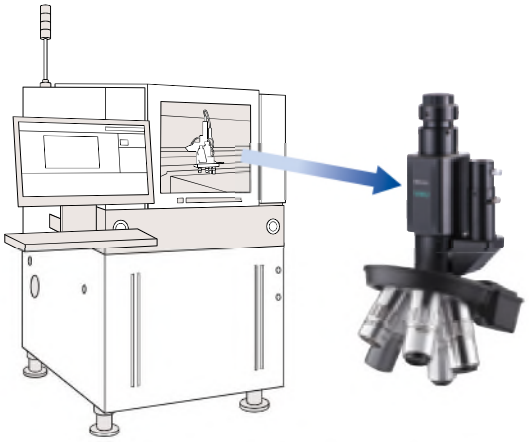
Mitutoyo

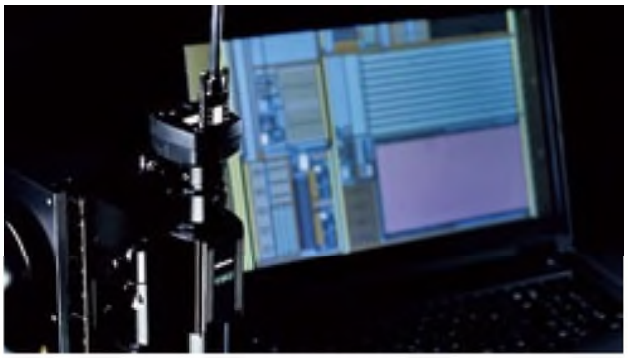
A wealth of Applications

Integration example



The VMU series provides a wide range of small, lightweight microscope units to be integrated into automatic optical inspection devices (AOI) and repair equipment of all sizes.

Digital microscope systems



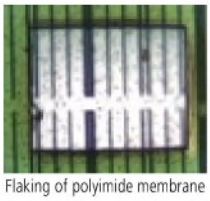
By installing a digital camera on a microscope the VMU provides a simple and compact system which allows microphotography and simultaneous external monitor observations. The VMU can be used in vertical and inverted positions according to your application requirements.

Using a simplified stand, it can be used as a compact microscope.

> Microphotography and observation of metallic, resinous and printed surfaces
> Micro-fluid analysis
> Cell and microorganism observation/analysis

Laser applications

UV laser application using VMU-L4B
(Source of photographs: V-Technology Co.,Ltd.)



Flaking of polyimide membrane

SEM photograph of IC surface after removing upper layer

UV laser application using VMU-L4B
(Source of photographs: HOYA CANDEO OPTRONICS CORPORATION)

Color filter working

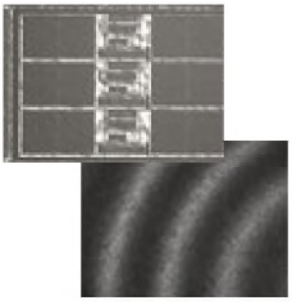
Objectives compatible with YAG lasers (1064 nm, 532 nm, 355 nm and 266 nm) allow high precision and quality working.

Using a simplified stand, it can be used as a compact microscope.

> Peeling off protective films and organic thin-films
> Cutting of IC wiring (Au, Al) and exposure of lower layer pattern
> FPD defects repair
> Photomask repair
> Marking, trimming, patterning, spot annealing and scribing

Various lasers are supported including femtosecond lasers.
(For details, please inquire.)

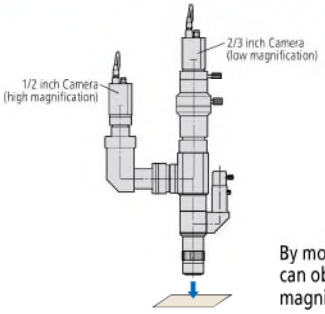
IR analysis/inspection



Optical systems using Mitutoyo M Plan Apo NIR objectives that cover a wide range of wavelength from visible to infrared are providing solutions on the production line and in the laboratory. Nondestructive inspection is made possible by using an infrared source.

