

To maximize the performance of this product and ensure satisfactory operation for a long time, read this document thoroughly before operating the product. After reading, retain it close at hand. Before being shipped from the factory, this product was thoroughly inspected to guarantee its mechanical and optical performance. If you encounter any issues or have any questions, contact a Mitutoyo sales office.

Conventions Used in This Document

NOTICE Indicates a situation which, if not avoided, may result in property damage.

IMPORTANT Indicates information that must be known when using the product.

Tips Indicates further information and details relevant for the operating methods and procedures that are explained in that section.

Indicates reference location if there is information that should be referred to in this document or an extraneous User's Manual. Example: For details about XX, see [1] "1 Overview".

Precautions for Use

- When assembling or operating this product, take sufficient care not to subject parts to impacts or excessive force.
- If you disassemble this product, its performance cannot be guaranteed even within the warranty period. Furthermore, if you disassemble this product and it falls, it will be subject to a repair charge.
- When carrying this product, carefully hold the main unit. Also, be careful not to touch any moving parts.
- If this product is dropped or falls over, its performance will be degraded.
- Use this product where it will not be exposed to direct sunlight, dirt, dust, high temperatures, high humidity, or vibration.
- If you want to incorporate this product in a high-speed or high-acceleration equipment, contact a Mitutoyo sales office in advance.

Warranty

This product has been manufactured under strict quality management, but should it develop problems within one year of the date of purchase in normal use, repair shall be performed free of charge. Please contact the agent where you purchased the product or Mitutoyo sales representative.

If this product fails or is damaged for any of the following reasons, it will be subject to a repair charge, even if it is still under warranty.

- Failure or damage owing to fair wear and tear
- Failure or damage owing to inappropriate handling, maintenance or repair, or to unauthorized modification
- Failure or damage owing to transport, dropping, or relocation of the product after purchase
- Failure or damage owing to fire, salt, gas, abnormal voltage, lightning surge, or natural disaster
- Failure or damage owing to use in ultra-hazardous activities

Export Control Compliance

This product falls into the Catch-All-Controlled Goods and/or Catch-All-Controlled Technologies (including Programs) under Category 16 of Appendix Table 1 of Export Trade Control Order or under Category 16 of Appendix Table of Foreign Exchange Control Order, based on Foreign Exchange and Foreign Trade Act of Japan. If you intend re-export of the product from a country other than Japan, re-sale of the product in a country other than Japan, or re-providing of the technology (including Programs), you shall observe the regulations of your country.

1 Overview

This product is a light and compact high-resolution (HR) wide-FOV video microscope unit, exclusively for camera-based observations. It provides wide-FOV images that are thoroughly and evenly lit by the newly designed lighting system. Also, the LED or fiber adapter can be installed to provide a variety of light sources.

2 Included Accessories

Unpack the product and confirm that all accessories and components are included and that the product was not damaged during shipment. If you encounter any issues or have any questions, contact a Mitutoyo sales office.

- Fiber adapter
- Fiber spacer
- Hexagon socket set screw (M4x6)
- Hexagon socket set screw (M4x4)
- C-mount adapter
- Hexagon socket screw key (Nominal: 3, 2.5, 2, 1.5)
- User's Manual (This document)
- Warranty card

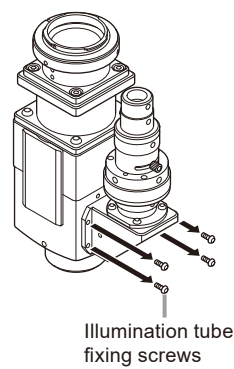
3 Setup

Set the mounting direction of the light source, attach the main unit to your equipment, and then attach the objective, the camera, and any optional accessories to this product.

3.1 Setting the Mounting Direction of the Light Source

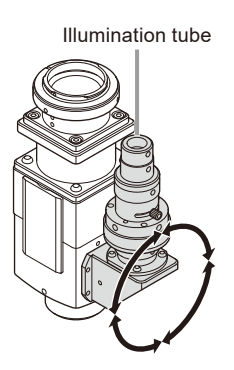
Use the following procedure to set the mounting direction of the illumination tube.

- Loosen and remove the four illumination tube fixing screws (hexagon socket button head screws (M3)), and then remove the F-mount.



