DIGITAL MICROSCOPE

MIC-D

REPAIR MANUAL

OLYMPUS

CONTENTS

INTRODUCTION

1. The purpose for this manual is to provide an outline of the MIC-D product including procedures for troubleshooting, assembly and disassembly, and adjustment. Repairs are to be performed by OLYMPUS authorized service tecnicians who have experience with optical adjustments of stereomicroscopes and who have a fundamental knowledge on the repair techniques for digital products. OLYMPUS is not responsible for any unauthorized repairs.

1.Products

(1) MIC-D is a digital microscope.
MIC-D is comprized of inverted zoom optical system, with a built in digital image pickup device for CMOS. The image is displayed from the monitor of a personal computer(PC).

(2) Service life
5 years

2. Features

(1) MIC-D is powered by the PC via the USB port cable.

(2) Exclusive user friendly software is included acquiring, saving, and processing the image.

(3) Swing-out arm easily permits for transmitted, reflected, and oblique illumination methods.

3. Using conditions

(1) Using environment: Temperature 0 - 40 Celsius, Humidity 35 - 80%RH

(2) Requires a PC for processing and observing the image.

(3) Supported operating systems include is not applicable.
(MAC OS is not applicable.)

(4) Functionnality of muitiple MIC-D's connected to one PC cannot be guaranteed.

4.MIC-D software

Recommended Operating Environment

(1) Operating system: Windows 98, Windows 98SE, Windows 2000 or Windows ME

(2) RAM: 128MB or more

(3) Hard disk space: 300MB or more

(4) PC: PC/AT compatible

(5) I/O devices: USB port, CD-ROM drive

(6) CPU: Intel Pentium processor, 500MHz or faster

(7) Dispaly: Resolution 800 X 600 or more, display colors High Color(16 Bit) or more

(8) Display adapter: Windows recommendation

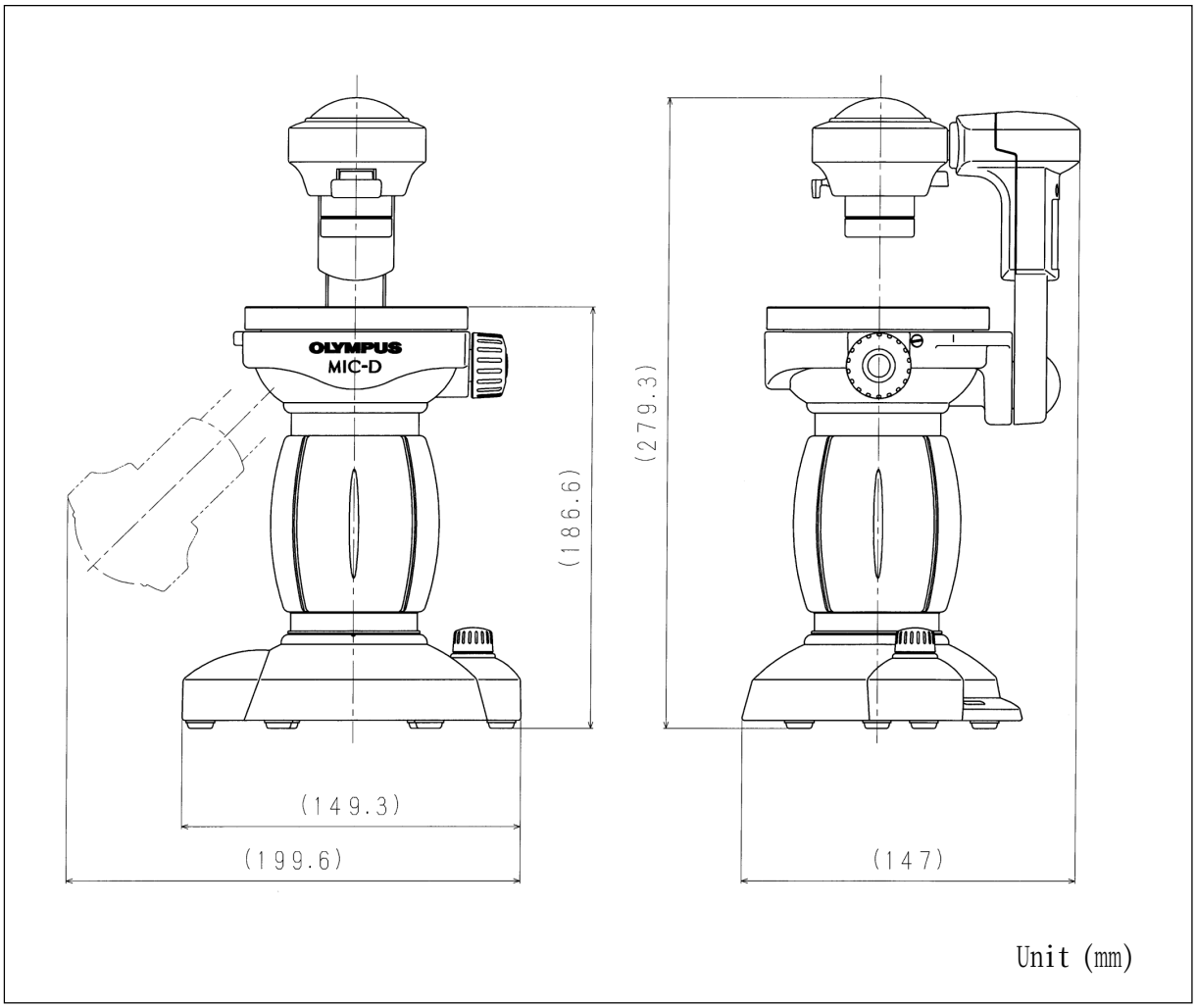
(9) Pointing device: Microsoft Mouse or compatible pointing device

(10) Keyboard: Windows recommendation

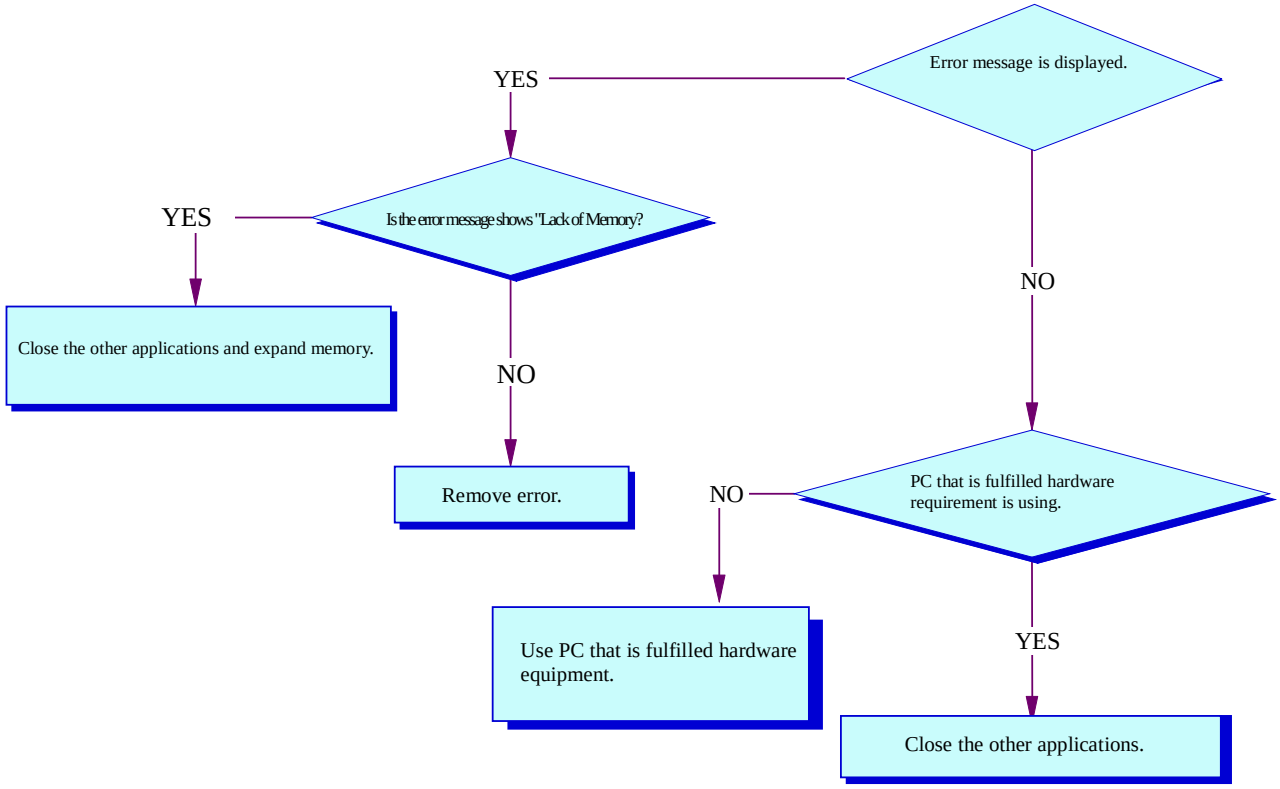
4. Specifications

Items		Specifications
1	Image pickup device	1. Maker and serial number CMOS VGA color digital camera SCIM1020, Manufactured by Olympus
		2. The number of effective pixels 640(H) X 480(V) Approx. 0.3 million pixels
		3. Pixel pitch 8.4μm(H) X 8.4μm(V)
2	Observation optical system	1. Magnification changer system Zoom magnification changer system
		2. Magnification changer range of optical system 0.7 – 9X, Zoom ratio
		3. Observation field 7.7mm X 5.7mm (0.7X) - 0.56 X 0.44mm (9.0X)
3	Illumination system	1. Light source White LED (1 piece)
		2. Light intensity adjustment Combination light intensity adjustment. Automatic which is interlocked with zoom, and manual pulse.
		3. Transmitted light, reflected light or oblique illumination is possible through swing-out action of illumination arm..
4	Stage	1. Mechanism and shape Gliding stage φ98mm (contains dustproof glass in the center)
		2. Stroke More than φ5mm in the center of optical axis
5	Focusing function	1. Focusing Vertical moving optical system (Fixed stage)
		2. Focusing range 5 mm or more from the upper stage
6	PC environment	Applicable OS Win98, Win98SE, WinME and Win2000
7	Input and output data	USB port
8	Power supply	Powered by the PC via the USB port
9	External standards	According to the external standard, CE mark appraved CE：IEC61010-1, EN61326 FCC：part15, Class A
10	Weight	1.5Kg

5. Dimensions



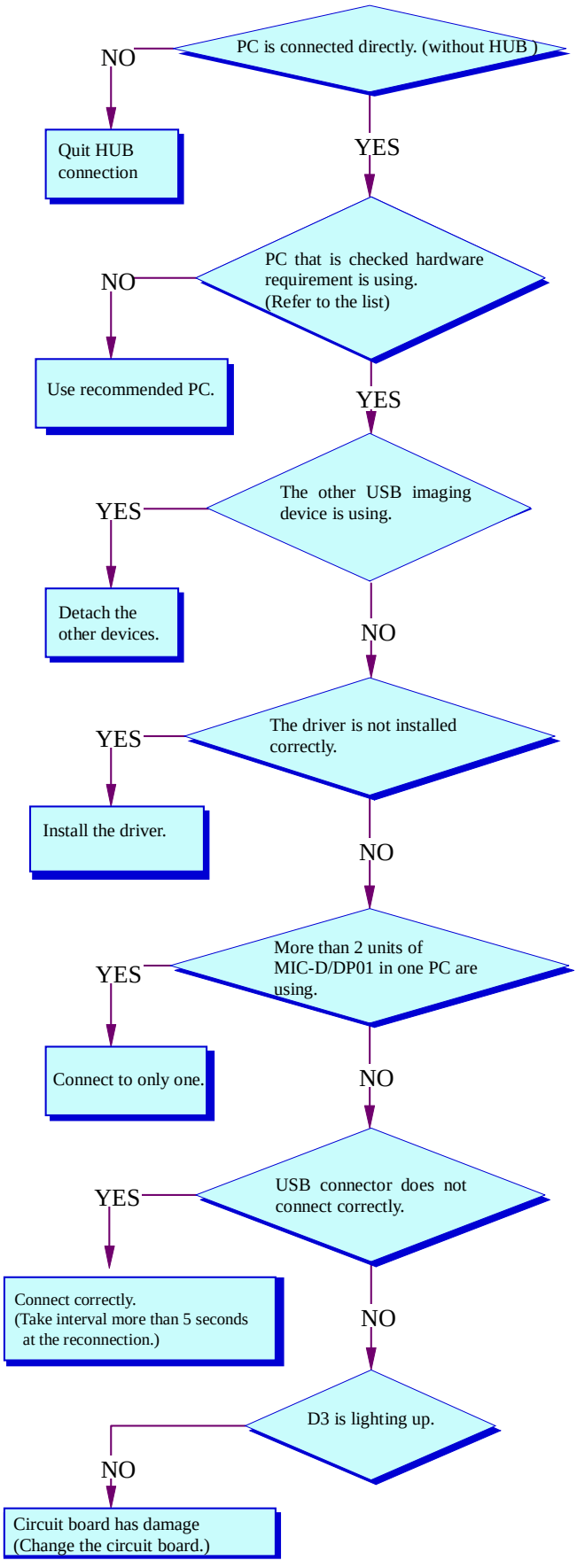
1. Application does not start up.



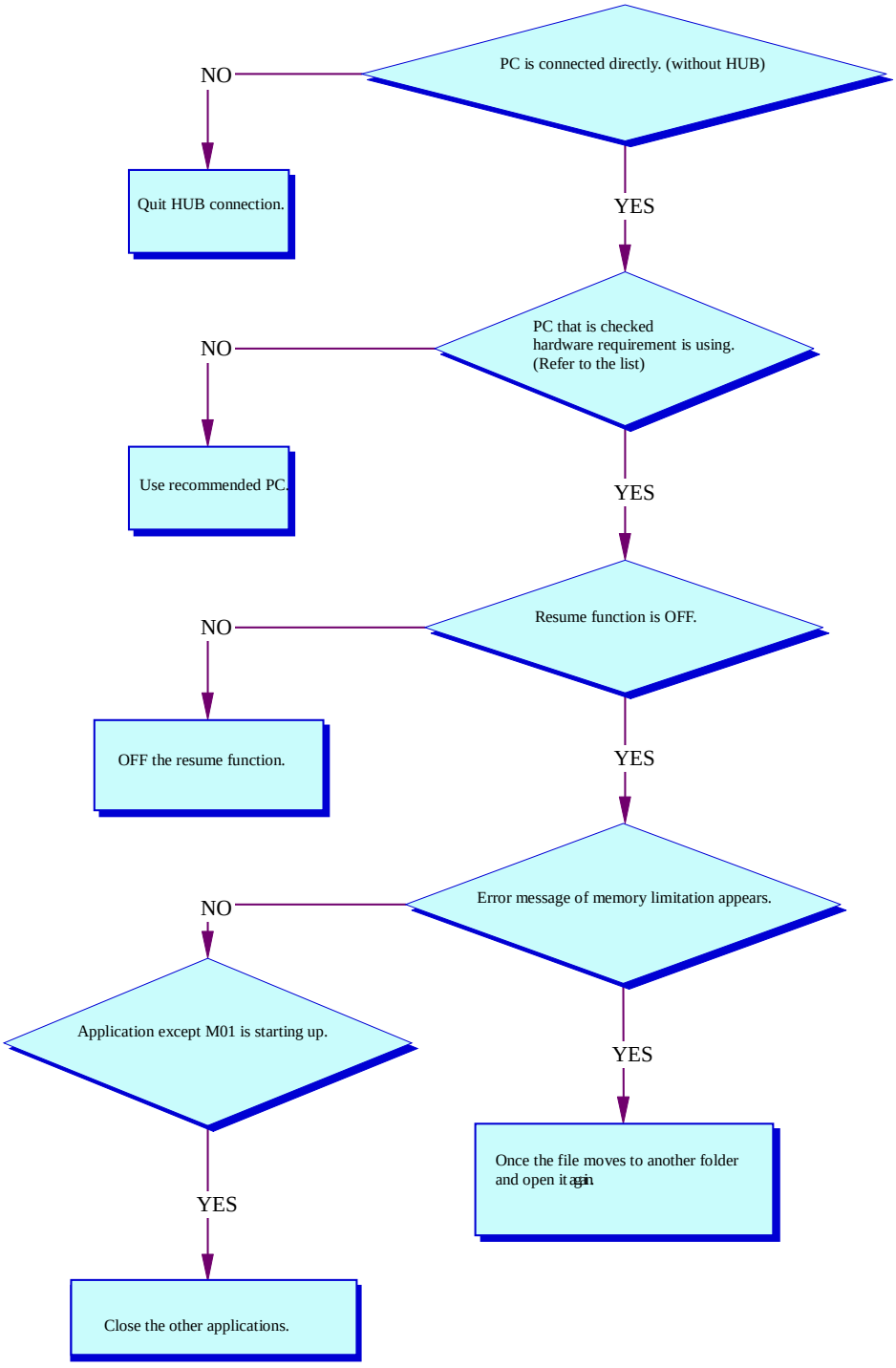
2. MIC-D does not recognize.

Capture screen does not start up on the application.

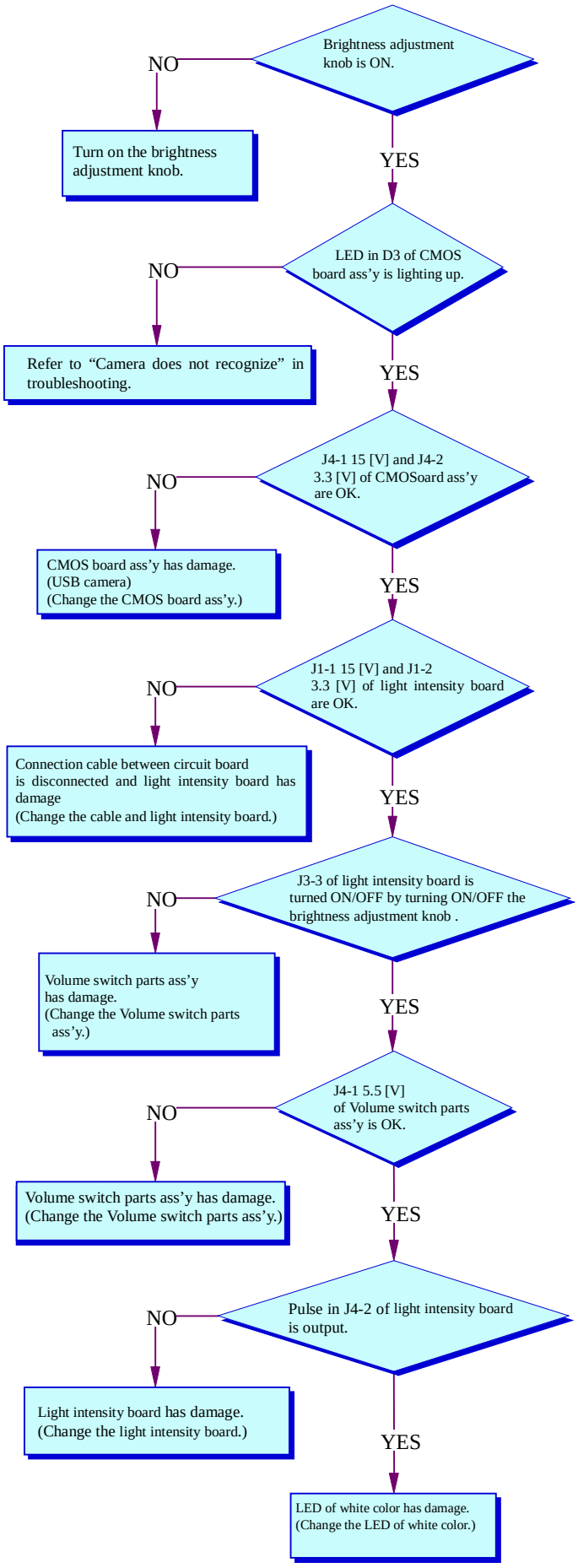
USB camera is not mounted in imaging device of system.



