near-infrared calibration)		Built-in 1X (near-infrared/visible/near-ultraviolet calibration)	Built-in 1X (visible/ultraviolet)
Available for lasers	—		YAG laser source (Fundamental, Second/Third harmonic) mountable	YAG laser source (Second/Third/Fourth harmonic) mountable
For observation	<b>M Plan Apo series, M Plan Apo HR series, M Plan Apo SL series, G Plan Apo series</b>			
Objective lens (required option)	—		M/LCD Plan Apo NIR series M/LCD Plan Apo NUV series Note: Selected depending on the wavelength of the laser source	M/LCD Plan Apo NIR series M/LCD Plan Apo NUV series M Plan UV series Note: Selected depending on the wavelength of the laser source
For laser processing	—			
Applicable camera(s)	2/3 type or less cameras (C-mount type)			
Reflected illumination optical system	Telecentric system equipped with an aperture diaphragm			
Illumination unit (optional)	Fiber-optic cable illumination unit (12 V, 100 W) <b>(378-700*)</b> / (15 V, 150 W) <b>(176-316*)</b>			
Main unit weight	650g	750g	1270g	1300g

Note1: Besides the models shown above, products equipped with a compact Koehler illumination system intended for general observation are also available.  
 Note2: The **M Plan Apo 1X** objective lens is used with the polarization unit (**378-710** or **378-715**).  
 \* Order numbers differ depending on the power supply cord.

กล้องไมโครสโคป

WIDE VMU series

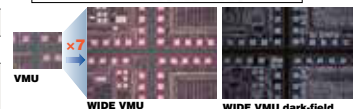
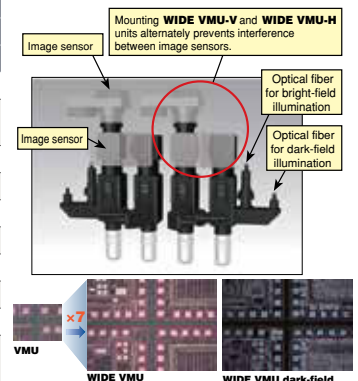
SERIES 378 — Wide-field Video Microscope Unit



- Wide-FOV video microscope unit for Bright/Dark-field observation.
- Incorporates a wide-field image sensor (APS-C format or smaller size) providing seven times greater viewing area than the VMU Series for greatly enhanced inspection efficiency.
- In addition to normal bright-field observation, this series supports darkfield observation for scratch inspection, etc., and polarized light observation for increased contrast when viewing certain specimens.
- Bulk inspections covering a wide area can be performed with multiple units in a high-density configuration.

		For Bright-field Observation		For Bright-/Dark-field Observation	
Model No.		WIDE VMU-V	WIDE VMU-H	WIDE VMU-BDV	WIDE VMU-BDH
Order No.		378-515	378-516	378-517	378-518
Camera mounting direction		Vertical	Horizontal	Vertical	Horizontal
Observation		Bright-field/ Erect image	Bright-field/ Inverted image	Bright /Dark-field/ Erect image	Bright /Dark-field/ Inverted image
	Optical system	Magnification: 1X Visible light			
	Camera Mount	F-Mount, C-Mount (with aligning and parfocal adjustment mechanism)			
	Optical tube	Built-in 1X tube lens (Correcting wavelength range: 436 to 656 nm)			
	Image forming (tube) lens				
	Image field	ø30			
	Polarized unit*	Mountable			
Objective lens (required option)		M Plan Apo, M Plan Apo HR, M Plan Apo SL, G Plan Apo		BD Plan Apo, BD Plan Apo HR, BD Plan Apo SL	
Applicable camera		APS-C format or smaller size			
Reflected illumination optical system		Telecentric illumination, Bright-field illumination optical tube (Single-port fiber-optic illumination)		Telecentric illumination, Bright/Dark-field illumination optical tube (Dual-port fiber-optic illumination) Bright/Dark-field switching with light source on-off	
Illumination unit (optional)		Fiber-optic illumination unit (12 V, 100 W) (378-700)/ (12 V, 150 W) (176-316)			
Main unit weight		1800g	1950g	2000g	2150g

\*Polarized observation by Bright-field illumination



## เลนส์

## FS series objective lens

## SERIES 378 — Ultra-long working distance objective lens

- **M/BD Plan Apo** (M Plan Apochromat Bright/Dark-field) objectives feature the image evenness over the entire view field needed to achieve high color reproducibility.
- The following objective lenses support a wide range of wavelength including near infrared, visible, and ultraviolet lasers. Specialty LCD laser objectives are available:

**M/LCD Plan NIR (-HR) series** (Near-infrared lenses for laser processing featuring ultra-long working

distances), **M/LCD Plan NUV series** (Nearultraviolet lenses), **M Plan UV series** (Ultraviolet lenses), and **G Plan Apo series** (Cover Glass corrected lenses that allow focusing through a window for vacuum and high temperature applications).

- Uses environment-friendly glass (no lead or arsenic) for the lens material (of the specified models).

BF (Bright-field) for observation/measurement



BD (Bright/Dark-field) for observation/measurement



For near-infrared calibration (NIR)



For near-ultraviolet calibration (NUV)



For the ultraviolet calibration (UV)



## Objectives for Bright Field Observation (long working distance)

M Plan Apo /  
M Plan Apo HR

VMU

WIDE VMU

FS70

MF-U

Hyper MF-U

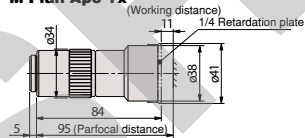
## Features

- Infinity corrected
- Bright field observation
- Long working distance
- Plan-Apochromat

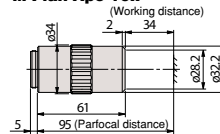


## DIMENSIONS

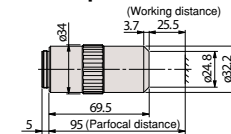
## M Plan Apo 1x



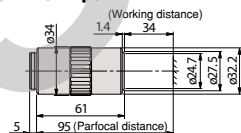
## M Plan Apo 10x



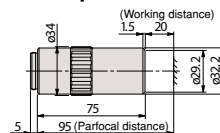
## M Plan Apo HR 5x



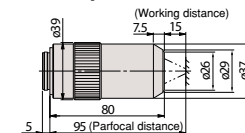
## M Plan Apo 2x



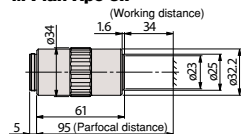
## M Plan Apo 20x



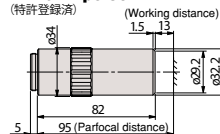
## M Plan Apo HR 10x



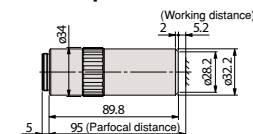
## M Plan Apo 5x



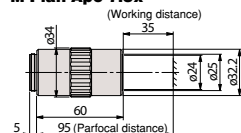
## M Plan Apo 50x



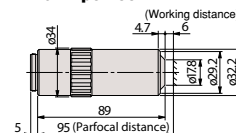
## M Plan Apo HR 50x



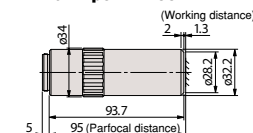
## M Plan Apo 7.5x



## M Plan Apo 100x



## M Plan Apo HR 100x





# OPTICAL MEASURING

การวัดด้วยเลนส์

Mitutoyo

Microscopes

กล้องไมโครสโคป

Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

Microscopes

กล้องไมโครสโคป

Inspection Mirror

กระจกส่อง

Magnifier

แว่นขยาย

Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
M Plan Apo									
M Plan Apo 1x *1	378-800-3	0.025	11.0	200	11.0	440	24	4.8x6.4	300
M Plan Apo 2x *2	378-801-6	0.055	34.0	100	5.0	91	12	2.4x3.2	220
M Plan Apo 5x	378-802-6	0.14	34.0	40	2.0	14	4.8	0.96x1.28	230
M Plan Apo 7.5x	378-807-3	0.21	35.0	26.67	1.3	6.2	3.6	0.64x0.85	240
M Plan Apo 10x	378-803-3	0.28	34.0	20	1.0	3.5	2.4	0.48x0.64	240
M Plan Apo 20x	378-804-3	0.42	20.0	10	0.7	1.6	1.2	0.24x0.32	270
M Plan Apo 50x	378-805-3	0.55	13.0	4	0.5	0.9	0.48	0.10x0.13	290
M Plan Apo 100x	378-806-3	0.70	6.0	2	0.4	0.6	0.24	0.05x0.06	320
M Plan Apo HR									
M Plan Apo HR 5x *3	378-787-4	0.21	25.5	40	1.3	6.2	4.8	0.96x1.28	285
M Plan Apo HR 10x *3	378-788-4	0.42	15.0	20	0.7	1.60	2.4	0.48x0.64	460
M Plan Apo HR 50x	378-814-4	0.75	5.2	4	0.4	0.49	0.48	0.10x0.13	400
M Plan Apo HR 100x	378-815-4	0.90	1.3	2	0.3	0.34	0.24	0.05x0.06	410
Lens set									
Lens set B1	378-911	A set of M Plan Apo 10x, 20x, 50x, and 100x							
Lens set B2	378-912	A set of M Plan Apo 2x, 5x, 10x, and SL20x							
Lens set B3	378-913	A set of M Plan Apo 5x, 10x, 20x, and 50x							

\* Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).

\*1: An appropriate polarizer should be used with this lens.

\*2: It is recommended that this lens be used with the 1/4 wavelength plate A (02ALN370) and appropriate polarizer. (Working distance will be shortened by 4mm).

\*3: These specific conditions apply to the objectives in isolation and may not apply when a lens is mounted in the turret of a microscope, depending on the design of that microscope. In the case where the illumination system is provided by the user it is important to balance the various optical parameters so that optimum illumination of the target surface is obtained. Contact your local Mitutoyo sales Office for information on how this may be achieved.

\*Made-to-order



Objectives for Bright Field Observation (Ultra-long working distance)

**M Plan Apo SL**

VMU

WIDE VMU

FS70

MF-U

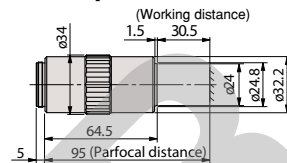
Hyper MF-U

**Features**

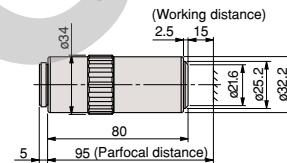
- Infinity corrected
- Bright field observation
- Long working distance
- Plan-Apochromat

## DIMENSIONS

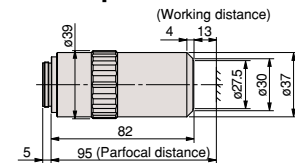
**M Plan Apo SL20x**



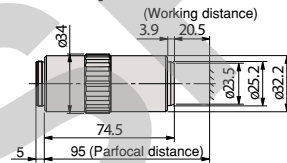
**M Plan Apo SL80x**



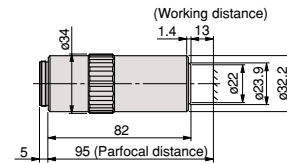
**M Plan Apo SL200x**



**M Plan Apo SL50x**



**M Plan Apo SL100x**



Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
M Plan Apo SL									
M Plan Apo SL20x	378-810-3	0.28	30.5	10	1.0	3.5	1.2	0.24x0.32	240
M Plan Apo SL50x	378-811-3	0.42	20.5	4	0.7	1.6	0.48	0.10x0.13	280
M Plan Apo SL80x	378-812-3	0.50	15.0	2.5	0.6	1.1	0.3	0.06x0.08	280
M Plan Apo SL100x	378-813-3	0.55	13.0	2	0.5	0.9	0.24	0.05x0.06	290
M Plan Apo SL200x	378-816-3	0.62	13.0	1	0.4	0.7	0.12	0.025x0.03	490

\* Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).



## Objectives for Bright Field Observation (with cover-glass thickness compensation)

### G Plan Apo

VMU WIDE VMU FS70 MF-U Hyper MF-U

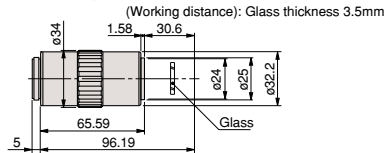
#### Features

- Infinity corrected
- Bright field observation
- Ultra-long working distance
- Plan-Apochromat
- Designed to observe a specimen through a 3.5mm cover glass.
- Design enables high-power observation through a cover glass.
- \* Contact Mitutoyo to custom-order a specific cover-glass to suit your application if required. Thickness, material and refractive index are all specificable within usual limits.

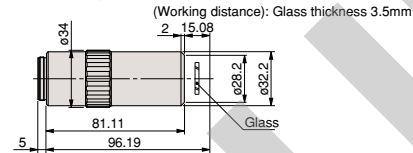


#### DIMENSIONS

##### G Plan Apo 20x



##### G Plan Apo 50x



Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
G Plan Apo									
G Plan Apo 20x (t3.5)	378-847	0.28	29.42	10	1.0	3.5	1.2	0.24x0.32	270
G Plan Apo 50x (t3.5)	378-848-3	0.50	13.89	4	0.6	1.1	0.48	0.10x0.13	320

\* Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).

