Final Manual

OLYMPUS

BX40 System Microscope Servicee Manual

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*This section is needed some of the repairs of BX40 frame. Only refer to it if given a specific reference form Section A BX40 Frame.

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SECTION A

THIS SECTION CONTAINS INFORMATION ON BX40 FRAME, OBJECTIVES, AND CONDENSER

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SECTION A

BX40F

List of Illustrations and Tables

Section A BX40 Frame, Objectives, and Condenser

INTRODUCTION

- This manual is written for the persons who can repair the BH2 series. Repair training is necessary for the persons who have no experience of repairing the BH2 series.
- The disassembly and assembly procedures are simplified in this manual.

  Disassemble the mechanical parts sequentially from ①.
  Assemble in the reverse order. Pay attention to the grease, adhesive and adjustment steps.

  Disassemble the electrical parts sequentially from ① with attention given to the connectors.
  Assemble in the reverse order. Pay attention to the connectors, adhesive and adjustment steps.
- For the adjustment, refer to the following pages.

[Example]

(Mechanical parts)

Disassembly

No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	BOTTOM PLATE	CUK3x6SA(*1)4 pcs.			
②	BLIND SEAL				
③	LEVER	PUTB3x16SA(*2)1 pc. SW3SA(*3) 1 pc. KNW3SA(*4) 1 pc.	OT1793		E8-3 (E-22)

Assembly

Reference item

Reference page

(Electrical parts)

No.	Parts name	Connectors	Screw	Adjustment
①	POWER BOARD	(a) CN1 --- Switch (b) CN2 --- Service outlet (c) CN20 -- Display board (d) Vout + Lamp (Gray) (e) Vout - Lamp (White)	CSTS3x8SA(*1)2 pcs. CTK3x4SA(*2) 4 pcs.	E10-3(E-32)

1. OUTLINE

(1) Application
Clinical inspection for diagnosis of disease, cells, blood, etc. and general researches.

(2) Product range
Replacement product range of BHT and BHTU market.

2. FEATURES

(1) The field number 22 (standard field of view) is used to expand the observation range 20% compared with the BH2.

(2) The arm rest (base) is eliminated to allow the operator to directly put his hand on the table surface, minimizing the operator's fatigue and improving the maneuverability.

(3) The base-less structure expands the operation space.

(4) The eye point height is adjustable to meet the operator when combined with U-TBI, minimizing the operator's fatigue and improving the workability.

(5) The wide field of view (field number 26.5) is available when combined with the superwide field observation tube.

(6) The new glass material and coating agent used in the UIS optics provide an image with sharp contrast.

(7) The ceramic coated stage is equipped as a standard to minimize the friction of the slide glass on the stage surface. (The wear resistance is improved to eight times or more than the BH2-SVR(L).)

(8) The stage control knob's rotating force is adjustable by the user (40 ~ 400g in each of the X and Y direction).

(9) The revolving nosepiece facing the rear side is used to facilitate visual inspection and marking of a specimen. Since the intermediate lens is not built in the revolving nosepiece, it prevents deterioration of an image by the intermediate lens and allows the U-excited observation.

(10) The light preset switch allows one-touch switching to the desired light level. (This is useful for setting the color temperature of photography and light intensity adjustment when switching between two objectives.)

(11) The stage stroke is increased and the interference between the specimen holder and the 40× objective is eliminated to enable observation of the whole surfaces of two slide glasses.

(12) The illumination switch, the light intensity control and the coarse and fine adjustment knob are located in a concentrated position to allow operation by minimum handling.

(13) The advanced computer simulation based on the finite element method(FEM) is employed to improved the rigidity and stability of the microscope frame.

(14) The 30W halogen bulb is used to increase brightness and to allow special observation such as darkfield and phase contrast.

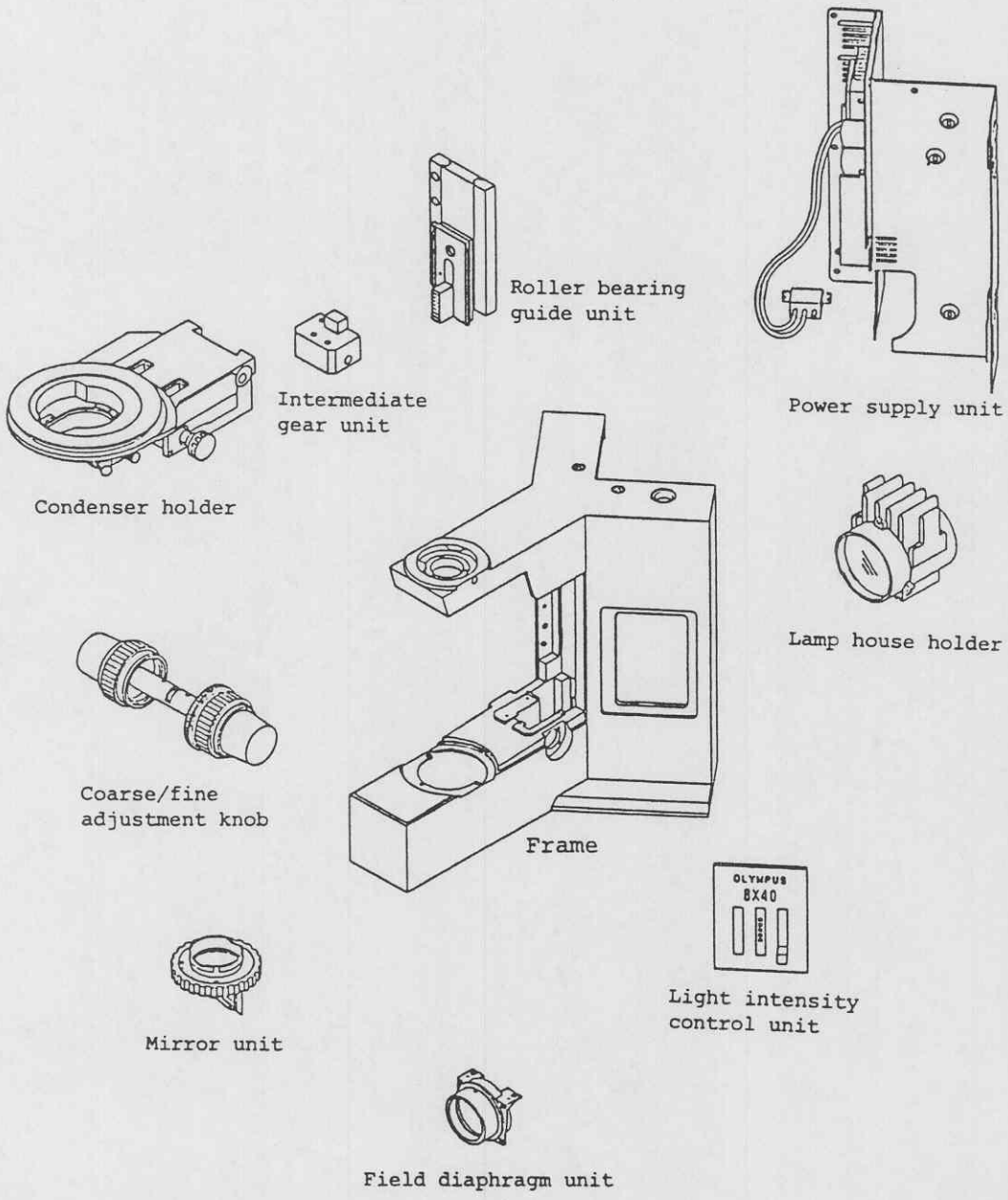
OLYMPUS

OLYMPUS AMERICA INC.
PRECISION INSTRUMENT DIVISION

CATALOG NO.	PRODUCT DESCRIPTION
	B-MAX 40 MICROSCOPE ITEM LIST
BX40F3	BX40F3: Microscope Stand for Olympus B-MAX modular system. Y-shaped design provides exceptional stability and ergonomic positioning of the coaxial coarse and fine focus knobs. Heavy-duty nichrome plated steel rack and pinion coarse focus gears move the stage elevation by means of roller bearings over a 25mm range. Fine focus graduation: 1 micron (0.001mm). Stroke per rotation of fine focus: 0.1mm; stroke per rotation of coarse focus: 15mm. Adjustable focus tension control and focus stop. The notched stage mount can be detached for relocation 15mm below the standard position, accommodating a specimen height of 40mm. Mount for B-MAX series observation tube, rotatable 360 degrees. Dust-free design with RMS thread quintuple inward-facing ball-bearing nosepiece. Transmitted light Koehler illumination optics. On/off switch; internal thyristor controlled continuously variable 6V/30W DC power supply. The LED voltage display and continuously variable light intensity controls are ergonomically positioned. The built-in intensity pre-set switch is adjustable throughout the entire intensity range. Built-in outlet for powering illuminated arrow pointer of multi-viewing attachments. Built-in graduated field diaphragm; accepts optional attachable filter cassette. Circular dovetail stage mount accepts B-MAX series interchangeable stages, and permits rotation of stage about the vertical axis. Attached rack and pinion vertical substage condenser mount with left and right control knobs; 26.5mm condenser stroke and centering screws. Includes dustcover*, immersion oil, instruction manual, allen wrench and warranty card. (Requires U-LS30 6V/30W lamp socket, bulb and power cord).
5-UL103	U-LS30: Lamp Socket for 6V/30W Halogen Bulb; precentered; plugs into back of B-MAX 40 microscope stand. Built-in louvres for convection cooling. Easily removeable for bulb replacement.
8-C410	6V/30W Bulb for the B-Max 40 and IX 50 microscopes.
9-U115	LBD filter, 45mm; for daylight color temperature conversion.
Z-89031	Dust Plug for Nosepiece.
3-U123	U-BI30: Binocular Observation Tube with 30 degree eyepiece inclination, dust-free design; F.N. 22 capable; Siedentopf-type. For Olympus B-MAX microscopes, using 30mm diameter WH series eyepieces. High transmission coated prisms; antifungal treatment. Graduated interpupillary distance adjustment 50mm-76mm. Left eyepiece tube with +/- 5 diopter control.
2-U1002	WH10X-2 Eyepiece: high eyepoint, widefield, F.N. 22; 30mm diameter; with shelf for 24mm reticle.
1-UB223	PL10X: 10X Plan Achromat Objective, infinity-corrected, F.N. 22; N.A. 0.25; W.D. 10.50mm.
1-UB227	PL40X: 40X Plan Achromat Objective, infinity-corrected, F.N. 22; N.A. 0.65; W.D. 0.56mm; spring-loaded.
1-UB235	PL100XO: 100X Plan Achromat Oil Immersion Objective, infinity-corrected, F.N. 22; N.A. 1.25; W.D. 0.15mm; spring-loaded.
6-U110	U-AC: Abbe Condenser, N.A. 1.25, oil immersible. All metal body with aperture iris diaphragm graduated in numerical apertures; detachable white cover to facilitate finding area to be viewed. Covers full field-of-view with 4X - 100X standard objectives (F.N. 22) and 10X - 100X objectives (F.N. 26.5).

CATALOG NO.	PRODUCT DESCRIPTION
4-U116	U-SVLS: Rectangular Mechanical Stage with left hand low position coaxial X and Y controls and user-adjustable torque. Ultra-durable ceramic coated platform; 180mm x 135mm. Y travel 52mm, X travel 76mm. Rotatable 20 degrees clockwise, 232 degrees counterclockwise, with locking screw. X axis rack and pinion recessed into back of stage plate, leaving a solid, unbroken platform surface, unaffected by dust or other debris. Uniform ball bearing movement with vernier reading to 0.1mm. Detachable specimen holder with parallel spring tension finger.
4-U191	U-HL: Specimen Holder with curved stainless steel finger on right side allowing observation of the slide to the very edge. Holds a 2" x 3" slide or two back-to-back 1" x 3" slides.
B-0430	BX40 microscope carrying case, will hold fully assembled microscope with pockets for extra bulbs and other supplies, suitcase type with locks and keys.
UYPC-15	Power cord, 15 feet long with green dot hospital plug for 110 V.
UYCP-16	Power cord, 15 feet long with no plug to be used in location not 110 V.
Z-85017	Mirror and fork assembly, 40 mm mirror, one side flat mirror and other side concave mirror, mounts in light well to provide illumination when no power source is available.
	* Dustcover is plastic cover which is included with the microscope stand. This is placed over the microscope when not being used to protect it.
	These are the items supplied and no other equipment is required to operate the microscope. Equipment required for service is listed in table 1, Test Equipment and Tool Kit List in Medical Support Kit Lists (DI-ILSS-80865).

3. APPEARANCE



1 NOMENCLATURE

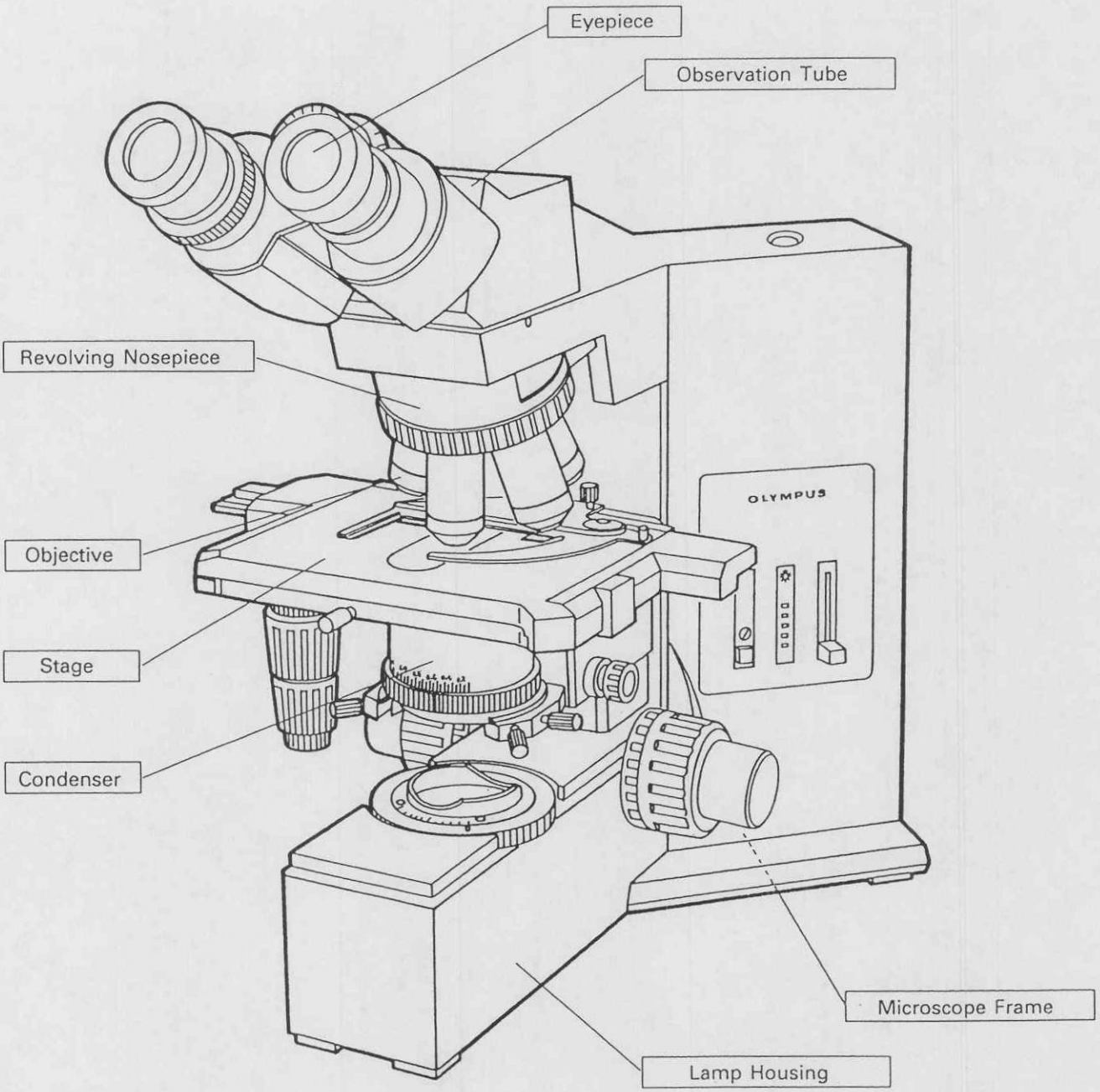


Fig. 1

2 ASSEMBLY

2-1 Assembly Diagram

The diagram below shows how to assemble the various modules. The numbers indicate the order of assembly.

★ When assembling the microscope, make sure that all parts are free of dust and dirt, and be very careful to avoid scratching any parts or touching glass surfaces.

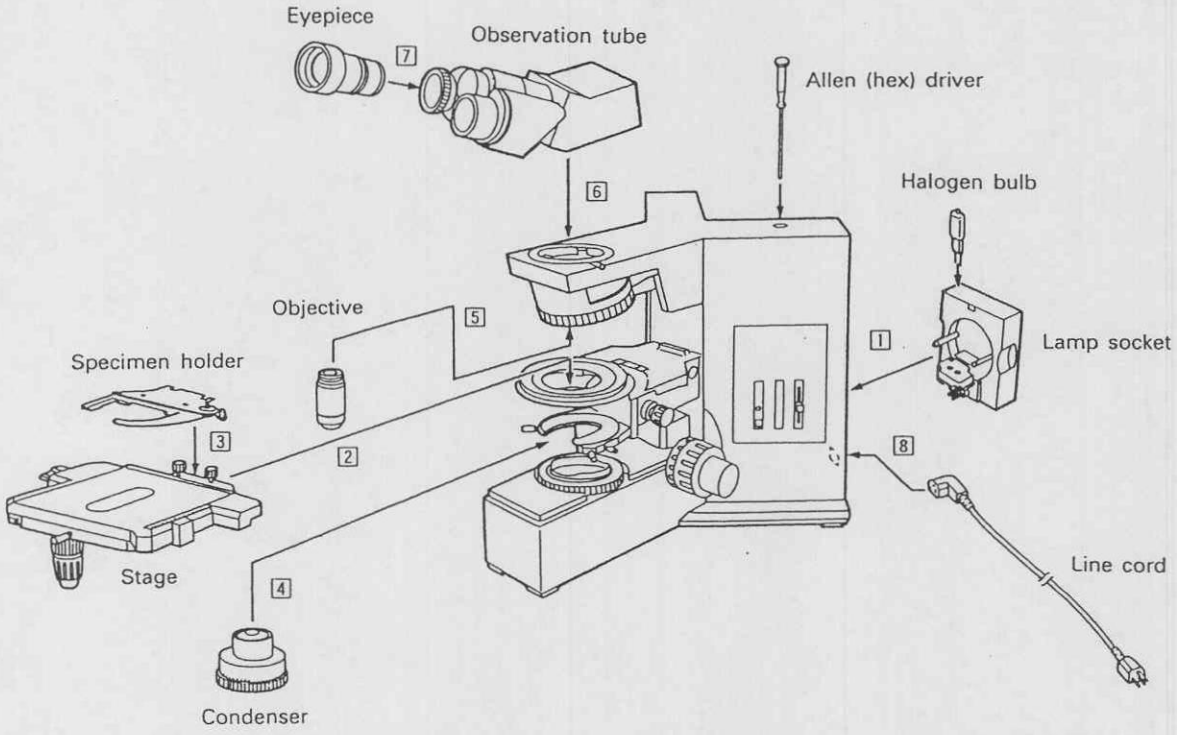


Fig. 2

7-8 Fork and Mirror Assembly

- The fork and mirror assembly is for use when a source of electricity to power the built-in illuminator is not available. A strong light source ie. sunlight, jeep headlight, bright flash light etc., reflected off the mirror is required to provide proper illumination.

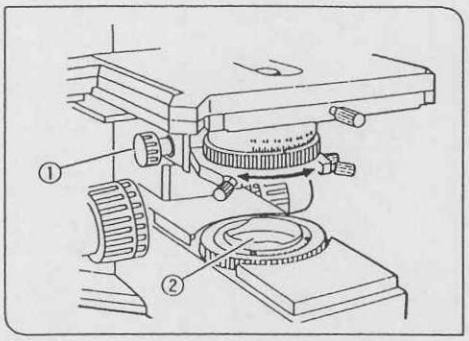


Fig. 64

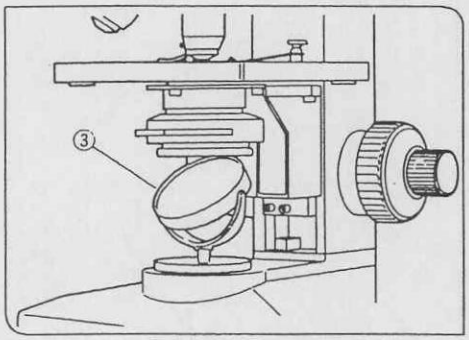


Fig. 65

1 Use of Fork and Mirror Assembly (Figs. 64, 65)

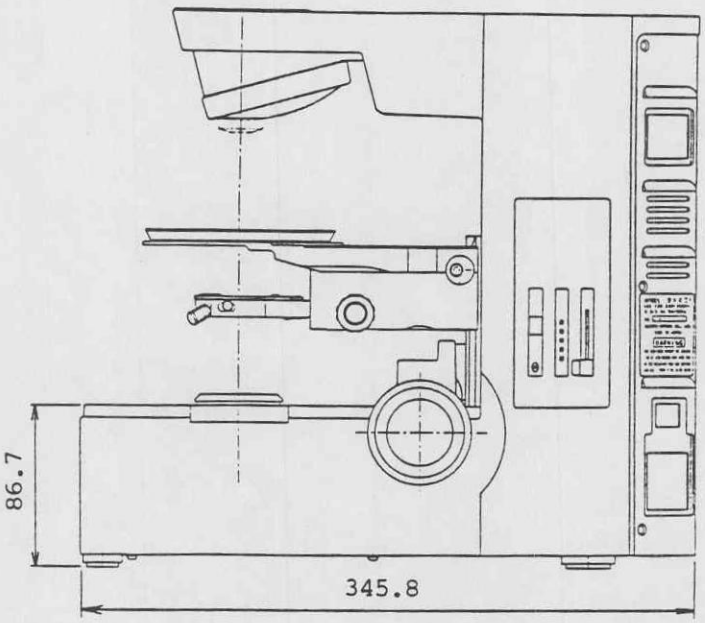
1. Raise the condenser up to its maximum height using condenser knob ① be careful not to run the stage up into the objectives.
2. Carefully insert the base of the fork and mirror assembly into the light well ② of the microscope.
3. Turn assembly ③ so that the mirror is facing front and adjust the angle to 45 degrees.
4. Shine light source onto mirror while looking through the eyepieces. The angle of the mirror may need to be adjusted to get maximum light intensity.

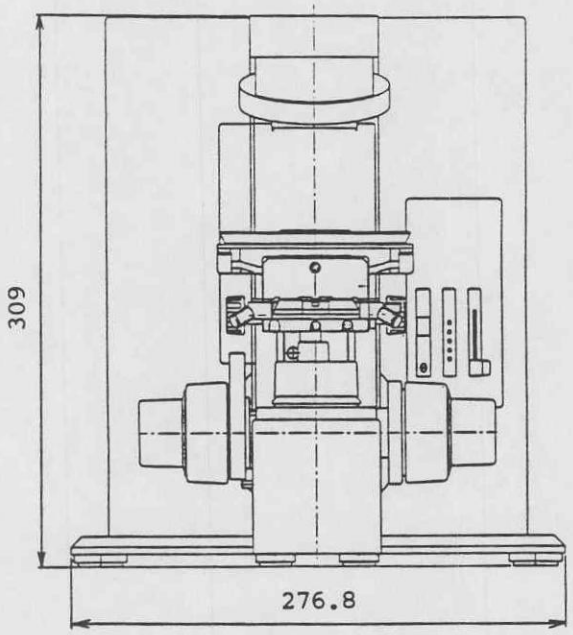
4. SPECIFICATIONS

	Item	Specification
1	Type	System microscope frame
2	Optical system	UIS optical system (Infinity/compensation-free)
3	Illumination system	Built-in transmitted Koehler illumination (Field number 26.5 = Superwide)
		6V/30W halogen bulb · Pre-centered. · Standard bulb: Philips No. 5761 (Average life: Approx. 100 hours)
		Supply voltage: 100V/200V (switchable) (6V/30W DC stabilized power transformer)
		Frequency: 50/60Hz (switching unnecessary)
		Power consumption: 80VA
		Intensity control range: 1.5 ~ 5.9V (continuous adjustment)
		ON/OFF switch, intensity control separated
		Light preset switch (Preset voltage adjustable in a range of 1.5 ~ 5.9V)
		LED power indication
		Transmitted filter cassette (optional)
		Dustproof design with the separated optical system and electronics
		Power outlet for DO/MDO (Max. 1A)
4	Focusing mechanism	Stage stroke with the roller bearing guide (rack & pinion)
		Coaxial coarse and fine adjustment knobs
		Fine focus sensitivity: 2μm (Knob reading: 1μm)
		Stroke per rotation · Fine: 0.1mm · Coarse: 15mm
		Maximum travel: 40mm (Stroke (25mm) + Stage mounting position variable (15mm))
		Coarse adjustment lock mechanism (upper limit)

	Item	Specification
		Coarse adjustment knob (with the torque adjustment mechanism)
		Torque adjustment height from fine focus to table surface: 73mm
		Automatic focusing unit attachable
5	Stage holder	Detachable from the substage and two positions spaced 15mm
		Stage connection: Circular dovetail (detachable)
		Condenser connection: Slide (detachable)
		Condenser holder stroke: 26.5mm (with left and right knobs)
		Condenser centering mechanism
6	Arm	High rigidity arm
		Revolving nosepiece fixed type (changeable by the dealer)
		Observation tube connection: Circular dovetail
		Various observation tubes mountable
7	Dimensions	276.8 mm (W) × 345.8 mm (D) × 309 mm (H)
8	Weight	Approx. 10kg

5. DIMENSIONS





Unit(mm)

6. USING CONDITIONS

- Not compatible with the BH2 except for the photomicrographic system and the condenser.
- The intermediate tube can be stacked (visual field 26.5) except for the U-TBI.

3 CONTROLS

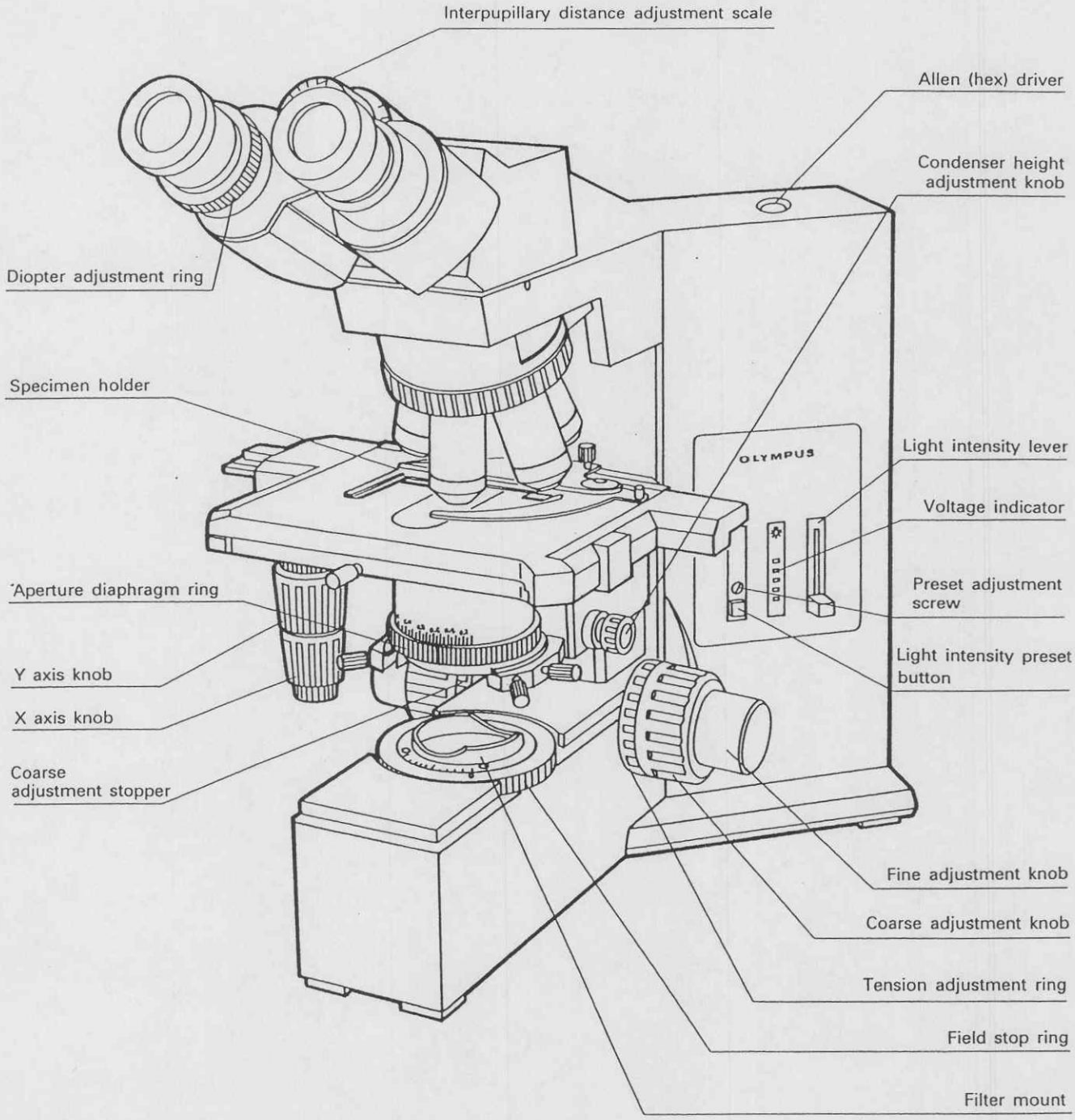


Fig. 15

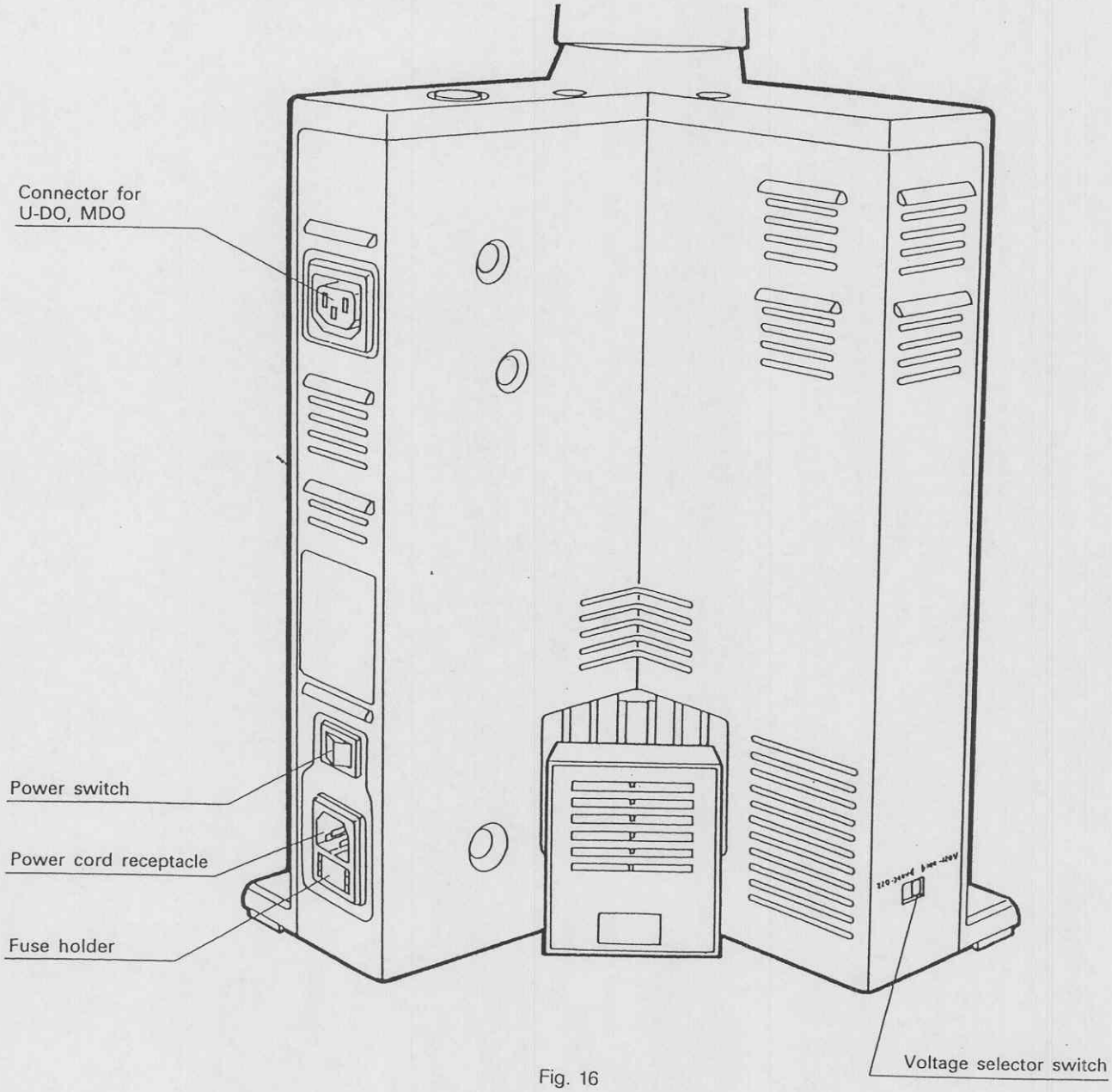

Connector for
U-DO, MDO
Power switch
Power cord receptacle
Fuse holder
Voltage selector switch

Fig. 16

30

4 SUMMARY OBSERVATION PROCEDURE

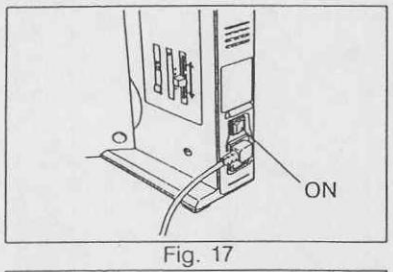


Fig. 17

1. Turn on the main switch and adjust the brightness with the light intensity lever. (When doing this, keep the light intensity preset button on.) (Page 10)

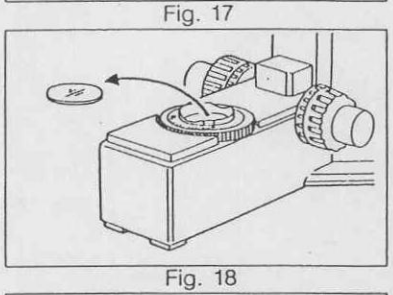


Fig. 18

2. Move all filters out of the light path. (Pages 10)

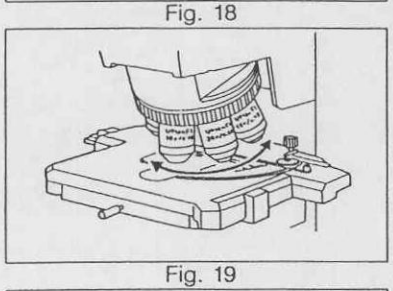


Fig. 19

3. Turn the revolving nosepiece so that the 10X objective is in the light path. Watch out for an audible click in that position.

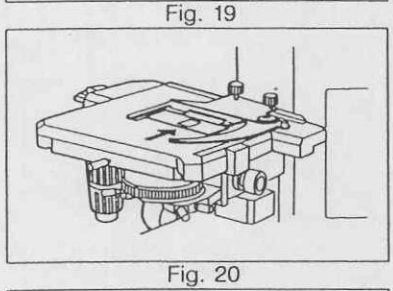


Fig. 20

4. Place a specimen on the stage. (Page 12)

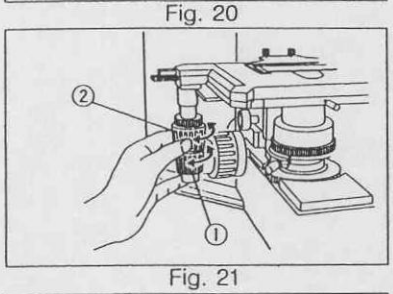


Fig. 21

5. Turn the X axis knob a and Y axis knob b to move the specimen into the light path.

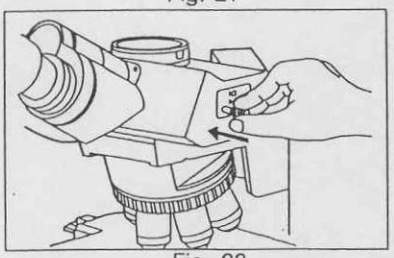


Fig. 22

[Using a trinouclar observation tube]

6. Push the observation tube's light path selector knob to "Both-100%" (the IN position). (Page 15)

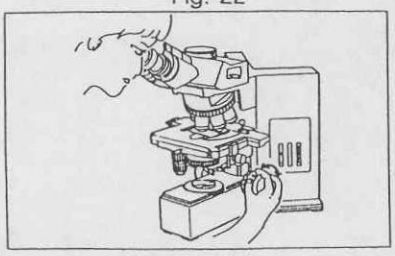


Fig. 23

7. Looking through the right eyepiece with your right eye, turn the coarse adjustment knob to bring the specimen into focus. After obtaining approximate focus, use the fine adjustment knob to make fine adjustments. (Page 18)

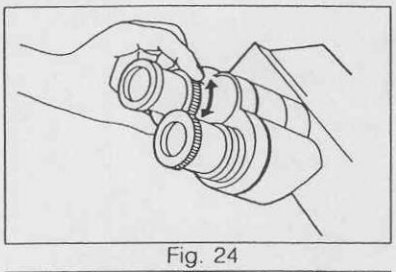


Fig. 24

8. Looking through the left eyepiece with your left eye, turn the diopter adjustment ring to focus the specimen. (Page 14)

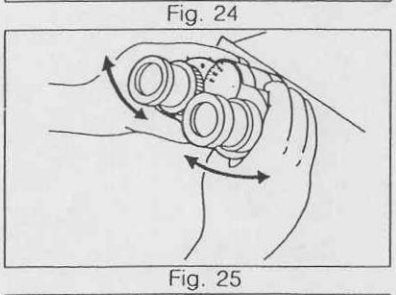


Fig. 25

9. Adjust the interpupillary distance of the eyepieces. (Page 14)

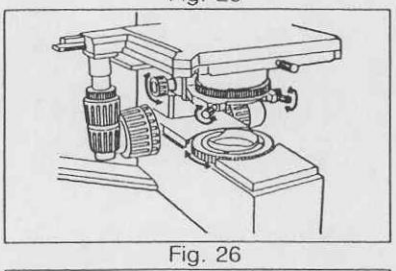


Fig. 26

10. Adjust condenser centering and focus. (Page 16)

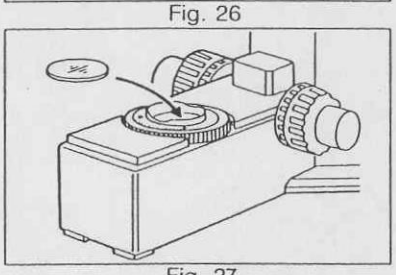


Fig. 27

11. Engage the objective to be used for observation and adjust the light intensity to the desired level, then readjust the focus.
12. Place your choice of filters into the light path. (Pages 10.11)

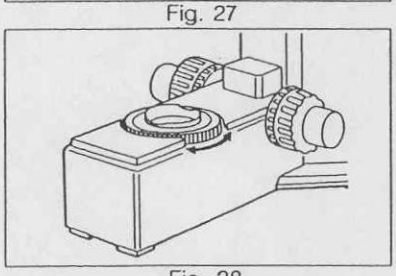


Fig. 28

13. Adjust the field iris diaphragm. (Page 16)

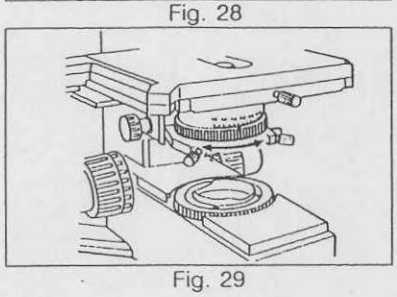


Fig. 29

14. Adjust the aperture iris diaphragm. (Page 17)

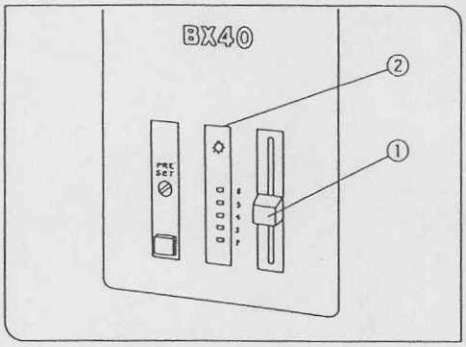


Fig. 30

1 Voltage Indicator (Fig. 30)

1. Sliding the light intensity lever a upward increases the voltage, making illumination brighter.
2. The numerals to the right of the LEDs of the voltage indicator ② indicate the voltage.

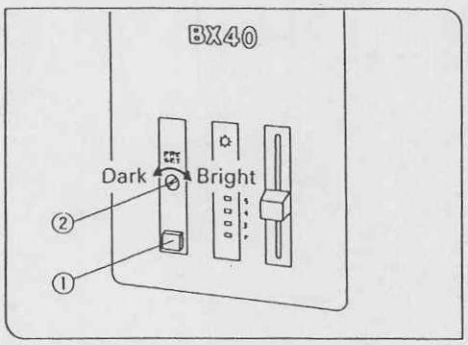


Fig. 31

2 Setting the Light Preset Button (Fig. 31)

The light preset button ① makes it possible to set the light intensity to a preselected level regardless of the position of the light intensity lever.

1. Push the light preset button ① to the ON position.
   (The face of the switch lights when the switch is ON.)
2. Using a small screwdriver, turn the preset adjustment screw to obtain the required light intensity. Turning the screw clockwise increases intensity.
3. Switch the light preset button OFF and brightness returns to the level set by the light intensity lever.
   ★ The light intensity lever does not affect brightness while the light preset button is ON.

Using the Light Preset Button

The light preset button allows you to temporarily adjust brightness to a preset level for applications such as photomicrography, making it unnecessary to manually adjust the brightness each time you take a photograph.

- Before shipment from the factory, the preset level is set to an intensity that is suitable for photomicrography.
- The light preset button is also useful when using two different objectives alternatingly, allowing you to avoid manually adjusting the brightness each time you change magnifications.

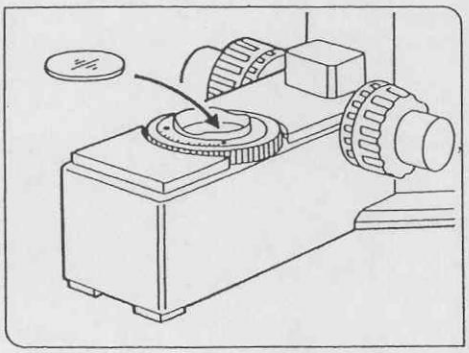


Fig. 32

3 Use of Accessory Filters (Fig. 32)

You can place to two 45 mm diameter filters into the filter holder on the light exit at the base of the microscope. If you need to use more than two filters at once, use a filter cassette.

★ When using a filter cassette, you can additionally use a single filter with a thickness of less than 3 mm over the light exit glass.

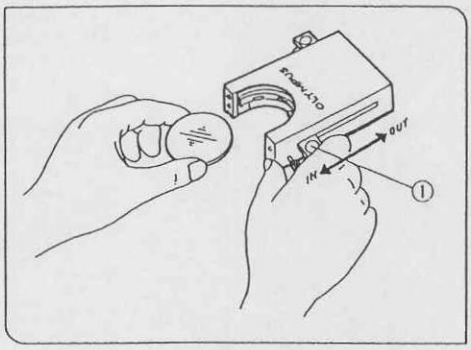


Fig. 33

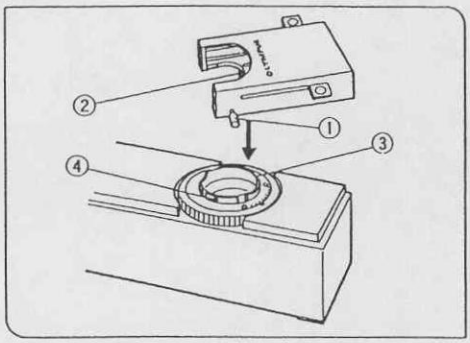


Fig. 34

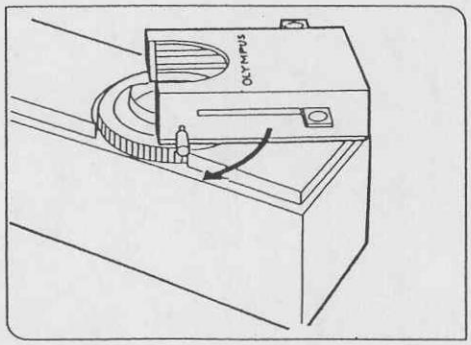


Fig. 35

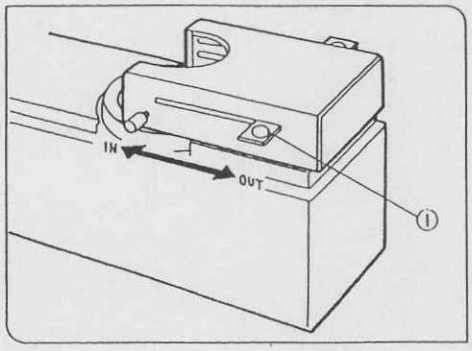


Fig. 36

Using the Filter Cassette (option) (Figs. 33, 34, 35, 36)

If you need to place 3 or more filters over the light exit window, use the filter cassette.

Loading Filters Into the Filter Cassette (Fig. 33)

The filter cassette has two filter levers on the right side and one on the left side.
The filter cassette accommodates filters with a diameter of 45 mm and a thickness of 2.7 mm or less.

1. Move all filter levers to the OUT position except for the one belonging to the slot into which the filter is to be inserted.
2. Slide lever a to the IN position. Make sure that it clicks securely into place.
3. Holding the lever in the position shown, put the filter into the cassette by inserting it in the direction indicated by the arrow.
4. Place the other two filters in the same manner.

Mounting the Filter Cassette (Figs. 34, 35)

1. Loosen the filter cassette clamping screw ①. (Fig. 39)
2. Holding the filter cassette above the light exit glass, align the key ② with the slot ③ and press the filter cassette into place from above.
3. Rotate the filter cassette to align its sides with the base. (Fig. 40)
4. Align the clamping screw ① with the positioning hole ④ on the light exit, then tighten the screw to fasten the filter cassette.
   ★ When the filter cassette is installed, the stage may hit it when lowered. Therefore, exercise caution when lowering the stage with the filter cassette installed.

Using the Filter Cassette (Fig. 36)

Usable filters	Applications	
45LBD-IF	Color balancing filter	
45ND-6, 45ND-25	Neutral density filter	
45G-530, 45G-533, 45IF550	Green	B7W contrast filter
45Y-48	Yellow	
45O-560	Orange	
45C-3, 45KB-3	Daylight filter	

Table 1

Up to three of the above filters can be inserted into the filter cassette. Moving the levers ① on the left and right sides of the cassette to the IN position moves the corresponding filter into the light path.

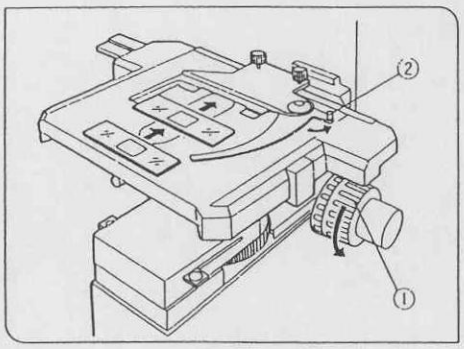


Fig. 37

1 Placing of Specimen Slides

Specimen Holder for 2 Specimen Slides (Fig. 37)

1. Raise the stage by turning the coarse adjustment knob ①.
2. Open the lever ② on the specimen clamp and slide the specimen slides on to the stage from the front.
3. After sliding the slides in as far as they will go, gently close the lock lever.

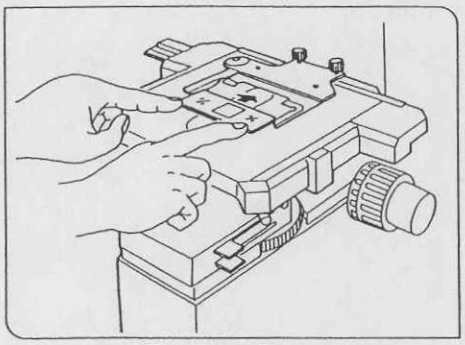


Fig. 38

Specimen Holder for Single Slides (Figs. 38, 39)

The specimen can easily be placed by sliding it into the specimen holder from the front. (Fig. 38)

★ With single slide observations, the maximum slide dimensions are 26 X 76 mm, with a thickness of 0.9 to 1.2 mm and cover glass thickness of 0.17 mm.

★ When observing large specimens slides, remove the specimen holder and move the slide by hand.

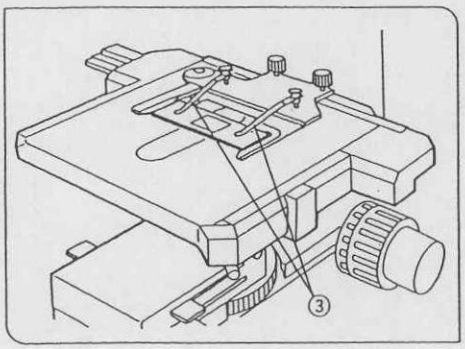


Fig. 39

Using an Oil Immersion Objective

Adsorption of immersion oil can cause the specimen to float. In such cases, it is recommended to use the optional specimen clip (BH2-SCB-3) for oil immersion objectives ③. (Fig. 44)

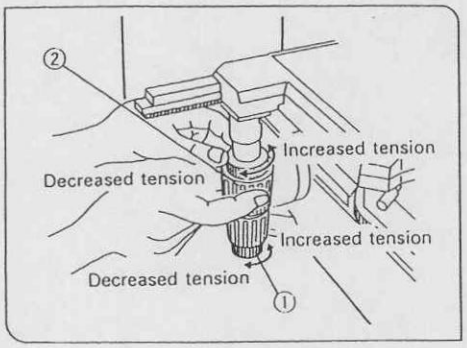


Fig. 40

2 Adjust the Tension of the X and Y Axes Knobs (Fig. 40)

The tension of the X and Y axes knobs can be individually adjusted. Turning the X adjustment knob ① or the Y adjustment knob ② in the direction of the arrow increases tension, and turning it in the opposite direction reduces tension.

When adjusting the tension, hold the X and Y axes knobs to keep them from turning along with the tension adjustment knobs.

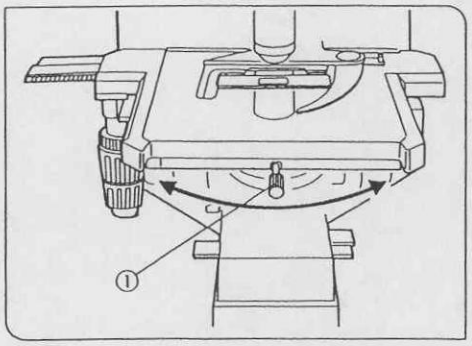


Fig. 41

3 Rotating the Stage (Fig. 41)

1. Slightly loosen the stage clamping screw ①.
2. The stage can be rotated by turning it with the stage clamping screw.
   • The rotation angle changes depending on position of the stage knobs.

	Rotation angle	
	Clockwise	Counter-clockwise
Right hand knobs	230°	20°
Left hand knobs	20°	230°

Table 2

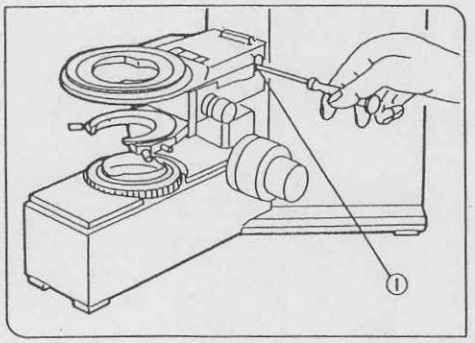


Fig. 42

4 Stage Height Adjustment (Figs. 42-43)

By lowering the stage height, the microscope will accommodate specimens with height up to 40 mm. This is useful when observing metallurgical specimens and other thick objects.

1. Lower the stage to the lower limit, then remove the stage from the microscope. (See page 43)
2. Loosen the stage bracket clamping screw ① and remove the stage bracket. (Fig. 42)
3. Turn the coarse adjustment knob and raise the focusing block ③ to where the stopper screw ② in the arm becomes visible. (Fig. 43)
4. Using the Allen wrench, loosen and remove the upper stopper screw ②.
5. Reattach stage bracket and stage.
   Store the removed stopper screw ② in a safe place so that you do not lose it.

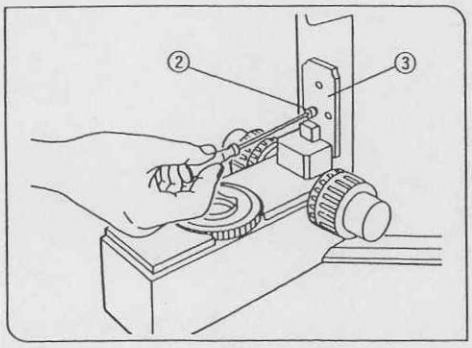


Fig. 43

5. Observation Tube

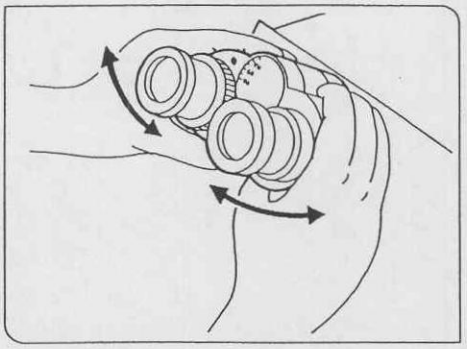


Fig. 44

1 Interpupillary Distance Adjustment (Fig. 44)

While looking through the eyepieces, adjust the binocular movement to where the left and right view fields are the same. The index dot o indicates the interpupillary distance.
Note your interpupillary distance so that it can be quickly duplicated.

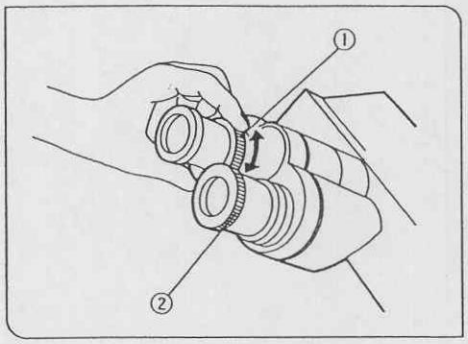


Fig. 45

2 Diopter Adjustment (Figs. 45, 46)

1 Looking through the right eyepiece with your right eye, focus on the specimen using the coarse and fine adjustment knobs.
2. Looking through the left eyepiece with your left eye, turn the diopter adjustment ring ① to where the specimen is in focus. (Fig. 45)

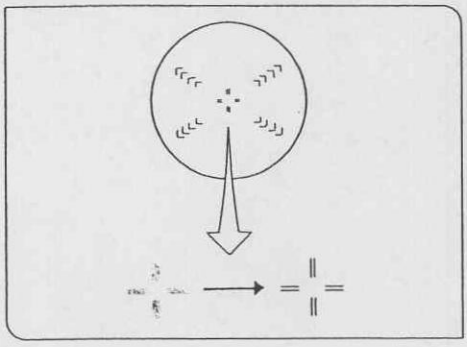


Fig. 46

Using a Finder Eyepiece

1. Looking through the right eyepiece with your right eye, turn the knurled ring on top of the eyepiece until you see two distinct sets of recticles in the field of view. (Figs. 45, 46)
2. Looking through the right eyepiece, turn the coarse adjustment knob to focus on the specimen and recticles.
3. Looking through the left eyepiece with your left eye, turn the diopter adjustment ring ① using a finder eyepiece

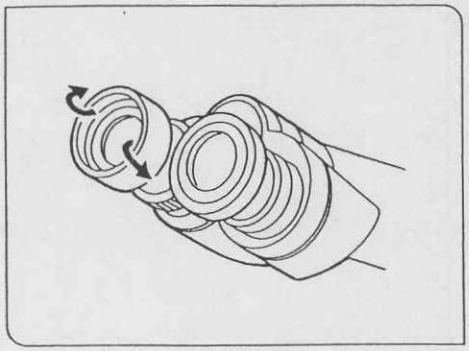


Fig. 47

3 Using the Eye Shades (Fig. 47)

When not Wearing Eyeglasses

Holding the diopter adjustment ring to keep it from turning, turn the eyepiece itself to fit its inclination to the contour of your face.

When Wearing Eyeglasses

Fold the eye shade outward with both hands. (Fig. 47)

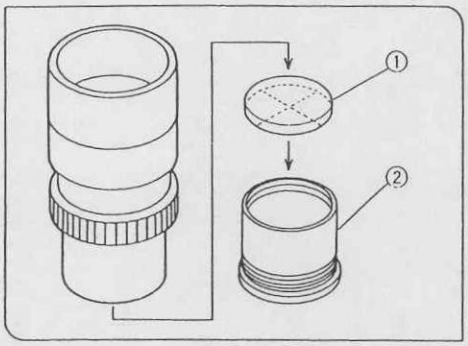


Fig. 48

4 Use of Eyepiece Micrometers (Fig. 48)

Eyepiece micrometers can be inserted on WH10X-H and WH10X eyepieces.

Following Fig. 48, unscrew the micrometer frame ② from the eyepiece, place a micrometer ① into the frame. Screw the micrometer frame into the eyepiece as it was before. (Please use ϕ24 X 1 mm micrometers.)

★ The micrometer is inscribed on one side of the glass and must be placed with the inscribed side facing the frame ②.

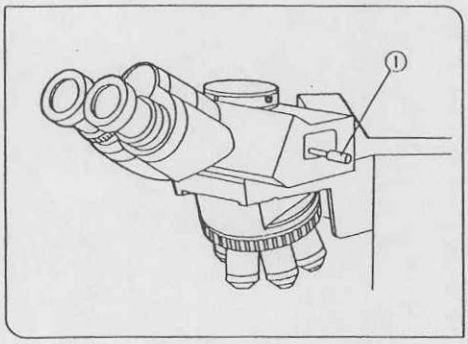
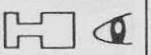
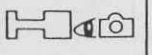
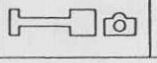


Fig. 49

5 Light Path Selection (U-TR30, U-SWTR) (Fig. 49)

Slide the light path selector knob ① to select the desired light path. The selector knob is ordinarily set at the middle position. With dark specimens, push the knob in. If additional light is needed for television or photomicrography, pull the knob out.

Light path selector knob	Indication	Intensity ratio	Application
Pushed in		100% at binocular eyepieces	Observation of dark specimens
Middle position		20% at binocular eyepieces, 80% for TV/photography	Observation of bright specimens, photography, TV observation
Pulled out		100% for TV/photography	Photography, TV observations

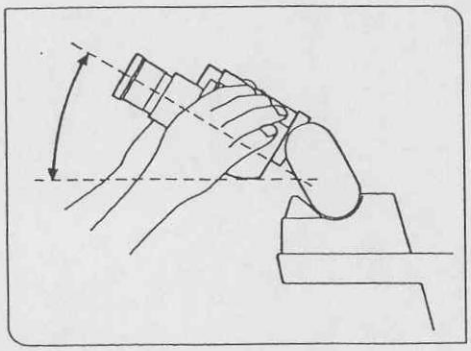


Fig. 50

6 Tilt Adjustment (U-TBI) (Fig. 50)

Adjust the height and tilt of the observation tube to the most comfortable viewing position.

Holding the binocular assembly with both hands, raise or lower it to the desired position.

★ Do not attempt to force the binocular assembly past the upper or lower stop positions. Applying excessive force could destroy the mechanism.

★ The U-TBI tilting observation tube can not be used in combination with various intermediate tubes because of vignetting in the peripheral field of view.

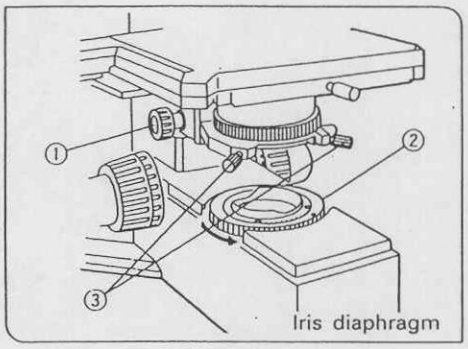


Fig. 51

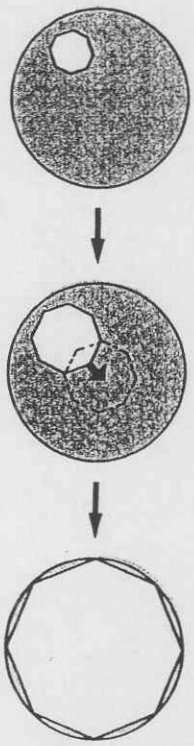


Fig. 52

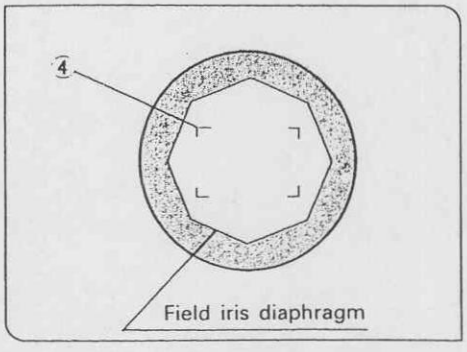


Fig. 53

1 Condenser Centration (Fig. 51, 52, 53, 54, 55)

1. Turn the condenser height adjustment knob ① and raise the condenser to its upper limit. (Fig. 34)
2. Focus on the specimen using the 10X objective.
   ★ When using the U-SC swing-out condenser, move the front lens into the light path.
3. Rotate the field iris diaphragm ring ② in the direction of the arrow to reduce the aperture.
4. Turn the condenser height adjustment knob ① to where the image of the iris diaphragm is visible in sharp focus.
5. Turn the two condenser centering screws ③ to move the image of the field iris diaphragm to the center of the field of view.
6. Gradually open the field iris diaphragm. The condenser is properly centered if the iris image is centered and inscribed in the field of view..
7. During actual use, increase the field stop slightly so that its image is just outside the field of view.

Field Iris Diaphragm (Fig. 53)

The field iris diaphragm restricts the diameter of the beam of light entering the condenser and thus excludes extraneous light, improving image contrast. The diameter of the field iris should be adjusted for objective power to the extent that it lies just outside the field of view. (See "Compatibility of objectives and condensers" on the next page.) When photographing specimens, stop the field stop down to where it is somewhat larger than the firm format ④ to obtain even better results.

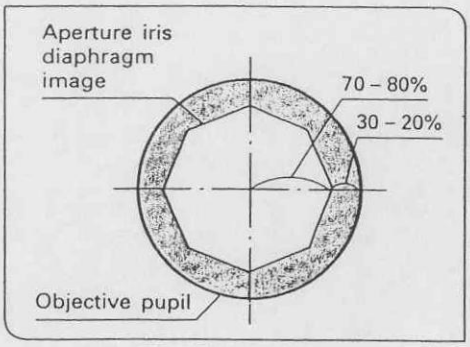


Fig. 54

Aperture Iris Diaphragm (Figs. 54, 55)

- The aperture iris diaphragm determines the numerical aperture of the illumination system. Matching the numerical aperture of the illumination system with that of the objective provides better image resolution and contrast, and also increases the depth of focus.
- Since the contrast of microscopic specimens is ordinarily low, setting the condenser aperture iris diaphragm to 70~80% of the N.A. of the objective in use is usually recommended. When necessary, adjust this ratio by removing the eyepiece and peeking into the eyepiece sleeve to see the image shown in Fig. 54.