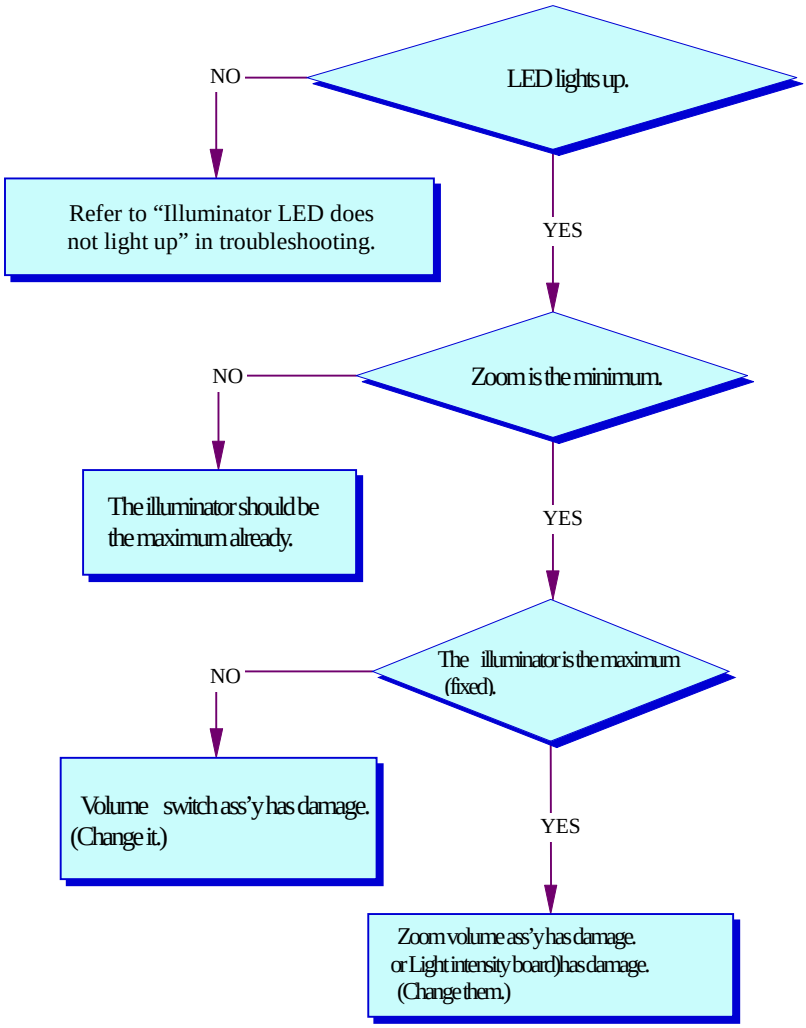
3. Photography is not available.



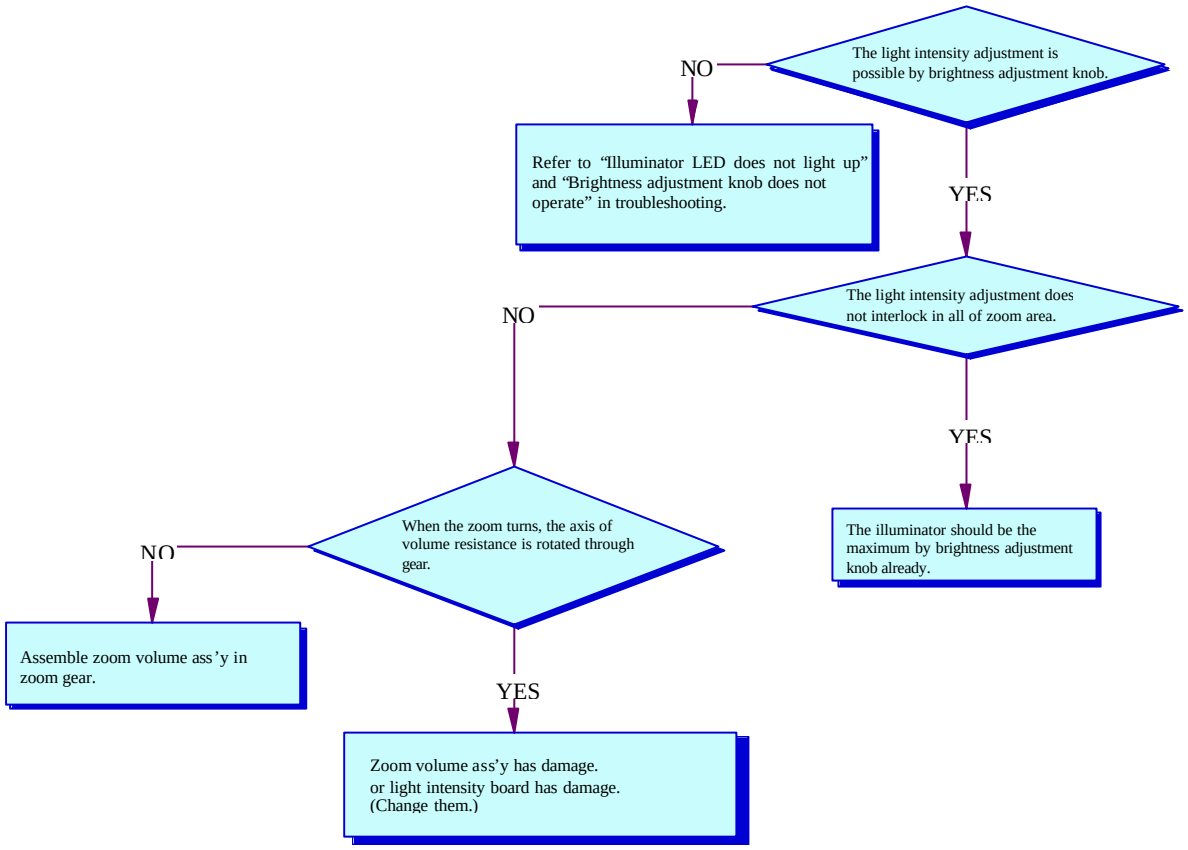
4. The Light emitting Diode (LED) does not light up.



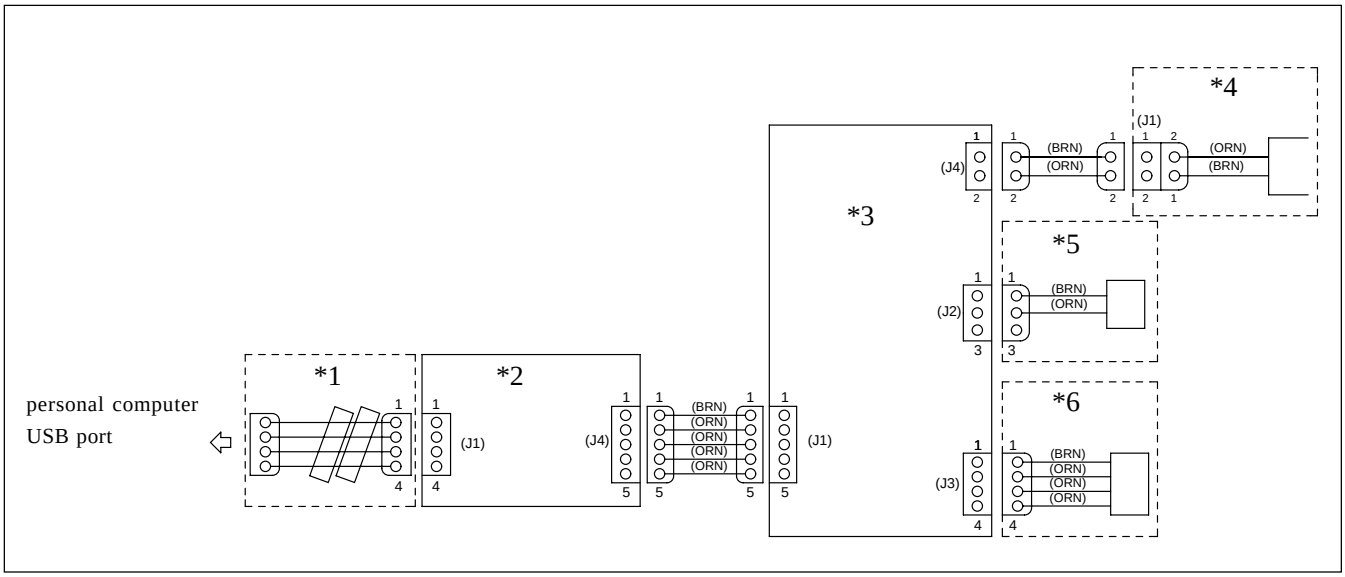
5. The brightness adjustment knob does not operate.



6. The light intensity adjustment does not interlock at the zooming.



1.Connection diagram



*1 USB cable : This cable is for connecting the MIC-D and personal computer. And it has two filament cores.

*2 C-MOS board ass'y : This board has a C-MOS(Complementary Metal Oxide Semiconductor).

*3 Light intensity board ass'y : This board control the brightness of MIC-D.

*4 LED unit ass'y : This is a white color LED.

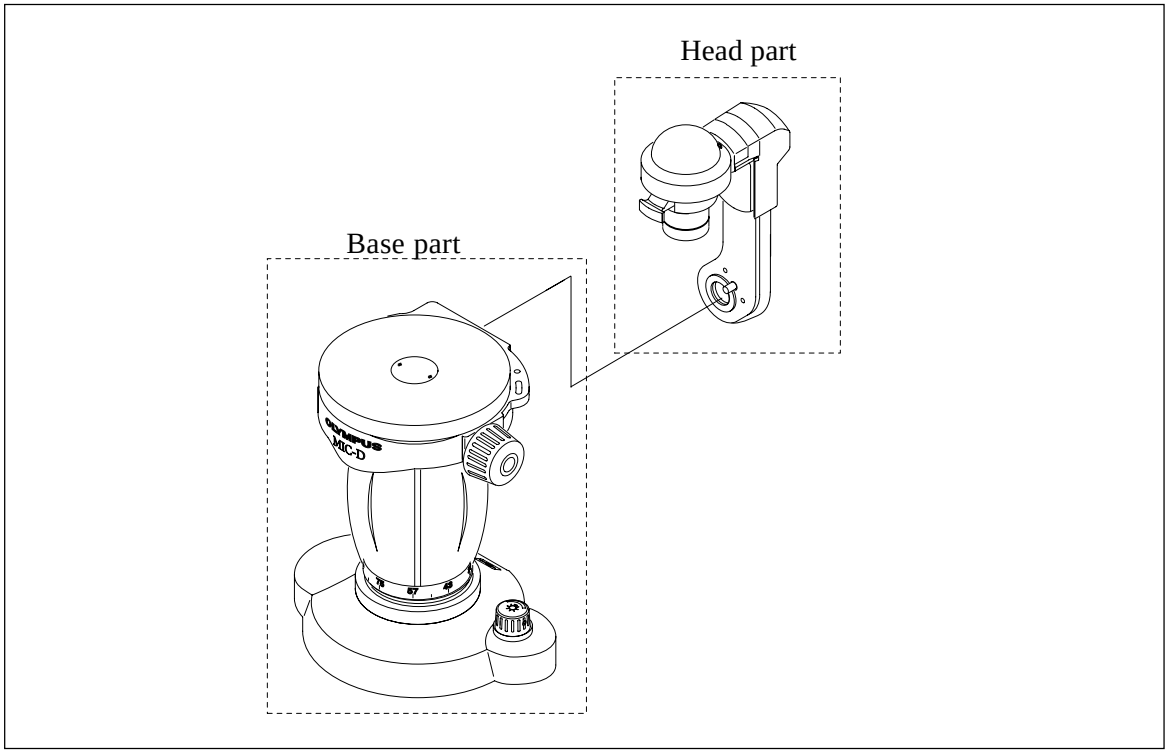
*5 Volume parts ass'y :When you turned the zoom, Brightness changes automatically.

*6 Volume switch ass'y : You can control brightness of lighting.

2. Assembly and disassembly procedure

The assembly and disassembly procedures of MIC-D will be covered in two parts as shown below.

The mark(*) indicates that there are additional adjustments necessary during assembly.



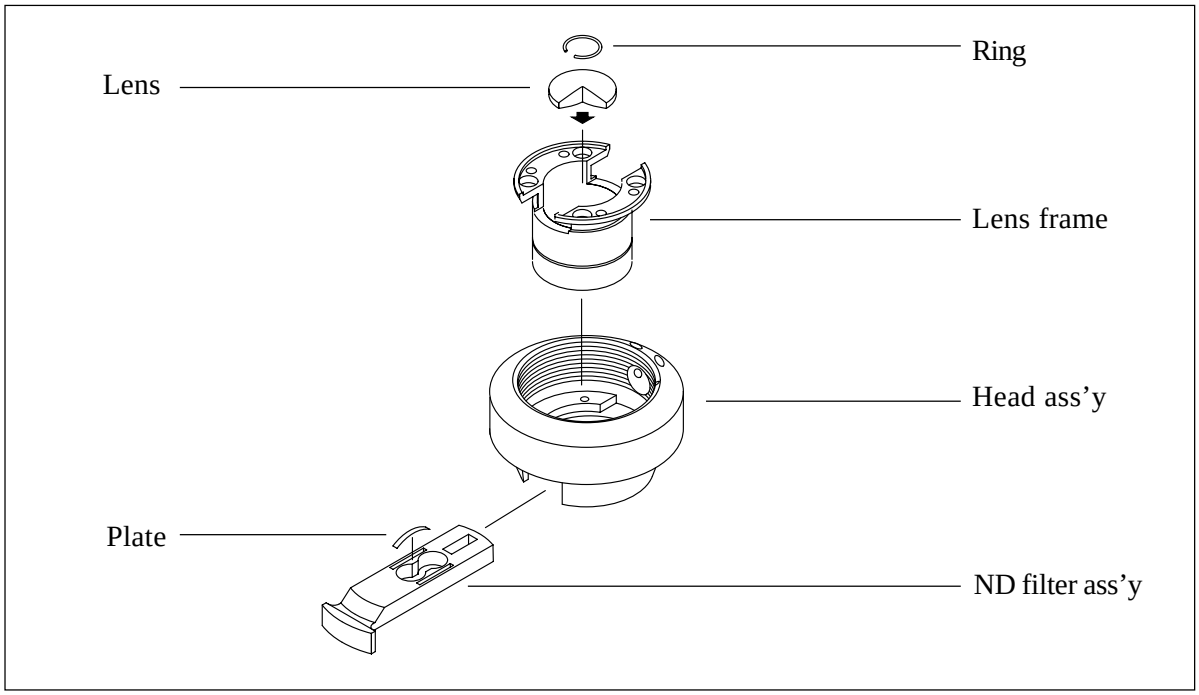
2-1. HEAD Part

(1) -1- Assemble the lens and ring to the lens frame.

-2- Apply grease (Los72515) on the notch of lens frame.

-3- Apply grease (Los72515) on the salient of plate.

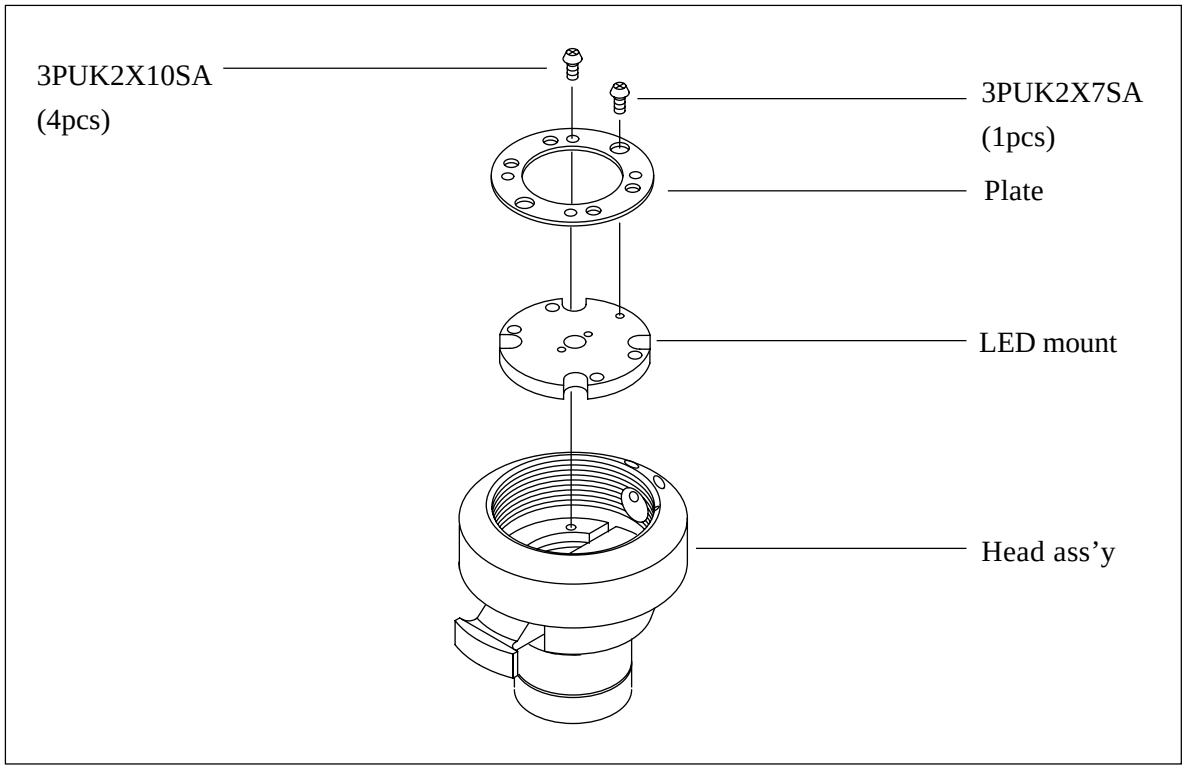
-4- Assemble the lens frame ass'y and ND filter ass'y to the head ass'y.