## Objectives for Bright Field Observation (with cover-glass thickness compensation)

### G Plan Apo

WIDE VMU FS70 MF-U Hyper MF-U

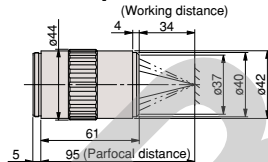
#### Features

- Infinity corrected
- Bright/dark field observation Suited to the observation of scratches, concavity and convexity on a surface
- Long working distance
- Plan-Apochromat

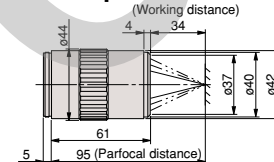


#### DIMENSIONS

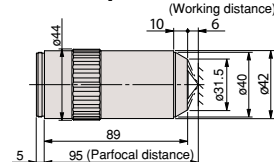
##### BD Plan Apo 2x



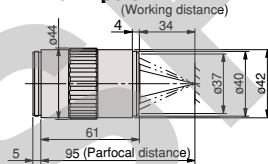
##### BD Plan Apo 10x



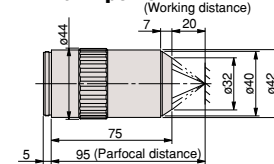
##### BD Plan Apo 100x



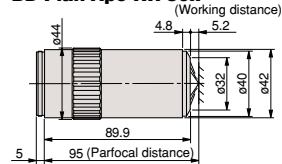
##### BD Plan Apo 5x



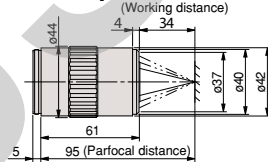
##### BD Plan Apo 20x



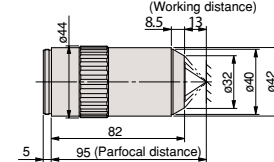
##### BD Plan Apo HR 50x



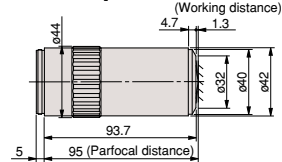
##### BD Plan Apo 7.5x



##### BD Plan Apo 50x



##### BD Plan Apo HR 100x



# OPTICAL MEASURING

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Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
BD Plan Apo									
BD Plan Apo 2x *1	378-831-7	0.055	34.0	100	5.0	91	12	2.4x3.2	340
BD Plan Apo 5x	378-832-7	0.14	34.0	40	2.0	14	4.8	0.96x1.28	350
BD Plan Apo 7.5x	378-830-7	0.21	34.0	26.67	1.3	6.2	3.6	0.64x0.85	350
BD Plan Apo 10x	378-833-7	0.28	34.0	20	1.0	3.5	2.4	0.48x0.64	350
BD Plan Apo 20x	378-834-7	0.42	20.0	10	0.7	1.6	1.2	0.24x0.32	400
BD Plan Apo 50x	378-835-7	0.55	13.0	4	0.5	0.9	0.48	0.10x0.13	440
BD Plan Apo 100x	378-836-7	0.70	6.0	2	0.4	0.6	0.24	0.05x0.06	460
BD Plan Apo HR									
BD Plan Apo HR 5x	378-845-7	0.75	5.2	4	0.4	0.49	0.48	0.10x0.13	530
BD Plan Apo HR 10x	378-846-7	0.90	1.3	2	0.3	0.34	0.24	0.05x0.06	545
Lens set									
Lens set D1	378-931	A set of BD Plan Apo 10x, 20x, 50x and 100x							
Lens set D2	378-932	A set of BD Plan Apo 2x, 5x, 10x, and SL20x							
Lens set D3	378-933	A set of BD Plan Apo 5x, 10x, 20x, and 50x							

\* Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).

\*1: It is recommended to be used together with the 1/4 wavelength plate B (02ALN380) and appropriate polarizer for the microscope used (Working distance will be shortened 4mm).



Objectives for Bright Field Observation (Ultra-long working distance)

## M Plan Apo SL

WIDE VMU

FS70

MF-U

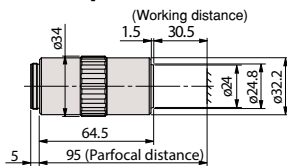
Hyper MF-U

### Features

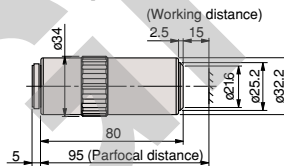
- Infinity corrected
- Bright/dark field observation Suited to the observation of scratches, concavity and convexity on a surface
- Ultra-long working distance
- Plan-Apochromat

## DIMENSIONS

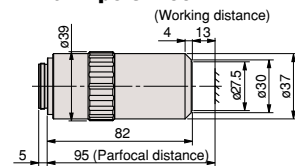
### M Plan Apo SL20x



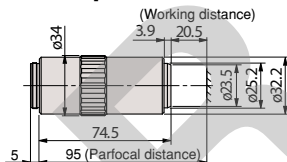
### M Plan Apo SL80x



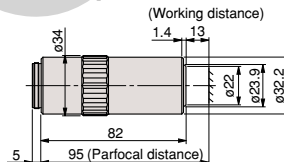
### M Plan Apo SL200x



### M Plan Apo SL50x



### M Plan Apo SL100x



Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
BD Plan Apo SL									
BD Plan Apo SL20x	378-840-7	0.28	30.5	10	1.0	3.5	.2	0.24x0.32	350
BD Plan Apo SL50x	378-841-7	0.42	20.0	4	0.7	1.6	0.48	0.10x0.13	410
BD Plan Apo SL80x	378-842-7	0.50	13.0	2.5	0.6	1.1	0.3	0.06x0.08	430
BD Plan Apo SL100x	378-843-7	0.55	13.0	2	0.5	0.9	0.24	0.05x0.06	440

\* Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).

Near-infrared radiation range objectives for bright field observation

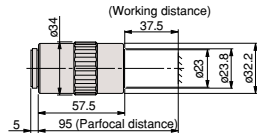
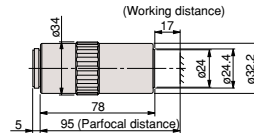
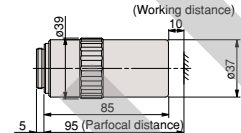
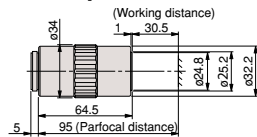
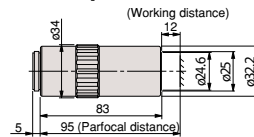
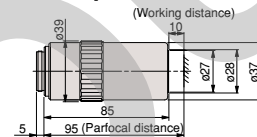
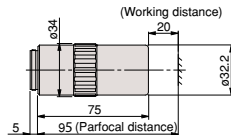
**M Plan Apo NIR /****M Plan Apo NIR HR**

VMU

FS70

**Features**

- Infinity corrected
- Suitable for bright field observation and laser applications
- Long working distance
- Plan-Apochromat
- Wavelength correction from visible to near-infrared (1800nm)
- Available high-power type (M Plan Apo NIR HR)

**DIMENSIONS****M Plan Apo NIR 5x****M Plan Apo NIR 50x****M Plan Apo NIR HR 50x****M Plan Apo NIR 10x****M Plan Apo NIR 100x****M Plan Apo NIR HR 100x****M Plan Apo NIR 20x**

Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
M Plan Apo NIR									
M Plan Apo NIR 5x	378-822-5	0.14	37.5	40	2.0	14.0	4.8	0.96x1.28	220
M Plan Apo NIR 10x	378-823-5	0.26	30.5	20	1.1	4.1	2.4	0.48x0.64	250
M Plan Apo NIR 20x	378-824-5	0.40	20.0	10	0.7	1.7	1.2	0.24x0.32	300
M Plan Apo NIR 50x	378-825-5	0.42	17.0	4	0.7	1.6	0.48	0.10x0.13	315
M Plan Apo NIR 100x	378-826-5	0.50	12.0	2	0.6	1.1	0.24	0.05x0.06	335
M Plan Apo NIR HR									
M Plan Apo NIR HR 50x	378-863-5	0.65	10.0	4	0.4	0.7	0.48	0.10x0.13	450
M Plan Apo NIR HR 100x	378-864-5	0.70	10.0	2	0.4	0.6	0.24	0.05x0.06	450

\* Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).  
 Note: If the wavelength used is 1100nm or longer, the focal point may deviate slightly from that in visible radiation.

**Profile Projectors**เครื่องวัดชิ้นงาน  
ชนิดแสงเงา**Microscopes**

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**Inspection Mirror**

กระจกส่อง

**Magnifier**

แว่นขยาย

**Illuminated Magnifier**แว่นขยายพร้อม  
ไฟส่องสว่าง

# OPTICAL MEASURING

การวัดด้วยเลนส์

Mitutoyo

Microscopes  
กล้องไมโครสโคป



## Near-infrared radiation range objectives for bright field observation M Plan Apo NIR B

### Features

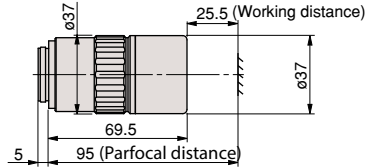
- Infinity corrected
- Suitable for bright field observation and laser applications
- Long working distance
- Plan-Apochromat
- A high-transmission laser type objective suited to the fundamental and second harmonic of the YAG laser. Corrected over the visible (420nm) to near-infrared (1064nm) spectrum.
- This series of objective has greatly improved in operability thanks to the achievement of an ultra-long working distance of 25.5mm while maintaining the NA of the NIR series 20X/50X.

VMU

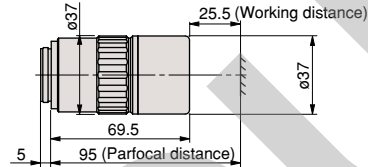
FS70

### DIMENSIONS

#### M Plan Apo NIR B 20x



#### M Plan Apo NIR B 50x



Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
M Plan Apo NIR B									
M Plan Apo NIR B 20x	378-867-5	0.40	25.5	10	0.7	1.7	1.2	0.24x0.32	350
M Plan Apo NIR B 50x	378-868-5	0.42	25.5	4	0.7	1.6	0.48	0.10x0.13	375

• Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).

Note: If the wavelength used is 1100nm or longer, the focal point may deviate slightly from that in visible radiation.



## Near-infrared radiation range objectives for bright field observation (with cover-glass thickness compensation) LCD Plan Apo NIR

### Features

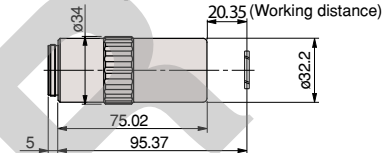
- Infinity corrected
- Suitable for bright field observation and laser applications through the LCD glass
- Ultra-long working distance
- Plan-Apochromat
- Designed to observe a specimen through glass 1.1mm or 0.7mm thick.
- This makes suitable for high-power observation through a sheet of glass.
- Mitutoyo is ready to design and manufacture a specific sheet of glass according to a specified glass thickness and material (or refractive index).

VMU

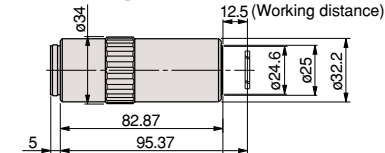
FS70

### DIMENSIONS

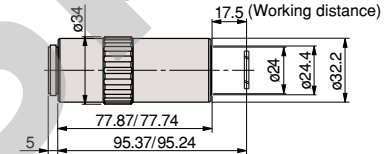
#### LCD Plan Apo NIR 20x (t1.1)



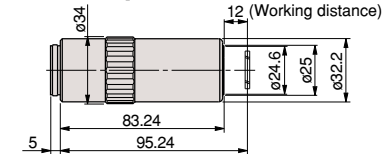
#### LCD Plan Apo NIR 100x (t1.1)



#### LCD Plan Apo NIR 50x (t1.1)/(t0.7)



#### LCD Plan Apo NIR 100x (t0.7)



Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
LCD Plan Apo NIR									
LCD Plan Apo NIR 20× (t1.1)	378-827-5	0.40	19.98	10	0.7	1.7	1.2	0.24x0.32	305
LCD Plan Apo NIR 50× (t1.1)	378-828-5	0.42	17.13	3.9	0.7	1.6	0.48	0.10x0.13	320
LCD Plan Apo NIR 50× (t0.7)	378-829-5	0.42	17.26	3.9	0.7	1.6	0.48	0.10x0.13	320
LCD Plan Apo NIR 100× (t1.1) *	378-752-5	0.50	12.13	2	0.6	1.1	0.24	0.05x0.06	335
LCD Plan Apo NIR 100× (t0.7)	378-754-5	0.50	11.76	2	0.6	1.1	0.24	0.05x0.06	335

• Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).