- Rotate the illumination tube to the desired rotational position. (The illumination tube can be rotated by a pitch of 90°.)

IMPORTANT When rotating the illumination tube, be careful not to touch the internal mirror or lens.



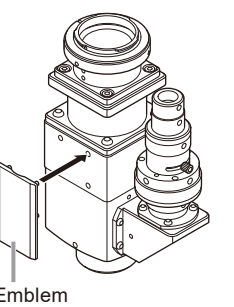
- Tighten the four illumination tube fixing screws (hexagon socket button head screws (M3)) to secure the illumination tube.

IMPORTANT Be sure to tighten the screws firmly.

3.2 Attaching to Your Equipment or Focusing Unit C

Use the mounting holes (four threaded holes, M4, pitch: 0.7, depth: 6 mm) on one of the three sides to attach this product to your equipment or to focusing unit C (Code No. 378-718).

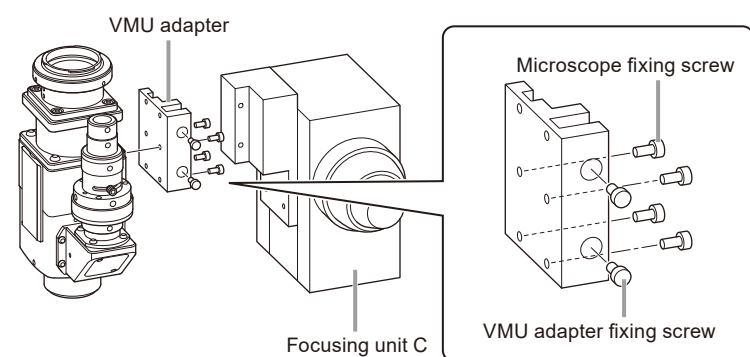
Tips The emblem can be moved to any side.



Focusing unit C

- Loosen the two VMU adapter fixing screws (hexagon socket head screws (M4)), and then remove the VMU adapter from focusing unit C.

- Secure the removed VMU adapter to this product by tightening the four microscope fixing screws (hexagon socket head screws (M4)) that are supplied with focusing unit C.



- Secure the VMU adapter to focusing unit C again by tightening the two loosened VMU adapter fixing screws (hexagon socket head screws (M4)).

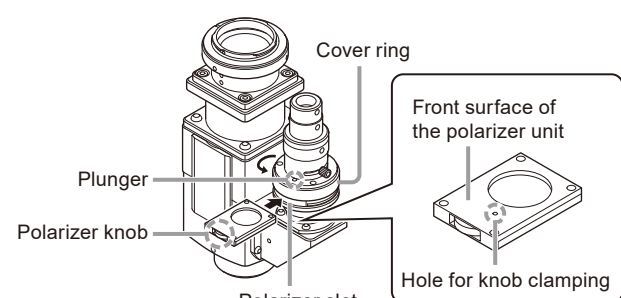
Tips By using focusing unit C together with the simple stand (Code No. 378-730), the optical axis of this product will be aligned with the center of the stage.

Polarizer unit

- Loosen (rotate) the cover ring of the illumination tube manually so that the cover ring moves to the end surface on the light source side.

• The polarizer slot appears.

- Insert the polarizer unit into the polarizer slot as far as it will go, and then manually rotate the cover ring in the reverse direction to secure the polarizer unit.



IMPORTANT The polarizer unit has front and rear sides. The front side of the polarizer unit should be positioned on the light source side.

- Tips**
- Rotating the polarizer knob changes the state of polarization observation.
 - The polarizer knob can be locked to prevent it rotating due to vibration, etc. Screw in the plunger of the illumination tube all the way and tighten it with the hexagon socket screw key (nominal: 0.89) supplied with polarization unit (C).
 - When removing the polarizer unit, unlock the polarizer knob.

4 Maintenance and Check

4.1 Daily Care

This product is particularly sensitive to dirt and dust. Perform daily care and store the product appropriately.

Cleaning the optical components

Carefully clean the optical components such as lenses and filters with the following method.
 Dust: Brush away with a lens brush or soft brush, or lightly wipe with gauze.
 Fingerprints and oil: Wipe gently with lens paper or gauze dampened with a small amount of lens cleaner.