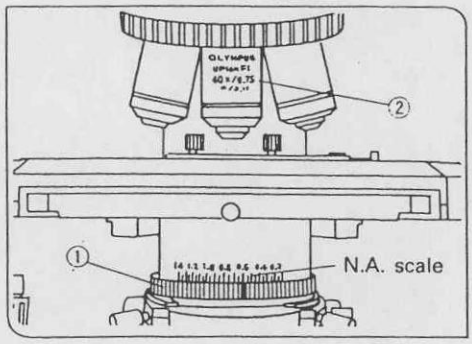


Fig. 55

Using the Numerical Aperture Scale

Set the condenser numerical aperture to about 80% of the NA value ② indicated on the objective. (Fig. 55)

Example: With the Plan 40X (NA 0.65), set the scale to 0.65 x 0.8 = 0.5.

Compatibility of Objectives and Condensers

Objective magnification	Condenser: Achromat U-AC	Achromat/aplanat U-AAC	Swing-out achromat U-SC	Ultra low magnification U-ULC
1.25X	Usable to FN22	Usable	Usable by moving front element out of the light path*2	Usable
2X				
4X				
10~60X	Usable	Usable	Front element in light path	
100X			NA not fully adequate*1	

*1 When using the U-SC swing-out achromat condenser together with the 2X or 4X objective, fully open the condenser aperture and use the field iris diaphragm in the base as aperture diaphram.

*2 Although slightly inadequate NA results in a somewhat darker field of view with a 100X objective, the combination is usable.

- To obtain better illumination, use of the U-ULC is recommended in photomicrography when using the 2X or 4X objective.

Table 4

5-5 Adjustment Knob

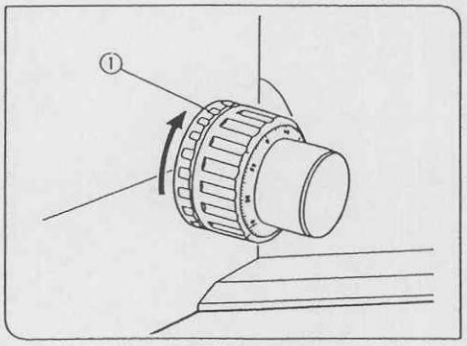


Fig. 56

1 Adjusting the Coarse Adjustment Knob Tension (Fig. 56)

Adjust the coarse adjustment knob tension using the tension adjustment ring.

The coarse adjustment knob tension is preadjusted for easy use. However, if desired you can change the tension using the tension adjustment ring ①. Turning the ring in the direction of the arrow increases tension, and vice versa.

The tension is too low if the stage drops by itself or focus is quickly lost after adjustment with the fine adjustment knob. In this case, turn the ring in the direction of the arrow to increase tension.

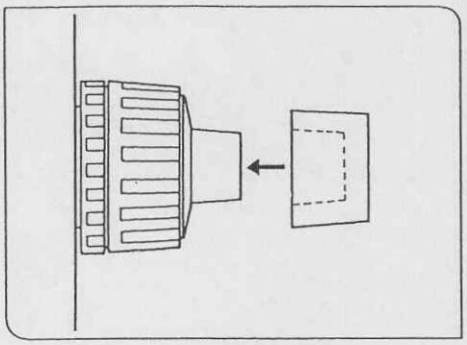


Fig. 57

2 Using the Fine Adjustment Knob Rubber Cap (Fig. 57)

Ordinarily, the fine adjustment knob is used with the rubber cap attached. However, if space between the knob and the stage knobs is insufficient, the cap may be removed. The cap makes it easier to turn the fine adjustment knob, allowing more accurate focus.

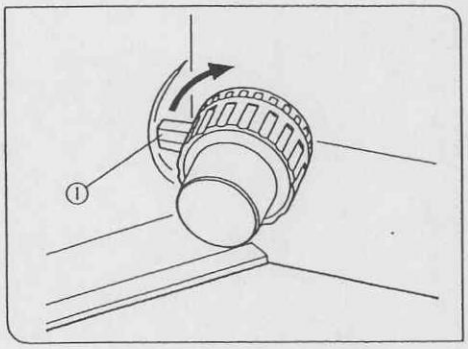


Fig. 58

3 Coarse Adjustment Stopper (Fig. 58)

The coarse adjustment stopper serves to keep the objective from bumping into the specimen and to simplify focusing. After focusing on the specimen with the coarse adjustment knob, turn this lever ① in the direction of the arrow to set an upper limit on the coarse adjustment movement. After changing specimens, refocussing is easily accomplished by turning the coarse adjustment knob to the stopper position, then making fine adjustments with the find adjustment knob.

Stage movement with the fine adjustment knob is not affected by this stopper.

5-6 Immersion Objectives

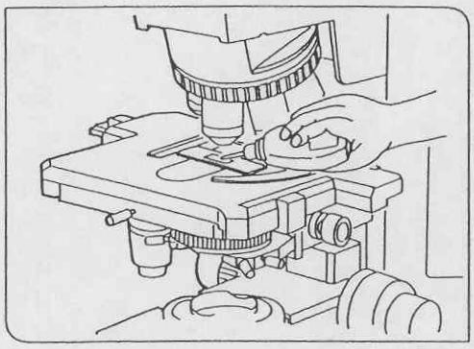


Fig. 59

1 Use of Immersion Objectives (Fig. 59)

1. Focus on the specimen with a low power objective.
2. Place a drop of immersion oil (provided) onto the specimen at the portion to be observed.
3. Turn the revolving nosepiece to move the oil immersion lens into the light path, then focus using the fine adjustment knob.
   If the condenser marking shows a numerical aperture (NA) of 1.0 or more, the number applies only when oil is present between the slide glass and the top element of the condenser. When oil is not present, the NA is about 0.9.
   ★ Since any bubbles in the oil will impair the image, make sure that the oil is free of bubbles.
   a. To check for bubbles, remove the eyepiece and fully open field and aperture iris diaphragm, then look at the exit pupil of the objective inside the observation tube. (It should appear round and bright.)
   b. To remove bubbles, rock the nosepiece slightly to move the oil immersion objective back and forth a few times.
4. After use, remove oil from the objective front lens by wiping it carefully with gauze dampened with a very small quantity of 7 parts ether: 3 parts alcohol solution, or with Xylol.
   ★ Using too much Xylol can dissolve the lens adhesive.

5-7 Photomicrography

• Use a trinocular observation tube (U-TR30) for taking photomicrographs.
Photomicrograph can be performed using either the PM-10, the PM-20, or the PM-30 photomicrographic system. Procedures for using the photomicrographic unit are described in respective instruction manual. Procedures specific to this microscope are given below.

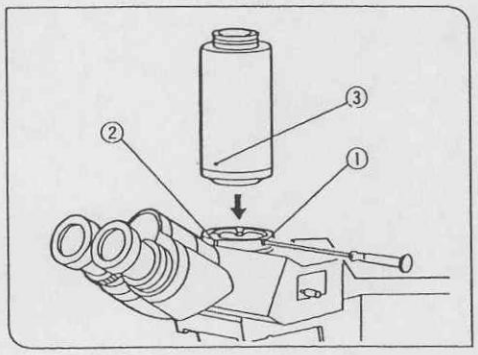


Fig. 60

1 Single Port Tube Attachment (U-SPT) (Fig. 60)

1. Using the Allen wrench, loosen the clamping screw ① on the trinocular lens photo tube.
2. Align the vertical index line ② with the index dot ③ on the single port tube, then insert the single port tube into the photo tube.
3. Securely tighten the clamping screw ①.

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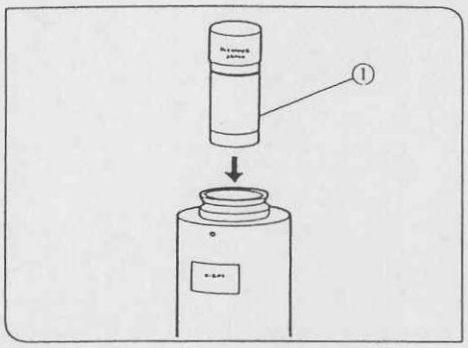


Fig. 61

2 Photo Eye piece (Fig. 61)

Use the PE photo eyepiece for photomicrography. Insert photo eyepiece ① into the dinhlr port tube on the trinocular observation tube.

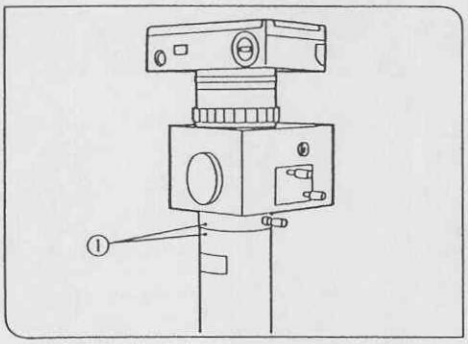


Fig. 62

3 Mountjng the Photographic Unit (Fig. 62)

Place the photographic unit directly over the circular dovetail of the trinocular observation tube. Make sure that the index dots ① on the observation tube and the unit are aligned, then clamp the unit.

4 Setting the Observation Tube Light Path

See page 15 of the "Observation Tube" section.

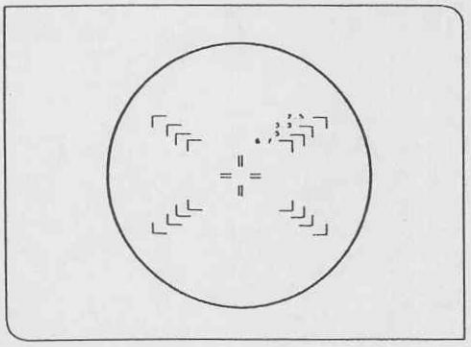


Fig. 63

5 Focus Adjustment (Fig. 63)

1. Focusing is done using the binocular eyepiece part of the trinocular observation tube.
   ★ Whenever you remove the viewer from the photographic unit, be sure to install the cap.
2. Insert a finder eyepiece into the right eyepiece sleeve.
3. The finder eyepiece has a built-in focusing lens with four masks, and the focus is practically the same for the focusing lens and the camera film plane. The masks indicate the areas covered, and the numerals next to the masks correspond to the magnification of the photo eyepiece. Different finder eyepieces are available for different cameras. Select the type that is appropriate for the camera being used.
4. Because of the great depth of focus of 1X to 4X objectives, use of the illuminated focusing telescope (U-FT) is recommended for accurate focusing.
   • Focusing is easier using the focusing telescope of the camera unit than using the finder eyepiece.

5-8 Fork and Mirror Assembly

- The fork and mirror assembly is for use when a source of electricity to power the built-in illuminator is not available. A strong light source ie. sunlight, jeep headlight, bright flash light etc., reflected off the mirror is required to provide proper illumination.

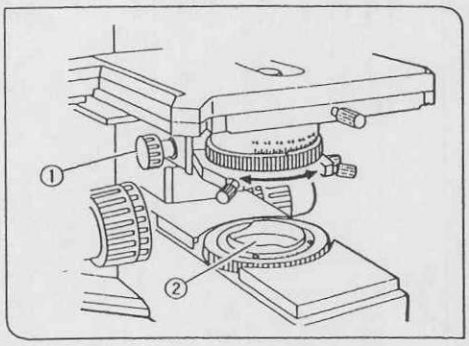


Fig. 64

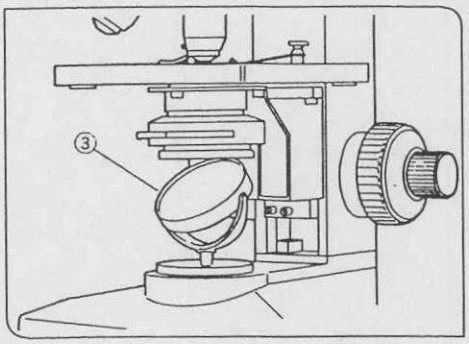


Fig. 65

1 Use of Fork and Mirror Assembly (Figs. 64, 65)

1. Raise the condenser up to its maximum height using condenser knob ① be careful not to run the stage up into the objectives.
2. Carefully insert the base of the fork and mirror assembly into the light well ② of the microscope.
3. Turn assembly ③ so that the mirror is facing front and adjust the angle to 45 degrees.
4. Shine light source onto mirror while looking through the eyepieces. The angle of the mirror may need to be adjusted to get maximum light intensity.

STORAGE INFORMATION

1. Microscopes should be stored indoors in their cases at all times.

2. Operating and storage environments should be maintained at temperatures between 0-40 degrees Centigrade and humidity of 30-90%. Failure to do so may lead to microscope malfunction.

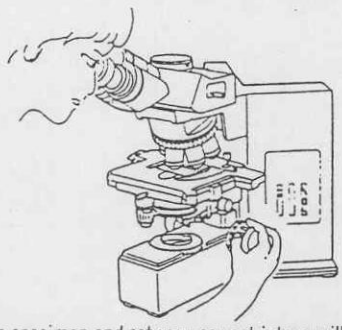
3. Microscopes are delicate instruments and should be stored and moved carefully.

4. As long as microscopes are stored in carrying cases in above environmental conditions, there is no inspection or preventative maintenance required.

OLYMPUS B-MAX MICROSCOPE
GUIDE TO CLEANING AND ADJUSTMENT

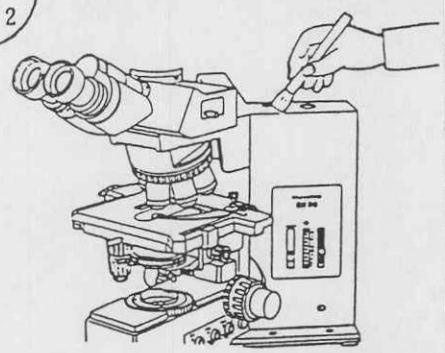
CLEANING THE MICROSCOPE STAND AND COMPONENTS

1



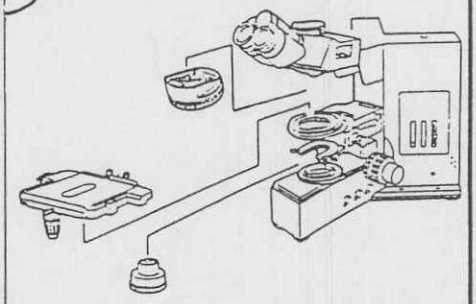
Mount a specimen and set your correct interpupillary distance. At the same time, check any areas suggesting a need for mechanical and/or optical maintenance.

2



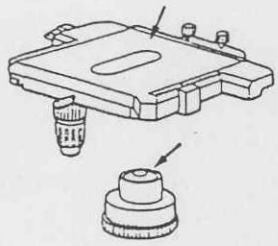
Softly brush clean all mechanical parts of the microscope.

3



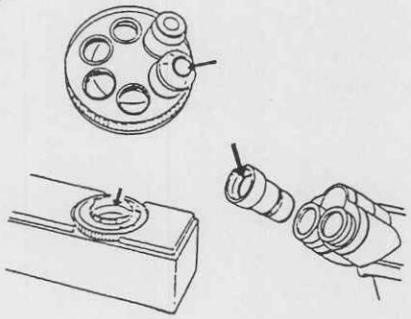
Remove the stage and condenser (and also, on the B-Max 50, the revolving nosepiece) from the microscope stand.

4



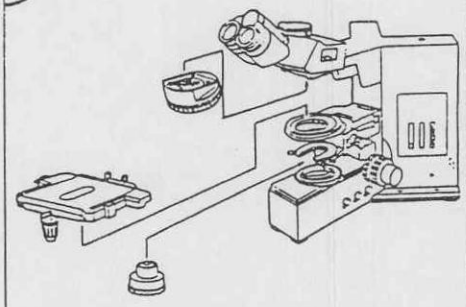
Clean any visible dirt spots with alcohol. Do not use ether/alcohol mixture, which can cause damage.

5



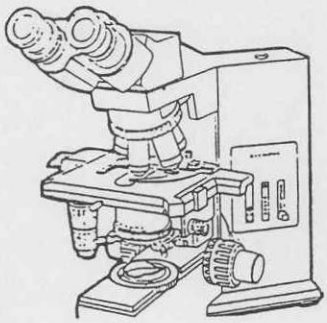
Clean all exposed optics.

6



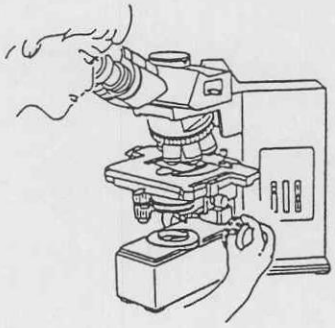
Replace all removed units onto the microscope stand.

7



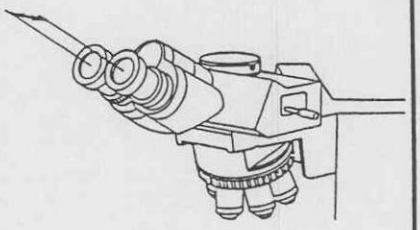
Polish all plastic components with soft gauze.

8



Do a final check of the microscope image, by observing a specimen.

9

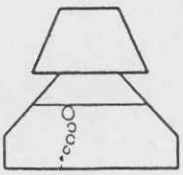


Reset the interpupillary distance to its original condition.

10

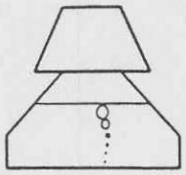
Cleaning Materials

Lens tissue



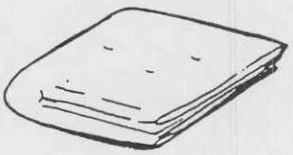
Ethyl Alcohol

—or—



70:30 Ether-Alcohol Mixture

Cotton swabs (Q-tips)



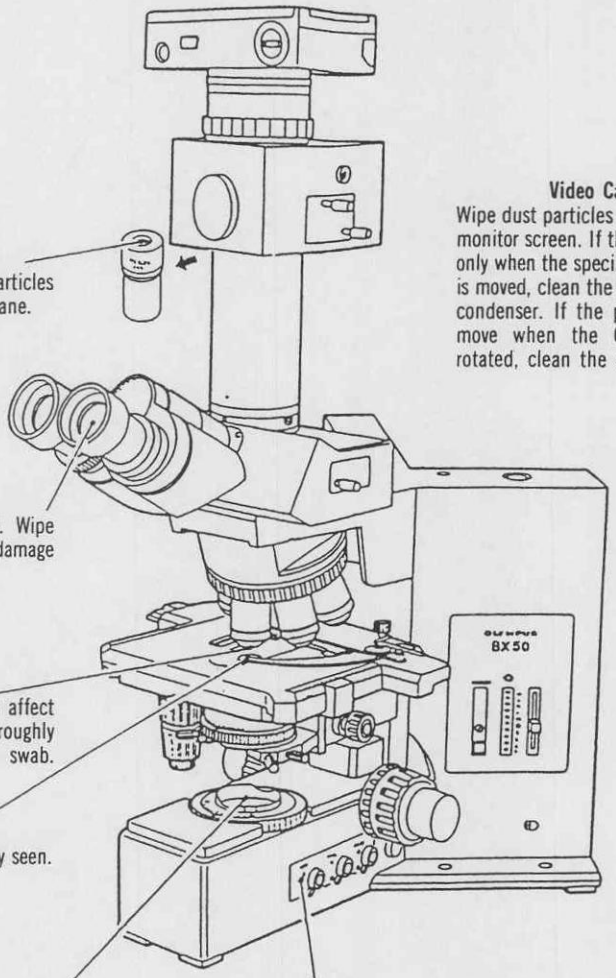
Soft Gauze

OLYMPUS

40

CLEANING FOR BETTER OBSERVATION AND PHOTOMICROGRAPHY

Microscope components get dirty with time. Dirt and dust particles on the optical components are especially damaging to image quality. When photographing important specimens which cannot be rephotographed, visible dust particles on the picture can be most frustrating. Therefore, we suggest the following critical microscope components be kept clean and dust-free.



Photoeyepiece
Remove and clean, since dust particles will be focused on the film plane.

Eyepieces
Eyepieces get dirty frequently. Wipe carefully and gently so as not to damage the lens coating.

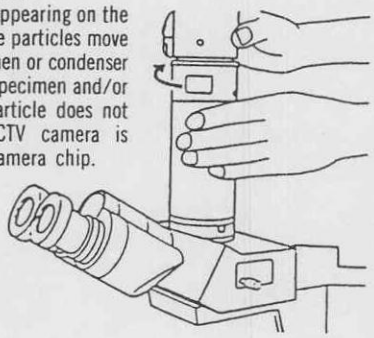
Objectives
Dirt and dust particles directly affect the microscope image. Wipe thoroughly and carefully with a cotton swab.

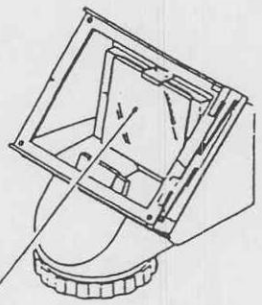
Condenser
Dirt and dust particles are easily seen. Always dust and wipe clean.

Filter and Light Exit Window
Dust and dirt particles here have minimal effect on the image. However, the overall appearance requires frequent cleaning. Wipe evenly since this is a wide surface area.

Built-in Filters
Difficult to clean. Please consult your Authorized Olympus Microscope Dealer.

Video Camera
Wipe dust particles appearing on the monitor screen. If the particles move only when the specimen or condenser is moved, clean the specimen and/or condenser. If the particle does not move when the CCTV camera is rotated, clean the camera chip.

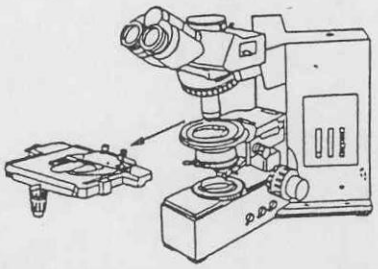




Mirror for Large Format Attachment
Dust and dirt particles here affect pictures. Difficult to clean without damaging the mirror surface, we advise you to contact your Authorized Olympus Microscope Dealer.

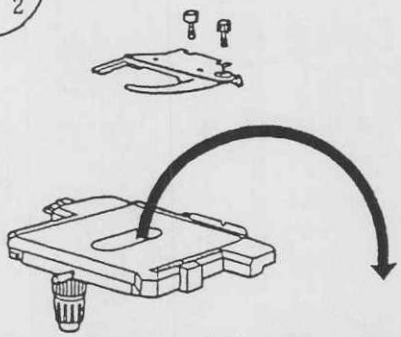
EXCHANGING THE STAGE

1



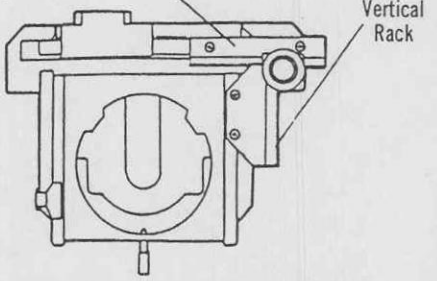
For stage rack replacement, remove the stage from the stand.

2



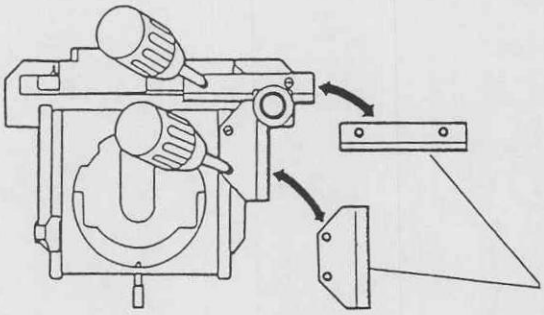
Remove the specimen holder and turn the stage upside down.

3



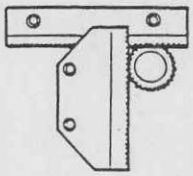
Before disassembly, rotate the stage movement knob(s) to understand the construction and movement of the rack.

4



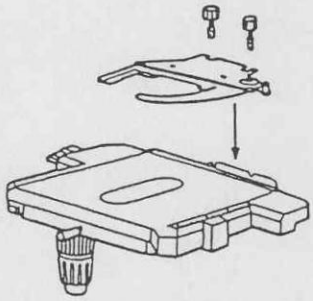
Replace the racks. In order to properly align the gear teeth, do not fully tighten the screws.

5

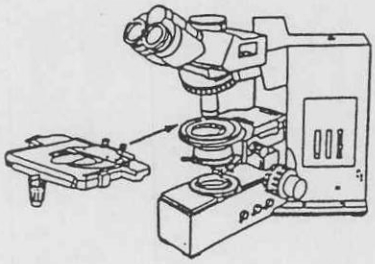


Properly mesh the teeth of the racks and gear (see details on the following page).

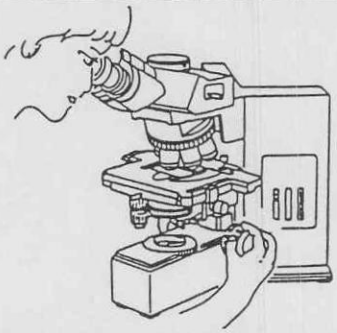
6 Reattach the specimen holder to the stage.



7 Attach the stage to the microscope stand.



8

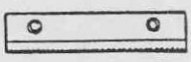


To check that the rack adjustment is complete. observe a specimen with 100x objective. The adjustment is complete if the specimen can be positioned smoothly, without play in the rack movement.

Required items:

• Screw Driver

• Vertical Rack



• Horizontal Rack

• Screws

CLEANING THE OPTICAL SYSTEM

Although cleaning the objectives and eyepieces is relatively easy, here are some procedures and simple techniques to protect the lens coating and assure optimal performance.

Required tools:

• Lens Tissue • Cotton swabs (Q-tips) • Blower • Magnifier • Cleaning Solution: 7 parts of ether and 3 parts of ethyl alcohol. The mixture ratio depends on room temperature and humidity. When the humidity is high, the ratio can be changed to 8 parts of ether and 2 parts of ethyl alcohol.

Caution:

Lightly brush the lens surfaces or blow with the blower before wiping with tissue. This removes particles that may scratch the lens surface.

HOW TO CLEAN OBJECTIVE LENSES

1

Wet the tip of a cotton swab with a generous amount of lens cleaning solution.

2

With a circular motion, wipe the front lens surface with the cotton swab, to thoroughly remove any oil or dirt from the lens.

3

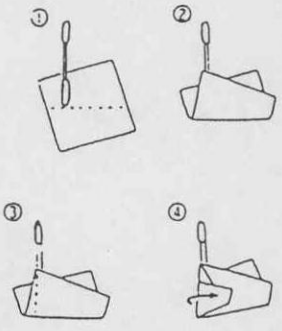
Dip a new cotton swab in the cleaning solution and shake vigorously to remove any excess solution.

4

Wipe the objective front lens from the center towards the periphery, while rotating the lens.

HOW TO CLEAN THE EYEPIECES

1

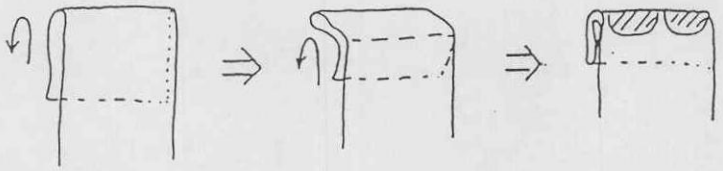


Wrap a sheet of lens tissue around a cotton swab as illustrated. If the area to be cleaned is large, wrap the lens tissue looser and thicker. Otherwise, make a thin, tight wrap.

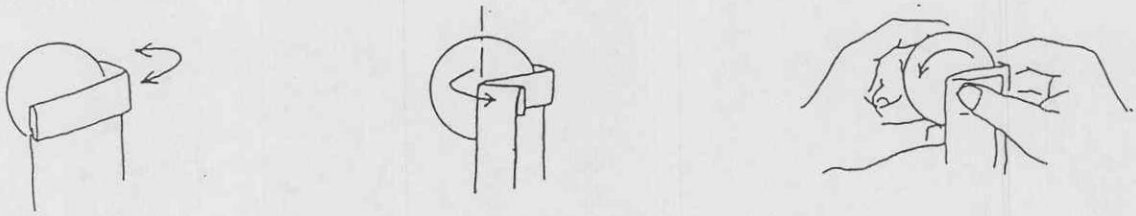
2

Dip the wrapped lens tissue in the cleaning solution, and wipe the eyepieces from the center towards the periphery in a circular motion.

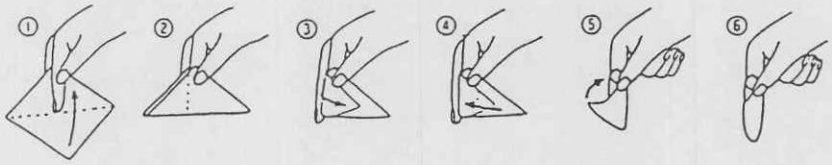
HOW TO CLEAN FILTERS



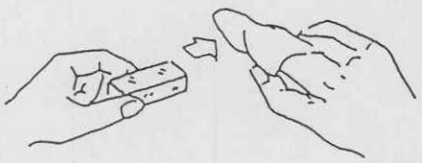
Fold the lens tissue into two or three layers and soak it with cleaning solution as illustrated. Hold the filter at its edge, and wipe as you slowly rotate it.



HOW TO CLEAN THE PRISM



Hold a piece of lens tissue between your middle and index fingers, then fold and wrap it around your index finger. Hold the tissue down with your thumb and soak it with sufficient cleaning solution. Then wipe the prism surfaces clean, applying even pressure.



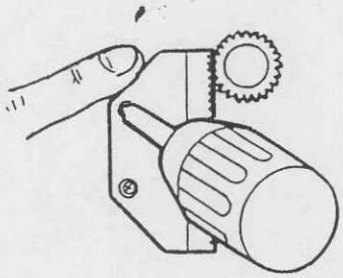
IMPORTANT NOTES:

- Do not use the same lens tissue to clean more than one lens.
- Do not put an excessive amount of cleaning solution on the lens tissue.
- Blow on the surface of objects to be cleaned before wiping them.

ADJUSTING THE STAGE RACKS AND GEARS

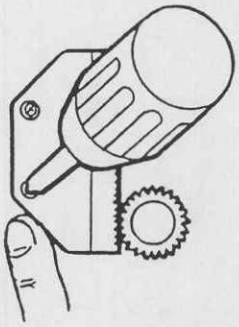
VERTICAL RACK

1



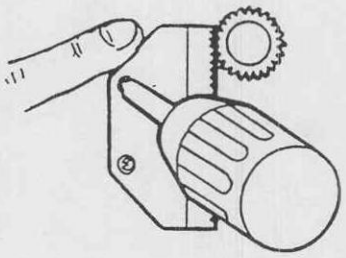
After loosening the screw, gently push the edge of the vertical rack towards the gear. Then tighten the screw nearest to the gear.

2



Move the gear to the opposite end of the rack. Perform the same procedure as Step 1.

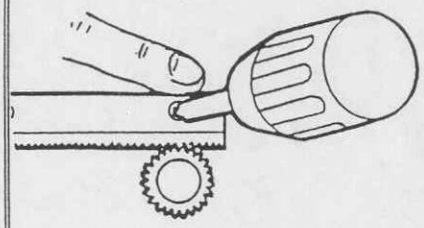
3



Repeat the procedures of Steps 1 and 2, further tightening the screws.

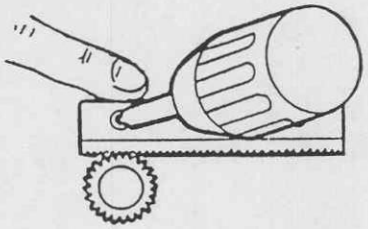
HORIZONTAL RACK

1



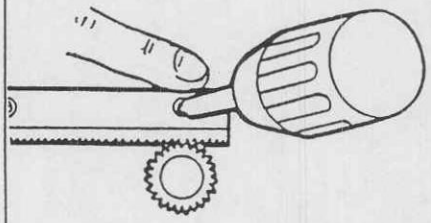
After loosening the screw, gently push the edge of the horizontal rack towards the gear. Then tighten the screw nearest to the gear.

2



Move the gear to the opposite end of the rack. Perform the same procedure as Step 1.

3



Repeat the procedures of Steps 1 and 2, further tightening the screws.

The above procedures should be done until the racks are smoothly meshing with the gears along the entire length of the racks.

See your Olympus Authorized Dealer for needed repairs or service.
They are best able to service your needs and your equipment.

OLYMPUS AMERICA INC.
Precision Instrument Division

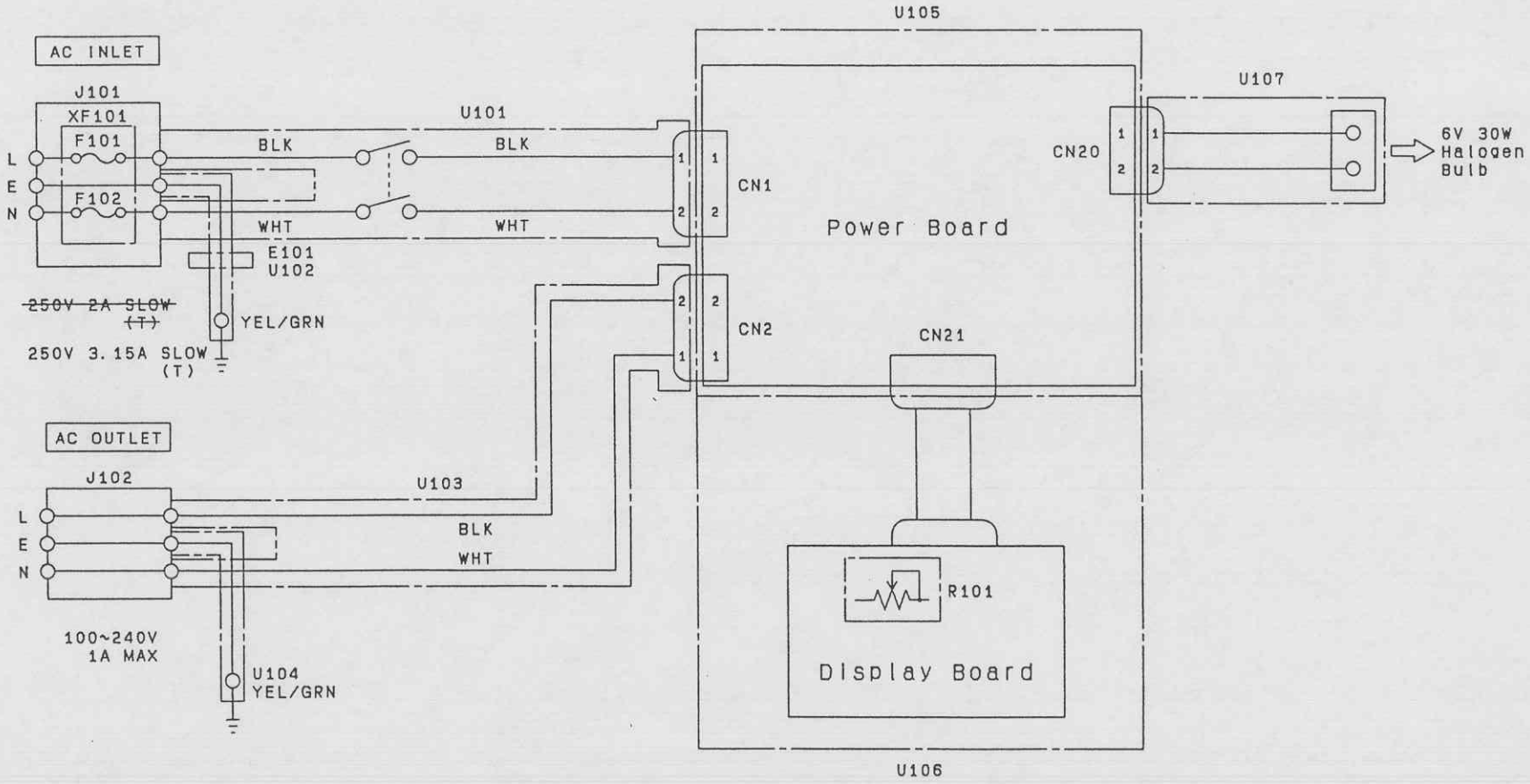
LUBRICATION SCHEDULE

It is recommenced that lubrication be changed every two years. The type of lubrication and procedures are found in the manual in the sections related to the different components of the microscope.

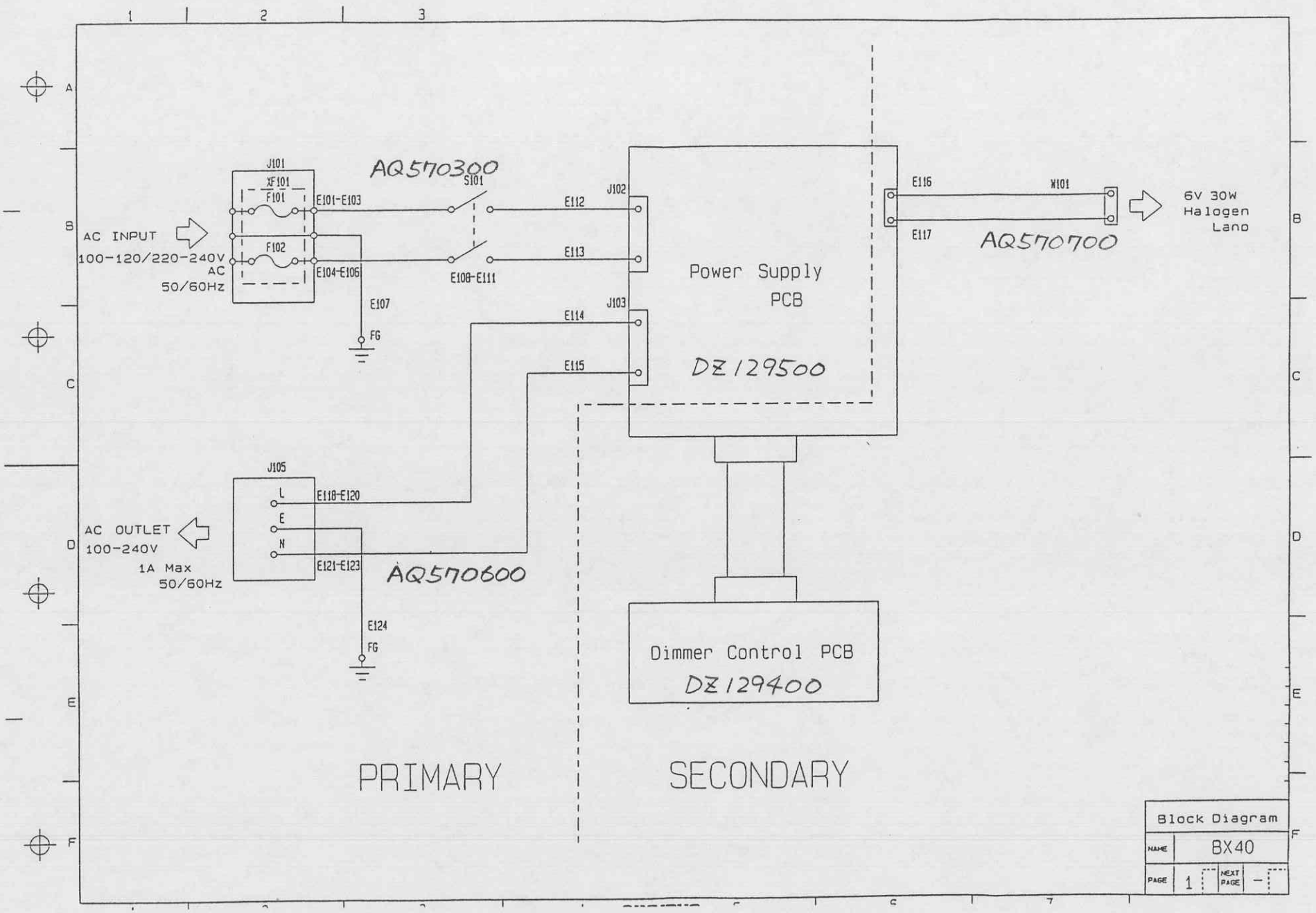
52

1. CIRCUIT DIAGRAM

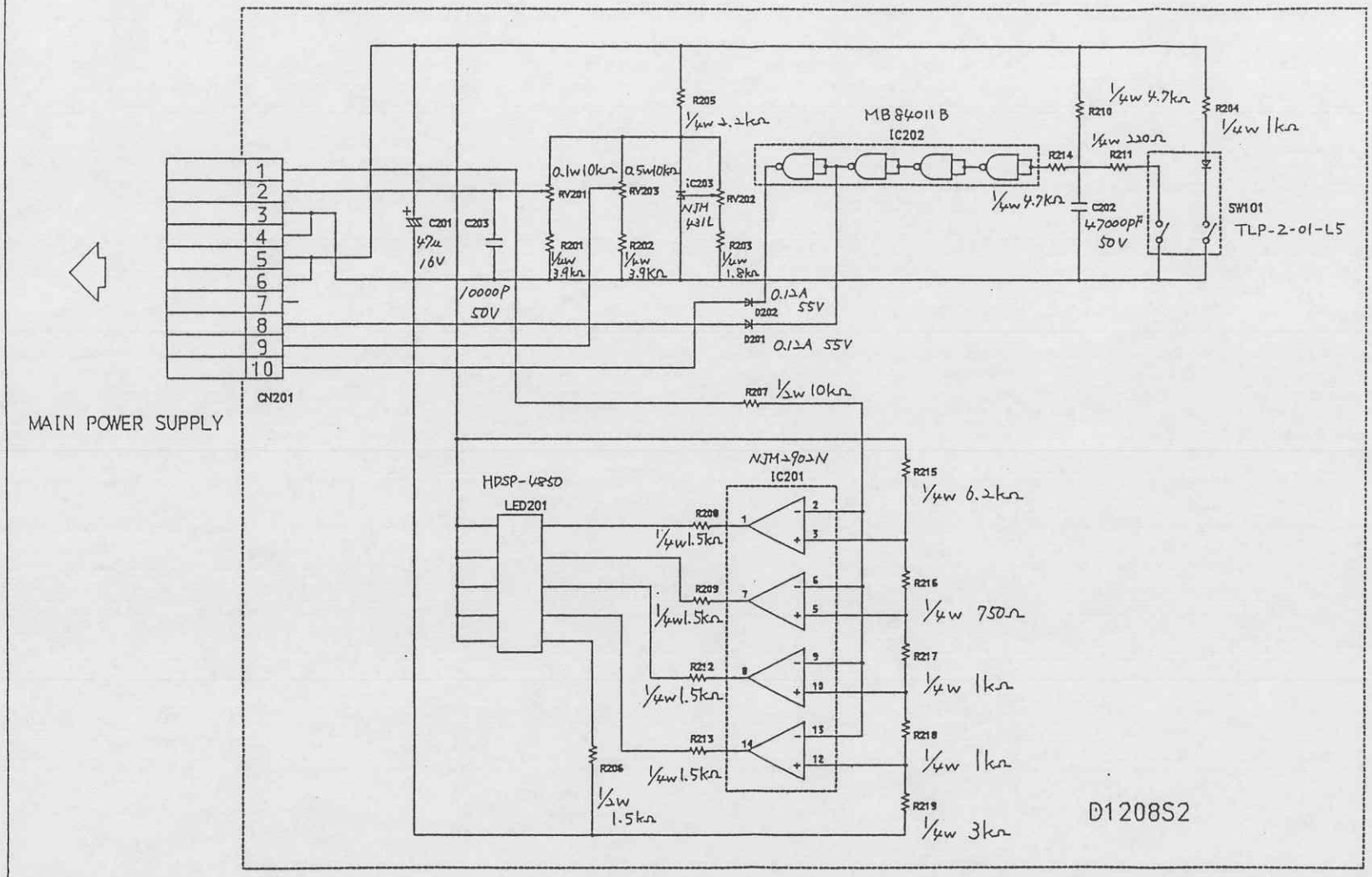
1-1 Connection diagram



53


AC INPUT
100-120/220-240V
AC
50/60Hz
J101
XF101
F101
F102
E101-E103
E104-E106
S101
E108-E111
E107
FG
AQ570300
J102
E112
E113
J103
E114
E115
Power Supply
PCB
DZ129500
E116
W101
E117
AQ570700
6V 30W
Halogen
Lamp
J105
L
E
N
E118-E120
E121-E123
AC OUTLET
100-240V
1A Max
50/60Hz
AQ570600
E124
FG
Dimmer Control PCB
DZ129400
PRIMARY
SECONDARY
Block Diagram
NAME
BX40
PAGE
1
NEXT PAGE
-

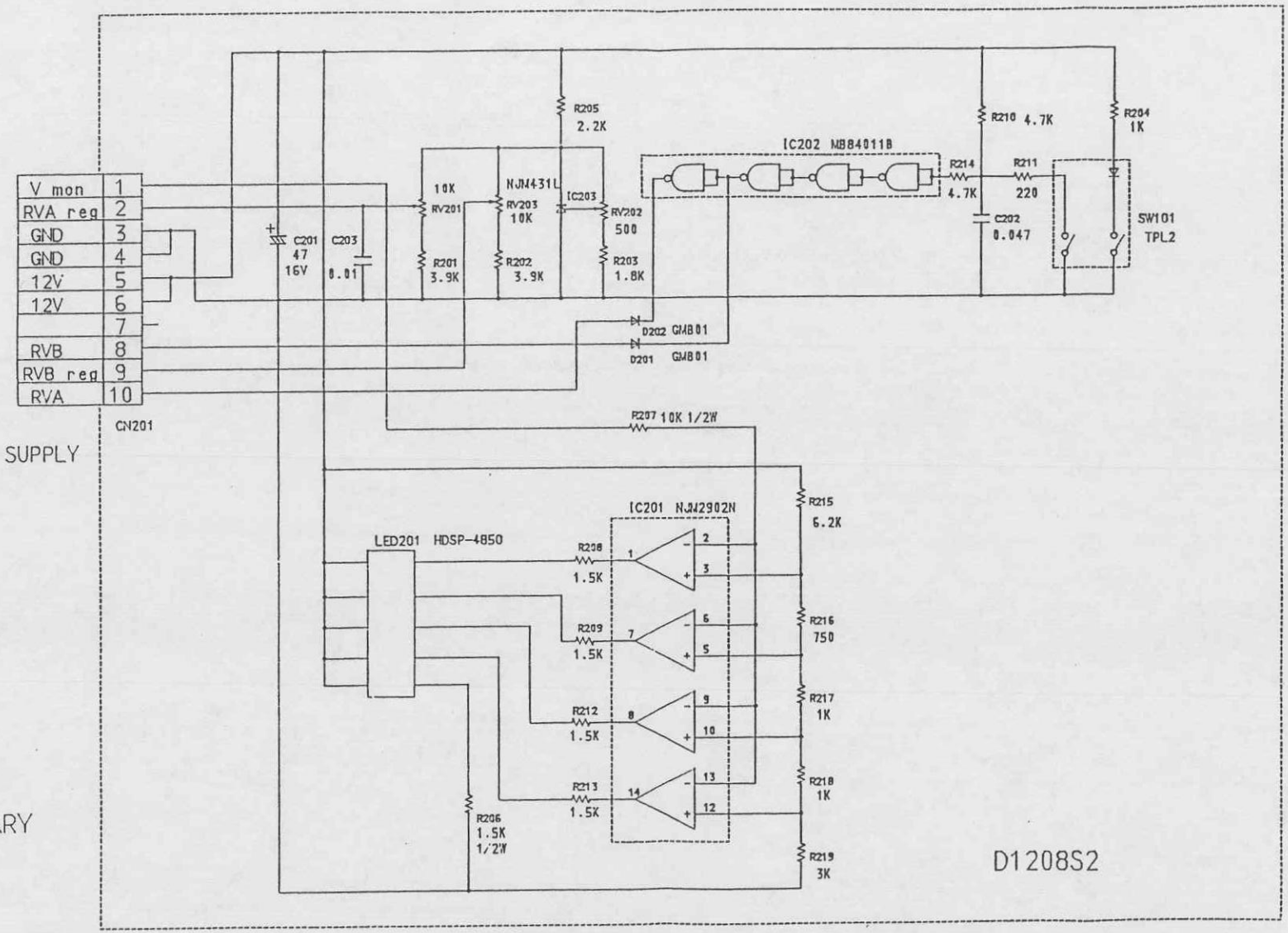
DZ129400



REVISIONS		DESIGNED BY	CHECKED BY	APPROVED BY	TITLE	DIMMER CONTROL CIRCUIT (1208B)
	RUBYCON CORPORATION	H. Yanagi			SIZE / DWG.No.	112B03
					DATE	'92.8.10

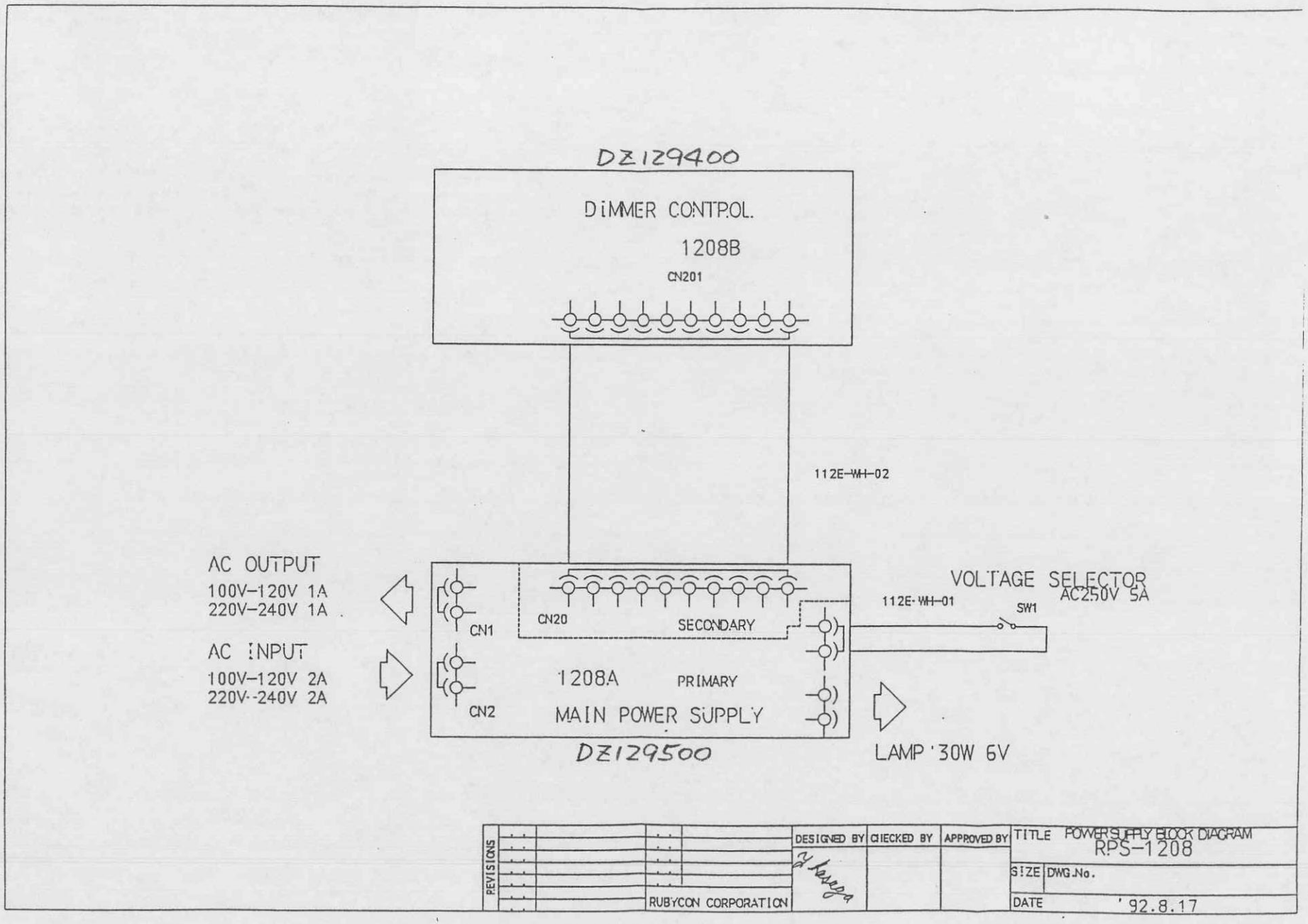
55

DZ 129400

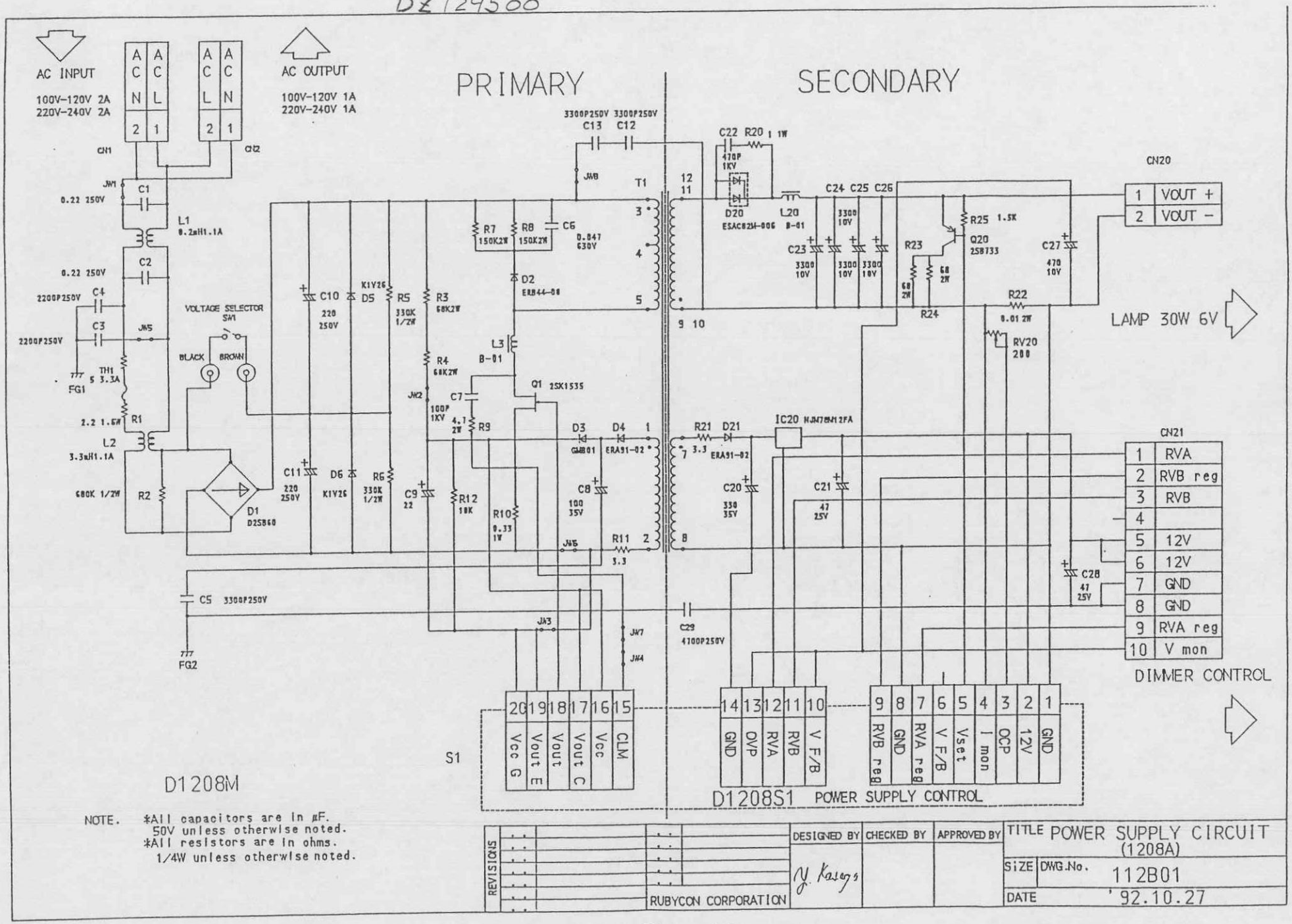


NOTE. *All capacitors are in μF. 50V unless otherwise noted.
*All resistors are in ohms. 1/4W unless otherwise noted.

REVISIONS	DESIGNED BY	CHECKED BY	APPROVED BY	TITLE DIMMER CONTROL CIRCUIT (1208B)
RUBYCON CORPORATION				SIZE DWG.No. 112B03
				DATE '92.10.20


DZ129400
DIMMER CONTROL
1208B
CN201
112E-WH-02
AC OUTPUT
100V-120V 1A
220V-240V 1A
AC INPUT
100V-120V 2A
220V-240V 2A
CN1
CN2
CN20
SECONDARY
1208A
PRIMARY
MAIN POWER SUPPLY
DZ129500
112E-WH-01
SW1
VOLTAGE SELECTOR
AC250V 5A
LAMP 30W 6V
REVISIONS
DESIGNED BY
CHECKED BY
APPROVED BY
TITLE POWER SUPPLY BLOCK DIAGRAM
RPS-1208
SIZE
DWG.No.
DATE '92.8.17
RUBYCON CORPORATION

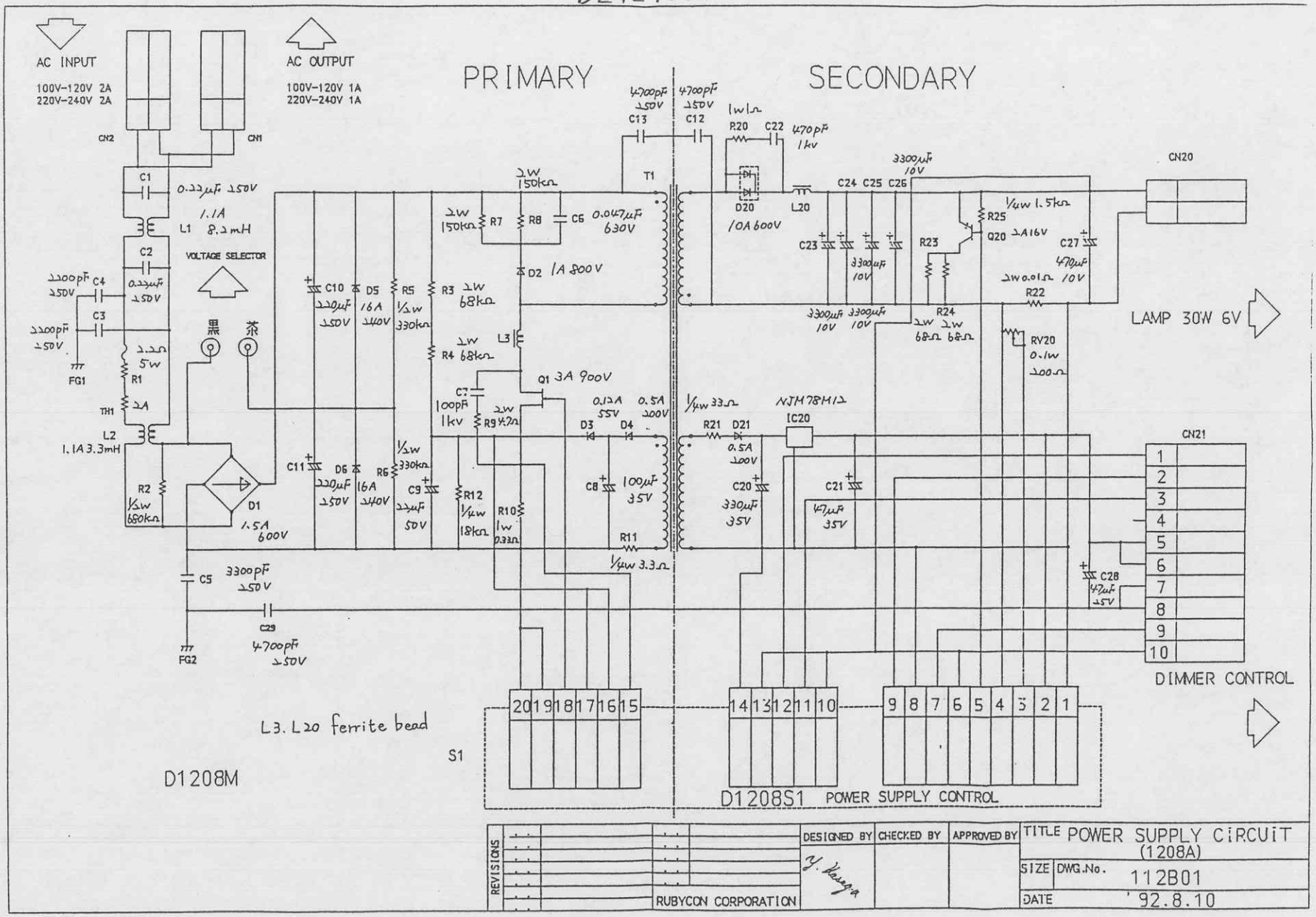
DZ129500



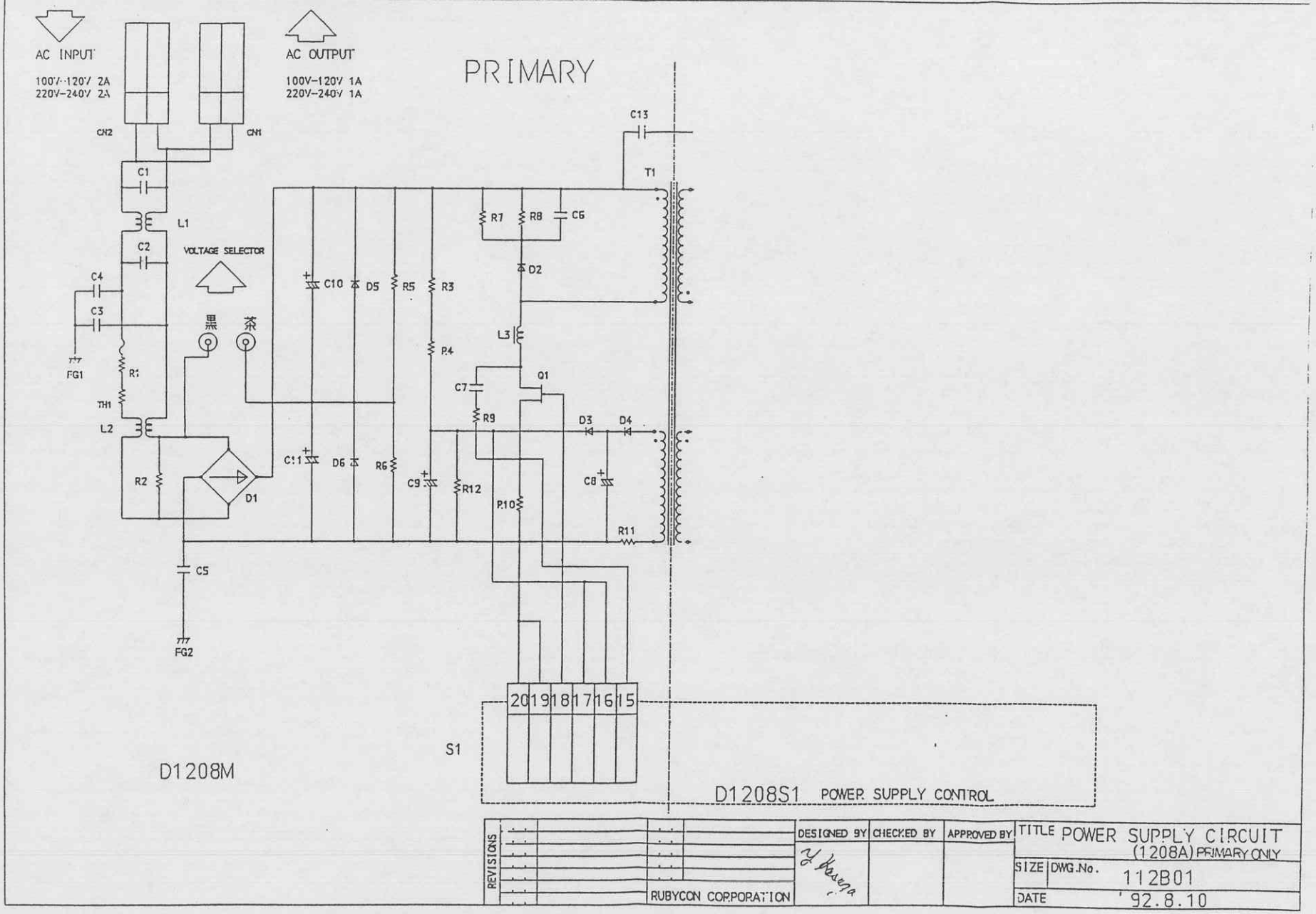
NOTE. *All capacitors are in μF.
50V unless otherwise noted.
*All resistors are in ohms.
1/4W unless otherwise noted.