\*Made-to-order

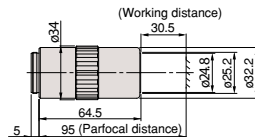
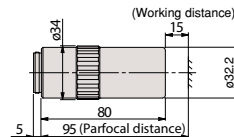
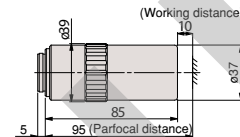
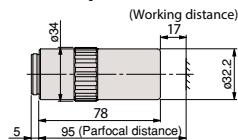
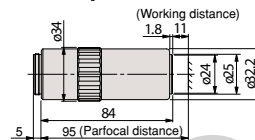
Near-ultraviolet radiation range objectives for bright field observation

**M Plan Apo NUV /  
M Plan Apo NUV HR**

VMU FS70

**Features**

- Infinity corrected
- Suitable for bright field observation and laser applications
- Long working distance
- Plan-Apochromat
- Performance optimized for near-ultraviolet (355nm) to visible
- High-power type available (M Plan Apo NUV HR)

**DIMENSIONS****M Plan Apo NUV 10x****M Plan Apo NUV 50x****M Plan Apo NUV HR 50x****M Plan Apo NUV 20x****M Plan Apo NUV 100x**

Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
M Plan Apo NUV									
M Plan Apo NUV 10×	378-809-5	0.28	30.5	20	1	3.5	2.4	0.48x0.64	255
M Plan Apo NUV 20×	378-817-6	0.40	17.0	10	0.7	1.7	1.2	0.24x0.32	340
M Plan Apo NUV 50×	378-818-6	0.42	15.0	4	0.7	1.6	0.48	0.10x0.13	350
M Plan Apo NUV 100×	378-819-4	0.50	11.0	2	0.6	1.1	0.24	0.05x0.06	380
M Plan Apo NUV HR									
M Plan Apo NUV HR 50×	378-888-6	0.65	10.0	4	0.42	0.65	0.48	0.10x0.13	500

\* Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).

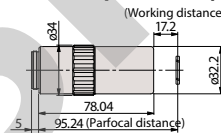
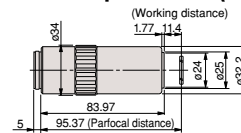
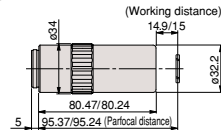
Near-ultraviolet radiation range objectives for bright field observation (with cover-glass thickness compensation)

**LCD Plan Apo NUV /  
LCD Plan Apo NUV HR**

VMU FS70

**Features**

- Infinity corrected
- Suitable for bright field observation and laser applications through the LCD glass
- Ultra-Long working distance
- Plan-Apochromat
- Designed to observe a specimen through glass 1.1mm or 0.7mm thick.
- This makes suitable for high-power observation through a sheet of glass.
- \* Mitutoyo is ready to design and manufacture a specific sheet of glass according to a specified glass thickness and material (or refractive index).

**DIMENSIONS****LCD Plan Apo NUV 20x (t0.7)****LCD Plan Apo NUV 100x (t1.1)****LCD Plan Apo NUV 50x (t1.1)/(t0.7)****LCD Plan Apo NUV HR 50x (t0.7)**

Model	Order No.	N.A.	W.D. (mm)	f (mm) (λ=550nm)	R (μm) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
							ø24 eyepiece	1/2" camera	
LCD Plan Apo NUV									
LCD Plan Apo NUV 20× (t0.7)	378-890-6	0.40	16.96	10	0.7	1.7	1.2	0.24x0.32	340
LCD Plan Apo NUV 50× (t1.1) *	378-753-6	0.42	14.53	4	0.7	1.6	0.48	0.10x0.13	350
LCD Plan Apo NUV 50× (t0.7)	378-820-6	0.42	14.76	4	0.7	1.6	0.48	0.10x0.13	350
LCD Plan Apo NUV 100× (t1.1) *	378-751-4	0.50	11.03	2	0.6	1.1	0.24	0.05x0.06	380
LCD Plan Apo NUV HR									
LCD Plan Apo NUV HR 50× (t0.7)	378-891-6	0.65	9.76	4	0.4	0.7	0.48	0.10x0.13	500

\* Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).

\*Made-to-order

Designed by JSR GROUP

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ห้ามนำไปเผยแพร่ก่อนได้รับอนุญาตจากทางบริษัท

# OPTICAL MEASURING

การวัดด้วยเลนส์

Mitutoyo

Microscopes  
กล้องไมโครสโคป



## Ultraviolet radiation range objectives for bright field observation M Plan UV

VMU

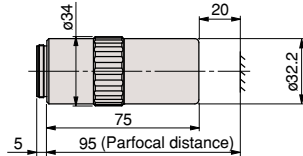
FS70

### Features

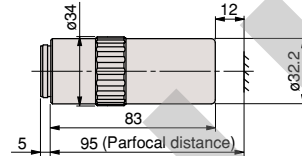
- Infinity corrected
- Suitable for bright field observation and laser applications
- Long working distance
- Plan
- Performance optimized for ultraviolet (266nm) and visible wavelengths
- High-transmittance in the ultraviolet range

### DIMENSIONS

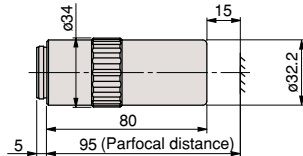
M Plan UV 10× (Working distance)



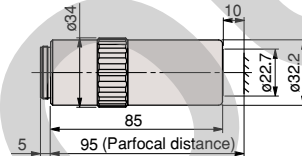
M Plan UV 50× (Working distance)



M Plan UV 20× (Working distance)



M Plan UV 80× (Working distance)



Model	Order No.	N.A.	W.D. (mm)	f (mm)		R ( m) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
				f266	f550			ø24 eyepiece	1/2" camera	
M Plan UV										
M Plan UV 10x	378-844-15	0.25	20.0	20	20.3	1.1	4.4	2.4	0.48x0.64	310
M Plan UV 20x	378-837-7	0.36	15.0	10	10.4	0.8	2.1	1.2	0.24x0.32	330
M Plan UV 50x	378-838-8	0.41	12.0	4	4.5	0.7	1.6	0.48	0.10x0.13	400
M Plan UV 80x	378-839-5	0.55	10.0	2.5	2.9	0.5	0.9	0.3	0.06x0.08	380

- When projecting a mask image on a specimen by using a YAG laser system mounted on a Mitutoyo microscope unit, the mask image will be scaled by the factor f/200 times (f=200mm, Mitutoyo tube lens). Since the focal length (f) in ultraviolet radiation (λ=266nm) is slightly smaller than that in visible radiation (λ=550nm) as above, the working area in ultraviolet radiation also becomes slightly smaller than the mask image in visible radiation.
- Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).

## Ultraviolet radiation range objectives for bright field observation (with cover-glass thickness compensation) LCD Plan UV

VMU

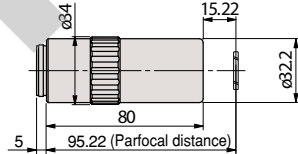
FS70

### Features

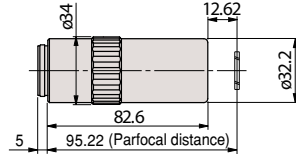
- Infinity corrected
- Suitable for bright field observation and laser applications through the LCD glass
- Long working distance
- Plan
- Designed to observe a specimen through glass 0.7mm thick.
- This makes suitable for high-power observation through a sheet of glass.
- \* Mitutoyo is ready to design and manufacture a specific sheet of glass according to a specific glass thickness and material (or refractive index).

### DIMENSIONS

LCD Plan UV 20× (Working distance)



LCD Plan UV 50× (Working distance)



Model	Order No.	N.A.	W.D. (mm)	f (mm)		R ( m) (λ=550nm)	±DOF (μm)	Real FOV (mm)		Mass (g)
				f266	f550			ø24 eyepiece	1/2" camera	
LCD Plan UV										
LCD Plan UV 20× (t0.7)	378-892-7	0.36	15.0	10	10.4	0.8	2.1	1.2	0.24x0.32	330
LCD Plan UV 50× (t0.7)	378-893-8	0.41	12.4	4	4.5	0.7	1.6	0.48	0.10x0.13	400

- When projecting a mask image on a specimen by using a YAG laser system mounted on a Mitutoyo microscope unit, the mask image will be scaled by the factor f/200 times (f=200mm, Mitutoyo tube lens). Since the focal length (f) in ultraviolet radiation (λ=266nm) is slightly smaller than that in visible radiation (λ=550nm) as above, the working area in ultraviolet radiation also becomes slightly smaller than the mask image in visible radiation.
- Every resolution and single objective's focal depth in the above table is a value determined on the basis of a reference wavelength (λ=0.55μm).



## กล้องไมโครสโคป

Variable Focal Length Lens  
TAGLENS

## Features

- Without changing the required magnification, ultra-high speed variable focal length enables obtaining perfectly focused images in real-time with stress-free operation.
- The time required for auto-focusing is drastically reduced, and the optical system focus range is extended without the expense of a mechanical drive.

## TAGLENS-T1

## TAGLENS main unit + Controller + Software

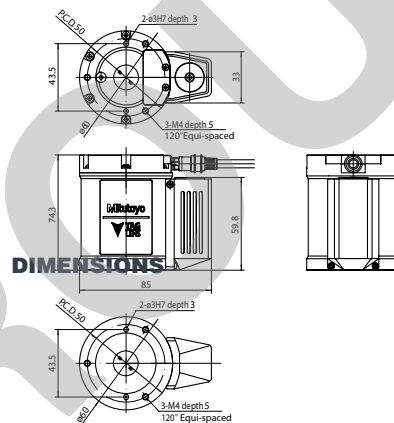
Ultra-high speed, varifocal lens.

A dedicated controller is equipped as standard.

Resonance frequency	70 kHz
Effective aperture	ø11 mm
Transmittance	90% or more ( $\lambda$ 400 nm to 700 nm)
Refractivity range	0.7 D to 1 D
Mountable posture	All directions
Accuracy guaranteed temperature range	15 °C to 30 °C
Operating Environment / Humidity	10 °C to 40 °C / 40% to 70% RH or less (non-condensing)
Storage Environment / Humidity	-10 °C to 50 °C / 80% RH or less (non-condensing)
Mass	Approx. 0.6 kg



## DIMENSIONS



## Controller

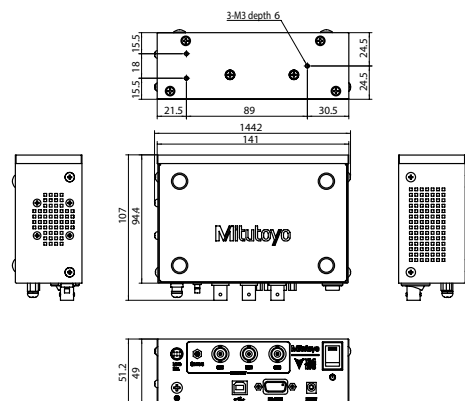
The controller supplies power to the TAGLENS main unit and controls the lens main unit via TAGPAK-C. Other than the connector to the main unit, output connectors for synchronization with external devices are equipped. The AC adapter supplied should be used to supply power to the controller.

Dimensions	144.2 mm x 107 mm x 51.2 mm
Mass	Approx. 0.4 kg
Distribution method	Single phase 2-wire system / 1-wire grounding
Power supply voltage	AC 100 V to 240 V 50 Hz / 60 Hz
Power consumption	Max. 20 W

① Lens driving signal output terminal	For connecting to TAGLENS.
② Camera trigger output terminal	An SMB connector to control an externally connected camera. It outputs the signals synchronized with the TAGLENS drive signals.
③ External trigger output terminal (CH1)	A BNC connector to control the externally connected devices. It outputs the signals synchronized with the TAGLENS
④ External trigger output terminal (CH2)	
⑤ External trigger output terminal (CH3)	
⑥ Ground terminal	A protection ground terminal.
⑦ USB connector	Connects the PC and the main unit with a USB cable.
⑧ RS-232C connector	Connects the PC or other measuring equipment and the main unit with an RS-232C cable.
⑨ Connector for power supply	A jack to connect the AC adapter.



## DIMENSIONS



## Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

## Microscopes

กล้องไมโครสโคป

## Inspection Mirror

กระจกส่อง

## Magnifier

แว่นขยาย

## Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

# OPTICAL MEASURING

การวัดด้วยเลนส์

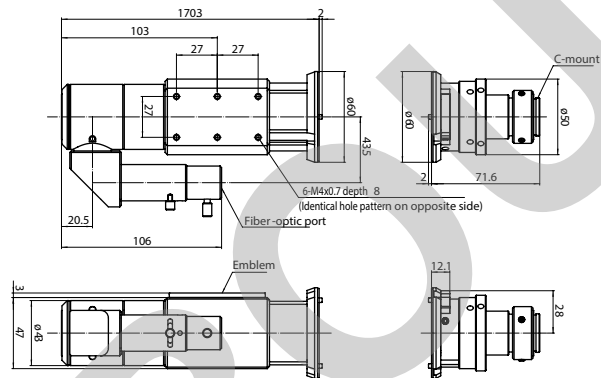
## Mitutoyo

**Video Microscope Unit**  
**VMU-T1**

TAGLENS-T1 is installed in the microscope unit. Incorporating the objective lens and the camera enables configuring a varifocal optical system.