Cleaning the metal parts

Lightly wipe dust and dirt off of the metal parts with a silicone cloth.

IMPORTANT Do not use cleaning agents, solvents, or polish materials, because they may discolor the surface or cause the paint to peel off.

Storage

Store this product in a place where the humidity is low so that mold will not grow. Especially, the optical components such as objectives should be housed in the corresponding cases and stored.

4.2 Periodic Check

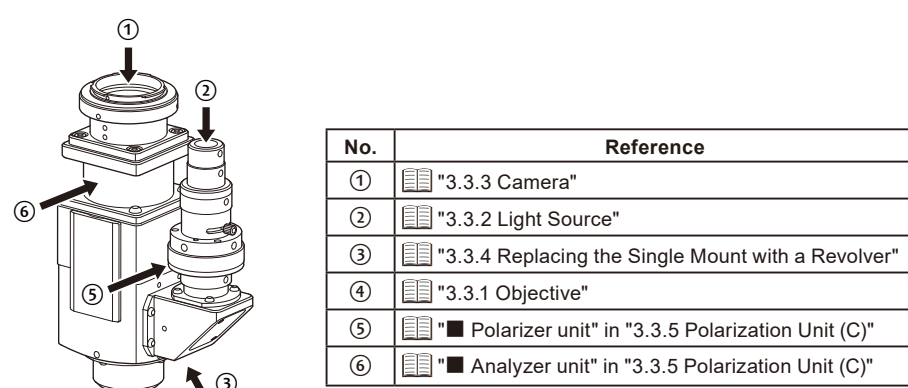
To maintain high performance of this product for a long time, Mitutoyo recommends that you have the product periodically checked by a Mitutoyo service engineer. Please contact the agent where you purchased the product or a Mitutoyo sales office.

5 Troubleshooting

If you encounter any problems while using this product, please try the solutions described below. If you cannot remedy the problem, please contact the agent where you purchased the product or a Mitutoyo sales office.

Issue	Point to check	Remedy
There are obstacles or dark areas in the field of view.	Is the aperture diaphragm narrowed too much?	Adjust the aperture diaphragm.
	Is the lens or the workpiece contaminated?	Clean the contaminated portions.
	Is the lens or the workpiece contaminated?	Clean the contaminated portions.
Poor contrast, resolution, or image quality.	Is the illumination bright enough?	Increase the illumination brightness.
	Is the aperture diaphragm narrowed too much?	Adjust the aperture diaphragm.
	Are you observing the workpiece through a medium other than air, such as a cover glass?	Use the exclusive objective. Remove the cover glass or other intervening medium.
One side of the image is blurry, or the image sways.	Is the workpiece tilted?	Correct the tilt of the workpiece.
	Has the objective been screwed in firmly?	Screw the objective in firmly.

3.3 Attaching Optional Accessories



No.	Reference
①	[1] "3.3.3 Camera"
②	[1] "3.3.2 Light Source"
③	[1] "3.3.4 Replacing the Single Mount with a Revolver"
④	[1] "3.3.1 Objective"
⑤	[1] "Polarizer unit" in "3.3.5 Polarization Unit (C)"
⑥	[1] "Analyzer unit" in "3.3.5 Polarization Unit (C)"

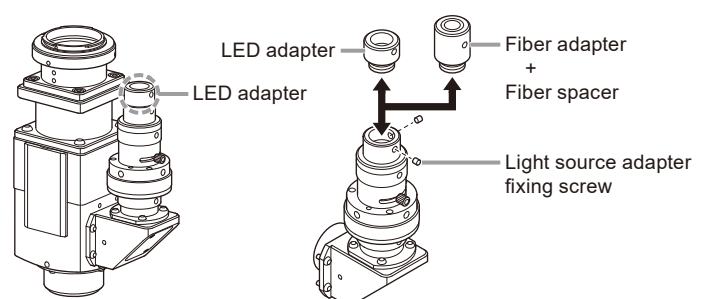
3.3.1 Objective

Remove the cap from the objective mount, and then screw the objective into the objective mount.

3.3.2 Light Source

When this product is shipped, the LED adapter is mounted on the end of the illumination tube as a light source adapter.

When using a fiber light source, loosen the two light source adapter fixing screws (hexagon socket set screws (M4)), and then remove the LED adapter. Replace the LED adapter with the supplied fiber adapter and fiber spacer, and then secure them with the light source adapter fixing screws.