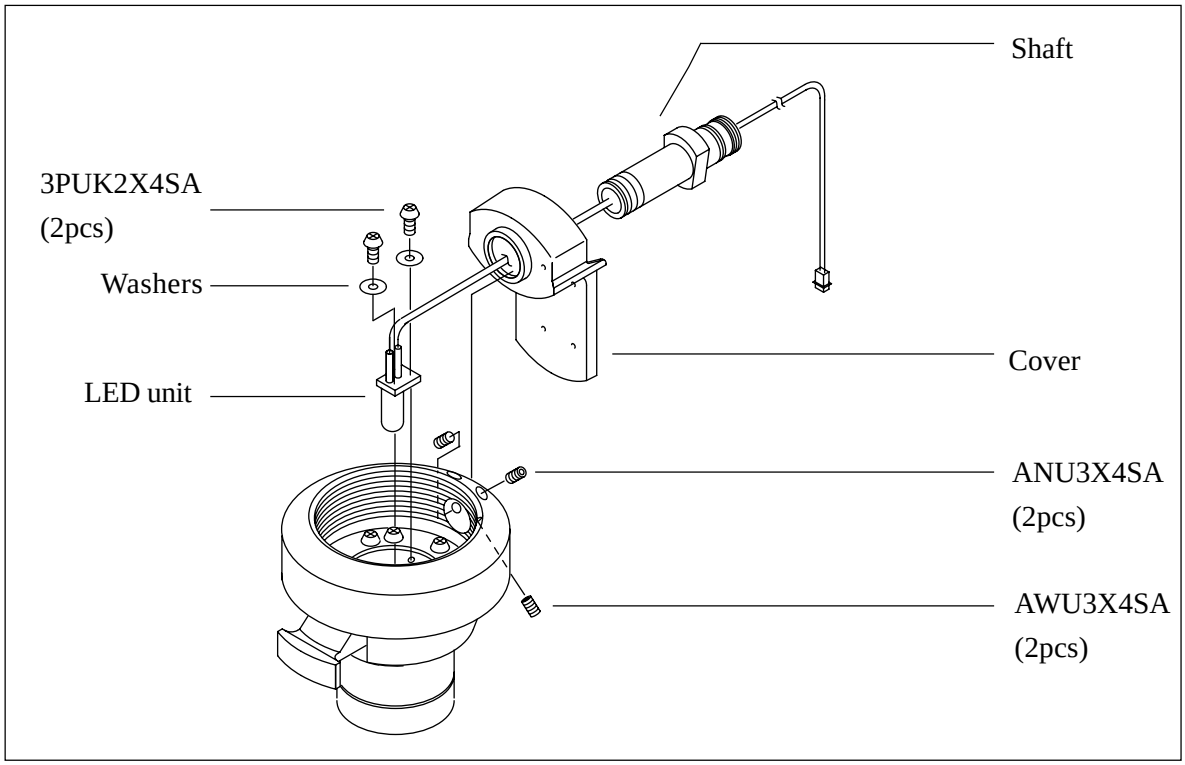
(2) -1- Assemble plate and LED mount to head ass'y.

-2- Fix the plate by screws (3PUK2X7SA : 1 pc, and 3PUK2X10SA : 4 pcs)

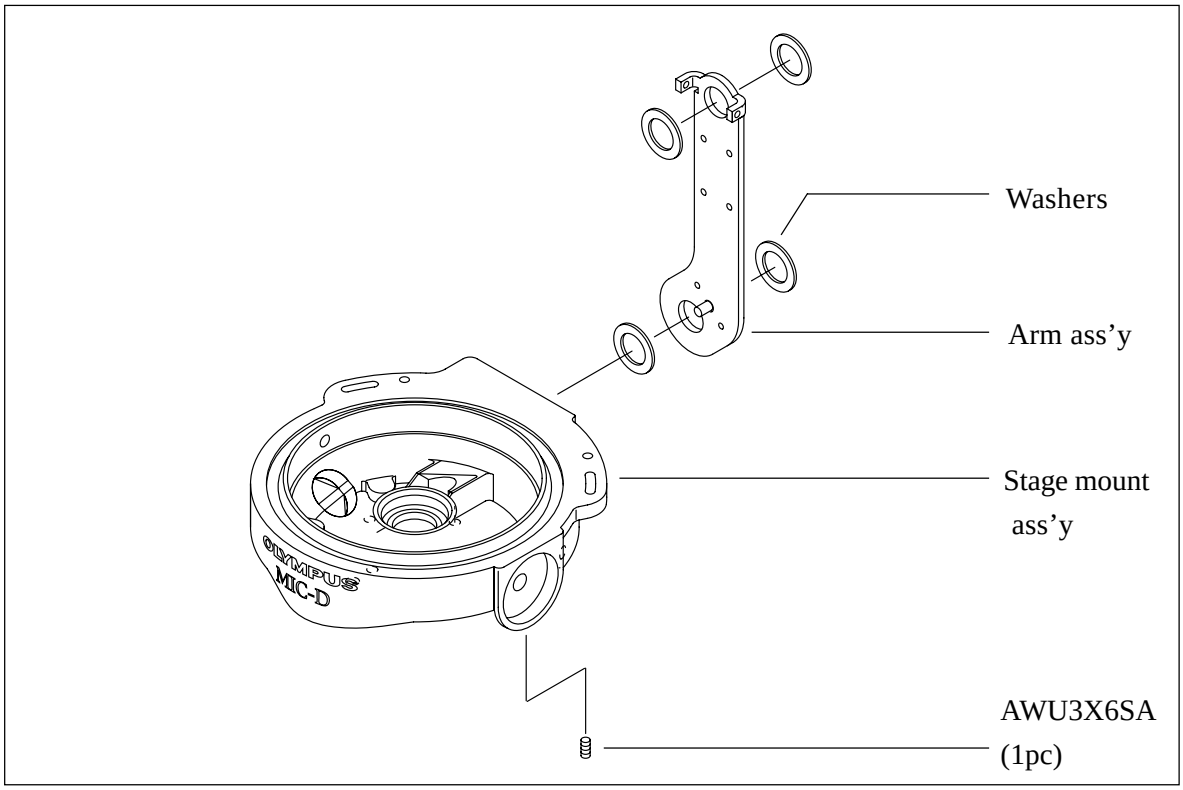
-3- Apply adhesive (TB1401C) to the screw of 3PUK2X7SA(1 pc).



(3) -1- Assemble shaft, cover and LED unit in the head ass'y.
-2- Fix the shaft by screws (ANU3X4SA : 2 pcs and AWU3X4SA : 2 pcs).
-3- Fix the LED unit by screws (3PUK2X4SA : 2 pcs) and washers.



(4) -1- Apply grease(ST-1) on washers.
-2- Assemble washers in arm ass'y.
-3- Tighten stage mount ass'y by screw (AWU3X6SA : 1 pc) temporarily.



(5) -1- Apply grease(ST-1) on the shaft of head ass'y and washers.

-2- Assemble lens frame, spring washer(1pc), washers and arm ass'y to head ass'y .

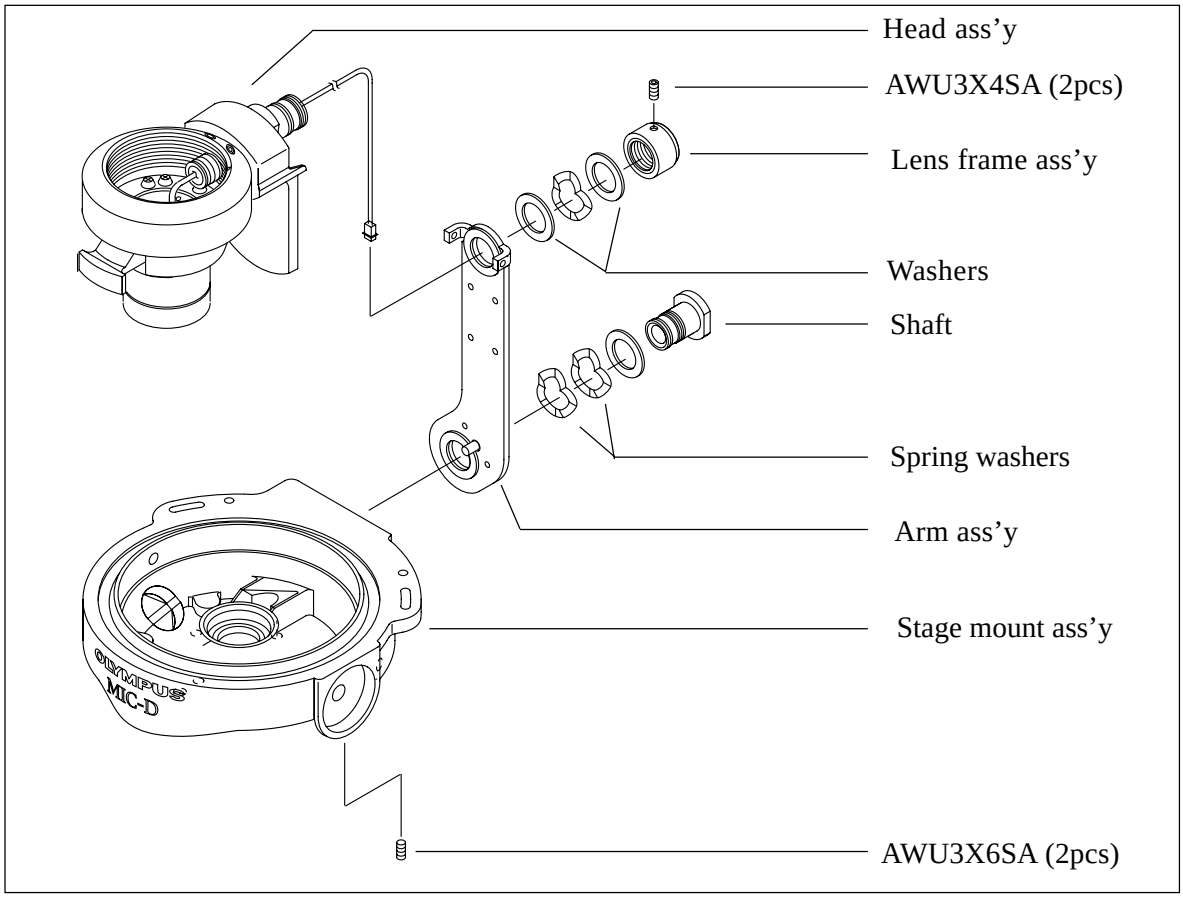
-3- Assemble spring washers (2pcs) on the shaft.

-4- Assemble arm ass'y, and head ass'y in the stage mount ass'y.

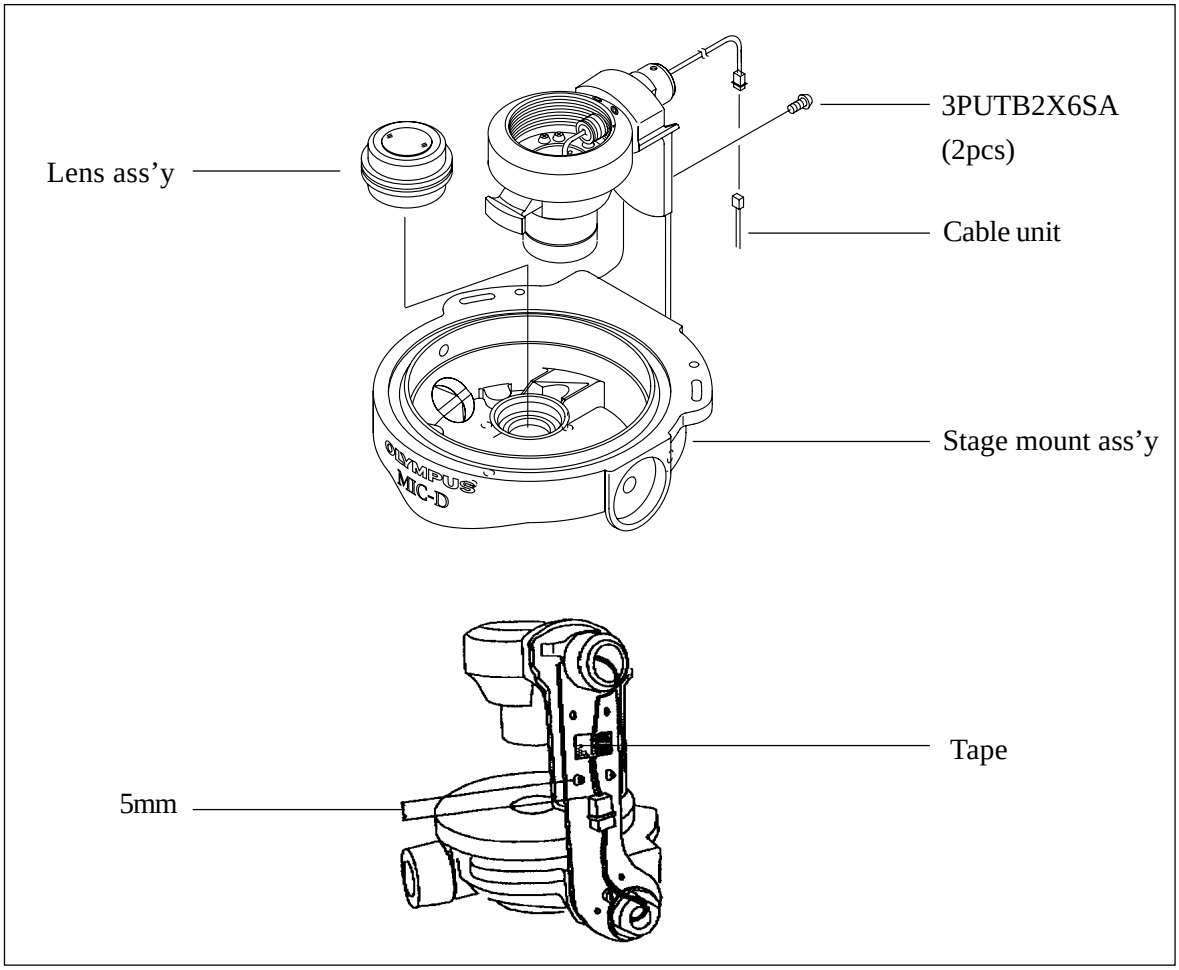
-5- Fix the head ass'y by screws (AWU3X4SA : 2 pcs).

-6- Fix the arm ass'y by screw (AWU3X6SA : 1 pc).

-7- Apply adhesive (TB1401C) on the screws (AWU3X4SA : 2 pieces and AWU3X6SA : 1 pc).



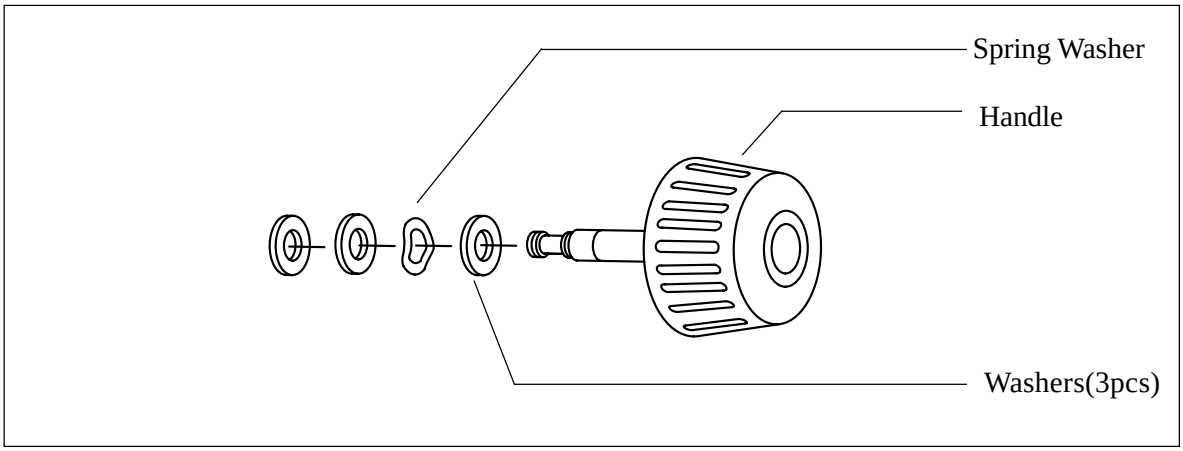
(6) -1- Fix the stage mount ass'y by screws (3PUTB2X6SA : 2 pcs).
-2- Fix the cable unit by tape.
-3- Apply grease (Los72515) on the lens ass'y.
-4- Assemble lens ass'y on the stage mount ass'y.
* The adjustment of arm rotation tension is necessary. Refer to adjustment procedure.(page D-1)
* The adjustment of illumination head movement tension is necessary.
Refer to adjustment procedure.(Page D-1)



2-2. Base part

(1) -1- Apply grease (Los72515) on the washers.

-2- Assemble washers and spring washer to the handle.



(2) -1- Apply grease (Los72515) on the washer.

-2- Assemble shaft, washer and handle ass'y on the stage mount ass'y.

-3- Fix the handle ass'y by screws (AWU3X4SA : 2 pcs).

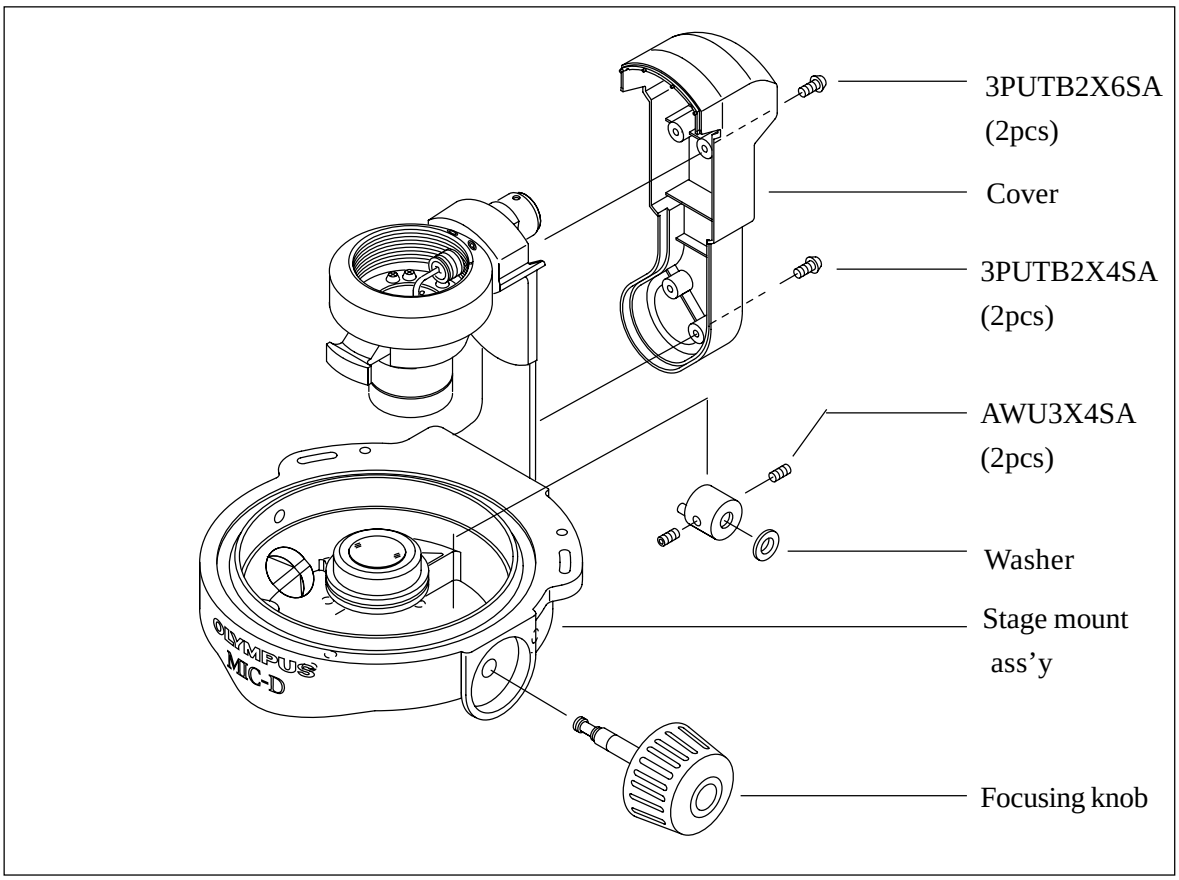
-4- Attach the cover to the stage mount ass'y.

