

**OLYMPUS**<sup>®</sup>

Your Vision, Our Future

SEMICONDUCTOR/FPD  
INSPECTION MICROSCOPE

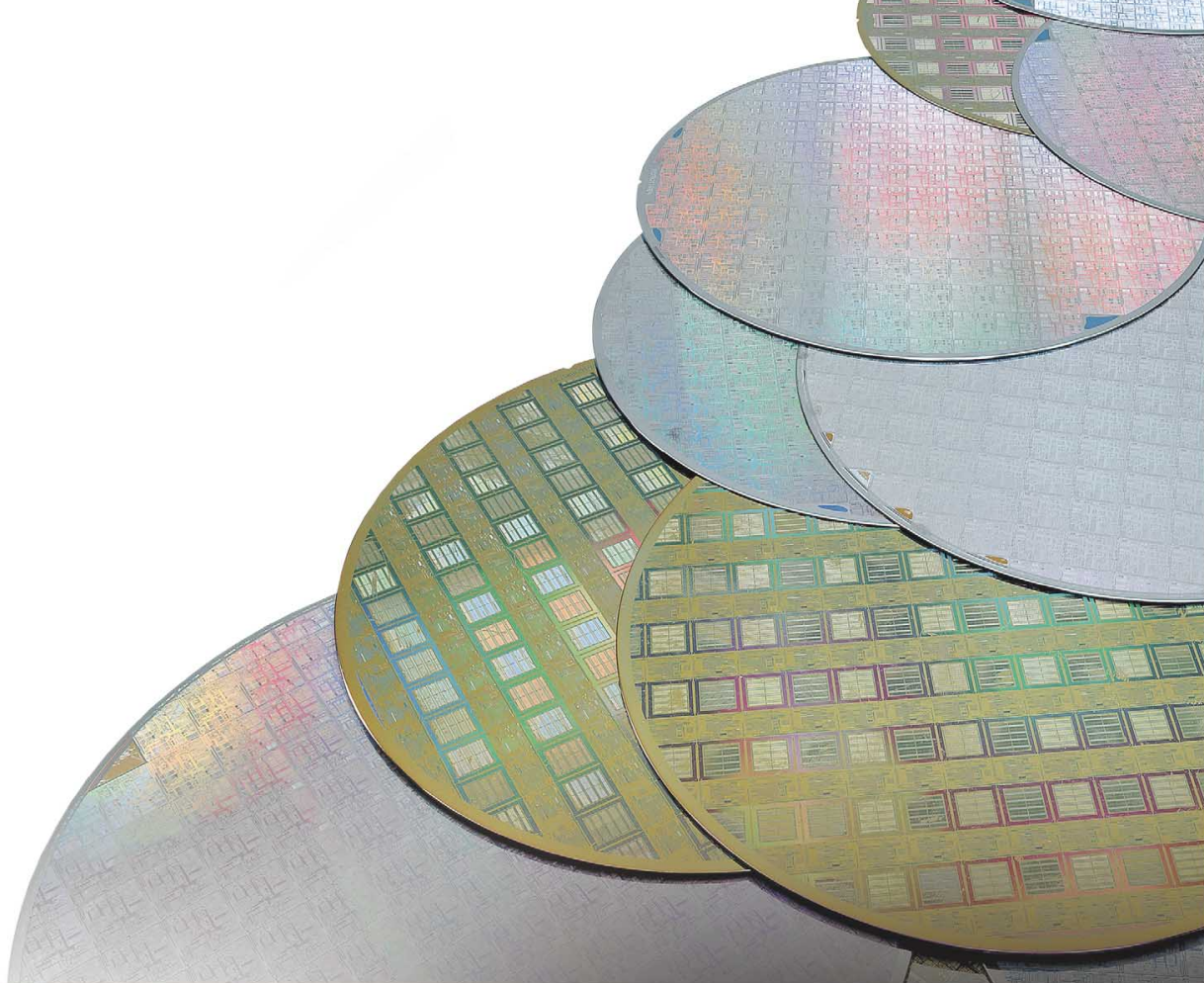
**MX61/MX61L**

*UIS*  
UNIVERSAL  
INFINITY SYSTEM

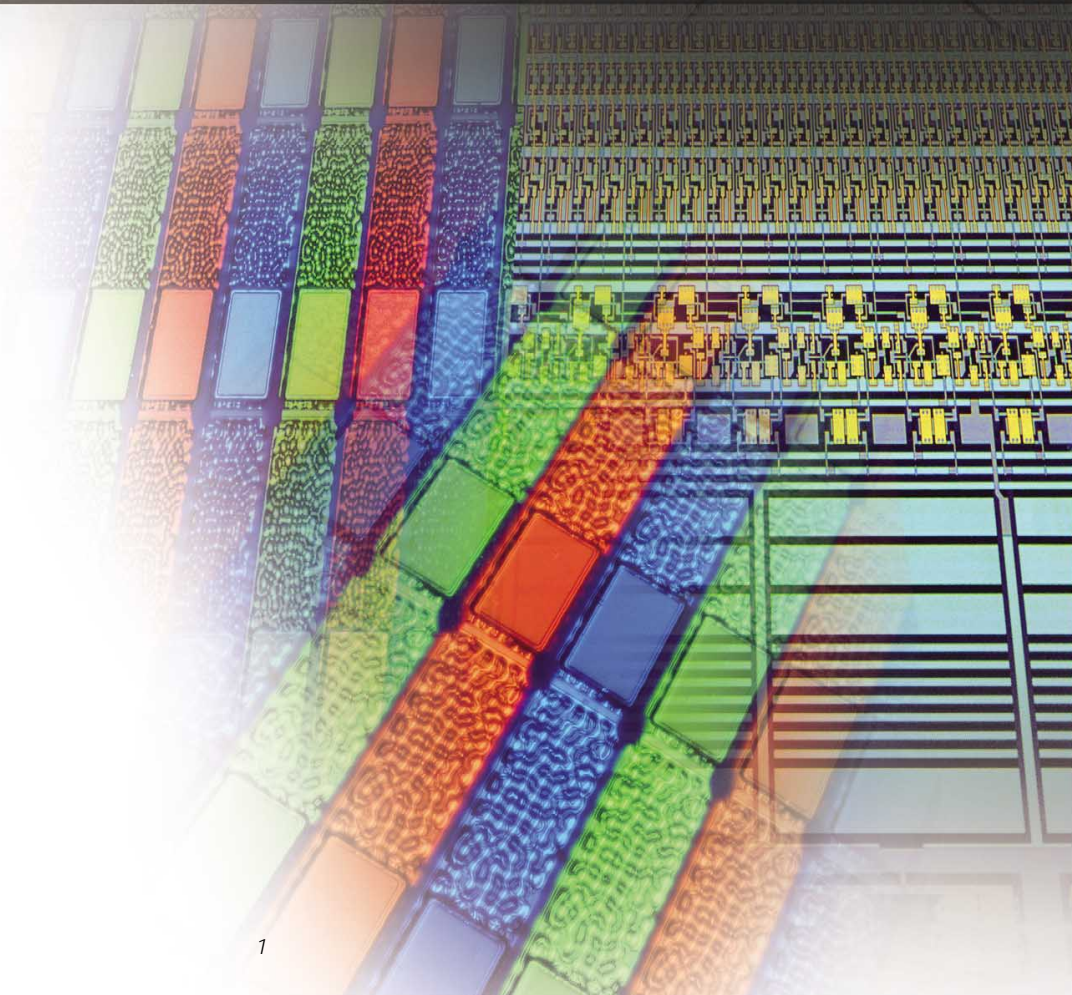


The best way to the best results

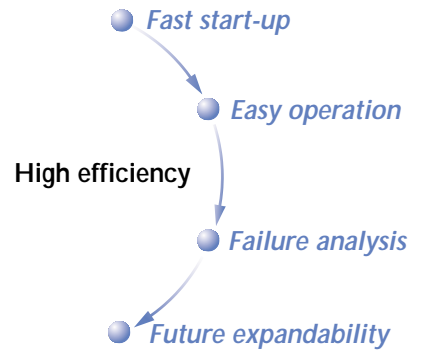




The highest efficiency...for all our







Olympus' key priority is the needs of each individual customer.

Naturally, we aim to ensure that our inspection microscopes deliver maximum benefit from the time of selection right through to after-sales support. And with our long experience of the industry, we already provide many clear-cut solutions to making electronic device inspections easier, quicker and more efficient.

At the same time, we know that each customer is unique, and has to address a unique set of issues to successfully incorporate the microscope into the production process. That's why we are always ready to help, at an individual, local level, providing ideas, solutions and support tailored to specific application needs.

The highest efficiency for all our customers — that's the commitment underlying the launch of our new Semiconductor/FPD inspection microscopes MX61/MX61L.

## customers

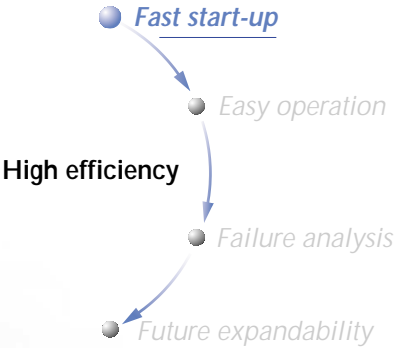


**MX61L**  
300mm SEMICONDUCTOR/FPD  
INSPECTION MICROSCOPE



**MX61**  
SEMICONDUCTOR  
INSPECTION MICROSCOPE

Olympus MX microscopes benefit every customer right from the start — meeting their needs in full, without wasting time or money.