REVISIONS	DESIGNED BY	CHECKED BY	APPROVED BY	TITLE POWER SUPPLY CIRCUIT (1208A)
RUBYCON CORPORATION	Y. Kasuya			SIZE DWG.No. 112B01
				DATE '92.10.27

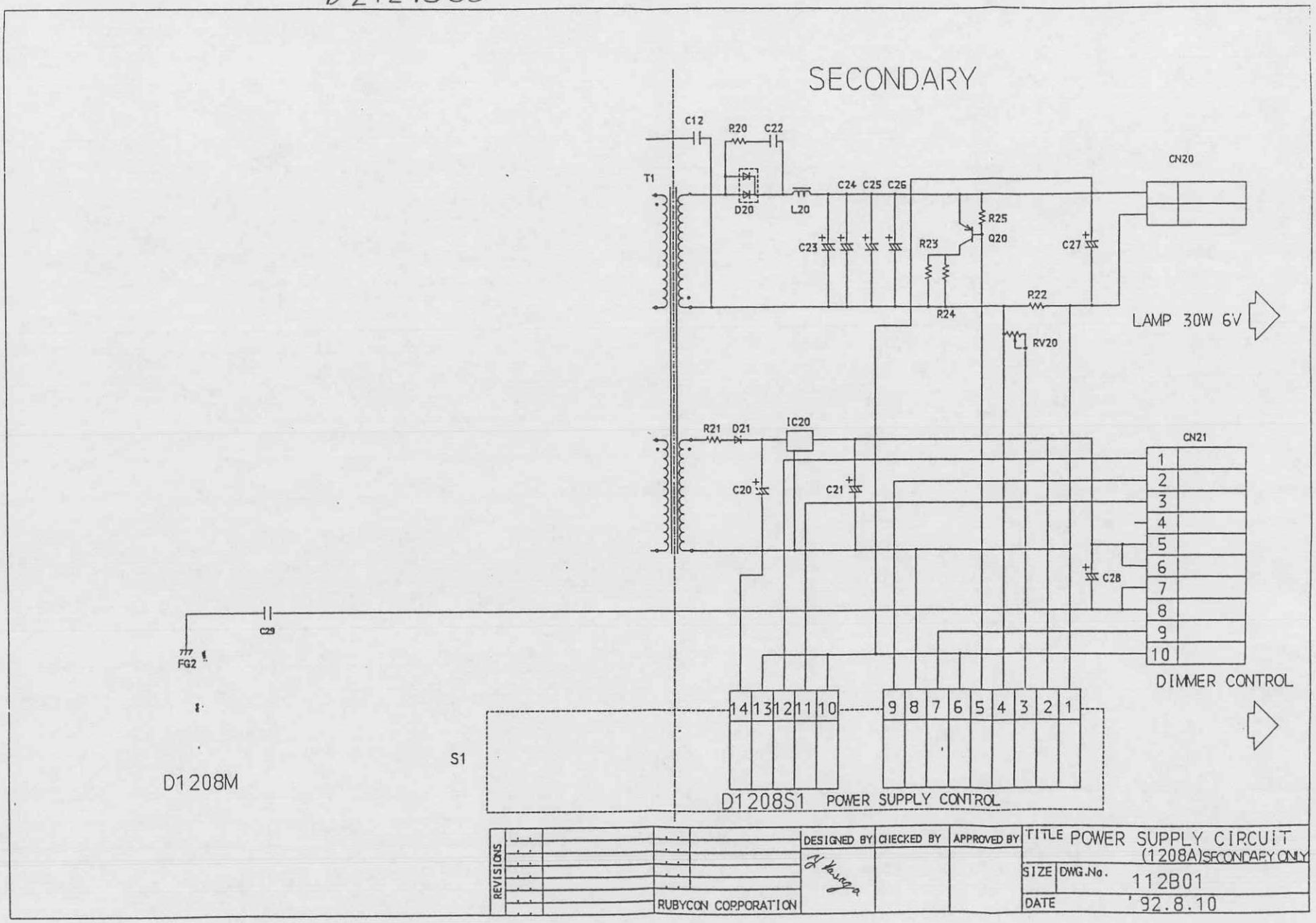
DZ129500


AC INPUT
100V-120V 2A
220V-240V 2A
AC OUTPUT
100V-120V 1A
220V-240V 1A
PRIMARY
SECONDARY
CN2
CN1
CN20
CN21
VOLTAGE SELECTOR
LAMP 30W 6V
DIMMER CONTROL
L3. L20 ferrite bead
D1208M
S1
D1208S1 POWER SUPPLY CONTROL
REVISIONS
RUBYCON CORPORATION
DESIGNED BY
CHECKED BY
APPROVED BY
TITLE POWER SUPPLY CIRCUIT (1208A)
SIZE
DWG.No. 112B01
DATE '92.8.10

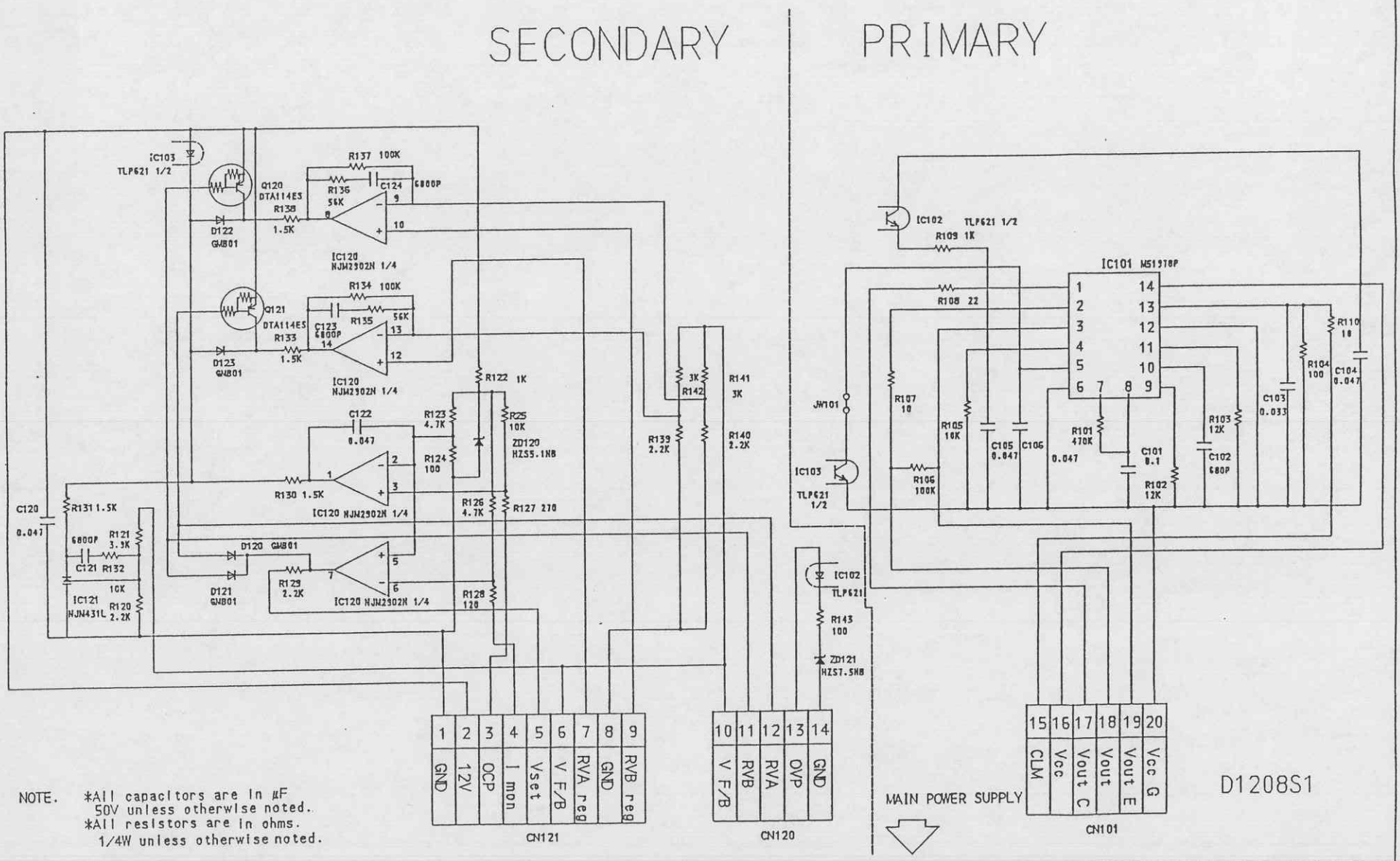
DZ129500


AC INPUT
100V-120V 2A
220V-240V 2A
AC OUTPUT
100V-120V 1A
220V-240V 1A
PRIMARY
CN2
CN1
C1
L1
C2
VOLTAGE SELECTOR
C4
C3
FG1
R1
TH1
L2
R2
D1
C10
D5
R5
R3
C11
D6
R6
C9
R12
P10
C13
T1
R7
R8
C6
D2
L3
P4
C7
Q1
R9
D3
D4
C8
R11
C5
FG2
黒
茶
S1
20 19 18 17 16 15
D1208M
D1208S1 POWER SUPPLY CONTROL
REVISIONS
DESIGNED BY
CHECKED BY
APPROVED BY
RUBYCON CORPORATION
TITLE POWER SUPPLY CIRCUIT
(1208A) PRIMARY ONLY
SIZE
DWG.No. 112B01
DATE '92.8.10

DZ129500


SECONDARY
C12
R20
C22
T1
D20
L20
C24 C25 C26
C23
R23
R25
Q20
C27
CN20
R24
R22
RV20
LAMP 30W 6V
R21
D21
IC20
C20
C21
CN21
1
2
3
4
5
6
7
8
9
10
C28
C29
FG2
DIMMER CONTROL
14 13 12 11 10
9 8 7 6 5 4 3 2 1
S1
D1208M
D1208S1 POWER SUPPLY CONTROL
REVISIONS
RUBYCON COPPORATION
DESIGNED BY
CHECKED BY
APPROVED BY
TITLE POWER SUPPLY CIRCUIT
(1208A) SECONDARY ONLY
SIZE
DWG.No.
112B01
DATE
'92.8.10

DZ129500

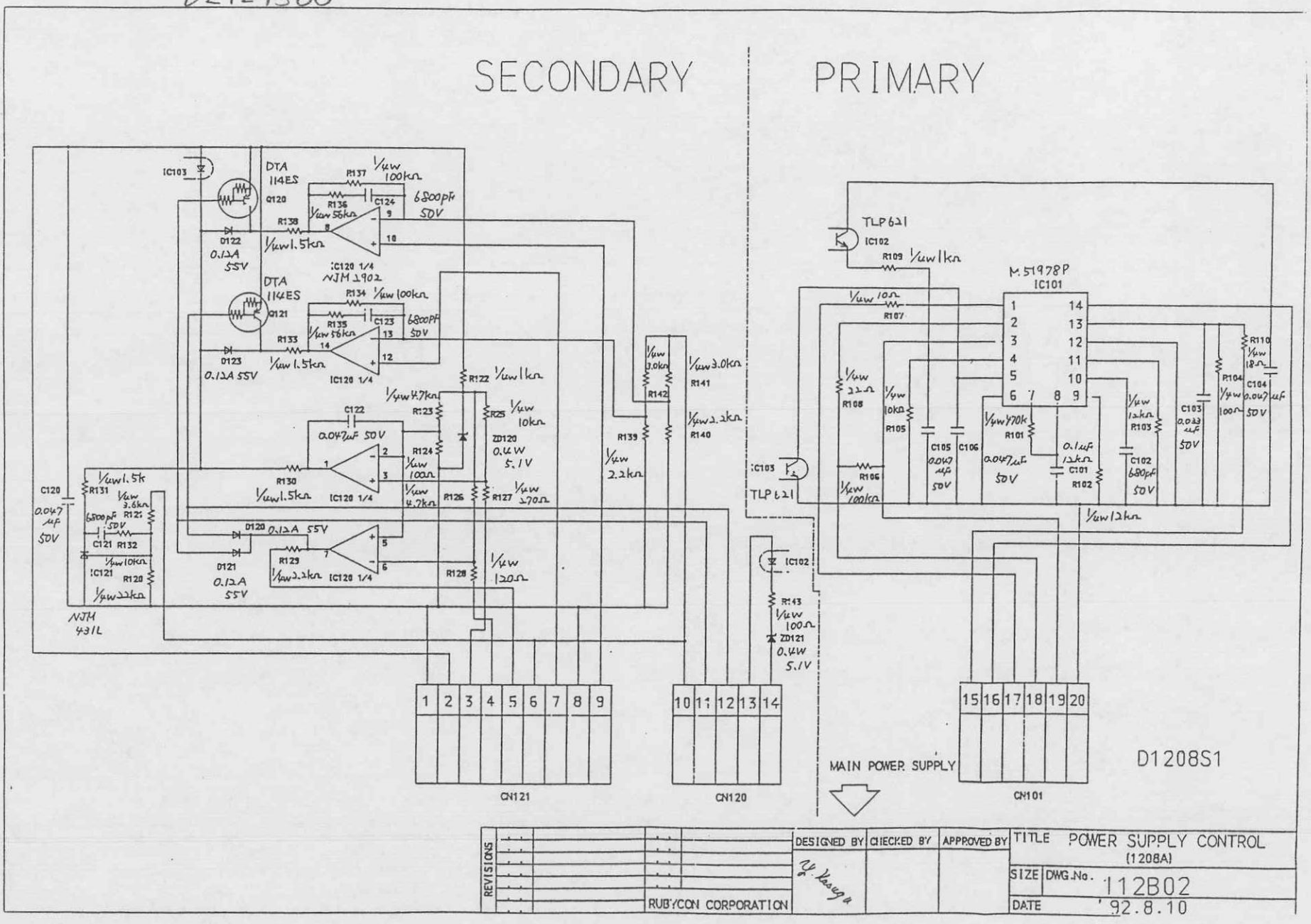


NOTE. *All capacitors are in μF
50V unless otherwise noted.
*All resistors are in ohms.
1/4W unless otherwise noted.

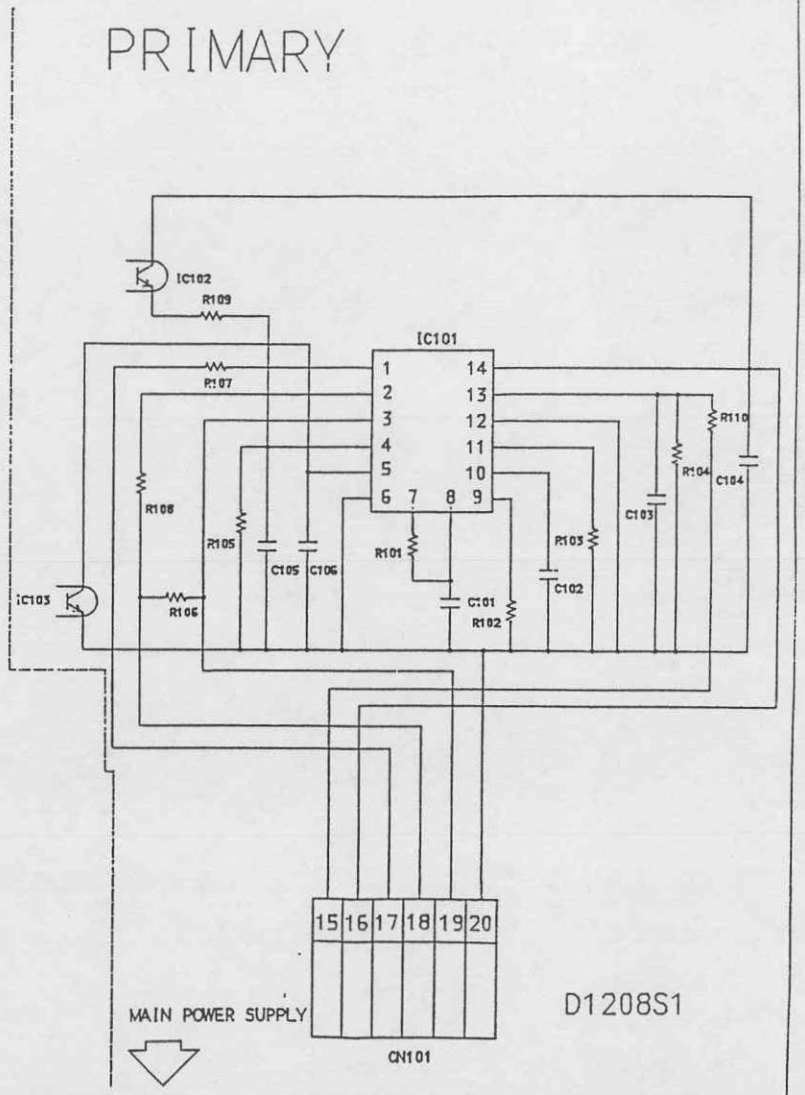
REVISIONS	DESIGNED BY	CHECKED BY	APPROVED BY	TITLE POWER SUPPLY CONTROL (1208A)
RUBYCON CORPORATION	Y. Kosuga			SIZE DWG.No. 112B02
				DATE '92.10.20

62

DZ129500


SECONDARY
PRIMARY
IC103
DTA 114ES
Q120
R137 1/4w 100kΩ
R136 1/4w 56kΩ
C124 6800pF 50V
R138 1/4w 1.5kΩ
D122 0.12A 55V
IC120 1/4 NJM 2902
DTA 114ES
Q121
R134 1/4w 100kΩ
R135 1/4w 56kΩ
C123 6800pF 50V
R133 1/4w 1.5kΩ
D123 0.12A 55V
IC120 1/4
R122 1/4w 1kΩ
1/4w 4.7kΩ
R123
R25 1/4w 10kΩ
C122 0.047μF 50V
ZD120 0.4W 5.1V
R124 1/4w 100Ω
R130 1/4w 1.5kΩ
IC120 1/4
R126 1/4w 4.7kΩ
R127 1/4w 270Ω
C120 0.047μF 50V
R131 1/4w 1.5k
R125 1/4w 3.6kΩ
6800pF 50V
C121 R132
IC121
1/4w 10kΩ
R120 1/4w 22kΩ
NJM 431L
D120 0.12A 55V
D121 0.12A 55V
R129 1/4w 2.2kΩ
IC120 1/4
R128 1/4w 120Ω
R139 1/4w 2.2kΩ
1/4w 3.0kΩ
R142
R141 1/4w 3.0kΩ
R140 1/4w 2.2kΩ
TLP621
IC102
R109 1/4w 1kΩ
M.51978P
IC101
1/4w 10Ω
R107
R108 1/4w 22Ω
R105 1/4w 10kΩ
C105 0.047μF 50V
C106
R101 1/4w 470k
0.047μF 50V
C101 0.1μF 12kΩ
R102
R103 1/4w 12kΩ
C102 680pF 50V
C103 0.033μF 50V
R104 1/4w 100Ω
R110 1/4w 18Ω
C104 0.047μF 50V
1/4w 12kΩ
:C103
TLP621
R106 1/4w 100kΩ
IC102
R143 1/4w 100Ω
ZD121 0.4W 5.1V
1 2 3 4 5 6 7 8 9
CN121
10 11 12 13 14
CN120
15 16 17 18 19 20
CN101
MAIN POWER SUPPLY
D1208S1
REVISIONS
RUBYCON CORPORATION
DESIGNED BY
Y. Yasuya
CHECKED BY
APPROVED BY
TITLE POWER SUPPLY CONTROL (1208A)
SIZE
DWG.No. 112B02
DATE '92.8.10

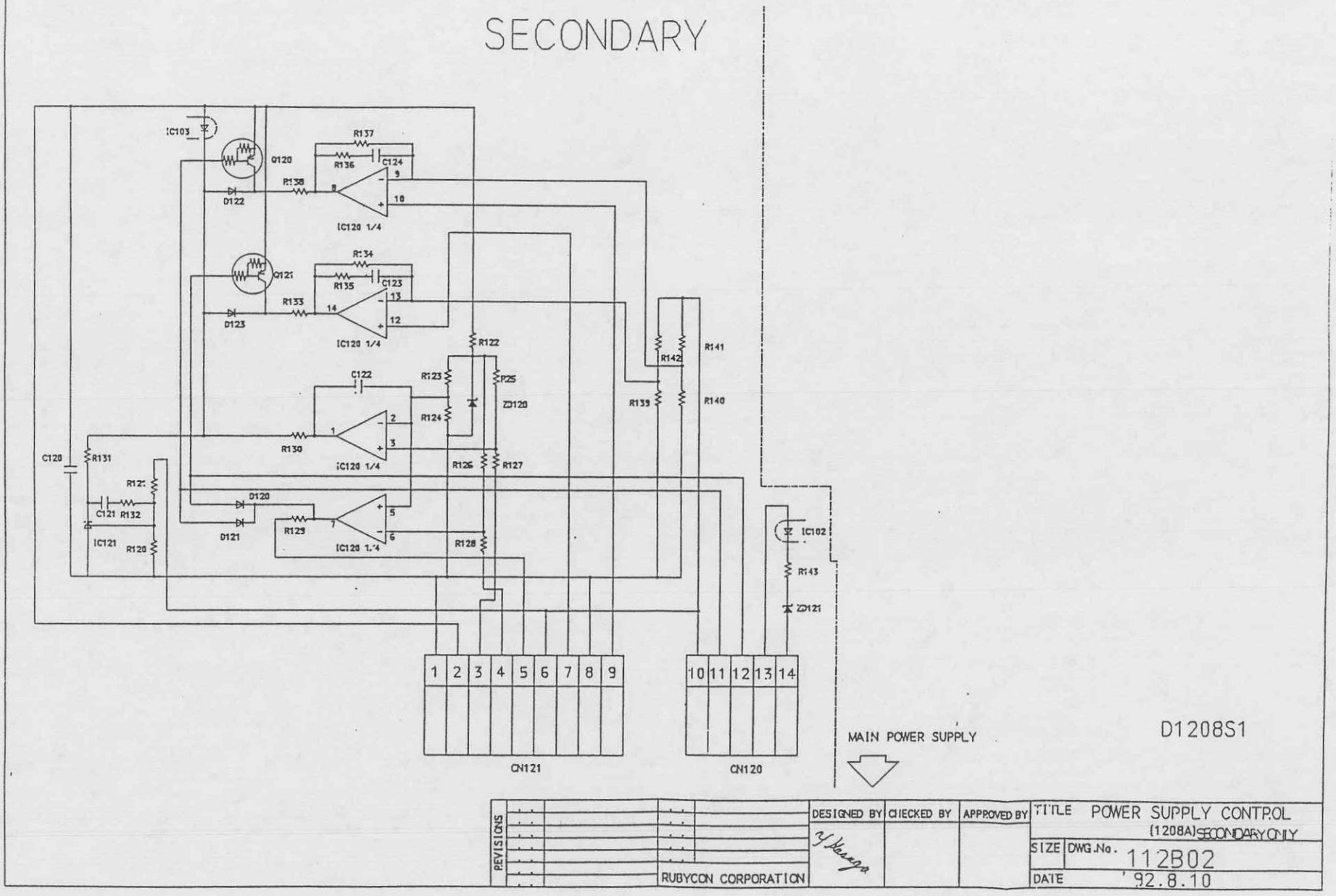
DZ129500



REVISIONS		DESIGNED BY	CHECKED BY	APPROVED BY	TITLE	POWER SUPPLY CONTROL (1208A) PRIMARY ONLY
	RUBYCON CORPORATION	Y Kasuga			SIZE	DWG.No. 112B02
					DATE	'92.8.10

64

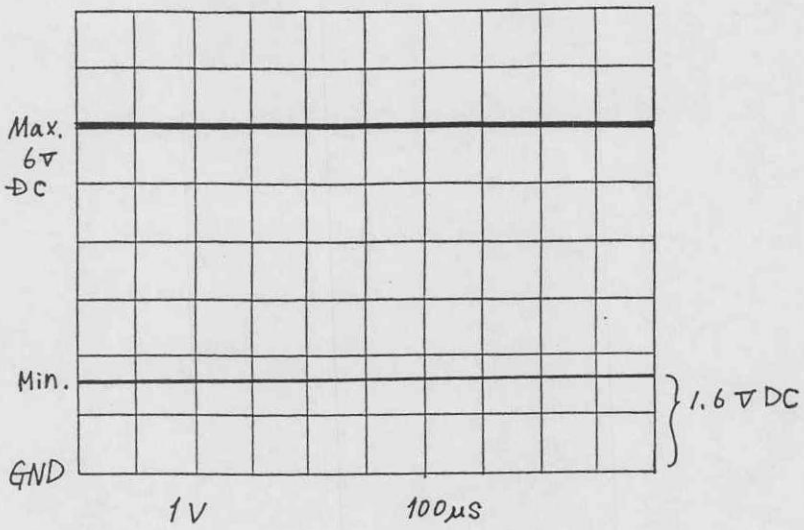
DZ129500


SECONDARY
IC103
Q120
R137
R136
C124
R138
D122
IC120 1/4
Q121
R134
R135
C123
R133
D123
IC120 1/4
R122
R141
R142
R139
R140
C122
R123
P25
ZD120
R124
R130
IC120 1/4
R126
R127
C120
R131
R121
C121
R132
IC121
R120
D120
D121
R129
IC120 1/4
R128
IC102
R143
ZD121
1 2 3 4 5 6 7 8 9
10 11 12 13 14
CN121
CN120
MAIN POWER SUPPLY
D1208S1
REVISIONS
RUBYCON CORPORATION
DESIGNED BY
CHECKED BY
APPROVED BY
TITLE POWER SUPPLY CONTROL
(1208A) SECONDARY ONLY
SIZE
DWG.No. 112B02
DATE '92.8.10

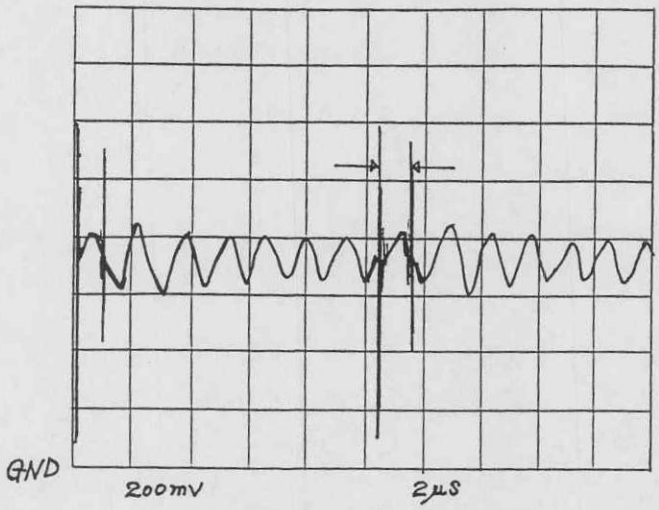
Statement Concerning Part Number for Components of Circuit Boards

Olympus America Inc. does not repair circuit boards in the BX40 microscope. They just replace the board if there is a problem with it. Therefore there are no part numbers for the individual components on the boards.

Lamp Outputs Voltage.

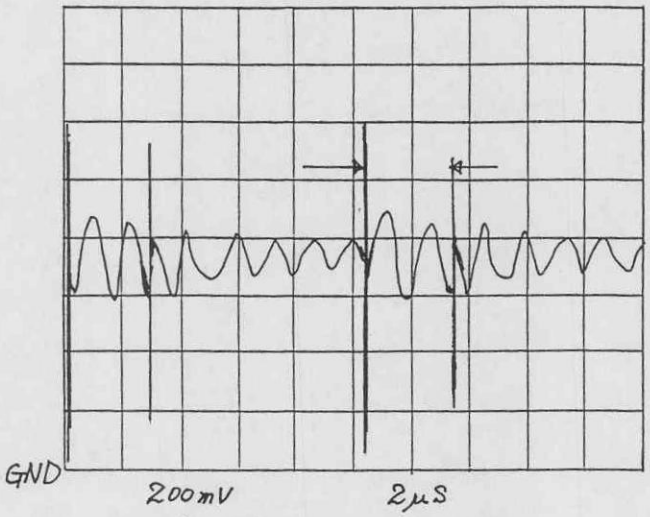


Light control signal. (Min.)



signal CN21 pin# 1 ↔ #11

Light control signal (Max.)



Signal. CN21 pin# 1 ↔ #11

67

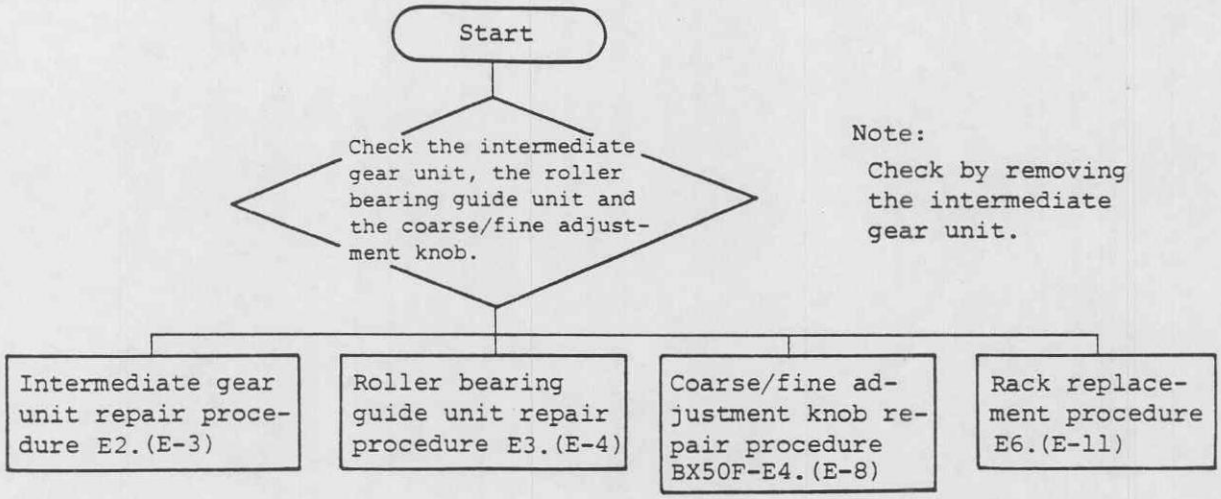
1. CHECK ITEMS AND STANDARDS

Item		Standard
1.	Fine focus sensitivity	· ±2μm maximum in the ±20μm fine adjustment range
2.	Fine adjustment knob	· No feeling of play and tightness
3.	Coarse adjustment knob	· No play. Focus adjustable with 40×. (The knob tension should be previously adjusted to prevent natural falling of the stage.)
4.	Coarse adjustment lock	· An image should remain with 40× when the stage is lowered and return back to the lock position after locking. · The lock should be definitely released.
5.	Field diaphragm	· Smooth with a play of 1/5 or less of the scale. · The diaphragm blade should not stop or bind.
6.	Field diaphragm size and form	· The field diaphragm should be seen with a 100× objective. . The ratio of the longest side to the shortest side should be 2:1 or less in the minimum diaphragm diameter.
7.	Condenser holder stroke	· Should be smooth. · Chattering during stroke should be minimized.
8.	Condenser holder upper limit	· The condenser holder should not butt against the slide glass at the upper limit position. The field diaphragm should be focused with a 1.4mm thick slide glass.
9.	Power supply unit	· When the power is turned on, the bottom LED should light with the light intensity control set to the minimum position and all LEDs should light with the control set to the maximum position. . The light intensity control should move smoothly and the LED should not flicker. · When the preset switch is turned on, the supply voltage should be switched to a desired value. (The setting range is 1.5 ~ 5.9V and set to 3.7 ~ 4.3V at the factory.)
10.	Mounting of modules	· The observation tube, the stage, the condenser, the lamp house and the revolving nosepiece can be mounted easily.

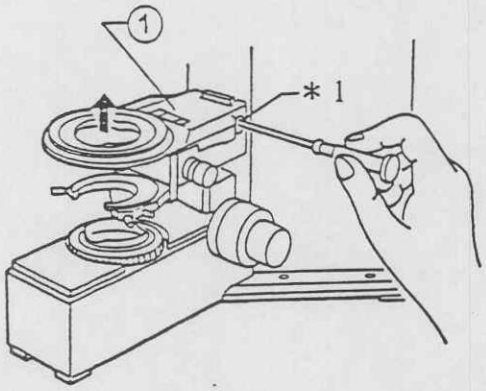
1. WHOLE UNIT

Unit	Symptom	Trouble-shooting	Repair procedure	Remarks
Optical system	Stain		E1.(E-1)	Clean the optical system.
Focusing unit	The coarse/fine adjustment knob does not move. The focus does not change with knob movement.	D2.(D-2)	E2.(E-3)	Intermediate gear unit
			E3.(E-4)	Roller bearing guide unit
			BX50F-E4.(E-8)	Coarse/fine adjustment knob
			E6.(E-11)	Rack
	Coarse adjustment error		BX50F-E4.(E-8)	Coarse/fine adjustment knob
Mirror unit/ Field diaphragm unit	The field diaphragm moves heavily.		E4.(E-7)	Mirror unit
	Field diaphragm diameter is incorrect.	D3.(D-3)	E4.(E-7)	Mirror unit
			E5.(E-10)	Field diaphragm unit
Filter unit	Filter error		E7.(E-12)	Filter unit
Condenser holder	Stroke error	D4.(D-4)	BX50F-E9-1(E-23) BX50F-E9-2(E-26)	Knob ass'y
			BX50F-E9-1(E-24) BX50F-E9-2(E-27)	Dovetail ass'y
	Centering error		BX50F-E9-1(E-25)	Condenser holder
	The condenser butts against the slide glass. The field diaphragm can not be focused.		BX50F-E9-2(E-28)	Condenser height adjustment
Power supply unit	The lamp does not light.	D5.(D-5)	E8.(E-13)	Power supply unit
	Light intensity control error	D6.(D-6)		
	The lamp flickers.	D7.(D-7)		

2. FOCUSING ERROR



[How to remove the intermediate gear unit]

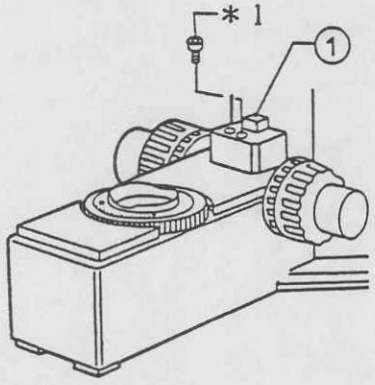


(1) Loosen the screw and pull out the CONDENSER HOLDER ① upward.

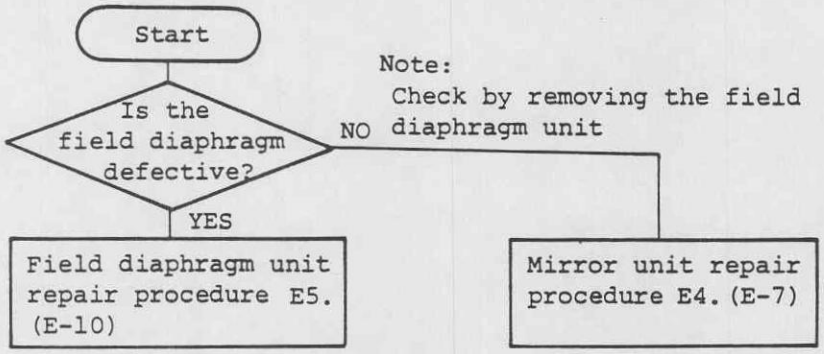
Screw AB4x12SA (*1) 1 pc.

(2) Remove the three screws and take off the INTERMEDIATE GEAR UNIT ① .

Screw AB3x8SA(*1) 3 pcs.



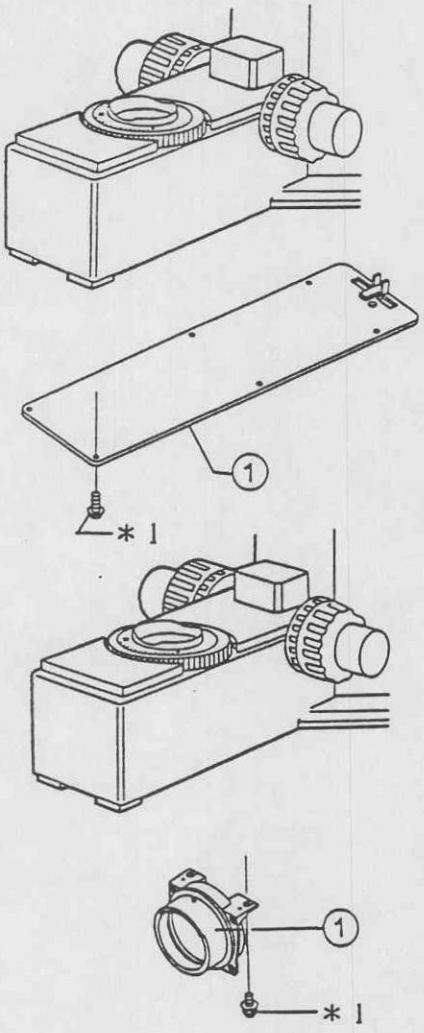
3. INCORRECT DIAMETER OF FIELD DIAPHRAGM



- The minimum diameter should be ø1.00 ~ ø1.25mm.
- The field diaphragm unit should move smoothly.

- The rotary ring of the mirror unit should turn smoothly.

[How to remove the field diaphragm unit]



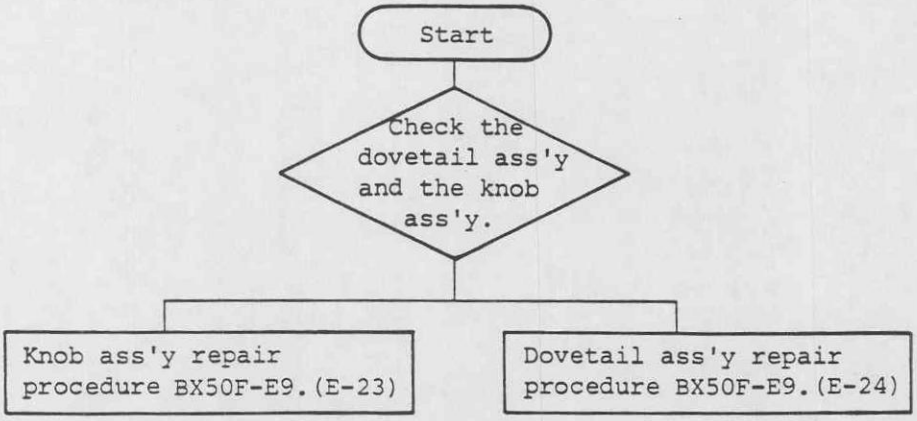
(1) Remove the eight screws and take off the BOTTOM PLATE ①.

Screw CUK3x6SA (*1) 8 pcs.

(2) Remove the two screws and take off the FIELD DIAPHRAGM UNIT ①.

Screw CUKSB3x6SA (*1) 2 pcs.

4. CONDENSER HOLDER STROKE ERROR

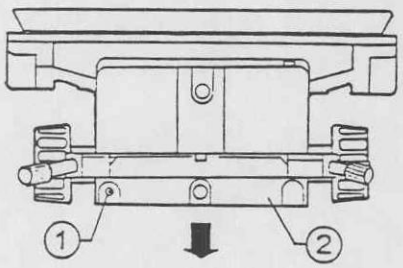


- The knob should turn smoothly.

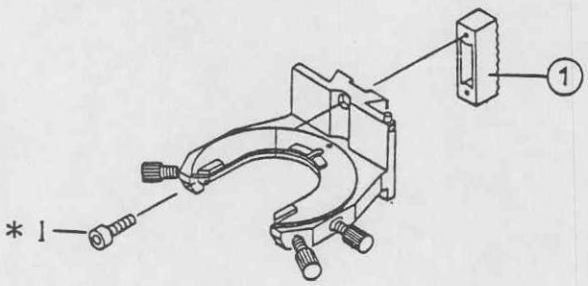
- The condenser holder should move smoothly without play.

Note:
Check by removing the rack.

[How to remove the rack]



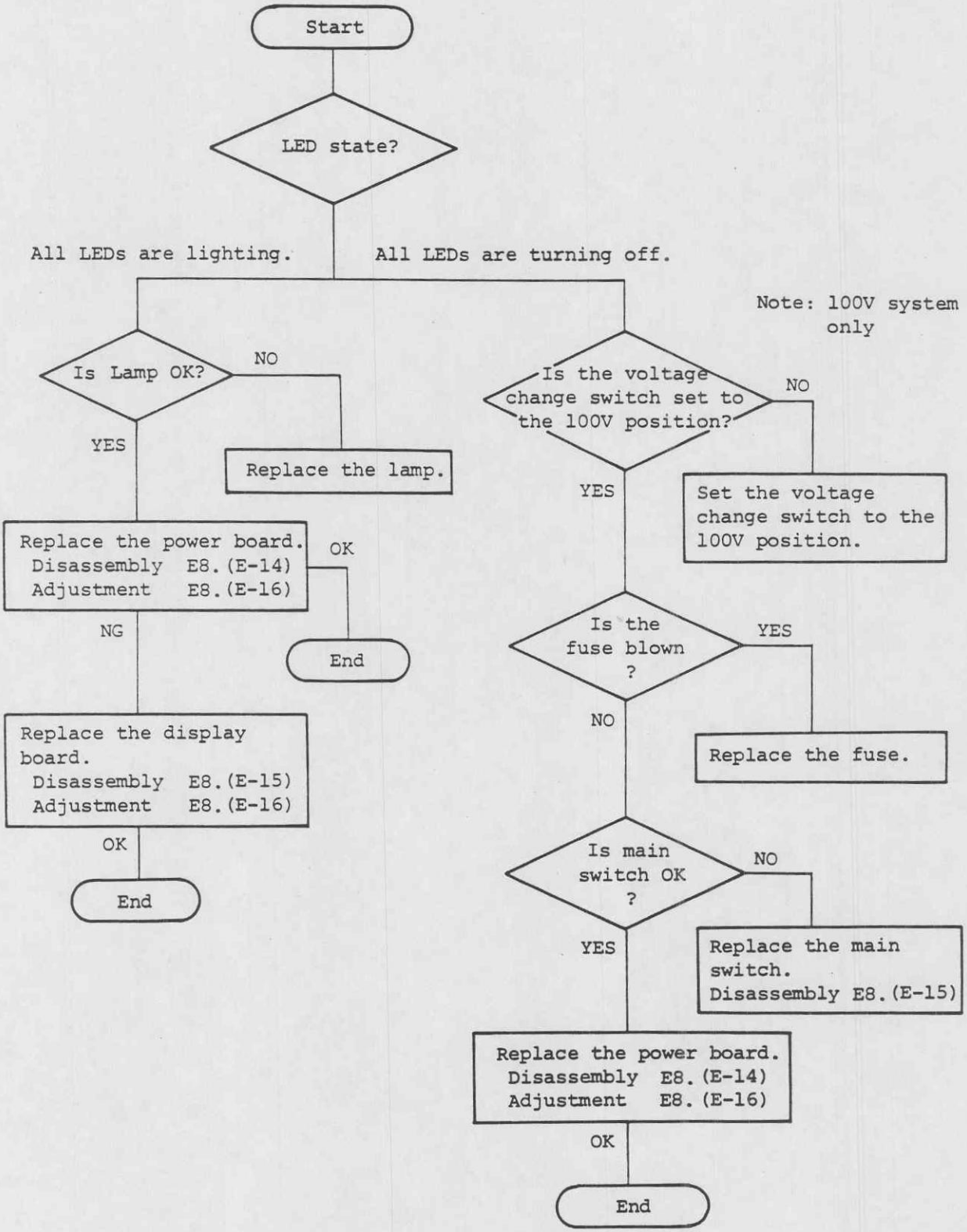
(1) Remove the STOPPER SCREW ① and pull out the CONDENSER HOLDER ②.



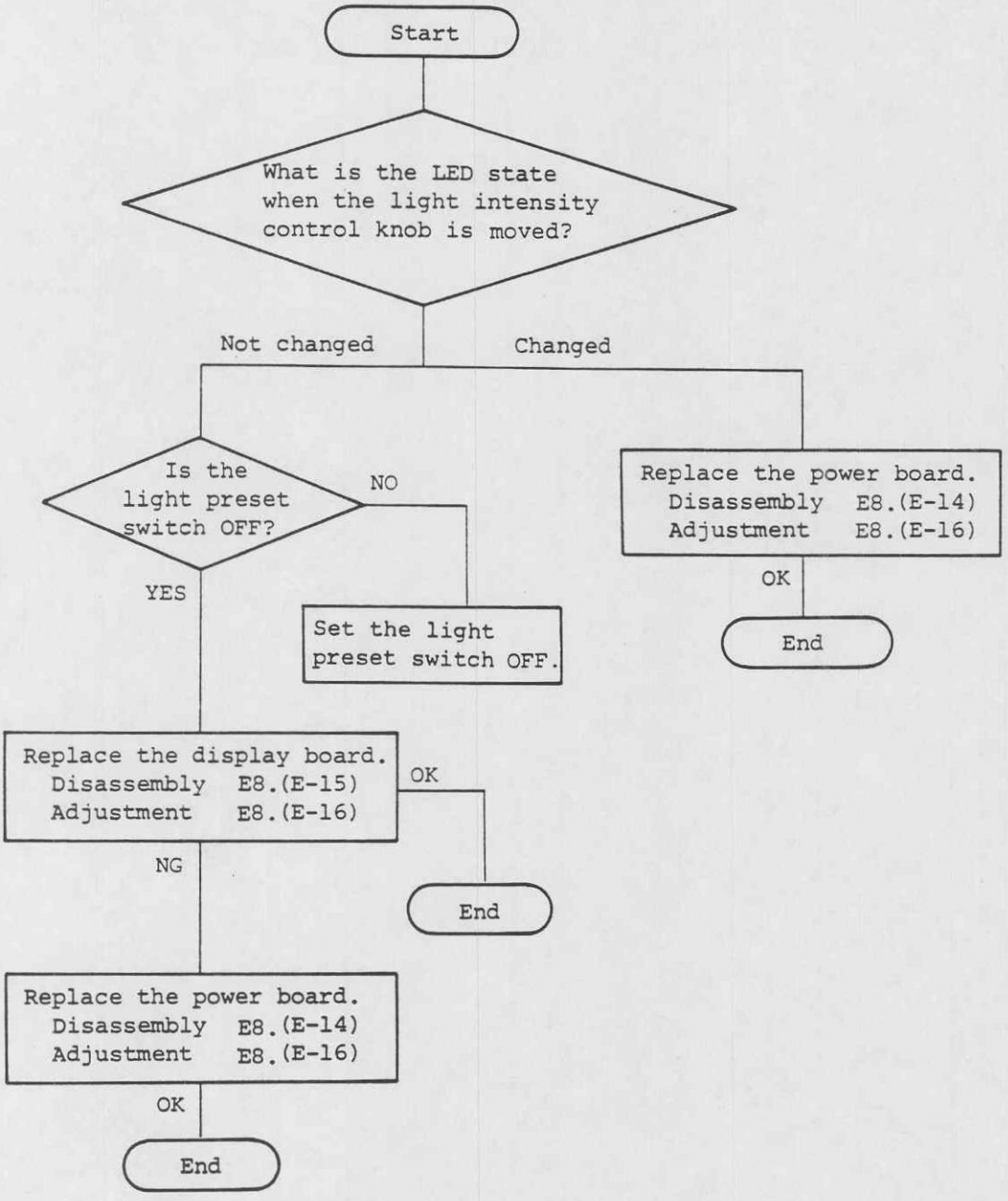
(2) Remove the two screws and take off the RACK ①.

Screw AB3x12SA (*1) 2 pcs.

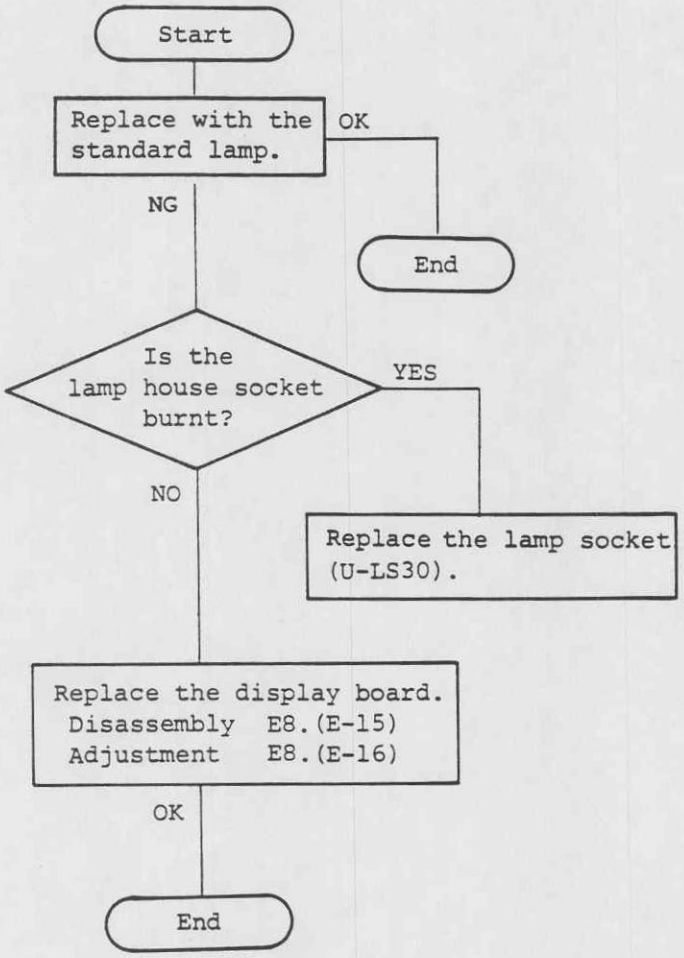
5. LAMP LIGHTING ERROR



6. LIGHT INTENSITY CONTROL ERROR



7. LAMP FLICKERING

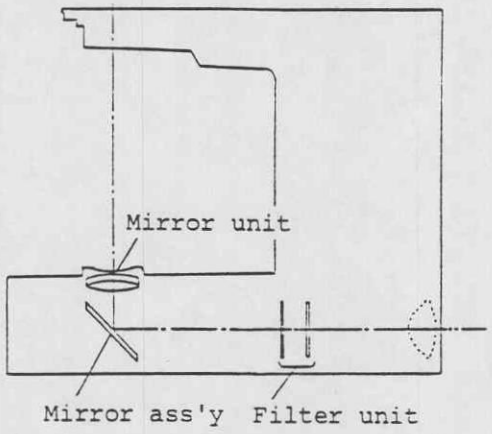


1. OPTICS CLEANING

1-1 Precautions

Dust is not seen through the eyepiece at observation, because it is not focused. But, if the dust is stacked, it will affect the observation brightness and the color temperature in photomicrography. So, take precautions to keep your finger away from the optical parts and to prevent exudation of grease. Illuminate with the maximum lamp voltage to facilitate checking a finger-print and exudation of grease.

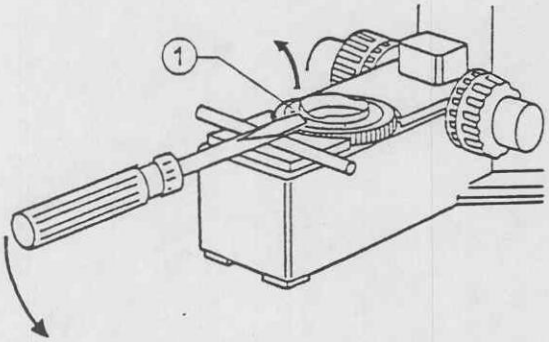
1-2 Optical Path Drawing



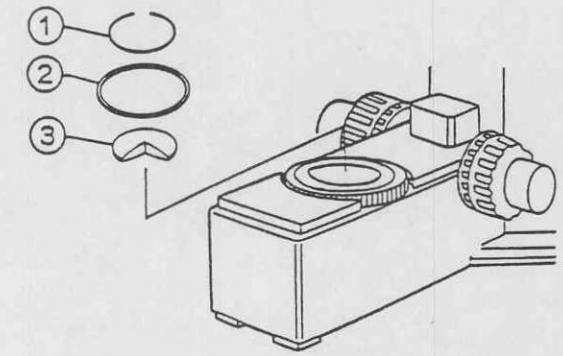
1-3 Mirror Unit

Remove the lens before cleaning the rear side of the lens.

[How to remove the mirror unit]



(1) Remove the FILTER MOUNT ① by prying it with a screwdriver (-) as shown on the left.



(2) Remove the SPRING RING ①, then take off the SPACER ② and the LENS ③.

1-4 Mirror Ass'y

Remove the lens and clean the mirror. The mirror has been coated. Use the lens cleaning paper moistened with the cleaning mixture.

* The optical axis must be readjusted if the mirror ass'y is disassembled. Avoid disassembling the mirror ass'y except when replacing it.

1-5 Filter Unit

Lay the BX frame sideways, remove the bottom plate, then clean the filter unit.

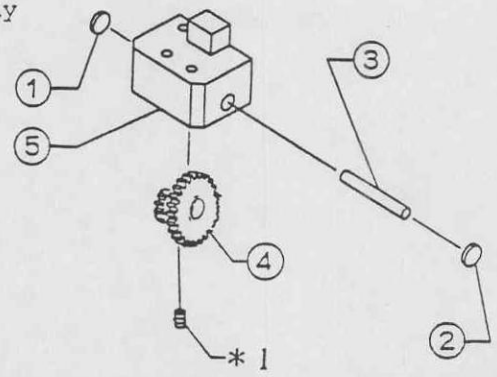
2. INTERMEDIATE GEAR UNIT

2-1 Precautions

When the intermediate gear unit is removed, be sure to check that the gear teeth are not broken and the gear moves smoothly.

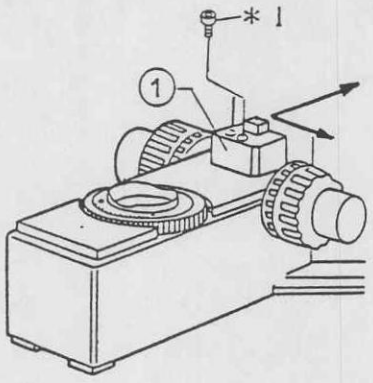
After checking, secure it paying attention to the direction against the mounting surface.

2-2 Disassembly and Assembly



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	BLIND SEAL				
②	BLIND SEAL				
③	SHAFT	ACU3x4SA(*1)1 pc.		OT1131(Screw)	
④	GEAR				
⑤	GEAR BOX				E2-3 (E-3)

2-3 Mounting the Intermediate Gear Unit



(1) Engage the INTERMEDIATE GEAR UNIT ① with the rack and pinion, push it in the direction of the arrow, then tighten the screws.

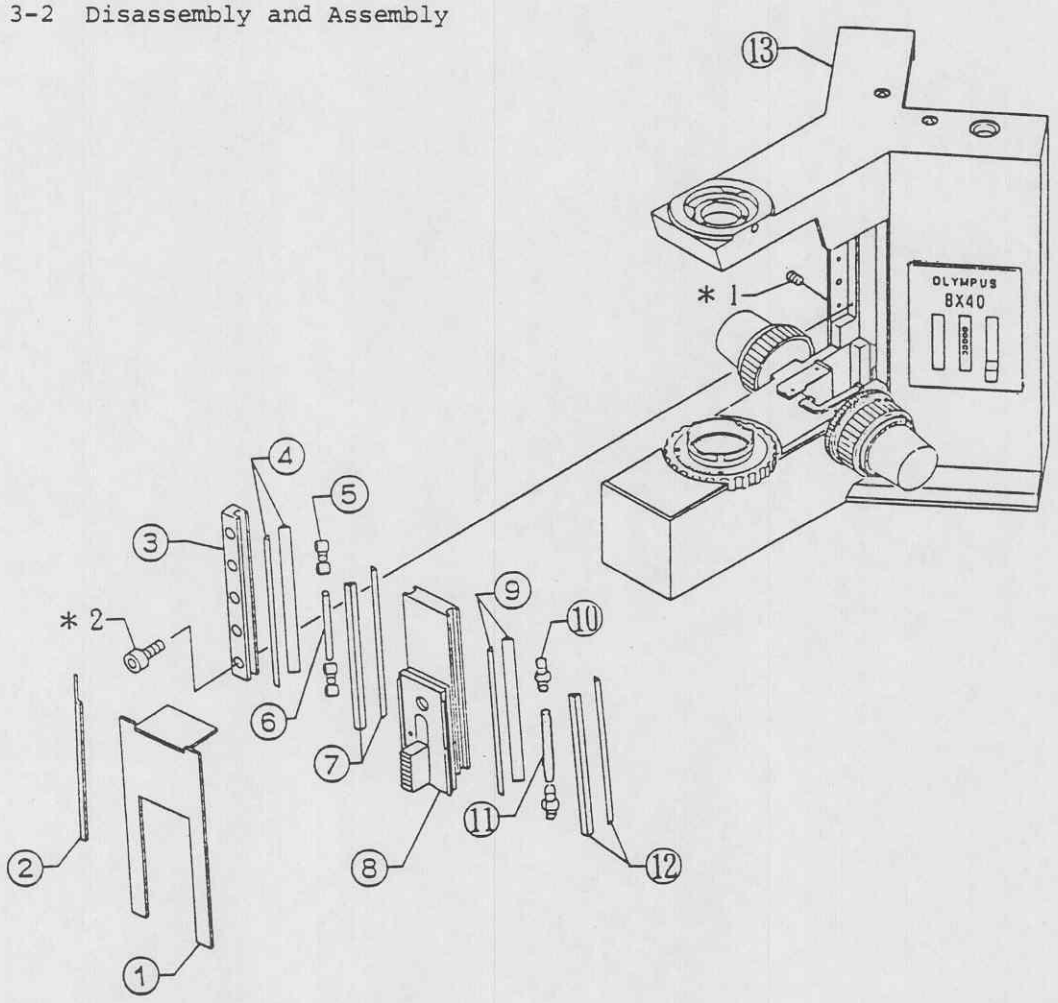
Screw AB3x8SA(*1) 3 pcs.

3. ROLLER BEARING GUIDE UNIT

3-1 Precautions

The guide working force should be adjusted so that the roller bearing guide moves smoothly. The guide working force has a large influence on the fine focus sensitivity, therefore, it should be carefully adjusted.

3-2 Disassembly and Assembly



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	PANEL				
②	PANEL				
③	OUTER GUIDE	AHU3x4SA(*1)3 pcs. AB4x16SA(*2)5 pcs.	OT2010	OT1131(*1)	E3-3(E-6)
④	WIRE (2 pcs.)				
⑤	ROLLER BEARING(6pcs.)		OT2010		
⑥	SPACER				
⑦	WIRE (4 pcs.)				
⑧	INNER GUIDE		OT2010		
⑨	WIRE (2 pcs.)				
⑩	ROLLER BEARING(6pcs.)		OT2010		
⑪	SPACER				
⑫	WIRE (2 pcs.)				
⑬	FRAME				

* When assembling, temporarily tighten the five screws (*2).

Screw AB4x16SA(*2) 5 pcs.

3-3 Adjusting the Roller Bearing Guide Unit

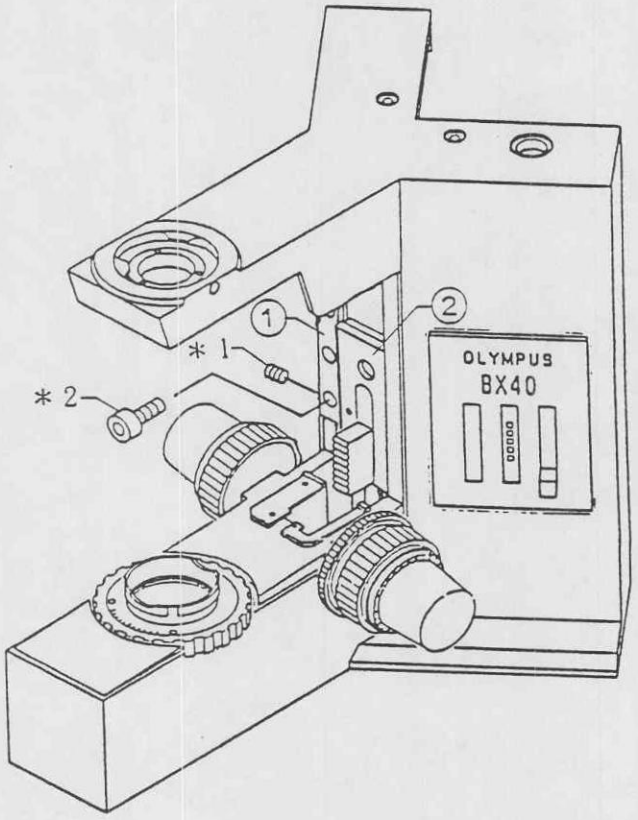
(1) Secure the OUTER GUIDE ① with three screws (*1), and adjust so that the INNER GUIDE ② moves without play and unevenness and the working force meets the standard (shown below).

Standard working force	80 ~ 100g

Tension gauge (200G): OT1143

(2) After the adjustment, securely tighten the five screws (*2) and apply adhesive to the three screws (*1).

Screw: OT1131 (Adhesive)



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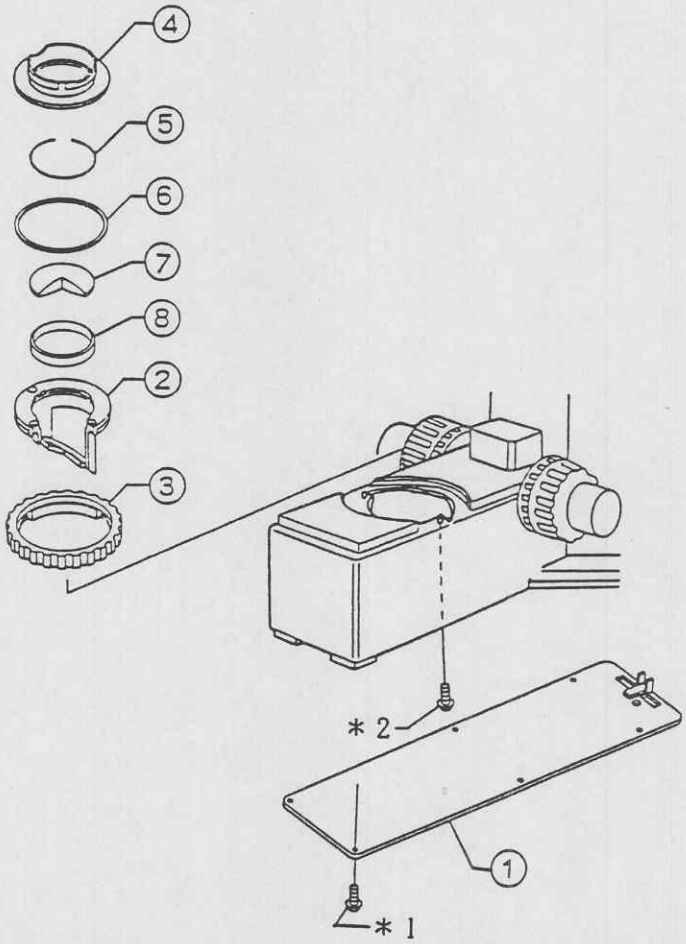
4. MIRROR UNIT

4-1 Precaution

Avoid removing the MIRROR ASS'Y except when replacing it. It needs readjustment if removed.