> Thickness measurement of LCD thin-film and silicon board film
> Internal inspection/analysis and 3D evaluation of MEMS devices
> Internal observation of IC packages, void inspection/evaluation sensor of wafer junctions
> Spectral characteristics analysis using an infrared source

Dual-camera (high & low magnification) observation



By mounting two Cameras on VMU-LB you can observe the same area at different magnifications simultaneously.

Microscope unit for incorporating in Equipment

VMU


VMU-V


VMU-H


VMU-LB


VMU-L4B

Objectives shown mounted on tubes are optional.

Features

> **Small, lightweight microscope unit** (Suitable for observing a wide range of objects: metal, resin, printed surfaces, minute mechanisms, etc.)
> **Can used with YAG (near-infrared, visible, near-ultraviolet, or ultraviolet) lasers.***1 (Suitable for cutting, trimming, repair and marking of IC wiring (Au, Al), removing and processing thin-film (insulating film) and repair of color filters (defects repair).)
> **Compatible with infrared optical systems***2
> **Equipped as standard with a telecentric illumination system with aperture diaphragm for epi-illumination optical systems** (This is the best illumination system for image processing applications (e.g. dimension measurement, form inspection and positioning) which require even lighting.)
> **Models with enhanced rigidity and performance (VMU-LB / VMU-L4B).**
> **Custom-order is available to meet the customers' requirements** (Dual-camera, double magnification (high & low), etc.)

*1: The performance and safety of laser-equipped system products is not guaranteed.
*2: An infrared source and infrared camera are necessary. For more details on infrared observation, contact your local Mitutoyo sales office.

Specifications

Model No.			VMU-V	VMU-H	VMU-LB	VMU-L4B
Order No.			378-505	378-506	378-513	378-514
Camera mounting orientation			Vertical	Horizontal	Vertical (rotatable)	
Observation			Bright-field/Erect image	Bright-field/Inverted image	Bright-field/Erect image	
Optical tube	Camera port	Optical features	Magnification: 1X; Wavelength (λ): visible radiation			
		Mount	C-mount (centering and parfocal adjustment)			C-mount with centering and parfocal adjustment and green filter switch
	Tube lens (correction range)		Built in 1X (visible - NIR)		Built in 1X (NUV - visible - NIR)	Built in 1X (UV - visible - NIR)
	Laser port	Optical features	—		Magnification: 1X λ: 355/532/1064 μm	Magnification: 1X λ: 226/355/532/1064 μm
		Mount	—		With parfocal adjustment	
		Suitable YAG laser type *2	—		Fundamental, second and third-harmonic mode	Fundamental and second, third and fourth-harmonic mode
	Polarizer unit *1		Available for observation		Available for observation and laser applications	Available for observation and laser applications
Suitable objective (optional)		For observation	**M Plan Apo/HR/SL, G Plan Apo**			
		For laser cutting	—		**M/LCD Plan Apo NIR, M/LCD Plan Apo NUV** Note: Selected depending on the wavelength of the laser source	**M/LCD Plan Apo NIR, M/LCD Plan Apo NUV, M Plan UV** Note: Selected depending on the wavelength of the laser source
Applicable camera			2/3 inch or smaller			
Optical system epi-illumination			Telecentric with aperture diaphragm			
Illuminated lens tube			Bright-field illuminated lens tube			
Illumination unit (optional)			Fiber-optic illumination unit (12 V, 100 W) (**378-700**)			
Main unit mass			650 g	750 g	1270 g	1300 g

*1: M Plan Apo 1X objective should be used together with a polarizer (**378-710** or **378-715**).
Note: Observe the following precautions when using VMU-LB or L4B with YAG laser source attached.
1. Be aware of the laser power and energy density. Otherwise, the optical system may be damaged.
2. Check the mass of the laser source. When mounting on a high-speed device or acceleration/deceleration device, please contact us.

WIDE VMU-HR

WIDE VMU-BDV

WIDE VMU-BDH

Objectives shown mounted on tubes are optional.