### Front-mounted main controls for faster, more efficient operations.

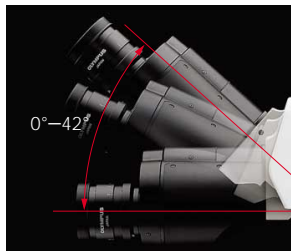
The adjustment of AS (Aperture Stop) open/close, which plays a key role in determining image contrast, is synchronized with objective exchange and observation method, and controlled by buttons. Inspection efficiency is further improved by the front-panel location of the light adjustment, which can be operated by a single finger. The buttons for objective exchange and AS are positioned crosswise for easy operation with the thumb only, so that the user does not have to let go of the focusing handle. The crosswise button layout also enhances fingertip sensitivity and prevents operating mistakes.



- ① Reflected light adjustment dial
- ② Objective magnifications exchange buttons
- ③ AS open/close buttons

### Tilting trinocular tubes to suit any viewing posture.

Adjusting chair height or adopting an unnatural posture to suit the operator's eyepoint are just two of the many small inconveniences that can slow down working speed. With this in mind, the MX61/61L is equipped with a tilting tube whose tilt angle can be varied from 0° to 42° (variable height: 150mm, compatible with SEMI S8); this allows operators to find their most comfortable posture, regardless of physical differences, and also enables inspection while standing. The tube also features a long distance from the center of the observation axis to the eyepoint, so that even a large stage can be operated easily.