-5- Fix the cover by screws (3PUTB2X4SA, 3PUTB2X6SA : 2 pcs).

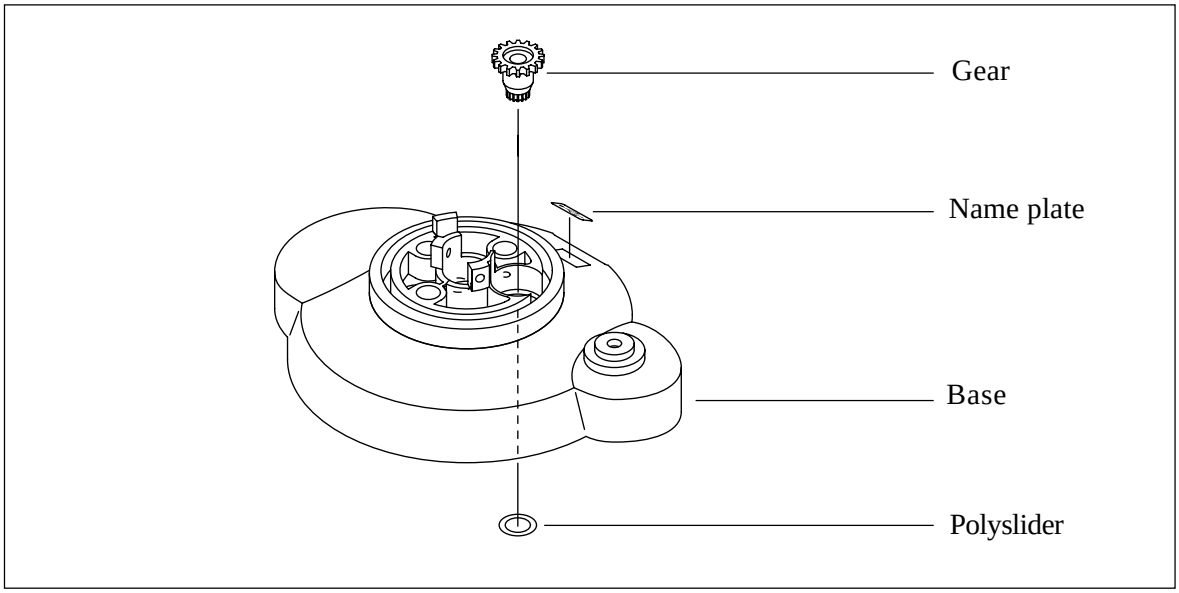
-6- Apply adhesive on the screws (3PUTB2X4SA, 3PUTB2X6SA : 2 pcs).

* The adjustment of focusing knob rotation tension is necessary.

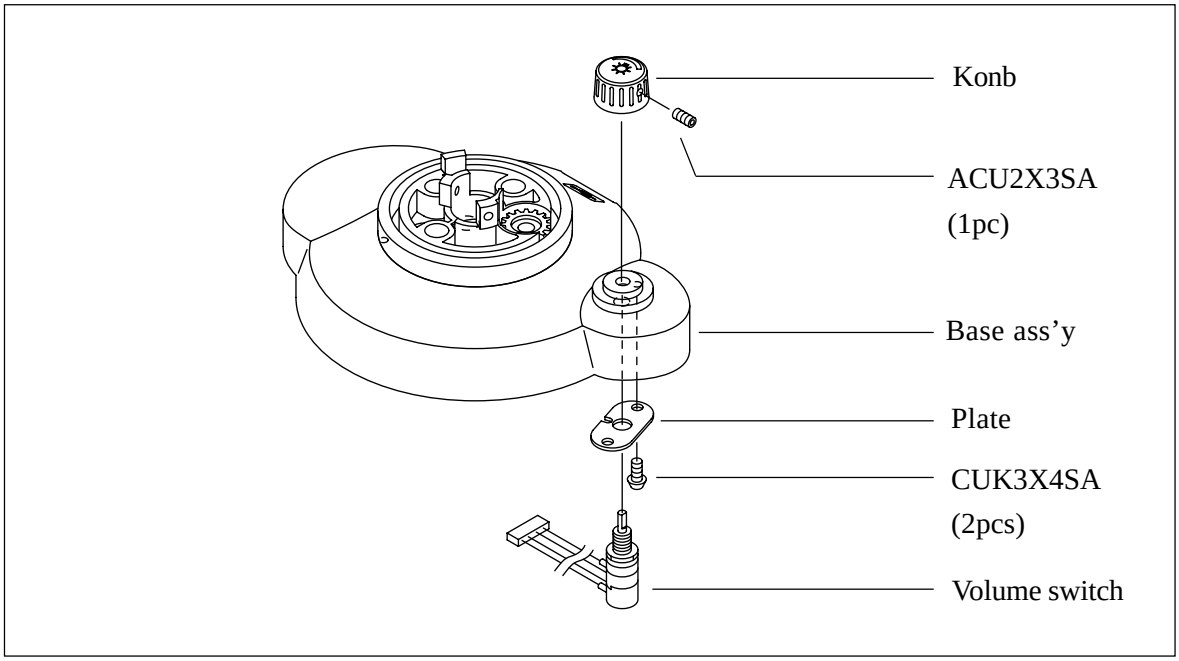
Refer to adjustment procedure.(page D-1)



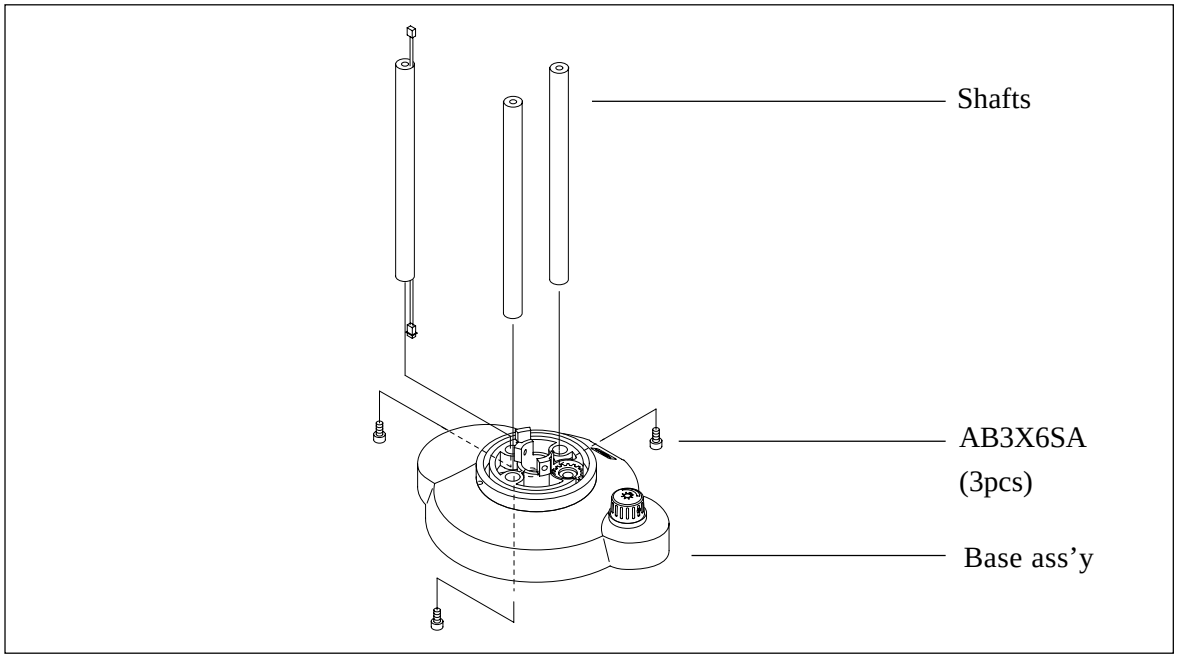
(3) -1- Apply grease (Los72515) on the gear.
-2- Cut out a piece of polyslider by cutter.
-3- Assemble gear and polyslider in the base.
-4- Stick the name plate on the base.



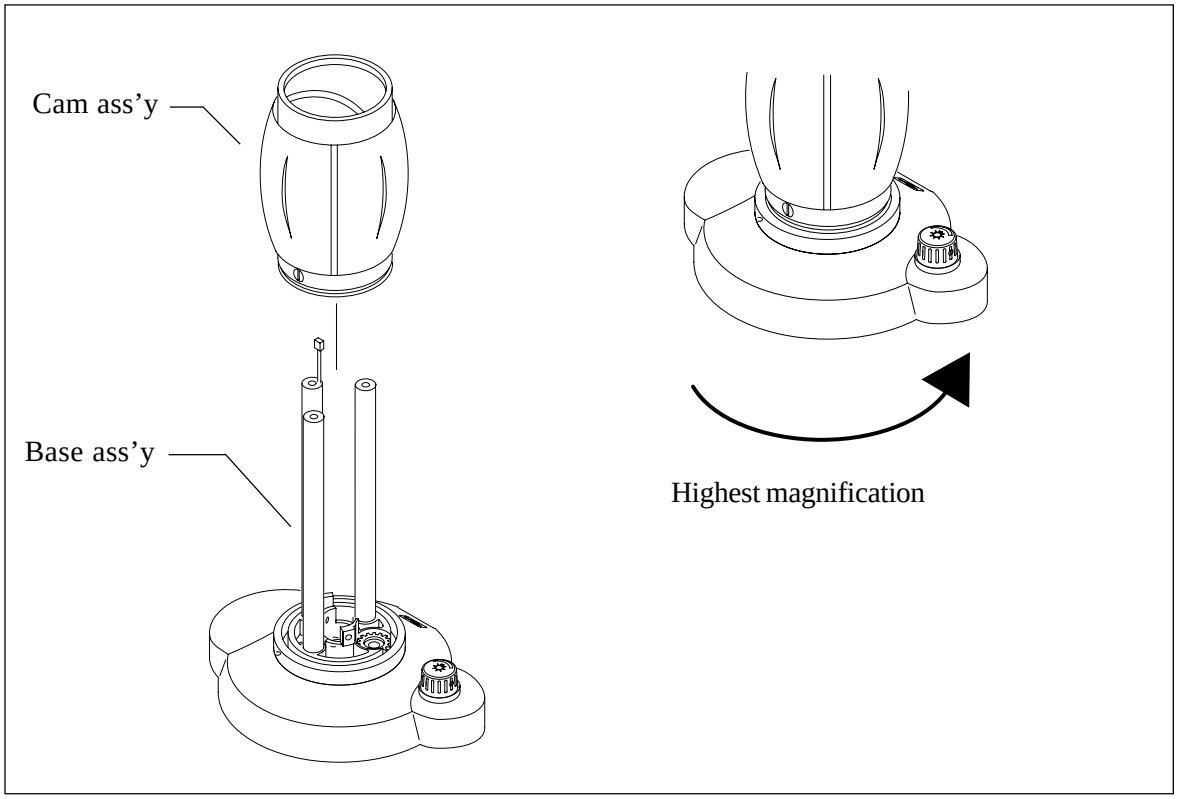
(4) -1- Assemble volume swicth and plate.
-2- Assemble volume switch ass'y in the base ass'y. Adjust the cable to the center of base ass'y.
-3- Fix the volume switch ass'y by screws (CUK3X4SA : 2 pcs).
-4- Assemble knob ass'y in the base ass'y.
-5- Fix the knob ass'y by screw (ACU2X3SA : 1 piece). Fix the screw to the D cut part.



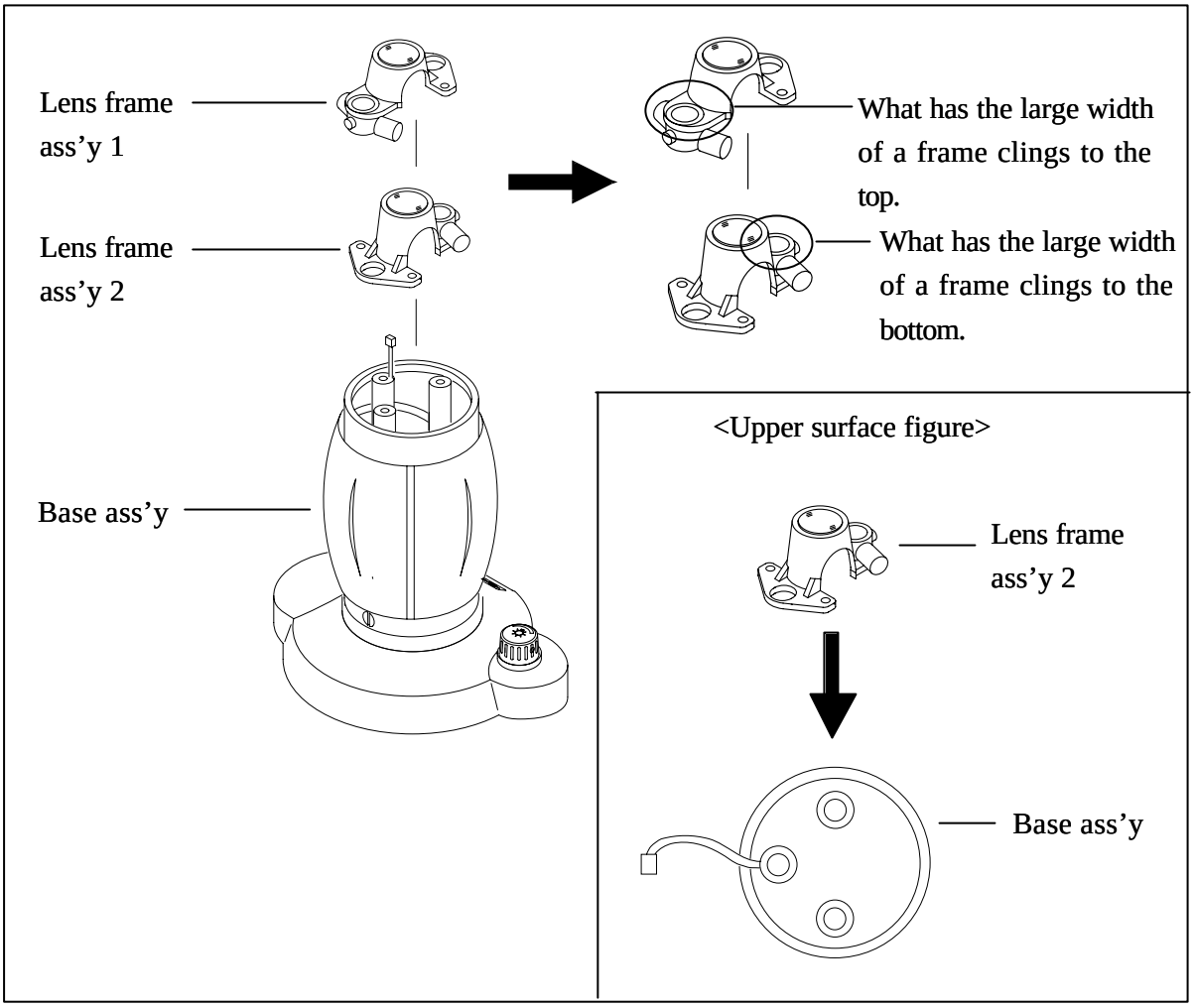
(5) -1- Apply grease (Los3340) to the side of shaft ass'y.
-2- Assemble shafts in the base ass'y.
-3- Fix the shaft ass'y by screws (AB3X6SA : 3 pcs).
-4- Apply adhesive (TB1401C) on the screws (AB3X6SA : 3 pcs).



(6) -1- Apply grease (Los72515) on the gear ass'y of cam ass'y.
-2- Assemble cam ass'y to the base ass'y.
-3-Set up the cam ass'y to highest magnification position.



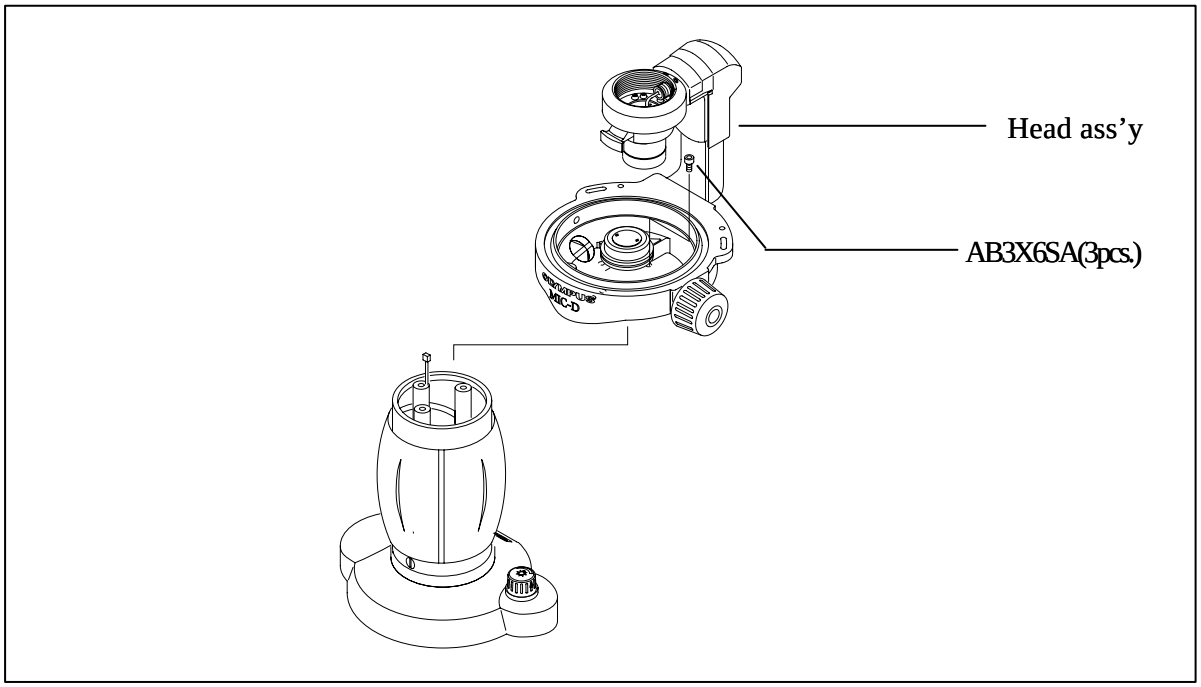
-4-Assemble Lens frame ass'y 1 and Lens frame ass'y 2 to base ass'y.