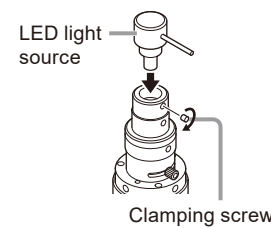


LED light source

- Insert the LED light source into the LED adapter.

- Use the supplied clamping screw (hexagon socket set screw (M4x4)) to secure it.

IMPORTANT If your LED light source does not fit the mount, contact a Mitutoyo sales office. For the dimensions of the mount, see [1] "LED light source mount" in "6.3 Dimensions".

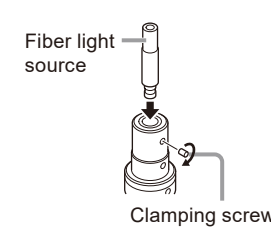


Fiber light source

- Insert the fiber light source into the fiber adapter.

- Use the supplied clamping screw (hexagon socket set screw (M4x6)) to secure it.

IMPORTANT When using a fiber light source that is not from Mitutoyo, remove the fiber spacer. If your fiber light source does not fit the mount, contact a Mitutoyo sales office. For the dimensions of the mount, see [1] "Fiber light source mount" in "6.3 Dimensions".



Adjusting the aperture diaphragm

The aperture diaphragm is used to adjust the numerical aperture (NA) of the lighting system. It influences image resolution, contrast, and depth of focus.

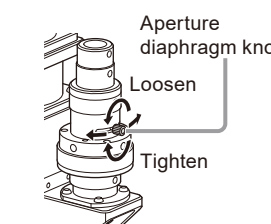
IMPORTANT In general, a good image with appropriate contrast can be obtained by narrowing the aperture diaphragm to about 80% of the NA of the objective. Narrowing the aperture diaphragm too far will lower the resolution; therefore caution should be exercised.

- Slightly loosen the aperture diaphragm knob.

- Move the aperture diaphragm knob horizontally to adjust the aperture diaphragm.

- Tighten the aperture diaphragm knob.

NOTICE Tightening with excessive force may cause malfunctions.



3.3.3 Camera

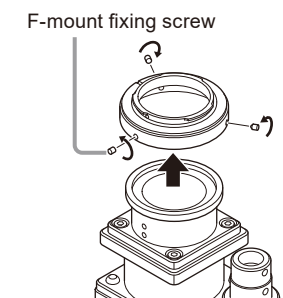
Assembly

IMPORTANT

- Be sure to tighten the screws firmly.
- Support the camera with your hand until it is completely secured, to prevent the camera from dropping.
- When incorporating this product into high-speed or high-acceleration equipment, depending on the weight of the camera, the camera should be supported not only by the F-mount or C-mount adapter but also by your equipment.

For F-mount-compatible cameras

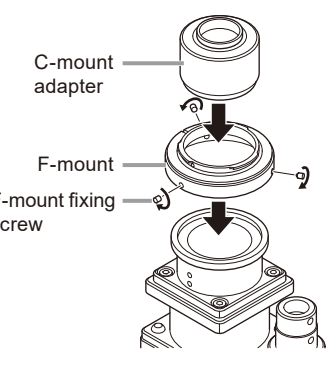
- Loosen the three F-mount fixing screws (hexagon socket set screw (M3)), and then remove the F-mount.
- Attach the F-mount to the camera, and then reattach the F-mount to this product.
- Tighten the three F-mount fixing screws (hexagon socket set screw (M3)) to secure the F-mount.



For C-mount-compatible cameras

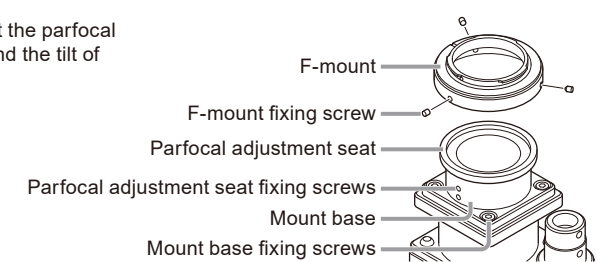
Attach the supplied C-mount adapter to the F-mount.