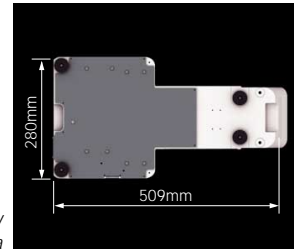


### SEMI S2/S8 compliance ensures safety and reliability.

The MX61/61L comply in full with international specifications and standards such as SEMI S2/S8, CE, and UL, and respond to environmental and safety issues with a high level of reliability.

### Clean Class 1 conformity: numerous features to exclude dust.

All driving components are housed in a shielded structure and are made of materials that offer excellent abrasion resistance and conformity with Clean Class 1. (There is a separate Class 1 compatible model for use with a revolving nosepiece.) MX61 is capable of accommodating up to 200mm wafers and MX61L up to 300mm wafers with the same small footprint. The depth of the 300mm wafer compatible system is amazingly small, occupying just 537mm on the table, or 677mm to the end of the lamp housing.



MX61/MX61L occupy small footprint area

### Optimized construction materials with upgraded anti-static protection.

Antistatic processing is applied to the microscope frame, tube, breath shield and other parts, to prevent wafer contamination.



Antistatic breath shield

### Safe, quick wafer handling improves product throughput.

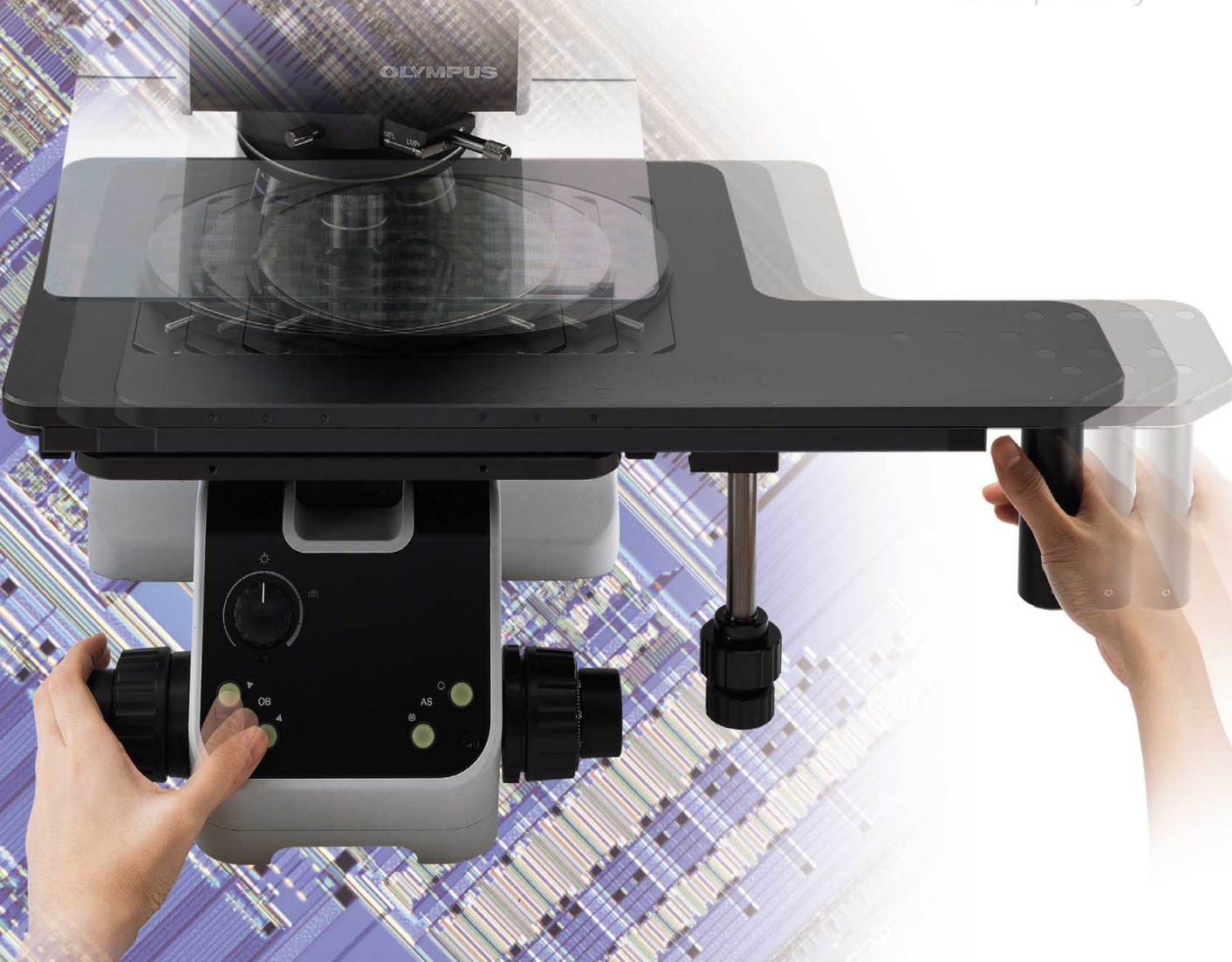
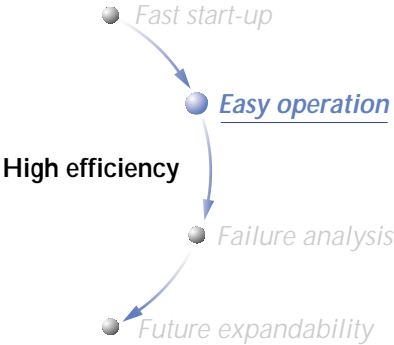
A wafer loader can be attached to both MX61/61L models with no significant increase in overall footprint size. Safe, efficient operation, from back macro to micro inspections, can be performed without using tweezers. The wafer cassette can easily be set from the front side.