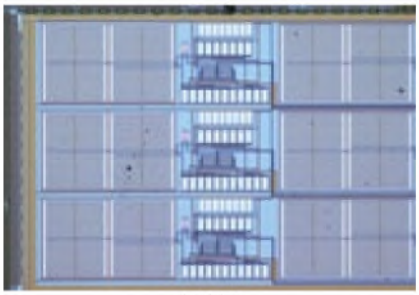
Features

> **Observation over a wide field of view** (Image field of ø30 mm)
> **Greatly enhanced brightness on the periphery of the field of view** (Reduces the dependence on the light distribution characteristics.)
> **Compatible with infrared optical systems**[*1]
> **Small optical observation system** (Refer to page 35 for the dimensions.)
> **Compatible with HR series of high resolving power lens** (Designed with pupil diameter of ø16.8)

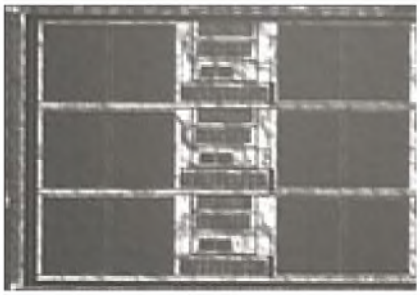
*1: An infrared source and infrared camera are necessary.
For more details on infrared observation, contact your local Mitutoyo sales office.

Features

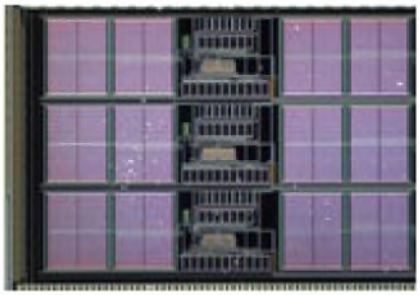
> **Observation over a wide field of view** (Image field of ø30 mm)
> **Available for various observation methods** (Including bright-field, dark-field for visual or scratch inspection, and polarized observation of objects with polarization characteristics)