Compatible TAGLENS	TAGLENS-T1
Imaging lens magnification	1X
Imaging area	ø11 mm
Applicable objective lenses	M Plan Apo Series
Options	Manual turret, Power turret, Polarizer and Analyzer, Focusing unit, X-Y stage, Simple stand

### DIMENSIONS



### Variable focal length range

M Plan Apo Series							
Objective lens	1X	2X	5X	7.5X	10X	20X	50X
Depth of focus $\times 2$ (mm)	0.88	0.18	0.028	0.012	0.007	0.003	0.0018
Total scanning width (mm)	16	4	0.64	0.28	0.16	0.04	0.007
Real FOV (mm)	1/2 inch camera	4.8 x 6.4	2.4 x 3.2	0.96 x 1.28	0.64 x 0.85	0.48 x 0.64	0.24 x 0.32
	2/3 inch camera	6.6 x 8.8	3.3 x 4.4	1.32 x 1.76	0.88 x 1.17	0.66 x 0.88	0.33 x 0.44
		0.096 x 0.128	0.132 x 0.176				

Note: M Plan Apo HR Series is not supported.

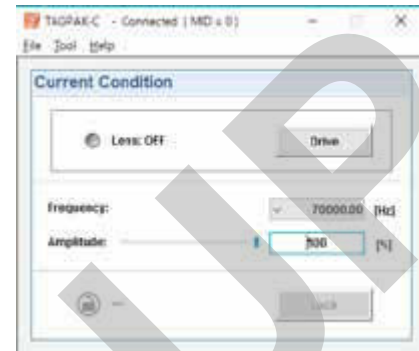
## กล้องไมโครสโคป SOFTWARE TAGPAK

### TAGPAK-C Supplied as standard

TAGPAK-C software\* controls the TAGLENS controller. The software communicates with the TAGLENS controller and conducts the drive start and stop, frequency setting, amplitude setting and resonance lock.

\* This software is required when using TAGLENS-T1.

Items	System specifications
OS	Windows10 Pro 64 bit
CPU Clock frequency	2.0 GHz or more
Memory	8 GB or more
PC	Hard disk
	25 GB or more
	Optical Drive
	DVD-ROM Drive for installation software.
	Communication port TAGLENS control
	USB 2.0 x 1 port and RS-232C x 1 port
Monitor	SXGA (1280x1024 Pixel) or more



<TAGPAK-C operation screen>

#### Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

#### Microscopes

กล้องไมโครสโคป

#### Inspection Mirror

กระจกส่อง

#### Magnifier

แว่นขยาย

#### Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

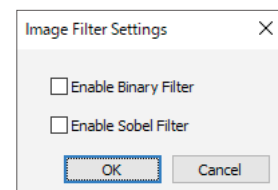
### TAGPAK-E Optional Software (Required for checking the inspection images.)

TAGPAK-E software converts images captured by the optical system using TAGLENS for extended depth of field (EDOF) images. The software provides functions relating to EDOF images such as parameter setting, image ON/OFF and saving and loading the images.

#### [Execution example of EDOF image]

Normal microscope observation	When using TAGLENS	
<p>Lower</p> <p>Upper</p> <p>With a height difference, only the upper or lower plane can be focused.</p>	<p>TAGLENS ON</p> <p>TAGLENS changes the focus point at high speed. However, because the capturing time per frame is longer than the focusing time, the images will have optically mixed focus points from different heights, and the image will be blurred.</p>	<p>EDOF ON</p> <p>Eliminate the blurriness caused by a change in the optical system or focus position, and you obtain an entirely sharper image. This is called the EDOF image.</p>

Items	System specifications
OS	Windows10 Pro 64 bit
TAGLENS control software	TAGPAK-C Ver.1.0
CPU	Clock frequency
	2.0 GHz or more
	Number of physical cores
	4 cores or more (Recommendation: 8 cores or more)
Memory	8 GB or more
Hard disk	25 GB or more
PC	Optical Drive
	DVD-ROM Drive for installation software.
	Communication port
	TAGLES control
	USB 2.0 x 1 port and RS-232C x 1 port
	GigE Vision control
	1000BASE-T x 1 port
	USB3 Vision control
	USB 3.0 x 1 port
	Dongle
	USB 2.0 x 1 port
Monitor	SXGA (1280x1024 Pixel) or more



Two filters, the binarization filter and the Sobel\* filter, are available for the image displayed on the viewer.

\* A filter function to emphasize a contour.

Note: For both TAGPAK-C and TAGPAK-E, some functions are available as SDK, enabling their integration into your software.

# OPTICAL MEASURING

การวัดด้วยเลนส์

Microscopes  
กล้องไมโครสโคป

# SELMIC

เลนส์ขยายสำหรับกล้องประสิทธิภาพสูง

**Variable rich zoom len, High performance camera to Choose**

Len lineup including ultra long operation focus lens which enabled high magnification observation of sample which can not be approached gives each high performance function and achieves appropriate price of 1/3~1/4 of conventional model did.

เลนส์สำหรับระยะไกลพิเศษ

**Ultra Long Working Distance Lens  
SEL-LWD 100 / 200 / 300 / 400 / 500**

### Features

High-resolution observation realized for sample unable to be observed in close range operation

Work distance for high resolution Special lens capable of observation of 100mm ~ 500mm

[Sample]

Len resolution of 100 mm type 75 time ~ 900 time  
On 19-inch monitor



เลนส์ไมโครกำลังขยาย x1-x45

**x1 - x45 Micro Zoom Lens  
SE-M1Z**

### Features

Camera - ready for all subjects on sample work.



เลนส์

**High magnification lens barrel  
SE-MP-L**

### Features

The lens can be selected according to the magnification you want to observe.



เลนส์ไมโครกำลังขยาย x80-x800

**x80 - x800 Zoom Lens  
SEL-80**

### Features

In-between things magnification rage of stereoscopic microscope and metallurgical microscope which is available for multipurpose zoom lens, ring light, double arm light and coaxial box light



เลนส์ไมโครกำลังขยาย x380-x3800

**x380 - x3800 Zoom Lens  
SEL-380**

### Features

High magnification zoom lens of high numerical aperture focused on resolution.



กล้อง

**Compatible Camera**

### Features

The number of pixels can be selected according to the object from the camera such as  
1.3 million pixels, 2 million pixels, 3 million pixels, 6 million pixels.



เลนส์กำลังขยาย x40-x240

**x40-x240 Medium Magnification Zoom Lens  
SE-40Z**

### Features

This lens allows you to be ready from wide view to detail shot and has a wide WD that is also regarded as a versatile zoom lens.

It also provides very similar magnification range to stereoscopic microscope and is available for diverse camera angle which is impracticable from stereoscopic microscope (use of multi angle stand) Available for both ring light and double arm light.



เลนส์กำลังขยาย x27-x270

**x27 - x270 Zoom Lens  
SEL-27**

### Features

It has a wider zoom range than the medium magnification zoom lens.

It can be attached to a lens barrel for high magnification lens and it is easy to use it separately from SEL lens Series.



เลนส์ไมโครกำลังขยาย x270-x2700

**x270 - x2700 Zoom Lens  
SEL-270**

### Features

High magnification zoom lens that has similar magnification range to metallurgical microscope.

The best for depth of field in comparison with metallurgical microscope.

Available for both ring light and coaxial box light.



### อุปกรณ์เสริมอื่นๆ

#### Operability • Focused on safety • Accessories Stands • Accessories

Accessories that combine excellent functions, support work efficiency UP!  
Powerful partner lineup of cameras and lenses that pull out accurate measured values.

#### ขาตั้งปรับองศาได้ Multi angle stand SE-MS



##### Features

Lens angle is very flexible where an angle is available for up to 90° move from side and is approached just above the object, diagonal side and right next to the object.  
Especially efficient on the middle magnification observation.  
Designed with vibration or conduction on tilted angle.  
Exclusive XY stage installation.

#### ฐานปรับองศาได้ FLEXIBLE ANGLE STAGE SE-FAS



##### Features

Variable stage that facilitates flexible move in all direction and angle.  
Specialized angle that provides subtle observation is realized as compared to stand (stage) which is only variable in a fixed direction.

#### ฐานมาตรฐาน XY Standard XY Stage SE-XY



##### Features

Standard XY stage that has a top plate of 100x100mm.  
The range of movement is possible for up to  $\pm 35$ mm and installation on the standard straight stand is also practicable.

#### ขาตั้งมาตรฐาน Standard Straight Stand SE-ST1



##### Features

Specialized straight stand for observation right on the object.  
Installation on standard XY stage or on the other particular stages is practicable.

#### ขาตั้ง Common Stand for Electrification SE-ST8



##### Features

Stand specialized for observation from directly above.  
Suitable for high magnification observation Z axis electric control unit can be installed.

#### พาวเวอร์ Ultra Compact High Power LED Light Source SELS-75-08W



##### Features

The industry's top class brightness is realized dimmer setting can be set from 0-240 stages with remote function, low power consumption environmentally friendly light source.



\*\*สามารถเลือกประกอบเองได้ หรือขอคำแนะนำจากพนักงานขาย\*\*

# OPTICAL MEASURING

การวัดด้วยเลนส์

Microscopes  
กล้องไมโครสโคป

SELMIC

ซอฟต์แวร์

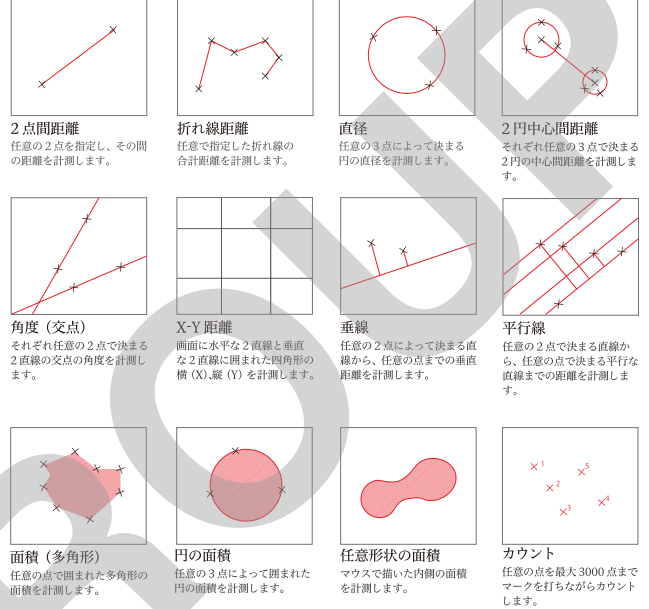
**Standard software emphasizing user-friendly operability**

Software that first developed user-friendly developed by VOC (Voice of Customer) in the microscope market for many years, software

## Features

- **Auto time photography**  
Available for automatic unmanned photography at regular intervals.
- **Shutter speed control**  
Possibility of conversion on 1/2000 seconds~1/2 seconds (Level 15).  
Brightness control of image that doesn't need to change the amount of accepted lights on sample.
- **Image stabilizer function**  
Image stabilizer function on halt shot photography. About 10% of image stabilizer function in theory.
- **Special effects set-up live image**  
Special effects set up in various ways including sharpness (strength/weakness), emphasison edge, edge detection and minute noise removal.
- **Scale indication**  
Four types of possible choices among horizontal line (x Bar), vertical line (XY Bar), grating (Mesh) and cross. A check on live image means automatic input during the halt shot photography.
- **Image photographing**  
Possible choices on your observation purpose between high resolution mode (1280x1024) which put stress on resolution og live image and low resolution mode (640x512) which put stress on speed.

## Measurement function



ซอฟต์แวร์

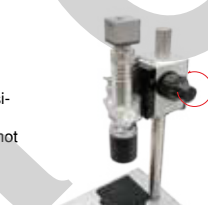
**Optical Software**

## Features

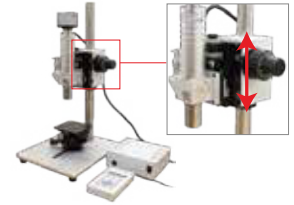
- **Real time focus compositeness (Image stabilizer function set up)**  
Focused image is allowed by just controlling focus above and below while observing it in real time.  
And also it provides up to maximum 10% of image stabilizer function that would happen in condition of position control.  
Moreover it relieves delicate focus difference that cannot be covered by the depth of field of lens.

- **3D Image installation**  
With focus compositeness in real time, 3D image installation based on the obtained data of z-axis.  
Available for holographic image sample.