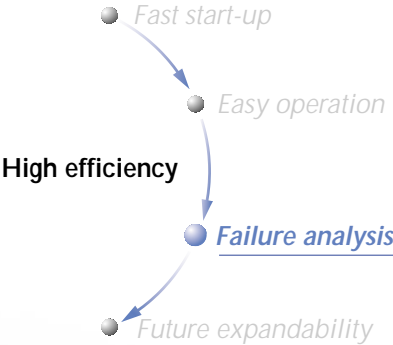
MX61 combined with AL110 wafer loader (200mm version)



Speedy detection of any flaw ensures faster, more productive throughput.



High resolving power and high image sensitivity support faster, more accurate analysis.

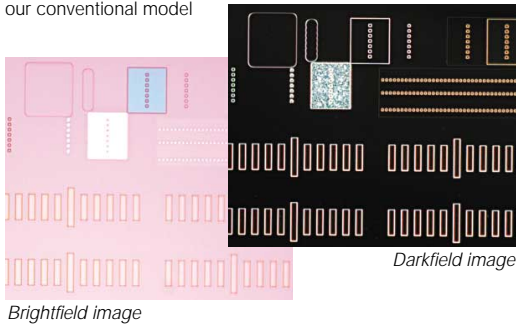




**7 times brighter darkfield images deliver a remarkable improvement in defect detection.**

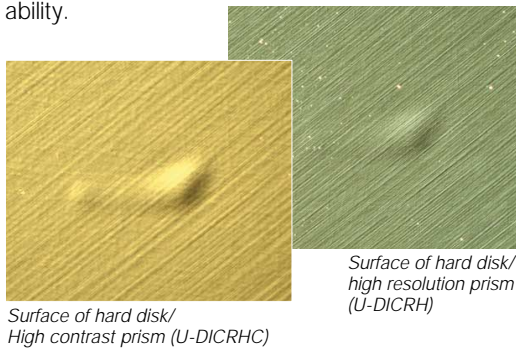
The newly-improved optics deliver brighter darkfield images (approx. 7 times brighter on average\*) and better darkfield observation effects, enabling quick, reliable detection of minute scratches that would previously have been overlooked. Clear, high-contrast brightfield images with optimized color temperature also capture color tone differences with outstanding precision.

\*Combined with recommended objectives and compared with our conventional model



**Optimized DIC contrast for different surface conditions enhances defect detection.**

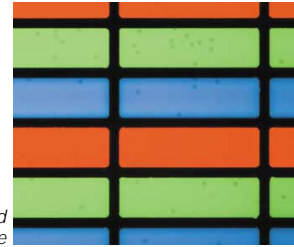
Three kinds of DIC prism — standard, high contrast or high resolution — can be selected according to the surface irregularities and reflection characteristics of the samples. This delivers images with optimized contrast and spatial effect, greatly improving defect detection ability.



**Simultaneous use of reflected and transmitted light.**

Reflected light and (optional) transmitted light illumination systems can be used simultaneously, with independent intensity adjustment for each.

This combination is ideal for precision inspections of semitranslucent devices.



LCD panel/transmitted light image

**High N.A. and long working distance objectives improve operability.**

Different types of UIS objectives that combine high resolving power with long working distances are available. These objectives minimize direct contact with samples caused by inaccurate operation of the focusing knob, and deliver the clear, high-resolution images needed for more precise analysis.



LCD objectives

**High performance imaging systems.**

Digital cameras can be attached to the various types of tubes. Olympus offers a wide range of highly cost-effective specialized models, and also provides a variety of adapters for attaching digital cameras or video cameras that the operator already owns.



MX61L combined with digital imaging system DP70



A complete range of accessories, available when and if you need them — no other exclusive optical microscope required.

## AF

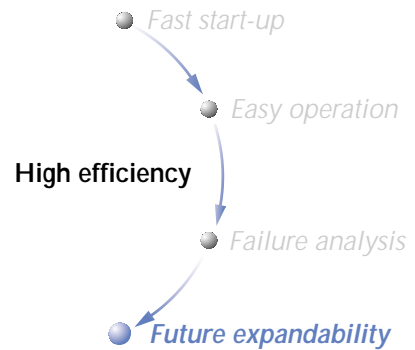
**Minimizing wafer inspection time.**

### Auto focus system MX-AF

This auto focus unit for the MX61/61L is compatible with all reflected light observation methods, including darkfield and Nomarski DIC. Fast and precise, it responds instantly to changes in the observation position to provide accurate focusing in real time.



Auto focus sensor unit (left)  
Auto focus hand switch (right)

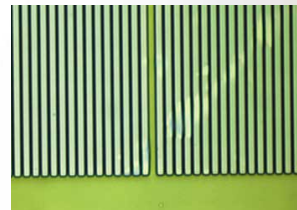


## CF

**More than 20% improvement in contrast at high magnifications.**

### Confocal system U-CFU

This unit integrates confocal optics into the tilting trinocular tube and is compatible with the 0.18 $\mu$ m rule inspection. High-precision devices with multiple layers can be inspected with high resolving power and high contrast.



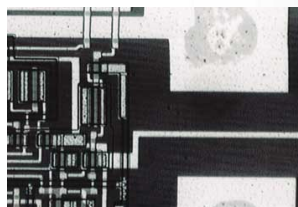
U-CFU combined with MX61 (left)  
Less than 0.2 $\mu$ m lines & spaces  
image (right)

## IR

**Suitable for observing silicon wafers, the inside of compound wafers, and the bonding section of wafer bump.**

### Near Infrared (IR) modules

Compatible accessories include objectives which compensate for aberrations from the visible to near IR wavelength light and various other options, allowing comprehensive inspection of the bump wafer.