4-2 Disassembly and Assembly

(1) Mirror unit



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	BOTTOM PLATE	CUK3x6SA(*1)8 pcs.			
②	MIRROR ASS'Y	CUK3x12SA(*2)3 pcs.		OT1131(screw)	E4-3(E-9)
③	ROTARY RING		OT1595		
④	FILTER MOUNT				
⑤	SPRING RING				
⑥	SPACER				
⑦	LENS				
⑧	SPACER				Attach with the large beveled surface facing to the mirror ass'y.

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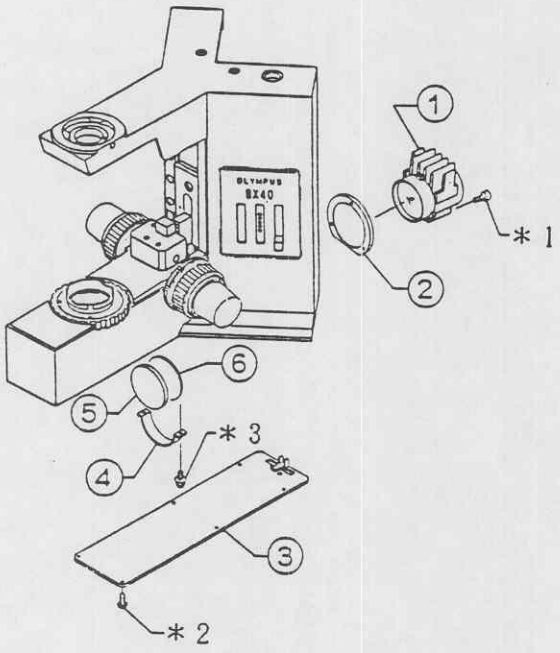
4-3 Adjustment



(1) Remove the LAMP HOUSE HOLDER ①. and BASE ②.

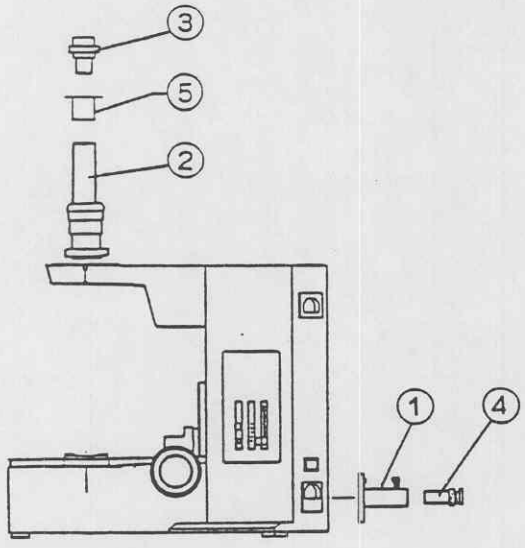
Screw ABS3x8SA 3 pcs.(*1)

(2) Remove the BOTTOM PLATE ③.

Screw CUK3x6SA 8 pcs.(*2)

(3) Remove the FILTER HOLDER ④, the ADIABATIC GLASS ⑤ and the FROSTED FILTER ⑥.

Screw CUKS3x8SA 2 pcs.(*3)



(4) Set the jigs as shown on the left.

Jigs

- BXKC002 ①
  (Optical alignment jig for illumination part)
- BXKN001 ②
  (UIS standard observation tube)
- KN0048 ③
  (Universal standard eyepiece)
- KN0029 ④
  (Centering telescope)
- KC2049 ⑤
  (Eyepiece adapter)

* Don't insert the objective.

(5) Lay the FRAME sideways.

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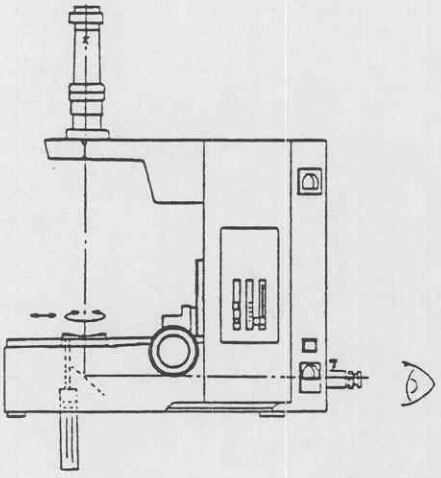


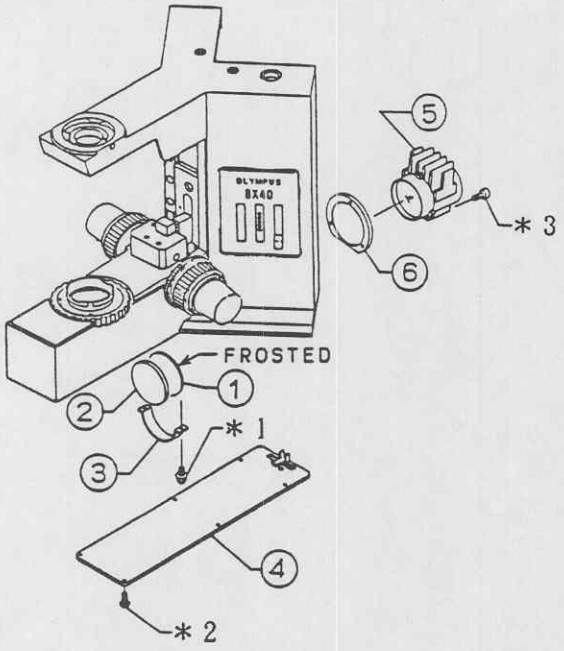
(6) Adjust the optical axis.

i. Adjust the focus to the cross hairs of the universal standard eyepiece by using the centering telescope.

ii. Adjust the optical axis by moving the MIRROR ASS'Y.

Standard	Max. 0.5 scale of the centering telescope

* When mounting the mirror unit, pay attention to the engaging position between the field diaphragm and the rotary ring.
* The minimum diameter of the field diaphragm should be ø1.00 ~ 1.25mm.



(7) Secure the FROSTED FILTER ①, the ADIABATIC GLASS ② and the FILTER HOLDER ③.

Screw CUKS3x8SA 2 pcs.(*1)

(8) Secure the BOTTOM PLATE ④.

Screw CUK3x6SA 8 pcs.(*2)

(9) Secure the BASE ⑥ and LAMP HOUSE HOLDER ⑤ to frame.

Screw ABS3x8SA 3 pcs.(*3)

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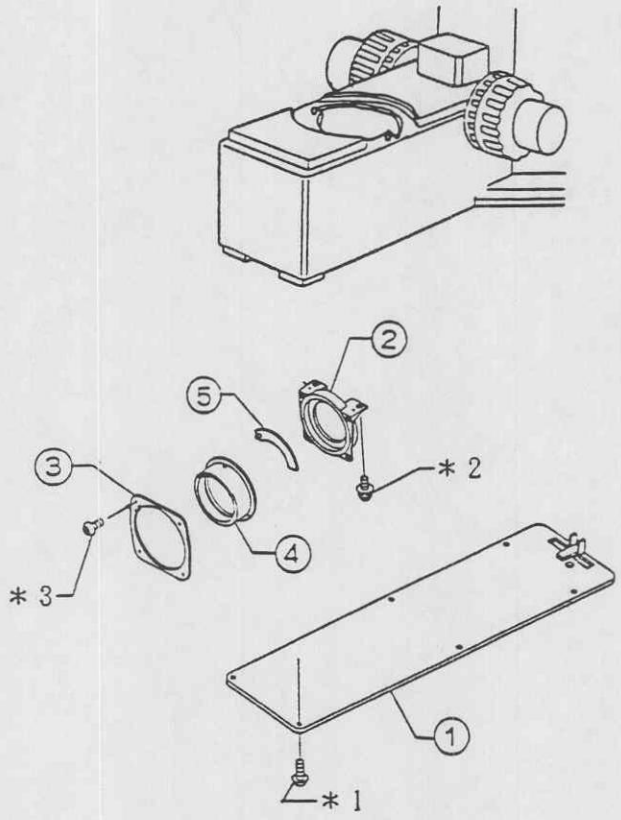
5. FILED DIAPHRAGM UNIT

5-1 Disassembly and Assembly



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	BOTTOM PLATE	CUK3x6SA(*1) 8 pcs.			
②	DIAPHRAGM FRAME	CUKSB3x6SA(*2) 2 pcs.			
③	PLATE	CUTS2.6x5SA(*3)4 pcs.			
④	ROTARY FRAME				
⑤	DIAPHRAGM BLADE(10pcs.)				

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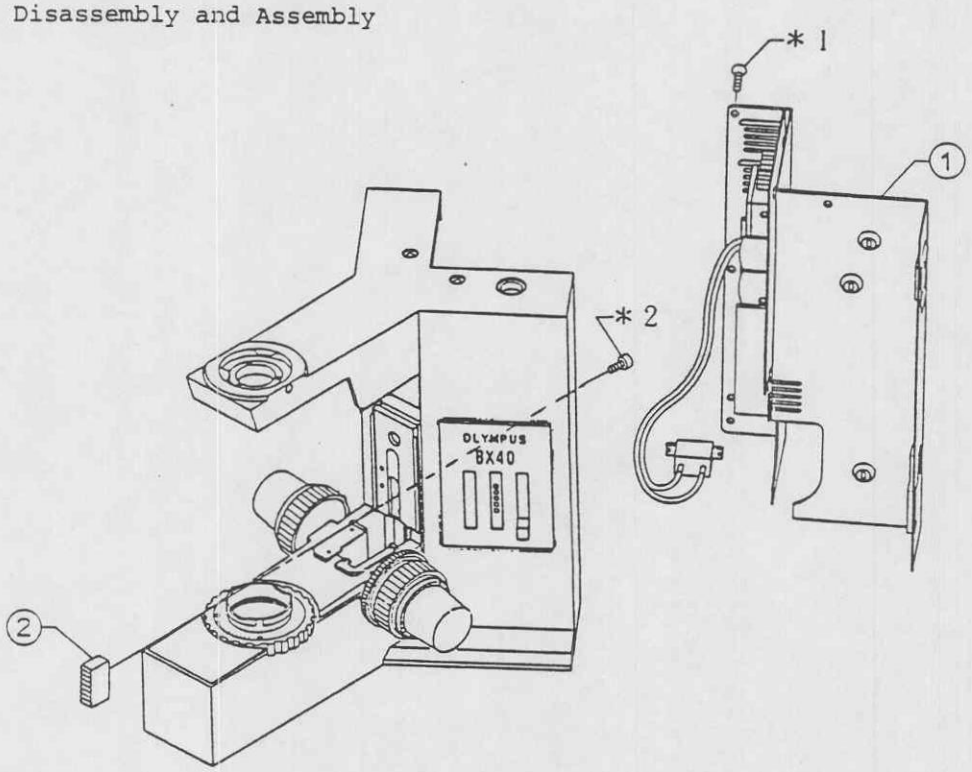
6. RACK

6-1 Precaution

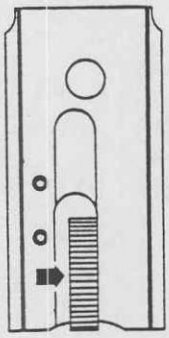
If the rack teeth are broken, the intermediate gear teeth may also be broken.

6-2 Disassembly and Assembly



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	POWER SUPPLY UNIT	CSK3x6SA(*1)6 pcs.			
②	RACK	AB3x6SA(*2) 2 pcs.		OT1126	E6-3(E-11)

6-3 Caution on securing the rack



(1) Push the rack in the direction of the arrow and mount it.

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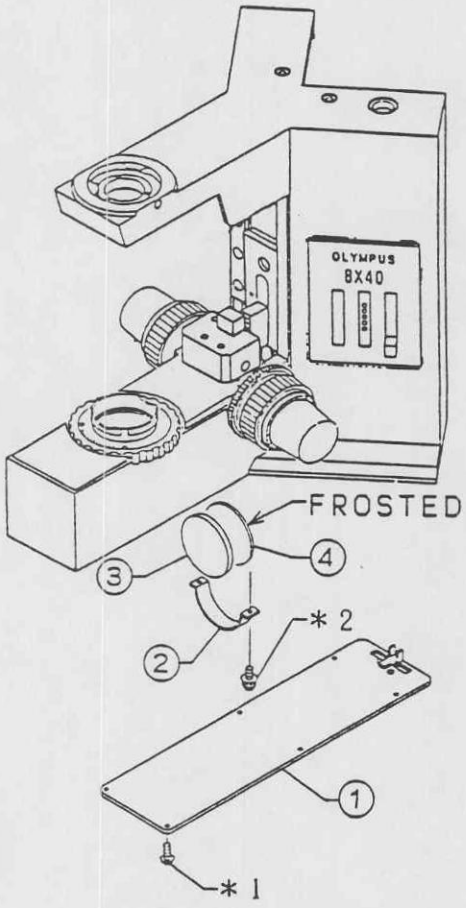
7. FILTER UNIT

7-1 Precaution

When replacing the FROSTED FILTER, pay attention to the frosted surface direction.

7-2 Disassembly and Assembly



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	BOTTOM PLATE	CUK3x6SA(*1) 8 pcs.			
②	FILTER HOLDER	CUKS3x8SA(*2)2 pcs.			
③	ADIABATIC GLASS				
④	FROSTED FILTER				Pay attention to the frosted surface.

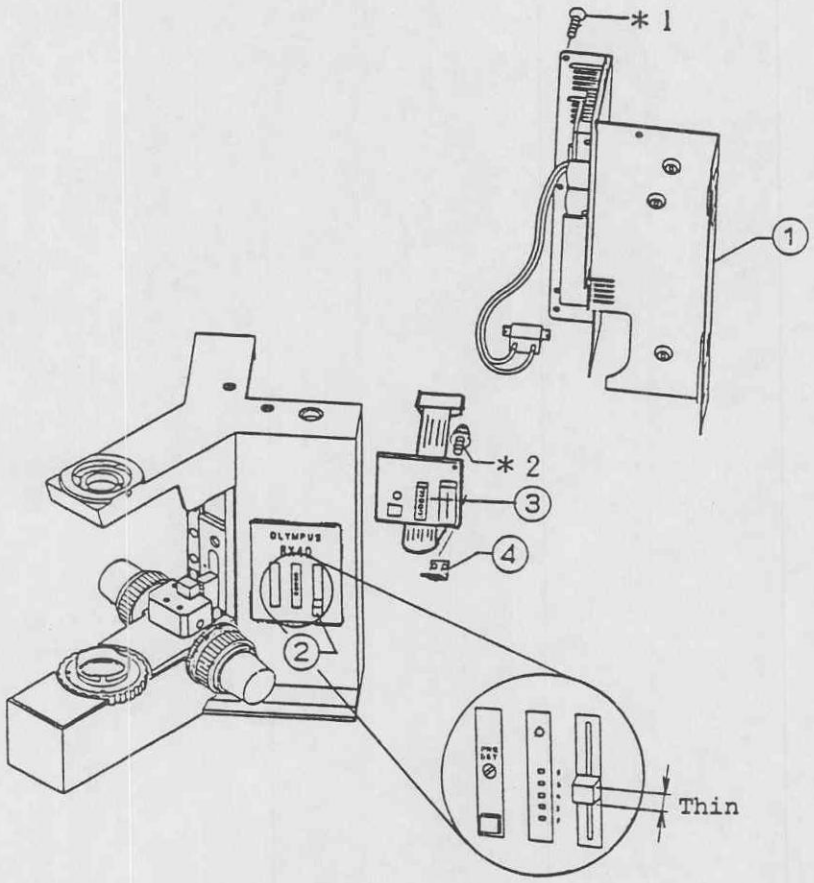
8. POWER SUPPLY UNIT

8-1 Precaution

When the board is replaced, the voltage adjustment is necessary.

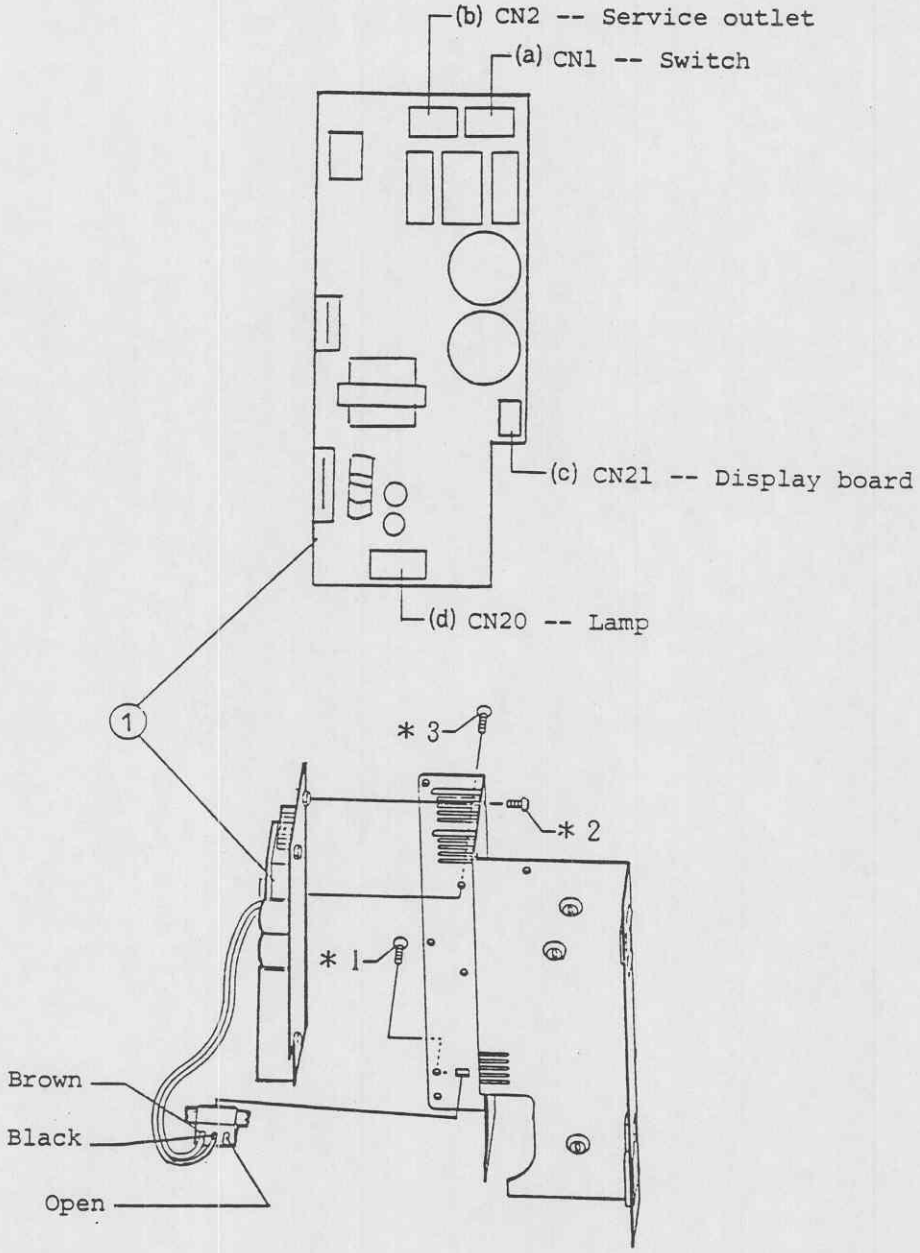
8-2 Disassembly and Assembly

(1) Whole unit



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	POWER SUPPLY UNIT	CTK3x6SA(*1) 6 pcs.			
②	KNOB				
③	DISPLAY BOARD	CUKSK3x4SA(*2)3 pcs.			
④	SPRING				

(2) Power board

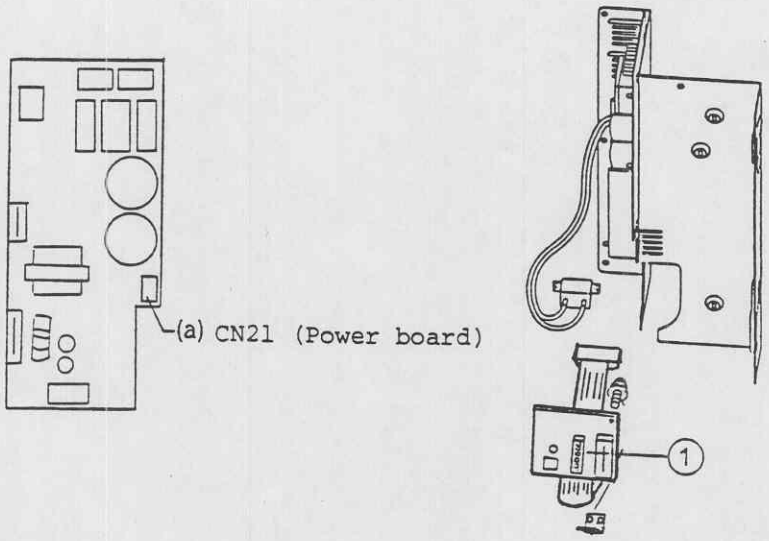


No.	Parts name	Connector	Screw	Adjustment
①	POWER BOARD	(a) CN1 --- Switch (b) CN2 --- Service outlet (c) CN21 -- Display board (d) CN20 -- Lamp	CSTS3x8SA(*1)2 pcs. CTK3x4SA(*2) 3 pcs. CSK3x4SA(*3) 2 pcs.	E8-3(E-16)

Note: When replacing the power board, apply the silicon grease between the board and the back panel.

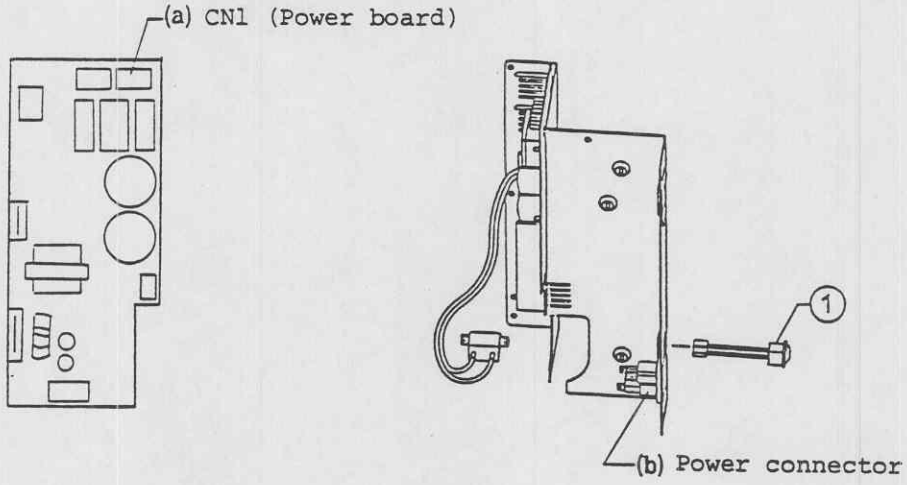
Silicon grease: OT1818

(3) Display board



No.	Parts name	Connector	Screw	Adjustment
①	DISPLAY BOARD	(a) CN21 (Power board)		E8-3(E-16)

(4) Main switch



No.	Parts name	Connector	Screw	Adjustment
①	MAIN SWITCH	(a) CN1 (Power board) (b) Power connector		

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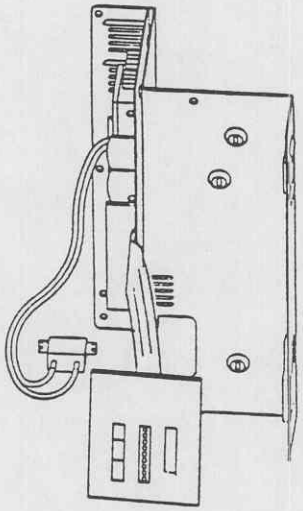
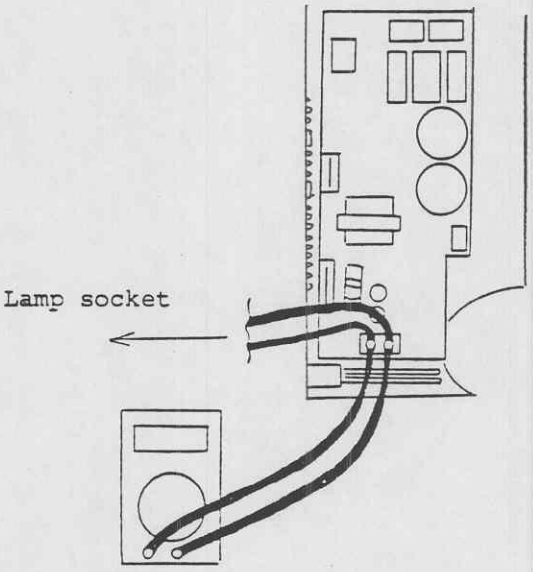
8-3 Voltage Adjustment

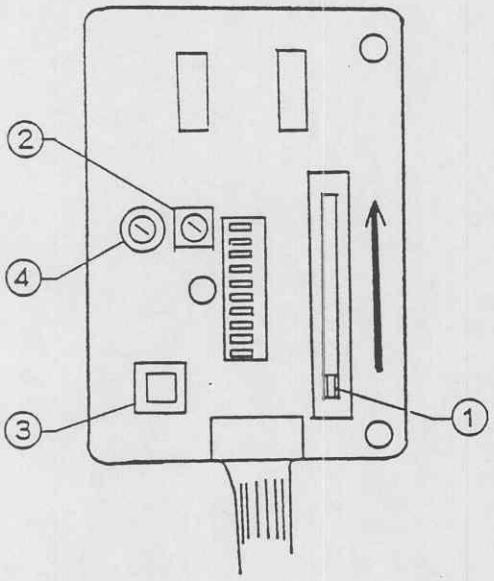
(1) Setup

Tool: Digital multimeter





(2) Adjustment procedure



i. Turn on the power and set the lamp to the maximum intensity by moving the LIGHT INTENSITY CONTROL KNOB ① in the direction of the arrow.

ii. Adjust the voltage to the standard value (shown below) by turning the trimmer RV2 ② .

Standard	5.7 ~ 5.9V

iii. Turn on the LIGHT PRESET SWITCH ③ .

iv. Adjust the voltage to the standard value (shown below) by turning the trimmer RV3 ④ .

Standard	3.7 ~ 4.3V

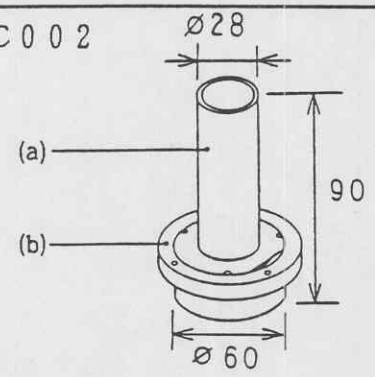
v. Check the above steps.

1. LIST OF JIGS AND TOOLS

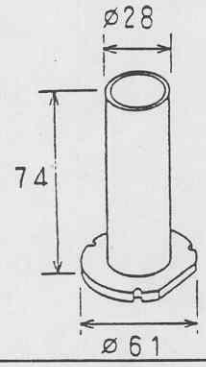
No.	Description	Page
BXKC002	Optical alignment jig for illumination part	E-8
BXKN001	UIS standard observation tube	E-8
KC2049	Eyepiece adapter	E-8
KN0029	Centering telescope	E-8
KN0048	Universal standard eyepiece with cross hairs	E-8
OT1143	Tension gauge (200g)	E-6
	Digital multimeter	E-16

2. EXPLANATION OF JIGS AND TOOLS

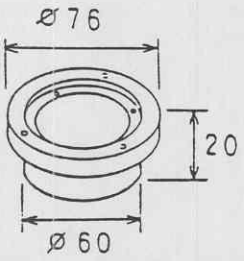
BXKC002



(a) Straight Tube Part



(b) Adapter Part

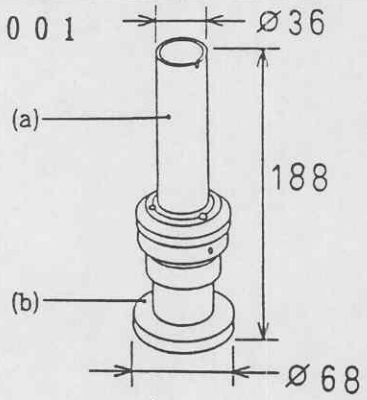


① BXKC002	② BX40F,BX50F,BX60F

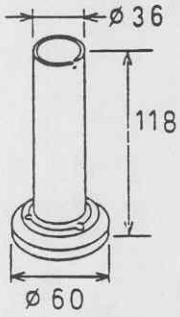
③ Optical Alignment Jig for illuminator part of frame.
Attach to the illuminator part of the frame and observe the cross hair of the standard eyepiece inserted into the standard observation tube with a CT.

It is composed of Straight Tube Part(a) and Adapter Part(b).
In case of BX40F, use only the Straight Tube Part(a).
In cases of BX50F and BX60F, use the whole jig.

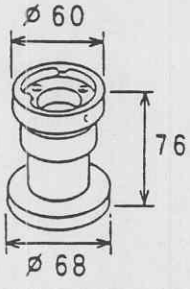
BXKN001



(a) Straight Tube Part



(b) Image Lens Part



① BXKN001	② GENERAL

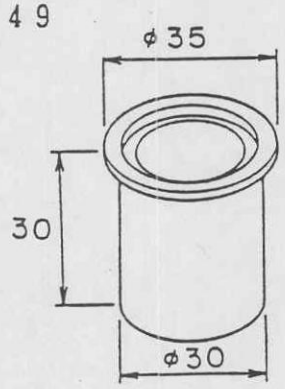
③ UIS Standard Observation Tube to adjust optical center and optical tube length.

It is composed of Straight Tube Part(a) and Image Lens Part(b).

In case of UIS observation tube, use only the Straight Tube Part (a).

In case of UIS intermediate tube, use the whole equipment.

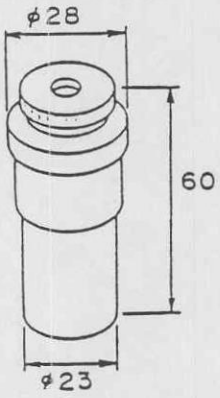
KC2049



① KC2049	② EYEPIECE

③ Eyepiece adapter to convert normal sleeve (ø23.2mm) into SW sleeve (ø30mm).
It has annulus for KN0028, KN0048, KN0022.

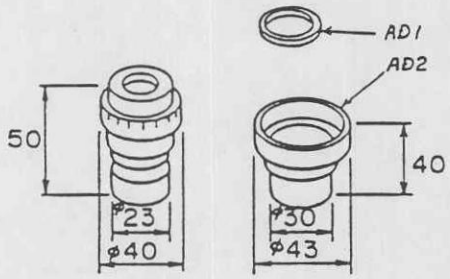
KN0029



① KN0029	② GENERAL

③ Centering telescope for normal sleeve (d=23.2mm). It is used for adjustment of exit pupil.

KN0048



① KN0048	② GENERAL

③ Universal use standard eyepiece for optical axis and tube length. It has two adapter. One is to convert to long barrel, and another one is to convert sleeve diameter d=23.2mm to d=30mm (for stereo).

1. LIST OF LUBRICANTS

<Grease>

No.	Description	Page
OT2010	Grease (Light)	E-5
OT1595	Silicone grease	E-7
OT1818	Silicone grease	E-14

2. LIST OF CHEMICALS

<Adhesive>

No.	Description	Page
OT1131	Shellac	E-3, 5, 7
OT1126	Anaemiamic adhesive	E-11

Symbol	Example	Description of symbol
①	①AB 612800 ①AB 612900 ①AQ 410800	Parts ASS'Y or parts itself can be supplied. Parts indicated "①"means parts ASS'Y. The above symbol is not written before parts number in case of supply of parts itself.
( )	②(AB 049600)	Parts itself cannot be supplied when the parts number is put in parenthesis "( )".
[	AB 021000 AB 230400 AA 600200	This bracket is used in case of selecting the proper part from a number of parts with slightly different dimension.
* 3	* 3	This asterisk denotes that a part can be used in several models and differs only by the engraving on it or an internal design feature. The differences are indicated in a table.
	CE 550600	This indicates counter-clockwise screw.
	CE 521500	Be carefull not to touch the parts marked with this symbol. Use tweezers because the parts have a special surface finish.
★	★12V-100W-HAL-L	Parts marked with this symbol cannot be supplied as repair parts. Please order through sales channels.
——	~~AB 021100~~ AB 175900	Used in case a part is substituted by a new design. The part number marked with a line "——" indicates old part, the new part number is without the line. Both parts can be supplied.
═══	AB 116100 ~~AA 136100~~	A double line indicates an old part which is superseded by a new design and no supply of the old part is available.
(t =) (d =) (h =) (ϕ =)	AB 656300(t = 0.5) AB 656400(t = 0.2) AB 656600(t = 0.1)	Figure put in "( )"after parts number indicates specific measurements of parts. t = thickness d = diameter h = height ϕ = symbol of diameter
△	△ AB 123400	This indicates additional parts when it is revised in the past.

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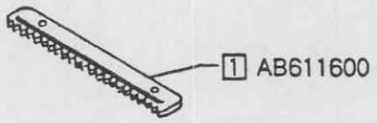
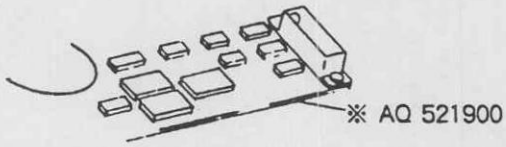
<table>
<tr><th>Symbol</th><th>Example</th><th>Description of symbol</th></tr>
<tr><td>↑</td><td>indicates Lens direction.
(Lens with frame is not marked)
ⓐMark with an arrow on convex side without regard to curvature.
convex/flat convex/concave
 
ⓑMark with an arrow on a sharp curve side. (radius of curvature is small.)
convex /convex concave /concave concave /flat
  </td><td></td></tr>
<tr><td>RED</td><td>indicates color of code
<table>
<tr><th>abbreviated name</th><th>color</th><th>abbreviated name</th><th>color</th></tr>
<tr><td>W H T</td><td>White</td><td>G R N</td><td>Green</td></tr>
<tr><td>B L K</td><td>Black</td><td>B L U</td><td>Blue</td></tr>
<tr><td>B R N</td><td>Brown</td><td>P R P</td><td>Purple</td></tr>
<tr><td>R E D</td><td>Red</td><td>G R A</td><td>Gray</td></tr>
<tr><td>O R N</td><td>Orange</td><td>S K Y</td><td>Sky</td></tr>
<tr><td>Y E L</td><td>Yellow</td><td>YEL/GRN</td><td>Yellow /Green</td></tr>
</table></td><td></td></tr>
<tr><td>1</td><td> 
1 AB611600</td><td>This indicates pair of replacing parts. When replaceing parts from old type to new type, replace the parts with same indicated number parts "1" simultaneously.</td></tr>
<tr><td>※</td><td> 
※ AQ 521900</td><td>This indicates that an explanatory note is printed below the part.</td></tr>
<tr><td>②</td><td>EXPLODED PARTS DIAGRAM
<table>
<tr><th>MODEL</th><th>UNIT</th><th>FIG</th></tr>
<tr><td>BX50F(1)</td><td></td><td>1</td></tr>
<tr><td colspan="3">OLYMPUS OPTICAL CO.,LTD. TOKYO. JAPAN</td></tr>
</table>
AR 0556
② BINDER No. 26</td><td>Number in circle "②" indicates the sequence of revised pages.
This number is located at the bottom of the page.</td></tr>
</table>

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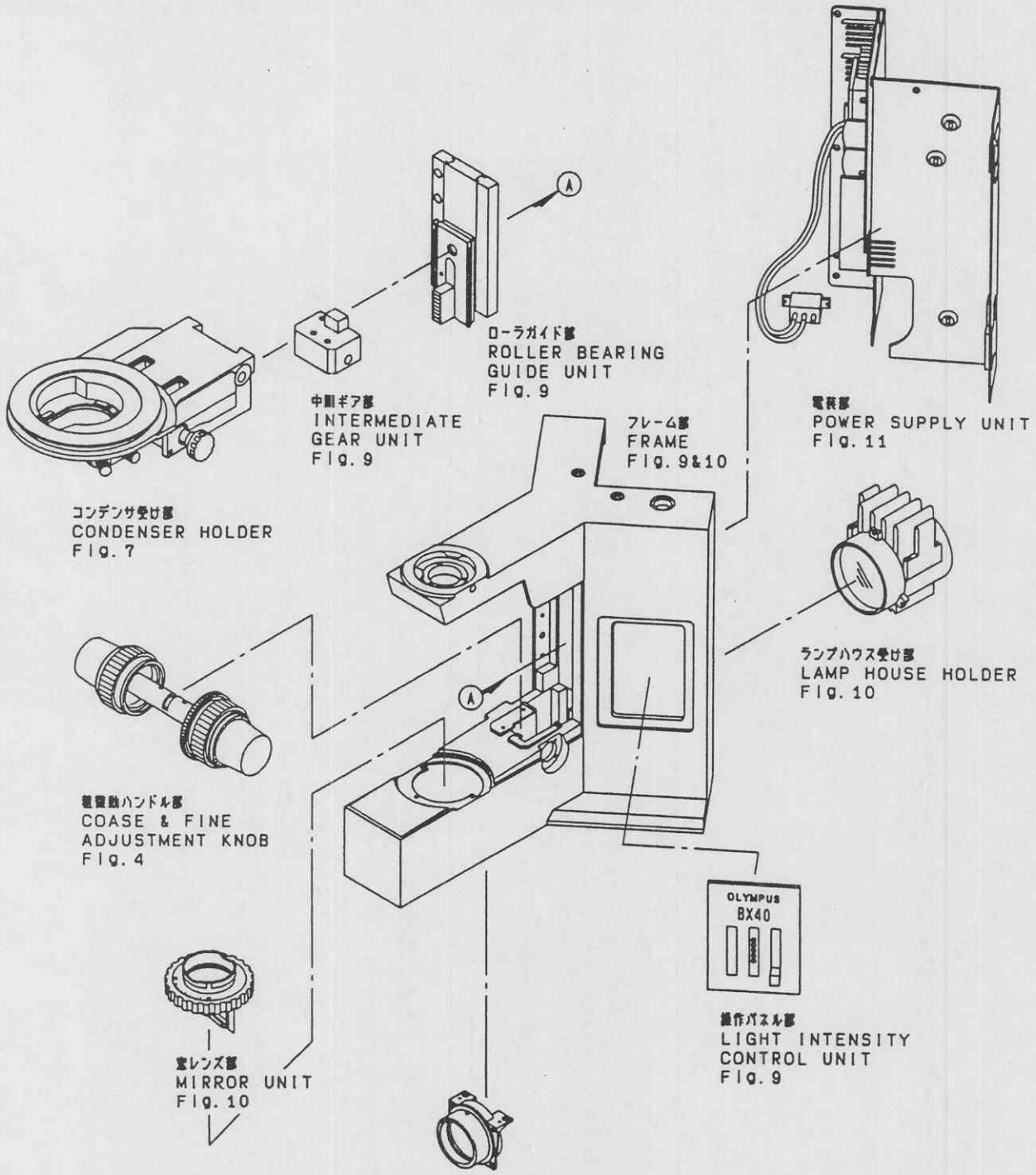
レイアウト図
LAYOUT CHART



結線図
CONNECTING DIAGRAM
Fig. 12

EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BX40F(1)		8
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

AR 0555

BINDER NO. 26

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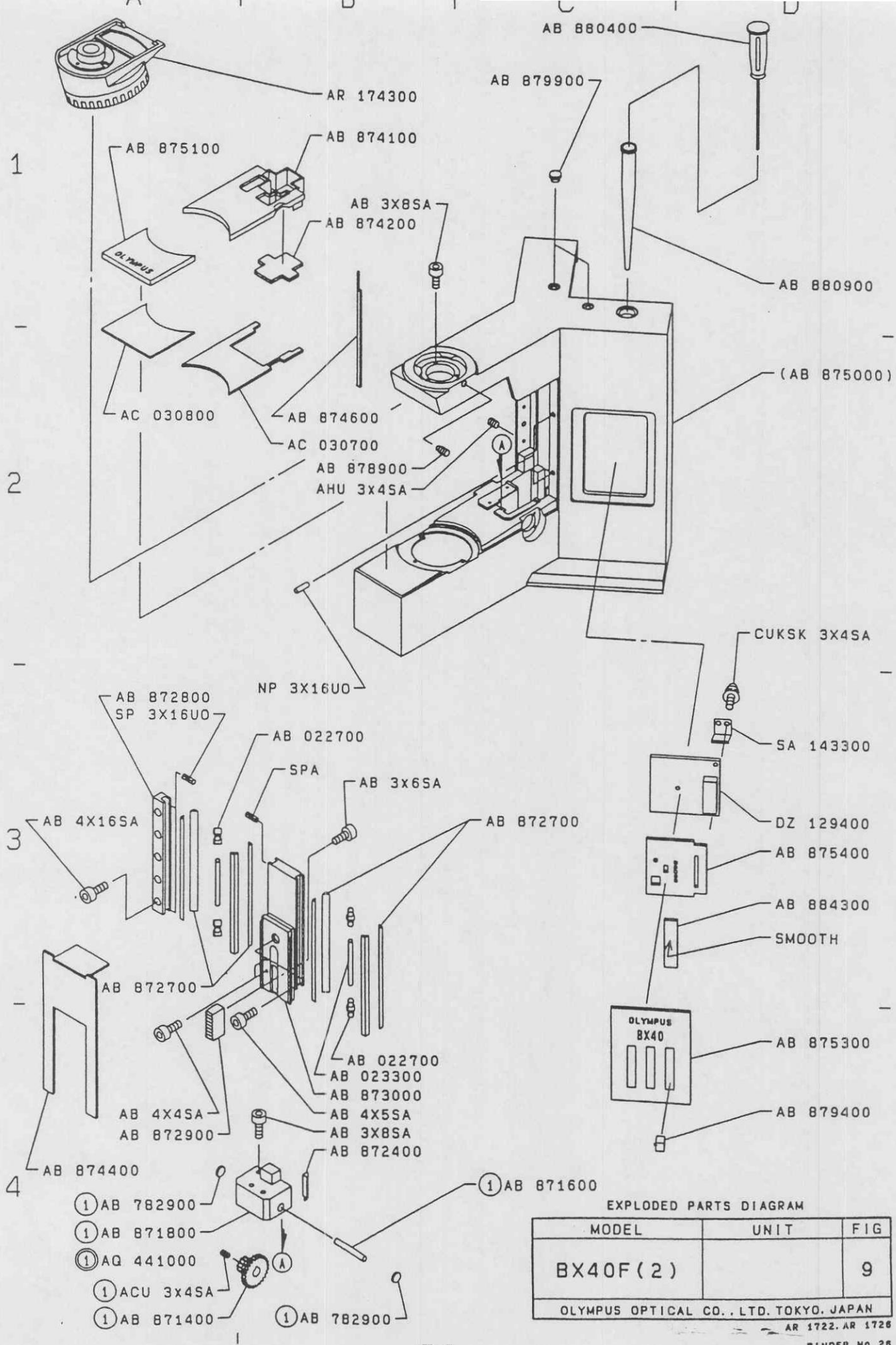
REFER TO	ユニット名	DESCRIPTION	COMMENT
FIG. 9 &10	本体部	FRAME	
FIG. 9	ローラガイド部	ROLLER BEARING GUIDE UNIT	
FIG. 10	ランプハウス受け部	LAMP HOUSE HOLDER	
FIG. 9	調光パネル部	LIGHT INTENSITY CONTROL UNIT	
FIG. 10	窓レンズ部	MIRROR UNIT	
FIG. 10	視野絞り部	FIELD DIAPHRAGM UNIT	・BX50F と共通。 COMMON TO BX50F.
FIG. 7	コンデンサ受け部	CONDENSER HOLDER	・BX50F と共通。 COMMON TO BX50F.
FIG. 4	粗微動ハンドル部	COASE & FINE ADJUSTMENT KNOB	・BX50F と共通。 COMMON TO BX50F.
FIG. 11	電源部	POWER SUPPLY UNIT	
FIG. 12	結線図	CONNECTING DIAGRAM	



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BX40F(2)		9

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

AR 1722, AR 1726

BINDER NO. 26

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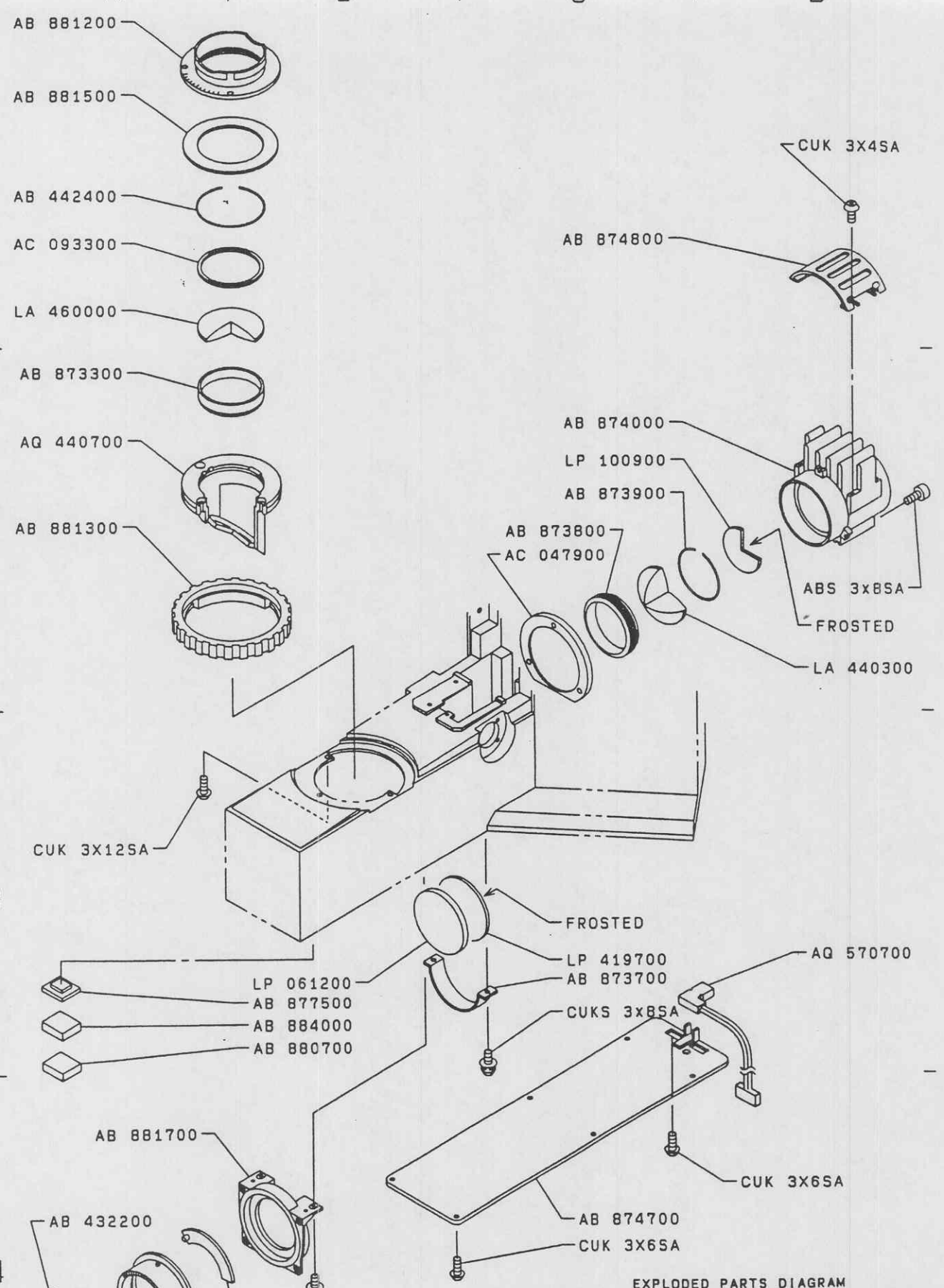
PARTS NO.	NAME OF PARTS		Q'ty
AB022700	コロ	ROLLER BEARING	12
023300	スペーサ	SPACER	2
782900	コンタミB	BLIND SEAL	2
800400	メイハン	NAME PLATE	1
871400	W ギア	GEAR	1
871600	アクシス	SHAFT	1
871800	G ボックス	GEAR BOX	1
872400	ギアカクシ	GEAR COVER	1
872700	ワイヤ	WIRE	8
872800	カタアリ	OUTER GUIDE	1
872900	ラック	RACK	1
873000	ガイドアリ	INNER GUIDE	1
874100	ボウジン1	COVER	1
874200	ボウジン2	COVER	1
874400	F パネル1	PANEL	1
874600	F パネル2	PANEL	1
875000	フレーム	FRAME	1
875100	カバー	COVER	1
875300	S パネル	PANEL	1
875400	S パネル	PANEL	1
878900	チクビス1	CLAMPING SCREW	1
879400	DSツマミ	KNOB	1
879900	キャップFW	CAP	2
880400	ロクカラ	HEXAGON WRENCH	1
880900	チューブ	WRENCH HOLDER	1
884300	ツライタ	PLATE	1
AC030700	シール	DOUBLE SIDE TAPE	1
030800	シール	DOUBLE SIDE TAPE	1
AR174300	レギ	NOSEPIECE	1
DZ129400	ディスプレイキバン	DISPLAY BOARD	1

PARTS NO.	NAME OF PARTS		Q'ty
WE402221	AB3X4SA	SCREW	2
402031	AB3X6SA	SCREW	2
402033	AB3X8SA	SCREW	3
402234	AB4X4SA	SCREW	2
402232	AB4X5SA	SCREW	1
402051	AB4X16SA	SCREW	5
WE120018	ACU3X4SA	SCREW	1
WE118001	AHU3X4SA	SCREW	3
WE168044	CUKSK3X4SA	SCREW	3
168026	CUKSK3X6SA	SCREW	8
WE159017	CUTS3X4SA	SCREW	6
159018	CUTS3X6SA	SCREW	12
WE601078	NP3X16U0	PIN	1

101



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BX40F(3)		10
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

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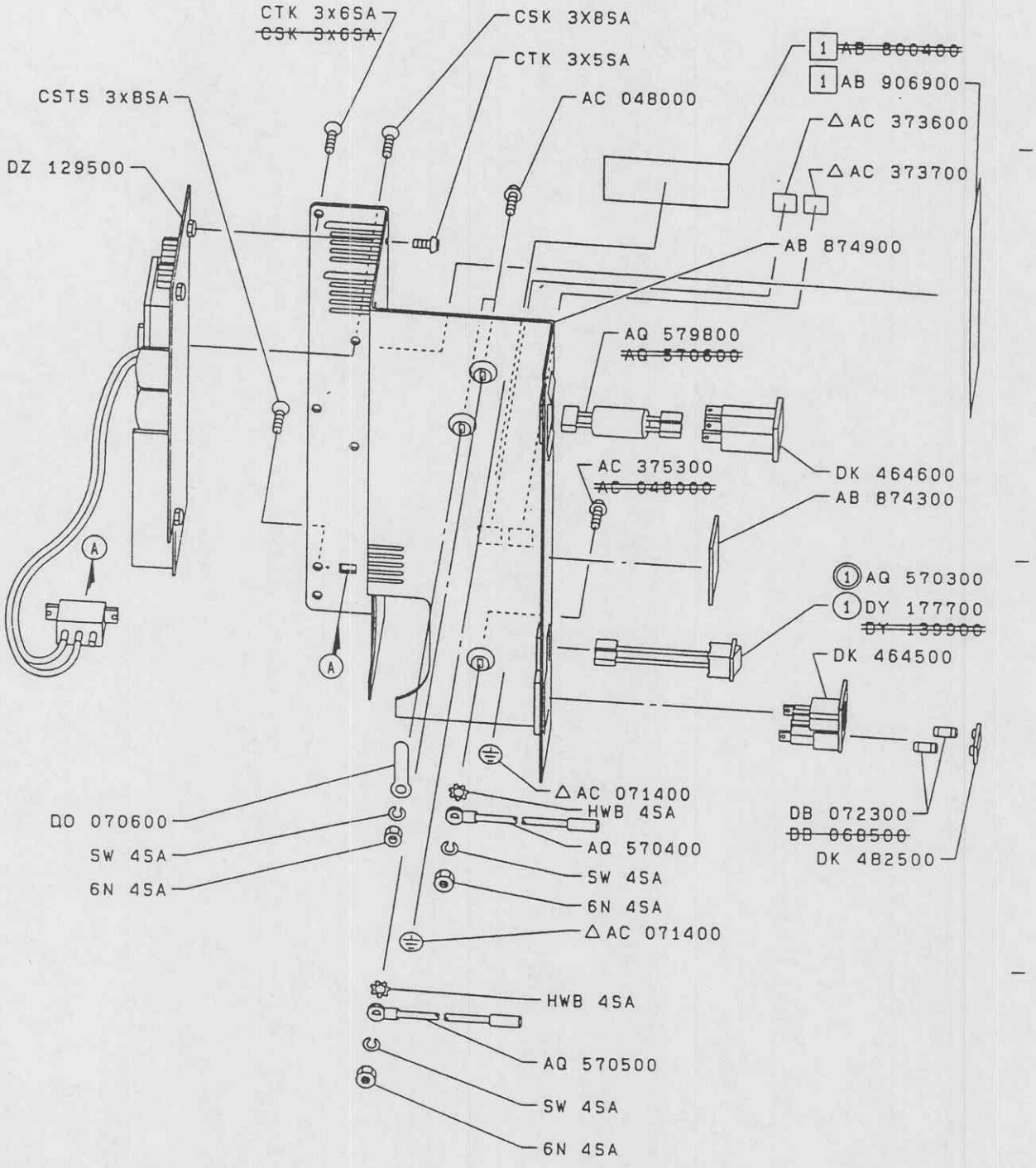
PARTS NO.	NAME OF PARTS		Q'ty
AB432200	ｵｻｴｲﾀ	PLATE	1
442400	ﾘﾝｸﾞ	SPRING RING	1
873300	ｽﾍﾟｰｻ	SPACER	1
873700	ﾛﾎﾞﾝｲﾀ	FILTER HOLDER	1
873800	L ﾘﾝｸﾞ	RETAINING RING	1
873900	C ﾘﾝｸﾞ	SPRING RING	1
874000	ﾗﾝﾌﾞﾜｸ	LENS FRAME	1
874700	ｿｺｲﾀ	BOTTOM PLATE	1
877500	ｽﾞﾚﾝｳｹ	FOOT 3	4
880700	ｽﾞﾚﾝ1	FOOT 1	4
881200	ﾌｨﾙﾀｰｻﾞ	FILTER MOUNT	1
881300	ﾏﾜｼｶﾝ	ROTARY RING	1
881500	ﾘｮｳﾒﾝﾃｰﾌﾟ	DOUBLE SIDE TAPE	1
881600	ｲﾄﾞｳﾜｸ	ROTARY FRAME	1
881700	ｼｷﾘｻﾞ	DIAPHRAGM FRAME	1
884000	ｻﾝﾗﾊﾞｰ2	FOOT 2	4
AC047900	HCﾍﾞｰｽ	BASE	1
093300	ｽﾍﾟｰｻ2	SPACER	1
AQ440700	ﾐﾗｰｸﾐ	MIRROR ASS'Y	1
570700	B4ｺﾈｸﾀｸﾐ	CABLE	1
LA440300	ﾚﾝｽﾞ	COLLECTOR LENS	1
460000	ﾚﾝｽﾞ	LENS	1
LP061200	ﾛﾎﾞﾝｶﾞﾗｽ	HEAT ABSORBING FILTER	1
100900	ﾌﾛｽﾄﾌｨﾙﾀｰ	FROSTED FILTER	1
419700	ﾌﾛｽﾄﾌｨﾙﾀｰ	FROSTED FILTER	1
ZA078800	ﾊﾈ	DIAPHRAGM BRADE	10

PARTS NO.	NAME OF PARTS		Q'ty
WE405001	ABS3X8SA	SCREW	3
WE114143	CUK3X4SA	SCREW	4
114160	CUK3X6SA	SCREW	8
114105	CUK3X12SA	SCREW	3
WE167011	CUKS3X8SA	SCREW	2
WE166026	CUKSB3X6SA	SCREW	2
WE159018	CUTS3X6SA	SCREW	4



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BX40F(4)		11
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

AR 1729

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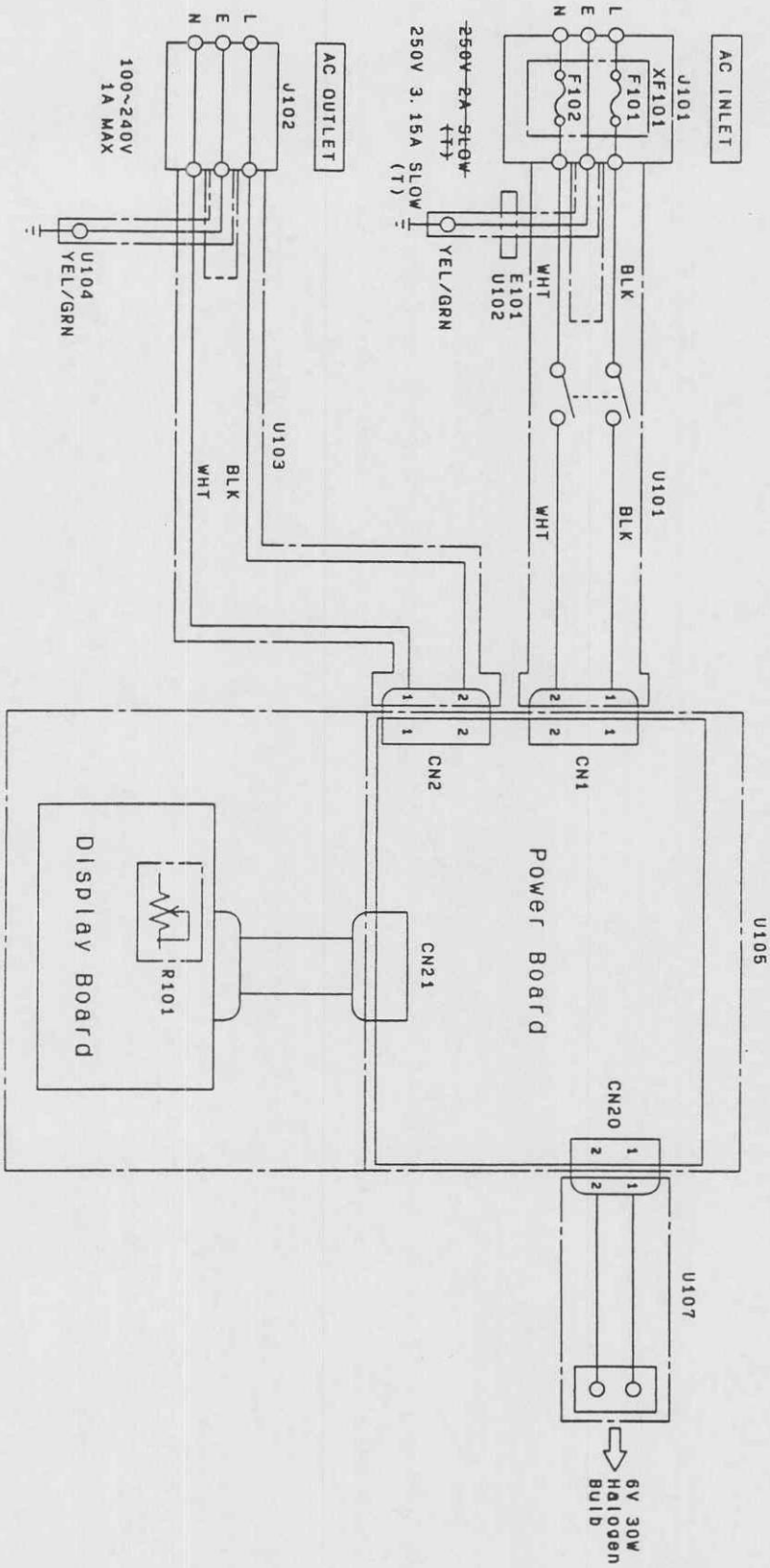
PARTS NO.	NAME OF PARTS		Q'ty
AB874300	ﾒｲﾊﾝ	NAME PLATE	1
874900	W ｲﾀ	BACK PLATE	1
800400	F ﾒｲﾊﾝ	NAME PLATE	1
906900	LHﾒｲﾊﾝ	PLATE	1
~~AC048000~~	~~ｱｰｽﾋﾞｽ~~	~~SCREW~~	~~8~~
AC375300	ｱｰｽﾋﾞｽ	SCREW	3
071400	ｱｰｽﾏｰｸ	EARTH MARK	2
373600	GSﾒｲﾊﾝ	GS PLATE	1
373700	CEﾒｲﾊﾝ	CE PLATE	1
AQ570300	B4SWｸﾐ	SWITCH ASS'Y	1
570400	FG ｹｰﾌﾞﾙ A	CABLE	1
570500	FG ｹｰﾌﾞﾙ B	CABLE	1
~~570600~~	~~AC ｹｰﾌﾞﾙ~~	~~CABLE~~	~~1~~
579800	AC ｹｰﾌﾞﾙ	CABLE	1
~~DB068500~~	~~ﾋｭｰｽﾞ~~	~~FUSE [250V2A(T)SLOW]~~	~~2~~
DB072300	ﾋｭｰｽﾞ	FUSE [250V3.15A(T)SLOW]	2
DK464500	ﾃﾞﾝｹﾞﾝｺﾈｸﾀ	AC INLET	1
464600	ﾃﾞﾝｹﾞﾝｺﾈｸﾀ	AC OUTLET	1
482500	ﾎﾙﾀﾞ	FUSE HOLDER	1
DO070600	ｺｰﾄﾞﾎﾙﾀﾞ	CORD HOLDER	1
~~DY130900~~	~~ｼｰｿ SW~~	~~SWITCH~~	~~1~~
DY177700	ｼｰｿ SW	SWITCH	1
DZ129500	ﾊﾟﾜｰｷﾊﾞﾝ	POWER BOARD	1

PARTS NO.	NAME OF PARTS		Q'ty
WE106053	CSK3X4SA	SCREW	2
~~106060~~	~~CSK3X6SA~~	~~SCREW~~	~~6~~
WE124002	CSTS3X8SA	SCREW	2
WE104066	CTK3X4SA	SCREW	3
	CTK3X6SA	SCREW	9
WE306012	HWB4SA	WASHER	2
WE501026	6N4SA	NUT	3

結線図 : CONNECTING DIAGRAM



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BX40F(5)		12
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

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INDEX No.	PARTS No.	NAME OF PARTS	Q'ty
E 101	DZ142700 フェライトコア	FERRAITE CORE	1
~~F 101~~	~~DB068500 ヒューズ~~	~~FUSE~~	~~2~~
~~102~~		~~[250V2A(T)SLOW]~~	
F 101	DB072300 ヒューズ	FUSE	2
102		[250V3.15A(T)SLOW]	
J 101	DK464500 デンゲンコネクタ	AC INLET	1
102	DK464600 デンゲンコネクタ	AC OUTLET	1
R 101	AQ440200 スライドテイコウ	VALIABLE RESISTOR	1
U 101	AQ570300 B4SW-クミ	SWITCH ASS'Y	1
102	AQ570400 FG ケーブル A	CABLE	1
~~103~~	~~AQ570600 AC ケーブル~~	~~CABLE~~	~~1~~
103	AQ579800 AC ケーブル	CABLE	1
104	AQ570500 FG ケーブル B	CABLE	1
105	DZ129500 パワーキバン	POWER BOARD	1
106	DZ129400 ディスプレイキバン	DISPLAY BOARD	1
107	AQ570700 B4コネクタクミ	CONNECTOR ASS'Y	1
XF101	DK482500 ホルダ	FUSE HOLDER	1

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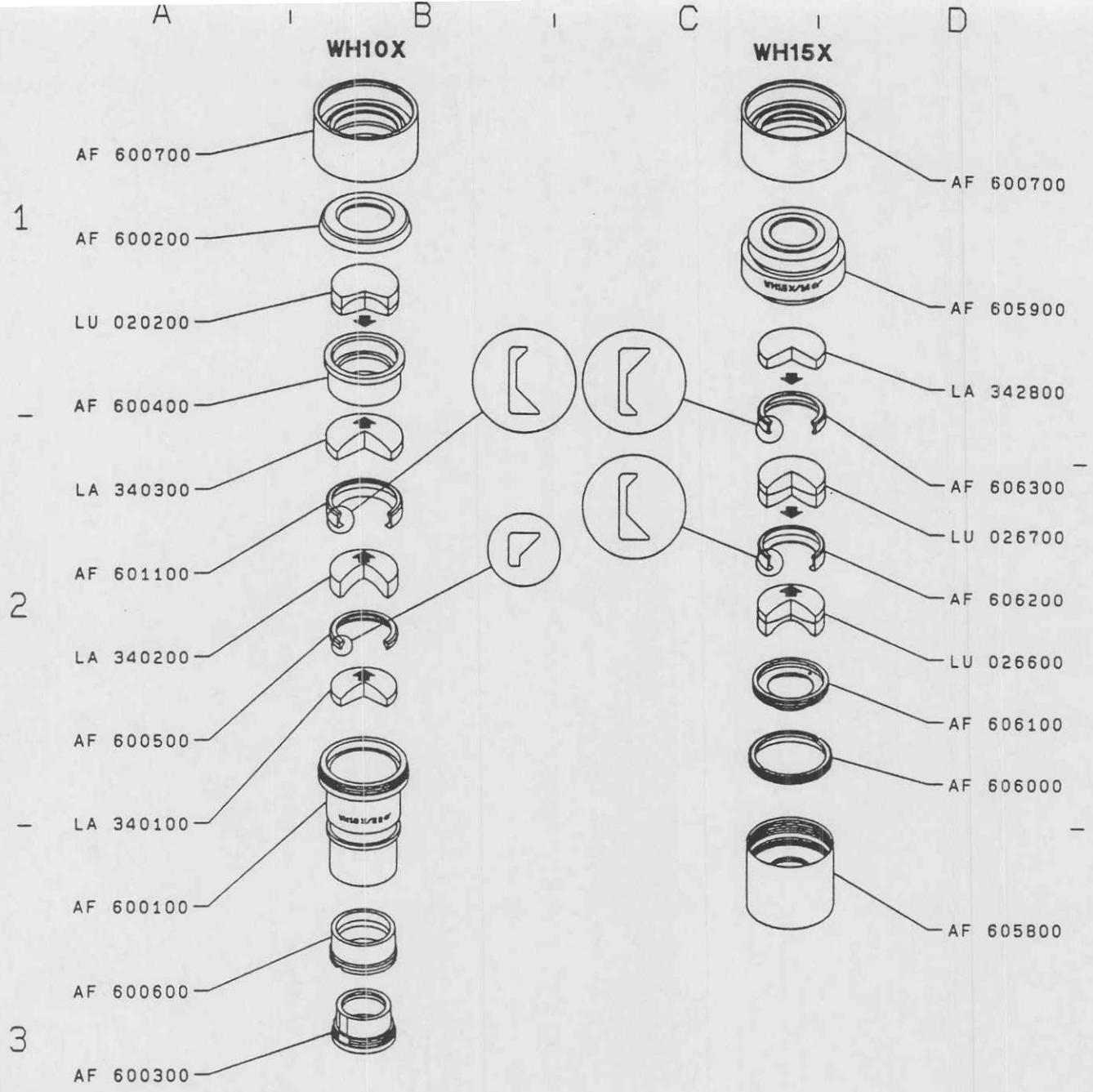

WH10X

PARTS No.		NAME OF PARTS	Q'ty
AF 600100	ｷﾝﾀｲ	TUBE	1
AF 600200	ｷｬｯﾌﾟ	RETAINING RING	1
AF 600300	ﾄﾘﾂｹｶﾝ	MOUNTING RING	1
AF 600400	SP1(ｽﾍﾟｰｻ)	SPACER	1
AF 600500	SP2(ｽﾍﾟｰｻ)	SPACER	1
AF 600600	ｵｻｴｶﾝ	RING	1
AF 600700	ｱｲｼｪｰﾄﾞ	EYESHADE	1
AF 601100	SP3(ｽﾍﾟｰｻ)	SPACER	1
LA 340100	1-T(ﾚﾝｽﾞ)	LENS	1
LA 340200	2-O(ﾚﾝｽﾞ)	LENS	1
LA 340300	3-T(ﾚﾝｽﾞ)	LENS	1
LU 020200	1-LACE(ﾚﾝｽﾞ)	LENS	1

WH15X

PARTS No.		NAME OF PARTS	Q'ty
AF 600700	ｱｲｼｪｰﾄﾞ	EYESHADE	1
AF 605800	ﾂﾂ	TUBE	1
AF 605900	ｷﾝﾀｲ	TUBE	1
AF 606000	ﾄﾘﾂｹｶﾝ	MOUNTING RING	1
AF 606100	ｵｻｴｶﾝ	RETAINING RING	1
AF 606200	SP1(ｽﾍﾟｰｻ)	SPACER	1
AF 606300	SP2(ｽﾍﾟｰｻ)	SPACER	1
LA 342800	3-T(ﾚﾝｽﾞ)	LENS	1
LU 026600	1-LACE(ﾚﾝｽﾞ)	LENS	1
LU 026700	2-LACE(ﾚﾝｽﾞ)	LENS	1

EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
WH10X WH15X		1
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

AR 6024, AR 6033
BINDER No. 29

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A | B | C | D

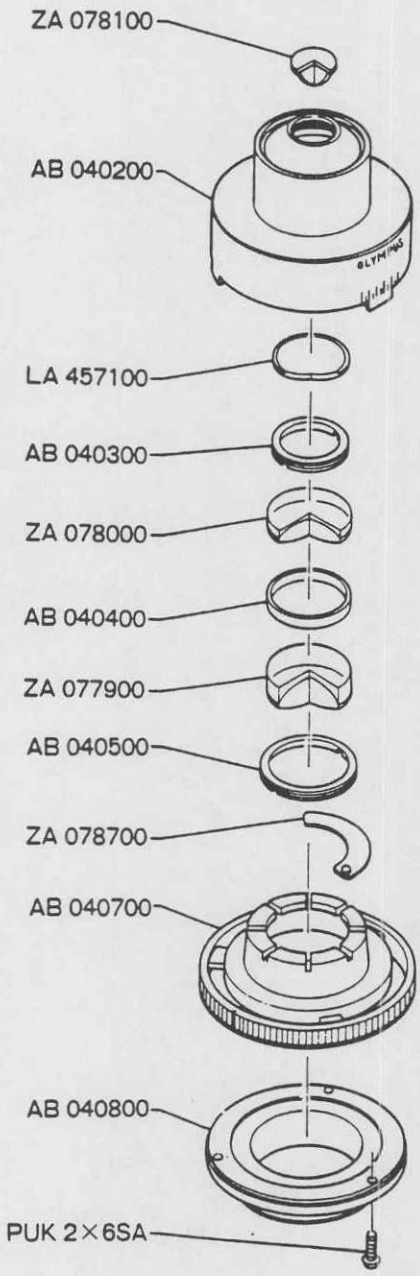
1

2

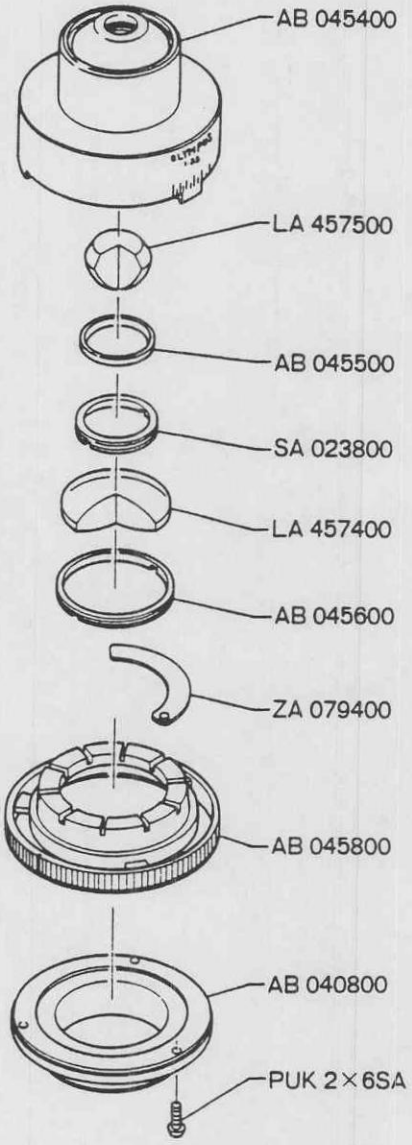
3

4

B2-AAC



B2-CD & U-AC



AB814400 WHITE COVER

EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BH2	B2-CD & U-AC B2-AAC	17

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NOTE: WHEN ORDERING FOR SPARE PARTS, PLEASE CLARIFY A MODEL OR UNIT, PARTS NUMBER AND QUANTITY.