- **3D Profiling function**  
Display graph with z-axis after getting a 3D image.

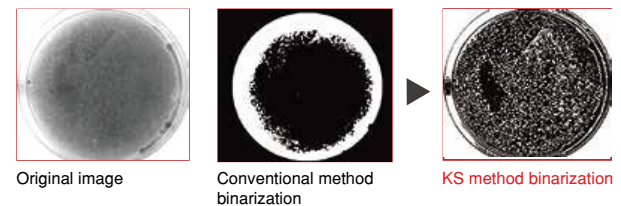


- **Automation synthesis system**  
Unit that controls the z-axis electrically, enables more precise depth synthesis function and 3D data acquisition.



- **KS Methods automation binarization (Japan, U.S.A. Patent)**

In image processing, the performance of binarization\*1 determines instrumentation precision. KS Methods binarization\*2 is the same way as the separation that men divides into shape and background by changing threshold in each pixel.  
Therefore, instrumentation of unclear image which was hard to measure or spotted image would be allowed in the exact binarization.  
Due to the installation of NS methods that is much more versatile than KS methods, it becomes more useful in multipurpose.





## ซอฟต์แวร์

### Software function

It is a dimension measurement software with camera easy to use for anyone. Equipped with convenient functions such as dimension measurement to respond to various applications, focus combined image connection halation removal!

#### Abundant dimension measurement tool

It is compatible with various dimension measurement with a wide variety of measurement function.



#### Measurement assist function

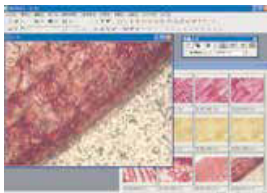


The mouse cursor is automatically fitted to the edge, human errors are reduced, and accurate measurement is reduced. It can be applied to all scenes to plot.

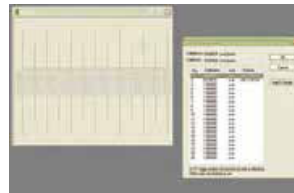


Zoom in on the point pointed by the mouse cursor. It reduces error by clicking and accurate measurement is possible. You can also scroll with the scroll bar.

#### Camera control & Scale setting

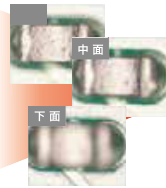


It is safe to use multiple devices. \*Please consult about compatible cameras



You can enter comments at calibration registration

#### Camera control & Scale setting



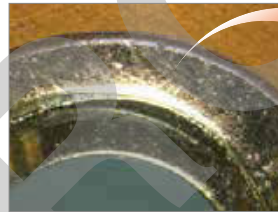
Even with sample that have height and focus will be blurred, you can easily generate all focus image. \*Please contact us for applicable models separately.

#### Camera control & Scale setting



It recognizes margin automatically and generates a connected image easily. In addition, we can realize highly accurate bonding with unique functions.

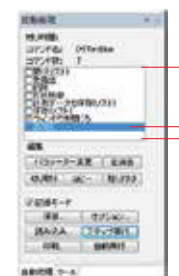
#### Halation Removal



A glossy sample also produces an image that does not reduce image quality and suppresses reflection. It can be adjusted instantly with easy operation.

#### Auto format function for fixed form processing

In the case of performing fixed image processing and measurement each time, if you register that procedure as one command, the software will automatically execute the process, so the work efficiency will be significantly improved.



Command buffer area  
Command Cursor

Memory mode automatically memorizes image processing procedures executed during startup.

#### Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

#### Microscopes

กล้องไมโครสโคป

#### Inspection Mirror

กระจกส่อง

#### Magnifier

แว่นขยาย

#### Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

# OPTICAL MEASURING

การวัดด้วยเลนส์

JSR Kasei Seiki

Microscope  
กล้องไมโครสโคป

กล้องจุลทรรศน์

## DIGITAL MICROSCOPE

Simple magnified observation is possible by connecting to a PC.

### USE :

- For mechanical parts, metal, fiber, paper, resin, biological tissue, cracks, surface degradation, corrosion inspection etc. It can save images and movies, it is ideal for reporting and document making.
- It is convenient for meetings and presentations because it allows multiple people to check the results of inspection in real time.

### FEATURES :

- Simple magnification observation and measurement are possible by connecting to a PC.
- With a stand that is easy to focus on.
- Complex setting is unnecessary, you can use immediately.

### SPECIFICATION

- Magnification: Approx 200 times display with 27 inch monitor
- Maximum recording size of still images: 2592 x 1944 pixels
- Power supply: Supplied from USB port
- Supported OS: Windows 7 • 8 • 8.1 • 10 MacOS 10 • 12 Sierra or later
- Size: Microscope Ø37 x 110 mm Stand 170 x 160 x 120 mm

### ACCESSORIES

- Special software
- Simple Scale
- Dedicated stand (assembly type)



Order No.	Model No.	Imaging element	No. of pixels	Frame rate	Interface	Light	Mass
MMS-500	140167	1/3.2CMOS	5 million pixels	30 frames / sec	USB 2.0	White LED x 8	Body: 100 g Dedicated stand: 520 g

กล้องจุลทรรศน์พร้อมจอ LCD

## DIGITAL MICROSCOPE WITH LCD MONITOR

Enlarged observation is possible without PC required!  
It can also output to PC.

### USE :

- For mechanical parts, metal, fiber, paper, resin, biological tissue, cracks, surface degradation, corrosion inspection etc. It can save images and movies, it is ideal for reporting and document making.
- It is convenient for meetings and presentations because it allows multiple people to check the results of inspection in real time.

### FEATURES :

- It is charge-ready, it can be used in places where there is no power supply.
- It is a monitor integrated type, there is no need to prepare a monitor.
- It is possible to connect to TV and PC, and it can be displayed on a big monitor.
- Simple measurement is possible by PC connection.

### SPECIFICATION

- Magnification: About 200 times on a 24-inch monitor Display about 30 times on the main body monitor
- Maximum recording size of still images: When connected to PC ... 640 x 480 pixels  
Product standalone ... 4032 x 3024pixels
- Power supply: DC 3.7V 1050mAh lithium ion battery
- Continuous usable time at rechargeable battery: about 2 hours 30 minutes • Charging time: about 2 hours
- Supported recording media: microSD card (up to 32 GB)
- Supported OS: Windows 7, 8, 8.1, 10

### ACCESSORIES

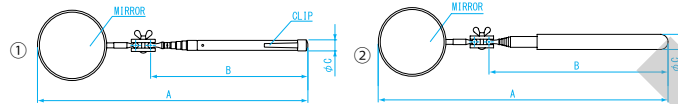
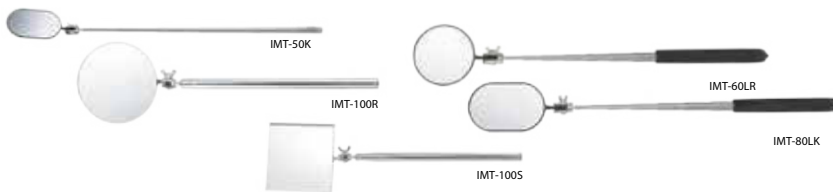
- Special software
- Simple Scale
- Cleaning cloth
- Video cable
- USB Cable
- AC Adapter
- Battery



Order No.	Model No.	Imaging element	No. of pixels	Frame rate	Interface	Light	Mass
MMS-500LCD	140168	1/3.2CMOS	5 million pixels	30 frames / sec	USB 2.0	White LED x 8	744 g (Including battery)

### กระจกส่องตรวจ

## TELESCOPING INSPECTION MIRROR



#### USE :

- Inspection of hard-to-see locations

#### MATERIAL :

- Body: Brass
- (IMT-60LR, IMT-80LK: Stainless steel)
- Mirror: Glass

#### FEATURES

- Extendable reach and easy to carry
- Replacement mirror also sold separately
- With mirror protective film

#### Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

#### Microscopes

กล้องไมโครสโคป

#### Inspection Mirror

กระจกส่อง

#### Magnifier

แว่นขยาย

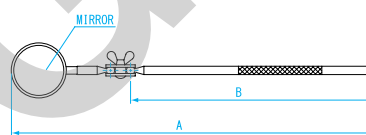
#### Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

Order No.	Model No.	Mirror Shape (mm)	A: Maximum Length (mm)	B: Telescope Length (mm)	C (mm)	Dimensions	Weight
<b>IMR-20R</b>	011140	Round Ø20	Approx. 525			①	40g
<b>IMR-30R</b>	011150	Round Ø30	Approx. 535	Approx. 130~475	10	①	40g
<b>IMR-50K</b>	011170	Oval 50 x 25	Approx. 555			①	45g
<b>IMR-85S</b>	011185	Square 100 x 85	Approx. 745			①	200g
<b>IMR-100S</b>	011186	Square 100 x 100	Approx. 745	Approx. 245~610	13	①	200g
<b>IMR-100R</b>	011187	Round Ø100	Approx. 745			①	200g
<b>IMR-80LK</b>	011181	Oval 80 x 50	Approx. 945	Approx. 160~840	14	②	100g
<b>IMR-60LR</b>	011161	Round Ø60	Approx. 925			②	100g

### กระจกส่องตรวจ

## INSPECTION MIRROR



#### USE :

- For inspection in hard-to-see location

#### MATERIAL :

- Body: Steel
- Mirror: Glass

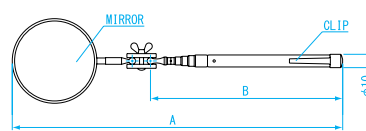
#### FEATURES

- Mirror firmly held for easy inspection
- With mirror protective film

Order No.	Model No.	Mirror Shape (mm)	A (mm)	B (mm)	Weight
<b>IM-20R</b>	011120	Round Ø20	Approx. 200		
<b>IM-30R</b>	011130	Round Ø30	Approx. 210	Approx. 145	50g
<b>IM-50K</b>	011110	Oval 50 x 25	Approx. 230		

### กระจกส่องตรวจ

## INSPECTION MIRROR



#### USE :

- For inspection in hard-to-see location

#### MATERIAL :

- Body: Brass
- Mirror: Glass

#### FEATURES

- Extendable reach and easy to carry
- Mirror magnifies objects for better visibility
- With mirror protective film

Order No.	Model No.	Mirror Shape (mm)	A: Maximum Length (mm)	B: Telescope Length (mm)	Magnification	Weight
<b>IMTR-20R</b>	011195	Round Ø20	Approx. 525		2	40g
<b>IMTR-30R</b>	011196	Round Ø30	Approx. 535		2	40g
<b>IMTR-60R</b>	011197	Round Ø60	Approx. 560	Approx. 130~475	1.5	60g
<b>IMTR-50K</b>	011198	Oval 50 x 25	Approx. 555		2	45g
<b>IMTR-80K</b>	011199	Oval 80 x 50	Approx. 575		1.5	60g

# OPTICAL MEASURING

การวัดด้วยเลนส์

**PEAK**

## แว่นขยาย LUPE



Order No.	Magnification	Effective aperture	Size	Net weight
<b>1960</b>	5X	-	Ø36.5 x 66mm	24.7g
<b>1961</b>	10X	Ø 24mm	Ø34.5 x 41.3mm	28g
<b>1962</b>	15X	Ø 19mm	Ø36 x 34.5mm	20g
<b>1964</b>	22X	Ø 12mm	Ø36 x 25mm	22g
<b>1996**</b>	30X	Ø 7mm	Ø37 x 20mm	10g

\*\* สินค้ามีปัญหาในการส่งมอบ กรุณาสอบถามพนักงานขายก่อนทำการสั่งซื้อทุกครั้ง

## ชุดแว่นขยายแบบมีสเกล SCALE LUPE SET



Order No.	Size	Detail	Net weight
<b>1976</b>	150 x 75 x 60mm	A set a scale lupe 7X and the 5 most frequently used scales in a plastic container.	172g (G.W.)
<b>2004</b>	150 x 75 x 60mm	A set a scale lupe 10X and the 5 most frequently used scales in a plastic container.	199g (G.W.)