Bright-field



Infrared



Dark-field

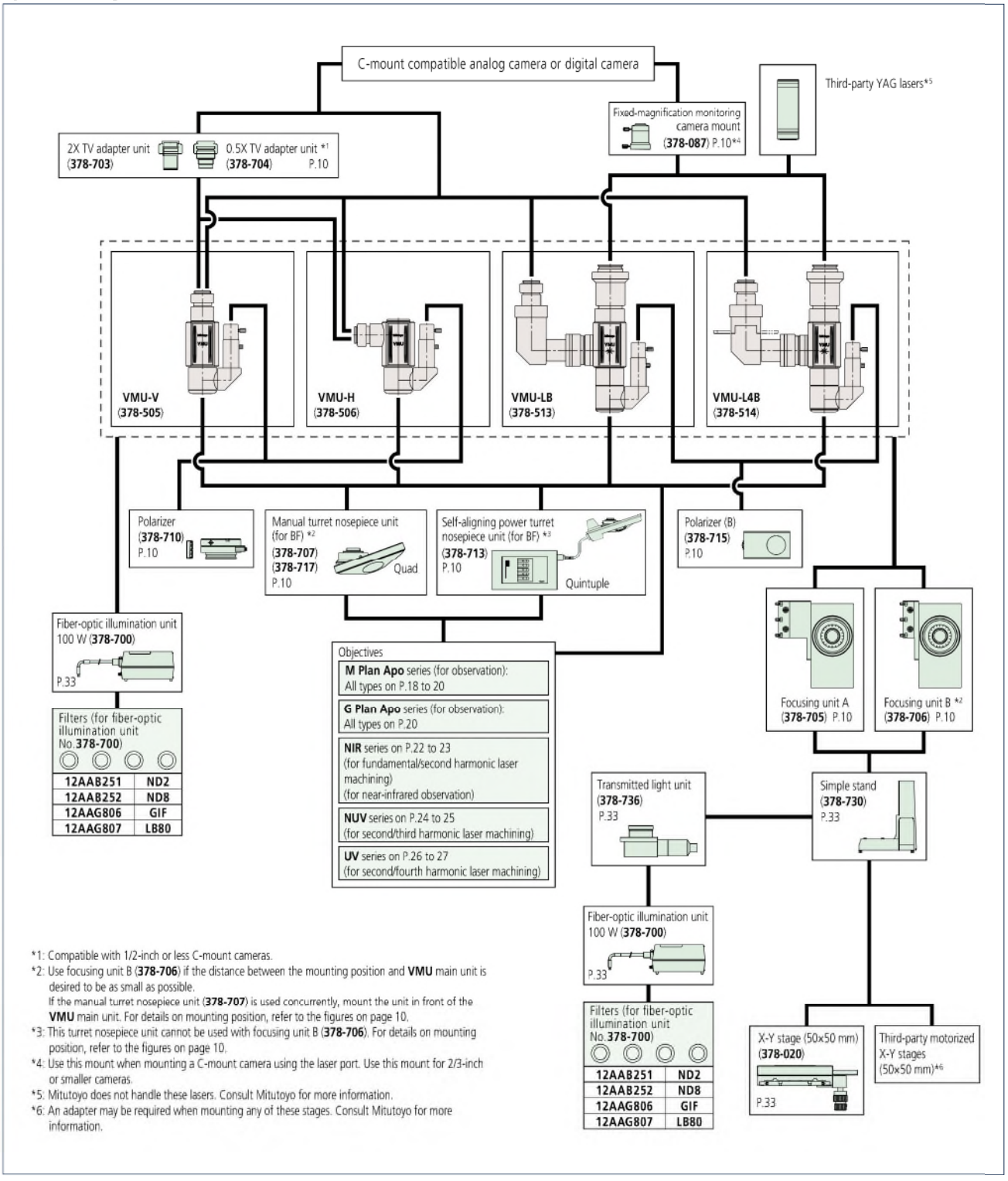
Specifications

		For Bright-field Observation	For Bright/Dark-field Observation	
Model No.		**WIDE VMU-HR**	**WIDE VMU-BDV**	**WIDE VMU-BDH**
Order No.		**378-519**	**378-517**	**378-518**
Camera mounting orientation		Vertical	Vertical	Horizontal
Observation		Bright-field/Erect image	Bright/Dark-field/Erect image	Bright/Dark-field/Inverted image
Optical tube	Optical system	Magnification: 1X Visible light - Infrared light	Magnification: 1X Visible light	
	Camera Mount	F-Mount, C-Mount (with aligning and parfocal adjustment mechanism)		
	Imaging forming (tube) lens	Built in 1X (visible - NIR)	Built in 1X (visible)	
	Image field	ø30		
	Polarized unit *1	Mountable		
Objective lens (required option)		**M Plan Apo, M Plan Apo HR, M Plan Apo SL, G Plan Apo, NIR series**	**BD Plan Apo**	
Applicable camera		Diagonal line length: 30 mm or less (equivalent to APS-C format)		
Optical system epi-illumination		Telecentric (Pupil diameter of ø16.8) *Coaxial epi-illumination, with aperture diaphragm	Telecentric illumination, Bright/Dark-field illumination optical tube (Dual-port fiber-optic illumination) Bright/Dark-field switching with light source on-off	
Illuminated lens tube		Bright-field illuminated lens tube (rotatable) *3, selectable between LED adapter and fiber adapter (both supplied as standard)	Bright-field illuminated lens tube (rotatable) *3	
Illumination unit (optional) *2		Fiber-optic illumination unit (12 V, 100 W) (**No. 378-700**)		
Main unit mass		1400 g	2000 g	2150 g

*1: Polarized observation by Bright-field illumination *2: Support for third-party LED illuminators (WIDE VMU-HR only) *3: The fiber (light source) mount orientation can be changed.