B2-AAC & U-AC

部番 PARTS No.	部品名 NAME OF PARTS		個数 Q'ty
AB 040200	ホンタイ	CONDENSER FRAME	1
040300	R	RING	1
040400	dp	SPACER RING	1
040500	R	RING	1
040700	シボリリング	DIAPHRAGM RING	1
040800	アリ	DOVETAIL	1
LA 457100	レンズ	LENS	1
ZA 078700	ハネ	DIAPHRAGM BLADE	8
077900	レンズ	LENS	1
078100	レンズ	LENS	1
PUK 2X6SA	ビス	SCREW	3

B2-CD

部番 PARTS No.	部品名 NAME OF PARTS		個数 Q'ty
AB 040800	アリ	DOVETAIL	1
045400	ホンタイ	CONDENSER FRAME	1
045500	オサエイタ	RING	1
045600	R	RING	1
045800	シボリリング	DIAPHRAGM RING	1
SA 023800	リング	RING	1
LA 457400	レンズ	LENS	1
457500	レンズ	LENS	1
ZA 079400	ハネ	DIAPHRAGM BLADE	10
PUK 2X6SA	ビス	SCREW	3

SECTION B

THIS SECTION CONTAINS INFORMATION ON BX40 STAGE

SEE TABLE OF CONTENTS NEXT PAGE

CONTENTS

TABLE OFCONTENTS
SECTION B
BX STAGE

List of Illustrations and Tables

Section B BX40 Stage

1. OUTLINE

The product is a stage with vertical low drive control to be attached to a series of system microscopes.
The product has two types according to the position of its X/Y knob. One is U-SVL (left-hand control) and the other is U-SVR (right-hand control). Both U-SVLD(B) and U-SVRD(B) have a specimen holder for two specimens. On the other hand, both U-SVLS(B) and U-SVRS(B) have a specimen holder for one specimen.
The (B) added at the end of the model, like U-SVLD(B), indicates the X/Y-knob for the long length type (25mm longer than the ordinary X/Y-knob).

2. FEATURES

(1) The surface of the stage is excellent in resistance to wear and takes no scratch because it is coated with melted ceramic.

(2) The X/Y-KNOB torque can be adjusted by the user.

(3) Since the X-guide unit is installed in the lower side of the stage, pieces of broken glass or dust are hard to enter into the guide unit.

(4) The working ranges of the X and Y-guides are 76mm and 52mm respectively. They are wider than those of conventional type.

(5) The stage can be rotated by slightly unfastening fixed screws.

(6) The shape of the specimen holder is designed not to interfere with objectives up to 40× magnification (except Plan Apo) in the height and directions. The whole surface of a specimen can be observed.

(7) Because the stage covers a wide area, large specimens can be placed on it.

3. USING CONDITIONS

(1) The stages cannot be installed in frames other than BX frames (BX40, BX50, BX60, BX60M), and AX frames.

(2) Operating temperature range 0 ~ 40°C

4. SPECIFICATIONS

	U-SVLD(B)	U-SVLS(B)	U-SVRD(B)	U-SVRS(B)
1 Type	Rectangular ceramic coated stage with coaxial lower left mechanical knob		Rectangular ceramic coated stage with coaxial lower right mechanical knob	
2 Size	Y:135mm × X:180mm			

		*U-SVLD(B)	U-SVLS(B)	*U-SVRD(B)	U-SVRS(B)
3	X/Y-guide movement	Ball guide system with rack and pinion The X/Y-control knob's rotary torque is adjustable. (No tool is required.) (Torque's adjustable range : 40 ~ 400g) Stroke Y:52mm × X:76mm (*The whole surface of 2 pieces of standard slide glass is observable.) Graduated (vernier minimum reading: 0.1mm)			
4	Rotation	Clockwise 232° Counterclockwise 20°		Clockwise 20° Counterclockwise 232°	
5	Specimen holder	U-SVLD and U-SVRD are used for holding 2 specimens (U-SVLS and U-SVRS hold 1 specimen). It can be freely detachable.			
6	Surface treatment	Ultra wear resistant ceramic (black) * No wear of the coating was seen after 500,000 slide changes.			
7	The position of X/Y-knob (top)	80mm from table surface 55mm from the table surface (long length type)			
8	Weight	1.2kg			
9	Other	Objective of 40× magnification or less does not interfere with the specimen holder. The whole surface of slide glass can be observed (except for immersion oil type and PlanApo).			

1. INTRODUCTION

There are eight kinds of BX stages, U-SVLD(B), U-SVRD(B), U-SVLS(B) and U-SVRS(B). Models are classified by X/Y-knob position and length, and specimen holder to be used (refer to Table 1). In this manual, of these eight kinds of BX stages, U-SVLD is described using illustrations, etc.

	U-SVLD(B)	U-SVRD(B)	U-SVLS(B)	U-SVRS(B)
Position in which X/Y KNOB is installed	Left	Right	Left	Right
Specimen holder to be used	For 2 specimens	For 2 specimens	For 1 specimen	For 1 specimen

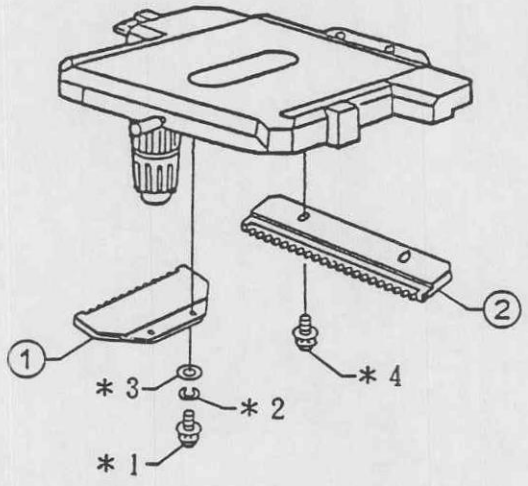
Table 1

Before disassembling each part, either the Y-RACK ASS'Y ① or the X-RACK ASS'Y ② are removed to evaluate which is defective, namely the GUIDE UNIT or the X/Y-KNOB ASS'Y.
The work is performed according to the item (Refer to Table 2).

Screw HK3-345SA 2 pcs. (*1) Washer SW3SA 2 pcs. (*2)
CUKSK3x6SA 2 pcs. (*4) KNW3SA 2 pcs. (*3)

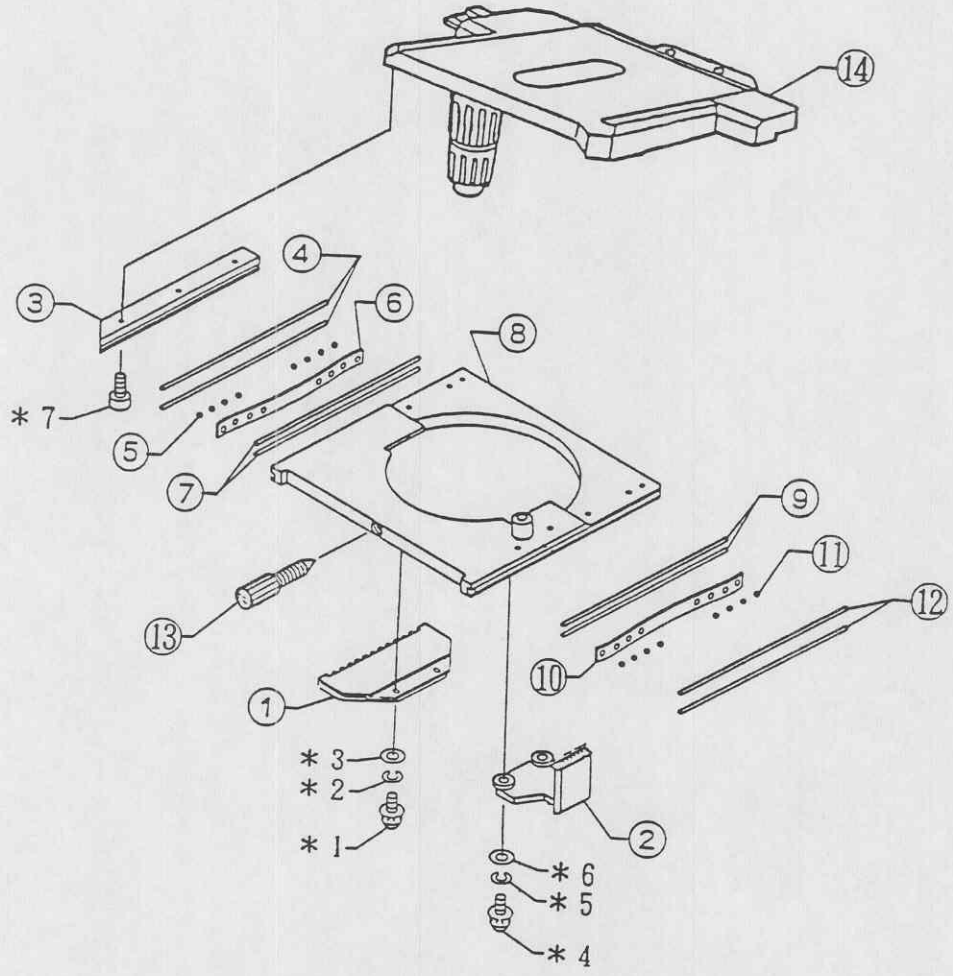
Cause of defect	Item	Page
Defect of Y-GUIDE UNIT	Repair of Y-GUIDE UNIT	B-2
Defect of X-GUIDE UNIT	Repair of X-GUIDE UNIT	B-6
Defect of X/Y-KNOB ASS'Y	Repair of X/Y-KNOB ASS'Y	B-10

Table 2



2. REPAIR OF Y-GUIDE UNIT

2-1 Disassembly and assembly



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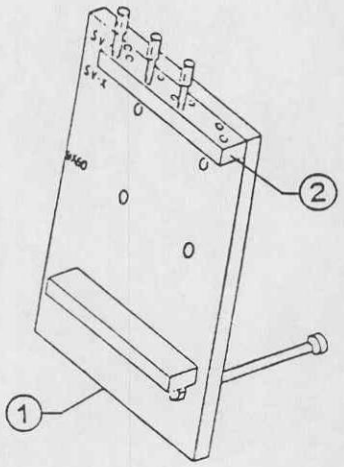
No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	Y-RACK ASS'Y	HK3-345SA (*1) 2 pcs. SW3SA (*2) 2 pcs. KNW3SA (*3) 2 pcs.			B2-2(B-5)
②	VERNIER MOUNT ASS'Y	HK3-345SA (*4) 2 pcs. SW3SA (*5) 2 pcs. KNW3SA (*6) 2 pcs.			
③	Y-GUIDE	AB3x8SA (*7) 3 pcs.	OT1595	OT1338	B2-2(B-4)
④	WIRE GUIDE (2 pcs.)				
⑤	BALL (8 pcs.)	B3	OT1595		
⑥	CASING				
⑦	WIRE GUIDE (2 pcs.)				
⑧	LOWER STAGE		OT1595		
⑨	WIRE GUIDE (2 pcs.)				
⑩	CASING				
⑪	BALL (8 pcs.)	B3	OT1595		
⑫	WIRE GUIDE (2 pcs.)				
⑬	KNOB ASS'Y		OT1595		
⑭	UPPER STAGE		OT1595		

* When assembling, parts ③ to ⑫ are assembled on the UPPER STAGE ⑭, and the Y-GUIDE ③ is provisionally fastened with screws. Adjust the working force of the Y-GUIDE referring to "2-2 Adjustment of working force of Y-GUIDE UNIT" (B-4).

2-2 Adjustment of working force of Y-GUIDE UNIT

(1) Set the BLOCK ② of JIG (BXKC001) ① to the position of "SV-Y".



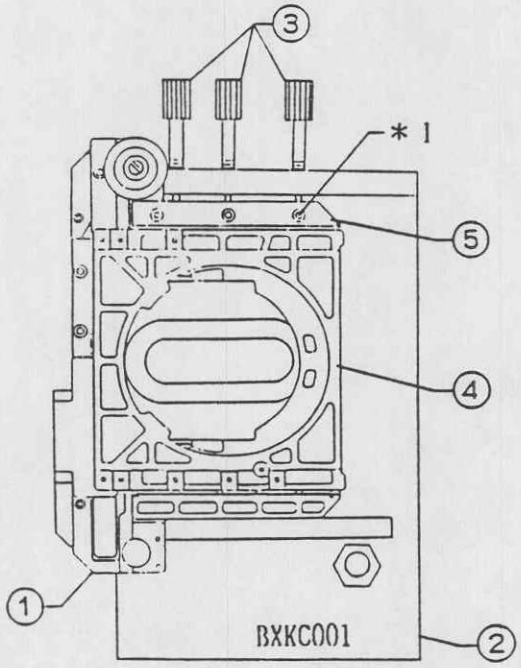
(2) Set the STAGE ① to JIG (BXKC001) ② and fasten it with three pieces of KNOB ③.

(3) Screw in and out three pieces of KNOB ③ so that the Y-GUIDE UNIT ④ can work without play, uneveness or jumping and the working force can be within the following standard.

Standard	8 ~ 15g	The tension gauge 110g (OT0085) is to be used.

(4) After adjusting the Y-GUIDE ⑤ position, tighten three screws firmly.

Screw AB3x8SA 3 pcs. (*1)



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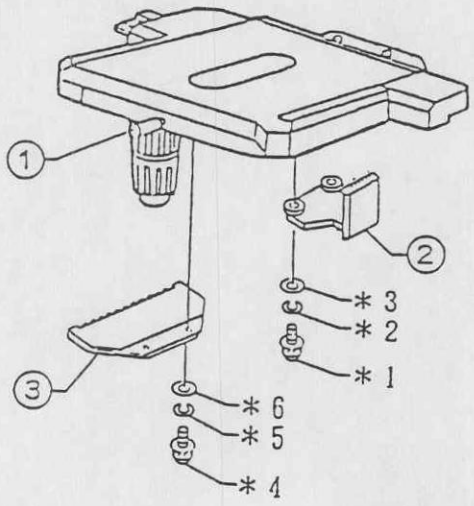
(5) Attach the KNOB ASS'Y ①, the VERNIER MOUNT ASS'Y ②, the Y-RACK ASS'Y ③ to the STAGE with two screws each.

Screw	HK3-345SA	2 pcs. (*1)	Washer	SW3SA	2 pcs. (*2)	KNW3SA	2 pcs.	(*3)
	HK3-345SA	2 pcs. (*4)		SW3SA	2 pcs. (*5)	KNW3SA	2 pcs.	(*6)

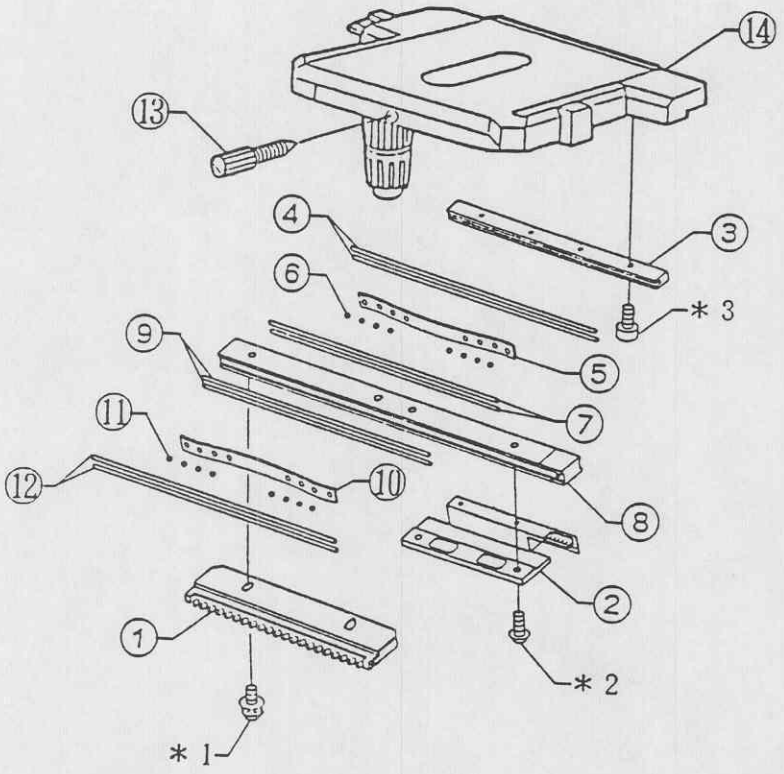
* The Y-RACK ASS'Y ③ must be attached so as not to cause any play or uneveness.



121

3. REPAIR OF X-GUIDE UNIT

3-1 Disassembly and assembly



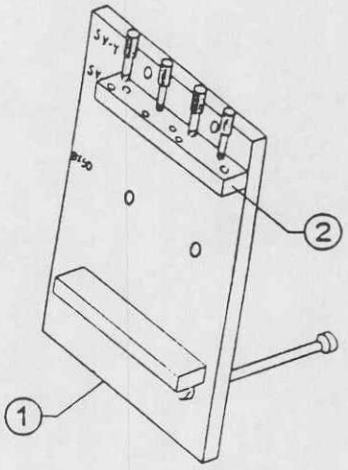
122

No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	X-RACK ASS'Y	CUKSK3x6SA(*1) 2 pcs.			B3-2(B-9)
②	CLIP GUIDE ASS'Y	CUK3x6SA(*2) 2 pcs.			
③	X-GUIDE	AB3x4SA(*3) 4 pcs.	OT1595	OT1338	B3-2(B-8)
④	WIRE GUIDE (2 pcs.)				
⑤	CASING				
⑥	BALL (8 pcs.)	B3	OT1595		
⑦	WIRE GUIDE (2 pcs.)				
⑧	FEEDING PLATE		OT1595		
⑨	WIRE GUIDE (2 pcs.)				
⑩	CASING				
⑪	BALL (8 pcs.)	B3	OT1595		
⑫	WIRE GUIDE (2 pcs.)				
⑬	KNOB ASS'Y		OT1595		
⑭	UPPER STAGE		OT1595		

* When assembling, parts ③ to ⑫ are assembled on the UPPER STAGE ⑭, and the X-GUIDE ③ is provisionally fastened with screws. Adjust the working force of the X-GUIDE UNIT referring to "3-2 Adjustment of working force of X-GUIDE UNIT (B-8)".

3-2 Adjustment of working force of X-GUIDE UNIT

(1) Set the block ② of JIG (BXKC001) ① to the position of "SV-X".



(2) Set the STAGE ① to the JIG (BXKC001) ② , and fasten it with four pieces of KNOB ③ .

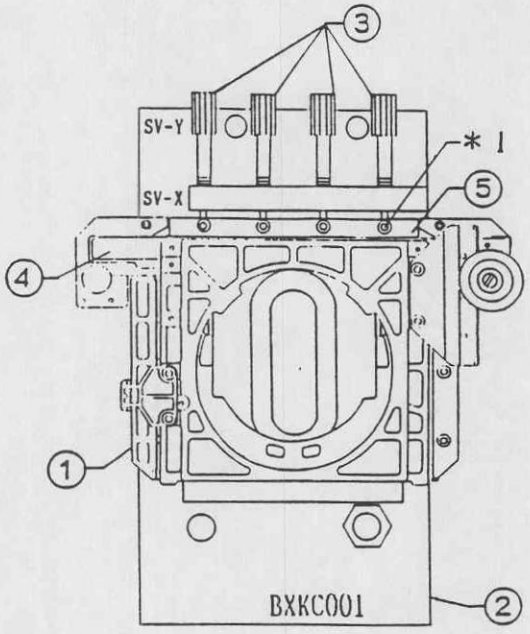
(3) Screw in and out four pieces of KNOB ③ so that the X-GUIDE UNIT ④ can work without play, uneveness, jumping, etc. and the working force can be within the following standard.

Standard	8 ~ 15g

The tension gauge 110g (OT0085) is to be used.

(4) After adjusting the X-GUIDE ⑤ position, tighten four screws firmly.

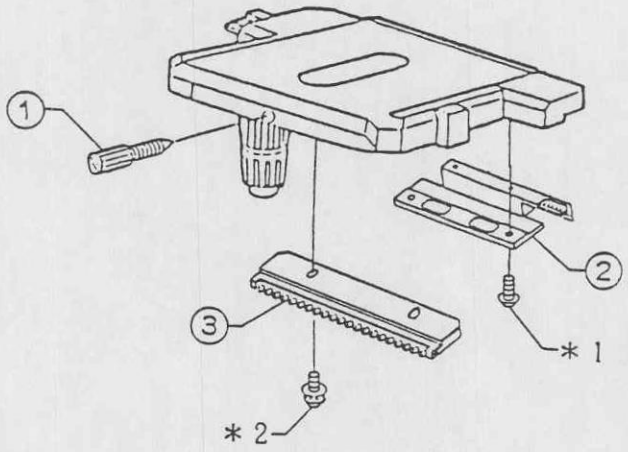
Screw AB3x4SA 4 pcs. (*1)



(5) Attach the KNOB ASS'Y ①, the CLIP GUIDE ASS'Y ②, the X-RACK ASS'Y ③ to the STAGE with two screws each.

Screw CUK3x6SA 2 pcs. (*1)
CUKSK3x6SA 2 pcs. (*2)

* The X-RACK ASS'Y ③ must be attached so as not to cause any play or uneveness.



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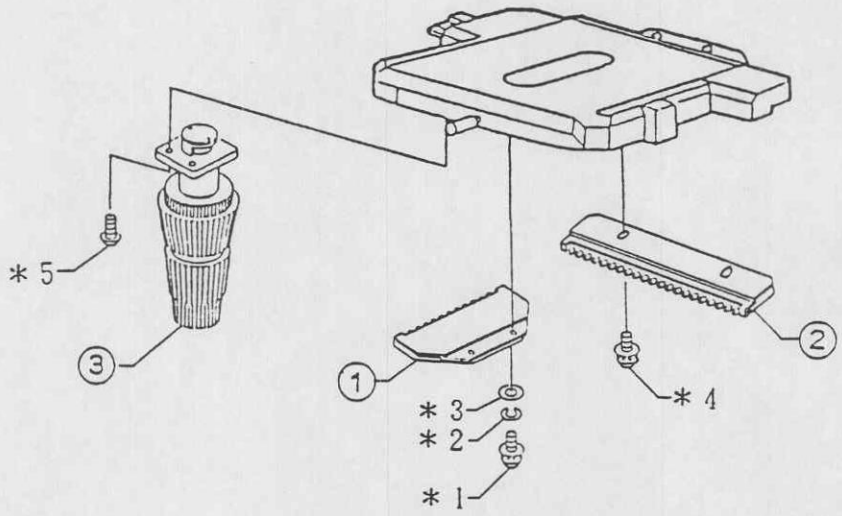
4. REPAIR OF X/Y-KNOB ASS'Y

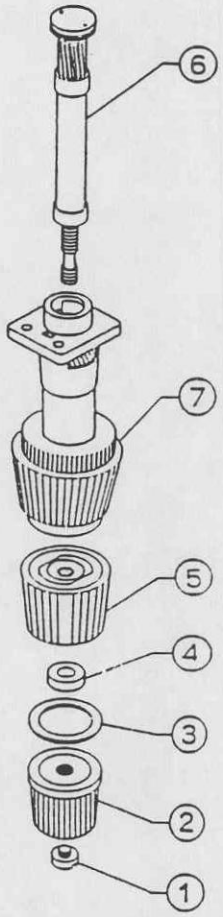
4-1 Disassembly and assembly

(1) Disassembly and assembly of X/Y-KNOB ASS'Y, Y-RACK ASS'Y and X-RACK ASS'Y



No.	Parts name	Screw	Grease	Adhesive	Remark
①	Y-RACK ASS'Y	HK3-345SA(*1) 2 pcs. SW3SA (*2) 2 pcs. KNW3SA (*3) 2 pcs.			B2-2(B-5)
②	X-RACK ASS'Y	CUKSK3x6SA(*4) 2 pcs.			B3-2(B-9)
③	X/Y-KNOB ASS'Y	CUK3x6SA(*5) 2 pcs.			For details, refer to B-11.

(2) Disassembly and assembly of X/Y-KNOB ASS'Y



No.	Parts name	Screw	Grease	Adhesive	Remark
①	SCREW (HK)			OT1131	
②	X-TENSION KNOB				To be screwed.
③	WASHER		OT1595		
④	NUT			OT1131	
⑤	X-KNOB ASS'Y				For details, refer to B-12.
⑥	X-PINION ASS'Y				For details, refer to B-13.
⑦	Y-KNOB ASS'Y				For details, refer to B-14.

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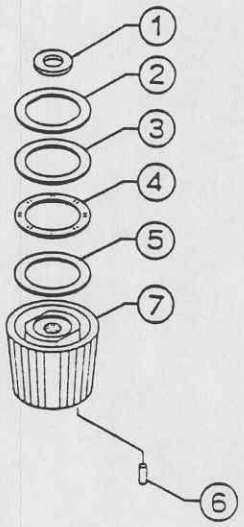
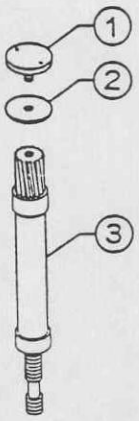
(3) Disassembly and assembly of X-KNOB ASS'Y



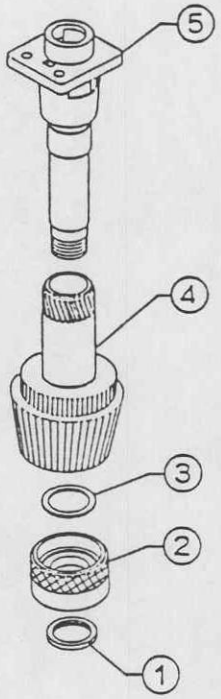
No.	Parts name	Screw	Grease	Adhesive	Remark
①	DUST PROTECTOR		OT1595		
②	WASHER		OT1595		
③	WASHER		OT1595		
④	SPRING WASHER				
⑤	WASHER		OT1595		
⑥	PIN (6 pcs.)	NP2x7UO or NP2x8UO	OT1595		
⑦	X-KNOB		OT1595		

(4) Disassembly and Assembly of X-PINION ASS'Y



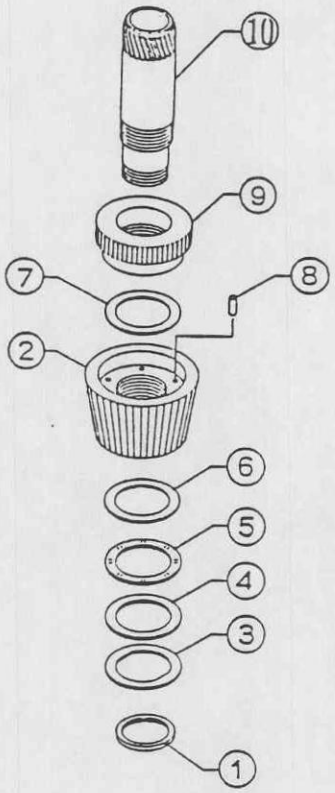
No.	Parts name	Screw	Grease	Adhesive	Remark
①	SCREW			OT1131	
②	X-WASHER		OT1595		
③	X-PINION		OT1595		

(5) Disassembly and assembly of Y-KNOB ASS'Y



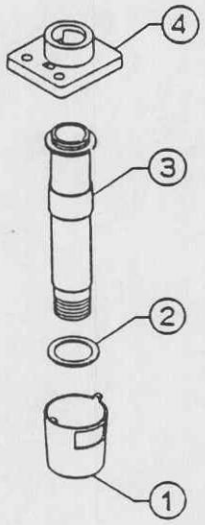
No.	Parts name	Screw	Grease	Adhesive	Remark
①	NUT (KHK)			OT1131	
②	FIXING GUIDE				Be careful not to tighten too firmly.
③	WASHER		OT1595		
④	Y-PINION ASS'Y				For details, refer to B-15.
⑤	KNOB MOUNT ASS'Y				For details, refer to B-16.

(6) Disassembly and assembly of Y-PINION ASS'Y



No.	Parts name	Screw	Grease	Adhesive	Remark
①	NUT (YHK)			OT1131	
②	Y-KNOB		OT1595	OT1131	To be screwed.
③	WASHER		OT1595		
④	WASHER		OT1595		
⑤	SPRING WASHER				
⑥	WASHER		OT1595		
⑦	WASHER		OT1595		
⑧	PIN (6 pcs.)	NP2x7UO	OT1595		
⑨	Y-TENSION KNOB		OT1595		Inverse screw
⑩	Y-PINION				

(7) Disassembly and assembly of KNOB MOUNT ASS'Y



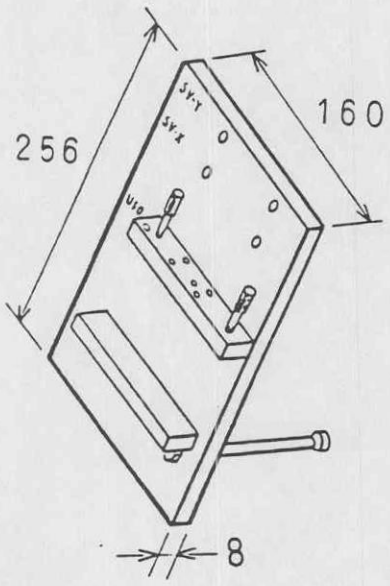
No.	Parts name	Screw	Grease	Adhesive	Remark
①	PINION COVER				Fit-in type
②	Y-WASHER		OT1595		
③	SHAFT MOUNT		OT1595	OT1315	
④	KNOB MOUNT				

1. LIST OF JIGS AND TOOLS

No.	Description	Page
BXKC001	Adjustment jig for ball and roller guide	B-4, B-8
OT0085	Tension gauge (110g)	B-4, B-8

2. EXPLANATION OF JIGS AND TOOLS

BXKC001



①BXKC001	②BX50F,U-SVR/L

③ Adjusting Jig to adjust sliding force of ball and roller guide.

This jig is usable for roller guide and ball guide adjustment of BX50F, U-SVR/L-X drive and U-SVR/L-Y drive by changing the position of clamping screw-block.

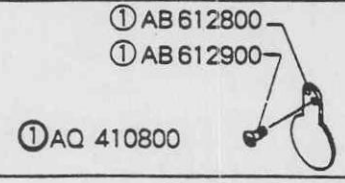
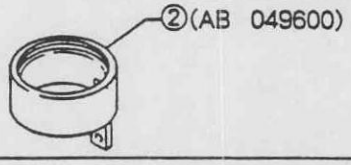
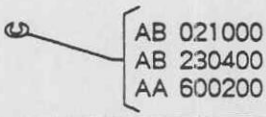
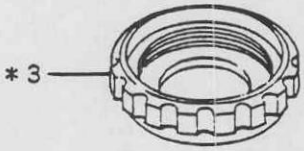
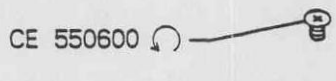
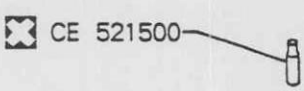
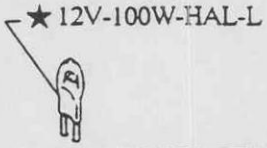
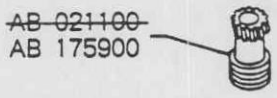
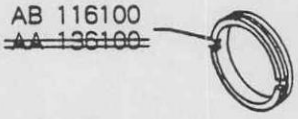
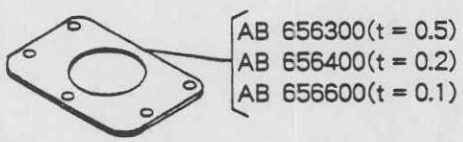
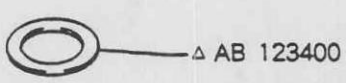
1. LIST OF GREASE

No.	Description	Page
OT1595	Silicone Grease	B-3, B-7, B-11 ~ B-16

2. LIST OF ADHESIVES

No.	Description	Page
OT1131	Shellac	B-11, B-13 ~ B-15
OT1315	Epoxy Adhesive (5 min.)	B-16
OT1338	Cyanoacrylate Adhesive	B-3, B-7

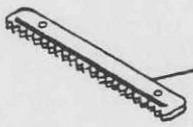
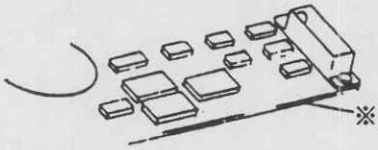
Description of symbol in parts list

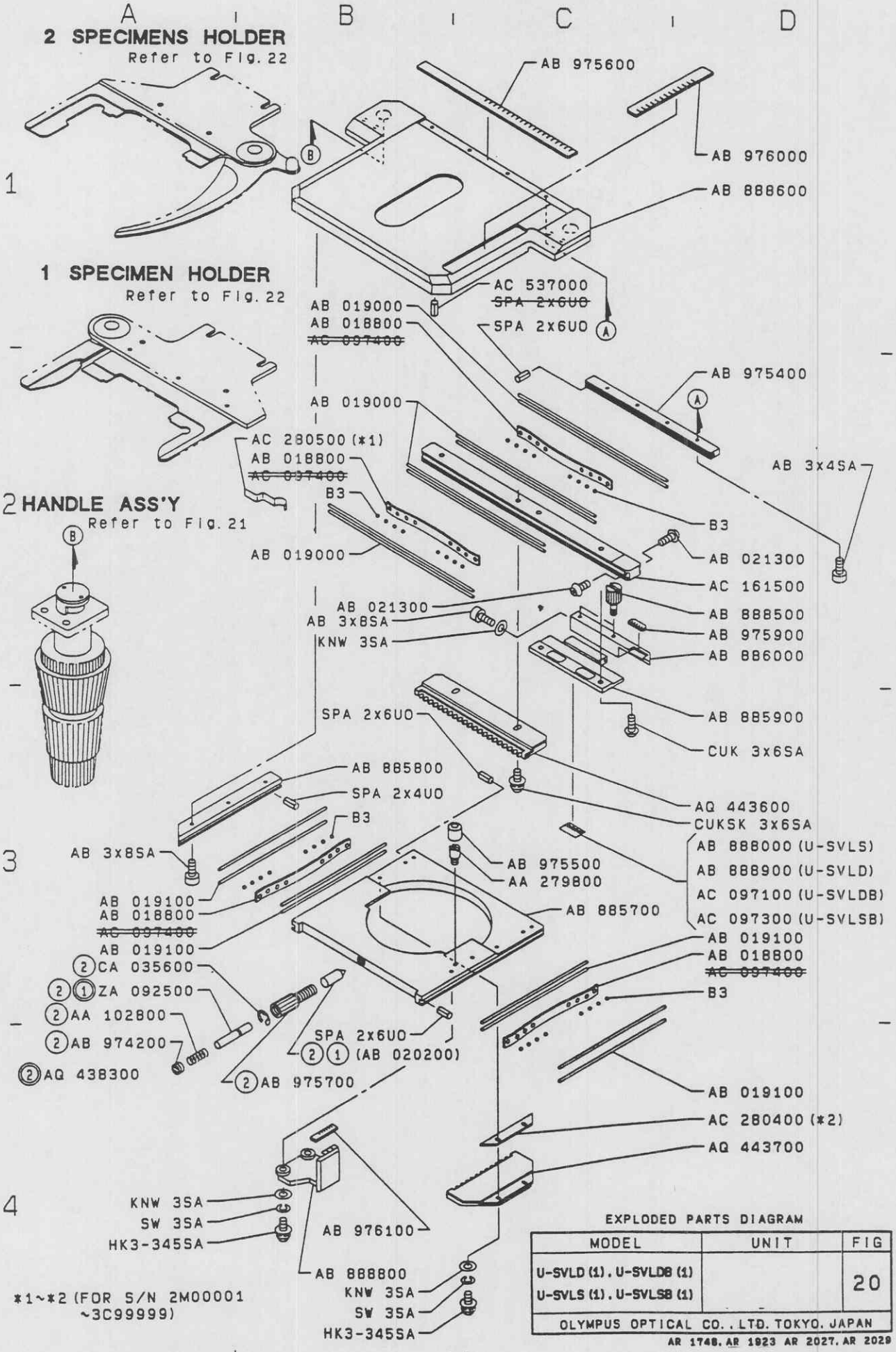
Symbol	Example	Description of symbol
①		Parts ASS'Y or parts itself can be supplied. Parts indicated "①"means parts ASS'Y. The above symbol is not written before parts number in case of supply of parts itself.
( )		Parts itself cannot be supplied when the parts number is put in parenthesis "( )".
[		This bracket is used in case of selecting the proper part from a number of parts with slightly different dimension.
* 3		This asterisk denotes that a part can be used in several models and differs only by the engraving on it or an internal design feature. The differences are indicated in a table.
		This indicates counter-clockwise screw.
		Be carefull not to touch the parts marked with this symbol. Use tweezers because the parts have a special surface finish.
★		Parts marked with this symbol cannot be supplied as repair parts. Please order through sales channels.
——		Used in case a part is substituted by a new design. The part number marked with a line "——" indicates old part, the new part number is without the line. Both parts can be supplied.
═══		A double line indicates an old part which is superseded by a new design and no supply of the old part is available.
(t =) (d =) (h =) (ϕ =)		Figure put in "( )"after parts number indicates specific measurements of parts. t = thickness d = diameter h = height ϕ = symbol of diameter
△		This indicates additional parts when it is revised in the past.

Description of symbol for parts list

Symbol	Example	Description of symbol
⬆	indicates Lens direction. (Lens with frame is not marked) ⓐ Mark with an arrow on convex side without regard to curvature. convex/flat  convex/concave  ⓑ Mark with an arrow on a sharp curve side. (radius of curvature is small.) convex/convex  concave/concave  concave/flat 	
RED	indicates color of code	

abbreviated name	color	abbreviated name	color
W H T	White	G R N	Green
B L K	Black	B L U	Blue
B R N	Brown	P R P	Purple
R E D	Red	G R A	Gray
O R N	Orange	S K Y	Sky
Y E L	Yellow	YEL/GRN	Yellow /Green

[1]	 [1] AB611600	This indicates pair of replacing parts. When replaceing parts from old type to new type, replace the parts with same indicated number parts "[1]" simultaneously.
※	 ※ AQ 521900	This indicates that an explanatory note is printed below the part.
②	EXPLODED PARTS DIAGRAM MODEL: BX50F(1) / UNIT: / FIG: 1 OLYMPUS OPTICAL CO.,LTD. TOKYO, JAPAN AR 0556 ② BINDER No. 26	Number in circle "②" indicates the sequence of revised pages. This number is located at the bottom of the page.



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
U-SVLD (1), U-SVLDB (1) U-SVLS (1), U-SVLSB (1)		20

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

AR 1746, AR 1923 AR 2027, AR 2029

BINDER No. 26

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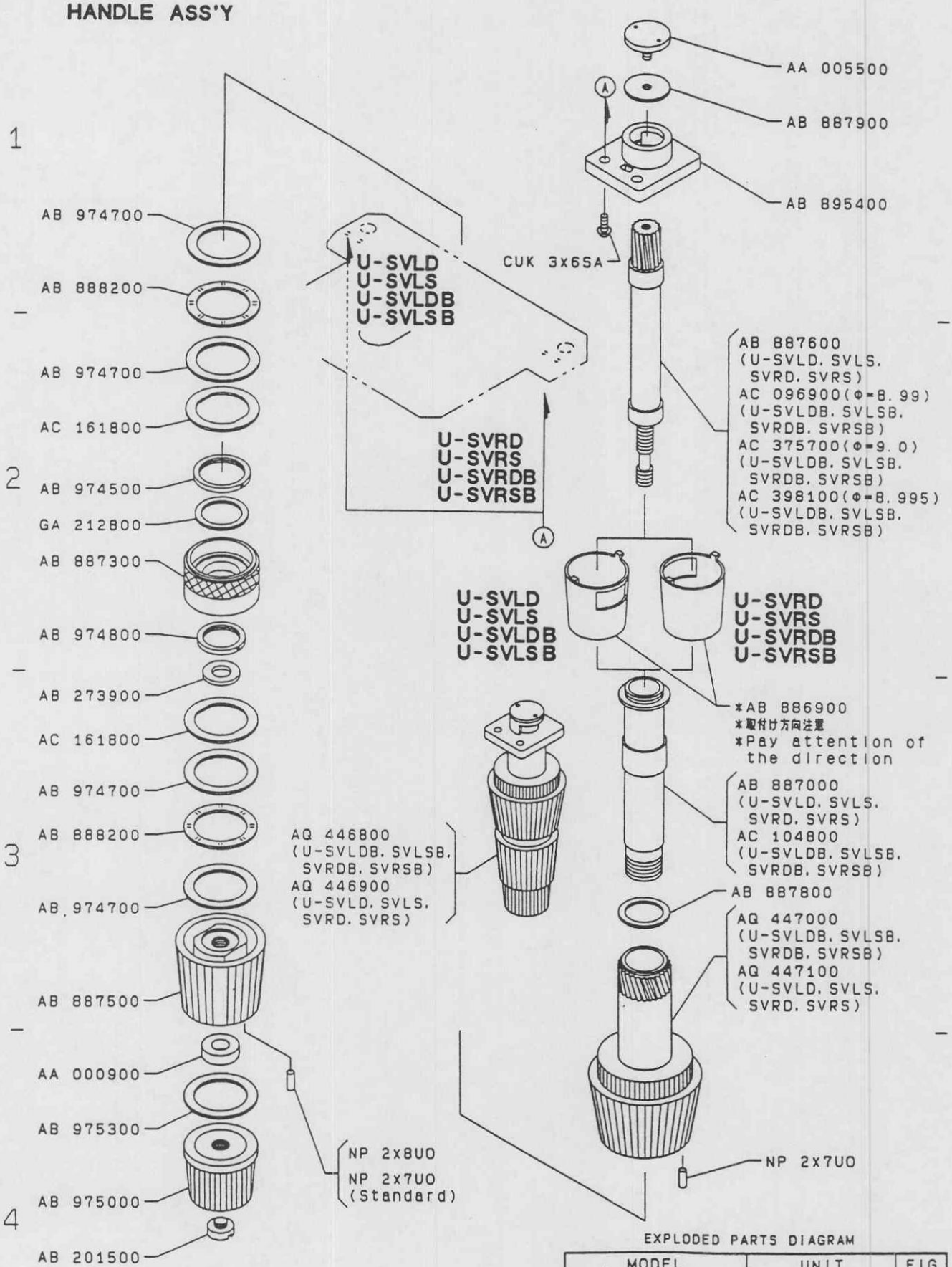
PARTS NO.	NAME OF PARTS		Q'ty
AA102800	ボールバネ	SPRING	1
279800	HK	SCREW	3
AB018800	ケーシング	CASING	4
019000	ワイヤ	WIRE GUIDE	8
019100	ワイヤ	WIRE GUIDE	8
021300	タップタイト	SCREW	4
885700	シタステージ	LOWER STAGE	1
885800	タテガイド	Y-GUIDE	1
885900	KMガイド	CLIP GUIDE	1
886000	クレンメルザ	CLIP HOLDER	1
888000	メイハンLS	NAME PLATE(U-SVLS)	1
888900	メイハンVL	NAME PLATE(U-SVLD)	
AC097100	シルクLDB	NAME PLATE(U-SVLDB)	
097300	シルクLSB	NAME PLATE(U-SVLSB)	
AB888500	ツマミ	KNOB	2
888600	ウエステージ	UPPER STAGE	1
888800	バーニヤザ	VERNIRE MOUNT	1
974200	KN	SCREW	1
975400	ヨコガイド	X-GUIDE	1
975500	ストッパ	STOPPER	3
975600	ヨコメモリ	X-SCALE	1
975700	ツマミ	KNOB	1
975900	ヨコバーニヤ	X-VERNIRE	1
976000	タテメモリ	Y-SCALE	1
976100	タテバーニヤ	Y-VERNIRE	1
~~AC097400~~	~~ケーシング~~	~~CASING~~	~~4~~
AC161500	オクリイタ L	FEEDING PLATE	1
280400	スペーサ1	SPACER	1～2
280500	SPカバー	COVER	1
537000	ピン	PIN	2
AQ438300	ツマミクミ	KNOB ASS'Y	1
443600	X ラッククミ	X-RACK ASS'Y	1
443700	Y ラッククミ	Y-RACK ASS'Y	1
CA035600	サークリップ	CLIP	1
ZA092500	ジク	SHAFT	1

PARTS NO.	NAME OF PARTS		Q'ty
WE402221	AB3x4SA	SCREW	4
402033	AB3x8SA	SCREW	5
WE114160	CUK3x6SA	SCREW	2
WE168026	CUKSK3x6SA	SCREW	2
WE101585	HK3-345SA	SCREW	4
WE302024	KNW3SA	WASHER	6
WE304020	SW3SA	WASHER	4
WE603003	SPA2x4U0	PIN	2
603004	SPA2x6U0	PIN	8
~~603004~~	~~SPA2x6U0~~	~~PIN~~	~~2~~
WE201011	B3	BALL	32

HANDLE ASS'Y



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
U-SVLD(2). U-SVLDB(2) U-SVLS(2). U-SVLSB(2)	-	21
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

AR 1748. AR 1923. AR 2027. AR 2029

BINDER No. 26

PARTS NO.	NAME OF PARTS		Q'ty
AA000900	ﾅｯﾄ	NUT	1
005500	ｶﾆﾒﾈｼﾞ	SCREW	1
AB201500	HK	SCREW	1
273900	ﾁﾘﾖｹ	DUST PROTECTOR	1
886900	P ｶﾊﾞｰ	PINION COVER	1
887000	ｺﾃｲｼﾞｸ	SHAFT MOUNT	
	(U-SVLD, SVLS, SVRD, SVRS)		1
AC104800	ｺﾃｲｼﾞｸ	SHAFT MOUNT	
	(U-SVLDB, SVLSB, SVRDB, SVRSB)		
AB887300	ｺﾃｲｶﾞｲﾄﾞ	FIXING GUIDE	1
887500	X ﾊﾝﾄﾞﾙ	X-KNOB	1
887600	X ﾋﾟﾆｵﾝ	X-PINION	
	(U-SVLD, SVLS, SVRD, SVRS)		
AC096900	X ﾋﾟﾆｵﾝ	X-PINION	
	(U-SVLDB, SVLSB, SVRDB, SVRSB)		1
375700	X ﾋﾟﾆｵﾝ	X-PINION	
	(U-SVLDB, SVLSB, SVRDB, SVRSB)		
398100	X ﾋﾟﾆｵﾝ	X-PINION	
	(U-SVLDB, SVLSB, SVRDB, SVRSB)		
AB887800	Y ﾜｯｼｬ	Y-WASHER	1
887900	X ﾜｯｼｬ	X-WASHER	1
888200	T ﾊﾞﾈ	SPRING WASHER	2
895400	ｺﾃｲｲﾀ	KNOB MOUNT	1
974500	YHK	NUT	1
974700	ﾋﾟﾝW	WASHER	4
974800	KHK	NUT	1
975000	TXﾊﾝﾄﾞﾙ	X-TENSION KNOB	1
975300	ﾋﾟﾝJW	WASHER	1
AC161800	ｺﾃｲ W2	WASHER	2
AQ446800	L ﾊﾝﾄﾞﾙﾌﾞｸﾐ	LONG HANDLE ASS'Y	
	(U-SVLDB, SVLSB, SVRDB, SVRSB)		1
446900	S ﾊﾝﾄﾞﾙﾌﾞｸﾐ	SHORT HANDLE ASS'Y	
	(U-SVLD, SVLS, SVRD, SVRS)		
447000	L ﾌﾞｸﾐ	Y-LONG PINION ASS'Y	
	(U-SVLDB, SVLSB, SVRDB, SVRSB)		1
447100	S ﾌﾞｸﾐ	Y-SHORT PINION ASS'Y	
	(U-SVLD, SVLS, SVRD, SVRS)		
GA212800	ﾌﾗﾜｯｼｬ	WASHER	1

PARTS NO.	NAME OF PARTS		Q'ty
WE114160	CUK3x6SA	SCREW	2
WE601103	NP2x7U0	PIN	6
601103	NP2x7U0	PIN	6
601036	NP2x8U0	PIN	

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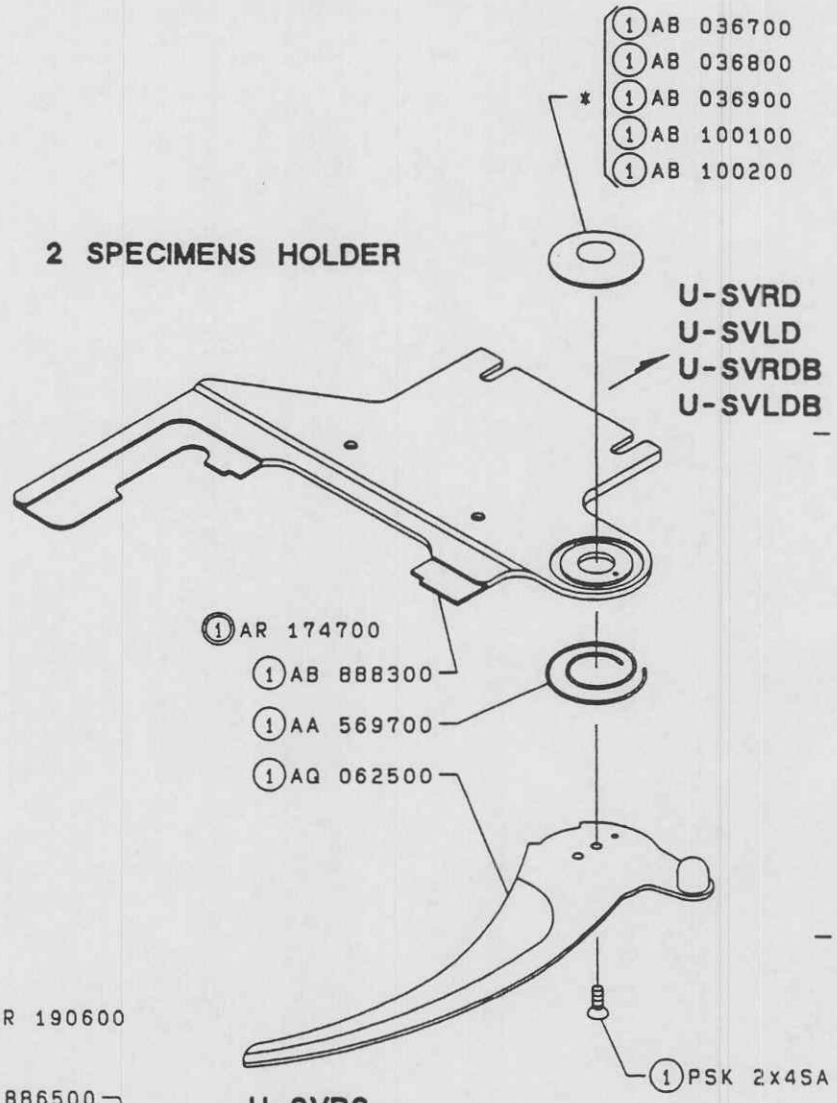
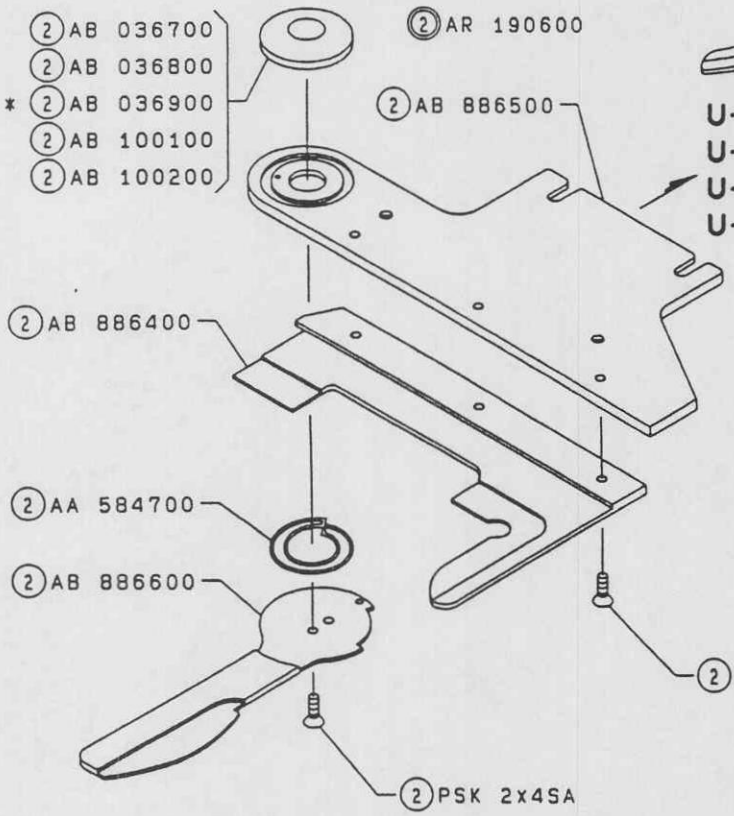
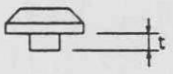
2 SPECIMENS HOLDER



1 SPECIMEN HOLDER





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	t
AB 036700	1.59~1.6(Standard)
AB 036800	1.61~1.62
AB 036900	1.63~1.64
AB 100100	1.,6~1.61
AB 100200	1.62~1.63

EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
U-SVLD(3), U-SVLDB(3) U-SVLS(3), U-SVLSB(3)	-	22
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