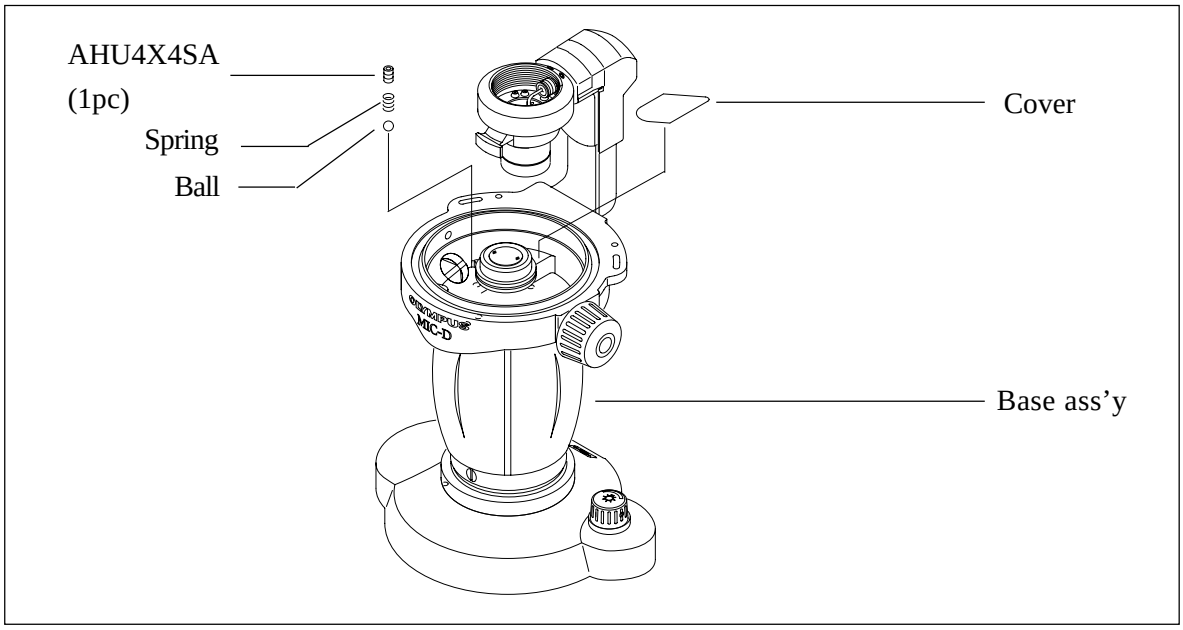
-5- Assemble head ass'y to the base ass'y.

-6- Fix the head ass'y by screws (AB3X6SA : 3 pcs).

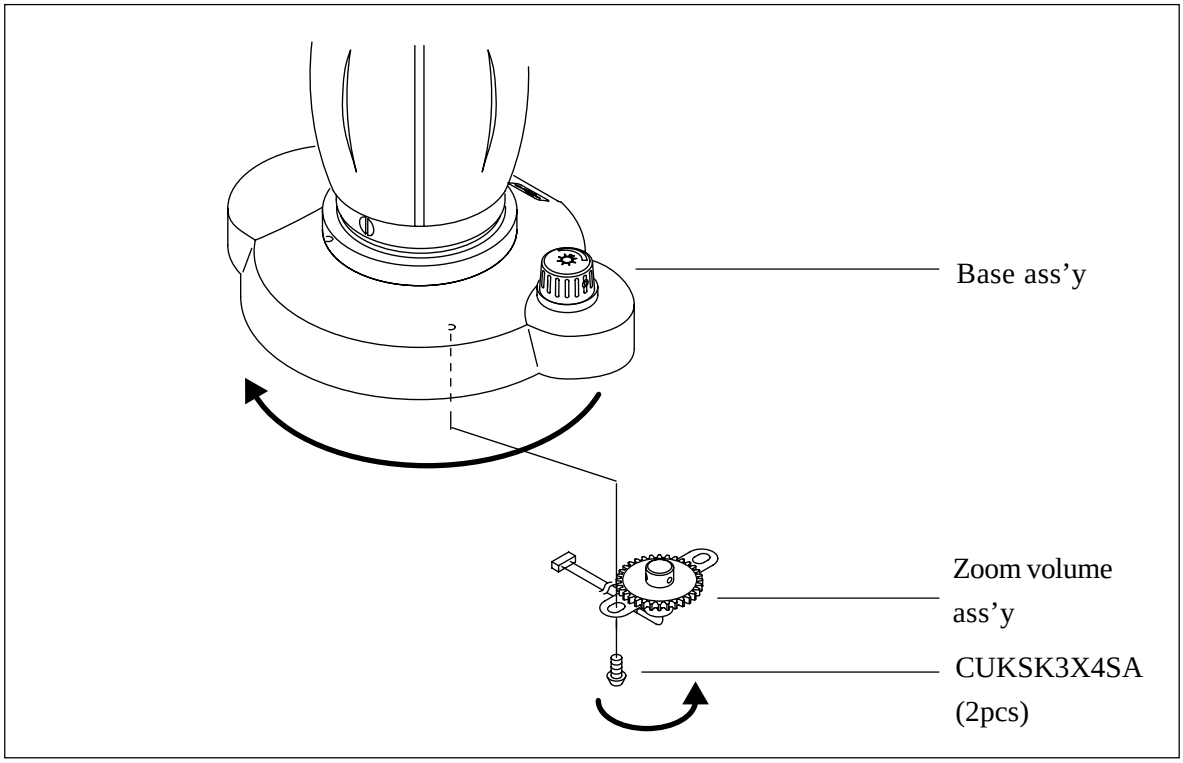
-7- Apply adhesive (TB1401C) on the screws (AB3X6SA : 3 pcs).



(7) -1- Assemble ball and spring in the base ass'y.
-2- Fix the spring by screw (AHU4X4SA : 1 pc).
-3- Apply adhesive (SE9176) on the screw (AHU4X4SA : 1 pc).
-4- Stick cover in the base ass'y.



(8) -1- Assemble zoom volume ass'y in the base ass'y.(CUKSK3X4SA : 2 pcs)
Set up the cam ass'y to lowest magnification position, rotate the zoom volume ass'y to counterclockwise. Then assemble the zoom volume ass'y to base ass'y.



(9) -1- Stick cover in the base ass'y.

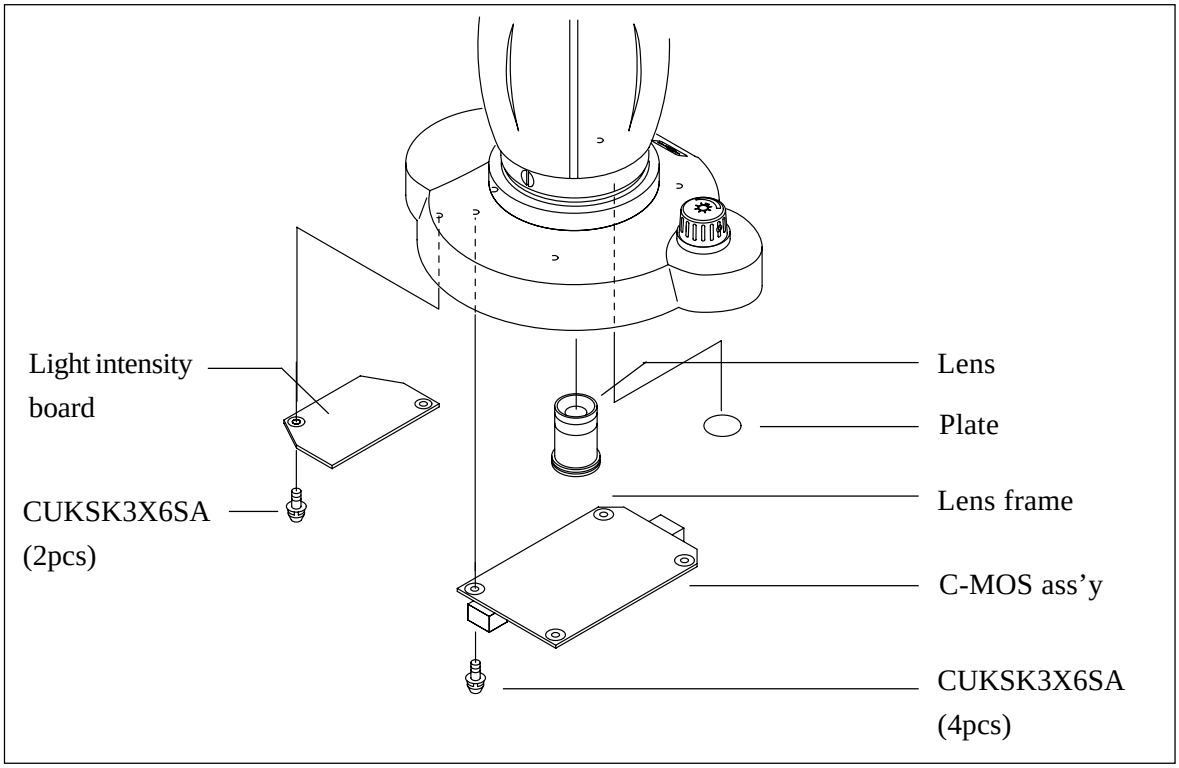
-2- Assemble lens frame and lens in the base ass'y.

-3- Assemble C-MOS ass'y in the base ass'y.

-4- Fix the C-MOS ass'y by screws (CUKSK3X6SA : 4 pcs) temporally.

-5- Assemble light intensity adjustment board to the base ass'y.

-6- Fix the light intensity ass'y by screws (CUKSK3X6SA : 2 pcs) temporally.

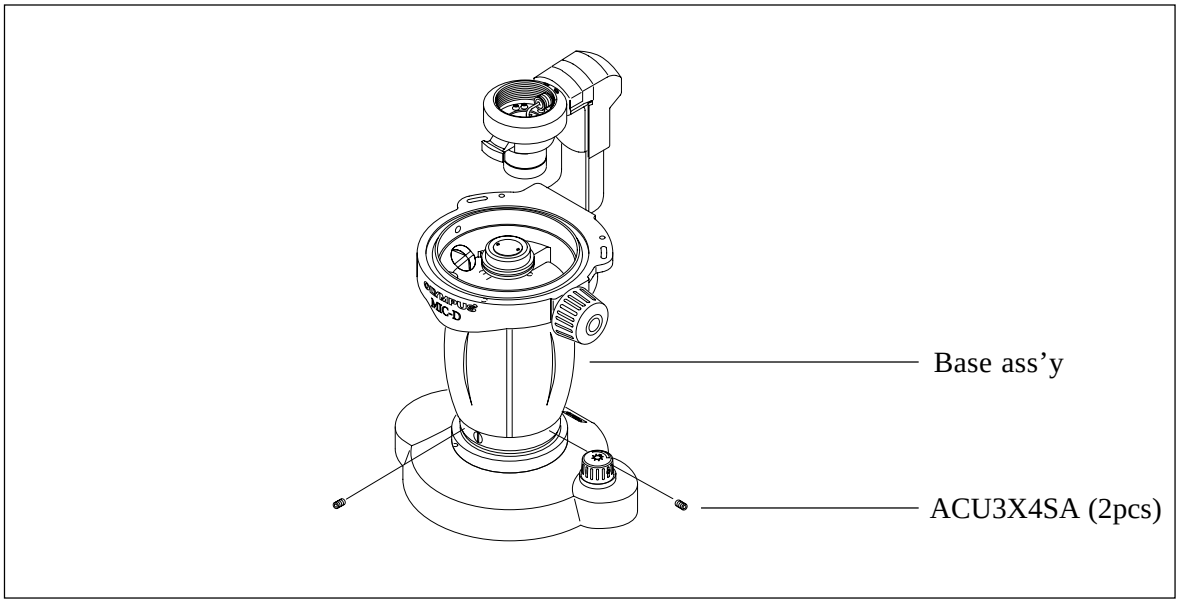


(10) * The adjustment of zoom parfocality is necessary.

Refer to adjustment procedure.(Page D-2)

-1- Fix the screws (ACU3X4SA : 2 pcs).

-2- Apply adhesive (SE9176) on the screws (ACU3X4SA : 2 pcs).



(11) -1- Remove C-MOS ass'y from base ass'y. Screws (CUKSK3X6SA : 4 pcs)

-2- Assemble dustproof rubber and mildewproof in the base ass'y.

-3- Fix the dustproof rubber piece by screws (ACU3X4SA : 2 pcs).

-4- Assemble the C-MOS ass'y in the base ass'y.

-5- Assemble the C-MOS ass'y by screws (CUKSK3X6SA : 4 pcs) temporally.

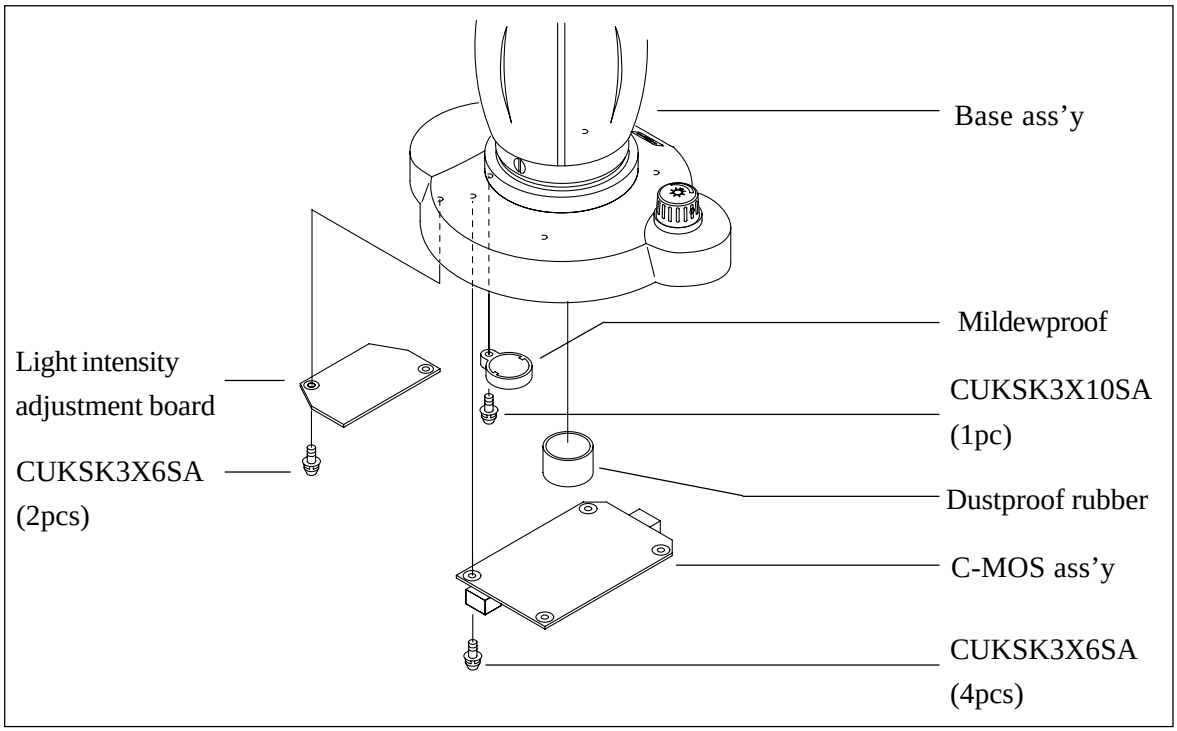
-6- Assemble light intensity board in the base ass'y.

-7- Fix the light intensity adjustment board by screws (CUKSK3X6SA : 2 pcs).

* The adjustment of output voltage is necessary. Refer to adjustment procedure.(Page D-4)

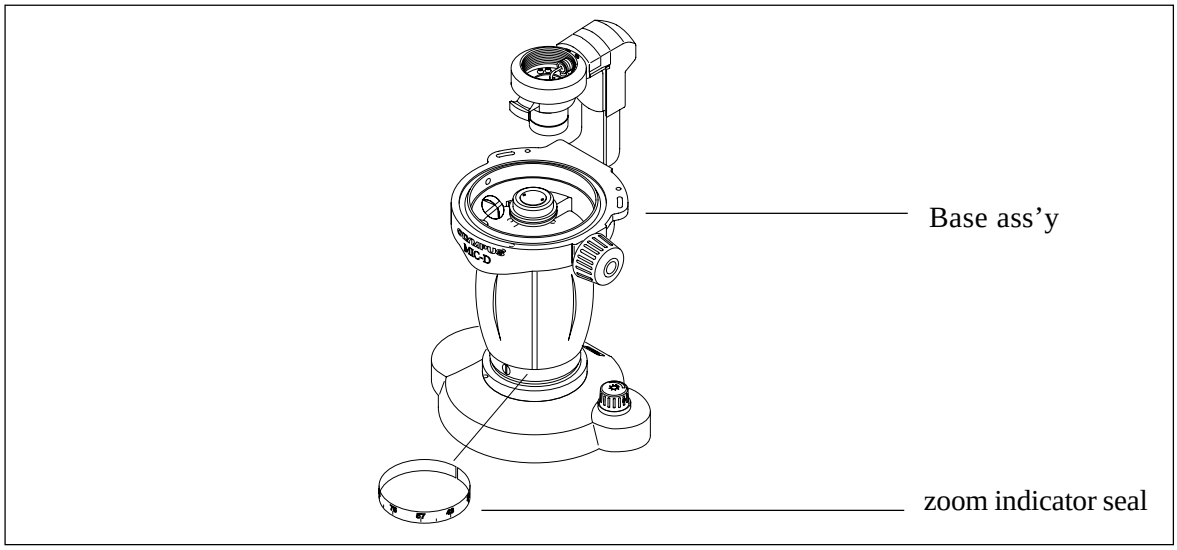
* The adjustment of CMOS color is necessary. Refer to adjustment procedure.(Page D-5)

* The adjustment of optical axis for shifting at the zoom is necessary.
Refer to adjustment procedure.(Page D-9)

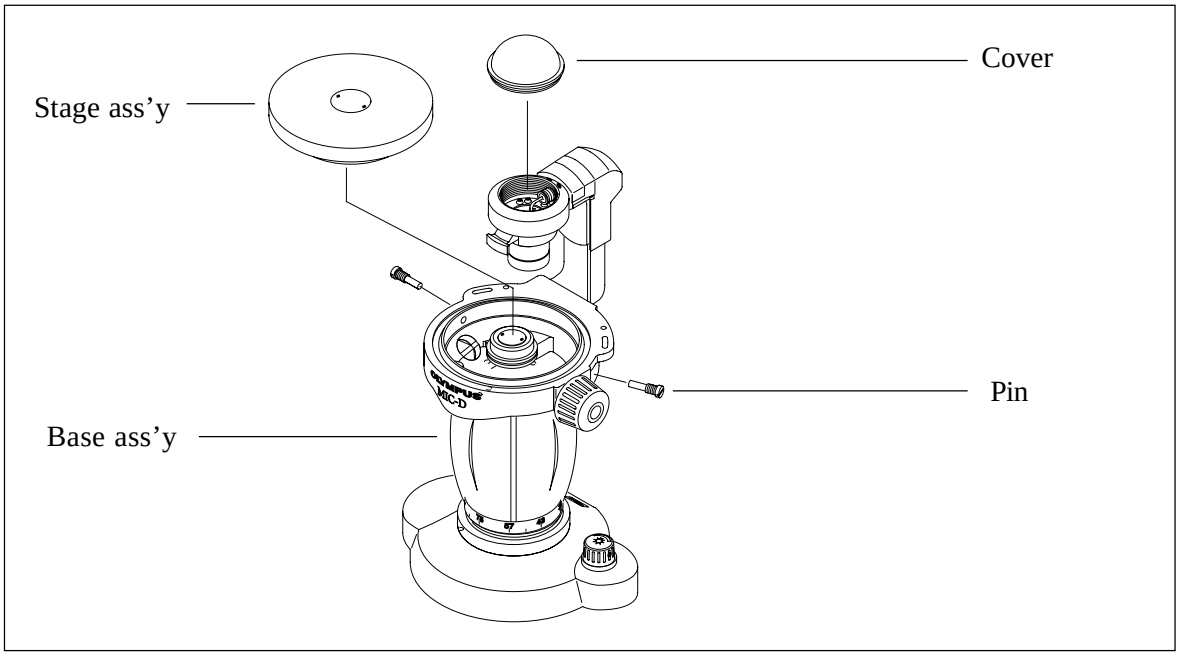


(12) -1- Stick zoom indicator seal on the base ass'y. It centers on 132.