VMU

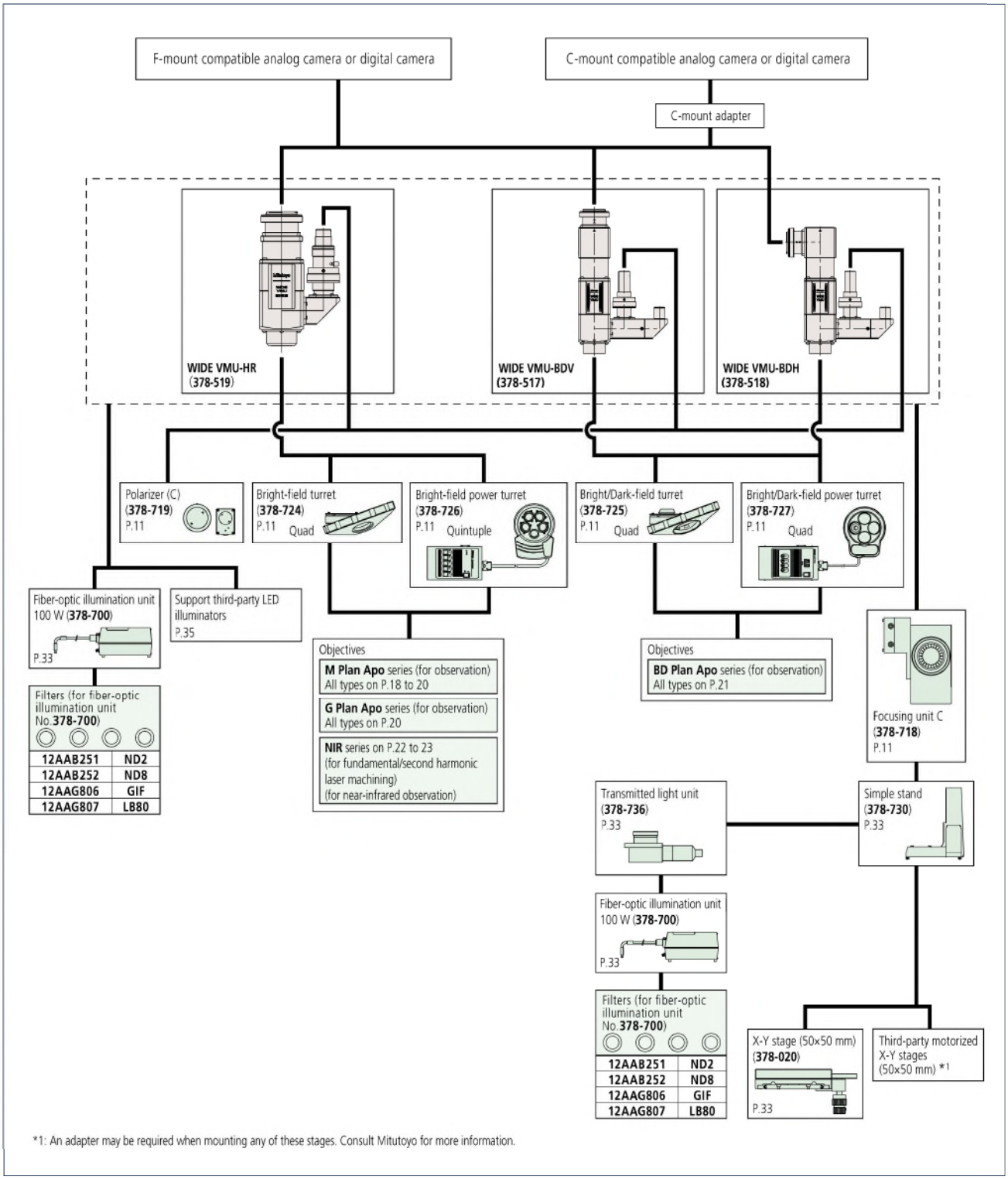
System diagram



*1: Compatible with 1/2-inch or less C-mount cameras.
*2: Use focusing unit B (**378-706**) if the distance between the mounting position and **VMU** main unit is desired to be as small as possible.
If the manual turret nosepiece unit (**378-707**) is used concurrently, mount the unit in front of the **VMU** main unit. For details on mounting position, refer to the figures on page 10.
*3: This turret nosepiece unit cannot be used with focusing unit B (**378-706**). For details on mounting position, refer to the figures on page 10.
*4: Use this mount when mounting a C-mount camera using the laser port. Use this mount for 2/3-inch or smaller cameras.
*5: Mitutoyo does not handle these lasers. Consult Mitutoyo for more information.
*6: An adapter may be required when mounting any of these stages. Consult Mitutoyo for more information.

WIDE VMU-HR / WIDE VMU-BD

System diagram



*1: An adapter may be required when mounting any of these stages. Consult Mitutoyo for more information.