AR 1747, AR 1906

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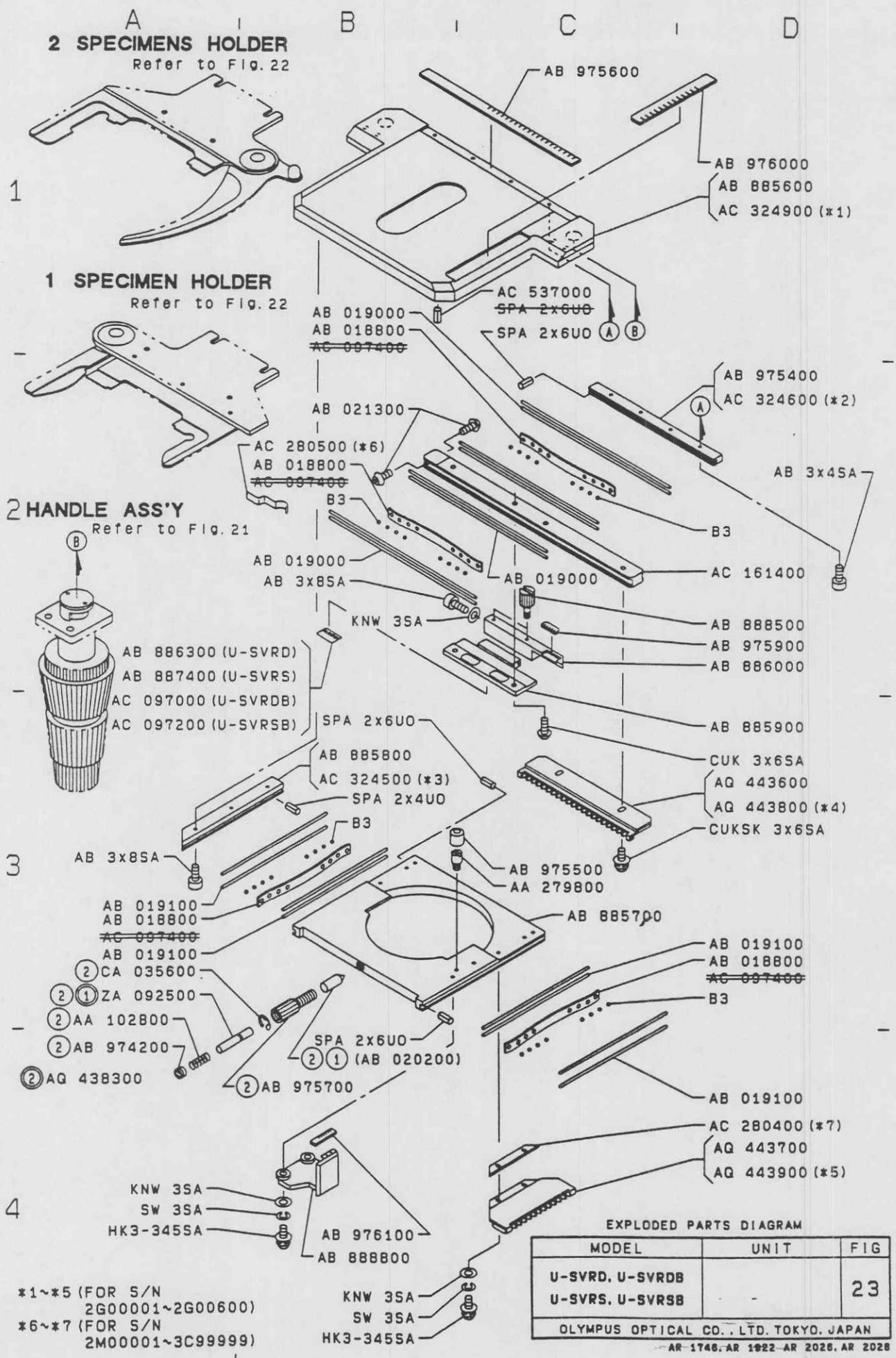
PARTS NO.	NAME OF PARTS		Q'ty
	2 SPECIMENS HOLDER		
AA569700	ｳｽﾏｷﾊﾞﾈ	SPRING	1
AB036700	ｼﾌｸ	SHAFT	1
036800	ｼﾌｸ	SHAFT	
036900	ｼﾌｸ	SHAFT	
100100	ｼﾌｸ	SHAFT	
100200	ｼﾌｸ	SHAFT	
888300	KMｷﾝﾀｲ	CLIP HOLDER	1
AQ062500	ｱｰﾑｸﾐ	CLIP	1
AR174700	ｸﾚﾝﾒﾙ	SPECIMEN HOLDER (U-HL)	1
WE107143	PSK2x4SA	SCREW	2

PARTS NO.	NAME OF PARTS		Q'ty
	1 SPECIMEN HOLDER		
AA584700	ｳｽﾏｷﾊﾞﾈ	SPRING	1
AB036700	ｼﾌｸ	SHAFT	1
036800	ｼﾌｸ	SHAFT	
036900	ｼﾌｸ	SHAFT	
100100	ｼﾌｸ	SHAFT	
100200	ｼﾌｸ	SHAFT	
886400	ｸﾚﾝﾒﾙｻﾞ	CLIP HOLDER	1
886500	ﾄﾘﾂｹｻﾞ	CLIP MOUNT	1
886600	ｸﾚﾝﾒﾙ	CLIP	1
AR190600	ｸﾚﾝﾒﾙ	SPECIMEN HOLDER (U-HL1)	1
WE107115	PSK2x2.5SA	SCREW	3
107143	PSK2x4SA	SCREW	2



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
U-SVRD, U-SVRDB U-SVRS, U-SVRSB	-	23

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

AR-1746, AR-1922, AR-2026, AR-2028

BINDER No. 26

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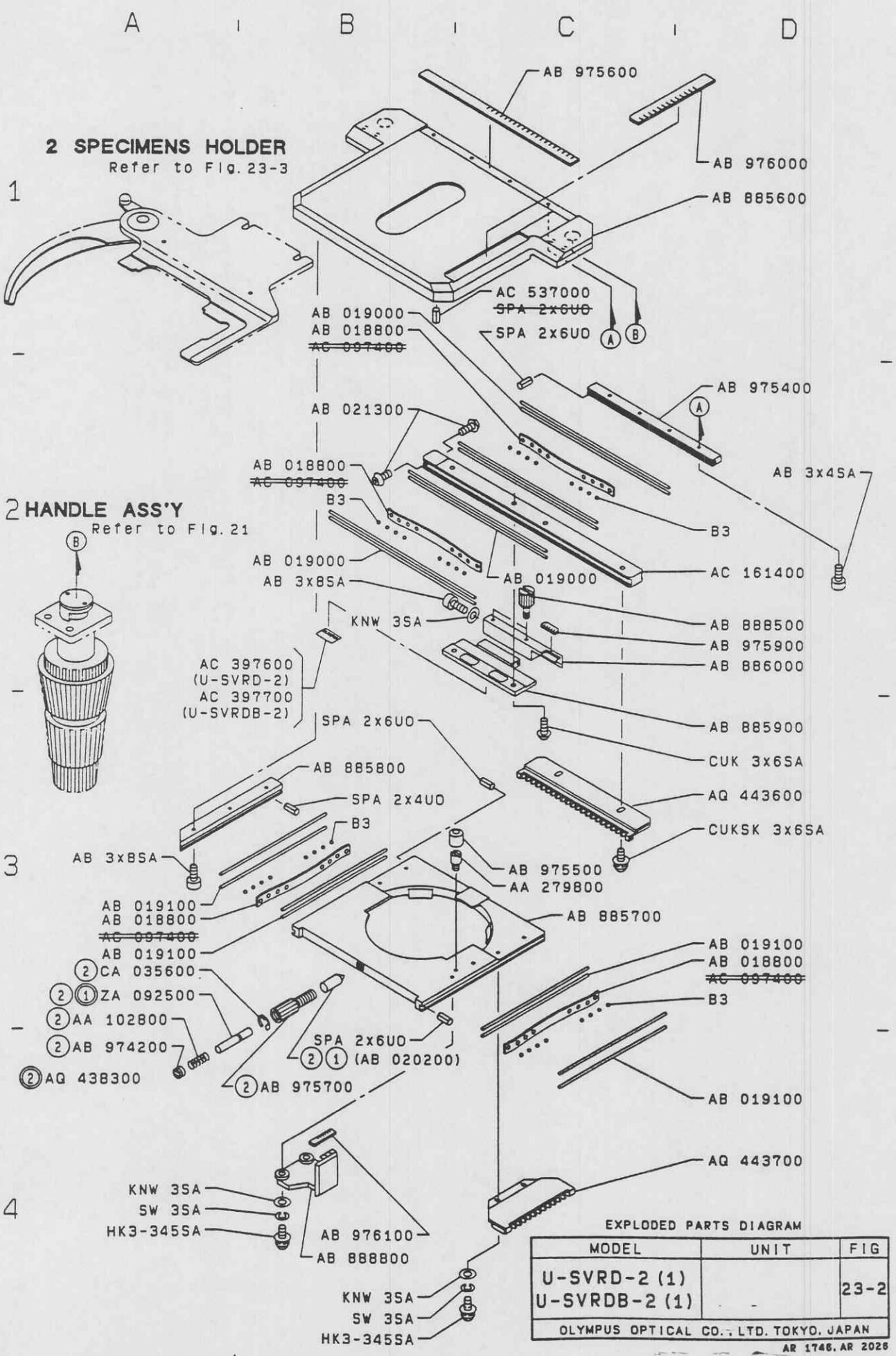
PARTS NO.	NAME OF PARTS		Q'ty
AA102800	ボールバネ	SPRING	1
279800	HK	SCREW	3
AB018800	ケーシング	CASING	4
019000	ワイヤ	WIRE GUIDE	8
019100	ワイヤ	WIRE GUIDE	8
021300	タップタイト	SCREW	4
885600	ウエステージ	UPPER STAGE	1
AC324900	ウエステージ	UPPER STAGE	
AB885700	シタステージ	LOWER STAGE	1
885800	タテガイド	Y-GUIDE	1
AC324500	タテガイド	Y-GUIDE	
AB885900	KMガイド	CLIP GUIDE	1
886000	クレンメルザ	CLIP HOLDER	1
886300	メイハンVR	NAME PLATE(U-SVRD)	1
887400	メイハンRS	NAME PLATE(U-SVRS)	
AC097000	シルクRDB	NAME PLATE(U-SVRDB)	
097200	シルクRSB	NAME PLATE(U-SVRSB)	
AB888500	ツマミ	KNOB	2
888800	バーニヤザ	VERNIRE MOUNT	1
974200	KN	SCREW	1
975400	ヨコガイト	X-GUIDE	1
AC324600	ヨコガイド	X-GUIDE	
AB975500	ストッパ	STOPPER	3
975600	ヨコメモリ	X-SCALE	1
975700	ツマミ	KNOB	1
975900	ヨコバーニヤ	X-VERNIRE	1
976000	タテメモリ	Y-SCALE	1
976100	タテバーニヤ	Y-VERNIRE	1
~~AC097400~~	~~ケーシング~~	~~CASING~~	~~4~~
AC161400	オクリイタ R	FEEDING PLATE	1
280400	スペーサ1	SPACER	1～2
280500	SPカバー	COVER	1
537000	ピン	PIN	2
AQ438300	ツマミクミ	KNOB ASS'Y	1
443600	X ラッククミ	X-RACK ASS'Y	1
443800	X ラッククミ	X-RACK ASS'Y	
443700	Y ラッククミ	Y-RACK ASS'Y	1
443900	Y ラッククミ	Y-RACK ASS'Y	
CA035600	サークリップ	CLIP	1
ZA092500	ジク	SHAFT	1

PARTS NO.	NAME OF PARTS		Q'ty
WE402221	AB3x4SA	SCREW	4
402033	AB3x8SA	SCREW	5
WE114160	CUK3x6SA	SCREW	2
WE168026	CUKSK3x6SA	SCREW	2
WE101585	HK3-345SA	SCREW	4
WE302024	KNW3SA	WASHER	6
WE304020	SW3SA	WASHER	4
WE603003	SPA2x4U0	PIN	2
603004	SPA2x6U0	PIN	8
~~603004~~	~~SPA2x6U0~~	~~PIN~~	~~2~~
WE201011	B3	BALL	32



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
U-SVRD-2 (1) U-SVRDB-2 (1)	-	23-2

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

AR 1746, AR 2026

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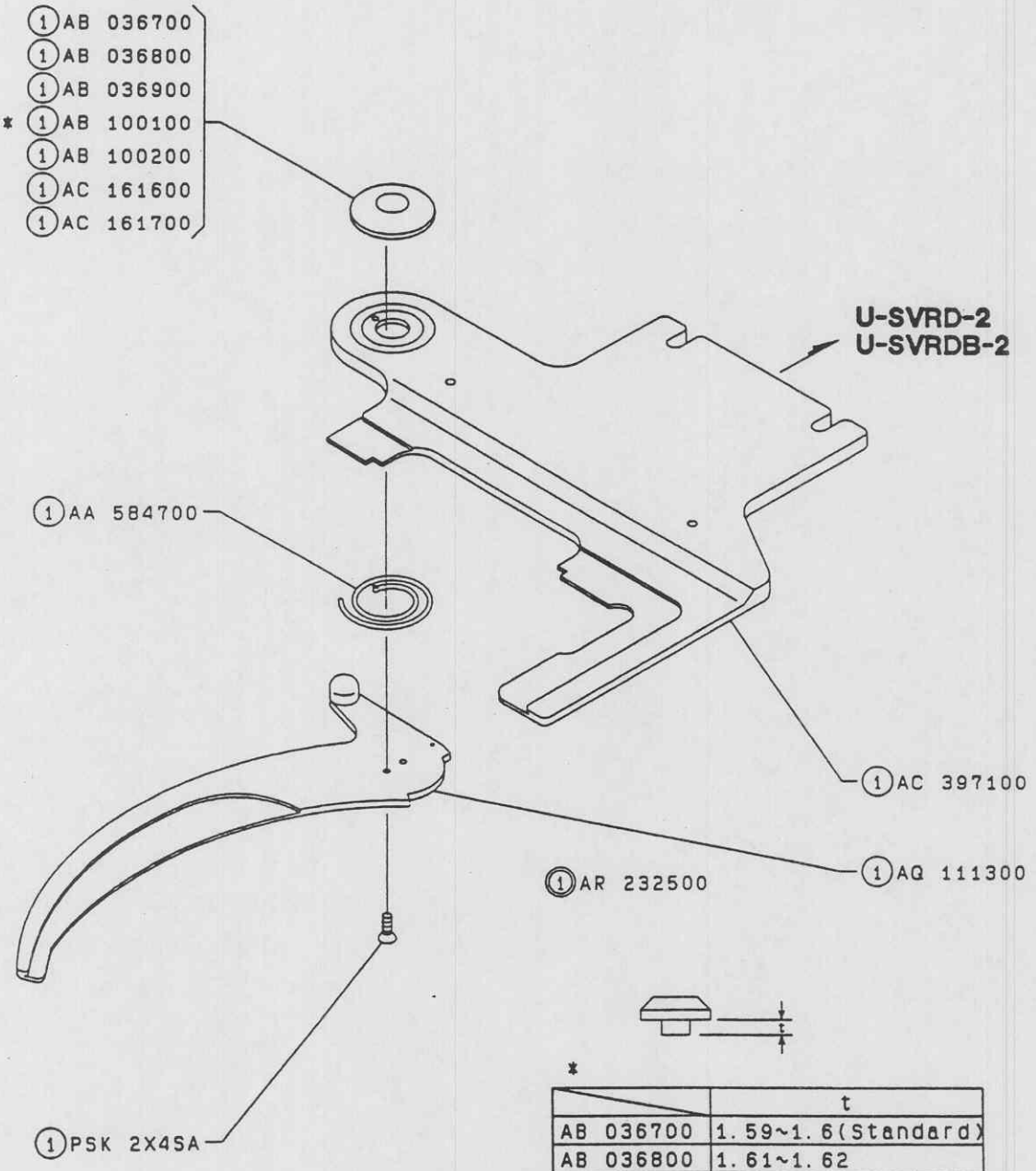
PARTS NO.	NAME OF PARTS		Q'ty
AA102800	ボールバネ	SPRING	1
279800	HK	SCREW	3
AB018800	ケーシング	CASING	4
019000	ワイヤ	WIRE GUIDE	8
019100	ワイヤ	WIRE GUIDE	8
021300	タップタイト	SCREW	4
885600	ウエステージ	UPPER STAGE	1
885700	シタステージ	LOWER STAGE	1
885800	タテガイド	Y-GUIDE	1
885900	KMガイド	CLIP GUIDE	1
886000	クレンメルザ	CLIP HOLDER	1
888500	ツマミ	KNOB	2
888800	バーニヤザ	VERNIRE MOUNT	1
974200	KN	SCREW	1
975400	ヨコガイド	X-GUIDE	1
975500	ストッパ	STOPPER	3
975600	ヨコメモリ	X-SCALE	1
975700	ツマミ	KNOB	1
975900	ヨコバーニヤ	X-VERNIRE	1
976000	タテメモリ	Y-SCALE	1
976100	タテバーニヤ	Y-VERNIRE	1
~~AC097400~~	~~ケーシング~~	~~CASING~~	~~4~~
AC161400	オクリイタ R	FEEDING PLATE	1
397600	メイハンR2	NAME PLATE (U-SVRD-2)	1
397700	メイハン	NAME PLATE (U-SVRDB-2)	
537000	ピン	PIN	2
AQ438300	ツマミクミ	KNOB ASS'Y	1
443600	X ラッククミ	X-RACK ASS'Y	1
443700	Y ラッククミ	Y-RACK ASS'Y	1
CA035600	サークリップ	CLIP	1
ZA092500	ジク	SHAFT	1

PARTS NO.	NAME OF PARTS		Q'ty
WE402221	AB3x4SA	SCREW	4
402033	AB3x8SA	SCREW	5
WE114160	CUK3x6SA	SCREW	2
WE168026	CUKSK3x6SA	SCREW	2
WE101585	HK3-345SA	SCREW	4
WE302024	KNW3SA	WASHER	6
WE304020	SW3SA	WASHER	4
WE603003	SPA2x4U0	PIN	2
603004	SPA2x6U0	PIN	8
~~603004~~	~~SPA2x6U0~~	~~PIN~~	~~2~~
WE201011	B3	BALL	32

2 SPECIMENS HOLDER



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	t
AB 036700	1.59~1.6(Standard)
AB 036800	1.61~1.62
AB 036900	1.63~1.64
AB 100100	1.6~1.61
AB 100200	1.62~1.63
AC 161600	1.58~1.59
AC 161700	1.57~1.58

EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
U-SVRD-2(2) U-SVRDB-2(2)		23-3

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AR 2325

PARTS NO.	NAME OF PARTS		Q'ty
	2 SPECIMENS HOLDER		
AA584700	ｳｽﾏｷﾊﾞﾈ	SPRING	1
AB036700	ｼｬﾌ	SHAFT	1
036800	ｼｬﾌ	SHAFT	
036900	ｼｬﾌ	SHAFT	
100100	ｼｬﾌ	SHAFT	
100200	ｼｬﾌ	SHAFT	
AC161600	ｼｬﾌ	SHAFT	
161700	ｼｬﾌ	SHAFT	
AC397100	KMﾎﾙﾀｲ	CLIP HOLDER	1
AQ111300	ｱｰﾑｸﾐ	CLIP	1
AR232500	ｸﾚﾝﾒﾙ	SPECIMEN HOLDER (U-HR)	1
WE107143	PSK2x4SA	SCREW	2

SECTION C

THIS SECTION CONTAINS INFORMATION ON BX40 OBSERVATION TUBE

SEE TABLE OF CONTENTS NEXT PAGE

TABLE OF CONTENTS
SECTION C
U-BI30

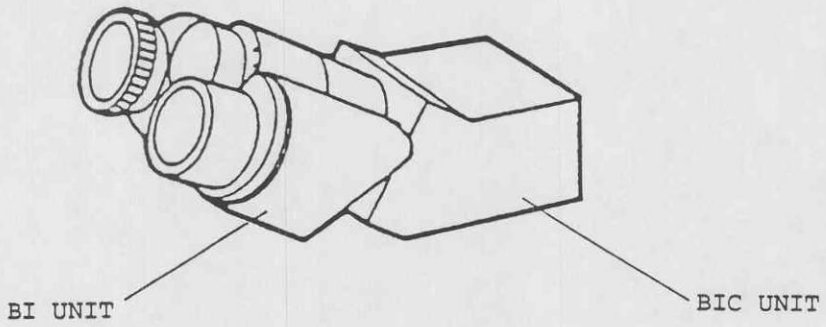
List of Illustrations and Tables

Section C BX40 Observation Tube U-BI30

1. OUTLINE

The U-BI30 binocular tube is one of the units in the BX system and has the function as an observation tube for the standard field of view (field number 22). It is the most standard observation tube applicable to all frames of the BX system.

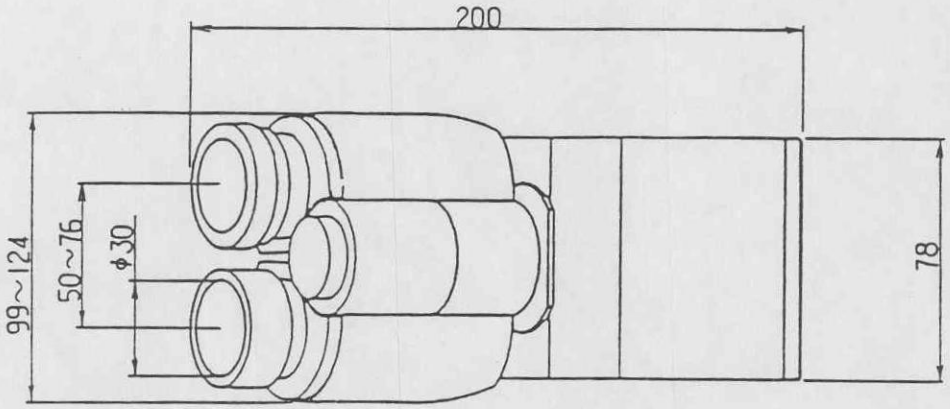
2. APPEARANCE

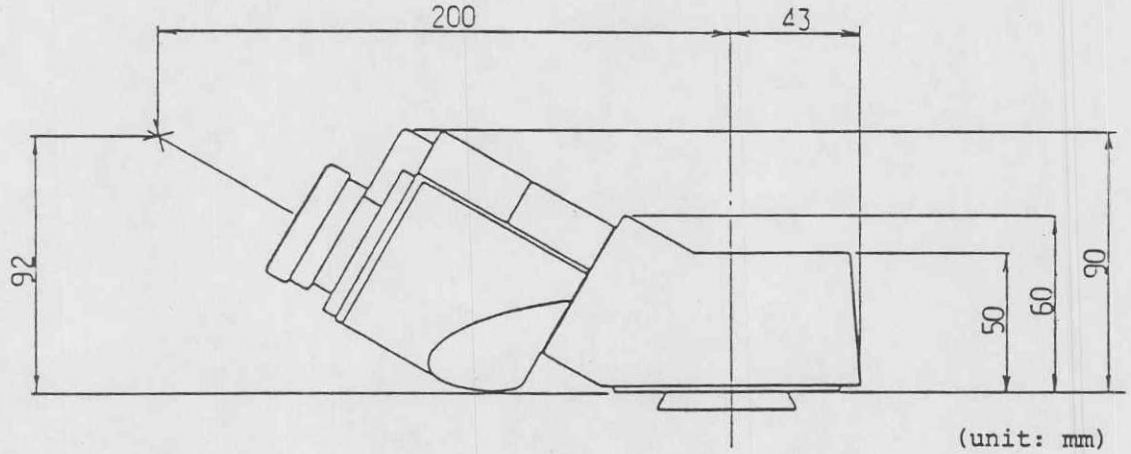


3. SPECIFICATIONS

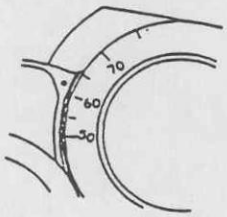
	Items	Specifications
1	Type	Siedentopf
2	Field number	ø22 (when using a 10× eyepiece)
3	Inclination	30° fixed
4	Interpupillary distance adjustment range	50 ~ 76mm
5	Magnification	Imaging lens: 1× (2-group/3-lens)
6	Image direction	Inverted image
7	Eyepiece sleeve	Inner diameter ø30, length 30mm, Outer diameter ø40
8	Left/right diopter difference compensation	Helicoid for adjustment provided in the left sleeve Diopter range: ±5 diopters
9	Light path	100% observation only
10	Mounting on the frame	Circular dovetail
11	Eyepoint height	92mm
12	Imaging lens focal distance	f = 180mm
13	Dimensions	See the next page.
14	Weight	0.9kg

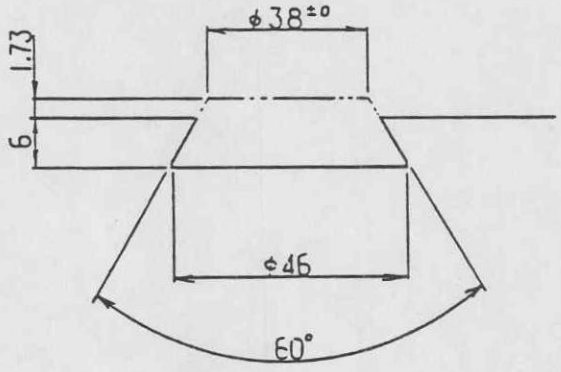
4. DIMENSIONS





(unit: mm)





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5. USING CONDITIONS

(1) Operating environment

Temperature: 0 ~ 40°C Humidity: 30 ~ 90%

(2) Applicable frames

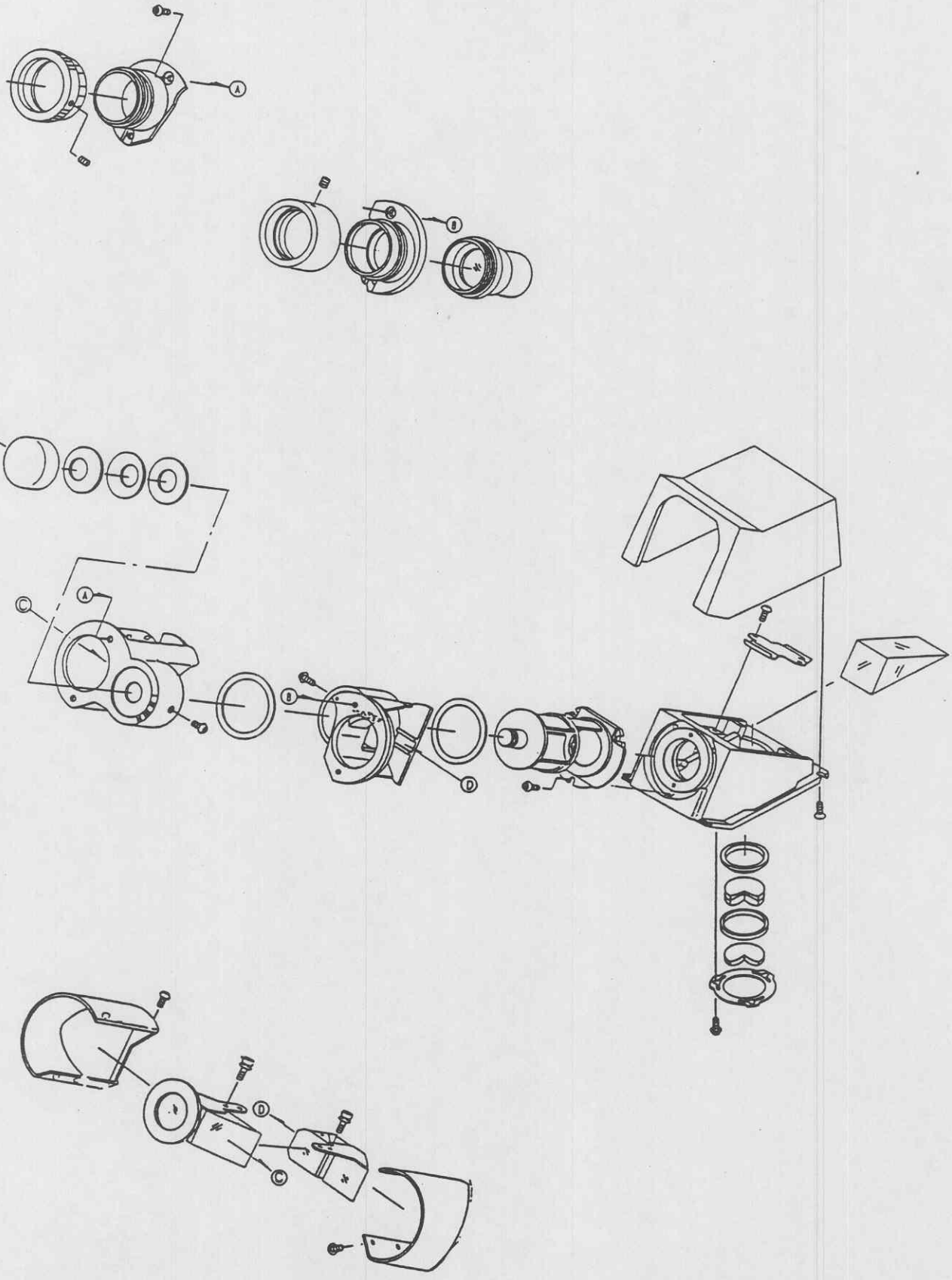
- BX series frames

* Not applicable to the conventional products (AH3, BH2, BH3, IMT2, PME3, PMG3, etc.) because of the different sizes of the circular dovetails.

(3) Applicable eyepieces

WH10x, WH10x-H, Cross-WH10x, 35WH10x, P-WH10x, WH12.5x, WH12.5x-H, WH15x

1. EXPLODED DIAGRAM



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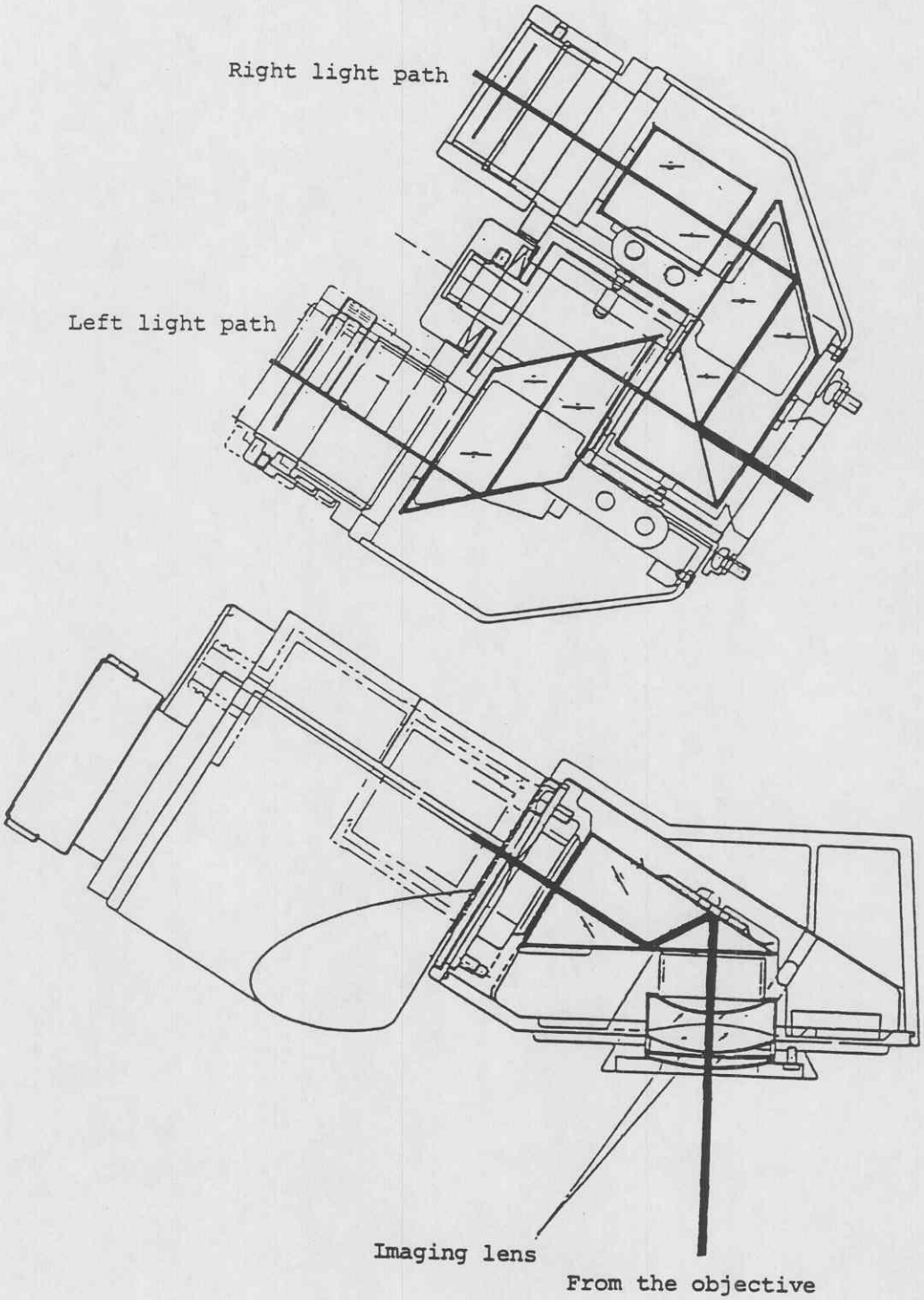
2. LIGHT PATH DIAGRAM



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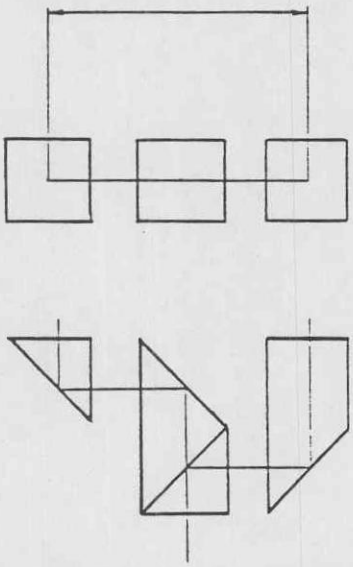
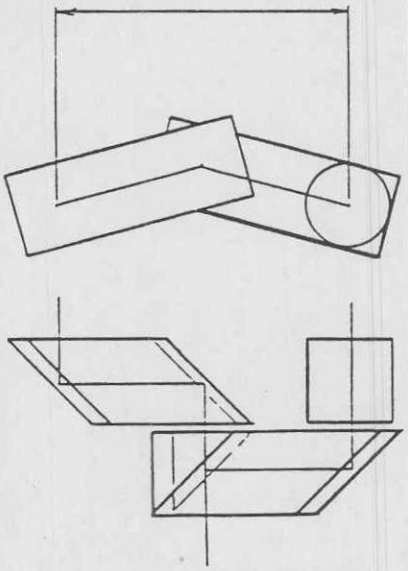
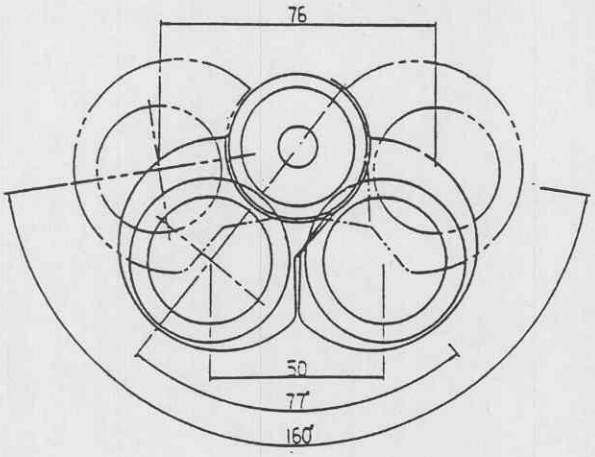
3. JENTSH AND SIEDENTOPF

Binocular tube has the mechanism to adjust the distance between left and right optical axes to meet the observer's eyes. This mechanism is available in two typical types: Jentsh which changes the distance in a straight line and Siedentopf which change the distance in an arc. Each type has merits and demerits. The features of each type are as shown below.

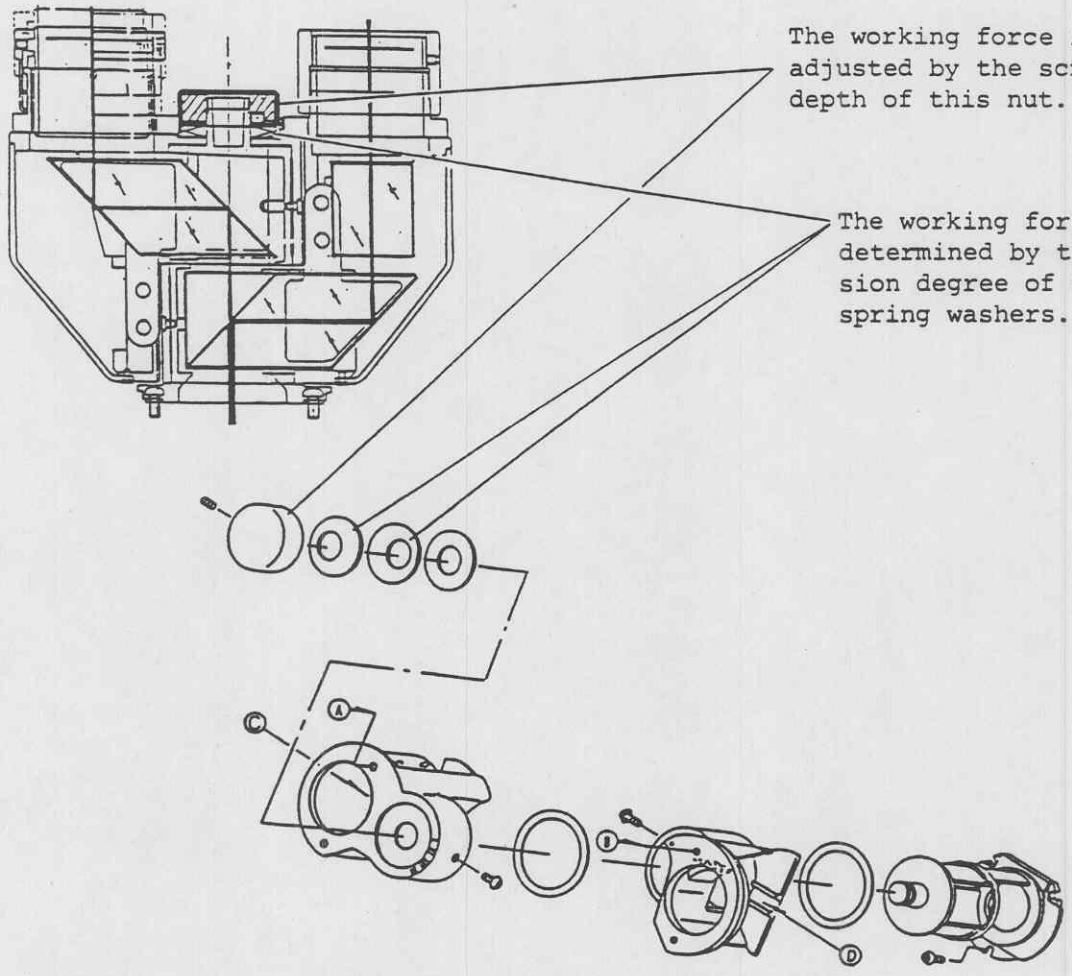
	JENTSH	SIEDENTOPF
Light path diagram		
Features	· The center prism is fixed. The interpupillary distance is adjusted by moving the left and right prisms in parallel to each other. · Less possibility of optical axis displacement caused by changing the interpupillary distance. · The reticle glass in the eyepiece does not incline even if the interpupillary distance is adjusted. · The optical tube length changes as a result of the change in the light path length when the interpupillary distance is adjusted. · Compact design.	· The left and right prisms have the function of a center prism. The interpupillary distance is adjusted by moving these prisms in an arc centering the optical axis going up from the objective. · The optical tube length is not changed even if the interpupillary distance is adjusted. · The interpupillary distance does not change even if the eyepiece is pushed during observation. · The reticle glass in the eyepiece inclines when the interpupillary distance is adjusted.

4. INTERPUPILLARY DISTANCE ADJUSTMENT MECHANISM

4-1 Adjustment range



4-2 Working force



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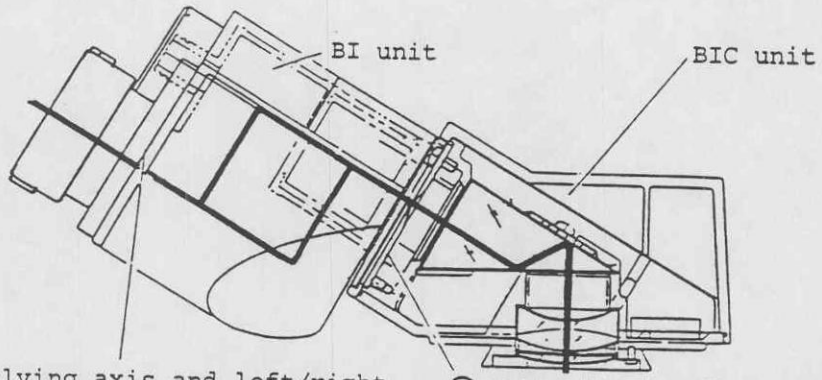
5. OPTICS ADJUSTMENT MECHANISM

5-1 Optical axis



Adjust the optical axis at the above two points. The internal prism position is adjustment-free in principle.

Adjustment ①

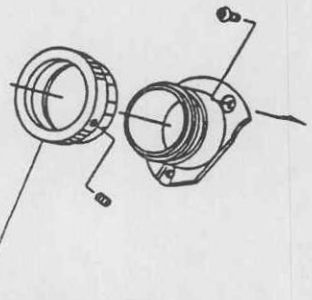
Adjust the revolving axis in the right sleeve. ("Revolving axis" means the mechanical rotation center upon interpupillary distance adjustment and the phenomenon which occurs when the optical axis is displaced. The optical axis mentioned here is the center of the sleeve. Align the optical axis with the mechanical rotation center by changing the sleeve position so that the image in the field of view does not move upon observation.)
The left sleeve is used to adjust only the left/right optical axis. (Align the right sleeve center with a point of a specimen beforehand, then match the left sleeve center with the point of a specimen.)

Adjustment ②

Almost the same as the adjustment method performed for installation of the BI unit of the conventional BH2-BI. Mount the standard objective on the adjusted frame. Mount the BI unit with the standard eyepiece attached to the right sleeve on the frame. Change the BI unit mounting position so that the cross center of a specimen coincides with the cross hairs center of the standard eyepiece.)

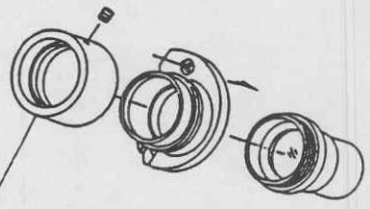
5-2 Optical tube length

Left sleeve



Adjust the helicoid scale to zero.

Right sleeve



This adj. ring is screwed inside and turned to adjust the optical tube length.

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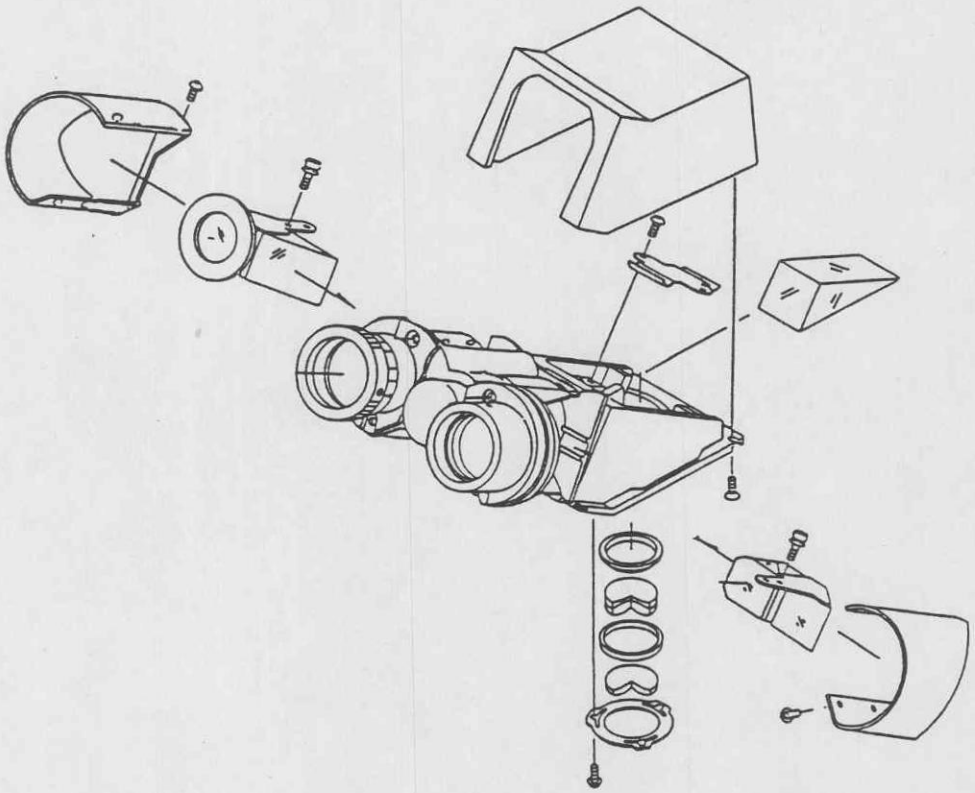
6. PARTS REQUIRING NO ADJUSTMENT IF REMOVED

· Position the prism by pushing to predetermined surface.



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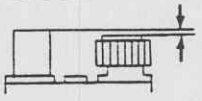
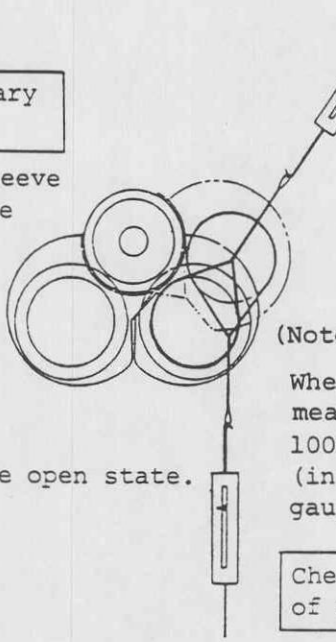
1. CHECK ITEMS AND METHODS

Item		Standard	Method
Inter-pupillary distance adjustment	Adjustment range	50mm or less at minimum 76mm or more at maximum	Set the observation state, insert a thin paper with graduations at the eye point position and measure the interpupillary distance.
	Working force	1000 ~ 2000g	Tie a string around the sleeve periphery and measure the interpupillary distance working force with a tension gauge.
Diopter difference compensation	Adjustment range	±5 diopters min.	Turn the diopter ring and check that the scale goes over the limit.
Optical axis	Left/right optical axis difference	On the image surface: Max. 0.2mm in the vertical direction Max. 0.2mm in the outward direction Max. 0.4mm in the inward direction	Set the observation state, use the standard eyepiece KN0048 + KC2049 and observe a specimen whose center can be identified (e.x., an concentric circle). Align the centers of the specimen and the visual field taking the right side sleeve as a standard, then check the centers displacement in the left sleeve by reading the reticle scale (1 graduation = 0.1mm) of KN0048.
	Optical axis of whole unit (right sleeve only)	0.15mm or less on the image surface when the inter-pupillary distance is 62mm	Set the interpupillary distance to about 62mm, combine the standard eyepiece (KN0048 + KC2049), the microscope frame (product) and the standard objective (KN0041), then check the displacement in the centers of the specimen and the visual field in the right sleeve by reading the reticle scale (1 graduation = 0.1mm) of KN0048.
Optical tube length	Intermediate image position (10mm from the sleeve end)	±0.15mm	Set the interpupillary distance to about 62mm (refer to "Interpupillary distance adjustment" above), combine the standard eyepiece (KN0048 + KC2049 + FT-36), the microscope frame(product) and the standard objective (KN0041), then check the displacement in the intermediate image between the right and left sleeves by reading the helicoid scale of the KN0048.
	Difference between left and right tube length	less than 1mm 	Set the diopter at "0". Put a rigid flat plate across the left and right tube surface, insert a 1mm thickness gauge between the flat plate and the tube surface. If the clearance is greater than 1mm, the unit is out of specifications.

2. USE OF JIGS AND TOOLS

Measuring the interpupillary distance working force

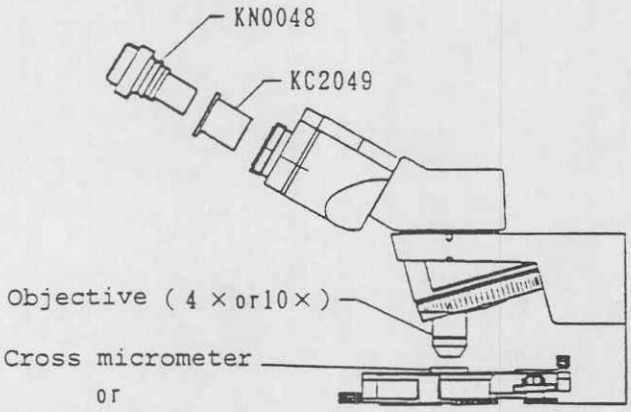
Tie a string around the sleeve periphery and pull with the tension gauge.



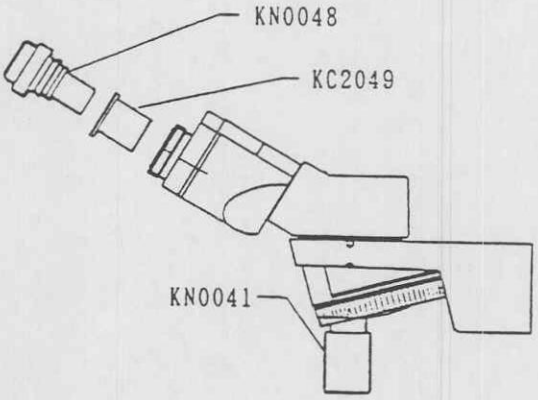
(Note)

When using the tension gauge to measure the open state, add about 100g to the measurement value (in the case of a 3kg tension gauge).

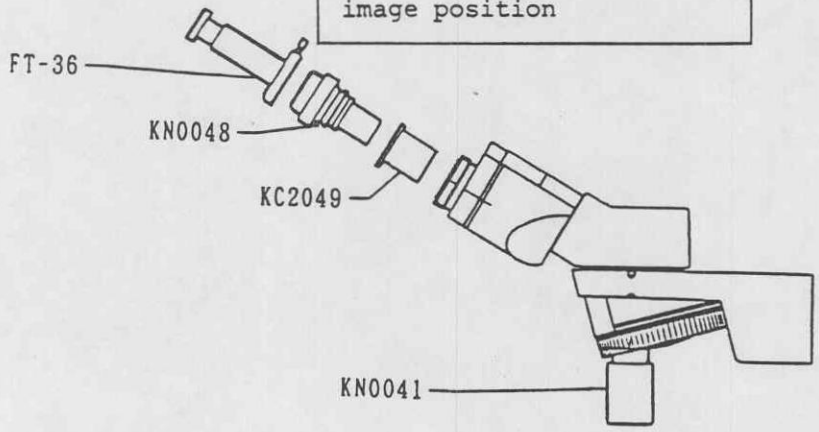
Checking the left/right optical axis



Checking the optical axis of whole unit



Checking the intermediate image position



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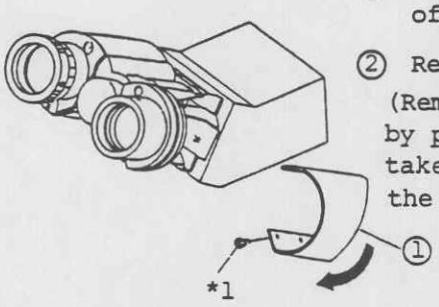
1. OPTICS CLEANING

1-1 BI unit

Check the optical axis before disassembling.

* Make a note of the optical axis positions.

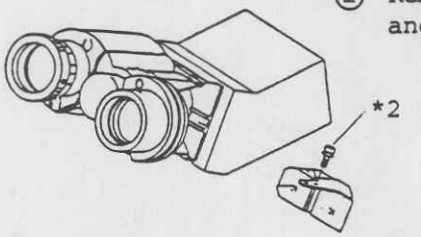


① Remove the two screws each of the upper and lower sides.

② Remove the cover ①.
(Remove the upper side first by prying the clearance, and take off in the direction of the arrow).

* The cover is hard to remove. It can be easily removed if the BI unit is removed from the BIC unit, but the optical axis of the whole unit will have to be adjusted.

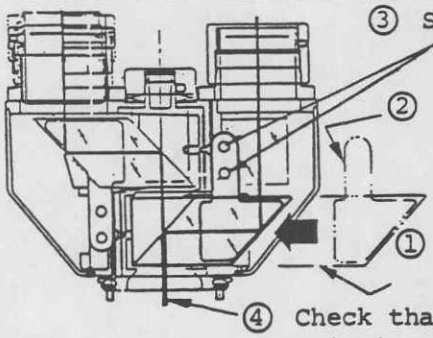
Screw 3PUTS2x3SB 4 pcs.(*1)



① Remove the two screws and take off the prism.

② Clean the prism.

Screw ABSK3x8SA 2 pcs.(*2)



③ Secure with two screws (*2).

② Close this side (leaving no clearance).

① Slide this side close to the frame.

④ Check that the optical axis is not displaced.

* For the optical axis check, refer to "C. INSPECTION STANDARD".
* If the optical axis can not be returned to the original position, remove the prism and install it again.
* Use no adhesives.

Screw ABSK3x8SA 2 pcs. (*2)

Mount and secure the cover with four screws.

Clean the other prism in the same way.

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2. OPTICAL ADJUSTMENT

OPTICAL ADJUSTMENT NECESSARY FOR U-BI30

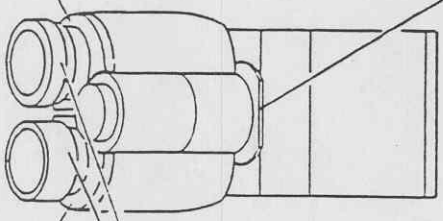
OUTLINE

Left sleeve

Adjust the left/right optical axis by changing this sleeve position.

BI unit

Adjust the optical axis of the whole unit by changing this BI unit position.



Right sleeve

Adjust the revolving axis by changing this sleeve position.

Left/right sleeve

Adjust the intermediate image position (optical tube length) by adjusting these sleeves.

(Right sleeve: turn the adj. ring around the right sleeve.)
(Left sleeve: change the helicoid scale position of the left sleeve.)

PROCEDURE

Start

Adjust the revolving axis by changing the right sleeve position.	Refer to D-3.
Adjust the left/right optical axis by changing the left sleeve position.	Refer to D-8.
Adjust the optical aixs of the whole unit by changing the BI unit position.	Refer to D-11.
Adjust the intermediate image position by adjusting the left and right sleeves.	Refer to D-13.

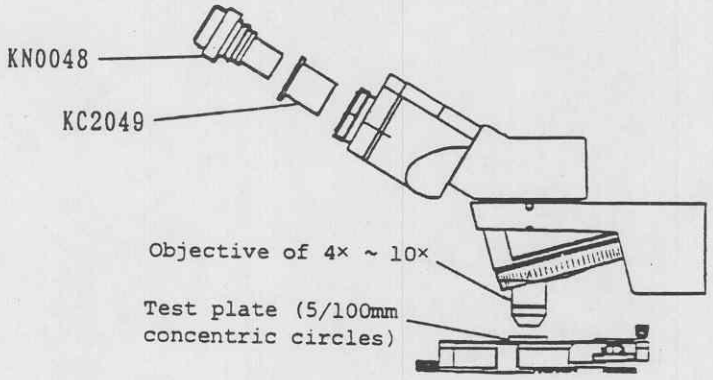
End

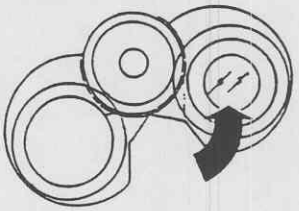
2-1 ADJUSTMENT OF REVOLVING AXIS

PREPARATION

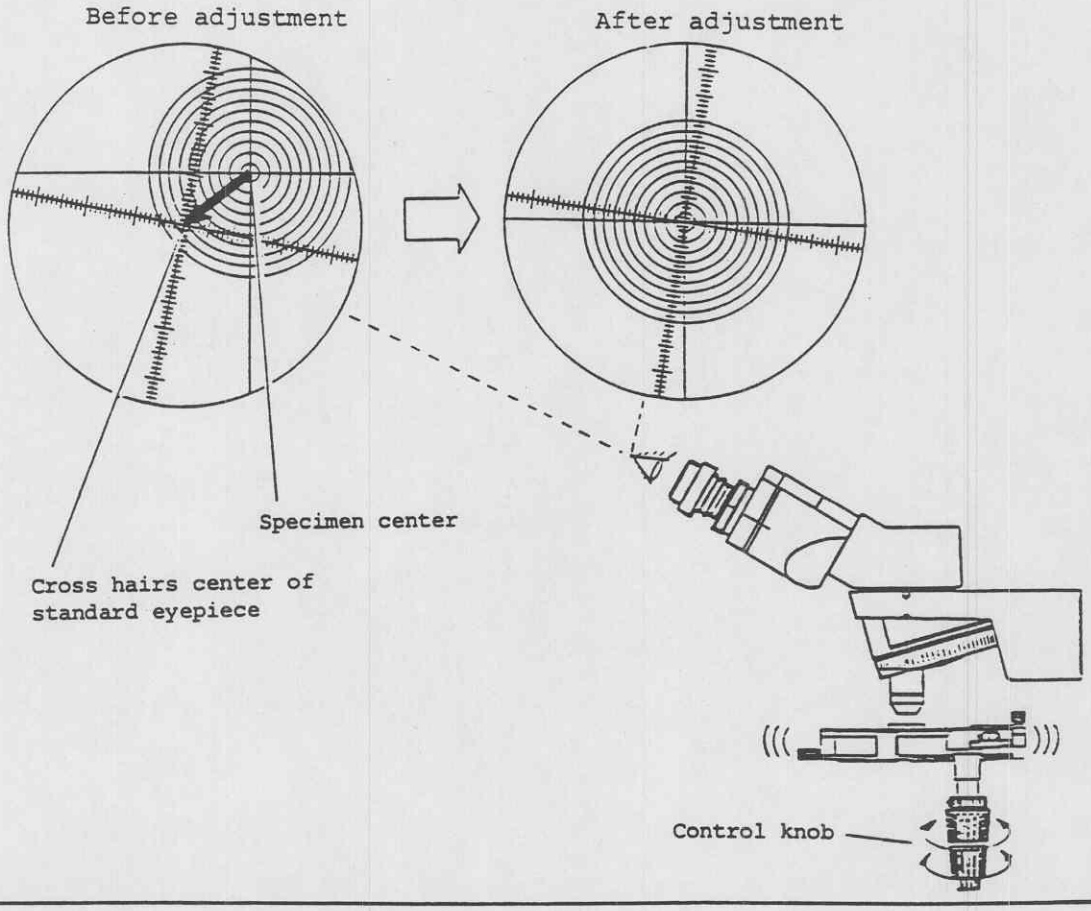
* Install the standard eyepiece in the right sleeve.

* Change the interpupillary distance by fully opening the right sleeve (see the illustration).



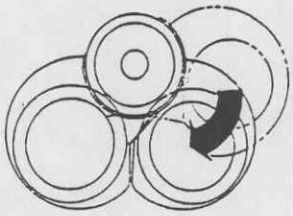
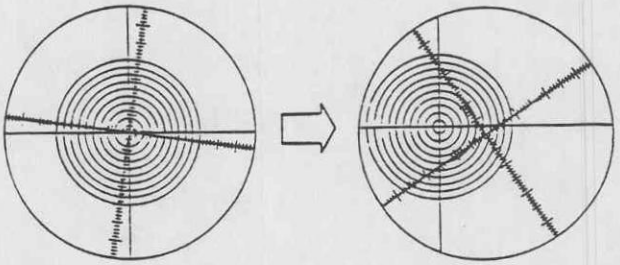


Align the specimen center with the cross hairs center of the standard eyepiece by turning the control knob of the stage.



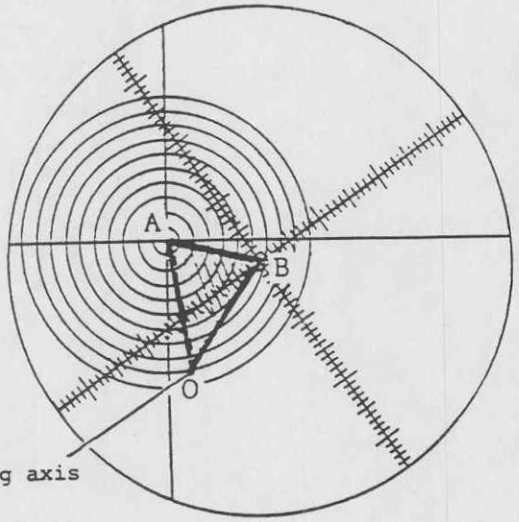
SEARCHING FOR THE REVOLVING AXIS

(1) Checking the optical axis displacement by the revolving axis

Work	Image seen through the standard eyepiece
Gradually reduce the inter-pupillary distance while observing through the standard eyepiece. 	The centers are aligned at first. The centers are deviated as shown below. 

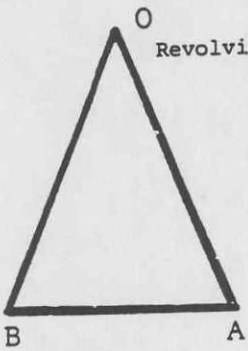
(2) Searching for the revolving axis from the optical axis displacement amount and direction checked in (1) above

The revolving axis is as shown below in the case of (1).



The triangle formed by A, B and O is always constant in shape.
→ Revolving axis triangle
The revolving axis can be found simply by adapting this triangle.

Revolving axis triangle



Remember this triangle shape and use it when finding the revolving axis after the step (1).

Reference

$\angle OAB \fallingdotseq 68°$

$AB : AO \fallingdotseq 1 : 1.3$

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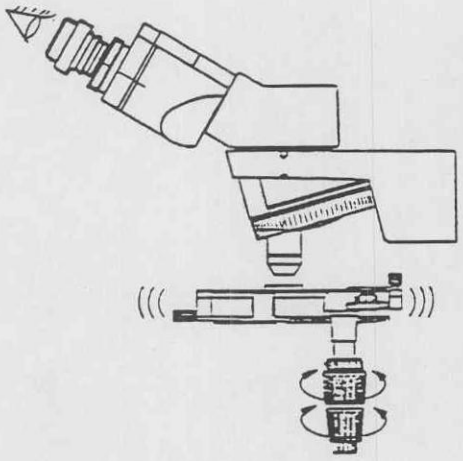
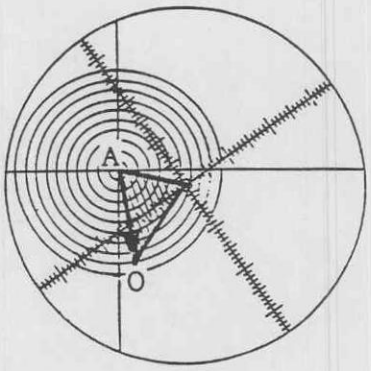
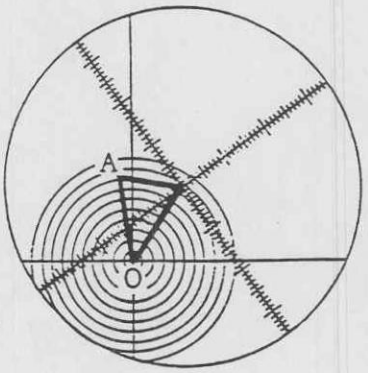
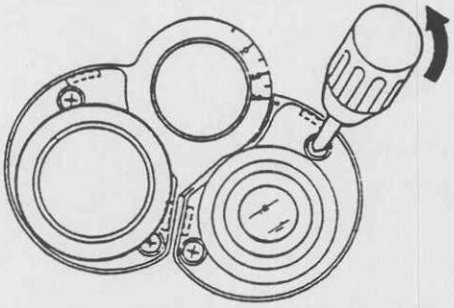
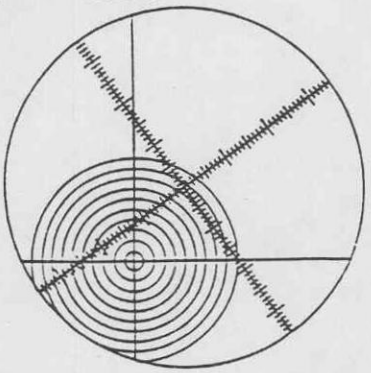
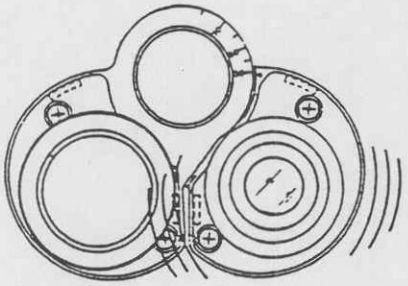
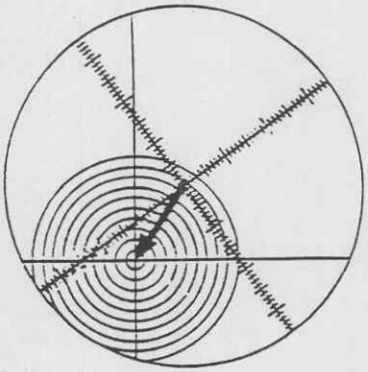
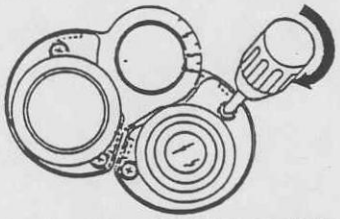
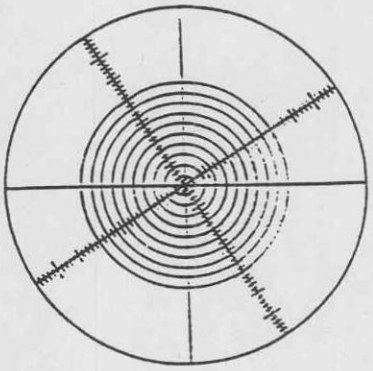
(3) Aligning the specimen center with the revolving axis found in (2) above.