IMPORTANT Screw in the C-mount adapter until it touches the F-mount.



Adjustments

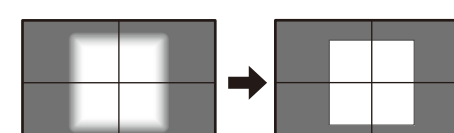
This section explains how to adjust the parfocal position, the observation center, and the tilt of the observation image.



Adjusting the parfocal position

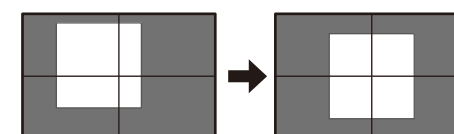
IMPORTANT The camera mount position has already been adjusted and parfocality has been confirmed at the time of shipment. Adjust the parfocal position only when your camera requires it.

Loosen the four parfocal adjustment seat fixing screws (hexagon socket set screws (M3)), and then rotate the parfocal adjustment seat to vertically adjust the camera mounting position.



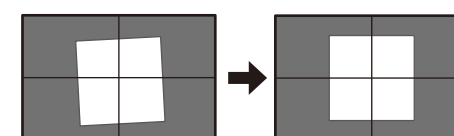
Adjusting the observation center

Loosen the four mount base fixing screws (hexagon socket set screws (M4)), and then swing the mount base horizontally to adjust the observation center.



Adjusting the tilt of the observation image

Loosen the three F-mount fixing screws (hexagon socket set screw (M3)), and then rotate the camera together with the F-mount.



Tips When multiple objectives are used mounted on a revolver, etc., it may be necessary to adjust the observation center and the focus. In that case, make adjustments using the following procedure (adjustment reference: objective with the maximum magnification).

- Select the objective with the maximum magnification, then move your equipment in the X-Y plane to align the target position of the workpiece with the center of the monitor, and then move the equipment along the Z axis so that the image is focused.
- Select the objective with the minimum magnification, and then check the state of the observation center and focusing. If either the observation center or the focus is not aligned, make adjustments accordingly.
- Select the objective with the maximum magnification again, and then readjust the target position of the workpiece and the focus.
- Select the objective with the minimum magnification, and then check the state of the observation center and focusing. If either the observation center or the focus is not aligned, make adjustments accordingly.

The adjustment is complete when there is no misalignment at step (4). If any misalignment remains, perform (3) and (4) again.

6 Specifications

6.1 Basic Specifications

Model name	WIDE VMU-HR
Code No.	378-519
Camera mounting direction	Vertical
Observation image	Bright field / Erect image
Camera mount	F-mount, C-mount (The parfocal adjustment and the centering adjustment are performed independently.)
Applicable sensor size	Diagonal: 30 mm or less (Corresponding to APS-C format)
FOV in camera port	φ30*1
Tube lens	Magnification: 1x, Visible light / Near-infrared light
Reflected illumination optical system	Telecentric illumination with aperture diaphragm (pupil diameter: φ16.8 mm)
Illumination tube	Bright field illumination tube (rotatable) (Both are standard accessories.)
Applicable objectives (optional accessories)	MIG Plan Apo series MLCD Plan Apo NIR series
Mass of main unit	Approximately 1,400 g