## แว่นขยาย MAGNETIC MAGNIFIER



Order No.	Magnification	Effective aperture	Size	Net weight
<b>1986</b>	5X	Ø30mm	Ø30 x 43 x 20mm	15g

## แว่นขยาย LIGHT SCALE LUPE



Order No.	Magnification	Size	Net weight	Battery
<b>1998</b>	7X	Ø36 x 58 x 175mm	118g	UM-2 (1.5V)x2
<b>2028</b>	10X	Ø47 x 45 x 185mm	134g	UM-2 (1.5V)x2
<b>2016-L**</b>	15X	Ø43 x 65 x 184mm	72g	UM-3 (1.5V)x2
<b>2037-L**</b>	30X	Ø43 x 65 x 184mm	48g	-

\*\* สินค้ามีปัญหาในการส่งมอบ กรุณาสอบถามพนักงานขายก่อนทำการสั่งซื้อทุกครั้ง

## แว่นขยายแบบมีสเกล SCALE LUPE



Order No.	Magnification	Fird of view	Effective aperture	Size	Net weight
<b>1975</b>	7X	Ø24mm	Ø18mm	Ø36 x 57mm	56g
<b>1983</b>	10X	Ø32mm	Ø20mm	Ø46 x 44mm	74g
<b>2016</b>	15X	Ø20mm	Ø13mm	Ø35 x 33mm	40g
<b>2037</b>	30X	Ø6mm	Ø7mm	Ø30 x 19mm	16g

## แว่นขยาย STEINHEIL LUPE



Order No.	Magnification	Size	Net weight
<b>1985-7</b>	7X	39 x 24 x 22mm	22g
<b>1985-10</b>	10	39 x 24 x 22mm	19g
<b>1985-14</b>	14X	39 x 24 x 22mm	18g
<b>1985-20</b>	20X	39 x 24 x 22mm	18g

## แว่นขยาย LIGHT LUPE



Order No.	Magnification	Fird of view	Size	Net weight	Battery
<b>1966</b>	10X	28mm	170x35x40mm	81g	UM-2 (1.5V) x 2
<b>1987**</b>	3.5X	-	60x75x 90mm	120g	UM-2 (1.5V) x2
<b>1996-L**</b>	30X	-	Ø43x65x184mm	40g	UM-3 (1.5V) x2
<b>2023</b>	15X	Ø19mm	Ø36x42x180mm	90g	UM-2 (1.5V) x2

\*\* สินค้ามีปัญหาในการส่งมอบ กรุณาสอบถามพนักงานขายก่อนทำการสั่งซื้อทุกครั้ง

## แว่นขยาย ANASTIGMET LUPE



Order No.	Magnification	Fied of view	Effective aperture	Min. scale division	Working distance	Size	Net weight
<b>1990-4</b>	4X	Ø58mm	Ø30mm	0.1mm	54mm	Ø73x77mm	272g
<b>1990-7</b>	7X	Ø22mm	Ø22mm	0.1mm	36mm	Ø55x53mm (Strap-clasp not included)	103g

## แว่นขยาย

### SUCKING LUPE



Order No.	Magnification	Effective aperture	Size	Net weight
1993**	10X	Ø24mm	Ø60 x 51mm	35g

\*\* สินค้ามีปัญหาในการส่งมอบ กรุณาสอบถามพนักงานขายก่อนทำการสั่งซื้อทุกครั้ง

## แว่นขยาย

### STAND MICROSCOPE



Order No.	Magnification	Fied of view	Min. scale division	Measuring range	Size	Net weight
2008-25	25X	Ø3.30mm	0.05mm	3.0mm	Ø41.5 x 122mm	83g
2008-50	50X	Ø2.00mm	0.02mm	1.6mm	Ø41.5 x 122mm	83g
2008-75	75X	Ø1.09mm	0.01mm	1.0mm	Ø41.5 x 122mm	83g
2008-10	100X	Ø0.84mm	0.005mm	0.8mm	Ø41.5 x 122mm	87.5g

## แว่นขยาย

### PLALUPE



Order No.	Magnification	Effective aperture	Size	Net weight
2032	10X	Ø26mm	Ø45 x 39.5mm	18g

## แว่นขยาย

### ZOOM LUPE



Order No.	Magnification	Fied of view	Diopter adjust ring	Min. scale division	Size	Net weight
2044	8X - 16X	Ø20-10	+2.5 to -5D	0.1mm, 0.005"	Ø45 x 65mm	149g

## แว่นขยาย

### LIGHT HOLDER FOR STAND MICROSCOPE



Order No.	Size	Net weight	Battery
2008-LH**	Ø47 x 60 x 190mm	26g	UM-3 (1.5V) x2

\*\* สินค้ามีปัญหาในการส่งมอบ กรุณาสอบถามพนักงานขายก่อนทำการสั่งซื้อทุกครั้ง

## แว่นขยาย

### MINI COMPARATOR



Order No.	Magnification	Fied of view	Effective aperture	Size	Net weight
2015	7X	Ø24mm	Ø16mm	Ø29 x 46mm	28g

## แว่นขยาย

### MULTI DESK LUPE



Order No.	Magnification	Size	Net weight
2041	2X (Main lens)	Lens frame : 175x150mm Arm : 280mm Base: 135mm Ø	1,700g

## แว่นขยาย

### POCKET MICROSCOPE



Order No.	Magnification	Field of View	Size	Net weight
2001-15	15X	Ø5.40mm	Ø12.4 x 126mm	13g
2001-25	25X	Ø3.30mm	Ø12.4 x 127mm	12g
2001-50	50X	Ø2.00mm	Ø12.4 x 127mm	12g
1985-75	75X	Ø1.09mm	Ø12.4 x 127mm	13g
1985-100	100X	Ø0.84mm	Ø12.4 x 127mm	16g

#### Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

#### Microscopes

กล้องไมโครสโคป

#### Inspection Mirror

กระจกส่อง

#### Magnifier

แว่นขยาย

#### Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง



# OPTICAL MEASURING

การวัดด้วยเลนส์

**PEAK**

แว่นขยาย

**EYE LUPE**



Order No.	Magnification	Material	Net weight
<b>2048-A13D</b>	3.3X	Aluminium	10g
<b>2048-A16D</b>	4X	Aluminium	10g
<b>2048-A20D</b>	5X	Aluminium	10g
<b>2048-A26D</b>	6.7X	Aluminium	11g
<b>2048-A40D</b>	10X	Aluminium	13g
<b>2048-A48D</b>	12X	Aluminium	16g
<b>2048-A60D</b>	15X	Aluminium	15g
<b>2048-A80D</b>	20X	Aluminium	16g

แว่นขยาย

**FLEXIBLE STAND LUPE**



Order No.	Magnification	Effective aperture	Size	Net weight
<b>2033-90</b>	2.2X	Ø90mm	145 x 120 x 460mm	1,427g
<b>2033-100</b>	2X	Ø100mm	145 x 120 x 470mm	1,484g
<b>2033-115</b>	1.7X	Ø115mm	145 x 120 x 485mm	1,527g

แว่นขยาย

**POCKET MEASURING MICROSCOPE**



Order No.	Magnification	Fied of view	Min. scale division	Measuring range	Working distance	Net weight
<b>2036-25</b>	25X	Ø3.30mm	0.05mm	3.00mm	Ø12.4 x 127mm	12g
<b>2036-50</b>	50X	Ø2.00mm	0.02mm	1.60mm	Ø12.4 x 127mm	12g

แว่นขยาย

**WIDE STAND MICROSCOPE**



Order No.**	Magnification	Fied of view	Min. scale division	Measuring range	Working distance	Size	Net weight
<b>2034-20**</b>	20X	Ø7.2mm	0.10mm, 0.005"	6.0mm	36.0mm	Ø63 x 172mm	307g
<b>2034-40**</b>	40X	Ø3.6mm	0.05mm, 0.002"	3.0mm	18.7mm	Ø63 x 172mm	306g
<b>2034-60**</b>	60X	Ø2.4mm	0.02mm, 0.001"	2.0mm	11.1mm	Ø63 x 172mm	309g
<b>2034-100**</b>	100X	Ø1.45mm	0.01mm, 0.0005"	1.2mm	5.7mm	Ø63 x 172mm	313g
<b>2034-150**</b>	150X	Ø0.96mm	0.005mm, 0.0002"	0.9mm	9.2mm	Ø63 x 172mm	314g
<b>2034-200**</b>	200X	Ø0.72mm	0.002mm, 0.0001"	0.6mm	6.1mm	Ø63 x 172mm	316g
<b>2034-300**</b>	300X	Ø0.48mm	0.001mm, -	0.4mm	3.7mm	Ø63 x 172mm	314g

\*\* สินค้ามีปัญหาในการส่งมอบ กรุณาสอบถามพนักงานขายก่อนทำการสั่งซื้อทุกครั้ง





1975  
Scale  
Lupe 7X



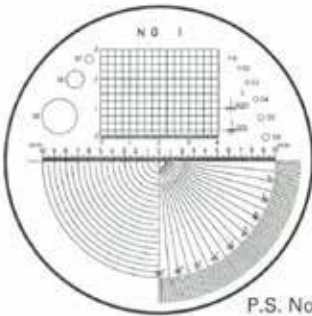
1983  
Scale Lupe  
10X



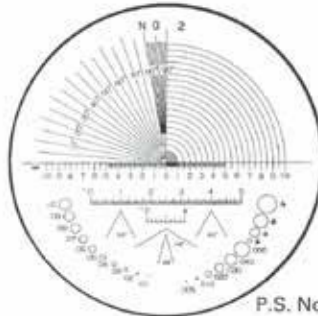
2015  
Mini  
Comparator  
7X



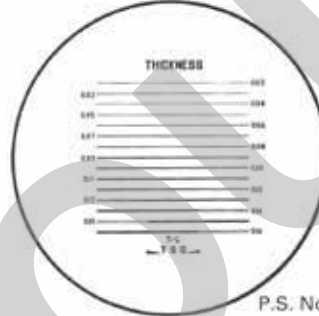
1999  
Telecentric  
Lupe 7X



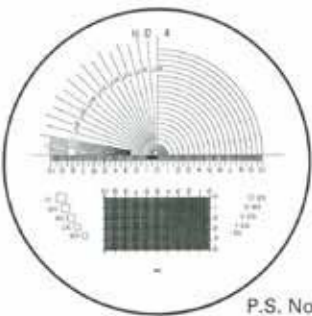
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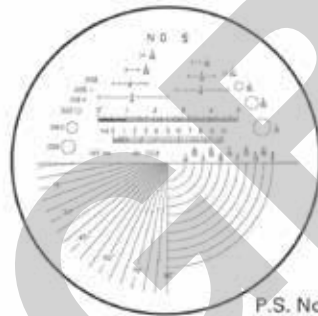
P.S. No. 2



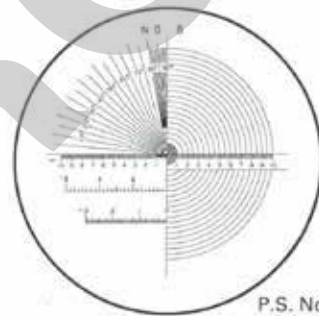
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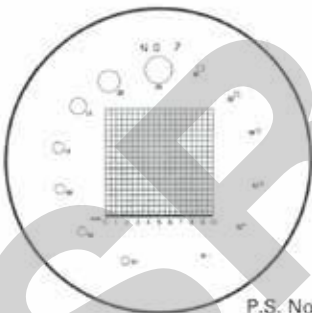
P.S. No. 4



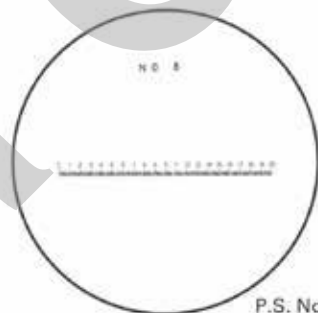
P.S. No. 5



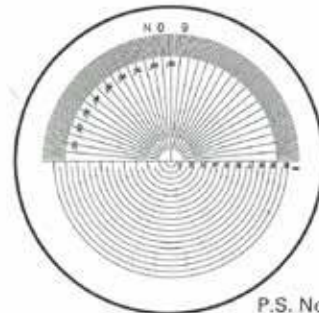
P.S. No. 6



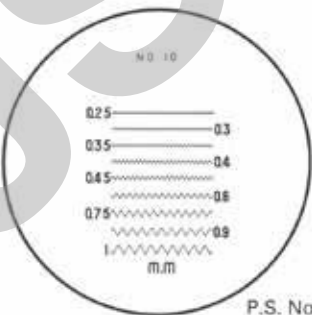
P.S. No. 7



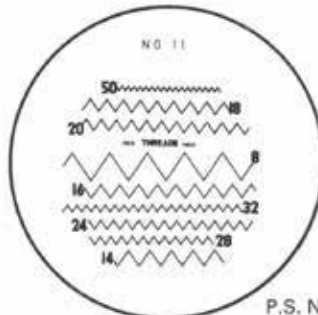
P.S. No. 8



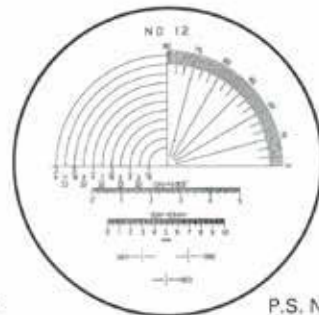
P.S. No. 9



P.S. No. 10



P.S. No. 11



P.S. No. 12

### Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

### Microscopes

กล้องไมโครสโคป

### Inspection Mirror

กระจกส่อง

### Magnifier

แว่นขยาย

### Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

# OPTICAL MEASURING

การวัดด้วยเลนส์

OTSUKA

แว่นขยายส่องสว่าง

## LED ILLUMINATED MAGNIFIER WITHOUT DIMMER - SKKL SERIES

### Features

We replaced the light source of the SKK series with LED, and released it as SKKL. The concept of development is to pursue the equivalent performance of the conventional fluorescent light, and to adopt the fluorescent light type LED. SKKL is competitively priced and suitable alternative to the SKK Series., and the electric power consumption is reduced to about 65%. The cost of 40,000 hours of operation is reduced to 1/3, and it is an Eco-friendly product suitable for growing calls of power shortage.