Work	Image seen through the standard eyepiece
Move the specimen center from A to O by turning the control knob. 	Image at first 
	Image at the end of adjustment 

ALIGNING THE CROSS HAIRS CENTER OF THE STANDARD EYEPIECE (the right sleeve optical axis) WITH THE SPECIMEN CENTER (the revolving axis).

Work	Image seen through the standard eyepiece
(1) Loosen the two screws slightly which secure the right sleeve. (Use a thin screwdriver. A thick screwdriver may damage the outside surface of sleeve.) 	Image at first 
(2) Align the cross hairs center of the standard eyepiece with the specimen center while observing through the standard eyepiece. (Change the right sleeve position by hand.) 	The centers are aligned. 
(3) Firmly tighten the screws which secure the right sleeve. (Use a thin screwdriver. A thick screwdriver may damage the outside surface of sleeve.)  * In the tube (U-TR30, U-SWTR, etc.) having the mechanism for right sleeve rotation stop, the belt slack should be eliminated by the eccentric pin after this adjustment. At this time, the sleeve may be pulled by the belt, resulting in displacement of the optical axis. When adjusting in such a case, set the right-side sleeve beforehand to displaced position from the specimen center by moving amount.	Image at the end of adjustment 

CHECKING THE REVOLVING AXIS

Change the interpupillary distance as shown in Fig. A and check if the specimen center in the right sleeve is seen within the range shown in Fig. B.

Fig. A

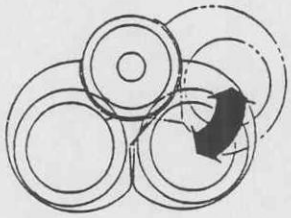
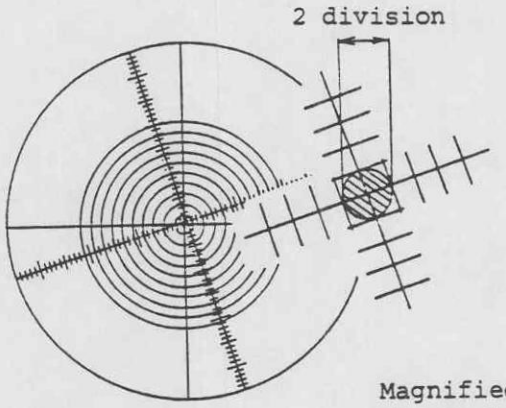


Fig. B

The specimen center in the right sleeve should be seen within the shaded area.



Magnified view of the center (The center position is within the shaded area.)

If the specimen center is not seen within the standard area, return to D-3 and repeat the adjustment.

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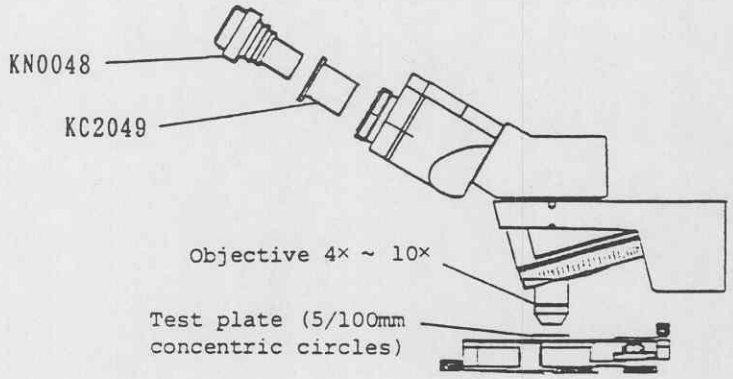
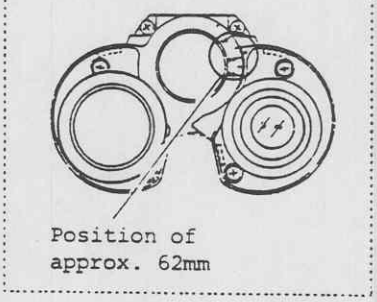
2-2 ADJUSTMENT OF LEFT/RIGHT OPTICAL AXIS

PREPARATION

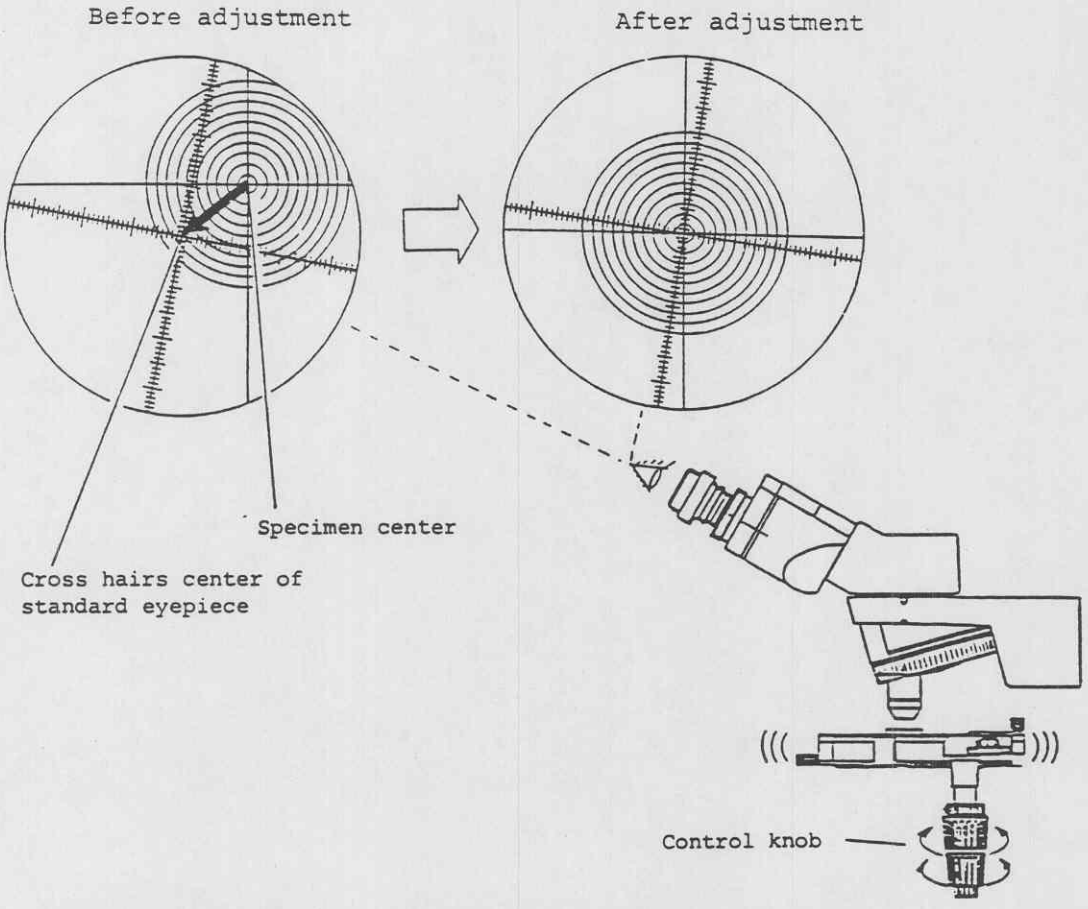
* Install the standard eyepiece in the right sleeve.



* Adjust the interpupillary distance to about 62mm (see the illustration).



Align the specimen center with the cross hairs center of the standard eyepiece by turning the control knob of the stage.



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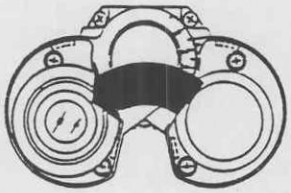
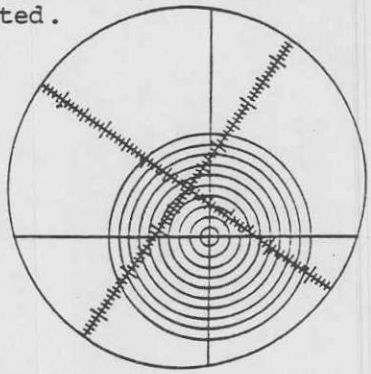
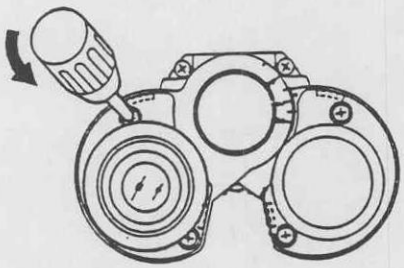
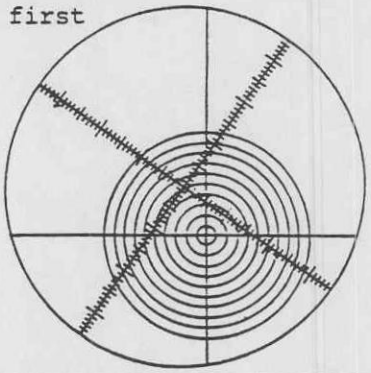
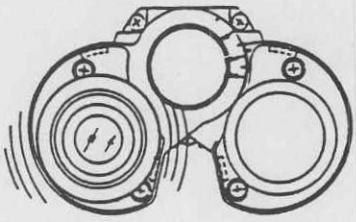
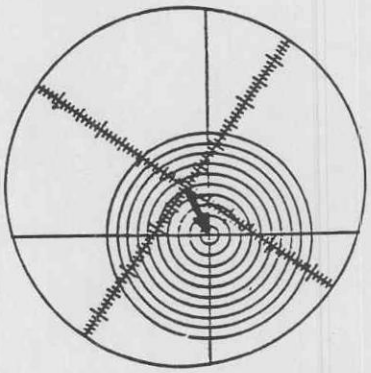
ADJUSTING THE LEFT/RIGHT OPTICAL AXIS

(1) Moving the standard eyepiece to the left sleeve.

Work	Image seen through the standard eyepiece
Move the standard eyepiece to the left sleeve. 	If the optical axis between left and right sleeves is deviated, the centers of the specimen and the cross hairs of the standard eyepiece are also deviated. 

(2) Aligning the cross hairs center of the standard eyepiece with the specimen center.

Work	Image seen through the standard eyepiece
1. Loosen the two screws slightly which secure the left sleeve. 	Image at first 
2. Align the cross hairs center with the specimen center while observing through the standard eyepiece. (Change the left sleeve position by hand.) 	The centers are aligned. 

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3. Firmly tighten the screws which secure the left sleeve.

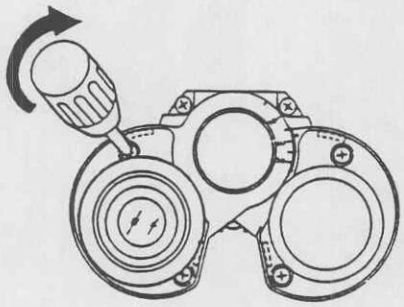
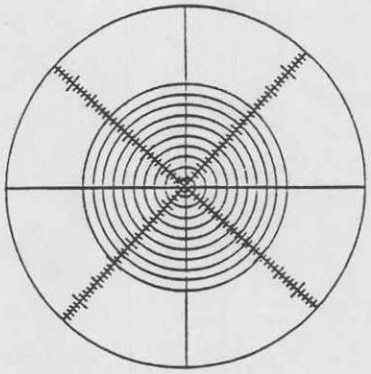


Image at the end of adjustment



CHECKING THE LEFT/RIGHT OPTICAL AXIS

Change the interpupillary distance as shown in Fig. A.
Check if the specimen center in the left sleeve is seen within the range shown in Fig. B.

Fig. A

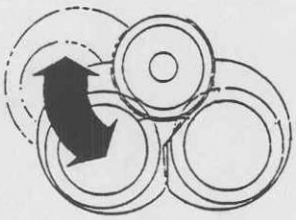
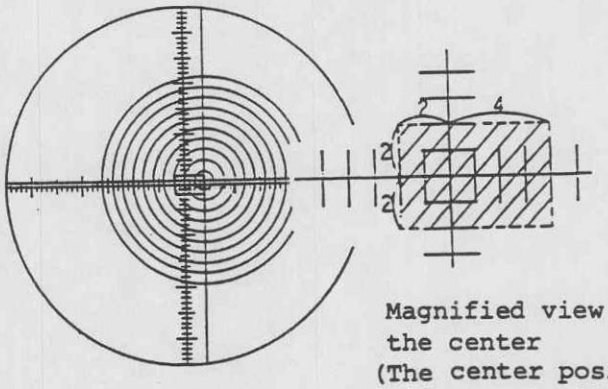


Fig. B

The specimen center in the left sleeve should be seen within the shaded area.



Magnified view of the center (The center position is within the shaded area. The digits indicate the scale graduations.)

If the specimen center is not seen within the standard area, return to D-7 and repeat the adjustment.

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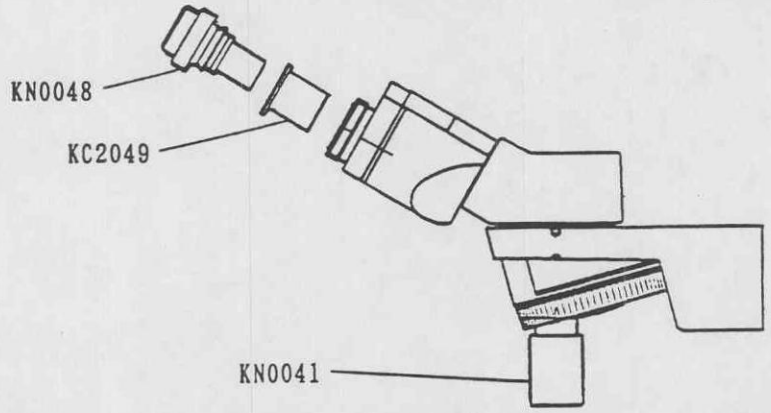
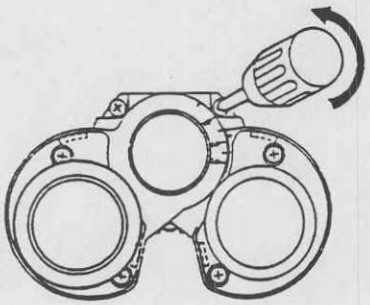
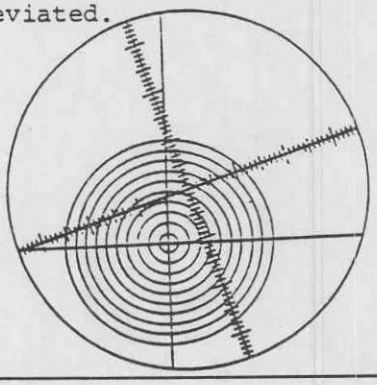
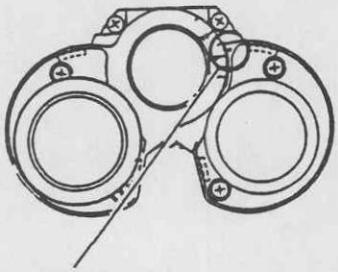
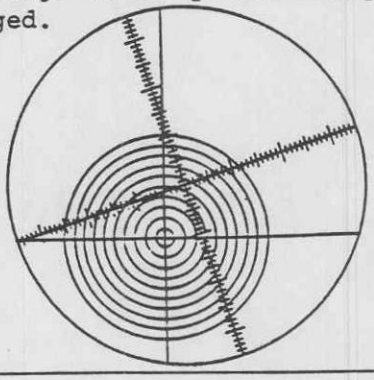
2-3 ADJUSTMENT OF OPTICAL AXIS OF WHOLE UNIT

PREPARATION

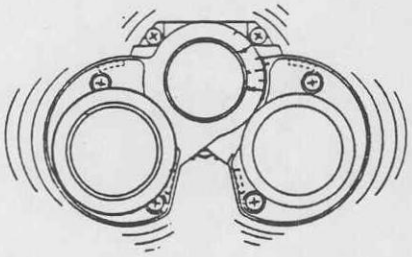
* Install the standard eyepiece in the right sleeve.



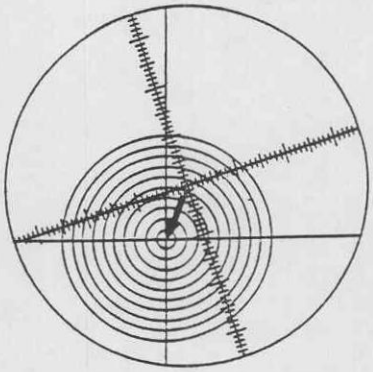
ADJUSTING THE OPTICAL AXIS OF THE WHOLE UNIT

Work	Image seen through the standard eyepiece
(1) Loosen the three screws slightly which secure the BI unit (to the extent that the unit does not become loose). 	If the optical axis of the whole unit is deviated, the centers of the cross hairs and the specimen in the standard objective are seen deviated. 
(2) Adjust the interpupillary distance to about 62mm. 	The image is not particularly changed. 

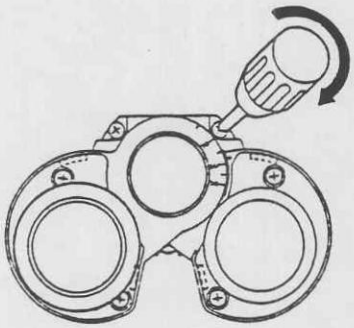
(3) Align the cross hairs center with the specimen center while observing through the standard eyepiece (change the BI position by hand).



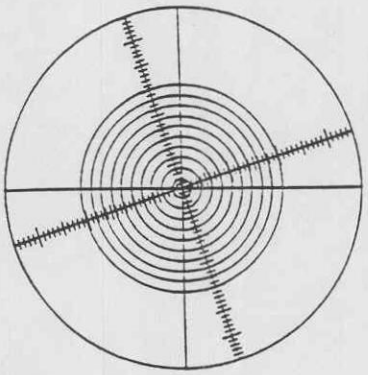
Align the centers.



(4) Firmly tighten the screws which secure the BI unit.



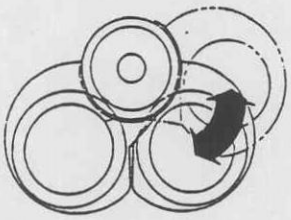
Pay attention not to displace the centers.



CHECKING THE OPTICAL AXIS OF THE WHOLE UNIT

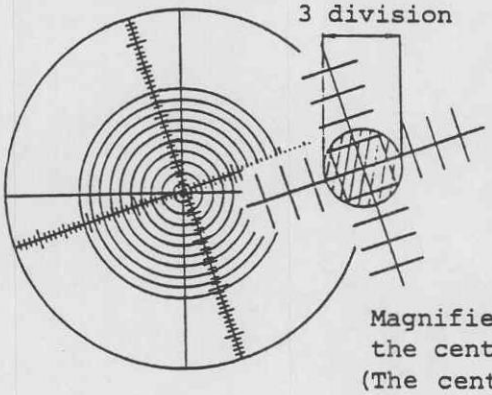
Change the interpupillary distance as shown in Fig. A. Check if the specimen center in the right sleeve is seen within the range shown in Fig. B.

Fig. A



If the specimen center is not seen within the standard area, return to D-10 and repeat the adjustment.

Fig. B The specimen center in the right sleeve should be seen within the shaded area.



Magnified view of the center (The center position is within the shaded area.)

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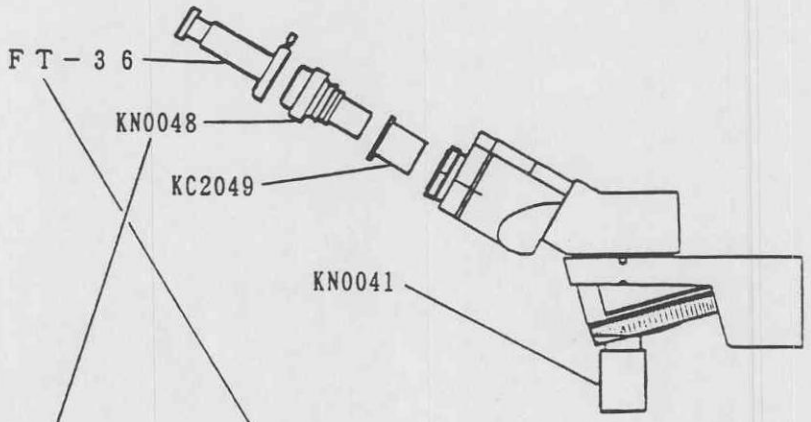
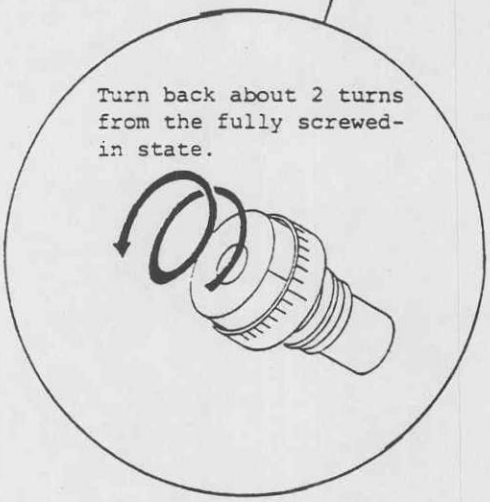
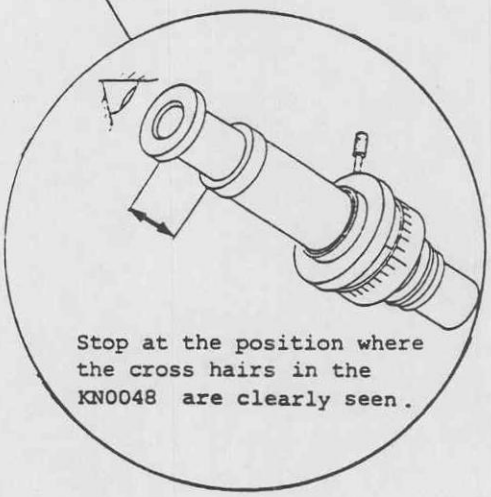
2-4 ADJUSTMENT OF INTERMEDIATE IMAGE POSITION

PREPARATION

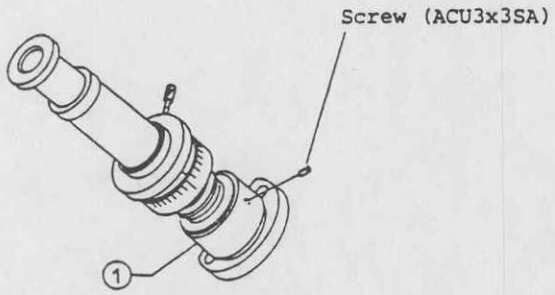
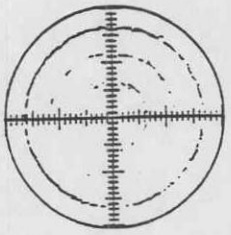
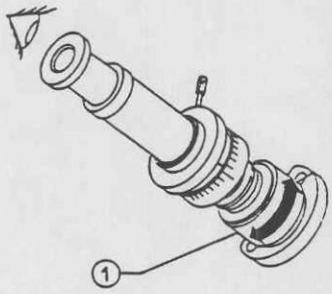
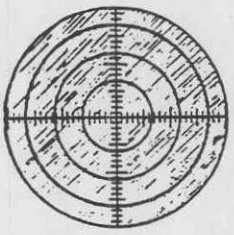
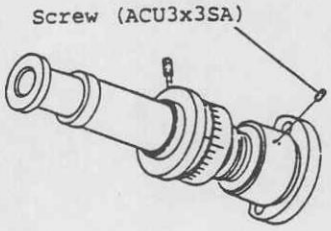
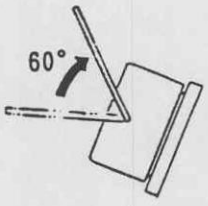
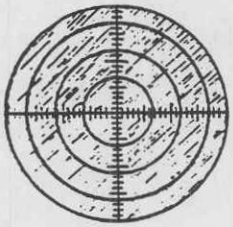
* Install the standard eyepiece in the right sleeve.



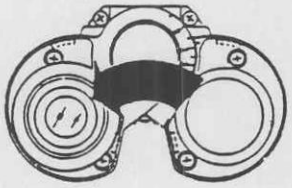
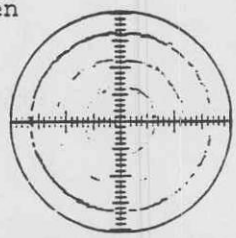
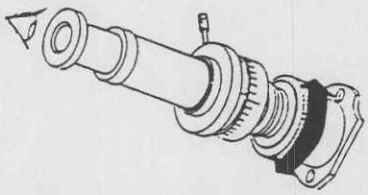
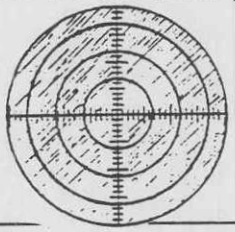
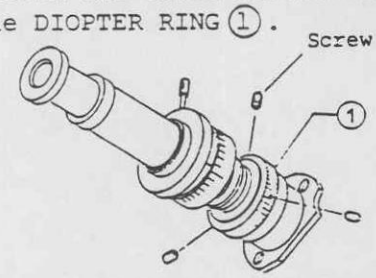
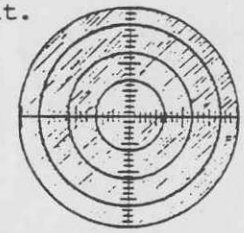
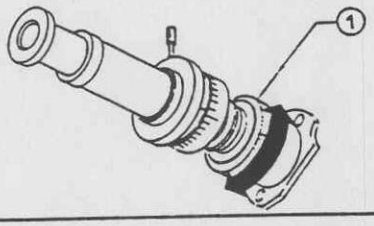
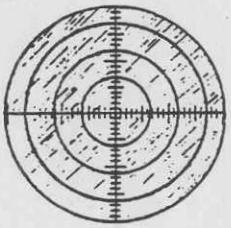
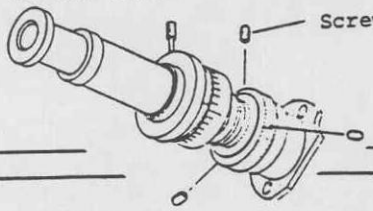
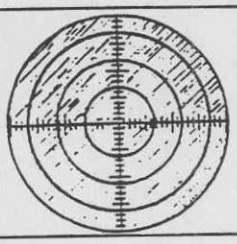




ADJUSTING THE INTERMEDIATE IMAGE POSITION IN THE RIGHT SLEEVE

Work	Image seen through the standard eyepiece
(1) Loosen the screw which secures the ADJ. RING ① of the right sleeve. 	The cross hairs of the standard eyepiece are clearly seen, but the specimen in the standard objective is seen unclear. 
(2) Adjust by turning the ADJ.RING ① so that the specimen in the standard objective is clearly seen while observing through the standard eyepiece. 	The fine stripes in the background of the specimen are clearly seen at the best position. 
(3) Tighten the screw which was loosened in (1). * Don't tighten the screw too strongly. The sleeve may be deformed. Turn the screw about 60° after the screw end contacts the sleeve.  	When tightening the screw, be careful not to disturb the adjustment. 

ADJUSTING THE INTERMEDIATE IMAGE POSITION IN THE LEFT SLEEVE

Work	Image seen through the standard eyepiece
(1) Move all the jigs and tools which were used in the right sleeve to the left sleeve. 	The cross hairs of the standard eyepiece are clearly seen, but the specimen in the standard objective is seen unclear. 
(2) Adjust by turning the helicoid ring of left sleeve so that the specimen in the standard objective is clearly seen. 	The fine stripes in the background of the specimen are clearly seen at the best position. 
(3) Loosen the three screws which secure the DIOPTER RING ①. 	When loosening the screw, be careful not to disturb the adjustment. 
(4) Keep the clear image of the specimen in the standard objective, move only the loosened DIOPTER RING ① and adjust "0" to the index "·". 	When turning the DIOPTER RING, be careful not to disturb the adjustment. 
(5) Tighten the screws which were loosened in (3). 	 When tightening the screw, be careful not to disturb the adjustment.

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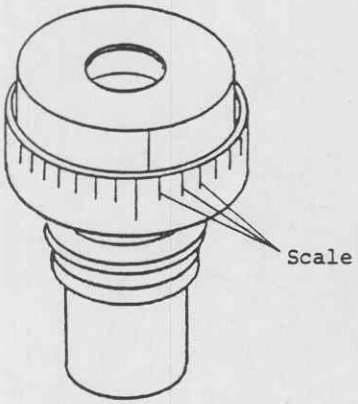
CHECKING THE INTERMEDIATE IMAGE POSITION

The cross hairs of the standard eyepiece and the specimen in the standard objective must be seen sharp at the same time. Even if the clearly seen positions are different, they must be within the standard range shown in Fig. A.

Fig. A

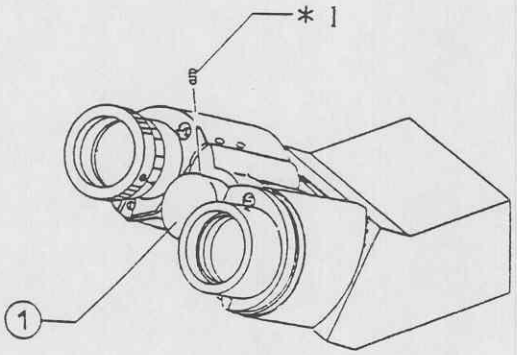
The clearly seen position difference between the cross hairs of the standard eyepiece and the specimen in the standard objective should be within 1.5 graduation on the scale of KN0048.



* Do not move the helicoid ring of left sleeve from the position "0".

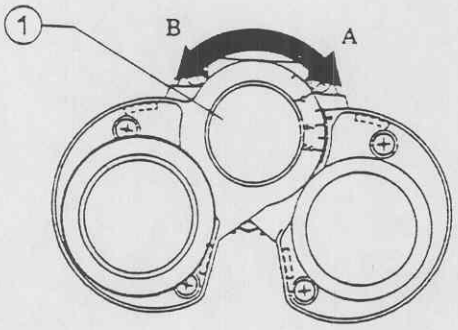
If the position difference is not within 1.5 graduation, return to D-12 and repeat the adjustment.

3. INTERPUPILLARY DISTANCE WORKING FORCE

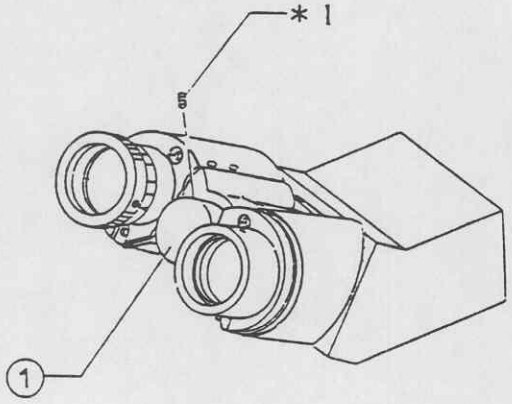


3-1 Loosen the screw securing the ADJ. RING (1).

Screw ACU3x3SA 1 pc. (*1)



3-2 Turn the ADJ. RING (1) in the A direction to increase the working force and in the B direction to decrease it.



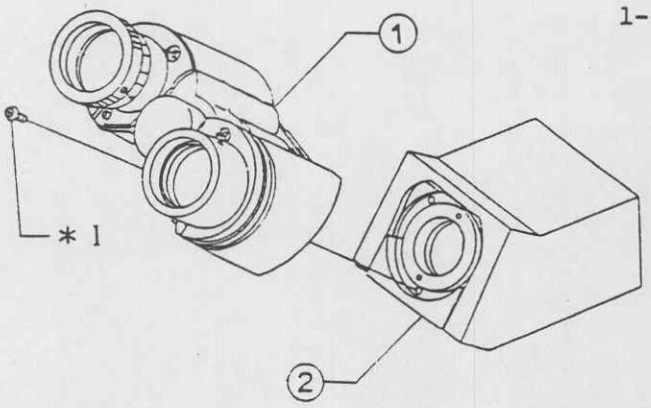
3-3 Tighten the screw which was loosened in 3-1.

Screw ACU3x3SA 1 pc. (*1)

3-4 Measure the working force according to "C. INSPECTION STANDARD".

Standard	1000 ~ 2000g

1. DISASSEMBLING THE BI AND BIC UNITS

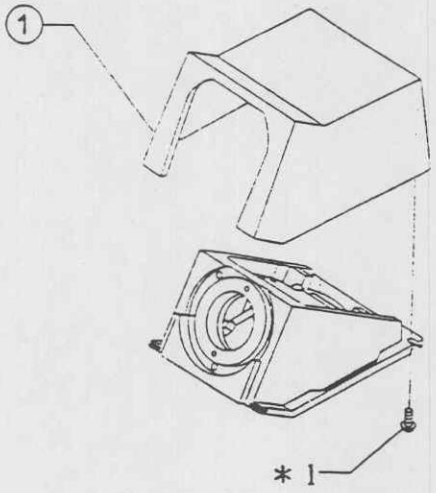


1-1 Remove the three screws and take off the BI unit ① from the BIC unit ② .

Screw CUK3x6SB 3 pcs. (*1)

* Be careful not to drop the BI unit.

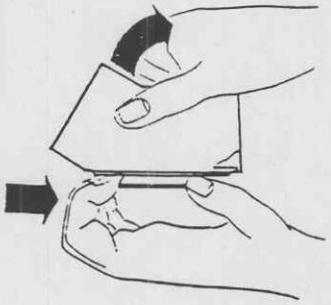
2. DISASSEMBLING THE BIC UNIT

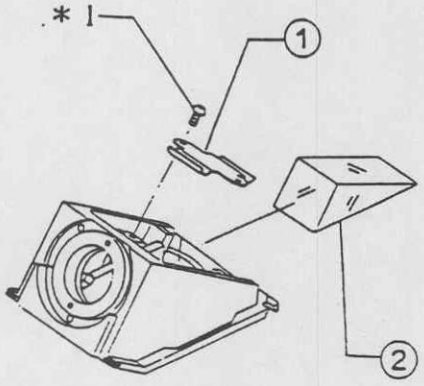


2-1 Remove the two screws and take off the COVER ① .

Screw CUK3x6SB 2 pcs. (*1)

* Sometimes it is hard to remove. Hold the circular dovetail with fingers and pull strongly in the direction of the arrow.





2-2 Remove the two screws and take off the FIXING SPRING ① . Then the PRISM ② comes off.

Screw CUK3x4SA 2 pcs. (*1)

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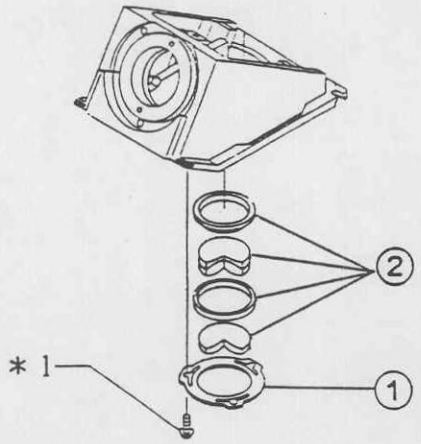
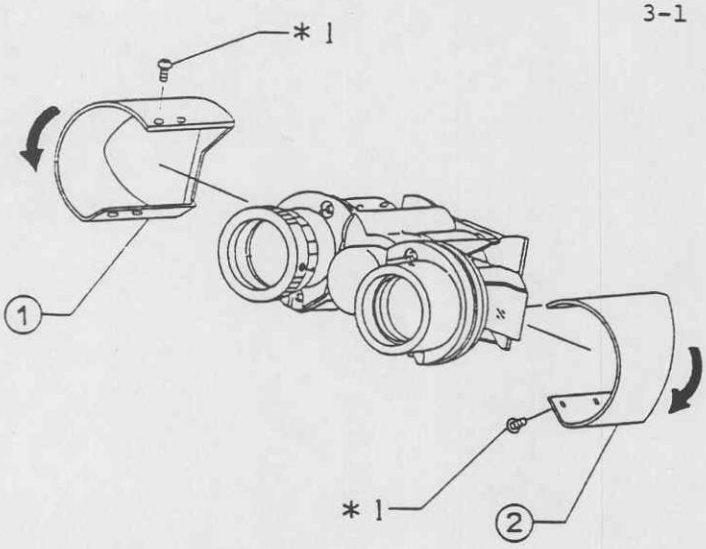


2-3 Remove the three screws and take off the FIXING SPRING (1). Then, the LENS, the SPACER and the DIAPHRAGM RING, (2) come off.

Screw PUK2x4SA 3 pcs. (*1)

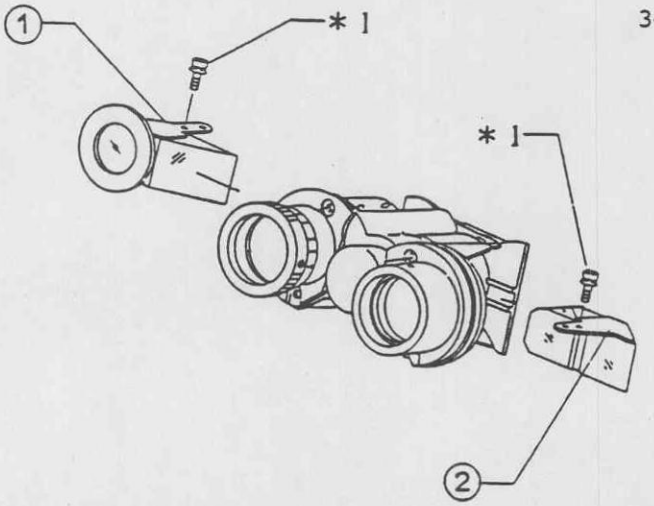
* The LENS, SPACER and DIAPHRAGM RING can be completely removed by holding it with lens paper and turning it over after removing the screws.

3. DISASSEMBLING THE BI UNIT



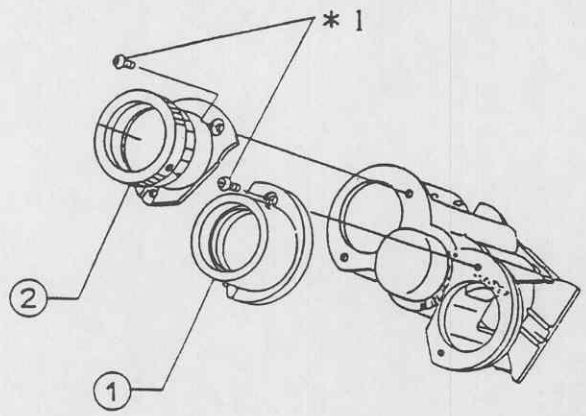
3-1 Remove the four screws each from the L-COVER (1) and the R-COVER (2) and take off these covers.

Screw 3PUTS2x3SB 8 pcs. (*1)



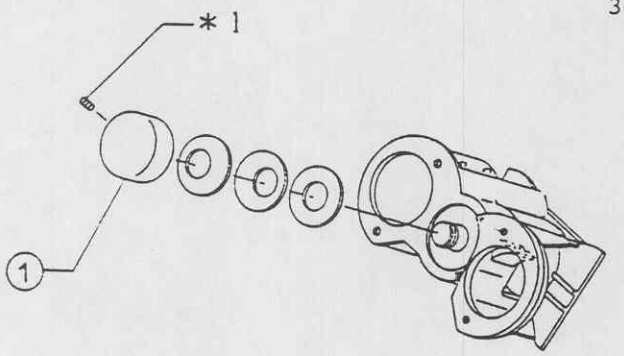
3-2 Remove the two screws each from the L-PRISM ASS'Y (1) and the R-PRISM ASS'Y (2) and take off these parts.

Screw ABSK3x8SA 4 pcs. (*1)



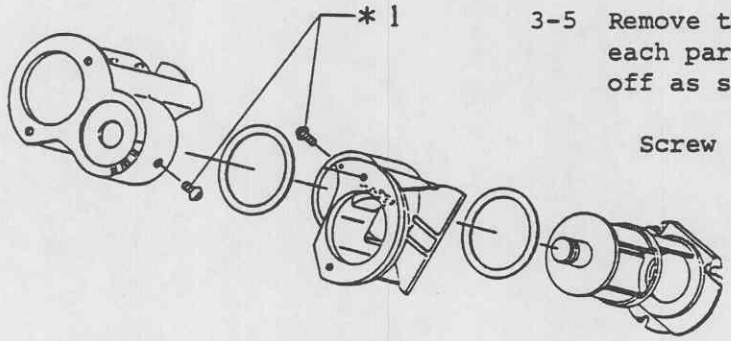
3-3 Remove the two screw each from the R-SLEEVE ASS'Y (1) and the L-SLEEVE ASS'Y (2) and take off these parts.

Screw CUK3x6SB 4 pcs. (*1)



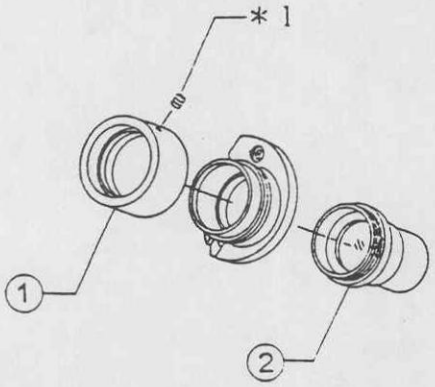
3-4 Loosen the screw and remove the ADJ. RING (1) by turning it. The other parts come off as shown left when the ADJ. RING (1) is removed.

Screw ACU3x3SA 1 pc. (*1)



3-5 Remove the screws, one each from each part. Then the parts come off as shown left.

Screw 3PUTS2x3SB 2 pcs. (*1)

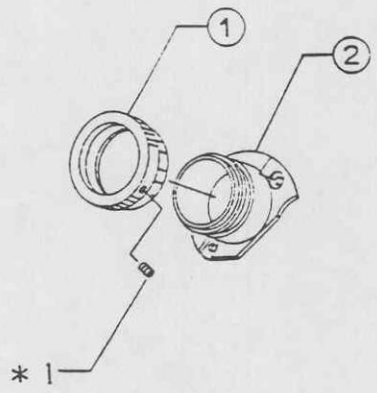


3-6 Disassemble the R-SLEEVE ASS'Y

(1) Loosen the screw, then the ADJ. RING ① can be removed by turning it.

Screw ACU3x3SA 1 pc. (*1)

(2) Remove the COLUMNED PRISM ASS'Y ② by turning it.



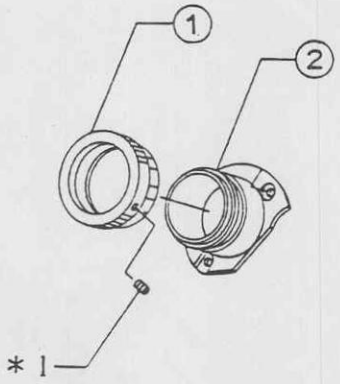
3-7 Disassemble the L-SLEEVE ASS'Y

(1) Loosen the three screws and take off the DIOPTER RING ①.

Screw ACU3x3SA 3 pcs. (*1)

* The helicoid ring can be disassembled after removing the DIOPTER RING, but reassembling is very difficult compared with reassembling the helicoid ring of the ordinary eyepiece. So, it is recommended to have a spare HELICOID ASS'Y ② available.

1. ASSEMBLING THE BI UNIT



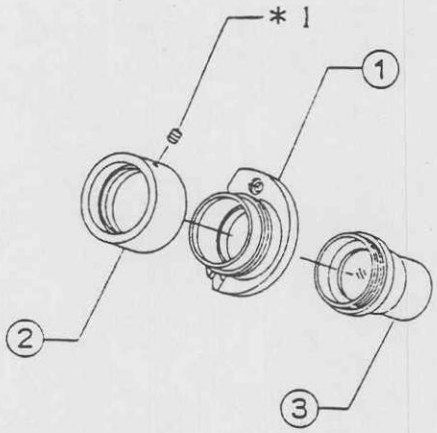
1-1 Assemble the L-SLEEVE ASS'Y.

(1) Attach the DIOPTER RING ① to the HELICOID ASS'Y ② as shown left and tighten temporarily with three screws.

Screw ACU3x3SA 3 pcs. (*1)

> * When replacing the grease of the HELICOID ASS'Y, avoid removing the helicoid ring as far as possible. If the helicoid ring is removed, have a spare HELICOID ASS'Y available.

Grease OT2008

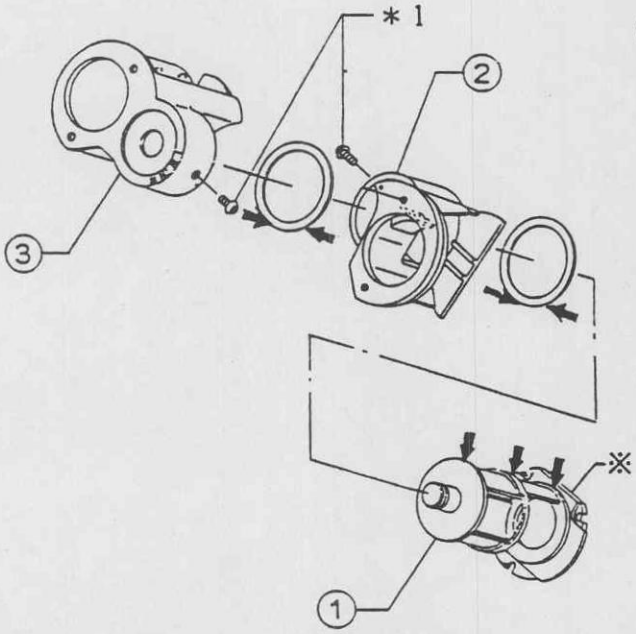


1-2 Assemble the R-SLEEVE ASS'Y.

(1) Screw the ADJ. RING ② all the way onto the R-SLEEVE ①, then screw back by two turns and a half. Secure the ADJ. RING temporarily with a screw.

Screw ACU3x3SA 1 pc. (*1)

(2) Screw the COLUMNED PRISM ASS'Y ③ firmly in the R-SLEEVE ①.



1-3 Assemble the SHAFT ASS'Y.

(1) Apply a small amount of the grease to the parts indicated by the arrows, then assemble them in order.

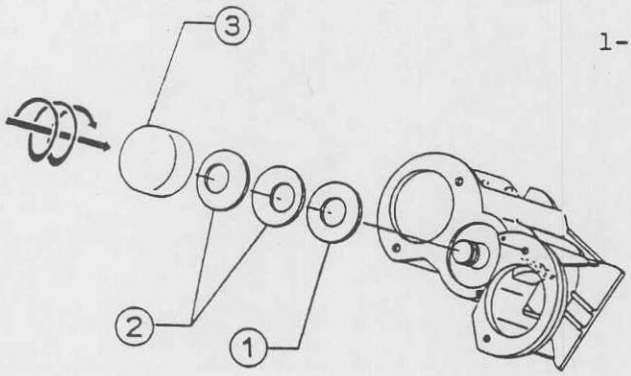
Grease OT1595

> * When attaching the SHAFT ① to the BIC UNIT, it should be installed with the D-cut part (※) facing up.

(2) Insert one screw each into the R-PRISM MOUNT ② and the L-PRISM MOUNT ③.

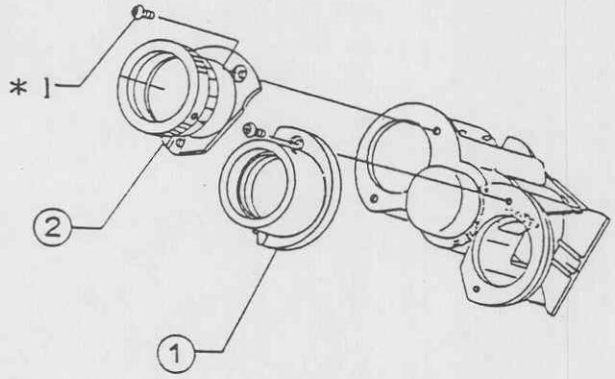
Screw 3PUTS2x3SB 2 pcs. (*1)

185



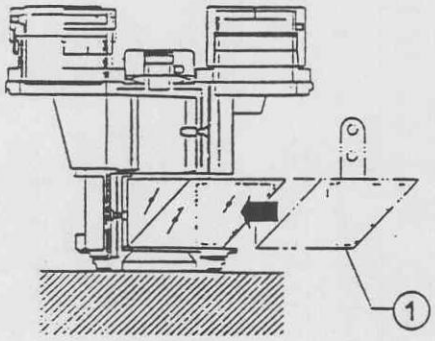
1-4 Apply a small amount of grease to both sides of the WASHER (1) and two SPRING WASHERS (2) (with the concave sides facing each other), insert them and screw the ADJ. RING (3) until it feels heavy.

Grease OT1595



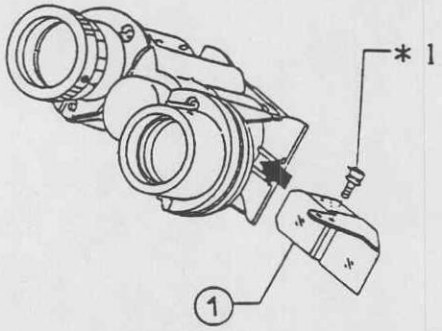
1-5 Secure the R-SLEEVE ASS'Y (1) and the L-SLEEVE ASS'Y (2) temporarily with two screws each.

Screw CUK3x6SB 4 pcs. (*1)

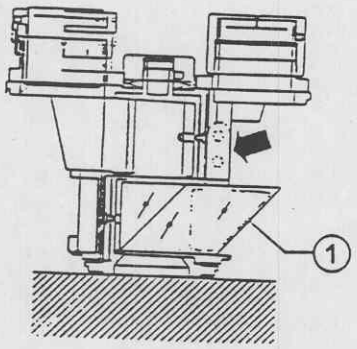


1-6 Stand the unit assembled in 1-5 above on a desk, slip the R-PRISM ASS'Y (1) into it and tighten two screws temporarily.

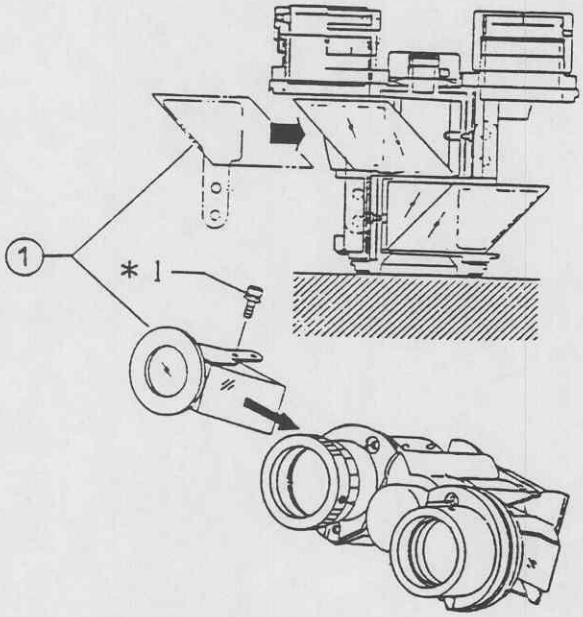
Screw ABSK3x8SA 2 pcs. (*1)



1/86

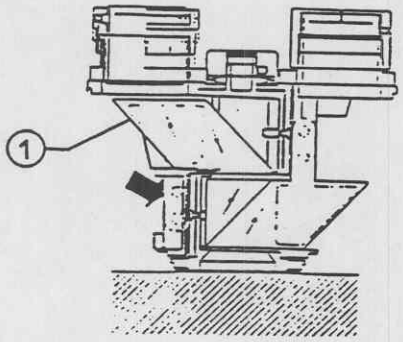


1-7 Push the plate of the R-PRISM ASS'Y (1) in the direction of the arrow with a finger and tighten the screws firmly.



1-8 Slip the L-PRISM ASS'Y (1) into the assembly and tighten two screws temporarily.

Screw ABSK3x8SA 2 pcs. (*1)



1-9 Push the plate of the L-PRISM ASS'Y (1) in the direction of the arrow with a finger and tighten the screws firmly.

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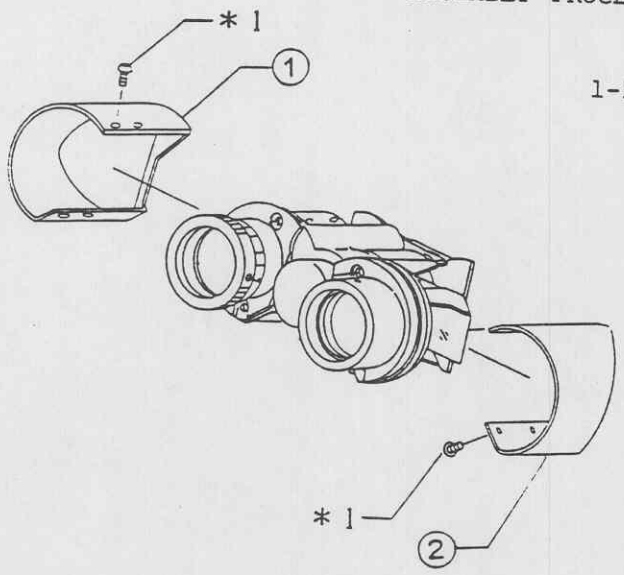
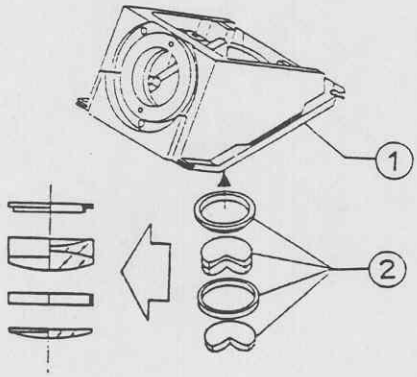


1-10 Mount the L-COVER (1) and the R-COVER (2) to the unit assembled in 1-9 above and secure them with four screws each.

Screw 3PUTS2x3SB 8 pcs. (*1)

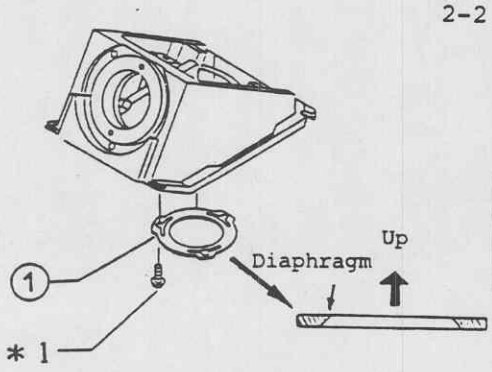
* The screws to secure the covers are of the self-tap type. The 3PUK2x3SB is recommended if the screws are replaced.

2. ASSEMBLING THE BIC UNIT



2-1 Install the LENS, the SPACER and the DIAPHRAGM RING, (2) in the BODY (1) in order.

* Be careful not to stain the lenses with a fingerprint when installing the parts.



2-2 Hold the parts installed in 2-1 above with the FIXING SPRING (1) and secure with three screws.

Screw PUK2x4SA 3 pcs. (*1)

* The FIXING SPRING (1) has front and back sides. Face the diaphragm side to the lens.

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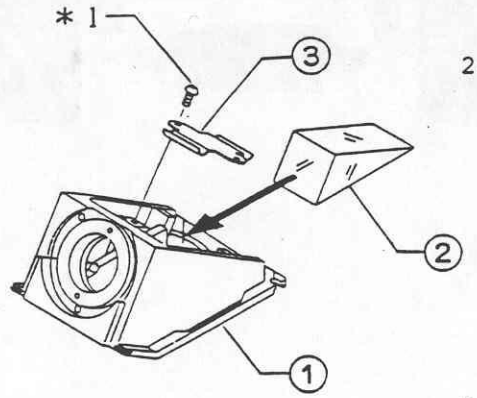
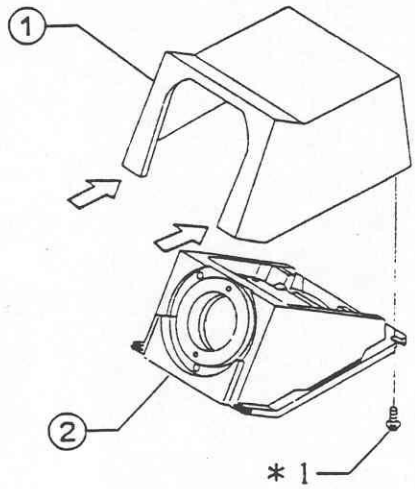


2-3 Slip the PRISM (2) into the BODY (1) as shown left, hold with the FIXING SPRING (3) when it butts against the back wall, then secure with two screws.

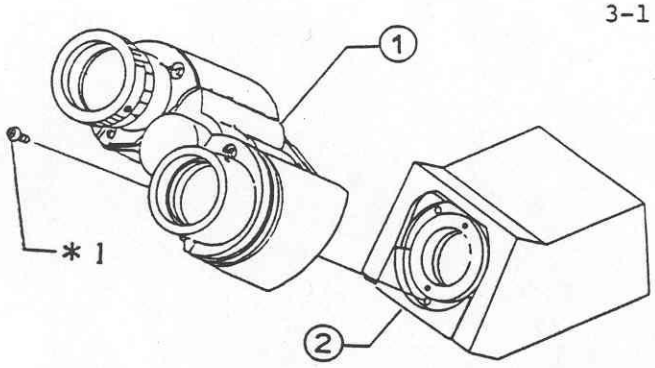
Screw CUK3x4SA 2 pcs. (*1)



2-4 There are projections inside the part of the COVER (1) indicated by the arrow. Fit the projections in the slit located on the front of the BODY (2) and put the COVER (1) on the BODY. Check that the BODY (2) is completely covered with the COVER (1), then secure the COVER with two screws.

Screw CUK3x6SB 2 pcs. (*1)

3. ASSEMBLING THE BI AND BIC UNITS



3-1 Secure the BI UNIT (1) temporarily to the BIC UNIT (2) with three screws.

Screw CUK3x6SB 3 pcs. (*1)

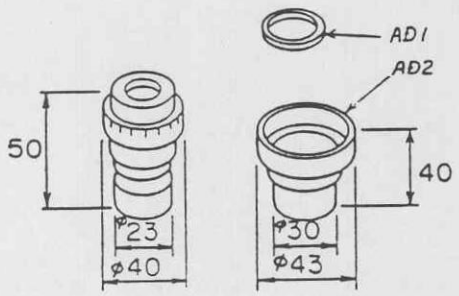
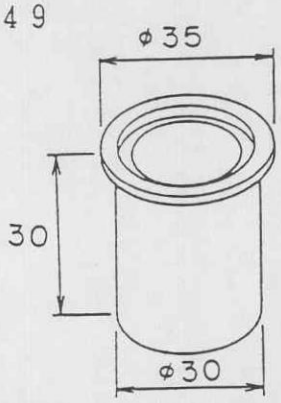
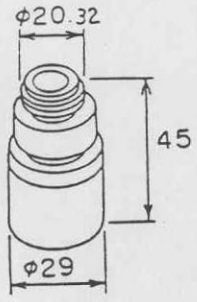
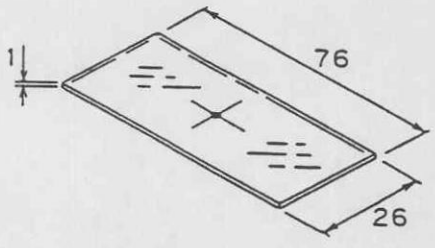
The assembling is completed by the above steps.
The assembled unit needs the following adjustments. For each adjustment , refer to "D. REPAIR PROCEDURE". Make the adjustments in the following order.

1. Adjustment of the interpupillary distance working force
2. Adjustment of the revolving axis
3. Adjustment of the left/right optical axis
4. Adjustment of the optical axis of the whole unit
5. Adjustment of the intermediate image position

1. LIST OF JIGS AND TOOLS

No.	Description	Page
KN0048	Universal standard eyepiece with cross hairs	C-1, 2, D-3, 8, 11, 13
KC2049	Eyepiece adapter	C-1, 2, D-3, 8, 11, 13
KN0041	Standard objective for IC series	C-1, 2, D-11, 13
KN0003	Test plate for stereo microscope alignment (5/100mm concentric circles)	C-1, 2, D-3 , 8
OT1068	Tension gauge (3kg)	C-1, 2, D-17
Product	Focusing telescope (FT-36)	C-1, 2, D-13
Product	Microscope Frame (BX40F, BX50F, etc.)	C-1, 2, D-3, 8, 11, 13
Product	Objective (4× or 10×)	C-1, 2, D-3, 8

2. EXPLANATION OF JIGS AND TOOLS

External View and Size	Jig No. Model, Description
KN0048 	① KN0048 ② GENERAL ③ Universal use standard eyepiece for optical axis and tube length. It has two adapter. One is to convert to long barrel, and another one is to convert sleeve diameter d=23.2mm to d=30mm (for stereo).
KC2049 	① KC2049 ② EYEPIECE ③ Eyepiece adapter to convert normal sleeve (ø23.2mm) into SW sleeve(ø30mm). It has annulus for KN0028,KN0048, KN0022.
KN0041 	① KN0041 ② GENERAL ③ Standard objective lens for IC series to adjust optical axis and tube length.
KN0003 	① KN0003 ② STEREO MICROSCOPE ③ Test plate for optical alignment of stereo microscope. (5/100mm concentric circles and cross hair)

1. LIST OF LUBRICANTS AND CHEMICALS

<Grease>

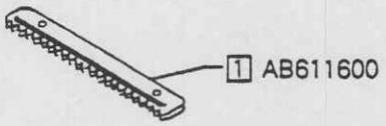
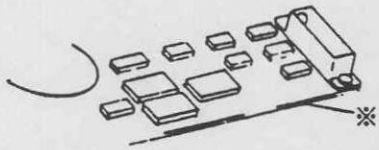
No.	Description	Page
OT2008	Grease (Middle)	F-1
OT1595	Silicone Grease	F-1, F-2

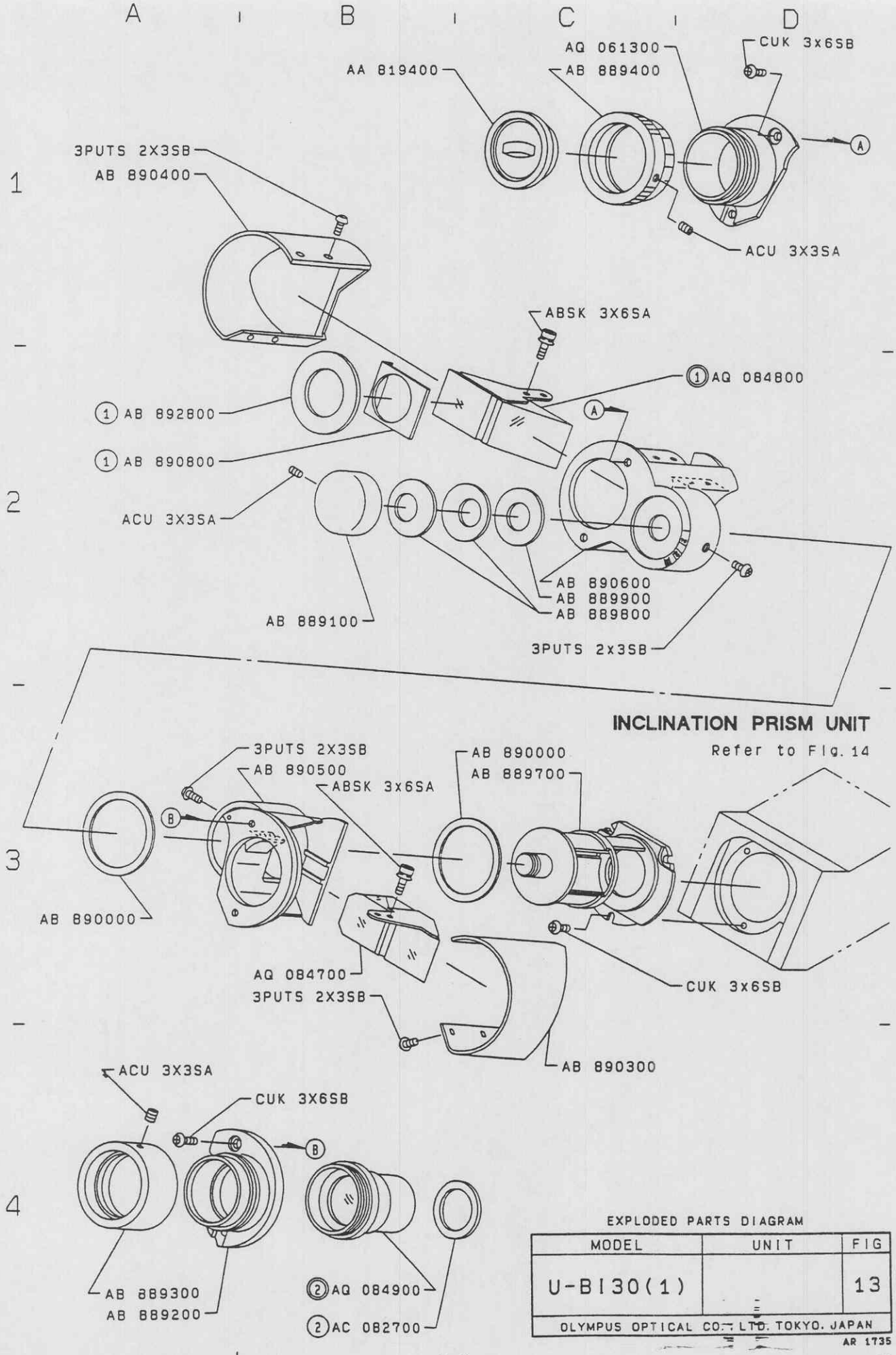
* Use no adhesives.