Bonding pad from the back  
side of wafer

# FL

*Suitable for judgement of resist residue.*

## Fluorescent modules

For fluorescence observation, a mirror unit can be added in the slider. U, B and G excitation mirror units are available; they are used for inspecting resist residue or organic LEDs



Fluorescence mirror units (left)  
Particle on wafer (right)

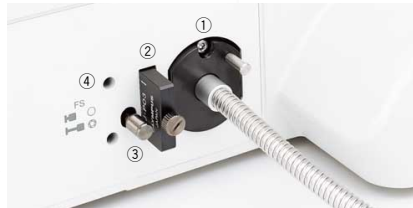
# Transmitted Light Illumination

*Indispensable for observing FPD or MEMS\* sensors.*

## Transmitted illumination modules MX-TILLA/MX-TILLB

There are two types of illumination modules: one for general purpose use and the other with high NA (Numerical Aperture). These transmitted illumination modules are provided to enable inspections for photomask and FPD. A polarizer is also equipped, allowing simple polarizing observations using transmitted light.

\*Micro-Electro-Mechanical System



Control panel of MX-TILLB

- ① Insertion slot for fiber light guide
- ② Filter slot ③ Field Stop (F.S.) lever
- ④ Centering holes (2) for F.S.



# I/F

*Controlling/obtaining information about microscope magnifications and aperture diaphragm.*

## RS232C

An RS232C interface is equipped on the MX61/61L as standard, enabling various motorized parts of the microscope to be controlled via a PC. The observation conditions for several microscopes can be set in the same way; this makes it possible to establish such conditions on a uniform basis among several PCs; to replicate particular environmental conditions of use.



# Motorized Stage

*Specific observation points on the wafer can be programmed, reducing tact time.*

## Motorized stage (MS200)

This stage is used when the MX61/61L is used in combination with wafer loader AL110. This enables complete surface inspections of a 200mm wafer, with specific inspection points quickly detected and examined according to preset programs.



Control of wafer loader  
AL110-8 (left)  
MS200 (right)





Please feel free to contact Olympus right away  
in the event of any new need or unexpected problem.  
We will be happy to help you find the most effective solution.



The semiconductor industry is exceptionally dynamic and fast-moving, constantly facing new issues and adapting to new advances. Olympus has wide experience of the challenges that result, and the kinds of solutions that different users need.

We stand with our customers, sharing ideas and solutions as an energetic, active and effective development partner.

— Your Vision, Our Future —

1990



**Beltless loading**  
Wafer loader / AL-1BL8

1994



**Front micro/macro  
and back macro  
inspection**  
Wafer loader / AL100 series

1996



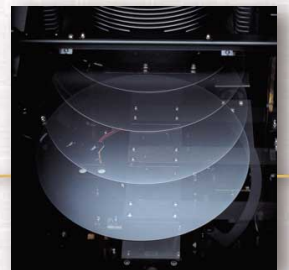
**Confocal unit**  
Real-time confocal microscope /  
MX50-CF