<b>Profile Projectors</b> เครื่องวัดชิ้นงาน ชนิดแสงเงา	ORDER NO.	<b>SKKL-A</b> (with table stand and microscope)	
	Weight	2.4kg (Excluding lens)	
	Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
	Power Consumption	8W	
	Magnification of microscope	20X / 40X / 60X / 100X	
<b>Microscopes</b> กล้องไมโครสโคป	Interchangeable Lens	2X (Ø130)   3X (Ø130)   4X (Ø130)   6X (Ø105)   8X (Ø85)   10X (Ø85)   12X (Ø90)   15X (Ø70)	
	ORDER NO.	<b>SKKL-B</b> (with table stand)	
	Weight	2.1kg (Excluding lens)	
	Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
	Power Consumption	8W	
<b>Inspection Mirror</b> กระจกส่อง	Interchangeable Lens	2X (Ø130)   3X (Ø130)   4X (Ø130)   6X (Ø105)   8X (Ø85)   10X (Ø85)   12X (Ø90)   15X (Ø70)	
	ORDER NO.	<b>SKKL-D</b> (Fixed-type box stand)	
	Weight	2.2kg (Excluding lens)	
	Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
	Power Consumption	8W	
<b>Magnifier</b> แว่นขยาย	Interchangeable Lens	2X (Ø130)   3X (Ø130)   4X (Ø130)   6X (Ø105)   8X (Ø85)   10X (Ø85)   12X (Ø90)   15X (Ø70)	
	ORDER NO.	<b>SKKL-CF</b> (Compact free arm and clamp type. Free-type and versatile for inspection, designing, crafting, etc.)	
	Weight	2.9kg (Excluding lens)	
	Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
	Power Consumption	8W	
<b>Illuminated Magnifier</b> แว่นขยายพร้อมไฟส่องสว่าง	Interchangeable Lens	2X (Ø130)   3X (Ø130)   4X (Ø130)   6X (Ø105)   8X (Ø85)   10X (Ø85)   12X (Ø90)   15X (Ø70)	
	ORDER NO.	<b>SKKL-CL</b> (Light box with transmission illumination)	
	Weight	3.2kg (Excluding lens)	
	Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
	Power Consumption	8W+5W	
<b>Profile Projectors</b> เครื่องวัดชิ้นงาน ชนิดแสงเงา	Standby Power	0W	
	Interchangeable Lens	2X (Ø130)   3X (Ø130)   4X (Ø130)   6X (Ø105)   8X (Ø85)   10X (Ø85)   12X (Ø90)   15X (Ø70)	
	ORDER NO.	<b>SKKL-CL</b> (Light box with transmission illumination)	
	Weight	3.2kg (Excluding lens)	
	Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
	Power Consumption	8W+5W	
	Standby Power	0W	
	Interchangeable Lens	2X (Ø130)   3X (Ø130)   4X (Ø130)   6X (Ø105)   8X (Ø85)   10X (Ø85)   12X (Ø90)   15X (Ø70)	

# OPTICAL MEASURING

การวัดด้วยเลนส์

OTSUKA

ILLUMINATED MAGNIFIER  
แว่นขยายพร้อมไฟส่องสว่าง

ORDER NO.	<b>SKKL-F</b> (-Free arm and clamp type -Free-type and versatile for inspection, designing, crafting, etc.)
Weight	3.1kg (Excluding lens)
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)
Power Consumption	8W
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>



## Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

## Microscopes

กล้องไมโครสโคป

## Inspection Mirror

กระจกส่อง

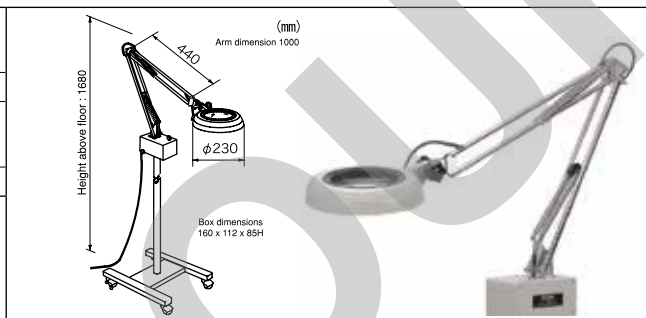
## Magnifier

แว่นขยาย

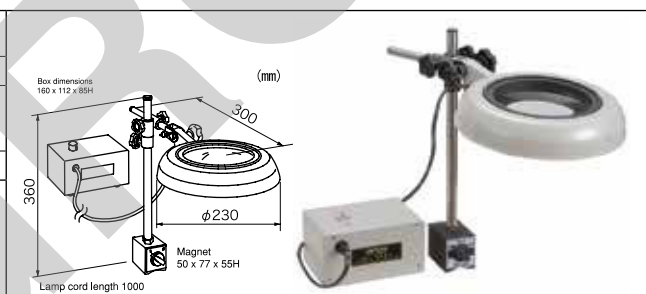
## Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

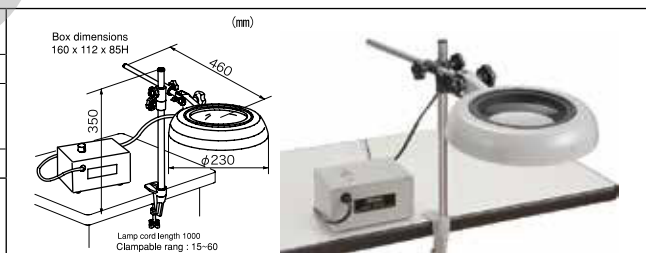
ORDER NO.	<b>SKKL-FL</b> (-Free arm with casters. -Moveable in the reach of the power cord)
Weight	14.5kg (Excluding lens)
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)
Power Consumption	8W
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>



ORDER NO.	<b>SKKL-MS</b> (Magnet stand type)
Weight	3.3kg (Excluding lens)
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)
Power Consumption	8W
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>



ORDER NO.	<b>SKKL-ST</b> (Clamp stand type)
Weight	2.4kg (Excluding lens)
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)
Power Consumption	8W
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>



#### แว่นขยายส่องสว่าง

#### LED ILLUMINATED MAGNIFIER WITH DIMMER - ENVL SERIES

##### Features

ENVL Series is the LED illuminated magnifier as succession series of dimmable ENV Series that was equipped with electronic ballast. ENVL is competitively priced and suitable alternative to the ENV Series., and the electric power consumption is reduced to about 55%. the cost for 40,000 hours of operation is reduced to 1/3, and it is an Eco-friendly product suitable for growing calls of power shortage.\*  
\* We do not supply ENVL-CL with transmission illumination.

ORDER NO.	<b>ENVL-A</b> (with table stand and microscope, light with dimmer 100~50%)	
Weight	2.5kg (Excluding lens)	
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
Power Consumption	11W	
Magnification of microscope	20X / 40X / 60X / 100X	
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>	

ORDER NO.	<b>ENVL-B</b> (with table stand and microscope, light with dimmer 100~50%)	
Weight	2.2kg (Excluding lens)	
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
Power Consumption	11W	
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>	

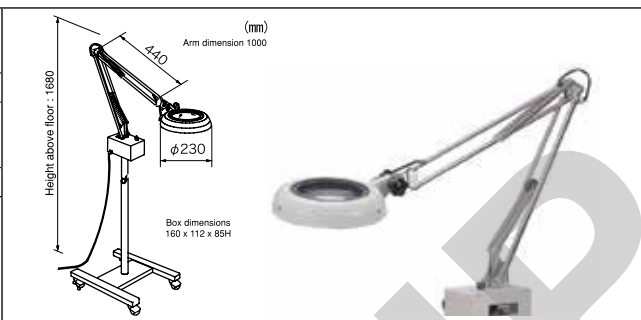
ORDER NO.	<b>ENVL-D</b> (Fixed-type box stand, light with dimmer 100~50%)	
Weight	2.3kg (Excluding lens)	
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
Power Consumption	11W	
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>	

ORDER NO.	<b>ENVL-CF</b> (• Compact free arm and clamp type. • Free-type and versatile for inspection, designing, crafting, etc. • light with dimmer 100~50%)	
Weight	2.9kg (Excluding lens)	
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
Power Consumption	11W	
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>	

ORDER NO.	<b>ENVL-F</b> (• Free arm and clamp type. • Free-type and versatile for inspection, designing, crafting, etc. • light with dimmer 100~50%)	
Weight	3.1kg (Excluding lens)	
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)	
Power Consumption	11W	
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>	



ORDER NO.	<b>ENVL-FL</b> (Free arm with casters, Moveable in the reach of the power cord, light with dimmer 100~50%)
Weight	14.6kg (Excluding lens)
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)
Power Consumption	11W
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>



## Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

## Microscopes

กล้องไมโครสโคป

## Inspection Mirror

กระจกส่อง

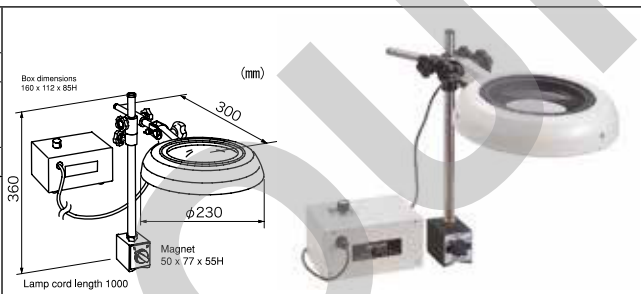
## Magnifier

แว่นขยาย

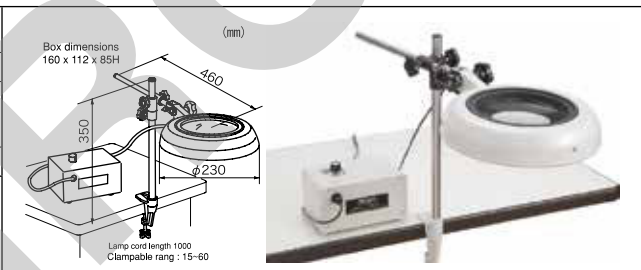
## Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

ORDER NO.	<b>ENVL-MS</b> (Magnet stand type, light with dimmer 100~50%)
Weight	3.4kg (Excluding lens)
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)
Power Consumption	11W
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>



ORDER NO.	<b>ENVL-ST</b> (Clamp stand type, light with dimmer 100~50%)
Weight	2.5kg (Excluding lens)
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)
Power Consumption	11W
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>



ORDER NO.	<b>ENVL-CL</b> (• with table stand • light with dimmer 100~50%)
Weight	3.2kg (Excluding lens)
Input voltage range	100 ~ 240V * 50/60 Hz (*125 ~ 240V is applicable by replacing the input plug. A kind of input plug consult your distributor)
Power Consumption	11W+9W
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div> <div>8X (Ø85)</div> <div>10X (Ø85)</div> <div>12X (Ø90)</div> <div>15X (Ø70)</div>



# OPTICAL MEASURING

การวัดด้วยเลนส์

OTSUKA

แว่นขยายส่องสว่าง

## LED ILLUMINATED MAGNIFIER - LSKs / LSK SERIES

### Features

LSKs / LSK Series have the LED lighting quality, long service life, and excellent performance. We will strongly support the customer's visual inspection processes with less facility investment, more high optical quality, and excellent energy saving performance.