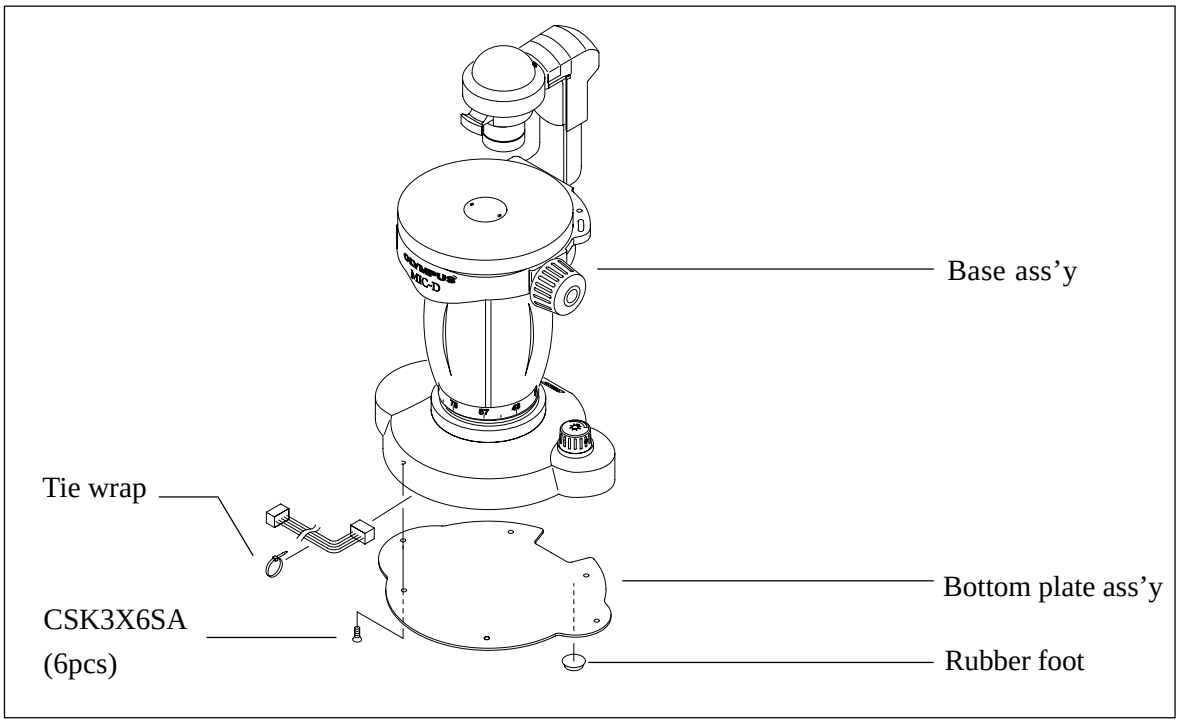
* The adjustment of center position of zoom indicator seal is necessary.
Refer to adjustment procedure.(Page D-12)



(13) -1- Apply grease(ST-1) on the mounting surface of stage ass'y.
-2- Assemble pins to the base ass'y.
-3- Assemble cover to the base ass'y
-4- Apply adhesive (SE9176) on the cover.



(14) -1- Band the cables together with tie wrap.
-2- Assemble bottom plate ass'y on the base ass'y.
-3- Fix the bottom plate ass'y by screws (CSK3X6SA : 6 pcs).
-4- Stick rubber feet on the bottom plate ass'y.



1.Rotating force adjustment of ARM and HEAD

(1)Tools

-1-Tension gauge

(2)Adjustment

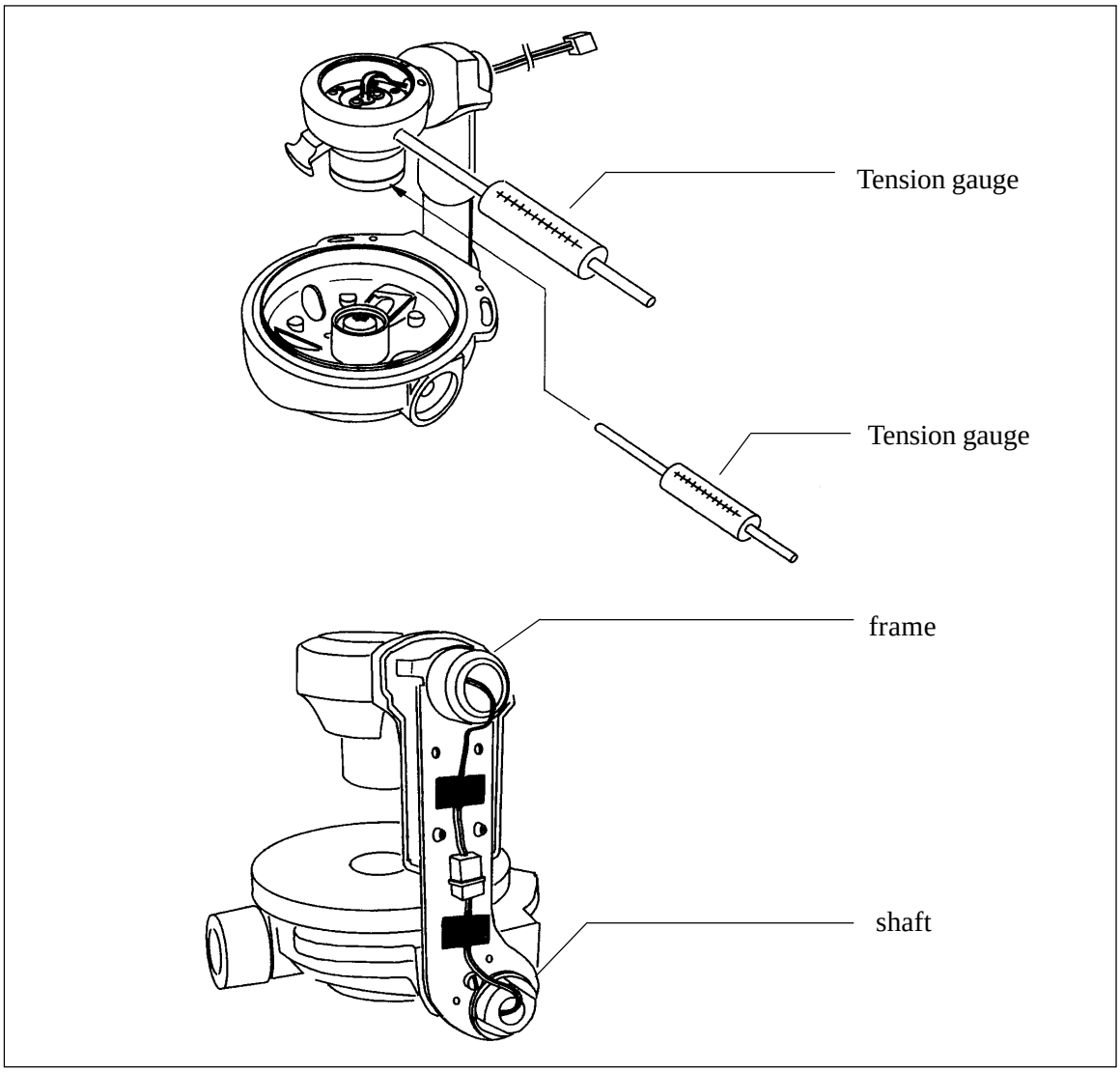
-1-Measure the rotating force of arm and head by tension gauge.

-2-Check that the amount of each rotating force are in a standard.

[STANDARD] ARM : 4.5-6N

HEAD: 1-2N

-3-In besides a standard, adjust by bolting of frame or shaft.



2.Rotating force adjustment of Focusing Knob

(1)Tools

-1-Tension gauge

(2)Adjustment

-1-Measure the rotating force of focusing knob by tension gauge.

-2-Check that the amount of rotating force is in a standard.

[STANDARD] :0.5-1N

(3)In besides a standard, adjust by bolting of focusing knob or shaft.

3. Parfocality adjustment

(1)Contents:Adjust the parfocality MAX zoom position and MIN zoom position.

(2)Products

-1-personal computer(PC)

-2-USB cable

-3-M01-BSW Ver.01.04

(3)Preparation

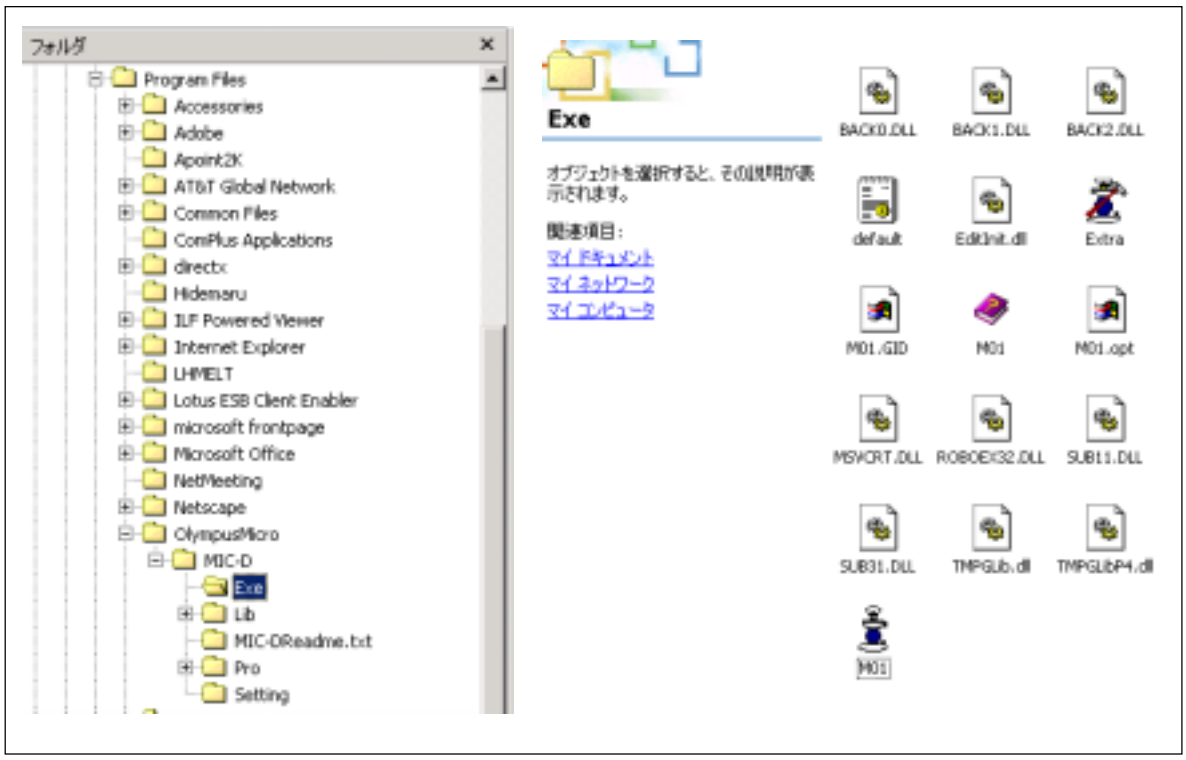
-1-Install the M01-BSW to PC.

-2-Connect the MIC-D with PC by USB cable.

-3-Install the driver for MIC-D.

-4-Chose the [Program Files]-|[OlympusMicro]-|[MIC-D]-|[EXE] folder by explorer.

-5-Start the Extra.EXE(execution file for adjustment) or MIC-D.EXE in [EXE] folder.



(4)Adjustment

-1-Set the cross-specimen on stage.

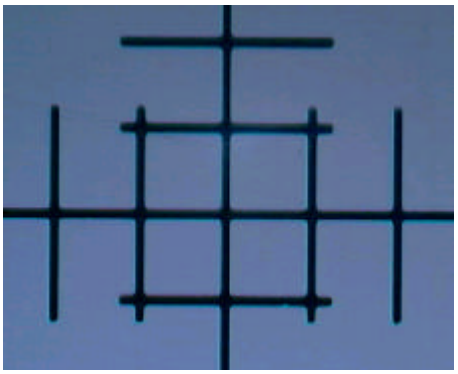
-2-Connect the USB cable with PC.

-3-Set the zoom of MIC-D to highest magnification position.

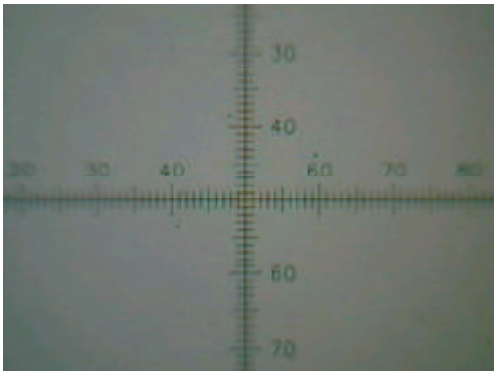
-4-Focus the cross-specimen by focusing knob.

-5-Set the zoom of MIC-D to lowest magnification position and Check the parfocality.

highest magnification position



lowest magnification position

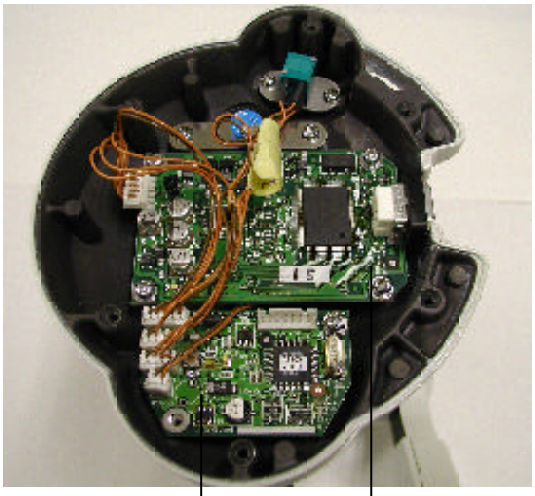


When parfocality is no good

-6-Remove the rubber feet and bottm plate. ACU3X4SA(2pcs.)

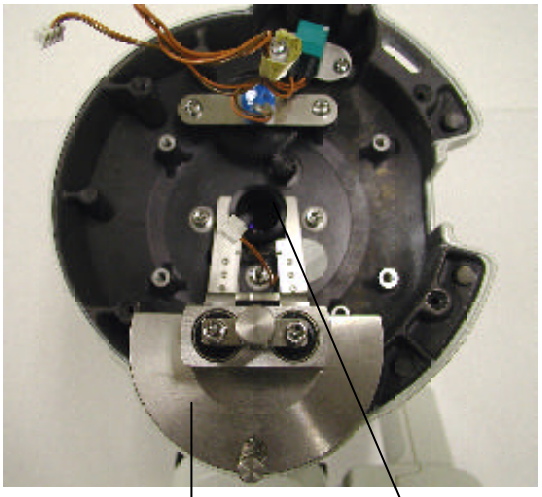
-7-Remove the C-MOS ass'y(CUKSK3X4SA:4pcs.) and light intensity adjustment board.(CUKSK3X6SA:2pcs.)

-8-Assemble the MIC-DKC02 to base ass'y. Hold the parfocality lens by MIC-DKC02.



Light intensity adjustment board

C-MOS ass'y

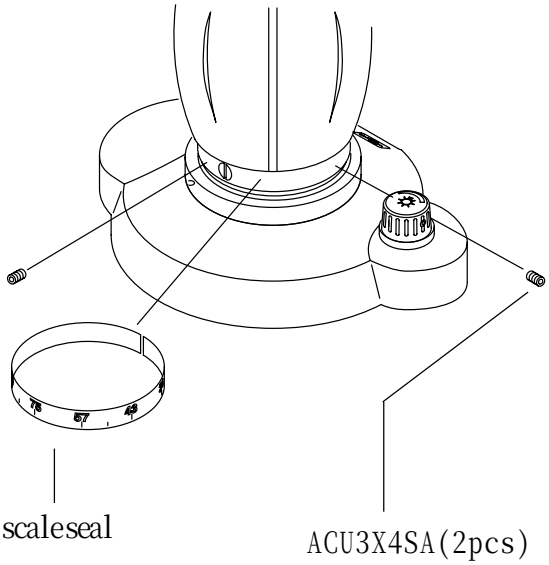


MIC-DKC02

Parfocality lens

-9-Fix the C-MOS'Y(CUKSK3X6SA:4pcs.) and Lightintensity adjustment board (CUKSK3X6SA:2pcs.) by screws.

-10-Remove the scale seal, lose the screws.(ACU3X4SA:2pcs.)



-11-Set up the cross specimen on stage.

-12-Conect the USB cable with PC.

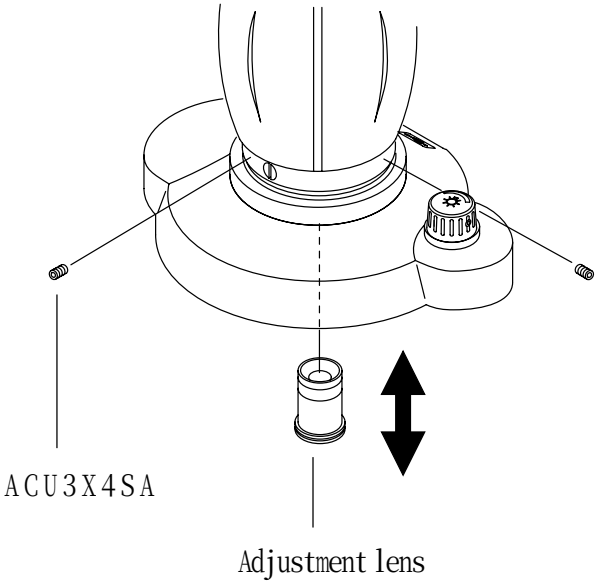
-13-Set up the zoom to highest magnification position.

-14-Focus the specimen by knob.

-15-Set up the zoom to lowest magnification position.

-16-Control the parfocality lens by MIC-DKC02 knob.

-17-Apply the adhesive(SE9176) to screws.(ACU3X4SA:2pcs.)



4.Trimmer resistance adjustment

(1)Contents : Adjust the voltage of volume switch by trimmer resistance.

(2)Tools

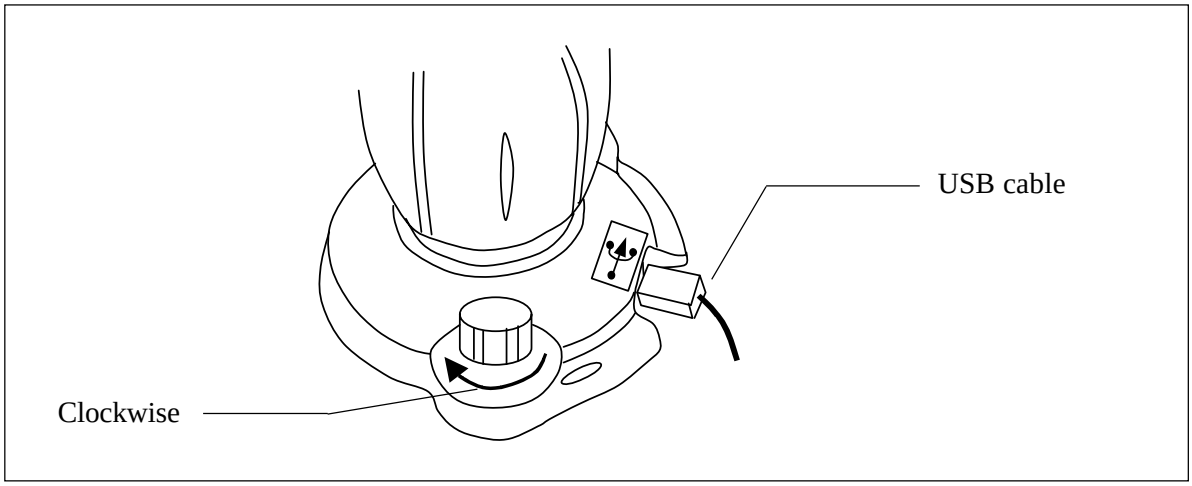
-1-Voltage meter

(3) Adjustment

-1- Connect MIC-D and PC by USB cable.