1998



**Super widefield tilting  
observation tube for  
the motorized stage**  
Semiconductor inspection  
microscope / MX80

1999



**Non-contact centering**  
Wafer loader / AL110 series

2002

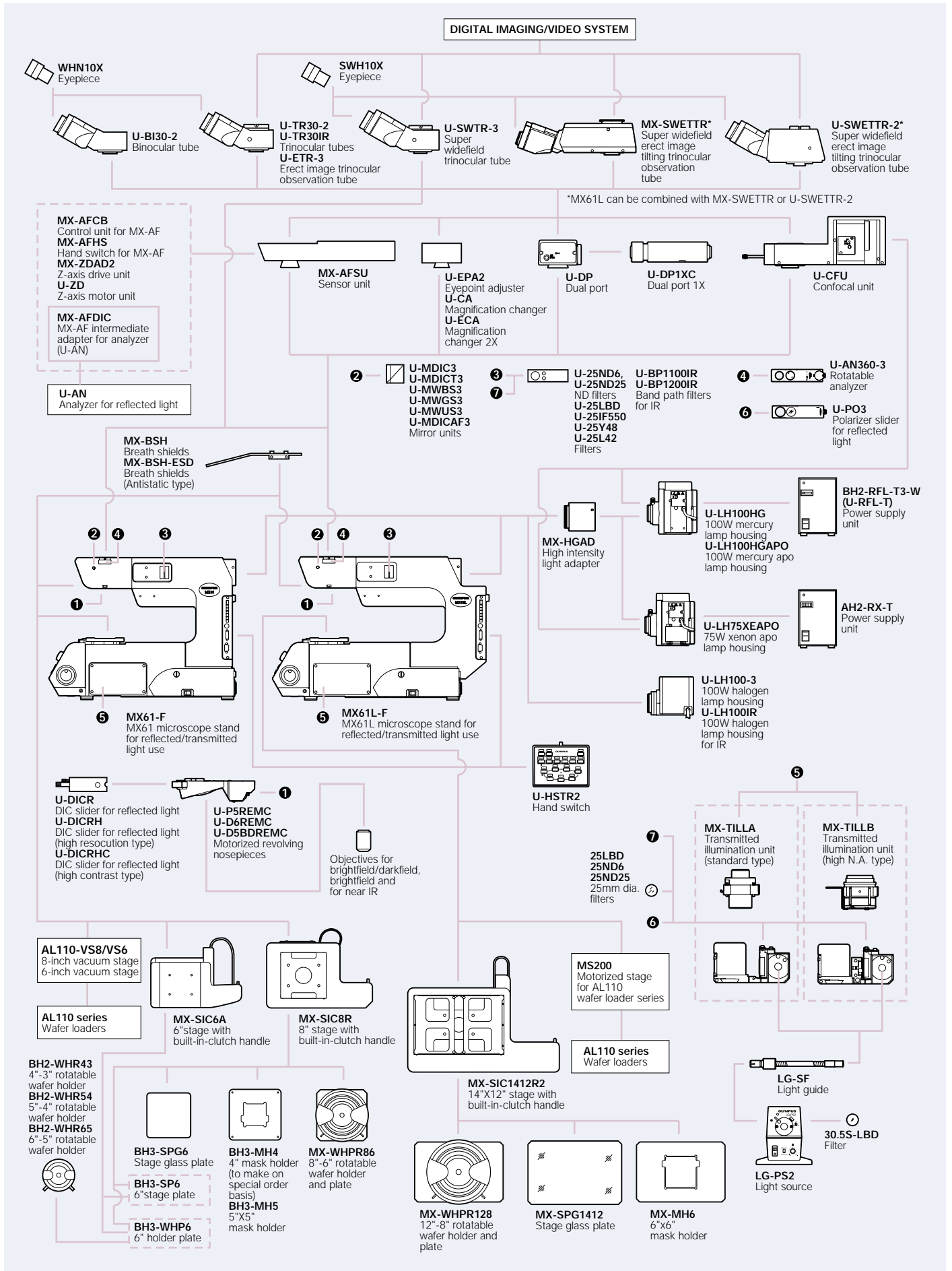


**Confocal unit**  
Confocal unit / U-CFU

2005

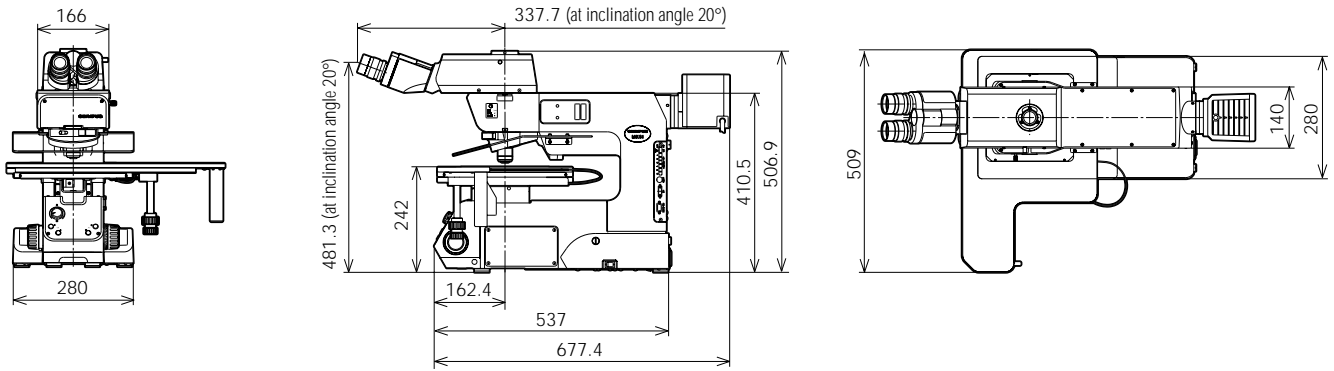


System Diagram

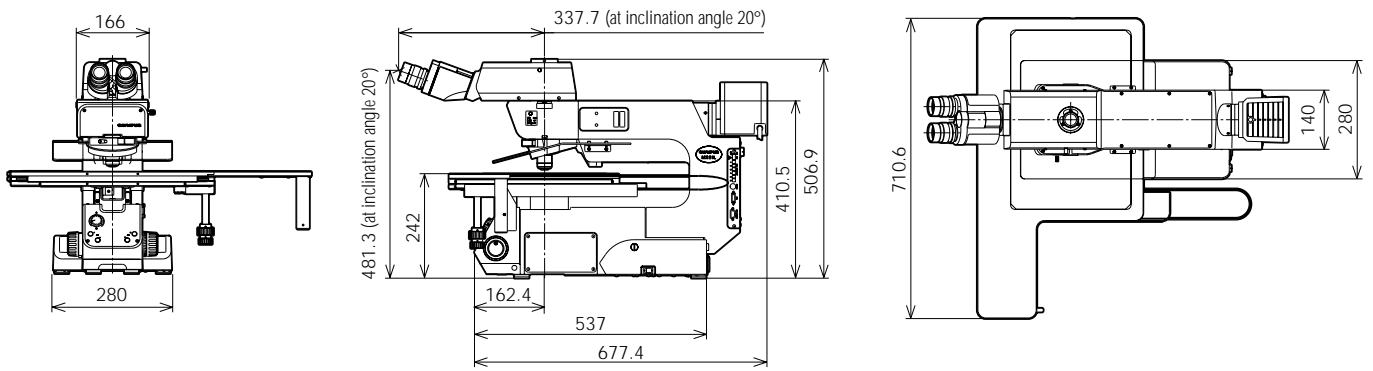


■ Dimensions (unit: mm)