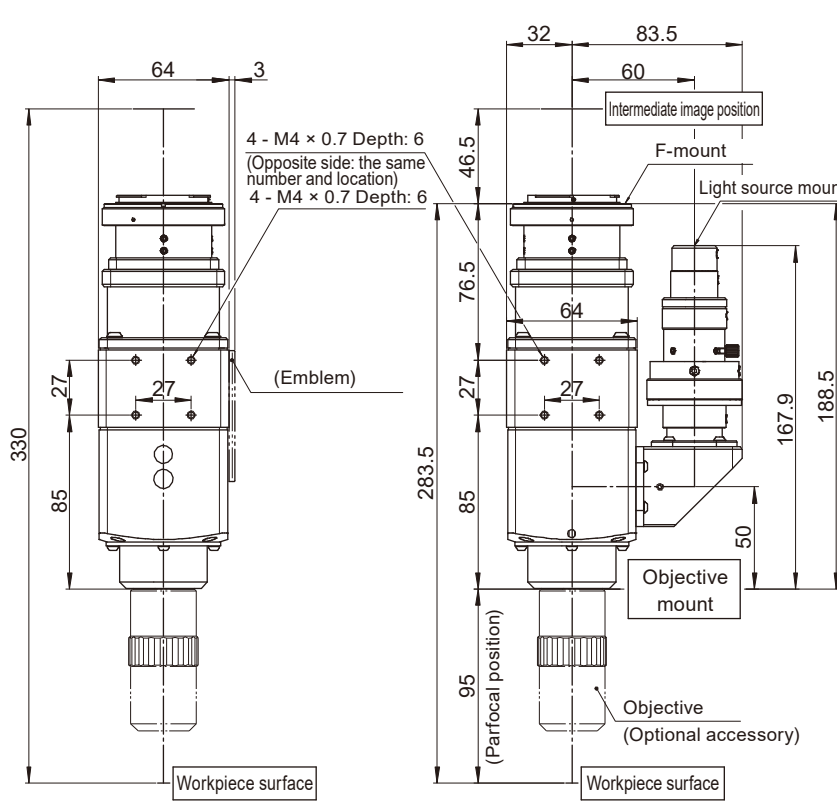
*1: When a low-magnification objective is used, the brightness in the peripheral portion of the FOV is lower than the brightness in the central portion of the FOV.

6.2 Optional Accessories

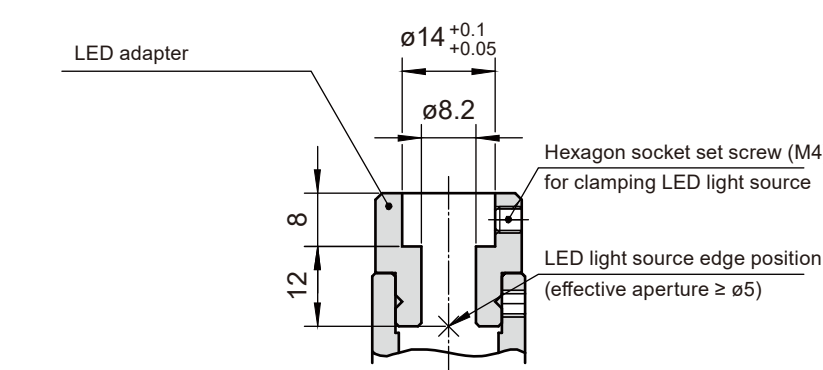
Product name	Code No.
Fiber-optic illumination unit (100 W)	378-700
ND2/filter for 378-700	12AB251
ND8/filter for 378-700	12AB252
GIF/filter for 378-700	12AAG806
LB80/filter for 378-700	12AAG807
Fiber-optic illumination (150 W)	176-316
Bright field revolver	378-724
Bright field motorized revolver	378-726
Polarization unit (C)	378-719
Focusing unit C	378-718
Simple stand	378-730
Transmitted light unit	378-736
X-Y stage	378-020