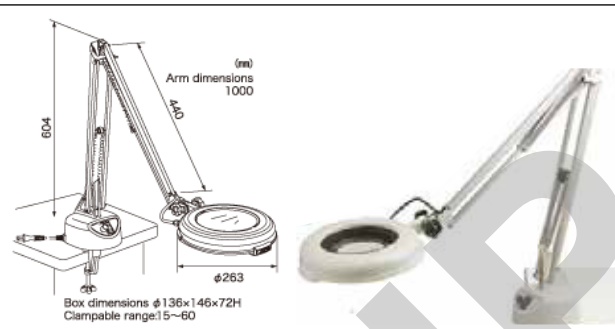
Input voltage range : AC100 ~ 240V \*50/60 Hz

(\*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)

<b>ORDER NO.</b> <b>Light source</b> <b>Weight of unit</b> <b>Special power supply</b> <b>Input voltage range</b> <b>Power consumption</b> <b>Interchangeable Lens</b>	<b>LSKs-B</b> (With table stand, LED illumination system with plastic protection) LED (estimated life time : 40,000 hours) 3.8 kg (Excluding lens) PS15C is attached AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.) 15W <div> <div>2X</div> <div>3X</div> <div>4X</div> </div>	
<b>ORDER NO.</b> <b>Light source</b> <b>Weight</b> <b>Input voltage range</b> <b>Power Consumption</b> <b>Interchangeable Lens</b>	<b>LSKs-F</b> (Free arm and clamp type, LED illumination system with plastic protection) LED (estimated life time : 40,000 hours) 3.1kg (Excluding lens) AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.) 15W <div> <div>2X</div> <div>3X</div> <div>4X</div> </div>	
<b>ORDER NO.</b> <b>Light source</b> <b>Weight</b> <b>Input voltage range</b> <b>Power Consumption</b> <b>Interchangeable Lens</b>	<b>LSKs-CF</b> (Clamp free arm and clamp type, LED illumination system with plastic protection) LED (estimated life time : 40,000 hours) 2.9kg (Excluding lens) AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.) 15W <div> <div>2X</div> <div>3X</div> <div>4X</div> </div>	
<b>ORDER NO.</b> <b>Light source</b> <b>Weight</b> <b>Input voltage range</b> <b>Power Consumption</b> <b>Interchangeable Lens</b>	<b>LSKs-ST</b> (Clamp stand type, LED illumination system with plastic protection) LED (estimated life time : 40,000 hours) 2.1kg (Excluding lens) AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.) 15W <div> <div>2X</div> <div>3X</div> <div>4X</div> </div>	
<b>ORDER NO.</b> <b>Light source</b> <b>Weight</b> <b>Input voltage range</b> <b>Power Consumption</b> <b>Interchangeable Lens</b>	<b>LSK-B</b> (- with table stand • LED illumination system with plastic protection • light with dimmer (100~10%)) LED (estimated life time : 40,000 hours) 4.4kg (Excluding lens) AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.) 15W <div> <div>2X</div> <div>3X</div> <div>4X</div> <div>6X</div> </div>	



ORDER NO.	<b>LSK-F</b> (Free arm and clamp type, LED illumination system with plastic protection, light with dimmer (100~10%))
Light source	LED (estimated life time : 40,000 hours)
Weight of unit	3.5 kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power consumption	15W
Interchangeable Lens	<div>2X (Ø130)</div> <div>3X (Ø130)</div> <div>4X (Ø130)</div> <div>6X (Ø105)</div>



## Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

## Microscopes

กล้องไมโครสโคป

## Inspection Mirror

กระจกส่อง

## Magnifier

แว่นขยาย

## Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

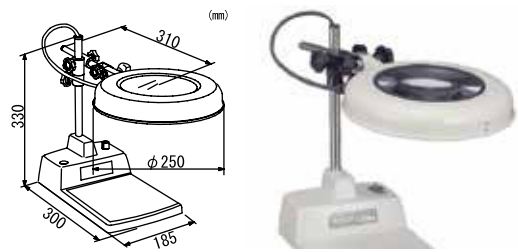
## แว่นขยายส่องสว่าง

### LED ILLUMINATED MAGNIFIER - LEKs

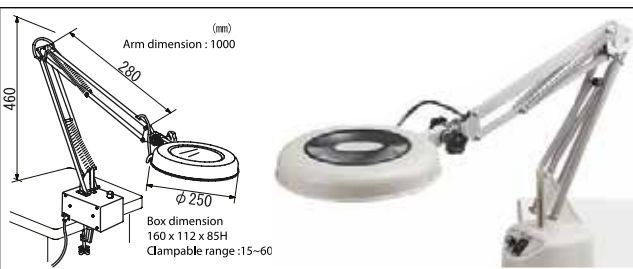
#### Features

We employed fluorescent lamp-type LED of high quality. We want to contribute to reduction of lighting power by having LED illuminated magnifiers used by more customers.

ORDER NO.	<b>LEKs WIDE-B</b> (With table stand)
Light source	LED (estimated life time : 40,000 hours)
Weight	2.4kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power Consumption	15W
Interchangeable Lens	<div>WIDE 2X (Ø150)</div> <div>WIDE 3X (Ø150)</div> <div>WIDE 4X (Ø150)</div>



ORDER NO.	<b>LSKs-WIDE-CF</b> (Compact free arm and clamp type)
Light source	LED (estimated life time : 40,000 hours)
Weight	3.1kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power Consumption	15W
Interchangeable Lens	<div>WIDE 2X (Ø150)</div> <div>WIDE 3X (Ø150)</div> <div>WIDE 4X (Ø150)</div>



ORDER NO.	<b>LSKs-WIDE-CL</b> (Light box with transmission illumination)
Light source	LED (estimated life time : 40,000 hours)
Weight	3.3kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power Consumption	15W+5W
Interchangeable Lens	<div>WIDE 2X (Ø150)</div> <div>WIDE 3X (Ø150)</div> <div>WIDE 4X (Ø150)</div>



# OPTICAL MEASURING

การวัดด้วยเลนส์

OTSUKA

แว่นขยายส่องสว่าง

## LED ILLUMINATED MAGNIFIER - LEKs

### Features

We employed fluorescent lamp-type LED of high quality. We want to contribute to reduction of lighting power by having LED illuminated magnifiers used by more customers.

<b>Profile Projectors</b> เครื่องวัดชิ้นงาน ชนิดแสงเงา	ORDER NO.	<b>LEKs WIDE-F</b> (Free arm and clamp type)	
	Light source	LED (estimated life time : 40,000 hours)	
	Weight	3.3kg (Excluding lens)	
	Interchangeable Lens	<div>WIDE 2X (Ø150)</div> <div>WIDE 3X (Ø150)</div> <div>WIDE 4X (Ø150)</div>	
<b>Microscopes</b> กล้องไมโครสโคป	ORDER NO.	<b>LSKs-WIDE-D</b> (Fixed-type box stand)	
	Light source	LED (estimated life time : 40,000 hours)	
	Weight	2.4kg (Excluding lens)	
	Interchangeable Lens	<div>WIDE 2X (Ø150)</div> <div>WIDE 3X (Ø150)</div> <div>WIDE 4X (Ø150)</div>	
<b>Inspection Mirror</b> กระจกส่อง	ORDER NO.	<b>LSKs-WIDE-MS</b> (Magnet stand type)	
	Light source	LED (estimated life time : 40,000 hours)	
	Weight	4.3kg (Excluding lens)	
	Interchangeable Lens	<div>WIDE 2X (Ø150)</div> <div>WIDE 3X (Ø150)</div> <div>WIDE 4X (Ø150)</div>	
<b>Magnifier</b> แว่นขยาย	ORDER NO.	<b>LSKs-WIDE-ST</b> (Clamp stand type)	
	Light source	LED (estimated life time : 40,000 hours)	
	Weight	2.6kg (Excluding lens)	
	Interchangeable Lens	<div>WIDE 2X (Ø150)</div> <div>WIDE 3X (Ø150)</div> <div>WIDE 4X (Ø150)</div>	

แว่นขยายส่องสว่าง

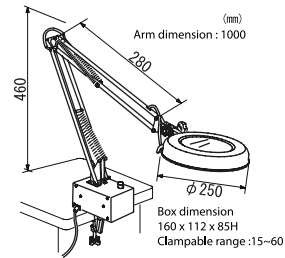
## WIDE SERIES WITH DIMMER - LEK SERIES

### Features

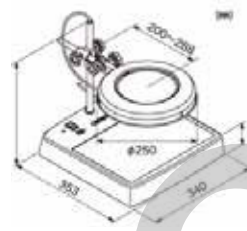
We employed fluorescent lamp-type LED of high quality. We want to contribute to reduction of lighting power by having LED illuminated magnifiers used by more customers.

ORDER NO.	<b>LEK WIDE-B</b> (With table stand, light with dimmer (100~10%))	
Light source	LED (estimated life time : 40,000 hours)	
Weight	2.4kg (Excluding lens)	
Interchangeable Lens	<div>WIDE 2X (Ø150)</div> <div>WIDE 3X (Ø150)</div> <div>WIDE 4X (Ø150)</div>	

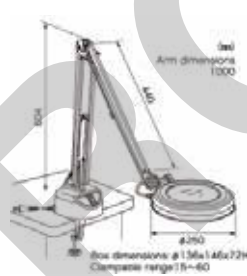
ORDER NO.	<b>LSK WIDE-CF</b> (Compact free arm and clamp type, light with dimmer (100~10%))
Light source	LED (estimated life time : 40,000 hours)
Weight	3.1kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power Consumption	15W
Interchangeable Lens	<div>WIDE 2X (0150)</div> <div>WIDE 3X (0150)</div> <div>WIDE 4X (0150)</div>



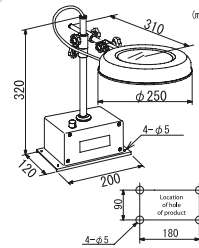
ORDER NO.	<b>LSK WIDE-CL</b> (Light box with transmission illumination, light with dimmer (100~10%))
Light source	LED (estimated life time : 40,000 hours)
Weight	3.3kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power Consumption	15W+5W
Interchangeable Lens	<div>WIDE 2X (0150)</div> <div>WIDE 3X (0150)</div> <div>WIDE 4X (0150)</div>



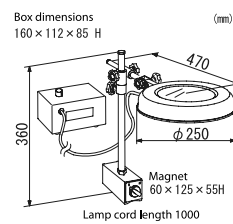
ORDER NO.	<b>LEK WIDE-F</b> (Free arm and clamp type, light with dimmer (100~10%))
Light source	LED (estimated life time : 40,000 hours)
Weight	3.3kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power Consumption	15W
Interchangeable Lens	<div>WIDE 2X (0150)</div> <div>WIDE 3X (0150)</div> <div>WIDE 4X (0150)</div>



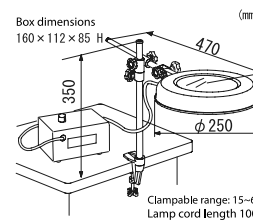
ORDER NO.	<b>LSK WIDE-D</b> (Fixed-type box stand, light with dimmer (100~10%))
Light source	LED (estimated life time : 40,000 hours)
Weight	2.4kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power Consumption	15W
Interchangeable Lens	<div>WIDE 2X (0150)</div> <div>WIDE 3X (0150)</div> <div>WIDE 4X (0150)</div>



ORDER NO.	<b>LSK WIDE-MS</b> (Magnet stand type, light with dimmer (100~10%))
Light source	LED (estimated life time : 40,000 hours)
Weight	4.3kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power Consumption	15W
Interchangeable Lens	<div>WIDE 2X (0150)</div> <div>WIDE 3X (0150)</div> <div>WIDE 4X (0150)</div>



ORDER NO.	<b>LSK WIDE-ST</b> (Clamp stand type, light with dimmer (100~10%))
Light source	LED (estimated life time : 40,000 hours)
Weight	2.6kg (Excluding lens)
Input voltage range	AC100~240V * 50/60 Hz (*AC125~ 240V is application by replacing the input plug. A kind of input plug consult your distributor.)
Power Consumption	15W
Interchangeable Lens	<div>WIDE 2X (0150)</div> <div>WIDE 3X (0150)</div> <div>WIDE 4X (0150)</div>



## Profile Projectors

เครื่องวัดชิ้นงาน  
ชนิดแสงเงา

## Microscopes

กล้องไมโครสโคป

## Inspection Mirror

กระจกส่อง

## Magnifier

แว่นขยาย

## Illuminated Magnifier

แว่นขยายพร้อม  
ไฟส่องสว่าง

# OPTICAL MEASURING

การวัดด้วยเลนส์

OSUTSUKA

แว่นขยายส่องสว่าง

## RECTANGULAR SERIES - OSL SERIES

### Features

Fixed to 2X and 4X Rectangular are uses, which are made by cutting off the parts of round lenses which cause aberration (distortion). The lenses are made of high-grade.

<b>Profile Projectors</b> เครื่องวัดชิ้นงาน ชนิดแสงเงา	ORDER NO.	<b>OSL-1</b> (Light box with transmission illumination))	
	Weight	6.5kg	
	Power Consumption	36W	
	Lamp	FL6N (four pieces)	
<b>Microscopes</b> กล้องไมโครสโคป	Interchangeable Lens	2X 4X	
	Weight	6.5 kg	
	Power Consumption	18W	
	Lamp	FL6N (two pieces)	
<b>Inspection Mirror</b> กระจกส่อง	Interchangeable Lens	2X 4X	
	Weight	6.0 kg	
	Power Consumption	18W	
	Lamp	FL6N (two pieces)	
<b>Magnifier</b> แว่นขยาย	Interchangeable Lens	2X 4X	
	Weight	5.5 kg	
	Power Consumption	18W	
	Lamp	FL6N (two pieces)	
<b>Illuminated Magnifier</b> แว่นขยายพร้อม ไฟส่องสว่าง	Interchangeable Lens	2X 4X	
	Weight	5.5 kg	
	Power Consumption	18W	
	Lamp	FL6N (two pieces)	