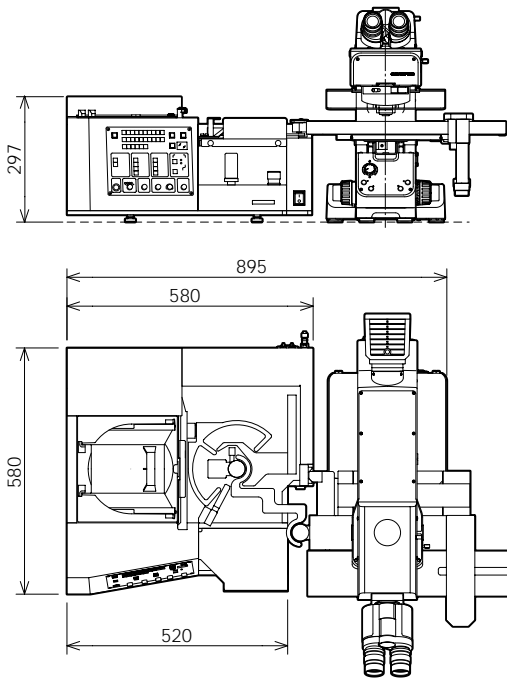
MX61



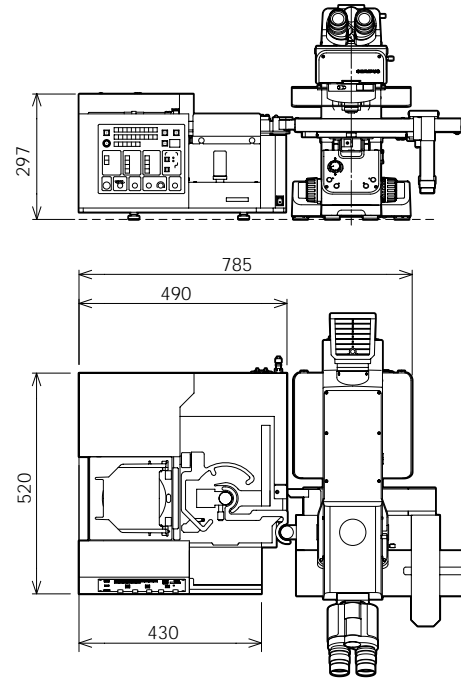
MX61L



MX61+AL110-86



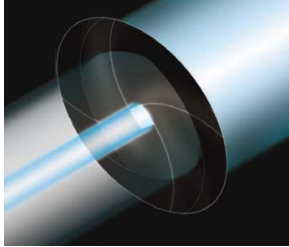
MX61+AL110-6





**Simultaneous AS (Aperture Stop) adjustment and objective switching obtains optimal contrast instantly, making inspections much faster.**

Inspections are slowed down if AS adjustment has to be performed manually every time the objective is changed. But with the MX61/61L, users can preset AS in 14 steps for each level of objective power, ensuring optimal image contrast immediately whenever the objective is changed. This eliminates the time and effort spent on AS adjustment, reduces operator fatigue and speeds up the inspection process.



*Powered aperture diaphragm*

**Easy switching and addition of observation methods.**

Both MX61/MX61L microscopes offer quick selection of observation mode via a single lever — brightfield, darkfield and optional cube. A transmitted light illumination unit can also be combined with both microscope stands, to enable the transmitted light polarizing observation required for FPD inspections.



*Observation method selection*

**Two high-precision stages for faster sample positioning.**

Two stages are available: the MX-SIC1412R2, which complies with wafers up to 300 mm and a 17-inch panel, and the MX-SIC8R which complies with wafers up to 200mm. The former provides a larger transmitted light illumination area (284mm) than the previous model (increased by 55mm in the Y-axis). In addition, the stage grip has a built-in clutch, to allow exchange between fine and coarse movement while retaining the grip on the handle: this enables unrestricted stage movement while observing through the eyepiece, and facilitates faster inspections.



*Quick operation of stage grip with built-in clutch*

**Faster objective exchange.**

The motorized nosepiece revolves 20% faster than previous models, and objective exchange (low-high/high-low magnification) is button operated, enabling faster inspection speeds. Users can select from among 3 clean-type revolving nosepieces, according to need.



**Various holders for different sizes of sample.**

Users can select various types of 8"-6" and 8"-12"\* wafer-sized wafer holders, mask holders, and glass plates. As a result, the production line can be modified at minimal cost even when the object of inspection changes. With the MX61, different stages can be used to accommodate 3", 4", 5" and 6" wafers on the inspection line.

\*MX61L only



- ①MX-WHPR128 ②MX-SPG128
- ③BH3-SPG6 ④MX-WHPR86
- ⑤BH2-WHR65 ⑥BH2-WHR54
- ⑦BH2-WHR43
- ⑤-⑦: Need to combine with BH3-WHP