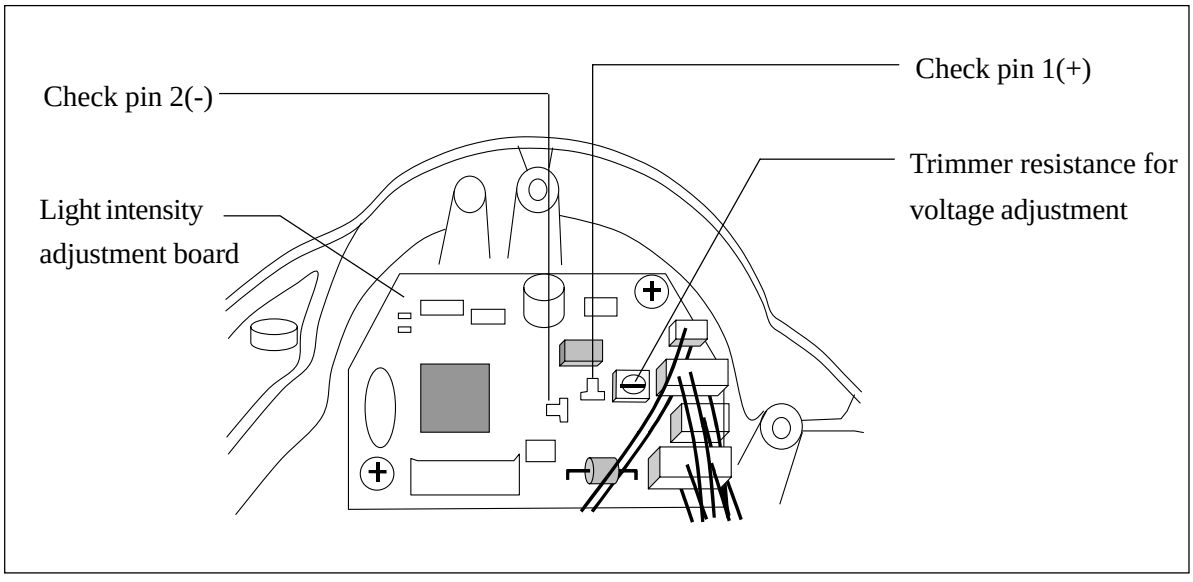
-2- Check that the illumination LED of MIC-D is light up.

-3- Turn the volume switch clockwise until the maximum.



-4-Connect red (+) probe to the check pin 1 in the light intensity adjustment board.
Connect black (-) probe to the check pin 2 in it.

-5-Adjust that the display value of tester may be set to 50+/-5mv with turning trimmer resistance for voltage adjustment.



5. CMOS color adjustment

(1)Contents:Adjust the CMOS color.

(2)Products

-1-personal computer(PC)

-2-USB cable

-3-M01-BSW Ver.01.04

(3)Preparation

-1-Install the M01-BSW to PC.

-2-Connect the MIC-D with PC by USB cable.

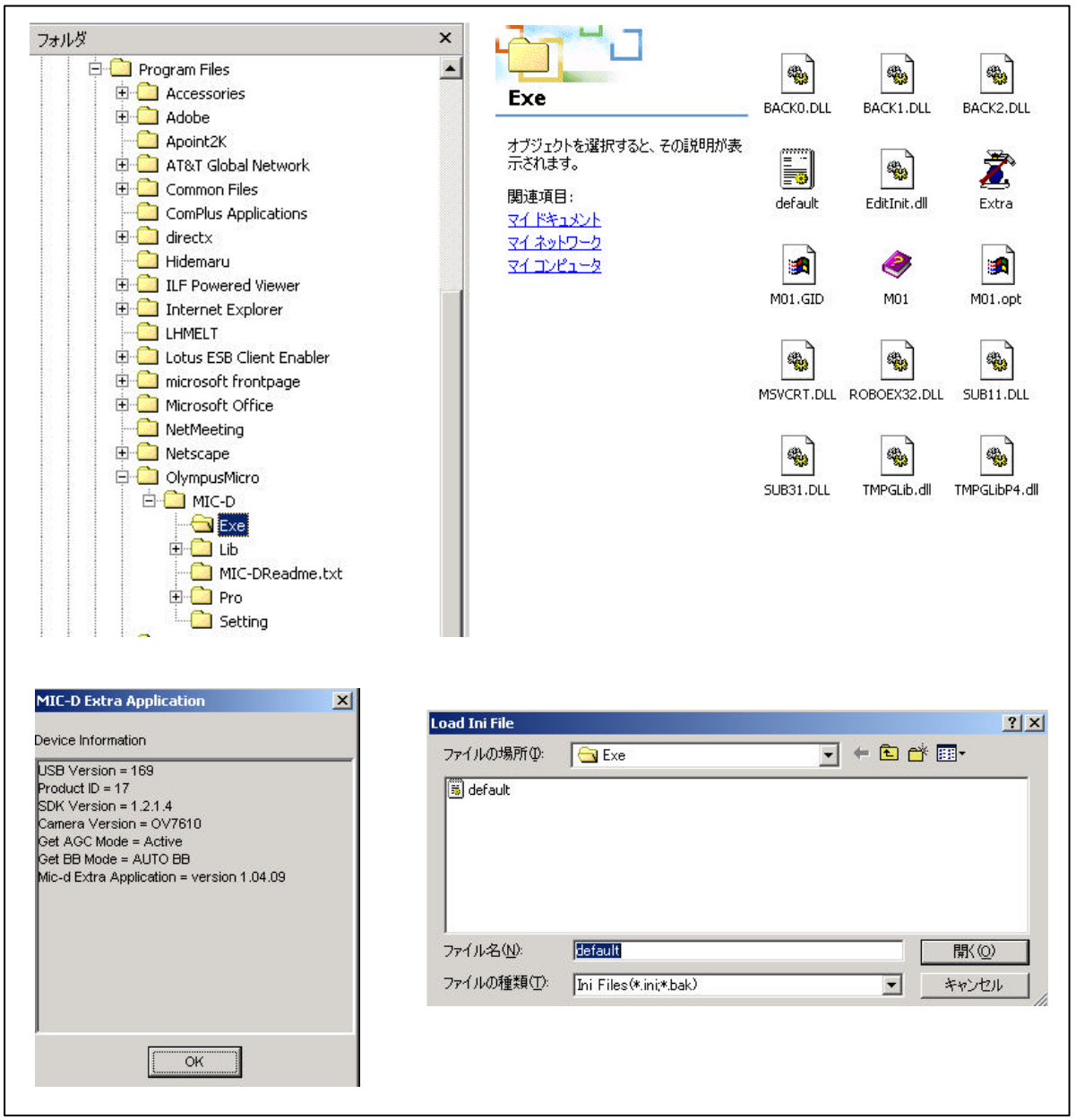
-3-Install the driver for MIC-D.

-4-Chose the [Program Files]-|[OlympusMicro]-|[MIC-D]-|[EXE] folder by explorer.

-5-Start the Extra.EXE(execution file for adjustment) in [EXE] folder.

-6-Push the [OK] button.

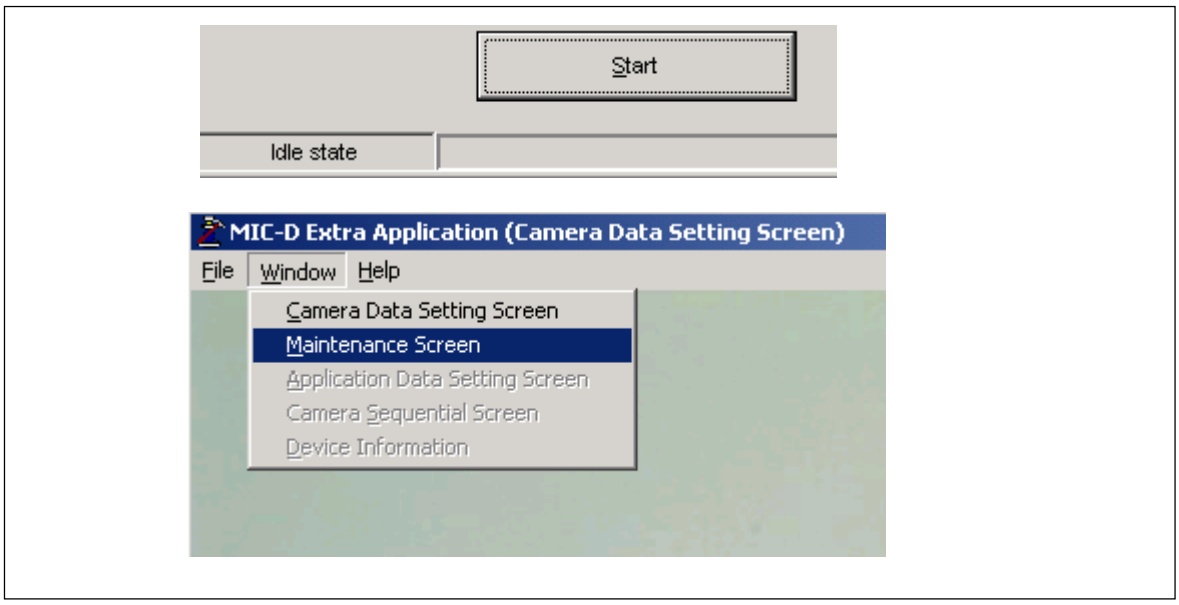
-7-Open the default.ini for MIC-D. default.ini is chosen automatically.



(3)Adjustment

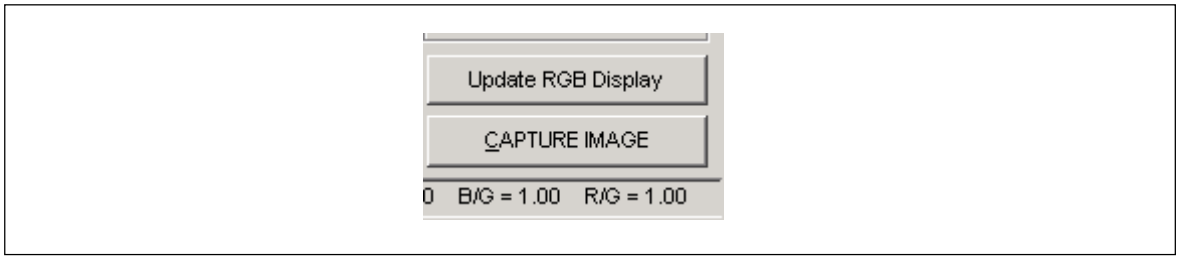
-1-Push the [START] button.

-2-Chose the [Window]-[Maintenance Screen].

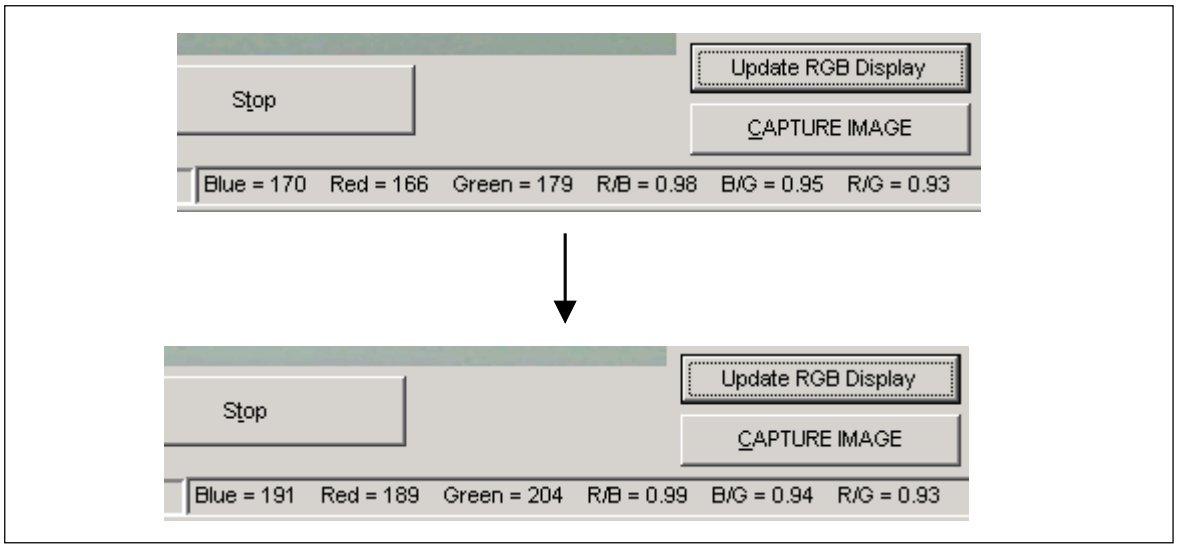


-3-Setup the MIC-D. Voltage is MAX. Zoom is MAX(255). Frosted filter is IN.
Specimen is none.

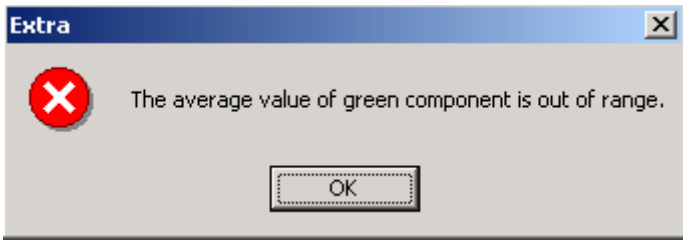
-4-Push the [Update RGB Display] button.

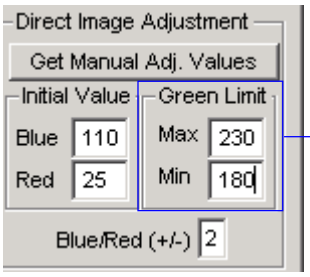


-5-Each color values are displayed. Check that Green values are the 205 neighborhoods.
The case where Green value not the 205 neighborhoods, rotate the zoom to MIN direction.
Then Push the [Update RGB Display] button again.



-6-Push the [GET Manual Adj. Values] button. Color adjustment is started.
When the following error is displayed, change the Green Limit value.

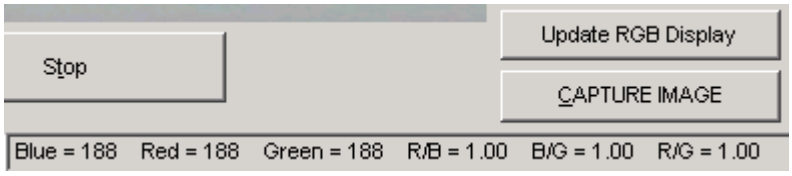




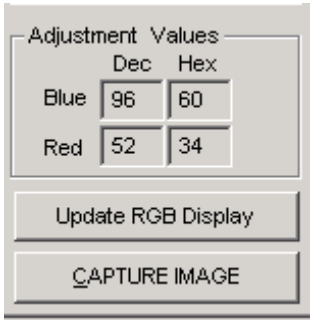
Green Limit

After adjustment, Check that R/B and B/G are in a standard.
When they are not in a standard, change the CMOS ass'y.

Standard: R/B,B/G = 0.8-1.2



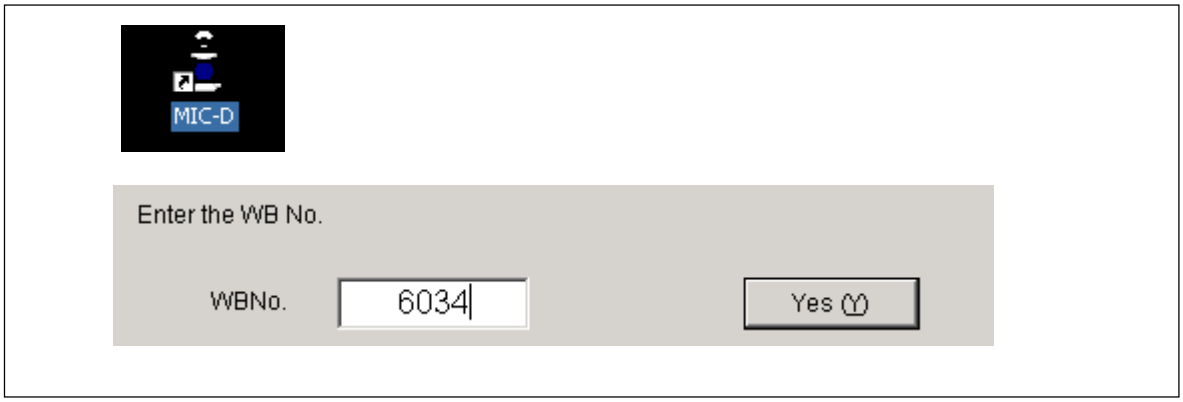
-7-Get the color adjustment values from [Adjustment Values]-[HEX].
The Color adjustment values of this MIC-D are Blue=60 and Red=34.
We stick the values on MIC-D.



-8-Start the MIC-D.EXE and input the 6034(color adjustment values) in WBNo..

When we started the MIC-D.EXE, we need to input the WBNo..

-9-Finish the color adjustment.



6. Optical shift adjustment

(1)Contents:Adjust the optical shift MAX zoom position and MIN zoom position.

(2)Products

-1-personal computer(PC)

-2-USB cable

-3-M01-BSW Ver.01.04

(3)Preparation

-1-Install the M01-BSW to PC.

-2-Connect the MIC-D with PC by USB cable.