6.3 Dimensions

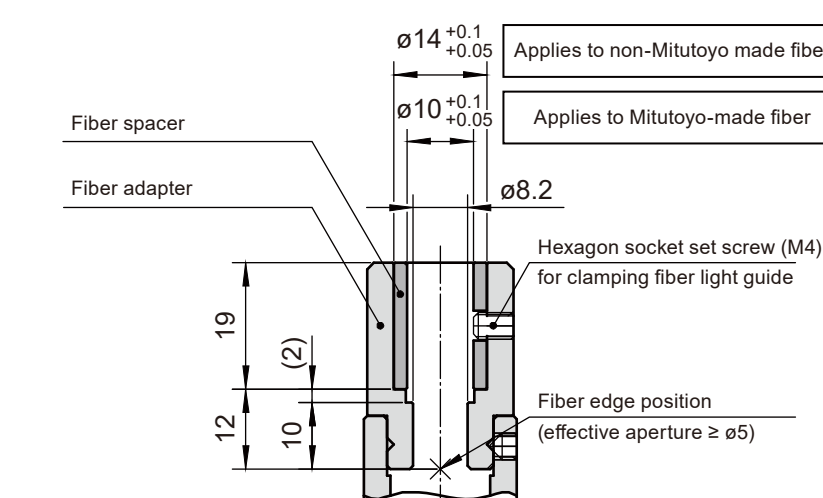
Main unit



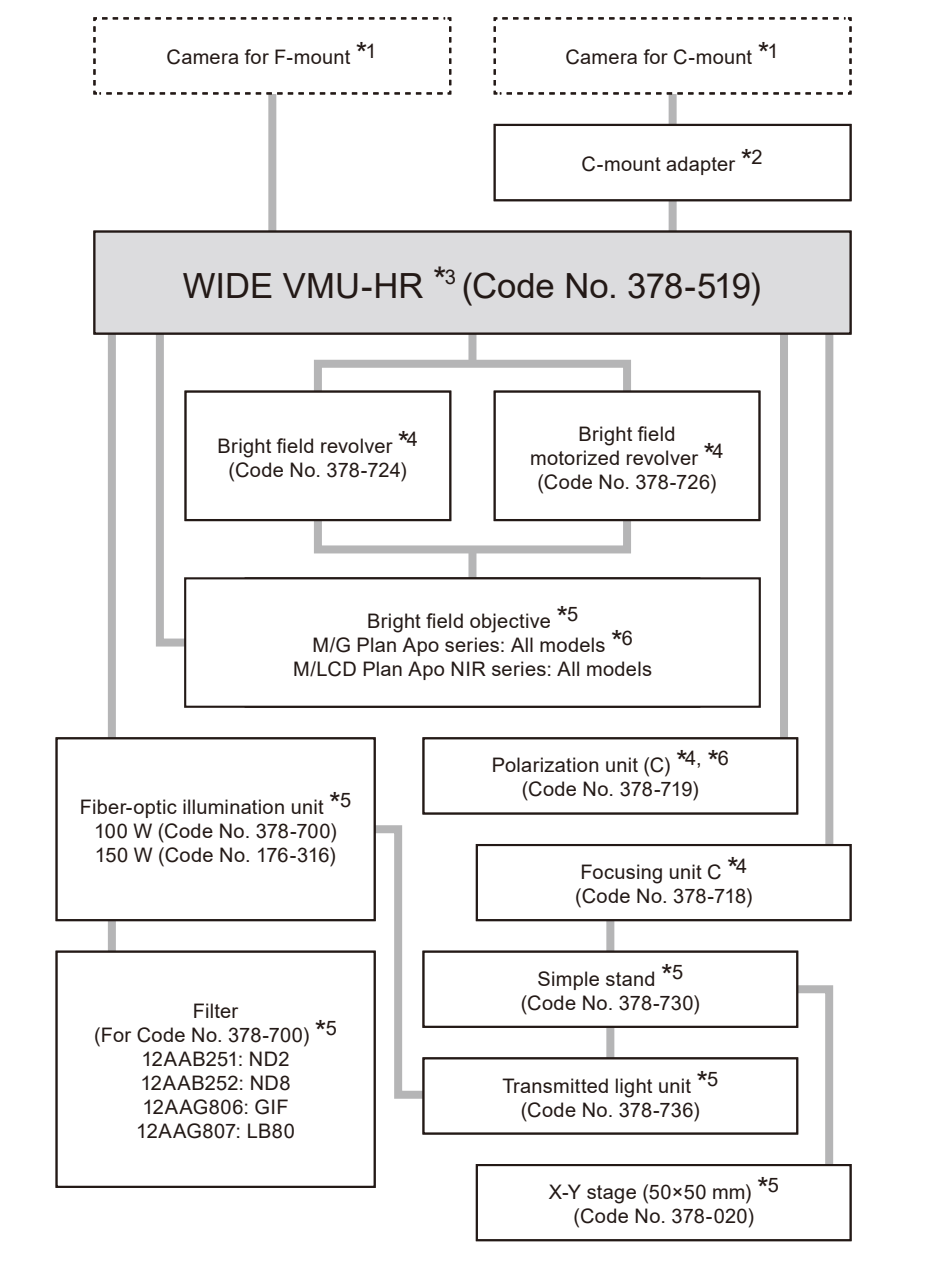
LED light source mount



Fiber light source mount



6.4 System Configuration



- *1: User supplied
- *2: Standard accessory
- *3: Main unit of the microscope
- *4: Product-exclusive optional accessory
- *5: Shared optional accessory
- *6: Polarization observation is possible at 2x or higher.