## ■ Specifications

Model	MX61	MX61L
Optics	UIS optics (infinity-corrected system)	
Microscope stand	<b>Reflected light illumination (F.N. 26.5)</b> 12V, 100W halogen lamp (pre-centering type) Brightfield/darkfield mirror plus 1 cube (option), exchange method Built-in motorized aperture diaphragm (Pre-setting for each objective, automatically open for darkfield observation)	
	<b>Transmitted light illumination* (F.N. 26.5)</b> <i>*When transmitted illumination unit MX-TILLA or MX-TILLB is combined.</i> Illumination by light source LG-PS2 and light guide LG-SF (12V, 100W halogen lamp) or their equivalent. •MX-TILLA: condenser (N.A.0.5), with aperture stop •MX-TILLB: condenser (N.A.0.6), with aperture stop and field stop	
Nosepiece	<b>Observation methods</b> ① Reflected light brightfield ② Reflected light darkfield ③ Reflected light Nomarski DIC ④ Reflected light simple polarizing ⑤ Reflected light fluorescence ⑥ Reflected light IR ⑦ Transmitted light brightfield ⑧ Transmitted light simple polarizing <i>*Separate (optional) cubes are required for ③, ④ and ⑤.            ⑦ and ⑧ require combination with a transmitted illumination unit.</i>	
	Motorized sextuple revolving nosepiece with slider slot for DIC: U-D6REMC Motorized quintuple BD revolving nosepiece with slider slot for DIC: U-D5BDREMC Motorized centerable quintuple revolving nosepiece with slider slot for DIC: U-P5REMC Forward rotation by objective exchange button on the front panel of microscope, or directly by hand switch U-HSTR2 (user designation)	
Observation tube	Super widefield erect image tilting trinocular tube (F.N.26.5): MX-SWETTR Others: Super widefield trinocular tube/Widefield binocular tube	Super widefield erect image tilting trinocular tube (F.N.26.5): MX-SWETTR or U-SWETTR (MX-SWETTR is equipped for MX61L as standard.)
	MX-SIC8R 8"x8" stage Stroke: 210x210mm (Transmitted light illumination area: 189x189mm) MX-SIC6A 6"x6" stage Stroke: 158x158mm (Reflected light use only)	MX-SIC1412R2 14"x12" stage Stroke: 356x305mm (Transmitted light illumination area: 356x284mm) combination with MX-TILLB
Stage	Roller guide slide mechanism, belt drive system (no rack), grip clutch function (belt drive disengagement system)	
Dimensions/weight	Dimensions: approx. 509(W) x 843(D) x 507(H)mm Weight: approx. 40kg (microscope stand only approx. 27kg)	Dimensions: approx. 710(W) x 843(D) x 507(H)mm Weight: approx. 51kg (microscope stand only approx. 31kg)
	Built-in reflected light source body 100-120/220-240V-1.9/0.9A 50/60Hz, Transmitted light source (LG-PS2) 100-120/220-240V-3.0/1.8A 50/60Hz	

## ■ Objectives characteristics

Lens Optical character	Magnification	N.A.	W.D. (mm)	Cover glass thickness (mm)	Resolution <sup>*2</sup> (μm)
UMPLFL	5X	0.15	20.0	—	2.24
	10X	0.30	10.1	—	1.12
	20X	0.46	3.1	0	0.73
	40X	0.75	0.63	0	0.45
	50X	0.80	0.66	0	0.42
100X	0.95	0.31	0	0.35	
UMPLFL-BD	5X	0.15	12.0	—	2.24
	10X	0.30	6.5	—	1.12
	20X	0.46	3.0	0	0.73
	50X	0.80	0.66	0	0.42
100X	0.90	0.31	0	0.37	
UMPLFL-BDP	5X	0.15	12.0	—	2.24
	10X	0.25	6.5	—	1.34
	20X	0.40	3.0	0	0.84
	50X	0.75	0.66	0	0.45
100X	0.90	0.31	0	0.37	
LMPLAPO	150X	0.9	1.0	0	0.37
	250X	0.9	0.80	0	0.37
LMPLAPO-BD	150X	0.9	1.0	0	0.37
	250X	0.9	0.80	0	0.37
LMPLFL	5X	0.13	22.5	—	2.58
	10X	0.25	21.0	—	1.34
	20X	0.40	12.0	0	0.84
	50X	0.50	10.6	0	0.67
	100X	0.80	3.4	0	0.42
LMPLFL-BD	5X	0.13	15.0	—	2.58
	10X	0.25	10.0	—	1.34
	20X	0.40	12.0	0	0.84
	50X	0.50	10.6	0	0.67
	100X	0.80	3.3	0	0.42
MPLAPO	20X	0.60	0.90	0	0.56
	50X	0.95	0.30	0	0.35
	100X	0.95	0.35	0	0.35
	100XOil	1.40	0.1	0	0.24
MPLAPO-BD	100X	0.9	0.31	0	0.37
MPLFL-BD	50X	0.8	1.0	—	0.42
	100X	0.9	1.0	—	0.37
MPL <sup>*3</sup>	5X	0.10	19.6	—	3.36
	10X	0.25	10.6	—	1.34
	20X	0.40	1.3	0	0.84
	50X	0.75	0.38	0	0.45
	100X	0.90	0.21	0	0.37
MPL-BD <sup>*1*3</sup>	5X	0.10	12.0	—	3.36
	10X	0.25	7.0	—	1.34
	20X	0.40	1.3	0	0.84
	50X	0.75	0.38	0	0.45
	100X	0.90	0.21	0	0.37
SLMPL	20X	0.35	21.0	0	0.58
	50X	0.45	15.0	0	0.75
LCPLAPO	20X	0.40	8.8	0/0.7/1.1	0.84
	50X	0.60	3.1	0/0.7/1.1	0.56
LCPLFL-LCD	100X	0.80	0.95/	0.6-1.2	0.42
			1.1/		
LMPL-IR	5XIR	0.10	20.0	—	—
	10XIR	0.25	18.5	—	—
	20XIR	0.40	8.1	—	—
	50XIR	0.55	6.0	—	—
	100XIR	0.80	3.4	—	—
MPL-IR	100XIR	0.95	0.3	—	—

<sup>\*1</sup> When MPL-BD objectives are used in combination with the U-LH100HGAP0/ULH75XEAP0 lamp housing (mercury/xenon socket) for darkfield observation, illumination near the perimeter of the field of view may be slightly insufficient depending on the specimen.

<sup>\*2</sup> Resolving power calculated with the aperture diaphragm fully opened.

<sup>\*3</sup> Up to F.N. 22.

●OLYMPUS CORPORATION obtains ISO9001/ISO14001.

Specifications are subject to change without any obligation on the part of the manufacturer.

**OLYMPUS**<sup>®</sup>

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