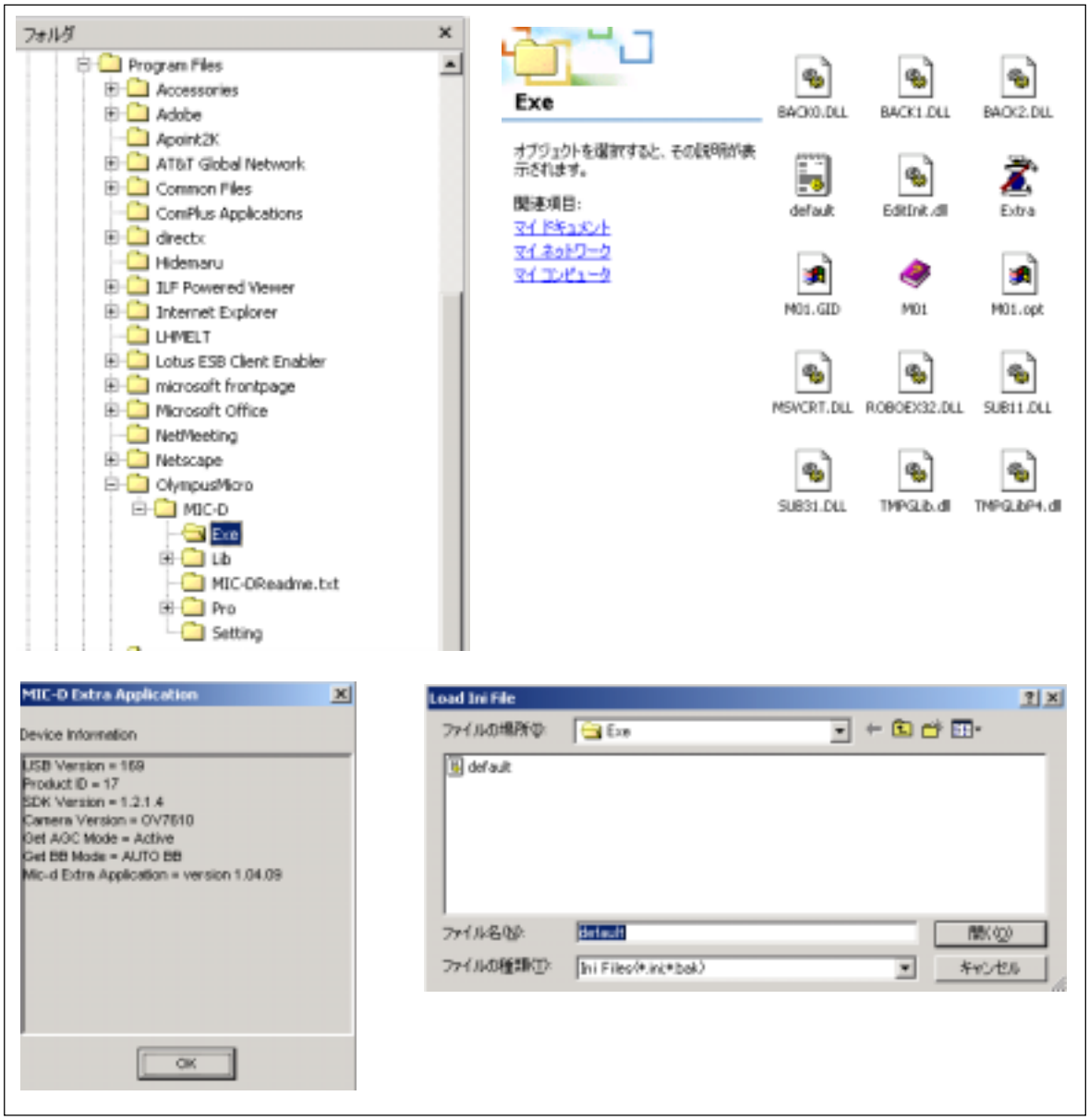
-3-Install the driver for MIC-D.

-4-Chose the [Program Files]-[OlympusMicro]-[MIC-D]-[EXE] folder by explorer.

-5-Start the Extra.EXE(execution file for adjustment) in [EXE] folder.

-6-Push the [OK] button.

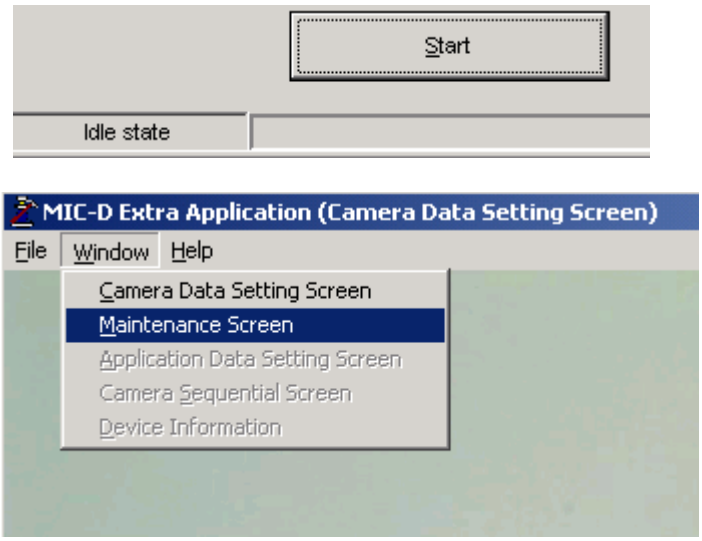
-7-Open the default.ini for MIC-D. default.ini is chosen automatically.



(3)Adjustment

-1-Push the [START] button.

-2-Chose the [Window]-[Maintenance Screen].



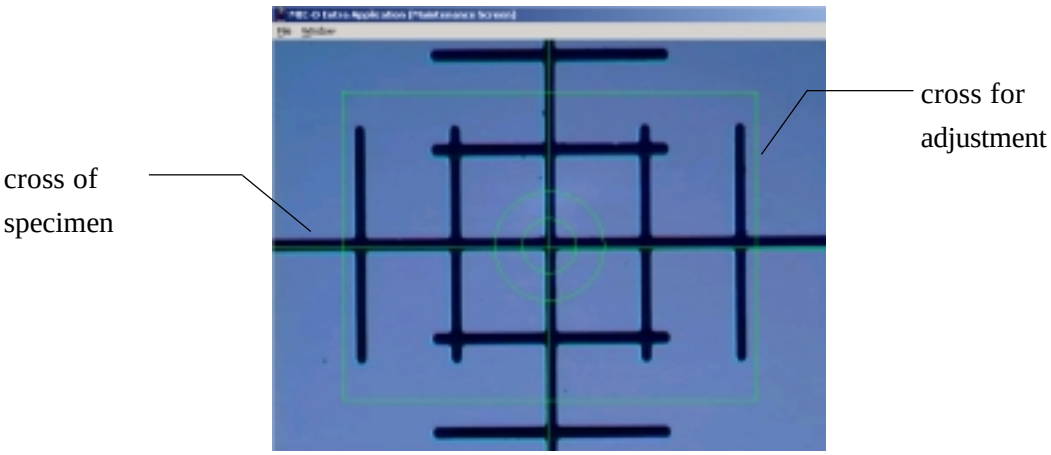
-3-Check that Cross Hairs, Connectric Circles and Field Display have check.

-4-Set the zoom of MIC-D to MAX.

-5-Set the cross-specimen on stage. Focus the specimen by focusing knob.

-6-Adjust the center position cross for adjustment and cross of specimen.

Fix the specimen on stage by tape.



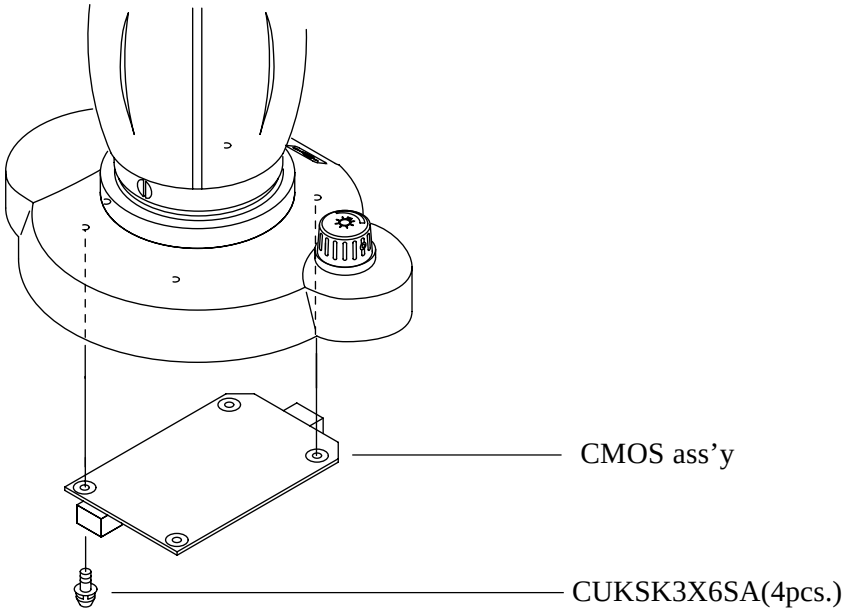
-7-Set the zoom of MIC-D to MIN.

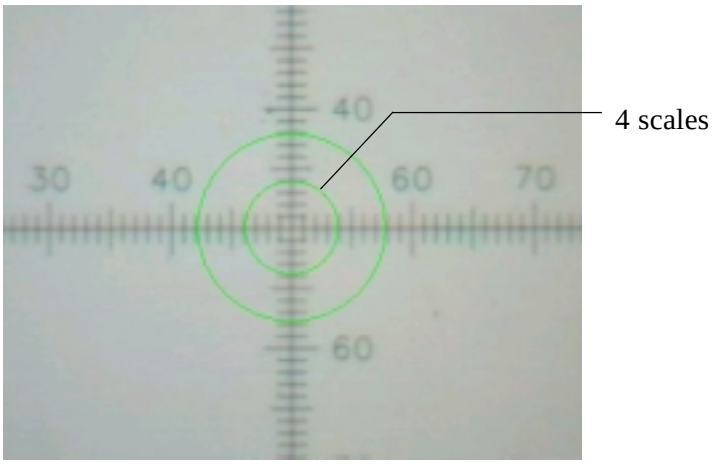
-8-Check the center position of cross for adjustment and cross of specimen.

When optical shift is no good

Loose the CUKSK3X6SA(4pcs.). Shake the CMOS ass'y and adjust the optical shift in a standard.

STANDARD : 4 scales





7.Zoom indicator seal posintion

(1)Contents:Adjust the Zoom indicator seal posintion

(2)Products

-1-personal computer(PC)

-2-USB cable

-3-M01-BSW Ver.01.04

(3)Preparation

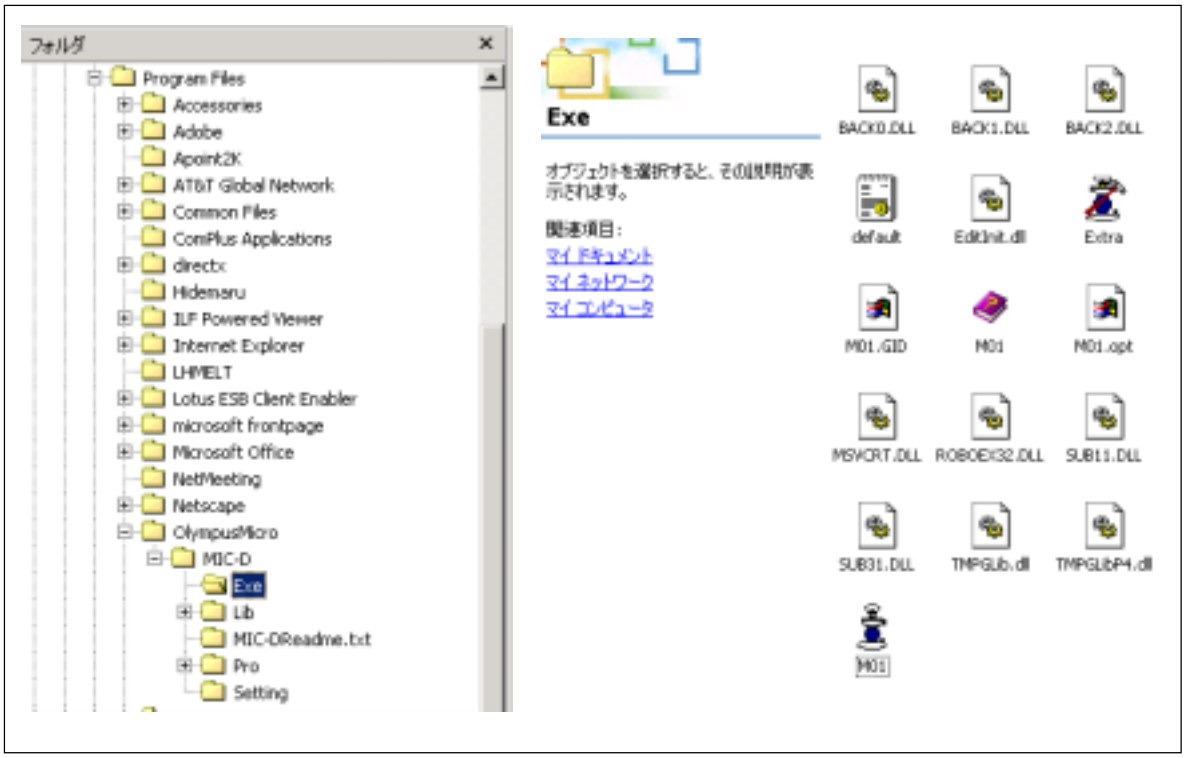
-1-Install the M01-BSW to PC.

-2-Connect the MIC-D with PC by USB cable.

-3-Install the driver for MIC-D.

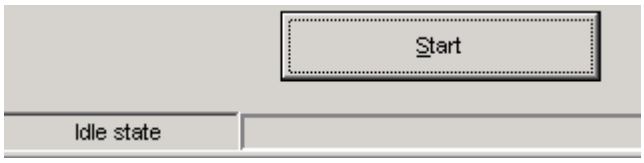
-4-Chose the [Program Files]-|[OlympusMicro]-|[MIC-D]-|[EXE] folder by explorer.

-5-Start the Extra.EXE(execution file for adjustment) or MIC-D.EXE in [EXE] folder.



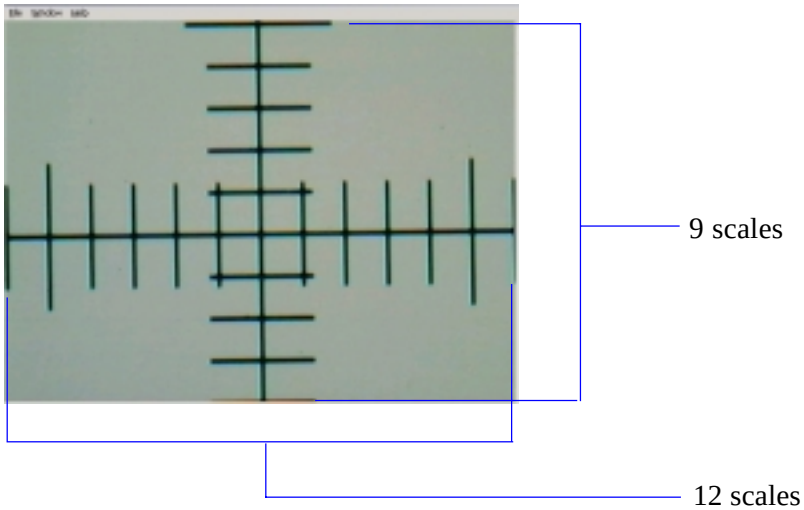
(4)Adjustment

-1- Push the [Start] button.

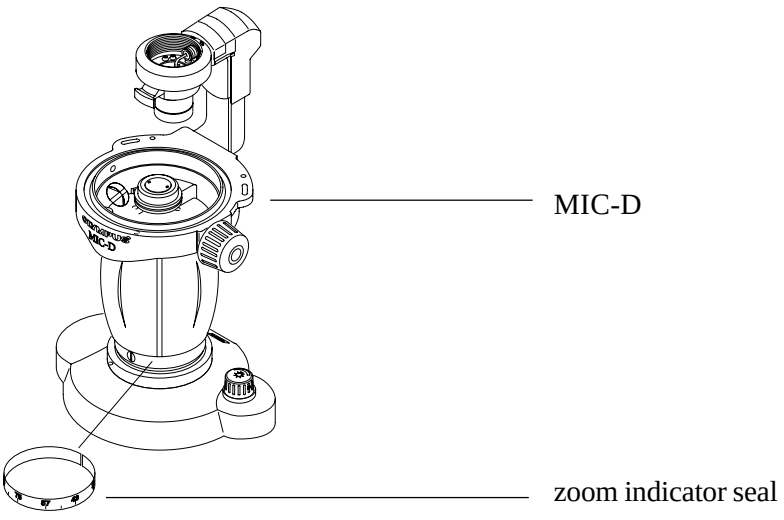


-2- Set the spacimen of cross on stage.

-3- Move the zoom until the memory of a specimen becomes width 12 scale and vertical 9 scale on display.

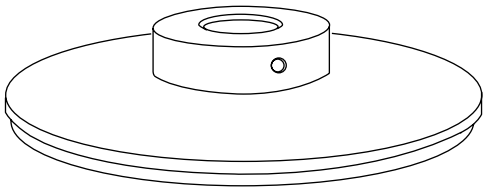
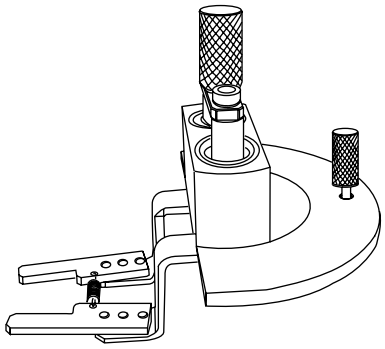


-3- Unite and stick 132 of a zoom indicator seal on the index of MIC-D.



1. LIST OF JIGS AND TOOLS

New Jigs

	
Jig Name:Parfocality specimen for MIC-D	Jig Name:Parfocality adjustment jig for MIC-D
Jig NO. :MIC-DKC01	Jig NO. :MIC-DKC02

Common jigs

Jigs Name	Jigs NO
Cross micrometer specimen	AX0003

2. LIST OF PRODUCTS

Products
Tension gauge (10N)
Personal computer
USB cable
MIC-D software Ver.01.04
Multimeter (RMS type)

1.LIST OF LUBRICANTS

Lubricants Name	OT NO.
Los72515	OT2008
ST-1	OT3155

2.LIST OF CHEMICALS

Chemicals Name	OT NO.
TB1401C	OT1026
SE9176	OT1870

PC

Q : Is the software of MIC-D possible to use with Windows 95 or Windows NT?

A : No, it is impossible. Windows 2000, Windows 98 (including Second Edition) and Windows Me are possible to use.

Q : Is the software of MIC-D possible to use with Macintosh?

A : No, Macintosh is not applicable.

Q : Is there recommendation PC to install the software of MIC-D?

A : We have checked to operate the PC in the following list. There is no problem to operate.

File

Q : Are the animation files (AVI and MPEG file), which are created by the software of MIC-D, possible to play back by the other software?

A : They are possible to play back by the animation software that is Windows Media Player of standard.

MIC-D operation

Q : We can see a dust and a dirt in the specimen that has finished to clean up.

A : Check the stage in the center of glass side whether it has dirt or not. If it has dirt, wipe it up by gauze. Also, wipe it up by gauze with a little mixed liquid, which are mixed by 70% for ether and 30% for alcohol, or a little EE system washing (Serial No. EE-6310 that is manufactured by Olympus) for the dirt of fingerprints or the dirt of oil and fats.

Q : The direction that shifts the stage by hands and the direction that moves the specimen on the monitor are different.

A : MIC-D is the inverted microscope that observes the specimen from the bottom. The operation of right and left is the same, however, the operation of upper and lower becomes reverse. Shift the stage to the lower part (this side) when you need to move the specimen to the upper part on the monitor.

Others

Q : Is there any problems when the specimen observes to insert in petridish?

A : It is impossible if you use such as petridishes, the bottom is curving, not clear container and thick container.

Q : Is MIC-D applied the waterproof and dust-proof?

A : There is the efficiency of drip-proof type against water from the upper stage. Also, there is dust-proof structure for the inside of zoom optical system.

1. CMOS (Complementary Metal Oxide semiconductor)

Abbreviation of complementary metal oxide semiconductor. Pronounced see-mos, CMOS is a widely used type of semiconductor. CMOS semiconductors use both NMOS(negative polanity) and PMOS (positive polanity) circuits. Since only one of the circuit types is on at any given time, CMOS chips reqire less power than chips using just one type of transistor. This makes them particularly attactive for use in battery-powered devices, such as portable computers. Personal computers also contain a small amount of battery-powered CMOS memory to hold the date, time, and system setup parameters.