Description of symbol in parts list

Symbol	Example	Description of symbol
①	①AB 612800 ①AB 612900 ①AQ 410800	Parts ASS'Y or parts itself can be supplied. Parts indicated "①"means parts ASS'Y. The above symbol is not written before parts number in case of supply of parts itself.
( )	②(AB 049600)	Parts itself cannot be supplied when the parts number is put in parenthesis "( )".
[	AB 021000 AB 230400 AA 600200	This bracket is used in case of selecting the proper part from a number of parts with slightly different dimension.
* 3	* 3	This asterisk denotes that a part can be used in several models and differs only by the engraving on it or an internal design feature. The differences are indicated in a table.
	CE 550600	This indicates counter-clockwise screw.
	CE 521500	Be carefull not to touch the parts marked with this symbol. Use tweezers because the parts have a special surface finish.
★	★12V-100W-HAL-L	Parts marked with this symbol cannot be supplied as repair parts. Please order through sales channels.
——	~~AB 021100~~ AB 175900	Used in case a part is substituted by a new design. The part number marked with a line "——" indicates old part, the new part number is without the line. Both parts can be supplied.
═══	AB 116100 ~~AA 136100~~	A double line indicates an old part which is superseded by a new design and no supply of the old part is available.
(t =) (d =) (h =) (φ =)	AB 656300(t = 0.5) AB 656400(t = 0.2) AB 656600(t = 0.1)	Figure put in "( )"after parts number indicates specific measurements of parts. t = thickness d = diameter h = height φ = symbol of diameter
△	△ AB 123400	This indicates additional parts when it is revised in the past.

Description of symbol for parts list

<table>
<tr><th>Symbol</th><th>Example</th><th>Description of symbol</th></tr>
<tr><td>↑</td><td>indicates Lens direction.
(Lens with frame is not marked)
ⓐMark with an arrow on convex side without regard to curvature.
convex/flat convex/concave
 
ⓑMark with an arrow on a sharp curve side. (radius of curvature is small.)
convex/convex concave/concave concave/flat
  </td><td></td></tr>
<tr><td>RED</td><td>indicates color of code
<table><tr><th>abbreviated name</th><th>color</th><th>abbreviated name</th><th>color</th></tr><tr><td>W H T</td><td>White</td><td>G R N</td><td>Green</td></tr><tr><td>B L K</td><td>Black</td><td>B L U</td><td>Blue</td></tr><tr><td>B R N</td><td>Brown</td><td>P R P</td><td>Purple</td></tr><tr><td>R E D</td><td>Red</td><td>G R A</td><td>Gray</td></tr><tr><td>O R N</td><td>Orange</td><td>S K Y</td><td>Sky</td></tr><tr><td>Y E L</td><td>Yellow</td><td>YEL/GRN</td><td>Yellow /Green</td></tr></table></td><td></td></tr>
<tr><td>1</td><td> 
1 AB611600</td><td>This indicates pair of replacing parts. When replaceing parts from old type to new type, replace the parts with same indicated number parts "1" simultaneously.</td></tr>
<tr><td>※</td><td> 
※ AQ 521900</td><td>This indicates that an explanatory note is printed below the part.</td></tr>
<tr><td>②</td><td>EXPLODED PARTS DIAGRAM
<table><tr><th>MODEL</th><th>UNIT</th><th>FIG</th></tr><tr><td>BX50F(1)</td><td></td><td>1</td></tr><tr><td colspan="3">OLYMPUS OPTICAL CO.,LTD. TOKYO. JAPAN</td></tr></table>AR 0F36
② BINDER No. 28</td><td>Number in circle "②" indicates the sequence of revised pages.
This number is located at the bottom of the page.</td></tr>
</table>



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
U-B130(1)		13

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

AR 1735

BINDER No. 26

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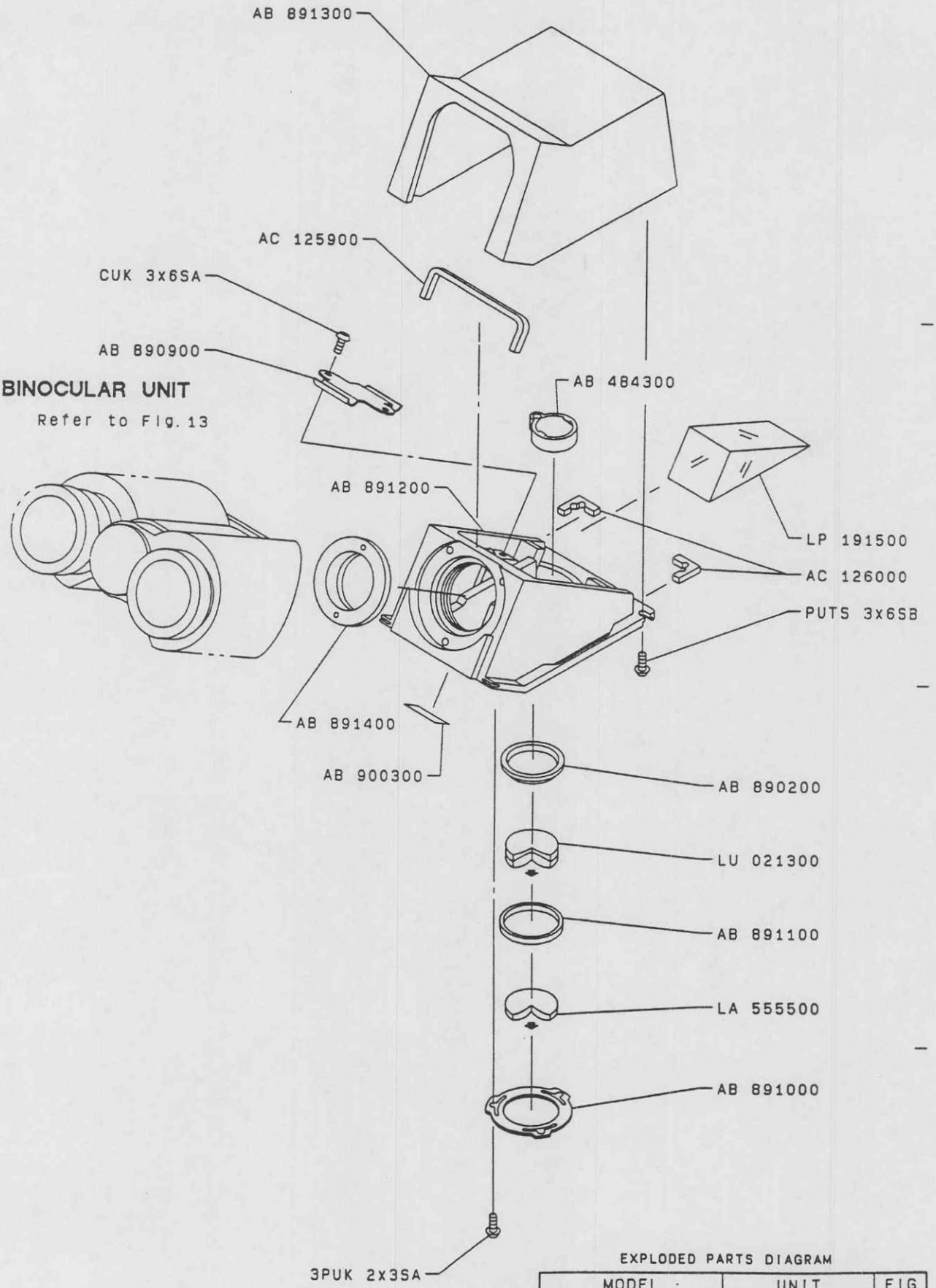
PARTS NO.	NAME OF PARTS		Q'ty
AA819400	ｷｬｯﾌﾟ L	CAP	2
AB889100	AJ ﾘﾝｸﾞ	ADJ. RING	1
889200	R ｽﾘｰﾌﾞ	SLEEVE R	1
889300	AJ ﾘﾝｸﾞ 2	ADJ. RING	1
889400	ﾒﾓﾘｶﾝ	DIOPTER RING	1
889700	ｼﾌｸ	SHAFT	1
889800	SW	SPRING WASHER	2
889900	W1	WASHER	1
890000	W2	WASHER	2
890300	R ｶﾊﾞｰ	COVER R	1
890400	L ｶﾊﾞｰ	COVER L	1
890500	P ﾀﾞｲR	PRISM MOUNT R	1
890600	P ﾀﾞｲL	PRISM MOUNT L	1
890800	ｼｷﾘ 2	DIAPHRAGM SHEET	1
892800	ｼｷﾘｶﾊﾞｰ	DIAPHRAGM COVER	1
AC082700	ﾘﾝｸﾞｼｷﾘ	DIAPHRAGM	1
AQ061300	ﾍﾘｸﾐ B	HELICOID ASS'Y	1
084700	P ｲﾀR ｸﾐ	PRISM R	1
084800	P ｲﾀL ｸﾐ	PRISM L	1
084900	P ｹｰｽｸﾐ	COLUMNED PRISM	1

PARTS NO.	NAME OF PARTS		Q'ty
WE404009	ABSK3x6SA	SCREW	4
WE120016	ACU3x3SA	SCREW	5
WE114406	CUK3x6SB	SCREW	7
WE133013	3PUTS2x3SB	SCREW	10

1960



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
U-B130(2)		14

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

AR 1736

BINDER No. 26

197

RTS NO.	NAME OF PARTS		Q'ty
AB484300	ボウカビボウイ	KABINON	1
890200	TL スリーブ	DIAPHRAGM RING	1
890900	P オサエ	FIXING SPRING	1
891000	レンズオサエ	FIXING SPRING	1
891100	レンズカン	SPACER	1
891200	キンタイ	BIC-BODY	1
891300	C カバー	COVER	1
891400	PR スリーブ	POSITIONING RING	1
900300	BI シリアル	NAME PLATE(BI30)	1
AC125900	シール	SEAL	1
126000	L シール	L-SEAL	2
LA555500	1-T	LENS	1
LP191500	1-P	PRISM	1
LU021300	1-LACE	LENS	1

PARTS NO.	NAME OF PARTS		Q'ty
WE114160	CUK3x6SA	SCREW	2
WE131030	PUTS3x6SB	SCREW	2
WE106007	3PUK2x3SA	SCREW	3

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1. LIST OF JIGS AND TOOLS

SECTION D

THIS SECTION CONTAINS INFORMATION ON BX50 FRAME

ONLY USED IF GIVEN SPECIFIC REFERENCE FROM SECTION A

SEE TABLE OF CONTENTS NEXT PAGE

TABLE OF CONTENTS

SECTION D

BX50F*

* All sections and pages not needed for repair of BX40 have been removed.

List of Illustrations and Tables

Section D BX50 Frame

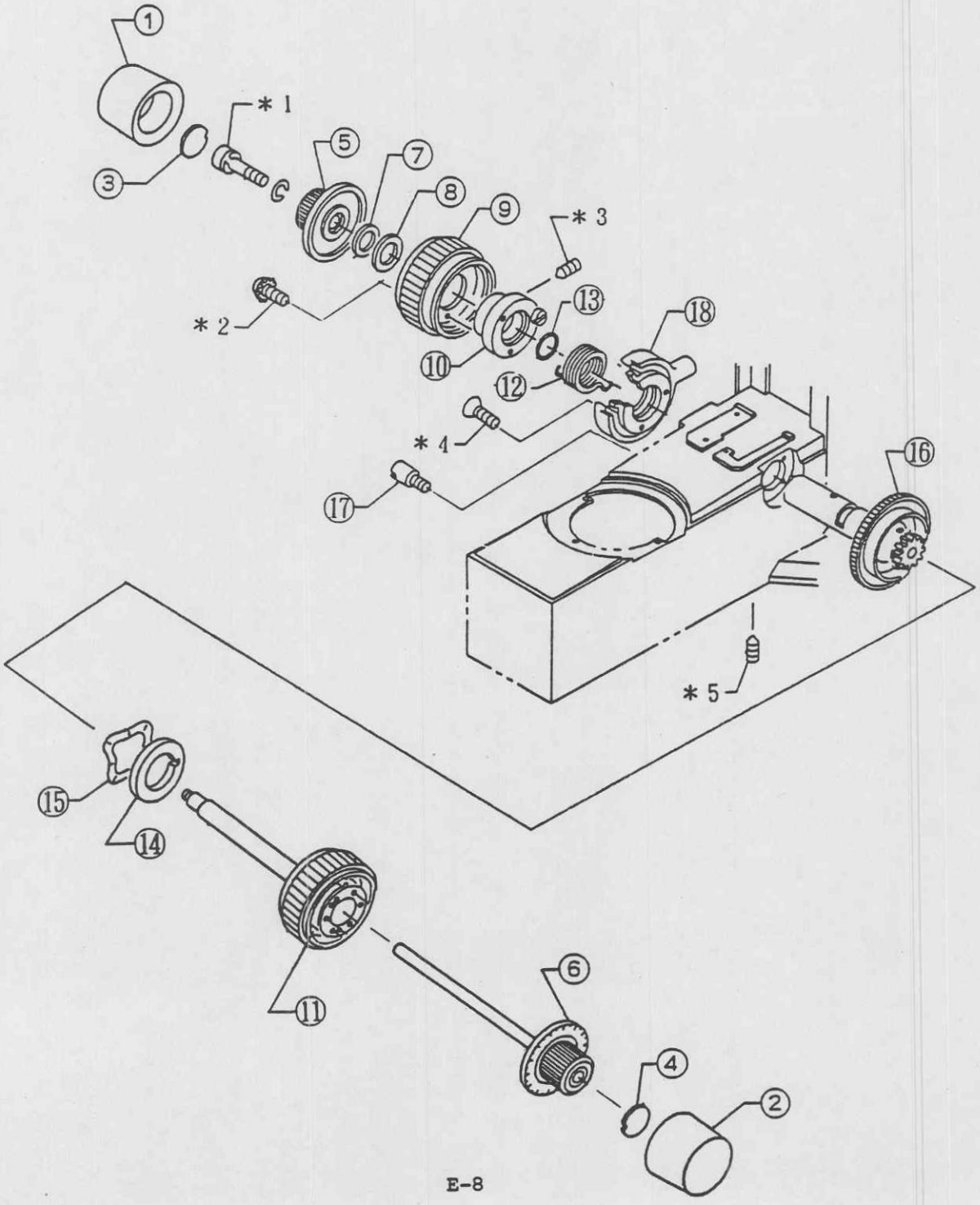
4. COARSE/FINE ADJUSTMENT KNOB

4-1 Precautions

Be careful when hooking the spring of the coarse adjustment lock and when assembling the pinion ass'y. Pay attention to the grease applying positions.

4-2 Disassembly and Assembly

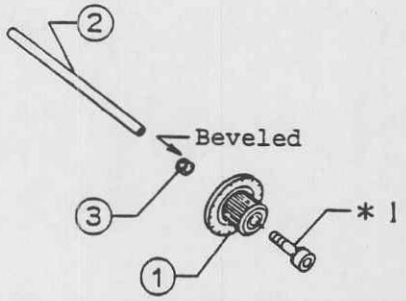
(1) Whole unit



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	RUBBER GRIP KNOB				
②	RUBBER GRIP KNOB				
③	PLATE				
④	PLATE				
⑤	FINE ADJ. KNOB (L)	AB3x8SA(*1) 1 pc.		OT1131 (Screw)	
⑥	FINE ADJ. KNOB ASS'Y (R)		OT2008		E4-2(E-10)
⑦	SPRING WASHER		OT2008		
⑧	WASHER		OT2008		
⑨	COARSE ADJ. KNOB (L)	CWK2.6x5SA(*2) 3 pcs.			
⑩	SHAFT MOUNT	ACU3x6SA(*3) 2 pcs.		OT1131 (Screw)	E4-3(E-12)
⑪	GEAR				E4-2(E-10)
⑫	SPRING				
⑬	WASHER		OT2008		
⑭	WASHER		OT2006		
⑮	SPRING WASHER		OT2006		
⑯	PINION ASS'Y	ACU3x6SA(*5) 2 pcs.		OT1131 (Screw)	E4-2(E-11) E4-3(E-14)
⑰	STOPPER SCREW			OT1126	
⑱	COARSE ADJ. LOCK	CSK3x5SA(*4) 3 pcs.			E4-3(E-13)

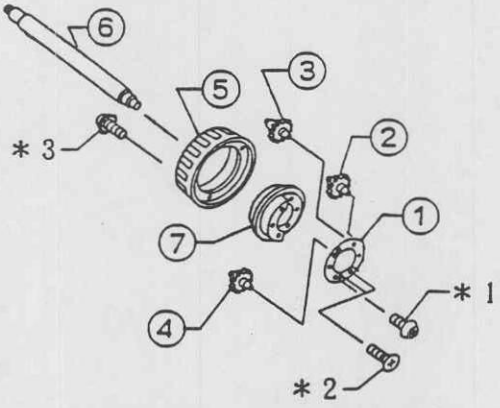
* When disassembling the shaft mount ⑩, hold it with pliers.

(2) Fine adjustment knob ass'y



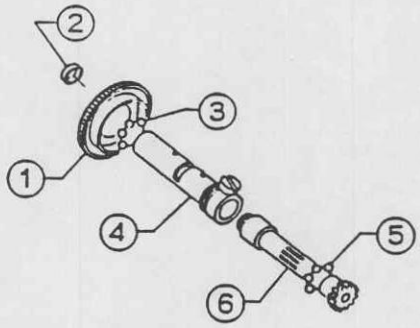
No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	FINE ADJ. KNOB (R)	ABS3x8SA(*1) 1 pc.		OT1131 (Screw)	
②	SHAFT				
③	GEAR				Pay attention to the beveled surface.

(3) Reduction gear ass'y



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	PLATE	CUK2.6x5SA(*1) 1 pc. CSK2.6x6SA(*2) 2 pcs.			
②	GEAR		OT2012		
③	GEAR		OT2012		
④	GEAR		OT2012		
⑤	COARSE ADJ. KNOB (R)	CWK2.6x5SA(*3) 3 pcs.			
⑥	SHAFT			OT1315	
⑦	GEAR MOUNT				

(4) Pinion ass'y



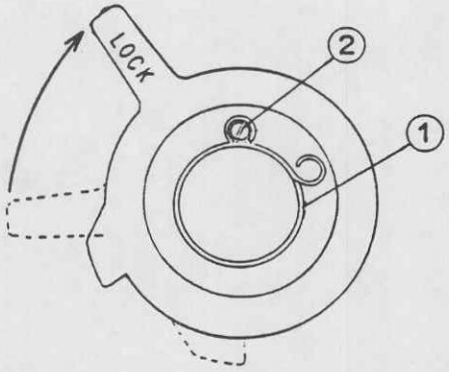
No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	TENSION RING		OT2006		
②	NUT			OT1338	E4-3(E-14)
③	BALL	B1/16 30 pcs.	OT2012		
④	PINION MOUNT		OT2012		
⑤	BALL	B1/16 30 pcs.	OT2012		
⑥	Pinion		OT2012		

* When removing the NUT ② , heat it with an alcohol lamp and use the special tools.

Special tools: ① KKAA7828 Pin-face wrench for AA 7828
② KC2010 Tool for holding gear

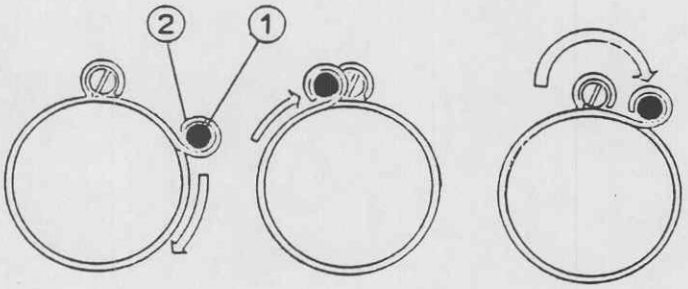
4-3 Adjustment

(1) Hooking the spring of the coarse adjustment lock



i. Put the hook of the SPRING ① on the SCREW ② as shown on the left, then move the coarse adjustment lock to the upper screw position.

ii. How to hook the spring



Insert the SCREW ① of the shaft mount into the SPRING HOOK ② and push the shaft mount slightly to the frame side.

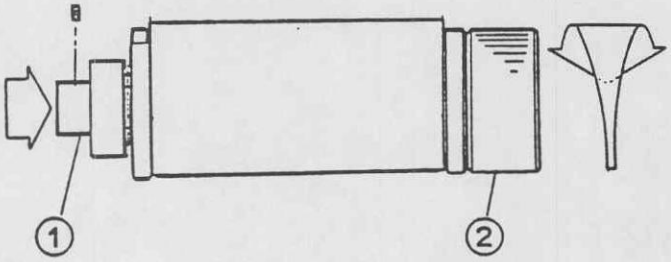
⇩

Turn the SCREW ① clockwise by one turn. Then, the two SCREWS contact each other.

⇩

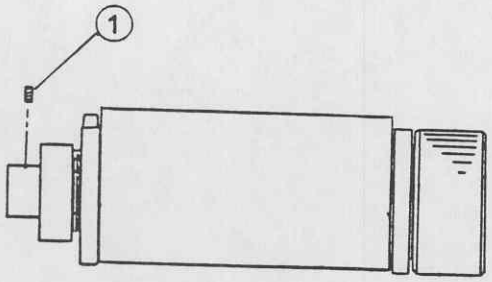
Separate the shaft mount slightly from the frame side to ride over the SCREW ②.

iii. Push the SHAFT MOUNT ① slightly to the frame side, and tighten the COARSE ADJUSTMENT KNOB ② by turning clockwise.



* When turning the coarse adjustment knob, check that the gear engages definitely with the pinion.

* When tightening the coarse adjustment knob, be careful that the shaft mount does not interfere with the spring.



iv. Tighten the two SCREWS ① which have been temporarily secured.

v. Check that the COARSE ADJUSTMENT KNOB and the LOCK KNOB move smoothly.

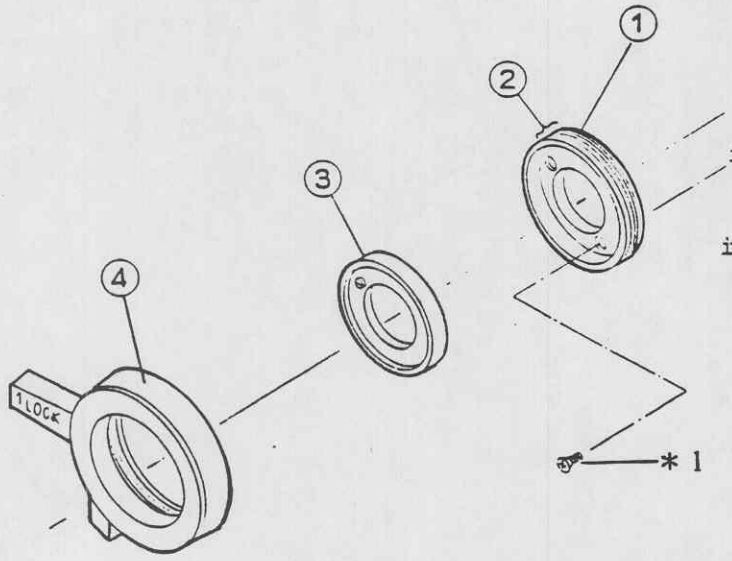
* The coarse adjustment knob should not have friction.

* When you set the lock knob and turn the right coarse adjustment knob counterclockwise by one turn, it stops. When you release the lock knob, check that the lock knob makes clicking noise.

vi. Tighten the SCREWS ① definitely and apply the adhesive.

Adhesive OT1131

(2) Coarse adjustment lock



i. Attach the DISK HOLDER ① to the frame.

Screw CSK3x5SA (*1) 3 pcs.

ii. Fit the DISK ③ to the DISK HOLDER ① .

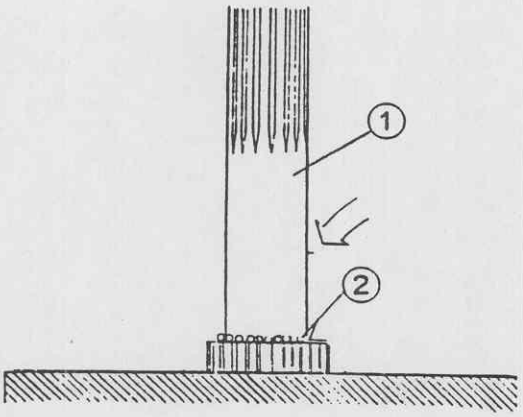
iii. Apply the grease to the thread ② of the DISK HOLDER ① .

Grease OT2006

* If too much grease is applied, it flows around the disk disabling the lock. If the disk is adhered with the grease, wipe it off completely with alcohol.

iv. Screw the LOCK KNOB ④ onto the DISK HOLDER ① .

(3) Pinion unit



i. Apply the grease around the tip of PINION (1) and arrange the thirty BALLS (2).

Ball: B1/16
Grease: OT2012

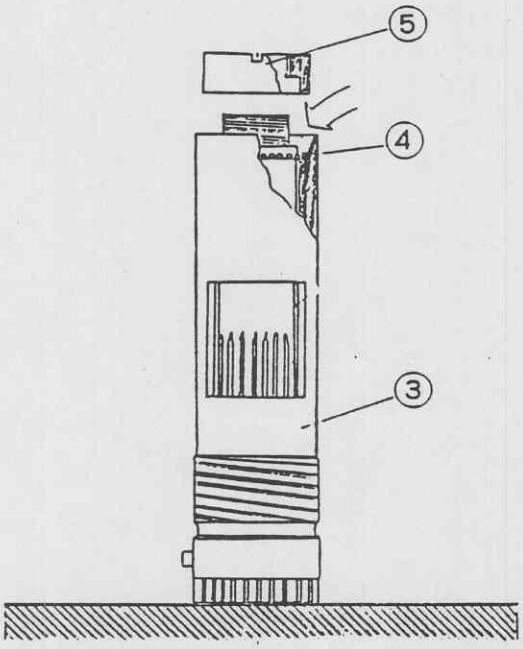
ii. Insert the PINION MOUNT (3) onto the PINION (1).

* Take care not to drop the balls.

iii. Arrange the thirty BALLS (4) coated with the grease between the PINION (1) and PINION MOUNT (3).

Ball: B1/16
Grease: OT2012

* Pay attention not to apply the grease on the thread of the pinion.



iv. Tighten the NUT (5) with fingers to the extent that side-to-side play does not exist.

* Pay attention not to over-tighten the nut.

v. Apply the adhesive to the clearance between the NUT (5) and the thread of the PINION (1).

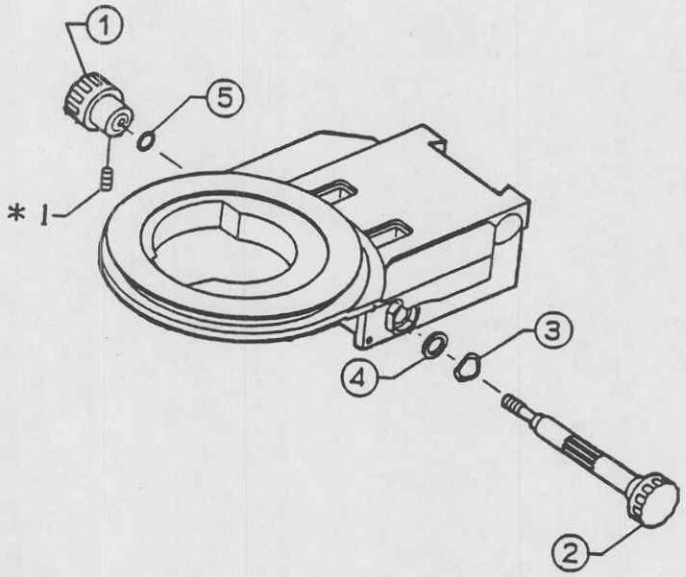
Adhesive OT1338

* Pay attention not to allow the adhesive to flow into the pinion mount.

9. CONDENSER HOLDER

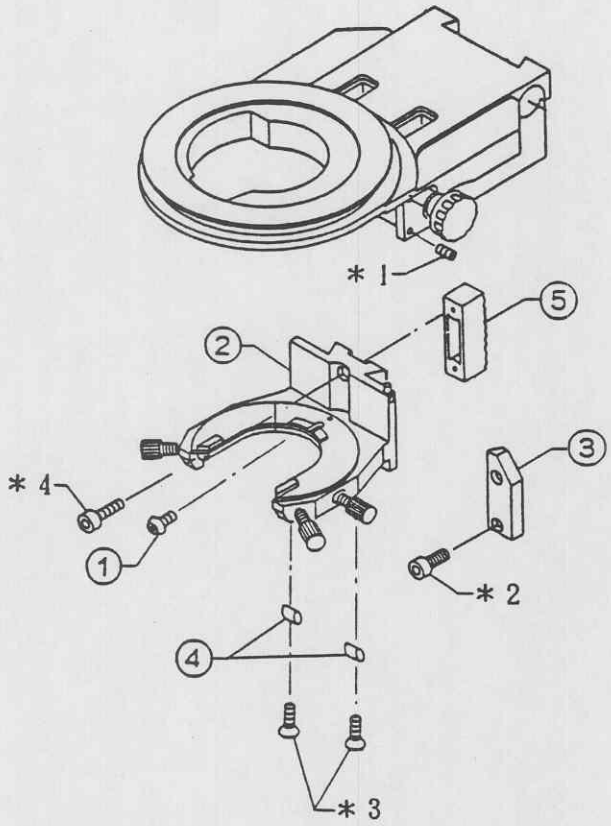
9-1 Disassembly and Assembly

(1) Knob ass'y



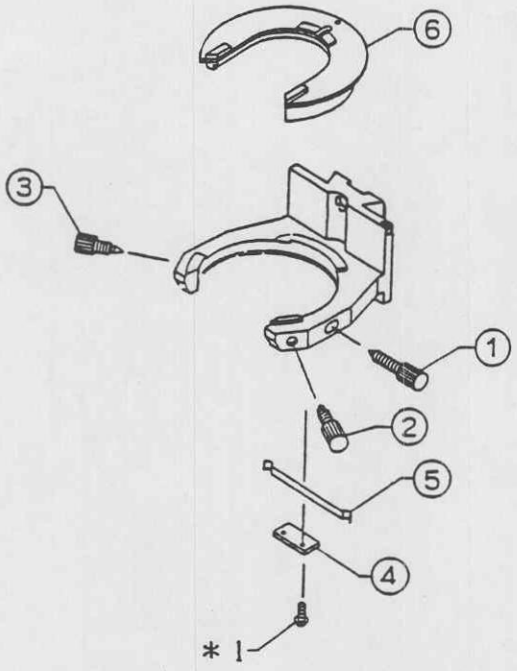
No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	KNOB	ACU3x3SA(*1) 2 pcs.			E9-2(E-26)
②	PINION		OT1793		
③	WASHER		OT1793		
④	WASHER		OT1793		
⑤	SPRING WASHER		OT1793		

(2) Dovetail ass'y



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	STOPPER SCREW	CUTS2x4SA			
②	CONDENSER HOLDER		OT1793		
③	DOVETAIL	AHU3x4SA(*1) 2 pcs. AB3x8SA(*2) 2 pcs.			E9-2(E-27)
④	ROLLER BEARING (2 pcs.)	CSK3x6SA(*3) 2 pcs.	OT1793		E9-2(E-27)
⑤	RACK	AB3x12SA(*4) 2 pcs.			E9-2(E-26)

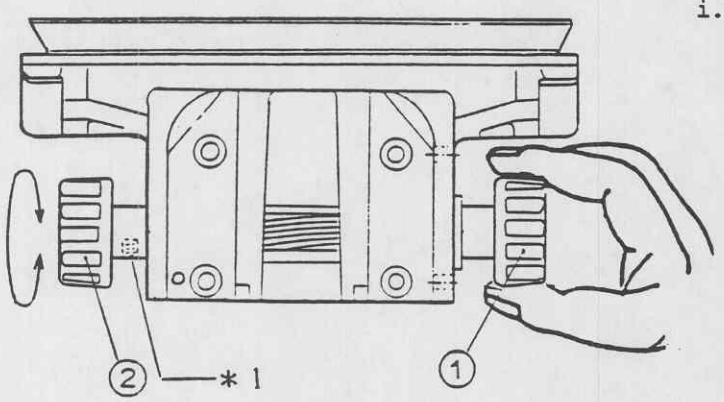
(3) Condenser holder



No.	Parts name	Screw	Grease	Adhesive	Adjustment
①	CLAMPING SCREW		OT2006		
②	CENTERING SCREW		OT2006		
③	CENTERING SCREW		OT2006		
④	PLATE .	3PUK2x4SA(*1) 2 pcs.			
⑤	LEAF SPRING		OT1793		
⑥	CONDENSER HOLDER		OT1793		

9-2 Adjustment

(1) Knob ass'y



i. Loosen the two screws, hold the RIGHT KNOB (1), and adjust the knob working force by turning the LEFT KNOB (2).

Screw ACU3x3SA(*1) 2 pcs.

Standard:
500 ~ 800g No-load (without a condenser)

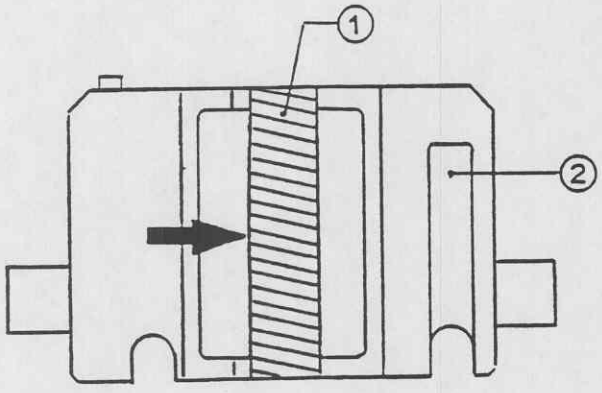
Jig OT1145 (tension gauge)

ii. After adjustment, tighten the two screws firmly and apply the adhesive.

Adhesive OT1131

(2) Rack

i. Secure the RACK (1) to the CONDENSER HOLDER (2) by pushing in the direction of the arrow.



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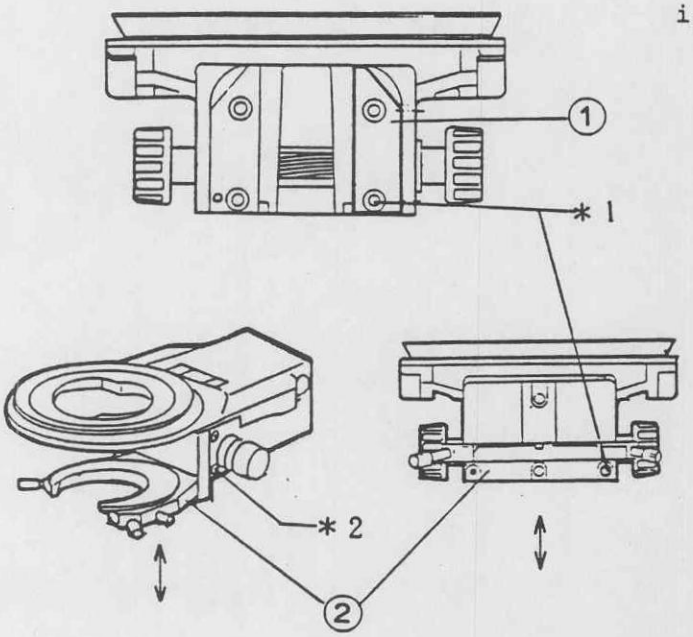
(3) Dovetail ass'y



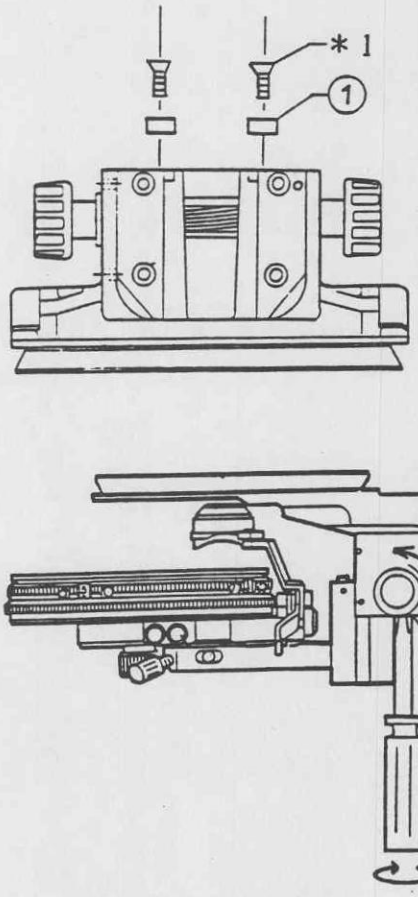
i. Adjust the dovetail.

Secure the DOVETAIL ① temporarily with the screws(*1).

⇩

Adjust the screws (*2) so that the CONDENSER HOLDER ② moves smoothly without play, then tighten the screws (*1) firmly.

Screws AB3x8SA(*1) 2 pcs.
AHU3x4SA(*2) 2 pcs.



ii. Adjust the chatter.

Apply the grease to the ROLLER BEARINGS ① and fit it in the groove of the body.

⇩

Apply the adhesive to the screw (*1) holes, tighten the screws (*1) temporarily.

⇩

Move the condenser (U-UCD) about ten times to the mounting lower end, then adjust the screws(*1) while ensuring smooth movement.

* The knob working force should not exceed 800g.

Screw CSK3x6SA(*1) 2 pcs.
Grease OT1793
Adhesive OT1028

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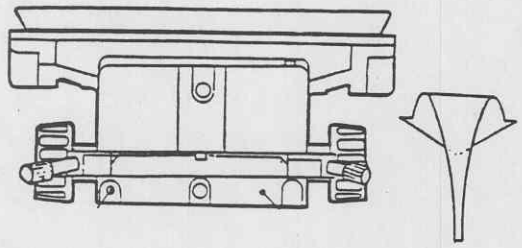
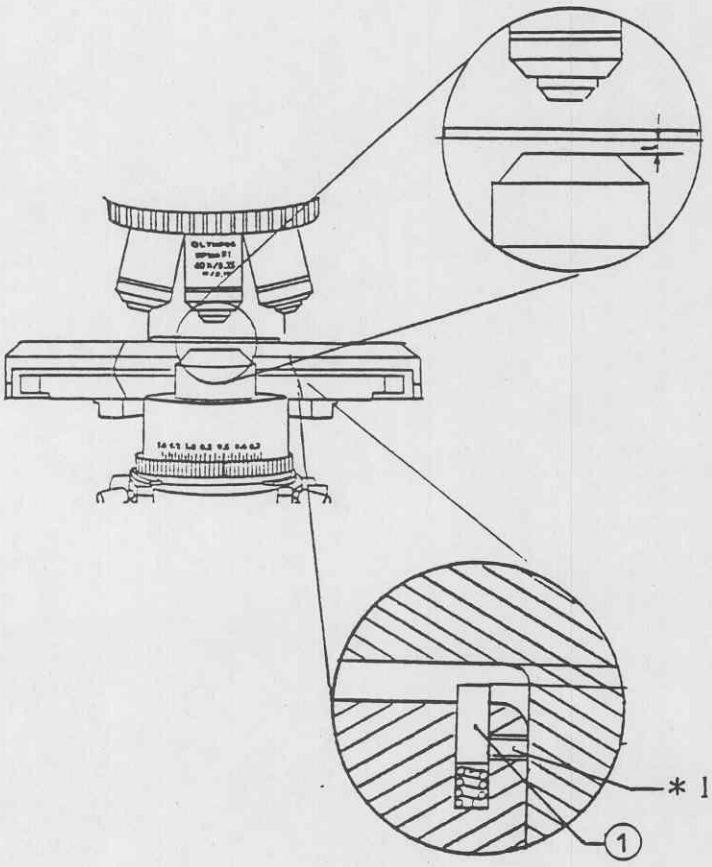
(4) Condenser height



i. Move the condenser up to the highest position.



ii. Adjust the height of the PIN ① by loosening the screw. Tighten the screw firmly and apply the adhesive.

Screw AHU3x3SA (*1)

Adhesive OT1131

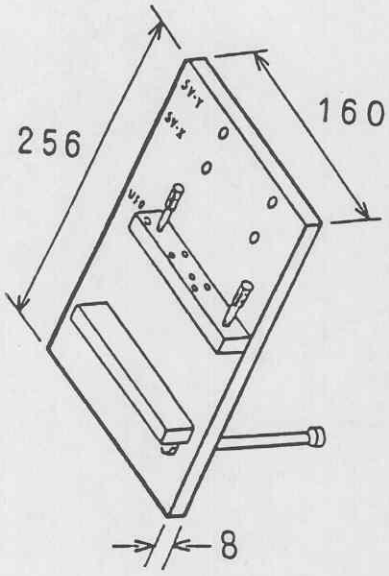
Standard:
Height from the condenser's top end to the stage surface
t = 0.08 ~ 0.12mm

Jig OT0317 (thickness gauge)

* The pin pops out when the screw is loosened.

2. EXPLANATION OF JIGS AND TOOLS

BXKC001

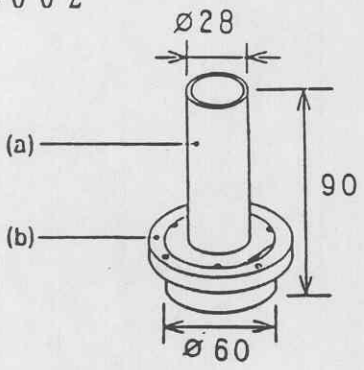


① BXKC001	② BX50F, U-SVR/L

③ Adjusting Jig to adjust sliding force of ball and roller guide.

This jig is usable for roller guide and ball guide adjustment of BX50F, U-SVR/L-X drive and U-SVR/L-Y drive by changing the position of clamping screw-block.

BXKC002

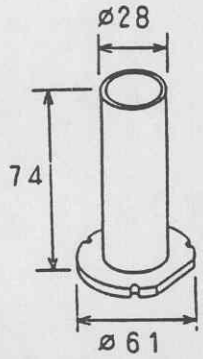


① BXKC002	② BX40F,BX50F,BX60F

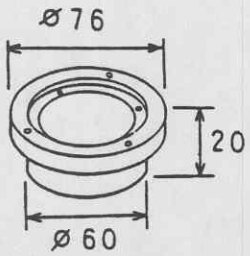
① Optical Alignment Jig for illuminator part of frame.
Attach to the illuminator part of the frame and observe the cross hair of the standard eyepiece inserted into the standard observation tube with a CT.

It is composed of Straight Tube Part(a) and Adapter Part(b).
In case of BX40F, use the only Straight Tube Part(a).
In cases of BX50F and BX60F, use the whole jig.

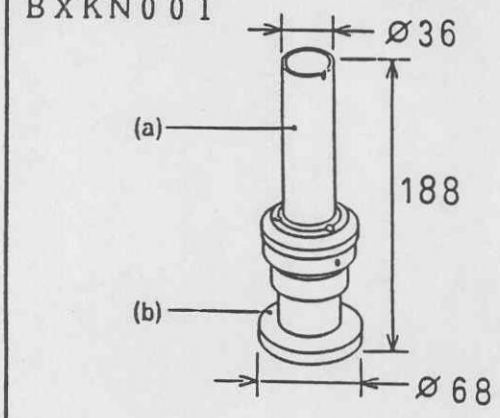
(a) Straight Tube Part



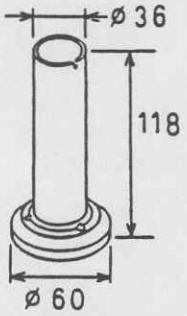
(b) Adapter Part



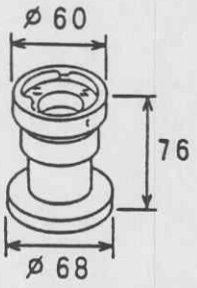
BXKN001



(a) Straight Tube Part



(b) Image Lens Part



① BXKN001	② GENERAL

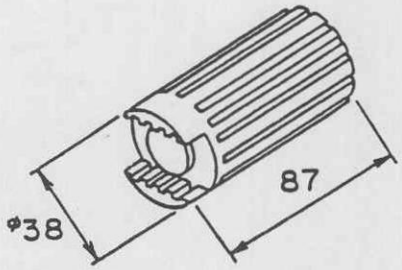
③UIS Standard Observation Tube to adjust optical center and optical tube length.

It is composed of Straight Tube Part(a) and Image Lens Part(b).

In case of UIS observation tube, use only Straight Tube Part(a).

In case of UIS intermediate tube, use the whole equipment.

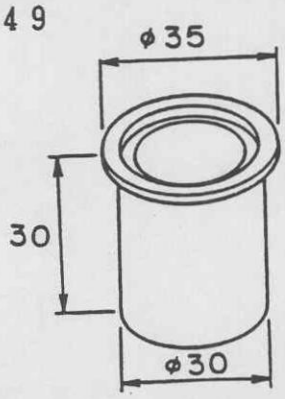
KC2010



① KC2010	②BH, CH

③ Tool for holding the PINION GEAR (ZJ808900) at disassembling.
This jig should be simultaneously used with KKAA7828.

KC2049



①KC2049	②EYEPIECE

③ Eyepiece adapter to convert normal sleeve (ø23.2mm) into SW sleeve (ø30mm). It has annulus for KN0028,KN0048, KN0022.

1. LIST OF LUBRICANTS

<Grease>

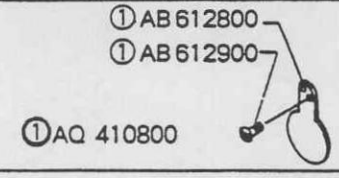
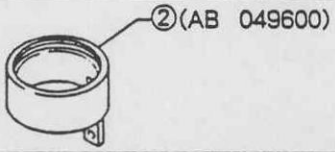
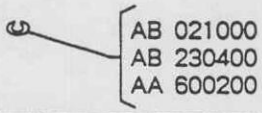
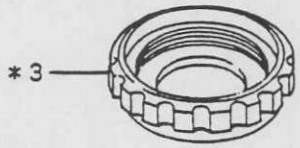
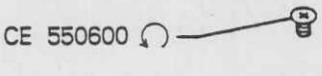
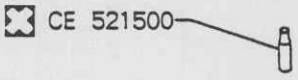
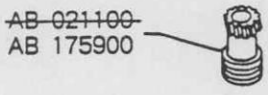
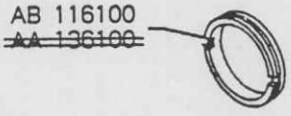
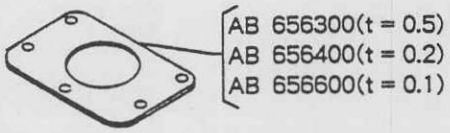
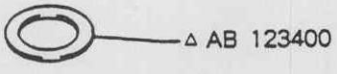
No.	Description	Page
OT2010	Grease (Light)	E-5
OT2008	Grease (Middle)	E-9
OT2006	Grease (Heavy)	E-9, 11, 13, 25
OT2012	Molykote Grease	E-10, 11, 14
OT1595	Silicone Grease	E-15, 21
OT1793	Silicone Grease (Middle)	E-20, 21, 23, 24, 25, 27
OT1818	Silicone Grease	E-30

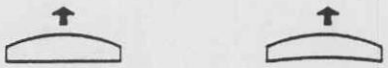
2. LIST OF CHEMICALS

<Adhesive>

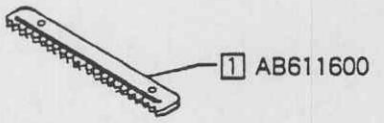
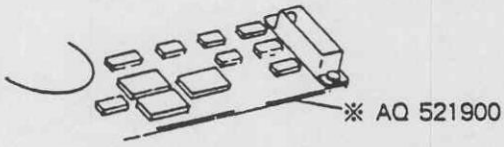
No.	Description	Page
OT1131	Shellac	E-3, 5, 7, 9, 10, 13, 15, 26, 28
OT1126	Anaemiamic Adhesive	E-5, 9, 19
OT1338	Cyanoacrylate Adhesive	E-5, 7, 11, 14
OT1315	Epoxy Adhesive (5 min.)	E-10, 21
OT1028	Epoxy Adhesive (12 hours)	E-27

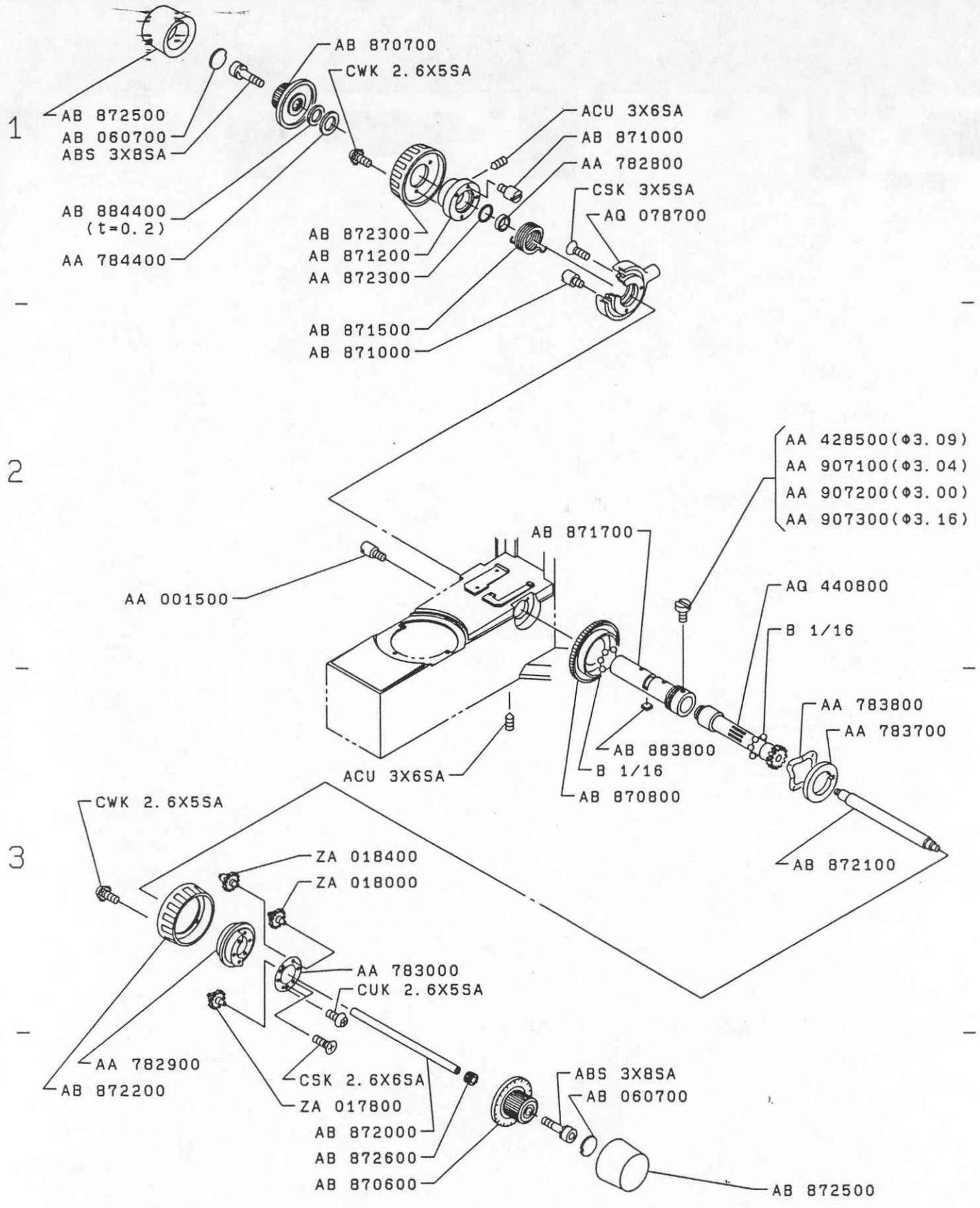
Description of symbol in parts list

Symbol	Example	Description of symbol
①		Parts ASS'Y or parts itself can be supplied. Parts indicated "①"means parts ASS'Y. The above symbol is not written before parts number in case of supply of parts itself.
( )		Parts itself cannot be supplied when the parts number is put in parenthesis "( )".
[		This bracket is used in case of selecting the proper part from a number of parts with slightly different dimension.
* 3		This asterisk denotes that a part can be used in several models and differs only by the engraving on it or an internal design feature. The differences are indicated in a table.
↺		This indicates counter-clockwise screw.
⊠		Be carefull not to touch the parts marked with this symbol. Use tweezers because the parts have a special surface finish.
★		Parts marked with this symbol cannot be supplied as repair parts. Please order through sales channels.
——		Used in case a part is substituted by a new design. The part number marked with a line "——" indicates old part, the new part number is without the line. Both parts can be supplied.
═══		A double line indicates an old part which is superseded by a new design and no supply of the old part is available.
(t =) (d =) (h =) (ϕ =)		Figure put in "( )"after parts number indicates specific measurements of parts. t = thickness d = diameter h = height ϕ = symbol of diameter
△		This indicates additional parts when it is revised in the past.

Symbol	Example	Description of symbol
⬆	indicates Lens direction. (Lens with frame is not marked) ⓐMark with an arrow on convex side without regard to curvature. convex/flat convex/concave 	ⓑMark with an arrow on a sharp curve side. (radius of curvature is small.) convex/convex concave/concave concave/flat 
RED	indicates color of code	

abbreviated name	color	abbreviated name	color
W H T	White	G R N	Green
B L K	Black	B L U	Blue
B R N	Brown	P R P	Purple
R E D	Red	G R A	Gray
O R N	Orange	S K Y	Sky
Y E L	Yellow	YEL/GRN	Yellow /Green

[1]		This indicates pair of replacing parts. When replaceing parts from old type to new type, replace the parts with same indicated number parts "[1]" simultaneously.
※		This indicates that an explanatory note is printed below the part.
②	EXPLODED PARTS DIAGRAM MODEL / UNIT / FIG BX50F(1) / / 1 OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN AR 0556 ② BINDER No. 28	Number in circle "②" indicates the sequence of revised pages. This number is located at the bottom of the page.

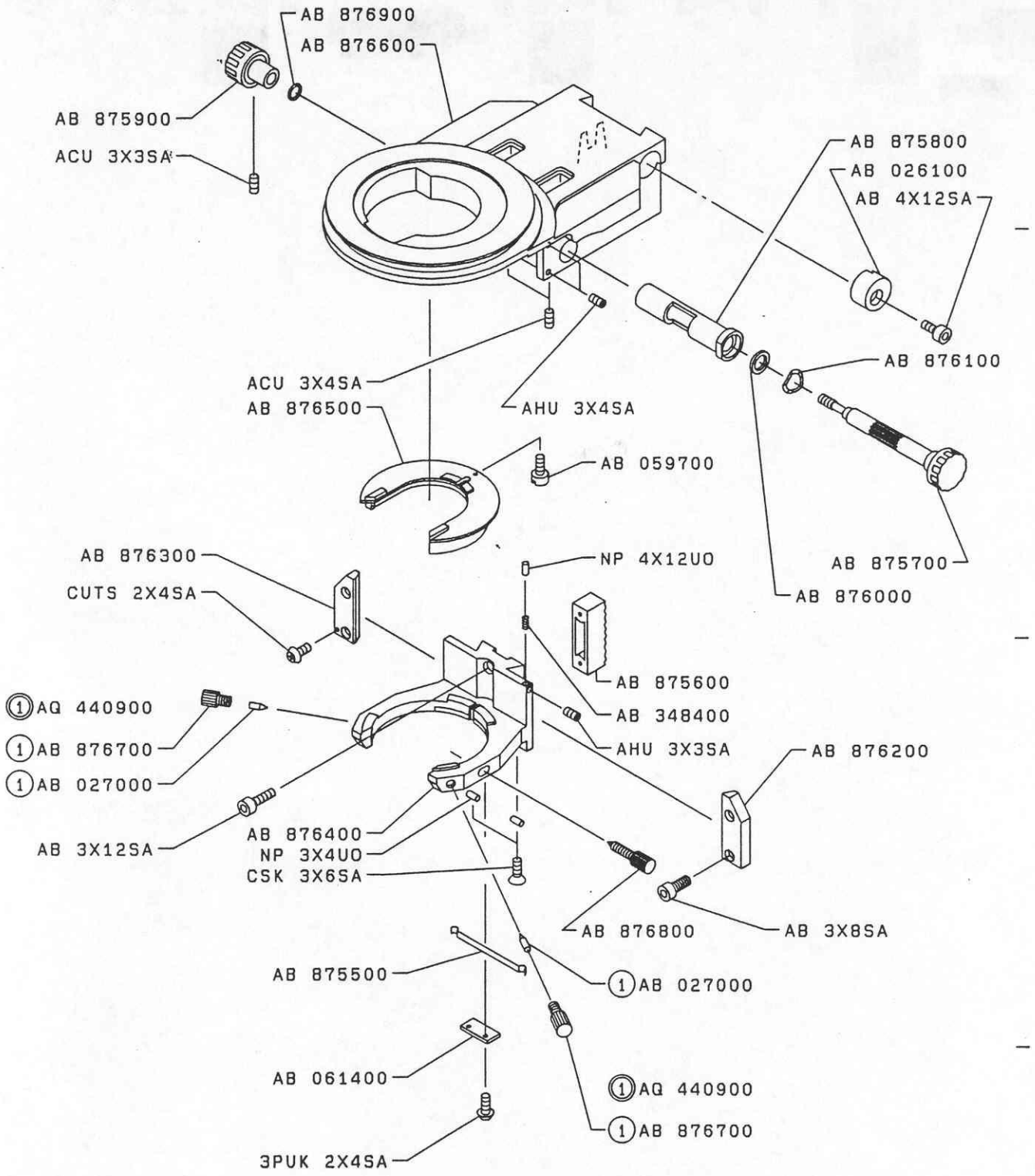


EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BX50F(4)		4
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

PARTS NO.	NAME OF PARTS		Q'ty
AA428500	CDビス(STD.)	SCREW(φ3.09)	
907100	CDビス	SCREW(φ3.04)	1
907200	CDビス	SCREW(φ3.00)	
907300	CDビス	SCREW(φ3.16)	
782800	ナット	NUT	1
782900	トリツケザ	GEAR MOUNT	1
783000	イタ	PLATE	1
783700	ワッシャ	WASHER	1
783800	バネ	SPRING WASHER	1
784400	ワッシャ	WASHER	1
800200	ワッシャ	WASHER	6
872300	ワッシャ	WASHER	1
AB060700	カザリイタ	PLATE	2
870600	ツマミ R	FINE ADJ. KNOB(R)	1
870700	ツマミ L	FINE ADJ. KNOB(L)	1
870800	T ハンドル	TENSION RING	1
871000	STピン	SCREW	2
871200	ジクウケ	SHAFT MOUNT	1
871500	バネ	SPRING	1
871700	ジクウケ	PINION MOUNT	1
872000	BDジク	SHAFT	1
872100	BSジク	SHAFT	1
872200	ソドウ R	COARSE ADJ.KNOB(R)	1
872300	ソドウ L	COARSE ADJ.KNOB(L)	1
872500	ゴムハンドル	RUBBER GRIP KNOB	2
872600	GFギヤ	GEAR	1
883800	ストッパ	CUSION	1
884400	SWR	LEAF SPRING WASHER	1
AQ078700	ソドウストッパ	COARSE ADJ. LOCK	1
440800	ピニオンクミ	PINION ASS'Y	1
ZA017800	ギヤ	GEAR	1
018000	ギヤ	GEAR	1
018400	ギヤ	GEAR	1

PARTS NO.	NAME OF PARTS		Q'ty
WE405001	ABS3X8SA	SCREW	2
WE120023	ACU3X6SA	SCREW	4
WE172000	CWK2.6X5SA	SCREW	6
WE106010	CSK2.6X6SA	SCREW	1
106056	CSK3X5SA	SCREW	3
WE114020	CUK2.6X5SA	SCREW	2



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
BX50F(7)		7
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

AR 1723

BINDER No. 26

PARTS NO.	NAME OF PARTS		Q'ty
AB026100	コマ	CLAMPING TIP	1
027000	コマ	CENTERINIG TIP	2
059700	HK	SCREW	1
061400	オサエ	PLATE	1
348400	バネ	SPRING	1
875500	CDバネ	LEAF SPRING	1
875600	CDラック	RACK	1
875700	CDハンドル2	PINION	1
875800	CDジクウケ	PINION HOLDER	1
875900	CDハンドル1	KNOB	1
876000	ワッシャ	WASHER	1
876100	ワッシャ	WASHER	1
876200	CDアリ1	DOVETAIL	1
876300	CDアリ2	DOVETAIL	1
876400	CDウケ	CONDENSER MOUNT	1
876500	CDホルダ	CONDENSER HOLDER	1
876600	ステージウケ	STAGE MOUNT	1
876700	CDツマミ	CENTERING SCREW	2
876800	クランプ	CLAMPING SCREW	1
876900	バネワッシャ	SPRING WASHER	1
AQ440900	ツマミクミ	KNOB ASS'Y	2

PARTS NO.	NAME OF PARTS		Q'ty
WE402033	AB3X8SA	SCREW	4
402018	AB3X12SA	SCREW	2
402042	AB4X12SA	SCREW	1
WE120016	ACU3X3SA	SCREW	1
120018	ACU3X4SA	SCREW	2
WE118022	AHU3X3SA	SCREW	1
118001	AHU3X4SA	SCREW	2
WE106060	CSK3X6SA	SCREW	1
WE159016	CUTS2X4SA	SCREW	1
WE116096	3PUK2X4SA	SCREW	2
WE601107	NP3X4UO	PIN	1
601003	NP4X12UO	PIN	1